

**CLASS 29, METAL WORKING****SECTION I - CLASS DEFINITION**

This is the generic class of metal working or shaping. It comprises processes, tools, machines, and apparatus not classifiable in the specific classes relating to the manufacture of articles from metal. It also includes means which comprise a plurality of operations which separately might be classified in the specific classes, but which by their joinder include more than is covered by the definitions of such specific classes.

This class has been made the generic class for the following subject matter, regardless of the composition of the blank, stock material, or article recited or worked upon: (a) process of electric condenser making; (b) a burnishing process; (c) a process of manufacture; (d) apparatus used to assemble or disassemble. See Subclass References to the Current Class, below, for specific subclass references.

**SECTION II - NOTES TO THE CLASS DEFINITION**

- (1) Note. Patents claiming both an article or product and a process of manufacturing that article or product which process is classifiable in this class are classified in a suitable article or product class and cross referenced to the appropriate subclass of this class.
- (2) Note. Historically, the term "metal working" has included assembling. Therefore assembling is included within the scope of paragraph I, above, even though no metal parts are being assembled.
- (3) Note. While this is the generic mechanical manufacturing class, it is noted that manufacturing by chemistry, electrochemistry, or the related arts is provided for in the chemical classes. See the classes listed on pages I-6 and I-7 in the front of the Manual of Classification under "I. Chemical and Related Arts". Also see the Search Notes below
- (4) Note. The relation of other mechanical manufacturing classes to Class 29 is detailed on pages I-14 through I-16 in the front of the Manual of Classification under "III. Mechanical Manufacturing and

Machine Element Arts, Manufacturing (Metal Working)". Also see the Search Notes below.

- (5) Note. Measuring, testing, recording and conveying, per se, are not considered "manufacturing" operations for this class.

**SECTION III - SUBCLASS REFERENCES TO THE CURRENT CLASS**

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 25.41+, for a process of electric condenser making.
- 90.01+, for a burnishing process,
- 592+, for a process of manufacture,
- 700+, for apparatus used to assemble or disassemble.

**SECTION IV - REFERENCES TO OTHER CLASSES**

SEE OR SEARCH CLASS:

- 52, Static Structures (e.g., Buildings), subclasses 742.1+ for processes of filling cavities in situ erected structures and subclasses 749.1+ for machines and implements particularly adapted to in situ building construction not elsewhere provided for.
- 53, Package Making, subclasses 266.1+ for means for filling and closing a preformed receptacle and subclasses 285+ for means for closing a package or filled receptacle.
- 65, Glass Manufacturing, for processes of, or apparatus for glassworking and/or treating.
- 72, Metal Deforming, for shaping metal by stressing beyond its elastic limit, generally. Normally, the combination of a metal working process or apparatus with additional metal deforming or cutting or with any additional operation that is ancillary to the metal deforming will be found in Class 72. However, there is an exception to this guideline in regard to a process of making a "special article". A "special article" is one named by the title of one of the subclasses of Class 29 for making that particular article, which subclasses are physically located in the portion of the Class 29 schedule, between subclass 1.1 and 179. A process of making a "special article" including plural, distinct metal deforming steps, if performed in the same die, or in the same processing line will be found in Class 72, whereas if not performed in the same die, or in the same processing line

- will be found in the “special article” making portion of Class 29. The metal deforming steps proper for the “special article” making portion of Class 29 may comprise different metal deforming types, e.g., rolling and drawing, or may comprise two steps of the same deforming type, e.g., a first and a second step of rolling. Note that the corresponding combination of apparatus for making a “special article” is to be found in Class 72 according to the general guideline not according to the exception.
- 86, Ammunition and Explosive-Charge Making, for making ammunition and explosive charges.
- 99, Foods and Beverages: Apparatus, for making and processing foods and beverages.
- 100, Presses, for press structure not elsewhere provided for where neither features of structure for holding work nor features of tool structure for performing the work of a type classifiable in Class 29 are claimed.
- 122, Liquid Heaters and Vaporizers, for a closed or pressurized apparatus to heat liquid or make steam.
- 132, Toilet, subclass 201 for methods of and subclass 56 for apparatus for making hair structures.
- 148, Metal Treatment, for the combination of significant heat treatment for modifying or maintaining internal physical structure (i.e., microstructure) or chemical properties of metal with a metal working, machining, fusion bonding, casting, or assembly or disassembly operation proper for Class 29. Particularly, see section III, A, of the Class 148 definition for amplification of what constitutes significant heat treatment. Furthermore, the combination of reactive coating or chemical heat removing (e.g., flame-cutting, etc.) or burning (i.e., oxidizing) to remove a portion of a metal workpiece, with a Class 29 metal working, machining, fusion bonding, or casting operation goes as an original to Class 148.
- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, as the generic class for the adhesive joining of parts utilizing nonmetallic cements and as the generic class for manufacturing processes involving a chemical reaction. See the class definition of Class 156 for the line between that class and Class 29.
- 157, Wheelwright Machines, subclass 13 for apparatus and processes for treating the outer periphery of a rubber tire casing by a slitting or machine operation which art (in the absence of this subclass) would ordinarily be classified in accord with the particular operation. (The treating of a rubber casing by abrading is classified in Class 451, Abrading).
- 160, Flexible or Portable Closure, Partition, or Panel, subclass 405 for making of shades, blinds, curtains, screens, and venetian blinds.
- 216, Etching a Substrate: Processes, for etching processes not otherwise provided for in which one of the manufacturing steps includes a chemical etching or physical solvation. See the class definition of class 216 for the line between that class and class 29.
- 219, Electric Heating, appropriate subclass for treating and joining by means of electrically heated instrumentalities.
- 231, Whips and Whip Apparatus, subclass 1 for machines for making whips.
- 234, Selective Cutting (e.g., Punching), for method of or means for perforating a workpiece by one or more cutting tools chosen from a plurality of tools constantly available for actuation.
- 241, Solid Material Comminution or Disintegration, for metal comminution, per se, and in combination with other treatment there provided for and see Class 241, section (4) of the class definition.
- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, for a process of manufacturing nonmetallic articles by shaping and/or treating.
- 269, Work Holders, Class 269 is the residual locus for patents to a device for clamping, supporting, and/or holding an article (or articles) in position to be operated on or treated. See notes thereunder for other related loci.
- 300, Brush, Broom, and Mop Making, for making brushes.
- 369, Dynamic Information Storage or Retrieval, and see the notes thereto for manufacture of sound recordings.
- 396, Photography, appropriate subclasses for photographic apparatus not otherwise provided for.
- 399, Electrophotography, appropriate subclasses for roller means to accomplish an operation of electrophotography.
- 404, Road Structure, Process, or Apparatus, for (1) highway, pathway, or walkway structure, per se, or (2) a process or apparatus for making, installing, repairing, or maintaining such structure where such structure, process, or apparatus is not otherwise classifiable as either (a) specifically provided for in other loci or (b) of such general utility as to be provided for on that basis. (See Class 404, Class Definition, for

- known collections of such nature and the particular lines of demarcation.) Note particularly subclasses 72+ for process and subclasses 83+ for apparatus.
- 425, Plastic Article or Earthenware Shaping or Treating: Apparatus, for apparatus to manufacture by shaping or reshaping plastic materials (e.g., organic plastics, clay, cement, earthenware, powdered metal or glass, etc.) including product treating unless such treating is provided for elsewhere. The combination of Class 425 apparatus and Class 29 metal working apparatus is provided for in Class 29.
- 429, Chemistry: Electrical Current Producing Apparatus, Product, and Process, subclass 49 for regeneration or repair of a battery.
- 430, Radiation Imagery Chemistry: Process, Composition, or Product Thereof, for process of making radiation images involving chemistry.
- 433, Dentistry, for making dentures.
- 438, Semiconductor Device Manufacturing: Process, for methods of making certain electrical devices (e.g., barrier layer type, etc.) utilizing a semiconductor substrate.
- 483, Tool Changing, subclass 1 for a process of transferring a tool to or from a material treating station or a tool storage means, generally, including a Class 29 process combined with transferring the tool used to or from the station at which the Class 29 process occurs; and subclasses 2-69 for means for transferring a tool to or from a material treating station or a tool storage means, generally, including a Class 29 tool combined with means to transfer the tool to or from the tool station.
- 505, Superconductor Technology: Apparatus, Material, Process, subclasses 300+ for processes of producing high temperature ( $T_c$  greater than 30 K) superconductors.
- 602, Surgery: Splint, Brace, or Bandage, subclass 900 for methods of making bandage structure.
- 901, Robots, appropriate subcollections for industrial robots used in metal working operations or in assembly.

## SECTION V - GLOSSARY

### ASSEMBLING

The physical act of or means for juxtaposing, associating, integrating, joining and/or putting together, with or without securing, of machines, devices, and things (articles).

### BARRIER LAYER DEVICE

An electrical component consisting of two conductors placed either in contact with each other or separated by an interface layer to which contacts or terminals have been secured, which component has a nonlinear resistance characteristic, as a result of the electrical action of the interface between the two conductors rather than from the characteristic of the conductors.

### DEFORMING

The physical act of or means for shaping without any substantial removal of material. This term includes forging, rolling, densifying, extruding, drawing and stretching.

### DISASSEMBLY

The physical act of or means for dissociating, disengaging, and/or taking apart of machines, devices, and things (articles).

### MACHINING

The physical act of or means for shaping by removing material by means of a cutting edge. This term includes milling, cutting, turning, boring, drilling, abrading, broaching, filing, sawing, punching, blanking, and planing.

### MANUFACTURING

The physical act of or means for creating, constructing, fabricating, machining, working, shaping, assembling, disassembling, and repairing of machines, devices, and things (articles).

### REPAIR

The physical act of or means for restoring inoperative machines, apparatus, static structures, and things (articles) when the operational limits of tolerance have become exceeded by wear, imperfections, destructive oxidation, electrolysis, or failure by (1) reshaping parts, (2) substituting a part and/or adding supplemental or additional parts or material, and/or (3) taking away sections of worn, torn, broken, distorted, eroded or otherwise unusable parts or material, and mending them by adding supplemental or additional parts or material.

### SHAPING

The physical act of or means for permanently altering the form, configuration, dimensions, proportions, or contour of a part or stock, either with or without the removal of material. This term includes deforming, compacting, densifying, slitting, machining, and briquetting.

## SLITTING

The physical act of or means for shaping solely by incising or severing the part or stock to form a partial separation along a plane or surface through the part or stock. When this separation is done by a true shearing operation, there is no material removed.

### SUBCLASSES

#### 2 BATTERY-GRID MAKING:

This subclass is indented under the class definition. Process or apparatus for making a metallic "grid" for an electric battery.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 623.2, for a process of making a battery cell.
- 730, for apparatus peculiar to assembling a storage cell or battery.
- 763, for apparatus peculiar to disassembling a storage cell or battery.
- 897.15, for the method of making a grille.

SEE OR SEARCH CLASS:

- 141, Fluent Material Handling, With Receiver or Receiver Coating Means, subclasses 32+ for battery grid paste applying means.
- 249, Static Molds, subclass 60 for molding apparatus for forming a grid or lattice-type product.
- 429, Chemistry: Electrical Current Producing Apparatus, Product, and Process, subclasses 233+ for battery grids and related structure.

#### 2.1 BIAS (I.E., HELICALLY) CUTTING OF TUBULAR STOCK:

This subclass is indented under the class definition. Process or apparatus for severing hollow work of generally circular or oval cross section by moving work and tool relative to each other so as to describe a helical line of severance along the surface of the hollow work.

- (1) Note. Included in this and indented subclasses is the bias cutting of "article-like" work where there is no "supply".

SEE OR SEARCH CLASS:

- 30, Cutlery, for a manually supported cutting implement.
- 33, Geometrical Instruments, subclasses 21.1+ for means to scribe, score, or scratch lines on curved surfaces.
- 69, Leather Manufactures, subclasses 9+ for skiving or splitting of leather.
- 82, Turning, subclass 47 for a process under that class definition of cutting hollow work while effecting relative rotary movement about an axis passing through the work and subclass 82 for the corresponding apparatus.
- 83, Cutting, especially subclass 54 for a process of cutting a hollow workpiece, generally, subclasses 178+ for cutting apparatus including a tool inside hollow work and subclasses 401+ for means to move work relative to tool station.
- 142, Wood Turning, subclasses 23 through 35 for spiral groove wood turning.
- 144, Woodworking, subclasses 209.1+ for a veneering lathe.
- 242, Winding, Tensioning, or Guiding, for a device for winding the product of this subclass. Note that the combination of such a cutting means with a product winding means is to be found in Class 29, subclasses 2.1+.
- 269, Work Holders, especially subclasses 47+ for means to support work while performing a bias cutting operation. The combination of such support means with means to sever being classified in Class 29.
- 408, Cutting by Use of Rotating Axially Moving Tool, for cutting tubular work by a tool that turns about an axis and moves along that axis but has no additional motion during operation.
- 409, Gear Cutting, Milling, or Planing, subclasses 65+ for a machine for generating a thread (or helix) by relative cutter and blank movements.
- 451, Abrading, subclass 48 for a process of grinding a drill, thread, reamer, or hob.

- 470, Threaded, Headed Fastener, or Washer Making: Process and Apparatus, appropriate subclasses for thread cutting by means of a chasing cutter, other than as provided for in Class 408.
- 2.11 Including orbital cutter:**  
This subclass is indented under subclass 2.1. Apparatus including a cutting means moving, bodily, in a predetermined path about the longitudinal axis or extent of work.
- 2.12 Within stock support:**  
This subclass is indented under subclass 2.11. Apparatus wherein the cutter orbits about a path internally of the work.
- 2.13 With orbiting strip accumulator:**  
This subclass is indented under subclass 2.11. Apparatus provided with means to handle the cut work, which means also follows a predetermined path about the longitudinal axis or extent of the work.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
2.1+, for the combination of such a cutting means with a product winding means.
- SEE OR SEARCH CLASS:  
242, Winding, Tensioning, or Guiding, for a device for winding the product of this subclass (2.13). Note that the combination of such a cutting means with a product winding means is to be found elsewhere in Class 29.
- 2.14 Including means to inflate stock:**  
This subclass is indented under subclass 2.1. Apparatus including means to inject gas under pressure into the work to cause the work to assume a tubular or hollow shape for passing onto a work support or mandrel.
- 2.15 With means to feed stock along support or mandrel:**  
This subclass is indented under subclass 2.1. Apparatus including means to engage a portion of work being internally supported to effect movement or shift of said portion with respect to cutting means.
- 2.16 Single means produces compound motion:**  
This subclass is indented under subclass 2.15. Apparatus including utilization of a unitary mechanism to effect a compound rotary and axial work movement.
- SEE OR SEARCH CLASS:  
414, Material or Article Handling, subclasses 431+ for apparatus for advancing and rotating an elongated article by means adapted to engage the article between its ends.
- 2.17 Endless belt drive means:**  
This subclass is indented under subclass 2.16. Apparatus wherein the unitary mechanism is a driven closed loop engaging the work and causing the work to move.
- SEE OR SEARCH CLASS:  
226, Advancing Material of Indeterminate Length, subclasses 170+ for endless belt means for advancing material.  
474, Endless Belt Power Transmission Systems or Components, subclasses 202+ and 237+ for an endless drive belt, generally.
- 2.18 Axially:**  
This subclass is indented under subclass 2.15. Apparatus including means to effect work movement or shift parallel to the extent of the work supporting means.
- 2.19 Rotatably:**  
This subclass is indented under subclass 2.15. Apparatus including means to effect work movement or shift in a circular or oval path which path lies in a plane transverse to the extent of the work support or mandrel.
- 2.2 With means to rotate and store stock supply:**  
This subclass is indented under subclass 2.1. Apparatus including means, other than the work being fed to support and cause a rotation of work accumulated thereon, from which the work is moved onto a work support or mandrel.
- SEE OR SEARCH CLASS:  
414, Material or Article Handling, for feeding a workpiece, generally, and see the search notes therein for other loci of work feeding.

**2.21 Axis of rotation parallel to support or mandrel:**

This subclass is indented under subclass 2.2. Apparatus wherein the supply is rotated in a plane perpendicular to the longitudinal extent of the mandrel.

**2.22 With means for arcuate shift of mandrel:**

This subclass is indented under subclass 2.1. Apparatus including means to pivot the mandrel in a plane parallel to the extent of said mandrel.

**2.23 Including means to handle produced strip or web:**

This subclass is indented under subclass 2.1. Apparatus including means to feed or convey the product subsequent to action of the severing means.

**2.24 With common adjustment for cutter:**

This subclass is indented under subclass 2.23. Process or apparatus including means to vary the position of both cutting means and cut-product handling means as an entity.

**2.25 Method:**

This subclass is indented under subclass 2.1. Process.

**3 BUCKLE MAKING:**

This subclass is indented under the class definition. Process or apparatus for making a part of a buckle or for assembling that part with another part in the manufacture of a buckle.

- (1) Note. This subclass includes the manufacture of a buckle from a rod, wire, plate, or sheet of metal.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 417, for a process of manufacture including obtaining plural pieces from a unitary piece by dividing the piece from its leading edge.

SEE OR SEARCH CLASS:

- 24, Buckles, Buttons, Clasps, etc., especially subclasses 163+ for the product of this subclass.

- 226, Advancing Material of Indeterminate Length, for a method of or apparatus for feeding material without utilizing both the leading and trailing ends to effect movement of the material.

**4 BUTTON-FASTENER MAKING:**

This subclass is indented under the class definition. Process or apparatus for making a metallic device for securing a button having a shank provided with an eye, e.g., a shoe button, etc.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 432+, for a process of assembling with punching, piercing, or reaming a part by engagement with a second part.  
512, for a process of assembling with joining by deforming comprising flaring a tube end inserted in the opening of another workpiece.

SEE OR SEARCH CLASS:

- 227, Elongated-Member-Driving Apparatus, subclass 33 for combined apparatus for juxtaposing a button with the bight of a workpiece and driving a member through the bight, i.e., through the eye of the button and into a fold of the workpiece.

**4.51 SHREDDING METAL OR METAL WOOL ARTICLE MAKING:**

This subclass is indented under the class definition. Process or apparatus, not elsewhere classified, (1) for reducing metal to shreds by cutting operations or (2) for producing an article of manufacture from metal wool.

- (1) Note. Metal wool is defined as metal filaments or threads matted into a densely felted mass.

SEE OR SEARCH CLASS:

- 82, Turning, subclass 1.11 for a process of turning, including cutting shavings from a rotating workpiece.  
140, Wireworking, subclasses 71+ for a machine or process for making an article from wire within the class definition.  
144, Woodworking, subclasses 185+ for slivering wood as for excelsior making.

- 148, Metal Treatment, subclasses 11.5+ for a method of metal working and heat treatment within the class definition.
- 241, Solid Material Comminution or Disintegration, for a process or apparatus for reducing metal to smaller particles without imparting a shape thereto. See Class 241, section (4), of the main class definition.
- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclasses 5+ for a process of forming a particulate material directly from molten or liquid mass other than glass, e.g., liquid comminuting.
- 419, Powder Metallurgy Processes, for a method of forming an article by uniting randomly associated metal particles.
- 425, Plastic Article or Earthenware Shaping or Treating: Apparatus, subclasses 6+ for apparatus for making particulate material directly from molten material.
- 428, Stock Material or Miscellaneous Articles, subclass 605 for metallic stock in the form of a mass of fibers and subclass 684 for composite metallic stock in which an iron-base component is next to a steel component.
- 4.52 Metal wool making:**  
This subclass is indented under subclass 4.51. Process or apparatus for producing metal wool.
- (1) Note. Metal wool is defined as metal filaments or threads matted into a densely felted mass.
- 4.53 Shaving or longitudinal cutting:**  
This subclass is indented under subclass 4.52. Process or apparatus wherein the metal wool is produced by severing or slicing off thin layers substantially along the long axis of a metal workpiece.
- (1) Note. Metal wool is defined as metal filaments or threads matted into a densely felted mass.
- SEE OR SEARCH CLASS:  
83, Cutting, subclasses 861+ for cutting other than completely through work within the class definition. Also see
- cross-section art collection subclass 906 for chip making.
- 4.54 Soap-pad making:**  
This subclass is indented under subclass 4.53. Process or apparatus whereby the produced metal wool is further processed to form a matted mass containing soap which mass is generally used for cleaning purposes.
- (1) Note. See search note under subclass 4.55.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
4.56, for a process or apparatus for bundling metal wool to produce a soap pad.
- SEE OR SEARCH CLASS:  
15, Brushing, Scrubbing, and General Cleaning, subclasses 104.9+ for a cleaning tool (e.g., a pad) coated or impregnated with material supply.  
118, Coating Apparatus, subclasses 35+ for a coating machine having means to cut the work and subclass 44 for coating machine having means to deform work.
- 4.55 Metal wool bundling:**  
This subclass is indented under subclass 4.51. Process or apparatus wherein metal wool is shaped into a longer mass generally to produce an article of manufacture.
- (1) Note. Metal wool is defined as metal filaments or threads matted into a densely felted mass.
- SEE OR SEARCH CLASS:  
72, Metal Deforming, for a method or apparatus for deforming a self-shape-sustaining metal workpiece within the class definition.
- 4.56 Soap-pad making:**  
This subclass is indented under subclass 4.55. Process or apparatus wherein the metal wool bundle is further processed to form a matted mass containing soap which mass is generally used for cleaning purposes.

- (1) Note. See search notes under subclass 4.54.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 4.54, for process or apparatus for making metal wool by a cutting technique and further producing a soap pad therefrom.

#### 4.6 CORD-HEDDLE MAKING:

This subclass is indented under the class definition. Process or apparatus for fabricating a thread guide of a loom's shed forming mechanism from strand-like textile material.

SEE OR SEARCH CLASS:

- 72, Metal Deforming, for an operation of that class used in making a textile guide, such as a cord heddle.  
 139, Textiles: Weaving, and especially subclasses 93+ for a loom employing a heddle, or for a heddle, per se.  
 140, Wireworking, subclass 72 for the making of a wire heddle or heddle eye.  
 163, Needle and Pin Making, for making a needle eye which will serve as a guide to a textile strand.

#### 5 COTTER-PIN MAKING:

This subclass is indented under the class definition. Process or apparatus for forming a split key not provided for elsewhere.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 13, for a process of or apparatus for making a paper-fastener.

SEE OR SEARCH CLASS:

- 59, Chain, Staple, and Horseshoe Making, subclasses 71+.  
 72, Metal Deforming, for bending, or bending and cutting, without an additional operation not provided for in that class.  
 140, Wireworking, subclasses 82 and 87 for wire clip and hairpin making.  
 226, Advancing Material of Indeterminate Length, for a process of or apparatus for feeding material without utilizing

both the leading and trailing ends to effect movement of material.

#### 6.01 CRANKSHAFT MAKING APPARATUS:

This subclass is indented under the class definition. Means for bending, forging, or otherwise manufacturing or treating an axial member which has at least one portion thereof adapted for applying torque thereto for changing reciprocating motion into circular motion or vice versa.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 888.08, for a process of making or treating a crankshaft.  
 888.1, for a process of making or treating a camshaft.

SEE OR SEARCH CLASS:

- 72, Metal Deforming, subclasses 298+ for a process or apparatus of twisting a crankshaft beyond its elastic limit.

#### 6.1 EXPANDED METAL MAKING:

This subclass is indented under the class definition. Process or apparatus, not elsewhere classified, for forming apertures in sheet material and thereafter deforming the apertured portion of the sheet to (1) increase the area of, or change the shape of, the aperture and (2) increase the length or width of the sheet.

- (1) Note. Apertures may be formed by cutting, punching, casting, drilling, milling, grinding, etc.  
 (2) Note. Deforming may include, for example, bending, corrugating, forging, rolling, or drawing.  
 (3) Note. Included herein is expanding of sheet material by simultaneously perforating and deforming the sheet.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 896.6+, for a process of making multiple perforations in a metallic sheet, tube, etc.



**SEE OR SEARCH CLASS:**

- 72, Metal Deforming, for shaping metal, other than expanded metal making, especially subclasses 185+ for cutting and deforming by a "flying" tool and subclasses 203+ for cutting and rolling.
- 83, Cutting, for cutting operations in a sheet preliminary to expanded metal making.
- 228, Metal Fusion Bonding, subclass 157 for bonding of multiple parts at spaced offset points into a single member and shaping the member to move the parts apart at the nonbonded areas.
- 428, Stock Material or Miscellaneous Articles, subclasses 596+ for metallic stock having an aperture or cut.

**6.2 By use of reciprocating perforator:**

This subclass is indented under subclass 6.1. Process or apparatus including a tool which travels back and forth in a straight line to form the aperture.

**SEE OR SEARCH CLASS:**

- 83, Cutting, subclasses 613+ for a cutting machine having a cutter having simple rectilinear reciprocating motion only and subclass 697 for a cutting machine having a reciprocating tool.

**7 EYEBOLT OR HOOK MAKING:**

This subclass is indented under the class definition. Process or apparatus for making an eyebolt or a hook comprising more than bending with incidental cutting.

**SEE OR SEARCH CLASS:**

- 72, Metal Deforming, for bending a rod into the form of a hook or an eyebolt with incidental cutting.
- 470, Threaded, Headed Fastener, or Washer Making: Process and Apparatus, subclasses 11+ for combined operations for making a bolt and subclasses 57+ for combined machines for making a bolt.

**7.1 FENCE BARB MAKING:**

This subclass is indented under the class definition. Process or apparatus for making pointed elements for subsequent attachment to fence wire, or for striking up pointed projections from fence stock material itself.

**SEE OR SEARCH CLASS:**

- 140, Wireworking, subclasses 58+ for a process of or apparatus for making and applying wire barbs to a wire strand, particularly, subclass 66 for applying barbs of sheet metal to a wire strand.
- 256, Fences, subclasses 2+ for barbed fences including barbed strands or fabric.

**7.2 By use of reciprocating cutter or die:**

This subclass is indented under subclass 7.1. Process or apparatus which travel back and forth in a straight line and directly contact the work to produce the fence barbs.

**SEE OR SEARCH CLASS:**

- 83, Cutting, subclasses 613+ for a cutting machine including a cutter with simple rectilinear reciprocating motion only and subclass 697 for reciprocable type tools, per se.

**7.3 By use of rotary cutter or die:**

This subclass is indented under subclass 7.1. Process or apparatus wherein the tool which directly contacts the work to produce the fence barb is mounted on a rotatable cylindrical member.

**8 FINGER-RING FORMING OR SIZING:**

This subclass is indented under the class definition. Process or apparatus for forming a finger ring by die cutting a flat ring from a disk and subsequently swaging or die shaping it into the desired form or for stretching or contacting a ring by use of a die.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 896.4+, for a process of making jewelry, generally.

**SEE OR SEARCH CLASS:**

- 63, Jewelry, subclasses 15+ for a finger ring.
- 72, Metal Deforming, especially subclass 377 for a process of deforming metallic work with attenuation, thickening, elongating, or shortening of the work and subclass 379.2 for a process of deforming sheet metal.
- 249, Static Molds, subclass 57 for a mold for casting a ring-type product, e.g., a finger ring, etc.

**9 FISHHOOK MAKING:**

This subclass is indented under the class definition. Process or apparatus for making a fishhook, including shaping, pointing, or barbing.

**SEE OR SEARCH CLASS:**

- 226, Advancing Material of Indeterminate Length, for a method of or apparatus for, feeding material without utilizing both the leading and trailing ends to effect movement of the material.

**10 GEM AND JEWEL SETTING:**

This subclass is indented under the class definition. Process or apparatus for cutting a socket for a gem or jewel or for securing the gem or jewel in the socket.

- (1) Note. This subclass includes jewel holders, feeding devices for jewel-setting machines, jewel-burnishing devices, etc.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 8, for process or apparatus for forming a finger ring or for sizing a finger ring.
- 896.4+, for a process of making jewelry, generally.

**SEE OR SEARCH CLASS:**

- 63, Jewelry, subclasses 26+ for a "setting" in which a gem is to be set.
- 81, Tools, subclass 7 for a watchmakers jewel setting tool.
- 125, Stone Working, subclass 35 for a work support for stone working.

- 205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, subclass 114 for electrolytic methods of setting or mounting gems.

**11 HINGE MAKING OR ASSEMBLING:**

This subclass is indented under the class definition. Process or apparatus for manufacturing a part of a hinge or for assembling that part with another part in manufacturing a hinge.

- (1) Note. The manufacturing operations of this subclass are mainly die cutting, milling, or broaching to finish interlocking parts, bending a sleeve, or inserting a pintle.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 3, for similar process or apparatus peculiar to making a buckle.
- 437+, for a method of assembling with retaining clearance for motion between the assembled parts by deforming interlocking structure.

**12 LACING-STUD MAKING:**

This subclass is indented under the class definition. Process or apparatus for making a lacing stud from a metal rod, metal wire, or specially-prepared metal stock.

**SEE OR SEARCH CLASS:**

- 72, Metal Deforming, for stressing metal beyond its elastic limit, generally.
- 425, Plastic Article or Earthenware Shaping or Treating: Apparatus, subclasses 110+ for apparatus to make a composite from a preform and means shaping fluent plastic stock and subclass 807 for lace tipping.

**13 PAPER-FASTENER MAKING:**

This subclass is indented under the class definition. Process or apparatus for making a member intended to be inserted in an opening in a paper sheet to secure something to that paper sheet.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 5, for cotter-pin making.

## SEE OR SEARCH CLASS:

- 59, Chain, Staple, and Horseshoe Making, subclasses 71+ for staple making.
- 226, Advancing Material of Indeterminate Length, for a method of or apparatus for feeding material without utilizing both the leading and trailing ends to effect movement of the material.
- 227, Elongated-Member-Driving Apparatus, subclasses 82+ for combined apparatus for forming and driving a member, e.g., nail.

**14 PLOW OR CULTIVATOR IRON, MAKING:**

This subclass is indented under the class definition. Process or apparatus for making that portion of a ground turning or stirring implement that comes in direct contact with the ground to effect work thereon.

- (1) Note. Also included herein is a process of making ancillary plow structure, such as a clevis.
- (2) Note. A plow "iron" may be called a "share", a "point", or a "sweep".

## SEE OR SEARCH THIS CLASS, SUBCLASS:

- 891+, for a process of making an agricultural device, generally.

## SEE OR SEARCH CLASS:

- 72, Metal Deforming, subclasses 470+ for a die for forging generally, including forging a plow or a cultivator iron.

**15 PUDDLERS' BALLS MAKING:**

This subclass is indented under the class definition. Process or apparatus for manufacturing a solid, generally spherical member intended to be used in molten metal, e.g., to assist in refining of metal.

## SEE OR SEARCH CLASS:

- 75, Specialized Metallurgical Processes, Compositions for use Therein, Consolidated Metal Powder Compositions, and Loose Metal Particulate Mixtures, for a process of treating metal in the molten state.

- 266, Metallurgical Apparatus, especially subclasses 227+ for means for separating metal in a molten mass from undesired material.

**16 RAILWAY-CHAIR MAKING:**

Process or apparatus for manufacturing a metal block intended to support and hold a railway track with respect to a cross-tie.

- (1) Note. Manufacture of structure relating to a railway chair, e.g., a clip for holding a chair to a rail, is included herein.

**17.1 FOIL OR OTHER THIN SHEET-METAL MAKING OR TREATING:**

This subclass is indented under the class definition. Process or apparatus for manufacturing or modifying small thickness sheet metal, e.g., foil, not provided for in another class.

- (1) Note. The lines existing between Class 29, subclasses 17.1+, and Class 72, Metal Deforming, are as follows:

Class 72 takes (1) a process or apparatus for rolling sheet metal whether a sheet, strip, pack, or otherwise, or (2) a process or apparatus for rolling sheet metal whether a sheet, strip, pack, or otherwise when combined with any nonrolling operation acceptable in Class 72.

Class 29 takes (1) a process or apparatus for manufacturing metal foil other than by rolling and (2) process or apparatus for rolling sheet metal when combined with another operation, which combination is not classified in Class 72.

- (2) Note. "Foil" is film-like metal, generally less than 0.010 inches thick which, because of its frailty must be handled much like a sheet of paper.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

- 33, for a machine for performing a combination of operations on a strip.
- 81.1+, for a process or apparatus for removing or preventing scale.
- 527.1, for a process including applying or shaping of fluent material.

## SEE OR SEARCH CLASS:

- 72, Metal Deforming, and see (1) Note above.
- 118, Coating Apparatus, for metal or non-metal coating apparatus combined with various treating means such as cutting or deforming.
- 164, Metal Founding, subclass 476 for continuous casting combined with rolling.
- 427, Coating Processes, for a method of coating a substrate, generally.
- 428, Stock Material or Miscellaneous Articles, subclasses 606+ for metallic foil or filament smaller than 6 mils.

**17.2 Method:**

This subclass is indented under subclass 17.1. Process.

**17.3 Clad or other composite foil or thin metal making:**

This subclass is indented under subclass 17.2. Process comprising manufacturing an article having plural layers or distinct components joined together.

- (1) Note. At least one layer or component must be metallic and that layer or component must be altered for classification in this subclass.
- (2) Note. In a process of this subclass, any two layers or components must have different characteristics.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

527.1+, for applying or shaping of fluent material to a substrate in forming a composite product.

## SEE OR SEARCH CLASS:

- 148, Metal Treatment, subclasses 240+ for a method of producing a reaction coating on a solid metal substrate wherein one component of the reaction coating comes from the metal, and subclass 127 for a method under that class definition of heat treating a metal composite.

- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, for a process or apparatus for adhesive bonding of a self-sustaining web or article.
- 164, Metal Founding, subclasses 31+ for a method under that class definition of forming a composite article.
- 205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, subclasses 76+ for making foil by electroforming.
- 228, Metal Fusion Bonding, for a process or apparatus for metallurgically bonding self-sustaining preforms together.
- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclasses 241+ for a process under that class definition of producing composite, plural part or a multilayered article.
- 419, Powder Metallurgy Processes, subclasses 3+ for a method of making a sheet of indefinite length.
- 427, Coating Processes, for producing a coated foil, generally.

**17.4 With assembling or disassembling of a pack:**

This subclass is indented under subclass 17.2. Process including (1) superposing plural work portions for metalworking or treating which work portions are to be subsequently separated to yield plural manufactured articles or (2) effecting or augmenting separation of superposed articles that have been, while superposed, subjected to metalworking or treatment.

- (1) Note. The pack may be made by folding a single sheet along a line if the work portions are to be severed later from the rest of the pack.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

- 18.1, for apparatus for opening or separating a pack.
- 403.3+, for a process of mechanical manufacture including separating materials one from another.
- 426.1+, for a process of disassembling, especially subclass 426.4 for disassembling by alteration or destruction.
- 700+, for apparatus for disassembling, generally.

## SEE OR SEARCH CLASS:

- 125, Stone Working, subclass 24 for a process or apparatus for separating mica or mica-like substance along its plane of cleavage.
- 428, Stock Metal or Miscellaneous Articles, subclasses 577+ for a metallic intermediate article.

**17.5 Using transitory solid cover material:**

This subclass is indented under subclass 17.4. Process including superposing a solid member over a work portion to facilitate metalworking or treating of the work portion, which solid member does not form part of one of the manufactured articles.

- (1) Note. The solid cover material generally constitutes some portion of the pack and may itself become a manufactured product but not in the course of the claimed invention.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

- 423+, for a method of diverse mechanical manufacturing utilizing transitory attached or separate material.

**17.6 Including bond prevention treatment:**

This subclass is indented under subclass 17.4. Process including applying material to a work portion or performing a particular operation on the work portion to stop welding or adhesion between layers or components of the pack.

- (1) Note. The bond preventing material is generally characterized as “anti-bond” or “prevent-weld”.
- (2) Note. The bond prevention material may comprise material that is normally used as a lubricant applied directly to the work, rather than merely to the working apparatus or machine.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

- 424, for a process of mechanical manufacture including use of a temporary protective coating, generally.

## SEE OR SEARCH CLASS:

- 228, Metal Fusion Bonding, subclass 118 for a metallurgical bonding process under that class definition which uses bond inhibiting separating material.

**17.7 Disassembling of a pack:**

This subclass is indented under subclass 17.4. Process including effecting or augmenting separation of superposed articles that have been, while superposed, subjected to metalworking or treatment.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

- 18.1, for apparatus for opening or separating a pack.
- 403.3+, for a process of mechanical manufacture including separating materials one from another.
- 426.1+, for a process of disassembling, especially subclass 426.4 for disassembling by alteration or destruction.
- 700+, for apparatus for disassembling, generally.

## SEE OR SEARCH CLASS:

- 125, Stone Working, subclass 24 for a process or apparatus for separating mica or mica-like substance along its plane of cleavage.

**17.8 By shaving or longitudinal cutting:**

This subclass is indented under subclass 17.2. Process including severing or slicing off a layer substantially along the length of the axis of a metal workpiece.

## SEE OR SEARCH CLASS:

- 82, Turning, for shaving off a rotating workpiece.
- 83, Cutting, subclasses 861+ for a process of cutting other than completely through work thickness or through work within the class definition.
- 409, Gear Cutting, Milling, or Planing, subclasses 288+ for shaving off a single layer of a workpiece.

**17.9 Using transitory material:**

This subclass is indented under subclass 17.2. Process wherein material is attached to or associated with the work to facilitate the manufac-

turing, which material forms no part of the manufactured product.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

423+, for a method of diverse mechanical manufacturing which utilizes transitory attached or associated separate material.

### 18.1 Means for opening or separating a pack:

This subclass is indented under subclass 17.1. Apparatus for breaking or pulling apart a group of superposed workpieces thereby to yield plural manufactured articles.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

403.3+, for a process of mechanical manufacture including separating materials one from another.

426.1+, for a process of disassembling, especially subclass 426.4 for disassembling by alteration or destruction.

700+, for apparatus for disassembling, generally.

SEE OR SEARCH CLASS:

125, Stone Working, subclass 24 for a process or apparatus for separating mica or mica-like substance along its plane of cleavage.

## 20 SPECTACLE-FRAME MAKING:

This subclass is indented under the class definition. Process or apparatus for manufacturing a member intended to hold or otherwise support a lens of eyeglass structure.

(1) Note. Included herein is structure for assembling a pair of spectacles or for manufacture of a portion thereof, such as a "temple" or "bridge-piece".

SEE OR SEARCH THIS CLASS, SUB-CLASS:

434+, for a process of assembling or joining while retaining clearance for motion between assembled parts, as in assembling a temple with the lens holding portion of a spectacle frame.

SEE OR SEARCH CLASS:

65, Glass Manufacturing, subclass 61 for grinding to make an article of glass, including making and grinding a lens.

72, Metal Deforming, for bending metal, generally, especially subclasses 362+ for the process.

140, Wireworking, subclasses 71+ for a process or apparatus for making an eyeglass frame of wire, under that class definition.

264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclasses 239+ for a method including shaping or molding to form or reform a shaped article, including molding of an eyeglass frame or lens.

351, Optics: Eye Examining, Vision Testing and Correcting, subclasses 41+ for spectacles or eyeglasses, subclass 177 for a process of making an ophthalmic lens not elsewhere provided for (see the appended notes to this subclass for a field of search for this subject matter), and subclass 178 for a process of making spectacles or eyeglasses not elsewhere provided for, securing an eyeglass lens to a support, or of assembling lens in spectacle frames.

425, Plastic Article or Earthenware Shaping or Treating: Apparatus, for making an article of plastic, generally, including making a portion of an eyeglass frame or a lens.

### 20.1 SPIRAL CUTTING OF FLAT STOCK:

This subclass is indented under the class definition. Process or apparatus for severing a strip or strap from sheet material, in substantially continuous fashion, by relative rotation of a tool and work about an axis while moving toward or away from each other during the severing operation.

(1) Note. The line of severance described by the cutting operation of this subclass comprises a flat spiral in the plane of the sheet material.

(2) Note. The cutting tool is usually at a fixed point or location with respect to which point the work is moved.

- (3) Note. The combination of spiral cutting (here classified) with winding and reeling (classified, per se, in Class 242, Winding, Tensioning, or Guiding) is to be found in this subclass.
- (4) Note. A subsequent cutting, either to length or desired cross section shape, of the severed strip or strap will not bar classification here if otherwise within the above definition.
- (5) Note. This subclass includes working of sheet material other than metal (e.g., rubber, cloth, leather, etc.) as set forth above to produce thongs, lacing, belting, etc.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 2.1+, for bias cutting tubular stock and see the notes thereunder for other cutting loci involving relative rotation between tool and work.

**SEE OR SEARCH CLASS:**

- 82, Turning, for cutting of rotating work, generally.
- 142, Wood Turning, subclasses 23 through 35 for a process or apparatus for cutting of a rotating workpiece of wood.
- 144, Woodworking, subclasses 209.1+ for a veneer lathe.
- 411, Expanded, Threaded, Driven, Headed, Tool-Deformed, or Locked-Threaded Fastener, for a fastener which may have been produced by a rotation of a workpiece.
- 428, Stock Material or Miscellaneous Articles, subclass 592 for metallic stock which is helical or has a helical component.

**21 STEREOTYPE-PLATE FINISHING:**

This subclass is indented under the class definition. Process or apparatus for finishing a plane or curved stereotype plate by beveling the edge, grooving, or finishing a rib on the back of a plate.

- (1) Note. Apparatus for casting a stereotype plate combined with a finishing mechanism which operates on a plate while still associated with a casting surface is

classified in Class 164, Metal Founding, subclass 140.

- (2) Note. Apparatus for merely planing the back of a stereotype plate are classified in Class 409, Gear Cutting, Milling, or Planing, subclasses 288+.

**SEE OR SEARCH CLASS:**

- 101, Printing, subclasses 368+ for a printing member, per se.
- 451, Abrading, subclasses 28+ for a process of abrading.

**21.1 MEANS FOR FORMING CLENCH-TONGUE (E.G., FOR TIEBAND):**

This subclass is indented under the class definition. Apparatus, including a punch for cutting out a flap from a sheet metal work portion, and including means to bend the flap to engage and secure plural portions in assembled relation.

- (1) Note. Included here is a device which cuts and bends the tongue by either single or plural means.
- (2) Note. Included here is a tongue cutting and clenching device, not otherwise classified, which acts on a single work piece.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 243.5+, for overedge assembling apparatus.
- 432+, for a process of assembling combined with punching, piercing or reaming a part by engagement with the surface of a second part.
- 509+, for a process of assembling including joining by deforming by overedge clamping of a seated part.
- 798+, for apparatus for assembling including means to drive a self-piercing work part.

**SEE OR SEARCH CLASS:**

- 72, Metal Deforming, subclasses appropriate to cutting and deforming.
- 413, Sheet Metal Container Making, subclasses 1+ for a method of fabricating a sheet metal can.

- 493, Manufacturing Container or Tube From Paper; or Other Manufacturing From a Sheet or Web, subclasses 350+ for a similar device which operates on a nonmetallic material.
- 22 TIRE UPSETTING, WITH CUTTING, PUNCHING, ETC.:**  
This subclass is indented under the class definition. Combined process or apparatus including use of a metal tire thickening device combined with use of a press for cutting or shaping the tire or tire blank.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
894.37, for a process of making a metal tire for a wheel, other than in the manner of this subclass.
- SEE OR SEARCH CLASS:  
72, Metal Deforming, especially subclass 294 for cutting combined with upsetting, generally, and subclasses 300 and 301+ for a pair of individually nondeforming clamps used to upset a metal strip other than a metal tire strip.
- 23.1 TOOTH-CYLINDER MAKING APPARATUS (E.G., TEXTILE WORKING CYLINDER):**  
This subclass is indented under the class definition. Means for forming, applying, and securing metallic teeth to the surface of a cylindrical body such as a cylinder for textile machinery.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
891+, for making a device for use in agriculture, generally.  
895, and 895.31, for a process of manufacturing a roller having teeth assembled thereto or formed thereon.
- SEE OR SEARCH CLASS:  
227, Elongated-Member-Driving Apparatus, subclass 77 for combined apparatus for applying a member, e.g., card teeth, and bending the end of such member.  
492, Roll or Roller, subclasses 30+ for a roll or roller with surface indentation,
- projections, or slits having plural alignment of slits.
- 23.51 IMPELLER MAKING APPARATUS:**  
Machines or tool for manufacturing a rotor for a turbine, fan, pump, etc.
- (1) Note. A conveyor screw is considered to be an "impeller".
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
889+, for a process of manufacturing an impeller.
- SEE OR SEARCH CLASS:  
72, Metal Deforming, subclasses 367.1+ for a method of making or reshaping a metallic tubular member, generally.  
198, Conveyors: Power-Driven, subclasses 657+ for a screw type conveyor.  
415, Rotary Kinetic Fluid Motors or Pumps, subclasses 71+ for a runner having a spirally arranged blade or fluid passage.  
416, Fluid Reaction Surfaces (i.e., impellers), for an impeller, per se.
- 24 TYPE FINISHING AND GROOVING:**  
Process or apparatus for breaking a "jet" (or "sprue line") from cast printing type, removing irregularities (such as a pin or burr) from printing type, or for grooving printing type.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
413, for a method of obtaining plural pieces from a unitary blank by breaking through a weakened portion.
- SEE OR SEARCH CLASS:  
199, Type Casting, subclasses 81+ for a machine for casting type combined with mechanism for finishing. See Class 409, Gear Cutting, Milling, or Planing, subclass 293 for a process of and subclasses 312 and 901 for apparatus for cutting to shape a metallic printing surface.  
225, Severing by Tearing or Breaking, subclasses 1+ for a method of breaking, generally, and subclasses 93+ for apparatus for breaking, generally.



**24.5 VENETIAN BLIND ASSEMBLING:**

This subclass is indented under the class definition. Process or apparatus (including a work holder) for assembling a venetian blind.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 33+, for apparatus including an assembling device combined with a shaping device, not otherwise classified, and see the notes to that subclass (33) for the lines with other classes.
- 592+, for a method of assembling combined with one shaping, not otherwise classified, especially subclasses 433+ for a method of assembling by stringing and subclasses 559+ for a method of assembling including work holding. See the notes to that subclass (592) for the lines with other classes.
- 700+, for apparatus for assembling, generally, especially subclass 241 for apparatus for assembling by stringing and subclasses 281.1+ for apparatus for assembling including use of a workholder.

**SEE OR SEARCH CLASS:**

- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclass 65 for a process of making a venetian blind ladder by laminating.
- 160, Flexible or Portable Closure, Partition, or Panel, subclass 166.1 for a venetian blind, per se, and see that definition for the definition of a "venetian blind".
- 227, Elongated-Member-Driving Apparatus, for apparatus for inserting a member, e.g., a nail or staple, into a venetian blind part, particularly subclasses 19+ and 99+ for combined apparatus for handling of a workpiece and for driving a member.
- 269, Work Holders, for a work holder, per se, not otherwise classified, and see the notes to that class for the lines with other classes.

**25 UMBRELLA-FRAME MAKING:**

This subclass is indented under the class definition. Process or apparatus for forming or assembling an umbrella frame including forg-

ing an umbrella rib, shaping, or assembling a component of an umbrella frame with another component.

- (1) Note. A component of an umbrella frame may be a "rib", a "fork", a "notch", a "tip", etc.

**SEE OR SEARCH CLASS:**

- 72, Metal Deforming, for a process or apparatus for merely die shaping the various elements from sheet material.
- 135, Tent, Canopy, Umbrella, or Cane, subclasses 20+ for an umbrella, or component, generally.

**25.01 BARRIER LAYER OR SEMICONDUCTOR DEVICE MAKING:**

This subclass is indented under the class definition. Process or apparatus not elsewhere classified comprising manufacturing (1) an electrical component consisting of two electrical conductors placed either in contact with each other or separated by an interface, which component has a nonlinear resistance characteristic as a result of the electrical action of the interface, (2) an electrical device which exhibits asymmetrical voltage current characteristic, or (3) a device incorporating a nonmetallic electric conductor in which current is carried by the movement of ions, which device is other than those classified in the class for Chemistry: Electrical and Wave Energy.

- (1) Note. This and the indented subclasses include a miscellaneous process or apparatus for making a barrier layer-type device, e.g., a contact rectifier, a transistor, or an electrolytic capacitor.
- (2) Note. This and the indented subclasses are not limited to the manufacture of a barrier layer device where a metal working operation is involved, but includes the manufacture of such device from any material where no specific class provides for the subject matter claimed.
- (3) Note. This and the indented subclasses are heavy in semiconductor diverse manufacturing apparatus (e.g., cluster apparatus, etc.) not provided for in a specific apparatus class.

- (4) Note. Where the patent includes a claim to the product in addition to a claim for the process of manufacture, the patent is classified in the product class and cross-referenced to the appropriate process class.
- (5) Note. In these subclasses are found, inter alia, patents relating to the manufacture a barrier layer device by the combination of a step which is, per se, classified in another class and a step of subjecting the barrier layer device to an electrical current for either forming, testing, or aging the device. The step of electrolytically forming a coating on an electrode, without more, is not deemed such an operation.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 2, for a process or apparatus for making an electric battery grid.
- 25.41+, for an electric capacitor making process or apparatus wherein the capacitor is not a barrier layer or electrolytic device.
- 592+, for a miscellaneous process of assembly, manufacture or repair, particularly, subclasses 592.1+ for a process of making a miscellaneous electrical device, of which, subclasses 610.1+ relate to a process of making an electrical resistor including metal working, or when not otherwise classifiable, subclasses 623.1+ relate to a process of making a battery, generally, and subclass 874+ relates to the making of a terminal including one to be used with a barrier layer device.
- 700+, for miscellaneous assembly or disassembly apparatus, particularly subclasses 729+ and 762+ for assembly or disassembly apparatus for an electrical device not proper for a superior subclass in this or another class, and subclasses 730+ and 763 for electric battery assembly or disassembly apparatus.

**SEE OR SEARCH CLASS:**

- 106, Compositions: Coating or Plastic, for a miscellaneous coating or plastic

- composition such as a ceramic or varnish composition.
- 117, Single-Crystal, Oriented-Crystal, and Epitaxy Growth Processes; Non-Coating Apparatus Therefor, for processes and non-coating apparatus for growing therein-defined single-crystal of all types of materials, including barrier layer or semiconductor materials.
- 134, Cleaning and Liquid Contact With Solids, for a process of or apparatus for cleaning material such as stock material for a barrier layer device.
- 205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, for a process, product, or apparatus for treating base stock by an electrolytic process, especially, subclass 213 for the cleaning or etching of aluminum by an electrolytic method, subclasses 183+, 188+, 191+, and 198+ for an electrolytic coating process, and subclasses 324+ for the oxide coating of aluminum from an aqueous bath. See (1) Note, above.
- 216, Etching a Substrate: Processes, subclass 3 for methods of forming a Josephson junction device including a chemical etching step.
- 252, Compositions, subclass 62.2 for an electrolyte for an electrolytic condenser or rectifier, subclass 62.3 for a composition for a barrier layer device, and subclasses 500+ for an electrically conductive and emissive composition which composition may be resistive in nature.
- 257, Active Solid-State Devices (e.g., Transistors, Solid-State Diodes), appropriate subclasses for an active solid-state device, per se, and see (2) Note, above.
- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, for a process of working, molding, or shaping a miscellaneous plastic material, per se, or combined with another operation, especially subclasses 614+ for a sintering method to make a coated or composite electrical article or component; subclasses 104+ for shaping electroconductive material; and sub-

- classes 272.11+ for shaping to make an encapsulated electrical component including a barrier layer or semiconductor device.
- 269, Work Holders, for a miscellaneous work support.
- 338, Electrical Resistors, for an electrical resistor, per se.
- 355, Photocopying, for a process or apparatus under that class definition for using an optical aligning mask, etc.
- 356, Optics: Measuring and Testing, for a process or apparatus for testing an optical aligning mask.
- 359, Optics: Systems (Including Communication) and Elements, for a process or apparatus under that class definition of using an optical aligning mask.
- 414, Material or Article Handling, for Handling of a wafer, per se.
- 420, Alloys or Metallic Compositions, for stock material which may be used in the process or apparatus of this and the indented subclasses.
- 427, Coating Processes, subclasses 58+ for a process of coating, per se, wherein the product has utility as an electrical product.
- 428, Stock Material or Miscellaneous Articles, for a stock material product in the form of a single or plural layer web, sheet, strand, or fiber; especially subclasses 175+, 190, 193+, 196+, and 365 for such a product including mechanically interengaged strand or strand portions (e.g., woven, knitted) and subclass 62 for metallic composite in which a component has a semiconductor base.
- 430, Radiation Imagery Chemistry: Process, Composition, or Product Thereof, subclasses 311+ for a process of making an electrical device by means of radiation imagery chemistry.
- 438, Semiconductor Device Manufacturing: Process, appropriate subclasses for methods of making a semiconductor electrical device; see the search notes thereunder.
- 442, Fabric (Woven, Knitted, or Nonwoven Textile or Cloth, etc.), subclasses 181+ and 304+ for a woven or knit fabric.
- 445, Electric Lamp or Space Discharge Component or Device Manufacturing, for a process or apparatus for making such a component or device.
- 505, Superconductor Technology: Apparatus, Material, Process, particularly subclass 329 for methods of making a Josephson junction device possessing a high temperature superconductor and subclass 922 for methods of making a Josephson junction device possessing a low temperature superconductor.
- 25.02 Barrier layer device making:**  
This subclass is indented under subclass 25.01. Process or apparatus comprising manufacturing (1) an electrical component consisting of two electrical conductors placed either in contact with each other or separated by an interface, which component has a nonlinear resistance characteristic as a result of the electrical action of the interface or (2) a device incorporating a nonmetallic electric conductor in which current is carried by the movement of ions, which device is other than those classified in the class for Chemistry: Electrical and Wave Energy.
- (1) Note. See the search notes under Class 29, subclass 25.01.
- 25.03 Electrolytic device making; e.g., capacitor:**  
This subclass is indented under subclass 25.02. Process or apparatus comprising manufacturing a device incorporating a nonmetallic conductor in which current is carried by the movement of ions, which device is other than those classified in Class 205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions.
- (1) Note. See the search notes under Class 29, subclass 25.01.
- 25.35 PIEZOELECTRIC DEVICE MAKING:**  
This subclass is indented under the class definition. Miscellaneous process or apparatus for manufacturing a piezoelectric device or piezoelectric crystal which is not classifiable in a specific class relating to the manufacture of such an article.

- (1) Note. A piezoelectric device under this definition is a device which contains a material which exhibits an electrostatic polarization when subjected to mechanical stress or which exhibits a mechanical stress, tending to produce a deflection, when subjected to electric stress, including provision in combination with means to utilize the piezoelectric property of said material. The material may be crystalline or may not be so. The vast majority of piezoelectric substances are crystalline, but a few substances which are not obviously crystalline, such as some barium titanate ceramics and some wax-resin electrets (the electrostatic analogue of the permanent magnet), exhibit piezoelectric properties. Since, in theory, piezoelectricity is attributed to certain types of anisotropy in the material, those piezoelectric materials which are not obviously crystalline may be regarded as having a quasi-crystalline structure and the expression piezoelectric crystal is adopted, for convenience of expression, as being generic to both types of material in the shaped (as distinguished from the bulk) state where the shape (e.g., plate, AT cut) is disclosed as being significant to the piezoelectric property of the material. In summary: Piezoelectric material = material in bulk. Piezoelectric crystal = material shaped for piezo-electricity. Piezoelectric device = piezoelectric material or crystal + utilization means (e.g., electrodes holder).
- (2) Note. This subclass is not limited to the manufacture of a piezoelectric device by a metal working operation, but includes the manufacture of such a device by any type of operation where no other class provides for the entire subject matter claimed.
- (3) Note. This subclass includes patents relating to the manufacture of the type of piezoelectric devices classified in Class 310, Electrical Generator or Motor Structure, subclasses 8+. Other classes which provide for piezoelectric devices may also include methods and apparatus for manufacturing the piezoelectric

devices in those other classes. For a list of such other classes consult the search notes below.

- (4) Note. Where a patent includes a claim to the piezoelectric device in addition to a claim to the process of or apparatus for manufacturing the piezoelectric device, the patent is classified in the article class and cross-referenced here.
- (5) Note. A process or apparatus for manufacturing a piezoelectric device when claimed in combination with a method or apparatus for using said piezoelectric device, is not classified in this subclass, but is classified in the class which pertains to the use.

**SEE OR SEARCH THIS CLASS, SUB-CLASS:**

- 25.41+, and the classes referred to in the search notes of that subclass for a method or apparatus for manufacturing an electric condenser which method or apparatus may be useful in the manufacture of a piezoelectric device.
- 592.1+, for a process, not elsewhere classified of manufacturing or assembling an electrical conductor or circuit.
- 729+, for miscellaneous apparatus not elsewhere classified for assembling electrical apparatus.

**SEE OR SEARCH CLASS:**

- 53, Package Making, for a method or apparatus for sealing a housing or envelope which is disclosed as containing piezoelectric crystals and for that subject matter where the claims recite merely that the housing contains a crystal (as distinguished, for example, from a crystal which is mounted within the housing). Note particularly subclasses 470+ and 239 where the housing is filled with both an article and fluent material and subclasses 403+ and 79+ where the housing is filled with a gas or evacuated and closed.
- 73, Measuring and Testing, subclass 570 for a piezoelectric transducer which couples an alternating current electric

- circuit and a device having mechanical vibrations for testing purposes or for the testing system which utilizes such a transducer.
- 106, Compositions: Coating or Plastic, for a composition useful to coat a piezoelectric crystal or device, as for waterproofing.
- 117, Single-Crystal, Oriented-Crystal, and Epitaxy Growth Processes; Non-Coating Apparatus Therefor, for processes and non-coating apparatus for growing therein-defined single-crystal of all types of materials, including piezoelectric materials.
- 118, Coating Apparatus, for miscellaneous coating apparatus. Note particularly subclasses 668+ where the coating is under the control of a characteristic of the workpiece (as when the coating apparatus is controlled by the varying resonant frequency of a piezoelectric crystal being coated), subclasses 715+ for vacuum evaporation coating apparatus, and subclasses 300+ for projection or spray type coating apparatus.
- 125, Stone Working, for a method or apparatus for shaping (e.g., sawing, drilling, surfacing) a piezoelectric crystal which utilizes a cutting tool (as distinguished from an abrasive or abradant tool). Such method and apparatus in Class 125 may include determining the crystallographic orientation of the crystal.
- 134, Cleaning and Liquid Contact With Solids, for a method or means for cleaning a piezoelectric crystal which may include merely treatment in a chemical bath or may include a mechanical operation.
- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclasses 345.1 through 345.55 provides for differential or pattern etching of piezoelectric materials. Class 156 is also the generic home for a apparatus for adhesively bonding materials and thus various crystal making steps relating to bonding, per se, may be there classified.
- 174, Electricity: Conductors and Insulators, subclasses 50+ and the classes referred to in the search notes of that class for a housing or an envelope having means for conducting electricity between the inside and outside of the housing. Included is such housing or envelope as is used for piezoelectric crystals.
- 200, Electricity: Circuit Makers and Breakers, subclass 181.
- 204, Chemistry: Electrical and Wave Energy, for an electrical method or apparatus for coating a piezoelectric crystal. Search subclasses 192.1+ for a method of coating by cathode sputtering, subclasses 193+ for electrolytic apparatus, and subclasses 298.01+ for cathode sputtering apparatus. Search subclasses 155+, and 164+ for a method of treating a compound by electricity or wave energy, such as neutron bombardment or X-ray radiation, to produce therein chemical changes which may be manifested by associated physical changes. Such method may be under the automatic control of some property of the material being treated or may be under manual control.
- 205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, subclasses 118+ for electrolytic methods of applying a coating where an electrolytic and a nonelectrolytic step are combined as where copper is electrolytically plated over a chemically deposited silver layer.
- 216, Etching a Substrate: Processes, subclass 13 for forming of an electrical conductor, e.g., circuit, etc.
- 220, Receptacles, for the structure of housings, casings, and envelopes, per se. Note particularly subclasses 2.1+ where the housing, casing, or envelope is of the electric discharge tube or similar (such as piezoelectric crystal) type and subclasses 3.2+ where the housing, casing, or envelope is of the outlet or junction box type.
- 228, Metal Fusion Bonding, subclasses 101+ for the method of soldering a metal to metal joint, such as the joint

- between a metallic coating on a quartz crystal and an electrode wire, and subclass 903 for an art collection of patents directed to a method of bonding metallic and nonmetallic part by a metallurgical bond, e.g., a method of joining an electrode wire to a quartz crystal.
- 250, Radiant Energy, search subclasses 306+ for methods of testing (as distinguished from treating a piezoelectric crystal by subjecting it to electronic or ionic rays) and for apparatus for testing or treating a piezoelectric crystal by subjecting it to electronic or ionic rays. Apparatus for treating piezoelectric crystals in Class 250 may be under the automatic control of some property, such as resonant frequency of the crystal being treated, or may be under manual control. Crystal goniometers in Class 250 may mark the crystallographic axis on the crystal being tested or may position the crystal in a certain orientation with respect to the testing ray or may otherwise indicate the crystallographic axis; however, crystal goniometers which, in addition, mount the crystal in a holder or cut it or perform some operation other than, and in addition, to the testing are not classified in Class 250.
- 252, Compositions, subclass 62.9 for piezoelectric compositions.
- 260, Chemistry of Carbon Compounds, for a process of crystallizing organic compounds, the process being classified with its product. Note particularly subclass 707 for a process of crystallizing organic compounds limited to no specific type of compound. The product of such a process and also the seed crystals used in the process are classified as chemical compounds. Seed crystals combined with supports are classified as crystallizing apparatus in Class 23, subclass 273. Organic piezoelectric chemicals, per se, when shaped to claimed configurations where the configuration is disclosed as being significant to the piezoelectric property of the crystal (e.g., plate, AT cut) are not classified in Class 260 (see the reference to Class 171, subclass 327, above). Organic chemicals are classified in Class 260, even though claimed as being piezoelectric, where the chemical is not claimed as being shaped with respect to the piezoelectric property and where it is uncombined with piezoelectric structure.
- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclasses 405+ for that class operation by direct application of electrical or wave energy to work.
- 310, Electrical Generator or Motor Structure, subclasses 311+ for piezoelectric crystal devices other than those combined with an art device.
- 315, Electric Lamp and Discharge Devices: Systems, subclass 55 for the structural combination of a piezoelectric crystal and a space discharge device or electric lamp.
- 318, Electricity: Motive Power Systems, subclass 116 for electric motor control systems where the electric motor is of the piezoelectric type.
- 324, Electricity: Measuring and Testing, for a process of or means for subjecting a piezoelectric crystal to an electric test as for predicting its frequency drift, for determining the polarity of charge produced by mechanical stress, or for determining its activity. Search subclasses 76.39+ for frequency determination. Note that indented subclass 76.49 relates to piezoelectric crystals among other devices.
- 331, Oscillators, subclasses 73, 139, 156, and 158 for electrical oscillator systems utilizing piezoelectric crystals.
- 332, Modulators, subclasses 117+ for frequency modulators which utilize a piezoelectric crystal.
- 333, Wave Transmission Lines and Networks, subclass 150 for electric delay networks utilizing piezoelectric crystals and subclass 187 for electric wave filters utilizing piezoelectric crystals.
- 356, Optics: Measuring and Testing, subclass 31 for methods and apparatus for determining the crystallographic axis of a crystal by optical means. Crystal goniometers in Class 356 may

- mark the crystallographic axis on the crystal being tested or may position the crystal in a certain orientation with respect to the light rays. Methods of determining the crystallographic axis which include chemically etching the crystal to develop etching pits which can be observed optically are included in subclass 31. Crystal goniometers which, in addition, mount the crystal in a holder or cut it or perform some operation other than or in addition to the testing are not classified in Class 356.
- 359, Optics: Systems (Including Communication) and Elements, subclass 230 for light control by a piezoelectric opaque element.
- 361, Electricity: Electrical Systems and Devices, subclasses 225+ for the step of merely charging or polarizing piezoelectric material.
- 366, Agitating, subclass 127 for method of and apparatus for agitating actuated by a piezoelectric device.
- 367, Communications, Electrical: Acoustic Wave System and Devices, subclasses 87+ for echo signaling or object sensing systems which may use a piezoelectric transducer, subclasses 118+ and, particularly, subclasses 157+ for underwater piezoelectric signaling or object sensing transducers, and subclass 180 for other piezoelectric signaling or object sensing transducers.
- 369, Dynamic Information Storage or Retrieval, subclass 144 for the structure of piezoelectric phonograph pickups.
- 378, X-Ray or Gamma Ray Systems or Devices, subclass 78 for piezoelectric crystallography.
- 379, Telephonic Communications, for the structure of a piezoelectric microphone.
- 381, Electrical Audio Signal Processing Systems and Devices, subclass 173.
- 422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, subclasses 245+ for chemical apparatus for producing crystals.
- 423, Chemistry of Inorganic Compounds, for inorganic compounds, per se, even though claimed as having piezoelectric properties.
- 427, Coating Processes, subclass 100 for a coating process, per se, wherein a product having piezoelectric properties is formed.
- 451, Abrading, for a method or apparatus for abrading the surface of a piezoelectric crystal to adjust its resonant frequency. Such an abrading method or apparatus may be under time control or under the control of the varying resonant frequency of the crystal being abraded. Note particularly subclasses 32+ for a process of abrading by tumbling, subclass 37 for a combined process including tumbling and sand blasting, subclasses 41+ for a process of abrading a crystal, subclass 78 for a sandblast machine, and subclasses 326+ for a tumbling machine used for abrading.
- 501, Compositions: Ceramic, for ceramic compositions used as dielectrics.
- 562, Organic Compounds, subclass 580 for a process of crystallizing Rochelle salt.
- 585, Chemistry of Hydrocarbon Compounds, especially subclasses 479 and 812+ for obtaining hydrocarbons in crystalline form. See the search note in this subclass to Class 260.
- 25.41 ELECTRIC CONDENSER MAKING:**  
Miscellaneous process or apparatus for making an electric condenser which is not classifiable in the specific classes relating to the manufacture of articles.
- (1) Note. This and indented subclasses do not include the manufacture of electric condensers of the electrolytic type. The patents relating to the manufacture of an electrolytic condenser are in Class 29, subclasses 25.01+, or in the classes referred to in the search notes of that subclass.
- (2) Note. This and the indented subclass are not limited to the manufacture of electric condensers where a metal working step is involved, but include the manufacture

- of such devices from any material where no specific class provides for the claimed subject matter.
- (3) Note. Where the patent includes a claim to the article manufactured, in addition to claims for the process or apparatus, the patent is classified in the article class and cross-referenced to these subclasses.
- (4) Note. For electric condensers of the type manufactured by the process or apparatus of this subclass, under "SEARCH CLASS", see Class 361, Electricity: Electrical Systems and Devices, subclasses 271+.
- (5) Note. Work holders are usually classified with the apparatus for performing the operation. Under "SEARCH CLASS", see Class 269, Work Holders, for miscellaneous work holders for assembly operations.
- (6) Note. Process or apparatus for making a condenser and testing that condenser is classified with the art which provides for the manufacturing operation.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 17.1+, for a process or apparatus for forming thin sheet metal and metal foil.
- 25.01+, and see (1) Note, above.
- 33+, for miscellaneous organized machines adapted to perform a plurality of operations upon metal.
- 400.1+, for a process for making metallic articles and a process of working metal not classified in specific classes. Note subclasses 592.1+ for miscellaneous process of making an electrical device which includes a metal working operation. Subclass 630 provides for a process for making a contact or terminal for an electric condenser and other electrical device.
- SEE OR SEARCH CLASS:
- 53, Package Making, subclasses 470+ and 239 for a method of or apparatus for merely placing a condenser in a container or receptacle and filling the container or receptacle with a fluent material.
- 106, Compositions: Coating or Plastic, for a miscellaneous coating, impregnated article or plastic composition.
- 118, Coating Apparatus, for miscellaneous coating apparatus.
- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, for a process for making a condenser where the process recites no more than operations of laminating or laminating and impregnating. The lamination may be a winding operation.
- 204, Chemistry: Electrical and Wave Energy, for electrolytic and wave energy method or apparatus for treating, coating, or forming an article.
- 209, Classifying: Separating, and Assorting Solids, subclasses 546+ for a process or apparatus of testing a group of electric condensers and assorting them according to their electrical properties.
- 216, Etching a Substrate: Processes, subclass 6 for forming a capacitor.
- 228, Metal Fusion Bonding, for joining of work portions by soldering, welding, or brazing.
- 242, Winding, Tensioning, or Guiding, subclasses 444.1+ for simultaneously winding an electrical conductor and dielectric strip to form an article such as a condenser without further manufacturing.
- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, for a process of working, molding, or shaping miscellaneous plastic materials, per se, or combined with other operations within the class definition. See Class 264 definitions for the line between this class (29) and Class 264. Some subclasses in Class 264 which are specific to production of electrical components or devices are subclasses 104+, 272.11+ and 615.
- 269, Work Holders, see (5) Note, above.
- 324, Electricity: Measuring and Testing, subclass 60 for a process or apparatus for making an electrical test of an electric condenser. Also see (4) Note above.



- 361, Electricity: Electrical Systems and Devices, subclasses 271+. See (4) Note, above.
- 413, Sheet Metal Container Making, subclasses 1+ for the method of fabricating a sheet metal can.
- 425, Plastic Article or Earthenware Shaping or Treating: Apparatus, for molding apparatus for shaping or reshaping, per se, plastic materials (e.g., resins, clay, etc.) or with combined operations not otherwise provided for. See, especially, subclasses 110+ for composite article manufacturing involving a preform and fluent material.
- 427, Coating Processes, subclasses 79+ for a coating process, per se, wherein the product is a condenser, capacitor, or a subcombination thereof.
- 428, Stock Material or Miscellaneous Articles, for a stock material product in the form of a single or plural layer web or sheet and subclasses 432+ and 457+ for a plural layer sheet including a layer of metal next to a layer of non-metal material.

**25.42 Solid dielectric type:**

This subclass is indented under subclass 25.41. Process or apparatus where the condenser being made is of the type which includes a solid dielectric material interposed between conductive condenser plates.

- (1) Note. Search the classes and subclasses referred to in the notes to the definition of Class 29, subclass 25.41 for other classes which provide for a blank, a process, or apparatus for making electric condensers of the solid dielectric type.

**26 Drill press:**

This subclass is indented under subclass 33. Apparatus for performing various materials treating functions, the primary function comprising a cutting operation by a rotating axially moving tool and a secondary function comprising either (1) a noncutting operation or (2) cutting by milling operation with the same milling operation with the same tool which performs the primary cutting operation.

**SEE OR SEARCH CLASS:**

- 100, Presses, for a press not elsewhere provided for, particularly, subclass 102 for a press combined with other features.
- 408, Cutting by Use of Rotating Axially Moving Tool, for a machine for cutting by a rotating tool that moves along the tool axis during operation, especially, subclasses 20+ for a device of that class which is convertible to a cutting operation of another class and subclasses 22+ for a device of that class which is combined with structure for performing a cutting operation of another class.
- 901, Robots, subcollection 6 for a robot which cooperates with another machine.

**27 Lathe:**

This subclass is indented under subclass 33. Apparatus, particularly, a "type of machine" characterized by mechanisms for rotating the work while a cutting or milling tool is traversing the work, either externally or internally; also machines in which the tool is rotated about the work.

**SEE OR SEARCH CLASS:**

- 82, Turning, for a machine for turning the exterior of a workpiece.

**28 Grinding attachment:**

This subclass is indented under subclass 27. Apparatus characterized by mechanisms for relatively rotating the work and a turning or milling tool and which have in addition thereto a grinding mechanism.

**SEE OR SEARCH CLASS:**

- 451, Abrading, for the combination of an abrading machine with a nonabrading means.

**29 Pulley or wheel:**

This subclass is indented under subclass 27. Apparatus specially adapted to turn, face, and bore or drill a pulley or a wheel, and, in some instances, to slot the same. The apparatus of this subclass is characterized by the rotation of the work about its axis or by the rotation of the tool about the axis of the work.

**SEE OR SEARCH CLASS:**

- 82, Turning, subclasses 107 and 108.  
 408, Cutting by Use of Rotating Axially Moving Tool, subclasses 20+ for a device of that class which is convertible to a cutting operation of another class and subclasses 22+ for a device of that class which is combined with structure for performing a cutting operation of another class.

**30 Planer:**

This subclass is indented under subclass 33. Apparatus characterized by a relative reciprocatory movement in substantially a straight line between the work and tool, said tool being a planing tool, a milling cutter or (in some instances) a drill.

**33 PLURAL DIVERSE MANUFACTURING APPARATUS INCLUDING MEANS FOR METAL SHAPING OR ASSEMBLING:**

This subclass is indented under subclass 700. Apparatus under the class definition including (1) two or more diverse metal shaping devices, (2) one metal shaping device combined with one or more nonmetal shaping devices, or (3) one or more assembling devices (classifiable, per se, in ... ) combined with a shaping device.

(.5) SPECIAL LINE NOTE. This subclass is intended to collect apparatus for metal shaping combined with apparatus for performing another manufacturing operation, if that combination is not provided for elsewhere. Class 29, subclasses 700-824 of this class have been screened for a combination proper for this and the subclasses indented hereunder. Not all classes other than Class 29 have been reviewed for combinations including metal shaping means beyond the respective class line; however, the search notes below referencing this Special Line Note have been screened.

- (1) Note. The terminology of (1), above, of the subclass definition can be read as: means for performing two or more diverse metal shaping operations. Thus read, the language encompasses devices including a composite tool as defined in subclass 566, below. See, also, the defi-

nitions of terms used, (Glossary and Notes to the Class Definition of this class (29).

- (2) Note. Diverse apparatus are those apparatus wherein there are two or more devices which operate differently on the part or stock and which collectively do not fall in any single art classification, e.g., sawing and forging, rolling and turning, etc. However, where the two diverse devices constitute a hand manipulable tool rather than a machine the combined device has been placed in Class 7, Compound Tools. Plural apparatus which operate in the same manner or constitute different phases of a single art are found with the single operation, e.g., turning to cylindrical shape followed by turning to taper are in Class 82, Turning.
- (3) Note. Where the shaping mechanism only operates subsequently to fasten or join parts which have been previously assembled, the apparatus will be found elsewhere in Class 29, subclasses 700+, or in the various joining classes.
- (4) Note. Included here is the combination of means to strip wire and means to further modify or treat the wire in other than a manner characteristic of Class 140, Wireworking.
- (5) Note. The combination of apparatus for plural diverse manufacturing (which apparatus falls within the scope of the above definition) with apparatus for packaging (which packaging, per se, falls within the scope of Class 53) is classifiable in the appropriate subclasses of Class 53, Package Making.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 560.1, for a convertible machine of the vise type, not elsewhere provided for.  
 592+, for a related process.  
 650, for plural diverse manufacturing apparatus, including means to assemble combined with means to coat.  
 700+, for assembling apparatus, per se, and see (3) Note, above.

## SEE OR SEARCH CLASS:

- 7, Compound Tools, and see (2) Note, above.
- 72, Metal Deforming, for cutting combined with deforming and for deforming of different types of combined with each other.
- 72, Metal Deforming, patents whose claimed disclosures include means for assembly have been placed in Class 29, subclasses 33+, if they include cutting or any other diverse operation. (Screened per the Special Line Note above).
- 83, Cutting, patents claiming the combination of cutting and assembling (in accordance with (3), above, of the subclass definition) have been screened from Class 83 and transferred to Class 29, subclasses 33+, except for claimed combinations wherein the assembling is limited to orienting, and stacking of products resulting from the cutting operation. This combination (cutting, orienting and stacking) is to be found in appropriate subclasses of Class 83. (Screened per the Special Line Note above).
- 83, Cutting, or a cutting device, per se, for cutting and stacking the cut work (product) see (.5) Note, above, for the line and see subclasses 84+ for a cutting device with means to form or hold a pile of product pieces.
- 100, Presses, for a press not elsewhere provided for, particularly, subclass 102 for a press combined with other features.
- 164, Metal Founding, for casting means in combination with cutting means for trimming the casting, while said casting is associated with the mold, or a portion of the mold. The term "mold" as used here includes (1) the core or cores, (2) core-like elements associated with gate portions of the casting and used for handling, and (3) conveying means serving to support a continuous casting while said casting is still associated with the molding means. All other casting in combination with cutting means for trimming the casting are classified in Class 29, subclasses 33+. Further, see subclasses 418+ for continuous casting apparatus having roller means associated therewith for deforming the continuum as it is cast.
- 225, Severing by Tearing or Breaking. (Screened per the Special Line Note above).
- 227, Elongated-Member-Driving Apparatus, for means to force a fastener into another member. (Screened per the Special Line Note above).
- 409, Gear Cutting, Milling, or Planing, subclass 71 for a milling machine having a thread or helix milling cutter combined with a nonthread milling cutter.
- 425, Plastic Article or Earthenware Shaping or Treating: Apparatus, for a combined apparatus including a shaping or reshaping molding means for plastic material not otherwise provided for. The combination of Class 425 apparatus and metal shaping apparatus is provided for in this subclass and the subclasses indented hereunder. (Screened per the Special Line Note above).
- 483, Tool Changing, subclasses 2 through 69 for means for transferring a tool to or from a material treating station or a tool storage means, generally, including "Plural Diverse Manufacturing Apparatus" combined with means to transfer the tool to or from the tool station. (Screened per the Special Line Note above).
- 901, Robots, subcollection 6+ for a robot which cooperates with another machine.
- 33.2 Slide fastener or slide fastener element:**  
This subclass is indented under subclass 33. Apparatus for manufacturing by diverse operations a slide fastener of the nature indicated under subclass 408, or a working element thereof.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
408+, for a process of making a slide fastener.

- 766+, for apparatus which assembles a slide fastener or a portion thereof.
- 33.5 Binding or covering and cutting:**  
This subclass is indented under subclass 33. Apparatus for assembling a first element or portion thereof (a binding or covering) around an edge of a second element (a base) and into embracing or encompassing relationship with the second element, combined with means for cutting either element, i.e., the binding or covering or the base material.
- 33.52 Cutting covering material only:**  
This subclass is indented under subclass 33.5. Device having means for cutting only the binding or covering material.
- 34 Forging and bending, cutting or punching:**  
This subclass is indented under subclass 33. Apparatus adapted to forge or weld metal and also to perform one or more of the above-mentioned operations upon the metal.
- SEE OR SEARCH CLASS:  
72, Metal Deforming, subclasses 185+ and 203+ for flexing metal back and forth as it is moving along a path.  
100, Presses, subclasses 70+ for a press not elsewhere provided for where there is additional treatment of the material, particularly subclasses 94+ for such press in which the additional working is by cutting, breaking, piercing, or comminuting.
- 35.5 With turret mechanism:**  
This subclass is indented under subclass 33. Apparatus including plural tool and/or plural work holding means provided with means to position said holding means.
- (1) Note. Included in this subclass is a device specific to means to securing a tool in the turret and mechanism for mounting the turret upon its carriage or upon the lathe bed.
- SEE OR SEARCH CLASS:  
74, Machine Element or Mechanism, subclasses 813+ for an assembly of general utility, including a turret mechanism for a metal working machine,
- having means to index rotary members, and see the notes thereto.
- 409, Gear Cutting, Milling, or Planing, subclass 221 for a milling machine having an indexable work support.
- 36 Multiple turret:**  
This subclass is indented under subclass 35.5. Apparatus having two or more turrets for carrying the tools or the stock. Nearly all of these machines have tool turrets.
- 37 Stock turret:**  
This subclass is indented under subclass 563. Apparatus in which a bar of metal stock of sufficient length to form more than one completed article is carried by a rotatable turret to the various tools. Multiple-tool holders in these patents are usually cam operated and are also provided with one or more rotary tools.
- 38 Blank turret:**  
This subclass is indented under subclass 563. Apparatus in which the blank, reduced to substantially the length of the finished article, is carried by turret into positions which enable it to be operated upon by various tools.
- SEE OR SEARCH CLASS:  
470, Threaded, Headed Fastener, or Washer Making: Process and Apparatus, subclasses 62, 72, 81, 100, 115, 120, 129,135 for machines using turret mechanisms for making threaded, headed fastener or washers.
- 38.9 Endless belt:**  
This subclass is indented under subclass 563. Device wherein the work conveying means comprises an elongated, generally planar, pliant member connected to itself along its elongated extent and adapted to move along its elongated extent in an orbital path such that work is conveyed as a segment of the member moves from a first point to a second; that segment then is guided to move along the orbit back to the first point.
- SEE OR SEARCH CLASS:  
226, Advancing Material of Indeterminate Length, subclasses 170+ for an endless belt work advancing means.

**39 Tool turret:**

This subclass is indented under subclass 35.5. Apparatus in which some of all of the operating tools are carried by a rotatable turret and which are not classifiable in the following specific subclasses.

## SEE OR SEARCH CLASS:

408, Cutting by Use of Rotating Axially Moving Tool, subclass 35 for multiple spindle turret drilling machines.

470, Threaded, Headed Fastener, or Washer Making: Process and Apparatus, subclasses 72 and 81 for turret mechanisms for die tools used in making screws and bolts.

**40 Rotary tool holder:**

This subclass is indented under subclass 39. Apparatus having a rotatable turret which is provided with one or more positively-rotated tools.

**41 Sliding tool holder:**

This subclass is indented under subclass 39. Apparatus having rotatable tool turrets in which the tools are mounted upon sliding tool spindles which are thrust forward against the blank or stock, usually against the pressure of a spring.

**42 Fluid operated:**

This subclass is indented under subclass 39. Apparatus having a tool turret which is advanced toward and retracted from the work by means of fluid pressure. In some cases, fluid operating mechanisms are employed for actuating the supplemental cutting tools, speed controllers, etc.

## SEE OR SEARCH CLASS:

408, Cutting by Use of Rotating Axially Moving Tool, subclass 63 for drilling machines having a fluid operated motor to make work move along the axis of tool rotation and subclass 130 for drilling machines having a fluid operated motor to make a tool move along the axis of tool rotation.

**Cam Operated:**

This subclass is indented under subclass 42. "Three dot" Located after ... subclasses 43 and 44 indented hereunder.

**43 Longitudinal turret axis:**

This subclass is indented under subclass 39. Cam-operated apparatus having a rotatable tool-holding turret, the axis of which is disposed parallel to the lathe bed, and which is advanced toward and retracted from the work-holding chuck by cam-operated mechanisms.

## SEE OR SEARCH CLASS:

408, Cutting by Use of Rotating Axially Moving Tool, subclass 64 for drilling machines in which there is a cam for feeding the work along the tool axis and subclasses 100+ and 129+ for drilling machines in which there is a cam for feeding the tool along the tool axis.

**44 Transverse turret axis:**

This subclass is indented under subclass 39. Cam-operated apparatus having a rotatable tool-holding turret, the axis of which is disposed transversely of the lathe bed (including both vertical and horizontal axes), and which is advanced toward and retracted from the work-holding chuck by cam-operated mechanisms.

**45 Lever operated:**

This subclass is indented under subclass 39. Apparatus having a rotatable tool turret which is advanced toward and retracted from the stock-holding chuck by means of a lever or a system of levers, usually hand operated.

**46 Rack-and-pinion operated:**

This subclass is indented under subclass 39. Apparatus having a rotatable tool turret which is advanced toward and retracted from the work-holding chuck by rack-and-pinion mechanism.

## SEE OR SEARCH CLASS:

408, Cutting by Use of Rotating Axially Moving Tool, subclass 66 for drilling machines in which the work is made to move by means including a rack and pinion and subclasses 99+ and 135 for drilling machines in which the

tool is made to move by means including a rack and pinion.

- 47 Screw operated:**  
This subclass is indented under subclass 39. Apparatus having a rotatable tool turret which is advanced toward and retracted from the stock-holding chuck by a screw-feeding mechanism.
- SEE OR SEARCH CLASS:  
408, Cutting by Use of Rotating Axially Moving Tool, subclass 64 for drilling machines in which the work is made to move by means including a nut which rotates relative to a screw threaded member and subclasses 100+ and 129+ for drilling machines in which the tool is made to move by means including a nut which rotates relative to a screw threaded member.
- 48.5 Including rotating and/or locking means:**  
This subclass is indented under subclass 35.5. Apparatus including means to rotate said holding means or means to prevent rotation of such a holding means.
- 49 Frictional and positive:**  
This subclass is indented under subclass 48.5. Apparatus wherein the means to prevent or hold against rotation include friction, clamping, or wedging action between the turret and its carriage as well as a still further positive lock such as a bolt or latch.
- 50 Multiple-tool holder:**  
This subclass is indented under subclass 33. Apparatus including a single element intended to support more than one working member in engagement with a workpiece, either at the same or at different times.
- 51 Laterally movable stock holder:**  
This subclass is indented under subclass 50. Apparatus having a nonrevolvable tool holder carrying a plurality of tools (usually rotary) and a stock holder which is movable laterally to present the stock to the various tools.
- 52 Axial tool and transversely movable slide rest:**  
This subclass is indented under subclass 50. Apparatus having a nonrevolvable tool holder carrying a plurality of tools which is movable transversely of the machine bed and having in addition thereto a single tool holder adapted to operate in the axial line of the chuck.
- 53 Rotary tool spindle:**  
This subclass is indented under subclass 52. Apparatus having nonrevolvable tool holders carrying a plurality of tools which are movable transversely of the machine bed and having in addition thereto a single tool holder adapted to operate in the axial line of the chuck, one or more of said tool holders being provided with a rotary tool spindle. Usually the axial tool is rotatable.
- 54 Longitudinally and transversely movable:**  
This subclass is indented under subclass 50. Apparatus having a nonrevolvable tool holder carrying a plurality of tools which are adapted to be moved longitudinally of the machine bed to bring the tools into operation and transversely of the bed to shift the various tools into alignment with the stock or blank holder, or vice versa.
- 55 Rotary tool spindle:**  
This subclass is indented under subclass 54. Apparatus having a nonrevolvable tool holder carrying a plurality of tools provided with one or more positively-rotated tool spindles supported in such a manner as to be moved longitudinally of the machine bed to bring the tools into operation and transversely of the bed to shift the various tools into alignment with the stock or blank holder or vice versa.
- 56 Oscillating tool:**  
This subclass is indented under subclass 50. Apparatus having a nonrevolvable tool holder carrying a plurality of tools which are oscillated about a pivot to place the tools into operative position.
- 56.5 Including machining means:**  
This subclass is indented under subclass 33. Apparatus including a cutting instrumentality adapted to engage work to be treated by a subsequently acting means or to engage the prod-

uct of a previously acting means to mill, cut, turn, bore, drill, abrade, broach, file, saw, punch, blank, or plane that work or product.

**56.6 And work-holder for assembly:**

This subclass is indented under subclass 56.5. Apparatus including a surface which contacts a work part to support or hold that part in a desired position while that work part is being juxtaposed, associated, or secured to another work part; or is being separated from and/or unfastened from another work part.

SEE OR SEARCH CLASS:

269, Work Holders, for a work holding support without an assembly means.

**57 Attachment:**

This subclass is indented under subclass 33. Device such as special tool holders and tool-operating mechanisms which are adapted to be attached to and removed from combined machines, usually "automatic lathes", for the purpose of performing some special function upon the work.

SEE OR SEARCH CLASS:

82, Turning, subclasses 152+.

**64 Speed controller:**

This subclass is indented under subclass 33. Device for controlling or changing the speed of the various parts of automatic machines during the cycle of operations performed by the machines. Most of the speed controllers in this subclass are automatically operated.

SEE OR SEARCH THIS CLASS, SUBCLASS:

42, for fluid-operated speed controllers.

SEE OR SEARCH CLASS:

82, Turning, subclasses 143+.

**65 Carriage stop mechanism:**

Automatic mechanism for stopping the feeding of the carriage which supports the turret or multiple tool or stock holder. These mechanisms are usually provided with devices for stopping the travel of the carriage at various points corresponding to the limit of the operations required by the successively-operating tools.

(1) Note. This subclass includes adjustable stop abutments.

SEE OR SEARCH CLASS:

82, Turning, subclasses 132+, 137, and 152+ for carriage stop devices for lathes.

408, Cutting by Use of Rotating Axially Moving Tool, subclass 8 for drilling machines including control means energized in response to activator stimulated by condition sensor.

409, Gear Cutting, Milling, or Planing, subclass 343 for a planing machine including cutter positioning means and means to effect stopping of the positioning means.

**76.1 FILING:**

This subclass is indented under the class definition. Process or apparatus for cutting metal by a hard instrument having a series of parallel, sharply ridged surfaces.

SEE OR SEARCH CLASS:

69, Leather Manufactures, subclass 1 for a machine for roughing leather by a filing action and subclass 20 for an implement employed for the same purpose.

76, Metal Tools and Implements, Making, subclass 25.1 for a machine for filing saws to sharpen them and subclasses 82+ for a machine for filing other tools to sharpen them.

132, Toilet, subclasses 76.4+ for a manicuring tool which has a file or other abrading or polishing surface.

144, Woodworking, subclasses 28.1+ for a pencil sharpening machine (i.e., one including movably related cutter and work holder or work guide parts) in which the cutter is a file.

157, Wheelwright Machines, subclass 13 for a process or apparatus for treating the outer periphery of a rubber tire casing by a slitting or machining operation which art, in the absence of this subclass, would ordinarily be classified in accord with the particular operation. See Class 451, Abrading, for roughening a rubber tire casing by an operation of that class.

- 168, Farriery, subclass 48.1 for a tool including a file for cleaning and trimming the hoof in fitting it for the shoe.
- 433, Dentistry, subclass 144 for a file particularly adapted for cutting tooth structure or bone and gum tissue adjacent to or in the mouth.
- 451, Abrading, for abrading to shape a workpiece.

**76.2 Of key article:**

This subclass is indented under subclass 76.1. Process or apparatus for cutting an implement provided with notches and grooves wherein the implement is insertable into and capable of opening and closing a lock.

**SEE OR SEARCH CLASS:**

- 409, Gear Cutting, Milling, or Planing, subclasses 81+ for a process or apparatus for producing a key by milling.

**76.3 Continuous band type:**

This subclass is indented under subclass 76.1. Process or apparatus wherein the instrument comprises an endless belt.

- (1) Note. The endless belt or band of this subclass is generally composed of a single piece of flexible material but may consist of a number of elements such as in link-type endless belt of loop.

**76.4 Reciprocating type:**

This subclass is indented under subclass 76.1. Process or apparatus wherein the instrument moves in a back and forth motion.

**77 File-blank stripper:**

Process or apparatus for preparing file blanks by filing the surfaces of the rough blanks.

- (1) Note. Machines for grinding the surfaces of file blanks are classified elsewhere.

**SEE OR SEARCH CLASS:**

- 76, Metal Tools and Implements, Making, subclasses 12+ for a machine for forming a rib or teeth in making a file or a rasp and see the notes thereto for other file forming.
- 403, Joints and Connections, for means connecting a handle to a tool wherein only such part of the handle and tool

is included as cooperates to effect the connection.

- 451, Abrading, for machines for grinding the surfaces of file blanks.

**81.01 SCALE REMOVER OR PREVENTOR:**

This subclass is indented under the class definition. Process or apparatus for removing metallic oxide, sulfide, or a similar metallic surface deposit from metal article, strip, sheet, and bar or for preventing such a surface deposit from building up.

- (1) Note. The scale removed from the metal is not foreign matter as removed by the apparatus of Class 15, Brushing, Scrubbing, and General Cleaning, but is a surface deposit having a metallic component such as magnetic oxide formed on the surface of iron when heated for processing.
- (2) Note. Preventing metallic surface deposits by modifying environment in contact with metal is classified elsewhere.
- (3) Note. Removal must be by mechanical means.

**SEE OR SEARCH CLASS:**

- 15, Brushing, Scrubbing, and General Cleaning, for related apparatus, particularly, subclasses 77 and 88 for brushing machines for sheets, bars, and plates.
- 72, Metal Deforming, subclasses 39 and 40 for a step or means for performing the separation or removal from the work material of all substances which may be present thereon and distinguishable from the work material, per se, before, during, or after the deforming operation.
- 83, Cutting, subclass 168 for device under the class definition wherein means are provided to remove foreign matter from the work or tool.
- 114, Ships, subclass 222 for devices adapted to cleaning, painting, or scraping a ship's hull or preventing the growth and deposit of foreign matter thereon.



- 118, Coating Apparatus, subclasses 72+ for apparatus for combined cleaning and coating of metal.
- 134, Cleaning and Liquid Contact With Solids, for a miscellaneous process of cleaning metal including metal pickling.
- 148, Metal Treatment, appropriate subclasses for cleaning or pickling processes combined with significant heat treatment of metal to modify or maintain the internal physical structure (i.e., microstructure) or chemical properties of metal. See the Class 148 definition for a description of what constitutes significant heat treatment.
- 205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, subclasses 210+ for combined processes of metal cleaning and electrolytic methods of cleaning metal.
- 228, Metal Fusion Bonding, subclasses 164+ for a process for preparing metal parts for joining.
- 422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, subclasses 7+ for preventing metallic surface deposits by modifying environment in contact with metal
- 451, Abrading, for a process or apparatus of cleaning by use of an abradant.
- 510, Cleaning, Compositions for Solid Surfaces, Auxiliary Compositions Therefor, or Processes of Preparing the Compositions, for cleaning compositions, including detergents, particularly subclasses 245+ for scale removing and metal cleaning compositions; this class also provides for processes involving the mere use of such compositions.

brush or broom type especially adapted for cleaning wire, rods, or tubes.

**81.021 Interior surface:**

This subclass is indented under subclass 81.02. Process or apparatus which removes scale from the inwardly facing surface of the hollow article.

SEE OR SEARCH CLASS:

- 15, Brushing, Scrubbing, and General Cleaning, subclass 88 for a machine having a cleaning instrument of the brush or broom type especially adapted for cleaning wire, rods, or tubes.
- 134, Cleaning and Liquid Contact With Solids, subclasses 22.1+ for a process which includes treating work such as bottles, tubes, or other work having cavities by application of the treating agent to the interior surfaces.

**81.03 Rolling deformation or deflection:**

This subclass is indented under subclass 81.01. Process or apparatus wherein a plurality of roll elements are utilized to bend or misshape the workpiece causing scale to break away from the surface thereof.

SEE OR SEARCH CLASS:

- 72, Metal Deforming, subclass 127 for apparatus and methods in which metal is worked by bending it back and forth and proceeding with such working continuously along the metal to treat successive portions similarly, i.e., metal flexing, per se.

**81.04 For wire or rod:**

This subclass is indented under subclass 81.03. Process or apparatus which removes scale from a slender elongated flexible (wire) or inflexible (rod) member.

**81.05 With rotary head:**

This subclass is indented under subclass 81.01. Process or apparatus which utilizes a body which is driven about an axis upon which there is integral with, or mounted thereon, scale removal means.

**81.02 For hollow workpiece:**

This subclass is indented under subclass 81.01. Process or apparatus for removing scale from the surfaces of a tubular or open cylindrical article.

SEE OR SEARCH CLASS:

- 15, Brushing, Scrubbing, and General Cleaning, subclass 88 for a machine having a cleaning instrument of the

## SEE OR SEARCH CLASS:

407, Cutter for Shaping, subclasses 30+ for a device including a cutter adapted to turn about an axis and including structure for supporting that cutter for rotation.

**81.06 Fluid impingement:**

This subclass is indented under subclass 81.01. Process or apparatus which removes scale by loosening it with the aid of fluid generally applied with force.

## SEE OR SEARCH CLASS:

239, Fluid Sprinkling, Spraying, and Diffusing, for nozzle and related structure for applying fluid to a workpiece.

**81.07 With heater:**

This subclass is indented under subclass 81.06. Process or apparatus wherein the impinging fluid is maintained at a relatively high temperature (i.e., hot gas, etc.).

**81.08 Liquid jet:**

This subclass is indented under subclass 81.06. Process or apparatus wherein the fluid is in liquid form.

**81.09 Airblast:**

This subclass is indented under subclass 81.06. Process or apparatus wherein the fluid is in gaseous form.

**81.1 Chainer:**

This subclass is indented under subclass 81.01. Process or apparatus wherein the work contacting members comprise a series of links.

## SEE OR SEARCH CLASS:

59, Chain, Staple, and Horseshoe Making, subclasses 78+ for general purpose chain structure.

**81.11 Scraper or scalper:**

This subclass is indented under subclass 81.01. Process or apparatus wherein the workpiece is contacted by an edged instrument to remove or scalp the scale from a surface thereof.

(1) Note. Placement in this subclass requires more than cutting away small pieces of scale from a surface with a sharpened

blade or chisel which is classified in subclass 81.16.

## SEE OR SEARCH CLASS:

15, Brushing, Scrubbing, and General Cleaning, subclass 93.1 for a machine in which the sole cleaning instruments are scrapers.

**81.12 Brush type:**

This subclass is indented under subclass 81.01. Process or apparatus wherein the work contacting member has a plurality of anchored bristles which loosen or remove the scale.

## SEE OR SEARCH CLASS:

15, Brushing, Scrubbing, and General Cleaning, subclass 21.1 for a cleaning machine whose cleaning instruments are of the brush type.

**81.13 Mechanically powered operator:**

This subclass is indented under subclass 81.01. Process or apparatus wherein a mechanically driven work contacting member removes the scale.

**81.14 Tack or needle type:**

This subclass is indented under subclass 81.13. Process or apparatus wherein the work contacting member includes a plurality of narrow ended elongated members mounted adjacently in a work engaging orientation.

**81.15 Hammer:**

This subclass is indented under subclass 81.13. Process or apparatus wherein the work contacting member includes a solid head for striking the workpiece to break and/or loosen the scale.

## SEE OR SEARCH CLASS:

7, Compound Tools, subclasses 143+ for a tool comprising an impacting instrument having the dominant or general structure of a hammer.

**81.16 Blade or chisel:**

This subclass is indented under subclass 81.13. Process or apparatus wherein the work contacting member includes a cutting member such as a blade or chisel.

**81.17 Hand tool:**

This subclass is indented under subclass 81.01. Process or apparatus wherein a manually driven or guided work contacting member is employed to remove or prevent scale.

**SEE OR SEARCH CLASS:**

- 15, Brushing, Scrubbing, and General Cleaning, for pertinent subclass(es) as determined by schedule review.
- 76, Metal Tools and Implements, Making, for pertinent subclass(es) as determined by schedule review.
- 81, Tools, for all hand tools not structurally limited to any classified art.

**89.5 BURNING IN, WEARING IN, OR OIL BURNISHING:**

This subclass is indented under the class definition. Apparatus for burning in or wearing in the bearings of engines, usually internal-combustion engines, and running in or oil burnishing to limber the bearings and to test for detection of oil leakage at the joints of the casings.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 404, for a process of treating or assembling a part or parts while effecting similar forces or maintaining a similar environment to substantially duplicate those forces or environmental factors encountered in actual use of the part or parts.

**90.01 BURNISHING:**

This subclass is indented under the class definition. Process or apparatus for condensing, compacting, smoothing, or polishing the surface of an article by rubbing or otherwise engaging the article with means having a smooth surface of greater hardness than that of the article.

- (1) Note. Burnishing, by its nature, prevents any significant removal of surface material from a treated article or workpiece. This lack of material removal distinguished burnishing from grinding or abrading (which generally results in integral surface removal of material) and cleaning (which generally results in the

removal of foreign material from the surface of material). Consequently, grinding or abrading is generally provided for in Class 451, while cleaning is generally provided for in Class 15.

- (2) Note. See the Class Definition, paragraph 2, of this class (29).
- (3) Note. This subclass includes blasting an article with metal shot when not classifiable in Class 72, Metal Deforming, subclass 53. See the definition thereof including notes for the line. Search Class 15, Brushing, Scrubbing, and General Cleaning, subclass 95 for a device or process of shottng material to clean it.
- (4) Note. This subclass includes a metal rolling device for compacting the interior surface of an opening. For apparatus of like structure employed for expanding or a flanging tube, search Class 72, Metal Deforming, subclasses 115 and 317.
- (5) Note. This subclass includes a burnisher in combination with a cutter where the combined device may be employed for burnishing without cutting. For a reamer which has a guiding portion which may burnish but has a cutter which is necessarily used during such burnishing, see Class 408, Cutting by Use of Rotating Axially Moving Tool, subclass 199.
- (6) Note. This subclass includes a broach-like device which is forced through an opening in order to burnish the inside of the opening. For a broach, i.e., a tool having sharp cutting edges, which is similarly forced through a hole for the purpose of cutting the interior thereof, search Class 407, Cutters, for Shaping, subclasses 1 and 13+.
- (7) Note. This is the residual home for burnishing, not only of metal, but of any material unless provided for elsewhere.

**SEE OR SEARCH CLASS:**

- 12, Boot and Shoe Making, subclass 70 for a boot or shoe burnishing machine and subclass 104 for a boot or shoe burnishing hand tool.

- 15, Brushing, Scrubbing, and General Cleaning, subclass 95 and see (5) Note, above.
- 38, Textiles: Ironing or Smoothing, as the generic class for a process or apparatus for producing a smooth appearance on the surface of a textile article or fabric by pressing, stretching, rolling, sliding contact, or other means.
- 69, Leather Manufactures, particularly, subclass 17 for leather strap finishing by burnishing and subclasses 37 to 47 and subclass, 21 for a machine or process of burnishing leather.
- 72, Metal Deforming, and see (5) and (6) Notes, above.
- 100, Presses, for a press not elsewhere provided for.
- 205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, subclass 222 for burnishing steps combined with electrolytic coating and subclass 141.5 for electrolytic polishing.
- 396, Photography, subclasses 658+ for burnishing means for photos:graphic images.
- 407, Cutters, for Shaping, subclass 13 for a broaching machine and see (6) Note, above.
- 428, Stock Material or Miscellaneous Articles, subclass 687 for metallic stock material having a defined surface feature, e.g., smoothness.
- 451, Abrading, subclasses 36+ for a process of abrading by fluent abradant (especially subclasses 38+ for a process of sand blasting) and subclasses 75+ for a sandblasting machine.
- 90.1 Of water laid fibrous article (e.g., paper):**  
This subclass is indented under subclass 90. Process or apparatus for burnishing materials made by a paper making operation, i.e., depositing fibrous material from a slurry onto a foraminous screen or mold surface.
- SEE OR SEARCH CLASS:  
162, Paper Making and Fiber Liberation, subclass 205 for the combination of forming an endless web and subsequently subjecting it to pressure, subclasses 224+ for a process of forming an article and subsequently subjecting it to pressure, and subclass 288 for the combination of forming and burnishing means.
- 493, Manufacturing Container or Tube From Paper; or Other Manufacturing From a Sheet or Web, for the combination of bending, folding, creasing, assembling, i.e., a basic operation of Class 493 combined with burnishing. Search especially subclass 271 for making a tube from a nonmetal sheet or web combined with minute size change of the formed tube and subclass 291 for making a nonmetal tube from a sheet or web combined with surface treatment. Search especially subclass 467 for surface treatment of a sheet or web other than burnishing. Burnishing, per se, of paper (or other material) is to be found in Class 29, subclasses 90.1+.
- 90.2 Heated burnishing member:**  
This subclass is indented under subclass 90.1. Process or apparatus in which the burnishing tool operates at an elevated temperature.
- SEE OR SEARCH CLASS:  
162, Paper Making and Fiber Liberation, subclasses 377+ for apparatus in which a heated die treats paper during a stage of its manufacture.
- 90.3 Burnishing tool reciprocates across work surface:**  
This subclass is indented under subclass 90.2. Process or apparatus in which the burnishing tool has a back and forth motion while in contact with the work.
- 90.5 Continuous feed:**  
This subclass is indented under subclass 90.01. Process or apparatus for burnishing a relatively elongated article of indefinite length, such as a wire, rod, tube, etc., by feeding the same longitudinally through or past the burnishing device.
- (1) Note. This subclass includes a machine or a process for smoothing, polishing, or compacting covered wire such as an insulated electric conductor.

**SEE OR SEARCH CLASS:**

- 15, Brushing, Scrubbing, and General Cleaning, especially subclasses 77, 88, 102, 104.04, and 269.
- 26, Textiles: Cloth Finishing, especially subclass 2.
- 28, Textiles: Manufacturing, subclasses 217+ for a thread finishing method or apparatus not elsewhere provided for.
- 57, Textiles: Spinning, Twisting, and Twining, especially subclass 138.
- 118, Coating Apparatus, subclasses 100+ for apparatus having a solid member for modifying a coating on the work.
- 144, Woodworking, especially subclass 49 for a miscellaneous single operation woodworking machine.
- 451, Abrading, particularly subclasses 64+ for an abrading machine, generally, subclasses 67+ for an abrading machine combined with a nonabrading means, subclasses 75+ for a sandblast machine, and subclasses 103+ for an abrading machine comprising a scouring device.
- 493, Manufacturing Container or Tube From Paper; or Other Manufacture From a Sheet or Web, subclass 467.

**90.6 Of gear article:**

This subclass is indented under subclass 90.01. Process or apparatus wherein the article is a toothed wheel, cylinder, or other machine element capable of meshing with another toothed element to transmit motion, change speed, or change direction.

**90.7 By shot peening or blasting:**

This subclass is indented under subclass 90.01. Process or apparatus wherein the condensing, compacting, smoothing, or polishing is effected by either hammering or bombarding the surface with hard shot.

**91 UPHOLSTERED ARTICLE MAKING:**

This subclass is indented under the class definition. Process or apparatus for the shaping and/or assembling of a padded or stuffed furniture component.

- (1) Note. A full search for pertinent art must include other subclasses in this class

organized, in the main, on the basis of particular mechanisms or method steps.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 33+, for plural diverse manufacturing apparatus.
- 592+, for a specific process of shaping or assembling.
- 700+, for an assembling apparatus.

**SEE OR SEARCH CLASS:**

- 5, Beds, for a support for sleeping, which may be upholstered.
- 53, Package Making, subclasses 523+ for a reshaping device which compacts or stretches material (e.g., as in mattress filling) and subclasses 436+ for a related process.
- 100, Presses, for patents to a particular process or device for compacting or compressing material.
- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, for a process of or apparatus for adhesive bonding in the manufacture of upholstery.
- 223, Apparel Apparatus, particularly subclasses 28+ and 52+ for pleating, shaping, or stretching of material somewhat analogous to upholstery.
- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, for a method of shaping plastic material, particularly, subclasses 41+ for shaping of foam material.
- 425, Plastic Article or Earthenware Shaping or Treating: Apparatus, for apparatus for shaping plastic material, particularly, subclass 4 for means for molding foam material.

**91.1 Method:**

This subclass is indented under subclass 91. Process of making a shaped, padded, or stuffed furniture component.

**91.2 Tufting:**

This subclass is indented under subclass 91. Apparatus for compressing and retaining portions of a furniture cushion or padded furniture component usually at regular intervals in accord with a desired pattern.

- (1) Note. Included here (91.2) are patents which, in addition to means for compressing, merely provide access for fastener means.

**SEE OR SEARCH CLASS:**

- 28, Textiles: Manufacturing, subclass 147 for a device for making a tuft or tassel.
- 112, Sewing, subclasses 2.1+ for a mattress sewing machine and subclasses 117+ for a quilting machine.
- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclass 91 for a process of surface bonding and/or assembly therefor including separate mechanical joining means, subclasses 250+ for a process of surface bonding and/or assembly therefor including punching, and subclasses 510+ for a surface bonding means and/or assembly means therefor including punching.
- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, especially subclasses 241+ for mechanical shaping or molding to form or reform a shaped article to produce a composite, plural part or multilayered article and digest 82 for an art collection including embossing by foaming.

**91.3 With means to clench fastener:**

This subclass is indented under subclass 91.2. Apparatus including means to deform the end or ends of a fastener inserted in a compressed portion of a cushion.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 243.5+, for a means for assembling parts by clenching a fastener thereabout.

**91.4 With means to insert guide pin or fastener:**

This subclass is indented under subclass 91.2. Apparatus including means for passing an element through a compressed portion of a furniture cushion or stuffed mattress which element either facilitates the assembly of a fastener member or is a fastener member to secure the compression of the entire cushion and/or localized portions thereof.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 91.3, for means to insert a fastener as well as clench the fastener end.
- 525+, for a process of assembling by a driven force fit.

**SEE OR SEARCH CLASS:**

- 227, Elongated-Member-Driving Apparatus, subclasses 19+ for combined apparatus for assembling workpieces and applying a member, e.g., nail, thereto.

**91.5 Cover stretching:**

This subclass is indented under subclass 91. Apparatus for drawing or pressing an outer fabric layer onto or about a stuffed or padded furniture component.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 33+, for plural diverse manufacturing apparatus.
- 592+, for a specific process of shaping or assembling.
- 700+, for an assembling apparatus.

**SEE OR SEARCH CLASS:**

- 5, Beds, for a support for sleeping, which may be upholstered.
- 53, Package Making, subclasses 523+ for a reshaping device which compacts or stretches material (e.g., as in mattress filling) and subclasses 436+ for a related process.
- 100, Presses, for patents to a particular process or device for compacting or compressing material.
- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, for a process of or apparatus for adhesive bonding in the manufacture of upholstery.
- 223, Apparel Apparatus, particularly subclasses 28+ and 52+ for pleating, shaping, or stretching of material somewhat analogous to upholstery.
- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, for a method of shaping plastic material, particularly, subclasses 41+ for shaping of foam material.

425, Plastic Article or Earthenware Shaping or Treating: Apparatus, for apparatus for shaping plastic material, particularly, subclass 4 for means for molding foam material.

**91.6 Edge-roll forming:**

This subclass is indented under subclass 91. Apparatus for forming a cylindrical piping-like portion along a corner or edge of a stuffed furniture component.

- (1) Note. The patents herein provide means to reshape a corner into a cord-like bumper along the corner.

SEE OR SEARCH THIS CLASS, SUBCLASS:

243.57+, for edge binding or covering apparatus, generally.

**91.7 Form or holder:**

This subclass is indented under subclass 91. Apparatus which supports and/or provides a desired configuration pattern for a stuffed furniture component during manufacture.

- (1) Note. Included here are patents for a form with means to hold a tuft element in a desired position in a pattern.

SEE OR SEARCH CLASS:

269, Work Holders, for a work holder of general utility not elsewhere provided for.

**91.8 With follower:**

This subclass is indented under subclass 91.7. Apparatus wherein the support or configuration pattern includes a plate or platen movable with respect to an opposite support element so as to compress the furniture component.

- (1) Note. No means is set forth to effect the movement of the follower.

SEE OR SEARCH THIS CLASS, SUBCLASS:

91.2, for a device which includes means to compact a furniture cushion in localized areas for tufting.

**213.1 Valve applying or removing:**

This subclass is indented under subclass 700. Apparatus for the assembling, securing, or disassembling of various types of valves or valve parts.

- (1) Note. This and indented subclasses include, for example: (a) the removal or placement of a water main or other main valve or engine valve spring and guide units. (b) the removal or placement of a water main or other main valve, including a pressure housing for facilitating this operation under the pressure of the main, and the insertion and removal of valve plugs to seal the main while assembly operation is being carried on. (For similar pressure housing usable in boring or drilling mains, see Search Notes below) (c) the manipulation of an engine valve rocker arm. (d) a support for supporting a valve in lifted position with the spring compressed. (e) apparatus for holding a valve spring in compressed condition. (f) apparatus for compressing an engine valve spring while on or off an engine.

SEE OR SEARCH CLASS:

137, Fluid Handling, subclass 15.17 for a process having a particular mounting or repairing feature for a valve or valve member, subclasses 15.18-15.26 for a process of assembling, disassembling, or repairing a valve or valve member, or subclasses 315.41-315.42 for a tool for applying or removing a valve or valve member.

**214 Engine valve unit puller or applier:**

This subclass is indented under subclass 213.1. Apparatus for pulling an engine valve unit (e.g., a valve, spring, or valve guide) from an engine block.

SEE OR SEARCH THIS CLASS, SUBCLASS:

215+, for apparatus for only compressing an engine valve spring.

- 215 Engine valve spring compressor (only):**  
This subclass is indented under subclass 213.1. Apparatus for compressing, or holding compressed, a valve spring of an engine (e.g., an internal combustion engine) to facilitate extraction of a valve key or pin.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 226, for apparatus for compressing helical transmission springs.  
227, for apparatus for compressing other helical springs.  
249, for apparatus for removing or inserting a valve stem key or pin.

SEE OR SEARCH CLASS:

- 81, Tools, subclass 486 for a resilient article tensioner or compressor.  
254, Pushing and Pulling Implements, subclass 10.5 for a spring stretcher or compressor having a force multiplying operator.

- 216 Plural spring engagement:**  
This subclass is indented under subclass 215. Apparatus in which the compressor has provision for operating on a plurality of springs for compressing the same simultaneously.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 226, for apparatus for compressing plural helical transmission springs simultaneously.

- 217 Screw operated:**  
This subclass is indented under subclass 215. Apparatus in which the means for developing the spring compressing force involves a screw.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 256+, for a screw operated means to assemble, generally.

- 218 Parallel or tong type, side entrance:**  
This subclass is indented under subclass 217. Apparatus in which the compressor includes spaced parallel or tong type bars, each having co-planar jaws at one end for engaging the spring from the side, the other ends of the bars being connected by a screw operated mecha-

nism for moving the jaws and bars toward or away from each other in a compressing operation.

- (1) Note. The bars may be parallel and maintained parallel by the mechanism, or may be substantially parallel but pivoted to the mechanism, which mechanism operates the bars around the pivot in quasi tong type.

SEE OR SEARCH CLASS:

- 81, Tools, for a hand tool of general utility or an assembling tool which structurally recognizes only one work part.

- 219 Lever operated:**  
This subclass is indented under subclass 215. Apparatus in which the compressor has provisions for operating on a single spring for compressing the same, the compressor having for its prime operating power a lever, or a lever operated linkage system.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 222+, for a lever operated piston ring inserter or remover.  
246, for a lever operated battery terminal puller.  
247+, for a lever operated cotter pin puller.  
249, for a lever operated valve stem pin or key puller.  
267+, for a miscellaneous lever operated pusher or puller.

- 220 Single jaw or valve engagement:**  
This subclass is indented under subclass 219. Apparatus in which the compressor has a single engagement with the valve spring or valve, i.e., a single jaw engages the springs or the valve and has reaction against other parts of the motor block and not against the spring or valve.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 219, and 221, for a lever operated valve compressor having opposed jaws engaging spaced parts of a spring or a spring and valve.



**221 Plier type:**

This subclass is indented under subclass 219. Apparatus in which the lever operated compressor is of the plier type of construction or operation, namely the jaws are caused to move toward or away from each other by squeezing in two relatively movable handles or levers.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 216, for a plier type plural spring compressor.
- 218, for a parallel or tong type side entrance valve compressor having levers or handles that are caused to move toward or away from each other by a screw.
- 223+, for a plier type piston ring inserter or remover.
- 226, for a plier type transmission spring compressor.
- 232, for a plier type clock or watch staker.
- 246, for a plier type battery terminal puller.
- 248, for a plier type cotter pin puller.
- 249, for a plier type valve stem pin or key puller.
- 268, for a miscellaneous plier type device.

SEE OR SEARCH CLASS:

- 81, Tools, for a hand tool of general utility or an assembling tool which structurally recognizes only one work part.

**221.5 To or from wheel rim of resilient tire or tube:**

This subclass is indented under subclass 213.1. Hand tool or assembling or removing a valve for a pneumatic tire or tube with or from the rim or other portion of the wheel with which the tire or tube is associated.

- (1) Note. The air valve may be encased in a resilient sheath which fits in a hole in the rim with a grommet effect to seal the valve to the rim.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 235, for a tool for inserting or removing a resilient grommet in a hole, and see (1) Note, above.

SEE OR SEARCH CLASS:

- 81, Tools, subclasses 15.2+ for a tool for repairing a resilient tire and, especially, subclass 15.4 for a tool for deflating a tire by air valve actuation.
- 157, Wheelwright Machines, for assembling a tire or tube to or from a rim or a wheel.

**221.6 Removal tool:**

This subclass is indented under subclass 213.1. Apparatus for disassembling or extracting any of various types of valve or valve parts.

**222 Piston ring inserter or remover:**

This subclass is indented under subclass 700. Apparatus for inserting or removing a piston ring in the receiving groove of a piston, (e.g., for an internal combustion engine) or for facilitating such an operation.

- (1) Note. This subclass includes, for example: (a) a piston ring compressor for compressing a piston ring around a piston or for contracting and holding a single ring for the reception of a mandrel holder. (b) apparatus for expanding a ring for removal or application to a piston. (c) a guide through which a piston with a ring(s) is moved, the guide compressing the ring during such movement.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 229, for a circular spring applier or remover.
- 269, for apparatus for compressing and holding a group of piston rings.

SEE OR SEARCH CLASS:

- 81, Tools, subclasses 3.4+ for a similarly constructed tool for use in removing receptacle closures.

**223 Plier-type operation:**

This subclass is indented under subclass 222. Apparatus which is of the plier type or has plier type operation.

SEE OR SEARCH CLASS:

- 81, Tools, for a hand tool of general utility or an assembling tool which structurally recognizes only one work part.

- 224 With ring encirclement:**  
This subclass is indented under subclass 223. Apparatus provided with means for partly or completely encircling a piston ring.
- 225 Spring applier or remover:**  
This subclass is indented under subclass 700. Apparatus for assembling or disassembling components of a spring or of a spring and another member.
- (1) Note. "Securing" is considered to be a type of "assembling".
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
213.1+, particularly 215+ for apparatus dealing with a valve (including engine valve) spring.  
222+, for piston ring apparatus.  
270+, for hand-manipulatable spring nut applier or remover.  
805, for apparatus for applying a spring retainer in a doll set.
- SEE OR SEARCH CLASS:  
79, Button Making, subclass 3 for inserting a spring retainer in a button.  
81, Tools, subclass 3.7 for a device for prying apart the leaves of a leaf spring assembly, subclass 7.5 for a main-spring winder for a watch or clock, and subclass 486 for a resilient article tensioner or compressor.  
254, Implements or Apparatus for Applying Pushing or Pulling Force, subclass 10.5 for a spring stretcher or compressor.
- 226 Transmission spring:**  
This subclass is indented under subclass 225. Apparatus for applying or removing a transmission spring.
- (1) Note. This subclass includes means to compress a helical transmission spring and includes a compressor engaging a plurality of springs at a time.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
215+, for a compressor for a helical engine valve spring.
- 227 Helical spring:**  
This subclass is indented under subclass 225. Apparatus for applying or removing a helical spring.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
215+, for apparatus for compressing a helical engine valve spring, holding such a spring, or for otherwise applying or removing an engine valve spring.  
226, for a helical transmission spring compressor.
- SEE OR SEARCH CLASS:  
53, Package Making, subclass 114 for apparatus for compressing coil springs and placing them in a cover (e.g., mattress or upholstery ticking).
- 228 Flat spiral spring (e.g., watch or clock type):**  
This subclass is indented under subclass 225. Apparatus for applying or removing a flat spiral spring, e.g., a watch or clock spring.
- SEE OR SEARCH CLASS:  
81, Tools, subclass 7.5 for a tool for winding a mainspring.
- 229 Circular spring:**  
This subclass is indented under subclass 225. Apparatus for applying or removing a circular spring, i.e., a single convolution spring of general circular shape.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
222+, for a piston ring inserter or remover.  
249, means for applying a key of split ring form to a valve stem.  
729+, for means for applying a split spacer disc to an electrical conduit.  
765, for means to place a traveler on a ring, or a ring on a bobbin in a textile machine.
- 230 Leaf spring:**  
This subclass is indented under subclass 225. Apparatus for applying or removing a leaf spring, having either single or plural leaves.

## SEE OR SEARCH CLASS:

254, Implements or Apparatus for Applying Pushing or Pulling Force, for a jack which is to be used to elevate a vehicle chassis relative to its running gear to thereby flex the vehicle springs.

**231 Means to stake watch or clock:**

This subclass is indented under subclass 700. Apparatus for removing arbors from watch pinions or hands from shafts, inserting arbors into watch pinions, or inserting the leaves of lantern pinions, etc.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

177+, for a process of mechanical manufacture of a watch or a clock.  
244+, for an assembling device comprising a pusher or puller, in general.

## SEE OR SEARCH CLASS:

81, Tools, subclasses 6+ for other watchmakers' tools.

**232 Plier type:**

This subclass is indented under subclass 231. Apparatus of the plier or pincer type.

## SEE OR SEARCH CLASS:

81, Tools, for a hand tool of general utility or an assembling tool which structurally recognizes only one work part.

**233 Brake lining to brake shoe:**

This subclass is indented under subclass 700. Apparatus for stretching or holding brake lining on a brake shoe to facilitate securement of the lining to the shoes, or for applying a fastener to secure the lining to the shoe.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

525.06+, for a process of riveting to secure a brake lining to a brake shoe.

## SEE OR SEARCH CLASS:

100, Presses, for a press for bonding a brake lining to a brake shoe, especially subclasses 300+ for a press for securing a lining to a shoe combined

with means to heat, cool, or dry the article or press.

156, Adhesive Bonding and Miscellaneous Chemical Manufacture, for a device for adhesively bonding a brake lining to a brake shoe comprising more than a mere press.

**234 Tube and coextensive core:**

This subclass is indented under subclass 700. Apparatus for assembling or disassembling a tube to or from a core that in assembled position is substantially coextensive with the tube.

(1) Note. The core may be tubular or of any other configuration.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

235+, for means for applying or removing a resilient element, including means for applying a noncoextensive resilient element to the interior of a tube, and means to apply a resilient tube or sleeve to a longer object.  
237, for means to assemble a coupling to a conduit.  
469.5, for a process of mechanical manufacture including metal deforming with nonmetallic bonding.  
517+, for a process of axially joining a hollow body to a rod or other elongated body.

## SEE OR SEARCH CLASS:

74, Machine Element or Mechanism, subclasses 500.5+ for a control lever or linkage system comprising a hand operated flexible transmitter.  
138, Pipes and Tubular Conduits, subclass 131 for a flexible pipe having a spirally wound metal core, subclass 139 for a flexible pipe having a metal core and subclasses 142 and 143 for another pipe having a metal core.  
156, Adhesive Bonding and Miscellaneous Chemical Manufacture, for an assembly operation combined with adhesive joining of the assembled parts.  
464, Rotary Shafts, Gudgeons, Housings, and Flexible Couplings for Rotary Shafts, subclasses 52+ for a flexible shaft within a housing.

**235 To apply or remove a resilient article (e.g., tube, sleeve, etc.):**

This subclass is indented under subclass 700. Apparatus for assembling or disassembling a resilient member with another member.

- (1) Note. Included herein is means to apply or remove a resilient tube, sleeve, etc., to or from another member; means to flex a resilient metal article within its elastic limit to facilitate assembly or disassembly; and means to apply a teat cup to a cooperating ring.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 215+, for an engine valve spring compressor.  
 222+, for a piston ring inserter or remover.  
 225+, for a spring applier or remover.  
 269, means for compressing and holding a group of piston rings.  
 446+, for a process of stressing a part within its elastic limit and assembling it with another part while it is stressed.  
 765, for means to place a traveler on a ring or to place a ring on a bobbin of a textile machine.  
 805, for means to apply a spring retainer to a doll set.  
 807, for means to apply watch crystal to a watch case.

**SEE OR SEARCH CLASS:**

- 12, Boot and Shoe Making, subclasses 109 and 110+ for a shoe last stretcher.  
 100, Presses, subclass 9 for a binder applying device, not otherwise provided for, which places a binder about material, the binder being circumferentially closed and ringlike prior to such placement.  
 119, Animal Husbandry, subclasses 14.47+ for teat cup structure.

**235.5 Nipple to nursing bottle:**

This subclass is indented under subclass 235. Apparatus for elastically expanding the open end of a resilient nipple for the insertion of the mouth of a nursing bottle into the nipple and removable from between the overlapped ends of bottle and nipple to permit the nipple to contract about and grip the bottle.

**SEE OR SEARCH CLASS:**

- 53, Package Making, subclasses 287+ and 476+ for a method of, or apparatus for applying a closure to a portable receptacle.  
 215, Bottles and Jars, subclasses 11.1+ for a nursing bottle including one with means for withdrawing the contents and subclass 387 for a nipple applier claimed in combination with a bottle or nipple.

**236 Well protector to sucker rod:**

This subclass is indented under subclass 235. Apparatus for applying or removing a well protector to or from a well sucker rod.

- (1) Note. The well protector of this subclass is commonly a resilient thick sleeve.  
 (2) Note. This subclass includes apparatus for stretching the protector and placing the same on the drill pipe or rod apparatus for stretching the protector and placing it on a carrier and the carrier that transports the expanded protector to a position on the drill pipe or rod.

**SEE OR SEARCH CLASS:**

- 277, Seal for a Joint or Juncture, subclass 323 for a seal for well apparatus having an installation, removal, assembly, disassembly, or repair feature.

**237 Coupling to conduit:**

This subclass is indented under subclass 700. Apparatus for assembling and securing or disassembling a coupling and a conduit.

- (1) Note. A machine for bringing the coupling and conduit together and for crimping is included in this subclass.

**SEE OR SEARCH CLASS:**

- 254, Implements or Apparatus for Applying Pushing or Pulling Force, subclass 29 for a jack especially designed for driving or pulling pipe otherwise than by impact.

**237.5 Loose-leaf sheet binder:**

This subclass is indented under subclass 700. Apparatus for supporting and guiding the motion of a separable loose-leaf binder device from a closed position to an open position to permit insertion or removal of a sheet.

- (1) Note. The operation of assembly or disassembly is usually manual, the apparatus merely serving as a support and guide for assembly operation.

**SEE OR SEARCH CLASS:**

- 248, Supports, subclasses 441.1+ for an easel, book, or music score holder support.
- 269, Work Holders, appropriate subclasses for means supporting a loose-leaf book or sheet, per se, for the purpose of writing thereon.

**238 Compressing parts together face to face:**

This subclass is indented under subclass 700. Apparatus that compress article parts together face to face for facilitating assembling.

- (1) Note. This subclass includes, for example: (a) apparatus for pressing overlapping apertured plates together to hold them while bolts or rivets are being applied. (b) apparatus for compressing stacked plates together face to face.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 244+, for apparatus for forcing interfitting parts into engagement, or for pulling them apart.

**SEE OR SEARCH CLASS:**

- 269, Work Holders, subclasses 37+ for plural holders which hold workpieces relative to each other.
- 411, Expanded, Threaded, Driven, Headed, Tool-Deformed, or Locked-Threaded Fastener, for a bolt, screw, or rivet that may be used for temporary fastening.

**239 Spreading parts apart or separating them from face to face engagement:**

This subclass is indented under subclass 700. Apparatus having (1) article engaging means moving in opposed directions for spreading parts apart or (2) for breaking a face to face engagement or for separating parts from a face to face engagement.

- (1) Note. The apparatus under (1) is distinguished from that under subclasses 244+ by a spreading operation as distinguished from a plain push or pull and is characterized by spaced jaws or article engaging means that are motivated in opposite directions to create a spreading action.
- (2) Note. The apparatus under (2) is generally of the character that breaks the adhesion of an automobile head and block.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 223, for a plier type device that engages the ends of a split piston ring to force the ends apart.
- 252, for means to assemble or disassemble including means to separate parts by fluid expansion.

**SEE OR SEARCH CLASS:**

- 12, Boot and Shoe Making, subclasses 109 and 110+ for shoe last stretching.
- 81, Tools, subclass 3.7 for a special tool for spreading the leaves of a leaf spring assembly apart, usually for the purpose of inserting lubricant therebetween; subclass 302 for a special tool having outwardly-facing work-engaging jaw surfaces; and subclass 485 for a tool for spreading one portion of a workpart from another portion, or for spreading apart two parts without disassembling them from each other.

**240 By rotation of work part:**

This subclass is indented under subclass 700. Apparatus in which the apparatus assembles or disassembles parts by rotating one or more parts with respect to another part or parts.

- (1) Note. Included here is a device for juxtapositioning and securing a screw type closure on an open ended collapsible tube.

**SEE OR SEARCH CLASS:**

- 53, Package Making, subclasses 317+ for apparatus for applying screw closures to receptacles.
- 81, Tools, subclass 3.07 for a receptacle closure removing tool and subclasses 52+ for a wrench for exerting a twisting strain to a workpart.
- 140, Wireworking, subclasses 92.3+ for intercoiling of helices of wire with each other or with successive loops or apertures by rotation of said helices with or without the concurrent helix forming.
- 173, Tool Driving or Impacting, subclass 164 for a means to drive a tool about an axis including means to hold and relatively rotate sections of tool shaft.
- 470, Threaded, Headed Fastener, or Washer Making: Process and Apparatus, subclasses 48+ for machines for assembling nuts or bolts by a screwing operation.

**240.5 Means to insert or remove helix:**

This subclass is indented under subclass 240. Devices wherein one of the parts is a wire-like or wire coil.

- (1) Note. Included herein is a device for positioning or removing a helical thread element with or without further securing means.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 227, for a helical spring applier or remover of general utility.
- 456, for a process including assembling a spirally convoluted member of substantially uniform cross section form to a second member.

**SEE OR SEARCH CLASS:**

- 72, Metal Deforming, subclass 409 for a plier type deforming tool.
- 140, Wireworking, subclass 92.3 for a method or apparatus for helix screw-

ing through one or more rows of loops or openings.

- 411, Expanded, Threaded, Driven, Headed, Tool-Deformed, or Locked-Threaded Fastener, subclass 438 for a wire coil spring thread insert, per se.

**241 Means to string:**

This subclass is indented under subclass 700. Apparatus that assemble or disassemble by a stringing action, either by stringing parts on an attenuated or elongated means, or by passing such means through a part or parts.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 279, for a device which having centrifugal separator discs strung thereon.
- 433, for a process of assembling by a stringing operation.
- 729+, for apparatus for placing a spacer disc on an electrical conduit.
- 765, for means to place a traveler on a ring or to place a ring on a bobbin of a textile machine.

**SEE OR SEARCH CLASS:**

- 12, Boot and Shoe Making, subclass 58.5 for a machine for placing lacings in the upper of a shoe or for removing the lacings therefrom.
- 53, Package Making, subclass 581 for means for forming a package by placing contents material on a core or spindle.
- 100, Presses, subclass 12 for apparatus, not otherwise provided for, for placing a binder which passes through the opening in ring-like material.
- 112, Sewing, subclasses 470.21+ for a machine for inserting a draw string by means of a needle, subclass 10 for a sewing machine which seams a bag and also inserts a draw string in a hem, and subclasses 223 and 224 for a needle threading attachment for a sewing machine.
- 223, Apparel Apparatus, subclass 48 for bead stringing means; subclass 50 for a device for inserting a tape, thread, or cord into a garment, lace and the like; subclass 99 for a device for threading a needle; subclasses 102+ for a needle which is a pointed instrument having

an eye, hook, or equivalent to attach to a thread, tape, or the like for sewing, threading, or attaching the thread to a fabric; and subclass 105 for a curtain rod threader.

- 254, Implements or Apparatus for Applying Pushing or Pulling Force, subclasses 134.3+ for apparatus for threading electric conductor wire or a leader therefor in a conduit or along a messenger cable.

**242 Tool handle and tool:**

This subclass is indented under subclass 700. Apparatus for assembling or disassembling a tool handle and a tool.

- (1) Note. This subclass includes, for example: (a) Apparatus for assembling or disassembling the parts of a handle or the parts of a tool. (b) Apparatus for assembling a tool with or disassembling a tool from a handle. (c) Apparatus for inserting a pin for securing a tool handle to a tool.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 243, for means to assemble a tool chuck and a tool.  
 244+, for means to assemble comprising a pusher or puller in general.  
 426.1+, for a process of disassembly.  
 428+, for a process of assembling or joining.

SEE OR SEARCH CLASS:

- 76, Metal Tools and Implements, Making, for pertinent subclass(es) as determined by schedule review.  
 144, Woodworking, subclasses 254 through 271 for wood bending.  
 403, Joints and Connections, for a connection between a tool and a handle, wherein only such structure of the tool and handle as cooperates to effect the connection is included.

**243 Tool chuck and tool:**

This subclass is indented under subclass 700. Apparatus for assembling or disassembling a tool chuck and a tool.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 242, for apparatus to assemble a tool handle and a tool chuck.  
 244+, for assembly or disassembling means comprising a pusher or puller in general.  
 426.1+, for a process of disassembling.  
 428+, for a process of assembling or joining.  
 592+, for a process of mechanical manufacture, generally.

SEE OR SEARCH CLASS:

- 279, Chucks or Sockets, for a tool chuck, per se.

**243.5 Overedge assembling means:**

This subclass is indented under subclass 700. Apparatus for assembling a first element or portion thereof around an edge of a second element and into overlapping relationship with the second element, the assembly being accomplished in whole or in part by deforming, i.e., stressing beyond the elastic, the first element.

- (1) Note. Subclasses 244 through 283 herebelow, comprising assembly apparatus of the nature there specified, were established before this subclass (243.5) and indented subclasses and have not been screened. Appropriate subclasses among them should be searched when advisable.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 509, for a process of assembling including overedge clamping of a seated part.  
 769, for means for attaching a slide fastener element to a tape.

**243.51 Belt-hook attacher:**

This subclass is indented under subclass 243.5. Apparatus for clinching one or more clips adapted to receive a connecting member (e.g., a hinge pin) along the end of a belt.

**243.517 Annular work:**

This subclass is indented under subclass 243.5. Apparatus wherein the first element is marginally defined by an outer circular border and by an inner circular border, concentric with the outer border.

- (1) Note. The “first element” of this subclass may be very short in the dimension of the axis of the borders in the case of a ring or may be longer so that the element is a tube.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

726+, for apparatus used to make a heat exchanger, e.g., to secure a boiler tube to a plate.

**243.518 With radially acting tool inside annular work:**

This subclass is indented under subclass 243.517. Apparatus wherein the first element is deformed by a shaping surface urging a portion thereof to move away from the its axis, wherein the shaping surface is part of a member between the inner border and the axis.

SEE OR SEARCH CLASS:

72, Metal Deforming, subclass 391.6 for a device including concentric or telescoped deforming tools wherein a tool fits inside a hollow metal fastener workpart to reshape that workpart into engagement with another member in which the fastener is fitted for securement, wherein no part of the device is in engagement with the other member, and subclass 393 for three or more tools inside an annular workpiece with provision to effect radial expansion of the workpiece by moving one of the tools radially with respect to the others.

**243.519 With second workpiece inside annular work one workpiece moved to shape the other:**

This subclass is indented under subclass 243.517. Apparatus wherein a first tool engages the annular member and a second tool engages a second member which is inside the cavity of the annular member to move the members relative to each other such that one member is stressed beyond its elastic limit.

**243.521 Comprising driver for snap-off-mandrel fastener: e.g., pop (tm) riveter:**

This subclass is indented under subclass 243.519. Apparatus wherein a first tool engages an annular end surface of a tube-like

workpiece, which surface generally faces the device, which first tool includes a passageway coaxial with the tubular axis of that workpiece, and wherein a second tool functions within that passageway to engage a shank portion of a second workpiece extending through the tubular axis of the work and through the coaxial passageway, which first tool urges against the annular surface and which second tool reactively pulls against the shank with sufficient force moves the second workpiece with respect to the first and to ultimately exceed the tensile strength of the shank portion and thereby divide one portion of the shank from the remainder thereof, which remainder serves with the tubular first workpiece as a fastener.

- (1) Note. The first and second workpiece of this subclass are normally supplied in the magazine as an assembly and are to be brought into assembly with another work part not originating in the storage chamber.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

812.5, for a driver for a snap-off-mandrel fastener including a fastener supply magazine.

**243.522 Including near side fastener shaping tool:**

This subclass is indented under subclass 243.522. Device intended to deform the annular surface of the work that faces the device.

**243.523 Pneumatic- or fluid-actuated tool:**

This subclass is indented under subclass 243.521. Device wherein one of the tools is urged to move with respect to the other to effect metal deformation by a flowable medium.

- (1) Note. (1) Incompressible fluid, e.g., liquid; (2) compressible fluid, e.g., gas; or (3) a flowable solid, e.g., pelletized material might be used as the urging medium of this and the indented subclasses.
- (2) Note. A device having a vacuum “driver”, i.e., a piston moved by ambient air pressure, is included herein.



- (3) Note. A device including an explosively actuated piston is included herein.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

453.01+, for a pneumatic- or fluid-actuated metal deforming tool, generally.

**243.524 Liquid:**

This subclass is indented under subclass 243.523. Device wherein the flowable medium is in the liquid state, i.e., is generally incompressible.

**243.525 And gas:**

This subclass is indented under subclass 243.524. Device wherein flowable medium in the liquid state is used as tool urging flowable medium and wherein flowable medium in the gaseous state is also used at tool urging medium.

- (1) Note. Included herein is a device having a cylinder powered by a gas (e.g., compressed air) that, in turn, drives a piston to pressurize a liquid which serves to move the tools.
- (2) Note. Included herein is a device utilizing liquid to effect repositioning (and deformation) of the "elements" and gas to return the tools to the resting position.

**243.526 Having rotary drive mechanism:**

This subclass is indented under subclass 243.521. Device including provision to move one tool with respect to the other to effect the deforming action, which provision turns more than 360 degrees.

- (1) Note. The "drive" of this subclass must be mechanically connected to one of the tools, e.g., a rotary electric motor that drives a tool via a gear box is included herein even though the final drive may not turn more than 360 degrees, whereas a rotary electric motor that drives a pump which transmits fluid to drive one of the tools is excluded.

**243.527 Having allochiral actuating handles:**

This subclass is indented under subclass 243.521. Device including provision to move one tool with respect to the other comprising a pair of mirror image members intended to be engaged by the hands of the operative and moved equally but oppositely with respect to each other and with respect to the remainder of the device to effect deformation.

**243.528 Having repositionable annulus engaging tool:**

This subclass is indented under subclass 243.521. Device wherein the tool having a passageway therethrough is adapted to be readily removed and replaced by another similar tool also mounted on the device, or is mounted to be shifted in position with respect to the remainder of the device.

**243.529 Including near side fastener shaping tool:**

This subclass is indented under subclass 243.519. Device intended to deform the annular surface of the work that faces the device.

**243.53 Riveter:**

This subclass is indented under subclass 243.5. Apparatus including means to upset or otherwise deform a rivet or like rod-shaped first element, or a similar portion of work, means to assemble such rivet to other work or to cause such rivet to secure components of other work together.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

243.52, for apparatus which deforms annular work, e.g., a hollow rivet or a boiler tube end.

SEE OR SEARCH CLASS:

- 72, Metal Deforming, for metal deforming apparatus (no assembly).
- 157, Wheelwright Machines, subclass 1.55 for a wheelmaking machine with a spoke-end header.
- 173, Tool Driving or Impacting, for a rivet-driver, per se.
- 227, Elongated-Member-Driving Apparatus, for riveting apparatus which forcibly drives a rivet into work prior to deforming the rivet.

**243.54 Single header:**

This subclass is indented under subclass 243.53. Apparatus which deforms only one rivet or like element at a time, using the same tool pair (header and anvil) each time.

**243.55 Pipe joiner:**

This subclass is indented under subclass 243.54. Apparatus which by riveting unites the edges of a pipe along a longitudinal seam or secures two or more pipes in an overlapping or abutting end-to-end relationship.

**243.56 Clip applier:**

This subclass is indented under subclass 243.5. Apparatus which when assembling the first element with the second element additionally unites the second element to at least one other element.

**SEE OR SEARCH CLASS:**

- 72, Metal Deforming, subclass 410 for a plier-type clip clencher claimed only as a deformer, i.e., without regard to assembly.
- 140, Wireworking, subclass 11 for means for joining intersecting wire elements of a wire fabric with a clip, which subclass contains art similar to some of that found here.

**243.57 Binding or covering:**

This subclass is indented under subclass 243.5. Apparatus which assembles by causing the first element or portion thereof to single-foldedly embrace or encompass the second element.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 33.5+, for apparatus for binding or covering combined with cutting.
- 243.5, for patents limited to lockseamed (double folded) assembly of two elements.
- 728, for apparatus which sheaths a running length core.

**243.58 Edge binding:**

This subclass is indented under subclass 243.57. Apparatus for assembling a combination in which the second element has a definitive edge (such as that of a plate or sheet), and the first element is a U-shaped member which

embraces only the edge portion of the second element.

**244 Puller or pusher means, contained force multiplying operator:**

This subclass is indented under subclass 700. Apparatus having means for engaging two work parts to be assembled or disassembled and means forming part of the apparatus for multiplying the force input to the apparatus (e.g., a lever, screw, force multiplying linkage, gearing, etc.) to develop the necessary assembling or disassembling force.

- (1) Note. Included in this and the indented subclasses, for example, are: (a) means for removing from and applying to a shaft, a collar, wheel, gear, bearing unit, etc. (b) means for removing from or applying to any of various elements, a nonresilient tube, collar, sleeve, ferrule, etc. (c) means for removing from or applying to any of various elements, a pin, cap, key, etc.
- (2) Note. Except as stated in the following notes, apparatus from preceding subclasses indented under subclass 700 and having power multiplying means for exerting a pushing or pulling force for assembling or disassembling has been cross-referenced in this or the indented subclasses.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 213.1+, for means to assemble or disassemble a valve component.
- 222+, for means for pushing a piston ring onto a piston.
- 225+, for means to apply a spring by pushing or pulling.
- 231+, for staking a watch or a clock.
- 233, for means for applying a brake lining to a brake shoe.
- 234, for means for pulling or pushing to assemble or disassemble a coextensive tube and core.
- 237, for means to assemble or disassemble a coupling to a conduit.
- 238, for assembling by compressing parts together face to face.

- 239, for means to assemble or disassemble including means to separate parts from face to face engagement.
- 240, for means to assemble or disassemble by rotation of one work part with respect to the other.
- 242, for means to assemble or disassemble a tool handle and a tools.
- 243, for means to assemble or disassemble a tool chuck and a tool.
- 270+, for a hand manipulable implement not having power multiplying means to develop the assembling or disassembling force.
- 724+, for means for inserting or removing balls or rollers from a bearing.
- 726+, for means for inserting or removing the tubes of a heat exchanger.
- 729+, for means for inserting or removing a contact into or from a plug connector.
- 730+, for means for removing or inserting a battery plate or battery-plate unit.
- 732+, for means for inserting or removing an armature shaft, coil, coil slot plug, etc.
- 765, for means to place a traveler on a ring or a ring on the bobbin of a textile machine.
- 805, for means for assembling doll parts.
- 807, for means to assemble a clock or watch-crystal into a bezel.
- SEE OR SEARCH CLASS:
- 74, Machine Element or Mechanism, subclasses 469+ for a lever and linkage system.
- 157, Wheelwright Machines, subclasses 3+ for a spoke setter, subclass 11 for a tire remover, and subclass 12 for a spoke extractor.
- 164, Metal Founding, subclasses 405+ for an ingot stripper.
- 227, Elongated-Member-Driving Apparatus, subclasses 19+ for combined apparatus for assembling and driving a member, e.g., nail, into the assembled parts.
- 242, Winding, Tensioning, or Guiding, subclasses 533+ for a coil stripping device for a winding machine.
- 254, Implements or Apparatus for Applying Pushing or Pulling Force, for such an implement in general.
- 294, Handling: Hand and Hoist-Line Implements, for a handling implement of the hand-and-hoist-line type.
- 425, Plastic Article or Earthenware Shaping or Treating: Apparatus, subclasses 436+ for a shaping surface including product release or removal means, especially, subclass 438 for a core remover; see the search notes thereunder.
- 433, Dentistry, subclasses 3+ for a tool for removing an orthodontic appliance from the teeth and subclasses 141+ for other disassembly and assembly implement (e.g., a tooth extractor, mold remover, crown remover.)
- 245 Hubcap and hub:**  
This subclass is indented under subclass 244. Apparatus for inserting or removing a hubcap onto or off of a wheel hub.
- (1) Note. Apparatus for inserting or removing a "wheel cover" onto or off of a wheel is included herein.
- 246 Battery post and terminal:**  
This subclass is indented under subclass 244. Apparatus for applying or removing an electricity transmitting connector to or from a battery post.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
730+, for means to assemble a storage cell or battery.
- 247 Cotter pin and cooperating member:**  
This subclass is indented under subclass 244. Apparatus, for inserting or extracting a cotter pin to or from another element.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
249, for a valve stem pin or key extractor or remover.
- 248 Plier type means:**  
This subclass is indented under subclass 247. Apparatus of the plier type.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 5, for a cotter pin making process or apparatus.  
700, and see the search note thereunder.

SEE OR SEARCH CLASS:

- 81, Tools, for a hand tool of general utility, or an assembling tool, especially, subclasses 300+ for general purpose pliers or pliers especially adapted for manipulating a cotter pin.

**249 Valve stem pin or key and another member:**  
This subclass is indented under subclass 244. Apparatus for inserting or extracting a valve stem pin or key into or away from some other element.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 213.1+, for valve applying and removing apparatus.  
247+, for cotter pin applying and removing apparatus.  
250, for machine key applying and removing apparatus.

**250 Machine key and another member:**  
This subclass is indented under subclass 244. Apparatus for inserting or extracting a machine key into or away from some other element.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 249, for a valve stem pin or key inserter or remover.

**251 Arbor-type press means:**  
This subclass is indented under subclass 244. Apparatus of the arbor press type.

SEE OR SEARCH CLASS:

- 100, Presses, for a press not elsewhere provided for.

**252 Having fluid operator:**  
This subclass is indented under subclass 244. Apparatus which is operated by fluid pressure.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 254, for assembling device comprising a puller or pusher operated by an explosive.  
421.1+, for a process of shaping a part or parts by direct application of fluid pressure.  
427, for a process of disassembly utilizing fluid pressure to separate parts.

SEE OR SEARCH CLASS:

- 60, Power Plants, subclass 325 for a residual fluid actuator, per se.  
91, Motors: Expansible Chamber Type, for such motors and their controls, per se.  
100, Presses, subclasses 269.01+ for reciprocating platen presses, not elsewhere provided for, in which fluid pressure actuates the movable platen.  
251, Valves and Valve Actuation, for a valve of general utility and an actuating means therefor.  
254, Implements or Apparatus for Applying Pushing or Pulling Force, subclass 93 for fluid pressure type.  
418, Rotary Expansible Chamber Devices, for a rotary expansible chamber motor, per se.

**253 Having wedge operator:**  
This subclass is indented under subclass 244. Apparatus which is operated by a wedge to develop the assembling or disassembling force.

SEE OR SEARCH CLASS:

- 254, Implements or Apparatus for Applying Pushing or Pulling Force, subclass 42 for wedge type printers' quoins and subclass 104 for miscellaneous wedge type.  
279, Chucks or Sockets, subclass 103 for friction grip type having wedge means to eject the tool.

**254 Having percussion or explosive operator:**  
This subclass is indented under subclass 244. Apparatus which are operated by percussion, including the explosion of a contained medium.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 252, for apparatus operated by sustained fluid pressure as distinguished from an explosion.
- 275, for an impact receiving tool not having contained impacting element.
- 427, for a process of separating parts (e.g., a broken drill stem from a drilled hole) utilizing percussion or explosion.

SEE OR SEARCH CLASS:

- 60, Power Plants, subclasses 632+ for a one shot explosion actuated expansible chamber type motor.
- 81, Tools, subclasses 463+ and see the notes thereto for other impact operated apparatus.
- 173, Tool Driving or Impacting, subclasses 90+ for a tool impacting device, per se, of general utility.
- 175, Boring or Penetrating the Earth, subclasses 2+ for subject matter relating to a device for penetrating the earth by means of a bullet or shaped charge which is fired in an inaccessible hole and including such a device for forming a perforation in a casing or other wall member in the hole.

**255 Tube, sleeve, or ferrule inserting or removing:**

This subclass is indented under subclass 254. Apparatus designed for inserting a tube, sleeve, ring, ferrule, or similar annular body into or removing such from an opening designed to receive the same.

**256 Having screw operator:**

This subclass is indented under subclass 244. Apparatus in which a screw is operated to develop the assembling or disassembling force.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 217+, for a screw operated engine valve spring compressor.
- 250, for a machine key extractor or inserter.

**257 C-frame:**

This subclass is indented under subclass 256. Apparatus which is screw operated and of the C-frame type, one leg of the C-frame reacting against one part of the article and a screw mounted in the other leg of the C-frame reacting against another part of the article.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 217+, for a screw operated C-frame engine valve spring compressor.
- 231, for a C-frame watch or clock staking device.
- 251, for C-frame arbor presses for assembling or disassembling.
- 252, for C-frame fluid operated presses for assembling or disassembling.
- 276, for a C-frame assembly or disassembly tool designed to receive an impact from a separate tool.

**258 Central screw, work-engagers around screw:**

This subclass is indented under subclass 256. Apparatus in which a central screw develops the assembling or disassembling force, whether motivated by turning the nut or screw, and which have work engagers on opposite sides of, adjacent to, and around the screw, the screw acting on one part of the article and the engagers acting on another part of the article.

- (1) Note. The side engagers may be arms on each side of the screw or constitute tubular or tube segment engagers encircling a major part of the screw, and the same may be secured to or have reaction contact with the article.

**259 Work-engager arms along or parallel to screw:**

This subclass is indented under subclass 258. Apparatus in which the side engagers comprise arms extending along or parallel with the screw, the arms having engagement with the screw nut or nut carrying frame at one end and engagement with an article part at the other end.

**260 With arm connecting engaging means:**

This subclass is indented under subclass 259. Apparatus in which the ends of the arms are connected by a means that engages the article part.

**261 Pivotal arms:**

This subclass is indented under subclass 259. Apparatus in which the arms are connected for pivotal movement to the nut or nut carrying frame.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

262, for pivotal grippers directly carried by the screw.

**262 Pivotal grippers on screw:**

This subclass is indented under subclass 259. Apparatus which have pivotal grippers mounted on the article engaging end of the screw.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

261, for pivotal work engager arms mounted on the nut or nut frame.

265, for relatively movable work grippers mounted on the force developing screw and of tubular or tube segment form.

**263 Tubular or tube segment forms work engager:**

This subclass is indented under subclass 258. Apparatus in including a work engager in the form of a tube or the segments of a tube.

(1) Note. The tubular or tube segment work engager may be an integral portion of the nut.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

280, for other tubular work engager having article gripping detents.

**264 Screw threaded work engager:**

This subclass is indented under subclass 263. Apparatus in which the tubular or tube segment work engager has screw threads for engagement with a threaded work part for reaction therewith.

(1) Note. The threaded work engaging part may be mounted on the nut, nut frame, or force developing screw.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

277, for a hand manipulatable impact receiving tool having a threaded device to be applied to screw threaded work to protect the same from impact.

281, for a hand manipulatable for tube sleeve or ferrule applying or removing having a thread tapping work grip.

**265 Movable grippers on screw:**

This subclass is indented under subclass 263. Apparatus in which the tubular or tube segment form a work engager having at least two relatively movable parts to grip the work which parts are mounted on the work engaging end of the force developing screw.

(1) Note. The grippers may be pivotal, slidable, etc.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

262, for pivotal grippers on force developing screws not of tubular or tube segment form.

264, for similar devices threaded to engage threaded work.

**266 Plate or bar forms work-engager:**

This subclass is indented under subclass 258. Apparatus in which the work engagers are in the form of a plate or bar, the screw extending through the center of the plate or bar.

**267 Having lever operator:**

This subclass is indented under subclass 244. Apparatus that is lever operated.

(1) Note. A screw may be used for adjusting the parts of the apparatus or gripping the part to be moved but the force input and multiplication for applying the pushing or pulling force is through a system (not involving a screw) operated by a lever.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 216, and 219+, for a lever operated engine valve spring compressor.
- 222+, for a lever operated piston ring inserter or remover.
- 245, for a lever operated hub cap remover.
- 246, for a lever operated battery terminal remover.
- 247+, for a lever operated cotter pin remover.
- 249, for a lever operated valve stem pin or key remover.
- 256+, for a miscellaneous device having a screw for force multiplication to apply the assembling or disassembling force.

SEE OR SEARCH CLASS:

- 254, Implements or Apparatus for Applying Pushing or Pulling Force, particularly subclasses 120+ for single throw levers.

**268 Plier type means:**

This subclass is indented under subclass 267. Apparatus of the plier type.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 700, for assembly or disassembly apparatus, generally.

SEE OR SEARCH CLASS:

- 81, Tools, for a hand tool of general utility, or for an assembling tool which structurally recognizes only one work part.

**269 Means comprising piston ring group contractor or holder:**

This subclass is indented under subclass 700. Apparatus for contracting, and/or holding contracted, a group of piston rings (usually for the reception of a mandrel holder).

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 222+, for a piston ring applier or remover or for means for contracting a single piston ring and holding it contracted for the reception of a mandrel holder.

**270 Means comprising hand manipulatable tool:**

This subclass is indented under subclass 700. Apparatus that is a hand tool or is a portable tool having no contained force multiplying operator to develop the assembling or disassembling force.

- (1) Note. There may be force multiplying means for the work engaging portions to firmly grip the work, but no such means for developing the assembling or disassembling force.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 213.1+, for a hand manipulatable valve keeper insertion tool.
- 244+, for a hand manipulatable or portable tool with a contained power multiplying operator.

SEE OR SEARCH CLASS:

- 7, Compound Tools, for a hand tool united with another hand tool.
- 42, Firearms, subclass 90 for an implement to be used in making or maintaining a firearm.
- 81, Tools, for a hand tool, generally.
- 99, Foods and Beverages: Apparatus, subclass 450.5 for a hand manipulatable implement means arranged to assemble edible preforms into a sandwich.

**271 Aligner or center:**

This subclass is indented under subclass 270. Apparatus that aligns one part with another.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 468, for a process of associating two or more parts by engaging each of the parts with a tool and moving the tool relative to the parts to effect alignment of the parts with respect to each other.

SEE OR SEARCH CLASS:

- 33, Geometrical Instruments, subclass 412 for shaft aligning and leveling straight edge type instruments.

- 272 Tube with tube:**  
This subclass is indented under subclass 271. Apparatus for aligning tubes with tubes.
- 273 Auto wheel with auto chassis:**  
This subclass is indented under subclass 271. Apparatus for lifting and/or aligning an automobile wheel with an automobile chassis.
- (1) Note. In this subclass, for example, is a tool intended to pass through bolt receiving wheel opening and engage the stud bolts or other connecting parts on the hub, brake drum, or other support of the automobile chassis and guide the wheel to such supporting means.
- 274 Clutch plates:**  
This subclass is indented under subclass 271. Apparatus for aligning clutch plates in the assembly of a clutch.
- 275 Means comprising impact receiving tool:**  
This subclass is indented under subclass 270. Apparatus to be applied to the work and to receive an impact from some outside source and transmit the blow to the work.
- (1) Note. The source of the impact is usually a machinist's or carpenter's hammer.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
254+, for impact or percussion apparatus having a contained source of impact producing means, as an explosive or a hammer.
- SEE OR SEARCH CLASS:  
30, Cutlery, subclass 168 for cold chisels and see the notes to such subclass.  
81, Tools, subclasses 463+ for a nail set adapted to drive the head of a nail below a wood surface when hit by a hammer.
- 276 C-frame:**  
This subclass is indented under subclass 275. Apparatus whose impact receiving tool is mounted in one leg of a C-frame, the other leg of the frame constituting an anvil for receiving the impact.
- 277 Thread protector (e.g., wheel axle type):**  
This subclass is indented under subclass 275. Apparatus in which the impact receiving tool transmits the impact to a threaded part and is constructed to protect the threads from injury.
- (1) Note. This subclass includes axle drivers that are threaded onto the end of an axle and are hit to break the connection between a wheel and axle, devices commonly called impact wheel removers.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
264, for other screw threaded devices to engage screw threaded work.
- SEE OR SEARCH CLASS:  
16, Miscellaneous Hardware, subclasses 2.1+ for protective liners and subclasses 108+ for protective caps or collars.  
138, Pipes and Tubular Conduits, subclass 96 for protectors for the threads on pipe ends.  
173, Tool Driving or Impacting, subclasses 128+ for an impacting device including means to transmit impact from a hammer head to a tool or the like.
- 278 Hand gripper for direct push or pull:**  
This subclass is indented under subclass 270. Apparatus that are gripped by the hand and given a direct push or pull by the hand.
- (1) Note. There may be force multiplying means for operating the parts that grip the work, but the assembling or disassembling force is given a direct push or pull by the person operating the same.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
244+, for devices that grip the work and have force multiplying means for the assembling or disassembling push or pull.



**279 Centrifugal separator:**

This subclass is indented under subclass 278. Hand devices for applying or removing parts of centrifugal separators.

- (1) Note. Most of the patents include an elongated means that is insertable through the openings of aligned separator plates or cone discs, with provisions for securing the bottom one thereto, so that the elongated means and the parts secured as a unit may be pulled from or inserted into the centrifugal machine by direct hand pull or push on the elongated means.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 241, for assembling by stringing objects on an elongated part.

**280 Tube sleeve or ferrule applying or removing:**

This subclass is indented under subclass 278. Apparatus that operates on tubes, sleeves, or ferrules.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 282, and see the notes thereto for other apparatus for operating upon tubes, sleeves, or ferrules.

**281 Thread-tapping grip:**

This subclass is indented under subclass 280. Apparatus that grips the tube, sleeve, or ferrule by means of screwing into the same a tapered threaded point in the nature of a tap.

SEE OR SEARCH CLASS:

- 408, Cutting by Use of Rotating Axially Moving Tool, subclasses 215+ for a tool of that class including pitch stabilizing ridge.  
470, Threaded, Headed Fastener, or Washer Making: Process and Apparatus, subclass 197 for tap dies used in a Class 470 machine for cutting interior screw threads.

**281.1 With work-holder for assembly:**

This subclass is indented under subclass 700. Apparatus including or with a surface which, when the work parts are being assembled, is

positioned beneath at least a portion of each work part to support the work parts against the force of gravity in at least one position of adjustment thereof.

- (1) Note. A mere pin is not considered to be a work holder for assembly.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 721, for similar structure having a signal, scale, or indicator.

SEE OR SEARCH CLASS:

- 269, Work Holders, subclasses 289+ for a work holder for assembly not in combination with an assembly means or not serving as means to move to assemble one work part relatively to another.

**281.2 For assembling a luminescent mantle:**

This subclass is indented under subclass 281.1. Apparatus intended to juxtapose, associate, or fasten one part of an illuminated mantle with respect to another part thereof.

- (1) Note. A mantle is a lace-like hood or envelop of some refractory material which, when placed in position over a flame, gives light by incandescence.  
(2) Note. This is the residual home for a work holder for assembling a luminescent mantle, even though only one part is recognized (engaged) thereby.

**281.3 And assembling press (e.g., truss assembling means, etc.):**

This subclass is indented under subclass 281.1. Apparatus including means to hold an assembly of several first work parts in a desired relationship and means to force an additional work part into the assembly to secure the first work parts in a desired relationship.

SEE OR SEARCH CLASS:

- 227, Elongated-Member-Driving Apparatus, particularly subclasses 19+ for similar structure wherein the additional work part is an "elongated member" as required by that class.

**281.4 Having means to permit support movement while work is thereon:**

This subclass is indented under subclass 281.1. Apparatus including a holder for a first work part and a holder for a second work part, which holders are allowed to move with the work parts mounted thereon.

SEE OR SEARCH THIS CLASS, SUBCLASS:

281.6, for structure holding a first work part such that the structure is supported thereby, which structure includes guide means for another work part.

**281.5 Including means to relatively position plural work parts:**

This subclass is indented under subclass 700. Apparatus including means to engage a first and a second work part and means to move one relatively to the other into a desired positional relationship.

**281.6 Work-supported apparatus:**

This subclass is indented under subclass 700. Apparatus including means to engage a first work part so as to be supported against the force of gravity thereon and including means to be engaged by a second work part to be juxtaposed, associated with, fastened to, or removed from the first work part.

**282 Tube, sleeve, or ferrule:**

This subclass is indented under subclass 700. Apparatus for assembling and/or securing or disassembling tubes, sleeves, or ferrules to each other or to other articles.

- (1) Note. Many of the preceding subclasses have special types of apparatus for this purpose, some of which are referred to in the following note.

SEE OR SEARCH THIS CLASS, SUBCLASS:

234, for tube and coextensive core apparatus.  
235+, for apparatus for operating upon resilient tubes or sleeves.  
255, for percussive apparatus.  
280+, for hand grippers.

SEE OR SEARCH CLASS:

81, Tools, subclass 3.05 for devices for extracting a shell, projector, or wad from a gun barrel.  
254, Implements or Apparatus for Applying Pushing or Pulling Force, subclasses 29+ for pipe jacks.  
405, Hydraulic and Earth Engineering, subclass 154.1 for a method or apparatus for laying a pipe or cable into a subterranean or submarine location where a step or means for handling the earth material is claimed, or a method or apparatus for laying, retrieving, manipulating, or treating a pipe or cable at or from a submerged location.

**283 Work gripper, anvil, or element:**

This subclass is indented under subclass 700. Apparatus claiming only (1) a work gripping subcombination, (2) an anvil, or (3) any subcombination of an assembling or disassembling apparatus incapable by itself of performing a work assembling or disassembling operation and not elsewhere classifiable.

SEE OR SEARCH CLASS:

72, Metal Deforming, subclass 476 for disclosure of a passive tool.  
269, Work Holders, for a work holder, per se.  
470, Threaded, Headed Fastener, or Washer Making: Process and Apparatus, subclass 208 for bolt and rivet anvils.

**283.5 By deforming:**

This subclass is indented under subclass 700. Apparatus including means to juxtapose, associate, fasten together, or separate a plurality of work by stressing one work part beyond the elastic limit thereof.

SEE OR SEARCH THIS CLASS, SUBCLASS:

402.11+, for a process of repairing by attaching a repair preform wherein damaged material is removed.

**284 MISCELLANEOUS APPARATUS:**  
This subclass is indented under the class definition. Miscellaneous metal working means not otherwise classifiable.

SEE OR SEARCH THIS CLASS, SUBCLASS:

33+, for a combined metal working machine, generally.

**401.1 Converting:**

This subclass is indented under subclass 592. Process comprising mechanically modifying or altering an existing structure, apparatus, or article of manufacture to produce a structure, an apparatus, or an article of manufacture of substantially different capacity, size, function, or type of operation.

- (1) Note. Since this concept was not specially provided for before this subclass was established in 1979 and since most of this class was not screened at that time, the art of this subclass is incomplete in that it does not include all the patents issued before that date.

SEE OR SEARCH THIS CLASS, SUBCLASS:

402.01+, for a process of repair (see the definition of "repair" in Class 29 class definition, Glossary).

403.1+, for a process of scrap recovery or utilization.

411, for mechanical manufacture including the process of obtaining plural pieces from a preassembled blank.

412+, for a process including separating a plurality of parts from a single part, e.g., cutting.

426.1, for a process including disassembly (see the definition of "disassembly" in Class 29, class definition, Glossary).

428+, for a process including assembling two or more self-sustaining parts (see the definition of "assembly" in Class 29 class definition, Glossary).

560, for a convertible metal working machine, generally.

SEE OR SEARCH CLASS:

92, Expansible Chamber Devices, subclass 59 for a device under that class that is convertible or changeable by assembly or disassembly.

144, Woodworking, subclasses 330+ for a process of reconstructing an article of wood.

285, Pipe Joints or Couplings, subclass 12 for a device of that class that is convertible.

432, Heating, subclass 3 for a process wherein converting or assembling is an integral part of a heating procedure.

**402.01 Repairing:**

This subclass is indented under subclass 592. Process comprising restoring an existing device such as an article of manufacture, a machine, an apparatus, or a static structure to a more functional, stable, or working condition.

- (1) Note. See the definition of repair in the class definition of this class (29), Glossary. These subclasses (402.01+) are intended as the residual home for mechanical repairing. Where a process of repairing a particular article is claimed, it is intended that the patent issue in the particular device making subclass of this class (29).

- (2) Note. To make a complete search for a process of repairing a particular device it may be necessary to search the subclass under Class 29 or elsewhere which provides for manufacturing the particular device.

- (3) Search appropriate subclasses for various mechanic manufacturing operations such as, for example, combined processes for making specific articles, converting one article to produce a different article, uniting, or shaping, or joining, which operations might be used in a repair operation.

SEE OR SEARCH CLASS:

12, Boot and Shoe Making, subclass 142 for a process of repairing a boot or a shoe.

- 49, Movable or Removable Closures, subclass 506 for a process of repairing a movable or removable closure.
- 52, Static Structures (e.g., Buildings), subclass 514 for a building component having means for split prevention or which repairs a damaged part.
- 62, Refrigeration, subclass 77 for a refrigeration process including repairing some part of a refrigeration apparatus.
- 65, Glass Manufacturing, subclass 27 for a process of repairing or cleaning glass working apparatus and subclass 28 for a process of mending otherwise unusable parts or material by a glass working operation for reuse, or preventing spreading of checks or cracks in a glass part during formation of the glass part.
- 66, Textiles: Knitting, subclass 1.5 for a process of or apparatus for repairing a hole or a run in a knitted fabric.
- 76, Metal Tools and Implements, Making, subclass 101.1 for a process of repairing a tool, generally.
- 137, Fluid Handling, subclasses 15.01 through 15.26 for a process of cleaning, repairing, or assembling.
- 138, Pipes and Tubular Conduits, subclasses 97+ for a process of or apparatus for repairing a leak in a pipe or hose.
- 144, Woodworking, subclasses 330+ for a process of repairing or reconstructing a wooden article.
- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclasses 94+ for a repairing process including a laminating step.
- 162, Paper Making and Fiber Liberation, subclass 199 for a process of repairing or maintaining paper making machinery.
- 164, Metal Founding, subclass 92.1 for casting of metal to repair a substrate.
- 166, Wells, subclass 277 for a process of repairing an object in a shaft or deep boring in the earth.
- 228, Metal Fusion Bonding, subclass 119 for repairing, restoring, or renewing a product for reuse.
- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclass 30 for furnace lining formation or repair and subclasses 36.1+ for repairing or restoring an article for reuse by an operation of that class.
- 285, Pipe Joints or Couplings, subclasses 15+ for repair of a pipe joint or coupling.
- 320, Electricity: Battery or Capacitor Charging or Discharging, appropriate subclasses for a process of recharging or reconditioning a voltaic cell, battery, or capacitor.
- 405, Hydraulic and Earth Engineering, for construction involving the titular subject matter.
- 413, Sheet Metal Container Making, subclasses 1+ for a process of fabricating sheet metal cans.
- 427, Coating Processes, subclasses 140+ for restoring or repairing by an operation of that class.
- 429, Chemistry: Electrical Current Producing Apparatus, Product and Processes, subclass 49 for a process of restoring, or aid in restoring a battery to its former condition after decay, injury, or partial destruction.
- 432, Heating, subclass 3 for a process in which a step of repairing is an integral part of a heat procedure or in which repairing of the apparatus is effected in part by the heat incident to the operation of the apparatus.
- 445, Electric Lamp or Space Discharge Component or Device Manufacturing, subclass 2 for a process of repairing an electric lamp or space discharge device.
- 402.02 Seal or element thereof:**  
This subclass is indented under subclass 402.01. Process of directly restoring, reconditioning, or replacing packing material, door seal, or like sealing material not provided for elsewhere.
- SEE OR SEARCH THIS CLASS, SUBCLASS:**  
235+, for apparatus which applies or removes a resilient article.

- 402.08, for a process of repair wherein the part to be replaced is disassembled and a new part substituted therefor.
- 450+, for a process of applying or removing a resilient article.

**SEE OR SEARCH CLASS:**

- 49, Movable or Removable Closures, subclass 506 for a process of repairing movable or removable closures.
- 62, Refrigeration, subclass 77 for a process of refrigeration which includes repairing some part of a refrigeration apparatus.
- 138, Pipes and Tubular Conduits, subclasses 97+ for a process of and apparatus for repairing a leak in a pipe or hose.
- 277, Seal for a Joint or Juncture, for a seal having an installation, removal, assembly, disassembly, or repair feature, subclass 323, for a seal for well apparatus, subclasses 370+ for a relatively rotatable extending sealing face member (e.g., face, mechanical, etc.), subclass 421 for a close proximity labyrinth seal, subclass 435 for a piston ring, piston ring expander or seat therefore, subclass 511 for a dynamic circumferential contact seal intended for containment or compression by a gland member in a packing box, subclass 551 for a dynamic, peripheral radially sealing flexible projection (e.g., lip seal, etc.) for other than a piston, subclass 598 for a static, contact seal for use between parts of an internal combustion engine, subclass 609 for a static contact seal intended for insertion between an end to end pipe, conduit, or cable joint, or subclass 630 for a static, contact seal for other than an internal combustion engine, or a pipe, conduit, or cable.
- 403, Joints and Connections, subclasses 11+ for a joint or connector with an adjunctive protector, broken parts retainer, repair, assembly, or disassembly feature.

**402.03 With disassembling:**

This subclass is indented under subclass 402.01. Process wherein the device to be repaired is composed of a plurality of interre-

lated attached components or subcombination elements comprising disassociating a component or an element from the other components or elements.

- (1) Note. See the definition of "disassembly" in the class definition Glossary.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 403.3+, for a process of separating one scrap material from another scrap material.
- 426.1+, for a process including the step of disassembling.

**SEE OR SEARCH CLASS:**

- 52, Static Structures (e.g., Buildings), subclasses 127.1+ for a building component with adjunctive means used to aid in an assembling or disassembling operation.

**402.04 Including reconditioning of part:**

This subclass is indented under subclass 402.03. Process including restoring a disassembled component or element to its functional, stable, or working condition.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 402.18, for a process of repairing by applying fluent material, e.g., coating, casting.

**SEE OR SEARCH CLASS:**

- 204, Chemistry: Electrical and Wave Energy, for reconditioning in the manner of that class.
- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclass 30 for furnace lining or repairing and subclasses 36.1+ for repairing or restoring an article for reuse in an operation of that class.
- 427, Coating Processes, subclasses 140+ for restoring or repairing by an operation of that class.

**402.05 By shaping:**

This subclass is indented under subclass 402.04. Process of restoring by permanently altering the configuration of the part.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

402.19+, for a process of repairing by shaping.

SEE OR SEARCH CLASS:

72, Metal Deforming, subclasses 362+ for a process under the class definition of deforming metal.

264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclasses 239+ for a process of applying distorting mechanical forces to solid self-sustaining workpieces of nonmetallic material wherein the configuration of at least one dimension of the workpieces is altered.

**402.06 Removing material:**

This subclass is indented under subclass 402.05. Process of repairing wherein the shaping comprises taking away or destroying integral material of the part.

- (1) Note. Removing or cleaning of nonintegral surface or extraneous material is not considered removing of material.
- (2) Note. To make a complete search for any repair process including removing material, it may be necessary to search the class which provides for the particular material removing process or apparatus.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

402.11+, for a process of repairing by attaching a repair preform combined with removal of damaged material.

**402.07 And by a metallurgical operation, e.g., welding, diffusion bonding, casting:**

This subclass is indented under subclass 402.06. Process of repairing including a step of metal welding, metal casting, or metal heat treating.

SEE OR SEARCH CLASS:

164, Metal Founding, subclass 92.1 for a process of repairing a metal preform by a metal casting technique.

219, Electric Heating, subclasses 603+ for a process of induction welding, subclasses 50+ for a process of resistance

welding, and subclasses 76.1+ for a process of coating or building up of a base by means of metal deposited by an electric arc.

228, Metal Fusion Bonding, subclass 119 for a process including metallurgically bonding work faces together wherein a product is repaired, renewed, or restored for reuse.

**402.08 Replacing of defective part:**

This subclass is indented under subclass 402.03. Process of repairing by substituting a new part for a damaged, worn, or imperfect part.

**402.09 By attaching repair preform, e.g., remaking, restoring, or patching:**

This subclass is indented under subclass 402.01. Process of repairing by fastening a solid member specially adapted for reinforcing, concealing, or rebuilding a desired dimension to a damaged or worn portion of the machine, apparatus, static structure, or article.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

402.08, for a process of repairing by replacing a defective part of an assembly.

428+, for a process including assembling two or more self-sustaining parts.

**402.11 And removing damaged material:**

This subclass is indented under subclass 402.09. Process of repairing combined with removing some of said portion of the machine, apparatus, static structure, or article.

**402.12 Mechanically attaching preform with separate fastener:**

This subclass is indented under subclass 402.11. Process of repairing comprising fastening the repair preform to the existing device by a third member, e.g., by a headed, threaded, resilient, or impact driven fastener, etc.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

402.14+, for a process of repairing wherein the repair preform is mechanically attached with a separate fastener member without removing damaged material.

432, for a process of attaching a part to a second part by punching, piercing, or reaming a sharp edge of one of the parts into the other.

525.01+, for a process of assembling or joining, generally, by application of a separate fastener.

**SEE OR SEARCH CLASS:**

227, Elongated-Member-Driving Apparatus, for securing two members together with a separate fastener, generally.

**402.13 Metallurgically attaching preform:**

This subclass is indented under subclass 402.11. Process of repairing comprising fastening the repair preform to the existing device by metal fusion bonding, metal casting, or heating of metal.

- (1) Note. Since this class (Class 29) is residual, a single or combined operation is to be found herein, unless provided for in a superior class; e.g., Class 219, Electric Heating; Class 228, Metal Fusion Bonding; Class 266, Metallurgical Apparatus, etc.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

402.16, for a process of repairing wherein the repair preform is metallurgically attached with removing damaged material.

426.6, for a disassembling process with prestressing of a work part by application of heat differential.

447, for an assembling process with prestressing of a work part by application of heat differential, e.g., shrink fitting.

**SEE OR SEARCH CLASS:**

164, Metal Founding, subclass 92.1 for a process of repairing a metal preform by metal casting.

219, Electric Heating, subclasses 76.1+ for a process of coating or building up a base from metal deposited by an electric arc.

228, Metal Fusion Bonding, subclass 119 for a process including metallurgically bonding work faces together

wherein a product is repaired, renewed, or restored for reuse.

**402.14 Mechanically attaching preform by separate fastener:**

This subclass is indented under subclass 402.09. Process of repairing comprising fastening the repair preform to the existing device by a third member, e.g., by a headed, threaded, resilient, or impact driven fastener.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

402.12, for a process of repairing including removing damaged material from and mechanically attaching the repair preform to the existing device by a separate fastener.

432, for a process of attaching a part to a second part by punching, piercing, or reaming a sharp edge of one of the parts into the other.

525.01+, for a process of assembling or joining, generally, by application of a separate fastener.

**SEE OR SEARCH CLASS:**

227, Elongated-Member-Driving Apparatus, for securing two members together with a separate fastener, generally.

**402.15 Screw threaded fastener:**

This subclass is indented under subclass 402.14. Process of repairing comprising fastening the repair preform to the existing device by an externally or internally helically ribbed means.

**402.16 Metallurgically attaching preform:**

This subclass is indented under subclass 402.09. Process of repairing comprising fastening the repair preform to the existing device by metal fusion bonding, metal casting, or heating of metal.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

402.13, for a process of repairing wherein some of the damaged material is removed and the repair preform is metallurgically attached.

**SEE OR SEARCH CLASS:**

- 164, Metal Founding, subclass 92.1 for a process of repairing a metal preform by metal casting.
- 219, Electric Heating, subclasses 76.1+ for a process relating to the coating or building up of a base by means of metal deposited by an electric arc.
- 228, Metal Fusion Bonding, subclass 119 for a process including metallurgically bonding work faces together wherein a product is repaired, renewed, or restored for reuse.

**402.17 Screw threaded preform:**

This subclass is indented under subclass 402.09. Process of repairing wherein the repair preform has a helically ribbed opening or projection.

**SEE OR SEARCH THIS CLASS, SUB-CLASS:**

- 525.01+, for a process of assembling including application of a separate fastener which may be screw threaded.

**SEE OR SEARCH CLASS:**

- 215, Bottles and Jars, subclasses 200+ for a container of that class having a screw threaded cover.
- 220, Receptacles, subclasses 288+ for a container of that class having a screw threaded cover.
- 411, Expanded, Threaded, Driven, Headed, Tool-deformed, or Locked-threaded Fastener, subclasses 378+ for an externally threaded fastener element, i.e., a bolt, screw, etc., per se.

**402.18 By applying fluent material, e.g., coating, casting:**

This subclass is indented under subclass 402.01. Process of repairing comprising (1) depositing a flowable substance upon or into a base material (e.g., coating, impregnating) or (2) shaping a flowable substance upon or into a base material (e.g., casting, molding).

- (1) Note. The terms "coating", "casting" and "molding" as used in this definition coincide with these concepts as comprehended in Class 427, Coating Processes; Class 148, Metal Treatment, subclasses

6+; Class 164, Metal Founding; Class 204, Chemistry: Electrical and Wave Energy; and Class 264, Plastic and Non-metallic Article Shaping or Treating: Processes.

**SEE OR SEARCH THIS CLASS, SUB-CLASS:**

- 424, for a manufacturing process utilizing a temporary protective coating or casting.
- 428+, especially subclasses 458+ or 460 for a process of assembling or joining combined with coating or casting.
- 526.2+, for a process of casting plus separating, removing, or eliminating a defect which has been cast in the ingot.
- 527.1+, for a process of applying or shaping of fluent material combined with an additional step of manufacturing.

**SEE OR SEARCH CLASS:**

- 72, Metal Deforming, subclasses 46+ for a process of coating or casting liquid material upon a metal base (but not casting the base, per se), and then deforming the base, regardless of whether or not the applied material is also deformed. See the definition and notes thereof.
- 148, Metal Treatment, appropriate subclasses, especially subclasses 538+ for casting or subclasses 516+ for coating operations combined with significant heat treatment of metal to modify or maintain the internal physical structure (i.e., microstructure) or chemical properties of metal. See the Class 148 definition to determine what constitutes significant heat treatment.
- 164, Metal Founding, subclass 92.1 for a process of repairing a metal preform by metal casting.
- 205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, subclass 115 for processes there provided for in which the object treated is repaired by electrodeposition.
- 219, Electric Heating, subclasses 76.1+ for a process of repairing by coating or building up of a base by means of metal deposited by an electric arc.



- 228, Metal Fusion Bonding, subclass 119 for a process including metallurgically bonding work faces together wherein a product is repaired, renewed, or restored for reuse.
- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclass 30 for furnace lining formation or repair, and subclasses 36.1+ for a process under the Class 264 definition of repairing or restoring an article for reuse.
- 425, Plastic Article or Earthenware Shaping or Treating: Apparatus, subclasses 11+ for plastic shaping or reshaping apparatus peculiar to product or preform repair or restoring means; see the search notes thereunder.
- 427, Coating Processes, subclasses 140+ for a process of restoring or repairing by coating.

**402.19 By shaping, e.g., bending, extruding, turning, etc.:**

This subclass is indented under subclass 402.01. Process of repairing comprising permanently altering the configuration of a portion of the machine, apparatus, static structure, or article.

SEE OR SEARCH THIS CLASS, SUBCLASS:

402.05+, for a process of repairing, including disassembling and reconditioning one or more components or parts by shaping.

SEE OR SEARCH CLASS:

- 72, Metal Deforming, subclasses 362+ for a process of deforming metal, generally.
- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclasses 239+ for a process of deforming a nonmetal, generally.

**402.21 Including heating:**

This subclass is indented under subclass 402.19. Process of repairing having a step of substantially raising the temperature of a portion of the machine, apparatus, static structure, or article.

SEE OR SEARCH THIS CLASS, SUBCLASS:

447, for a process of assembling including application of heat, e.g., to shrink fit.

SEE OR SEARCH CLASS:

- 72, Metal Deforming, subclass 69 for metal deforming by use of a tool acting during relative rotation of the tool and the work about an internal center, with modification or control of temperature, and subclass 364 for a process of metal deforming with temperature maintenance or modification.
- 148, Metal Treatment, appropriate subclasses for processes of significant heat treatment of metal to modify or maintain the internal physical structure (i.e., microstructure) or chemical properties of metal. See the Class 148 definition to determine what constitutes significant heat treatment.

**403.1 Scrap recovering or utilizing:**

This subclass is indented under subclass 592. Process including (1) mechanical manufacture wherein scrap (or surplus) material (i.e., material which would otherwise be discarded) is produced combined with treating that material to give it value, (2) using scrap (or surplus) material from any source to make an article of manufacture, or (3) treating of scrap (or surplus) from any source to give value to the scrap.

- (1) Note. To make a complete search for any process of salvaging a particular article of manufacture, it may be necessary to search the subclass for the process of making the particular article and to search the subclass providing for the article produced.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 401.1, for a process of converting an existing article, structure, or apparatus to produce an article, structure, or apparatus of substantially different capacity, size, function, or type of operation.
- 402.01+, for a process of repairing an article generally.

415, for a process of cutting articles from a stock piece in such a way as to effect maximum utilization of the stock and thus minimizing the amount of scrap produced.

**SEE OR SEARCH CLASS:**

65, Glass Manufacturing, subclass 28 for a process of using surplus or discarded material from glass working or treating operation in a process of glass manufacture.

75, Specialized Metallurgical Processes, Compositions for Use Therein, Consolidated Metal Powder Compositions, and Loose Metal Particulate Mixtures, subclasses 401+ for treating multicomponent metal-containing scrap having an integral substrate to separate metal therefrom by temperature modification or chemical process other than using nonmetallic material which is liquid under standard conditions wherein at least one metal remains solid during separation in order to recover free metal and subclasses 711+ for treating multicomponent metal-containing scrap having an integral substrate to separate metal therefrom by using nonmetallic material which is liquid under standard conditions in order to recover free metal.

156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclasses 94+ for a laminating process including a step of scrap recovery.

162, Paper Making and Fiber Liberation, subclasses 189+ for a paper making process including a step of reclamation, salvage, or reuse of materials.

264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclasses 37.1+ for a process of recycling nonmetallic reclaimed process materials. See especially subclass 37.19 for recycling of reclaimed hydro-settable material. Search Cross-Reference Art Collections 911 through 921 for processes of recycling consumer used products or articles utilizing a molding operation

266, Metallurgical Apparatus, for apparatus for salvaging by melting metal.

445, Electric Lamp or Space Discharge Component or Device Manufacturing, subclass 2 for a process of salvaging an electric lamp or space discharge device.

493, Manufacturing Container or Tube From Paper; or other Manufacturing From a Sheet or Web, for utilization of scrap paper in manufacturing.

**403.2 Metalworking to consolidate scrap:**

This subclass is indented under subclass 403.1. Process (1) including mechanical manufacture wherein scrap metallic material (i.e., material which would otherwise be discarded) is produced combined with deforming that scrap material to force it to occupy a smaller space, or (2) deforming scrap metallic material from any source to force it to occupy a smaller space.

**SEE OR SEARCH CLASS:**

419, Powder Metallurgy Processes, subclasses 1+ for a powder metallurgy process combined with or including heating or sintering.

428, Stock Material or Miscellaneous Articles, for material from which scrap (and usable product) may be formed and for scrap material which has been made usable.

**403.3 Separating one material from another:**

This subclass is indented under subclass 403.1. Process including the step of removing one constituent from a different constituent.

(1) Note. Usually at least one of the constituents is metallic although this is not a necessity for original placement in this subclass.

(2) Note. The removing operation may be mechanical, chemical, or electric in nature.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

17.7, for a method of foil making including disassembling of a pack of foil work portions.

18.1, for apparatus for foil making including means to disassemble a pack of foil work portions.

426.1+, for a process including the step of mechanically disassembling. The principal distinction between the concept of this subclass (29/403.3) and subclasses 29/426.4+ is that, in this subclass, there is intent to recover or utilize scrap material.

**SEE OR SEARCH CLASS:**

- 134, Cleaning and Liquid Contact With Solids, subclass 2 for a process of separating or removing foreign or undesired matter from solid materials having a metallic base.
- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclass 344 for a delaminating process, per se, of adhesively or chemically bonded laminae.
- 209, Classifying, Separating, and Assorting Solids, subclasses 509+ for a process of separating solid materials or articles and segregating them according to their physical characteristics.
- 241, Solid Material Comminution or Disintegration, subclass 24 for a process of comminuting or disintegrating combined with then classifying or separating according to the physical characteristics of the parts separated.

**403.4 By burning or heating:**

This subclass is indented under subclass 403.3. Process in which the step of removing is facilitated or accomplished by combustion or by application of thermal energy.

**SEE OR SEARCH CLASS:**

- 110, Furnaces, subclass 346 for a process of incinerating solid or liquid refuse.
- 126, Stoves and Furnaces, for a device for heating, generally.
- 134, Cleaning and Liquid Contact With Solids, subclass 19 for a process of removing foreign matter from solid materials by the application of heat or contact with hot products of combustion.
- 266, Metallurgical Apparatus, for means to work metal by application of heat, generally; especially subclasses 48+ for a torch used to cut metal and subclasses 200+ for means to melt or

vaporize metal or means to treat liquified metal.

**404 During simulated operation or operating conditions:**

This subclass is indented under subclass 592. Process including subjecting the product being manufactured during such manufacture (1) to forces that duplicate those encountered in actual use of the product or (2) to an environment that duplicates that encountered in actual use of the product.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 89.5, for a machine or device for burning in or wearing in a bearing of an engine (usually an internal combustion engine) and for running in or oil burnishing to limber a bearing or to test for oil leakage at the joints of a casing.
- 722, for apparatus to assemble with control of the environment.

**SEE OR SEARCH CLASS:**

- 73, Measuring and Testing, subclasses 66+ for testing a rotor for imbalance under operation simulating conditions.

**405 Temperature:**

This subclass is indented under subclass 404. Process including maintaining the environmental heat (or coolness) level that duplicates that encountered in actual use of the product.

**406 Center locating and shaping:**

This subclass is indented under subclass 592. Process comprising determining the desired axis of rotation of a part and forming the surface thereof to provide a configuration for support of the part during rotation about its axis.

**SEE OR SEARCH CLASS:**

- 33, Geometrical Instruments, subclass 644 for a collocating tool with a gauge to mark a center location and subclasses 670+ for a gauge with a point marker having marker centering means.
- 82, Turning, subclass 170 for centering apparatus peculiar to turning.

- 408, Cutting by Use of Rotating Axially Moving Tool, subclasses 72+ for a cutting tool of that class combined with other work engaging structure, particularly, subclass 114 for that combination when the other work engaging structure is axially fixed to move with the cutting tool and engages a work surface parallel to the axis of the tool.
- 451, Abrading, subclass 436 for an attachment for a lathe intended to be used in grinding the lathe "center" and subclass 460 for a work mounting device which may support a rotatable workpiece for a grinding operation.

**407.01 With testing or indicating:**

This subclass is indented under subclass 400.1. Process combined with (a) detecting or analyzing some condition of the part or parts being worked on or assembled or (b) visually or audibly indicating the condition.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 402.01+, for a process of repairing a void left in a part by the removal of a sample to be tested.
- 404, for a process including simulated operation or operating conditions not elsewhere provided for.
- 593, for electrical device making combined with measuring or testing of the device or a component thereof.
- 705, for means to assemble or disassemble with means for testing.

SEE OR SEARCH CLASS:

- 33, Geometrical Instruments, for measuring apparatus, generally, especially subclasses 666+ for a gauge with a point marker.
- 73, Measuring and Testing, for testing a process and apparatus, in general, and see the notes to the general definition of Class 73 for the loci of other testing or indicating process or an apparatus.
- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclass 64 for a laminating process including a step of measuring, testing, or inspecting.

- 301, Land Vehicles: Wheels and Axles, subclasses 5.21+ for a wheel balancing device for attachment to a wheel.
- 324, Electricity: Measuring and Testing, for testing or indicating in the manner of that class, especially subclasses 345+ for testing by magnetic means, and subclass 407 for testing a circuit for a diverse-type electron tube.
- 340, Communications: Electrical, subclasses 500+ for an electrical automatic condition responsive indicating system.
- 356, Optics: Measuring and Testing, for testing or indicating in the manner of that class.
- 374, Thermal Measuring and Testing, for testing or indicating in the manner of that class.
- 445, Electric Lamp or Space Discharge Component or Device Manufacturing, subclasses 3+ for a process of making such a device, combined with testing or adjusting, and subclasses 63+ for the corresponding apparatus.
- 492, Roll or Roller, subclasses 9+ for a roll, not elsewhere provided for, having measuring, testing, or indicating means.

**407.02 Torquing threaded assemblage or determining torque herein:**

This subclass is indented under subclass 407.01. Process wherein the testing or indicating includes (a) applying a predetermined twisting or turning force to a threaded fastener component of a threaded assemblage, or (b) quantitatively measuring the twisting or turning force on a threaded component of a threaded assemblage.

SEE OR SEARCH CLASS:

- 81, Tools, subclasses 467+ for a wrench or screwdriver responsive to torque on work.

**407.03 Determining relative number of threaded member rotations:**

This subclass is indented under subclass 407.02. Process wherein the number of rotations of the threaded component is measured or the threaded component is rotated a fixed angular amount after a predetermined event is observed.

**407.04 Using optical instrument (excludes mere human eyeballing):**

This subclass is indented under subclass 407.01. Process wherein the testing or indicating employs an optic or light-sensitive device other than a human eyeball (e.g., microscope, camera, photoelectric cell, etc.).

**SEE OR SEARCH CLASS:**

356, Optics: Measuring and Testing, for using an optical device for measuring or testing, per se.

**407.05 Quantitative measuring or gauging:**

This subclass is indented under subclass 407.01. Process wherein the testing or indicating includes a countable or comparable evaluation using a standard.

**SEE OR SEARCH CLASS:**

73, Measuring and Testing, for measuring or testing, per se, and see the search notes therein.

**407.06 By radioactive tracing:**

This subclass is indented under subclass 407.05. Process wherein unstable isotopes are used for testing or indicating.

**407.07 By vibratory or oscillatory movement:**

This subclass is indented under subclass 407.05. Process wherein the testing or indicating includes rapid motion about an equilibrium position or swinging back and forth between alternative extremes.

**SEE OR SEARCH CLASS:**

73, Measuring and Testing, subclasses 570+ for vibration measuring and testing, per se.

**407.08 Pressure, force, or weight determining:**

This subclass is indented under subclass 407.05. Process wherein the testing or indicating includes evaluating the magnitude of mechanical stress or gravitation exertion.

**SEE OR SEARCH CLASS:**

73, Measuring and Testing, for pressure and force measuring and testing, per se.  
177, Weighing Scales, subclass 1 for a process of weighing, per se.

**407.09 Aligning, guiding, or instruction:**

This subclass is indented under subclass 407.01. Process wherein the testing or indicating includes means (a) for arranging the various parts or tools in a desired relationship, (b) for directing or regulating a motion or operation, or (c) for furnishing with knowledge or teaching.

**407.1 Assisting assembly or disassembly:**

This subclass is indented under subclass 407.09. Process wherein the aligning, guiding, or instructional means are for facilitating assembly or disassembly.

(1) Note. See the class definition Glossary of this class (29) for definitions of "assembling" or "disassembly".

**408 Of a slide fastener:**

This subclass is indented under subclass 592. Process of (1) fabricating the component parts of a securing assembly comprised of a device (slider) which travels along rows of fastener elements to engage or disengage the elements, and any part peculiar to such assembly, or for (2) joining together such component parts in operative relation to each other.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

33.2, for plural diverse manufacturing apparatus used in making a slide fastener assembly or element.  
34, for apparatus for forging, bending, cutting, or punching in the manufacture of a slide fastener.  
766+, for apparatus for assembling a slide fastener or element.

**SEE OR SEARCH CLASS:**

24, Buckles, Buttons, Clasps, etc., subclasses 381+ for a slide fastener assembly or a component thereof.  
264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclass 252 for a process of molding portions (e.g., slide fastener "teeth") along a sheet edge.

- 425, Plastic Article or Earthenware Shaping or Treating: Apparatus, subclass 814 for an art collection of apparatus for making a slide fastener or a component thereof of plastic.
- 409 Of slider:**  
This subclass is indented under subclass 408. Process for making the travelling device.
- (1) Note. The slider is also known as a "rider".
- SEE OR SEARCH CLASS:  
24, Buckles, Buttons, Clasps, etc., subclasses 415+ for a slider, per se.
- 410 Of interlocking element:**  
This subclass is indented under subclass 408. Process of fabricating the cooperating interfitting fastener elements and/or attaching these elements to a tape.
- (1) Note. These fastener elements are also known as "scoops", "stringers", "teeth", or "links".
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
505+, for a process of joining one part to another by deforming the first part into engagement with the other, generally.
- 411 Obtaining plural composite product pieces from preassembled workpieces:**  
This subclass is indented under subclass 592. Process wherein two or more stock elements are interengaged or integrally secured comprising subsequently separating a product member from the stock elements along lines different than those on which the interengagement or securement was effected so that the resultant composite member includes a portion of every stock element.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
412, for a process of producing plural product members from grouped stock elements wherein the produced members do not include a portion of every stock element.
- 412 Obtaining plural product pieces from unitary workpiece:**  
This subclass is indented under subclass 592. Process comprising separating a plurality of (similar or dissimilar) product members from a single stock element.
- (1) Note. A process of subdividing a group of adjacent stock elements to form a plurality of product members is included herein.
- (2) Note. A process of shaping a stock element of indefinite length and then cutting off product members is included herein in Class 29. See Search Notes below.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
2.1+, for bias cutting of tubular stock.  
411, for obtaining composite product members from a preassembled group of stock elements.  
412+, for a process of shaping a stock element of indefinite length and then cutting off product members.  
426.1, for a process of dissociating an assembly of parts into component parts by separating the parts along the line(s) of joinder.
- SEE OR SEARCH CLASS:  
413, Sheet Metal Container Making, subclasses 1+ for a process of fabricating a sheet metal can.
- 413 Breaking through weakened portion:**  
This subclass is indented under subclass 412. Process in which the stock element is provided with a localized area which has been reduced in strength so as to be more readily fracturable than the remainder of the stock element comprising fracturing the stock element through such area.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
414, for a process of dividing a stock element into product members through a modified portion of the stock element.

## SEE OR SEARCH CLASS:

- 83, Cutting, subclasses 861+ for cutting other than through the thickness of a workpiece (stock element) which may be to weaken the workpiece for subsequent breaking, especially, search subclasses 875+ for grooving and subclasses 879+ for scoring.
- 225, Severing by Breaking or Tearing, subclass 2 for a method of preliminarily weakening combined with breaking or tearing and subclasses 94+ for apparatus to preliminarily weaken combined with apparatus to break or tear.
- 428, Stock Material or Miscellaneous Articles, subclass 571 for metallic stock material having a portion weakened for severing.

**414 Dividing through modified portion:**

This subclass is indented under subclass 412. Process in which a stock element (1) has been worked on to produce a localized area of a different characteristic from the remainder of the stock element or (2) has another part or stock material assembled therewith at a localized area comprising separating the product member from the stock element through the localized area.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

- 413, for a process of breaking a stock element through a weakened localized area.

**415 Dividing on common outline:**

This subclass is indented under subclass 412. Process comprising separating at least two product members from the stock element along a line which defines at least a portion of the configuration of both those members, wherein the line of separation is other than perpendicular to the longitudinal axis of the stock.

- (1) Note. No scrap is produced between the adjacent parts.
- (2) Note. "Other than perpendicular to the longitudinal axis" excludes simply chopping the parts apart.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

- 417, for a process of dividing a stock element consisting only in separating it along a line perpendicular to the longitudinal axis thereof.

**416 Coacting pieces:**

This subclass is indented under subclass 412. Process comprising separating product members from a stock element wherein the separated product members subsequently cooperate as abutting, adjoining, interfitting, or otherwise interacting assembled pieces of a blank or finished article.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

- 418, for a process of removing a temporary holding or handling portion from between members being assembled in a particular spacial relationship.
- 428+, for a process of joining or assembling co-acting parts wherein the coacting parts are not obtained from a unitary blank.

**417 Dividing sequentially from leading end, e.g., by cutting or breaking:**

This subclass is indented under subclass 412. Process comprising separating plural product members from a forward end of an elongated stock element by repetitively subdividing the stock element along a straight line transverse to the axis of the stock element.

- (1) Note. This subclass includes a process of (1) cutting to length combined with significant treating, or (2) cutting off more than one product member from a stock element, unless provided for in a superior class.

**418 Providing transitory integral holding or handling portion:**

This subclass is indented under subclass 592. Process comprising manufacturing a product, wherein the stock element is provided with a temporary protuberance, or web which facilitates support or manipulation of the stock element during manufacture and subsequently eliminating the protuberance or web.

- (1) Note. "Assembling" of a plurality of stock elements is considered to be "manufacturing" in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 416, for a process of manufacturing coacting pieces from a unitary piece.  
423+, for a process of associating a separate part or material with the part being worked upon, concurrently shaping both parts, and subsequently removing the separate part or material.

SEE OR SEARCH CLASS:

- 285, Pipe Joints or Couplings, subclass 23 for a pipe joint or coupling with an assembly means or feature comprising a holding means functioning only during transportation, assembly, or disassembly and subclass 38 for a pipe joint or coupling with an assembly means or feature comprising a handle or handwheel for rotary engagement.  
403, Joints and Connections, subclass 12 for a joint or connection, generally, with an assembly means or feature comprising a holding means functioning only during transportation, assembly, or disassembly and subclass 17 for a joint or connection, generally, with a handle or handwheel.

**419.1 Shaping fiber or fibered material:**

This subclass is indented under subclass 592. Process comprising changing the external configuration of a mass of discrete solid particles, each particle being a slender and threadlike body (1) while the particles of said mass are acting as individual elements so that each is separately shaped, or (2) treating a body formed by uniting or associating such a mass of discrete solid particles.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 4.51+, for apparatus and process of shredding metal or producing an article from metal wool.

SEE OR SEARCH CLASS:

- 19, Textiles: Fiber Preparation, for means for isolating or manipulating textile fibers.  
28, Textiles: Manufacturing, subclass 116 for a process of and apparatus for the entangling of fibers by mechanical working (e.g., felting) and see, especially, subclass 118 for the compressing, compacting, or shaping fibrous material into a wad or plug, and see the search notes thereto for other process of treating fibrous material.  
65, Glass Manufacturing, subclasses 376+ for processes of manufacturing glass fibers, filaments, or preforms; subclasses 17.1+ for processes of working or treating glass, especially subclasses 17.3+ for shaping of particulate glass material and subsequent fusing of particles.  
140, Wireworking, subclasses 71+ for a process of making articles from wire stock.  
148, Metal Treatment, for a process including metal treatment under the class definition.  
156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclasses 62.2+ for process of forming a surface bonded lamina by bulk deposition of discrete particles, subclass 161 for process of surface bonding in stressed condition of stressed filament, and subclasses 166+ for process of surface bonding flexible filamentary material while in indefinite length or running length.  
164, Metal Founding, subclasses 91+ for a process of metal casting to form a composite article.  
264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclasses 109+ for process of forming an article by uniting randomly associated particles and subclass 174 for a process of forming continuous or indefinite length work comprising a strand-like or filament-like preform.  
419, Powder Metallurgy Processes, for a process of producing a metallic, alloy, or metal-containing composition in a



- solid or compact state from particulate material.
- 420, Alloys or Metallic Compositions, and see the notes thereto for the locus of other art relating to the shaping of powdered material.
- 425, Plastic Article or Earthenware Shaping or Treating: Apparatus, subclasses 80.1+ for air felting to form a fibrous mat.
- 493, Manufacturing Container or Tube From Paper; or Other Manufacturing From a Sheet or Web, subclasses 39+ for the residual home for a process of making a cigarette filter even if not constructed of sheet or web material.

#### 419.2 Magnetically shaping:

This subclass is indented under subclass 592. Process including permanently altering the dimensions of a magnetically responsive part beyond its elastic limit by means of a force effected by direct application of a magnetic field to that part.

##### SEE OR SEARCH CLASS:

- 72, Metal Deforming, subclasses 54+ for a process of deforming a metal part utilizing an energy field.
- 164, Metal Founding, subclasses 466+ for a process of shaping molten metal utilizing magnetic force.
- 204, Chemistry: Electrical and Wave Energy, subclasses 155+ for a process of chemically treating a material using a magnetic field.
- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclass 427 for processes of producing and treating magnetic products or precursors by direct application of electrical or wave energy, subclass 437 for conveying or aligning particulate material by direct application of electrical or wave energy, and especially subclass 460 for forming articles by uniting randomly associated particles using direct application of electrical or wave energy.
- 335, Electricity: Magnetically Operated Switches, Magnets, and Electromagnets, subclass 219 for a device of that class combined with a diverse-type art device.

- 425, Plastic Article or Earthenware Shaping or Treating: Apparatus, subclass 3 for shaping material of that class by magnetic force.
- 427, Coating Processes, subclasses 547+ and 598+ for a process of coating utilizing a magnetic field.

#### 421.1 Shaping by direct application of fluent pressure:

This subclass is indented under subclass 592. Process including permanently altering the dimensions of a part beyond its elastic limit by means of a pressure differential effected by direct action of a flowable material which is in immediate contact with the part altered.

- (1) Note. Permanently altering the dimensions of a part requires stressing the part beyond its elastic limit thereby causing plastic deformation.

##### SEE OR SEARCH THIS CLASS, SUBCLASS:

- 426.5+, for a process of disassembling one part from a plurality of associated parts by means of the application of pressure or impact.
- 446+, for a process of assembling using fluid pressure to temporarily elastically deform a member to facilitate assembly.

##### SEE OR SEARCH CLASS:

- 72, Metal Deforming, subclasses 54+ for a process of deforming a metal article by means of direct application of fluent material.
- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclasses 500+ for a method of permanently shaping particulate or nonmetallic material by means of direct application of fluid pressure differential.
- 427, Coating Processes, subclasses 331+ for a method of post-treating a coating or a coating material.

#### 421.2 Explosively shaping:

This subclass is indented under subclass 421.1. Process wherein the pressure differential is effected by an explosion.

## SEE OR SEARCH CLASS:

- 72, Metal Deforming, subclasses 56+ for shaping of metal by kinetic energy of a fluid or a field.
- 102, Ammunition and Explosives, subclasses 301+ for a process of blasting under the class definition.
- 148, Metal Treatment, appropriate subclasses for processes that combine use of significant heat treatment of metal as a separate step with metal deforming using an explosion to apply working pressure. Particularly, see Class 148, subclass 515, and section III, A, of the Class 148 definition.
- 228, Metal Fusion Bonding, subclasses 107+ for a process of metallurgical bonding utilizing explosive energy.
- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclass 84 for a method of applying explosive force to make an article from particulate or nonmetallic material.

**422 Shaping container end to encapsulate material:**

This subclass is indented under subclass 592. Process including inwardly deforming the walls of an extant end portion of an article containing or material containing receptacle to decrease the size of the end opening and thereby prevent escape of contents of the receptacle.

- (1) Note. In the patents here classified the "container" has a fixed, or more or less permanent, relationship with the material encapsulated rather than being merely a temporary or transient cover to form a package; for example, in this subclass may be found metal bottles for gas storage the claims reciting the association of the metal bottle with an absorbent material for holding the gases which association of metal cover and absorbent material is a permanent relationship. The mere association of the metal bottle with the contained gases only, however, is an example of the type of transient association that is not provided for in this class but may be found in other appropriate classes. See the Search Notes below.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

- 243.52, for apparatus for assembling by over-edge clamping by deforming an annular member.
- 511, for a process for joining parts in which one of the parts is a cup or tube and the process includes a step of necking in the cup or the tube wall at its end.

## SEE OR SEARCH CLASS:

- 53, Package Making, for a process of encompassing, encasing, or completely surrounding goods or materials with a cover made from sheet material stock, or for placing contents in a preformed receptacle and closing. The processes of class (53) encase or encompass goods and materials with a cover made from sheet material stock which serves for identifying, protecting, or unit handling the goods or materials. The cover is usually removable from the contents when the latter is used; however, some exceptions are found to this removable cover, including, e.g., match books, capsules, and tea bags. Also see (1) Note above.
- 141, Fluent Material Handling, With Receiver or Receiver Coacting Means, for a process of or device for filling receivers with fluent material and see the notes to the class definition of Class 141 for the locus of other art relating to filling, and see (1) Note, above.

**423 Utilizing transitory attached element or associated separate material:**

This subclass is indented under subclass 592. Process including (1) provisionally assembling or associating a work part with a separate sacrificial part or material, (2) performing a manufacturing operation of treating or shaping on both assembled or associated parts or materials, and (3) subsequently discarding or destroying the sacrificial part or material.

- (1) Note. This subclass does not provide for the temporary association of a workpiece with a jig, fixture, tool, or other apparatus used in the manufacturing operation.

Rather, the material of this subclass is in effect a part of the workpiece during the manufacturing operation and is usually deformed, distorted, or shaped along with the workpiece during the manufacturing operation. Search the appropriate subclasses, below, for the associations mentioned above.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 17.5, for a process of making foil with pack formation or treatment including use of a transitory solid cover material.
- 17.9, for a process of making foil including use of a transitory solid cover material, generally.
- 404, for a process of placing a part in an environment which is a simulation of that encountered in actual operation of the part, treating the part, and then removing the part for final assembly with other parts or for further treatment.
- 418, for a process involving the use of a transitory integral portion of a workpiece as distinguished from these subclasses in which a separate transitory material is used.
- 425, for a process of associating parts, shaping them, and then disassociating and reassembling them in a different position.

**SEE OR SEARCH CLASS:**

- 72, Metal Deforming, subclasses 465+ for disclosure of a flexible tool used during deformation and subclasses 54+ when the tool is made of fluent material.
- 164, Metal Founding, subclasses 34+ for metal molding with first making the mold, metal molding, and then destruction of the mold pattern to allow disassociation of the produced article.
- 171, Unearthing Plants or Buried Objects, subclasses 13, 93, 95+, 116, and utilizing a flexible, deformable, or destructible molding surface or material.

- 205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, subclass 73 for a process of electroforming a roll, a ring, or a hollow body.
- 228, Metal Fusion Bonding, subclass 118 for process of assembling a plurality of parts including first treating at least two of the contacting interfaces of the parts to inhibit bonding, or selecting the materials of at least two of the parts to provide a nonbonding interface, then applying heat and/or pressure to the assembly to effect bonding at the other interfaces.
- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclasses 221 and 313 therein pertains to a process including the step of subsequent destruction of a forming surface or mold.
- 419, Powder Metallurgy Processes, for a process of forming articles by uniting discrete particles containing metal particles, especially, subclasses 61+.

**424 Temporary protective coating, impregnation or cast layer:**

This subclass is indented under subclass 423. Process in which the separate material associated with the part is in the nature of a coating, impregnation, or cast layer.

- (1) Note. The coating is usually for the purpose of protecting or supporting the coated surface during treating or shaping.
- (2) Note. The terms "coating", "impregnation", and "cast layer" as used in this definition are defined in the class definition of Class 118, Coating Apparatus, sections II and VII, and are as follows: "the term coating is used throughout the definition in a generic sense and could mean either (1) an initially fluent film or layer of material lying on or bonded to the surface of a base, or (2) an impregnating material which penetrates the base either partially or completely and all or part of which is retained therein, either in its original form or physically or chemically combined therewith". Casting includes applying a layer of

material on a base, in which the layer of such thickness as to require molds, walls, or flanges on the base to retain the cast material thereon.

SEE OR SEARCH THIS CLASS, SUBCLASS:

527.1+, for a casting and/or coating process combined with other mechanical manufacturing steps.

SEE OR SEARCH CLASS:

72, Metal Deforming, subclasses 41+ for metal deforming with lubricating of the work or product.

164, Metal Founding, subclasses 91+ for a process of composite article forming by shaping liquid metal against a forming surface.

264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclass 264 for molding of that class with preventing adherence of shaped material to preform.

427, Coating Processes, subclasses 331+ for coating combined with post-treatment of coating or coating material.

**425 Shaping mating parts for reassembly in different positions:**

This subclass is indented under subclass 592. Process including temporarily assembling two or more cooperating parts of a device, concurrently altering their dimensions in some respect, and then disassembling and putting together the parts in a different relationship.

SEE OR SEARCH THIS CLASS, SUBCLASS:

404+, for a process of treating parts in a similar operational environment or during simulated operation.

423, for a process of concurrently shaping a part with an associated, separate part or material and then discarding the separate part or material.

445, for a process of associating parts in their operative relationship and altering their dimensions while they are in such relationship.

**426.1 Disassembling:**

This subclass is indented under subclass 592. Process comprising disconnecting disassociating, disintegrating, or otherwise removing (1) one or more parts in a final relationship of parts, or (2) parts or articles existing in an unintended or unexpected association.

(1) Note. This subclass excludes the mere separation of a tool from the work (such as retracting a drill from a bored hole) or removing a completed assembly or subassembly from a fixture and is therefore generally limited to the disassembly of component parts of an article or subassembly. However, under the second alternative in the definition above, there is here included a process of separating parts in unexpected or unusual relation to each other, i.e., a broken drill stem in a hole, or two noncooperating parts frictionally stuck together.

(2) Note. Since the term "manufacturing" has been defined, for the purpose of classification, as including disassembly, this and indented subclasses have been screened and all relevant patents have been classified as originals in the appropriate special article subclasses appearing, above.

SEE OR SEARCH THIS CLASS, SUBCLASS:

17.7, for foil making, including assembling or disassembling a pack.

700+, for apparatus for disassembly.

SEE OR SEARCH CLASS:

52, Static Structures (e.g., Buildings), subclasses 741.1+ for a process relating to the assembly of in situ erected building structures.

156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclass 344 for a delaminating process, per se.

166, Wells, subclass 377 for a process of disassembling well parts from a well or in some relationship to a well.

**426.2 With other than ancillary treating or assembling:**

This subclass is indented under subclass 426.1. Process combined with an additional, diverse step of physically altering, juxtaposing, associating, integrating, or joining the parts or articles and wherein the additional step is other than an auxiliary step to facilitate disassembly.

- (1) Note. Mere handling or conveying of a part is not considered "treatment" as defined, above.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 402.03+, for a process of repairing which includes a disassembly step.  
 403.1, for a process of salvaging which may include a disassembly step.  
 418, for a process including providing a temporary integral holding portion which portion is later removed.  
 423+, for a process which includes removing or destroying separate material which has been temporarily associated or attached to a part while a manufacturing operation is performed on the part.  
 425, for a process of temporarily assembling a plurality of parts, changing their configuration while they are so associated, and then disassembling and reassembling them in different spacial relationship.

**426.3 With conveying of work or disassembled work part:**

This subclass is indented under subclass 426.1. Process including transporting a part or parts to or away from the location at which they were disassembled.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 771+, for automatic assembly or disassembly apparatus including interrelated work part conveyors.  
 822+, for assembly or disassembly apparatus including a work conveyor.

**426.4 By altering or destroying work part or connector:**

This subclass is indented under subclass 426.1. Process comprising disconnecting or disassociating parts by or resulting in shaping or destroying either a part or an element that fastened the parts together.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 17.7, for foil making including assembling or disassembling of a pack.

SEE OR SEARCH CLASS:

- 166, Wells, subclass 376 for a process of destroying or dissolving a well part in a well or in some relationship to a well.

**426.5 By applying force:**

This subclass is indented under subclass 426.1. Process in which parts secured together are disassembled by the application of pressure or impact in such manner as to overcome the instrumentalities holding the parts in securement.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 244+, for miscellaneous assembly or disassembly tools having a force multiplying operator.  
 446, a process of assembling and/or joining with prestressing of a part.  
 525, for a process of assembly by means of a force fit.

**426.6 To elastically deform work part or connector:**

This subclass is indented under subclass 426.5. Process wherein the pressure or impact is employed to stretch or compress a part or a fastening means within its elastic limit to facilitate separation of parts secured together.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 235+, for apparatus for applying or removing a resilient article.  
 450+, for a process of assembling or disassembling with prestressing of a workpart and elastically joining of parts.

453, for a process of assembling or disassembling with prestressing of parts by snap fit.

**428 Assembling or joining:**

This subclass is indented under subclass 592. Process including juxtaposing or bringing into ordered association two or more self-sustaining or preformed, parts and/or fastening these parts or portions of the same part, or separate parts, to each other.

- (1) Note. A Process of manufacturing a composite article by coating a base or casting a layer on a base is not provided for in this and indented subclasses in that these subclasses require the parts, when joined, to be self-sustaining or preformed. Therefore, a process wherein a part is coated or has material cast upon it, and the cast or coated layer joins to the part without any further treatment, is classified in the appropriate class which provides for the casting or coating operation, (see the Search Notes below); but performing a part by casting it and then joining it to another part or a portion is placed here. The combination of casting or coating and an additional working step other than assembly is classified elsewhere in Class 29 (see search notes below). However, if after solidification of the cast or coated layer, such layer and base are treated, e.g., by rolling, extruding, or forging, to effect or improve a joint between the base and layer, such process is considered to be joining for this and the indented subclasses, unless the particular effecting or improving of the joint is provided for specifically in a superior class, e.g., Class 228, Metal Fusion Bonding, since at the time of treating, the part and layer are self-sustaining.
- (2) Note. To be classified in this and the indented subclasses, the surfaces to be joined, if part of a single workpiece, must be united so that a positive seam is formed. Thus, for example, mashing the end of a tube flat without in any other way joining the mashed sides is merely a deforming operation and would not be here classified; but, unless provided for

in a superior class, such an operation combined with the additional step of bending the mashed end over to form a positive seam is provided for here.

- (3) Note. Generally, when searching for a process of this and the indented subclasses, it is advisable to consider expanding the search to the subclasses of the product made.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

527.1+, for the combination of casting or coating and an additional working step other than assembly.

**SEE OR SEARCH CLASS:**

- 12, Boot and Shoe Making, subclass 142 for a process of lacing shoes and subclasses 147+ for a process of attaching a heel to a shoe.
- 52, Static Structures (e.g., Buildings), subclasses 741.1+ for a process of assembling a building in situ, i.e., on a foundation. A process of assembling a portable building is included in Class 29, subclasses 428+.
- 57, Textiles: Spinning, Twisting, and Twining, for process of assembling a plurality of metal filaments to form a cable, and see (9) Note of the class definition of Class 57 for the line between Classes 29 and 57.
- 72, Metal Deforming, for bringing together two edges of a single metal part by an operation of that class type, i.e., by exceeding the elastic limit of the part without additional operations not included in that class. Search, in particular, subclasses 48+ for a tool couple pressing together adjacent surfaces of the same work to form a tube with a seam, subclass 66 for forming a helical member by a work-guide member orbiting the longitudinal centerline of a formed coil and subclasses 176+ for a troughing operation of continuously advancing metal sheet to form a tube-like member. The assembling of two distinct work parts by metal deformation is included in this and the indented subclasses as is the combination of metal deforming with

- assembling, if not included in Class 72.
- 144, Woodworking, subclasses 344+ for a process for assembling two workparts, one of which is wood, combined with a step of woodworking.
- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclasses 60+ as the generic home for manufacturing articles by an adhesive bonding step utilizing nonmetallic cements and assembly steps therefor. See the class definition of that class for a more comprehensive statement of the lines between the two classes.
- 164, Metal Founding, subclass 137 for a process of assembling mold parts and subclasses 91+ for a process of forming composite articles by metal casting. See the (1) Note above.
- 166, Wells, subclasses 378+ for a process for assembling well parts in a well or in some relationship to a well and subclasses 381+ for a process for placing or shifting a well part in a similar manner.
- 204, Chemistry: Electrical and Wave Energy, See the (1) Note above.
- 205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, subclass 114 and 115 for processes there provided for in which the object treated is repaired or parts of an object are united by electrodeposition.
- 228, Metal Fusion Bonding, for uniting two members or portions of the same member by welding, soldering or brazing; particularly subclasses 101+ for such process.
- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, for a method of shaping nonmetallic material, generally, usually involving flow of the material; particularly subclasses 4+ for encapsulating a normally liquid material, and subclasses 241+ for a method of molding nonmetallic material to produce a product of distinct materials. See the (1) Note above.
- 270, Sheet-Material Associating, subclasses 32+ and subclasses 52.01+ for associating sheet material.
- 413, Sheet Metal Container Making, for a process of or apparatus for changing stock sheet metal into a container, generally.
- 419, Powder Metallurgy Processes, for a method of manufacture peculiar to powder metallurgy.
- 427, Coating Processes, for a method of placing a relatively thin layer of fluent material on a substrate, generally. See the (1) Note above.
- 428, Stock Material or Miscellaneous Articles, subclass 582 for an intermediate article, i.e., a blank having an outward flange or gripping means.
- 470, Threaded, Headed Fastener, or Washer Making: Process and Apparatus, subclasses 2+ for methods for assembling and disassembling a bolt with a nut or with a washer.
- 483, Tool Changing, subclass 1 for a process of transferring a tool to or from a material treating station or a tool storage means, generally, including an assembling process combined with transferring the Class 29 tool to or from the working station.
- 493, Manufacturing Container or Tube From Paper; or Other Manufacturing From a Sheet or Web, for the step of or apparatus for changing paper or paper like stock material into a container, or other structure, without thickening or thinning of the material, generally. See the notes therein for lines with this class, e.g., Class 29.
- 429 Progressively advancing of work assembly station or assembled portion of work:**  
This subclass is indented under subclass 428. Process including relatively moving an article and a part-adding location and fastening a part to the article at such location.
- 430 Advancing work to successive stations (i.e., assembly line):**  
This subclass is indented under subclass 429. Process including (1) fastening a part to an article at a part-adding location, (2) moving the article to a next part-adding location, and (3) fastening a next part at said next part-adding location.

**431 Advancing station:**

This subclass is indented under subclass 429. Process including (1) fastening a part to an article at a part-adding location, (2) moving the part-adding location to a different area of the article, and (3) fastening a next part at the new location.

**432 Punching, piercing or reaming part by surface of second part:**

This subclass is indented under subclass 428. Process in which assembling at least two parts or two portions of the same part is preceded by or includes forming or enlarging a hole in a first part by shearing, piercing, or reaming using a point or an edge on another part.

- (1) Note. The step of “forming or enlarging” includes a cutting action and does not comprise only deforming, i.e., does not comprise stressing the part beyond its elastic limit.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 525, for a process of assembling or joining by force fitting. Forming or enlarging a hole in a part combined with force fitting the part that formed the hole with the first part is included in this and the indented subclasses (432+).
- 716, for means to assemble or disassemble a self-piercing work part with another part.
- 798, for means to assemble or disassemble including means to drive a self-piercing work part, which self-piercing part is not an “elongated member” which would be properly classified in Class 227. See the note to Class 227, below.

**SEE OR SEARCH CLASS:**

- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclasses 92+ for a process of assembling including the combination of adhesive bonding with use of a penetrating or piercing fastener.
- 227, Elongated-Member-Driving Apparatus, for apparatus to effect assembly of a first member with another member which other member is elongated

and is forced to penetrate the first member. Search, especially, subclasses 19+ for juxtaposing work parts and applying a fastening member, e.g., a nail, a rivet, etc., thereto.

**432.1 With shaping:**

This subclass is indented under subclass 432. Process including an additional step of altering form, configuration, dimension, proportion, or contour of any part.

**432.2 Of first part:**

This subclass is indented under subclass 432.1. Process wherein the step of altering is performed on the first part.

**433 By stringing:**

This subclass is indented under subclass 428. Process including the step of (1) passing a narrow attenuated member through a series of pieces, or (2) passing pieces serially over the member to arrange these pieces upon the member.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 24.5, for a process of assembling slats or cords in the tapes of a venetian blind.
- 241, for apparatus for stringing, generally, and see the notes in that subclass definition for stringing elsewhere classified.
- 432, for a process of assembling or joining including forming or enlarging (e.g., by shearing, piercing, or reaming) a hole in one member by a surface of a second member.
- 525, for a process including joining parts by force fitting one part or portion thereof into an aperture of another part.

**434 Retaining clearance for motion between assembled parts:**

This subclass is indented under subclass 428. Process in which the parts are finally assembled to provide a tolerance space or clearance of fit sufficient to permit movement with respect to each other in the assembled relationship.

- (1) Note. In this subclass may be found parts which when assembled have sliding, piv-



oting, or rotating motion, one with respect to the other.

**SEE OR SEARCH CLASS:**

- 59, Chain, Staple, and Horseshoe Making, for a process of making a chain or a swivel, and see the notes thereto for the locus of analogous art relating to chain making.
- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclass 70 for a process of encasing a movable or loosely confined element between adhering lamina, i.e., encasing between adhesively bonded lamina a drawstring.
- 285, Pipe Joints or Couplings, especially subclass 223 for a flexible pipe joint or coupling.
- 384, Bearings, for structure intended to reduce the friction between or guide two relatively movable members.
- 403, Joints and Connections, subclasses 220+ for flexibly connected rigid members, generally.

**435 Between tube-forming helical coils:**

This subclass is indented under subclass 434. Process including shaping or assembling two or more elongated members into spiral intercoiled convolutions to form a wall of a tube, which members slide relative to one another to permit bending of the tube along its axis while maintaining substantially constant diameters.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 456, for a process including fabricating and assembling, or merely assembling a spirally convoluted member to a second member.

**SEE OR SEARCH CLASS:**

- 267, Spring Devices, subclasses 285+ for a vehicle spring comprised of plural coils.

**436 Through resilient media:**

This subclass is indented under subclass 434. Process including connecting a surface of an elastic means to a surface of each of the parts so that the motion between the parts takes place through the elastic means by distorting it within its elastic limit.

- (1) Note. The elastic means of this subclass substantially fills the space between the parts assembled.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 235+, for apparatus for assembling or disassembling a resilient part with another part.
- 450+, for a process of making a joint between elastic and nonelastic parts which includes prestressing the elastic part so that the elastic part grips the other part and prevents relative motion between it and the other part.

**437 By deforming interlock:**

This subclass is indented under subclass 434. Process wherein a first part is inserted within an opening in a second part or positioned adjacent thereto, and one of the parts has its dimensions or shape permanently altered by deformation beyond its elastic limit to prevent withdrawal or separation of the other part.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 243.5+, for apparatus for assembling or disassembling by an overedge assembly operation.
- 283.5, for apparatus for assembling or disassembling by deforming one or more of the parts assembled.
- 505+, for joining parts by deforming, generally.

**SEE OR SEARCH CLASS:**

- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, for a method of shaping plastic material, generally, including shaping one margin of a workpiece to interfit with another portion of that workpiece, as in making a tube, and including forming nonmetallic material about a "pre-form" which may be metallic. Search, especially, subclass 242 for a method under that class definition including joining parts while allowing the parts to move relative to each other.

- 438 By folding part into plural ears:**  
This subclass is indented under subclass 437. Process in which the second or outer part has spaced preformed openings therein and is bent intermediate the openings to axially align the openings and embrace a pair of gudgeons on the first or inner part in the openings to thereby journal the gudgeons.
- 439 By wrapping around:**  
This subclass is indented under subclass 437. Process wherein the assembly is consummated by forming the second or outer part into an encircling bearing surface which surrounds at least a portion of the first part.
- 440 Of link closure:**  
This subclass is indented under subclass 439. Process in which the second or outer part is provided with an eye or opening, and the first part is inserted part way through the eye and deformed to encircle a portion of the eye or the edge of the opening.
- 441.1 Of sphere, i.e., ball, in socket:**  
This subclass is indented under subclass 437. Process wherein the first part has a spherical surface which is inserted in a cavity in the second or receiving part comprising deforming the receiving part to confine the spherical surface within the cavity while permitting relative movement of the parts.
- 441.2 Ball point pen making:**  
This subclass is indented under subclass 441.1. Process comprising deforming the second or receiving part around the first part having the spherical surface so that the spherical surface can extend beyond the end of the receiving part so as to form a writing instrument.
- (1) Note. Included herein is a process of inserting a ball into a confining receiver to form a writing extremity or "nib" (that part of a writing instrument in which the ball is housed or the front end shank around the ball and the formed ball seating surface).
- SEE OR SEARCH CLASS:  
401, Coating Implements With Material Supply, subclasses 208+ for a ball-point pen.
- 442 Allowing assembled sphere to move in single plane only:**  
Process under subclasses 441.1+ wherein the parts are configured such that after assembly they interfit with each other in a way that allows relative movement therebetween about an axis without allowing relative movement therebetween along that axis.
- 443 Of flange into tubular socket:**  
This subclass is indented under subclass 437. Process including deforming a protuberance on the first part into an annular channel in the second part, or including deforming an annular channel into the second part to receive a protuberance of the first part whereby the parts may swivel relative to one another.
- 444 Outwardly deforming internally fitted rod:**  
This subclass is indented under subclass 437. Process wherein the first part comprises a rod inserted in an opening in the second part and subsequent separation of the parts is prevented by providing a flange on the rod, which flange is enlarged beyond the internal diameter of the entrance of the opening.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
443, for a process wherein an inserted part is flanged to fit within an annular channel in a surrounding part.  
512, for a process of uniting two or more parts by a deforming operation in which an inserted tube is flared to secure it within a surrounding part.
- 445 Sizing mating parts during final positional association:**  
This subclass is indented under subclass 428. Process including assembling two or more cooperating parts in their ultimate relationship, and while they are assembled, altering their dimensions by machining, deforming, etc., concurrently so that a proper fit or tolerance of these parts with themselves or with the other cooperating parts of the mechanism is effected.
- (1) Note. "Altering" of this subclass is to improve the fit of the parts; it does not comprise deforming of the parts to secure them to each other.

- (2) Note. Both parts must be altered, but this may make them fit another part. For example, a rod assembled into a cylinder altered by transverse drilling for placement of a securing bolt is included herein.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 404, for a process of manufacture involving treating the part during the simulation of the actual operation or operating conditions for which the part will ultimately be used.
- 425, for a process of temporarily associating cooperating parts, altering their dimensions, disassociating the parts, and then reassembling them in a relationship different from the temporary one.

**446 With prestressing of part:**

This subclass is indented under subclass 428. Process wherein one part is distorted within its elastic limit, e.g., by tension or compression, and while so distorted is subsequently fastened to one or more other parts while in a stressed condition.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 525, for a process of fastening parts by means of a driven force fit. A force fit differs from prestressing of a part in time of application of stress, in that the stress in a force fit is initiated at the time of joinder whereas in this subclass the stress is applied prior to the time of joinder. For example, forcing a rod into a hole of smaller size so that the parts are held by the frictional engagement of the rod and sides of the hole is a process of force fitting for subclass 525. However, if the same rod is stretched within its elastic limit to thin it and inserted in the same hole while stretched, and the stretching force is then released to permit the rod to expand radially outwardly to frictionally grip the sides of the hole, that process is considered classifiable in these subclasses (446+) and indented subclasses.

SEE OR SEARCH CLASS:

- 52, Static Structures (e.g., Buildings), subclasses 223.1+ for prestressed structure in a static building.
- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclasses 160+ for a laminating process involving uniting in stressed condition of prestressed elements.
- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, for a process of molding plastic material with prestressing by a metal reinforcing means.

**447 By temperature differential (e.g., shrink fit):**

This subclass is indented under subclass 446. Process in which the tension or compression is effected by changing a dimension of one of the parts relative to the other part by creating a temperature variation between the parts.

- (1) Note. Included in this subclass is a process of fastening parts by means of a shrink fit for example, heating to expand a rim followed by assembling the rim over a wheel and allowing the rim to cool and shrink into gripping assembly with the wheel.
- (2) Note. "Expansion Fitting", as by cooling to shrink and prestress is included herein.

SEE OR SEARCH CLASS:

- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, for heating a member of plastic having "elastic memory" to effect shrinking for assembling that member with another member. Such "elastic memory" in a member of metal utilized in a method of assembling is included in this subclass.
- 285, Pipe Joints or Couplings, subclass 381.1 for a pipe joint formed by shrink fitting.
- 403, Joints and Connections, subclass 273 for a shrink fitted rod joint.

**448 Of skin on frame member:**

This subclass is indented under subclass 446. Process wherein one of the parts is a sheet or web and the other part includes spaced supporting elements to which the edges of the sheet are joined such that the sheet is held taut within its elastic limit.

- (1) Note. Included, for example, are processes of attaching the skin of an aircraft to the wings or fuselage.

**SEE OR SEARCH THIS CLASS, SUB-CLASS:**

462, for a process of joining a plate or sheet to a frame of spaced elements which does not involve prestressing of a part.

**449 By flexing:**

This subclass is indented under subclass 448. Process wherein the tension or compression is effected by bending one of the parts within its elastic limit to reduce the area in the surface of a plane through the spaced points of joinder.

**450 Elastic joining of parts:**

This subclass is indented under subclass 446. Process wherein the part to be distorted is a yieldable, flexible, or rubber-like solid, and the other part has a mating portion which will not accommodate the first part except when the first part is in distorted condition, and as the distorted part attempts to return to its undistorted shape, the stress between the two parts prevents relative motion and separation therebetween.

**451 Confining elastic part in socket:**

This subclass is indented under subclass 450. Process wherein the distorted part is assembled or retained within a cavity in a surrounding part, and the surrounding part prevents the expansion of the rubber-like part to its original dimensions.

**452 Prestressing rod, filament or strand:**

This subclass is indented under subclass 446. Process wherein the distorted part is long in relation to its cross-section, all of its cross-section dimensions are of the same order, and the part is tensioned along its length.

**SEE OR SEARCH CLASS:**

52, Static Structures (e.g., Buildings), subclasses 223.1+ for a prestressed building structure.

242, Winding, Tensioning, or Guiding, for winding flexible material under tension. Search subclasses 438+ for a process or apparatus for making of an article by winding.

254, Implements or Apparatus for Applying Pushing or Pulling Force, subclass 29 for a tie rod for use in stressing or prestressing.

264, Plastic and Nonmetallic Article Shaping or Treating: Processes, for prestressing a steel reinforcement means combined with molding nonmetallic material thereabout.

**453 By snap fit:**

This subclass is indented under subclass 446. Process for joining a resilient part to another part comprising distorting the resilient part and passing it (1) over a protuberance or (2) through a constriction on the other part and then permitting the resilient part to spring into a recess past the protuberance or constriction to anchor the parts.

**SEE OR SEARCH CLASS:**

285, Pipe Joints or Couplings, subclass 921 for a cross-reference art collection of snap-fit pipe joints.

403, Joints and Connections, for a joint between two members, generally.

**454 Of flexible wall, expansible chamber devices (e.g., bellows):**

This subclass is indented under subclass 428. Process for manufacturing a container, the volume of which is changeable by means of relative motion of one or more of the walls of the container, which walls are resilient, pliable, or yielding.

- (1) Note. The devices manufactured in this subclass are variously known in the arts as bellows, bourdon springs, "siphons", expansible diaphragms, etc.

## SEE OR SEARCH CLASS:

- 92, Expansible Chamber Devices, subclasses 34+ for a bellows type expansible chamber.
- 138, Pipes and Tubular Conduits, subclasses 118+ for a flexible pipe, particularly subclasses 121+ for a flexible corrugated pipe.
- 267, Spring Devices, subclasses 118+ for an expansible-contractible chamber spring device.
- 285, Pipe Joints or Couplings, subclasses 226+ for a tubular structure adapted for connecting two relatively movable parts to form a flexible and expansible fluid tight joint therebetween. See the search notes thereunder.

**455.1 Spaced wall tube or receptacle:**

This subclass is indented under subclass 428. Process including assembling a surrounding circumferential part to a core, either the core or surrounding part being equipped with a spacer element to radially separate the two or joining the surrounding part to the core while maintaining the radial separation.

- (1) Note. The separating radial space may be occupied by a layer of insulating material or by a gas such as air.

## SEE OR SEARCH CLASS:

- 52, Static Structures (e.g., Buildings), subclass 743 for a process relating to the filling of a cavity in a building structure, i.e., filling a hollow wall.
- 122, Liquid Heaters and Vaporizers, for a closed or pressurized apparatus to heat liquid or make steam, subclass 19.2 for a stand boiler (e.g., water heater, etc.) that provides hot water for domestic or household use (e.g., cooking, cleaning, washing, bathing, space heating, etc.) that may be in other than a house or home (e.g., apartment building, office building, restaurant, laundry, recreational vehicle, etc.) and a casing for the stand boiler or an external water tank therefor.
- 126, Stoves and Furnaces, for a water heater or steam generator of an open or unpressurized type, or may be a

closed or pressurized type if it is part of the stove or furnace structure; and subclasses 344 through 363.1 for a liquid heater that may include a kettle, a steam generator, stove pipe for use with a stove, and a domestic water heater or boiler (e.g., kitchen boiler, range boiler, etc.) for use with a stove or furnace.

- 138, Pipes and Tubular Conduits, for a spaced wall tube or receptacle, generally.
- 220, Receptacles, appropriate subclasses, particularly 62.18, 560.1, and 586+, for multilayer receptacle structure and subclasses 918+ for an element for spacing inner and outer walls of a receptacle.
- 228, Metal Fusion Bonding, subclass 115 for a process of making a multilayer metallic article in which each layer is joined to the adjacent layer and subclass 126 for a process of enclosing a tube or rod with a separate tubular member and bonding the parts together.

**456 Of separate helix (e.g., screw thread):**

This subclass is indented under subclass 428. Process including fabricating and assembling or merely assembling a spirally convoluted member of substantially uniform cross section form to a second member so that the axis of the spiral member lies substantially parallel to the axis of a right cylindrical surface upon or within the second member.

- (1) Note. These helices are usually screw threads assembled either upon a rod or within a cylindrical aperture.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

- 173, for a process of making a spring, generally, including making a helical spring.
- 240.5, for means to insert and/or remove a helix by rotation.
- 435, for a process of assembling a plurality of interconvoluted spiral members to form a tube.
- 890.03+, for a process of making a radiator to be filled with a liquid.

## SEE OR SEARCH CLASS:

- 72, Metal Deforming, subclasses 135+ for a process of fabricating a helically convoluted metal member.
- 140, Wireworking, for a process of making a product of wire, including combined operations, generally.

**457 Ribbing:**

This subclass is indented under subclass 428. Process including assembling a plurality of elongated separate fins or ridges on the surface of a part, parallel to each other and to the surface.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

- 157.3+, for a process of making a radiator to be filled with a liquid.

## SEE OR SEARCH CLASS:

- 165, Heat Exchange, especially subclasses 148+ for a radiator type core that may have been made by ribbing.
- 228, Metal Fusion Bonding, subclasses 183+ for a process of making a heat exchanger by welding, soldering, or brazing.
- 428, Stock Material or Miscellaneous Articles, subclasses 602 and 603+ for metallic stock material having ribs.

**458 With coating before or during assembling:**

This subclass is indented under subclass 428. Process in which assembly and/or joining is preceded by or takes place simultaneously with coating of one or more of the parts.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

- 424, for a process utilizing a temporary protective coating.
- 527.1+, for coating combined with manufacturing operations.

## SEE OR SEARCH CLASS:

- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, especially subclasses 293+ for applying an adhesive coating to a member and subsequently bringing the coated member into adhesive engagement with another member.

- 205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, subclasses 80+ for a process of electrolytic coating.

- 228, Metal Fusion Bonding, subclasses 101+ for a method of applying of a coating to facilitate a bonding operation.

- 427, Coating Processes, for coating, generally, without bringing members together.

**459 To roughen surface:**

This subclass is indented under subclass 458. Process in which the coating increases the frictional characteristics of the coated surface, e.g., by including a particulate roughening material such as grit in the coating.

## SEE OR SEARCH CLASS:

- 403, Joints and Connections, subclasses 345+ for a coated interfitted joint with an intermediate roughened material.

**460 Subsequently coating:**

This subclass is indented under subclass 428. Process in which assembly and/or joining is followed by coating the assembly or a portion thereof.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

- 527.1+, for coating combined with manufacturing operations.

## SEE OR SEARCH CLASS:

- 205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, subclasses 80+ for a process of electrolytic coating.

- 427, Coating Processes, for coating, generally, without bringing members together.

**461 With spreading of cable strands:**

This subclass is indented under subclass 428. Process in which at least one of the parts is a unit handled plurality of fibers in rope-like form, including opening the lays of fibers.

- (1) Note. The opening of the lays may be, for example, for the purpose of provid-

ing larger surface contact with the part to be joined or assembled thereto.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

419.1, for a process of mechanical manufacture including shaping fiber or fibered material.

SEE OR SEARCH CLASS:

156, Adhesive Bonding and Miscellaneous Chemical Manufacture, for bonding cable strands, generally.

228, Metal Fusion Bonding, for bonding metallic cable strands by welding, soldering, or brazing.

403, Joints and Connections, for a joint, generally, that includes uniting opened cable strands.

439, Electrical Connectors, for an electrical connector including splaying means to separate the strands of an electrical cable for use with the connector.

**462 Joining plate edge perpendicularly to frame:**  
This subclass is indented under subclass 428. Process including fastening a plate to a supporting structure extending substantially at right angles to the plane of the plate along at least two peripheral edges of the plate.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

448+, for a process of assembling a sheet or a plate to a frame including prestressing one of the parts.

**463 Peripheral joining of opposed mirror image parts to form a hollow body:**  
This subclass is indented under subclass 428. Process including juxtaposing allochiral portions of parts and joining the edges thereof to enclose a space at the interface.

(1) Note. The parts are usually provided with flanges around the periphery or are dished in the center to leave a space intermediate the edges.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

243.52, for apparatus to assemble annular work by overedge assembly.

511, for a process of assembling, including joining by deforming, including over-edge assembling by necking in cup or tube walls at the end of the cup or tube.

512, for a process of assembling, including joining by deforming, including over-edge assembling by flaring an inserted tube end.

**464 Associating parts by use of aligning means (e.g., use of a drift pin or a "fixture"):**

This subclass is indented under subclass 428. Process in which adjunctive to the step of assembling of two or more parts (1) the relative position of the parts is compared with a separate standard or guide part and adjusted with relation thereto, or (2) one or more independent instrumentalities physically cooperates with the parts to actively register one with the other.

(1) Note. The aligning means of this subclass, especially under clause (1), may be inactive, i.e., it may serve to allow a user to visually align parts being assembled or, especially under clause (2), it may be active, e.g., it may be base mounted and guide one or more parts into assembled position or it may be manipulated by a user to position or align a part with respect to another part. If the aligning means is base mounted, normally the parts are brought to it, whereas if it is manually manipulated, it is brought to the parts.

SEE OR SEARCH CLASS:

228, Metal Fusion Bonding, subclasses 212+ for the process of soldering, brazing, or welding employing supports or clamps to hold the work parts being joined.

269, Work Holders, subclasses 37+ for patents to plural holders which hold workpieces relative to each other.

**465 Registering mating opposed tool parts (e.g., registering a punch and a cooperating die):**

This subclass is indented under subclass 464. Process of assembling the cooperating parts of a machine tool which cooperating parts will, during use of the machine tool, perform a treating, e.g., a cutting or a shaping, operation upon a blank or stock.

- (1) Note. The cooperating parts of the machine tool are aligned in their supports structure by the process of this subclass so that in operation of the machine tool, the cooperating tools come together properly.

SEE OR SEARCH CLASS:

- 76, Metal Tools and Implements, Making, subclasses 107.1+ for the process of making a "cooperating part" of a machine tool.
- 384, Bearings, subclasses 7+ for a guide means that directs movement of "cooperating parts" of a machine tool during operation of the machine tool.

- 466 By multiple cooperating aligning means:**  
This subclass is indented under subclass 464. Process including first engaging each of two or more single parts or subassemblies by a work holding member which has mating features cooperable with mating features of one or more other work holding members, and then moving the members into mating engagement, and fastening the parts or subassemblies to each other.

- 467 Sequentially associating parts on stationary aligning means:**  
This subclass is indented under subclass 464. Process of assembling parts upon a single work holding member by assembling a part thereon and then adding other cooperating parts to the member (1) in a particular pattern, or (2) in a particular order and fastening the cooperating parts to the first part.

- 468 By manipulating aligning means:**  
This subclass is indented under subclass 464. Process including first engaging two or more parts by the work holding member, and then moving the member relative to the parts to effect alignment of the parts with respect to each other.

- (1) Note. Use of a drift pin is included in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 271+, for means to assemble comprising a hand manipulatable aligning or centering tool, such as a drift pin.

- 469 Assembling a subassembly, then assembling with a second subassembly:**

This subclass is indented under subclass 428. Process including assembling a plurality of parts together to form a subunit, and then assembling two or more subunits together.

SEE OR SEARCH CLASS:

- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclass 182 for a process of assembling a plurality of parts together to form a sandwich and then assembling the sandwich with another sandwich.

- 469.5 Metal deforming with nonmetallic bonding:**  
This subclass is indented under subclass 428. Process including stressing a metallic workpiece beyond the elastic limit thereof combined with fastening of that workpiece to another workpiece by adhesive or fusion bonding wherein the securement is by use of a molecular interfit brought about by use of nonmetallic material.

- (1) Note. The nonmetallic material may come directly from a workpiece (fusion or diffusion bonding) or may be added for bonding (adhesive bonding).

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 33+, for plural diverse manufacturing apparatus, generally, including apparatus to deform metal and perform nonmetallic bonding.

SEE OR SEARCH CLASS:

- 72, Metal Deforming, for stressing of a metallic workpiece beyond the elastic limit thereof without bonding.
- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclasses 1+ for the process of bonding by nonmetallic attachment without deforming of metallic work and subclasses 196+ for the process of deforming nonmetallic work combined with nonmetallic bonding. Especially search subclasses 47+ for making an electrical conductor of indefinite length, generally, which may include metal deforming. (Note



- that this is an exception to the general rule that combined operations including plastically deforming metal combined with nonmetallic bonding is to be found in Class 29.
- 228, Metal Fusion Bonding, subclasses 141.1+ for a process of shaping of a workpiece combined with metallic bonding of that workpiece to another workpiece.
- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, especially subclasses 249+ for a method of molding a nonmetallic member into engagement with a metal member, i.e., in the manufacture of a seal, if there is no shaping of the metallic member.
- 425, Plastic Article or Earthenware Shaping or Treating: Apparatus, especially subclasses 110+ for apparatus for molding a nonmetallic member into engagement with a metal member, if there is no means to shape the metallic member.

### 505 Joining by deforming:

This subclass is indented under subclass 428. Process in which the fastening of the part or parts is effected by distorting a portion of at least one of the parts beyond its elastic limit, so that portion interferes with or prevents separation of the parts or other portion of the same part.

- (1) Note. The distortion may, for example, (1) extend a portion of a part beyond a dimension of another part to thereby interlock them (see search notes below for example), or (2) change a dimension of the first part to frictionally grip the other part with or without changing the latter's dimensions (see search notes below for example).

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 2 through 25.42, 91 through 91.8, 592.1 through 623.5, and 825 through 899.1, for a process of fastening by deforming in making (1) a special article by combined diverse operations or (2) for making a special article by a single operation not provided for specifically

- elsewhere in this class (Class 29), i.e., not joining by deforming a single operation provided for in this and the indented subclasses.
- 437+, for a process of joining by deforming wherein clearance for movement of the parts is retained.
- 509+, for extending a portion of a part beyond a dimension of another part to thereby interlock them. See (1) Note above.
- 515+, 522+, for changing a dimension of the part to frictionally grip the other part with or without changing the latter's dimensions. See (1) Note above.

SEE OR SEARCH CLASS:

- 72, Metal Deforming, for shaping of metallic work, generally, including "recognition" of only one work piece. Recognition usually comprises physical contact.
- 100, Presses, subclasses 35+ for a process of making an article from particulate material in which the particles do not bond to each at their respective interfaces but are held together to form a self-sustaining mass solely by the intermingling and/or deformation of the particles together.
- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, especially subclasses 249+ for a method of shaping of a nonmetal, generally, including uniting such nonmetal with a metal if there is no stressing of the metal beyond its elastic limit.

### 506 Securing cup or tube between axially extending concentric annuli:

This subclass is indented under subclass 505. Process of assembling a first tubular member with second and third relatively short tubular members wherein the second is smaller in diameter than the first and the third is larger in diameter than the first, comprising telescoping the members, i.e., assembling the members so that they share a common axis and that a plane normal to the axis passes through each of the members, so that the first member is fastened by deformation between the second and third members.

- (1) Note. The “second member” and the “third member” may be concentric tubular portions of a single annulus or may be distinct members.
- (2) Note. Included herein is securing a hose connector to the end of a hose and securing a bearing seal of resilient material between inner and outer metallic rings.

**507 By expanding inner annulus:**

This subclass is indented under subclass 506. Process in which the second short tubular member, i.e., the inner member is deformed radially outwardly to confine the end of the first tubular member between the second or inner and the third or outer tubular members.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 523, for a process of joining parts by outwardly expanding a part in a cavity to frictionally grip the cavity walls.

**508 By constricting outer annulus:**

This subclass is indented under subclass 506. Process in which the third or outer tubular member is deformed radially inwardly to confine the end of the first tubular member between the third or outer and the second or inner tubular member.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 515+, especially subclass 516 for a process of fastening parts by deforming inwardly the walls of a surrounding aperture or hollow body to frictionally fasten a part.

**509 Overedge assembling of seated part:**

This subclass is indented under subclass 505. Process in which one of the parts has a shoulder or stop which abuts a portion of the other part when assembled therewith, including inserting one part or a portion thereof into a cavity in the other part until such relative motion is limited by the stop or shoulder, and deforming one of the parts over an end or projection on the other part to fasten the inserted part.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

243.5+, for apparatus for overedge assembling.

441.1+, for a process of fastening a sphere in a socket by bending over the ends of the socket to confine the sphere.

SEE OR SEARCH CLASS:

403, Joints and Connections, subclasses 274+ for a joint or connection formed by in situ deformation.

411, Expanded, Threaded, Driven, Headed, Tool-Deformed, or Locked-Threaded Fastener, for a fastening means used in overedge assembling.

**510 By necking in cup or tube wall:**

This subclass is indented under subclass 509. Process in which one of the parts is a cup or tube including substantially annularly deforming the wall of the cup or tube radially inwardly to fasten therein a second part.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

516+, for a process of assembling by inward deformation of a hollow body other than by overedge assembling.

SEE OR SEARCH CLASS:

285, Pipe Joints or Couplings, subclasses 382+ for a connection of that class formed by deformation.

**511 At cup or tube end:**

This subclass is indented under subclass 510. Process in which the deformation is at the open end of the cup or tube.

**512 By flaring inserted cup or tube end:**

This subclass is indented under subclass 509. Process in which a cup or tube is fastened within a cavity in a part by substantially annularly, radially expanding the terminus of the cup or tube.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

243.52, for apparatus for overedge assembling of annular work.

523, for a process of joining by expanding an inner tube to grip an outer sur-

rounding part and in which process no overedge clamping of seated part is involved.

SEE OR SEARCH CLASS:

285, Pipe Joints or Couplings, subclasses 382.4+ for a joint between two tubular members formed by radially expanding the inner member.

**513 By bending over projecting prongs:**  
This subclass is indented under subclass 509. Process in which the parts are fastened together by bending spaced first and second tabs carried by one part over an edge of the other part.

**514 Of parallel side-by-side elongated members:**  
This subclass is indented under subclass 505. Process in which the parts fastened together are rod-like or strip-like members and are disposed with their longitudinal axes in parallelism.

**515 Inward deformation of aperture or hollow body wall:**  
This subclass is indented under subclass 505. Process in which one part has a cavity therein, i.e., has a passageway therethrough or is hollow and the joining includes the step of collapsing at least a part of the cavity wall to fasten at least a portion of the other part.

SEE OR SEARCH THIS CLASS, SUBCLASS:

410, for a process of fastening the interlocking elements of a slide fastener to a tape by inserting the edge of the tape between spaced legs of an element and deforming the legs inwardly into the tape.

510, for a process of overedge clamping of a seated part by necking in a cup or tube wall.

SEE OR SEARCH CLASS:

285, Pipe Joints or Couplings, subclasses 382+ for a connection of that class made by deformation.  
403, Joints and Connections, subclasses 274+ for a connection, generally, formed by deformation, in situ.

**516 Hollow body is axially joined cup or tube:**  
This subclass is indented under subclass 515. Process in which the part having a cavity is tubular and the other part is inserted into an open end of the cup or tube and then fastened thereto.

**517 Joined to rod:**  
This subclass is indented under subclass 516. Process in which the part fastened within the hollow body is a solid elongated member.

SEE OR SEARCH CLASS:

174, Electricity: Conductors and Insulators, subclass 84 for an electrical conduit the joints of which are crimped together.

403, Joints and Connections, subclasses 274+ for a device of that class wherein components have been secured together by in situ deformation.

**518 Joined to overlapping ends of plural rods:**  
This subclass is indented under subclass 517. Process in which two or more solid elongated members are disposed in parallel side-by-side relationship for a portion of their length and are enclosed in a tube at such portion and then fastened to each other and to the tube by the inward deformation of the tube wall.

**519 After thinning:**  
This subclass is indented under subclass 517. Process in which the elongated member is reduced in cross section at the area of fastening before being fastened to the hollow body.

**520 By axially applying force:**  
This subclass is indented under subclass 515. Process in which the cavity has an axis, and the inward deformation results from the application of force applied in the direction of that axis.

**521 Surface interlocking:**  
This subclass is indented under subclass 505. Process in which the parts have generally planar faces that carry projections, including deforming the projections to interengage and thereby fasten matching faces of the parts to each other.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

524, for a process of securing the peripheral edges of abutting plates by interlocking.

**522.1 Radially expanding part in cavity, aperture or hollow body:**

This subclass is indented under subclass 505. Process including inserting a part or portion thereof into a cavity in a second part and then distorting the inserted part or portion radially outwardly to fill the hole or opening and thereby fasten the parts together.

**523 Radially expanding internal tube:**

This subclass is indented under subclass 522.1. Processes in which the inserted part is tubular.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

512, for a process of expanding a tube outwardly to grip a surrounding part, and in addition, flaring the end of the tube beyond the edge of the aperture or cavity in which the tube is fastened.

SEE OR SEARCH CLASS:

285, Pipe Joints or Couplings, subclasses 382.4+ for a coupling between a first and a second pipe formed by outwardly bulging the inner pipe.

**524 Peripheral edge joining of abutting plates:**

This subclass is indented under subclass 522.1. Process in which the parts have margins that carry projections, including deforming the projections to interengage and thereby fasten matching margins of the parts to each other.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

521, for a process of joining overlapping faces of adjacent parts by interlocking of portions therefrom.

**524.1 Riveting:**

This subclass is indented under subclass 522.1. Process including a rod-like part wherein a portion of that part within the cavity is enlarged during or after insertion into the cavity to fasten the rod-like part to the part having the cavity.

SEE OR SEARCH CLASS:

411, Expanded, Threaded, Driven, Headed, Tool-Deformed, or Locked-Threaded Fastener, subclasses 501+ for a headed fastener element having a plastically flowable or deflectable end, e.g., a rivet, etc.

**525 By driven force fit:**

This subclass is indented under subclass 428. Process including fastening a first part to another part having a cavity by applying force to at least one of the parts to cause a portion of the first part to be inserted in the cavity, the relative dimensions of the inserted part and cavity being such that the parts are distorted within their elastic limits to secure them together.

(1) Note. A force fit is considered to exist if the overall dimensions of the hole or inserted part are not permanently changed. Thus, the formation of lands and grooves in the hole, effected by forcing a splined part thereinto, is found in this subclass since the parts are held together in the direction of assembly by the elasticity of the parts.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

432, for a process of assembling including punching, piercing, or reaming a part by a surface of a second part combined with or including force fitting the parts together, and see (1) Note, above.

433, for a process of assembling by stringing.

446+, for a process of assembling in which the parts are distorted within their elastic limit before assembly into the joined position. A force fit differs from prestressing a part, i.e., the art in those subclasses, in time of application of stress, in that the stress in a force fit is initiated at the time of joiner whereas in prestressing of those subclasses the stress is applied prior to the time of joiner. For example, forcing a rod into a hole of smaller size so that the parts are held by the frictional engagement of the rod and sides of the hole is a process of force fitting for

subclasses 525+. However, if the same rod is stretched within its elastic limit to thin it and inserted in the same hole while stretched, and the stretching force is then released to permit the rod to expand radially outwardly to frictionally grip the sides of the hole, that process is considered classifiable in those prestressing subclasses, e.g., subclasses 446+.

505+, for a process in which parts are secured together by distorting at least one of the parts beyond its elastic limits.

**525.01 By applying separate fastener:**

This subclass is indented under subclass 428. Process wherein a plurality of parts are mechanically joined together by means of a detached connecting member which performs no other function in the assembly other than to join the parts together.

- (1) Note. Utilizing a driven nonrotating fastener which pierces the parts, such as a nail or staple, is NOT included in this subclass or any indented subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

402.12, and 402.14, for repairing by attaching a preform to a part being repaired by use of a separate fastener.

402.17, for patching by use of a screw threaded patching preform.

432, for a process of fastening parts together by an operation which includes piercing one part by another (e.g., nailing, stapling, etc.).

SEE OR SEARCH CLASS:

228, Metal Fusion Bonding, subclasses 120 and 189 for an analogous process in which a connecting part is metallurgically bonded to each of two parts to secure them together.

411, Expanded, Threaded, Driven, Headed, Tool-Deformed, or Locked-Threaded Fastener, for a securing means, per se, of that class type.

470, Threaded, Headed Fastener, or Washer Making: Process and Apparatus, for the process of or apparatus for making a fastener as provided for in that class.

**525.02 Multipart cooperating fastener (e.g., bolt and nut):**

This subclass is indented under subclass 525.01. Process wherein the connecting member comprises a plurality of elements adapted to act together such as a nut and bolt.

**525.03 Nonthreaded:**

This subclass is indented under subclass 525.02. Process wherein the multipart cooperating fastener does not rely upon a helical or spiral ridge for effecting the joining.

**525.04 At least one part is nonmetallic:**

This subclass is indented under subclass 525.02. Process wherein at least one of the fastener elements has no metal constituents.

**525.05 Fastener deformed after application:**

This subclass is indented under subclass 525.01. Process wherein the connecting member is mechanically and nonelastically altered in shape after application.

SEE OR SEARCH THIS CLASS, SUBCLASS:

505+, for a process of fastening parts together by a deforming operation to interlock the parts (e.g., riveting, etc.); especially search subclasses 509+ for such fastening by overedge assembling.

**525.06 Riveting:**

This subclass is indented under subclass 525.05. Process wherein the connecting member includes a deformable element that passes through holes in the parts and at least one end of the deformable element is deformed to form an enlargement.

- (1) Note. See the definition of "Deforming" in the Class 29 definition Glossary.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

524.1, for a process of riveting by expanding one part within a cavity of another part.

SEE OR SEARCH CLASS:

411, Expanded, Threaded, Driven, Headed, Tool-Deformed, or Locked-Threaded Fastener, subclasses 501+ for a rivet having a plastically flowable or deflectable end.

**525.07 At least one part nonmetallic:**

This subclass is indented under subclass 525.06. Process wherein at least one part has no metal constituents.

**525.08 Nonresilient fastener:**

This subclass is indented under subclass 525.01. Process wherein the connecting member holds or restrains the parts together in a substantially inelastic manner, the connecting member being nonthreaded.

- (1) Note. In this subclass the connecting member is generally in the nature of a pin, clip, clasp, or clamp.
- (2) Note. Joining by means of a driven non-rotating fastener which pierces the parts, such as a nail or staple, is NOT included in this subclass or any indented subclass.

**525.09 At least one part nonmetallic:**

This subclass is indented under subclass 525.08. Process wherein at least one part has no metal constituents.

**525.11 Threaded fastener:**

This subclass is indented under subclass 525.01. Process wherein the connecting member relies upon a helical or spiral ridge for effecting the joining.

**525.12 At least one part nonmetallic:**

This subclass is indented under subclass 525.11. Process wherein at least one part has no metal constituents.

**525.13 With supplemental joining:**

This subclass is indented under subclass 525.01. Process including an additional attaching means.

- (1) Note. the additional attaching means may be a chemical or metallurgical bond.

SEE OR SEARCH CLASS:

156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclasses 91+ for a process of nonmetallic surface bonding including use of a separate permanent mechanical joining means.

**525.14 Metal fusion joining:**

This subclass is indented under subclass 525.13. Process wherein the additional attaching means is a metallurgical bond.

SEE OR SEARCH CLASS:

228, Metal Fusion Bonding, for a process of metallurgical bonding and perfecting operations therefor under the class definition.

**525.15 At least one part nonmetallic:**

This subclass is indented under subclass 525.13. Process wherein at least one part has no metal constituents.

**526.2 With separating, localizing, or eliminating of as-cast defects from a metal casting (e.g., anti-pipe):**

This subclass is indented under subclass 592. Process including removing segregating or eliminating an impurity, a pipe, a flaw, a blow hole, or the like from the sound portion of a cast metal body.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

527.1+, for a process of applying or shaping of fluent material which may include casting combined with other treating.

SEE OR SEARCH CLASS:

148, Metal Treatment, for combined operations including metal treatment. Treating a metal body (which may be cast) in accordance with Class 148 will go

to that class. The same treating combined with removing or eliminating defects comes to Class 29, subclasses 526.2+.

164, Metal Founding, subclasses 47+ for a metal casting process, in general, and see Class 29, subclass 527.1 the search note for the line between the classes.

**526.3 Compressing ingot while still partially molten:**

This subclass is indented under subclass 526.2. Process including compacting a cast ingot before it completely solidifies.

- (1) Note. For example, included here is a process of rolling or forging an ingot while its center is still fluid to thereby eliminate gas pockets by compacting the metal or to squeeze the impurities toward one end of the ingot.

**SEE OR SEARCH CLASS:**

164, Metal Founding, for continuous casting and for continuous casting combined with deforming, generally, without separation, isolation, or elimination of defects. (That combination is in this subclass).

**526.4 Removing defects:**

This subclass is indented under subclass 526.2. Process including separating an unsound portion of an ingot from the sound metal.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

527.6, for a miscellaneous manufacturing process, generally, including casting followed by removing material.

557+, for a miscellaneous manufacturing process, generally, including separating and discarding a portion of the part worked upon.

**526.5 From center of ingot to leave hollow blank:**

This subclass is indented under subclass 526.4. Process in which the unsound portion of the ingot is located in its midportion, and the removal of this portion shapes the ingot into a tube.

**526.6 After deforming:**

This subclass is indented under subclass 526.4. Process in which the removal is preceded by a step of deforming.

- (1) Note. The deforming operation of this subclass is often for the purpose of isolating the unsound portion to one end of the ingot.

**527.1 Combined manufacture including applying or shaping of fluent material:**

This subclass is indented under subclass 592. Process, including the combination of (1) depositing a flowable material upon or into a base material (e.g., coating, impregnating, casting or other molding on a base) or (2) configuring a flowable material (e.g., casting or other molding without a base) with additional manufacturing, which combination is not elsewhere classified.

- (1) Note. The additional manufacturing may occur before, after, or during the fluent material applying or shaping operation.

- (2) Note. The term "casting" includes the operation known as "molding". The terms "casting" and "coating" as used in these definitions coincide with those concepts comprehended in Class 427, Coating Processes; Class 148, Metal Treatment, subclasses 240+; Class 164, Metal Founding, Class 204, Chemistry: Electrical and Wave Energy; and Class 264, Plastic and Nonmetallic Article Shaping or Treating: Processes.

- (3) Note. A process comprising casting a metal workpiece and then deforming it by plastic shaping is classified in this and the indented subclasses, e.g., Class 29, subclasses 527.1+, except for the casting of metal in situ in an extrusion apparatus ("charging" it) and subsequent die expression therefrom, which is specifically included in Class 72, Metal Deforming, subclass 270.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

424, for a process utilizing a temporary protective coating or casting.

- 428+, and, especially, subclasses 458+ or 460 for a process of assembling or joining combined with a step of coating or casting.
- 526.2+, for a process of casting plus the step of separating, removing, or eliminating a defect which has been cast in the ingot.
- SEE OR SEARCH CLASS:**
- 72, Metal Deforming, subclasses 46+ for a process of coating or casting liquid material upon a metal base (but not casting the workpiece, per se) and then deforming the base, regardless of whether or not the applied material is also deformed. See the definition and notes thereof. Search subclass 270 for casting combined with subsequent die expression, i.e., for extruding after solidification of material. (This is an exception to the general line expressed in (3) Note, above).
- 148, Metal Treatment, particularly subclasses 538+ for casting or subclasses 516+ for coating operations combined with significant heat treatment of metal to modify or maintain the internal physical structure (i.e., microstructure) or chemical properties of metal. See Class 148 definition to determine what constitutes significant heat treatment. The metal working classes take: (1) Metal working plus an unspecified heat treatment. (2) Metal working plus annealing broadly wherein the annealing is for the purpose of relieving working stress or to facilitate working. Class 148 takes: (1) Metal working plus specific heat treatment, other than annealing, where the heat treatment is other than conditioning to a working temperature or subsequently returning to ambient or handling temperature. (2) Metal working plus a specific annealing step.
- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclasses 47+ for making an electrical conductor of indefinite length, generally, which may include metal deforming. Note that this is an exception to the general rule that combined operations including plastically deforming metal combined with non-metallic bonding is to be found in Class 29.
- 164, Metal Founding, as the generic place for metal casting processes. A process of preparing a workpiece for casting (e.g., by coating, cutting, shaping by deformation, etc.) combined with casting is to be found in Class 164. Similarly, a process of forming a product by casting combined with a treatment to perfect the casting operation (e.g., removal of an unneeded portion of the cast product) is to be found in Class 164. The combination of casting with a distinct metal shaping is to be found in Class 29, subclasses 527.1+ if not provided for elsewhere.
- 205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, subclasses 205+ for electrolytic coating process including an additional step of treating the base before coating step.
- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, the generic place for processes of plastic or non-metallic article shaping or treating. The general line between Class 264 and the metal working or shaping classes, e.g., Class 29 is as follows;
- (a) A process of deforming material broadly, the disclosure reciting deformation of a metal or of a nonmetal, is to be found in the appropriate metal working class.
  - (b) (2) A process limited to deforming metal is to be found in the appropriate metal working class.
  - (c) (3) A process limited to permanently deforming or other molding of a nonmetal will be found in Class 264.
  - (d) (4) A patent including a claim directed to a process of deforming a metal and including an equally comprehensive and mutually exclusive claim drawn to deforming a nonmetal will be



found in the appropriate metal working class.

(e) (5) A process of deforming both a metal and a nonmetal (included in the same claim) will be found in the appropriate metal working class, e.g., Class 29, Metal Working, depending on the claim as set out.

(f) (6) An claimed process of working broadly or nondefinitively recited material is to be found in the appropriate metal working class, as stated above, and this will include disclosures of deforming: (a) A laminate of a metal with a nonmetal (b) A "composite material" such as a metal laminated to a nonmetal article or workpiece except where by disclosure only the nonmetal component is deformed or shaped.

(g) (7) A process including plural diverse operations will be found in Class 29 unless provided for in a superior class.

(h) (8) A process of making a mold (which may be of cast metal) combined with use of that mold in molding nonmetallic material is to be found in Class 264, especially subclasses 219+.

427, Coating Processes, for a process of coating a metal base generally.

### 527.2 Coating:

This subclass is indented under subclass 527.1. Process wherein the first named operation comprises depositing a flowable material upon a base material or impregnating a base material with flowable material.

#### SEE OR SEARCH CLASS:

428, Stock Material or Miscellaneous Articles, subclasses 567+ for particulate metallic stock material having continuous interengaged phases of plural metals, e.g., an impregnated particle component.

### 527.3 And casting:

This subclass is indented under subclass 527.2. Process wherein the additional manufacturing includes shaping fluent material by means of a molding surface.

#### SEE OR SEARCH CLASS:

164, Metal Founding, subclasses 72+ for a process of coating a mold surface with a treating agent and casting on the coated mold surface and subclass 75 for coating a preformed base member prior to casting thereupon, generally.  
264, Plastic and Nonmetallic Article Shaping or Treating: Processes, for a process of plastic or nonmetallic article shaping or treating, generally.

### 527.4 Subsequent to metal working:

This subclass is indented under subclass 527.2. Process wherein the additional manufacturing includes changing the configuration of a metal workpiece and occurs prior to the coating operation.

### 527.5 Metal casting:

This subclass is indented under subclass 527.1. Process wherein said first named operation comprises shaping molten metal by means of a molding surface.

### 527.6 Followed by cutting or removing material:

This subclass is indented under subclass 527.5. Process wherein the additional manufacturing occurs after the casting operation and comprises either severing or separating a portion of the cast product.

(1) Note. Included herein is casting, other than continuous casting, combined with trimming.

#### SEE OR SEARCH THIS CLASS, SUBCLASS:

526.4+, for a process of casting followed by removal of material to separate a defect from the ingot.

#### SEE OR SEARCH CLASS:

164, Metal Founding, subclasses 70.1 and 460 for a process of cutting or removing material from the product of a casting operation while the product is

still in the mold, i.e., continuous casting with severing or separating a portion of the cast product.

**527.7 Combined with rolling:**

This subclass is indented under subclass 527.5. Process wherein the additional manufacturing includes deforming by use of a roller.

SEE OR SEARCH CLASS:

72, Metal Deforming, subclasses 199+ and 365.2+ for a process of deforming metal by rolling.

**530 Filling of opening:**

This subclass is indented under subclass 527.1. Process in which the casting and/or the coating operation comprises depositing flowable material to substantially fill a void or opening in work.

SEE OR SEARCH THIS CLASS, SUBCLASS:

402.18, for a process of repairing cracked material by depositing material in the crack.

**557 Shaping one-piece blank by removing material:**

This subclass is indented under subclass 592. Process limited to shaping a single part by one or more steps of separating and discarding a portion of the part worked upon.

- (1) Note. The initial part (the blank) may be composite, i.e., formed of a plurality of laminae or of parts integrated into a unit.
- (2) Note. The classes listed in the following search notes include references to subcombinations of structures included in this subclass. The indicated classes may be beneficial as a field of search, but are not intended to designate a required field of search. Note that, generally, combined operations will be found in the class of the subcombination only if they are provided for specifically, i.e., in a subclass entitled, "COMBINED".

SEE OR SEARCH THIS CLASS, SUBCLASS:

445, for a process of assembling or joining including sizing of mating parts during final positioning.

SEE OR SEARCH CLASS:

30, Cutlery, for shaping a one-piece blank by a hand held, work supported or randomly manipulated cutting tool.

72, Metal Deforming, for shaping a one-piece blank of metal by deforming and for shaping a one-piece blank by deforming combined with cutting.

82, Turning, for shaping a one-piece blank by rotating that blank about an axis and engaging it with a fixed cutting tool.

83, Cutting, for shaping a one-piece blank by shearing or punching, generally.

142, Wood Turning, for shaping a one-piece blank of wood by rotating that blank about an axis and engaging it with a fixed cutting tool.

144, Woodworking, for shaping a one-piece blank or wood, generally.

225, Severing by Tearing or Breaking, for shaping a one-piece blank by tensile forces exceeding the structural strength thereof.

408, Cutting by Use of a Rotating Axially Moving Tool, for shaping a one-piece blank in the manner of that class.

409, Gear Cutting, Milling or Planing, for shaping a one-piece blank in the manner of that class.

451, Abrading, for shaping a one-piece blank by engagement of a grinding tool.

470, Threaded, Headed Fastener, or Washer Making: Process and Apparatus, for making an article of Class 470 which comprise a one-piece blank made by removing material.

**558 Successive distinct removal operations:**

This subclass is indented under subclass 557. Process which includes a first removal step immediately followed by a second removal step of a type different from the first.

**559 Work holding:**

This subclass is indented under subclass 592. Process of supporting or grasping material to be modified or treated.

- (1) Note. See the class definition of Class 269, Work Holders, for the scope of the terms “material”, “modified”, “treated”, and “supporting”. This subclass is residual to processes of holding work by means provided for in said Class 269.
- (2) Note. Work holding combined with work treating is to be found in the appropriate work treating class.

**SEE OR SEARCH CLASS:**

- 76, Metal Tools and Implements, Making, subclass 106.1 for making a metal work holder not elsewhere provided for.
- 269, Work Holders, for a device for holding work. See notes thereunder for other loci.
- 335, Electricity: Magnetically Operated Switches, Magnets, and Electromagnets, subclasses 285+ for a work holding magnet.
- 414, Material or Article Handling, especially subclasses 800+ for a process of material handling, generally.

**560 CONVERTIBLE METAL WORKING MACHINE:**

This subclass is indented under the class definition. Device having alterable means by which the device is modified by adjustment, addition, removal, or reassembly of one or more parts causing the device to perform some function diverse from that performed prior to the particular modification.

- (1) Note. Included here, for example, is a device which may be adjusted to either (a) cut or bend, (b) saw or mill, (c) shear or emboss, etc.
- (2) Note. This subclass is residual and does not include device capable of modification to perform a function elsewhere classified, i.e., in a subclass that provides for either a “convertible” device or is a recognized locus of such art.

- (3) Note. Diverse apparatuses are those wherein there are two or more devices which operate differently on the part or stock, and which collectively do not fall in any single art classification, e.g., milling and forging, rolling, and turning, etc. However, where the two diverse devices constitute a hand manipulable tool, rather than a machine, the combined device has been placed in Class 7, Compound Tools. Plural apparatus which operate in the same manner or constitute different phases of a single art are found with the single operation, i.e., turning to cylindrical shape following by turning to a taper are in Class 82, Turning.

- (4) Note. This subclass was established with patents originally screened from classes listed under a SPECIAL LINE NOTE elsewhere in this Class. Only these devices encompassed by the limitation of this Special Line Note are to be considered for placement here in subclass 560. See Search Notes below for location of this note.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 33, Special Line Note. Only the devices encompassed by the limitation of this Special Line Note are to be considered for placement in this subclass (560).
- 33+, for a machine capable of diverse functions without modification of said machine.
- 401.1, for a process including converting a machine, under the definition of this class.

**SEE OR SEARCH CLASS:**

- 408, Cutting by Use of Rotating Axially Moving Tool, subclasses 20+ for a machine of that class type convertible to a different class type cutting machine.
- 483, Tool Changing, subclass 1 for a process of transferring a tool to or from a material treating station or a tool storage means, generally, including a Class 29 process combined with transferring the tool used to or from the

station at which the Class 29 process occurs; and subclasses 2-69 for means for transferring a tool to or from a material treating station or a tool storage means, generally, including a Class 29 tool combined with means to transfer the tool to or from the tool station.

**560.1 Vise type:**

This subclass is indented under subclass 560. Device wherein the basic apparatus subject to conversion is a work holder with relatively movable jaws.

- (1) Note. Though “work holding” is strictly neither a “shaping” nor an “assembling” function in accord with the concepts of Class 29, subclass 33 patents relative to the convertible (compound or combined) vise-shaping art are placed here and cross-referenced to the particular work holder or shaping class for specific details of such features.
- (2) Note. Included herein is a device which by disclosure is intended for use with other than metal workpieces-- though not so limited in the claimed structure.
- (3) Note. Included herein is a device wherein the means for moving the vise jaws also serves (a) to effect relative movement between a workpiece and a shaping instrumentality and/or (b) to operate or actuate a shaping instrumentality.

**SEE OR SEARCH CLASS:**

269, Work Holders, subclasses 86+ for a work holder having relatively movable jaws.

**561 With means to feed work during tool contact:**

This subclass is indented under subclass 33. Apparatus including material handling means which provides for uninterrupted movement of material while material modifying means engage said material.

- (1) Note. Included here are spaced tool means for simultaneously operating on material being conveyed past said tool

means, the several tool means generally treating the same portion of material in sequence to further modify said portion.

**562 Including nonrotary flying tool:**

This subclass is indented under subclass 561. Apparatus wherein at least one material modifying means has a component of motion in the direction of the moving material during the period of material modification.

- (1) Note. This subclass does not include rotary type modifying means, machines using such tools being classified on features other than “flying”.

**SEE OR SEARCH CLASS:**

83, Cutting, subclass 284 for similar devices limited to cutting or severing.

**563 With means to feed work intermittently from one tool station to another:**

This subclass is indented under subclass 33. Apparatus including means to convey material successively from one material modifying means to another, the material movement being intermittent.

- (1) Note. A plurality of tools mounted on a common support or driver, which support moves relative to work to effect treatment of said work by each tool in a single work contacting cycle--between successive feed movement of the work -- is not considered to constitute “separate tool stations”. Even if the work feed is such that some portions of work are acted on more than once by some of the tools (as in progressive shaping operations) the congregation of tools so arranged is considered a tool complex for subclasses 565 or 566, below.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

566, for apparatus including composite tools and see (1) Note, above.

**SEE OR SEARCH CLASS:**

407, Cutters, for Shaping, subclass 1 for a composite tool, per se.  
483, Tool Changing, subclass 15 for apparatus including a tool transfer means combined with either a tool support or

- storage means, and further including plural machine tools.
- 901, Robots, subcollections 6+ for a robot which conveys work and cooperates with another machine.
- 564 Separate tool stations for selective or successive operation on work:**  
This subclass is indented under subclass 33. Apparatus including spaced material modifying means operable one after the other, or at the option of an operator, generally on different portions of material being worked.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
563, (1) Note.
- 564.1 Including assembling or disassembling station:**  
This subclass is indented under subclass 564. Apparatus wherein one of the spaced material modifying means (1) includes means for engaging a first work part and includes means for engaging a second work part, which means are adapted to either bring the two work parts into juxtaposed relationship or cause one of the work parts to intimately engage the other to thereby fasten the work parts together, or (2) includes means to engage at least one work part and force that work part to move out of intimate engagement with another work part to which it has previously been secured.
- (1) Note. For clarification, see "Assembly" in the Glossary of Class 29 and see the definition and notes of subclass 700.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
700+, for assembling means without additional metal shaping means.
- 564.2 And means to machine work part to fit cooperating work part:**  
This subclass is indented under subclass 564.1. Apparatus wherein one of the spaced material modifying means includes a cutting instrumentality adapted to remove a portion(s) of material from one of the work parts to assure cooperative interfit of the work parts.
- 564.3 And means to sever work prior to disassembling:**  
This subclass is indented under subclass 564.1. Apparatus wherein one of the spaced material modifying means includes means to engage at least one work part and force that work part to move out of intimate engagement with another work part to which it had previously been secured, including distinct means to cut or subdivide a work member into work parts prior to movement of a work part away from another work part, and including means to apply force to move one work part away from another work part.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
56.5, for means to sever prior to disassembly if the severing is done at the same work station as the disassembly.
- 564.4 Comprising means to strip insulation from wire:**  
This subclass is indented under subclass 564.3. Apparatus wherein the structure is particularly adapted to subdivide electrically insulative covering material off a conductive metallic strand and disassemble a portion of that covering from the remaining covering and the strand.
- 564.5 And means to stake electric wire to commutator or armature in assembling of electric motor or generator:**  
This subclass is indented under subclass 564.1. Apparatus including means to sever a strand of the armature coil of a dynamoelectric device and means to secure the ends of the armature coil strand to the commutator of the dynamoelectric device.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
735, for structure for securing the loose strand of coil to the commutator in the assembly of a dynamoelectric device without a strand severing means.
- 564.6 And means to sever work from supply:**  
This subclass is indented under subclass 564.1. Apparatus including means to transport an attenuated stock of work to the assembly station and means to subdivide a portion from the

stock into a work part to be subsequently used in the assembly.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

56.5, for an apparatus for performing multiple operations including cutting at a single work station.

566.1, for composite tool adapted to perform an assembling operation and a severing operation at the same stroke.

**564.7 And means to machine product:**

This subclass is indented under subclass 564.1. Apparatus including a cutting edge adapted to engage the product of the assembly station to mill, cut, turn, bore, drill, abrade, broach, file, saw, punch, blank, or plane that product.

**564.8 To sever product to length:**

This subclass is indented under subclass 564.7. Apparatus including means to cut the product of the assembly station to subdivide a portion therefrom.

**565 Common reciprocating support for spaced tools:**

This subclass is indented under subclass 33. Apparatus wherein separated plural diverse material modifying means are mounted on or carried by the same member for to-and-fro movement together in the same direction.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

563, (1) Note.

- (2) Note. Nonseparated plural tools which effect either superimposed, concentric, or immediate contiguous work modifications in a single work contacting cycle are tool complexes for subclass 566.

SEE OR SEARCH CLASS:

493, Manufacturing Container or Tube From Paper; or Other Manufacturing From Sheet or Web, subclasses 340+ for sheet or web working combined with a drill and notcher mounted on a common reciprocating head for forming edge notched entry slots and holes in a notebook or ledger sheet.

**566 Including composite tool:**

This subclass is indented under subclass 33. Apparatus including a unitary or integral work modifying means embodying structural elements which, in each and every single work contacting cycle, effect plural diverse treatments or modifications of work--which modifications are either superimposed, concentric, or in immediate contiguous relationship.

- (1) Note. Included here, for example, are devices wherein a rotary cutter (Class 83) has mounted on its radial face an element which burnishes (Class 29), abrades (Class 451), or mills (Class 409).

- (2) Note. A platen carrying spaced plural tools which progressively act on and modify work, intermittently presented from one tool to another in succession, is not considered to be a composite tool; see subclasses 563 and 565, above.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

6.1+, for expanded metal making.

7.1+, for fence barb making.

21.1, for tie band tongue making--which devices often utilize composite tools.

SEE OR SEARCH CLASS:

72, Metal Deforming, subclasses 325+ for a composite metal cutting and deforming device.

407, Cutters, for Shaping, subclass 1 for a composite tool, per se.

**566.1 Including severing means:**

This subclass is indented under subclass 566. Apparatus wherein the unitary or integral work modifying means includes provision to cut or subdivide one part of the work from another part.

**566.2 To sever electric terminal from supply strip:**

This subclass is indented under subclass 566.1. Apparatus particularly adapted to cut or subdivide a work part that is designed to serve as a connection member to transmit electrical energy from a supply length of attached similar members.

**566.3 To trim electric component:**

This subclass is indented under subclass 566.1. Apparatus particularly adapted to cut or subdivide a portion of an electrical conductor from some type assembly adapted to carry or direct electrical energy.

**566.4 Means comprising hand-manipulatable implement:**

This subclass is indented under subclass 566.3. Apparatus adapted to, during the cutting of subdividing operation, be supported against gravity by an operative and adapted to be randomly moved relative to the station at which cutting and assembling is to be performed.

**592 METHOD OF MECHANICAL MANUFACTURE:**

This subclass is indented under the class definition. Process of mechanical manufacturing .

- (1) Note. See the definition of "Manufacturing" in the Class 29 definition Glossary.
- (2) Note. Whereas Class 29 is the generic mechanical manufacturing class; manufacturing by chemistry, electrochemistry, electricity, or the related arts is provided for in the chemical and electrical classes. See the classes listed on pages I-6 through I-10 in the front of the Manual of Classification under "I. Chemical and Related Arts" and "II. Communications, Designs, Radiant Energy, Weapons, Electrical, and Related Arts."
- (3) Note. A complete search for any process of manufacturing a particular article may include the class providing for that article.
- (4) Note. A process as defined above, whether comprising a single or a plurality of operations, is included in Class 29, subclasses 592+, only when no other class provides for the same. A typical patent of this subclass recites a plurality of steps or operations separately provided for in different classes, none of which provide for the combination.
- (5) Note. Many of the preceding subclasses in Class 29 include apparatus and

include a process which is a function of an apparatus; see, particularly, the subclasses directed to the manufacture of "special articles" (i.e., subclasses 1.1 to 25.42, above).

- (6) Note. Patents are classified here regardless of the material operated on and/or the number of operations involved unless provided for elsewhere. See the Class Definition, paragraph 2, of this class (29).
- (7) Note. Measuring, testing, recording, article handling, conveying, and cleaning, per se, are not considered manufacturing processes for this class (29).

**SEE OR SEARCH CLASS:**

- 12, Boot and Shoe Making, subclasses 142+ for a process of making an article of that class.
- 14, Bridges, subclass 77.3 for a process of constructing a bridge pier.
- 52, Static Structures (e.g., Buildings), subclasses 741.1+ for a process of manufacturing and assembling a static structure at the job site (i.e., in situ).
- 53, Package Making, subclasses 396+ for a process of enclosing contents in a container, generally.
- 57, Textiles: Spinning, Twisting, and Twining, subclasses 1+ for a process of making a textile by the operations provided therein.
- 59, Chain, Staple, and Horseshoe Making, for a process of making an article of that class.
- 65, Glass Manufacturing, especially subclasses 36+ for process of fusion bonding of glass to a formed part and subclass 155 for electronic device making means involving fusion bonding.
- 72, Metal Deforming, for a process of deforming metal.
- 76, Metal Tools and Implements, Making, subclasses 101.1+ for a process of making various metal tools and implements; see, especially, the notes to all of these subclasses (101.1+) for the loci of other processes of tool making.
- 79, Button Making, for a process of making a button.

- 83, Cutting, subclasses 13+ for a process of severing or piercing by use of a sharp cutting edge, generally.
- 112, Sewing, for making a product by sewing; especially, search subclasses 262.1+ for a process thereof.
- 125, Stone Working, for a process of stone working.
- 132, Toilet, subclasses 201+ for a process of making a hair structure.
- 134, Cleaning and Liquid Contact With Solids, subclasses 1+ for a process of cleaning or treating under the class definition.
- 137, Fluid Handling, subclasses 15.01 through 15.26 for a process of cleaning, repairing, or assembling.
- 138, Pipes and Tubular Conduits, subclasses 97+ for a process of repairing the device of that class.
- 140, Wireworking, for a combined operation involving metallic strandlike work.
- 144, Woodworking, subclasses 329+ for a manufacturing process including a significant woodworking step.
- 148, Metal Treatment, appropriate subclasses for a process of mechanical working or shaping of metal combined with significant heat treatment of metal to modify or maintain internal physical structure (i.e., microstructure) or chemical properties of metal. See the Class 148 definition to determine what constitutes significant heat treatment.
- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, (a) Class 156 is generic to adhesive bonding utilizing nonmetallic cement. (b) Class 156 is the residual (i.e., unless provided for in a superior loci) class for combined chemical reactions used in manufacturing an article. (c) Class 156 is the residual home for a single chemical reaction not provided for elsewhere. See the class definition of Class 156 for an amplified statement of the lines between Classes 29 and 156. Especially, search subclasses 47+ for making an electrical conductor of indefinite length, generally, which may include metal deforming. (Note that this is an exception to the general rule that combined operations including plastically deforming metal combined with nonmetallic bonding is to be found in Class 29).
- 157, Wheelwright Machines, subclass 13 for a process of treating the outer periphery of a rubber tire.
- 163, Needle and Pin Making, subclass 5 for a process of making a device thereof.
- 164, Metal Founding, subclasses 1+ for a process of forming liquid metal.
- 166, Wells, subclasses 378 and 381 for a process for constructing or assembling well parts in the well or with some relationship to the well.
- 175, Boring or Penetrating the Earth, especially subclasses 57+ for a process thereof.
- 204, Chemistry: Electrical and Wave Energy, for an electrical or wave energy process of manufacture.
- 219, Electric Heating, for a process of metal heating or welding by induction, electrostatic, electromagnetic, electrical resistance, or arc means.
- 225, Severing by Breaking or Tearing, subclasses 1+ for a method thereof.
- 227, Elongated-Member-Driving Apparatus, for an apparatus for driving a staple or nail into a workpiece, generally.
- 228, Metal Fusion Bonding, subclasses 101+ for a process of metallurgical bonding under the class definition.
- 242, Winding, Tensioning, or Guiding, subclasses 430+ for a process of making a composite object under the class definition.
- 254, Implements or Apparatus for Applying Pushing or Pulling Force, subclasses 134.3+ for a process of placing conductive wire in or through a conduit.
- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, the generic home for a process of shaping or treating nonmetallic or particulate material. The general line between Class 264 and the metal working or shaping classes (e.g., Class 29) is as follows: (1) A process of deforming material broadly, the disclosure reciting deformation of a metal and of a nonmetal, is to be found in the appropriate metal



- working class. (2) A process limited to deforming metal is to be found in the appropriate metal working class. (3) A process limited to deforming or other molding of a nonmetal will be found in Class 264. (4) A patent including a claim directed to a process of deforming a metal and including an equally comprehensive and mutually exclusive claim drawn to deforming a nonmetal will be found in the appropriate metal working class. (5) A process of deforming both a metal and a nonmetal (included in the same claim) will be found in the appropriate metal working class (e.g., Class 29, Metal Working) depending on the claim as set out. (6) A claimed process of working broadly or nondefinitively recited material is to be found in the appropriate metal working class, as stated above, and this will include disclosures of deforming: (a) A laminate of a metal with a nonmetal. (b) A “composite material” such as a metal/nonmetal article or workpiece except whereby in disclosure only the nonmetal component is deformed or shaped. (7) A process including plural diverse operations will be found in Class 29 unless provided for in a superior class. (8) A process of making a mold (which may be of cast metal) combined with use of that mold in molding nonmetallic material is to be found in Class 264, especially subclasses 219+.
- 269, Work Holders, for apparatus for supporting a workpiece while being treated, generally. (Note that a process of holding work is to be found in this class (i.e., Class 29, subclass 559)).
- 277, Seal for a Joint or Juncture, subclass 316 for a process of using a static seal formed in place (i.e., in situ), subclasses 922+ for manufacture of a seal by bonding or joining, or subclass 924 for manufacture of a seal by deformation, material removal or molding.
- 289, Knots and Knot Tying, subclass 1.5 for a process of tying a knot.
- 300, Brush, Broom, and Mop Making, subclass 21 for a process of making a brush, broom, or mop.
- 359, Optics: Systems (Including Communication) and Elements, cross-reference art collection 900 for optical methods.
- 404, Road Structure, Process, or Apparatus, subclasses 72+ for a process of making a road structure.
- 405, Hydraulic and Earth Engineering, for a process under the class definition.
- 412, Bookbinding: Process and Apparatus, subclass 1 for a process specialized for manufacturing a book.
- 413, Sheet Metal Container Making, subclasses 1+ for a process of making a sheet metal container.
- 414, Material or Article Handling, subclass 786 for a process of material handling, generally.
- 419, Powder Metallurgy Processes, for a process including a powder metallurgy step.
- 422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, subclasses 7+ for a process of maintaining an environment nondestructive to metal.
- 426, Food or Edible Material: Processes, Compositions, and Products, subclasses 665+ for a process under the class definition.
- 427, Coating Processes, for a process of coating under the class definition.
- 430, Radiation Imagery Chemistry: Process, Composition, or Product Thereof, for a process under the class definition.
- 433, Dentistry, for a process of making or installing a dental appliance under the class definition.
- 438, Semiconductor Device Manufacturing: Process, particularly subclasses 26+, 51, 55, 64+, and 106+ for certain methods of packaging a semiconductor device; see the search notes thereunder.
- 445, Electric Lamp or Space Discharge Component or Device Manufacturing, subclasses 1+ for a process of making those devices.
- 451, Abrading, for a process of or apparatus for grinding.

- 470, Threaded, Headed Fastener, or Washer Making: Process and Apparatus, for a manufacturing operation peculiar to making an article of Class 470.
- 483, Tool Changing, subclass 1 for a process of transferring a tool to or from a material treating station or a tool storage means, generally, including a Class 29 process combined with transferring the Class 29 tool to or from the working station.
- 493, Manufacturing Container or Tube From Paper; or Other Manufacturing From a Sheet or Web, for a process under the class definition.
- 602, Surgery: Splint, Brace, or Bandage, cross-reference art collection 900 for bandage making methods.
- 901, Robots, for a cross-reference art collection including a process of using a robot.

#### GLOSSARY

The following definitions of terms are used uniformly in this and indented subclasses. Other definitions of terms used uniformly throughout will be found in the Class 29 class definition Glossary.

#### CUP

A tube having one end closed.

#### DISTORTING

The physical act of altering the form, configuration, dimensions, proportions, or contour of a part or stock within the elastic limits of the material of which it is made without any removal of material.

#### PLATE

A sheetlike member the thickness of which is small in relation to its area measured in a plane normal to its thickness.

#### ROD

An elongated member in which the transverse cross-sectional dimensions are substantially uniform and are small in relation to its length.

#### TUBE

A pipe, hollow cylinder, or hollow rodlike member.

#### 592.1 Electrical device making:

This subclass is indented under subclass 592. Process for making an article which will produce, transmit, or utilize electrical energy.

- (1) Note. Subclasses 597, 598, 602.1, 607-610.1, 613-621, 631, and 874-885 correspond to subclasses with similar titles formerly identified by decimals of subclass 155 of this class.

#### SEE OR SEARCH CLASS:

- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclasses 47+ for a method of making an indefinite length electrical conductor involving an operation other than metal working and amounting to more than mere wire of filament making.
- 242, Winding, Tensioning, or Guiding, subclasses 430+ for methods or apparatus for winding elongated material directly onto a support to make an article such as an inductor, capacitor, or resistor or nonelectrical article.
- 254, Implements or Apparatus for Applying Pushing or Pulling Force, subclasses 134.3+ for a method of and an apparatus for placing electric wire.
- 419, Powder Metallurgy Processes, for a method of manufacturing including a powder metallurgy step.
- 425, Plastic Article or Earthenware Shaping or Treating: Apparatus, subclasses 110+ for composite article making apparatus for plastic molding to encapsulate a preform (e.g., an electrical device).
- 427, Coating Processes, subclasses 58+ for a method of coating under the class definition to produce an electrical product.
- 430, Radiation Imagery Chemistry: Process, Composition, or Product Thereof, for method of making an electrical device, employing radiation imagery chemistry.

- 445, Electric Lamp or Space Discharge Component or Device Manufacturing, subclasses 1+ for a process of making an electric lamp or space discharge article.
- 593 Including measuring or testing of device or component part:**  
This subclass is indented under subclass 592.1. Process including making a qualitative determination regarding the device being made.
- (1) Note. To be considered measuring or testing for placement in this subclass there must be a sensed readout of the qualitative determination. A process that employs a transducer that senses the device for generation of a signal used to control the manufacturing process is placed below on the basis of the particular device made or manufacturing steps employed, and see (5) Note in Notes to the Class Definition of this class (29).
- (2) Note. The testing or measurement of the device frequently requires the device to be placed in an electrical circuit. A complete search for such a circuit would require investigation of the various electrical classes providing for similar circuits based on the proximate function of the circuit, e.g., Classes 329, Demodulators and Detectors; 330, Amplifiers; 331, Oscillators, etc.
- SEE OR SEARCH CLASS:  
242, Winding, Tensioning, or Guiding, subclass 431 for apparatus for winding wire on a core to make a composite electrical coil, which apparatus includes operation control means responsive to measurement of an electrical property of the work.  
324, Electricity: Measuring and Testing, for electrical measuring and testing, per se.
- 594 Acoustic transducer:**  
This subclass is indented under subclass 592.1. Process for making a device which converts to sound energy to electrical energy or vice versa.
- SEE OR SEARCH CLASS:  
381, Electrical Audio Signal Processing Systems and Devices, subclasses 150+.
- 595 Indicating transducer:**  
This subclass is indented under subclass 592.1. Process for making a device particularly adapted to provide a visual indication of an electrical current.
- SEE OR SEARCH CLASS:  
324, Electricity: Measuring and Testing, subclasses 76.11+ for electrical meter structure or a process of use.
- 596 Dynamoelectric machine:**  
This subclass is indented under subclass 592.1. Process for making a device which is adapted to convert mechanical to electrical energy or vice versa by employing electromagnetism.
- SEE OR SEARCH CLASS:  
242, Winding, Tensioning, or Guiding, subclasses 432+ for a method or apparatus for making a motor stator by directly winding a wire onto a stator core.  
310, Electrical Generator or Motor Structure, subclasses 10+ for a dynamoelectric device.
- 597 Commutator or slip ring assembly:**  
This subclass is indented under subclass 596. Process in which the device made includes a portion to be carried by a rotary part of a dynamoelectric machine and, in cooperation with a stationary contact, is designed to transmit current to or from the rotary part.
- 598 Rotor:**  
This subclass is indented under subclass 596. Process in which the device made includes the rotary element in a dynamoelectric device.
- SEE OR SEARCH CLASS:  
242, Winding Tensioning or Guiding, subclasses 433+ for making a motor armature by directly winding wire onto an armature core.

**599 Superconductor:**

This subclass is indented under subclass 592.1. Process for making a device particularly adapted, by reason of a property of constituent material which exhibits an electrical resistance of zero under certain physical conditions, to utilize the magnetic and current effects of transmission of electrical energy without resistance.

**SEE OR SEARCH CLASS:**

- 338, Electrical Resistors, subclasses 14 and 25+ for a resistor device which is responsive to temperature.
- 505, Superconductor Technology: Apparatus, Material, Process, subclasses 300+ for processes of producing high temperature ( $T_c$  greater than 30 K) superconductors.

**600 Antenna or wave energy “plumbing”:**

This subclass is indented under subclass 592.1. Process for making a device which either transmits, delays, or attenuates electrical wave energy by series of material boundaries dimensionally related to the frequency of the wave energy.

- (1) Note. Some conductors are capable of transmitting other electrical currents as well as radio wave current. A process of making such a conductor is placed here only if it involves a parameter of construction which is wave energy dependent, i.e., frequency dependent. If no wave energy parameter is present, a method of producing such a conductor is placed in subclasses 624+, below.

**SEE OR SEARCH CLASS:**

- 333, Wave Transmission Lines and Networks, for a wave energy transmitting device or system.
- 343, Communications: Radio Wave Antennas, subclasses 700+ for a wave energy radiating and receiving antenna.

**601 With other electrical component:**

This subclass is indented under subclass 600. Process including joining the device to another electrical device.

**602.1 Electromagnet, transformer or inductor:**

This subclass is indented under subclass 592.1. Process for making a device which either (1) exhibits magnetic attraction when electrical current is applied, or (2) changes the magnitude or phase of an alternating current by inductive coupling, or (c) impedes a change of current flow by induced magnetism.

- (1) Note. Included in this and the indented subclasses is a process of making a permanent magnet, that is, a magnetic body which has been magnetized, or which may later be magnetized, and an electromagnetic coil, with or without a core of magnetic material. See the Search Note below referencing this (1) Note.
- (1.5) Note. For an electromagnet or transformer or a related product, see below the search notes below referencing this (1.5) Note.
- (2) Note. For other classes which provide for combination of winding or coiling and coating for impregnating operations.
- (3) Note. For the making of an electromagnet, inductance, or coil by a winding operation, see note (2) above, where the process or apparatus also includes coating or impregnating, and see the search notes below that reference this (3) Note for other classes and subclasses which provide for winding or coiling.
- (4) Note. For making a magnet or magnetic core from comminuted materials and for the classes which provide for analogous method or apparatus for making an article from comminuted materials see the search notes below referencing this note.
- (5) Note. For other classes and subclasses which provide for making magnets and magnetic cores from laminated metal, see the search notes referring to the (3) Note above, where the laminating is performed by winding operations. Also see the search notes referencing this (5) Note.

- (6) Note. A process of making a magnet or magnet inductance or transformer core which includes the operation of magnetizing the core and another operation are in general classified with such other operation unless the class which provides for the other operation excludes combined operations in which case the patent is classified in this or one of the indented subclasses. For example, processes of making magnets and magnet inductance or transformer cores which include the operation of magnetizing the core and another operation are, in general, classified with such other operation unless the class which provides for the other operation excludes combined operations in which case the patent is classified in this or one of the indented subclasses. For example, Class 148, Metal Treatment, subclass 100 contains many patents for significant heat treatment of metal and intentionally magnetizing
- (7) Note. For other classes which provide for manufacturing process and apparatus, see the notes to the definitions of Class 29, subclasses 25.01+ and subclass 25.41 of this class. Subclasses 25.41+ provides for electric condenser making. Subclasses 25.01+ provide for a method or apparatus for making a semiconductor or barrier layer device.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 25.01+, see (7) Note, above.  
 25.41+, see (7) Note, above.  
 33+, for a miscellaneous organized machine not otherwise classified adapted to perform a plurality of operations upon metal in manufacturing an electromagnet, inductor or transformer or a part thereof. (See the (3) Note above).  
 33+, for a miscellaneous organized machine not classified in any other class or subclass, adapted to perform a plurality of operations upon metal, including a machine designed for making an electromagnet, inductor, or transformer, or for making a part

- thereof. See the reference to subclasses 33+ in (3) Note, above.  
 598, for a miscellaneous process of making a rotor or part thereof, other than a commutator, for a dynamoelectric machine.  
 729+, for miscellaneous apparatus for assembling or disassembling an electrical device, including means to assemble an electromagnet, an inductance device, a transformer, or associated parts thereof. Note that indented subclass 732 provides for such apparatus for assembling a motor, a generator, or a subcombination thereof.

SEE OR SEARCH CLASS:

- 53, Package Making, for a method of or apparatus for encompassing or encasing goods or materials with a separate cover or band which serves as means for identifying, protecting, or unit handling the goods or materials. (See (2) Note above).  
 53, Package Making, for a method of or apparatus for encompassing or encasing goods or materials with a separate cover or band which serves as means for identifying, protecting, or unit handling the goods or materials. (See the (3) Note above).  
 72, Metal Deforming, subclasses 66, 135, and 371 for wire coiling. (See the (3) Note above).  
 72, Metal Deforming, for a method of metal deforming, per se, and see the reference to Class 72 in (3) Note, above.  
 75, Specialized Metallurgical Processes, Compositions for Use therein, Consolidated, Metal Powder Compositions, and Loose Metal Particulate Mixtures, for a process of producing a metal or an alloy and subclass 122.1 for a process of making an alloy. See the (1.5) Note and (4) Note, above.  
 75, Specialized Metallurgical Processes, Compositions for Use therein, Consolidated, Metal Powder Compositions, and Loose Metal Particulate Mixtures, subclasses 255+ for loose mixtures of two or more comminuted elemental metals or alloys. (See the (4) Note above).

- 106, Compositions: Coating or Plastic, for a miscellaneous coating, impregnating, or plastic composition.
- 140, Wireworking, subclasses 71+ for miscellaneous apparatus for coiling or winding wire which involves combined wire working operations. See indented subclass 92.1 for a device on or by which material, generally wire, is wound to produce a coil of predetermined form or shape, the device being mostly formers for winding an armature inductance and a electromagnet coil. Winding wire upon a stationary form is in subclass 71. Where the coil or winding is intended to be removed from the mandrel or former, or where the coil is shaped after winding, the patent is in Class 140. See Class 140, subclass 76 for making a ferrule of wire by coiling, subclass 86 for making a wire cork or stopper extractor of spiral form and, subclass 92 for making a spiral stud (shirt stud) which includes a conical of wire. (See the (3) Note above).
- 140, Wireworking, for a miscellaneous process and apparatus for wire working including the working of wire by banding or twisting it to form a specific article or fabric, the applying of wire to an article, and cutting, feeding, straightening and tensioning wire. See the reference to Class 140 in (3) Note above.
- 148, Metal Treatment, subclasses 100 through 122 for a process of modifying magnetic properties of metal except as indicated in (2) Note in the definition of Class 148, subclass 100, and the appended search note to Class 29. Thus, a method consisting of working or assembling metallic material, having intended effect upon the magnetic properties of the material, combined with broad treatment in a magnetic field, is classified in subclasses 602.1+ of this class (29). See the (1) Note above. (Also see (6) Note above).
- 148, Metal Treatment, subclasses 300+ for metal stock having magnetic properties resulting from a process classifiable in any of subclasses 100 to 122.
- See the (1.5) Note above. (Also see the other references to Class 148 in the (4) Note of this subclass (602.1))
- 148, Metal Treatment, subclass 104 relating to dust cores for a process that involves microstructural change wherein magnetic properties of free metal or metal alloys are developed, improved, modified, or preserved. See the (4) Note above.
- 148, Metal Treatment, for a miscellaneous process of treating solid metal, including magnetic material, and the resulting product. See the reference to Class 148, Notes (1.5), (4), and (6), above.
- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, for a process and apparatus for making a laminated article. subclass 184 and 446, for example, include the operations of winding and adhering the windings. This reference to Class 156 should be compared with the reference to Classes 242 and 427 in this note. See (2) Note above.
- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, for a miscellaneous process of laminating layers with a nonmetallic adhesive. See the (5) Note above.
- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, for a process and apparatus for making a laminated article or fabric.
- 178, Telegraphy, subclass 45 for a conductor which is provided with loading (magnetic) means and subclass 46 for the structure of induction or inductance coil for cables. See the (1.5) Note above.
- 241, Solid Material Comminution or Disintegration, for a miscellaneous process and apparatus for the comminution and disintegration of solid material. (see the (4) Note above).
- 242, Winding, Tensioning, or Guiding, subclasses 430+ for a machine or method of winding an electromagnet, transformer, or inductor coil where a coating is applied to the winding as an incident to the winding. Class 242 includes coating the wire or other material as it is being wound. This reference to Class 242 should be com-

- pared with the reference to Class 156 in this note. (See (2) Note above).
- 242, Winding, Tensioning, or Guiding, for apparatus or process of making by winding an article such as an electromagnet, inductor, or coil. Class 242 includes other operations incidental or essential to the winding operation. Usually in Class 242, the wire or other material is wound upon a mandrel or former upon which the wire or other material is to remain, or the wire is wound into a form such as cylinder or conoid which is analogous to the form in which wire or thread is wound for the purpose of storage. (See the (3) Note above).
- 242, Winding, Tensioning, or Guiding, subclass 899 for a miscellaneous process and apparatus for making an article by winding and miscellaneous apparatus for winding or unwinding flexible material, such as wire or fabric, from a holder. See the reference to Class 242 in (2) and (3) Notes, above.
- 252, Compositions, subclass 62.51 and the classes and subclasses specified in the notes thereto for a composition specialized and designed for use as magnetic material, a substance peculiar to such a composition and the process of making such a composition and substance. Subclass 62.51 also takes a process of making such a composition combined with magnetizing and/or broad molding as well as any combination these steps with a heat treating operation except where heat treatment modifies a magnetic property of a metallic component of the composition, in which case the process is classified in Class 148. See the (1.5) Note above.
- 252, Compositions, subclass 62.51 for a miscellaneous magnetic composition. The notes of Class 252, subclass 62.51, refer to classes and subclasses for miscellaneous compositions containing nonmetallic materials and comminuted metals which exhibit magnetic properties. See the (4) Note above. (Also see a the (1.5) Note, above.)
- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclass 117 for a method of forming an article by uniting of discrete bulk assembled particles. (See the (4) Note above).
- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, for a miscellaneous process for the working, especially by molding and casting of miscellaneous plastic materials, to make and reproduce an article of definite shape and for a process for the shaping and embossing of a sheet of miscellaneous plastic material to make an article of a definite shape including combinations with other operations, e.g., coating. Also see the (4) Note, above.
- 269, Work Holders, for a miscellaneous work holder.
- 324, Electricity: Measuring and Testing, subclass 200 for a process apparatus for testing the magnetic properties of an article or material and also for a testing process and apparatus which utilize magnetic effects.
- 335, Electricity: Magnetically Operated Switches, Magnets, and Electromagnets, subclass 209 for magnet and electromagnet structure. See the (1.5) Note above.
- 336, Inductor Devices, for the structure of a transformer or inductive reactor. See the (1.5) Note above.
- 360, Dynamic Magnetic Information Storage or Retrieval, subclass 131 and the classes specified in the notes to the definition of that subclass for magnetic records. See the (1.5) Note above.
- 419, Powder Metallurgy Processes, for a process of making a compact or sintered article from comminuted metal or metal-containing composition by the application of heat or pressure without melting of the ingredients. See the (4) Note above.
- 420, Alloys or Metallic Compositions, appropriate subclasses for a single metal in comminuted form. (See the (4) Note above).

- 427, Coating Processes, for a process of coating, per se, note especially subclass 58 for process wherein an electrical product is produced and subclass 127 for a process wherein a product having a magnetic base or coating is produced. See the (1.5) Note above.
- 427, Coating Processes, for a process of coating, per se, and note especially subclasses 58+ for a process wherein an electrical product is produced and subclass 127 for a process wherein a product having a magnetic base or coating is produced. See the (3) Note above.
- 428, Stock Material or Miscellaneous Articles, subclasses 546+ for a metal blank containing metal particles. See the (4) Note above.
- 428, Stock Material or Miscellaneous Articles, subclasses 432 and 457 for a plural layer product in which at least one layer is a metal and is next to a layer of nonmetal material and subclass 900 (a cross-reference art collection) for a product having a magnetic feature. See the (5) Note above.
- 603.01 Magnetic recording reproducing transducer (e.g., tape head, core, etc.):**  
This subclass is indented under subclass 602.1. Process of manufacturing a device especially adapted to read or write an electrical signal from or onto a moving magnetic copying media such as a tape or disc.
- SEE OR SEARCH CLASS:  
360, Dynamic Magnetic Information Storage or Retrieval, subclasses 110 through 130.34 for magnetic recording or reproducing transducer.
- 603.02 Including disassembly step:**  
This subclass is indented under subclass 603.01. Process having a disassembly operation.
- (1) Note. The term “disassembly” is defined in the Class 29 general class definition, Glossary
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
426.1+, for a process of disassembly not elsewhere provided for, and see the search notes thereunder.
- 603.03 Making disc drive:**  
This subclass is indented under subclass 603.01. Process wherein the manufactured device is especially adapted for transmitting motion to or applying mechanical force to a thin, flat, circular recording plate.
- 603.04 Mounting preformed head/core onto other structure:**  
This subclass is indented under subclass 603.01. Process wherein a premanufactured recording head or core is assembled or permanently associated with additional parts or components.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
428+, for a process of assembly or joining not elsewhere provided for, and see the search notes thereunder.
- 603.05 Mounting multitrack head:**  
This subclass is indented under subclass 603.04. Process wherein the premanufactured recording head or core is provided with a plurality of reading or writing portions.
- 603.06 With bonding:**  
This subclass is indented under subclass 603.04. Process wherein the assembled or permanently associated head or core is solvent or heat joined or secured with glue, filler metal, glass, or cement.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
469.5, for an assembly process including metal deforming and nonmetallic bonding.
- 603.07 Fabricating head structure or component thereof:**  
This subclass is indented under subclass 603.01. Process including producing or manufacturing the head, core, or part thereof.



**603.08 Treating to affect magnetic properties:**

This subclass is indented under subclass 603.07. Process wherein the fabricated head structure or component thereof is processed or acted upon to materially alter or influence the magnetic characteristics.

## SEE OR SEARCH CLASS:

148, Metal Treatment, subclasses 100+ for a process of heat treating magnetic material under the class definition; Class 148 specifically provides for metalworking or assembly in combination with metal treatment.

**603.09 Including measuring or testing:**

This subclass is indented under subclass 603.07. Process wherein (a) a dimension, a quantity, or a capacity is ascertained, or (b) some condition of the device or component is detected or analyzed.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

404, for a process including simulated operation or operating conditions not elsewhere provided for.  
407.01+, for a process including testing or indicating not elsewhere provided for and see the search notes thereunder.

**603.1 Using reference point/surface to facilitate measuring:**

This subclass is indented under subclass 603.09. Process wherein a specific locus or surface boundary is utilized as a benchmark to accomplish the measuring.

## SEE OR SEARCH CLASS:

428, Stock Material or Miscellaneous Articles, subclasses 800 through 848.9 for magnetic recording component or stock, having disclosed utility in dynamic magnetic recording, reproducing, or storage or in a component intended for information storage, with specific chemical composition or physical chemistry.

**603.11 With dual gap materials:**

This subclass is indented under subclass 603.09. Process wherein the fabricated head structure utilizes at least two substantially dif-

ferent substances in the operating magnetic break.

**603.12 With significant slider/housing shaping or treating:**

This subclass is indented under subclass 603.09. Process wherein the fabricated head structure or component thereof is subjected to a meaningful or notable processing or forming of the working surface or cover structure.

**603.13 Depositing magnetic layer or coating:**

This subclass is indented under subclass 603.09. Process wherein at least one magnetic material deposition covering or striation is formed.

## SEE OR SEARCH CLASS:

427, Coating Processes, subclasses 58+ for a process of producing an electrical product by coating steps and perfecting operations.

**603.14 Plural magnetic deposition layers:**

This subclass is indented under subclass 603.13. Process wherein at least two magnetic deposition layers or coatings are created.

**603.15 With etching or machining of magnetic material:**

This subclass is indented under subclass 603.13. Process wherein the deposited magnetic layer is chemically or mechanically shaped by removing material therefrom.

**603.16 Machining magnetic material (e.g., grinding, etching, polishing):**

This subclass is indented under subclass 603.07. Process wherein the magnetic substance is mechanically or chemically shaped by removing material therefrom.

**603.17 Employing workholding means:**

This subclass is indented under subclass 603.16. Process having means for restraining or supporting the workpiece during treating or processing.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

557, for a process of workholding not elsewhere provided for.

**603.18 By etching:**

This subclass is indented under subclass 603.16. Process wherein the shaping is done by electrolytic or chemical action.

**603.19 Multitrack heads having integral holding means:**

This subclass is indented under subclass 603.07. Process wherein the fabricated head, core, or part thereof is provided with a plurality of reading or writing portions, all of which have constituent retaining means.

**603.2 With bond/laminating preformed parts, at least two magnetic:**

This subclass is indented under subclass 603.07. Process wherein the fabricated head, core, or part thereof is made up of a plurality of previously fabricated parts adhered or secured together, two or more parts being magnetic.

**603.21 Using glass bonding material:**

This subclass is indented under subclass 603.2. Process wherein the parts are adhered or secured together by means of a vitreous composition.

**603.22 With work positioning means:**

This subclass is indented under subclass 603.2. Process including means for appropriately locating or arranging the workpiece or component thereof.

**603.23 Providing winding:**

This subclass is indented under subclass 603.07. Process wherein the fabricated head structure or component thereof is furnished with or supplied with at least one electromagnetic coil loop.

**603.24 Multilayered winding:**

This subclass is indented under subclass 603.23. Process wherein the winding is made up of a plurality of substrates or strata.

**603.25 By coating:**

This subclass is indented under subclass 603.23. Process wherein the winding is formed from a deposition layer.

**603.26 Preformed winding:**

This subclass is indented under subclass 603.23. Process wherein the winding is provided as a previously fabricated component.

**603.27 Specific diverse magnetic materials:**

This subclass is indented under subclass 603.07. Process wherein the fabricated head structure or component thereof includes two or more distinct magnetic compositions.

**604 Data storage inductor or core:**

This subclass is indented under subclass 602.1. Process for making a device particularly adapted for use in information storage application.

**SEE OR SEARCH CLASS:**

365, Static Information Storage and Retrieval, subclasses 129+ for data storage/retrieval of information using particular type elements.

**605 By winding or coiling:**

This subclass is indented under subclass 602.1. Process including feeding a conductor on a rotating center member or placing successive turns of a conductor about a fixed center.

- (1) Note. This subclass provides for a winding or coiling operation combined with another step, usually metal working, which precludes placement based on the winding or coiling step, per se.

**SEE OR SEARCH CLASS:**

242, Winding, Tensioning, or Guiding, subclasses 430+ for making an article solely by directly winding an elongated material onto a core, particularly subclasses 434+ for winding through a ring shaped core, subclasses 437+ for winding on an irregularly shaped core, subclasses 439+ for winding onto a core by orbiting a material supply about the core, and subclasses 443+ for winding onto a rotating core.

**606 By assembling coil and core:**

This subclass is indented under subclass 602.1. Process including joining a wound inductance in operative relation with a solid having magnetic properties.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 452, for a process of prestressing a filament or strand and while it is stressed, assembling it with another part, e.g., a core or mandrel.
- 456, for a process of making and/or assembling a helix upon or within a cylindrical member.
- 598, for a process of assembling the windings or coils with the core or armature of a rotor for a dynamoelectric machine.
- 605, for this subject matter where the assembling process includes a winding or coiling operation.
- 729+, for miscellaneous apparatus for assembling a coil and a core of an electromagnet, inductor or transformer, or their associated parts, and especially subclasses 732+ for such apparatus for assembling a motor or generator, or the parts thereof.

**607 Including permanent magnet or core:**

This subclass is indented under subclass 602.1. Process for making a permanent magnet or a core for a magnet, inductor, or transformer.

SEE OR SEARCH CLASS:

- 365, Static Information Storage and Retrieval, subclass 62 for a permanent magnet used as a component in a magnetic storage device.

**608 From comminuted material:**

This subclass is indented under subclass 607. Process in which magnet or core is made from comminuted material.

- (1) Note. See (4) Note to the definition of subclass 602.1 for the other classes which provide for a process or apparatus for making a magnet or core from comminuted materials.

**609 Laminated:**

This subclass is indented under subclass 607. Process for making a laminated magnet or core.

- (1) Note. See (5) Note to the definition of subclass 602.1 for the other classes which provide for a process or apparatus for making a laminated magnet or core, or parts thereof.

**609.1 Acoustic transducer:**

This subclass is indented under subclass 602.1. Process wherein the device either (1) includes wires mounted for vibration, and means to induce vibrations in the wires or (2) converts electromagnetic energy to sound energy or vice versa.

**610.1 Resistor making:**

This subclass is indented under subclass 592.1. Process for making an electrical resistor and including (1) a process for making a resistor which involves metal working, (2) a process for making a resistor which involves metal working combined with a nonmetal working process such as chemical or metallurgical and not otherwise classifiable, and (3) a process for making a resistor not otherwise classifiable.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 631, for a method of making an insulator.
- 729+, for apparatus for assembly and disassembly of a electrical device.

SEE OR SEARCH CLASS:

- 33, Electrical Resistors, Class Definition, for the definition of an electrical resistor.
- 53, Package Making, for a resistance making method involving incasing or covering or depositing fluent materials in a preformed receptacle and not otherwise classifiable.
- 72, Metal Deforming, subclasses 68, 135 and 371 for wire coiling.
- 118, Coating Apparatus, for resistor coating apparatus.
- 148, Metal Treatment, subclasses 4+ for a solid metal treatment process, such as case hardening or heat treating, for making resistors.

- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, for a process and device for making a resistor involving only a laminating step or in which the resistor is a running or indefinite length conductor.
- 164, Metal Founding, for a metal founding process.
- 204, Chemistry: Electrical and Wave Energy, subclass 155 and subclasses 157.15, and 164 for a process of making an electrical resistor involving electrical or wave energy chemistry.
- 205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, appropriate subclasses for an electrolytic process of resistor making.
- 216, Etching a Substrate: Processes, subclass 16 for the use of a resistor in an electrical circuit.
- 219, Electric Heating, for a process not otherwise classifiable of making an electrical resistor by an electrical heating step, especially subclass 600 for inductive heating, subclass 678 for microwave heating, or subclass 764 for a capacitive dielectric heating process, and subclass 50 for a resistance heating process such as coating, resistance welding, or arc welding. Combinations of an electrical heating process and a nonincidental metal working or assembly process of this Class 29, subclass 610.1.
- 242, Winding, Tensioning, or Guiding, subclasses 430+ for making an article by winding onto a core, particularly subclass 437.4 which includes the winding of flat card resistors
- 252, Compositions, particularly subclasses 500+ for a process peculiar to the making of a composition such as light sensitive, carbon containing, free metal containing, carbide containing, radioactive material containing, or metal compound containing, which composition may be resistive in nature.
- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, for a process of working, molding, or shaping a miscellaneous plastic material. See Class 264 definitions for the line between this class (29) and Class 264. Some subclasses in Class 264 which are specific to production of an electrical component or device are 104, 272.11, and 614+.
- 338, Electrical Resistors, for electrical resistor structure.
- 419, Powder Metallurgy Processes, for a powder metallurgy process with sintering, in general.
- 427, Coating Processes, subclass 101 for a process of coating, per se, wherein the coated product is an electrical resistor.
- 445, Electric Lamp or Space Discharge Component or Device Manufacturing, Manufacture and Repair, subclasses 1+ for a method of manufacture, repair, or salvage of an electric lamp or discharge device which may include a resistance, and subclasses 60+ for apparatus performing the method.
- 451, Abrading, subclass 78 for a machine for making a resistor by abrading, without other metal working.
- 611 Heater type:**  
This subclass is indented under subclass 610.1. Process for making an electrical resistor adapted to change electrical energy to thermal energy and structurally adapted to transmit this thermal energy to other structure or ambient surroundings.
- SEE OR SEARCH CLASS:  
219, Electric Heating, subclasses 200+ for electrical heating devices.
- 612 Thermally variable:**  
This subclass is indented under subclass 610.1. Process for making an electrical resistor in which the electrical characteristics are dependent on the ambient temperature.
- SEE OR SEARCH CLASS:  
338, Electrical Resistors, subclasses 25+ for an electrical resistor which is value dependent on ambient temperature.
- 613 With envelope or housing:**  
This subclass is indented under subclass 610.1. Process including enclosing or surrounding the resistor as by an envelope or housing.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 588, for a method of encapsulating a semiconductor or barrier layer device.
- 620, for a process involving the coating of resistive material onto a base with no enclosing or housing, but combined with some noncoating step such as assembly or metal working.
- 627, for a process of encapsulating a completed circuit board assembly.

SEE OR SEARCH CLASS:

- 338, Electrical Resistors, subclasses 226+ for the structure of a resistor, generally, which may be incased, embedded, or housed.
- 427, Coating Processes, subclasses 101+ for a process of coating, per se, wherein the coated product is an electrical resistor.

**614 Filling with powdered insulation:**

This subclass is indented under subclass 613. Process including filling the housing or envelope with powdered insulation in a dry condition.

SEE OR SEARCH CLASS:

- 53, Package Making, subclasses 473+ and 476+ for a method of filling and closing a receptacle.
- 338, Electrical Resistors, subclasses 238+ for resistance structure wherein the element is embedded in powdered material enclosed by a metallic sheath.

**615 With direct compression of powdered insulation:**

This subclass is indented under subclass 614. Process including compressing directly the powdered insulation, as by means of a die applied directly to the powder.

- (1) Note. For classification in this subclass, the device exerting the compressive force must be applied directly to the powder. Compression by reduction of a metallic sheath, for example, is in subclass 614. See also subclasses 616 and 617 involving compression of the insulation to reduce it to a powder. Inclusion of

a step of compressing by reducing the sheath, in addition to the direct application of a compressive, force does not preclude classification in this subclass.

SEE OR SEARCH CLASS:

- 141, Fluent Material Handling, With Receiver or Receiver Coating Means, subclass 12 for a material handling process with material treatment including compacting.
- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclass 109 for a process directed to forming an article by uniting discrete bulk assembled particles. See the search notes to Class 264 under (4) Note of this Class 29, subclass 602.1.
- 419, Powder Metallurgy Processes, for a process of forming an article by uniting discrete metal particles, especially subclasses 61+.

**616 Powdering the insulation:**

This subclass is indented under subclass 613. Process including reducing the solid insulation in which the resistance element is embedded, or by which the element is surrounded, to a powder.

SEE OR SEARCH CLASS:

- 338, Electrical Resistors, subclasses 238+ for the structure of resistances embedded in powdered material with a metallic sheath.

**617 By oxidation:**

This subclass is indented under subclass 616. Process wherein the embedding insulation is powdered in situ by oxidation, as by passing steam over a metal such as magnesium.

**618 With winding:**

This subclass is indented under subclass 613. Process including winding the resistance element onto a core.

SEE OR SEARCH CLASS:

- 242, Winding, Tensioning, or Guiding, subclasses 430+ for making an article by winding onto a core where no other steps, except such as are incidental to the winding, are claimed, particularly

subclass 437.4 which includes the winding of flat card resistors.

338, Electrical Resistors, subclasses 296+ for the structure of a helical or wound resistor.

**619 Applying terminal:**

This subclass is indented under subclass 613. Process including applying at least one terminal to the resistance element.

SEE OR SEARCH THIS CLASS, SUBCLASS:

602.1+, for a method of applying a terminal to an electromagnet, transformer or inductor.

621, for a method, generally, of applying a terminal to a resistance element.

874+, for a method of making an electrical contact or terminal, per se.

SEE OR SEARCH CLASS:

338, Electrical Resistors, subclasses 322+ for the structure of a resistor having a nondetachable (e.g., a solder type) terminal applied thereto.

439, Electrical Connectors, for the structure of a quickly detachable terminal applied to a resistor where the resistor is only nominally claimed.

**620 Coating resistive material on a base:**

This subclass is indented under subclass 610.1. Process including coating resistive material onto a base.

(1) Note. The term "coating" is employed herein to mean both surface coating and impregnating. For classification in this subclass, the coating material must be conductive and be intended to modify an electric current as a resistor. Forming a housing about an otherwise complete resistor by coating is classified in subclass 613, whether the coating material is insulative or conductive, and even though the conductive coating material, where used, functions as an electrostatic shield.

(2) Note. A method of coating on or with resistive material is, per se, classified in Class 427, Coating Processes, subclasses 101+. Class 29, subclass 620 is residual

and includes the application of the resistive material by coating plus any additional process or step, not necessary to coating, except where the coating and additional process or step is provided for in another class. For example, this subclass includes coating plus metal working or coating plus assembly, but does not include coating plus molding, which is in Class 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclasses 129+.

SEE OR SEARCH THIS CLASS, SUBCLASS:

458+, and 460, for a process of mechanical manufacture generally including coating.

613+, for forming a protective housing or envelope by a coating step. See also (1) Note, above.

SEE OR SEARCH CLASS:

338, Electrical Resistors, subclasses 308+ for resistor structure wherein the element is coated on a base.

427, Coating Processes, subclasses 101+ for a method of making a resistor by coating, and see (2) Note, above.

**621 Applying terminal:**

This subclass is indented under subclass 610.1. Process including applying one or more terminals to the resistance element.

SEE OR SEARCH THIS CLASS, SUBCLASS:

602.1+, for a process of applying a terminal to an electromagnet, transformer, or inductor.

619, for a process of applying a terminal to the resistance element together with enveloping or housing.

874+, for a process of making a contact or terminal, per se.

SEE OR SEARCH CLASS:

338, Electrical Resistors, particularly subclasses 322+ for the structure of a resistor having a terminal applied thereto, and especially subclass 322 where the terminal is of the quickly detachable type.

- 439, Electrical Connectors, for the structure of a quickly detachable terminal applied to a resistor, or to another device, where the device is not significantly claimed.
- 621.1 Strain gauge making:**  
Process under 610.1 wherein the resistor is an element of a larger device which uses the change in a resistance under strain to measure force or pressure.
- (1) Note. To be classified in this subclass, the process must be directed to manufacturing the device, and not merely to mounting or to securing a strain gauge onto another object.
- 622 Switch making:**  
This subclass is indented under subclass 592.1. Process for making a device adapted to interrupt or establish an electrical current flow between electrical conductors joined to the device.
- SEE OR SEARCH CLASS:  
200, Electricity: Circuit Makers and Breakers, for an electrical switch, per se.
- 623 Fuse making:**  
This subclass is indented under subclass 592.1. Process for making a device which is destroyed by the thermal energy generated by the current flowing through the conductor to break the current carrying connection at a predetermined value.
- SEE OR SEARCH CLASS:  
200, Electricity: Circuit Makers and Breakers, subclasses 402+ for a thermal current switch including a fuse.
- 623.1 Electric battery cell making:**  
This subclass is indented under subclass 592.1. Process particularly adapted to the manufacture of a device to be used for the long term chemical storage of electrical energy.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
2, for the manufacture of a battery grid.  
730+, for apparatus for assembling battery cell components.
- 763, for apparatus for disassembling battery cell components.
- SEE OR SEARCH CLASS:  
136, Batteries: Thermoelectric and Photoelectric, for the method of or apparatus for manufacture of an electrical energy cell if combined with the use of the cell.
- 623.2 Including sealing:**  
This subclass is indented under subclass 623.1. Process including the closing of encasing structure about the device to be used for the long term storage of electrical energy.
- SEE OR SEARCH CLASS:  
53, Package Making, for closing a vessel, generally.
- 623.3 Including laminating of indefinite length material:**  
This subclass is indented under subclass 623.1. Process including the bringing together of components of such longitudinal dimension that the leading and trailing ends thereof are not both engaged during the manufacture.
- (1) Note. The cutting of the product of this subclass to length subsequent to bringing together of the components is not considered to be engagement of the trailing end and such a combination is therefore considered to be proper for this subclass.
- 623.4 Including adhesively bonding:**  
This subclass is indented under subclass 623.1. Process including bringing fluent material between components being united, which material is adapted to adhere to the surface of each component and thereby hold the components together.
- SEE OR SEARCH CLASS:  
156, Adhesive Bonding and Miscellaneous Chemical Manufacture, for bonding of structures together, generally.
- 623.5 Including coating or impregnating:**  
This subclass is indented under subclass 623.1. Process including placing of a layer of flowable material over at least a portion of the

structure of the device for storage of electrical energy.

**SEE OR SEARCH CLASS:**

- 118, Coating Apparatus, for apparatus for coating of structure, generally.  
427, Coating Processes, for coating of structure, generally.

**650 PLURAL DIVERSE MANUFACTURING APPARATUS:**

This subclass is indented under the class definition. Apparatus including the combination of a first material treating device under the class definition and a second material treating device of a recognized, different type.

- (1) Note. Assembly means combined with coating means is included in this subclass.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 33+, for an assembling device combined with a treating device.  
592+, for the corresponding method.  
791+, for a first assembling means combined with a second assembling means.

**SEE OR SEARCH CLASS:**

- 118, Coating Apparatus, (1) for a device for placing a relatively thin coating on work, combined with a device for performing additional treatment of work, which additional treatment is ancillary or preparatory to the coating operation, provided that the additional device does not include means to assemble work parts or (2) for a device for placing a relatively thin coating on work combined with a single device for performing a nonancillary or preparatory treatment. Therefore, the combination of a coating device with either an assembling device or, first and second nonancillary or preparatory treating devices will be found in this subclass.

**700 MEANS TO ASSEMBLE OR DISASSEMBLE:**

This subclass is indented under the class definition. Apparatus (1) including means for engaging a first work part and including means for engaging a second work part which means are adapted to either bring the two work parts into juxtaposed relationship or cause one of the work parts to intimately engage the other to thereby fasten the work parts together or, (2) including means to engage at least one work part and force that work part to move out of intimate engagement with another work part to which it has previously been secured.

- (1) Note. To be proper for classification in this subclass a patent directed to clause (1) "assembly means" of the definition of this subclass must include structure to recognize (engage) the first work part and structure to recognize (engage) the second work part; whereas, a patent directed to clause (2) "means to disassemble" must include a claimed disclosure that the parts are either unfastened or moved out of positional relationship and must claim structure that recognizes (engages) at least one of the parts.
- (2) Note. Means to relatively position two elements of a machine, i.e., to adjust the machine, is not considered to be an assembly or disassembly means for this subclass and those indented hereunder.
- (3) Note. A portion of material to be assembled to another portion will be considered to be a "part" in this subclass and in the subclasses indented hereunder even if both portions to be assembled are surfaces of the same member.
- (4) Note. This subclass is the residual home for a device for assembling or disassembling a first and a second work part. Therefore, classification is in this and the indented subclasses only when no other class (or preceding subclass of this class) provides for the type of apparatus claimed. See the search notes below.
- (5) Note. A mechanical manufacturing apparatus often includes an assembling



means combined with a shaping means. Such apparatus will fall into one of two groups: (a) those including a shaping means intended to operate simultaneously or subsequently to a juxtaposing means and serving only to secure the work parts together or, (b) those including a shaping device whether acting preliminarily, simultaneously, or subsequently to the juxtaposing of the parts intended to shape a work part(s) other than or in addition to securing. Group (a) apparatus recognizing at least two work parts (see (1) Note, above) have their generic locus provided for in this and the indented subclasses unless elsewhere classified. The apparatus of group (b) are classified either in the preceding subclasses of Class 29, particularly subclasses 33+, or in other appropriate classes on the basis of the shaping operation.

- (6) Note. Generally, apparatus for the manufacture of a particular article which apparatus is peculiar to that manufacture will be found in the appropriate class directed to making of that article. Examples of such classes providing for the manufacture of a particular article are in the SEArch Notes below, referencing this (6) Note.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 1.01, through 91.8, providing for the manufacture of a particular article. See (6) Note above.
- 2 through 25.42, 91 through 91.8, 592.1 through 623.5, and 825 through 899.1, for a process of fastening by deforming in making (1) a special article by combined diverse operations or (2) for making a special article by a single operation not provided for specifically elsewhere in this class (Class 29), i.e., not joining by deforming a single operation provided for in this and the indented subclasses.
- 3, for a process of or apparatus for buckle assembling.
- 11, for a process of or apparatus for hinge assembling.

- 23.1, for apparatus for making a toothed cylinder.
- 23.51, for apparatus for impeller making.
- 25, for umbrella frame assembling.
- 33+, for a combined machine for performing both an assembling operation and a shaping operation. An operation done as part of an assembling operation is not considered to be combined i.e., upsetting a rivet to secure the rivet to a plate is not considered to be forging plus assembling, but rather simply assembling.
- 592+, for a method of assembling. Since Class 29, subclass 592, precedes this subclass 700 in the schedule, where both a process is claimed and apparatus for its practice is claimed, the process claim governs classification. Therefore, this subclass 700 has no original patents claiming the process of assembling.
- 401.1, for process of converting an article or apparatus to produce an article or apparatus of substantially different function, capacity, or type.
- 402.01+, for miscellaneous process of repair.
- 408+, for process of making or assembling a slide fastener.
- 426.1+, for process of disassembly.
- 428+, for process of associating or fastening, particularly subclasses 505+, for the process of joining by means of a deforming operation to interlock the parts, subclass 525 for the process of joining by means of a driven force fit and subclass 526 for the process of joining by means of a separate fastener.
- 650, for a combined machine for performing both an assembling and some other nonmaterial shaping manufacturing operation.

SEE OR SEARCH CLASS:

- 7, Compound Tools, for a miscellaneous combination of two or more hand tools usable in assembling or disassembling. The hand tool of Class 7 is of general utility; i.e., it is not limited to assembling only a certain restricted type of work parts.
- 12, Boot and Shoe Making, for boot or shoe assembling.

- 19, Textiles: Fiber Preparation, for pertinent subclass(es) as determined by schedule review.
- 26, Textiles: Cloth Finishing, for pertinent subclass(es) as determined by schedule review.
- 28, Textiles: Manufacturing, for pertinent subclass(es) as determined by schedule review.
- 33, Geometrical Instruments, particularly subclasses 501.05+, for a collocating gauge.
- 52, Static Structures (e.g., Buildings), particularly subclasses 111+, 122.1+, 127.1+, 143, and 155+ for a building or a building component with fixedly mounted means for handling, assembling, transporting, or installing.
- 53, Package Making, for the method of or apparatus for encompassing or encasing goods or materials with a separate cover or band which serves as means for identifying, protecting, or unit handling the goods or materials. The juxtaposing of a closure and receptacle, with or without securing, is also classified in Class 53. See particularly subclass 331.5 for tightening or loosening of a screw-type closure by rotation in combination with before or after handling of the work and subclasses 317+ for assembling of a screw-type closure onto a receptacle. Included in this subclass 700 and the subclasses indented hereunder is the assembly of a work part within an encompassing work part for the assembly of a manufactured article; e.g., see subclasses 266.1+ for means for assembling film into a cassette to form a manufactured assembly, generally, especially see subclass 284.4 for inserting X-ray film into a special receptacle.
- 57, Textiles: Spinning, Twisting, and Twining, for apparatus for assembling a plurality of metal filaments to form a cable in the absence of metal working and see (9) Note of the Class Definition of Class 57 for the lines between Classes 29 and 57.
- 59, Chain, Staple, and Horseshoe Making, subclass 7 for assembling or disassembling of sprocket chains including apparatus for removing a pin or a rivet. See (6) Note, above.
- 65, Glass Manufacturing, for pertinent subclass(es) as determined by schedule review.
- 66, Textiles: Knitting, for pertinent subclass(es) as determined by schedule review.
- 72, Metal Deforming, for deforming of a work part (without recognition of a second work part), particularly, subclasses 48+ for a tool couple adapted to fasten by pressing together surface portions of a single work member. See (5) Note, above.
- 75, Specialized Metallurgical Processes, Compositions for Use therein, Consolidated Metal Powder Compositions, and Loose Metal Particulate Mixtures, subclasses 401+ for treating multi-component metal-containing scrap having an integral substrate to separate metal therefrom..
- 76, Metal Tools and Implements, Making. See (6) Note above.
- 79, Button Making, for assembling button parts.
- 81, Tools, for a hand tool of general utility, or an assembling tool which structurally recognizes only one workpart.
- 86, Ammunition and Explosive-Charge Making, for the making, including assembling or disassembling, of an ammunition or explosive device.
- 87, Textiles: Braiding, Netting, and Lace Making, for means to braid a metallic cable, in the absence of metal working.
- 99, Foods and Beverages: Apparatus, subclasses 450.1+, for making an edible composite (e.g., sandwich, filled pie, etc.)
- 100, Presses, especially subclass 78, for a press not elsewhere classified, having means to additionally wind material on a mandrel and means to pull or push a centrally located mandrel upon which the material has been wound from within the roll of material.
- 112, Sewing, for securing two workpieces by a filamentary thread.
- 114, Ships, subclasses 65+ for ship building and subclass 359 for a frame or former for assembling a boat hull.

- 118, Coating Apparatus, for means to apply a coating or modify a coating on work.
- 131, Tobacco, for cigar or cigarette manufacture.
- 137, Fluid Handling, subclasses 315.01 through 329.4 for a fluid handling system with repair, tapping, or assembly means, especially subclasses 317-325 for a fluid handling system with means to tap a pipe, keg, or apertured tank under pressure.
- 139, Textiles: Weaving, for interweaving a plurality of strands.
- 140, Wireworking, especially subclasses 3+ for means for or process of making metal fabric involving an operation other than those operations of the textile classes. For example, metal deforming while coiling the strands of a cable will be found in Class 140. See (6) Note, above.
- 144, Woodworking, especially subclass 25 for box hooping.
- 147, Coopering, for wooden barrel, box, basket, or crate assembling.
- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, for securing parts together by nonmetallic adhesion including the combination with ancillary operation.
- 157, Wheelwright Machines, for process or apparatus for assembling a wheel.
- 162, Paper Making and Fiber Liberation, for pertinent subclass(es) as determined by schedule review.
- 164, Metal Founding, for means to mold metal onto a preform. See (5) Note, above.
- 166, Wells, subclasses 85.1+ for well head apparatus with assembly or disassembly means.
- 199, Type Casting, especially the various "assembling" subclasses.
- 204, Chemistry: Electrical and Wave Energy, subclasses 194+ for electrolytic apparatus, in general.
- 205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, subclasses 80+ for a process of electrolytic coating, especially subclass 114 for united of two separate solid materials and subclass 115 for repairing.
- 219, Electric Heating, especially subclasses 78.02, 121.11+, 148, 603, 633, and 765 for electric heating for welding or soldering and subclasses 127 and 157 for electric riveting.
- 221, Article Dispensing, for an article dispenser (feeder) not otherwise provided for, and see the class definition of Class 221 for a statement of the class lines and for the disposition of related disclosures of article and strip feeding process or apparatus.
- 222, Dispensing, for means for discharging the contents of a receptacle or for material holder. See the notes to the definition of that class for the location of other art of that type.
- 223, Apparel Apparatus, particularly subclass 48 for bead stringing and subclass 49 for assembling garment supporters.
- 227, Elongated-Member-Driving Apparatus, especially subclasses 19+ for combined apparatus for juxtaposing work parts and applying a fastening member, e.g., a nail or rivet, thereto. This subclass (700) includes apparatus for driving one member to pierce and thereby be fastened to another member if the driven member is not an "elongated member" as required for Class 227. Also, this subclass includes structure for fastening by use of an "elongated member" if no driving structure is claimed which would, if claimed, establish classification in Class 227.
- 228, Metal Fusion Bonding, for apparatus for or the method of joining metallic work parts by a metallurgical bond. See subclass 19 for apparatus and subclass 125 for the method of removing applied solder.
- 242, Winding, Tensioning, or Guiding, subclasses 430+ for making an article by winding an elongated article directly onto a core.
- 254, Implements or Apparatus for Applying Pushing or Pulling Force, see paragraph 4 of the class definition of Class 254.
- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, see (5) Note, above.

- 269, Work Holders, for a device which holds plural parts in desired spatial relationship while being joined or secured together, means for joining or securing not being claimed. The inclusion of claimed means to move work parts relatively to each other or means to guide the parts for such movement is a greater combination than is provided for in Class 269 and is properly classified in Class 29, subclass 700. Class 269 is the residual locus for a device for clamping, supporting, or holding an article (or articles) in position to be operated on or treated. See section VII under the class definition of Class 269.
- 270, Sheet-Material Associating, for bringing plural sheets of material in a particular array.
- 277, Seal for a Joint or Juncture, for a seal having an installation, removal, assembly, disassembly, or repair feature, subclass 323 for a seal for well apparatus, subclasses 370+ for a relatively rotatable extending sealing face member (e.g., face, mechanical, etc.) subclass 421 for a close proximity labyrinth seal, subclass 435 for a piston ring, piston ring expander, or seat therefor, subclass 511 for a dynamic, circumferential, contact seal intended for containment or compression by a gland member in a packing box, subclass 551 for a dynamic peripheral radially sealing flexible projection (e.g., lip seal, etc.) for other than a piston, subclass 598 for a static contact seal for use between parts of an internal combustion engine, subclass 609 for a static, contact seal intended for insertion between an end to end pipe, conduit, or cable joint, or subclass 630 for a static, contact seal for other than an internal combustion engine, or a pipe, conduit, or cable.
- 294, Handling: Hand and Hoist-Line Implements, subclasses 86.4+ for a hand-or-hoist-line grapple.
- 412, Bookbinding: Process and Apparatus, subclasses 9+ for apparatus specialized for the manufacture of books, which may include assembling means.
- 413, Sheet Metal Container Making, subclasses 1+ for the a method of fabricating sheet metal cans. See (6) Note above.
- 414, Material or Article Handling, subclasses 788+ for apparatus for assembling articles in a particular relationship wherein the assembling comprises or facilitates handling rather than the production of a final product.
- 425, Plastic Article or Earthenware Shaping or Treating: Apparatus, subclass 48 for a curing bag inserter, releaser, or remover in a tire vulcanizing apparatus; subclasses 78+ for means for molding powered metal including molding onto a preform and subclasses 110+ for means to mold plastic material onto a preform. See (5) Note, above.
- 434, Education and Demonstration, subclasses 302 and 369 for apparatus for use in teaching of the subject of mechanics and subclass 52 for apparatus for use in demonstrating manufacturing stages.
- 470, Threaded, Headed Fastener, or Washer Making: Process and Apparatus, subclasses 2+ for methods for assembling and disassembling a bolt with a nut or washer and subclasses 48+ for apparatuses for assembling or disassembling a bolt with a nut or washer and subclasses 164+ for a distributor or feeder for bolts, nuts, rivets, screws, or washers.
- 493, Manufacturing Container or Tube From Paper; or Other Manufacturing From a Sheet or Web, for making a product from a nonmetal sheet or web, generally, particularly subclasses 374+ for assembling non-metal sheet or web workpieces; generally subclasses 88 for applying a bail to a box and for making a box combined with applying a bail thereto, 93+ for making a box and inserting a lining therein, 102+ for making a box and applying an end closure, 374+ for applying a reinforced washer to an opening in a tag, and 375+ for attaching a fastener pin or wire to a tag and for attaching a string to a tag.

**701 With means to regulate operation by use of templet, tape, card, or other replaceable information supply:**

This subclass is indented under subclass 700. Apparatus including structure for utilizing the characteristics (e.g., physical or electrical) of an element that is separate from the work and is separate from the organized structure of the device to influence the operation of the apparatus.

- (1) Note. This subclass includes machines for utilizing a prepared information supply that is to be removably placed in the machine. This subclass does not include structure for utilizing the characteristics of a “permanent” part if the machine such as a cam or gear to influence the operation of other parts of the machine.

SEE OR SEARCH CLASS:

901, Robots, subcollections 3+ for a programming system for an industrial robot.

**702 With comparator:**

This subclass is indented under subclass 701. Apparatus including means to sense a condition of the work or product, means to sense a corresponding condition of the information supply, means to relate the sensed conditions, and means to regulate the operation of the apparatus in accordance with any distinction between the sensed conditions.

**703 Computer input:**

This subclass is indented under subclass 702. Apparatus wherein the information supply includes an electronic or magnetic memory bank.

**704 Web or strand-carried information supply:**

This subclass is indented under subclass 701. Apparatus wherein the separate structure used to influence the apparatus is elongated and is adapted to pass through a sensing portion of the apparatus or to lie still in a sensing portion of the apparatus during operation thereof.

**705 With means to test work or product:**

This subclass is indented under subclass 700. Apparatus combined with means to determine the weight or other characteristics of the mate-

rial to be assembled or disassembled of the material that has been assembled or disassembled.

- (1) Note. Orientation of the work or product is not considered to be a characteristic of the material.

**706 With randomly actuated stopping or disabling means:**

This subclass is indented under subclass 700. Apparatus provided with means to bring any or all of the moving parts of the apparatus to a halt, i.e., to cease to operate, the halting effect being initiated by an abnormal occurrence during the operation of the apparatus.

- (1) Note. A machine capable of stopping will not be placed in this subclass unless the stopping means operates as a result of an unplanned or unpredictable occurrence.
- (2) Note. Termination of a normally continuous work supply is considered to be an abnormal occurrence.

**707 Responsive to condition of work or product:**

This subclass is indented under subclass 706. Apparatus including a detector for sensing a characteristic of the work parts being assembled (or disassembled) or of the product of the assembly operation and provision to utilize this sensed characteristic to cause the apparatus to halt.

**708 Responsive to operative (e.g., safety device, etc.):**

This subclass is indented under subclass 706. Apparatus including a detector for sensing a characteristic of a person operating the apparatus and provision to utilize this sensed characteristic to cause the apparatus to halt.

**709 With control means energized in response to activator stimulated by condition sensor:**

This subclass is indented under subclass 700. Apparatus including means for: (1) detecting any of the following characteristics: a state or property, a change in a state or property, an occurrence of a predetermined event; in any of the following: a work part or parts being assembled (or disassembled), the assembled product, the assembling apparatus itself, or the

environment of the apparatus affecting the operation thereof; (2) initiating or modifying (as a direct result of such detection) a force or impulse other than that generated or transmitted by the detecting means; (3) regulating or modifying (as a direct result of such initiation) the operation of said machine.

- (1) Note. The control system of this and the indented subclasses is similar in concept to the control system of other classes, particularly, Class 72, Metal Deforming, especially subclasses 6+; Class 83, Cutting; Class 173, Tool Driving or Impacting, especially subclasses 2+; and Class 226, Advancing Material of Indeterminate Length, especially subclasses 10+. The total operation and the claimed combination are, of course, different; but, the control system, per se, found in each of these other classes may be analogous to that found herein and may be applicable to the machine of this class (29).
- (2) Note. This definition requires a patent to claim at least four instrumentalities for original placement herein. One of these must be an assembly apparatus. The other three are: (a) a sensor (e.g., photocell system, trip-lever, pressure diaphragm) to detect a condition as stated in (a) of the definition. (b) an activator (e.g., an element to make or break an electric circuit, a clutch, a valve) to cause a release of energy more than or different from that accounted for by mere change in condition (e.g., position or movement) of the sensor while it is functioning. (c) a controller (e.g., a motor or driver for said apparatus) to change or cause the operation of said apparatus. Therefore, a cam follower (or sensor) directly linked to a controller, whereby follower movement directly effects controller movement is not proper subject matter for this subclass due to lack of an activator as defined. An assembly apparatus with such controlling means are proper for subclass 771, below. On the other hand, disclosure of a cam follower that makes and breaks an electrical circuit that energizes a motor, may be placed herein.

- (3) Note. A voluntary act of the person operating the machine (the "operative") is not proper subject matter for this subclass. For example, disclosure of an assembling apparatus having an on-off switch adapted to be manipulated by the operative to start or stop the machine (even though the switch initiates a release of energy) should be considered for subclass 706 above rather than for this subclass.

**710 Including means to divert defective work part:**

This subclass is indented under subclass 709. Apparatus including a line along which assembly normally takes place and including means to detect a condition of the work and if that work is faulty, including further means to direct that work to move out of the line of assembly.

**711 Multiple station assembly or disassembly apparatus:**

This subclass is indented under subclass 709. Apparatus including means for bringing together and/or uniting corresponding work parts or means to unfasten (disunite) corresponding work parts at a first location and including means for bringing together and/or uniting corresponding work parts or means to unfasten corresponding work parts at a second location.

- (1) Note. The second location may serve for the assembly of work parts that are independent from those of the first location or may serve to further assemble or disassemble the work of the first location.

**712 Including position sensor:**

This subclass is indented under subclass 711. Apparatus including a detector particularly adapted to sense the presence of the work being assembled or disassembled or of the product of the operation.

**713 Responsive to timer:**

This subclass is indented under subclass 709. Apparatus including a time period limiting means operating independently of the apparatus drive means, which time limiting means

causes a change in the operation of the apparatus at the end of the selected time period.

- (1) Note. The timing means must be independent to the extent, for example, that a change in apparatus drive speed will not change the period measured by the timing apparatus.

**714 Responsive to work or work-related machine element:**

This subclass is indented under subclass 709. Apparatus wherein the detected condition is a characteristic of a work part or parts being assembled (or disassembled) or of a machine element partaking of all motion of the work during the assembling or disassembling operation.

**715 With means to fasten by deformation:**

This subclass is indented under subclass 714. Apparatus including means to secure a first and a second work part by stressing at least one work part beyond the elastic limit thereof.

SEE OR SEARCH THIS CLASS, SUBCLASS:

761, for means for fastening of electrical components by deformation and see the search notes thereunder for other means for assembly by deformation.

**716 Self-piercing work part:**

This subclass is indented under subclass 715. Apparatus including means to force a cutting edge of one work part to form or enlarge a hole in a second work part and force the first work part through or into the second part, whereby the parts are secured together.

SEE OR SEARCH THIS CLASS, SUBCLASS:

432+, for the corresponding process.  
798, for means to drive a self-piercing work part not including a control means.

SEE OR SEARCH CLASS:

227, Elongated-Member-Driving Apparatus, for means for forcing an elongated nail or rivet into a work part.

**717 With means to fasten by elastic joining:**

This subclass is indented under subclass 714. Apparatus adapted to secure a first work part to a second work part by stressing at least one of the work parts within the elastic limit thereof.

**718 With means to fasten by frictional fitting:**

This subclass is indented under subclass 714. Apparatus including means to force a first work part into interfitting relationship with a second work part such that the work parts are secured one to the other without any indication of changing the shape of either work part either within or beyond the elastic limit thereof.

- (1) Note. The securement of this subclass is generally termed, "force-fit" or "press-fit".

**719 Including means to apply magnetic force directly to position or hold work:**

This subclass is indented under subclass 714. Apparatus including means to apply magnetic force to metallic work to move the work relatively to the area at which assembly is to be performed or to hold the work at the assembly area.

**720 With signal, scale, illuminator, or optical viewer:**

This subclass is indented under subclass 700. Apparatus including, in addition to structure for performing a class type operation, either (1) means to produce a perceptible (e.g., audible or visual) manifestation of a condition of a part (or all) of the machine or the work; (2) means to designate a characteristic of the apparatus, the work, or the product; (3) means to increase the lighting intensity in the vicinity of the apparatus or the work; or (4) means to modify light waves to make characteristics of the apparatus, the work, or the product more readily discernable to the view of the operative.

**721 For work-holder for assembly or disassembly:**

This subclass is indented under subclass 720. Apparatus including or with a surface which, when the work is being assembled or disassembled, is positioned beneath at least a part of the work to support the work against the force of gravity in at least one position of adjustment thereof.

- (1) Note. A mere pin is not considered to be a work holder for assembly.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

281.1+, for similar structure having no signal, indicator, illuminator, or optical means.

SEE OR SEARCH CLASS:

269, Work Holders, subclasses 289+ for a work holder for assembly not in combination with an assembly means or not serving as a means to move to assemble one work part relatively to another.

**722 Including means to provide a controlled environment:**

This subclass is indented under subclass 700. Apparatus including provision to affect the atmosphere about the apparatus.

- (1) Note. Included herein, for example, is the combination of an assembly apparatus with an air conditioned room in which the apparatus is operated.

**723 Nuclear Device:**

This subclass is indented under subclass 700. Apparatus particularly adapted to assembly or disassembly of structure intended for the utilization of radioactive material.

SEE OR SEARCH CLASS:

53, Package Making, for filling a vessel with radioactive material in the manufacture of a fuel cell.

**724 Roller or ball bearing:**

This subclass is indented under subclass 700. Apparatus including means to assemble or disassemble various parts of an assembly used to support relatively moving machine elements, which assembly includes a freely rotatable rod-like, frusto-conical, or spherical, load bearing member adapted to permit relative movement of the machine elements by rolling contact.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

244+, for means to assemble (or disassemble) a bearing member to other machine structure.

898.06+, for the process of assembling the parts of a roller or ball bearing assembly.

SEE OR SEARCH CLASS:

384, Bearings, particularly subclasses 91+ for ball and roller bearing structures.

**725 Including deforming means:**

This subclass is indented under subclass 724. Apparatus including means to secure, confine or detach one part of the assembly to another part by stressing at least one part beyond the elastic limit thereof.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

564.1, for means to assemble combined with means to deform, if deformation is not to assemble or disassemble.

**726 Heat exchanger:**

This subclass is indented under subclass 700. Apparatus including means to bring together or secure parts of structure particularly adapted to transfer thermal energy or including means to detach such previously assembled (or disassembled) parts.

- (1) Note. This subclass includes, but is not limited to: (a) Apparatus for inserting a tube into the corresponding hole of a fin. (b) Apparatus for compressing radiator sections together. (c) Apparatus for removing a heat exchanger from an assembly nest. (d) Apparatus for assembling refrigeration elements.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

33+, for apparatus for performing combined operations in the assembly of a heat exchanger.

238, for apparatus for compressing other work parts in face to face relation.

244+, particularly subclasses 258+ for an apparatus for merely exerting a push or a pull.



890.03+, for the process of assembling a heat exchanger.

**SEE OR SEARCH CLASS:**

- 72, Metal Deforming, subclasses 115+ and 317 for pipe or tube flaring.
- 126, Stoves and Furnaces, for a heat exchanger used in a heating plant.
- 165, Heat Exchange, subclasses 76+ for a heat exchanger including assembly structure and appropriate subclasses for the heat exchanger, per se.
- 269, Work Holders, appropriate subclasses for a work holder, per se, used in the assembling of a heat exchanger.

**726.5 Including means to manipulate heat exchanger tube bundle:**

Apparatus for effecting assembly of elongated gas or liquid transmitting passage devices with respect to a receiving shell.

**SEE OR SEARCH CLASS:**

- 414, Material or Article Handling, subclass 745.3 for means to manipulate an assembly of heat exchanger tubes without recognition of the receiving shell.

**727 Including deforming means:**

This subclass is indented under subclass 726. Apparatus including means to stress at least one part beyond the elastic limit thereof.

**728 Means to place sheath on running-length core:**

This subclass is indented under subclass 700. Apparatus including means to enclose an inner part of indeterminate length with a separate, coextensive, hollow, outer, tubular part.

- (1) Note. The inner part may be hollow or may be made of multiple parts.
- (2) Note. The product of this apparatus may be "armored cable".
- (3) Note. This subclass includes apparatus which would be classified in the class for Textiles: Spinning, Twisting, and Twinning, except that the apparatus herein includes means to perform a "setting" operation. "Setting" denotes a mechanical operation such as interlocking or

deformation, other than the mere application, which causes the sheath to stay put. See the Search Notes below.

**SEE OR SEARCH THIS CLASS, SUB-CLASS:**

- 33.5+, for similar apparatus combined with cutting means.
- 234, for apparatus for assembling a tube of definite length into a coextensive core.
- 435, for a process of making helically wound armored cable.
- 779, for similar structure for assembling running length work.

**SEE OR SEARCH CLASS:**

- 57, Textiles: Spinning, Twisting, and Twinning, subclasses 3+ for a device for applying a strand spirally to a core of indeterminate or indefinite length without additionally "setting" the wrapper. See (3) Note to this subclass, above.
- 72, Metal Deforming, subclasses 48+ and 135+ for making a helical tube or coil from a single workpiece and subclasses 253.1+, especially subclass 268, for extruding metal sheath material around a core.
- 140, Wireworking, for process of or means assembling wires by a wireworking operation, i.e., by setting or deforming a wire, etc. See (3) Note, above.
- 228, Metal Fusion Bonding, subclasses 126+ for the process of encasing a metal core with a metal sheath and fusion bonding the core to the sheath.

**729 Means to assemble electrical device:**

This subclass is indented under subclass 700. Apparatus including means to assemble work parts in the manufacture of an apparatus particularly adapted to transmit or utilize electrical energy, wherein the parts assembled serve collectively, to effect the passage or action of the electrical energy.

- (1) Note. Included herein, for example, is means for assembling a coil with an armature because this assembly is used in the handling of electrical energy; whereas, means for placing a base on a

motor housing is excluded from this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 25.01+, for a method of or an apparatus for making a barrier layer device or semiconductor device.
- 25.35, for method or apparatus for making a piezoelectric device.
- 241, for stringing apparatus.
- 592.1+, for a method of making an electricity utilizing device.

SEE OR SEARCH CLASS:

- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclasses 47+ for endless or indefinite length conductor making or splicing and subclasses 349+ for apparatus for making an electrical device by laminating only.
- 223, Apparel Apparatus, subclass 48 for bead stringing and subclasses 102+ for a needle.
- 254, Implements or Apparatus for Applying Pushing or Pulling Force, subclasses 134.3+ for electric wire placing apparatus.
- 445, Electric Lamp or Space Discharge Component or Device Manufacturing, for a method or apparatus for making, including by assembling, an electric lamp, etc.

**730 Storage cell or battery:**

This subclass is indented under subclass 729. Apparatus particularly adapted to the assembly of parts: e.g., container, electrodes, terminals, etc., of an apparatus used for the chemical storage of electrical energy.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 2, for the manufacture of a battery grid.
- 246, for means to assemble a terminal to a battery post.
- 623.1+, for the process of assembling battery cell components.
- 763, for apparatus for disassembling battery cell components.

SEE OR SEARCH CLASS:

- 136, Batteries: Thermoelectric and Photoelectric, for the method of or apparatus for manufacture of an electrical energy cell if combined with the use of the cell.

**731 Including deforming means:**

This subclass is indented under subclass 730. Apparatus including means to secure or confine one part of the assembly to another part by stressing at least one part beyond the elastic limit thereof.

**732 Motor or generator:**

This subclass is indented under subclass 729. Apparatus particular to the association or joining of work parts in the making of a dynamoelectric device, i.e., a device for (1) converting electrical energy to mechanical energy, or (2) converting mechanical energy to electrical energy.

- (1) Note. This subclass includes, for example: (a) Apparatus for collecting and assembling commutator segments and commutator parts. (b) Apparatus for assembling the various parts of an armature, including apparatus for inserting a coil into slots of a commutator; apparatus for inserting insulation or insulation plugs into said slots, as well as the staking of the coil leads in the commutator slots. The manufacture of a paper insulation plug combined with assembly in a motor or generator is included herein.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 33+, for combined machine used in the manufacture of a dynamoelectric device.
- 243.52, for apparatus not otherwise classified which assembles by "heading" a hollow member.
- 596+, for a method of making a dynamoelectric machine.

SEE OR SEARCH CLASS:

- 242, Winding, Tensioning, or Guiding, subclasses 432+ for making a stator by winding directly onto a core, and

- subclasses 433+ for making an armature by winding directly onto a core.
- 310, Electrical Generator or Motor Structure, appropriate subclasses for generator or motor structure.
- 493, Manufacturing Container or Tube From Paper; or Other Manufacturing From a Sheet or Web, subclasses 405+ for folding sheet or web material.
- 733 Means to assemble commutator:**  
This subclass is indented under subclass 732. Apparatus for making the portion of a dynamoelectric device adapted to rotate and transmit electric current from the brushes of the stationary structure of the device to the armature.
- (1) Note. The brushes of a dynamoelectric device are electric terminals adapted to making sliding electrical contact with the commutator. The armature is that portion of the dynamoelectric device that rotates and includes electric coils, the shaft, bearings, and the commutator.
- 734 Means to position insulation:**  
This subclass is indented under subclass 732. Apparatus including means to associate material into the dynamoelectric device, which material serves to limit the flow of electricity or heat away from a portion of the device.
- 735 Means to stake wire to commutator or armature:**  
This subclass is indented under subclass 732. Apparatus including the fastening of the ends of the armature coil to the commutator.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
564.5, for similar structure combined with coil strand cutting means.
- 736 Including deforming means:**  
This subclass is indented under subclass 732. Apparatus including means to secure or confine one part of the assembly to another part by stressing at least one part beyond the elastic limit thereof.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
761, for means for fastening of electrical components by deformation and see the search notes thereunder for other means for assembly by deformation.
- 737 Magnetic memory device:**  
This subclass is indented under subclass 729. Apparatus including means peculiar to the assembly of a device capable of being magnetized at a prescribed area, in accordance with a condition, which magnetized area is to be later detected and utilized to show that condition.
- 738 Laminated device:**  
This subclass is indented under subclass 729. Apparatus adapted to associate or secure a first generally planar member to a second similar member along their generally planar surfaces.
- 739 Means to fasten electrical component to wiring board, base, or substrate:**  
This subclass is indented under subclass 729. Apparatus adapted to be used in the assembly of a generally planar, nonconductive member having or to be provided with paths of conductive material to an electrical component such that the component is electrically secured to at least one of the conductive paths.
- 740 Chip component:**  
This subclass is indented under subclass 739. Apparatus wherein the electrical component is a semiconductor and is very small in size.
- 741 Multilead component:**  
This subclass is indented under subclass 739. Apparatus wherein more than one electrical connection is made between the paths of conductive material and the component.
- 742 Multiple station assembly apparatus:**  
This subclass is indented under subclass 729. Apparatus including a first work station wherein work parts are juxtaposed, associated, or secured together and a second work station where work parts are juxtaposed, associated, or secured together.
- (1) Note. The work stations may operate independently or dependently on one another, may operate on the same or dif-

ferent work, or may operate simultaneously or sequentially.

SEE OR SEARCH THIS CLASS, SUBCLASS:

783, for multiple station assembly apparatus including means to interrelatedly feed plural work parts from plural sources with manual intervention.

791, for multiple station assembly apparatus in general.

**743 Means to apply vacuum directly to position or hold work part:**

This subclass is indented under subclass 729. Apparatus including means to create a reduced atmospheric pressure on a portion of a work part to cause atmospheric pressure on other portions of the work part to either move that part from one location to another or to secure the work part in a position.

**744 Means to apply magnetic force directly to position or hold work part:**

This subclass is indented under subclass 729. Apparatus wherein a work part which is capable of being attracted by magnetism (e.g., is ferrous, etc.) is subjected to means causing magnetic force to be applied to the work part either to move that part from one location to another or to secure the work part in a position.

**745 Conductor:**

This subclass is indented under subclass 729. Apparatus including means to juxtapose, associate, or fasten a structure intended to be used to transport electrical energy.

**746 Electrode:**

This subclass is indented under subclass 745. Apparatus wherein the assembled product includes an end portion or an electrical terminal by which electric flow enters or leaves an electrolyte, a gaseous medium, plasma, or a vacuum.

**747 Terminal or connector:**

This subclass is indented under subclass 745. Apparatus wherein one work part is adapted to serve as a disconnectable link to transmit electric current from a first member to a second member.

**748 Assembled to wire-type conductor:**

This subclass is indented under subclass 747. Apparatus wherein the work part to which the connector is assembled is an electrical conductor that is generally elongated and rod-like.

**749 Means to simultaneously assemble multiple, independent conductors to terminal:**

This subclass is indented under subclass 748. Apparatus including means for assembling a plurality of rod-like conductors to a terminal(s) at the same instant, wherein the conductors remain electrically separated after the assembly.

**750 Means comprising hand-manipulatable implement:**

This subclass is indented under subclass 748. Apparatus adapted to be supported and moved randomly by an operative.

**751 Fastening by deformation:**

This subclass is indented under subclass 750. Apparatus adapted to secure a work part to another work part by stressing at least one of the parts beyond the elastic limit thereof.

SEE OR SEARCH THIS CLASS, SUBCLASS:

761, for means to fasten electrical components by deforming one of the components, and see the search notes thereunder for other means for assembly by deformation.

**752 Fastening by elastic joining:**

This subclass is indented under subclass 750. Apparatus adapted to secure a work part to another work part by stressing at least one work part within the elastic limit thereof.

**753 Means to fasten by deformation:**

This subclass is indented under subclass 748. Apparatus adapted to secure a work part to another work part by stressing at least one of the parts beyond the elastic limit thereof.

SEE OR SEARCH THIS CLASS, SUBCLASS:

761, for means for fastening of electrical components by deformation, and see the search notes thereunder for other means for assembly by deformation.

- 754 Means to fasten by elastic joining:**  
This subclass is indented under subclass 748. Apparatus adapted to secure a work part to another work part by stressing at least one work part within the elastic limit thereof.
- 755 Multiple, independent conductors:**  
This subclass is indented under subclass 745. Apparatus including means for juxtaposing, associating, or fastening together an electrical assembly including a first structure and a second structure intended to be used to transport electrical energy wherein the first and second structures are and remain electrically insulated from each other.
- 756 Switch or fuse:**  
This subclass is indented under subclass 745. Apparatus wherein the assembled means to transport electrical energy includes make or break contact means to allow the means to selectively transmit or to not transport electrical energy.
- 757 Means to simultaneously fasten three or more parts:**  
This subclass is indented under subclass 729. Apparatus including means to secure into a single assembly more than two work parts, the securing being done at the same time.
- 758 Means comprising hand-manipulatable implement:**  
This subclass is indented under subclass 729. Apparatus adapted to be supported and moved randomly by an operative.
- 759 Means to align and advance work part:**  
This subclass is indented under subclass 729. Apparatus including means to move work toward a station at which assembly is to take place and including means to critically position the workpiece at the station.
- 760 With work-holder for assembly:**  
This subclass is indented under subclass 729. Apparatus including a surface which contacts a work part to support or hold that part in a desired position while that work part is being juxtaposed, associated, or secured to another work part.
- 761 Means to fasten by deforming:**  
This subclass is indented under subclass 729. Apparatus including means to secure a first work part and a second work part together by stressing at least one work part beyond the elastic limit thereof.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
715, for similar assembly apparatus including work responsive control means.  
736, for means for securing parts of an electric motor or generator by stressing a part beyond the elastic limit thereof.  
753, for means for stressing a work part beyond its elastic limit in fastening a terminal to an electricity conducting wire.  
788, for means to fasten by deforming combined with means to feed plural workpieces together without manual intervention.  
796, for multiple station assembly apparatus including means to fasten the work parts by deformation.
- 762 Means to disassemble electrical device:**  
This subclass is indented under subclass 700. Apparatus including means to separate or unfasten work parts of a device particularly adapted to transmit or utilize electrical energy, wherein the parts of the device serve collectively, to effect the passage or action of the electrical energy.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
729+, for structure to assemble a device particularly adapted to transmit or utilize electrical energy, and see notes following the definition of that subclass.
- 763 Storage cell or battery:**  
This subclass is indented under subclass 762. Apparatus particularly adapted to the assembly of parts, e.g., container, electrodes, terminals, etc., of a device used for the chemical storage of electrical energy.
- SEE OR SEARCH CLASS:  
269, Work Holders, for a work holding support without an assembly mean.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

730+, for structure for assembling an electrical cell or battery.

**764 Means comprising hand manipulatable implement:**

This subclass is indented under subclass 762. Apparatus adapted to be supported and moved randomly by an operative.

**765 Means to place traveler on ring or ring on bobbin of a textile machine:**

This subclass is indented under subclass 700. Apparatus for (1) applying a traveller to a spinning ring; (2) applying a gripping ring to a textile bobbin; or (3) for disassembling either of the above assemblies.

- (1) Note. In clause (1), a "traveller" is generally a C-shaped wire-like member adapted to loosely grip a raised annular ridge on a spinning ring, the assembly to be used to twist fibers in textile manufacture. In clause (2), an annular, resilient, wire-like member is stressed within the elastic limit thereof over a mandrel-like bobbin, the assembly to be used to support a supply of fiber strand in a textile manufacture.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

222+, for means to assemble (or disassemble) a piston and a resilient piston ring.

229, for means to assemble (or disassemble) a resilient spring and another member.

235+, for means to assemble (or disassemble) a resilient member to another member, in general.

241, for means for assembling by stringing, in general.

**766 Slide fastener:**

This subclass is indented under subclass 700. Apparatus comprising means for juxtaposing, associating, or fastening together the component parts of a slide fastener; or means to detach such previously assembled parts.

- (1) Note. A slide fastener is an assembly of elements normally used to temporarily fasten together garment portions and is comprised of a pair of opposing stringers (i.e., elongated members adapted to be each fastened permanently to a garment portion and adapted to detachably connect to each other by an interlocking fit), a slider (adapted to travel along the stringers and cause the stringers to connect or disconnect from each other), a lower stop (limiting the extent of travel of the slider in the opening direction of the stringers), and an upper stop (limiting the extent of travel of the slider in the closed direction of the stringers).

SEE OR SEARCH THIS CLASS, SUB-CLASS:

33.2, for apparatus for assembling a slide fastener combined with additional apparatus for shaping a work part, e.g., for trimming a component.

408+, for a process of manufacturing a slide fastener.

SEE OR SEARCH CLASS:

425, Plastic Article or Earthenware Shaping or Treating: Apparatus, subclasses 522+ for means to injection mold a component part of a slide fastener and cross-reference art collection 814 for apparatus for making a slide fastener, generally.

**767 Means to assemble stop onto stringer:**

This subclass is indented under subclass 766. Apparatus including means to fasten an upper or lower slide travel stopping means to at least one of the elongated members adapted to detachably connect to each other.

**768 Means to assemble slider onto stringer:**

This subclass is indented under subclass 766. Apparatus including means to juxtapose or associate the slider member with at least one of the stringers.

**769 Means to assemble teeth onto stringer:**

This subclass is indented under subclass 766. Apparatus for assembling the type of slide fastener having distinct teeth forming the inter-

- locking portion of each stringer comprising means for attaching the teeth to the stringer.
- 770 Disassembly means:**  
This subclass is indented under subclass 766. Apparatus for separating previously fastened slide fastener elements one from the other.
- 771 Means to interrelatedly feed plural work parts from plural sources without manual intervention:**  
This subclass is indented under subclass 700. Apparatus including an assembly station, a first conveyor means for transporting a first work part to the assembly station, and a second conveyor means for transporting a second work part to the assembly station wherein the first and second work parts are assembled at the station without requiring manipulation of the work parts by an operative.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
709, for an automatic machine functioning without manual intervention that includes means to regulate the machine in response to a sensed condition.
- SEE OR SEARCH CLASS:  
100, Presses, subclass 218 for a reciprocating platen press having means to eject material from the surface which supports the material during a pressing operation and not elsewhere provided for.  
227, Elongated-Member-Driving Apparatus, subclasses 19+ for means to drive an elongated member combined with means to bring two work parts together.  
470, Threaded, Headed Fastener, or Washer Making: Process and Apparatus, subclasses 44+ and 48+ for automatic machines for assembling or disassembling a bolt with a nut or washer.
- 772 Box or pallet assembly means:**  
This subclass is indented under subclass 771. Apparatus to assemble wood or wood-like parts to produce a container or a portable, generally planar material support.
- 773 Means to assemble container:**  
This subclass is indented under subclass 771. Apparatus to assemble a vessel intended for the storage of other material therein.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
772, for means for assembling a container of wood or wood-like material.
- SEE OR SEARCH CLASS:  
53, Package Making, for apparatus or process of closing a filled container.
- 774 Handle to container:**  
This subclass is indented under subclass 773. Apparatus for assembling to a storage vessel a member to be gripped by a person for manipulation of the vessel.
- (1) Note. Included herein is a device for supporting a coated cardboard, gabled top container of the type used in storage of milk and means for assembling therewith a plastic handle.
- SEE OR SEARCH CLASS:  
53, Package Making, subclasses 134.1+ for means for making a package combined with means to assemble a handle thereto.
- 775 Label to container:**  
This subclass is indented under subclass 773. Apparatus for assembling to a storage vessel a member intended to identify the vessel.
- SEE OR SEARCH CLASS:  
53, Package Making, subclasses 135.1+ for means for making a package combined with means for applying a label thereto.
- 776 Pressurized dispensing container:**  
This subclass is indented under subclass 773. Apparatus for assembling the component parts of a vessel, which vessel includes a nozzle and is to be partially filled with a fluent material and partially filled with a propellant gas, adapted to expel the fluent material through the nozzle.

## SEE OR SEARCH CLASS:

222, Dispensing, subclasses 394+ for a dispensing container adapted to be pressurized by gas pressure combined with a nozzle.

**777 Hypodermic syringe:**

This subclass is indented under subclass 773. Apparatus including means to assemble the component parts of a hypodermic syringe.

- (1) Note. A hypodermic syringe includes a hollow needle adapted to pierce animal tissue and includes a vessel adapted to support fluent material removed from or to be inserted into the animal tissue, connected to the needle so that the needle may transmit the fluent material therein, from the vessel to the tissue.

**778 Including fluid component:**

This subclass is indented under subclass 773. Apparatus including means to assemble to a preformed vessel part a liquid or gaseous work part that is intended to remain as a part of the assembled product.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

801, for means to assemble (or disassemble) a liquid work material to a preformed work part wherein the means does not feed plural work parts together without manual intervention.

## SEE OR SEARCH CLASS:

53, Package Making, for closing a filled, preformed vessel with a fluent material wherein the material is not intended to be a part of the vessel.

**779 Running-length work:**

This subclass is indented under subclass 771. Apparatus adapted to assemble (i.e., juxtapose, associate, or fasten) a first work part to a second work part, wherein at least the first work part moves continuously during assembly with respect to the apparatus, without any recognition of the trailing end thereof.

**780 Means including orbiting running-length work supply:**

This subclass is indented under subclass 779. Apparatus including means to wrap a work part about an axis-of-bend through more than 360 degrees of wrap by an element that engages the work part with sliding contact and revolves about and is radially spaced from said axis-of-bend, whereby the work part is juxtaposed, associated, with or fastened to another work part.

## SEE OR SEARCH CLASS:

72, Metal Deforming, subclass 66, for similar structure for deforming a single work part.  
140, Wireworking, especially subclasses 3+ for means for or process of making metal fabric involving an operation other than those operations of the textile classes. For example, metal deforming while coiling the strands of a cable will be found in Class 140. (See (6) Note of the definition of subclass 700 above).  
242, Winding, Tensioning, or Guiding, especially subclasses 430+, for winding a strand(s) on a core of fixed length.

**781 Pipe section:**

This subclass is indented under subclass 779. Apparatus wherein the article to be produced is an elongated tube.

- (1) Note. Included herein is means to form an elongated tube and simultaneously fill that tube with powder.

**782 Assembled to article:**

This subclass is indented under subclass 779. Apparatus wherein the second work part is an element of definite length to which the continuously moving first part is associated, juxtaposed, or fastened.

**783 Multiple station assembly apparatus:**

This subclass is indented under subclass 771. Apparatus including a first work station wherein work parts are juxtaposed, associated, or secured together and a second work station where work parts are juxtaposed, associated, or secured together.



- (1) Note. The work stations may operate independently or dependently one of the other, may operate on the same or different work, or may operate simultaneously or sequentially.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
742, for multiple station assembly apparatus for assembling and electrical device.  
791, for multiple station assembly apparatus, generally.
- 784 Including assembly pallet:**  
This subclass is indented under subclass 771. Apparatus including a member adapted to pass through the apparatus and serve as a base upon which the work parts are assembled, which member is not intended to remain as a permanent part of the assembly.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
799, for assembly apparatus including an assembly pallet for supporting the work parts passing from one work station to another work station.
- 785 Including turret-type conveyor:**  
This subclass is indented under subclass 771. Apparatus wherein at least one of the feed means includes a circular member having peripherally spaced pockets adapted to receive work parts, which annular member is driven intermittently to sequentially present work parts from the peripherally spaced pockets to an assembly station.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
792, for multiple station assembly apparatus including turret type feed means.
- 786 Including converging conveyors:**  
This subclass is indented under subclass 771. Apparatus including a first transport means for carrying a first work part along a first path and second transport means for carrying a second work part along a second path, wherein the first and second work parts are moved toward each other for assembly.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
793, for similar apparatus for assembling wherein there may be manual intervention.
- 787 And means to fasten work parts together:**  
This subclass is indented under subclass 771. Apparatus comprising means to secure one work part to a corresponding portion of another work part or the same work part.
- 788 By deforming:**  
This subclass is indented under subclass 787. Apparatus including means to secure a first work part and a second work part together by stressing at least one work part beyond the elastic limit thereof.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
564.1, for assembly means combined with deforming means wherein the deformation is other than to fasten work parts together.  
715, for similar assembly apparatus including work responsive control means.  
736, for means for securing parts of an electric motor or generator by stressing a part beyond the elastic limit thereof.  
753, for means for stressing a work part beyond its elastic limit in fastening a terminal to an electricity conducting wire.  
761, for means for fastening of electrical components by deformation; and, see the search notes thereunder for other means for assembly by deformation.  
796, for multiple station assembly apparatus including means to fasten the work parts by deformation.
- 789 By elastic joining:**  
This subclass is indented under subclass 787. Apparatus including means to secure a first work part and a second work part together by stressing at least one of the work parts within the elastic limit thereof.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 717, for similar apparatus including work responsive control means.
- 752, for handheld means to secure a terminal to an electricity conductor.
- 797, for multiple assembly stations including means to fasten work parts together by elastic joining.

**790 By friction fit:**

This subclass is indented under subclass 787. Apparatus including means to force a first work part into interfitting relationship with a second work part such that the work parts are secured one to the other without any indication of changing the shape of either work part either within or beyond the elastic limit thereof.

- (1) Note. The securement of this subclass is generally termed "force-fit" or "press-fit".

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 718, for similar apparatus including work responsive control means.

**791 Multiple station assembly or disassembly apparatus:**

This subclass is indented under subclass 700. Apparatus including a first work station wherein work parts are juxtaposed, associated, or secured together or moved out of intimate engagement and a second work station where work parts are juxtaposed, associated, or secured together or moved out of intimate engagement.

- (1) Note. The work stations may operate independently or dependently one of the other, may operate on the same or different work, or may operate simultaneously or sequentially.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 742, for multiple station assembly apparatus for assembling an electrical device.
- 783, for multiple station assembly apparatus including means to interrelatedly

feed plural work parts from plural sources without manual intervention.

**792 Including turret-type conveyor:**

This subclass is indented under subclass 791. Apparatus including a feed means comprising a circular member having peripherally spaced pockets adapted to receive work parts, which annular member is driven intermittently to sequentially present work parts from the peripherally spaced pockets to an assembly station, or to sequentially remove work parts from a disassembly station.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 785, for a turret type conveyor used in apparatus for assembling work parts from plural sources without manual intervention.

**793 Including converging conveyors:**

This subclass is indented under subclass 791. Apparatus including a first transport means for carrying a first work part along a first path and a second transport means for carrying a second work part along a second path, wherein the first and second work parts are moved toward each other.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 786, for similar apparatus for assembling without manual intervention.

**794 And primary central conveyor:**

This subclass is indented under subclass 793. Apparatus wherein the first transport means serves to receive the second work part from the second transport means.

- (1) Note. Included herein is the apparatus common to "assembly line" technique wherein a work part is transferred manually from a secondary transport means to a primary transport means.

**795 Means to fasten work parts together:**

This subclass is indented under subclass 791. Apparatus comprising means to secure a portion of one work member to a corresponding portion of another work member or of the same work member.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

791, for multiple station apparatus to unfasten work parts.

**796 By deforming:**

This subclass is indented under subclass 795. Apparatus including means to secure a first work part and a second work part together by stressing at least one work part beyond the elastic limit thereof.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

788, for means to feed distinct work parts from plural sources without manual intervention including means to fasten by deforming, and see the search notes thereunder for other fastening by deforming.

**797 By elastic joining:**

This subclass is indented under subclass 795. Apparatus including means to secure a first and a second work part together by stressing at least one of the work parts within the elastic limit thereof.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

739, for means to feed distinct work parts from plural sources without manual intervention including means to fasten by elastic joining, and see the search notes thereunder for other similar fastening.

**798 Means to drive self-piercing work part:**

This subclass is indented under subclass 700. Apparatus including means to force a cutting edge of one work part to form or enlarge a hole in a second work part and force the first work part through or into the second work part, whereby the parts are secured together.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

432+, for the corresponding process and for a process corresponding to the apparatus of Class 227.

716, for similar apparatus including a work responsive control means.

SEE OR SEARCH CLASS:

227, Elongated-Member-Driving Apparatus, especially subclasses 19+ for combined apparatus for juxtaposing work parts and applying a fastening member, e.g., a nail, a rivet, etc., thereto. This subclass includes apparatus for driving one member to pierce and thereby be fastened to another member if the driven member is not an "elongated member" as required for Class 227. Also, this subclass includes structure for fastening by use of an "elongated member" if no driving structure is claimed which would, if claimed, establish classification in Class 227.

**799 Including assembly pallet:**

This subclass is indented under subclass 700. Apparatus including a detached member adapted to pass through the apparatus and serve as a base upon which the work parts are assembled, which member is not intended to remain as a permanent part of the assembly.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

784, for assembly apparatus including an assembly pallet for supporting work parts fed from plural sources without manual intervention.

**800 Including provision to utilize thermal expansion of work:**

This subclass is indented under subclass 700. Apparatus including provision using the phenomenon that work changes dimension when heated to associate, juxtapose, or fasten work parts together; or to separate or unfasten one work part from another.

**801 Means to assemble or disassemble container and fluid component:**

This subclass is indented under subclass 700. Apparatus including means to assemble to a preformed work part a liquid or gaseous work part that is intended to remain as a part of the assembled product; or means to detach such previously assembled parts.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

778, for means to assemble a liquid work part to a preformed work part without manual intervention in the assembly of a vessel.

SEE OR SEARCH CLASS:

53, Package Making, for closing a preformed vessel filled with a fluent material wherein the material is not intended to be a part of the vessel.

**802 Vehicle wheel:**

This subclass is indented under subclass 700. Apparatus adapted to assemble or disassemble a circular device intended to roll on terrain and support a mobile carriage.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

894.3+, for the process of assembling a vehicle wheel.

SEE OR SEARCH CLASS:

157, Wheelwright Machines, for devices meeting that class definition for the building of a wheel, particularly subclasses 1.1+, for apparatus for mounting or dismounting a rubber tire from a wheel; and subclasses 1.5+ for apparatus for assembling metallic, spoked wheels.

**803 Railway wheel:**

This subclass is indented under subclass 802. Apparatus adapted for assemble or disassemble a wheel that is intended to roll on a prepared ridge of rigid material, generally metal.

**804 Tumbler lock:**

This subclass is indented under subclass 700. Apparatus for juxtaposing, association, or fastening the component parts or separating previously assembled parts of a securing device, which securing device includes a movable impediment adapted to respond to an operating element to move the impediment alternatively from an open to a secure condition, or for detaching such previously assembled parts.

SEE OR SEARCH CLASS:

70, Locks, for the device assembled by the apparatus of this subclass.

81, Tools, subclass 15.9 for a tool specially adapted to manipulate a lock, latch, or portion thereof.

**805 Toy doll:**

This subclass is indented under subclass 700. Apparatus for juxtaposing, associating, or fastening together the component parts of a child's plaything, which plaything generally resembles the form of a human being or animal, or for detaching such previously assembled parts.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

434+, for a process of assembling a doll eye into a doll head to permit movement (e.g., closing of the eye relative to the head).

SEE OR SEARCH CLASS:

425, Plastic Article or Earthenware Shaping or Treating: Apparatus, for molding of doll parts, particularly subclasses 110+ for molding onto a preformed part such as a doll's eye.

446, Amusement Devices: Toys, subclasses 268+ for toy dolls.

**806 Film or tape cartridge:**

This subclass is indented under subclass 700. Apparatus including means to juxtapose or fasten the component parts of an article of commerce including a support vessel and a relatively thin, pliant, web-like material to be supplied to that vessel for subsequent discharge or utilization, or including means to separate or unfasten the component parts of such an article of commerce.

SEE OR SEARCH CLASS:

53, Package Making, for similar means for assembling an article(s) into a vessel wherein the article(s) is stored rather than a device as found here wherein the entire assembly is considered to be an article of commerce.

242, Winding, Tensioning, or Guiding, subclasses 520+ for winding weblike material into a convolute coil.

**807 Crystal to watch or clock:**

This subclass is indented under subclass 700. Apparatus intended to juxtapose, associate, or fasten the face covering transparent window of a time piece to the time piece case, or intended to separate or unfasten the face covering transparent window of a time piece from the time piece case.

- (1) Note. The patents in this subclass, for the most part, distort the crystal to decrease the perimeter and enable the crystal to be inserted into its bezel.

**SEE OR SEARCH CLASS:**

- 81, Tools, subclasses 3.5+, for a tool for operating on and assembling a spectacle frame and a lens and subclasses 6+ for a watchmaker's tool.

**808 Means to insert or extract pen point:**

This subclass is indented under subclass 700. Apparatus for associating, juxtaposing, or fastening the portion of a writing pen that engages material to be written on to the handle thereof, or for detaching such a portion from the handle to which it was previously assembled.

- (1) Note. Most of the patents in this subclass are specific to means for withdrawing (i.e., "means to disassemble") a pen point from its holder.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 700, (1) Note, pointing out that to meet the requirements of these subclasses "means to disassemble" requires only the recognition of a single work part and the functional intent to separate: while "means to assemble" requires recognition of two work parts and the functional intent to bring together or to fasten together.

**SEE OR SEARCH CLASS:**

- 15, Brushing, Scrubbing, and General Cleaning, subclass 442 for a pen point ejector constituting part of a pen-holder.

**809 With magazine supply:**

This subclass is indented under subclass 700. Apparatus including in combination therewith an attached storage chamber for a work part and including provision to transport that work part to the portion of the apparatus where that work part is to be assembled to another work part not originating in the storage chamber.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 776, for means to convey a first work part from a first source to an assembly station and means to convey a second work part from a second source to that assembly station without manual intervention.
- 822, for means to convey a first work part to an assembly station, which means acts to convey a second work part to the assembly station for assembly with the first work part.

**SEE OR SEARCH CLASS:**

- 100, Presses, subclasses 215+ for a reciprocating platen press not elsewhere provided for with a storage provision for material to be subjected to a pressing operation.
- 221, Article Dispensing, appropriate subclasses for an article dispenser (feeder) not otherwise provided for, and see the class definition of Class 221 for a statement of the class lines and for the disposition of related disclosures.
- 227, Elongated-Member-Driving Apparatus, subclasses 107+ for means to drive an elongated fastener into a workpiece combined with a supply magazine.

**810 And magnetic work-holder or positioner:**

This subclass is indented under subclass 809. Apparatus including means having the property of attracting ferrous work material adapted to utilize that property for manipulating the work or product or for holding the work in position at the location of work securing means.

**811.2 Assembling means comprising hand-manipulatable implement:**

This subclass is indented under subclass 809. Apparatus adapted to be at least partially supported by an operative during the assembly or disassembly operation.

**812 One work part comprising living tissue:**

This subclass is indented under subclass 811. Apparatus wherein the work in the magazine is adapted to be united with work in the form of a live human or animal.

SEE OR SEARCH CLASS:

227, Elongated-Member-Driving Apparatus, for means to drive a fastener into a work part, or human body.

**812.5 Comprising driver for snap-off-mandrel fastener; e.g., pop (tm) riveter:**

This subclass is indented under subclass 809.2. Apparatus wherein a first tool engages an annular end surface of a tube-like workpiece, which surface generally faces the device, which first tool includes a passageway coaxial with the tubular axis of that workpiece, and wherein a second tool functions within that passageway to engage a shank portion of a second workpiece extending through the tubular axis of the work and through the coaxial passageway, which first tool urges against the annular surface and which second tool reactively pulls against the shank with sufficient force to move the second workpiece with respect to the first and to ultimately exceed the tensile strength of the shank portion and thereby divide one portion of the shank from the remainder thereof, which remainder serves with the tubular first workpiece as a fastener.

- (1) Note. The first and second workpiece of this subclass are normally supplied in the magazine as an assembly and are to be brought into assembly with another work part not originating in the storage chamber.

SEE OR SEARCH THIS CLASS, SUBCLASS:

243.521+, for a driver for a snap-off-mandrel fastener, generally.

SEE OR SEARCH CLASS:

72, Metal Deforming, subclass 391.6 for a device including concentric or telescoped deforming tools wherein a tool fits inside a hollow metal fastener workpart to reshape that workpart into engagement with another member in which the fastener is fitted for securement, wherein no part of the device is in engagement with the other member.

**813 One work part comprising nut or screw:**

This subclass is indented under subclass 811. Apparatus including means to secure one workpiece to another by rotating one with respect to the other and utilizing relative helical ribbing of one of the workpieces to cause the securement.

**814 One work part comprising paper clip:**

This subclass is indented under subclass 811. Apparatus including means particularly adapted to gripably secure a multi-convolution spring ring to the margin of a sheet of paper.

SEE OR SEARCH THIS CLASS, SUBCLASS:

809, for means to superimpose two sheets of paper combined with means to fasten the sheets using a multi-convolution spring ring.

**815 Means to assemble tire stud into tire tread:**

This subclass is indented under subclass 811. Apparatus including means particularly adapted to assemble a traction improving lug into a prepared socket in a vehicle supporting tire.

**816 Means to fasten by deforming:**

This subclass is indented under subclass 811. Apparatus including means to secure a first and second work part by stressing at least one work part beyond the elastic limit thereof.

**817 Fastening sinker to fishing line:**

This subclass is indented under subclass 816. Apparatus intended to deform a heavy, metallic member onto a filament, which assembly is to be used in fishing.

**818 Means to fasten by deforming:**

This subclass is indented under subclass 809. Apparatus including means to secure a first and a second work part by stressing at least one work part beyond the elastic limit thereof.

**819 Running-length work:**

This subclass is indented under subclass 700. Apparatus adapted to assemble (i.e., juxtapose, associate, or fasten) a first work part to a second work part, wherein at least the first work part moves continuously during assembly with respect to the apparatus without any recognition of the trailing end thereof; or adapted to detach such previously assembled parts.

**820 Assembled on core:**

This subclass is indented under subclass 819. Apparatus including a second work part on which the first work part is flexed and wrapped to encircle (more than 360 degrees) thereabout.

**821 Including means to vibrate work:**

This subclass is indented under subclass 700. Apparatus including means to cause a work part to move rapidly to and fro during the assembly or disassembly operation.

- (1) Note. The vibration applied by the apparatus of this subclass may be to cause assembly or may be to assist some other structure to perform the assembly operation.

**822 Including work conveyor:**

This subclass is indented under subclass 700. Apparatus including means to transport work parts from a remote position toward an assembly station for assembly with each other.

SEE OR SEARCH THIS CLASS, SUBCLASS:

771, for means to convey a first work part from a first source to an assembly station, means to convey a second work part from a second source to that assembly station, without manual intervention.

809+, for means to convey work parts from a single source to a work station for assembly with work part not from that source.

**823 Including transporting track:**

This subclass is indented under subclass 822. Apparatus including fixed structure adapted to cause the work parts to move a prescribed path with respect to the assembly station.

- (1) Note. Included herein is an endless belt utilized to transport work parts.

**824 And work carrying vehicle:**

This subclass is indented under subclass 823. Apparatus including a wheeled member adapted to follow the fixed path and carry a work part thereon with respect to the assembly station.

**825 Conductor or circuit manufacturing:**

This subclass is indented under subclass 592.1. Process of manufacturing a device or structure which confines an electrical current to a conductive path determined by the configuration of the device or structure.

- (1) Note. This subclass and indented subclasses provide for a process of manufacturing a conductor characterized by specific physical configurations as well as a process of joining electrical elements to form an electrical circuit of predetermined electrical and physical configuration not classified elsewhere.

- (2) Note. Since all materials that have the property of conducting electricity and all devices made therefrom may be termed conductors, only a process under the class definition which makes a device with the stated proximate purpose of providing a conducting electrical current are placed in this subclass.

- (3) Note. The terms “manufacturing”, “shaping”, “assembly”, and “deforming” are defined in the Glossary of the class (29) definitions.

SEE OR SEARCH CLASS:

65, Glass Manufacturing, especially subclasses 36+ for process of fusion bonding of glass to a formed part and subclass 155 for electronic device making means involving fusion bonding.

- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclasses 47+ for a method of making an indefinite length electrical conductor involving an operation other than metal working and amounting to more than mere wire of filament making.
- 216, Etching a Substrate: Processes, for a multistep process of manufacturing an electrical circuit or conductor which involves a chemical reaction, e.g., etching. See the main class definition of Class 216 for a statement of the complete line between Class 216 and this Class 29.
- 438, Semiconductor Device Manufacturing: Process, particularly subclasses 26+, 51, 55, 64+, and 106+ for methods of packaging a semiconductor device; see the search notes thereunder.

#### GLOSSARY

The following are definitions for various terms used extensively throughout the following definitions. Whenever these terms appear in the definitions they will be denoted by an asterisk (\*) to remind and clarify their meanings to the user.

#### ELECTRICAL COMPONENT (\*):

A self-contained active or passive element designed for and capable of utilizing electricity to produce a specified electrical characteristic property, or output other than normal conductivity associated with any electrical structure.

#### ELONGATED CONDUCTOR (\*):

A body whose longitudinal dimension is much greater than any of its lateral dimensions and which is designed for the stated proximate purpose of carrying an electric current or electromagnetic energy.

#### TERMINAL (\*):

An electrically conductive connective means having a portion or end designed for relatively permanent attachment to an elongated conductor and having a second portion or end designed to facilitate connection with another elongated conductor, an electrical component, or another electrically conductive connective means.

#### 826 Brush:

This subclass is indented under subclass 825. Process of manufacturing an electrically conductive element specially designed or adapted to contact and conduct electricity to or from the rotor of a rotary dynamoelectric device.

SEE OR SEARCH THIS CLASS, SUBCLASS:

598, for a process of assembling a brush and rotor.

SEE OR SEARCH CLASS:

310, Electrical Generator or Motor Structure, subclasses 248+ for electrical brush structure with or without an electrical connector.

#### 827 Beam lead frame or beam lead device:

This subclass is indented under subclass 825. Process of manufacturing either: (1) an integrated circuit having electrical connecting structure in the form of an electrically conductive body having a generally rectangular cross section and wherein the body is mounted in a cantilever fashion to the circuit, or (2) an intermediate article of manufacture utilized to produce electrical connecting structure for integrated circuits consisting of a generally flat electrically conductive strap or band section which has been stamped, cut, or otherwise deformed to produce an open encasing structure provided with a plurality of generally rectangular cross-sectioned inwardly facing bodies designed to be attached to the circuit in a cantilever fashion.

SEE OR SEARCH CLASS:

216, Etching a Substrate: Processes, subclass 14 lead frame or beam lead in an electrical circuit.

257, Active Solid-State Devices (e.g., Transistors, Solid-State Diodes), subclasses 666 through 677 for electrical lead frames, per se, or combined with active solid-state devices.

361, Electricity: Electrical Systems and Devices, subclass 813 for a lead frame supporting a plurality of diverse electrical components.

428, Stock Material or Miscellaneous Articles, subclasses 571 through 574, if stock material is claimed either as an



- individual lead frame without being labeled "lead frame" or as a strip of interconnected lead frames prior to separation into individual lead frames.
- 438, Semiconductor Device Manufacturing: Process, particularly subclasses 111+ and 123 for methods of attaching a lead frame to a semiconductor device possessing significant semiconductor device structure; see the search notes thereunder.
- 828 Co-axial cable:**  
This subclass is indented under subclass 825. Process of making an electrical path structure to be utilized to transmit electrical energy in the form of a first elongated conductor completely surrounding, co-extensive with, and insulated from a second conductor.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
517, for a process in which a member which is secured within a tubular shaped hollow body is a rod or similarly proportioned part.
- SEE OR SEARCH CLASS:  
174, Electricity: Conductors and Insulators, subclass 75 for a co-axial cable joint with an end structure; subclass 88 for a spliced single or plural contact co-axial cable joint; subclass 102 for sheath or armored conduit, cable, or conductor structure.
- 829 On flat or curved insulated base, e.g., printed circuit, etc.:**  
This subclass is indented under subclass 825. Process (1) of manufacturing a conductive path to, on, or in an insulative base, which base has either a curved or planar surface and wherein the conductive path lies on, or follows the contour of the curved surface, or lies on or runs parallel to the planar surface, (2) of assembling of an electrical component to a base having a conductive path applied thereto, or formed thereon or therein as set forth in (1) above, or (3) of assembling a terminal to, or for forming a terminal or connector on, or through a base having a conductive path applied thereto or formed thereon or therein as set forth in (1) above.
- SEE OR SEARCH CLASS:  
174, Electricity: Conductors and Insulators, subclasses 250+ for printed circuit board structure, per se, and subclasses 71 and 72 for a branched or multiduct conduit combined with a printed circuit board.  
336, Inductor Devices, subclass 200 for printed circuit inductor device structure.  
361, Electricity: Electrical Systems and Devices, subclasses 748+ for a printed circuit board used to mount plural diverse electrical components.  
439, Electrical Connectors, subclasses 55+ for an electrical connector combined with a printed circuit.
- 830 Assembling bases:**  
This subclass is indented under subclass 829. Process of assembling together two or more bases, each of which is provided with an electrical current path confining device or structure.
- SEE OR SEARCH CLASS:  
361, Electricity: Electrical Systems and Devices, subclasses 736 and 784+ for plural circuit boards housing or mounting a module.
- 831 Assembling formed circuit to base:**  
This subclass is indented under subclass 829. Process of assembling a previously fabricated, substantially rigid, self-sustaining conductive path to the base.
- SEE OR SEARCH CLASS:  
257, Active Solid-State Devices (e.g., Transistors, Solid-State Diodes), subclass 668 for a lead frame on an electrically insulating carrier other than a printed circuit board, subclasses 701-707 for housings made of electrically insulating material, and subclasses 787+ for encapsulated devices.  
361, Electricity: Electrical Systems and Devices, subclass 736 for a printed circuit board mounting a module.

**832 Assembling to base an electrical component, e.g., capacitor, etc.:**

This subclass is indented under subclass 829. Process of assembling an electrical component (\*) to the base.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

25.01+, for a process or apparatus for making a semiconductor or a barrier layer device.

739, for apparatus including means for engaging a planar nonconductive member, e.g., a circuit board, having or to be provided with paths of conductive material to an electrical component, the component being secured to a conductive path.

741, for apparatus used to make more than one electrical connection between an electrical component and paths of conductive material.

SEE OR SEARCH CLASS:

257, Active Solid-State Devices (e.g., Transistors, Solid-State Diodes), subclass 668 for a lead frame on an electrically insulating carrier other than a printed circuit board, subclasses 701-707 for housings made of electrically insulating material, and subclasses 787+ for encapsulated devices.

361, Electricity: Electrical Systems and Devices, subclasses 760+ for electrical components connected to a printed circuit board.

**833 By utilizing optical sighting device:**

This subclass is indented under subclass 832. Process wherein the assembly is performed at least in part by using means which aid or enhance visual location or determination of the position of a component relative to the base.

SEE OR SEARCH CLASS:

348, Television, subclass 86 for manufacturing wherein a picture signal generator (i.e., television camera) is utilized for monitoring a manufacturing operation.

353, Optics: Image Projectors, for an optical projector capable of being used in an assembly method.

382, Image Analysis, subclasses 141+ for manufacturing using image analysis.

**834 With component orienting:**

This subclass is indented under subclass 832. Process including the specific step of aligning or positioning the electrical component with respect to a portion of the base.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

759, for apparatus including means to align and advance a work part.

760, for apparatus with a work holder for assembly.

**835 And shaping, e.g., cutting or bending, etc.:**

This subclass is indented under subclass 834. Process and the step of shaping the electrical component or base.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

25.01+, for a process or apparatus for making a semiconductor or a barrier layer device.

33.5, for apparatus for assembling a first element or portion thereof to an edge of a second element including binding or covering and cutting.

838+, for a process of assembling an electrical component to a base by inserting and deforming a component lead or terminal in a base aperture.

844+, for a process of assembling a terminal to a base by deforming or shaping.

**836 Different components:**

This subclass is indented under subclass 834. Process wherein plural diverse electrical components are assembled to the base.

**837 By inserting component lead or terminal into base aperture:**

This subclass is indented under subclass 832. Process wherein an electrically conducting wire of the electrical component or a terminal attached thereto is passed into a hole in the base.

SEE OR SEARCH CLASS:

361, Electricity: Electrical Systems and Devices, subclass 761 for plural diverse electrical components con-

nected to a printed circuit board by the use of aperture therein.

- 838 With deforming of lead or terminal:**  
This subclass is indented under subclass 837. Process wherein either the wire or the terminal (\*) is deformed.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 33.5, for apparatus for assembling a first element or portion thereof to an edge of a second element including binding or covering and cutting.  
56.5, for plural devices manufacturing apparatus including machining means.

SEE OR SEARCH CLASS:

- 439, Electrical Connectors, subclasses 877+ for an electrical connector adapted to be secured by crimping, deforming, or bending.

- 839 Including metal fusion:**  
This subclass is indented under subclass 838. Process wherein a portion of the terminal (\*) is metal and wherein said portion or a portion of the wire is either raised to a fusible temperature or subjected to metal in a fused state thereby effecting bonding of the electrical component (\*) to the base.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 840, for a process of assembling an electrical component to a base by metal fusion.  
843, for a process of assembling a terminal to a base by metal fusion.  
860, for a process of assembling a terminal to an elongated conductor by metal fusion.  
879, for a process of assembling contact or terminal by metal fusion.

SEE OR SEARCH CLASS:

- 219, Electric Heating, subclasses 78.01+ for a process or apparatus for bonding (e.g., welding) by use of electrical current and pressure.  
228, Metal Fusion Bonding, subclasses 179.1+ for a process of simultaneously fusion bonding (e.g., welding,

generally) of multiple joints of an electrical device. See Class 228, class definition, V, A, 1, for the line between Class 228 and other manufacturing classes.

- 840 By metal fusion:**  
This subclass is indented under subclass 832. Process wherein a portion of the electrical component (\*) or of a terminal (\*) attached thereto is composed of metal and further wherein the portion is either raised to a fusible temperature or subjected to metal in a fused state thereby effecting bonding of the electrical component (\*) to the base.

SEE OR SEARCH CLASS:

- 219, Electric Heating, subclasses 78.01+ for a process or apparatus for bonding (e.g., welding) by use of electrical current and pressure.  
228, Metal Fusion Bonding, subclasses 179.1+ for a process of simultaneously fusion bonding (e.g., welding, generally) multiple joints of an electrical device. See Class 228, class definition V, A, 1, for the line between Class 228 and other manufacturing classes.

- 841 With encapsulating, e.g., potting, etc.:**  
This subclass is indented under subclass 832. Process including covering a substantial portion of the electrical component (\*) to protect same from deleterious effects of the environment.

- (1) Note. The encapsulating is usually effected by molding a flowable and settable electrically insulating material about the component.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 25.01+, for a process or apparatus for making a semiconductor or a barrier layer device.  
530, for a process of (1) depositing a flowable material upon or into a void or opening in the work or (2) configuring a flowable material (e.g., casting, molding) combined with additional manufacturing and which combination is not elsewhere classified.

855+, for a process of assembling electrical components to a terminal or elongated with encapsulating.

**SEE OR SEARCH CLASS:**

174, Electricity: Conductors and Insulators, subclass 521 for an electrical device encapsulated (potted).  
 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclass 272 for a process of encapsulating of electrical components by molding.  
 361, Electricity: Electrical Systems and Devices, subclass 424 for an electrical device provided with shielding means.  
 439, Electrical Connectors, subclasses 625+ for an electrical connector provided with molded insulation other than a conductor sheath.

**842 Assembling terminal to base:**

This subclass is indented under subclass 829. Process of assembling a terminal (\*) to the base.

**SEE OR SEARCH CLASS:**

361, Electricity: Electrical Systems and Devices, subclass 774 for a specific shaped lead on a printed circuit board to facilitate connection to an electrical component.

**843 By metal fusion bonding:**

This subclass is indented under subclass 842. Process wherein a portion of the terminal (\*) is composed of metal which is either raised to a fusible temperature or is subjected to metal in a fused state thereby effecting bonding of the terminal (\*) to the base.

**SEE OR SEARCH CLASS:**

219, Electric Heating, subclass 78.01 for a process or apparatus for bonding by electrical current and pressure.  
 228, Metal Fusion Bonding, subclasses 179.1+ for a process of simultaneously fusion bonding multiple joints of an electrical device. See Class 228, class definition, V, A, 1, for the line between Class 228 and other manufacturing classes.

**844 By deforming or shaping:**

This subclass is indented under subclass 842. Process wherein either the terminal (\*) or base is deformed or shaped.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

33.5, for apparatus for assembling a first element or portion thereof to an edge of a second element including binding or covering and cutting.  
 56.5, for plural diverse manufacturing apparatus including machining means.

**SEE OR SEARCH CLASS:**

439, Electrical Connectors, subclasses 877+ for an electrical connector secured by crimping, deforming, or bonding.

**845 With shaping or forcing terminal into base aperture:**

This subclass is indented under subclass 844. Process wherein the base is provided with a hole and further wherein either the hole is used to shape the terminal (\*) or the terminal (\*) is compelled to pass into the hole.

**846 Manufacturing circuit on or in base:**

This subclass is indented under subclass 829. Process of manufacturing a conductive path to, on, or in an insulative base.

- (1) Note. A circuit functions only to electrically connect two points, devices, etc., whereas a terminal functions to both electrically and mechanically connect two points, devices, etc.
- (2) Note. A circuit may be manufactured by molding, coating, etching, wire forming, etc., or a combination of these steps.

**SEE OR SEARCH CLASS:**

174, Electricity: Conductors and Insulators, subclasses 250+ for printed circuit board structure, per se.  
 336, Inductor Devices, subclass 200 for printed circuit inductor device structure.

- 361, Electricity: Electrical Systems and Devices, subclass 777 for a specific pattern on a printed circuit board facilitating attachment of electrical components.
- 427, Coating Processes, subclasses 96.1 through 99.5 for a process of coating a substrate to produce an integrated or printed circuit or circuit board.
- 430, Radiation Imagery Chemistry: Process, Composition, or Product Thereof, subclass 5 for a process of photochemistry using a mask: subclasses 311+ for a process of photochemistry producing electrical devices.
- 847 With selective destruction of conductive paths:**  
This subclass is indented under subclass 846. Process wherein a plurality of paths are formed and including the step of destroying a predetermined portion of a path.
- SEE OR SEARCH CLASS:  
205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, subclasses 118+ for electrolytic coating processes of selected areas.
- 848 With molding of insulated base:**  
This subclass is indented under subclass 846. Process including the step of forming (i.e., shaping) a fluid settable material that is highly resistant to the passage of electricity into the shape of a base.
- SEE OR SEARCH CLASS:  
264, Plastic and Nonmetallic Article Shaping or Treating: Processes, for a method of molding a plastic or non-metallic article.
- 849 Simultaneous circuit manufacturing:**  
This subclass is indented under subclass 848. Process wherein the circuit manufacture occurs concurrently with the molding of the base.
- 850 By using wire as conductive path:**  
This subclass is indented under subclass 846. Process wherein the path is formed by a metallic body whose longitudinal dimension is much greater than its round cross section and which is designed for the stated proximate purpose of carrying an electric current.
- 851 With sintering of base:**  
This subclass is indented under subclass 846. Process including the cohering base material by heating it almost to, but below, its melting point.
- 852 By forming conductive walled aperture in base:**  
This subclass is indented under subclass 846. Process of shaping a hole in the base and attaching electrically conductive material to the walls of the hole.
- SEE OR SEARCH CLASS:  
427, Coating Processes, subclasses 97.2 and 97.7-98.3 for a process of coating a hole wall to produce an integrated or printed circuit or circuit board.
- 853 With deforming of conductive path:**  
This subclass is indented under subclass 852. Process including deforming the electrically conductive path to provide conductive material in the hole.
- 854 Assembling electrical component directly to terminal or elongated conductor:**  
This subclass is indented under subclass 825. Process of contiguously assembling an electrical component (\*) to a terminal (\*) or an elongated conductor (\*).
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
25.01+, for a process or apparatus for making a semiconductor or a barrier layer device.  
619, for a process of making electrical resistors with at least one terminal being applied to a resistance element.  
621, for a process of making electrical resistors including applying one or more terminals to a resistance element.  
739, for apparatus including means for engaging a planar nonconductive member, e.g., a circuit board, having or to be provided with paths of conductive material to an electrical component, the component being secured to a conductive path.

- 741, for apparatus used to make more than one electrical component and paths of conductive material.
- 748, for apparatus including means to juxtapose, associate, or fasten an electrical connector member to a conductor, the connector member being elongated and rodlike.
- 749, for apparatus including means for assembling a plurality of rodlike conductors to a terminal(s) simultaneously.
- 750, for apparatus including means for assembling a plurality of rodlike conductors to a terminal(s) simultaneously, said apparatus being hand manipulatable.
- 751, for apparatus including means for assembling a plurality of rodlike conductors to a terminal(s) simultaneously, said apparatus being hand manipulatable and being capable of fastening by deformation.
- 752, for apparatus including means for assembling a plurality of rodlike conductors to a terminal(s) simultaneously, said apparatus being hand manipulatable and being capable of fastening by elastic joining.
- 753, for apparatus including means for assembling a plurality of rodlike conductors to a terminal(s) simultaneously, said apparatus being capable of fastening by deformation.
- 754, for apparatus including means for assembling a plurality of rodlike conductors to a terminal(s) simultaneously, said apparatus being capable of fastening by elastic joining.

**SEE OR SEARCH CLASS:**

- 219, Electric Heating, subclass 78.01 for a process or apparatus for bonding by electrical current and pressure.
- 228, Metal Fusion Bonding, subclasses 179.1+ for a process of simultaneously fusion bonding multiple joints of an electrical device. See Class 228, class definition, V, A, 1, for the line between Class 228 and other manufacturing classes.

- 438, Semiconductor Device Manufacturing: Process, particularly subclasses 26+, 51, 55, 64+, and 106+ for methods of packaging a semiconductor device; see the search notes thereunder.

**855 With encapsulating:**

This subclass is indented under subclass 854. Process including substantially covering a portion of the assembled component, (\*) terminal, (\*) or conductor (\*) to protect same from deleterious effects of the environment.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 530, for a process including (1) depositing a flowable material upon or into a void or opening in the work, or (2) configuring a flowable material (e.g., casting, molding) combined with additional manufacturing, which combination is not elsewhere classified.
- 586, for a process of making and encapsulating a semiconductor or barrier layer device.

**SEE OR SEARCH CLASS:**

- 174, Electricity: Conductors and Insulators, subclass 521 for an electrical device encapsulated (potted).
- 361, Electricity: Electrical Systems and Devices, subclass 424 for an electrical device provided with a shielding.
- 439, Electrical Connectors, subclasses 271+ for an electrical connector provided with a joint sealing gasket or packing and subclasses 607+ for an electrical connector with a radio type electrical shield.

**856 By molding or insulating material:**

This subclass is indented under subclass 855. Process wherein the encapsulating is by forming and shaping a settable fluid material highly resistant to the passage of electricity.

**SEE OR SEARCH CLASS:**

- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclasses 272.11+ for a process of encapsulating electrical component by molding.

439, Electrical Connectors, subclasses 625+ for an electrical connector provided with molded insulation other than a conductor sheath.

**857 Assembling terminal to elongated conductor:**

This subclass is indented under subclass 825. Process for assembling a terminal (\*) to an elongated conductor (\*).

SEE OR SEARCH THIS CLASS, SUBCLASS:

747, for apparatus including means to juxtapose, associate, or fasten an electrical connector member to a conductor.

748, for apparatus including means to juxtapose, associate, or fasten an electrical connector member to a conductor, the connector member being elongated and rodlike.

749, for apparatus including means for assembling a plurality of rodlike conductors to a terminal(s) simultaneously.

750, for apparatus including means for assembling a plurality of rodlike conductors to a terminal(s) simultaneously, said apparatus being hand manipulatable.

752, for apparatus including means for assembling a plurality of rodlike conductors to a terminal(s) simultaneously, said apparatus being hand manipulatable and being capable of fastening by elastic joining.

754, for apparatus including means for assembling a plurality of rodlike conductors to a terminal(s) simultaneously, said apparatus being capable of fastening by elastic joining.

756, for apparatus including means to juxtapose, associate, or fasten a conductor, the assembled structure having a switch or fuse.

SEE OR SEARCH CLASS:

174, Electricity: Conductors and Insulators, subclass 75 for conduits, cables, or conductors having a joint with an end structure; subclass 94 for bare conductor joints between conduits, conductors, cables, or connectors.

**858 With molding of electrically insulating material:**

This subclass is indented under subclass 857. Process including forming (i.e., shaping) a fluid settable material or plastically reshaping a preform wherein the material or preform is highly resistant to the passage of electric current.

SEE OR SEARCH CLASS:

439, Electrical Connectors, subclasses 625+ for an electrical connector provided with shaped insulation other than a conductor sheath.

**859 By shrinking of cover:**

This subclass is indented under subclass 858. Process wherein the preform is a tube or sleeve structure and further wherein said structure is contracted in size about a portion of the terminal (\*) or conductor (\*).

SEE OR SEARCH CLASS:

439, Electrical Connectors, subclasses 271+ for an electrical connector provided with a joint sealing gasket or packing.

**860 By metal fusion bonding:**

This subclass is indented under subclass 857. Process wherein either end of the terminal (1) or an end of the elongated conductor (2) is metal and further wherein assembly is effected by juxtaposing and bonding the metal end of the terminal to the end of the conductor either by (a) raising the temperature of the metal end to its fusion point, or (b) applying molten metal to the juxtaposed ends.

SEE OR SEARCH CLASS:

219, Electric Heating, subclass 78.01 for a process or apparatus for bonding by electrical current and pressure.

228, Metal Fusion Bonding, subclasses 179.1+ for a process of simultaneously fusion bonding multiple joints of an electrical device. See Class 228, class definition, V, A, 1, for the line between Class 228 and other manufacturing classes.

**861 By deforming:**

This subclass is indented under subclass 857. Process wherein the assembly is effected or enhanced either by deforming the terminal (\*) or the conductor (\*).

- (1) Note. The deforming can be of any portion of the terminal or conductor including various insulative covering layers thereon.

SEE OR SEARCH THIS CLASS, SUBCLASS:

751, for apparatus including means for assembling a plurality of rodlike conductors to a terminal(s) simultaneously, said apparatus being hand manipulatable and being capable of fastening by deformation.

753, for apparatus including means for assembling a plurality of rodlike conductors to a terminal(s) simultaneously, said apparatus being capable of fastening by deformation.

SEE OR SEARCH CLASS:

174, Electricity: Conductors and Insulators, subclass 84 for a crimped joint between conduits, cables, or conductors.

439, Electrical Connectors, subclasses 877+ for an electrical connector secured by crimping, deforming, or bending.

**862 Of ferrule about conductor and terminal:**

This subclass is indented under subclass 861. Process wherein the assembly is effected by the use of a short tube designed to substantially circumscribe and be deformed about the assembled terminal (\*) and conductor (\*).

- (1) Note. This subclass includes a process of attaching a terminal to a wire wherein a separate ferrule is employed. A process utilizing a terminal with integral ferrule or ferrule-like structure, which is deformed to make the connection between the terminal and wire, is provided in other subclasses under 863.

SEE OR SEARCH CLASS:

439, Electrical Connectors, subclasses 95+ for an electrical connector having means to engage the conductor sheath to ground the sheath.

**863 Of terminal:**

This subclass is indented under subclass 861. Process wherein the terminal (\*) is deformed.

- (1) Note. This subclass provides for a process in which the deforming force is primarily, if not totally, applied to the terminal. Any deformation of the conductive wire resulting from the terminal deformation is considered to be secondary and therefore not controlling as to classification.

SEE OR SEARCH THIS CLASS, SUBCLASS:

56.5, for plural diverse manufacturing apparatus including machining means.

871, for a process of assembling conductive wires by deforming a bridge member.

**864 With forming eyelet from elongated conductor:**

This subclass is indented under subclass 863. Process including deforming an end of the elongated conductor(s) into a generally circular configuration to receive the terminal (\*).

**865 With penetrating portion:**

This subclass is indented under subclass 863. Process wherein the terminal (\*) is provided with structure capable of piercing either a single or plural stranded elongated conductor (\*) or an electrically resistant material covering thereon.

SEE OR SEARCH CLASS:

439, Electrical Connectors, subclasses 387+ for an electrical connector provided with piercing means.

**866 Through insulation:**

This subclass is indented under subclass 865. Process wherein the penetrating portion pierces a layer of electrically resistant material covering the elongated conductor (\*).



## SEE OR SEARCH CLASS:

439, Electrical Connectors, subclasses 387+ for an electrical connector provided with insulation piercing means.

**867 With insulation removal:**

This subclass is indented under subclass 863. Process wherein the elongated conductor (\*) is provided with material highly resistant to the passage of electric current and including removing some of the material.

**868 Assembling elongated conductors, e.g., splicing, etc.:**

This subclass is indented under subclass 825. Process of joining elongated conductor(s) (\*) to one another.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

56.5, for plural diverse manufacturing apparatus including machining means.

755, for apparatus including means to juxtapose, associate, or fasten multiple independent conductors.

## SEE OR SEARCH CLASS:

156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclass 49 for a process of making and splicing an electrical conductor of indefinite length. See notes under subclass 47, particularly notes (3) to (7), for the proper classification between Classes 29 and 156 regarding the manufacture of indefinite length electrical conductors.

174, Electricity: Conductors and Insulators, subclass 21 for conduit or joint structure; subclasses 71+ for spliced branched and/or multiducted conduits; subclass 73.1 for spliced conduits, cables, and conductors having conductive stress distributing means; subclass 88 for spliced plural conduit, cable, or conductor joints; and subclass 94 for bare conductor joints between conduits, cables, or conductors.

**869 With end-to-end orienting:**

This subclass is indented under subclass 868. Process wherein respective ends of the elongated conductors are juxtaposed and manipulated to extend along a common longitudinal axis.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

756, for apparatus including means to juxtapose, associate, or fasten a conductor, the assembled structure having a switch or fuse.

**870 Including fluid evacuating or pressurizing:**

This subclass is indented under subclass 869. Process including increasing or decreasing the pressure of a fluid contained in one of the elongated conductors.

## SEE OR SEARCH CLASS:

439, Electrical Connectors, subclasses 271+ for an electrical connector provided with a joint sealing gasket or packing.

**871 Including deforming of joining bridge:**

This subclass is indented under subclass 869. Process including deforming fastening structure spanning the juxtaposed elongated conductors.

## SEE OR SEARCH CLASS:

156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclass 50 for a process with mechanical working of a conductor.

174, Electricity: Conductors and Insulators, subclass 84 for a crimped joint between conduits, cables, and conductors.

439, Electrical Connectors, subclasses 877+ for an electrical connector adapted to be secured by crimping, deforming, or bending.

**872 With overlapping orienting:**

This subclass is indented under subclass 868. Process wherein respective ends of the elongated conductor(s) (\*) are juxtaposed and are manipulated to have parallel longitudinal axes, and wherein one elongated conductor (\*)

extends over a portion of the other elongated conductor (\*).

SEE OR SEARCH THIS CLASS, SUBCLASS:

518, for a process in which two or more rods or similarly proportioned parts are disposed in parallel side-by-side relationship for a portion of their length and are enclosed in a tube and then joined to each other and to the tube by the inward deformation of the tube.

SEE OR SEARCH CLASS:

156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclass 55 for a process of longitudinally bending of wrapping sheet material about plural spaced conductors.

174, Electricity: Conductors and Insulators, subclass 87 for overlapped angled spliced conduit, cable, or conductor joints.

**873 Including oppositely facing end orienting:**

This subclass is indented under subclass 872. Process wherein end surfaces of the wires are oppositely disposed.

**874 Contact or terminal manufacturing:**

This subclass is indented under subclass 825. Process of manufacturing either: (1) an electrically conductive means of a relay, switch, or connector utilized to engage or disengage another similar means to open or close an electrical circuit or (2) a terminal (\*).

SEE OR SEARCH THIS CLASS, SUBCLASS:

622, for a process of making a device which is adapted to interrupt or establish an electrical current flow between electrical conductors joined in the device.

SEE OR SEARCH CLASS:

200, Electricity: Circuit Makers and Breakers, subclass 11 for pivoted dial-type contact structure, per se, and subclasses 275+ for particular contact shape or structure.

428, Stock Material or Miscellaneous Articles, subclass 929 for electrical contact metallic stock structure.

**875 By powder metallurgy:**

This subclass is indented under subclass 874. Process wherein the contact or terminal (\*) is manufactured by pressing, binding, and sintering powdered metal.

SEE OR SEARCH CLASS:

75, Specialized Metallurgical Processes, Compositions for Use Therein, Consolidated Metal Powder Compositions, and Loose Metal Particulate Mixtures, subclass 247 for consolidated metal powder composition having a base metal of one or more noble metals or copper.

**876 By assembling plural parts:**

This subclass is indented under subclass 874. Process wherein the contact or terminal (\*) is manufactured by assembling two or more cooperating elements.

SEE OR SEARCH CLASS:

200, Electricity: Circuit Makers and Breakers, subclass 263 for cooperating contact structure composed of different material and subclasses 268 and 269 for a contact composed of two or more layers of different material.

**877 With bonding:**

This subclass is indented under subclass 876. Process including joining the elements by adhesion or cohesion.

(1) Note. Examples of the types of bonding to be found in this and the indented subclasses includes applying an adhesive coating or lamina, tackifying a surface to be united with another by applying a solvent thereto, fusion welding, soldering, etc.

**878 Of fused material:**

This subclass is indented under subclass 877. Process wherein the bond is effected either by bringing to or applying material in a molten state to a portion of the element joint.

- SEE OR SEARCH CLASS:  
439, Electrical Connectors, subclasses 874+ for an electrical connector secured by fused material.
- 879 Metal:**  
This subclass is indented under subclass 878. Process wherein a portion of the fused material is metal.
- SEE OR SEARCH CLASS:  
219, Electric Heating, subclass 78.01 for a process or apparatus for bonding by electrical current and pressure.  
228, Metal Fusion Bonding, subclasses 179.1+ for a process of simultaneously bonding multiple joints of an electrical device. See Class 228, class definitions, V, A, 1, for the line between Class 228 and other manufacturing classes.
- 880 By impregnating a porous mass:**  
This subclass is indented under subclass 879. Process wherein a portion of the element joint is composed of substance having a plurality of interstices and further wherein the fused material is applied to and penetrates the substance interstices.
- SEE OR SEARCH CLASS:  
200, Electricity: Circuit Makers and Breakers, subclass 264 for infiltrated porous contact structure, per se.
- 881 By elastic joining:**  
This subclass is indented under subclass 876. Process wherein the cooperating elements are joined by distorting one of the elements within its elastic limit.
- SEE OR SEARCH CLASS:  
439, Electrical Connectors, subclasses 296+ for an electrical connector which is held coupled to a cooperating electrical connector by a spring actuated or resilient member.
- 882 With deforming:**  
This subclass is indented under subclass 876. Process including a step of deforming one of the cooperating elements.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
56.5, for plural diverse manufacturing apparatus including machining means.
- SEE OR SEARCH CLASS:  
439, Electrical Connectors, subclasses 877+ for an electrical connector adapted to be secured by crimping, deforming or bending.
- 883 With molding of insulation:**  
This subclass is indented under subclass 876. Process including a step of forming and shaping a fluid material highly resistant to the passage of electricity.
- SEE OR SEARCH CLASS:  
264, Plastic and Nonmetallic Article Shaping or Treating: Processes, for a process of molding a plastic nonmetallic article.
- 884 Forming array of contacts or terminals:**  
This subclass is indented under subclass 876. Process wherein a plurality of contacts or terminal(s) (\*) are manufactured in a predetermined orderly arrangement.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
56.5, for plural diverse manufacturing apparatus including machining means.
- SEE OR SEARCH CLASS:  
361, Electricity: Electrical Systems and Devices, subclass 822 for a housed or mounted array of contacts or terminals.  
439, Electrical Connectors, subclasses 55+ for an electrical connector for use on a printed circuit board, and subclasses 660+ for a bayonet plug or socket connector, per se.
- 885 With coating:**  
This subclass is indented under subclass 874. Process including a step of applying a flowable substance upon or into a portion of the assembled parts.

## SEE OR SEARCH CLASS:

205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, subclasses 80+ for an electrolytic coating process, per se.

**886 Electret making:**

This subclass is indented under subclass 592.1. Process wherein the article made exhibits a permanent external electrostatic field due to internal polarization.

- (1) Note. An electret possesses persistent electric polarization and is generally a solid dielectric. A few substances such as wax-resin electrets also exhibit piezoelectric properties. See the (1) Note to the definition of Class 29, subclass 25.35.
- (2) Note. Some of the classes referred to in the search notes of Class 29, subclass 25.35, have a process that is useful in the manufacture of an electret.
- (3) Note. This subclass is not limited to the manufacture of an electret by a metal working operation, but includes the manufacture of such a device by any type of operation where no other class provides for the entire subject matter claimed.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

25.35, for method of or apparatus for manufacturing a piezoelectric device or a piezoelectric material that is not classifiable in the specific classes relating to manufacturing.  
 610.1+, for a method of making a resistor under the class definition.  
 887, for a method of making an insulator under the class definition.

**887 Insulator making:**

This subclass is indented under subclass 592.1. Process where the device made serves to support or confine an electrical conductor while preventing current flow between that conductor and another conductor or ground.

- (1) Note. The process classified here may be for making the necessary attachments of fittings for mounting the conductor and insulator as well as the insulator body, per se.

## SEE OR SEARCH CLASS:

174, Electricity: Conductors and Insulators, subclasses 137+ for insulators, per se.

**888 Prime mover or fluid pump making:**

This subclass is indented under subclass 592. Process for manufacturing (1) an internal combustion (I.C.) engine, (2) a power device for converting the energy of a pressurized gas or liquid to mechanical work, (3) a gas or liquid pump or compressor, (4) a part especially adapted for (1), (2) or (3) which is not elsewhere classified.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

890.08, for a process of making a manifold or exhaust pipe for an internal combustion engine.  
 890.09, for a process of making a fluidic or fluid actuated device, i.e., not a fluid power device.  
 890.1, for a process of making a fluid pattern dispersing device, e.g., ink jet, subclasses 428+ for an assembly process.

## SEE OR SEARCH CLASS:

123, Internal-Combustion Engines, for an internal combustion engine.  
 184, Lubrication, for means to lubricate a prime mover or fluid pump

**888.01 I.C. (internal combustion) engine making:**

This subclass is indented under subclass 888. Process of manufacturing (1) a prime mover, such as a gasoline or diesel engine, which burns fuel within the prime mover and the combustion products serve as the thermodynamic fluid or (2) a part especially adapted for (1) which is not elsewhere classified.

## SEE OR SEARCH CLASS:

60, Power Plants, subclasses 597+ for a fluid motor driven by waste heat or by exhaust energy from an internal combustion engine and subclasses 272+

- for an internal combustion engine with treatment or handling of exhaust gas.
- 73, Measuring and Testing, subclass 66 for testing roto unbalance and subclass 114.01 for a device for testing an internal combustion engine or related engine system or engine component.
- 92, Expansible Chamber Devices, subclass 261 for a crankcase, generally.
- 123, Internal Combustion Engines, for an engine of that class, generally.

**888.011 Repairing, converting, servicing or salvaging:**

This subclass is indented under subclass 888.01. Process wherein an existing I.C. engine is (1) restored or otherwise put in a more functional, stable or improved working condition; (2) mechanically modified or altered to produce an article of substantially different capacity, size, function or type of operation; or (3) treated to recover a portion of the whole thereof which would otherwise constitute discarded material or using such material in a process of mechanical manufacturing.

- (1) Note. See the definition of repair in Class 29 definitions, paragraph III, Terms of Definitions.
- (2) Note. Making a new replacement part, per se, is not found in this subclass unless that part is claimed as being installed in the device being repaired.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 401.1, for a process of converting. Also see the search notes thereunder.
- 402.01+, for a process of repairing. Also see the search notes thereunder.
- 403.1+, for a process including scrap recovery or utilization. Also see the search notes thereunder.

**888.012 Rotary or radial engine making:**

This subclass is indented under subclass 888.01. Process of manufacturing an I.C. engine wherein (1) the thermodynamic cycle is carried out in a mechanism relying entirely upon circular movement about an axis without any reciprocating components such as a piston, crankshaft or connecting rod; (2) the cylinders

are arranged like the spokes of a wheel or at equiangular intervals around a crankshaft; or (3) a component, part of subcombination of (1) or (2) which are not elsewhere specifically provided for.

- (1) Note. Stern engine making and stem turbine making are not included in this subclass since they are not internal combustion engines.

**888.02 Fluid pump or compressor making:**

This subclass is indented under subclass 888. Process wherein the manufactured article is especially adapted (1) for increasing the pressure of a gas, liquid or vapor; (2) for accelerating, conveying or transporting fluid which article generally draws the fluid into itself through an entrance port and forces the fluid out through an exhaust port; or (3) a part especially adapted for (1) or (2) which is not elsewhere classified.

- (1) Note. A method of making an impeller is included therein when more than the impeller is made.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 889, for a process of making an impeller, per se.
- 890.09, for a process of making a fluidic or fluid actuated device.

**888.021 Repairing, converting, servicing or salvaging:**

This subclass is indented under subclass 888.02. Process wherein an existing valve or valve seat is (1) restored or otherwise put in a more functional, stable or improved working condition; (2) mechanically modified or altered to produce an article of substantially different capacity, size, function or type of operation; or (3) treated to recover a portion or the whole thereof which would otherwise constitute discarded material or using such material in a process of mechanical manufacturing.

- (1) Note. See the definition of repair in the Class 29 Glossary.
- (2) Note. Making a replacement part, per se, is not found in this subclass unless that

part is claimed as being installed in the device being repaired.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

401.1, for a process of converting. Also see the search notes thereunder.

402.01+, for a process of repairing. Also see the search notes thereunder.

403.1+, for a process including scrap recovery or utilization. Also see the search notes thereunder.

890.121, for a process of repairing, converting, servicing or salvaging a valve in general.

**888.022 Scroll or peristaltic type:**

This subclass is indented under subclass 888.02. Process wherein the manufactured fluid pump or compressor (1) employs in its operation at least one diaphragm member which is spirally wrapped, the walls of which define a closed space that serves as the working fluid chamber; (2) employs in its operation a resilient tubing that is compressed, which tubing serves as the working fluid chamber; or (3) a part especially adapted for (1) or (2) which is not elsewhere classified.

(1) Note. A method of making a scroll member or a peristaltic tubing is classified in this subclass.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

888.3, for a process of making a seal or packing member.

**888.023 Screw or gear type, e.g., moineau type:**

This subclass is indented under subclass 888.02. Process wherein the driving means or prime mover of the manufactured article is (1) a toothed machine element or a train of such elements, (2) a cylindrical machine element with a helical groove cut into its surface or (3) a part especially adapted for (1) or (2) which is not elsewhere classified.

**888.024 Centrifugal type:**

This subclass is indented under subclass 888.02. Process wherein the manufactured article (1) accelerates the fluid radially outward by means of an impeller to a surrounding

volute casing or (2) is a part especially adapted for (1) which is not elsewhere classified.

**888.025 Vane type or other rotary, e.g., fan:**

This subclass is indented under subclass 888.02. Process wherein the manufactured fluid pump or compressor is a displacement device that delivers a steady fluid flow of the action of two members in rotational contact, which device is not elsewhere classified.

(1) Note. Original placement in this subclass requires that the manufactured article be more than an impeller vane assembly.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

889+, for a method of making an impeller, per se.

**888.03 Valve lifter making:**

This subclass is indented under subclass 888. Process wherein the manufactured article is (1) especially adapted for opening a device which regulates or controls the flow of fluid to or from a cylinder such as in an I.C. engine or is (2) a part especially adapted for (1) which is not elsewhere classified.

**888.04 Piston making:**

This subclass is indented under subclass 888. Process for manufacturing (1) a sliding metal cylinder that reciprocates in a tubular housing, either moving against or moved by fluid pressure or (2) a component or part especially adapted for use with (1) not elsewhere classified.

SEE OR SEARCH CLASS:

92, Expansible Chamber Devices, appropriate subclass for a piston, per se.

123, Internal-Combustion Engines, appropriate subclass for an internal combustion engine having at least one piston.

219, Electric Heating, for process of electric welding or laser welding.

228, Metal Fusion Bonding, appropriate subclass for a process of making a piston by metallurgical bonding under the class definition.

419, Powder Metallurgy Processes, appropriate subclass for making a piston

utilizing powder metallurgy techniques.

- 451, Abrading, subclasses 51+ for a process of grinding a cylinder.

**888.041 Repairing, converting, servicing or salvaging:**

This subclass is indented under subclass 888.04. Process wherein an existing piston is (1) restored or otherwise put in a more functional, stable, or improved working condition; (2) mechanically modified or altered to produce an article of substantially different capacity, size function, or type of operation; or (3) treated to recover a portion or the whole thereof which would otherwise constitute discarded material or using such material in a process of mechanical manufacturing.

- (1) Note. See the definition of repair in Class 29 Glossary in the Class Definition.
- (2) Note. Making a replacement part, per se, is not found in this subclass unless that part is claimed as being installed in the device being repaired.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 401.1, for a process of converting. Also see the search notes thereunder.
- 402.01+, for a process of repairing. Also see the search notes thereunder.
- 403.1+, for a process including scrap recovery or utilization. Also see the search notes thereunder.

**888.042 Multi-element piston making:**

This subclass is indented under subclass 888.04. Process wherein the piston is manufactured from a plurality of associated parts such as multiple body pieces or multiple skirt pieces, the parts being joined together to form a piston, but not including assembly with a connecting rod or with a gudgeon pin, wrist pin, piston pin or a boss therefor.

- (1) Note. The multi-element piston may be made by composite casting or molding steps, but there must be recited subject matter which is beyond the scope of the casting class, Class 164, or the molding

class, Class 264, for placement in this subclass.

- (2) Note. Making a coated or clad piston, per se, is not sufficient for placement in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 888.048, for method of making a piston by coating or cladding.

**888.043 Utilizing a high energy beam, e.g., laser, electron beam:**

Process under 888.042 wherein a very intense, nearly unidirectional flow of particles of great velocity, or a like propagation of electromagnetic or acoustic waves is used in the manufacture of the multi-element piston.

SEE OR SEARCH CLASS:

- 219, Electric Heating, subclasses 121.11+ for a method of metal heating using an electron beam, laser or plasma under the class definition.

**888.044 With assembly or composite article making:**

This subclass is indented under subclass 888.04. Process wherein the manufactured article is (1) composed of a plurality of interrelated attached components or subcombination elements, some of which are associated or dissociated from the other components or elements during the manufacture or (2) a unitary structure composed of at least two different materials or compositions with each material or composition retaining its identity.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 890.124, for a process of assembling a valve or making a composite valve other than an I.C. engine or poppet valve.

**888.045 With thermal barrier or heat flow provision:**

This subclass is indented under subclass 888.044. Process wherein the manufactured piston has structure especially adapted for (1) preventing heat flow or heat build up, (2) dissipating heat or (3) transferring heat.

SEE OR SEARCH THIS CLASS, SUB-CLASS:  
890.045+, for a process of making a tube with heat transfer means.

**888.046 With fiber reinforced structure:**

This subclass is indented under subclass 888.044. Process wherein filament or elongated particles are employed to strengthen or otherwise improve the mechanical integrity of the manufactured piston.

SEE OR SEARCH THIS CLASS, SUB-CLASS:  
419.1+, for a process of shaping fibrous material.

**888.047 By composite casting or molding:**

This subclass is indented under subclass 888.044. Process wherein the piston is fabricated using a plurality of distinct materials integrated to produce at least one piston element, e.g., a squeeze-cast piston enveloping a fiber material, which material is disposed through at least a portion of the piston body.

SEE OR SEARCH THIS CLASS, SUB-CLASS:  
527.5+, for a process of metal casting in combination with a diverse manufacturing operation.

SEE OR SEARCH CLASS:  
164, Metal Founding, subclasses 91+ for a process of casting a metal composite article.  
264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclasses 241+ for a process of molding a composite article under the class definition.

**888.048 By coating or cladding:**

This subclass is indented under subclass 888.044. Process wherein the piston is subjected to an operation wherein (1) fluent material is deposited upon or within a base material or (2) a preformed metal sheath or layer of material is attached to the surface of the base material.

- (1) Note. The claimed recitation of a chemical reaction will generally bar placement of the original reference in this subclass.

SEE OR SEARCH CLASS:

- 205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, subclasses 80+ for a process of electrolytic coating (e.g., electroplating, etc.).  
427, Coating Processes, for a process of coating including perfecting steps for coating.

**888.049 Ring groove forming or finishing:**

This subclass is indented under subclass 888.044. Process wherein the manufactured piston has a slot or recess especially adapted for receiving a piston ring or seal means therein.

**888.05 Gudgeon pin, wrist pin, piston pin, or boss therefor:**

This subclass is indented under subclass 888.044. Process for manufacturing (1) a fastening member such as a wrist pin or a gudgeon pin or (2) a circular protuberance or shaped area on the piston especially adapted for use with (1).

**888.051 With other attaching provision for connecting rod:**

This subclass is indented under subclass 888.044. Process wherein the piston is secured to a connecting rod without the use of a fastening element, per se, such as by casting about a connecting rod and the piston by swaging or by staking.

**888.06 Cylinder, cylinder head or engine valve sleeve making:**

This subclass is indented under subclass 888. Process wherein the manufactured article is (1) a tube in which a piston moves and where a work is done on the piston by the conversion of various forms of energy into mechanical force and motion as in an internal combustion engine or fluid pump; (2) a cap that serves to close the end of the piston chamber of a reciprocating engine; (3) a cylindrical part especially adapted for fitting inside (1) or (2); or (4) a covering or deposited layer for the inner surface of (1) or (2).



- (1) Note. A method of making a cylinder block by diverse manufacturing steps is found in this subclass.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

888.01, for a process of making an internal combustion engine.

**888.061 With liner, coating or sleeve:**

This subclass is indented under subclass 888.06. Process wherein the manufactured engine cylinder or cylinder head (1) has its surface covered by a cylindrical preform or covered with deposited material; or (2) manufacturing such preform.

**888.07 Piston ring or piston packing making:**

This subclass is indented under subclass 888. Process for manufacturing a circular sealing element or component especially adapted for fitting around a piston and extending to the cylinder wall thus preventing leakage.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

888.3, for a process of making a seal having plural district layers.

SEE OR SEARCH CLASS:

72, Metal Deforming, appropriate subclass for a process of shaping or working metal stock material.

277, Seal for a Joint or Juncture, for a generic sealing means or process, subclasses 434+ for a piston ring or piston ring expander or seat therefor, subclasses 922+ for a seal manufactured by bonding or joining or subclass 924 for a seal manufactured by deformation, material removal, or molding.

**888.071 Including forging or hammering:**

This subclass is indented under subclass 888.07. Process wherein the manufactured ring is shaped or worked by compressive impact force which produces plastic deformation.

**888.072 Including casting or molding:**

This subclass is indented under subclass 888.07. Process wherein the manufactured ring is produced by shaping a liquid or plastic substance into a fixed shape utilizing a forming surface or mold.

**888.073 Including rolling or die forming e.g., drawing, punching:**

This subclass is indented under subclass 888.07. Process wherein the manufactured ring is shaped or worked (1) by compressive force exerted by opposed rotating rollers or (2) by plastic deformation in a tool used to impart shape.

**888.074 Including coating or plating:**

This subclass is indented under subclass 888.07. Process wherein the manufactured ring is made by depositing a layer of fluent material upon or within a base material.

**888.075 Including grinding or honing:**

This subclass is indented under subclass 888.07. Process wherein the manufactured ring is shaped or polished by abrading which removes surface material.

SEE OR SEARCH CLASS:

451, Abrading, subclasses 51+ for process of grinding a piston or packing ring.

**888.076 Including machining or angular cutting:**

This subclass is indented under subclass 888.07. Process wherein the manufactured ring is (1) shaped by milling, broaching, or planing or (2) severed on a bias or in a manner other than transverse to the longitudinal axis of the ring.

**888.08 Crankshaft making:**

This subclass is indented under subclass 888. Process of (1) manufacturing an axial member having at least one portion thereof adapted for applying torque thereto for changing reciprocating motion into circular motion or vice versa (2) performing other operation upon such an axle or (3) manufacturing a part especially adapted for (1) or (2) which is not elsewhere classified.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

6.01, for a machine for making a crankshaft.

**888.09 Connecting rod making:**

This subclass is indented under subclass 888. Process of manufacturing a link which transmits motion or power from one linkage to a second linkage within the prime mover or the power device.

**888.091 Including metallurgical bonding:**

This subclass is indented under subclass 888.09. Process wherein the manufactured connecting rod is produced utilizing a soldering, brazing or welding step.

**888.092 Including metal forging or die shaping:**

This subclass is indented under subclass 888.09. Process wherein the manufactured connecting rod is metal which has been plastically deformed (1) by compressive forces into a desired shape or (2) by a tool used to impart shape.

**888.1 Camshaft making:**

This subclass is indented under subclass 888. Process wherein the manufactured article is (1) a rotating axle to which is attached a plate or cylinder that communicates motion to a follower by means of its edge or a groove cut in its surface or (2) a part especially adapted for (1) which is not elsewhere classified.

**888.2 Push rod or rocker arm making:**

This subclass is indented under subclass 888. Process wherein the manufactured article is (1) a bar or slender shaft which is actuated by a cam to open and shut valves such as in an I.C. engine (2) a lever that is pivoted near its center and is operated at one end by a push rod as defined in (1) which causes the other end of the lever to raise and depress a valve stem such as in an I.C. engine or (3) a part especially adapted for (1) or (2) which is not elsewhere classified.

**888.3 Seal or packing making:**

This subclass is indented under subclass 888. Process wherein the manufactured article is (1) especially adapted to close or make secure against unwanted fluid leakage or fluid passage

or (2) a part of (1) which is not elsewhere classified.

SEE OR SEARCH CLASS:

277, Seal for a Joint or Juncture, for a generic sealing means or process, subclasses 922+ for a seal manufactured by bonding or joining or subclass 924 for a seal manufactured by deformation, material removal, or molding.

**888.4 Poppet or I.C. engine valve or valve seat making:**

This subclass is indented under subclass 888. Process wherein the manufactured article is (1) a device that regulates fluid flow by means of a movable part that opens, shuts or partially obstructs a port or passageway, i.e., a valve which device rises perpendicularly to or from a circular ring on which the device rests when closed; (2) the circular ring for such a device; or (3) a part especially adapted for (1) or (2) which is not elsewhere classified.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

890.12, for a process of making a valve, per se.

**888.41 Valve guide making:**

This subclass is indented under subclass 888.4. Process wherein the manufactured article is especially adapted for maintenance of alignment of a stem of a poppet valve or I.C. engine valve.

**888.42 Repairing, converting, servicing or salvaging:**

This subclass is indented under subclass 888.4. Process wherein an existing valve or valve seat is (1) restored or otherwise put in a more functional, stable or improved working condition; (2) mechanically modified or altered to produce an article of substantially different capacity, size, function or type of operation; or (3) treated to recover a portion or the whole thereof which would otherwise constitute discarded material or using such material in a process of mechanical manufacturing.

(1) Note. See the definition of repair in Class 29 Glossary in the Class Definition.

- (2) Note. Making a replacement part, per se, is not found in this subclass unless that part is claimed as being installed in the device being repaired.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 401.1, for a process of converting. Also see the search notes thereunder.  
 402.01+, for a process of repairing. Also see the search notes thereunder.  
 403.1+, for a process including scrap recovery or utilization. Also see the search notes thereunder.  
 890.121, for a process of repairing, converting, servicing or salvaging a valve in general.

**888.43 Valve tappet making:**

This subclass is indented under subclass 888.4. Process wherein the manufactured article is (1) a lever or oscillating member moved by a cam and intended to tap or touch for purpose of operation of a valve or part thereof or (2) a part especially adapted for (1) which is not elsewhere classified.

**888.44 Valve seat making:**

This subclass is indented under subclass 888.4. Process wherein the manufactured article is the circular ring on which the poppet valve or I.C. engine valve rests when closed.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 890.122, for a process of making a valve seat, per se, not for a poppet or I.C. engine valve.

**888.45 Composite or hollow valve stem or head making:**

This subclass is indented under subclass 888.4. Process wherein the manufactured article is a disk part of the poppet or I.C. engine valve or a rod part which operates to open or close the valve, which disk part or rod part is (1) a unitary structure composed of at least two different materials or compositions with each material or composition retaining its identity or (2) a structure which is concave or has a cavity within.

- (1) Note. Composite valves include both solid and substantially solid valves having metal or ceramic inserts; and they may contain a heat exchange fluid or a particulate material.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 890.123, for a process of making a valve stem, per se.  
 890.124+, for a process of assembling a valve or making a composite valve.

**888.451 Including forging:**

This subclass is indented under subclass 888.45. Process wherein the manufactured article is shaped or worked by compressive impact force which produces plastic deformation.

**888.452 Including extruding:**

This subclass is indented under subclass 888.45. Process wherein the manufactured article is shaped by forcing solid material, such as metal, through the orifice of a die to produce a continuously formed piece.

**888.453 Including casting:**

This subclass is indented under subclass 888.45. Process wherein the manufactured article is produced by shaping liquid metal into a fixed shape utilizing a forming surface or mold.

**888.46 With assembly or composite article making:**

This subclass is indented under subclass 888.4. Process wherein the manufactured article is (1) composed of a plurality of interrelated attached components or subcombination elements, plurality of interrelated attached components or subcombination elements some of which are associated or disassociated from the other components or elements during the manufacture or (2) a unitary structure composed of at least two different materials or compositions with each material or composition retaining its identity.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 890.124, for a process of assembling a valve or making a composite valve other than an I.C. engine or poppet valve.

- 889 Impeller making:**  
This subclass is indented under subclass 592. Process of manufacturing a device including a rotor (e.g., rotary bladed spindle) for imparting motion in connection with fluid flow.
- SEE OR SEARCH CLASS:  
416, Fluid Reaction Surfaces (i.e., Impellers), for particular fluid flow devices.
- 889.1 Repairing or disassembling:**  
This subclass is indented under subclass 889. Process wherein an existing impeller device is restored to a more functional, stable or improved working condition or wherein its parts are disassociated.
- (1) Note. See the definition of repair in Class 29 Glossary in the Class Definition.
- (2) Note. Making a new replacement part, per se, is not found in this subclass unless that part is claimed as being installed in the device being repaired.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
402.01+, for a process of repairing. Also see the search notes thereunder.
- 889.2 Turbomachine making:**  
This subclass is indented under subclass 889. Process for manufacturing a device for enclosing and directing fluid flow with respect to an axially mounted rotary member including flow interacting members thereon (e.g., blades, vanes, buckets, etc.).
- SEE OR SEARCH CLASS:  
416, Fluid Reaction Surfaces (i.e., Impellers), subclasses 204+ for turbomachine assembly.
- 889.21 Assembling individual fluid flow interacting members, e.g., blades, vanes, buckets, on rotary support member:**  
This subclass is indented under subclass 889.2. Process wherein the manufacturing includes the permanent association of the flow interacting members with the rotary support member.
- SEE OR SEARCH CLASS:  
416, Fluid Reaction Surfaces (i.e., Impellers), for specific blade assembly under subclass 204.
- 889.22 Assembling fluid flow directing devices, e.g., stators, diaphragms, nozzles:**  
This subclass is indented under subclass 889.2. Process wherein the manufacturing includes the permanent association of the parts of the fluid flow devices.
- 889.23 Shaping integrally bladed rotor:**  
This subclass is indented under subclass 889.2. Process including altering the configuration or dimensions of a rotor to form thereon portions serving as a fluid interacting member such as a blade or vane.
- SEE OR SEARCH CLASS:  
416, Fluid Reaction Surfaces (i.e., Impellers), subclass 234 for blade structure integrally shaped or blended into hub or rotor.
- 889.3 Axial blower or fan:**  
This subclass is indented under subclass 889. Process of fabricating an impeller of the type wherein the fluid flow discharge is substantially in the direction of the rotational axis of the rotor.
- SEE OR SEARCH CLASS:  
416, Fluid Reaction Surfaces (i.e., Impellers), especially subclasses 189+ for axially extending shroud ring or casing and subclasses 198+ for multiple axially spaced working members.
- 889.4 Centrifugal blower or fan:**  
This subclass is indented under subclass 889. Process for manufacturing an impeller of the type wherein the fluid flow discharge is substantially outwardly in radial direction from the central portion of the rotor.
- SEE OR SEARCH CLASS:  
416, Fluid Reaction Surfaces (i.e., Impellers), subclass 178 for perimetric blading extending axially between annular members (e.g., squirrel cage type, etc.).

**889.5 Fluid coupling device:**

This subclass is indented under subclass 889. Process of manufacturing a device including impeller means for transmitting force, i.e., a coupling by means of fluid to a device such as a turbine, e.g., hydraulic type of torque converter.

## SEE OR SEARCH CLASS:

60, Power Plants, subclasses 330+ for impeller and turbine unit type torque transmitting apparatus.

**889.6 Propeller making:**

This subclass is indented under subclass 889. Process for manufacturing a device consisting of a central hub with radiating blades twisted to form part of a substantially helical surface that is used to propel a vehicle, e.g., airplane or ship.

## SEE OR SEARCH CLASS:

416, Fluid Reaction Surfaces (i.e., Impellers), subclasses 223+ for specific blade structure.

**889.61 Utilizing hollow tube blank:**

This subclass is indented under subclass 889.6. Process wherein a propeller blade portion is made from an open cylindrical workpiece.

## SEE OR SEARCH CLASS:

416, Fluid Reaction Surfaces (i.e., Impellers), subclasses 232 and 233 for hollow blade structure.

**889.7 Blade making:**

This subclass is indented under subclass 889. Process of manufacturing the individual fluid flow interacting members utilized in an impeller device.

## SEE OR SEARCH CLASS:

416, Fluid Reaction Surfaces (i.e., Impellers), subclasses 223+ for specific blade structure.

**889.71 Composite blade:**

This subclass is indented under subclass 889.7. Process wherein a blade is made of distinctly different and identifiable portions or materials.

## SEE OR SEARCH CLASS:

416, Fluid Reaction Surfaces (i.e., Impellers), subclasses 229+ for laminated, embedded member or encased material type blade structure.

**889.72 Hollow blade:**

This subclass is indented under subclass 889.7. Process wherein the interior of the blade includes substantial open space.

## SEE OR SEARCH CLASS:

416, Fluid Reaction Surfaces (i.e., Impellers), subclasses 232 and 233 for hollow blade structure.

**889.721 With cooling passage:**

This subclass is indented under subclass 889.72. Process wherein the interior open space serves to allow fluid to flow within the blade for heat dissipation purposes.

**889.722 Passage contains tubular insert:**

This subclass is indented under subclass 889.721. Process wherein the cooling passage receives therein a hollow cylindrical member.

**890 Catalytic device making:**

This subclass is indented under subclass 592. Process for manufacturing an article which utilizes a substance that alters the velocity of a chemical reaction and which substance may be recovered essentially unaltered in form and amount at the end of the reaction.

(1) Note. A recited chemical reaction, per se, will generally bar original placement in this subclass.

(2) Note. Prior to the establishment of this subclass (890), this subject matter was indented under "Gas and Water Device Making" (old 29/157+). Other subclasses under Class 29 subclasses 592+ have not been screened for this subject matter.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

890.08, for a method of making a muffler, manifold or exhaust pipe.

**890.01 Rocket or jet device making:**

This subclass is indented under subclass 592. Process for manufacturing an article especially adapted for producing a strong, well-defined stream of fluid which issues from an orifice or nozzle or moves within a contracted duct.

- (1) Note. Generally a rocket or jet is utilized for propulsion purposes.
- (2) Note. No method of making carburetor or fuel injector device, per se, is found within this subclass.
- (3) Note. Prior to the establishment of this subclass (890.01) this subject matter was indented under "Gas and Water Device Making" (old 29/157+). Other subclasses under Class 29 subclasses 592+ have not been screened for this subject matter.

**890.02 Burner, torch or metallurgical lance making:**

This subclass is indented under subclass 592. Process for manufacturing an article especially adapted for (1) consuming fluid fuel to produce a flame or to cut material or (2) consuming fluid or gaseous fuel to combust or otherwise remove undesired material.

- (1) Note. A process of making carburetor or fuel injector, per se, is not considered appropriate subject matter for this subclass since the combustion reaction occurs at a latter stage of the engine.
- (2) Note. Prior to the establishment of this subclass (890.02) this subject matter was indented under "Gas and Water Device Making" (old 29/157+). Other subclasses under Class 29, subclasses 401.1+ have not been screened for this subject matter.

**890.03 Heat exchanger or boiler making:**

This subclass is indented under subclass 592. Process for manufacturing (1) a water heater for generating steam or (2) an article especially useful for recovery of thermal energy or for transferring thermal energy from one fluid to another fluid or to the environment.

- (1) Note. This subclass and the subclasses indented hereunder include a method of making a subcombination not elsewhere provided for, which are especially useful in heat exchanger or boiler devices.
- (2) Note. Prior to the establishment of these subclasses (890.03+), this subject matter was indented under "Gas and Water Device Making" (old 29/157+). Other subclasses under Class 29, subclasses 592+ have not been screened for this subject matter.
- (3) Note. Making a heat sink device, per se, or heat absorbing material, per se, is not included in this subclass or indented subclasses.

**SEE OR SEARCH CLASS:**

- 73, Measuring and Testing, especially subclass 113.01 for measuring or testing a steam or water operated engine; related engine system or engine component, subclass 114.68 for measuring or testing the cooling system of an internal combustion engine and subclass 700 for a fluid pressure gauge, generally.
- 110, Furnaces, for a heating system, generally.
- 122, Liquid Heaters and Vaporizers, for a heating unit specific to that class.
- 126, Stoves and Furnaces, for a heating unit, generally.
- 137, Fluid Handling, for a fluid system, generally.
- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclasses 60+ for a method of making a heat exchanger or boiler by means of adhesive or nonmetallic bonding where no metalworking takes place.
- 159, Concentrating Evaporators, for an evaporator for cooling, and Digest 18 an art collection specific to an accumulator.
- 205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, subclass 73 for an electrolytic method of making a hollow body such as a heat exchanger or boiler.

264, Plastic and Nonmetallic Article Shaping or Treating: Processes, appropriate subclass for a process of shaping or treating nonmetallic material under the class definition.

**890.031 Repairing, converting, servicing or salvaging:**

This subclass is indented under subclass 890.03. Process wherein an existing heat exchanger or boiler is (1) restored or otherwise put in a more functional, stable or improved working condition; (2) mechanically modified or altered to produce an article of substantially different capacity, size, function or type of operation; or (3) treated to recover a portion or the whole thereof which would otherwise constitute discarded material or using such material in a process of mechanical manufacturing.

(1) Note. See the definition of repair in Class 29 Glossary in the Class Definition.

(2) Note. Making a replacement part, per se, is not found in this subclass unless that part is claimed as being installed in the device being repaired.

SEE OR SEARCH THIS CLASS, SUBCLASS:

401.1, for a process of converting. Also see the search notes thereunder.

402.01+, for a process of repairing. Also see the search notes thereunder.

403.1+, for a process including scrap recovery or utilization. Also see the search notes thereunder.

**890.032 Heat pipe device making:**

This subclass is indented under subclass 890.03. Process wherein the article made is a heat-transfer device consisting of a sealed receptacle which absorbs radiant energy at one end by vaporization of a liquid and releases energy at the other end by condensation of the vapor.

**890.033 Solar energy device making:**

This subclass is indented under subclass 890.03. Making wherein the article made is especially useful for capturing, transmitting, storing or otherwise utilizing radiation from the sun.

**890.034 Regenerator or recuperator making:**

This subclass is indented under subclass 890.03. Process wherein the article made is especially useful for recovering thermal energy from effluent or exhaust fluids, which thermal energy is usually transferred to incoming fluids.

(1) Note. These articles generally are either reversible--one is in a heat absorbing cycle whereas a second is in a heat transmitting cycle, or utilize counter principles.

**890.035 Cooling apparatus making, e.g., air conditioner, refrigerator:**

This subclass is indented under subclass 890.03. Process wherein the article made is especially useful for (1) removing thermal energy from an enclosed chamber and its contents or (2) comfort treating an ambient area by lowering the air temperature and reducing the humidity.

SEE OR SEARCH CLASS:

159, Concentrating Evaporators, for an evaporator for cooling, and Digest 18 an art collection specific to an accumulator.

**890.036 Tube inside tube:**

This subclass is indented under subclass 890.03. Process wherein the heat exchanger or boiler made has an elongated hollow generally cylindrical structure housed inside a similar structure.

**890.037 Tube wound about tube:**

This subclass is indented under subclass 890.03. Process wherein the heat exchanger or boiler made comprises a first elongated hollow generally cylindrical structure wrapped around a second elongated hollow generally cylindrical structure.

**890.038 Tube joined to flat sheet longitudinally, i.e., tube sheet:**

This subclass is indented under subclass 890.03. Process wherein the heat exchanger or boiler made comprises a broad generally flat member attached to an elongated hollow generally cylindrical structure which passageways

constitute substantially all of the heat exchanger or boiler passageways.

- (1) Note. Tube plate structure is quite different and distinct from tube sheet structure. A tube plate has traverse passageways therethrough and generally serves as end joint structure for a heat exchanger made up of a large plurality of associated tubes.

**890.039 Sheet joined to sheet:**

This subclass is indented under subclass 890.03. Process wherein the heat exchanger device or boiler made comprises a plurality of broad generally flat members joined directly together.

**890.04 With inserted tubes:**

This subclass is indented under subclass 890.039. Process wherein the heat exchanger device or boiler made comprises a plurality of broad generally flat members joined directly together having a plurality of elongated hollow generally cylindrical members extending therethrough.

**890.041 Utilizing bond inhibiting material:**

This subclass is indented under subclass 890.039. Process wherein the heat exchanger or boiler is selectively bonded together making use of coating composition or applied substance which prevents or minimizes bonding in particular interface areas.

- (1) Note. The above method is one type of "roll bonding".

**890.042 With subsequent fluid expansion:**

This subclass is indented under subclass 890.041. Process herein the selectively bonded heat exchanger or boiler is pneumatically or hydraulically inflated.

**890.043 Tube joint and tube plate structure:**

This subclass is indented under subclass 890.03. Process wherein the heat exchanger or boiler is made by joining elongated hollow generally cylindrical members to one another or to associated heat exchanger members.

- (1) Note. Tube sheet structure is quite different and distinct from tube plate structure. A tube sheet has longitudinal passage-

way therein, whereas a tube plate has traverse passageways therethrough.

**890.044 Including conduit expansion or inflation:**

This subclass is indented under subclass 890.043. Process wherein the tube joint or tube plate structure is plastically deformed to increase its size or volume.

- (1) Note. Generally, the expansion or inflation is done to perfect the joint structure integrity or to prepare the structure for its particular use.

**890.045 Tube with heat transfer means:**

This subclass is indented under subclass 890.03. Process wherein the heat exchanger or boiler has an elongated hollow generally cylindrical member having features especially adapted for transferring thermal energy.

**890.046 Finned tube:**

This subclass is indented under subclass 890.045. Process wherein the heat transfer means include at least one protuberance.

**890.047 Common fin traverses plurality of tubes:**

This subclass is indented under subclass 890.046. Process wherein at least one fin extends across and is attached to or associated with more than one of the tubes.

**890.048 Helically finned:**

This subclass is indented under subclass 890.046. Process wherein the heat exchanger or boiler has an elongated hollow generally cylindrical structure having spiral protuberances thereon for facilitating heat transfer.

**890.049 Internally finned:**

Process under 890.046 wherein the protuberance is located on the inside surface of the tube.

**890.05 Made from unitary workpiece, i.e., no assembly:**

This subclass is indented under subclass 890.046. Process wherein the finned tube is manufactured from a single preform member or bonded monolithic structure.



**890.051 Boiler making:**

This subclass is indented under subclass 890.03. Process wherein the article made is especially useful for (1) generating steam or (2) heating water in a closed system for distribution of thermal energy.

- (1) Note. Hot water heaters which are not closed systems are excluded from this subclass.

**SEE OR SEARCH CLASS:**

122, Liquid Heaters and Vaporizers, for a closed or pressurized apparatus to heat liquid or make steam.

**890.052 Header or manifold making:**

This subclass is indented under subclass 890.03. Process wherein the article made includes a conduit or chamber for distributing fluid from a series of smaller conduits.

**890.053 Tube making or reforming:**

This subclass is indented under subclass 890.03. Process wherein (1) the article made comprises an elongated hollow generally cylindrical member or (2) such an existing cylindrical member is reshaped.

**890.054 With metallurgical bonding:**

This subclass is indented under subclass 890.03. Process wherein the article made is manufactured employing metal soldering, brazing or welding.

**890.06 Accumulator making:**

This subclass is indented under subclass 592. Process for manufacturing a gas and water device which (1) acts upon a contained fluid to allow the fluid to be discharged rapidly thereby yielding high pneumatic or hydraulic power or (2) enables a uniform steam boiler output to meet an irregular steam demand.

- (1) Note. Prior to the establishment of this subclass (890.06), this subject matter was indented under "Gas and Water Device Making" (old 29/157+). Other subclasses under Class 29, subclasses 592+ have not been screened for this subject matter.

**890.07 Condenser, evaporator or vaporizer making:**

This subclass is indented under subclass 592. Process for manufacturing a gas and water device especially useful for changing matter in its vaporous or gaseous phase to a liquid phase or in its liquid phase to a vaporous or gaseous phase.

- (1) Note. This subclass excludes making driers, per se, since the phase change involved is only incidental to the drying use.
- (2) Note. Prior to the establishment of this subclass (890.07), this subject matter was indented under "Gas and Water Device Making" (old 29/157+). Other subclasses under Class 29, subclasses 592+ have not been screened for this subject matter.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

592.1+, for a method of making an electrical device.

**SEE OR SEARCH CLASS:**

122, Liquid Heaters and Vaporizers, for a closed or pressurized apparatus to heat liquid or make steam.

126, Stoves and Furnaces, for a water heater or steam generator of an open or unpressurized type, or may be a closed or pressurized type if it is part of the stove or furnace structure, subclass 350.2 for a fluid fuel burner other than a top-accessible liquid heating vessel vaporizer or humidifier or subclasses 381.1 and 382.1 for an open-top liquid heating vessel that may include a lid having a condenser for steam from the vessel.

**890.08 Muffler, manifold or exhaust pipe making:**

This subclass is indented under subclass 592. Process for manufacturing a gas and water device which is (1) useful for deadening the noise produced by escaping gas or vapor, (2) a duct through which spent gas leaves an engine or gas turbine or (3) a branch duct arrangement which connects valve parts of a multicylinder

internal combustion engine to a carburetor or to an exhaust gas handling system.

- (1) Note. Prior to the establishment of this subclass (890.08), this subject matter was indented under "Gas and Water Device Making" (old 29/157+). Other subclasses under Class 29, subclasses 592+ have not been screened for this subject matter.

**SEE OR SEARCH CLASS:**

138, Pipes and Tubular Conduits, for a tubular member for transmitting gas, generally.

**890.09 Fluidic or fluid actuated device making:**

This subclass is indented under subclass 592. Process for manufacturing a gas and water article which (1) operates by the interaction of streams of fluids or (2) employs fluid dynamic phenomena to perform control, processing or actuation functions.

- (1) Note. Automatic transmission making and brake system making are not included in this subclass.
- (2) Note. Fluidic power device making is not included in this subclass.
- (3) Note. Fluidic devices are themselves classified in Class 137, subclasses 803+.
- (4) Note. Prior to the establishment of this subclass (890.09), this subject matter was indented under "Gas and Water Device Making" (old 29/157+). Other subclasses under Class 29, subclasses 592+ have not been screened for this subject matter.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

888+, for process of making a fluidic power device.

**890.1 Fluid Pattern dispersing device making, e.g., ink jet:**

This subclass is indented under subclass 592. Process for manufacturing a gas and water article which is especially useful for projecting, depositing, ejecting, or emitting fluid for pro-

ducing s:graphic, printing, or other information characters.

- (1) Note. Prior to the establishment of this subclass (890.1), this subject matter was indented under "Gas and Water Device Making" (old 29/157+). Other subclasses under Class 29, subclasses 592+ have not been screened for this subject matter.

**890.11 Tapping device making:**

This subclass is indented under subclass 592. Process for manufacturing a gas and water article which is especially useful for gaining entry or access into a fluid system at a location which was not previously an entry or access point.

- (1) Note. Prior to the establishment of this subclass (890.11), this subject matter was indented under "Gas and Water Device Making" (old 29/157+). Other subclasses under Class 29, subclasses 592+ have not been screened for this subject matter.

**890.12 Valve or choke making:**

This subclass is indented under subclass 592. Process for manufacturing a gas and water device which is especially useful for regulating or controlling the flow of fluids in a piping system or in machinery.

- (1) Note. Installing a preformed valve or valve assembly, per se, into a fluid system, per se, is not herein or hereunder unless some significant shaping or manufacturing occurs such as valve seat forming or assembling valve subcomponents.
- (2) Note. Prior to the establishment of these subclasses (890.12+), this subject matter was indented under "Gas and Water Device Making" (old 29/157+). Other subclasses under Class 29, subclasses 592+ have not been screened for this subject matter.

**890.121 Repairing, converting, servicing or salvaging:**

This subclass is indented under subclass 890.12. Process wherein an existing valve or choke is (1) restored or otherwise put in a more functional, stable or improved working condition; (2) mechanically modified or altered to produce an article of substantially different capacity, size, function or type of operation; or (3) treated to recover a portion of the whole thereof which would otherwise constitute discarded material or using such material in a process of mechanical manufacturing.

- (1) Note. See the definition of "repair" in Class 29 Glossary in the Class Definition.
- (2) Note. Making a replacement part, per se, is not found in this subclass.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 401.1, for a process of converting. Also see the search notes thereunder.
- 402.01+, for a process of repairing. Also see the search notes thereunder.
- 403.1+, for a process including scrap recovery or utilization. Also see the search notes thereunder.

**SEE OR SEARCH CLASS:**

- 137, Fluid Handling, subclass 15.17 for a process having a particular mounting or repairing feature for a valve or valve member, or subclasses 15.18-15.26 for a process of assembling, disassembling, or repairing a valve or valve member.

**890.122 Valve seat forming:**

This subclass is indented under subclass 890.12. Process including the step of permanently deforming, shaping or making the annular or circular ring upon which the valve head rests when the valve is in a closed position.

**890.123 Valve stem or tire valve making:**

This subclass is indented under subclass 890.12. Process including the step of manufacturing (1) connector structure by means of which a disk or plug is moved thereby opening

or closing the valve or (2) an elongated valve for use on pneumatic tires.

**890.124 With assembly, disassembly or composite article making:**

This subclass is indented under subclass 890.12. Process wherein the valve or choke which is manufactured is (1) composed of a plurality of interrelated attached components or subcombination elements, some of which are associated or disassociated from the other components or elements during the manufacturing or (2) a unitary structure composed of at least two different materials or compositions with each material or composition retaining its identity.

**SEE OR SEARCH CLASS:**

- 137, Fluid Handling, subclass 15.17 for a process having a particular mounting or repairing feature for a valve or valve member, or subclasses 15.18-15.26 for a process of assembling, disassembling, or repairing a valve or valve member.

**890.125 Joining plural semi-circular components:**

This subclass is indented under subclass 890.124. Process wherein the valve or choke is manufactured from at least two arcuate members or elements assembled together.

**890.126 With material shaping or cutting:**

This subclass is indented under subclass 890.124. Process wherein the valve or choke is manufactured (1) utilizing a deforming, casting or molding operation or (2) employing a machining, drilling or severing step.

- (1) Note. A coating step, per se, is not a material shaping for the purpose of this subclass.

**890.127 Including molding or casting:**

This subclass is indented under subclass 890.126. Process wherein the material shaping operation includes shaping a liquid or plastic substance into a fixed shape utilizing a forming surface or mold.

**890.128 Including machining or drilling:**

This subclass is indented under subclass 890.126. Process wherein the material shaping operation includes the use of a cutter to remove

excess material to produce the desired shaped valve or component thereof.

- (1) Note. The cutter herein is generally a milling, drilling, grinding, broaching or planing tool.

**890.129 Including metallurgical bonding:**

This subclass is indented under subclass 890.126. Process including a metal soldering, welding or brazing step.

**890.13 Including metal deforming:**

This subclass is indented under subclass 890.126. Process including metal shaping employing forces which exceed the elastic limit of the metal, which forces plastically shape the metal without any substantial removal of material.

- (1) Note. See the definition of “deforming” in the Class 29 Glossary in the Class Definition.

**890.131 Including metallurgical bonding:**

This subclass is indented under subclass 890.124. Process wherein the valve or choke is manufactured employing metal soldering, brazing, or welding.

**890.132 Including metal shaping and diverse operation:**

This subclass is indented under subclass 890.12. Process wherein the valve or choke is manufactured by the combined steps of (1) permanently altering the form, configuration, or contour of the workpiece or stock, with or without removal of material, together with (2) an unlike or different manufacturing step, which second step is distinct from the first step although the second step may also constitute another metal shaping operation.

**890.14 Gas and water specific plumbing component making:**

This subclass is indented under subclass 592. Process for manufacturing an article especially adapted for use with gaseous phase matter or with aqueous material, which article is utilized generally by a skilled plumber in the practice of his trade.

- (1) Note. Original placement in this subclass or the indented subclasses requires more

than the process of assembling two or more self-sustaining parts, per se.

- (2) Note. Prior to the establishment of this subclass (890.14+), this subject matter was indented under “Gas and Water Device Making” (old 29/157+). Other subclasses under Class 29, subclasses 592+ have not been screened for this subject matter.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 428+, for a process including assembling two or more self-sustaining parts. See the definition of “assembly” in Class 29 Glossary in the Class Definition.

SEE OR SEARCH CLASS:

- 15, Brushing, Scrubbing, and General Cleaning, for utilization of gas or water in that class operation.  
138, Pipes and Tubular Conduits, for means to transmit gas or water.

**890.141 Plumbing fixture making:**

This subclass is indented under subclass 890.14. Process wherein the manufactured article is a fixed or attached gas and water utility device which is to be installed into a fluid system.

SEE OR SEARCH CLASS:

- 4, Baths, Closets, Sinks, and Spittoons, for a plumbing fixture, generally

**890.142 Nozzle making:**

This subclass is indented under subclass 890.14. Process wherein the manufactured article is an especially adapted tubelike device, generally streamlined, for accelerating, directing, and dispersing a fluid, whose pressure decreases as it leaves the device.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 890.01, for a method of making a rocket or jet device.

**890.143 Sprayer:**

This subclass is indented under subclass 890.142. Process wherein the manufactured nozzle is especially useful for dispersing or projecting the fluid so as to form a spray.

**890.144 Flexible conduit or fitting therefor:**

This subclass is indented under subclass 890.14. Process wherein the manufactured article is (1) a pliant or nonrigid tube or pipe or (2) an accessory part or component especially adapted for use with (1).

**890.145 Flue connector device making:**

Process under 890.14 wherein the manufactured article forms at least part of an enclosed passageway or channel for conveying flame, hot gases, or smoke to a chimney or to the ambient atmosphere.

**890.146 Trap making:**

This subclass is indented under subclass 890.14. Process wherein the manufactured article is especially useful in a fluid system for preventing the passage of sewer gas or noxious effluent gas while allowing other material and fluid to proceed therethrough.

- (1) Note. A trap generally consists of a bend or partitioned chamber in which the liquid forms a seal to prevent passage of the undesired gas.

**890.147 Return connector device making:**

This subclass is indented under subclass 890.14. Process wherein the manufactured article forms at least part of an enclosed passageway or channel for conveying gas or water back to its starting point or previous location.

**890.148 T-shaped fitting making:**

This subclass is indented under subclass 890.14. Process wherein the manufactured article is an accessory, part, or component especially adapted for use in a fluid system, which part or component has a form or configuration similar to the 20th letter of the English alphabet.

**890.149 Elbow or L-shaped fitting making:**

This subclass is indented under subclass 890.14. Process wherein the manufactured article is an accessory part or component especially adapted for use in a fluid system, which part or component has a form or configuration similar to the bent joint in the human arm or to the 12th letter of the English alphabet.

**890.15 Ferrule making or reforming:**

This subclass is indented under subclass 890.14. Process wherein the manufactured article has a structure similar to a band, ring, cap, collar, or a short tube or bushing.

**891 Agricultural device making:**

This subclass is indented under subclass 592. Process for manufacturing apparatus utilized in the cultivation of the soil producing crops.

**891.1 Traction apparatus, e.g., for tractor:**

This subclass is indented under subclass 891. Process for manufacturing devices related to the motivation of agricultural machinery (e.g., crawler type tractor, etc.) with respect to ground contact.

**SEE OR SEARCH CLASS:**

180, Motor Vehicles, subclasses 9+ for track driven motor vehicle structure and subclass 16 for traction wheel attachments.

**891.2 Harvester guard:**

This subclass is indented under subclass 891. Process for manufacturing a protection device for the user of a crop cutting device.

**SEE OR SEARCH CLASS:**

56, Harvesters, subclasses 307+ for guard finger and bar structure for cutter members.

**892 Pulley making:**

This subclass is indented under subclass 592. Process of manufacturing a wheel for transmitting power by means of a band or belt type member passing over its rim.

**SEE OR SEARCH CLASS:**

474, Endless Belt Power Transmission Systems or Components, subclasses 152+ for positive drive pulley structure and subclasses 166+ for friction drive pulleys or guide roll structure.

**892.1 Assembly:**

This subclass is indented under subclass 892. Process wherein the pulley is manufactured from a plurality of permanently associated parts.

**892.11 With shaping:**

This subclass is indented under subclass 892.1. Process including a step of altering form, configuration, or contour of a pulley component.

**892.2 Disc splitting to form pulley rim groove:**

This subclass is indented under subclass 892. Process wherein a circular metal blank is rotated and caused by a tool to divide at its periphery into at least one band or belt receiving channel which is incorporated into a pulley rim.

## SEE OR SEARCH CLASS:

72, Metal Deforming, subclass 82 for metal deforming by use of rotating shape imparting tool during work spinning by work holder.

**892.3 Groove forming in sheet metal pulley rim:**

This subclass is indented under subclass 892. Process wherein a thin metal blank is shaped into at least one band or belt receiving channels which is incorporated into a pulley rim.

## SEE OR SEARCH CLASS:

474, Endless Belt Power Transmission Systems or Components, subclasses 166+ for pulleys with single or plural rim groove structure.

**893 Gear making:**

This subclass is indented under subclass 592. Process of manufacturing a wheel having segmented force transmitting portions thereon such as teeth extending about its periphery.

- (1) Note. Processes herein classified may include steps of removing, disassembling, and repairing as part of the gear making process.

**893.1 Assembling of gear into force transmitting device:**

This subclass is indented under subclass 893. Process including the joining of at least one gear into a unit for conveying driving energy or power.

## SEE OR SEARCH CLASS:

74, Machine Element or Mechanism, subclasses 412+ for directly cooperating gears.

**893.2 Gear mounting:**

This subclass is indented under subclass 893. Process wherein at least one gear is joined or assembled with elements such as an axle, thus forming a gear component assembly.

**893.3 Gear shaping:**

This subclass is indented under subclass 893. Process including mechanically permanently altering the form, configuration, dimensions, proportions or contour of a part or stock either with or without the removal of material to form a gear.

**893.31 Worm gear:**

This subclass is indented under subclass 893.3. Process for the shaping of a gear of the kind having a thread type element which revolves and intermeshes with the driven elements of a rack or wheel device.

## SEE OR SEARCH CLASS:

74, Machine Element or Mechanism, subclasses 425+ and 458 for worm type gear structure.

**893.32 Roll forming:**

This subclass is indented under subclass 893.3. Process wherein the shaping of the gear includes deforming the gear stock by means of a shaped forming tool which comes in rolling contact with the gear stock during its deformation thereof.

## SEE OR SEARCH CLASS:

72, Metal Deforming, subclasses 102+ for deforming during relative rotation between work and tool using a noncylindrical rotating tool.

**893.33 Punching or stamping:**

This subclass is indented under subclass 893.3. Process wherein the shaping of the gear includes the use of a cutting tool to sever the desired shape from the confines of relatively thin gear stock.

**893.34 Die-press shaping:**

This subclass is indented under subclass 893.3. Process wherein the shaping of the gear includes deforming the gear stock by means of a shaped forming tool or die which substantially imparts its shape to the gear stock as the

tool or die applies its deformation force thereto.

SEE OR SEARCH CLASS:

72, Metal Deforming, subclasses 343+ for deforming with use of closed-die and coacting work forcer (e.g., push-drawing).

**893.35 Gear tooth cutting:**

This subclass is indented under subclass 893.3. Process wherein the shaping of the gear includes removing material from a gear blank utilizing an operating tool, i.e., to cut teeth in its periphery by removal of material between said teeth.

SEE OR SEARCH CLASS:

409, Gear Cutting, Milling, or Planing, subclasses 1 through 62 for gear cutting as defined thereunder.

**893.36 Gear blank making:**

This subclass is indented under subclass 893.3. Process wherein stock for material forming a gear is shaped or treated.

**893.37 With specific gear material:**

This subclass is indented under subclass 893.3. Process utilizing particular or special materials both metallic and nonmetallic.

**894 Wheel making:**

This subclass is indented under subclass 592. Process for manufacturing a device having a generally circular, relatively narrow peripheral surface, i.e., a rim, framing an inner surface element, i.e., a connected hub, capable of turning on its central axis.

SEE OR SEARCH CLASS:

16, Miscellaneous Hardware, subclass 45 for caster wheel structure and subclass 117 for hand wheel type structure.  
74, Machine Element or Mechanism, subclass 572.21 for flywheel structure.  
310, Electrical Generator or Motor Structure, subclasses 261+ for rotor structure.

**894.01 Railway or trolley wheel making:**

This subclass is indented under subclass 894. Process wherein the device is especially adapted for use on rail transportation vehicles or streetcars.

SEE OR SEARCH CLASS:

72, Metal Deforming, for making a wheel by deforming a metal workpiece.

**894.011 Multiple part or composite:**

This subclass is indented under subclass 894.01. Process wherein the device is made of a plurality of distinct or assembled components.

**894.012 With axle or hub:**

This subclass is indented under subclass 894.011. Process wherein the device includes (a) a center portion or (b) a supporting shaft or member upon which the device revolves.

**894.1 Steering wheel:**

This subclass is indented under subclass 894. Process wherein the wheel made is of the type which is generally manually rotated about its axis to control by means of linkages the direction of movement of a vehicle such as an automobile.

SEE OR SEARCH CLASS:

74, Machine Element or Mechanism, subclasses 372+ for a hand wheel.  
264, Plastic and Nonmetallic Article Shaping or Treating Processes, for molding or shaping processes within the class definition which may include molding and uniting.

**894.2 Material winding, e.g., reel, spool:**

This subclass is indented under subclass 894. Process for manufacturing a device having a core which receives material to be wound thereon.

SEE OR SEARCH CLASS:

242, Winding, Tensioning, or Guiding, directed to particular material winding structure such as a reel, bobbin, spool, etc.

**894.3 Land wheel:**

This subclass is indented under subclass 894. Process wherein the wheel made is of the type that is generally mounted on a vehicle or other apparatus so that it supports the vehicle or apparatus against the force of earth's gravity while contacting the earth's surface.

## SEE OR SEARCH CLASS:

301, Land Vehicles: Wheels and Axles, for a land wheel, per se.

**894.31 Assembling tire to wheel body:**

This subclass is indented under subclass 894.3. Process wherein a wheel surrounding element, i.e., a tire, which may be replaceable is attached to a portion, i.e., the rim, of a wheel.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

894.37, for a process of making a nonresilient tire.

**894.32 Disc type wheel:**

This subclass is indented under subclass 894.3. Process wherein the central portion of the wheel is in the form of a generally thin solid circular element, i.e., a disc which supports the rim for turning about the wheel axis upon its hub.

## SEE OR SEARCH CLASS:

301, Land Vehicles: Wheels and Axles, directed to disc type wheel structure.

**894.321 Assembling wheel disc to rim and hub:**

This subclass is indented under subclass 894.32. Process including joining the disc to both the rim and hub portions of the wheel.

**894.322 Assembling wheel disc to rim:**

This subclass is indented under subclass 894.32. Process including joining the rim portion to the disc portion of the wheel.

**894.323 With disc shaping:**

This subclass is indented under subclass 894.322. Process including a step of altering form, configuration, or contour of the wheel disc.

**894.324 Integral rim and disc making:**

This subclass is indented under subclass 894.32. Process wherein the disc and rim portion are formed out of a unitary blank.

**894.325 Disc shaping:**

This subclass is indented under subclass 894.32. Process comprising of altering the form, configuration, or contour of the wheel disc.

**894.33 Tensioned spoke type wheel making:**

This subclass is indented under subclass 894.3. Process wherein the wheel has individual elements, i.e., spokes which radiate from the center of the wheel and support the rim portion thereof, the elements supporting the rim being in a mechanical state of tension.

- (1) Note. Determining spoke tension and adjusting such accordingly (i.e., wheel truing) is considered wheel making as defined in this subclass.

## SEE OR SEARCH CLASS:

301, Land Vehicles: Wheels and Axles, directed to tensioned spoke type wheel structure.

**894.331 Tensioning all spokes simultaneously:**

This subclass is indented under subclass 894.33. Process wherein elongation stress is applied at one moment of time to all spokes of a wheel to place them in a state of mechanical tension.

**894.332 Tensioning spokes in series:**

This subclass is indented under subclass 894.33. Process wherein a plurality of wheel spokes, but less than all, have the tensioning stress applied to them followed by a separate step of tensioning a further plurality of spokes.

**894.333 Tensioning spokes individually:**

This subclass is indented under subclass 894.33. Process wherein each wheel spoke has the tensioning stress applied to it in a separate operation.



**894.34 Compression, e.g., nontension, spoke type wheel making:**

This subclass is indented under subclass 894.3. Process wherein the wheel has individual elements, i.e., spokes radiating from the center of the wheel which support the rim portion thereof, the elements supporting the rim being subjected to no axial force prior to the supporting of any weight by the wheel.

**SEE OR SEARCH CLASS:**

301, Land Vehicles: Wheels and Axles, directed to nontensioned spoke type wheel structure.

**894.341 Joining spokes to rim and hub:**

This subclass is indented under subclass 894.34. Process including attaching the spokes to both the rim and hub portion of the wheel.

**SEE OR SEARCH CLASS:**

301, Land Vehicles: Wheels and Axles, subclasses 67 through 85 for spoke connections to felly (rim) and hub.

**894.342 Joining spokes to rim:**

This subclass is indented under subclass 894.34. Process including attaching the spokes to the rim portion of the wheel.

**894.343 Joining spokes to hub:**

This subclass is indented under subclass 894.34. Process including attaching the spokes to the hub portion of the wheel.

**894.344 Making plural spokes from a single blank:**

This subclass is indented under subclass 894.34. Process wherein a plurality of spokes are manufactured from a unitary workpiece.

**SEE OR SEARCH CLASS:**

301, Land Vehicles: Wheels and Axles, subclass 66 for integrally connected spoke type wheels.

**894.345 Individual spoke making:**

This subclass is indented under subclass 894.34. Process wherein a spoke member is fabricated from stock material.

**SEE OR SEARCH CLASS:**

301, Land Vehicles: Wheels and Axles, subclass 104 for spoke structure.

**894.35 Rim making:**

This subclass is indented under subclass 894.3. Process for manufacturing the outer peripheral portion of a wheel which is joined to a hub or central portion thereof such as by spokes or a disc element.

**SEE OR SEARCH CLASS:**

301, Land Vehicles: Wheels and Axles, subclass 95.101 for felly or rim structure.

**894.351 With assembling:**

This subclass is indented under subclass 894.35. Process wherein the rim is manufactured from a plurality of permanently associated parts.

**894.352 Demountable rim making:**

This subclass is indented under subclass 894.351. Process wherein the manufactured rim includes a special feature to facilitate the attaching or detaching of an element such as a tire upon the rim.

**SEE OR SEARCH CLASS:**

301, Land Vehicles: Wheels and Axles, subclasses 10.1+ for demountable rim structure.

**894.353 Die-press shaping:**

This subclass is indented under subclass 894.35. Process wherein stock material is deformed by means of a forming tool which substantially imparts its shape to the material as deformation force is applied thereto to form the rim.

**894.354 Roller forming:**

This subclass is indented under subclass 894.35. Process wherein the rim is manufactured from stock material deformed by means of a forming tool which comes in rolling contact with such material.

**894.36 Hub making:**

This subclass is indented under subclass 894.3. Process for manufacturing the central portion of a wheel especially a structure which may be joined at the wheel center with other wheel elements, e.g., spokes, and is used for mounting the wheel for rotation during use.

- (1) Note. A process of repairing a hub is included herein as well as method of demounting a hub from associated elements.

SEE OR SEARCH CLASS:

301, Land Vehicles: Wheel and Axles, subclasses 105.1+ for hub structure.

**894.361 With assembling:**

This subclass is indented under subclass 894.36. Process wherein the hub is manufactured from a plurality of permanently associated parts.

**894.362 Hub shaping:**

This subclass is indented under subclass 894.36. Process wherein the hub is manufactured of stock material altered in form, configuration, or contour.

**894.37 Tire making:**

This subclass is indented under subclass 894.3. Process for manufacturing a wheel surrounding element joined thereto, usually by means of the wheel rim, said element generally comprising the land contacting surface.

- (1) Note. Excluded from this subclass are the resilient tire molding processes, per se, as defined in Class 156 and the corresponding apparatus, Class 425.

SEE OR SEARCH THIS CLASS, SUBCLASS:

894.31, for process of assembling tire to wheel body.

SEE OR SEARCH CLASS:

301, Land Vehicles: Wheels and Axles, subclasses 39.1+ for emergency tire structure and 86+ for nonresilient tire structure.

**894.38 Wheel trim making, e.g., wheel cover, hub-cap:**

This subclass is indented under subclass 894.3. Process for manufacturing a device secured to and rotating with a wheel which device ornaments or protects the wheel.

**894.381 With means for retaining trim member on wheel:**

This subclass is indented under subclass 894.38. Process including a component for securing, generally removably, a trim member to a wheel.

**895 Roller making:**

This subclass is indented under subclass 592. Process for manufacturing a device having a generally cylindrical work contacting surface which surface revolves about the longitudinal axis thereof with rolling motion relative to the surface of the work.

SEE OR SEARCH THIS CLASS, SUBCLASS:

898.068, for process of manufacturing a cylindrical rolling component for use in a anti-friction bearing.

SEE OR SEARCH CLASS:

- 72, Metal Deforming, subclass 236 for a disclosure of roller reconditioning or lubricating.
- 76, Metal Tools and Implements, Making, subclass 107.1 for a process of making a die roll.
- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, for method of making rolls by lamination.
- 205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, subclass 73 for the electroforming of a roll, ring, or hollow body; subclasses 131+ for the electrolytic coating of an internal surface (e.g., inside of a cylinder, etc.); and subclass 151 for the electrolytic coating of a predominantly single metal or alloy cylinder, roll, or hollow article.
- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, for molding and shaping of plastic materials within the class definition.
- 409, Gear Cutting, Milling, or Planing, subclass 305 for a machine for planing a groove in the curved surface of a roll to provide a scored surface, e.g., for forming the surface of a grinding roll, a crushing roll, etc.

- 427, Coating Processes, subclasses 230+, for a process of coating the interior of a hollow article, including a roll, by other than immersion.
- 451, Abrading, subclasses 49+ for a process of grinding a roll, roller, shaft, ball, or piston.
- 492, Roll or Roller, for a roller of general utility not elsewhere provided for; see the notes thereunder.

### 895.1 Repairing or servicing:

This subclass is indented under subclass 895. Process comprising the restoring of an existing roller to a more functional, stable, or improved working condition.

- (1) Note. See the definition of "repair" in the Class 29 Glossary in the Class Definition.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 402.01+, for particular repair operations which may be utilized in repair of a roller. Also see the search notes thereunder.

### 895.2 Assembling preformed components:

This subclass is indented under subclass 895. Process for joining or juxtaposing in a permanent relationship the previously manufactured elements of a roller.

SEE OR SEARCH CLASS:

- 492, Roll or Roller, for a roll not elsewhere provided for, and see the notes thereunder.

### 895.21 Work contacting surface element assembled to core:

This subclass is indented under subclass 895.2. Process wherein a previously formed work contacting surface is assembled to an interior centrally portioned support element.

SEE OR SEARCH CLASS:

- 492, Roll or Roller, for a roll not elsewhere provided for, and see the notes thereunder.

### 895.211 Work contacting surface wound about core:

This subclass is indented under subclass 895.21. Process wherein the previously formed work contacting surface is in the form

of an elongated strip-like element which is caused to sinuously encircle the interior centrally positioned support element.

### 895.212 With prestressing of component by heat differential, e.g., shrink fit:

This subclass is indented under subclass 895.21. Process including the use of temperature variation to change a dimension of a part relative to another part to facilitate the joining of the parts by a subsequent temperature variation.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 447, for general processes of assembly or joining during mechanical manufacture with prestressing of part by heat differential.

### 895.213 Work contacting surface having annular axial sections:

This subclass is indented under subclass 895.21. Process wherein the work contacting surface includes at least two abutting annular elements axially of another along the axis of rotation of the roll.

SEE OR SEARCH CLASS:

- 492, Roll or Roller, subclasses 40+ for a roll, not elsewhere provided for, having axially stacked annular members.

### 895.22 Work contacting surface element assembled to end support members:

This subclass is indented under subclass 895.2. Process wherein the opposing end portions of a cylindrical work contacting surface element are assembled to end engaging holding or driving members.

### 895.23 Includes securing removable cover on roller:

This subclass is indented under subclass 895.2. Process including the step of placing and holding a sheet, strip, or tube element in position on a roller body element.

SEE OR SEARCH CLASS:

- 492, Roll or Roller, subclasses 22+ for a roll, not elsewhere provided for, having means to hold the edge of a sheet, strip, or tube element thereon.

**895.3 Fabricating and shaping roller work contacting surface element:**

This subclass is indented under subclass 895. Process including the steps of manufacturing the body of or configuring the roller work contacting surface element.

- (1) Note. This subclass includes treating the surface of a roller work contacting surface element to change its surface characteristic or shape (i.e., roughening or crowning).

**SEE OR SEARCH CLASS:**

492, Roll or Roller, for a roll not elsewhere provided for, and see the notes thereunder.

**895.31 Toothed roller:**

This subclass is indented under subclass 895.3. Process for forming, applying, and securing metallic teeth to the surface of cylindrical bodies.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

23.1, for machines and tools for forming, applying, and securing metallic teeth to the surface of cylindrical bodies.

**895.32 With coating or casting about a core:**

This subclass is indented under subclass 895.3. Process wherein the work contacting surface element is formed by covering the surface of an interior support element with a relatively thin layer of material applied, for example, projecting a liquid material against said surface or by molding a fluent material against said surface which material hardens to form said layer.

- (1) Note. In some instance, the formed work contacting surface element is formed on a mandrel from which it may be removed and mounted on another interior support element for use.

**SEE OR SEARCH CLASS:**

264, Plastic and Nonmetallic Article Shaping or Treating: Processes, for molding and shaping within the class definition.

**895.33 One-piece roller making:**

This subclass is indented under subclass 895. Process wherein the roller is made of one piece such as by molding or casting.

- (1) Note. A blank may be shaped by forming steps such as drawing, coining, and swaging into the final roller configuration.

**896.1 Dental appliance making:**

This subclass is indented under subclass 592. Process for manufacturing a device pertaining to or for the teeth such as a denture, a bridge, a crown, or an artificial tooth.

**SEE OR SEARCH CLASS:**

433, Dentistry, subclasses 215+ for a method or material for testing, treating, restoring, or removing natural teeth.

**896.11 Orthodontic device making:**

This subclass is indented under subclass 896.1. Process wherein the device is especially adapted for correcting abnormally aligned or positioned teeth.

**896.2 Sound device making:**

This subclass is indented under subclass 592. Process for manufacturing a device especially adapted for producing, recording, amplifying, modifying, or otherwise altering a vibratory disturbance in a fluid or solid, which disturbance is capable of being detected by the organs of hearing.

**896.21 Hearing aid component making:**

This subclass is indented under subclass 896.2. Process wherein the manufactured device is especially adapted to be worn in order to compensate for poor hearing.

**SEE OR SEARCH CLASS:**

600, Surgery, subclass 25 for a process of surgically implanting a vibratory hearing aid. Also see the search note thereunder.

**896.22 Musical instrument or tuning fork making:**

This subclass is indented under subclass 896.2. Process wherein the manufactured device is especially adapted (a) for producing sounds or

tones possessing rhythm, melody, and harmony or (b) for producing a sound of fixed pitch useful as a reference, as in adjusting a musical instrument.

**SEE OR SEARCH CLASS:**

84, Music, subclasses 1+ for a musical instrument, per se, and subclasses 454+ for a turning device, per se.

**896.23 Including diaphragm or support therefor:**

This subclass is indented under subclass 896.2. Process wherein the manufactured device (a) includes a thin disk whose vibrations convert electric signals to sound waves or sound waves to electric signals or (b) bears the weight of or holds in position such a disk.

**SEE OR SEARCH CLASS:**

181, Acoustics, especially subclasses 148+ for a diaphragm and enclosure and subclasses 157+ for a diaphragm, per se, and/or mounting or suspension means therefor.

**896.24 Phonograph component making:**

This subclass is indented under subclass 896.2. Process wherein the manufactured device is a machine for reproducing sound from a record disk or a part of such a machine.

**SEE OR SEARCH CLASS:**

369, Dynamic Information Storage or Retrieval, subclasses 99+ for specific detail of information handling portion of system.

**896.3 Watch or clock making:**

This subclass is indented under subclass 592. Process for manufacturing (a) a device especially adapted for measuring or indicating time such as by means of a numbered dial and moving hands or pointers or (b) a part of such a device.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

228, for means to apply or remove a flat spiral spring to or from a watch or clock.

**SEE OR SEARCH CLASS:**

368, Horology: Time Measuring Systems or Devices, subclasses 62+ for a chronological device, per se.

**896.31 Having arbor, pinion, or balance:**

This subclass is indented under subclass 896.3. Process wherein the manufactured device or part includes (a) a spindle of a wheel, (b) a small cogwheel engaged by a larger cogwheel or a rack, or (c) a wheel adapted for attaining equilibrium.

(1) Note. Included herein is a blank to be made into an arbor, pinion, or balance.

**SEE OR SEARCH CLASS:**

368, Horology: Time Measuring Systems or Devices, especially subclasses 127+ for a balance wheel-type escapement and subclass 322 for arbor and pinion details.

**896.32 Having indicia, face, or dial:**

This subclass is indented under subclass 896.3. Process wherein the manufactured device or part includes (a) identifying marks for indicating the time or (b) the front marked side indicating the time.

(1) Note. Included herein is a blank to be made into an indicia, face, or dial.

**SEE OR SEARCH CLASS:**

368, Horology: Time Measuring Systems or Devices, especially subclasses 232+ for dial details, per se.

**896.33 Having case, cover, or back:**

This subclass is indented under subclass 896.3. Process wherein the manufactured device or part includes (a) a container or receptacle or (b) a wrapper or protector.

(1) Note. Included herein is a blank to be made into a case, cover, or back.

**SEE OR SEARCH CLASS:**

72, Metal Deforming, subclasses 343+ for disclosure of push-drawing or deep-drawing, subclasses 412+ for a tool couple embodying a nonplanar

tool face, and cross-reference art collection 703 for knurling.

368, Horology: Time Measuring Systems or Devices, especially subclasses 276+ for a case.

**896.34 Having crown, stem, or pendent:**

This subclass is indented under subclass 896.3. Process wherein the manufactured device or part includes (a) a small projecting shaft by which a watch or clock is set or wound; (b) an expanded button or knob for use on (a); or (c) a dangling, suspended, or projecting member.

(1) Note. Included herein is a blank to be made into a crown, stem, or pendent.

SEE OR SEARCH CLASS:

72, Metal Deforming, subclasses 343+ for disclosure of push-drawing or deep-drawing, subclasses 412+ for a tool couple embodying a nonplanar tool face, and cross-reference art collection 703 for knurling.

368, Horology: Time Measuring Systems or Devices, especially subclasses 301+ for cases with pendent details and subclasses 319+ for crown or stem details.

**896.4 Jewelry or locket making:**

This subclass is indented under subclass 592. Process for manufacturing a device or component especially adapted for adornment purposes such as an ornament made of precious or decorative material or set with gems or gem imitations.

(1) Note. A method of making a jewelry box or a case for containing jewelry is included herein.

SEE OR SEARCH THIS CLASS, SUBCLASS:

10, for gem or jewel setting.

SEE OR SEARCH CLASS:

163, Needle and Pin Making, subclasses 1+ for making a needle, generally.

**896.41 Human adornment device making:**

This subclass is indented under subclass 896.4. Process wherein the manufactured device or component is especially adapted to decorate or

lend beauty to a person who wears the device or component.

**896.411 Bracelet making:**

This subclass is indented under subclass 896.41. Process wherein the manufactured device or component is for encircling the human wrist, arm, ankle, or leg.

**896.412 Finger ring making:**

This subclass is indented under subclass 896.41. Process wherein the manufactured device or component is for encircling one of the five digits on the human hand or foot.

SEE OR SEARCH THIS CLASS, SUBCLASS:

8, for forming or sizing a finger ring.

**896.42 Latch, clasp, or fastener component making:**

This subclass is indented under subclass 896.4. Process wherein the manufactured device or component is especially adapted for securing or holding together a jewelry or locket device.

**896.43 Ornamental stock making:**

This subclass is indented under subclass 896.4. Process wherein the manufactured device or component is raw material or a blank especially adapted for producing an ornament therefrom.

**896.5 Knob or knob shank making:**

This subclass is indented under subclass 592. Process for manufacturing a device or component having (a) a rounded protuberance offset from a surface or extremity or (b) a tang or stem for mounting (a).

(1) Note. A knob is generally useful for opening or operating purposes.

SEE OR SEARCH CLASS:

292, Closure Fasteners, subclass 347 for a closure knob, generally.

**896.6 Multiperforated metal article making:**

This subclass is indented under subclass 592. Process for making multiple perforations in a metallic sheet, tube, etc.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

6.1+, for a process or apparatus for making apertures in sheet material and thereafter deforming the apertured portion of the sheet to form an expanded metal article.

SEE OR SEARCH CLASS:

83, Cutting, subclasses 13+ for a process of cutting, generally.  
 205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, subclass 75 for an electrolytic method of making a perforated article.  
 428, Stock Material or Miscellaneous Articles, subclass 592 for metallic stock material which is helical or has a helical component and subclass 596 for such material which has apertures or cuts.

**896.61 Coil wound wall screen:**

This subclass is indented under subclass 896.6. Process for making a perforated filtering device which includes a spiral element for performing the filtering.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

905, for a cross-reference art collection of methods for making a coil wound wall screen.

SEE OR SEARCH CLASS:

166, Wells, subclass 231 for a spiral well screen.  
 210, Liquid Purification or Separation, subclass 497.1 for a helically wound filter.  
 242, Winding, Tensioning, or Guiding, subclasses 430+ for making a composite hollow object by an operation of that class.

**896.62 Filter:**

This subclass is indented under subclass 896.6. Process of making a perforated article which will be used to separate particles from material flowing through the article.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

902, for a cross-reference art collection including a method for making a filter.

SEE OR SEARCH CLASS:

210, Liquid Purification or Separation, subclass 498 for a filter having a perforated or grooved plate.

**896.7 Turnbuckle making:**

This subclass is indented under subclass 592. Process for (a) manufacturing a coupling device used for tightening a rod or cable or (b) assembling a tensioning member to such a device.

**896.8 Spring-head clip making:**

This subclass is indented under subclass 592. Process for manufacturing a clasp or fastener especially adapted for use on railway rolling stock such as a carriage spring head or a spring clip.

SEE OR SEARCH CLASS:

24, Buckles, Buttons, Clasps, etc., subclasses 455+ for a clip, per se, generally.  
 105, Railway Rolling Stock, subclasses 157.1+ for a railway truck including a spring-head clip.

**896.9 Spring making:**

This subclass is indented under subclass 592. Process for manufacturing an elastic device or component that regains its original shape after being compressed or extended.

(1) Note. A spring made (a) by metal working without an assembly or diverse manufacturing step or (b) including any tempering or hardening step is generally not found as an original patent in Class 29.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

896.8, for a process of making a spring-head clip peculiar to railway usage.

## SEE OR SEARCH CLASS:

- 72, Metal Deforming, for bending, generally, a metal workpiece; especially subclass 66 for coiling by a workguide member orbiting about the longitudinal centerline of a formed coil and subclasses 135+ for making a helical coil by deflecting.
- 140, Wireworking, for working wire stock by operations other than provided for in the metal deforming class, especially subclass 89 for spring setting and subclass 103 for the loop forming of a coil spring.
- 148, Metal Treatment, for modifying or maintaining metal microstructure (i.e., tempering, hardening, solution heat treating, etc.) with or without assembly or diverse operations.
- 267, Spring Devices, for a spring, per se.
- 428, Stock Material or Miscellaneous Articles, subclass 592 for metallic stock material which is helical.

**896.91 For vehicle or clutch:**

This subclass is indented under subclass 896.9. Process wherein the elastic device is especially adapted for use in (a) a device or conveyance for carrying passengers, freight, goods, or equipment or (b) a device for engaging and disengaging two working parts of a shaft or of a shaft and a driving mechanism.

**896.92 For human comfort:**

This subclass is indented under subclass 896.9. Process wherein the elastic device is especially adapted for providing physical ease or well being to mankind.

- (1) Note. Generally these devices are for use in cushions, chairs, beds, furniture, or sofas.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

896.93, for a method of making a shock or vibration absorber, per se.

**896.93 Resilient shock or vibration absorber utility:**

This subclass is indented under subclass 896.9. Process wherein the elastic device is especially adapted for damping or dissipating mechanical

impact, collision, wave fluctuation, or periodic quivering.

**897 Structural member making:**

This subclass is indented under subclass 592. Process of manufacturing an element utilized in supporting relationship with other elements as components of an entity such as a building or vehicle.

- (1) Note. Prior to the issuance of the classification order establishing this subclass (897), this subject matter was indented under "Braces and Brackets" (old 29/150) and "Columns and Girders" (old 29/155). Other subclasses under Class 29, subclasses 592+ have not been screened for this subject matter.

## SEE OR SEARCH CLASS:

72, Metal Deforming, for apparatus or process for the mechanical treatment of metal work.

**897.1 Restoring existing member, e.g., reinforcing, repairing:**

This subclass is indented under subclass 897. Process wherein an element is returned or improved to a more functional or stable working condition.

## SEE OR SEARCH CLASS:

228, Metal Fusion Bonding, for joining the meeting faces of engaged metal work parts.

**897.15 Grille making:**

This subclass is indented under subclass 897. Process wherein the manufactured structural member is a grating or screen.

- (1) Note. A grille is generally used to protectively cover or shield an opening for fluid or a communication receiver, transmitter, or amplifier.

**897.2 Vehicular structural member making:**

This subclass is indented under subclass 897. Process for manufacturing a structural member which is integral with a transporting device, e.g., an automobile, airplane, or ship.



## SEE OR SEARCH CLASS:

- 105, Railway Rolling Stock, for structural element of wheeled cars bodies, etc., of such vehicles.
- 280, Land Vehicles, for structural elements of wheeled and other type of such vehicles.
- 296, Land Vehicles: Bodies and Tops, for body and top structural elements of such vehicles.

**897.3 Static structure, e.g., a building component:**

This subclass is indented under subclass 897. Process of manufacturing elements utilized in immovable ground attached shelter and other utility type construction, e.g., masts, light, and telephone poles.

## SEE OR SEARCH CLASS:

- 52, Static Structures (e.g., Buildings), for building and other structural elements.

**897.31 Openwork, e.g., a truss, joist, frame, lattice-type or box beam:**

This subclass is indented under subclass 897.3. Process for manufacturing a structural element area having passages or openings wherein the openings are formed by plural members held at spaced intervals or by perforating sheet-like members.

## SEE OR SEARCH CLASS:

- 52, Static Structures (e.g., Buildings), subclasses 633+ for openwork structures including truss, screen, frame, etc.

**897.312 Frame component:**

This subclass is indented under subclass 897.31. Process for manufacturing a constituent part of an openwork structure for enclosing or supporting something such as a window, door, etc.

**897.32 Panel:**

This subclass is indented under subclass 897.3. Process for manufacturing (1) a pair of opposed facings or sheet-like members retained by internal supporting structure or (2) a thin sheet-like member forming a surface or part of a larger surface.

## SEE OR SEARCH CLASS:

- 52, Static Structures (e.g., Buildings), subclasses 474+ for facer and subclasses 782.1+ for composite prefabricated panel.

**897.33 Columnar member:**

This subclass is indented under subclass 897.3. Process of manufacturing a member used for supporting compressional loads while in a substantially vertical orientation, e.g., column, pole, post, etc.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

- 897.35, for process of manufacturing a beam or girder.

## SEE OR SEARCH CLASS:

- 52, Static Structures (e.g., Buildings), subclasses 633 through 697 for openwork structures and subclasses 831-857 for elongated rigid structure.
- 174, Electricity: Conductors and Insulators, subclass 45 for towers, poles, or posts.
- 362, Illumination, subclass 431 for pole or post type support.

**897.34 Metal reinforcement member for nonmetallic, e.g., concrete, structural element:**

This subclass is indented under subclass 897.3. Process for manufacturing an element of a metallic nature, e.g., iron, steel, etc., which is incorporated for strengthening purposes within a substantially nonmetallic element such as a cast concrete column.

## SEE OR SEARCH CLASS:

- 52, Static Structures (e.g., Buildings), subclasses 600 through 602 for opaque stone-like module with elongated reinforcing and subclasses 851-857 for elongated rigid structure often used to reinforce concrete.

**897.35 Beam or girder:**

This subclass is indented under subclass 897.3. Process of manufacturing an elongated rigid member whose longitudinal dimension is much greater than its width and depth and is utilized as a principle horizontal support member in building.

SEE OR SEARCH THIS CLASS, SUB-CLASS:  
897.33, for method of manufacturing a column.

SEE OR SEARCH CLASS:

52, Static Structures (e.g., Buildings), subclasses 831 through 849 for an elongated rigid structure.

**898 Process for making bearing or component thereof:**

This subclass is indented under subclass 592. Process for manufacturing a machine part or a component thereof, which part is designed for general use, where one member continuously bears the weight of another and wherein there is either linear motion (a crosshead), rotary motion (of a shaft or axle), or oscillating movement (a lever between the two members).

- (1) Note. The subclasses hereunder include (a) methods of mounting and demounting bearings where such methods are especially utilized to connect or disconnect a specified bearing to supporting structure, (b) methods of lubricating bearing, (c) methods of sealing bearings, (d) methods of surface treating bearing elements, and (e) pre-usage processes (i.e., freeing, preloading, adjusting and aligning bearing, or bearing elements).

SEE OR SEARCH CLASS:

72, Metal Deforming, subclasses 343+ for a process or apparatus for deforming metal by use of a closed die and coacting work forcer, including making a ball or a race.  
384, Bearings, for a bearing, generally, especially subclasses 276+ for a sleeve or lining, per se.  
419, Powder Metallurgy Processes, subclass 28 for a process of making a miscellaneous article from comminuted metal in which a bond is obtained by heat with or without pressure and including significant subsequent shaping of the blank.

**898.01 Repairing:**

This subclass is indented under subclass 898. Process wherein an existing bearing or component thereof is restored to a more functional, stable, or improved working condition.

- (1) Note. See the definition of repair in Class 29, definitions paragraph III, Terms of Definitions.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

402.01+, for particular repair operations which may be utilized in repair of a bearing.

**898.02 Fluid bearing:**

This subclass is indented under subclass 898. Process of manufacturing a bearing wherein liquid or gas under pressure is used to support a component in whole or in part during relative movement of the manufactured bearing.

- (1) Note. Fluid (i.e., liquid, or gas) support and lubrication both involve interposing a fluid between relatively moving members. In general, the difference between them is that lubrication merely minimizes contact between the members whereas fluid support eliminates it altogether via a thicker layer of fluid. Almost all gas, hydrodynamic, or hydrostatic bearings involve fluid support.

SEE OR SEARCH CLASS:

384, Bearings, subclass 12 for linear fluid bearings and subclass 100 for rotary fluid bearings.

**898.03 Linear Bearing:**

This subclass is indented under subclass 898. Process of manufacturing a bearing wherein a bearing surface supports a member which has sliding or line movement in a straight direction relative to it.

SEE OR SEARCH CLASS:

384, Bearings, subclasses 7+ for specified linear type bearing devices.  
403, Joints and Connections, subclasses 52+ for two or more members connected together by a joint which includes a guide or slide.

**898.04 Rotary bearing:**

This subclass is indented under subclass 898. Process of manufacturing a bearing wherein the relative motion between the bearing and supported members includes a rotary component.

- (1) Note. This subclass includes a bearing arrangement wherein the relative motion between the supported and bearing members may be a result of flexure of a portion of the bearing (i.e., a resilient rotary oscillating movement).

**898.041 Thrust bearing:**

This subclass is indented under subclass 898. Process of manufacturing a bearing designed for loads imposed in the direction of the axis of rotation.

SEE OR SEARCH CLASS:

384, Bearings, for various types and structural features of thrust bearings.

**898.042 Plain bearing:**

This subclass is indented under subclass 898.04. Process of manufacturing a bearing wherein a bearing surface supports a member which has sliding or line contact relative to it.

- (1) Note. The term plain is used to distinguish from the so-called anti-friction type bearing which employs balls or rollers.

**898.043 Self-adjusting or self-aligning, including ball and socket type, bearing and component making:**

This subclass is indented under subclass 898.042. Process for manufacturing a bearing wherein relatively sliding surfaces in a support structure for the bearing permit continuous self-movement of the position of the bearing thereby correcting a misalignment of related components of the bearing included herein are bearings wherein one component has a spheroid portion, i.e., a ball, which is received in a recess of another component, i.e., a socket, and there relative sliding movement between the two components.

- (1) Note. The term "ball" is broadly used to refer to a bearing component which

includes a spherically shaped bearing portion but does not refer necessarily to a "ball" in the sense of an entire spheroid surface. The ball in many instances is a truncated "ball", i.e., cut off (more or less) at opposite ends thereof.

**898.044 Deforming socket to secure ball:**

This subclass is indented under subclass 898.043. Process of altering the shape of the ball receiving socket to facilitate the retention therein of the ball.

SEE OR SEARCH THIS CLASS, SUBCLASS:

243.5+, for overedge assembling apparatus.

441.1, for a method of assembling a sphere within a socket including deforming while retaining clearance for motion between the assembled parts.

725, for apparatus for assembling a roller or ball bearing by deformation.

SEE OR SEARCH CLASS:

72, Metal Deforming, subclasses 362+ for deforming processes.

384, Bearings, subclass 207 for sheet metal socket structure and subclass 208 for ball and socket assembly structure.

**898.045 Die-press shaping:**

This subclass is indented under subclass 898.044. Process wherein the step of deforming the socket is done by means of a shaped forming tool or die which substantially imparts its shape to the socket as the tool or die applies its deformation force thereto.

SEE OR SEARCH CLASS:

72, Metal Deforming, subclasses 343+ for deforming by use of closed die and coacting work forcer.

**898.046 Having liner:**

This subclass is indented under subclass 898.045. Process including the step of providing a structural element between the ball and socket components which element provides a sliding surface for at least one of said components.

- (1) Note. The liner element is distinct from a mere coacting layer on either of the ball and socket components.

**898.047 Having liner:**

This subclass is indented under subclass 898.043. Process including the step of providing a structural element between the ball and socket components, which element provides a sliding surface, for a least one of said components.

- (1) Note. The liner element is distinct from a mere coating layer on either of the ball and socket components.

**898.048 Socket making:**

This subclass is indented under subclass 898.043. Process including the step of manufacturing the socket component.

SEE OR SEARCH CLASS:

- 384, Bearings, subclass 207 for sheet metal socket.

**898.049 By molding or casting:**

This subclass is indented under subclass 898.048. Process wherein the socket component is made by shaping substantially flowable and settable material about the ball component.

SEE OR SEARCH CLASS:

- 164, Metal Founding, subclasses 47+ for shaping liquid metal against a forming surface.  
264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclasses 239+ for mechanical shaping or molding to form or reform shaped article.

**898.05 Nonmetallic socket:**

This subclass is indented under subclass 898.048. Process wherein material other than metal is utilized to form the socket component.

**898.051 By assembling:**

This subclass is indented under subclass 898.048. Process wherein the socket is manufactured from a plurality of permanently associated parts.

SEE OR SEARCH CLASS:

- 384, Bearings, subclass 208 for assembly structure of ball and socket type bearing.

**898.052 Ball making:**

This subclass is indented under subclass 898.043. Process including the step of manufacturing the ball component.

- (1) Note. The term "ball" is broadly used to refer to a bearing component which includes a spherically shaped bearing portion, but does not refer necessarily to "ball" which in many instances is a truncated ball, i.e., cut off (more or less) at opposite ends thereof.

SEE OR SEARCH CLASS:

- 384, Bearings, subclass 211 for structure or assembly of ball of "ball and socket" type bearing.

**898.053 With metallurgical bonding:**

This subclass is indented under subclass 898.052. Process wherein the step of making the ball component includes joining separate elements together by metal fusion techniques such as welding, soldering, or brazing.

SEE OR SEARCH CLASS:

- 384, Bearings, subclass 212 for structure for assembly of sectional type ball of ball and socket type bearing.

**898.054 Sleeve or bushing making:**

This subclass is indented under subclass 898.042. Process including the manufacture of a usually removable cylindrical lining for an opening which lining supports an element either rotary, oscillating, or nonrotary which has sliding or line contact relative to it.

- (1) Note. The lining may include cylindrical shaped segments.

SEE OR SEARCH CLASS:

- 384, Bearings, subclasses 276+ for plain type bearing structure with specified sleeve or liner.

**898.055 Nonmetallic:**

This subclass is indented under subclass 898.054. Process wherein material other than metal is utilized in the manufacture of the sleeve or bushing which material provides functional sleeve characteristics such as flexibility.

- (1) Note. The inclusion of a metallic backing or lining member as a component of such bearings does not effect their non-metallic designation since the dominant functional characteristics of such bearings result from the nonmetallic components thereof.

SEE OR SEARCH CLASS:

- 384, Bearings, subclasses 297+ for a plain bearing with specified nonmetal sleeve or liner.

**898.056 Strip or blank material shaping:**

This subclass is indented under subclass 898.054. Process including the step of shaping an elongated substantially narrow workpiece, i.e., a strip or a bendable predimensioned sheet blank into a sleeve or bushing type bearing element.

SEE OR SEARCH CLASS:

- 72, Metal Deforming, subclasses 362+ for appropriate metal deforming processes.

**898.057 Die-press shaping:**

This subclass is indented under subclass 898.056. Process wherein the means for manufacturing or altering the shape of the sleeve or bushing includes a movable member to forcibly press strip or blank material into a shaped cavity to such an extent that the work has impressed therein a shape in substantial conformance with at least a portion of said shaped cavity.

**898.058 Having inner lining layer:**

This subclass is indented under subclass 898.057. Process including the step of forming an adhering layer of material on the inner bearing surface of the sleeve or bushing.

**898.059 Having liner:**

This subclass is indented under subclass 898.054. Process including the step of providing an element on the inner cylindrical surface of the sleeve or bushing which slidably supports a movable element thereon.

SEE OR SEARCH CLASS:

- 384, Bearings, subclass 282 for a plain bearing with specified sleeve or liner having a bearing surface insert.

**898.06 Anti-friction bearing or component thereof:**

This subclass is indented under subclass 898.04. Process wherein the relative motion between the weight bearing and the supported member includes a rotary component and the friction between the members is in the nature of rolling friction, as in a ball or roller bearing.

- (1) Note. The components of anti-friction bearings include races, cages, and rolling friction members, i.e., rollers or balls, which terms are used uniformly in this and the indented subclasses as defined hereafter:

**RACE**

A structural member including the contact surface or raceway for rolling friction members such as rollers or balls.

**CAGE**

Members for mechanically spacing the rolling function members such as balls or rollers in their contact with the raceway.

**ROLLING FRICTION MEMBERS**

Those members, commonly balls or rollers, which provide that the friction between the relatively movable anti-friction bearing members is of the rolling type.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 724, for roller or ball bearing type anti-friction bearing assembling or disassembling means.

SEE OR SEARCH CLASS:

- 205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, subclass 73 for a process of making a roll, a ring, or a hollow body by electroforming.
- 384, Bearings, subclasses 445+ for anti-friction bearing assemblies and components.

**898.061 Assembling of race, cage and rolling anti-friction members:**

This subclass is indented under subclass 898.06. Process including the assembly of anti-friction bearing components, specifically, races, cages, and rollers or balls.

- (1) Note. See “assembly” in Glossary in the Class Definition.

**SEE OR SEARCH CLASS:**

384, Bearings, subclasses 510, 511, and 537 for specified means facilitating assembly of a ball bearing; subclasses 559+, 584, and 585 for roller bearing assembling means; and subclasses 600 and 617 for thrust bearing type assembling means.

**898.062 Assembling of race and rolling anti-friction members:**

This subclass is indented under subclass 898.06. Process wherein the assembled elements include races and either rollers or balls.

- (1) Note. See search notes to subclass 898.061 regarding means facilitating assembly, etc.

**898.063 With race making:**

This subclass is indented under subclass 898.062. Process including the step of manufacturing the race.

**898.064 Assembling of cage and rolling anti-friction members:**

This subclass is indented under subclass 898.06. Process wherein the assembled elements include a cage and either a roller or a ball.

- (1) Note. See search notes to subclass 898.061 regarding means facilitating assembly, etc.

**898.065 With cage making:**

This subclass is indented under subclass 898.064. Process including the step of manufacturing the cage.

**898.066 Race making:**

This subclass is indented under subclass 898.06. Process for manufacturing a race.

- (1) Note. See defined terms under subclass 898.06 for definition of a race.

**SEE OR SEARCH THIS CLASS, SUB-CLASS:**

898.063, for race making included with steps of assembling the race, ball, or roller members.

**SEE OR SEARCH CLASS:**

384, Bearings, directed to race structure as part of ball, roller, and thrust type anti-friction bearings.  
451, Abrading, subclass 52 for means for the grinding of a bearing raceway.

**898.067 Cage making:**

This subclass is indented under subclass 898.06. Process for manufacturing a cage.

- (1) Note. See defined terms under subclass 898.06 for definition of a cage.

**SEE OR SEARCH THIS CLASS, SUB-CLASS:**

898.065, for cage making included with steps of assembling the cage with ball or roller members.

**SEE OR SEARCH CLASS:**

384, Bearings, directed to cage structure as part of ball, roller, and thrust type anti-friction bearings.

**898.068 Roller making:**

This subclass is indented under subclass 898.06. Process of manufacturing a cylindrical rolling component for use in an anti-friction bearing.

**SEE OR SEARCH THIS CLASS, SUB-CLASS:**

895+, for method of making a roller for general usage.

**SEE OR SEARCH CLASS:**

384, Bearings, subclasses 565+ for roller structure.

**898.069 Ball making:**

This subclass is indented under subclass 898.06. Process of manufacturing a spheroid element for use in an anti-friction bearing.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

899+, for method of making a ball of general usage.

SEE OR SEARCH CLASS:

205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, subclass 73 for a process of making a roll, a ring, or a hollow body by electroforming.

384, Bearings, subclass 491 for ball structure and subclass 492 for ball composition or material.

451, Abrading, subclasses 49+ for means for the grinding of a roll or roller.

**898.07 Mounting:**

This subclass is indented under subclass 898. Process including the step of providing means or process for holding a bearing or elements thereof in a substantially fixed position in its environment, usually secured to a support element.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

428+, for assembling, generally, including assembling a bearing on a shaft or inside a holder.

**898.08 Demounting:**

This subclass is indented under subclass 898. Process for removing a bearing or elements thereof from a substantially fixed position in its environment, usually secured to a support means.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

426.1+, for disassembling, generally, including removing a bearing from a shaft or from inside a holder.

724, for apparatus including means to assemble or disassemble a roller or ball bearing.

**898.09 Pre-usage process, e.g., preloading, aligning:**

This subclass is indented under subclass 898. Process including the step of readying a manufactured bearing for utilization such as by (1) freeing the component parts for relative move-

ment, (2) mechanically adjusting the position of component parts with or without stressing force applied such as preloading (simulating operating conditions), and (3) the aligning of such bearing components in their installed position.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

898.044, for step of freeing bearing components after deforming step to secure same during assembly.

**898.1 Lubricating:**

This subclass is indented under subclass 898. Process including a step of supplying lubricant to a bearing by means of a lubricating element, of treating bearing components to retain lubricant, and of forming lubrication structure within the bearing members such as passage for lubricant to circulate.

SEE OR SEARCH CLASS:

384, Bearings, directed to lubricating means as part of and combined with anti-friction bearings.

**898.11 Sealing:**

This subclass is indented under subclass 898. Process of manufacturing a means for preventing matter from entering into, passing through, or escaping from a bearing.

SEE OR SEARCH CLASS:

384, Bearings, subclasses 130+ and 477+ for specified seals.

**898.12 Coating or casting:**

This subclass is indented under subclass 898. Process wherein the manufacturing of a bearing or component thereof includes the covering of a surface of such workpiece with a relatively thin layer of material applied, for example, by projecting a liquid material against said surface or by molding a fluent material against said surface which material hardens to form said layer.

**898.13 Bearing surface treatment:**

This subclass is indented under subclass 898. Process of operating on the bearing surface supporting portions of a bearing element to change its physical properties, e.g., peening.

**898.14 Specific metallic composition:**

This subclass is indented under subclass 898. Process wherein a bearing or component thereof is manufactured utilizing specific metallic compositions to provide their inherent qualities to the resulting structure.

**SEE OR SEARCH CLASS:**

384, Bearings, Cross-Reference Art Collection 912.

**898.15 Nonmetallic bearing element:**

This subclass is indented under subclass 898. Process wherein nonmetallic material is utilized to manufacture the bearing components or parts thereof to provide their inherent qualities to the resulting structure.

**SEE OR SEARCH CLASS:**

384, Bearings, Cross-Reference Art Collections 907+.

**899 Ball making:**

This subclass is indented under subclass 592. Process for manufacturing a spheroid element.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

34, for plural diverse manufacturing apparatus used for ball making.  
413, for process of obtaining plural pieces by breaking through weakened portion.  
417, for process of obtaining plural pieces by dividing sequentially from leading end.  
898.069, for process of manufacturing a spheroid element for use in a anti-friction bearing.

**SEE OR SEARCH CLASS:**

72, Metal Deformation, subclass 365 for "rolling" type process.  
86, Ammunition and Explosive-Charge Making, subclass 57 for shot making, firearm type.  
148, Metal Treatment, directed to particular operations defined therein.  
264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclass 15 for spheroiding or rounding of solid particles.

451, Abrading, subclasses 49+ for a method of ball grinding.

**899.1 Hollow ball:**

This subclass is indented under subclass 899. Process wherein the spheroid element comprises an outer member enclosing an empty portion thereof.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

463, for process of mechanical manufacture including peripheral joining of opposed mirror image parts to form hollow bodies.  
D20, process and apparatus for double blank.

**SEE OR SEARCH CLASS:**

228, Metal Fusion Bonding, subclass 173.6 for bonding by deforming sheet metal.

**CROSS-REFERENCE ART COLLECTIONS**

The documents in the following collections have been placed without regard to their original classification or to their claimed subject matter and are therefore not exhaustive of the art subject matter but are only examples of the art. Consequently, a complete search for an art subject matter provided here would require a review of the higher portions of this classification schedule.

**900 METHODS AND APPARATUS FOR ASSEMBLY BY ELECTROSTATIC ATTRACTION:**

Cross-reference art collection of documents wherein self-sustaining parts are juxtaposed, associated, or fastened to each other by the use of electrostatic attraction wherein one part is given an electrostatic charge.

- (1) Note. The purpose of the processes of this subclass is usually the attachment of sheets and/or objects to each other for ready detachment at a measurably later time.
- (2) Note. Adherence of liquids or of fluent solids to a solid material is excluded from this subclass; the objects of this subclass must be handled as units.



- (3) Note. The subject matter of this subclass has not been clearly provided for in any patent class heretofore; thus, this subclass is established as a collection place for such art. Because it is impossible to locate all art classifiable herein, a search of this subclass cannot be considered authoritative for patents issued before its establishment.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 428+, for a process of mechanical assembly, and see the notes thereto for locus of other subject matter concerned with assembly of objects.
- 700+, for apparatus for mechanical assembly, and see the notes thereto for the locus of other subject matter concerned with assembly of objects.

**SEE OR SEARCH CLASS:**

- 53, Package Making, for a process or apparatus using electrostatic charging in package making.
- 83, Cutting, for electrostatic charging in a cutting process or apparatus.
- 118, Coating Apparatus, subclasses 621+ for electrostatic projection or attraction of liquid or fluent solid coating material to work.
- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclasses 60+ for a surface-bonding process using tacky or other adhesive substances.
- 198, Conveyors: Power-Driven, subclass 691 for electrostatic means to enhance the adherence between a conveyor and its load.
- 226, Advancing Material of Indeterminate Length, subclass 94 for electrostatic means enhancing adherence work being moved by an advancing means.
- 242, Winding, Tensioning, or Guiding, for a process or apparatus using electrostatic charging in winding or reeling.
- 250, Radiant Energy, subclasses 324+ for electrostatic charging of objects by corona discharge.

- 271, Sheet Feeding or Delivering, subclass 18.1 for electrostatic separators and subclass 193 for electrostatic deliver conveyors.
- 361, Electricity: Electrical Systems and Devices, subclasses 225+ for electrostatic charging by other than corona discharge.
- 399, Electrophotography, for electric photography which involves charged photoconductive materials.
- 414, Material or Article Handling, for electrostatic charging used in material or article handling.
- 425, Plastic Article or Earthenware Shaping or Treating: Apparatus, subclass 174.8 for means of applying electrostatic charges to an object in a plastic or earthenware shaping or treating machine.
- 427, Coating Processes, subclasses 13+ for a process of coating with a liquid or with fluent solids which utilizes an electrostatic charge.
- 430, Radiation Imagery Chemistry: Process, Composition, or Product Thereof, subclasses 31+ for a process of electric photography including the electrostatic charging of chemically defined photoconductive materials.

**901 BALANCING METHOD:**

This subclass is indented under the class definition. Cross-reference art collection of documents relating to a process of bringing a dynamic device into or maintaining a state of equilibrium or harmony relative to mechanical forces or torques.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 407.01+, for a method of testing or indicating under the class definition.

**SEE OR SEARCH CLASS:**

- 73, Measuring and Testing, for a testing process and apparatus in general, and see the notes to the general definition of this class (73) for the loci of other testing and indicating processes and apparatus.

- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclass 64 for a laminating process including measuring, testing, or inspecting.
- 340, Communications: Electrical, subclasses 500+ for an electrical automatic condition responsive indicating systems.
- 902 FILTER MAKING:**  
This subclass is indented under the class definition. Cross-reference art collections of documents relating to a method of manufacturing a perforated or porous metal article which separates particles from materials flowing through the articles.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
896.62, for a method of making a multiperforated metal filter.
- SEE OR SEARCH CLASS:  
264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclasses 41+ for a method of pore forming in situ a nonmetallic article or an article formed from particulate material, and subclasses 109+ for a method of forming articles by uniting randomly associated particles.
- 419, Powder Metallurgy Processes, for a method of making an article by powder metallurgy techniques.
- 903 FIREARM BOLT MAKING:**  
This subclass is indented under the class definition. Cross-reference art collection of documents relating to a method manufacturing (1) a sliding bar that positions or manipulates a cartridge in a breech-loading rifle or (2) a similar device in any breech mechanism or any rifle.
- SEE OR SEARCH CLASS:  
42, Firearms, subclasses 69.01+ for a gun lock or firing mechanism.
- 904 LAMINATED METAL ARTICLE MAKING:**  
This subclass is indented under the class definition. Cross-reference art collection relating to a method of manufacturing metal ware having united superposed layers.
- SEE OR SEARCH CLASS:  
156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclasses 60+ for a method of surface bonding under the class definition.
- 228, Metal Fusion Bonding, subclasses 101+ for a method of metallurgically bonding.
- 413, Sheet Metal Container Making, subclasses 1+ for a method of fabricating a sheet metal receptacle or an element thereof.
- 427, Coating Processes, subclasses 402+ for a method of applying superposed diverse coating or coating a coated base.
- 905 MAKING COIL WOUND WALL SCREEN:**  
This subclass is indented under the class definition. Cross-reference art collection of documents relating to a method of manufacturing a filtering device which includes spiral elements for performing the filtering.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
896.61, for a method of fabricating a coil wound wall screen of multiperforated metal.
- SEE OR SEARCH CLASS:  
140, Wireworking, subclasses 71+ for a method of making an article from wire.
- 906 NUCLEAR DEVICE MAKING:**  
This subclass is indented under the class definition. Cross-reference art collection of documents relating to a method of manufacturing an article which releases energy by atomic fission or fusion or by radioactive decay.
- SEE OR SEARCH CLASS:  
376, Induced Nuclear Reactions: Processes, Systems, and Elements, for a nuclear device or an element thereof.
- 419, Powder Metallurgy Processes, for a method including a powder metallurgy step.
- 427, Coating Processes, subclasses 5+ for a method of coating a radioactive base or applying a radioactive coating. Fish

Tail Shore was named for its natural shape. Over the ages, sand deposits have built up from both sides of the point creating a natural harbor. This campsite is located on the north side of the reservoir.

END