CLASS 166, WELLS

SECTION I - CLASS DEFINITION

This class relates to processes or means not otherwise classified comprising (1) shafts or deep borings in the earth, commonly known as wells, for the extraction of fluids from the earth, (2) shafts or deep borings in the earth for inserting a fluid into the interstices of a porous earth formation, usually to enable withdrawal of fluid from a producing output well, (3) apparatus peculiarly adapted for treating a well or for use in or with a well, or (4) processes of using, making, or treating a well.

This class takes combinations of elements or process steps relating to wells and going beyond the scope of subcombinations, such as measuring or testing means or pumps, classifiable, per se, in other classes. The class also takes subcombinations, such as packers or expanding anchors, peculiar to wells. However, the class does not take various intermediate combinations, such as devices performing only a measuring or testing function or a pumping function, which may include subcombinations, such as packers or expanding anchors, as minor perfecting features.

Treating a well includes various miscellaneous processes or apparatus relating to wells; typically, gravel layer forming, cementing, washing or acidizing.

SECTION II - LINES WITH OTHER CLASSES AND WITHIN THIS CLASS

A. RELATIONSHIP TO CLASS 175, BORING OR PENETRATING THE EARTH

The relationship of Class 166 with boring or penetrating the earth, classified in Class 175, is close both for historical and functional reasons. The lines between Class 166 and Class 175 are set forth in the class definition of the latter class with the exception of the below noted reference to cementing. While Class 166 is generic to processes including earth boring or penetrating steps no general subclass has been provided in Class 166 for combinations with earth boring since earth boring of some kind is always associated with well making and the relationships expressed in the claims of patents were thought to be better classified on other bases in this class, see Class 175 subclasses 57+ and the search there noted for earth boring processes, per se.

Generally in relation to apparatus Class 175 is more comprehensive than Class 166 and takes combinations of Class 175 and Class 166 subject matter. Class 166 however, takes some miscellaneous subcombinations which may be disclosed as used only in drilling operations but which are in fact of general utility in wells, particularly when there is no suitable subclass provided in Class 175 and a suitable subclass is provided in Class 166.

Processes of cementing, plugging or consolidating as defined in Class 166 subclass 21 are distinguished from drilling with fluid processes classifiable in Class 175 subclasses 65+ by the interruption of the actual earth cutting operation of the drilling process. Thus a process which purports to be a drilling process but which includes in its disclosure some indication that the actual earth cutting has stopped to permit cementing, such as a statement that “drilling is resumed” or that “after the cement has set”, will be considered a cementing process for Class 166. The fact that a drilling tool stem or shaft is disclosed as the means for delivering the cementing materials below ground or a disclosure that drilling mud or drilling fluid is used as a carrier for or a constituent of the cementing material will not preclude classification in Class 166. Such processes in which drilling is interrupted to permit cementing are classifiable in Class 166 even if the cementing step is only normally or inferentially claimed. See, however (1) Note in Class 166, subclass 21.

B. RELATIONSHIP TO PUMPS

The general line between Class 417, Pumps and Class 166 is that if subject matter relating to a feature peculiar to a well is claimed in combination with Class 417 subject matter, classification is in Class 166. The following categories of subject matter more specifically delineate this line.

1. Class 166 Subject Matter Classifiable With Class 417 Subject Matter in Class 417.

a. Combinations of certain subcombinations, which if claimed, per se, are classifiable in Class 166, those with Class 417 subject matter are classifiable in Class 417. A recitation of a well broadly, or with certain well features will not exclude a patent from Class 417. The following are examples of such features which would be classifiable in Class 417:

i. a well tubing or conduit.

ii. structure in well tube to support a Class 417 device.

iii. a packer or anchor for sealing a Class 417 device in tube.

iv. a below ground check valve in pump inlet or outlet.

v. a valve which drains Class 417 device.

b. In examples iv. and v. it should be noted that a broadly recited pump or pump barrel with an anchor, packer or drain valve is classifiable in Class 166 in appropriate anchor, packer or valve subclasses.

2. Class 417 Device Combined With Below Ground Separator or Screen.

A well screen, as defined in Class 166, subclass 227, generally contacts the earth wall of the well bore as a continuation of a casing. A solids separator or inlet screen for a pump tube in a well is generally disposed inside the casing and well screen. A well type screen specifically described as such and claimed in combination with a pump as more than an opening or a passage for fluid is classifiable in Class 166. A gas separator or anchor disclosed as in a well, even though claimed in combination with a Class 417 device is classifiable in Class 166 (see Subclass References to Current Class, below), except as noted in section D below. Further, a sediment trap or deflector (e.g., sand trap) disclosed as in a well is also classified in Class 166 (see Subclass References to Current Class, below) even though claimed in combination with a pump.

3. Above Ground Well Structure Combined With Class 417 Device.

Generally the combination of a Class 417 device, whether above or below ground, with above ground well apparatus for handling pumped fluid or supporting a pump driving means is classifiable in Class 417. Note, however, that features which relate the well structure to the earth, such as placing pipes below the frost line or embedded foundation which also supports well casing will cause classification in Class 166.

4. Below Ground Fluid Entrainment Type Pumps and Flowing Wells.

a. Class 417 will take an aerating column, jet, gas lift or other entrainment type pump, per se. See References to Other Classes, below.

b. Class 166 will take Class 417 device as set forth in paragraph (1) when the solely disclosed and claimed means for supplying all the motive fluid to the device is located in the well and collects the motive fluid by trapping or separating well fluid in the well (e.g., gas anchor, packer with gas passage to central conduit etc.).

c. Class 417 will take subject matter similar to that in paragraph (2) above when there is a specific description of means to supply additional motive fluid from the earth surface or a point outside the well. This classification prevails even though the additional motive fluid may have been originally obtained from the same well. Obviously combinations of these features with other well features may cause classification in Class 166.

5. Summary of Well Feature.

a. The following features, claimed in combination with a Class 417 device, are representative of the type of subject matter in general which will cause classification in Class 166:

i. Any specific relationship of the Class 417 device or other fluid conducting structure to the earth or earth formations as: plural pumps in plural wells; single pump connected to a plurality of wells; inlets from a plurality of earth formations; location of parts in relation to the frost line in earth; lateral conduit below ground; earth contacting well screen; and earth embedded support for tubing or casing.

ii. Any specific relationship to well operation or structure, such as: process steps in addition to installation, removal or operation of a pump; control of pump or pumped fluid in response to a condition sensed in a well; control or pump or pumped fluid in relation to operation of another device in the well, other than mere flow check valves; above ground separation of fluids leaving well for purposes other than the production or removal of pump operating or motive fluid; apparatus, not forming a part of the pump itself, for handling or manipulating pump parts; passages for pumped fluid specifically described as directing the fluid to wash, clean or otherwise treat the well; sediment traps or deflectors; and gas separators (but see Section 4c above).

C. WELL SHAFTS AND METHODS AND THE LIKE ELSEWHERE CLASSIFIED

Well shafts or shafts sunk in the earth and structurally similar to well shafts, and methods of operating wells are not all classified in Class 166.

See References to Other Classes for classes that provide

for shaft structures and methods which are equivalent or very similar to those found in Class 166.

D. DEVICES OR PROCESSES IN WELLS OR THE LIKE ELSEWHERE CLASSIFIED

Class 166 provides for various well treating and flow controlling devices to be inserted into a well below the ground level, but other classes also provide for similar devices. In cases of doubtful classification the fact that a device is disclosed only for use below ground in a well should incline classification towards Class 166.

Class 166 provides for example, for apparatus and methods for fluid sampling in a well for cementing, washing, or mechanically cleaning a well, acidizing or otherwise treating a formation, packing, plugging, heating, cooling, dissolving paraffin, separating materials in a well, (including liquids from liquids, gases from liquids and solids from liquids), graveling or otherwise forming strainers in a well, and anchoring devices in a well.

See References to Other Classes, below, for other classes which take devices inserted in a well or analogous devices and processes relating to such devices.

E. REFERENCES INTEGRAL TO AND EXTERNAL TO THIS CLASS

Subclass References to the Current Class, below, includes both subclass references integral to Class 166 as well as references to art areas external to this class.

SECTION III - SUBCLASS REFERENCES TO THE CURRENT CLASS

SEE OR SEARCH THIS CLASS, SUBCLASS:

3, for processes of taking a fluid sample only.
50, 55, 55.3, 55.4, 55.8, 57, 60, 63, 66, 66.5, 75.1, 77.1, 77.51, 82.1, 85.1, 99, 100, 105, 107, 113, 117.5, 117.6, 120, 157, 162, 170, 174, 177.6, 178, 206, 212, 222, 227, 239, 241, 242.8, 250.1, 254.1-256, 264, 272.1, 285, 292, 296-302, 305, 307, 308, 312, 315, and 316, for boring or penetrating the earth.
50, 77.1, 242.9, 285, 286, 287, 292, 302, and 315, for hydraulic and earth engineering.
50, 177.5, 179, 206, 249, 268, 272.1, 303, 305, 308, and 315, for mining or in situ disintegration of hard material.
54, 55, 72, 88.5, 95.1, 97.1, 105, 165, 205, 227, 244, 277, 311, 314, 316, and 327, for fluid handling.
54.5, 55, 63, 135, 162, 177.5, 179, 192, 241.1+, 299, 308, and 311, for ammunition and explosives.
54.5, 55, 55.6, and 55.7, for cutlery.
54.5, fishing, trapping, and vermin destroying.
54.5 and 66.5, for ships.
55, 297, and 298, for cutting.
55, for cutting by use of rotating axially moving tool.
55, 85.1, 98, 99, 117.7, 162, 166, 178, 206, 217, 226, and 301, for Handling: Hand and Hoist-Line Implements.
55 and 297, for metal deforming.
57 and 58, for stoves and furnaces.
57, 63, 75.1, 106, 112, 142, 170, 174, 177.7, 179, 188, 202, and 206, for pumps.
60 and 315, for electric heating.
64, 66, 113, and 250, for geometrical instruments.
64 and 250, for registers.
66 and 250.1, for Communications: Directive Radio Wave Systems and Devices (e.g., Radar, Radio Navigation).
66 and 250.1, for Communications: Electrical.
66 and 250.1, for Electricity: Measuring and Testing.
66 and 250.1, for radiant energy.
75.1, 82.1, 86.1, 88.1, 162, 170, and 311, for brushing, scrubbing, and general cleaning.
75.1, for fire extinguishers.
75.1, 78.1, 82.1, 84.1, 86.1, 88.1, 179, 187, 202, and 315, for joint packing.
75.1, 81.1, 84.1, 86.1, 88.1, 168, 179, 206, 242.3, and 315, for pipe joints or couplings.
75.1, 91.1, 135, 179, 192, 227, 242, and 316, for pipes and tubular conduits.
75.1, 92.1, 93.1, 162, and 192, for receptacles.
75.1, 86.1, 88.1, 91.1, 95.1, 97.1, and 316, for valves and valve actuation.
77.1, for Distillation: Processes Separatory.
77.1, for implements or apparatus for applying pushing and pulling force.
77.51, 117.7, and 315, for tools.
81 and 315, for metal working.
100, for fluid conducting lateral probes sealed to the well wall.
105.5+, for devices combined with a pump or plunger means for drawing well fluid out of the well or into a receptacle which is to be taken out of the well.
107, 113, 162, 250.1, and 264, for measuring and testing.
117.5+, for means for guiding an insertable element laterally of the well axis, e.g., whipstock, per se.
153, 170, 177, 179, and 202, for expansible chamber devices.

162, for dispensing.
162, for excavating.
162, 171, 205, 227, 228, and 265, for liquid purification or separation.
177.6, for agitating.
178, for tool driving or impacting.
178, in particular, and appropriate subclasses, for well devices combined with a jar for releasing a stuck part.
222, for fluid sprinkling, spraying, and diffusing.
237, for clutches and power-stop control.
237, for machine element or mechanism.
244, 268, 285, 292, 304, 305, 307, 310, and 312, for compositions.
250.1, for acoustics.
250.1, for recorders.
250.1, 264, and 265, for Chemistry: Physical Processes.
265, for gas separation: apparatus.
265, for gas separation: processes.
265, for Mineral Oils: Apparatus.
265, for Mineral Oils: Processes And Products.
265, for refrigeration.
285, for coating apparatus.
285, for chemistry of carbon compounds.
285, for Plastic and Nonmetallic Article Shaping or Treating: Processes.
285 and 292, for compositions: coating or plastic.
285 and 315, for adhesive bonding and miscellaneous chemical manufacture.
285 and 315, for static structures (e.g., buildings).
300, for a detailed discussion of processes involving no more than placing specific compounds or compositions in a well using insignificant manipulative steps.
311, for cleaning and liquid contact with solids.

SECTION IV - REFERENCES TO OTHER CLASSES

SEE OR SEARCH CLASS:

15, Brushing, Scrubbing, and General Cleaning, for apparatus designed or adapted for cleaning for other than well use subclasses 104.05+ for pipe, tube, or conduit cleaner, subclass 249.1 for a brush or broom flue cleaning implement or subclasses 249.2+ for a scraper-type cleaning implement. (Lines With Other Classes and Within This Class, Devices or Processes in Wells or the Like Elsewhere Classified.)

23, Chemistry: Physical Processes, subclass 232 for processes of gas sampling involving the use of sorbents or chemical treatments which may include a shaft sunk in the ground to collect gas for analysis. (Lines With Other Classes and Within This Class, Well Shafts and Methods and the Like Elsewhere Classified.)

23, Chemistry: Physical Processes, subclass 232 for gas analyzing process for use in a gas well, involving the use of sorbents. (Lines With Other Classes and Within This Class, Devices or Processes in Wells or the Like Elsewhere Classified.)

29, Metal Working, appropriate subclasses for processes or apparatus for assembling or disassembling well structures above ground, or in which there is no special relationship with the well. See Subclass References to the Current Class, above.

30, Cutlery, subclasses 92+ for pipe cutting implements. (Lines With Other Classes and Within This Class, Devices or Processes in Wells or the Like Elsewhere Classified.)

33, Geometrical Instruments, appropriate subclasses, for instruments, per se, for measuring distances, angles, and the like in a well, subclasses 302 and 304+, for borehole direction or inclination sensing and indicating. (Lines With Other Classes and Within This Class, Devices or Processes in Wells or the Like Elsewhere Classified.)

37, Excavating, subclasses 54+ for dredgers. (Lines With Other Classes and Within This Class, Well Shafts and Methods and the Like Elsewhere Classified.)

37, Excavating, subclass 182 and subclasses 183+ for orange peel and clamshell buckets, which may be inserted in a well. (Lines With Other Classes and Within This Class, Devices or Processes in Wells or the Like Elsewhere Classified.)

43, Fishing, Trapping, and Vermin Destroying, subclasses 124+ for vermin destroying shafts sunk in the earth. (Lines With Other Classes and Within This Class, Well Shafts and Methods and the Like Elsewhere Classified.)

52, Static Structures (e.g., Buildings), subclasses 19+, 169.1+, 192+, 223.1, 245+, and 261 for a masonry construction surrounding an open space which may form a cistern or well wherein no feature peculiar to well operation, e.g., screens, pumps, driving points, shoes, etc., is defined. (Lines With Other Classes and Within This Class, Well Shafts and Methods and the Like Elsewhere Classified.)

62, Refrigeration, subclasses 45+ for subject matter, including wells, for the use and handling of

liquefied gas. (Lines With Other Classes and Within This Class, Well Shafts and Methods and the Like Elsewhere Classified.)

72, Metal Deforming, see Subclass References to the Current Class, above.

73, Measuring and Testing, subclasses 151.01+ for subject matter relating to bore hole studies and subclasses 863+ for soil gas sampling devices. (Lines With Other Classes and Within This Class, Well Shafts and Methods and the Like Elsewhere Classified.)

73, Measuring and Testing, appropriate subclasses, especially subclasses 152.01+ for instruments, per se, (including subcombination means such as packers or anchors for perfecting the measuring or Testing Function) for bore hole studies and subclasses 863+ for fluid samplers of general utility. Class 166 takes devices for taking a sample of fluid from a potential producing horizon of a well, but such sampling combined with measuring or testing or bore hole study is in Class 73. Devices or methods for sampling gas from the soil by means sunk into the ground to a point not far from the surface of the ground are in Class 73, subclasses 863+. (Lines With Other Classes and Within This Class, Devices or Processes in Wells or the Like Elsewhere Classified.)

74, Machine Element or Mechanism, see Subclass References to the Current Class, above.

81, Tools, see Subclass References to the Current Class, above.

83, Cutting, see Subclass References to the Current Class, above.

92, Expansible Chamber Devices, subclasses 172+ for pistons, and particularly subclass 180, for an elongated tubular well type plunger, and subclasses 240+ for a piston having the side wall portion thereof provided with a peripheral axially extending flexible lip. A piston which is fluid driven for treating a well (e.g., for cementing) is classified in Class 166, subclasses 153+. (Lines With Other Classes and Within This Class, Devices or Processes in Wells or the Like Elsewhere Classified.)

95, Gas Separation: Processes, subclasses 241+ for degasification of liquid and other appropriate subclasses for processes to be used near oil or gas wells to separate gas from other constituents discharged from the well. Claims to these processes may include a nominal recitation of the well process. However, a detailed recitation of the well process or a recitation of an input well receiving material from the separator indicates classification in Class 166. See Subclass Refereneces to the Current Class, above.

96, Gas Separation: Apparatus, subclasses 155+ for degasifying means for liquid and other appropriate subclasses for apparatus to be used near oil or gas wells to separate gas from other constituents discharged from the well. Claims to this apparatus may include a nominal recitation of the well. However, a detailed recitation of the well or a recitation of an input well receiving material from the separator indicates classification in Class 166. See Subclass References to the Current Class, above.

102, Ammunition and Explosives, subclasses 301+ for apparatus and methods for causing an explosion in a well to break up a formation, clean a bore, or perform other functions involving only an explosion. (Lines With Other Classes and Within This Class, Devices or Processes in Wells or the Like Elsewhere Classified.)

106, Compositions: Coating or Plastic, see Subclass References to the Current Class, above.

111, Planting, subclasses 118+ for devices for placing fluids below the surface of the earth without any expectation of recovering them and subclasses 89+ for dibbles. (Lines With Other Classes and Within This Class, Well Shafts and Methods and the Like Elsewhere Classified.)

114, Ships, see Subclass References to the Current Class, above.

118, Coating Apparatus, see Subclass References to the Current Class, above.

126, Stoves and Furnaces, see Subclass References to the Current Class, above.

134, Cleaning and Liquid Contact With Solids, see Subclass References to the Current Class, above.

137, Fluid Handling, subclasses 272+ for fire hydrants and subclasses 363+ for ground supporting enclosures. (Lines With Other Classes and Within This Class, Well Shafts and Methods and the Like Elsewhere Classified.)

137, Fluid Handling, appropriate subclasses for fluid handling devices of general application and not having a specific location in a well or other specific relationship to a well, especially subclasses 67+ for such devices with destructible or deformable element control other than valves or closures in wells destructible by drilling, subclass 155 for gas lift valves for wells and subclass 515 for direct response valves in couplings for co-axial conduits. (Lines With

Other Classes and Within This Class, Devices or Processes in Wells or the Like Elsewhere Classified.)

138, Pipes and Tubular Conduits, subclasses 37+ for flow restrictors or pipes with flow restrictors; and subclasses 100-178 for conduit structure of general utility, including conduits disclosed only for use as well casings or tubings. (Lines With Other Classes and Within This Class, Well Shafts and Methods and the Like Elsewhere Classified.)

138, Pipes and Tubular Conduits, subclasses 89+ for closures and plugs other than plugs which are inserted into a prepositioned well conduit. (Lines With Other Classes and Within This Class, Devices or Processes in Wells or the Like Elsewhere Classified.)

156, Adhesive Bonding and Miscellaneous Chemical Manufacture, appropriate subclasses for process and apparatus for laminating in general and see especially subclasses 293+ and 423+ for inserting a core within a tube combined with a laminating step. A process of lining a well or conduit in a well is classified in Class 166. (Lines With Other Classes and Within This Class, Devices or Processes in Wells or the Like Elsewhere Classified.)

165, Heat Exchange, subclass 45 for a geographically installed heat exchanger that may comprise a well. Heat exchange apparatus comprising part of a well apparatus for producing or treating a well would be classified in Class 166. (Lines With Other Classes and Within This Class, Well Shafts and Methods and the Like Elsewhere Classified.)

169, Fire Extinguishers, subclasses 2+ for processes for extinguishing or preventing well fires, and also patents for apparatus for extinguishing or preventing fires claiming no more of the well than cooperates with the fire extinguishing or preventing means and also claiming some fire extinguishing or prevention feature beyond a mere cap or casing head, means for diverting flow or means for inserting a fluid into the well. See Subclass References to the Current Class, above.

173, Tool Driving or Impacting, see Subclass References to the Current Class, above.

175, Boring or Penetrating the Earth, subclass 1 for processes or apparatus for boring including seismic shock generation; subclasses 2+ for processes or apparatus for boring by below ground explosion, and including a device for firing a bullet or exploding a shaped charge from an inaccessible bore to penetrate the formation, to enlarge the bore, or form a bore, and including such device even when limited by disclosure to merely perforating or cutting a casing or other wall member in the bore if the device inherently causes penetration of the formation; subclasses 11+ for processes or apparatus for boring by directly applying heat to fluidize or comminute the earth; especially subclass 12 for combustion of the earth formation itself and subclass 16 for electrically produced heat; subclass 17 for processes or apparatus including heating or cooling either within the bore or of the drilling fluid (merely using drilling fluid to cool or heat is not included); subclasses 40+ for processes or apparatus for boring including signaling, indicating, testing or measuring and especially subclass 45 for tool direction or inclination measuring or indicating within the bore; subclasses 57+ for earth boring processes, per se, and especially subclass 59 for processes of taking samples of solid earth formation including (1) retaining fluid in the solid sample or (2) taking a separate fluid sample (processes of taking a fluid sample only are in Class 166; see Subclass References to the Current Class, above); subclass 77 for side wall tools fed laterally of an existing bore hole (fluid conducting lateral probes sealed to the well wall are in Class 166; see Subclass References to the Current Class, above); subclasses 79+ for tool shafts which are advanced relative to a guide (e.g., whipstock) insertable in a well bore to change the direction of advance (means for guiding an insertable element laterally of the well axis, e.g., whipstock, per se, are in Class 166; see Subclass References to the Current Class, above); subclass 84 for boring apparatus with an above ground cleaner therefor; subclasses 98+ for a below ground tool drive motor with an expansible anchor; subclasses 207+ for boring apparatus with above ground means for handling drilling fluid or cuttings, especially subclasses 209+ in which the means engages the bore entrance; subclass 230 for boring apparatus including an expanding anchor; subclasses 293+ for below ground hammer or impact devices claimed, per se, (well devices combined with a jar for releasing a stuck part are in Class 166; see Subclass References to the Current Class, above); subclass 314 for boring apparatus combined with a well type screen; and subclass 402 for an earth cut-

ting casing shoe type bit. (See Lines With Other Classes and Within This Class, Relationship To Class 175, Boring or Penetrating The Earth, above.)

175, Boring or Penetrating the Earth, appropriate subclasses, for processes and apparatus for boring or penetrating the earth, see particularly Lines With Other Classes and Within This Class, above, and the search notes located within this section. (Lines With Other Classes and Within This Class, Devices or Processes in Wells or the Like Elsewhere Classified.)

181, Acoustics, subclasses 102+, for mechanical acoustical devices inserted in wells.

192, Clutches and Power-Stop Control, see Subclass References to the Current Class, above.

196, Mineral Oils: Apparatus, see Subclass References to the Current Class, above.

203, Distillation: Processes Separatory, see Subclass References to the Current Class.

208, Mineral Oils: Processes and Products, see Subclass References to the Current Class.

210, Liquid Purification or Separation, subclasses 459+ for filters and strainers which may be used in a well or as a pump intake. See Class 166, subclass 227 for the line between Classes 166 and 210. (Lines With Other Classes and Within This Class, Devices or Processes in Wells or the Like Elsewhere Classified.)

210, Liquid Purification or Separation, subclasses 294+ for diverse distinct separators, subclasses 322+ for plural distinct separators, subclasses 348+ for a filter, and subclasses 513+ for a gravitational separator. See Subclass References to the Current Class, above.

219, Electric Heating, subclasses 277+ for electric heaters, per se, for lowering into a well. The combination of a heater and well structure is in Class 166. The well structure, for example, may be no more than a tubing for flowing fluid from or into the well. (Lines With Other Classes and Within This Class, Devices or Processes in Wells or the Like Elsewhere Classified.)

220, Receptacles, for receptacles of general utility.

222, Dispensing, subclasses 356+ and the subclasses there noted for dipping type dispensers not used in a well. (Lines With Other Classes and Within This Class, Devices or Processes in Wells or the Like Elsewhere Classified.)

235, Registers, see Subclass References to the Current Class, above.

239, Fluid Sprinkling, Spraying, and Diffusing, see Subclass References to the Current Class, above.

250, Radiant Energy, subclasses 83+ for ray energy detection or measurement in wells. (Lines With Other Classes and Within This Class, Devices or Processes in Wells or the Like Elsewhere Classified.)

251, Valves and Valve Actuation, appropriate subclasses for valves and valve actuators of general application and not having a specific location in a well or other specific relationship to a well, especially subclass 76 for impact actuated valves, subclasses 142+ for a flow path with a single valve, and subclasses 341+ for valves in which the valve actuator is the valve casing or a continuation thereof. (Lines With Other Classes and Within This Class, Devices or Processes in Wells or the Like Elsewhere Classified.)

251, Valves and Valve Actuation, subclasses 1.1+ for valve type blowout preventers, per se, on well casing heads. See Subclass References to the Current Class, above.

254, Implements or Apparatus for Applying Pushing and Pulling Force, see Subclass References to the Current Class, above.

260, Chemistry of Carbon Compounds, see Subclass References to the Current Class, above.

264, Plastic and Nonmetallic Article Shaping or Treating: Processes, see Subclass References to the Current Class, above.

277, Seal for a Joint or Juncture, for packing structure of general application particularly subclasses 5+ for a packing between a casing and a relatively movable sectional rod and subclass 31 for a rotatable packing between a casing and a reciprocating rod. (Lines With Other Classes and Within This Class, Devices or Processes in Wells or the Like Elsewhere Classified.)

285, Pipe Joints or Couplings, appropriate subclasses for joints between pipes, including tubing and casing sections of general utility. (Lines With Other Classes and Within This Class, Well Shafts and Methods and the Like Elsewhere Classified.)

294, Handling: Hand and Hoist-Line Implements, subclasses 68.22+ for hoist buckets to be inserted into a well, and subclasses 65.5 and 86.1+ for grappling devices for withdrawing loose or stuck objects from a well. Grapples for Class 294 may include means for washing dirt away from the object to be grappled. Processes for withdrawing loose or stuck objects

from a well involving the use of grappling devices are classified in appropriate subclasses in Class 166. The line between hoisting buckets or grapples for Class 294 and receptacles for Class 166 is set forth in Class 166, subclasses 99 and 162. The line between grapples for Class 294 and expansible anchors for Class 166 is set forth in Class 166, subclass 206. (Lines With Other Classes and Within This Class, Devices or Processes in Wells or the Like Elsewhere Classified.)

299, Mining or In Situ Disintegration of Hard Material, appropriate subclass for recovering hard, solid, valuable materials from the earth and for utilizing a tunnel (a horizontal earth passage in which a human works) to recover valuable fluid material from the earth. Wells and well processes for extracting fluid from the earth, including petroliferous material such as freely flowing oil, oil adhered to the formation which must be recovered by secondary methods, asphalts and tars are classified in Class 166. Furthermore, wells and well processes for recovering hydrocarbons from material such as shale by treating the material in situ to remove only liquid or gas, or for treating or converting solid hydrocarbons such as coal or lignite in situ for recovery solely as a liquid or gas are classified in Class 166. However, wells and well processes for treating or comminuting solid materials other than hydrocarbons (e.g., sulfur and salt) for recovery in the liquid or gaseous state are classified in Class 299. Likewise, wells and well processes for recovering valuable solid material including hydrocarbons such as coal, oil shale or oil sand, where any of the valuable material is removed from the well in the solid state, are classified in Class 299. (Lines With Other Classes and Within This Class, Well Shafts and Methods and the Like Elsewhere Classified.)

324, Electricity: Measuring and Testing, subclasses 323+ for subject matter relating to the determination of an electrical characteristic of the sub-surface of the earth, and involving devices in wells. (Lines With Other Classes and Within This Class, Devices or Processes in Wells or the Like Elsewhere Classified.)

340, Communications: Electrical, subclasses 853.1+ for telemetering in wells. (Lines With Other Classes and Within This Class, Devices or Processes in Wells or the Like Elsewhere Classified.)

342, Communications: Directive Radio Wave Systems and Devices (e.g., Radar, Radio Navigation), appropriate subclasses for radar systems in wells. (Lines With Other Classes and Within This Class, Devices or Processes in Wells or the Like Elsewhere Classified.)

346, Recorders, see Subclass References to the Current Class, above.

366, Agitating, see Subclass References to the Current Class, above.

367, Communications, Electrical: Acoustic Wave Systems and Devices, subclasses 25+ for seismic well logging; subclasses 81+ for acoustic wellbore telemetering; and subclass 86 for acoustic borehole testing. (Lines With Other Classes and Within This Class, Devices or Processes in Wells or the Like Elsewhere Classified.)

405, Hydraulic and Earth Engineering, subclass 8 for a pressurized caisson; subclass 36 for drainage systems comprising shafts sunk in the earth for removing surplus water from the soil; subclass 53 for underground storage of fluids; subclass 128.15 for the collection of fluid contaminants in a collection well for the purpose of soil remediation, including a significant soil treatment step external to the well; subclass 129.4 for the subterranean disposal of waste in an earthen fracture which is created with fluid pressure; subclass 129.45 for drainage or collection of waste or waste byproduct within a waste site for preventing the waste or waste byproduct from contaminating “clean” neighboring earth or earthen structure or purging the waste product from the waste site; subclass 133 for methods and structure relating to shafts of general utility sunk into the earth, and for methods and apparatus for the sinking of shafts, including well shafts, by means of a caisson or other similar means for excavating earth beneath a shaft being sunk; subclass 232 for a process and apparatus for installing piles in the earth; subclass 233 for casting a pile of hardenable material in situ; subclass 234 combined with heating, cooling, or explosion; subclass 240 combined with withdrawal of a form structure subsequent to placing the fluent material; subclass 249 for methods and structure relating to the sinking of a caisson or hollow shaft which is subsequently filled to form a pile or pier; and subclass 270 for temporary shoring means. (Lines With Other Classes and Within This Class, Well Shafts, and Methods and the Like Elsewhere Classified.)

408, Cutting by Use of Rotating Axially Moving Tool, see Subclass References to the Current Class, above.

417, Pumps, for means for pumping liquid out of wells, especially subclasses 56+, for drilled well free piston type pumps, subclasses 86 and 118+, for pneumatic displacement pumps, subclasses 90+, and 108+, for aerated column pumps, subclass 358, for a pump-motor unit raised in a well conduit by pressure fluid applied below the unit, subclass 434, for pumps with a separate port or noncyclic valve for draining a pump portion, subclasses 448+, for well pumps removable as a unit by drive rod manipulation and subclasses 451+, for well removable with the pumping member. (See Lines With Other Classes and Within This Class, Summary of Well Feature.)

417, Pumps, appropriate subclasses for pumps inserted in a well. (Lines With Other Classes and Within This Class, Devices or Processes in Wells or the Like Elsewhere Classified.)

417, Pumps, subclasses 63+ for apparatus having (1) signals, indicators, registers, recorders, or gauges for indicating a condition of the pump or pumped fluid or the position of a pump part such as a piston, control member, valve, etc., such devices comprising relatively movable, changeable or audible information giving parts, or (2) transparent viewing means whereby the pump operation or the condition of some part thereof may be observed.

418, Rotary Expansible Chamber Devices, for rotary expansible chamber devices, per se. The line between Classes 166 and 418 is the same as that set forth between Classes 166 and 417 for which see Lines With Other Classes and Within This Class in the main class definition to Class 166. (Lines With Other Classes and Within This Class, Devices or Processes in Wells or the Like Elsewhere Classified.)

422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, subclasses 50+ for apparatus for gas sampling involving use of sorbents or chemical treatments which may include a shaft sunk in the ground to collect gas for analysis. (Lines With Other Classes and Within This Class, Well Shafts and Methods and the Like Elsewhere Classified.)

422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, subclasses 83+ for gas analyzing apparatus for use in a well, involving the use of sorbents.

427, Coating Processes, subclasses 230+ for processes of Coating the interior of hollow articles in general. (Lines With Other Classes and Within This Class, Devices or Processes in Wells or the Like Elsewhere Classified.)

436, Chemistry: Analytical and Immunological Testing, for processes for gas sampling involving the use of sorbents or chemical treatments which may include a shaft sunk in the ground to collect samples. (Lines With Other Classes and Within This Class, Well Shafts and Methods and the Like Elsewhere Classified.)

507, Earth Boring, Well Treating, and Oil Field Chemistry, for processes involving no more than placing specific compounds or compositions in a well using insignificant manipulative steps. See Subclass References to the Current Class above for a subclass Reference to a detailed discussion. (Lines With Other Classes and Within This Class, Devices or Processes in Wells or the Like Elsewhere Classified.)

507, Earth Boring, Well Treating, and Oil Field Chemistry, see Class 166, Section II, Lines With Other Classes, subsection D, Devices or Processes in Wells or the Like Elsewhere Classified, and subclasses 244.1, 268, 285, 292, 304, 305.1, 307, 310, 312, and 371.

516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, see Class 166, subclasses 244.1, and 309.

702, Data Processing: Measuring, Calibrating, or Testing, subclass 6 for computations in the application of well logging.

703, Data Processing: Structural Design, Modeling, Simulation, and Emulation, subclass 10 for mathematical simulation of a fluid well.

SECTION V - GLOSSARY

CASING

A pipe which lines all or a portion of the wall of a well. The casing may be adjacent the wall of the well for only a part of its length and lie within another casing section for the remainder of its length. The casing usually is of metal and is used with cement between it and the well wall. The casing is intended to form the permanent lining of the well.

CENTRAL CHAMBER

A generic term covering both a central conduit, as

defined below, and a receptacle for bodily transport of fluid material from inside the well to the top of the well or bodily transport of material from the top of the well for discharge at a point in the well. In a well device the central chamber is considered to be the primary locus from which or to which fluid is moved. For example, the "central chamber" in a tester is the sample chamber receiving the test fluid, whether this be a receptacle or a tubing, while the "central chamber" in a liquid discharging washer is the primary place from which liquid flows, whether this be a tubing or a receptacle.

CENTRAL CONDUIT

Any passage forming conduit which extends from the top of the well into the well and is positioned within another conduit. The central conduit may be, for example, a string of tubing positioned within another tubing or within the casing, or it may be a string of casing positioned within the well bore.

FLUID

A material capable of flowing. A naturally occurring fluid in the earth. It includes gases, liquids, plastics, and solids which can be handled in the manner of a liquid.

LINER

A column of casing having screen forming perforations which does not extend to the top of the well and which is usually the lowest column of casing in the well. The liner is placed in position by lowering it from the top of the well through the casing sections already placed in well. The perforations may be formed before the liner is run into the well or after. The liner is sometimes surrounded by a perforated section of casing, the liner then becoming a secondary lining section of the well.

TUBING

A pipe for conducting fluids which extends from the top of the well to some point below and lies within the casing or is used without a casing as a temporary structure.

WELL CONDUIT

Either (1) a well tubing, (2) a well casing, or (3) the earth or cementitious wall of the well.

SUBCLASSES

50 WELLS WITH LATERAL CONDUITS:
This subclass is indented under the class definition. Devices comprising a main vertical shaft and one or more conduits extending outwardly transversely into the formation for collecting fluid therefrom or inserting fluid thereinto.

(1) Note. The transversely extending conduits of this subclass comprise relatively long tubes. See subclass 100 for a short probing member carried by a central tube and extending transversely into the earth.

SEE OR SEARCH CLASS:
175, Boring or Penetrating the Earth, subclasses 61and 62 for processes of boring (1) curved or re-directed bores or (2) horizontal bores, respectively.
299, Mining or In Situ Disintegration of Hard Material, subclass 19 for a mining plan or layout which may comprise lateral tunnels or drifts large enough for a person to work in extending outwardly from a vertical shaft.
405, Hydraulic and Earth Engineering, subclasses 36+ for wells with lateral conduits for collecting surplus water from the soil.

51 MEANS FOR FORMING FILTER BEDS (E.G., GRAVEL PLACING):
This subclass is indented under the class definition. Devices comprising means specially adapted for use in the operation of placing a mass of filter material, e.g., gravel, in final position in the well.

(1) Note. Means for merely lowering a preformed screen or bed of filter material into the well is not included. Such filter beds may have means aiding to form them above ground or a contiguous reservoir for filter material which is intended to fall down to replenish the main filter bed. Also means for merely supporting filter material placed into the well are not included. See subclass 228 for all these devices.

SEE OR SEARCH THIS CLASS, SUBCLASS:

228, for screens comprising filter material.

278, for processes of placing a bed of filter material.

52 PLURAL WELLS:

This subclass is indented under the class definition. Devices comprising a plurality of wells.

(1) Note. One or more of the wells may be a shaft for placing fluid in a porous earth strata.

(2) Note. Also included are wells, such as drive points, which may be connected below ground with a single shaft.

SEE OR SEARCH THIS CLASS, SUBCLASS:

50, for a well comprising a single vertical shaft and plural laterally extending fluid collecting or discharging conduits.

245, for processes involving specific patterns of plural well.

251.1 and 256+, for processes involving plural wells and in situ combustion.

252 and 268+, for processes involving injection and producing wells.

263, for processes involving cyclic operation of plural wells.

53 AUTOMATIC:

This subclass is indented under the class definition. Devices comprising means to sense a condition which may or may not be present or may occur spasmodically, and cause operation of a control device, without the intervention of a human operator, (e.g., liquid level or specific gravity responsive devices, temperature responsive devices or self-correlating devices).

(1) Note. For a definition of self-correlating see Class 137, Fluid Handling, subclasses 87.01+.

(2) Note. Control devices for signals or indicators and control devices comprising valves or closures across a passage operated to control fluid flowing in the passage by means sensing the pressure or velocity of the fluid flowing in said passage and control devices operated in response to means sensing inertia, gravity, time, the bottom of the well, an obstruction in the well, a break, projection, cavity or joint in a well are not considered automatically operated in this class and are classified on other features.

SEE OR SEARCH THIS CLASS, SUBCLASS:

64+, for well devices with means indicating time or distance or with counting means or temperature responsive means, the temperature responsive means sensing temperature as part of an operating cycle or by insertion into a zone of predetermined temperature which causes a predetermined response.

66, for well devices with electrical indicating means.

113, for well devices with mechanical indicating means.

132, for well devices comprising packers or plugs with expanding anchors and having means to sense the end of a conduit.

206+, and the subclasses there noted for anchor devices caused to be set by a means sensing a cavity, joint or break in a wall or caused to be set by an inertia or gravity sensing means, especially subclasses 209+ for anchors caused to be set by inertia or gravity sensing means and subclasses 214+ for anchors caused to be set by means sensing a cavity joint or break in a well wall.

226, and the subclasses there noted for valves, closures or changeable restrictors caused to be operated by means sensing the well bottom or an obstruction or projection in the well.

54 Float controlled valve:

This subclass is indented under subclass 53. Devices comprising valves controlled by a float responsive to the change in level or specific gravity of a fluid.

SEE OR SEARCH CLASS:

137, Fluid Handling, subclasses 409+ for float controlled valves, per se.

54.1 WITH MEANS FOR SEPARATELY PUMPING FROM PLURAL SOURCES IN WELL:

This subclass is indented under the class definition. Devices comprising a well having plural earth formations which are isolated from each other so that fluid is separately obtainable therefrom and in which pumping means, comprising one or more individual pumps, is operatively associated to pump from each formation for separate delivery of the fluids from the well.

SEE OR SEARCH THIS CLASS, SUBCLASS:

52, for plural wells.

54.5 MEANS FOR CUTTING CABLE OR ROPE BELOW GROUND:

This subclass is indented under the class definition. Devices comprising means for severing a flexible strand such as a cable, rope or the like, the severing means being located in a well below ground level when performing the severing operation.

(1) Note. See (1) Note under subclass 75.1 for the meaning of ground level as used in this definition.

(2) Note. The cable or rope may be used to suspend a tool, such as an earth boring bit or the like, and the nominal recitation of a tool by name will not preclude classification in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

55+, for means perforating, weakening, bending or separating pipe at any point in a well.

SEE OR SEARCH CLASS:

30, Cutlery, subclasses 92+, and the search there noted, for pipe or rod cutters of general utility.

43, Fishing, Trapping, and Vermin Destroying, subclass 17.2 for devices for cutting a fishing line near the hook or for otherwise releasing the hook or other fishing element.

114, Ships, subclasses 221+ for ship working implements including devices for cutting a ship's cable when the anchor is caught or for other reasons.

54.6 Cutting means actuated by contacting element suspended in well by cable or rope:

This subclass is indented under subclass 54.5. Devices comprising a means for causing the operation of the severing means which requires contact of some part of the device with a stationary object in the well for its operation, the stationary object being a member which is held in position in the well by the flexible strand which is to be severed.

(1) Note. Many of the devices found in the subclasses noted in the Search Class Notes of subclass 54.5 are of this type.

55 MEANS FOR PERFORATING, WEAKENING, BENDING OR SEPARATING PIPE AT AN UNPREPARED POINT:

This subclass is indented under the class definition. Devices comprising means for perforating, weakening, bending or separating the side wall of a well pipe at a location in the pipe which has not been specially preconditioned for such action.

(1) Note. A means for merely indicating the location in a pipe at which an operation such as cutting is to be performed is not considered a special preconditioning of the pipe.

(2) Note. The earth wall of the well is not considered a “pipe”.

(3) Note. A mere pipe coupling sleeve is not a specially preconditioned location.

(4) Note. A device to fire a bullet or explode a shaped charge to perforate a casing or other wall member in a bore is classified in Class 175, even though there is no disclosure that penetration of the earth occurs.

(5) Note. If the device functions above ground level some significant limitation to the well art should be present for classification under this definition, but if the device functions below ground level a disclosure line prevails, except where

there is a body of art in other classes relating to such devices used in a well.

SEE OR SEARCH THIS CLASS, SUBCLASS:

63, for devices involving explosive apparatus similar to that found in subclass 55 but used for penetrating only the formation rather than a pipe or a pipe and the formation.

297+, for processes for perforating, weakening, bending or separating pipe at an unprepared point.

SEE OR SEARCH CLASS:

30, Cutlery, subclasses 92+ for pipe and rod cutters not disclosed as for use in a wall.

60, Power Plants, subclasses 632+, for one shot explosion actuated expansible chamber type motors.

72, Metal Deforming, appropriate subclass for a pipe deforming means of general utility, including a pipe deforming means described as functioning in a well and particularly subclasses 112+ for a tool which orbits or rotates as it operates and subclass 391 for a tool having motion in a fixed path to deform fixed material.

83, Cutting, appropriate subclasses, for method and apparatus for cutting or punching holes in a tubular workpiece.

102, Ammunition and Explosives, subclasses 306+ for well torpedoes for breaking up formation, generating seismic sounds or cleaning the bore.

137, Fluid Handling, subclasses 317+, for fluid handling devices of general application including means for tapping, boring or drilling a container or main under pressure.

175, Boring or Penetrating the Earth, subclasses 2+ for a device for firing a bullet or exploding a shaped charge from an inaccessible bore to penetrate the formation and including such a device even when limited by disclosure to merely perforating or cutting a casing or other wall member in the bore, subclasses 249+ for earth boring apparatus with a core retaining or severing means which is movable relative to a bit and subclasses 263+ for an earth boring cutter element which is laterally shifted below ground.

294, Handling: Hand and Hoist-Line Implements, subclasses 86.1+ for means for separating a pipe in a well by a mere grappling action.

408, Cutting by Use of Rotating Axially Moving Tool, appropriate subclasses, for general utility cutting in the manner of that class.

55.1 With disparate below ground feature:

This subclass is indented under subclass 55. Devices including a means for performing a function below ground level unlike and other than a function which directly contributes to the use of the device as a perforating, weakening, bending or separating device.

(1) Note. The means for performing an unlike function comprise, for example, means to collect a fluid sample, insert an orifice bushing in a pipe wall, insert treating fluid or cement into the well or grapple or otherwise remove an object from the well (unless the grappling or removing means also performs a function which is necessary to the perforating, weakening, bending or separating operation, such as grappling in order to activate cutting means, such grappling means being found in the following subclasses indented under subclass 55).

SEE OR SEARCH CLASS:

175, Boring or Penetrating the Earth, subclasses 2+ for a device which fires a bullet or explodes a shaped charge for perforating a wall member in a bore which device inherently causes penetration of the formation, especially subclass 4.51 for such device which has a position indicating or orienting means and subclass 4.52 for such device which has a wall engaging packer or anchor. In accordance with the line between Classes 166 and 175, as set forth in the class definition of Class 175, Lines With Other Classes and Within This Class, and the definition of Class 175, subclass 2, a claim to an apparatus comprising a gun or shaped charge perforating means dis-

closed as inherently functioning to penetrate the earth is classifiable in Class 175, subclasses 2+ even if it also recites a disparate well feature. Thus, apparatus patents of this type are classified as originals in Class 175 and cross-referenced to Class 166, subclass 55.1 if appropriate while patents of this type with method claims are classified as originals in Class 166, subclass 35 and cross-referenced to a suitable apparatus subclass if appropriate.

55.2 Perforating or splitting cutter:
This subclass is indented under subclass 55. Devices comprising a mechanical tool for forming an aperture or fissure in the wall of the pipe.

(1) Note. An aperture or fissure formed merely by direct application of heat or fluid pressure is not considered an aperture formed within this subclass definition.

55.3 Wedge or cam actuated:
This subclass is indented under subclass 55.2. Devices in which the tool is forced or guided into engagement with the wall of the well pipe by means comprising a member having an angular or curvilinear surface.

SEE OR SEARCH THIS CLASS, SUBCLASS:
117.5+, for means for guiding an insertable element laterally of the well axis (e.g., whipstocks).

SEE OR SEARCH CLASS:
175, Boring or Penetrating the Earth, subclasses 79+ for earth boring apparatus in which the tool shaft is advanced relative to a guide insertable in an inaccessible hole (e.g., well bore) to change the direction of advance.

55.6 Cutter rotates circumferentially of pipe:
This subclass is indented under subclass 55. Devices in which a cutting tool is revolved around the periphery of the well pipe and in contact therewith during the cutting operation.

SEE OR SEARCH CLASS:
30, Cutlery, subclasses 94+ for cutters, not disclosed as for use in a well, in which the cutting element is rotated about the exterior of a tube.

55.7 Internal:
This subclass is indented under subclass 55.6. Devices in which the cutting tool is located inside the pipe and advances outwardly for cutting.

SEE OR SEARCH CLASS:
30, Cutlery, subclasses 103+ for cutters, not disclosed for use in a well, in which the cutting element is rotated internally of a pipe.

55.8 Tool moved radially by fluid pressure:
This subclass is indented under subclass 55.7. Devices in which a gaseous or liquid medium under pressure is used to apply a radial force to the tool.

SEE OR SEARCH CLASS:
175, Boring or Penetrating the Earth, subclasses 267+ and the search there noted, for laterally shiftable earth cutting elements or other elements movable by fluid pressure.

56 SCREEN AND OUTSIDE CLEANING PIPE:
This subclass is indented under subclass 227. Devices under the class definition comprising a well screen combined with a pipe located outside of the screen for handling fluid to clean the screen or the bed of earth or filter material outside of the screen.

(1) Note. The pipe may be located inside of an outer screen member so long as it is located outside of an inner screen member.

57 WITH HEATING, REFRIGERATING OR HEAT INSULATING MEANS:
This subclass is indented under the class definition. Devices for causing a heating, refrigerating or heat insulating effect.

(1) Note. For classification in this and indented subclasses the apparatus must

be described as purposely intended to perform the said functions. An apparatus adapted to perform some other function and causing a mere inherent, unclaimed heating, refrigerating or insulating effect is not classified in this group of subclasses. Such apparatus is classified on other features.

(2) Note. The mere use of the earth as an insulating means, (as when a tunnel is used to inject fluid in a well and the earth above the tunnel insulates it) is not included. See subclasses 75.11+ (especially 90.1) for such devices.

(3) Note. Where the sole function of an element is described as for supplying a heating or refrigerating or insulating effect, classification is in this or indented subclasses even if such function is not claimed.

(4) Note. A device comprising a heating means used merely to set off an explosion, the explosion being intended to accomplish some function due to the violent pressure exerted and not due to heat is not classified in subclasses 57+. See subclasses 55 and 63 for such devices.

(5) Note. An internal combustion engine, per se, is not considered a heating means if the only use of the engine is for driving a shaft or the like.

SEE OR SEARCH THIS CLASS, SUBCLASS:

90, for nozzles for inserting a steam into a casing, casing head or tubing to extinguish a fire.

302, and the subclasses there noted for processes involving heating.

SEE OR SEARCH CLASS:

126, Stoves and Furnaces, appropriate subclasses for heaters of general utility.

175, Boring or Penetrating the Earth, subclasses 11+ for processes or apparatus for boring by directly applying heat to fluidize or comminute the earth formation and subclass 17 for processes or apparatus including heating or cooling within the bore, or heating or cooling the drilling fluid.

417, Pumps, subclasses 73+, for combustion type pumps for wells.

431, Combustion, appropriate subclass for a burner, per se, particularly subclass 202 for a burner broadly related to other structures or having a geographic feature.

432, Heating, appropriate subclasses for a residual means for application of heat to materials or bodies.

58 Fuel supply or hot billet in well:

This subclass is indented under subclass 57. Devices comprising (1) means for supporting a supply of fuel in the well or (2) a heated bar or container adapted to be lowered into the well after it is heated or filled with a hot material.

(1) Note. "Fuel" in this subclass is any material which is intended to enter into an exothermic chemical reaction in the well.

SEE OR SEARCH THIS CLASS, SUBCLASS:

55, for pipe perforating, weakening bending or separating means involving exothermically reacting materials inserted in a well.

63, for explosive or gas generating means in a well in which the purpose of the explosion or gas generation is not to evolve heat, being usually to generate pressure or deliver a fracturing blow.

SEE OR SEARCH CLASS:

126, Stoves and Furnaces, appropriate subclasses for heaters, especially subclasses 263.01+ for heaters, heating by reaction of chemicals in a container and not disclosed or claimed as only used in a well.

59 Burner in well:

This subclass is indented under subclass 57. Devices comprising means for burning fuel in the well, the fuel being fed to the burner from a source outside of the well.

60 Electrical heater in well:
This subclass is indented under subclass 57. Devices comprising electrical heating means situated below ground level.

SEE OR SEARCH CLASS:
175, Boring or Penetrating the Earth, subclass 16 for processes or apparatus of boring by directly applying electrically produced heat to fluidize or comminute the earth formation.
219, Electric Heating, subclasses 277+ for electrical oil well heaters, per se. See the class definition of Class 166 for the line.

61 Heater surrounding production tube:
This subclass is indented under subclass 57. Devices in which a heating means surrounds the well conduit through which the earth fluid flows to the surface of the ground.

SEE OR SEARCH THIS CLASS, SUBCLASS:
62, for devices in which a heater surrounds only a pump rather than the conduit.

62 With eduction pump or plunger in well:
This subclass is indented under subclass 57. Devices comprising pump or plunger means in the well for drawing well fluids out of the well or into a receptacle which is lifted out of the well.

(1) Note. Devices in which a heated fluid is conveyed into the well so as to act as both a heating and a lifting means are not considered to be pumps for this subclass. Such devices may be found in subclass 57.

SEE OR SEARCH THIS CLASS, SUBCLASS:
61, for well devices comprising a heater surrounding a pump production tube.

63 WITH EXPLOSIVE OR GAS GENERATING MEANS IN WELL:
This subclass is indented under the class definition. Devices comprising an explosive means or a means capable of generating gas, the means in each case being located in the well below ground level.

(1) Note. The “gas generating means” may be a closed container containing compressed gas which is to be released.

SEE OR SEARCH THIS CLASS, SUBCLASS:
55, for explosive or gas generating devices for perforating, weakening, bending or separating a well pipe at any unprepared point other than devices for firing a bullet or exploding a shaped charge which inherently cause penetration of the formation for which see Class 175, subclasses 2+.
57+, for heating means which may cause generation of gas in the formation or well.
162+, for receptacle in which gas (e.g., air) originally not under pressure may be trapped by fluid rushing in, the gas thus being compressed and escaping.
299, and subclasses there noted for processes involving an explosion in the well.
309, for processes involving producing foam or gas in a well by a foaming or gas producing material.

SEE OR SEARCH CLASS:
60, Power Plants, subclasses 632+ for one shot explosion actuated expansible chamber type motors.
102, Ammunition and Explosives, subclasses 301+ for well torpedoes for use in a well to break up a formation, clean a bore, etc., and for a well torpedo combined with a plug which acts as a tamping means. Class 166, subclass 63, however, take an explosive surrounded by material to form a plug when the explosion occurs.
175, Boring or Penetrating the Earth, subclasses 2+ for subject matter relating to a device for firing a bullet or exploding a shaped charge in an inaccessible bore to penetrate the earth formation or perforate or cut a casing or other wall member in the bore and inherently penetrate the formation.
417, Pumps, subclasses 73+, for combustion type pumps for wells.

64 WITH TIME OR DISTANCE MEASURING, TEMPERATURE RESPONSIVE OR COUNTING MEANS:

This subclass is indented under the class definition. Devices combined with means for measuring time or distance, responding to temperature changes for performing some function, or counting objects such as joint couplings.

(1) Note. A mere delayed action response to a condition such as provided by a damper is not considered time measuring. Such devices are classified on other bases.

(2) Note. Means with indicia to indicate the position of adjustment of a device such as a valve or telescoping part are not included in this subclass. Such a means in combination with a well device would be classifiable in subclass 113.

SEE OR SEARCH CLASS:

33, Geometrical Instruments, appropriate subclasses for means for measuring distance.

235, Registers, appropriate subclasses for counters, per se.

374, Thermal Measuring and Testing, subclass 136 for subsurface temperature determination other than for strata identification.

702, Data Processing: Measuring, Calibrating, or Testing, subclasses 127 through 199 for the basic measurements of temperature, distance, or time which include a computation.

65.1 WITH ELECTRICAL MEANS:

This subclass is indented under the class definition. Devices provided with a specific electrical component (e.g., particular electrical conductor, insulator or magnetic structure).

SEE OR SEARCH THIS CLASS, SUBCLASS:

60, for well devices comprising electrical heaters.

63, for electrical means for igniting an explosive charge.

SEE OR SEARCH CLASS:

174, Electricity: Conductors and Insulators, appropriate subclass for these types of devices which may be located in a well device or well.

200, Electricity: Circuit Makers and Breakers, appropriate subclass for an electrical with means which may be located in a well device or well.

439, Electrical Connectors, appropriate subclass for an electrical connector which may be located in a well device or well.

66 Indicating:

This subclass is indented under subclass 65.1. Devices in which an electric means is used for furnishing information to an observer.

SEE OR SEARCH CLASS:

33, Geometrical Instruments, subclass 312, for electrical telemetering of sensed borehole direction or inclination.

175, Boring or Penetrating the Earth, subclasses 40+, for processes or apparatus for boring including signaling, indicating, testing or measuring.

250, Radiant Energy, subclasses 83+, for ray energy detection or measurement.

324, Electricity: Measuring and Testing, subclasses 1+, for apparatus relating to the determination of an electrical characteristic of the subsurface of the earth.

340, Communications: Electrical, subclasses 500+ for electrical automatic condition responsive indicating systems.

367, Communications, Electrical: Acoustic Wave Systems and Devices, subclasses 25+ for electro acoustic well logging; subclasses 81+ for electro acoustic wellbore telemetering; and subclass 86 for electro acoustic borehole testing.

66.4 Electric motor (e.g., solenoid actuator):

This subclass is indented under subclass 65.1. Devices in which the electrical means includes structure to convert electrical energy into mechanical motion.

SEE OR SEARCH CLASS:

310, Electrical Generator or Motor Structure, appropriate subclass for an electric motor of general utility.

66.5 Magnetic:

This subclass is indented under subclass 65.1. Electrical component including permanent magnetic or electromagnet structure.

SEE OR SEARCH THIS CLASS, SUBCLASS:

66.4, for well means including motor structure, the motor structure generally having magnetic elements.

SEE OR SEARCH CLASS:

175, Boring or Penetrating the Earth, appropriate subclass for an earth boring bit which is magnetized or includes a magnet.

294, Handling: Hand and Hoist-Line Implements, subclass 65.5 for a grapple adapted to be used in a borehole and provided with magnetic means.

66.6 Valve:

This subclass is indented under subclass 65.1. Electrical means for a flow regulating means operable in the well to effect fluid movement.

66.7 Longitudinally movable operator:

This subclass is indented under subclass 66.6. Valve with electrical means in which the flow regulator is opened, closed, or adjusted by an element shifted parallel to the well pipe or casing.

67 WITH BELOW AND ABOVE GROUND MODIFICATION:

This subclass is indented under the class definition. Devices comprising means intended to function and remain above ground level combined with means intended to function in the well below ground level.

(1) Note. Some specific feature of both the above ground level and below ground level means must be recited in a claim for classification of a patent in this or indented subclasses. The mere recitation of a cable, pipe, rod, tubing or casing for insertion in a bore hole is not sufficient. Above ground level apparatus combined with such features will be found in subclasses 75.11+ or in other subclasses, according to the subject matter involved.

(2) Note. The mere recitation by name only of a pump above ground for inserting a treating or circulating fluid is not sufficient for classification of a patent in this or indented subclasses. Such patents are classified on other characteristics.

(3) Note. See subclass 75.11 for the meaning of ground level in this definition.

SEE OR SEARCH THIS CLASS, SUBCLASS:

335+, for a well which is above ground but below water. Note, however, that a well device which is disclosed as being under water but in which no claim is made to a feature peculiarly adapting the device to function under water is considered as if the water were not present and is classifiable in subclasses 67+ if it otherwise meets the definition of subclass 67.

51, for above and below ground apparatus for placing gravel.

52, for above and below ground apparatus associated with a plurality of wells.

53+, for above and below ground apparatus with automatic means.

57+, for above and below ground apparatus for heating, refrigerating or with heat insulating means.

64, for above and below ground apparatus with time or distance measuring, temperature responsive or counting means.

65.1+, for above and below ground apparatus with electrical means.

68 Eduction pump or plunger in well:

This subclass is indented under subclass 67. Devices comprising pump or plunger means situated in the well for drawing fluid out of the well or into a receptacle which is then taken out of the well.

(1) Note. See the class definition of Class 166 for the line with Class 417.

SEE OR SEARCH THIS CLASS, SUBCLASS:

61 and 62, for well devices for heating or refrigerating combined with an eduction pump in a well.

68.5 With above ground (1) motor carried by casing or casing support or (2) well fluid pump:

This subclass is indented under subclass 68. Devices comprising (1) an above ground driving motor for actuating the below ground pump or plunger, said motor being carried on a ground embedded casing or an embedded foundation which supports a casing or (2) an above ground pump means which acts on fluid derived from the well.

(1) Note. The pump means under part (2) of the above definition may be a pump for supplying motive fluid to a drive motor for the below ground pump, the main criteria being that the fluid be derived from the same well.

69 With receptacle for insertion into well:

This subclass is indented under subclass 67. Devices comprising the combination of an above ground apparatus and a receptacle for insertion in the well.

(1) Note. The claiming of a magazine other than the casing for receiving the receptacle, or a means associated with the well for engaging the receptacle to support or open it is sufficient for classification in this subclass.

(2) Note. A "receptacle" is a device which discharges material in the well or receives fluid from the well and transports its contents between the top of the well and the point of use by its own bodily movement.

SEE OR SEARCH THIS CLASS, SUBCLASS:

162+, for receptacles to be inserted into the well for function therein and also having means which descend into the well with the receptacle but are intended to function only above ground. An example is a bailing receptacle with a discharge valve which is intended to be opened only above ground.

SEE OR SEARCH CLASS:

414, Material or Article Handling, subclasses 403+ for portable receptacle emptying devices, and subclasses 639+ and 657+ for means for lifting well buckets and discharging their contents outside of the well.

70 Head for tool, piston or cleaner (e.g., cement head):

This subclass is indented under subclass 67. Devices comprising (1) above ground apparatus claimed in combination with a piston as defined in subclass 153 or a mechanical cleaner as defined in subclass 170, or (2) above ground apparatus with means for engaging a device to be inserted into the well to restrain the device against upward or downward movement.

(1) Note. Under (2) of the definition the means for engaging the device must be something other than a supporting cable, rod or pipe attached to the device.

(2) Note. The "device" under (2) of the definition must be something other than a mere tubing, casing, cable or rod extending into the well from above ground level.

SEE OR SEARCH THIS CLASS, SUBCLASS:

82+, for a sealing means on a casing head for a cable rod or pipe in combination with means to be engaged by a well device for causing the sealing means to be released or yield so that the well device may pass out of the well.

71 With above ground casing sinking means:

This subclass is indented under subclass 67. Devices in which there is an anvil, weight, pushing or turning means for causing a well casing to sink in the earth.

SEE OR SEARCH CLASS:

173, Tool Driving and Impacting, appropriate subclasses for devices which provide mechanical movement or

blows to a work contacting element which effect alteration in the work.

72 Above ground actuating means for below ground device:
This subclass is indented under subclass 67. Devices comprising a means situated above ground for causing movement of means situated below ground in the well.

(1) Note. A valve above ground which causes actuation of a device in the well by changing pressure conditions is not considered an actuating means for this subclass.

(2) Note. A mere elongated member such as a wire, rod or pipe extending from inside the well to the surface is not considered an actuating means.

SEE OR SEARCH CLASS:
137, Fluid Handling, subclasses 272.1+ for hydrants.

73 Tubing or casing actuated:
This subclass is indented under subclass 72. Devices comprising a tubing or casing which is moved by the actuating means.

SEE OR SEARCH THIS CLASS, SUBCLASS:
71, for above ground casing sinking means.

74 With below ground screen:
This subclass is indented under subclass 67. Devices comprising a well screen as defined in subclass 227.

SEE OR SEARCH THIS CLASS, SUBCLASS:
51, for wells with screens and means for placing filter material.
56, for wells with screens and pipes outside of the screens for cleaning them or the area around them.
71, for casings with screens and above ground casing sinking means.

75.11 ABOVE GROUND APPARATUS:
This subclass is indented under the class definition. Device comprising means peculiar to a well; e.g., recitation of a cable, pipe, rod, tubing or casing for insertion in a bore hole and intended to function with the means and remain at or above the surrounding terrain.

(1) Note. For purposes of this subclass ground level is either (a) the level at which a person may work outside the casing of the well; this working space being provided either in the open, by a cellar, or tunnel or (b) the level; e.g., in a trench, at which a laterally running pipe line for discharging well fluid from or inserting treating fluid into the well is connected to the well casing.

(2) Note. This subclass includes those means adjacent the defined level though actually below it.

(3) Note. Devices dropped into or forced down along the length of the well conduit for functioning inside the conduit, and of a type usually used below ground level, are excluded even though they may function above ground level. Such devices are classified on other features, usually as packers, plugs, pistons or wipers.

(4) Note. A well device which is disclosed as being under water but in which no claim is made to a feature peculiarly adapting the device to function under water is considered as if the water were not present and is classifiable in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:
51, for a means of placing a mass of filter material; e.g., gravel, in a final position in the well.
65.1+, for devices with electrical means.
67+, for above and below ground apparatus in combination.
348, for underwater suspension means.
357, for separator attached to a well under water.
360, for underwater assembly means.
365, for underwater disassembly means.
368, for a wellhead which is above ground but below water.

SEE OR SEARCH CLASS:

15, Brushing, Scrubbing, and General Cleaning, subclasses 210.1+ and 236.01 for wipers or scrapers applied to well heads for cleaning pipes, rods, or cable passing to or from the well with no more of the well casing being claimed than is necessary to support the wiper or scraper. The wiping or scraping device may include lateral ports, for the purpose only of disposing of material removed from an inner member being wiped.

138, Pipes and Tubular Conduits, subclasses 89+ for pipes or pipe fittings (including well pipe and fittings) having closures or plugs, or closures and plugs limited by structure to use with pipes. Class 138 takes such devices even if named for use with a well casing but a well feature such as a lateral port causes classification in Class 166.

169, Fire Extinguishers, subclass 69 for means for extinguishing well fires involving more than a mere cap, plug, flow diverter or means for inserting fluid in the well.

175, Boring or Penetrating the Earth, subclasses 207+ for earth boring apparatus including above ground means for handling drilling fluid or cuttings and especially subclasses 209+ for such apparatus in which the means engages the bore entrance.

251, Valves and Valve Actuation, subclasses 1.1+ for blowout preventers of the type comprising plural relatively movable flow obstructing members controlling flow through the annular passage between an inner rod or pipe and a surrounding casing or tubing head and having characteristics which go beyond a mere packing means. Addition of a lateral port in a casing head structure for diverting flow from the well is enough to cause classification in Class 166, but Class 251 takes blowout preventers or other valves in appropriate subclasses even though the valve is operated by the well fluid pressure or there are plural valves and broad recitations of casing or casing head structure.

277, Seal for a Joint or Juncture, subclass 31 for annular seals or blowout preventers between an inner cable, rope, rod or pipe and a casing head. Addition of a well feature such as a port for handling fluid will cause classification in Class 166. A means for causing fluid to tighten the packing, however, would be classifiable in Class 277 with the packing.

285, Pipe Joints or Couplings, subclasses 123.3+ for joints between concentric pipes. Class 285 takes casing heads with means for sealing inner pipes which are normally stationary, including means for sealing such inner pipes while they are being run into the well, and/or means for anchoring pipes against movement up or down with the anchoring feature comprising more than a mere pipe coupling resting on a sealing or valve device. The claiming of a fluid handling feature such as a port or valve will cause classification in Class 166.

75.12 Treatment of produced fluids:

This subclass is indented under subclass 75.11. Above ground apparatus which the gas or oil (or water) is cleaned, separated, or filtered.

SEE OR SEARCH CLASS:

175, Boring or Penetrating the Earth, subclasses 207+ for earth boring apparatus including above ground means for handling drilling fluid or cuttings and especially subclasses 209+ for such apparatus in which the means engages the bore entrance.

75.13 Well caps or casing heads:

This subclass is indented under subclass 75.11. Above ground apparatus which prevents the flow of fluid from or into the well.

SEE OR SEARCH CLASS:

138, Pipes and Tubular Conduits, subclasses 89+ for pipes or pipe fittings (including well pipe and fittings) having closures or plugs, or closures and plugs limited by structure to use with

pipes except for a well feature such as a lateral port.

75.14 Suspension means:
This subclass is indented under subclass 75.11. Above ground apparatus for hanging tubing within a well.

SEE OR SEARCH THIS CLASS, SUBCLASS:
208, for below ground liner hangers.

75.15 With means for injecting solid or particulate material into the well:
This subclass is indented under subclass 75.11. Above ground apparatus comprising the particular structure or device for placing balls, cement, etc.

76.1 Having structure for converting from one mode of operation to another; e.g., valve to pack-off:
This subclass is indented under subclass 75.11. Above ground apparatus whose function is changed (a) by reassembling all or some of their parts in a different relationship or (b) by adding or omitting a part.

(1) Note. Since well casing heads are commonly arranged (e.g., with threaded bolts) so that parts may be interchanged, added or omitted, the convertability feature must be explicitly discussed in the specification and recited in the claim for classification here.

(2) Note. The mere use of a valve to shut off flow so parts may be interchanged, without removal of the valve, is not considered enough for classification in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:
102, for a class device convertible to a non-class device.

77.1 Moving tubing or cable into an existing well:
This subclass is indented under subclass 75.11. Above ground apparatus comprising means for pushing a rope-like line or thin-walled pipe into a cased borehole.

SEE OR SEARCH THIS CLASS, SUBCLASS:
71, for a casing sinking means with a below ground modification.

SEE OR SEARCH CLASS:
175, Boring or Penetrating the Earth, subclass 162 for an above ground means to feed a boring tool into the earth.
254, Implements or Apparatus for Applying Pushing or Pulling Force, subclasses 29+ for pipe or rod jack.
405, Hydraulic and Earth Engineering, subclasses 232+ for processes and apparatus for installing piling.

77.2 Coiled tubing:
This subclass is indented under subclass 77.1. Moved tubing wherein the thin-walled pipe is wound on a reel.

SEE OR SEARCH CLASS:
226, Advancing Material of Indeterminate Length, subclasses 162+ for feeding material by moving a grip element engaging the material.

77.3 Chain injector:
This subclass is indented under subclass 77.2. Moved coiled tubing wherein the tubing is pushed by a series of links or rings.

SEE OR SEARCH CLASS:
226, Advancing Material of Indeterminate Length, subclasses 170+ for orbitally traveling material engaging surface on endless belt or chain.

77.4 Piston and cylinder:
This subclass is indented under subclass 77.1. Moved tubing wherein the thin-walled pipe is pushed by an assembly including a generally tubular-shaped member confining a movable mass and driven by fluid pressure.

(1) Note. Patents properly classifiable here must include specific piston and cylinder structure connections; i.e., claims properly classified under subclasses 77.2 and 77.3 are not classified here.

77.51 With means facilitating connecting or disconnecting supported tubing or rod sections:

This subclass is indented under subclass 75.11. Above ground apparatus comprising a separate apparatus for effecting the make-up or break-up of discrete pieces of thin-walled pipe or tubular bar in a line being inserted or removed from the well.

(1) Note. The devices classifiable in this subclass must be specifically described as performing one of the following functions during the connecting or disconnecting operation (a) rotate one section of rod or pipe, (b) hold one section of rod or pipe stationary or (c) temporarily support a section of rod or pipe.

(2) Note. The separate apparatus under this definition must be normally separate from the device being assembled or disassembled and must be something more than a mere detachable section of pipe constituting a continuation of the line of pipe being handled.

(3) Note. A mere guide for aligning a rod or pipe section to be connected or disconnected from another without supporting the section is excluded from this subclass and will be found below in subclass 85.1.

SEE OR SEARCH THIS CLASS, SUBCLASS:

78.1, for apparatus for rotating a tubing extending into a well.

85.1, for above ground apparatus for assembling or disassembling other well apparatus.

377+, for a process of disassembling a well part.

378+, for a process of assembling a well part.

SEE OR SEARCH CLASS:

81, Tools, subclasses 52+ for a wrench or screwdriver, subclasses 54+ for a mechanically operated type and especially subclasses 57+ for use in well operations (pipe tongs).

173, Tool Driving or Impacting, subclass 164 for means to drive a tool about an axis and having means to hold and relatively rotate tool shaft sections.

175, Boring or Penetrating the Earth, subclasses 170+ for similar apparatus combined with a rotary drive for an earth boring tool.

414, Material or Article Handling, subclasses 22.51+ for well pipe or rod racking mechanism.

77.52 With elevator detail:

This subclass is indented under subclass 77.51. Device for connecting sections using a specific lifting device for a pipe or bar.

77.53 Upper and lower slips:

This subclass is indented under subclass 77.51. Device for connecting sections including wedge-shaped members, usually with a serrated face, located near the pipe or bar at the top and bottom.

78.1 With tube rotating means (rotary tables):

This subclass is indented under subclass 75.11. Above ground apparatus comprising means for turning a thin-walled pipe about its axis.

(1) Note. The tubing is usually a pump tubing which is rotated to distribute wear.

SEE OR SEARCH CLASS:

175, Boring or Penetrating the Earth, subclass 195, for a boring apparatus with a tool rotating means.

277, Seal for a Joint or Juncture, subclass 31 for rotatable packing for axially movable rod.

79.1 Cap having transporting means or ground support:

This subclass is indented under subclass 75.11. Above ground apparatus which prevents the flow of fluid from or into the well including (a) a device having wheels or skids or (b) structure arranged to merely rest on the area around the pipe or be connected to either this area or a foundation only, rather than to the casing or tubing of the well.

SEE OR SEARCH THIS CLASS, SUBCLASS:

94.1, for a laterally adjustable cap or head.

80.1 Having retractable pipe section to allow closing of gate type valve or flapper valve for rod or pipe:
This subclass is indented under subclass 75.11. Above ground apparatus comprising (a) a discrete tubular member axially shiftable to enable a flow control means; e.g., gate valve, to stop flow or (b) a hinged plate allowing passage of a tubular member or bar in one direction and preventing upward flow after removal of a tubular member or bar.

(1) Note. The axially adjustable member remains assembled with the rest of the device at all times.

(2) Note. The pipe section does not have to actuate the valve.

81.1 Fluid catcher around pipe coupling:
This subclass is indented under subclass 75.11. Above ground apparatus comprising an enclosure or deflecting member, other than the casing head, placed about a section of well pipe so that the liquid contents of the pipe may be prevented from being indiscriminately emitted.

(1) Note. Pipe wipers or cleaners are not properly classifiable here.

SEE OR SEARCH THIS CLASS, SUBCLASS:
80.1, for a retractable pipe section to allow closing of gate valve or flapper valve for rod or pipe.
82.1, for a releasable seal or cleaner for an inner member.

SEE OR SEARCH CLASS:
285, Pipe Joints or Couplings, subclasses 13+ for enclosures about pipe couplings for collecting leakage from the couplings and subclasses 148.6+ for a leak-gland type coupling.

82.1 Releasable seal or cleaner disengaged by projection on inner member:
This subclass is indented under subclass 75.11. Above ground apparatus comprising a detachably connected flow preventing or enclosure device for tubing, pipe, rod, or wireline within a casing opened by a lug, movable rod, collar, trip member, or protuberance on the tubing, pipe, rod, or wireline to cause the device to be detached from the well.

SEE OR SEARCH CLASS:
15, Brushing, Scrubbing, and General Cleaning, subclass 220.4, for fabric type wiper for rods, pipes or cables, subclass 236.01 for a scraper, and subclass 236.1 for a rotary scraper.
277, Seal for a Joint or Juncture, subclasses 5+ for a packing which opens or yields to allow a projection on the rod to pass, subclasses 19+, for sealing means with external fluid receiver usually between a casing and an inner rod, pipe or cable, subclass 31 for rotatable packing for axially moving rod, subclass 33 for axially biased rod.

83.1 Latches releasable radially inward:
This subclass is indented under subclass 82.1. Releasable seal or cleaner in which there are catch or dog members which move towards the centerline of the casing, when the projection contacts the device, in order to detach the enclosure or the flow preventing device.

84.1 With seal for reciprocating member:
This subclass is indented under subclass 75.11. Above ground apparatus comprising a flow prevention device for rod, pipe, tubing, wireline moving into and out of a well.

(1) Note. The inner member must be free to reciprocate and not anchored against movement.

SEE OR SEARCH THIS CLASS, SUBCLASS:
82.1+, for releasable seal or cleaner for inner member and unfastening means.
86.1+, for inner member anchor or seal with valve.
88.1+, for inner member anchor or seal with lateral port.

SEE OR SEARCH CLASS:
277, Seal for a Joint or Juncture, subclasses 5+ for a packing which opens or yields to allow a projection on the rod to pass, subclasses 19+, for sealing means with external fluid receiver usually between a casing and an inner rod, pipe or cable, subclass 31 for

rotatable packing for axially moving rod, subclass 33 for axially biased rod.

84.2 Cooling fluid or grease supplied to seals:
This subclass is indented under subclass 84.1. Reciprocating member seal wherein means are provided to deliver (a) temperature reducing liquid or gas or (b) lubrication to the flow prevention device.

84.3 Rotary blowout preventer type:
This subclass is indented under subclass 84.1. Reciprocating member seal wherein the flow prevention device is rotatable (via bearings) and is sensitive to excessive well bottom pressure.

SEE OR SEARCH CLASS:
251, Valves and Valve Actuation, subclasses 1.1+ for blowout preventers of the type comprising plural relatively movable flow obstructing members controlling flow through the annular passage between an inner rod or pipe and a surrounding casing or tubing head and having characteristics which go beyond a mere packing means. Addition of a lateral port in a casing head structure for diverting flow from the well is enough to cause classification in Class 166, but Class 251 takes blowout preventers or other valves in appropriate subclasses even though the valve is operated by the well fluid pressure or even though there are plural valves and broad recitations of casing or casing head structure.

84.4 Fluid pressure actuated seals:
This subclass is indented under subclass 84.1. Reciprocating member seal wherein the flow prevention device is moved to a pipe engaging position by liquid or gas force.

84.5 Seal fixedly mounted to rod:
This subclass is indented under subclass 84.1. Reciprocating member seal wherein the flow prevention device is permanently attached and movable with a tubular bar.

85.1 With assembly or disassembly means (e.g., handling, guiding or tool feature):
This subclass is indented under subclass 75.11. Above ground apparatus comprising (a) means for cooperating with a separate apparatus for aiding in putting together or taking apart a device or a part thereof or (b) means for aiding in inserting a member into or removing a member from the well.

(1) Note. The separate apparatus under (a) of the definition must be normally unconnected with the device being assembled or disassembled and must be something more than a mere detachable section of pipe constituting a continuation of the line of pipe being handled.

(2) Note. The aiding means under (b) of the definition must comprise more than a mere flared section of pipe.

SEE OR SEARCH THIS CLASS, SUBCLASS:
377+, for processes of placing, removing or assembling well elements.

SEE OR SEARCH CLASS:
137, Fluid Handling, subclasses 315.01 through 329.4 for a fluid handling system with repair, tapping, assembly, or disassembly means.
294, Handling: Hand and Hoist-Line Implements, subclasses 86.1+ in particular for grapples that are adapted to function in a well bore.

85.2 Pitless well adapters:
This subclass is indented under subclass 85.1. Assembling device in which the upper end of an inner pipe is connected to a below ground lateral port in a casing.

85.3 Seal or bushing insertion or removal:
This subclass is indented under subclass 85.1. Assembling device including means for installing or removing a flow prevention device or cylindrical lining from a well member.

85.4 With blowout preventer:
This subclass is indented under subclass 85.1. Assembling device for connecting a flow prevention device, sensitive to excessive well bottom pressure, to a well member.

SEE OR SEARCH CLASS:
251, Valves and Valve Actuation, subclasses 1.1+ for blowout preventers of the type comprising plural relatively movable flow obstructing members controlling flow through the annular passage between an inner rod or pipe and a surrounding casing or tubing head and having characteristics which go beyond a mere packing means. Addition of a lateral port in a casing head structure for diverting flow from the well is enough to cause classification in Class 166, but Class 251 takes blowout preventers or other valves in appropriate subclasses even though the valve is operated by the well fluid pressure or even though there are plural valves and broad recitations of casing or casing head structure.

85.5 Guiding or aligning feature:
This subclass is indented under subclass 85.1. Assembling device including means for directing or lining up a well member.

86.1 Inner member anchor or seal with valve:
This subclass is indented under subclass 75.11. Above ground apparatus comprising a flow regulating device in combination with a means for (a) preventing upward or downward movement of an inner pipe, rod, or cable member depending into a well casing or tubing or (b) preventing flow in the annular space between a casing supported enclosure and a pipe, rod, tubing, or wireline, said regulating device being disposed either in the well casing, tubing or pipe or in a conduit communicating with said well casing, tubing or pipe.

(1) Note. The sealing means under (b) of this definition may be of the blow out preventer type which is considered a "valve" for classification in Class 251, subclasses 1.1+.

SEE OR SEARCH THIS CLASS, SUBCLASS:
84.1+, for a well apparatus with a seal for a reciprocating member.

SEE OR SEARCH CLASS:
251, Valves and Valve Actuation, subclasses 1.1+ for blowout preventers of the valve type.

86.2 Annular sealing type valve:
This subclass is indented under subclass 86.1. Inner member seal with valve wherein the flow regulating device controls flow through the annulus defined between the pipe, rod, tubing, or wireline and casing.

86.3 Gate type (perpendicular to pipe) valve:
This subclass is indented under subclass 86.1. Inner member seal with valve including a flow regulating device movable perpendicular to the pipe, rod, tubing, or wireline.

(1) Note. The gate valve can only moves to the closed position after the inner member has been removed or disconnected.

87.1 Axially movable type valve:
This subclass is indented under subclass 86.1. Inner member seal with valve comprising a flow regulating device which is movable in the direction of the axis of a pipe in order to control fluid flow in the pipe.

88.1 Inner member anchor or seal with lateral port:
This subclass is indented under subclass 75.11. Above ground apparatus comprising an enclosure having an opening in a side wall thereof for allowing flow of fluid into the well or from the well for outside delivery in combination with (a) means for preventing upward or downward movement of a pipe, rod or cable member depending into the well or (b) a flow prevention device closing the annular space between the enclosure and an pipe, rod or cable member.

(1) Note. The sealing means under (b) of the definition may be a valve type blow out preventer classifiable, in Class 251, subclasses 1.1+.

SEE OR SEARCH THIS CLASS, SUBCLASS:

84.1+, for a seal interposed between a casing and an inner member reciprocating therein and which may have a lateral port communicating with the casing.

86.1+, for a casing which may have a lateral port and an inner elongated member either anchored to the casing or sealed therein, in which a flow passage is provided with a valve.

SEE OR SEARCH CLASS:

15, Brushing, Scrubbing, and General Cleaning, subclass 220.4, for fabric-type wiper for rods, pipes or cables, subclass 236.01 for a scraper, and subclass 236.1 for a rotary scraper.

251, Valves and Valve Actuation, subclasses 1.1+ for valve-type blowout preventers.

277, Seal for a Joint or Juncture, subclasses 5+ for a packing which opens or yields to allow a projection on the rod to pass, subclasses 19+, for sealing means with external fluid receiver usually between a casing and an inner rod, pipe, or cable, subclass 31 for rotatable packing for axially moving rod, subclass 33 for axially biased rod.

285, Pipe Joints or Couplings, subclasses 123.3+ for joints between a well head and an inner pipe.

88.2 Slip type well anchor:
This subclass is indented under subclass 88.1. Inner member anchor with lateral port wherein the means for preventing movement is a wedge-shaped member with a serrated face.

88.3 Seal actuated with anchor:
This subclass is indented under subclass 88.2. Slip type inner member anchor with lateral port wherein the flow prevention device and means for preventing movement are put into mechanical motion simultaneously.

88.4 With hydraulic conduit or line extending through outer member:
This subclass is indented under subclass 88.1. Inner member anchor with lateral port wherein the casing includes an opening for a pipe or tube extending therethrough.

89.1 Plural inner pipes:
This subclass is indented under subclass 88.1. Inner member anchor with lateral port in which there are at least two conveying lines within the outermost casing.

89.2 Parallel pipes (as opposed to concentric):
This subclass is indented under subclass 89.1. Plural inner pipes anchor with lateral port wherein the conveying lines are coaxial and side by side.

89.3 Having slip type hanger:
This subclass is indented under subclass 89.1. Plural inner pipes anchor with lateral port in which a means for preventing movement has a wedge-shaped member with a serrated face.

90.1 With means for inserting fluid into the well:
This subclass is indented under subclass 75.11. Above ground apparatus comprising a constricted tube to speed flow for introducing gas or liquid into a well casing, casing head or tubing.

SEE OR SEARCH THIS CLASS, SUBCLASS:

88.1+, for well casing heads having lateral ports which may be employed to introduce a fluid into said casing in combination with the inner members sealed or anchored with respect to the casing head.

91.1 With flow restrictors (e.g., chokes or beans):
This subclass is indented under subclass 75.11. Above ground apparatus comprising a head, cap, or system of pipes attached to a well casing or tubing in combination with a means for regulating the flow of fluid by presenting a predetermined limitation to fluid movement.

(1) Note. All valves and pipes offer some restriction to flow; this subclass, however, is intended to take only those well devices which include means specially built to restrict flow and known to the art as “chokes” or “beans”.

SEE OR SEARCH CLASS:

138, Pipes and Tubular Conduits, subclasses 40+ for flow restrictors.

251, Valves and Valve Actuation, subclasses 117 and 118+ for fluid handling systems of general utility with valves and flow restrictors.

92.1 Cap or head pivotably attached to tube or casing:
This subclass is indented under subclass 75.11. Above ground apparatus comprising a cover or top plug type structure in which all, or a section, is hinged to a pipe or to a tubular member inserted in a well.

SEE OR SEARCH THIS CLASS, SUBCLASS:
75.13, for well caps or casing heads of general utility which do not require the pivoting of the caps or heads.

93.1 Split cap or head:
This subclass is indented under subclass 75.11. Above ground apparatus comprising a cover or top plug-type structure for a well casing or tubing which is divided on a longitudinal plane so that it may be applied in a lateral direction to the casing or tubing.

94.1 Laterally adjustable cap or head:
This subclass is indented under subclass 75.11. Above ground apparatus comprising a cover or top plug-type structure for a well casing or tubing which is adjustable for movement away from or over the tubing or casing in a direction perpendicular to the longitudinal axis of the tubing or casing.

SEE OR SEARCH THIS CLASS, SUBCLASS:
79.1, for a cap or head provided with transportation means or which is unconnected to the well casing or tubing.

95.1 Central valve or closure and lateral port:
This subclass is indented under subclass 75.11. Above ground apparatus comprising (a) a head for attachment to a casing or tubing and having a flow regulating device operating across a vertical passage in line with the casing or tubing and an opening for a pipe in the side wall of the head or (b) a cap for closing off the tubing or casing and an opening for a pipe in the side wall of the tubing casing or cap.

(1) Note. There must be some detail of the head or cap shown or claimed for classification in this subclass. A patent having mere conventional showing of the cap or head and claims drawn to other features is classifiable in subclass 75.11 or other appropriate subclasses.

(2) Note. A sole disclosed use as a well casing head of a structure comprising a valve and a lateral port for handling fluid to or from the well is enough to cause classification in Class 166.

SEE OR SEARCH THIS CLASS, SUBCLASS:
88.1+, for devices in which an inner member is anchored or sealed with respect to an outer pipe and there is a port in the outer pipe.

96.1 External anchoring or bracing means:
This subclass is indented under subclass 75.11. Above ground apparatus comprising a head, cap or enclosure for attachment to a well casing or tubing and structural reinforcement such as tie rods for holding or shoring the head, cap or enclosure to the well casing or tubing or for attaching the casing or tubing to the ground or to a fixed well structure.

(1) Note. The anchoring or bracing means must comprise more than, or be additional to, a mere pipe joint or joint securing a closure to the top of a pipe.

97.1 With valve on cap or head:
This subclass is indented under subclass 75.11. Above ground apparatus comprising a cover or top plug type structure for attachment to a well tubing or casing in combination with a flow regulating device contiguous to, or on, the cover, plug-type structure, tubing, or casing.

(1) Note. There must be some detail of the valve structure or its attaching means shown for classification in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:
75.13, for well caps or heads.
80.1, for retractable pipe section extending through a valve.

86.1+, for an inner member anchor or seal with a valve.
95.1, for a central valve and a lateral port.

SEE OR SEARCH CLASS:
251, Valves and Valve Actuation, subclasses 1.1+ for blowout preventers comprising separate sections operable to close the annulus about a pipe and having characteristics which go beyond a mere packing means. Provision of a specific means for coupling the valve to the casing or arrangements of valves in branch lines are examples of features which will cause classification of a well casing head structure in Class 166.

97.5 Parallel pipes extending along distinct paths through wellhead:
This subclass is indented under subclass 75.11. Above ground apparatus including generally coaxial conduits which (a) are not located one within another and (b) extend from a position above ground to a position below ground.

SEE OR SEARCH THIS CLASS, SUBCLASS:
54.1, for means for separately pumping from plural sources in a well, which may include parallel, nonconcentric conduits extending above ground.

SEE OR SEARCH CLASS:
285, Pipe Joints or Couplings, subclasses 124.1+ for pipe systems including plural noncommunication paths which are parallel and nonconcentric and which are of the wellhead suspension type.

98 GRAPPLE AND WELL ANCHORED LIFTING MEANS:
This subclass is indented under the class definition. Devices comprising a means which is fixed in position in the well combined with a means for grappling an object in the well and a means for lifting the object and moving it relative to the fixed means.

SEE OR SEARCH CLASS:
294, Handling: Hand and Hoist-Line Implements, appropriate subclasses for grapples, per se, and subclasses 86.1+ in particular for grapples that are adapted to function in a well bore.

99 WITH JUNK RETRIEVING MEANS:
This subclass is indented under the class definition. Devices adapted to retrieve a plurality of discrete objects (e.g., pieces of tools usually known as junk or fish from a well).

(1) Note. This subclass is closely related to the well grapple art in Class 294, Handling: Hand and Hoist-Line Implements, subclasses 86.1+, especially subclass 86.11. The distinction is that Class 166, subclass 99 relates to junk retrievers which have features of fluid handling or other well features considered too specialized for Class 294. Specifically, if junk is swept into the retrieving device by means of fluid circulated down the inside of a central conduit which supports the retrieving device classification is in Class 166, subclass 99. On the other hand, a junk retrieving device (e.g., a junk basket as in Class 294, subclass 86.11) in which junk is swept into the basket by circulation of fluid down the outside of a central conduit supporting the device and then up the inside of the conduit, or a junk retrieving device in which junk is swept into the device merely by means such as a plunger causing a sudden inrush of fluid, is classified in Class 294.

(2) Note. The devices of this subclass are intended to comprise a unitary means to recover junk only, as distinct from a mass of fluent material which may incidentally contain junk. Thus a device for this subclass may consist of a receptacle with a foraminous bottom which permits the fluent material to drain away as distinct from a receptacle with a solid bottom which retains fluent material. Receptacles for recovering a mass of fluent material are found in Class 166, subclasses 107+ and 162+ and also in Class 294, Handling: Hand and Hoist-Line

Implements, subclasses 68.22+. Receptacles in combination with earth boring means are found in Class 175, Boring and Penetrating the Earth, subclasses 308+. If a single device has two distinct means, one (of any type) for recovering junk only and one for recovering a mass of fluent material of the type classifiable in Class 166, subclasses 107+ or subclasses 162+, classification is in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

107+, and 162+, for a receptacle for retrieving fluent material from a well which material may or may not contain junk, as distinct from a junk retriever for subclass 99 which may be a receptacle designed to hold only junk but which receptacle incidentally may also hold a small amount of fluent material.

SEE OR SEARCH CLASS:

175, Boring or Penetrating the Earth, subclasses 244+ for a core removing means, which core may contain junk and subclasses 308+ for earth boring means with a receptacle which may be adapted to retrieve junk.

294, Handling: Hand and Hoist-Line Implements, subclasses 86.1+ for a well grapple, especially subclass 86.11 for a well grapple of the basket forming type and see (1) Note above; and subclass 86.34 for a device for freeing a single stuck object from its environment in a well by a washover or cutover means and retrieving said object.

100 LATERAL PROBE OR PORT SEALED AGAINST WELL WALL:

This subclass is indented under the class definition. Devices comprising (1) a means pressed against the side wall of a prepositioned well conduit so as to form a seal around a port for passage of fluid or (2) a means penetrating the earthen side wall of the well bore so as to provide a passage for fluid between a tubular member in the well and the formation.

(1) Note. The port is often formed in a packer sealing means. Separate packers which, broadly considered, form ports between them are not included. See subclass 191 and the subclasses there noted for such devices.

SEE OR SEARCH THIS CLASS, SUBCLASS:

223, for nozzles which are projected against a conduit structure but have no sealing means.

SEE OR SEARCH CLASS:

73, Measuring and Testing, subclass 152.26 for a sealing detail in an apparatus for fluid flow measuring or fluid analysis combined with sampling wherein the test is not purely electrical or purely magnetic.

175, Boring or Penetrating the Earth, subclasses 2+, 77, 78, and 79+ for means insertable in an inaccessible hole (e.g., well bore) to bore into a sidewall thereof.

101 PACKER OR PLUG AND PUMP OR PLUNGER MEANS EXERTING OUTWARD PRESSURE:

This subclass is indented under subclass 179. Devices under the class definition comprising a packer or plug combined with a pump or plunger means for exerting outward fluid pressure against the wall of the surrounding conduit either in the space between a pair of packer or plug means or in the space beneath the packer or plug means.

(1) Note. The pump or plunger means must be some device other than a packer or plug which forms a seal with the surrounding conduit specified in the definition. See subclass 119 for devices which may create pressure by the relative movement of packer or plug sealing means.

(2) Note. Cementing and washing devices and other well devices commonly are associated with a pump (usually at the well top) for producing pressure beneath a packer. A mere broad or nominal reference to a pump means is therefore not sufficient for classification in this subclass. Such devices are classified in appropriate subclasses on other features.

(3) Note. The pump or plunger means must cause a direct outward fluid pressure. See subclass 106 for devices in which an eduction pump while withdrawing liquid may create a condition which causes outward pressure as defined in subclass 101.

SEE OR SEARCH THIS CLASS, SUBCLASS:

106, for a packer or plug and eduction pump means which may indirectly or incidentally cause pressure outwardly, while it pumps liquid out of the well.

177, for packers or plug devices reciprocated in a surrounding conduit to cause surging or outward pressure.

102 CONVERTIBLE:

This subclass is indented under the class definition. Devices used below ground level and so designed that (1) by working on them above ground and reassembling all or some of their parts, adding or omitting a part or rearranging or adjusting parts they are changed from devices classifiable in Class 166 to ones which function as devices classifiable in other classes, or (2) by working on them above ground and reassembling all or some of their parts or adding or omitting a part their mode of operation may be changed.

104 WITH MOTOR FOR ROTARY OR OSCILLATING MOTION:

This subclass is indented under the class definition. Devices combined with a prime mover imparting rotary or oscillating motion.

(1) Note. A device which acts merely to rotate itself is not considered a rotary motor. See subclass 223 for well devices comprising rotary nozzles.

SEE OR SEARCH THIS CLASS, SUBCLASS:

66.4, for well devices with electrical rotary motors.

105 WITH EDUCTION PUMP OR PLUNGER:

This subclass is indented under the class definition. Devices combined with a pump or plunger means for drawing well fluid out of the well or into a receptacle which is to be taken out of the well.

(1) Note. See the class definition of Class 166 for the line with Class 417, Pumps.

(2) Note. Well devices such as sampling or cementing means frequently are provided with means for circulating liquids (e.g., introducing a liquid to drive out a liquid). Such liquid circulating means are not considered pumps for this subclass. These devices are classified on other features, mainly, the arrangement of valves and packers as in subclasses 142+.

(3) Note. Claims involving merely a pump or pump tubing carrying an expanding support in a well conduit, or a packer or plug structure for a pump and claiming the pump by name only or as a pump barrel are classified on the basis of the supporting or packing structure rather than in this or indented subclasses, the pump or pump barrel being treated as a mere pipe or central conduit, according to the disclosure.

SEE OR SEARCH THIS CLASS, SUBCLASS:

61 and 62, for heating, refrigerating or insulating means with an eduction pump or plunger in the well.

68, for above and below ground structure including an eduction pump or plunger in the well.

176, for brushing, scraping, cutting or punching type cleaners on a pump sucker or rod.

206+, for expansible anchor means on a pump tubing.

SEE OR SEARCH CLASS:

137, Fluid Handling, subclass 155 for gas lift valves for wells and subclass 206 for apparatus for gas displacements of a liquid.

175, Boring or Penetrating the Earth, subclass 324 for earth boring apparatus having a tool shaft with means other than bit structure to induce fluent flow.

267, Spring Devices, subclass 125, for a piston-type fluid spring device useful

in apparatus for drawing fluid from a well.

105.1 Having sediment trap or deflector:
This subclass is indented under subclass 105. Devices including (1) a device for both separating and collecting sand, earth or other solid impurities from the well fluid which is being or has been moved by the pump or plunger, or (2) a device which acts as a means for diverting or deflecting impurities away from the pump or plunger.

(1) Note. Patents which are disclosed as receptacles for elevating fluid and which may incidently include some earth material are not included here but will be found in subclasses 107+ below.

105.2 Carried by reciprocating plunger or plunger rod:
This subclass is indented under subclass 105.1. Devices in which the sediment collecting or deflecting device is attached to the plunger or plunger rod of the reciprocating type.

105.3 Sediment trap formed in pumping chamber:
This subclass is indented under subclass 105.1. Devices in which the sediment collecting means is formed within the same housing which houses the pumping element of a pump such that the sediment is in effect collected in the pump chamber or housing.

105.4 In pump discharge flow path:
This subclass is indented under subclass 105.1. Devices in which the collecting or deflecting means acts on fluid which has already been acted upon by the pumping element of the pump.

105.5 Having liquid-gas separator:
This subclass is indented under subclass 105. Devices including a device having structure to cause gas (1) to be separated from the liquid well fluid or (2) to be collected or confined by the structure.

(1) Note. A packer or packers and a passage, whether valved or not, is not included under the definition of this subclass, see subclass 106 below. To be included in this definition there must be some gas directing structure in addition to the packer.

105.6 Gas fed to entrainment type pump:
This subclass is indented under subclass 105.5. Devices in which there is a pump of the type which liquid is pumped by being displaced or carried by a gas (e.g., jet, aerated column, etc.), and the gas separating or collecting structure includes means for directing the gas to the pump to act as a pumping fluid for the liquid.

106 With packer or plug:
This subclass is indented under subclass 105. Devices including packers or plugs as defined in subclass 179.

(1) Note. Claims involving merely a pump carrying a packer or plug or expanding support and including the pump or pump barrel by name only are classified on the basis of the packing, plug or support structure rather than in this subclass, the pump or pump barrel being treated as a mere pipe unless disclosed as a portion of a central conduit.

SEE OR SEARCH THIS CLASS, SUBCLASS:
101, for packers or plugs and pump or plunger means exerting outward pressure on the space below the packer or plug, which pressure may be alternated with an inward eduction flow.

SEE OR SEARCH CLASS:
417, Pumps, appropriate subclasses for pumps combined with packers or plugs.

107 Receptacles:
This subclass is indented under subclass 105. Devices comprising a container into which a well fluid is drawn by the pump or plunger means, the container being lifted bodily out of the well to transport the fluid to the top of the well.

SEE OR SEARCH CLASS:
73, Measuring and Testing, subclass 864.52 for sampling devices comprising a receptacle with suction means. Patents having a sole disclosure of or

a claim to use in a well are classified in Class 166.

175, Boring or Penetrating the Earth, subclasses 308+, and the search there noted, for earth boring apparatus having a receptacle.

108 Piston actuates foot valve:

This subclass is indented under subclass 107. Devices in which a pump or plunger piston is mechanically connected with a valve at the bottom portion of the container so as to close the valve when the piston is at the end of its lifting stroke.

109 Telescoping:

This subclass is indented under subclass 107. Devices in which the fluid is drawn into the container by the relative motion of telescopically related tubular parts thereof.

110 Lateral port always below piston and used in well:

This subclass is indented under subclass 107. Devices in which there is an opening through the side wall of the container below the lowest position of the pump or plunger piston providing for fluid flow through the opening while the container is in the well.

(1) Note. The opening must be more than a mere scallop on the lower edge of the container.

111 Bail engaging piston rod:

This subclass is indented under subclass 107. Devices in which a bail on the top of the container engages the actuating rod of the pump or plunger piston.

112 With leak means:

This subclass is indented under subclass 105. Devices comprising a pump having a means for causing a portion of the well fluid being pumped to flow back into the well to treat it (e.g., wash it) while the pump is being operated to draw a major portion of the well fluid out of the well.

SEE OR SEARCH CLASS:

417, Pumps, subclass 434, for pumps including a separate port or noncyclic valve for draining a pump portion and subclasses 443+ and 446, for pumps with a pressure responsive distributor (e.g., check valve) which may be selectively held open as, for example, to drain the pump.

113 COMBINED (E.G., WITH NON-ELECTRICAL INDICATING):

This subclass is indented under the class definition. Devices combined with means for other functions than operating, treating or making a well or a means for perfecting the functions of operating, treating or making a well, the said means not being provided for in preceding subclasses.

(1) Note. Operating, treating or making a well is considered to include, for example, flowing, washing, acidizing, cementing, and connecting or disconnecting parts in a well. Ancillary subcombination of such devices such as pumps for forcing fluid into a well or inflating a packer, clutches, detents, knives or release detents or open closures, means attachable or detachable in the well, bearings or jars are not considered subject matter for this subclass. Devices including these means having been classified in appropriate subclasses according to the features claimed.

(2) Note. Devices found in this subclass include for example, cementing plugs with an indicating flare fluid, a well plug with an indicating ball on a string, a bailer with a means for taking an impression of lost tools, a washing device with a camera, and cementing casing shoes with means for testing the casing for fluid tightness.

(3) Note. While well devices with added special means for testing for fluid leakage are included, well devices such as packers or plugs which inherently are capable of use as fluid leakage testers without modification are not found in this subclass but are classified according to other features.

(4) Note. It is common in the art and inherent in most devices to give an indication of the operation of some part by manipulating a flow controlling means so as to

cause a change in pressure. Devices for giving an indication by a change in pressure are not included unless some indicia means are claimed, such as a gauge, scale or pointer.

(5) Note. Many well devices inherently give an indication of their position, as when expanding anchor means catch on conduit joints, when they are manipulated to operate valves or when detent or clutch means are operated. Well devices adapted to indicate an operation by means such as the position of parts or resistance to motion are not included in this subclass unless an indicia means such as a scale or pointer is included.

SEE OR SEARCH CLASS:

33, Geometrical Instruments, subclasses 304+, for means sensing and indicating borehole direction or inclination.

73, Measuring and Testing, subclasses 152.01+, for apparatus for bore hole studies. Such apparatus may include a sampling device or other well devices such as packers in combination with means for bore hole study such as flow meters, temperature recorders, well pressure indicators, etc., the well devices being used to perfect the bore hole study means rather than being used for well functions such as treating the well.

175, Boring or Penetrating the Earth, subclasses 40+ for processes or apparatus for earth boring including signaling, indicating, testing or measuring.

374, Thermal Measuring and Testing, subclass 136 for subsurface temperature measurement, in general.

114 CENTRAL MEMBER WITH PRE-SET PACKER OR PLUG IN SAME CONDUIT:

This subclass is indented under subclass 179. Devices under the class definition comprising a packer or plug set in final position within a surrounding conduit, (the setting tool or conduit which supported the packer or plug during insertion into the surrounding conduit having been withdrawn) combined with a centrally positioned longitudinally extending member, other than the aforesaid setting tool or supporting conduit and not a mere retrieving means for the packer or plug which is run into the surrounding conduit after the packer or plug is set.

(1) Note. The centrally positioned longitudinally extending member must be more than a mere piston, fluid driven into the well or plug, per se. Usually the centrally positioned member is a central conduit, receptacle or pump barrel. For a piston, fluid driven into the well cooperating with another such piston see subclass 153.

SEE OR SEARCH THIS CLASS, SUBCLASS:

115+, for a central chamber sealed with respect to a prepositioned surrounding conduit.

179+, and the subclasses there noted for packers or plugs assembled in a well.

115 CENTRAL CHAMBER SEALED WITH RESPECT TO PREPOSITIONED MODIFIED SURROUNDING CONDUIT:

This subclass is indented under the class definition. Devices comprising a central conduit or centrally positioned receptacle in combination with a surrounding conduit, the surrounding conduit being prepositioned in final position in the earth before the central conduit or receptacle is associated therewith, there being a means sealing a portion of the annular space between the central conduit or receptacle and the surrounding conduit.

(1) Note. For classification in this subclass a patent must claim the surrounding conduit which may even be the earth wall of the well, with some particularity. For example, the mere naming of a conduit or a conduit with a perforation or group of perforations is not enough, but the recitation of spaced perforations or groups of perforations is sufficient. A mere functional claiming of a relationship is not enough. See the search notes for devices having a particular relationship with a surrounding conduit.

(2) Note. The sealing means of the definition is usually a packer carried by the central conduit or receptacle.

(3) Note. A broadly recited pump barrel is not considered a central conduit or receptacle. Devices comprising a pump barrel with a packer cooperating with a shoulder in a surrounding conduit may be found in subclasses 195 and 203.

SEE OR SEARCH THIS CLASS, SUBCLASS:

114, for a central chamber with a packer or plug combined with a preset packer or plug whose setting means has been withdrawn.

136, for packers or plugs with expanding anchors where the expanding anchor is spring set and adapted to engage in a recess in the surrounding conduit.

195, for deformable packers adapted to engage a shoulder on a surrounding conduit.

203, for nondeformable packers adapted to engage a shoulder on a surrounding conduit.

116 Surrounding conduit carries packer or plug:
This subclass is indented under subclass 115. Devices in which the surrounding conduit carries a packer or plug as defined in subclass 179.

117 RECEPTACLE OR PART THEREOF LEFT IN WELL:
This subclass is indented under subclass 162. Devices under the class definition comprising a receptacle so constructed and arranged that the receptacle or a part thereof is left in the well and separated from its lowering means, if any, when performing or after performing its intended function.

(1) Note. The part left in the well must comprise more than a mere knock out or frangible closure.

(2) Note. These devices are usually intended to plug the well by rupturing, breaking up or parting the receptacle while releasing its contents.

SEE OR SEARCH THIS CLASS, SUBCLASS:

205, and 227+, for well screens or well screen parts which may be lifted from the well after sediment collects therein.

117.5 MEANS FOR GUIDING INSERTABLE ELEMENT LATERALLY OF WELL AXIS (E.G., WHIPSTOCK):
This subclass is indented under the class definition. Devices comprising a means positioned in a well conduit and adapted to be engaged by an element or member movable in the well conduit so that the element or member is directed laterally of the longitudinal axis of the well conduit.

SEE OR SEARCH THIS CLASS, SUBCLASS:

55+, for device for perforating, weakening, bending or separating pipe at any point in a well and especially subclass 55.3 for wedge or cam actuated pipe perforating or splitting cutters.

SEE OR SEARCH CLASS:

175, Boring or Penetrating the Earth, subclass 61 for processes of drilling curved or redirected bores and subclasses 79+ for earth boring devices in which the tool moves axially relative to means to redirect the tool laterally.

117.6 Secured in operative position by movable means engaging well conduit (e.g., anchor):
This subclass is indented under subclass 117.5. Devices in which the diverting means is secured in operative position in the well conduit by means movable relative to the diverting means and adapted to engage or cause a portion of the diverting means to engage the wall of the well conduit to prevent either longitudinal or rotary movement of the diverting means relative to the well conduit.

SEE OR SEARCH THIS CLASS, SUBCLASS:

206+, for expansible anchors in well conduits. See the search notes thereunder for other features combined with anchors.

SEE OR SEARCH CLASS:

175, Boring or Penetrating the Earth, subclass 81 for earth boring devices having a means to redirect the tool later-

ally which has a bore wall engaging anchor.

117.7 MEANS ANCHORED AGAINST ROTATION IN ONE CONDUIT SECTION FOR RELATIVELY ROTATING ANOTHER SECTION:

This subclass is indented under the class definition. Devices comprising a means located below ground level in a well conduit adapted to cause relative rotary motion between one section of conduit and another section of conduit also located in the well, said means including a means movable outwardly to engage the surrounding well conduit section to prevent rotation of one portion of the rotating means in the well.

(1) Note. Generally one of the sections of conduit is a pipe which is stuck in the well bore and held against rotation and the below ground means is anchored to a separate outer well conduit and engages only the uppermost section of the stuck section in the manner of a fishing tool.

SEE OR SEARCH THIS CLASS, SUBCLASS:

98, for a grapple with a well anchored lifting means.

206+, and the search there noted, for expansible well anchors or casings.

SEE OR SEARCH CLASS:

81, Tools, subclasses 436+ for tools which have a force-exerting portion inserted into a cavity in the work, especially subclasses 442+ for expanding type portions.

294, Handling: Hand and Hoist-Line Implements, subclasses 86.24+ for internally expanding well grapples, and subclasses 93+ for internally expanding grapples of general utility.

118 With expanding anchor:

This subclass is indented under subclass 179. Devices under the class definition comprising plug or packer means combined with expansible anchor means as defined in subclass 206.

119 Relatively movable packers or plugs:

This subclass is indented under subclass 118. Devices wherein there are at least two packers or plugs so arranged that all portions of the sealing part of one are bodily movable with respect to all portions of the sealing part of the other while the device is in unitary condition in the well.

SEE OR SEARCH THIS CLASS, SUBCLASS:

123, for devices having expanding anchors and packers or plugs in which one packer or plug is detachable from another in the well.

120 Anchor actuated by fluid pressure:

This subclass is indented under subclass 118. Devices in which the anchoring means is movable to set or inset position, all or part of the movement being due to fluid pressure.

(1) Note. The whole of the movement to operative locking position is usually due to the fluid pressure. Devices in which some of the movement to final locking position is due to some other motive power are classifiable here only if there is also some added modification of the device for the use of fluid pressure to move or tend to move the anchoring means. The added modification must be supplementary to the common placement of a packer and expanding anchor whereby the pressure of the fluid being blocked acts to increase the anchoring effect. See subclass 140 for devices so arranged that fluid pressure increases the anchoring action but having no special modification for this purpose.

(2) Note. Devices in which fluid pressure is used to release a latch so that some other means may move the anchoring means are not classified in this or indented subclasses. See subclass 136 for spring set anchors with latches released by fluid pressure.

(3) Note. The fluid pressure may be caused by movement of the device through or into a body of fluid.

SEE OR SEARCH THIS CLASS, SUBCLASS:

212, for expansible anchors actuated by fluid pressure, the anchors being not disclosed as associated with packers or plugs.

SEE OR SEARCH CLASS:

175, Boring or Penetrating the Earth, subclass 99 for earth boring apparatus in which a below ground motor is anchored to the bore wall by a support having fluid operated expansible anchor.

121 Pressure transmitted by cup type packer or plug seal:

This subclass is indented under subclass 120. Devices wherein the fluid pressure for moving the anchoring means is exerted on a cup type packer sealing portion of the type defined in subclass 202.

122 Pressure transmitted by packer or plug expanded by confined fluid from central chamber, pump, or plunger:

This subclass is indented under subclass 120. Devices wherein the fluid pressure for moving the anchor is applied to the sealing portion of a packer or plug in the manner defined in subclass 187.

123 With detachable setting means:

This subclass is indented under subclass 118. Devices comprising means for detachably coupling the device to a means for lowering the device into the surrounding conduit, the detachable connection being such that the packer or plug may be left in the well while the lowering means is completely withdrawn.

SEE OR SEARCH THIS CLASS, SUBCLASS:

181+, and the search there noted, for other packers and plugs or other well elements having a detachable setting means or part.

124 Screw threaded:

This subclass is indented under subclass 123. Devices in which the connection comprises screw threads on the device engaging screw threads on the lowering means.

125 Radially movable latch:

This subclass is indented under subclass 123. Devices in which the connection comprises a latching member which is movable in a direction generally radially of the well bore in order to unmake the connection in the well.

126 With controllable passage between central chamber and space below packer:

This subclass is indented under subclass 118. Devices with a controllable passage between a central chamber comprising a central conduit or a receptacle and a space below a packer, as set forth in subclass 142.

SEE OR SEARCH THIS CLASS, SUBCLASS:

120+, (especially 122), for devices as defined in subclass 126 in which the expanding anchor is actuated to setting position by fluid pressure.

123, for devices as defined in subclass 126 in which the central conduit is a detachable setting tool.

127 Spaced packer or plug seals:

This subclass is indented under subclass 126. Devices in which there are packer or plug sealing portions spaced from each other as defined in subclass 191.

128 Passage controllable by movement of central chamber:

This subclass is indented under subclass 126. Devices in which the valve, closure or changeable restriction controlling the passage is opened, closed or held in position or freed for movement because the central chamber is moved.

SEE OR SEARCH THIS CLASS, SUBCLASS:

127, for devices as defined in this subclass in which there are spaced packer blocking means.

129 With controllable bypass outside central conduit:

This subclass is indented under subclass 118. Devices wherein the packer is adapted to be supported by a central conduit from the top of the well as it is run into the well and there is a fluid passage within the packer but not in com-

munication with the central conduit passageway in the region of the packer, which fluid passage connects the space below the packer with the annular space above the packer, the fluid passage being controllable by a valve, closure or changeable restriction.

130 Packer expanded by upper valve:
This subclass is indented under subclass 129. Devices wherein the packer blocking portion is expanded laterally by means of force transmitted through coacting shoulder members which are situated above the packer and which act to close the fluid passage as they expand the packer blocking portion.

131 With controllable passage between central conduit and space above packer or plug:
This subclass is indented under subclass 118. Devices wherein there is a fluid passage between a central conduit which supports the packer or plug from the top of the well while it is being run into the well and the annular space above the packer or plug, between the central conduit and the surrounding conduit, the passage being controllable by a valve, closure or changeable restriction.

SEE OR SEARCH THIS CLASS, SUBCLASS:
123+, for devices as defined in this subclass wherein the passage is opened by detaching the central conduit.
127, for a device comprising a central chamber expanding anchors, spaced packers and a controllable passage between the chamber and the space above a lower packer outside of the chamber.
129+, for devices as defined in this subclass in which the passage between the central conduit and the space above the packer passes through the packer but outside the central conduit.

132 Portion extends beyond end of surrounding conduit:
This subclass is indented under subclass 118. Devices wherein the anchoring means is prevented from expanding till the device or a part thereof passes beyond the end of the surrounding well conduit.

133 With controllable passage through packer:
This subclass is indented under subclass 118. Devices in which there is a fluid passage through the packer connecting the space below the packer with the space above the packer, the passageway being controllable by a valve, closure or changeable restriction.

SEE OR SEARCH THIS CLASS, SUBCLASS:
126+, for devices as defined in this subclass in which the controllable passage through the packer is between a central chamber and the space below the packer.
129+, for devices as defined in this subclass in which the controllable passage is a bypass outside a central conduit.

134 Support and holddown expanding anchors:
This subclass is indented under subclass 118. Devices in which the expanding anchor comprises two distinct means, one being adapted to anchor the device against downward movement, and the other adapted to anchor the device against upward movement.

SEE OR SEARCH THIS CLASS, SUBCLASS:
122, for devices as defined in subclass 134 in which the packer or plug sealing portion is expanded in order to actuate the anchor means to expand condition.

135 Flow stopping type, e.g., plug:
This subclass is indented under subclass 118. Devices comprising a plug as defined in subclass 179.

SEE OR SEARCH THIS CLASS, SUBCLASS:
132, for plugs anchored beyond the conduit end.
192+, for plugs without separate expanding anchor means, these plugs being usually held in place by the frictional engagement of the sealing means.

SEE OR SEARCH CLASS:

102, Ammunition and Explosives, subclasses 301+ for well torpedoes with plugging means; and subclass 333 for plugs used in blasting.

138, Pipes and Tubular Conduits, subclass 89 for closures and plugs of general utility (including those assembled with a conduit before the conduit is inserted into the well).

136 Spring set anchor:

This subclass is indented under subclass 118. Devices in which the energy stored in a spring is used to move the expanding anchor outwardly to set it.

(1) Note. Where a spring means forms a resilient mounting but movement of the anchor is due to some other means classification is not in this subclass. See subclasses 138+ for such devices.

SEE OR SEARCH THIS CLASS, SUBCLASS:

132, for spring set anchors which cooperate with the end edge of the surrounding conduit to prevent upward movement.

137 Spring moves anchor slip relative to wedge or cam:

This subclass is indented under subclass 136. Devices in which the spring causes relative movement between a wedge or cam and the expanding anchor means to move the means outwardly.

138 Wedge or cam and friction drag:

This subclass is indented under subclass 118. Devices in which there is a friction means as defined in subclass 241 and a wedge or cam means engageable with the anchor means in order to move it outwardly.

(1) Note. The friction means may be identical with the anchor means if the device is constructed so that the anchor frictionally resists movement when in the unexpanded condition in order to enable setting of the device.

(2) Note. The friction means may be a packer or plug sealing means if this sealing means is used like a friction drag to set the anchor.

SEE OR SEARCH THIS CLASS, SUBCLASS:

121, for packers or plugs and expanding anchors set by fluid pressure wherein fluid pressure acting on a cup type packer seal may cause it to act in a manner similar to a friction drag when setting the expanding anchor.

129+, for devices as defined in this subclass in which there is also a controllable bypass outside of a central conduit supporting the packer or plug.

139 Threaded element rotated:

This subclass is indented under subclass 138. Devices in which interengaging screw threads on different parts are relatively rotated in order to set the anchor, packer or plug.

(1) Note. The rotation may occur as a preliminary operation or during the setting operation proper.

140 Anchor above packer or plug seal:

This subclass is indented under subclass 138. Devices wherein the anchoring means is positioned above the packer or plug blocking portion.

(1) Note. This subclass does not include those devices in which the anchoring means is positioned in the same zone as the packer or plug means so that only part of the blocking portion of the packer or plug is below the anchor. See subclasses 138 and 139 for such devices.

141 Sealing portion closes port between central pipe and outside space when unexpanded:

This subclass is indented under subclass 179. Devices under the class definition comprising an expansible packer or plug in which the blocking or sealing portion of the packer closes a port in the side wall of the central tubular member when in unexpanded condition and opens the port to the space outside the packer or plug when expanded laterally to blocking position.

(1) Note. A ring portion which is attached to the sealing part and handled as a unit therewith is considered part of the sealing portion.

142 With controllable passage between central chamber and space below packer:

This subclass is indented under subclass 179. Devices under the class definition comprising (1) a packer constructed to be supported from the top of the well by a central conduit for insertion thereby into the well or (2) a packer as defined in subclass 179 for use with a centrally positioned receptacle as defined in subclass 162, there being a fluid passage between the central conduit or receptacle and the space below the packer outside of the conduit or receptacle, fluid flow through said passage being capable of being altered or affected by a valve, closure device or changeable restriction in subclass 224 positioned across the passage.

(1) Note. The passage may include as a part thereof any space inside of the surrounding conduit which receives the packer.

(2) Note. A packer is considered to bound a space even if unexpanded.

(3) Note. The central conduit or receptacle forms a central chamber for the purpose of receiving or discharging fluid, as for example, in sampling, cementing or washing devices.

SEE OR SEARCH THIS CLASS, SUBCLASS:

126+, for devices as defined in this subclass which also comprise expanding anchor means.

SEE OR SEARCH CLASS:

417, Pumps, subclasses 526, 528, and 547, for piston connected to a hollow piston rod which acts as a discharge conduit.

143 Central conduit detachable:

This subclass is indented under subclass 142. Devices in which the central conduit is adapted to be readily detachable from the packer while in the well by means of a connection such that either the packer or conduit may be left in the well while the other member is completely withdrawn from the well.

SEE OR SEARCH THIS CLASS, SUBCLASS:

123+, for devices as defined in subclass 143 in which there are also expansible anchor means.

158, for a screen with a jetting or washing point or shoe and a detachable jet or wash pipe.

181+, for packers or plugs with detachable setting means.

144 Bottom supported casing or screen section:

This subclass is indented under subclass 143. Devices in which the central chamber is a central conduit and is detachably attached to the lower portion of a casing or screen section which carries the packer sealing portion so that the central conduit supports the casing or screen section against the action of gravity while it is being lowered into the well.

145 Bypass closing and passage opening to upward flow constrained to occur simultaneously:

This subclass is indented under subclass 142. Devices in which there is a bypass around the packer and a valve or closure for the bypass, the control element for the passage being so interconnected with the valve or closure for the bypass that complete opening of the passage to upward fluid flow into the central chamber and closing of the bypass to upward fluid flow are constrained to occur together.

(1) Note. A bypass is a passage through the packer that connects the annular space outside the central conduit or receptacle and above the packer with the space below the packer.

(2) Note. The closing of the bypass and opening of the passage need not occur exactly simultaneously but may occur a short time interval apart as the result of an operating movement which is intended to take place without interruption once started.

146 Passage connects with space below packers and continuously open passageway connects with space between packers:

This subclass is indented under subclass 142. Devices in which the passage connects with a space below a plurality of packer blocking means and there is a passageway which is always open to passage of fluid in either direction between the central conduit of receptacle and the annular space between the packer blocking means.

147 Passage connects with space between packer or plug seals:

This subclass is indented under subclass 142. Devices in which the passage connects with the annular space between spaced packer or plug sealing portions as defined in subclass 191.

SEE OR SEARCH THIS CLASS, SUBCLASS:

146, for devices in which the passage connects with a space below packers and a continuously open passageway connects with the space between the packers.

148 Upwardly biased check valve and means for opening or bypassing it:

This subclass is indented under subclass 142. Devices in which there is a check valve normally effectively closing the passage against upward flow of fluid while the device is being run into the well but permitting downward flow and there is also a means for rendering the check valve ineffective to stop upward flow after the device is positioned in the well, either by opening said valve or providing a fluid passageway around said valve.

SEE OR SEARCH CLASS:

137, Fluid Handling, subclasses 599.01 through 601.21 for systems dividing into parallel flow lines then recombining.

149 With passageway between central chamber and space above packer:

This subclass is indented under subclass 142. Devices in which there is also a passageway between the central conduit or receptacle and the annular space above the packer and outside of the central conduit or receptacle.

(1) Note. The central chamber may comprise concentric conduits each of which forms a "chamber", one having a passage to the space beneath the packer and one having a passageway to the space above the packer.

SEE OR SEARCH THIS CLASS, SUBCLASS:

131 and 184, for devices in which there is a central conduit carrying a packer and a controllable passage between the conduit and the space above the packer.

143+, for devices as in subclass 149 comprising a passageway provided between a central chamber and the space above the packer due to the disconnection of the central chamber from the packer, or a passageway provided between a setting tool and a concentric screen section carrying a packer.

146, for devices as in subclass 149 and in which the passageway is continuously open and there is an additional packer carried by the central chamber above the passageway outlet.

150 Passageway controllable by movement of central chamber:

This subclass is indented under subclass 149. Devices in which fluid flow through the passageway between the central conduit or receptacle and the space above the packer is controllable by a valve, openable closure or changeable restriction operated or held in position by movement of the central conduit or receptacle.

SEE OR SEARCH THIS CLASS, SUBCLASS:

145, for devices as in this subclass in which fluid flow through a bypass through the packer is stopped when fluid flow to the central chamber is permitted.

151 Passageway valve directly responsive to fluid pressure:

This subclass is indented under subclass 149. Devices in which fluid flow through the passageway between the central conduit or recep-

tacle and the space above the packer is controllable by a valve, openable closure or changeable restriction which is responsive to fluid pressure exerted directly upon it by contact with the fluid whose flow is being controlled.

(1) Note. A valve, closure or changeable restriction operated by a dropped ball or other means acted on by fluid pressure is not considered within the definition of this subclass. See subclass 149 for such devices used to control the passageway between the central chamber and the space above the packer.

152 Passage controllable by movement of central chamber:

This subclass is indented under subclass 142. Devices in which the valve, closure or changeable restriction controlling the passage is opened, closed, held in position or freed for movement because the central conduit or receptacle is moved.

SEE OR SEARCH THIS CLASS, SUBCLASS:

128, for devices as defined in subclass 152 in which there is also an expanding anchor means.

143+, (especially 144), for devices as defined in subclass 152 in which the central chamber (usually a setting tool) is detachable after operating a valve to close the passage.

145, for devices as defined in subclass 152 in which there is also a bypass around the packer which is closed when the passage to the central chamber is opened.

146, for devices as defined in subclass 152 in which there is also a continuously open passageway between the central chamber and a space between plural packers.

148, for devices as defined in subclass 152 in which there is also an upwardly biased check valve between the central chamber and the space below the packer.

150, for devices having a controllable passage between a central chamber and a space below a packer and also having a space below a packer and also having a passageway between a central chamber and the space above the packer in which the passageway is controlled by a valve, closure or changeable restriction operated by movement of the central chamber.

153 PISTONS, FLUID DRIVEN INTO WELL (E.G., CEMENTING PLUGS):

This subclass is indented under the class definition. Devices comprising piston means adapted to be inserted from the top of the well into an already placed well conduit and to be driven down by fluid pressure acting directly on the piston.

(1) Note. The piston must closely contact the wall of the casing or tubing as it moves down or be close enough to function as a scraper.

SEE OR SEARCH THIS CLASS, SUBCLASS:

170+, for brushing, scraping, cutting or punching cleaners adapted to fall down a well by gravity.

177.3, for wiping means adapted to fall by gravity down the well.

193+, for plugs of the dropped ball type.

291, for processes of cementing using piston separators.

SEE OR SEARCH CLASS:

92, Expansible Chamber Devices, subclasses 172+ for pistons for an expansible chamber device.

154 Surrounding conduit valve or closure opened by piston:

This subclass is indented under subclass 153. Devices in which a valve, closure or restriction means carried by the casing or tubing in which the piston operates is opened or released for opening by engagement of the piston with the means or an element connected thereto.

SEE OR SEARCH THIS CLASS, SUBCLASS:

194, for sleeve valves on conduits opened by dropped ball type plugs.

155 With downflow past piston:

This subclass is indented under subclass 153. Devices which are so constructed that fluid may flow downwardly past the piston at a certain period of its operation by a flexing of the piston sealing means or opening of a valve or closure.

(1) Note. Plugs which are constructed to be drilled out in their entirety are not classified in this subclass but will be found in subclass 153 or other indented subclasses.

156 With stop:

This subclass is indented under subclass 153. Devices in which there are means in the casing or tubing in which the piston operates cooperating with the piston to stop its motion.

(1) Note. A stop means which comprises merely the top or bottom of the casing or tubing (e.g., the inwardly sloping wall of a set shoe) is not included. See subclasses 153+ for such devices.

(2) Note. A means in the tubing or casing which stops the piston only until fluid pressure is increased is also not included. See subclasses 153+ for such devices.

(3) Note. The stop means may be for preventing an upward motion of the piston after it is driven down the well.

(4) Note. The stop means must be more than merely the bottom piston of a pair of pistons.

SEE OR SEARCH THIS CLASS, SUBCLASS:

154, for pistons, fluid driven into the well, engaging a valve part which acts as a stop or engages some other stop means.

155, for pistons which allow fluid to flow past them after they contact a stop.

170+, for stops associated with brushing, scraping or cutting type cleaners.

193+, for dropped balls or plugs of the type which do not make a close fit with the surrounding conduit as they move downwardly combined with stops.

157 SCREEN WITH WASHING POINT OR SHOE:

This subclass is indented under subclass 227. Devices under the class definition comprising a conduit comprising a screen in combination with a means at the end of the conduit comprising a structure having a port for conducting fluid outwardly of the end of the conduit usually to wash the screen.

SEE OR SEARCH THIS CLASS, SUBCLASS:

327+, for conduit shoes with check valves (usually disclosed for floating in and cementing a casing).

SEE OR SEARCH CLASS:

175, Boring or Penetrating the Earth, subclass 314 for earth boring apparatus, including a jetting point, combined with a well type screen.

158 Detachable wash pipe:

This subclass is indented under subclass 157. Devices in which there is a separate pipe associated with the screen for passing fluid downwardly into the well to wash the screen, the separate pipe being readily removable from association with the screen structure while the screen remains in the well.

(1) Note. Wash pipes which are disclosed as merely liftable from the screen structure (e.g., the back pressure valve) are classified in this subclass if they are also disclosed as capable of being completely removed from the well leaving the screen in the well.

SEE OR SEARCH THIS CLASS, SUBCLASS:

143+, for devices as defined in this subclass in which the detachable jet or wash pipe is a central conduit and there is a packer carried by the screen.

162 RECEPTACLES:

This subclass is indented under the class definition. Devices comprising a container which is bodily movable for transporting material from the top of the well and discharging the material therefrom at a point in the well or which is bodily movable for receiving fluid material

from the well and transporting it to the well top.

SEE OR SEARCH THIS CLASS, SUBCLASS:

69, for a receptacle used with above ground apparatus.

99, for receptacles combined with junk retrieving means.

107+, for receptacles combined with a pump or plunger mechanism for drawing fluid into the receptacle.

142+, for receptacles with packers and a controllable passage between the receptacle and the space below the packer.

205, and 227+, for well screens or well screen parts which may be lifted from the well after sediment collects therein.

SEE OR SEARCH CLASS:

15, Brushing, Scrubbing, and General Cleaning, subclass 1.7 for submerged cleaners with ambient flow guides, and subclass 246.5 for tank cleaners. See the search notes thereunder.

37, Excavating, subclass 182 for orange peel buckets and subclass 461 for clamshell buckets.

73, Measuring and Testing, subclasses 152.23+ for sampling of a well fluid combined with flow measuring or fluid analysis wherein the test is not purely electrical or purely magnetic, and especially subclass 152.28 for sampling of a well fluid combined with fluid flow measuring or fluid analysis by use of a downhole measuring apparatus wherein the test is not purely electrical or purely magnetic and subclass 864.51 for receptacles for taking liquid samples from locations other than wells. See the class definition of Class 166 for the line with Class 73 as to receptacles used in a well.

102, Ammunition and Explosives, subclass 331 for well torpedoe receptacles.

175, Boring or Penetrating the Earth, subclasses 308+, and the search there noted, for earth boring means with a receptacle for cuttings or sediment. A mere dart extension to operate a bottom valve is not considered an earth boring means sufficient for classification in Class 175.

210, Liquid Purification or Separation, subclasses 523+ for gravitational separators, with mechanical liquid removers, and subclasses 532+ for gravitational separators with heavier constituent traps.

220, Receptacles, for receptacles of general utility, especially subclasses 200+ for receptacle closures.

222, Dispensing, subclasses 356+ and subclasses there noted for dipping type dispensers. See section 13 of the class definition of Class 222 for other classes relating to the subject matter.

294, Handling: Hand and Hoist-Line Implements, subclasses 68.22+ for hoisting bucket or bailer type receptacles, and subclass 86.11 for devices similar to receptacles for carrying only solid objects such as junk out of a well. Class 294 takes dumping and bailing receptacles which are structurally very similar to those of Class 166, the line being that Class 166 takes those receptacles that have some feature special to use in wells or are described for use in wells and are long and slender so as to adapt them for use in narrow diameter bored wells and also have at least one of the following features; a pump or plunger means for loading the receptacle, disclosure that the receptacle or part thereof is left in the well and separated from its lowering means, a separate air, gas or vacuum chamber, a valve and destroyable closure, a closed or valved top, valve control means operated by contact with the side wall, a bottom loading valve, which is bodily movable for discharge, a side opening for use in the well. These features form the subject matter of subclasses 107, 117 and 163 through 169 of Class 166.

163 With separate air chamber having openable passage:

This subclass is indented under subclass 162. Devices in which the container has a fluid retaining chamber and a separate air, gas or

vacuum chamber, so arranged that when a passage into the air, gas or vacuum chamber is opened the fluid in the well rushes into the fluid retaining chamber.

164 With destroyable closure and valve:
This subclass is indented under subclass 162. Devices in which there is a closure which is adapted to be broken or otherwise destroyed so that fluid in the well will enter the container and there is also a valve for retaining the fluid in the container.

165 With valved or closed top:
This subclass is indented under subclass 162. Devices in which the top of the container is closed or there is a valve or openable closure closing the top or an opening adjacent the top.

(1) Note. There may be enclosed side openings near the top; but a mere bail is not considered to close the top.

SEE OR SEARCH THIS CLASS, SUBCLASS:
163 and 164, for receptacles with closed or valved tops and separate air chambers or destroyable closures and check valves.

SEE OR SEARCH CLASS:
137, Fluid Handling, subclass 205 for apparatus of general utility providing means whereby a container may be filled with liquid by evacuating the container.

166 Valve control means contacting well conduit wall:
This subclass is indented under subclass 162. Devices comprising a valve or closure and control means for the valve or closure adapted to contact the wall of the well conduit within which the container is positioned.

SEE OR SEARCH THIS CLASS, SUBCLASS:
145, for devices as defined in subclass 166 in which there is also a packer, a bypass around the packer and a passage between the receptacle and the space below the packer which is opened when the bypass is closed.

SEE OR SEARCH CLASS:
294, Handling: Hand and Hoist-Line Implements, subclasses 68.22+ for hoist buckets in which a valve may be opened by contact with the bottom or an obstruction across a well.

167 Bottom receiving and side discharge valves:
This subclass is indented under subclass 162. Devices in which there is a valve across the bottom of the container to admit and thereafter retain fluid from the well and there is also an additional valve or openable closure in the side wall of the container for releasing the contents of the container after the container is withdrawn from the well.

SEE OR SEARCH THIS CLASS, SUBCLASS:
165, for well containers with valves or openable closures in the side walls adjacent the top of the container.

168 Readily releasable bottom valve:
This subclass is indented under subclass 162. Devices in which there is a valve across the bottom of the container for admitting and retaining fluid from the well, the valve and container being so constructed that the valve may be readily bodily moved from its position across the container so that the container may be emptied after it has been withdrawn from the well.

(1) Note. In the case of a pivoted valve the "bodily movement" is such as to include movement of the pivot axis.

(2) Note. A reciprocating type check valve readily movable only by means extending through the discharge opening is not included in the definition of this subclass. See Class 294, subclass 72 for such devices.

SEE OR SEARCH CLASS:
285, Pipe Joints or Couplings, appropriate subclasses for a joint between tubular sections of the receptacle.

169 Lateral ports used in well:

This subclass is indented under subclass 162. Devices in which there is an opening in the side wall of the container so that fluid may be discharged from or may enter laterally into the container while it is in the well.

(1) Note. Usually the lateral port is controlled by a valve member operated when a part contacts the well bottom.

(2) Note. The opening must be more than a mere scallop on the lower edge of the container.

SEE OR SEARCH THIS CLASS, SUBCLASS:

110, for a well receptacle with a piston or plunger and a lateral port for use in the well always positioned below the plunger or piston.

165, for openings associated with the top closing structure of the container.

166, for well receptacles with side discharge openings in which a valve control means contacts a well conduit wall.

167, for a well receptacle with a side opening for discharge of the contents outside of the well.

170 BRUSHING, SCRAPING, CUTTING OR PUNCHING-TYPE CLEANERS:

This subclass is indented under the class definition. Devices comprising means for cleaning well conduits or other devices in a well by brushing, scraping, cutting or punching.

(1) Note. The devices in this and indented subclasses are for removing only material deposited on well elements or conduits.

SEE OR SEARCH THIS CLASS, SUBCLASS:

177.3, for means for cleaning by wiping.

SEE OR SEARCH CLASS:

15, Brushing, Scrubbing, and General Cleaning, appropriate subclasses, especially subclasses 104.05+ for devices of general utility for cleaning pipes and subclass 249 for flue cleaners. Where the sole disclosure or claimed use of a cleaner is a use inside a well, classification is in Class 166.

92, Expansible Chamber Devices, subclass 87 for a piston for an expansible chamber device which includes brushing, scraping or cutting means.

175, Boring or Penetrating the Earth, subclasses 263+, for earth boring bits having cutter elements laterally shiftable below ground and subclasses 327+ for earth boring bits, per se.

417, Pumps, subclasses 545+, for well swabs (valved pistons reciprocated in a well to remove fluid therefrom). Well swabs classifiable in Class 417 may include scrapers. Such patents should be cross-referenced to Class 166.

171 Perforation cleaners:

This subclass is indented under subclass 170. Devices comprising means specially adapted for cleaning perforations in well conduits.

(1) Note. These devices either comprise means disclosed as entering the perforations of a well conduit, means claimed in combination with a perforated conduit or means claimed as adapted to be used for cleaning perforated conduits. Cleaners which may be used for perforation cleaning but do not qualify under this note may be found in subclass 170 or indented subclasses other than subclass 171.

SEE OR SEARCH CLASS:

210, Liquid Purification or Separation, subclasses 407+ for a strainer of general utility combined with cleaning means and see the search notes thereunder.

172 Bow spring type:

This subclass is indented under subclass 170. Devices in which the cleaning element is supported on a bow spring or constitutes a bow spring.

(1) Note. A bow spring is one which is supported at its ends and bulges outwardly at its mid-portion.

SEE OR SEARCH THIS CLASS, SUBCLASS:

241.1, for bow spring centering or friction means which do not have a separate cleaning element or which do not claim a cleaning function, and see the notes to subclass 241.1.

173 On tubing or casing:

This subclass is indented under subclass 170. Devices comprising cleaning elements projecting outwardly from and supported by a tubing or casing.

SEE OR SEARCH THIS CLASS, SUBCLASS:

172, for cleaning elements of the bow spring type supported on a tubing or casing.

174 Retractable on support while lowering:

This subclass is indented under subclass 170. Devices comprising a cleaning element so constructed that its effective lateral dimensions may be reduced while it is being lowered into a well conduit so that the cleaner may be easily inserted in the well and then may expand to perform its cleaning function.

(1) Note. The reduction of lateral dimensions must be more than that brought about merely by the resilience of a bristle or wire as it is lowered in the well.

SEE OR SEARCH THIS CLASS, SUBCLASS:

171, for retractable perforation cleaners.
172, for bow spring type cleaners.
173, for retractable cleaners on a fluid conducting tubing or casing.

SEE OR SEARCH CLASS:

175, Boring or Penetrating the Earth, subclasses 263+, for earth cutter elements which are laterally shiftable (e.g., expansible) below ground.
417, Pumps, subclasses 454+, for well swabs.

175 Reciprocable relative to central member extending from well top:

This subclass is indented under subclass 170. Devices comprising a cleaning element which can reciprocate longitudinally of the well relative to a centrally positioned member extending down into the well from the top of the well.

(1) Note. Usually the cleaning element is mounted loosely on a rod so that as the rod is reciprocated in the well the position of the cleaning element varies with respect to the rod.

SEE OR SEARCH THIS CLASS, SUBCLASS:

172, for bow spring scrapers reciprocable relative to their supports.

176 On sucker rod:

This subclass is indented under subclass 170. Devices in which the cleaning element is supported on a sucker rod which is used to pump the well while the scraper is on it.

SEE OR SEARCH THIS CLASS, SUBCLASS:

175, for scrapers on sucker rods, the scrapers being reciprocable relative to the sucker rod.

SEE OR SEARCH CLASS:

175, Boring or Penetrating the Earth, subclasses 325.1+, and the search there noted, for earth boring apparatus having bore well engaging means carried on the tool or tool shaft.

177.1 Sonic device:

This subclass is indented under the class definition. Apparatus wherein acoustic energy is used for agitating, fracturing or vibrating.

SEE OR SEARCH CLASS:

175, Boring or Penetrating the Earth, subclass 1 for processes or apparatus for boring the earth combined with seismic shock generation and subclass 56 for processes or apparatus for boring the earth including a relationship between the natural vibration characteristics of one boring element and (a) the natural vibration characteristics of

another boring element or (b) the frequency of an imposed motion.

177.2 With specific downhole feature:
This subclass is indented under subclass 177.1. Sonic device wherein the apparatus includes a oscillator structure; e.g., piston, stem, nozzle, diffuser; driving structure; e.g., linkage; or filter below ground level.

177.3 Wiper:
This subclass is indented under the class definition. Apparatus having a means for cleaning the interior surface of a tubular well member.

(1) Note. For classification in this subclass as a wiper, a device must clearly be intended to function as removing detritus. An incidental wiping action of a device intended for some other use, such as a packer or plug, is not sufficient to cause classification here. Classification is then based on the other use or the characteristics of the packer or plug.

SEE OR SEARCH THIS CLASS, SUBCLASS:
153+, for pistons, fluid driven into the well, which wipe the walls of the surrounding conduit.

SEE OR SEARCH CLASS:
92, Expansible Chamber Devices, subclasses 172+ for a piston for an expansible chamber device, even though disclosed as a well plunger or swab.

177.4 Cementing device:
This subclass is indented under the class definition. Apparatus comprising specific structure for agitating, vibrating or mixing a slurry used to fix or adhere a pipe to a formation or to another pipe in a well.

177.5 Hydraulic fracturing device:
This subclass is indented under the class definition. Apparatus comprising specific structure for placing a liquid to erode a formation to increase permeability.

SEE OR SEARCH THIS CLASS, SUBCLASS:
101, for devices comprising a packer or plug and a pump or plunger means exerting outward fluid pressure on a conduit surrounding the packer or plug beneath it or between a pair of packers or plugs.
308, for a process of fracturing a formation.

SEE OR SEARCH CLASS:
102, Ammunition and Explosives, subclasses 301+ for well torpedoes.
299, Mining or In Situ Disintegration of Hard Material, subclasses 20+ for an expansible breaking down device for breaking up hard material in situ.

177.6 Vibrator:
This subclass is indented under the class definition. Apparatus using rapid back and forth movement for loosening pipes, inserting pipes, cleaning, or stimulating flow.

SEE OR SEARCH THIS CLASS, SUBCLASS:
177.1+, for sonic vibrating devices.
178, for devices for giving a discrete blow to a well apparatus or part thereof to free it from the well, any vibratory effect being merely incidental to the intended function rather than the principal intended function of the device.
249, for processes for vibrating the earth.

SEE OR SEARCH CLASS:
175, Boring or Penetrating the Earth, subclass 56 for processes or apparatus for boring the earth including a relationship between the natural vibration characteristics of one boring element and (a) the natural vibration characteristics of another boring element or (b) the frequency of an imposed motion.

177.7 Agitator:
This subclass is indented under the class definition. Apparatus comprising means for generating irregular, quick, or violent action for cleaning or stimulating flow in a well.

(1) Note. For classification in this subclass as an agitator a device must clearly be intended to function as removing detritus or promoting fluid movement.

(2) Note. Excluded from this subclass is agitation caused by the motion of whirling or rotary nozzles.

SEE OR SEARCH THIS CLASS, SUBCLASS:

112, for eduction pumps with means to force well liquid out of the pump while it is operating to wash the well or agitate the liquid.

170+, especially subclass 174 for brushing, scraping or cutting cleaners which may agitate the well fluid as they brush or scrape.

177.1, for sonic agitating means.

178, for devices for giving a discrete blow to a well apparatus or part thereof to free it from the well, any vibratory effect being merely incidental to the intended function rather than the principal intended function of the device.

223, for agitation caused by the motion of whirling or rotary nozzles.

SEE OR SEARCH CLASS:

366, Agitating, subclasses 108+ for agitating by vibration devices.

417, Pumps, subclasses 430+, for pumps with means to agitate the pump fluid or prevent foreign material settling therefrom.

178 WITH JAR MEANS FOR RELEASING STUCK PART:

This subclass is indented under the class definition. Devices comprising an apparatus under the class definition combined with a means for giving a sharp blow to the apparatus or part thereof to free it from the well.

(1) Note. The jarring function must be specifically described for classification in this subclass and not left to inference.

SEE OR SEARCH THIS CLASS, SUBCLASS:

177.1+, for agitating, wiping, vibrating or formation fracturing apparatus.

196+, for packers or plugs with a telescopic central support which is adapted to give a jarring blow.

SEE OR SEARCH CLASS:

173, Tool Driving or Impacting, subclasses 90+, for above or below ground impacting devices (other than lost motion connections in an earth bore) of general utility for imparting blows to a tool or the like.

175, Boring or Penetrating the Earth, subclasses 293+ for below ground hammer or impact members, either (1) claiming a specific earth cutting means or having some feature related to earth boring such as a wall engaging guide or packer on a shaft being used in a boring operation or (2) comprising a lost motion connection.

294, Handling: Hand and Hoist-Line Implements, subclass 86.18 for a well grapple with a releasing means responsive to a jarring force and subclass 86.23 for a well grapple with an impact means.

179 PACKERS OR PLUGS:

This subclass is indented under the class definition. Devices insertable from the top of or well into a well conduit and comprising: (1) Means usually known as a packer and comprising a vertical or longitudinally extending tubular member forming a fluid passage and an annular means projecting from the member and blocking fluid flow either up or down or both in the annular space between the tubular member and the surrounding well conduit, said means comprising structure which goes beyond a mere packing assembly or (2) means usually known as a plug and comprising a means for blocking the flow of fluid either up or down or both in a surrounding well conduit by filling the bore of the conduit.

(1) Note. The device must be insertable from the top of the well to final position in the well, and the surrounding conduit must have been finally positioned in the well before the device is inserted in it. Parts of the device may be inserted at different times in order to be assembled in the well.

(2) Note. The device may be arranged to stop flow in the annular space between a pipe and an enclosing conduit by contacting the top of a shoulder (e.g., a rat hole shoulder) in the conduit. The shoulder may be disclosed as a flat well bottom, if a sealing function is clearly disclosed.

(3) Note. An annular casing or tubing shoe is considered to be a packer for this and indented subclasses only if it is disclosed as having a blocking function, and the blocking function is claimed, or if it is specially modified to have a blocking function and the modification is claimed.

(4) Note. The device must be of limited extent longitudinally of the well. For example, a filling of concrete extending along distance between concentric pipes is a part of the pipe structure rather than a packer.

(5) Note. A packer or plug usually comprises an annular deformable or laterally expansible blocking or sealing portion, such as rubber, combined with a supporting structure, such sealing portion and support structure, per se, being subject matter for Class 277, Joint Packing.

(6) Note. The device usually forms a tight seal with the conduit, but if a device is disclosed as intended to function to block fluid flow the seal may not be tight.

(7) Note. A brushing or scraping means is not considered a packer or plug device for this or indented subclasses. See subclass 170 for such devices.

(8) Note. Devices usually called “cement baskets” are considered to be “packers” for this or indented subclasses.

SEE OR SEARCH THIS CLASS, SUBCLASS:

100, for a lateral probe or port sealed against a well wall.

101, for a packer or plug and a pump or plunger means exerting outward pressure.

106, for well devices having eduction pumps and packers or plugs.

114, for a central member and a prepositioned packer or plug.

115+, for a central chamber with a packer or plug and a modified surrounding conduit.

118+, for packers or plugs and expanding anchors.

141, for a packer in which the sealing portion closes a port between a central pipe and an outside space when the sealing portion is unexpected.

142+, for a central chamber with a packer and a controllable passage between the central chamber and the space below the packer.

153+, for pistons fluid driven into the well.

177.1+, for agitating, wiping, vibrating or fracturing means.

315, for methods of placing packers or plugs.

SEE OR SEARCH CLASS:

92, Expansible Chamber Devices, subclasses 172+ for a piston for an expansible chamber device even though disclosed as for use as a well plunger or swab.

102, Ammunition and Explosives, subclasses 301+ for well torpedoes with plugging means; and subclass 333 for plugs used in blasting.

138, Pipes and Tubular Conduits, subclasses 89+ for closures or plugs for pipes in general including those placed in a well conduit before the conduit is lowered in the well.

220, Receptacles, subclasses 200+, for closures or plugs including those placed in a well conduit before the conduit is lowered into the well.

277, Seal for a Joint or Juncture, for a packing element, per se, or material combined with the structure necessary to cooperate therewith to perform a packing function, which structure may include a tubular member supporting an annular means for blocking fluid flow and all the ancillary means for causing the annular means to func-

tion to block the flow, as well as the surrounding conduit, but does not include a well feature for a distinct function, e.g., a lateral port on the tubular member above or below the packing, or structural detail of the tubular member not contributing to the blocking function. The mere naming of the device as a well packer or as for use in a well does not preclude classification in Class 277.

285, Pipe Joints or Couplings, subclasses 123.3+ for seals between concentric pipes other than those established below ground level as provided for in Class 166, subclass 179.

299, Mining or In Situ Disintegration of Hard Material, subclasses 20+ for an expansible breaking down device for hard material in situ, and which may include or comprise an expansible packer or plug.

417, Pumps, subclasses 545+, for valved piston including valved well swabs.

180 Adjustable over pipe or set over prepositioned pipe:

This subclass is indented under subclass 179. Devices comprising a laterally expansible blocking portion (1) intended to be positioned around and form a seal with a fluid conducting pipe which is already in place in the well or (2) which is so constructed that it may be expanded and contracted in the well to form a seal between the surrounding conduit and an inner concentric fluid conducting pipe at different positions along the pipe.

181 With detachable setting means:

This subclass is indented under subclass 179. Devices comprising means for detachably coupling the device to a means for lowering the device into the surrounding conduit, the detachable connection being such that the packer or plug may be left in the well while the lowering means is completely withdrawn.

SEE OR SEARCH THIS CLASS, SUBCLASS:

117, for receptacles detachable from a lowering means, the detached portions of the receptacle and the contents of the receptacle cooperating to form a plug.

123+, for packers or plugs with expanding anchor means and detachable setting means.

143+, for packers with a controllable passage between a central chamber and the space below the packer, the central chamber being detachable from the packer.

158, for a screen with a washing point or shoe having a detachable wash pipe.

205, for a screen having a portion removable in the well.

182 Packer or plug locked expanded:

This subclass is indented under subclass 181. Devices in which the sealing portion of the packer or plug is maintained in laterally expanded condition after the setting means is detached by a ratchet, dog or latch other than an expanding anchor as defined in subclass 206.

SEE OR SEARCH THIS CLASS, SUBCLASS:

123+, for packers or plugs with detachable setting means maintained in expanded condition by expanding anchor means.

198, for packers or plugs expanded by a telescoping central support, the packer or plug being locked in expanded condition.

183 With controllable bypass outside central conduit:

This subclass is indented under subclass 179. Devices wherein the packer is adapted to be supported by a central conduit from the top of the well while it is being run into the well, the central conduit extending through the region of the blocking portion of the packer, and there is a fluid passage separate from the central conduit passageway, and through the packer blocking portion which fluid passage connects the space below the packer with the annular space above the packer, fluid flow in the passage being controllable or changeable by a valve, closure or changeable restriction as defined in subclass 224.

SEE OR SEARCH THIS CLASS, SUBCLASS:

129+, for devices as defined in subclass 183 with an expanding anchor means.

149+, for devices with a controllable passage between a central chamber and a space below a packer or plug and also a passageway between the central chamber and a space above the packer or plug, the said passageway being outside the central chamber and through the packer or plug.

184 With controllable passage between central conduit and space above packer or plug:
This subclass is indented under subclass 179. Devices comprising a packer or plug adapted to be supported from the top of the well by a central conduit for insertion thereby into the well and a fluid passage between said central conduit and the annular space above the packer or plug between the central conduit and the surrounding conduit, fluid flow in the passage being controllable or changeable by a valve, a closure or a changeable restriction, as defined in subclass 224.

SEE OR SEARCH THIS CLASS, SUBCLASS:

123+, 143+ and 181+, for a central conduit detachable from a packer or plug, a fluid passage above the packer or plug being opened when the central conduit is detached.

127, for a device comprising an expanding anchor, spaced packer or plug seals and a controllable passage between a central conduit and the space between the packer or plug seals.

129 and 183, for a central conduit with a packer, the conduit passage being continued past the packer blocking means and there being a controllable bypass through the packer outside of the central conduit passage.

131, for a device comprising an expanding anchor, a packer or plug and a controllable passage between a central conduit and the space above the packer or plug.

147, for a central conduit with spaced packer or plug seals and a controllable passage between the conduit and the space between packer or plug seals.

149+, for a central conduit with a packer and a controllable passage between the conduit and the space above the packer and also the space below the packer.

185 With central conduit and fluid port to space outside:
This subclass is indented under subclass 179. Devices comprising a packer or plug adapted to be supported from the top of the well by a central conduit for insertion thereby into the well, and a port for the passage of fluid between said central conduit and the space outside the conduit adjacent the packer or plug.

(1) Note. The port may be any side opening or a restricted open end portion of the central conduit.

SEE OR SEARCH THIS CLASS, SUBCLASS:

100, for a lateral probe or port sealed against a well wall.

101, for a packer or plug and pump or plunger means exerting outward pressure.

106, for a packer or plug and an eduction pump.

126 and 142+, for a packer with a controllable passage between a central conduit and the space below the packer.

131 and 184, for a packer or plug with a controllable passage between a central conduit and the space above the packer.

141, for a packer or plug sealing portion which closes a port between a central conduit and the space outside when unexpanded.

186 Port between sealing portions and bypass around:
This subclass is indented under subclass 185. Devices in which the port is between spaced packer or plug blocking or sealing means and there is a bypass passage across both spaced means connecting the spaces outside the central conduit with each other.

187 Expanded by confined fluid from central chamber, pump or plunger:
This subclass is indented under subclass 179. Devices wherein the packer or plug is moved into expanded, blocking position by means of or with the help of fluid supplied from a central conduit or receptacle or forced into the packer

or plug by a pump or plunger means, the fluid while expanding the packer or plug being confined within the device.

(1) Note. Operation of a latch by fluid pressure whereby the packer or plug may be expanded by other means is not included. Such devices are classified on other features.

SEE OR SEARCH THIS CLASS, SUBCLASS:

121, for devices in which fluid pressure on a cup shaped packer expands it and causes it to act on an anchor to cause expansion thereof, the fluid while expanding the packer or plug not being confined within the device.

122, for devices in which fluid from a central conduit causes expansion of a packer or plug which acts on an anchor to cause expansion thereof.

SEE OR SEARCH CLASS:

277, Seal for a Joint or Juncture, appropriate subclasses, particularly subclasses 70+, 103 and 126+ for packing of general application which is biased by fluid pressure.

188 Controllable passage through packer:

This subclass is indented under subclass 179. Devices comprising a fluid passage through the packer with a valve, closure or changeable restriction for controlling or altering flow through the passage.

SEE OR SEARCH THIS CLASS, SUBCLASS:

126 and 142+, (especially subclasses 149+) for packers with a controllable passage between a central tubing or receptacle and a space beneath the packer.

129 and 183, for a packer with a controllable bypass outside a central conduit.

133, for a packer with an expanding anchor and a controllable passage through the packer.

SEE OR SEARCH CLASS:

417, Pumps, subclasses 545+, for valved pistons including valved well swabs.

189 For non-concentric members:

This subclass is indented under subclass 179. Devices in which the packer or plug seals the space between the surrounding conduit and two longitudinally extending members which are positioned in side by side relationship (not one within the other).

(1) Note. These devices are usually packings for a pump tube and a gas vent pipe. Where more structure is involved than a mere packing such a device is classifiable in Class 417 as a pump venting means.

191 Spaced sealing portions:

This subclass is indented under subclass 179. Devices comprising spaced sealing portions on the same central supporting structure.

(1) Note. Sealing portions separated merely by a washer or washers so that the sealing portions act as a unit are not considered to be spaced in the meaning of the definition of this subclass.

(2) Note. The “sealing portion” is the part which does the actual blocking of flow in the surrounding conduit. It is usually of rubber or deformable but may be a hard machined surface.

(3) Note. The sealing portions must be spaced, from any other sealing portion when in set, expanded condition.

SEE OR SEARCH THIS CLASS, SUBCLASS:

119, for relatively movable spaced packer or plug sealing portions with an expanding anchor.

127, for spaced packer or plug sealing portions and an expanding anchor with a controllable passage between a central chamber and a space below a packer.

146 and 147, for spaced packer or plug sealing portions with a controllable passage between a central chamber and a space below a packer.

186, for spaced packer or plug sealing means with a port between a central conduit and a space between the

packer seals and a bypass passage around both packer seals.

192 Flow stopping type; e.g., plug:
This subclass is indented under subclass 179. Devices comprising means for blocking the flow of fluid either up or down or both in a surrounding well conduit by completely filling the bore of the conduit.

(1) Note. The essential elements for filling the bore should be claimed. For example, if a central support member for a deformable seal is disclosed as a solid rod and the support member is claimed classification is in this subclass. However, if a central support member is disclosed as a pipe which is closed off at one end with a deformable or other sealing portion claimed, classification is based on other characteristics of the device if subclasses are provided for such characteristics since the device as claimed is indistinguishable from a packer.

(2) Note. The plug member as a whole may be adapted to be drilled up or otherwise destroyed. If only a central portion is destroyed or is intended to be destroyed first the device is classifiable in subclass 188.

SEE OR SEARCH THIS CLASS, SUBCLASS:
117, for plugs formed by leaving a receptacle as defined in subclass 162 or part thereof in the well.
132 and 135, for plugs combined with expanding anchor means.
153+, for pistons, fluid driven into the well.
187, for plugs expanded by fluid from a central conduit, pump or plunger.

SEE OR SEARCH CLASS:
102, Ammunition and Explosives, subclasses 301+ for well torpedoes with plugging means; and subclass 333 for plugs used in blasting.
138, Pipes and Tubular Conduits, subclass 89 for pipe closures and plugs of general utility, including those placed in a well conduit before the conduit is lowered into the well.
220, Receptacles, subclasses 233+ for expansible plug type closures.

193 Free falling type (e.g., dropped ball):
This subclass is indented under subclass 192. Devices comprising an element which does not closely contact the conduit wall and is intended to be dropped or floated down the surrounding conduit (rather than let down by a supporting string) till it strikes a shoulder on the conduit.

SEE OR SEARCH THIS CLASS, SUBCLASS:
153+, for piston devices which closely engage the conduit wall and are forced down by fluid pressure.

194 With sleeve valve:
This subclass is indented under subclass 193. Devices comprising a sleeve portion which is moved by the plug or is moved due to fluid pressure or other means made effective by the presence of the plug, the sleeve portion being carried by the surrounding conduit and acting to open or close ports in the conduit walls for fluid passage.

SEE OR SEARCH THIS CLASS, SUBCLASS:
154, for conduit valves operated by a piston, fluid driven into the well.

195 Deformable portion engages conduit restriction:
This subclass is indented under subclass 179. Devices in which the expansible portion is made of a deformable nonmetallic or soft metallic material and is adapted to engage an inwardly projecting shoulder on the surrounding conduit.

(1) Note. The shoulder may be the bottom of the conduit.

SEE OR SEARCH THIS CLASS, SUBCLASS:
115, for a central chamber with a packer or plug claimed in combination with a modified surrounding conduit.
192+, for plugs having a deformable portion engaging a surrounding conduit shoulder.
201, for packers having a rigid ring portion which engages a conduit shoulder and

rides up on a pipe to expand a deformable sealing portion.

196 Central support has shoulders expanding sealing portion, or telescopes:

This subclass is indented under subclass 179. Devices comprising either (1) a central support for the deformable sealing portion comprising telescoping sections whereby relative longitudinal movement of this section causes expansion of the sealing portion or (2) a central support for the deformable sealing portion having projecting portions relatively movable towards each other to cause expansion of the sealing portion.

(1) Note. The central support is usually a pipe which extends beyond the ends of the deformable sealing portion in a longitudinal direction.

SEE OR SEARCH THIS CLASS, SUBCLASS:

118+, especially subclasses 134 through 140, for devices in which projecting portions on a central support, which causes expansion of a deformable sealing portion, comprise expanding anchor means.

195, for packers of the telescoping support type in which the deformable portion of the packer engages a shoulder on the surrounding conduit.

202 Cup type:

This subclass is indented under subclass 179. Devices in which the laterally expansible blocking portion of the device has one end thereof attached to and adjacent to a central pipe support and the other longitudinally displaced end portion spaced from the support axis and in which the blocking portion is flexible or hinged to the support whereby the fluid pressure of the fluid, the flow of which is being stopped, tends to cause the spaced end portion to engage the enclosing conduit more tightly.

SEE OR SEARCH THIS CLASS, SUBCLASS:

121, for cup type packer seals which transmit fluid pressure to move expanding anchors to set position.

153+, for pistons, fluid driven into the well with cup type seals.

199, and 201, for packers in which sleeve or shoulder parts spread one end of a deformable sealing portion.

SEE OR SEARCH CLASS:

92, Expansible Chamber Devices, subclasses 172+, and particularly subclasses 240+ for a piston in which the side wall portion thereof is provided with a peripheral axially extending flexible lip (e.g., cup type).

277, Seal for a Joint or Juncture, for packing which establishes a tight seal. The metal cement baskets found in this subclass (202) are not considered to form tight seals for Class 277.

417, Pumps, subclasses 545+, for valved pistons including valved well swabs.

203 Non-deformable type:

This subclass is indented under subclass 179. Devices comprising nondeformable portions (e.g., a hard metal) forming the blocking means between the inner supporting member and the outer conduit.

(1) Note. Casing shoes or the like are classified in this subclass if the blocking or sealing function of the shoe is disclosed and this function or the structure performing the function is claimed.

SEE OR SEARCH THIS CLASS, SUBCLASS:

161, for casing shoes with cutting, scraping or reaming means.

192+, for nondeformable plugs.

204, for metallic rings used to prevent extrusion of a deformable sealing portion of a packer or plug, such rings forming a secondary blocking means.

205 SCREEN WITH VALVE, CLOSURE, CHANGEABLE RESTRICTOR OR PORTION REMOVABLE IN WELL:

This subclass is indented under subclass 227. Devices under the class definition comprising a screen combined with (1) a valve, closure or changeable restrictor as defined in subclass 224, (2) a destroyable portion or (3) a screen part removable from the well while the screen remains in the well.

SEE OR SEARCH THIS CLASS, SUBCLASS:

143+, for screens with packers and detachable setting means, there being a valve closure or changeable restriction between the conduit of the setting means and the space below the packer.

157+, for screens with washing point or shoes provided with valves.

181+, for screens with packers and detachable setting means.

231+, for spiral screens constructed so that the space between the spirals may be varied.

296, for processes for preventing flow into a strainer while it is being lowered by blocking the strainer openings.

SEE OR SEARCH CLASS:

137, Fluid Handling, subclasses 544+ for fluid handling means of general utility combined with screens.

210, Liquid Purification or Separation, subclasses 418+ for filters of general utility with flow controllers, and see the search notes thereunder.

206 EXPANSIBLE ANCHOR OR CASING:

This subclass is indented under the class definition. Devices comprising (1) a means attached to a member which is run into a well conduit already in fixed position in the well, the means being movable outwardly to engage and jam against the surrounding conduit wall or to interlock in a preformed recess in the conduit, the means functioning to attach the member to the conduit in the well so as to resist action of gravity or a lifting force or (2) a section of casing which is expansible in the well.

(1) Note. The outwardly movable means usually have teeth that bite into the surrounding conduit wall and serve to fix the device in the well conduit.

SEE OR SEARCH THIS CLASS, SUBCLASS:

174, for expansible brushing or scraping cleaners.

179+, for expansible packers or plugs.

241, for devices which frictionally engage or press against the wall of a surrounding conduit and offer some resistance to longitudinal movement but are not interlocked with or jammed against the wall of the conduit to form an anchor.

SEE OR SEARCH CLASS:

175, Boring or Penetrating the Earth, subclasses 98+ for an earth boring means having a below ground drive motor with an expansible bore wall engaging anchor, subclass 230 for other earth boring apparatus with an expanding bore wall engaging anchor and subclasses 263+ for earth boring cutter elements which are laterally shiftable (e.g., expansible) below ground.

285, Pipe Joints or Couplings, subclasses 123.3+ for joints between concentric pipes not established below ground level in a well as provided for in Class 166, subclass 206.

294, Handling: Hand and Hoist-Line Implements, subclasses 86.24+ for internally expanding well grapples, and subclasses 93+ for internally expanding grapples of general utility. Sole disclosure of, or a statement in a claim of use as a grapple is enough for classification Class 294.

299, Mining or In Situ Disintegration of Hard Material, subclasses 20+ for an expansible breaking down device for hard material in situ which may be structurally similar to an anchor.

417, Pumps, appropriate subclasses for well pumps with expanding anchor means where there is only a nominal recitation of a pump, pump barrel or tubing in a claim to a device including an expanding anchor classification is in Class 166 in this or indented subclasses.

207 Expansible casing:

This subclass is indented under subclass 206. Devices in which the outwardly movable means comprises a section of casing which is expansible in the well.

208 Liner hanger:
This subclass is indented under subclass 206. Devices specifically disclosed for anchoring a liner to the surrounding well conduit against movement up or down or both.

209 Set by wedge or cam at any point by drop only (e.g., tubing catcher):
This subclass is indented under subclass 206. Devices in which setting the outwardly movable means by engagement with an element that forces the outwardly movable means into contact with the surrounding conduit during running in the member by a quick downward motion of the member, no other motion or act of an attendant being required for movement of the outwardly movable means to the final position and the outwardly movable means being anchorable to the surrounding conduit at any point thereon.

SEE OR SEARCH THIS CLASS, SUBCLASS:
118, for a packer or plug and expansible anchor set by a dropping movement only.

210 With friction drag for setting by turning movement also:
This subclass is indented under subclass 209. Devices which comprise a friction means with the outwardly movable means shiftable to the final position after or during a turning movement of the running in member, so that the outwardly movable means may be anchored either by a quick downward movement of the running in member or also may be anchored after or during a turning movement of the running in member.

211 With spring:
This subclass is indented under subclass 209. Devices in which the stored energy of a spring is used to effect all or part of the movement of the outwardly movable means to the final position.

(1) Note. A spring used only as a friction drag does not come within the definition.

212 Fluid pressure actuated:
This subclass is indented under subclass 206. Devices in which the outwardly shiftable means is movable to or from the final position by means of the force exerted by the pressure of a fluid.

SEE OR SEARCH THIS CLASS, SUBCLASS:
55.8, for well pipe cutters which are moved radially outward by fluid pressure.
120+, for packers or plugs and expanding anchors actuated by fluid pressure.
187, for packers or plugs expanded by fluid from a central conduit, pump or plunger.

SEE OR SEARCH CLASS:
83, Cutting, subclass 180 for an expanding mandrel inside a hollow workpiece, subclass 191 for an active cutter inside hollow workpiece, and subclasses 639.1+ for a fluid-pressure actuated reciprocatable cutting tool.
175, Boring or Penetrating the Earth, subclass 99 for a below ground drive motor for an earth boring apparatus which is anchored to the bore wall by a fluid operated expansible anchor, and subclasses 267+ for laterally shiftable cutter elements which are shifted by fluid pressure.

213 Bowed anchor means:
This subclass is indented under subclass 206. Devices in which the movable means is secured to a central support at each end and bowed outwardly intermediate the ends.

SEE OR SEARCH THIS CLASS, SUBCLASS:
241.1, for devices of similar form which are not jammed against the wall surrounding conduit.

214 Spring set:
This subclass is indented under subclass 206. Devices in which the energy stored in a spring is used to move the movable means outwardly to anchor the device in the conduit.

SEE OR SEARCH THIS CLASS, SUBCLASS:

136, for spring set expansible anchors combined with packers or plugs.

215 Spring moves anchor slip relative to wedge or cam:

This subclass is indented under subclass 214. Devices in which the spring causes relative movement between an element that forces the outwardly movable means into contact with the surrounding conduit and the outwardly movable means to shift the means radially.

SEE OR SEARCH THIS CLASS, SUBCLASS:

137, for packers or plugs combined with expansible anchors set by a spring causing relative movement between the anchor and a wedge or cam.

216 With wedge or cam and friction drag:

This subclass is indented under subclass 206. Devices comprising a combination of a friction means and an element that forces the outwardly movable means into contact with the surrounding conduit.

SEE OR SEARCH THIS CLASS, SUBCLASS:

138+, for devices comprising a friction drag, a wedge or cam moved expansible anchor means and a packer or plug.

210, for anchors set at any point by drop only and also set by a turning movement, the setting means comprising a wedge or cam and also a friction drag.

217 Expansible means translated by wedge or cam:

This subclass is indented under subclass 206. Devices in which the outwardly movable means is translated radially due to relative movement between it and an element that forces the outwardly movable means into contact with the surrounding conduit surface.

SEE OR SEARCH THIS CLASS, SUBCLASS:

120+, for wedge or cam actuated slips set by fluid pressure.

209+, for wedge or cam actuated expanding anchors set at any point in the well by a sudden lowering.

215, for a wedge or cam and an expanding anchor operated by a spring.

216, for expansible means with a wedge or cam and a friction drag.

SEE OR SEARCH CLASS:

294, Handling: Hand and Hoist-Line Implements, subclass 86.25 for cam spread, expanding jaw, well grapples, and subclasses 93+ for cam spread expanding jaw grapples of general utility.

222 WHIRLING OR LATERAL DISCHARGE OR PROJECTABLE NOZZLES:

This subclass is indented under the class definition. Devices comprising means for directing fluid outwardly into the well from a tubing or casing, said means comprising more than a mere opening in a wall and (1) acting to give a whirling or tangential motion to the fluid, or (2) positioned in a side wall of the tubing or casing rather than being an end opening, or (3) said means being capable of being projected from the tubing or casing.

SEE OR SEARCH THIS CLASS, SUBCLASS:

99, for junk retrieving means having nozzles for directing fluid outwardly from the junk catcher.

112, for eduction pumps with nozzles for spraying the well walls.

157+, for screens with washing points or shoes.

169, for receptacles having lateral ports for the discharge of fluid.

SEE OR SEARCH CLASS:

175, Boring or Penetrating the Earth, subclass 424 for earth boring jetting or suction nozzles.

239, Fluid Sprinkling, Spraying, and Diffusing, appropriate subclasses for fluid spraying and discharging devices of general utility.

223 Rotary or projectable:

This subclass is indented under subclass 222. Devices in which the means for directing the fluid turns about an axis on the casing or tubing

or is capable of being projected from the tubing or casing.

SEE OR SEARCH THIS CLASS, SUBCLASS:

100, for well devices with a lateral probe or port sealed against the well wall.

227 SCREENS:

This subclass is indented under the class definition. Devices comprising means, usually strainers or filters, for separating solids from the earth fluid flowing into a well conduit.

(1) Note. A strainer may comprise no more than a pipe with a multiplicity of perforations. The disclosed use is the important factor for classification herein.

SEE OR SEARCH THIS CLASS, SUBCLASS:

157+, for screens and washing points or shoes.

171, for screens with mechanical perforation cleaners.

205, for screens with a valve, closure, changeable restrictor or removable portion.

SEE OR SEARCH CLASS:

137, Fluid Handling, subclasses 544+ for fluid handling apparatus of general utility combined with screens.

138, Pipes and Tubular Conduits, subclass 41 for flow restrictors of general utility combined with screens.

175, Boring or Penetrating the Earth, subclass 314 for earth boring apparatus with a well type screen including jetting or well points.

210, Liquid Purification or Separation, subclasses 459+ for a filter of general utility attached to a pipe end, subclasses 483+ for filter elements, and subclasses 500.1+ for filter materials.

418, Rotary Expansible Chamber Devices, for rotary expansible chamber type pumps or motors, per se. As between Classes 166 and 210 a patent is placed in Class 166 if its sole disclosed or claimed use is merely as a well screen or well filter for earth fluids, whether disclosed on a casing or tubing. Class 210, however, takes patents for filters or screens of general utility and also those specifically disclosed as pump or pipe intakes positioned within a well and not forming a casing of the well.

428, Stock Material or Miscellaneous Articles, subclasses 131+ for a stock material product in the form of a single or plural layer web or sheet in which at least one component is perforated or reticulated, and subclasses 304.4+ for a composite web or sheet product in which one component is porous or cellular.

228 Porous material:

This subclass is indented under subclass 227. Devices comprising a straining portion made up of a mass of material having fine, irregularly shaped or tortuous pores or channels.

(1) Note. The material is usually a body of gravel, sand or porous concrete.

SEE OR SEARCH THIS CLASS, SUBCLASS:

51, for apparatus for placing porous beds.

230, for screens using woven fabric (wire mesh) to form straining openings.

276, for a process for providing a porous mass of adhered filter material in the well.

278, for a process of graveling or filter forming.

SEE OR SEARCH CLASS:

210, Liquid Purification or Separation, subclass 496 for shaped porous filter elements of general utility, and subclass 510.1 for a filter material comprising a porous unitary mass.

428, Stock Material or Miscellaneous Articles, subclasses 304.4+ for a stock material product in the form of a composite sheet or web, in which one component is porous or cellular.

229 Inserted screen plug:

This subclass is indented under subclass 227. Devices comprising an element of limited extent such as a plug having a straining opening or openings and positioned at least partially within a hole or recess in a conduit wall.

230 Woven mesh:
This subclass is indented under subclass 227. Devices comprising a woven fabric providing straining openings between the element of the fabric.

(1) Note. A "wire mesh screen" will be presumed to be a "woven fabric" unless described as not woven.

SEE OR SEARCH THIS CLASS, SUBCLASS:
229, for screens in which a woven fabric forms a plug member.

SEE OR SEARCH CLASS:
428, Stock Material or Miscellaneous Articles, subclasses 175+, 190, 193, 196+ for other products comprises a layer of mechanically interengaged strands, which may be open mesh.
442, Fabric (Woven, Knitted, or Nonwoven Textile or Cloth, etc.), subclasses 19, 29, 43+, and 58 for a coated or impregnated open mesh fabric.

231 Spiral:
This subclass is indented under subclass 227. Devices comprising a helically wound element which provides straining openings between turns of the element, or (2) has straining openings provided in it or (3) provides straining opening between itself and a base member to which it is secured.

232 With spacing lug for adjacent turns:
This subclass is indented under subclass 231. Devices in which the helical element is provided with spaced lugs to engage an adjacent turn of the element in order to position the turns to form straining openings.

(1) Note. The spaced lugs may be formed by spaced recesses in the edge of the helical element.

233 With perforated pipe:
This subclass is indented under subclass 231. Devices combined with a pipe having solid walls formed with perforations cooperating with the straining openings of the helical element to pass the strained fluid.

(1) Note. A skeleton structure built in the shape of a pipe is not considered a solid pipe with perforations. See subclasses 231 and 232 for such structure.

SEE OR SEARCH THIS CLASS, SUBCLASS:
232, for screens having a perforated pipe and a helical element and in which the helical element has spacing lugs.

234 Strip or rod:
This subclass is indented under subclass 227. Devices comprising elongated solid elements which provide (1) straining openings between each other, or (2) straining openings between themselves and a base member to which they are secured, or (3) straining openings in themselves.

(1) Note. The elongated solid element may be curved but is not a complete annulus. However, several separate elongated elements may be welded or otherwise secured together to form an annular unit.

SEE OR SEARCH THIS CLASS, SUBCLASS:
231+, for screens comprising spiral elongated elements providing straining openings.
235, for screens comprising integral annular elongated elements providing straining openings.

SEE OR SEARCH CLASS:
428, Stock Material or Miscellaneous Articles, subclasses 105+ for a stock material product in the form of a composite sheet or web including layers of angularly related strips or strands (e.g., rods, filaments, etc.).

235 Stacked annular sections:
This subclass is indented under subclass 227. Devices comprising a vertically aligned assembly of annular units which provide straining openings between themselves or at least two of which have straining openings in themselves.

236 Concentric pipes:

This subclass is indented under subclass 227. Devices comprising a plurality of concentrically positioned pipe sections at least one of which has straining openings.

SEE OR SEARCH THIS CLASS, SUBCLASS:

228, for concentric pipes with porous material therebetween.

230, for screens in which a concentric pipe section is made of a woven fabric such as a wire mesh.

232, and 233, for screens in which a concentric pipe section is made of a spiral element providing straining openings.

234, for screens in which one or more concentric pipes are made of elongated elements providing straining openings.

237 DETENTS OR CLUTCHES:

This subclass is indented under the class definition. Devices comprising means for preventing relative movement between two parts and manipulable to permit relative movement, or means to permit relative movement and manipulable to prevent relative movement, the change in condition between movement prevention and movement permission being for the purpose of enabling operation of some device in a well (e.g., setting a packer) and the two parts always remaining connected in the well by other means.

(1) Note. Devices which include mere end stops to limit motion are not included in this subclass. See subclass 241.1 for centering devices which include stops for limiting the sliding movement of the centering means on their supports.

SEE OR SEARCH THIS CLASS, SUBCLASS:

63, and subclasses there noted, for well devices with detents released by an explosive means.

162+, and subclasses there noted, for well receptacles with latch devices for valves and closures.

182, and 198, for detents holding the telescopic supports of packers or plugs locked in order to hold the packers or plugs expanded.

206+, and subclasses there noted, for expansible anchors coacting with a prepositioned conduit.

216, for devices comprising an expanding anchor and friction drag with a detent means to prevent setting of the anchor till a desired location is reached.

241.1+, and subclasses there noted, for centering devices.

332.1+, and subclasses there noted, for valve devices with actuating means engaging the well bottom, an obstruction or wall.

SEE OR SEARCH CLASS:

74, Machine Element or Mechanism, subclasses 2+ and 527+ for trips and detents of general utility.

192, Clutches and Power-Stop Control, subclasses 30+ for clutches of general utility.

238 Flow permitting means bridging fluid conduit:

This subclass is indented under subclass 237. Devices in which the movement prevention means extends completely across a well conduit but permits fluid to flow past the means, the means acting to control relative movement between the conduit and another part.

(1) Note. A separate movable part, such as a go-devil, between two detent means is not considered within the definition of this subclass. See other subclasses in this group for such devices.

239 Operated by dropped weight:

This subclass is indented under subclass 237. Devices in which the movement prevention means is set in operation by a falling weight (e.g., a go-devil).

SEE OR SEARCH THIS CLASS, SUBCLASS:

153+, for fluid driven pistons operating detent means.

193+, for dropped ball type plugs operating detent means.

238, for a weight operated movement preventing means comprising an element bridging a fluid conduit.

SEE OR SEARCH CLASS:

175, Boring or Penetrating the Earth, subclasses 268, 270, and 271 for earth cutting elements which are laterally shiftable below ground (e.g., expansible) by a dropped element.

240 Lug in closed branched slot:

This subclass is indented under subclass 237. Devices comprising a lug on one part moveable in a branched slot having a continuous perimeter on the other part, so that though the lug is always in the slot, movement of the parts (at least in some directions) is prevented in one position of the lug and permitted in another position.

241.1 GUIDE FOR DEVICE OR CONDUIT:

This subclass is indented under the class definition. Apparatus comprising positioning means attached to and projecting laterally beyond (1) a tool; (2) a fluid moving structure; or (3) a fluid conveying means (i.e., tubing) to centralize within the well the tool, fluid moving structure, or fluid conveying means.

(1) Note. Included are centralizing means that press against the inner wall of the conduit to form a stationary point of reference for manipulation of the well device, but may be moved longitudinally with respect to the well if enough force is applied.

(2) Note. Included in this subclass are devices for centrally positioning a casing during a cementing operation.

(3) Note. Included in this subclass are discreet guides for either connecting (1) two spaced well devices or fluid conveying portions, or (2) terminating either the device or fluid conveying means, and which require the well device or fluid conveying means to be fabricated for the purpose of holding the guide.

SEE OR SEARCH THIS CLASS, SUBCLASS:

138+, for a friction drag combined with a packer or plug and an expansible anchor.

153+, for pistons propelled by fluid in a well conduit.

166, for receptacles with centering devices engaging the wall of a well conduit to operate a valve.

170+, especially 172, for centering devices combined with scraping or brushing means.

179+, for packers or plugs.

206+, for an anchoring device which is jammed against the wall of a surrounding conduit or interlock therewith, especially subclasses 210 and 216 for anchoring devices with wedges and friction drags and subclass 213 for anchors similar to centering devices, but jammed against the surrounding conduit wall.

332.1+, for valves in combination with friction devices engaging a well conduit.

SEE OR SEARCH CLASS:

175, Boring or Penetrating the Earth, subclasses 325.1+ for earth boring apparatus having bore wall engaging means carried on the tool or tool shaft, particularly subclass 325.3 for bearings.

384, Bearings, subclasses 29+ for a cylindrical linear bearing of general use; if bore hole contacting structure is disclosed or claimed, placement is in Class 175, subclasses 325.1+.

241.2 On sucker or pump rod:

This subclass is indented under subclass 241.1. Apparatus in which a fluid moving structure is positioned centrally within a fluid conveying means.

241.3 Rotatable or having a rotatable element:

This subclass is indented under subclass 241.2. Apparatus where the centralizer includes an element that turns about an axis.

241.4 Surrounding existing rod:

This subclass is indented under subclass 241.2. Apparatus where the centralizer encircles and is secured to a fluid moving structure having no alteration to accommodate the centralizer.

241.5 For a wireline operation:
This subclass is indented under subclass 241.1. Apparatus in which the guide is peculiarly adapted to be employed with equipment for well logging or surveying.

241.6 Surrounding existing device or tubing:
This subclass is indented under subclass 241.1. Apparatus where the guide encircles either (1) the fluid conveying means or (2) the tool.

(1) Note. Included under tool would be, for example, cable cutters, or drift recorders.

241.7 Removably secured by a fastener (e.g., pin) parallel to the tubing:
This subclass is indented under subclass 241.6. Apparatus in which the means holding the guide to the existing fluid conveying means or device is readily taken out along the tubing length.

242.1 CONDUIT WALL OR SPECIFIC CONDUIT END STRUCTURE:
This subclass is indented under the class definition. Apparatus comprising (a) a particular modification to a pipe through the thickness or (b) means at the end of a conduit for facilitating entry of the conduit into the well (e.g., casing shoes).

(1) Note. Claims to a plurality of well conduits may be classified here, but conduits with attachments thereon other than shoes are classified in subclass 243 or other subclasses according to the features claimed.

(2) Note. Couplings for conduit sections are considered parts of the conduit wall structure.

SEE OR SEARCH THIS CLASS, SUBCLASS:
227+, for conduit structure comprising or combined with a screen or filter.

SEE OR SEARCH CLASS:
138, Pipes and Tubular Conduits, subclasses 100+ for pipe structure of general utility.

242.2 Flexible tube or cable:
This subclass is indented under subclass 242.1. Conduit wall structure comprising a pliant thin-walled pipe; e.g., coiled tubing.

SEE OR SEARCH THIS CLASS, SUBCLASS:
77.2+, for forcing coiled tubing into an existing well.
385, for a method of placing or shifting a well part using a flexible cable or wire.

SEE OR SEARCH CLASS:
138, Pipes and Tubular Conduits, subclasses 118+ for flexible pipe structure of general utility.

242.3 Plural parallel nonconcentric conduits:
This subclass is indented under subclass 242.1. Conduit wall structure comprising at least two side by side, coaxial pipes.

(1) Note. Included in this subclass are pipes of dissimilar diameter; e.g., hydraulic lines, control lines, flushing tubing, grouting tube.

SEE OR SEARCH THIS CLASS, SUBCLASS:
89.2, for inner member anchor or seal with lateral port using parallel pipes.
97.5, for parallel pipes extending through distinct paths through wellhead.
242.5, for side entry.
313, for a method for parallel string or multiple completion of well.

SEE OR SEARCH CLASS:
285, Pipe Joints or Couplings, subclasses 120.1+ for plural non-communicating paths.

242.4 Corrosion prevention or deterring:
This subclass is indented under subclass 242.1. Conduit wall structure comprising specific wall structure for averting or slowing deterioration due to reaction with water, pollutants, or salt spray.

SEE OR SEARCH THIS CLASS, SUBCLASS:

250.05, for a method of scale or corrosion determination.

250.11, for a method of locating coupon holders.

902, for corrosion inhibiting.

SEE OR SEARCH CLASS:

138, Pipes and Tubular Conduits, Digest 6 for corrosion prevention.

242.5 Side entry:

This subclass is indented under subclass 242.1. Conduit wall structure comprising means for introducing an; e.g., cable or conduit, into the conduit wall through a bulged or enlarged section of the conduit.

SEE OR SEARCH THIS CLASS, SUBCLASS:

65.1+, for side entry of electrical cable.

117.5+, for side pocket mandrel and means for guiding into a side pocket.

255.3, for determining location or position of whipstocks.

242.6 Downhole coupling or connector:

This subclass is indented under subclass 242.1. Conduit wall structure comprising a specific joining structure for two conduit sections.

(1) Note. Couplings for conduit sections are considered parts of the conduit wall structure.

242.7 Telescopic:

This subclass is indented under subclass 242.6. Coupling for conduit wall structure wherein the coupling allows relative axial movement between two conduit wall sections.

242.8 Shoe detail:

This subclass is indented under subclass 242.1. End structure comprising the particular shape, design, construction, or configuration of the means at the terminus of a conduit for facilitating entry of the conduit into the well (e.g., cementing shoes).

SEE OR SEARCH THIS CLASS, SUBCLASS:

156, for casing shoes with stop means for pistons, fluid driven into the well.

157+, for screens with a washing point or shoe.

203, for conduit shoes specifically formed and claimed as packers.

222+, for shoes with nozzles for whirling or lateral discharge or projectable nozzles.

316+, for conduits with valves, closures or changeable restrictors, especially subclasses 327+ for shoes with check valves.

SEE OR SEARCH CLASS:

175, Boring or Penetrating the Earth, subclass 402 for casing shoe type earth cutting bits.

242.9 Brick or cement casing liner:

This subclass is indented under subclass 242.1. Conduit wall structure wherein the conduit wall is formed of a hardened clay or powdered alumina, silica, lime, iron oxide and magnesia material used in; e.g., water wells.

SEE OR SEARCH CLASS:

52, Static Structures (e.g., Buildings), subclasses 19+, and 169.1+, for a masonry construction, per se, surrounding an open space which may be defined as forming a cistern or well.

405, Hydraulic and Earth Engineering, subclasses 132+ for tunnel structure and structure of shafts of general utility; and subclasses 231+ for columnar foundation structures (e.g., pier, pile) and methods and apparatus for installing the same.

243 MISCELLANEOUS (E.G., ANCHOR PIPES):

This subclass is indented under the class definition. Devices not provided for in other subclasses.

(1) Note. In this subclass are found, for example, tubing supports of types other than those found in subclasses 206+, catchers for falling objects and go-devils.

244.1 Processes:
This subclass is indented under the class definition. A process.

SEE OR SEARCH CLASS:
137, Fluid Handling, subclass 1 for processes of handling material in a pipe line including forming or maintaining a film on the interior of the pipe.
507, Earth Boring, Well Treating, and Oil Field Chemistry, subclasses 200+ for processes involving no significant manipulative steps or relationship with the well and consisting only of placing a treating material in a well. Examples of broadly recited steps which are not considered significantly manipulative are (a) generally producing the well or (b) broad removal of spent material. Examples of processes classifiable in Class 166 rather than Class 507 are: using pressure; introducing one material after another; introducing materials through separate conduits; introducing material at the bottom of the well or below paraffin deposits; contacting well fluids with an introduced material during pumping; producing or blowing the well; a process in which materials are introduced into a well to react with each other (including a process in which one material reacts with the product of the reaction between another material and a material found in the well); a process in which a material is introduced in a special location, as between the casing and tubing; or a process in which material is inserted into the pores of the earth.
516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, appropriate subclasses for subject matter relating to: colloid systems (such as sols*, emulsions, dispersions, foams, aerosols, smokes, gels, or pastes) or wetting agents (such as leveling, penetrating, or spreading); subcombination compositions of colloid systems containing at least an agent specialized and designed for or peculiar to use in making or stabilizing colloid systems; compositions and subcombination compositions specialized and designed for or peculiar to use in breaking (resolving) or inhibiting colloid systems; processes of making the compositions or systems of the class; processes of breaking (resolving) or inhibiting colloid systems; in each instance, when generically claimed or when there is no hierarchically superior provision in the USPC for the specifically claimed art.

245 Specific pattern of plural wells:
This subclass is indented under subclass 244.1. A process in which an arrangement of more than two wells in plan view is claimed with enough specificity to indicate a pattern of wells (e.g., two lines of wells, one well surrounded by a ring of other wells, etc.).

246 Using microorganisms:
This subclass is indented under subclass 244.1. A process in which a biological organism of microscopic or ultramicroscopic size (e.g., bacteria, etc.) is used.

(1) Note. A process involving using a bactericide or the like to treat any microorganism which may be present but which is not introduced as a part of the process is not included under this definition. Such a process is classifiable on other features.

247 Nuclear energy or radioactivity for treating:
This subclass is indented under subclass 244.1. A process comprising (1) using nuclear energy or (2) using radioactivity of a substance to effect some treating operation (e.g., heating the formation, etc.).

(1) Note. Nuclear energy in this subclass is energy created by an induced nuclear reaction as described in the class definition of Class 376, Induced Nuclear Reactions: Processes, Systems, and Elements. Patents which claim well processes which recite a nuclear reactor or details of the nuclear explosive are provided for in Class 376, subclasses 273+.

SEE OR SEARCH THIS CLASS, SUBCLASS:

248, for a process involving using electromagnetic waves to treat the earth by heating it.

299, for a process using a non-nuclear explosion.

248 Electric current or electrical wave energy through earth for treating:

This subclass is indented under subclass 244.1. A process comprising passing an electric current through the earth to treat it or material in the pores of the earth (e.g., by heating, etc.).

(1) Note. Electromagnetic Waves created in the earth to treat it are considered to come within the definition.

SEE OR SEARCH THIS CLASS, SUBCLASS:

247, for processes for treating the earth by radioactive emissions.

250.1+, for processes in which a current may be passed through the earth for the purpose of an indicating, testing, measuring or locating step.

249 Vibrating the earth or material in or being placed in the earth pores:

This subclass is indented under subclass 244.1. A process in which rapidly pulsating forces of a mechanical nature are applied to the earth, material in the pores of the earth or material being injected into the pores of the earth.

(1) Note. The rapid pulsations must be in the sonic or ultrasonic range, i.e., at least 15 cycles per second. Some disclosures do not recite the rapidity of the vibrations. If, however, it is concluded that the intent of the disclosure is to cover sonic or ultrasonic vibrations, the patent should be classified under this definition.

(2) Note. A single explosion, implosion or blow may be followed by rapid pulsations but such subject matter is not included under this definition unless explosions or blows are repeated at sonic or ultrasonic frequencies. See subclass 299 for a process including an explosion, or implosion by breaking a container.

(3) Note. Vibrations applied to the earth merely for measuring, testing, indicating, etc., are not included. A process with such steps would be classifiable in subclasses 250.1+.

(4) Note. A process involving incidental vibration of the earth or material in the earth, such as may take place when cementitious material or gravel in a well is vibrated are not included. The stated purpose of the process must be to impart vibrations or pulsations to the earth or material in or being placed in the pores of the earth.

SEE OR SEARCH THIS CLASS, SUBCLASS:

286, for a cementing process including vibrating the cement being placed in a well bore rather than in the pores of the earth.

SEE OR SEARCH CLASS:

299, Mining or In Situ Disintegration of Hard Material, subclass 14 for mining processes involving breaking down material by vibrating.

250.01 With indicating, testing, measuring or locating:

This subclass is indented under subclass 244.1. Process including a step of: providing evidence of a condition; e.g., leak, oil-gas interface; performing an analysis; e.g., downhole pressure; counting; or determining the position of an object or formation.

(1) Note. A process including a mere step(s) of indicating, detecting, signaling, recording or measuring wherein the result is not related to any other step in the claim is not classifiable here.

(2) Note. A process involving merely taking a sample of earth fluid is not included under this definition. See subclass 264 for such a process.

(3) Note. A process in which an inherent measuring step or the like would take place, such as a process involving the use of a fluid at a certain temperature, is

not classified under this definition unless a separate step of making the measurement, or the like, is recited in a claim. Further, many well processes inherently give a signal or indication when some well function is performed, such as a pressure rise taking place when a plug closes an opening in a cementing operation. Such processes, also, are not classified under this definition unless some added indicating step is claimed.

SEE OR SEARCH THIS CLASS, SUBCLASS:

64, for well apparatus combined with time or distance measuring or counting means.

66, for well apparatus combined with electrical indicating means.

113, for below ground devices comprising well apparatus combined with non-electrical indicating, testing or measuring means.

SEE OR SEARCH CLASS:

33, Geometrical Instruments, subclass 302, for processes of sensing and indicating borehole direction or inclination, and subclasses 717+ sounding devices combined with samplers not for well fluids.

73, Measuring and Testing, subclasses 152.02+ for miscellaneous tests and measurements relating to wells. Class 73 takes a process relating to measuring or testing including steps relating to well features for perfecting the measuring or testing process while Class 166 takes a more comprehensive process relating to well conditions or structure which includes a measuring or testing step.

175, Boring or Penetrating the Earth, subclass 4.51 for a gun or explosive charge perforating means or step which inherently results in penetration of the earth in combination with a position orienting or indicating means or step, contributing to the effect of the perforating or penetrating means or step, subclasses 40+ for processes or apparatus for earth boring including signaling, indicating, testing or measuring and especially subclass 45 for tool direction or inclination measuring or indicating within the bore hole.

181, Acoustics, subclasses 101+ for acoustic devices in wells or seismological prospecting.

250, Radiant Energy, subclasses 83+ for ray energy detection or measurement.

324, Electricity: Measuring and Testing, subclasses 323+ for subject matter relating to the determination of an electrical characteristic of the subsurface of the earth.

340, Communications: Electrical, subclasses 500+ for electrical automatic condition responsive indicating systems, and subclasses 853.1+ for well bore signaling systems.

342, Communications: Directive Radio Wave Systems and Devices (e.g., Radar, Radio Navigation), subclass 22 for transmission through media other than air or free space, and subclass 459 for radar systems in wells.

346, Recorders, subclass 33 for well logging.

367, Communications, Electrical: Acoustic Wave Systems and Devices, subclasses 25+ for seismic well logging; subclasses 81+ for acoustic wellbore telemetering; and subclass 86 for acoustic borehole testing.

436, Chemistry: Analytical and Immunological Testing, subclasses 25+ for geochemical, geological, or geothermal exploration. A nominal step in a claim, reciting drilling a well or recovering fluid from the earth does not affect classification of a patent in Class 436.

702, Data Processing: Measuring,Calibrating, or Testing, subclasses 6 through 13 for the application of well logging which requires a mathematical calculation and only nominal recitation to the structure of well logging.

703, Data Processing: Structural Design, Modeling, Simulation, and Emulation, subclass 10 for mathematical simulation of a fluid well.

250.02 Permeability determining:
This subclass is indented under subclass 250.01. Measuring including the step(s) of ascertaining the ease with which a fluid can flow through a formation.

250.03 Determining fluid interface or fluid level:
This subclass is indented under subclass 250.01. Measuring including the step(s) of indicating a liquid-gas contact or a depth of a gas or liquid within a well.

250.04 Plug indicating or releasing:
This subclass is indented under subclass 250.01. Indicating including the step(s) of monitoring the position or disengagement of a flow stopping device.

250.05 Scale or corrosion determination:
This subclass is indented under subclass 250.01. Indicating including the step(s) of finding detritus or deterioration due to reaction with water, pollutants, or salt spray.

250.06 Steam quality:
This subclass is indented under subclass 250.01. Testing including the step(s) of finding the degree of superiority of superheated water vapor.

250.07 Bottom hole pressure:
This subclass is indented under subclass 250.01. Testing including the step(s) of determining weight per volume at the well total depth.

250.08 Leak testing or locating:
This subclass is indented under subclass 250.01. Testing or locating including the step(s) of finding a nongeological fault allowing the escape of fluid or solids.

250.09 Impression means:
This subclass is indented under subclass 250.01. Measuring including the step(s) of taking an imprint of the formation.

250.1 Fracturing characteristic:
This subclass is indented under subclass 250.01. Measuring or indicating including the step(s) of determining the orientation, width, length, or pressure of the result of placing a liquid or particulate material to erode a formation to increase permeability.

250.11 Holder for coupon or sensor:
This subclass is indented under subclass 250.01. Indicating including the step(s) of using or installing a device to retain (a) a metal member to monitor the effect of corrosion or (b) a detector within a well.

250.12 Tracer:
This subclass is indented under subclass 250.01. Indicating involving the use of an easily detectable material (e.g., dye, inert gas, halocarbons, cobalt-57, carbon dioxide).

SEE OR SEARCH THIS CLASS, SUBCLASS:
252.6, for tracing material with a driving fluid.

250.13 Determining stuck point:
This subclass is indented under subclass 250.01. Indicating including the step(s) of finding where an object (tool, tubing, etc.) is caught in a well.

SEE OR SEARCH THIS CLASS, SUBCLASS:
98+, for apparatus for removing objects from a well.
301, for method of releasing a stuck object.

250.14 Of cementing or plugging technique:
This subclass is indented under subclass 250.01. Measuring including the step(s) of determining the quality or ingredients of (a) pipe to formation or pipe to pipe sealing or adhering strength or (b) pipe stopper strength.

SEE OR SEARCH THIS CLASS, SUBCLASS:
285+, for a cementing process.

250.15 Automatic control for production:
This subclass is indented under subclass 250.01. Measuring including the step(s) of using a sensor to regulate outgoing gas or oil without an operator.

250.16 Prospecting:
This subclass is indented under subclass 250.01. Locating including the step(s) of finding the presence of hydrocarbons from water or earth samples.

250.17 Including testing or treating tool having at least one actuatable packer:
This subclass is indented under subclass 250.01. Testing including the step(s) of using an apparatus with a single or plurality of inflatable sealing devices that reduce or stop flow to monitor well parameters or change a well condition.

251.1 Including in situ combustion:
This subclass is indented under subclass 250.01. Indicating including a step of burning in the pores of the formation.

(1) Note. "Burning" under this definition is a vigorous union of a substance with oxygen, but does not include an explosion.

252.1 Including production of earth fluid by driving fluid:
This subclass is indented under subclass 250.01. Indicating in which liquid or gas in the pores of the formation, before the start of the process, is caused to be pushed towards a well by another liquid or gas for flowing to the surface of the earth.

SEE OR SEARCH THIS CLASS, SUBCLASS:
251.1, for an in situ combustion process involving indicating, testing, measuring or locating.
268+, for a process of flooding.

252.2 Residual oil or oil saturation:
This subclass is indented under subclass 252.1. Production of earth fluid by driving fluid including the step(s) of determining liquid hydrocarbon remains or suffusion.

252.3 Salinity or acidity:
This subclass is indented under subclass 252.1. Production of earth fluid by driving fluid including the step(s) of determining the amount of (a) a compound that results when, in an acid, the hydrogen is replaced by a metallic element or compound or (b) a compound containing hydrogen in a fluid.

252.4 Flood front:
This subclass is indented under subclass 252.1. Production of earth fluid by driving fluid including step(s) of monitoring a leading fluid in a process of pushing hydrocarbons into a well using liquid or gas.

252.5 Permeability or viscosity:
This subclass is indented under subclass 252.1. Production of earth fluid by driving fluid including step(s) of determining a measure of the ease with which a fluid can flow through a formation or a property of a fluid that causes the fluid to tend to hold together as during flow.

252.6 And tracing material:
This subclass is indented under subclass 252.1. Production of earth fluid by driving fluid including step(s) of using an easily detectable composition (e.g., dye, inert gas, halocarbons, cobalt-57, carbon dioxide).

SEE OR SEARCH THIS CLASS, SUBCLASS:
250.12, for a method of measuring, testing, indicating, or locating using a tracer not requiring the use of a drive fluid.

253.1 Indicating the location, presence or absence of cement:
This subclass is indented under subclass 250.01. A process including a step of determining or indicating the position, diffusion or existence of plugging or consolidating material.

(1) Note. For classification in this subclass a process must have a step which relates directly to the subject matter rather than to some step from which the position, presence or absence of cement, etc., may be deduced. For example, a step of logging a well may indicate the location to receive cement after a cementing operation, or the process may include the step of indicating the pressure of cement being pumped from which it may be deduced that cement is present. Such steps are too indirect to be included. An example of a process under this subclass

is one in which the well is cemented by a cement containing a radioactive material whose presence is sensed to thereby determine the position of the cement.

SEE OR SEARCH THIS CLASS, SUBCLASS:

64, for apparatus comprising means for measuring the distance to a body of cement.

250.14, for a process of determining cement quality or make-up.

285+, for a cementing process.

254.1 Determining position of earth zone or marker:

This subclass is indented under subclass 250.01. A process in which some identifiable property of a portion of a formation is ascertained.

(1) Note. The position determining steps must be explicitly recited in a claim for classification in this subclass and not left to inference. The position of a portion of the earth is almost always determined at some stage in processes involving wells.

(2) Note. Included in this subclass are a natural property which exists before any alteration by man and locating a radioactive marker inserted in a formation.

SEE OR SEARCH THIS CLASS, SUBCLASS:

253.1, for a process of determining location or absence of cement which may use radioactive markers.

SEE OR SEARCH CLASS:

73, Measuring and Testing, subclasses 152.02+ for a well logging wherein the well process is used only to perfect a test.

175, Boring or Penetrating the Earth, subclasses 40+, especially subclass 50 for a process of earth boring including indicating, testing or measuring a condition of the formation.

254.2 Well logging:

This subclass is indented under subclass 254.1. Determining position of earth zone which includes the step(s) of using a wireline operated device to traverse the formation.

(1) Note. The logging step must be explicitly recited in a claim for classification in this subclass and not left to inference. The position of a portion of the earth is almost always determined at some stage in processes involving wells.

SEE OR SEARCH CLASS:

73, Measuring and Testing, subclasses 152.02+ for formation logging.

324, Electricity: Measuring and Testing, subclasses 323+ for a method or apparatus for geophysical surface or subsurface in situ.

255.1 Determining position of object in well:

This subclass is indented under subclass 250.01. A process in which the location of a well completion device in the well is ascertained.

(1) Note. The object must be something other than an instrument used in a process for ascertaining the position of something.

(2) Note. A fluid or a formless substance is not considered an object under this definition. A casing or tubing, however, is considered an object.

(3) Note. For classification in this subclass some special step for directly determining the position of an object must be recited in a claim since the position of objects is generally known in well processes or can be deduced from other information if so desired.

SEE OR SEARCH THIS CLASS, SUBCLASS:

250.13, for locating stuck pipe.

SEE OR SEARCH CLASS:

175, Boring or Penetrating the Earth, subclass 4.51 for subject matter relating to well perforating by a bullet or

shaped charge of an explosive combined with position orienting or indicating and subclass 45 for boring tool position, direction, or inclination measuring or indicating within the bore.

255.2 Tool orienting:
This subclass is indented under subclass 255.1. Determining position of an object including a step of setting or arranging a device in a determinate position with respect to other well structure or the formation.

255.3 Using whipstock:
This subclass is indented under subclass 255.2. Tool orienting wherein the device is for diverting a pipe, tubing, or a well tool.

SEE OR SEARCH THIS CLASS, SUBCLASS:
117.5+, for whipstock apparatus in general.

SEE OR SEARCH CLASS:
175, Boring or Penetrating the Earth, subclass 61 for methods and subclasses 79+ for apparatus of drilling using a whipstock.

256 In situ combustion:
This subclass is indented under subclass 244.1. A process in which burning takes place underground in the pores of the earth.

(1) Note. "Burning" under this definition is a vigorous union of a substance with oxygen, but does not include an explosion.

(2) Note. Burning taking place in a fracture in the earth is considered to take place in the pores of the earth.

SEE OR SEARCH THIS CLASS, SUBCLASS:
251.1, for a process involving in situ combustion and a step of indicating, testing, measuring or locating.
270, for a process involving injection and producing wells and chemical interreaction of introduced material in the pores of the earth.
299, for a process involving an explosion.
300, for a process involving chemical interreaction of materials introduced into a well.

SEE OR SEARCH CLASS:
175, Boring or Penetrating the Earth, appropriate subclasses for boring by combustion of the formation material.

257 Injecting while producing by in situ combustion from same well:
This subclass is indented under subclass 256. A process in which material found in the earth is produced from the top of a well due to in situ combustion taking place in the pores of the earth, while at the same time material is being injected into the pores of the earth from the same well.

258 Plural distinct superimposed formations:
This subclass is indented under subclass 256. A process in which plural, naturally distinct, vertically related zones of earth are involved.

(1) Note. The distinct zones are usually identified by the fluid they contain, such as oil or water. But where it appears that different fluids are in a single zone having the same physical characteristics throughout, the zone is considered to be a single entity.

(2) Note. It is common to produce a fluid from a formation located between two or more other formations. Patents are classified in this subclass only when the existence of plural distinct zones or formation is a significant factor in the claimed process. A reference in a claim to the top or bottom of a zone is not enough for classification under this definition.

259 Including fracturing or attacking formation:
This subclass is indented under subclass 256. A process in which the earth is cracked to produce a fissure or fissures therein, or in which fluid introduced into the pores of the earth chemically reacts with the earth or deposits in the earth to enlarge the pores of the earth.

(1) Note. See (1) Note in subclass 307 for a discussion of the meaning of "deposits in the earth".

(2) Note. The fracture or pore enlargement must be effected by some cause other than the heat of the in situ combustion itself. A process in which the heat of the in situ combustion is said to cause fracturing or increase of permeability is classified on other features.

260 Injecting specific fuel or catalyst for burning into formation:

This subclass is indented under subclass 256. A process in which (1) a burnable substance is placed into the pores of the earth and burned therein or (2) a catalyst for affecting the burning operation is placed into the pores of the earth.

(1) Note. For classification as an original in this subclass the burnable substance should be recited in a claim with some specificity since it is very common to insert fuel into the pores of the earth for in situ combustion. A mere recitation of a combustible mixture of gaseous fuel and air or oxygen is not enough. However, a recitation of a specific ratio of fuel to oxygen or air is sufficient. Also a statement in a claim of the injection of fuel in a significant sequence such as after an air injection is also sufficient.

(2) Note. "Burned" in the definition means a vigorous union of a substance with oxygen.

(3) Note. A process in which a material is placed into the pores of the earth for some other purpose and is not said to be burned though it may actually be incidentally burned is not included under this definition. Such a process would be classifiable in subclass 261.

261 Injecting specific material other than oxygen into formation:

This subclass is indented under subclass 256. A process in which a material is placed into the pores of the earth, said material being other than oxygen, per se, or air.

(1) Note. A broad recitation of a combustion supporting gas or a mixture of oxygen and an inert gas or of air enriched with oxygen is not included. However, a recitation of a separate injection of inert gas or a recitation of a specific ratio of oxygen in air or inert gas is included, except a recitation such as 20% or more oxygen in inert gas which is tantamount to a recitation of air or air enriched with oxygen.

SEE OR SEARCH THIS CLASS, SUBCLASS:

260, for an in situ combustion processes in which a specific fuel or catalyst for burning is injected into the pores of the earth.

262 Solid fuel or particles in well:

This subclass is indented under subclass 256. A process in which solid fuel or a bed of solid particles is placed in a well for purposes of starting or affecting in situ combustion.

263 Cyclic injection then production of a single well:

This subclass is indented under subclass 244.1. A process including a step in which a well is (1) used for a period of time only to place material into the pores of the earth and then for a period of time used only to produce fluid from the earth or (2) used for a period of time to produce fluid from the earth and then used (a) for a period of time only to place material into the pores of the earth or (b) for a period of time is shut in to stop flow of fluid from the earth.

SEE OR SEARCH THIS CLASS, SUBCLASS:

245, for specific pattern of plural wells.

268, for cyclic operation in an injection well moving hydrocarbons to a producing well.

370, for varying downhole pressure in a producing well.

264 Sampling well fluid:

This subclass is indented under subclass 244.1. A process comprising taking a limited amount of the fluid in a well or the adjacent earth for testing or measuring purposes.

(1) Note. No special steps for limiting the flow need be set forth for classification in this subclass. The mere statement is a claim that a sample is taken is sufficient. Merely setting a sampler in position, however, without the step of taking the sample is not sufficient for classification in this subclass. Such processes would be classifiable in subclass 315.

SEE OR SEARCH THIS CLASS, SUBCLASS:

369+, and the subclasses there noted for a process of producing a well.

SEE OR SEARCH CLASS:

73, Measuring and Testing, subclasses 152.02+ for a process or apparatus for taking a sample from a well combined with making a determination of a physical characteristic of a well, a borehole casing, or a drill rigging wherein the test is not purely electrical or purely magnetic, in particular subclasses 152.07, 152.09, and 152.11 for core sample analysis for making a formation logging wherein the test is not purely electrical or purely magnetic, and subclasses 152.23+ for fluid flow measuring or fluid analysis combined with sampling well fluid wherein the test is not purely electrical or purely magnetic, and subclasses 863+ for a process or an apparatus for sampling a fluid not in a well or for a soil gas sampling process and apparatus.

175, Boring or Penetrating the Earth, subclass 59 for processes of taking solid samples of earth formation combined with a step of retaining fluid therein or taking a separate fluid sample.

422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, subclasses 50+ for apparatus for gas sampling involving use of sorbents or chemical treatments which may include a shaft sunk in the ground to collect gas for analysis.

436, Chemistry: Analytical and Immunological Testing, subclasses 1 through 183 for gas sampling as part of a process of chemical testing.

265 Separating material entering well:

This subclass is indented under subclass 244.1. A process comprising separating a stream of material which has entered the well into two or more portions and as a result of such separation delivering the material coming out of the top or head of the well to two or more separate repositories or transmission lines.

(1) Note. One of the repositories may be the same well from which the material flows.

SEE OR SEARCH THIS CLASS, SUBCLASS:

54, for apparatus including float controlled valves for separating fluid in a well.

105.5+, for wells having structure for separating gas from well fluid.

313, for a multiple completion well in which separate streams of material enter the well from separate formations and come out of the top of the well for delivery to separate repositories.

SEE OR SEARCH CLASS:

23, Chemistry: Physical Processes, appropriate subclasses for sampling involving the use of sorbents or chemical treatment. A well may be broadly recited as a source.

62, Refrigeration, subclasses 58, 123+, and 600+ for processes and apparatus for separation of a mixture by refrigeration even though broadly related to a well.

95, Gas Separation: Processes, for processes of gas separation, per se, especially subclasses 241+ for degasification of liquid.

96, Gas Separation: Apparatus, for apparatus for gas separation, per se, especially subclasses 155+ for degasifying means for liquid.

196, Mineral Oils: Apparatus, for apparatus for treating mineral oils not disclosed as in a well nor in the pores of the earth even though a well is named broadly as a source.

208, Mineral Oils: Processes and Products, for processes of treating mineral oils not disclosed as in a well nor in the pores of the earth even though a well is named broadly as a source.

210, Liquid Purification or Separation, subclasses 600+ for a process of separating the components or constituents of a liquid-liquid or liquid-solid mixture.

417, Pumps, subclass 435, for pumps having means for venting gas from pumped liquid.

422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, appropriate subclasses for sampling apparatus involving the use of sorbents or chemical treatment. A well may be broadly recited as a source.

423, Chemistry of Inorganic Compounds, subclasses 210+ for processes of separating or purifying gases by a chemical reaction.

266 Injection and producing wells:

This subclass is indented under subclass 265. A process including using a plurality of wells, at least one of which receives a fluid for insertion into the pores of the earth and another of which conveys a fluid from the pores of the earth to the surface of the earth.

(1) Note. The line between this subclass and the various classes relating to separation of fluids is that the positive recitation in a claim of the step of placing a fluid in a well causes classification in this subclass.

(2) Note. See subclass 265 for search notes on classes concerned with fluid separations.

267 Separating outside of well:

This subclass is indented under subclass 265. A process comprising separating the material coming out of the well into two or more portions by steps taking place outside of the well.

(1) Note. The line between this subclass and the classes concerned with separation or treatment of fluids is that a process comprising some significant steps of flowing or treating taking place in a well combined with steps of separating the fluid after it leaves the well is classified in Class 166, but a process including the mere step of withdrawing fluid from a well is classified according to the remaining subject matter of the process.

(2) Note. A method of pumping a well (classifiable, per se, in Class 417, Pumps) combined with a method of separating fluid after it leaves the well is classifiable in this subclass.

(3) Note. See subclass 265 for search notes on classes concerned with fluid separation.

SEE OR SEARCH THIS CLASS, SUBCLASS:

266, for processes involving separation outside of the well and also the use of injection and producing wells.

268 Distinct, separate injection and producing wells:

This subclass is indented under subclass 244.1. A process comprising a step of using a plurality of wells, at least one of which receives a fluid for insertion into the pores of the earth, usually to push hydrocarbons, and another of which conducts the pushed hydrocarbons and fluid from the pores of the earth to the surface of the earth.

(1) Note. Patents are classified as originals under this definition even if the output well is not claimed if the sole disclosure is for a process involving input and output wells, and a fluid claimed as inserted into the formation is disclosed as a drive fluid. A “drive fluid” is one which is continued to be inserted into the formation until breakthrough or near breakthrough at an output well occurs (e.g., the “water” in a waterflood process, etc.). A patent describing a waterflood secondary recovery process or the like which is not specifically disclosed as applicable to a single combined input and output well is considered as drawn to a sole disclosure of input and output wells even if the output well is not mentioned.

SEE OR SEARCH THIS CLASS, SUBCLASS:

245, for a process in which there is a specific pattern of plural wells including input and output wells.

252.1+, for a process using input and output wells and including a step of indicating, testing, measuring, or locating.

256, for a process using in situ combustion.

263, for a process using a single well in which a single well is used as an output well and then shut in or used as an input well or is used as an input well and then used as an output well.

266, for a process using input and output wells and in which there is a separation of material issuing from an output well.

306, for a process in which fluid enters and leaves a single well at spaced zones in the well.

SEE OR SEARCH CLASS:

299, Mining or In Situ Disintegration of Hard Material, subclass 4 for subject matter relating to input and output wells utilized for in situ conversion of solid material other than hydrocarbon to fluid for recovery.

507, Earth Boring, Well Treating, and Oil Field Chemistry, subclasses 200+ for compositions for treating a well and processes for using the compositions involving no significant manipulative step or relationship with the well. A process including placing a composition into the pores of the earth is considered to involve a significant manipulative step or relationship.

269 Fluid injected from longitudinally spaced locations in injection well:

This subclass is indented under subclass 268. A process in which fluid material is introduced into the pores of the earth from locations in an input well which are spaced from each other along the longitudinal axis of the well, i.e., vertically spaced in the ordinary well having a vertical axis.

(1) Note. A location which is packed off from another location is considered longitudinally spaced. A single group of holes in a well conduit is not considered to provide longitudinally spaced locations, but longitudinally spaced groups of holes do provide spaced locations. Fluid introduced from an uncased portion of a well is considered to be introduced from a single location.

(2) Note. A claim which calls for separate introduction of fluids at locations longitudinally arranged in the well is considered to meet the definition since such claim inherently requires the use of a packer or equivalent means to effect the separate introduction.

SEE OR SEARCH THIS CLASS, SUBCLASS:

258, for a process involving plural distinct superimposed formations and in situ combustion.

270 Injecting a composition to adjust the permeability (e.g., selective plugging):

This subclass is indented under subclass 268. A process in distinct, separate wells in which the fluid temporarily alters the ease of flow through the formation by filling in the pores for a specific time, usually immediately prior to a hydrocarbon driving fluid.

(1) Note. Included in this subclass are gels.

SEE OR SEARCH THIS CLASS, SUBCLASS:

300, for chemical interaction of two or more introduced materials.

270.1 Injecting a composition including a surfactant or cosurfactant

This subclass is indented under subclass 268. A process in distinct, separate wells in which the fluid is a wetting agent that causes the lowering of interfacial tension between two fluids; e.g., water and oil.

(1) Note. The term “surface active agent” also describes this type of material.

SEE OR SEARCH CLASS:

507, Earth Boring, Well Treating, and Oil Field Chemistry, subclasses 200+ for well treating compositions.

270.2 Nonaqueous type:
This subclass is indented under subclass 270.1. Surfactant or cosurfactant in which the fluid is a gas or a liquid not containing water.

271 Including fracturing or attacking formation:
This subclass is indented under subclass 268. A process in which the earth is cracked to produce a fissure or fissures therein or in which fluid introduced into the pores of the earth chemically reacts with the earth or deposits in the earth to enlarge the pores.

(1) Note. See (1) Note in subclass 307 for a discussion of the meaning of "deposits in the earth".

SEE OR SEARCH THIS CLASS, SUBCLASS:
259, for a process including in situ combustion, input and output wells and fracturing or attacking the formation.

272.1 Involving the step of heating:
This subclass is indented under subclass 268. A process in distinct, separate wells incorporating the step of raising the temperature of the fluid.

(1) Note. Any incidental heating due to a chemical reaction is not included unless it is specifically claimed.

(2) Note. The heating due to the natural heat of a formation is not included.

SEE OR SEARCH THIS CLASS, SUBCLASS:
247, for a process involving input and output wells and nuclear energy or radioactivity for heating the formation.
256+, for a process involving input and output wells and in situ combustion.
266, for a process involving input and output wells and separating fluid outside of the well by heating.
302+, for a heating process.

SEE OR SEARCH CLASS:
175, Boring or Penetrating the Earth, subclass 12 for processes or apparatus for forming a bore by combustion of the earth formation material and subclass 17 for processes or apparatus including heating within the bore or heating the drilling fluid used in boring.
299, Mining or In Situ Disintegration of Hard Material, subclass 4 for subject matter relating to input and output wells utilized for in situ conversion of solid material, other than hydrocarbons, to fluid for recovery and generally including the use of heat.

272.2 In association with fracturing or crevice forming processes:
This subclass is indented under subclass 272.1. Heating including the step of creating a fissure in the formation.

SEE OR SEARCH THIS CLASS, SUBCLASS:
308, for fracturing.

272.3 Steam as drive fluid:
This subclass is indented under subclass 272.1. Heating utilizing high temperature water vapor.

SEE OR SEARCH CLASS:
60, Power Plants, subclasses 643+ for motive fluid energized by externally applied heat.
91, Motors: Expansible Chamber Type, subclasses 152+ for steam engines.
122, Liquid Heaters and Vaporizers, subclass 35 for boiler steam storage, 379+ for cleaning, and 459+ for steam treatment.
159, Concentrating Evaporators, subclasses 16.1+ for gaseous blast or current (fluid steam injection).
165, Heat Exchange, subclasses 110+ for first fluid holder or collector open to second fluid (steam vapor condenser).
261, Gas and Liquid Contact Apparatus, digest 10 for steam heaters and condensers.

272.4 In combination with alkyls or carbon chains:
This subclass is indented under subclass 272.3. Steam drive including a substance having (a) univalent aliphatic, aromatic-aliphatic, or alicyclic hydrocarbon radical or (b) the element carbon in a chemical string.

SEE OR SEARCH THIS CLASS, SUBCLASS:

293, for cement or consolidating material containing inorganic water settable and organic ingredients.

294, for cement or consolidating material being organic or having organic ingredients.

295, for organic cementing material being a resin or resinous.

272.5 With override zone, diverting, or path blocking operation:

This subclass is indented under subclass 272.3. Steam drive including a bypassing, redirecting, or plugging operation.

272.6 Liquid material injected:

This subclass is indented under subclass 272.1. Heating wherein the fluid is flowable, wettable, cohesive, has a viscosity which decreases with temperature, and which is above ambient temperature.

272.7 Horizontal well:

This subclass is indented under subclass 272.1. Heating in which the borehole is substantially parallel to the earth's surface.

275 Injected fluid comprises water and material other than inorganic gas:

This subclass is indented under subclass 268. A process in which a fluid mixture or solution comprising water and a material other than an inorganic gas, is introduced into the pores of the earth.

(1) Note. The “material” must be other than a material which is already present in the source water. Thus a natural brine would not comprise an added “material” but a naturally occurring water to which salt has been added would have an added “material”.

(2) Note. See (1) Note in subclass 268 for the classification of a patent claiming placing a fluid into the formation but not claiming an output well.

SEE OR SEARCH THIS CLASS, SUBCLASS:

273, and 274, for a process involving input and output wells in which two or more separate fluids are introduced into the formation. Patents in subclasses 273 and 274 which disclose significant species relating to introducing a single fluid mixture or solution comprising water and a material other than inorganic gas should be cross-referenced to subclass 275.

305.1+, and the subclasses there noted for processes of recovering fluid from a well involving placing a fluid into the formation from the same well.

276 Providing porous mass of adhered filter material in well:

This subclass is indented under subclass 244.1. A process comprising establishing a mass of material having small irregular interstices in the well at the location where earth fluid enters the well so as to act as a filter for such fluid.

(1) Note. The material may be made porous before or after it is placed in the well. It must continue to be an adhered mass after being made porous.

(2) Note. The mass of material must be coherent or made of adhered particles. A bed of separate unadhered particles such as a gravel bed is not included. See subclass 278 for a process of making an unadhered bed of particles.

SEE OR SEARCH THIS CLASS, SUBCLASS:

278, for a process of graveling or filter forming.

280, for a specific propping feature for a fracture.

285+, and the subclasses there noted for a process of cementing, plugging or consolidating which may include establishing a porous mass of adhered particles in the formation, especially subclass 295 for a process in which the cementing or consolidating material is or has an ingredient which is a resin.

277 Repairing object in well:
This subclass is indented under subclass 244.1. A process comprising repairing an object in the well (e.g., connecting broken ends, stopping leaks through the casting wall, replacing a casing section, etc.).

SEE OR SEARCH THIS CLASS, SUBCLASS:
207, for an expansible casing section.
311+, for processes for cleaning, which may cause an ineffective object to become operative.
315, for a process of placing, shifting, constructing or assembling well parts including expanding a casing section against a bore hole wall.

SEE OR SEARCH CLASS:
137, Fluid Handling, subclasses 15.01 through 15.26 for a process of cleaning, repairing, or assembling.

278 Graveling or filter forming:
This subclass is indented under subclass 244.1. A process comprising making a bed of gravel or other filter material in situ in the well for straining fluids flowing into the well.

(1) Note. This definition does not include a process involving merely forming a bed of filter material outside of the well and lowering it into the well. See subclass 315 for a process of making a well.

(2) Note. This definition includes washing away earth around a well conduit to form a bed of gravel or the like. Processes involving merely cleaning a well, however, would be classified in subclasses 311+ and processes involving attacking a formation would be classified in subclass 307 or the subclasses there noted.

(3) Note. Making a bed of gravel or filter material in the formation is not included. Note subclass 280 for propping material in a fracture and subclasses 285+ and the subclasses there noted for permeable material deposited in the formation.

SEE OR SEARCH THIS CLASS, SUBCLASS:
51, for apparatus for forming a filter bed.
276, for a process involving providing a porous mass of adhered gravel or filter material in the well.
280, for a process involving a specific propping feature for a fracture.
285+, and subclasses there noted for a process of cementing, plugging or consolidating which may involve establishing a filter effect in the formation.

279 Material placed in pores of formation to treat resident fluid flowing into well:
This subclass is indented under subclass 244.1. A process comprising placing material into the pores of the earth so that fluid which was in the pores of the earth before the start of the process will be treated to acquire some beneficial property (e.g., corrosion inhibiting, etc.) as it flows past the material to enter the well.

(1) Note. Merely flushing out a material (e.g., an acid, etc.) which has been placed in the pores of a formation by flow of fluid from the pores of the earth without any desired beneficial property being given to the earth fluid does not come within this definition. Such processes are classified in subclass 305 and the subclasses there noted.

280.1 Specific propping feature (EPO):
This subclass is indented under subclass 305.1. A process comprising some claimed specific feature relating to placing discrete particles in a fracture in a formation to maintain the walls of the fracture spaced apart by resisting forces tending to close the fracture.

(1) Note. For classification as an original under this definition the specific feature must be more than merely identifying the propping material as sand, or the equivalent, or merely the use of a specific fluid containing the propping material or merely the introduction of the propping material in one of a series of fracturing fluids.

(2) Note. Placing in a fracture a slurry of cement which sets and remains in place as an adhered mass and which cement may contain hard particles dispersed therein is not considered to come within this definition. For a process involving cementing see subclasses 281, 283 and 285. This definition does include, however, a process in which discrete propping particles are adhered together after being placed and a process in which propping particles are incorporated in a carrier fluid, which may be cement (such as a gel), and the carrier fluid is changed in nature, or removed, or is of such a nature that the discrete particles themselves resist closing of the fracture rather than a mass of cement in which the particles are embedded resisting closing of the fracture.

(3) Note. A process in which discrete particles are placed in a fracture so that the particles are crowded together or compacted to plug the fracture to impede the flow of fluid is not considered to come within this definition. See the subclasses relating to cementing or plugging, especially subclass 292 for such a process.

(4) Note. Discrete particles in a fracture which are described merely as forming a filter will be assured also to act as props and be classifiable under this definition.

(5) Note. Included in this subclass are the foreign patent documents from ECLA (E21B 43/267).

SEE OR SEARCH THIS CLASS, SUBCLASS:

205, for a process of cementing, plugging or consolidating in which the cement or plug is located in a fracture and resists forces tending to close the fracture.

281, 283, and 308, for a process involving fracturing a formation, which may include propping the formation by steps not specific enough to come within this definition.

280.2 Composition of proppant (EPO):

This subclass is indented under subclass 305.1. Process wherein the composition of a constituent is defined.

(1) Note. Included in this subclass are the foreign patent documents from ECLA (E21B 43/267B).

281 Separate steps of (1) cementing, plugging or consolidating and (2) fracturing or attacking formation:

This subclass is indented under subclass 244.1. A process in which a part of the process relates to (1) cementing, plugging or consolidating and a separate part of the process relates to (2) fracturing or attacking the formation.

(1) Note. See the definition of subclasses 307 and 308 for the meaning of attacking the formation and fracturing the formation, respectively.

(2) Note. It is not considered two separate parts of a process if a single stream or volume of one fluid composition performs both functions (1) and (2). See subclasses 282 and 283 for such processes.

(3) Note. It is not considered two separate parts of a process performing functions (1) and (2) if the process is for forming a fracture by cementing, plugging or consolidating material and as a separate step forming another fracture by such material. Such process would be classifiable in subclass 283.

282 Specific low fluid loss feature for fluid attacking formation:

This subclass is indented under subclass 244.1. A process in which a fluid is introduced into the pores of the earth to chemically react with the earth or deposits in the earth to enlarge the pores of the earth and there is a specifically claimed feature of the process for limiting travel of the fluid in the pores of the formation.

(1) Note. See (1) Note of subclass 307 for the meaning of “deposits in the earth”.

(2) Note. The feature to limit travel of the fluid may relate to an addition in the fluid or to another material placed in the pores of the formation or in the well in contact with the formation acting to limit or block flow of the attacking fluid in all directions or to deflect the flow to a desired direction. A mechanical means for directing flow such as a packer in the well bore is not included. The blocking or flow directing material is sometimes called a blanketing material.

SEE OR SEARCH THIS CLASS, SUBCLASS:

281, for processes relating to separate steps for (1) cementing, plugging or consolidating and (2) attacking the formation in which the cementing, plugging or consolidating material may limit loss of the attacking fluid.

283 Specific low fluid loss feature for fracturing fluid or cement causes fracture:

This subclass is indented under subclass 244.1. A process in which the earth is cracked by a fluid in order to create a fissure or fissures therein and in which (1) there is a specifically claimed feature for limiting travel of the fluid in the pores of the formation or (2) the fluid is a cementing, plugging or consolidating material.

(1) Note. See (2) Note of subclass 282 for the meaning of the feature to limit travel of the fluid.

SEE OR SEARCH THIS CLASS, SUBCLASS:

281, for processes relating to separate steps of (1) cementing, plugging or consolidating and (2) fracturing, in which the cementing, plugging or consolidating material may limit fluid loss of the fracturing fluid.

284 Fluid flow causes pellet to block opening in wall of conduit:

This subclass is indented under subclass 244.1. A process in which there is an opening in the side wall of a pipe or well conduit and a pellet entrained in a fluid is caused to be moved by said fluid to impede flow of said fluid through the opening, a single pellet being used to impede flow through an opening.

(1) Note. Plural pellets may be used to block plural openings but only one pellet is used for each of the openings blocked by the pellets. If a plurality of pellets or particles are used to block an opening the operation is considered to be a cementing or plugging process for subclasses 285+.

(2) Note. The pellet must be free to travel a substantial distance due to fluid flow. A pellet confined in a cage adjacent an opening which pellet is moved by fluid flow to block the opening is considered a check valve. A process using such a pellet would be classified on other features.

285 Cementing, plugging or consolidating:

This subclass is indented under subclass 244.1. A process comprising (1) causing fluent material to flow into position in prepositioned well conduit substantially to stop flow of a fluid by forming a blocking means in situ, said material being plastic or hardenable after being so placed, (2) placing small particles in a prepositioned well conduit to cause them to form a mass of particles in situ substantially to stop flow of a fluid, (3) placing or forming solid or plastic material in the pores of or spaces in a formation to block them and thereby impede flow of an earth fluid, (4) treating a formation with an introduced material so as to prevent it from shifting or breaking down, i.e., consolidating the formation, or (5) treating a formation (e.g., by heating, etc.) to cause the formation to coalesce into an impermeable or consolidated mass.

(1) Note. Patents with claims in which there is only a broad mention by name only of a cementing, plugging or consolidating process with no detail of the steps of the process or the material used, are classified on the basis of the other steps recited. In the case, however, of a drilling process in which drilling is interrupted for cementing, classification may be in subclasses 285+ even if the cementing step is only nominally or inferentially claimed. See section III of the class definition. However, if any

other steps are set forth in a claim affording a basis for classification in a subclass below subclasses 285+ then the patent is classified in the appropriate subclass, the nominal cementing step being disregarded.

(2) Note. Processes which include forming a coating or lining on the bore hole wall or plugging the pores of the formation by drilling fluid while the earth in being cut or disintegrated to form the bore, are not classified as cementing, plugging or consolidating processes for this class. See section III of the class definition of Class 166 for the line with Class 175, Boring or Penetrating the Earth, and the search notes below.

(3) Note. Merely forming a plug or the like by lowering a quantity of plastic material in a container and permitting it to harden in the container is not included. See subclass 315 for such processes.

(4) Note. Under this definition material deposited in the openings of a formation may block one fluid and not another, or may form a permeable mass.

(5) Note. Material deposited in the formation to form a film or thin coating on the formation material, or to form a foam, is not considered to come within this definition. See subclasses 305+ and the subclasses there noted for processes for so treating the formation.

(6) Note. Material deposited in a fracture to form discrete props for the fracture is not considered to come within this definition. See subclass 280 for processes involving a specific propping feature and see (3) Note in said subclass for the distinction between propping and cementing or plugging.

SEE OR SEARCH THIS CLASS, SUBCLASS:

244.1, for a miscellaneous process involving forming a film or coating on a member.

276, for a process for providing a porous cementitious filter in a bore hole.

279, for a process for placing material in the pores of a formation to treat resident fluid flowing into the well.

280, for a process including a specific feature relating to propping a fracture.

281, for a process involving separate steps of (1) cementing, plugging or consolidating and (2) fracturing or attacking the formation.

283, for a process for fracturing a formation by forcing cement or plugging material into the formation.

284, for a process for causing a pellet to block an opening in the wall of a well conduit by flowing a fluid carrying said pellet, a single pellet being large enough to block an opening.

305+, and subclasses there noted for a process for placing material other than cementing, plugging or consolidating material in the openings of a formation.

SEE OR SEARCH CLASS:

52, Static Structures (e.g., Buildings), subclasses 741.11+ for a process of construction or assembling of a building, e.g., cistern or well, made by workmen operating on an exposed face of such a structure.

106, Compositions: Coating or Plastic, appropriate subclasses for plastic compositions which may be used in well cementing, plugging or consolidating processes.

118, Coating Apparatus, subclasses 25+ and the subclasses there noted for apparatus of general utility for applying a coating.

156, Adhesive Bonding and Miscellaneous Chemical Manufacture, appropriate subclasses for processes and apparatus for laminating in general and see especially subclasses 293+ and 423+ for inserting a core within a tube.

175, Boring or Penetrating the Earth, subclasses 65+ for processes of boring with a fluid and especially subclass 72 for such processes which include prevention of lost circulation or caving while drilling. See section III of the class definition of Class 166 for the line between Class 166 and Class 175.

260, Chemistry of Carbon Compounds, appropriate subclasses for compounds which may be used in cementing, plugging or consolidating processes.

264, Plastic and Nonmetallic Article Shaping or Treating: Processes, appropriate subclasses, for processes of working, shaping or molding plastic materials, within the class definition.

405, Hydraulic and Earth Engineering, subclass 57 for processes of cementing fluid reservoirs in the earth by means operated from the earth surface; subclasses 130+ for processes of applying heat to or removing heat from an earth formation; subclasses 233+ for casting a pile in situ from hardenable fluent material; and subclasses 263+ for applying a chemical substance to an earth formation to condition the same, especially subclasses 266+ for cementitious substances, except that patents disclosing or claiming treatment of a well or treatment of the earth around a well are classified in Class 166.

507, Earth Boring, Well Treating, and Oil Field Chemistry, subclasses 100+ for the composition of well drilling mud and processes which involve no more than the mere use of such compositions or a compound.

520, Synthetic Resins or Natural Rubbers, appropriate subclasses, particularly Class 523, subclasses 130+ for a composition having utility in consolidating a formation in a well or in cementing a well or to processes of preparing said composition.

286 Tamping, vibrating, exploding or using receptacle:

This subclass is indented under subclass 285. A process comprising placing cement by (1) using a container of the cement in a well, (2) exploding the cement against the bore hole wall, (3) vibrating the cement while in the bore hole, or (4) striking the cement in the bore hole a blow or series of blows.

SEE OR SEARCH THIS CLASS, SUBCLASS:

117, for a receptacle, all or a part of which is separated from a lowering means and left in the well in order to plug the well with cement.

162+, for a container for transporting material into a well.

249, for a process involving vibrating the earth or material in or being placed in the pores of the earth.

315, for a process for forming a plug or the like by merely lowering a quantity of plastic material in a container and letting it harden.

SEE OR SEARCH CLASS:

405, Hydraulic and Earth Engineering, subclass 234 for a process or apparatus for casting a pile in situ of hardenable fluent material utilizing an explosion.

287 Removable molding or forming means:

This subclass is indented under subclass 285. A process in which a mold or forming means is used to hold the cement, the mold or forming means being removed from the well bore after the cement has set and been shaped by the mold or form.

SEE OR SEARCH CLASS:

405, Hydraulic and Earth Engineering, subclass 243 for a corresponding process employed to cast a pile in situ.

288 Including heating:

This subclass is indented under subclass 285. A process involving the use of a significant or substantial amount of heat.

(1) Note. The use of heat in preparing a cementing, plugging or consolidating material above ground is not included. See subclasses 292+ for such a process.

(2) Note. The presence of heat must be positively stated in a claim for classification of a patent in this subclass. An inference that heat is present, as because of a chemical reaction, is not sufficient for classification in this subclass.

(3) Note. Merely permitting the natural heat present in the well to act on cementing, plugging, or consolidating material is not included. See subclass 295 for methods

involving the use of resins set by the natural heat of the well.

SEE OR SEARCH CLASS:
405, Hydraulic and Earth Engineering, subclass 234 for processes or apparatus for casting a piling in situ of hardenable fluent material including heating or cooling.

289 Discharging cement from casing at different levels:
This subclass is indented under subclass 285. A process in which cementing, plugging or consolidating material is caused to issue from a single string of well casing at a plurality of levels.

(1) Note. A group of substantially evenly spaced perforations in a casing out of which cementing, plugging or consolidating material may issue is considered a single level rather than a plurality of levels.

SEE OR SEARCH THIS CLASS, SUBCLASS:
269, for a process involving input and output walls and fluid injected into the earth from different levels in an injection well.

290 By tubing which is subsequently lifted:
This subclass is indented under subclass 285. A process comprising placing the cementing, plugging or consolidating composition by means of a well tubing, the lower end of which is lifted from the level at which the composition is placed, after placement.

291 With piston separator:
This subclass is indented under subclass 285. A process comprising forcing the cement down a tubing or casing in the well and separating the traveling body of cement from an adjacent fluid by a piston means at an end of the cement body.

(1) Note. The piston means may itself comprise a fluid of limited longitudinal extent which functions like a solid piston.

SEE OR SEARCH THIS CLASS, SUBCLASS:
153+, for well devices comprising pistons fluid driven into the well.

292 Using specific materials:
This subclass is indented under subclass 285. A process using a specifically claimed material in at least one of the steps of the process.

(1) Note. The mere naming in a claim of Portland cement, hydraulic cement or water is not sufficient to cause classification of a patent in this subclass.

SEE OR SEARCH CLASS:
106, Compositions: Coating or Plastic, appropriate subclasses for compositions useful in well cementing, plugging or consolidating.
175, Boring or Penetrating the Earth, subclasses 64 and 65+, especially subclass 72, for drilling while circulating fluid which may form a mud sheath or plug the formation. See Lines With Other Classes and Within This Class in the class definition of Class 166 for the line between Class 166 and Class 175.
405, Hydraulic and Earth Engineering, subclasses 263+ for processes of applying a chemical substance to an earth formation not involving wells.
507, Earth Boring, Well Treating, and Oil Field Chemistry, subclasses 100+ for compositions to carry off cutting during drilling and broadly claimed processes of using said compositions or compounds.

293 Cement or consolidating material contains inorganic water settable and organic ingredients:
This subclass is indented under subclass 292. A process in which the material which causes cementing, plugging or consolidating comprises a mixture of an organic material and an inorganic material which hydrates to become hard or plastic.

(1) Note. Clays, for the purpose of this definition, are not considered to be materials which hydrate to become hard or plastic.

(2) Note. The material of the definition must be a slurry which is considered to form an intermingled mixture of organic and inorganic cementing, plugging or consolidating materials when in final position in the well or formation. If the organic and inorganic materials were considered to be separate or separate in the formation or well so that only one of them performs the cementing, plugging or consolidating function, then classification would be on some other basis, probably in subclasses 292 or 294+.

294 Cement or consolidating material is organic or has organic ingredient:

This subclass is indented under subclass 292. A process in which the material performing the cementing, plugging or consolidating function is organic or comprises an organic ingredient.

295 Organic material is resin or resinous:

This subclass is indented under subclass 294. A process in which the organic material is a resin or is resinous.

(1) Note. The resin or resinous material may be the end result of a reaction between other materials in the well or formation.

296 Preventing flow into strainer while lowering by blocking openings:

This subclass is indented under subclass 244.1. A process comprising the steps of preventing the flow of earth fluid into a well conduit through the openings of a preformed strainer or preformed filter while it is being lowered through a producing formation and then permitting flow of earth fluid through said openings to produce the well.

SEE OR SEARCH THIS CLASS, SUBCLASS:

205, for screens with valves, closures or removable portions.

SEE OR SEARCH CLASS:

175, Boring or Penetrating the Earth, subclass 314 for drive points with screens which may have means for preventing entrance of fluid while driving the point into the ground.

297 Perforating, weakening, bending or separating pipe at an unprepared point:

This subclass is indented under subclass 244.1. A process comprising forming a hold, weakening a localized portion, bending or separating portions of a pipe at any suitable location which has not previously been prepared to make it easier to operate on.

(1) Note. The earth wall of the well or a cake left on the formation by circulating fluid while drilling a bore is not considered a pipe wall, but a cementitious wall of a well conduit made by the process defined in subclass 285 or made above ground is considered a pipe wall.

(2) Note. In processes relating to an above ground location some significant well feature should be present for classification in this subclass, but for processes taking place below ground a disclosure line is followed except for those processes provided for in other classes.

(3) Note. The term “bending” in this definition is limited to bending which causes a change in the direction of the longitudinal axis of the pipe. Processes involving expanding a pipe wall may be found in subclasses 277 and 315.

SEE OR SEARCH THIS CLASS, SUBCLASS:

55+, for devices for perforating, weakening, bending or separating a well pipe at an unprepared location.

SEE OR SEARCH CLASS:

72, Metal Deforming, subclasses 367.1+ for processes of tube making and/or reshaping which may be disclosed as for use in a well.

83, Cutting, subclasses 13+ for cutting methods in general, and particularly subclass 54, indented thereunder, for a method of cutting the wall of a hollow workpiece.

175, Boring or Penetrating the Earth, subclasses 2+ for processes of firing a bullet or exploding a shaped charge from an inaccessible bore for perforating a wall member in the bore if the

process inherently result in penetration of the formation.

298 Perforating, weakening or separating by mechanical means or abrasive fluid:
This subclass is indented under subclass 297. A process in which the wall portion of the pipe is perforated, weakened or separated by (1) a mechanical cutting, punching or abrading means or (2) a jet of fluid containing an abrasive.

(1) Note. A projectile propelled by an explosive jet of fluid such as that produced by a shaped charge is not included. Processes using such projectiles or jets are classifiable in subclass 297 or Class 175, Boring or Penetrating the Earth, subclasses 2+.

SEE OR SEARCH THIS CLASS, SUBCLASS:
55+, for apparatus for perforating, weakening or separating a pipe wall.

SEE OR SEARCH CLASS:
83, Cutting, subclasses 13+ for cutting methods in general, especially subclass 54 for a method of cutting the wall of a hollow workpiece, and subclass 177 for apparatus for cutting by fluid blast and/or suction.
175, Boring or Penetrating the Earth, subclass 67 for boring by fluid erosion and subclass 422 for an earth boring nozzle.

299 With explosion or breaking container to implode:
This subclass is indented under subclass 244.1. A process in which an explosion is caused to occur or a container is broken to cause an implosion.

(1) Note. An explosion in an internal combustion engine for driving the engine is not considered an "explosion" for this subclass. Such disclosures are classified on other features.

(2) Note. The container usually contains relatively low pressure fluid such as air at atmospheric pressure so that when it is broken in a high pressure environment, such as a well, an implosion occurs.

(3) Note. A "container" under this definition is a completely enclosed space and not a tubing of indefinite length.

(4) Note. Breaking a closure portion only of a container is not included.

SEE OR SEARCH THIS CLASS, SUBCLASS:
63, for apparatus for causing an explosion in a well.
162+, for a receptacle bodily movable in a well to carry material which may be used to cause an implosion.
247, for a process involving an explosion caused by nuclear energy.
297, for a process including perforating, weakening or separating a pipe wall in a well.
311, for a cleaning process using an implosion caused by creating access to a low pressure area in a container or tubing.

SEE OR SEARCH CLASS:
175, Boring or Penetrating the Earth, subclasses 2+ for processes or apparatus for forming a bore hole by below ground explosion, or perforating or cutting a casing or other bore lining by firing a bullet or exploding a shaped charge in an inaccessible bore.
417, Pumps, subclasses 73+, for combustion type pumping methods for wells.

300 Chemical inter-reaction of two or more introduced materials (e.g., selective plugging or surfactant):
This subclass is indented under subclass 244.1. A process comprising placing from above ground level, two or more materials into the well which chemically react with each other in the well or earth.

(1) Note. The reaction may be between one introduced material and a product produced by the reaction of another introduced material with a material found in the well.

(2) Note. The word “material” in the definition is intended to mean an unformed or particulate material or a material which has a form for purposes of the process but is not a device such as a tool, pipe, closure disk, or the like, which has an independent function in the well.

SEE OR SEARCH THIS CLASS, SUBCLASS:

59, for apparatus comprising a burner in the well.

260, for an in situ combustion process comprising introducing fuel or a catalyst into the pores of the formation.

262, for an in situ combustion process in which there is a solid fuel in the well.

270, for a process involving input and output wells and in which there is a chemical interreaction in the pores of the formation of material introduced into the input well.

276, for a process of forming a porous, cementitious material to form a filter.

283, for a process for fracturing a formation, said process having a specific low fluid loss feature and including braking a low fluid loss compound or composition.

292+, for a cementing, plugging or consolidating process involving chemical reaction of introduced materials.

299, for a process involving a chemical reaction which produces an explosion.

309, for a process for producing foam or gas in a well by reaction of a foam or gas producing material with material already in the well.

311+, for a cleaning process in which the material being removed has been introduced before the cleaning process starts.

SEE OR SEARCH CLASS:

175, Boring or Penetrating the Earth, subclass 64 for processes of boring including a chemical reaction with the earth formation or a drilling fluid constituent.

301 Freeing stuck object, grappling or fishing in well:

This subclass is indented under subclass 244.1. A process for (1) releasing an object in the well from a condition which prevents it from being moved, (2) grappling for an object in the well or (3) retrieving a small, loose object from inside the well.

(1) Note. A process under part (1) of this definition must involve more than merely disconnecting two parts, severing a part so as to leave a stuck portion in the well and free the severed portion or unsetting a device like a packer; a special procedure must be used to free a member held fast in the well by a condition such as corrosion or cave-in of the formation. A process under part (2) of this definition relates to a process for using the grapple apparatus found in Class 294, Handling: Hand and Hoist-Line Implements, especially subclasses 86.1+; a process for merely affecting a pipe joint or coupling is not included, such process when used in a well being classifiable in subclass 315. A process under part (3) of the definition relates to a process for using the fishing means found in Class 294, especially subclasses 86.1+, or in Class 166, subclass 99.

SEE OR SEARCH THIS CLASS, SUBCLASS:

55+, for apparatus for separating a pipe section from an adjacent section at an unprepared point.

98, for apparatus comprising a grapple and a well anchored lifting means.

99, for apparatus with junk retrieving means.

178, for apparatus with jar means for releasing a stuck part.

297+, for a process of freeing a pipe section by separating it from an adjacent section at an unprepared point.

311+, for a process of cleaning which may be similar to a process in subclass 301 but not for freeing a stuck object, grappling or fishing in the well. For example, a process for bailing sand from a well would be classifiable in subclasses 311+ whereas a process for

fishing, e.g., recovering a small discrete object from the well rather than a particulate mass of material, would be classifiable in subclass 301.

315, for a process of disconnecting parts, removing parts from a well or unsetting devices such as packers, no special releasing procedure being used because of caving, corrosion or the like.

SEE OR SEARCH CLASS:

175, Boring or Penetrating the Earth, subclasses 293+ for apparatus comprising below ground hammer or impact means, including such means used to free a stuck object in a well.

294, Handling: Hand and Hoist-Line Implements, subclass 66.5 for a grapple comprising a magnet and subclasses 86.1+ for a well type grapple apparatus.

302 Heating, cooling or insulating:

This subclass is indented under subclass 244.1. A process in which there is a heating, cooling, or insulating step or a heated or cooled material is used.

(1) Note. A mere welding step is not included. See the search notes below.

(2) Note. The cooling effect of gas flowing through a choke is not subject matter for this subclass unless said effect forms a part of the method being claimed. Processes involving wells flowing through chokes may be classified in subclass 314.

(3) Note. In processes for attacking a formation heat may be generated by chemical reaction with the formation. Such a process is not classified as an original under this definition, however, unless the heat effect is specifically recited in a claim. Processes for attacking the formation are classified in subclass 307 and the subclasses there mentioned.

(4) Note. The heating due to the natural heat of a formation is not included.

SEE OR SEARCH THIS CLASS, SUBCLASS:

55, for apparatus for perforating, bending or separating a tubing or casing by an explosively propelled projectile.

57+, for well apparatus with heating or cooling means.

63, for apparatus involving means for causing an explosion or gas generation in a well.

247, for a process involving nuclear energy or radioactivity for heating.

248, for a process in which an electric current is passed through the earth for heating the earth.

256+, for a process involving in situ combustion.

265+, for a process in which the heating or cooling is used to effect separation of fluids from the well.

270, for a process involving input and output wells and chemical reaction of introduced materials in the pores of the earth or a surfactant produced in situ in the pores of the earth.

272.1, for a process involving input and output wells, and a heating step.

286, for a cementing, plugging or consolidating process including an explosion.

288, for a cementing, plugging or consolidating process including heating.

297, for a process for perforating, weakening, bending, or separating tubing or casing involving an explosion or heating means.

299, for a process including an explosion.

300, for a process including an exothermic interreaction of chemicals introduced into the well.

315, for a process of joining well parts by welding or soldering.

SEE OR SEARCH CLASS:

175, Boring or Penetrating the Earth, subclasses 11+ for processes or apparatus for boring by directly applying heat to fluidize or comminute the formation and subclass 17 for processes or apparatus for heating or cooling within the bore hole or heating or cooling the drilling fluid.

405, Hydraulic and Earth Engineering, subclasses 56 and 130+ for the application or removal of heat from an earth formation not involving a well.

303 Placing preheated fluid into formation:
This subclass is indented under subclass 302. A process in which a heated fluid is introduced into the pores of the earth, said fluid being heated before it enters the pores of the earth.

SEE OR SEARCH THIS CLASS, SUBCLASS:
247, for a process for using nuclear energy to heat a fluid to be injected into the formation.
272.1, for a process involving input and output wells and including placing preheated fluid into the formation.
288, for a process involving placing a heated cementing, plugging or consolidating material in the pores of the earth.

SEE OR SEARCH CLASS:
299, Mining or In Situ Disintegration of Hard Material, subclasses 3+ for mining by introducing a heated fluid into the formation. See the reference to Class 299 in section V of the class definition of Class 166 for the line between Class 166 and Class 299.

304 Dissolving or preventing formation of solid oil deposit:
This subclass is indented under subclass 244.1. A process in which paraffin or other similar solid petroleum deposits are dissolved by a solvent therefor or paraffin or other solid petroleum deposits are prevented from forming.

SEE OR SEARCH THIS CLASS, SUBCLASS:
112, for eduction pumps with means for throwing a jet oil on the sides of the well during pumping in order to dissolve or prevent formation of paraffin.
279, for a process for placing material (including paraffin solvents) in the pores of a formation to treat resident fluid flowing into the well.
300, for a process of removing paraffin comprising the interreaction of introduced chemicals.
302+, for a process of preventing formation of or dissolving paraffin comprising a heating or cooling step.
311+, for a process of cleaning in which paraffin may incidentally be dissolved or removed.
314, for a process of flowing a well in which paraffin may incidentally be dissolved or prevented from forming.

SEE OR SEARCH CLASS:
507, Earth Boring, Well Treating, and Oil Field Chemistry, subclass 90 for compositions for preventing contaminant deposits in petroleum oil conduits.

305.1 Placing fluid into or fracturing the formation:
This subclass is indented under subclass 244.1. A process in which a fluid is caused to enter the pores of the earth.

(1) Note. Mere incidental entry into the formation of a fluid used for cleaning the well is not enough for classification under this definition. Such processes may be found in subclasses 311+. If, however, in a cleaning process a fluid is positively claimed as entering the pores of a formation the process is considered to come within this definition.

(2) Note. The fluid used to enter the pores of the earth may come from the well itself or may have entered the well from another earth zone and may be separated from other fluids while remaining in the well.

(3) Note. Class 405 takes subject matter relating to merely storing or disposing of fluid in an earthen cavity or the soil. However, subject matter relating to recovering both a fluid from its original location in the earth and a fluid previously caused to enter the earth is classified in Class 166.

SEE OR SEARCH THIS CLASS, SUBCLASS:
256+, for a process in which fluid enters the earth and in situ combustion in the pores of the earth occurs.

263, for cyclic operation of plural wells in which a well is used as an input well.

266, for a process involving input and output wells and separating material leaving the well.

268+, for a process involving input and output wells. Patents are classified in subclasses 268+ even if the output well is not claimed if the sole disclosure is for a process involving input and output wells and a fluid claimed as inserted into the formation is disclosed as a drive fluid. A "drive fluid" is one which is continued to be inserted into the formation until breakthrough or near breakthrough at an output well (e.g., the "water" in a waterflood process). A patent to a waterflood or secondary recovery process which is not specifically disclosed as applicable to a single combined input and output well is considered a sole disclosure of input and output wells even if the output well is not mentioned.

279, for a process involving placing material in the pores of a formation to treat resident fluid flowing into the well.

285+, for a process involving causing cementing, plugging or consolidating material to enter the pores of a formation.

300, for a process involving chemical reaction of material introduced into the well, which material may enter the pores of a formation.

302+, for a process involving heating or cooling, especially subclass 303, for a process involving placing a preheated fluid into the pores of a formation.

304, for a process involving dissolving or preventing the formation of a solid oil deposit which process may include placing a fluid into the pores of a formation.

SEE OR SEARCH CLASS:

175, Boring or Penetrating the Earth, subclasses 65+ for earth boring with fluid, especially subclass 67 for boring by fluid erosion.

299, Mining or In Situ Disintegration of Hard Material, subclasses 16+ for a process of breaking down valuable or hard material by direct contact with fluid.

405, Hydraulic and Earth Engineering, subclasses 53+ for fluid storage in an earthen cavity; and subclass 129.1 for subterranean waste disposal, containment, or treatment.

507, Earth Boring, Well Treating, and Oil Field Chemistry, subclasses 200+ for well treating compositions and mere methods of using them.

306 Fluid enters and leaves well at spaced zones: This subclass is indented under subclass 305.1. A process in which fluid leaves the well to enter pores in the earth and fluid also enters the well from pores in the earth, the zones of departure from and entry into the well being spaced from each other.

(1) Note. The spacing of zones is often effected by a packer. A single group of holes in a well conduit is considered a single zone.

SEE OR SEARCH THIS CLASS, SUBCLASS:

257, for a process involving injecting fluid into the earth while producing fluid from the earth by in situ combustion from the same well.

307 Attacking formation: A process under subclasses 305.1+ in which fluid introduced into the pores of the earth chemically reacts with the earth or deposits in the earth to enlarge the pores.

(1) Note. The phrase "deposits in the earth" does not include material purposely placed in the earth such as cement or fracture props. It is intended to include material precipitated from the flowing earth fluid. Processes for attacking material purposely placed in the earth are classified on other bases and may comprise a part of a process involving cementing in subclasses 285+ or propping in subclass 280.

SEE OR SEARCH THIS CLASS, SUBCLASS:

259, for a process involving in situ combustion and also fracturing or attacking the formation.

271, for a process involving input and output wells and also fracturing or attacking the formation.

281, for a process involving separate steps of (1) cementing, plugging or consolidating and (2) fracturing or attacking the formation.

282, for a process involving a specific low fluid loss feature for a fluid attacking the formation.

304, for a process for dissolving solid oil deposits in the formation.

SEE OR SEARCH CLASS:

175, Boring or Penetrating the Earth, subclass 64 for earth boring processes involving a chemical reaction with the earth formation.

216, Etching a Substrate: Processes, appropriate subclasses for etching of various materials.

507, Earth Boring, Well Treating, and Oil Field Chemistry, subclasses 200+ for well treating compositions and mere methods of using them. See SEARCH CLASS note in Class 166, subclass 244.1, for a further discussion.

308.1 Fracturing (EPO):

This subclass is indented under subclass 305.1. Process wherein the earth is cracked to create a fissure therein.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (E21B 43/26).

SEE OR SEARCH THIS CLASS, SUBCLASS:

177.1, for apparatus for fracturing a formation.

281, for a process involving separate steps of (1) cementing, plugging or consolidating and (2) fracturing the formation.

283, for a process involving a specific low fluid loss feature for a fracturing fluid or a process in which a cementing, plugging or consolidating material causes a fracture.

299, for a process of fracturing involving use of an explosive.

259, for a process involving in situ combustion and also fracturing a formation.

271, for apparatus for fracturing a formation.

SEE OR SEARCH CLASS:

102, Ammunition and Explosives, subclass 301 for apparatus and methods for fracturing a formation by the use of an explosive.

175, Boring or Penetrating the Earth, subclass 2, and appropriate subclasses, especially for initially forming or radially enlarging an elongated hole having a desired geometrical configuration, rather than forming an irregular fissure, in the earth.

299, Mining or in Situ Disntegration of Hard Material, subclass 13 for a process of breaking down hard material by an explosive, subclass 16 for a process of breaking down material by direct contact with fluid, and subclass 20 for expansible breaking down devices. The line between Classes 299 and 166 as to this subject matter is based on the disclosed purpose for performing the fracturing process. If the purpose is ultimately to recover fluid from the earth by a Class 166 process classification is in Class 166; if the purpose is ultimately to perform a Class 299 mining operation or to perform a mere disintegration operation (of the type classifiable in Class 299) then classification is in Class 299. See the reference to Class 299 in References to Other Classes in the class definition of Class 166 for the distinction between Class 166 and Class 299 relative to recovering fluid from the earth and mining.

308.2 Using a chemical (EPO):

This subclass is indented under subclass 308.1. Process wherein the substance used to create the fissure has a specified molecular composition.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (E21B 43/26B).

308.3 Water based composition with inorganic material (EPO):

This subclass is indented under subclass 308.2. Process wherein the substance is aqueous and does not a contain a hydrocarbon radical.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (E21B 43/26B2).

308.4 Oil based composition (EPO):

This subclass is indented under subclass 308.2. Process wherein the substance substantially comprises a derivative of petroleum.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (E21B 43/26B4).

308.5 Including cross-linking agent (EPO):

This subclass is indented under subclass 308.1. Process wherein the substance includes plural polymeric molecules covalently attached together by means of abinding molecule.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (E21B 43/26B6).

308.6 Foam (EPO):

This subclass is indented under subclass 308.2. Process wherein the substance is in the form of a froth.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (E21B 43/26B8).

309 Producing foam or gas in well by foaming or gas producing material:

This subclass is indented under subclass 244.1. A process comprising introducing a material into the well which by interreaction with fluid already in the well acts as a foaming agent in the well or by its own change of state causes production of gas bubbles or foam.

SEE OR SEARCH THIS CLASS, SUBCLASS:

300, for a process involving a chemical interreaction of a plurality of introduced materials which may produce gas or foam.

311, for a process of unloading a well by introduction of gas into the well, which gas may cause generation of a foam or entrained gas bubbles without use of a foaming agent.

SEE OR SEARCH CLASS:

516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 10+ for foam colloid systems or agents for such systems or making or stabilizing such systems or agents, when generically claimed or when there is no hierarchically superior provision in the USPC for the specifically claimed art.

310 Entraining or incorporating treating material in flowing earth fluid:

This subclass is indented under subclass 244.1. A process comprising placing material in a well so that fluid flowing into and out of the well from the earth entrains, dissolves or reacts with the material thereby to impart some beneficial property to the resulting mixture, solution or composition.

(1) Note. An example of a “beneficial property” is corrosion inhibiting.

SEE OR SEARCH THIS CLASS, SUBCLASS:

279, for a process involving material placed in the pores of a formation to treat resident fluid flowing into the well.

309, for a process involving material placed in a well to produce a foam or gas in the well as the earth fluid flows into and out of the well.

311, for a process for cleaning or unloading a well comprising entraining gas in material in a well to lift it out of the well.

SEE OR SEARCH CLASS:

507, Earth Boring, Well Treating, and Oil Field Chemistry, subclasses 100+ for earth boring or well treating compositions and their mere methods of use.

311 Cleaning or unloading well:

This subclass is indented under subclass 244.1. A process comprising (1) removing undesired deposited material from well apparatus, (2) removing undesired deposited material from an existing bore hole or cavity or surrounding formation or (3) removing undesired liquid standing in the well and impeding the production of the desired fluid from the earth.

SEE OR SEARCH THIS CLASS, SUBCLASS:

301, for a process for removing a stuck object, grappling or fishing in the well.

305+, for a process of placing a fluid into the formation, and see (1) Note in subclass 305 for the distinction between subclasses 305+ and 311+.

309, for a process of unloading a well by producing foam or gas in the well by a foaming or gas producing material.

314, for a process of producing the well which may include moving liquid in the well out of the well.

SEE OR SEARCH CLASS:

15, Brushing, Scrubbing, and General Cleaning, subclass 1.7 for submerged cleaners with ambient flow guides, and subclass 246.5 for tank cleaners, and see the search notes thereunder.

102, Ammunition and Explosives, subclasses 301+ for apparatus and methods for cleaning a bore by exploding a torpedo.

134, Cleaning and Liquid Contact With Solids, subclasses 22.1+ for process of cleaning hollow articles other than wells.

137, Fluid Handling, subclasses 15.01 through 15.26 for a process of cleaning, repairing, or assembling.

312 Liquid introduced from well top:

This subclass is indented under subclass 311. A process in which a liquid is introduced into the well from the top of the well.

(1) Note. The liquid may have come originally from the well itself.

SEE OR SEARCH THIS CLASS, SUBCLASS:

56, for a screen with a washpipe located outside of the screen.

157+, for a screen with a washing point or shoe.

278, for a process of graveling including cleaning.

285+, for a process of cementing, plugging or consolidating including cleaning.

300, for a process of cleaning involving chemical reaction of introduced materials, one of which may be the material to be removed.

301, for a process for removing a stuck object, grappling or fishing in the well.

302+, for a process of cleaning involving heating.

304, for a process of dissolving solid oil deposits.

305.1+, for a process of cleaning involving placing a fluid into the pores of a formation.

SEE OR SEARCH CLASS:

175, Boring or Penetrating the Earth, subclass 67 for processes of boring, which include reaming or enlarging the diameter of the bore, by fluid erosion.

507, Earth Boring, Well Treating, and Oil Field Chemistry, subclasses 100+ for processes of cleaning involving only inserting a material in the bore hole without any significant manipulative step. See the reference to Class 507 in Class 166, subclass 244.1, SEARCH CLASS, for a further discussion of class lines.

313 Parallel string or multiple completion well:

This subclass is indented under subclass 244.1. A process comprising (1) the use of plural well conduits which extend from the ground surface

substantially to or past a producing formation, the conduits being positioned side by side rather than one within the other, or (2) producing fluid from vertically spaced zones in the well.

(1) Note. A conduit which extends alongside another conduit and which is intended to be used only for servicing the other conduit as by furnishing lifting gas is not considered a well conduit for part (1) of the definition. Processes using such conduits are classified on other features.

(2) Note. A patent is classified as an original in this definition under part (1) if conduits are referred to in a claim and they are disclosed as positioned side by side and not one within another even though no claim recites the side by side feature.

(3) Note. The vertically spaced zones may be nothing more than spaced groups of perforations receiving fluid from a single producing zone but usually the vertically spaced zones are for producing fluid from spaced formations.

SEE OR SEARCH THIS CLASS, SUBCLASS:

189, for a packer for non concentric conduits.
258, for a process of producing fluid from distinct formations by in situ combustion.
269, for a process of producing fluid from spaced formations by driving fluid through the formations from an adjacent well and desirably distributing the driving fluid through the formations.
306, for a process in which fluid leaves a well and fluid enters a well from spaced zones.

316 VALVES, CLOSURES OR CHANGEABLE RESTRICTORS:

This subclass is indented under the class definition. Devices comprising (1) valves, (2) closure means operable while the device is in the well (e.g., by destroying them) to effect fluid flow, or (3) means for effecting a calculated regulation of fluid flow by a restriction whose restrictive effect may be varied (e.g., a changeable choke).

(1) Note. The restrictive effect under (3) of the definition may be changed by destroying the restriction.

SEE OR SEARCH THIS CLASS, SUBCLASS:

54, for float controlled valves.
107+, for valved receptacles with eduction pumps or plungers.
112, for valves operated during the operation of an eduction pump to allow liquid to flow into the well.
141, for a packer or plug seal which opens a port when expanded.
142+, and subclasses there noted for a central chamber with a packer or plug and a controllable passage between the chamber and the space beneath the packer.
154, for valves or closures opened by a piston fluid driven into the well.
155, for pistons fluid driven into the well with means permitting flow past the piston.
156, for a stop member positioned in a conduit and having an opening which is adapted to be closed by a piston fluid driven into the well.
162+, for receptacles with valves or closures.
179+, for flow control by means of packers or plugs.
183, for a packer with a controllable bypass outside a central conduit.
184, for a controllable passage between a central conduit and the space above a packer or plug.
188, for a packer or plug with a passage therethrough controlled by a valve, closure or variable restriction.
194, for a sleeve valve operated by a dropped ball type plug.
205, for screens with valves, closures or changeable restrictors.
231+, for spiral well screens constructed so that the spacing between the spirals may be varied.

SEE OR SEARCH CLASS:

137, Fluid Handling, subclasses 67+, for flow controllers responsive to the destruction, fusion or permanent deformation of an element, subclass 155, for gas lift valves in wells, subclass 515, for line condition change responsive valves in conduit couplings, and other appropriate subclasses for fluid handling means with valves of general utility. See the class definition of Class 166 for the line.

138, Pipes and Tubular Conduits, subclasses 37+, for flow regulators of general utility and 89+, for pipe closures and plugs of general utility.

175, Boring or Penetrating the Earth, subclasses 232+, for a below ground means movable relative to an earth boring tool to stop flow toward the bore bottom, and subclasses 317+, for an earth boring apparatus with a means movable relative to a tool or shaft to control a below ground passage.

251, Valves and Valve Actuation, subclass 76, for impact actuated valves, subclasses 142+, for a flow path with a single valve, subclasses 341+, for valves in which the valve actuator is the valve casing or a continuation thereof, and other appropriate subclasses, for valve and actuators of general utility not having a specific location in or relationship to the well.

317 Destructible element:

This subclass is indented under subclass 316. Devices in which there is an element that is destroyed or permanently deformed to allow fluid flow or to stop fluid flow.

318 Operated by dropped element:

This subclass is indented under subclass 316. Devices in which there is an element or member dropped into the well to operate the valve to open or closed position.

SEE OR SEARCH THIS CLASS, SUBCLASS:

317, for an element which is dropped to effect destruction of a valve.

319 Fluid operated:

This subclass is indented under subclass 316. Devices wherein the valve is actuated in response to fluid pressure or fluid flow. The operating fluid may be derived from a source externally of the valve or it may be the fluid which flows through the valve.

320 Variably opened:

This subclass is indented under subclass 319. Devices in which the valve element is adjustable to control the amount of fluid flowing through the valve. The adjustment of the valve may be a positive, variable opening or closing of the valve or it may be an automatic adjustment responsive to fluid pressure at the valve.

321 Fluid pressure biased to open position position:

This subclass is indented under subclass 319. Devices in which fluid pressure acts on a surface of the valve to urge the valve to open position. The fluid acting on the valve may be the flow line fluid acting on surfaces of the valve of unequal areas or the fluid may be a control fluid distinct from the flow fluid.

322 Retrievable:

This subclass is indented under subclass 321. Devices in which the valve is insertable and retrievable from the flow line, seats in position in the flow line and is usually held in position by a latch means.

323 Locked open or closed:

This subclass is indented under subclass 321. Devices in which the valve element is positively locked in open or closed position to provide flow therethrough in both directions or to prevent flow therethrough in either direction.

324 With fluid pressure equalizing means:

This subclass is indented under subclass 321. Devices in which the valve has means which when operated equalized the pressure on both sides of the valve before the valve is moved to open position.

325 One way, e.g., check valve type:

This subclass is indented under subclass 319. Devices in which the valve allows flow of fluids in one direction, but closes upon the revers-

ing of flow in the opposite direction (check valve type).

326 Flexible valve element:
This subclass is indented under subclass 325. Devices in which a part of the valve comprises a flexible valve element.

327 Shoes with check valve:
This subclass is indented under subclass 325. Devices comprising annular or blunt nosed means (usually known as casing shoes) at the end of a well conduit for facilitating its entrance into the well combined with a valve which is opened by fluid pressure acting directly on it and which returns to its original position when the pressure is removed.

SEE OR SEARCH THIS CLASS, SUBCLASS:
143+, for a shoe with a check valve attached to a casing or strainer section having a packer, and detachably connected to a setting string.
157+, for a shoe with check valve attached to a screen for washing the screen.

SEE OR SEARCH CLASS:
137, Fluid Handling, subclass 515, for check valves in couplings joining sections of a well conduit. These devices, usually known as float collars, are often very similar in structure to the float plugs or cement shoes of this subclass (327) of Class 166.

328 Loose ball closure:
This subclass is indented under subclass 327. Devices wherein the valve comprises a loose ball that closes the valve opening to prevent reverse flow.

329 Loose ball closure with limited reverse flow:
This subclass is indented under subclass 319. Devices wherein the valve element comprises a ball that allows full flow in one direction and limited flow in the opposite direction, and closes when the flow in the opposite direction becomes excessive.

330 Rotated operator:
This subclass is indented under subclass 316. Devices where the valve operator is rotated to open or close the valve.

331 Lug in branched slot, e.g., "J" slot:
This subclass is indented under subclass 330. Devices comprising a lug on one part and a branched slot on the other part, and rotation of the operator moves the lug to a position whereby the valve is or can be operated.

332.1 Longitudinally movable operator:
This subclass is indented under subclass 316. Valve, closure or changeable restrictor comprising an axially shiftable element operated from the surface of the well to control movement of a flow regulating device.

(1) Note. Fluid operated valves are not classifiable here, they belong in subclasses 319+.

SEE OR SEARCH THIS CLASS, SUBCLASS:
66.7, for electric longitudinal movable operator.

332.2 Having rotational movement:
This subclass is indented under subclass 332.1. Longitudinally moveable operator wherein the axial shifting of the operator causes the flow regulating device to turn.

SEE OR SEARCH THIS CLASS, SUBCLASS:
330+, for rotated operators wherein the operator extends to the surface and is rotated from the surface.

332.3 Ball valve type:
This subclass is indented under subclass 332.2. Devices wherein the flow regulating device is a spherical member with at least one passage.

332.4 Operated by means inserted from the surface:
This subclass is indented under subclass 332.1. Longitudinally moveable operator wherein a tool is inserted into the well from the wellhead to actuate the flow regulating device.

SEE OR SEARCH THIS CLASS, SUBCLASS:
332.2+, for a rotatable valve which could be operated by a tool inserted from the surface.

332.5 Valving means inserted or retrieved to operate:
This subclass is indented under subclass 332.1. Longitudinally moveable operator wherein the flow regulating device is placed in the well or removed from the well to control fluid flow.

332.6 Having a dump or discharge type means:
This subclass is indented under subclass 332.1. Longitudinally moveable operator wherein the flow regulating member includes a passage to allow excess fluid to escape.

332.7 Having equalizing valve:
This subclass is indented under subclass 332.1. Longitudinally moveable operator including a flow regulating portion that allows pressure inside the tool to be the same as pressure outside the tool.

SEE OR SEARCH THIS CLASS, SUBCLASS:
324, for a fluid operated valve with fluid pressure equalizing means.

332.8 Flapper Type:
This subclass is indented under subclass 332.1. Longitudinally moveable operator wherein the flow regulating device comprises a hinged plate allowing flow in one direction.

333.1 Contact with bore bottom:
This subclass is indented under subclass 332.1. Longitudinally movable operator valve comprising means which operate the flow regulating device upon impact with the deepest point in the well.

334.1 Vertical movement of conduit:
This subclass is indented under subclass 332.1. Longitudinally movable operator valve comprising a flow regulating device which is actuated by axial shifting of the pipe or tubing string on which the device is supported.

334.2 With rotational movement, e.g., ball valve type:
This subclass is indented under subclass 334.1. Vertical movement of conduit which causes the flow regulating device, or member, to turn.

334.3 Drain type:
This subclass is indented under subclass 334.1. Vertical movement of conduit wherein the flow regulating device allows excess fluid to escape.

SEE OR SEARCH THIS CLASS, SUBCLASS:
332.8, for drain valves operated by longitudinal movement.

334.4 Fluid flow through lateral port to exterior:
This subclass is indented under subclass 334.1. Vertical movement of conduit wherein the shifting controls gas or liquid movement via a nipple in the pipe wall.

335 SUBMERGED WELL:
This subclass is indented under the class definition. Process, apparatus, or device including a step of, or means for, assembling the components of a well or including the component parts of such a well, the discharge surface of which well is located below the surface of a body of water.

(1) Note. The well of this subclass is located below the surface of an ocean, a lake, a river, etc.

(2) Note. For inclusion in this subclass characteristics must be claimed to peculiarly limit the process, apparatus, or device to function with or as a well, the surface of which is below the surface of a body of water.

(3) Note. In this and the indented subclasses the terms at the end of this subclass definition will be used as defined herein (terms followed by an asterisk (*) have been so defined).

SEE OR SEARCH THIS CLASS, SUBCLASS:
75.11+, for above ground apparatus generally, including a wellhead structure. A wellhead structure disclosed as being under water but not claimed is made to a feature peculiarly adapting the device to function under water is to be found in subclasses 75.1+.

SEE OR SEARCH CLASS:

37, Excavating, subclasses 307+ for apparatus adapted to dredge material from a submerged location.

114, Ships, for a floating vessel generally including a floating vessel which may be utilized in construction of a submerged well.

175, Boring or Penetrating the Earth, subclasses 5+ for a process of, or apparatus for, boring a submerged formation.

299, Mining or In Situ Disintegration of Hard Material, for mining or disintegrating hard material in a submerged location.

405, Hydraulic and Earth Engineering, for subject matter not including well structure directed to apparatus adapted to function in a submerged location, particularly subclasses 158+ for a process of, or apparatus for, laying pipe or cable into a submerged location; and subclasses 195+ for floatable marine floor-supported structure including a submerged well platform.

GLOSSARY

FLOW LINE:

A tubular member adapted to transmit well fluid* away from the well.

RISER:

Structure for use with a submerged well intended to extend from the wellhead* toward the surface of the water generally directly above the wellhead.

WELL ELEMENT:

Any individual portion of well structure.

WELL FLUID:

The desired fluid material of the earth. The purpose of the well is to remove this fluid.

WELLHEAD:

Means at the top of the well, generally extending above the surface of the earth, adapted to cap the well, support the well structure* inside a well casing, regulate the operation of the well, and/or supply well fluid* for distribution.

WELL STRUCTURE:

Equipment added to the earth in the formation or use of a well. Well structure may extend above the surface of the earth (see wellhead*) as well as laterally away from the well (see flow line*).

336 Testing:
This subclass is indented under subclass 335. Process, apparatus, or device including means for determining the characteristics of the well structure.

337 For leak:
This subclass is indented under subclass 336. Process, apparatus, or device including means for determining if the structure of the well is sufficiently tight to hold fluid therein.

338 Connection or disconnection of submerged members remotely controlled:
This subclass is indented under subclass 335. Process, apparatus, or device including an actuatable tool or well element functioning to secure together or release two well elements, with means above the water surface to actuate the tool or well element.

SEE OR SEARCH CLASS:

285, Pipe Joints or Couplings, for a pipe joint adapted to be operated from a remote location, and particularly subclasses 18+ for a pipe joint or coupling with an assembly means or feature.

405, Hydraulic and Earth Engineering, subclasses 169+ for assembling conduit underwater to a fixed structure wherein the fixed structure is not limited to be a well; subclasses 190+ for diving combined with remote control of the diving apparatus.

901, Robots, appropriate subcollections for robots adapted to work in an under water environment.

339 With provision for removal or repositioning of member without removal of other well structure:
This subclass is indented under subclass 338. Process, apparatus, or device including a well peculiarly designed to enable detachment of a well element without corresponding disturbance of other well structure, or including a step of, or means for, manipulating such well element.

340 Disconnection:
This subclass is indented under subclass 338. Process, apparatus, or device including an actuatable tool or well element functioning to release two previously secured well elements from each other, with means above the water surface to actuate the tool or well element.

(1) Note. The device of this subclass may function to both secure and release two well elements, but it is required that there be claimed reference to the function of release.

341 With orienting or aligning of member for connection:
This subclass is indented under subclass 338. Process, apparatus, or device including provision to cause at least one well element to move about an axis or to be translated to a different position to properly interfit with another well element.

342 Including removable, member mounted guide:
This subclass is indented under subclass 341. Process, apparatus, or device including use of means to passively direct movement of one well element relative to another well element, which means is adapted to be detachably secured to a well element when in use.

343 Including means to pull member into position:
This subclass is indented under subclass 341. Process, apparatus, or device including use of means exerting tensile force to draw a well element to an operational location with respect to another well element.

344 Connection to provide fluid flow path:
This subclass is indented under subclass 338. Process, apparatus, or device including securing of a well element of the type that is to provide as a passage of liquid or gaseous flowable material.

345 Connection of riser-and-tubing assembly to other structure:
This subclass is indented under subclass 344. Process, apparatus, or device wherein the well element comprises a grouping of tubular components extending upwardly from the wellhead to the surface of the water, one of the components intended to convey well fluid to the surface of the water.

346 Yieldable tubing:
This subclass is indented under subclass 344. Process, apparatus, or device wherein the well element includes a passage that is intended to change shape.

(1) Note. Included herein is a tube intended to flex within its elastic limit, as well as a tube intended to yield beyond its elastic limit.

347 Connection of lateral flow line:
This subclass is indented under subclass 344. Process, apparatus, or device wherein the well element is a tubular member adapted to serve as a passage for well fluid from the well across the surface of the earth and away from the well.

348 Connection of pipe hanging:
This subclass is indented under subclass 338. Process, apparatus, or device wherein the connection made is intended to support the weight of tubing suspended therefrom and extending down into the well.

349 Connection of guide means:
This subclass is indented under subclass 338. Process, apparatus, or device wherein the well element is a member adapted to extend from the surface of the water to the surface of the earth in the vicinity of the well and is intended to serve to passively direct another well element to move therealong and down the well.

350 Submerged, buoyant wellhead or riser:
This subclass is indented under subclass 335. Process, apparatus, or device involving use of a device at the top of the well, positioned above the surface of the earth, adapted to cap the well, support the structure inside a well casing, regulate the operation of the well, and/or supply well fluid for distribution; or involving use of a device extending upwardly from the plane where the well meets the surface of the earth toward the surface of the water for fluid communication with the surface of the water, which device includes portions lighter than the water displaced thereby to assist in supporting the adjacent well structure against gravity.

SEE OR SEARCH THIS CLASS, SUBCLASS:
367, for a riser, generally, for use beneath the surface of a body of water.
368, for a wellhead, generally, for use beneath the surface of a body of water.

351 Means removably connected to permanent well structure:
This subclass is indented under subclass 335. Process or apparatus intended to be used in the operation or formation of a well and intended to be removable from the well without destruction of the well.

(1) Note. A derrick including structure of this class will be found in this subclass or the subclasses indented hereunder even if there is no specific disclosure of subsequent removal from the well.

SEE OR SEARCH THIS CLASS, SUBCLASS:
358, for well drilling combined with derrick structure in a device of this subclass.

352 Surface vessel:
This subclass is indented under subclass 351. Process or apparatus including structure adapted to buoyantly rest upon the surface of the water above the well.

SEE OR SEARCH THIS CLASS, SUBCLASS:
358, for well drilling including floating of a buoyant derrick to the well site.

353 Having means to move vessel to precise location:
This subclass is indented under subclass 352. Process or apparatus including provision to cause the buoyant structure to be displaced from a remote position to a more exact position to be suitable for use with a well.

354 Having means to hold vessel at given location (e.g., anchor, etc.):
This subclass is indented under subclass 352. Process or apparatus including provision to cause the buoyant means not to move once in position over the well.

355 With means to compensate for vessel movement:
This subclass is indented under subclass 352. Process or apparatus including provision to accommodate for the relative movement between the buoyant means resting on the surface of the water and the well.

(1) Note. Included herein is provision to allow for relative movement brought about by wave or tide action on the vessel.

356 Means to provide protective environment for operative access below surface of water:
This subclass is indented under subclass 351. Process or apparatus including provision of a means to isolate a man from hostile conditions, which means is located beneath the surface of the water.

SEE OR SEARCH CLASS:
405, Hydraulic and Earth Engineering, subclasses 185+ for diving under water to a well where no well or well manipulation is claimed.

357 Separator:
This subclass is indented under subclass 351. Process or apparatus including means to isolate one portion of the well fluid from another or including means to isolate the well fluid from foreign material.

358 Drilling means:
This subclass is indented under subclass 351. Process or apparatus including means for forming a passageway.

359 Removable riser:
This subclass is indented under subclass 351. Process or apparatus wherein the structure intended to be removed from the well is generally rigid, generally fixed structure extending from the well upwardly for fluid communication with the surface of the water.

(1) Note. A flow line extending laterally away from the well is not considered to be a riser even though eventually extending upwardly to the surface of the water.

SEE OR SEARCH THIS CLASS, SUBCLASS:
367, for a riser that is a portion of a fixed structure of a well.

360 Well component assembly means:
This subclass is indented under subclass 351. Process or apparatus comprising bringing together a pair of well elements or including securing together a pair of well elements.

SEE OR SEARCH CLASS:
29, Metal Working, subclasses 700+ for assembly means, generally.

361 Pipe cutting means:
This subclass is indented under subclass 351. Process or apparatus including means to subdivide one portion of the well tubing from another portion.

363 With safety or emergency shutoff:
This subclass is indented under subclass 335. Device combined with means to terminate the flow of well fluid under conditions that would otherwise endanger the well or environment (including personnel) or other extreme conditions.

364 Including disaster feature:
This subclass is indented under subclass 335. Device wherein the well structure is provided with means allowing damaging conditions to occur without total loss of the well.

365 With provision for disassembly:
This subclass is indented under subclass 335. Device wherein intentional provisions in the well structure allow the portions of the well to be separated one from the other.

366 Multiple wells:
This subclass is indented under subclass 335. Device including more than one well.

367 Riser:
This subclass is indented under subclass 335. Device comprising means extending from the plane where the well meets the surface of the earth upwardly toward the surface of the water for fluid communication with the surface of the water.

SEE OR SEARCH THIS CLASS, SUBCLASS:
350, for a riser for use beneath the surface of a body of water, which riser is buoyantly supported above the surface of the earth.

368 Wellhead:
This subclass is indented under subclass 335. Device comprising means at the top of the well, generally extending above the surface of the earth, adapted to cap the well, support the well structure inside a well casing, regulate the operation of the well, and/or supply well fluid for distribution.

SEE OR SEARCH THIS CLASS, SUBCLASS:
350, for a wellhead for use beneath the surface of a body of water, which wellhead is buoyantly supported above the surface of the earth.

369 Producing the well:
This subclass is indented under subclass 244.1. Process which includes a significant manipulative step of recovering fluid from the earth.

(1) Note. The mere placing of a control device or removing an obstruction is not enough for classification in this subclass. Also the mere broad recitation in a claim that a well is flowed or produced is not enough. Some detail of the flowing steps must be set forth. Processes with a

mere broad recitation that a well is flowed or produced are classified on some other basis. Subject matter found in any subclass of this class may have a disclosure of producing the well. Cross-references should be made with restraint, therefore. The subclasses noted below are considered especially pertinent to producing processes.

SEE OR SEARCH THIS CLASS, SUBCLASS:

247, for a process of producing a well involving the use of nuclear energy or radioactivity.

249, for a process of producing a well involving vibrating the earth or material in the earth.

263, for cyclic operation of plural wells.

264, for a process of producing a well merely to take a sample of fluid.

265+, for a process of producing a well comprising separating material leaving a well.

302+, for a process of producing a well involving heating or cooling.

305+, and especially subclass 306, for a process of producing a well involving placing a fluid into or fracturing a formation.

311+, for a process of cleaning or unloading the well.

313+, for a process of producing a parallel, nonconcentric string or multiple completion well.

SEE OR SEARCH CLASS:

137, Fluid Handling, subclasses 1+ for processes of controlling fluid flow of general application. Sole disclosure or claiming of use in a well causes classification in Class 166.

417, Pumps, appropriate subclasses for methods of and apparatus for recovering earth fluids involving only pumping.

370 Including varying downhole pressure:

This subclass is indented under subclass 369. Process including a significant step of changing the below ground pressure by either (a) varying the pressure in the central conduit or pump inlet, as by a vacuum pump, or (b) varying formation pressure in a geopressurized zone so that recoverable gas is evolved from the formation fluid.

(1) Note. Inasmuch as any process for reproducing fluid from a formation will in all likelihood cause incidental changes in below ground pressure, the broad recitation of producing the formation or of pumping it is, in itself, not sufficient for classification in this subclass.

371 Including nonexplosive material placed in well:

This subclass is indented under subclass 369. Process including a step of introducing into the well a material which acts in a manner other than to physically force the well fluid toward the surface.

SEE OR SEARCH THIS CLASS, SUBCLASS:

246, for a process of producing a well involving the use of microorganisms.

279, for a process of producing a well comprising contacting the fluid to be produced by a treating material in the pores of a formation.

310, for a process of producing a well comprising entraining or incorporating a treating material in the flowing earth fluid in a well.

SEE OR SEARCH CLASS:

507, Earth Boring, Well Treating, and Oil Field Chemistry, subclasses 200+ for processes involving no significant manipulative steps or relationship with the well and consisting only of placing a treating material in a well. Example of broadly recited steps which are not considered significantly manipulative are: using pressure, introducing one material after another, introducing materials through separate conduits, producing the well, removing spent material, introducing material at the bottom of the well, or below paraffin deposits, contacting well fluids with an introduced material during pumping producing or blowing the well. Examples of processes classifiable in Class 166 rather than Class 507 are; a process in which materials are introduced into a well to

react with each other (including a process in which one material reacts with the product of the reaction between another material and a material found in the well), a process in which a material is introduced in a special location, as between the casing and tubing, or a process in which a material is inserted into the pores of the earth.

372 By fluid lift:
This subclass is indented under subclass 369. Process wherein a motive fluid is used to expel the well fluid from the well.

SEE OR SEARCH THIS CLASS, SUBCLASS:
256+, for a process of producing a well comprising in situ combustion.
268+, for a process of producing a well by forcing fluid into an adjacent well.
309, for a process including a step of producing a foam or gas in the well by a foam or gas making material.

373 Operating a valve, closure, or changeable restrictor in a well:
This subclass is indented under subclass 244. Process for operating a fluid flow regulating device located in the well.

(1) Note. The mere step of positioning or landing a valve in a well without a significant operating step is not sufficient for inclusion in this subclass. Likewise, the mere step of placing or removing a plug in a well for stopping or allowing flow is classified in subclass 286.

SEE OR SEARCH THIS CLASS, SUBCLASS:
316, for a valve, closure, or changeable restrictor.
386, for a method of positioning a valve in a well, where no significant operation step is claimed, or a method of positioning or removing a plug from a well.

374 Operated by fluid pressure controlled above ground:
This subclass is indented under subclass 373. Process wherein the flow regulating device is operated by a fluid pressure change which is initiated by an above ground operator.

(1) Note. The fluid pressure change is typically communicated to the flow controller by the conduit which the valve controls.

(2) Note. Changing the production flow to cause a change in pressure is subject matter in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:
72, for an above ground actuating means for a below ground device.

375 By auxiliary fluid control line:
This subclass is indented under subclass 374. Process wherein the fluid pressure change which is initiated by an above ground operator is communicated to the flow regulating device by a conduit used exclusively for that purpose.

376 Destroying or dissolving well part:
This subclass is indented under subclass 244.1. Process including a step of intentionally ruining or disintegrating an element of the well or a portion thereof.

SEE OR SEARCH THIS CLASS, SUBCLASS:
297+, for a process of perforating, weakening, bending, or separating a pipe at an unprepared point.

SEE OR SEARCH CLASS:
29, Metal Working, subclass 426.4 for residual methods for disassembly by alteration or destruction of a work part.

377 Disassembling well part:
This subclass is indented under subclass 244.1. Process including a step of disconnecting, disassociating, or otherwise removing one or more elements of a well in a final relationship of elements.

(1) Note. The above definition excludes removal of a part in an unintended or unexpected association with another (e.g., a part which accidentally drops and becomes lodged in a well).

SEE OR SEARCH THIS CLASS, SUBCLASS:

77.51+, for above ground means facilitating the disconnection of tubing or rod sections.

88.1, for above ground disassembly means (e.g., handling, guiding, or tool feature).

301, for a process of freeing a stuck object by grappling or fishing in the well.

SEE OR SEARCH CLASS:

29, Metal Working, subclasses 426.1+ for the residual locus of disassembly methods.

378 Assembly well parts:

This subclass is indented under subclass 244.1. Process including a step of securing together two elements of a well.

(1) Note. The mere actuation or expansion of an anchor or hanger into engagement with a casing or borehole is not considered assembly.

SEE OR SEARCH THIS CLASS, SUBCLASS:

85.1, for above ground assembly means (e.g., handling, guiding, or tool feature).

313, for a process for assembling or otherwise handling or manipulating well elements of a parallel, nonconcentric string or multiple completion well.

382, for a method of placing or shifting a well part.

SEE OR SEARCH CLASS:

29, Metal Working, subclasses 428+ for the residual locus of assembly methods.

137, Fluid Handling, subclasses 15.01 through 15.26 for a process of cleaning, repairing, or assembling.

379 Above ground parts:

This subclass is indented under subclass 378. Process wherein the two elements, once secured, are employed at or above ground level.

(1) Note. For purpose of this subclass, ground level is either (a) the level at which a person may work outside the casing of the well, this working space being provided either in the open or by a cellar or tunnel, or (b) the level at which a laterally running pipeline for discharging well fluid from or inserting treating fluid into the well is connected to the well casing.

(2) Note. The definition is considered to include also those means adjacent the defined level though actually below it.

380 Conduit:

This subclass is indented under subclass 378. Process wherein at least one of the elements is a well conduit or portion thereof.

SEE OR SEARCH THIS CLASS, SUBCLASS:

77.51+, for above ground means facilitating the connection of tubing or rod sections.

381 Placing or shifting well part:

This subclass is indented under subclass 244.1. Process including a step of putting an element of a well in a particular place or moving an element to or from a position of use.

(1) Note. Movement of an actuator, or handle therefor, is insufficient to cause classification in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

71, for apparatus with above ground casing sinking means and a below ground feature.

117.5, for a means for guiding an insertable element laterally of the well axis (e.g., a whipstock, or side pocket mandrel).

264, for a process of placing in position of use an apparatus (e.g., a tubing and a

packer, etc.) for taking a sample of well fluid.

276, for a process of providing a porous cementitious filter.

277, for repairing an object in the well including expanding a section of pipe to repair another pipe.

278, for a graveling or filter forming process.

313, for a process of assembling or otherwise handling or manipulating well elements of a parallel, nonconcentric string or multiple completion well.

SEE OR SEARCH CLASS:

405, Hydraulic and Earth Engineering, subclass 133 for a method of placing or shifting parts (e.g., lining) in an underground vertical shaft.

382 Providing support for well part (e.g., hanger or anchor):

This subclass is indented under subclass 381. Process including a significant manipulative step of furnishing support for a well part.

(1) Note. The step of actuating a hanger or anchor to fix the same inside a well is sufficient to cause classification in this subclass.

(2) Note. Landing a well tool on a prepared set is subject matter for this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

207, for an expansible casing section.

383 By fluid driven piston:

This subclass is indented under subclass 381. Process wherein a translating member driven by fluid pressure is employed to put into place or move a well part.

SEE OR SEARCH THIS CLASS, SUBCLASS:

153+, for the piston apparatus, per se.

384 With bending of tubing:

This subclass is indented under subclass 381. Process including a step of deforming a conduit or portion thereof while placing it in a well.

SEE OR SEARCH THIS CLASS, SUBCLASS:

77.1+, for apparatus which force tubing or cable into an existing well.

385 Flexible cable or wire:

This subclass is indented under subclass 381. Process including a step of inserting or moving a strand of flaccid material, or for placing or shifting a well part using a strand of flaccid material.

SEE OR SEARCH THIS CLASS, SUBCLASS:

77.1+, for above ground apparatus for forcing a tubing or cable into an existing well.

386 Fluid flow control member (e.g., plug or valve):

This subclass is indented under subclass 381. Process wherein the element comprises a device for regulating or obstructing fluid flow in the central conduit or tubing of the well.

SEE OR SEARCH THIS CLASS, SUBCLASS:

123+, for detachable setting means for a packer or plug with an expanding anchor.

181+, for a detachable setting means for a packer or plug.

373, for a process of operating a valve, closure or changeable restrictor in a well.

387 With sealing feature (e.g., packer):

This subclass is indented under subclass 381. Process wherein the element comprises means to block the passage of material into or out of a particular area.

SEE OR SEARCH THIS CLASS, SUBCLASS:

118+, for a packer or plug with an expanding anchor.

179+, for a packer or plug.

284+, for a process for blocking a perforation already in a member in a well by a pellet.

400 Sequentially injected separate fluids (e.g., slugs):

This subclass is indented under subclass 268. A process in distinct, separate wells in which gas or liquid quantities are introduced into the pores of the earth through an input well or wells, the quantities being separately identifiable at the point of introduction into the earth, each fluid quantity consisting of a solution, mixture, compound, or element.

(1) Note. The separate identity of the fluid quantities is established by introduction into the earth at different time intervals or in spaced locations. A single fluid quantity may be one whose composition gradually changes in proportions so that there is no distinct break in the time-composition curve. Any distinct break in such a curve is considered to result in separately identifiable quantities. A broad reference to introduction from a plurality of wells or introduction from a single group of perforations is not enough to qualify a quantity as introduced from "spaced locations."

(2) Note. One of the fluid quantities may be a final displacing or driving fluid. The injection of such a fluid is sometimes indicated only by a phrase such as, "driving (the previously placed fluid) toward the output well." The meaning of such a phrase should be construed in the light of the specification. If the specification indicates that the drive is accomplished by a separately identifiable displacing fluid, then the displacing fluid is one of the fluid quantities. If the specification indicates that the drive is merely the continued introduction of a previous fluid or pump pressure, then the drive fluid is not a separately identifiable fluid quantity.

(3) Note. A single compound forming part of a mixture is not a fluid quantity under this definition. Thus, a mixture of three compounds is a single fluid quantity rather than three fluid quantities.

SEE OR SEARCH THIS CLASS, SUBCLASS:

260, for a process involving in situ combustion and injecting specific fuel or catalyst for burning into formation.

261, for a process involving injecting specific material other than oxygen into formation.

269, for processes involving input and output wells and fluid introduced into the formation from vertically spaced locations in an input well.

270+, for a process involving input and output wells including selective plugging or a surfactant.

271, for processes involving input and output wells and a separate fluid for fracturing or attacking the formation.

401 Injecting a gas or gas mixture:

This subclass is indented under subclass 400. Sequentially injected fluid in which a drive or flooding substance is compressible, has low cohesive force, and has a viscosity that increases as temperature increases.

(1) Note. Included in this subclass would be air, nitrogen, hydrocarbon gas, flue gas, etc.

SEE OR SEARCH THIS CLASS, SUBCLASS:

309, for a process producing foam or gas in a well by a material.

402 CO_2 or carbonated gas:

This subclass is indented under subclass 401. Injected gas in which (a) carbon dioxide or (b) a salt or ester of carbonic acid in the vapor phase is inserted.

403 In combination with additional organic material (e.g., alkyls, carbon chains):

This subclass is indented under subclass 402. Injecting CO_2 or carbonated gas including more carbon based substances such as (a) a univalent aliphatic, aromatic-aliphatic, or alicyclic hydrocarbon radical or (b) the element carbon in a chemical string.

CROSS-REFERENCE ART COLLECTIONS

901 WELL IN FROZEN TERRAIN (E.G., PERMAFROST):
Subject matter specialized to well operations in locations where the temperature of the soil is below the freezing point of water.

902 FOR INHIBITING CORROSION OR COATING:
Subject matter specialized to preventing or alleviating the effects of either (a) corrosion or (b) formation of a coating material on well equipment.

SEE OR SEARCH THIS CLASS, SUBCLASS:

170+, for brushing, scraping, cutting or punching type well cleaners.

304, for dissolving or preventing formation of a solid oil deposit.

311+, for cleaning or unloading well.

FOREIGN ART COLLECTIONS

The definitions below correspond to abolished subclasses from which these collections were formed. See the Foreign Art Collection schedule of this class for specific correspondences. [Note: The titles and definitions for *indented* art collections include all the details of the one(s) that are hierarchically superior.]

FOR 100 Specific propping feature for a fracture:
Foreign Art Collection for a process comprising some claimed specific feature relating to placing discrete particles in a fracture in a formation to maintain the walls of the fracture spaced apart by resisting forces tending to close the fracture.

(1) Note. For classification as an original under this definition the specific feature must be more than merely identifying the propping material as sand, or the equivalent, or merely the use of a specific fluid containing the propping material or merely the introduction of the propping material in one of a series of fracturing fluids.

(2) Note. Placing in a fracture a slurry of cement which sets and remains in place as an adhered mass and which cement may contain hard particles dispersed therein is not considered to come within this definition. For a process involving cementing see subclasses 281, 283 and 285+. This definition does include, however, a process in which discrete propping particles are adhered together after being placed and a process in which propping particles are incorporated in a carrier fluid, which may be cement (such as a gel), and the carrier fluid is changed in nature, or removed, or is of such a nature that the discrete particles themselves resist closing of the fracture rather than a mass of cement in which the particles are embedded resisting closing of the fracture.

(3) Note. A process in which discrete particles are placed in a fracture so that the particles are crowded together or compacted to plug the fracture to impede the flow of fluid is not considered to come within this definition. See the subclasses relating to cementing or plugging, especially subclasses 292+ for such a process.

(4) Note. Discrete particles in a fracture which are described merely as forming a filter will be assured also to act as props and be classifiable under this definition.

FOR 101 Fracturing:
Foreign Art Collection for a process under subclasses 305.1+ in which the earth is cracked to create a fissure therein.

END