

CLASS 299, MINING OR IN SITU DISINTEGRATION OF HARD MATERIAL

SECTION I - CLASS DEFINITION

This class provides for (a) the obtaining of valuable, naturally occurring minerals from the earth in a solid state (the phrase "solid state" including a state in which the minerals are in the form of particles of larger size than colloidal), (b) the obtaining of ice from a naturally occurring bed of ice, (c) the obtaining of naturally occurring, nonhydrocarbon, solid, valuable, minerals from the earth in a fluid state (the phrase "fluid state" including a dissolved state or a state of colloidal dispersion or suspension) or (d) the obtaining of any naturally occurring valuable material from the earth in a solid or fluid state when this is accomplished by the claimed use of a substantially horizontal tunnel providing a working space for human beings.

This class also provides for cutting, severing or breaking up of naturally occurring solid, hard material. Such cutting, severing or breaking up of solid, hard material generally comprises, (a) recovering valuable material in desirable shapes or specific sized chunks, (b) forming an opening or cut in native material of larger cross-sectional surface area than the effective cutting area of the cutting means by movement of the means parallel to the exposed surface, or (c) forming a large horizontal passageway into the earth by continuously advancing a cutting device by means of a vehicle or the like which is limited to substantially horizontal operation, the cutting means forming the entire passageway in an uninterrupted advance movement as the vehicle or the like follows the cutting means into and along the passageway.

This class further includes miscellaneous subject matter which does not meet the criteria of the above, but which relates to forming or using a large underground passageway in the earth and is not elsewhere classifiable.

This class was partially formed from an unofficial classification that had been used by the Examiners for many years. While the schedule and definitions are intended to be employed as completely consistent with present rules of classification, the claims of the patents at the time of the formation of this class have not been analyzed to the degree necessary to guarantee exact technical, original or cross-reference classification of all patents.

SECTION II - LINES WITH OTHER CLASSES AND WITHIN THIS CLASS

References To Other Classes, below, contain information about lines with other classes.

SECTION III - REFERENCES TO OTHER CLASSES

SEE OR SEARCH CLASS:

- 15, Brushing, Scrubbing, and General Cleaning, subclasses 3+ for a machine for cleaning foreign material from a surface. Class 299 includes machines for in situ disintegration of purposely applied hard material such as concrete, linoleum, roofing, etc., but similar devices which remove accidentally accumulated oil, grease, dirt, etc., are classified in Class 15.
- 30, Cutlery, appropriate subclass for a hand manipulated cutting tool of general utility.
- 37, Excavating, appropriate subclass for a process or apparatus for excavating relatively soft or alluvial material and particularly subclass 3 for peat excavators and subclasses 307+ for dredgers. The line between Class 299 and Class 37 relative generally turns on the relatively hardness of the material recovered, Class 299 taking devices limited by disclosure or claim to working hard material, with the exception that Class 37 type excavating when combined with separating of the excavated material into component parts is classified in Class 299.
- 56, Harvesters, for subject matter directed to gathering or cutting valuable plant products from above the surface of the earth.
- 102, Ammunition and Explosives, subclasses 301+ for apparatus and methods of blasting.
- 125, Stone Working, appropriate subclass for subject matter directed to the manufacture or working of stone articles. The line between Class 299 and Class 125 generally is determined by disclosed use, Class 299 taking subject matter directed to working hard material in situ. However, Class 125 has some hand tools described as for working materials in situ, such as miners picks.
- 166, Wells, appropriate subclass for subject matter directed to winning valuable material which is naturally in the fluid state in the earth (such as water, oil or gas). Furthermore, subject matter for recovering a hydrocarbon material from a well in a fluid state is classified in Class 166, whether the material is described as originally in the solid state, merely too viscous to flow or trapped in cavities in shale or the like. How-

- ever, if any of the valuable material is recovered in the solid state, or if a valuable solid material other than a hydrocarbon is converted to the fluid state for recovery, classification is in Class 299. Furthermore, a process or structure involving the use of a tunnel (a horizontal earth passage in which a human works) to recover naturally occurring fluid (including hydrocarbon) from the earth is classified in Class 299.
- 169, Fire Extinguishers, subclass 45 for processes of preventing fire, and subclass 64 for apparatus for fighting fire in mines.
- 171, Unearthing Plants or Buried Objects, appropriate subclass for subject matter directed to the recovery of nonmineral objects or nonvaluable mineral objects such as stones found in soft earth adjacent the earth surface. Class 171 primarily provides for the recovery of plants or plant products from the earth, although subject matter directed to the recovery of stones or manufactured articles from the earth in the same manner as recovering plants or plant products is also found in Class 171.
- 172, Earth Working, appropriate subclasses for subject matter relating to working the earth in situ. In general, Class 172 takes apparatus of general utility for working both soft earth and hard earth or material such as rock, ice or pavement while Class 299 takes apparatus limited by disclosure to working hard material such as rock, coal, ice or pavement. However, Class 172 takes apparatus of the type in which a tool carried by a support is advanced over the earth by movement of the support without relative movement between the tool and support if such apparatus is of general earth working utility even if the disclosure is limited to working hard material such as rock. An example of an apparatus for Class 172 is a ripper tooth intended to be used by being traversed over the earth by a tractor, the tooth being stationary with respect to the tractor when working the earth. An example of a apparatus for Class 299 is a driven or rolling tool such as a cutter mounted on a driven chain or a rolling disk limited by disclosure to working rock.
- 173, Tool Driving or Impacting, appropriate subclass for tool driving devices which comprise combinations peculiar to driving but do not recite features which limit the devices to a specific art. Devices for driving impact type and mere rotary motion tools described as for mining are classified in Class 173. However, Class 299 includes large tunnel forming type machines with material handling features which do not necessarily include specific structure of work disintegrating tool means and similarly chain type cutter driving and manipulating devices which lack specific cutter chain features, which were retained in Class 299 for the time being as peculiar to mining or in situ material disintegration functions.
- 175, Boring or Penetrating the Earth, appropriate subclass for a process, machine or tool for initially forming or radially enlarging an elongated opening in the earth, such opening being formed in a sustained advance movement and of approximately the radial extent of the cutting area of the tool. Class 299 provides for similar subject matter directed to enlarging an opening to the surface by moving the tool parallel to said surface, breaking down the material in shapes or sizes desirable for recovery or forming a large horizontal passageway into the earth by continuously advancing a cutting device by means of a horizontally operating vehicle which cutting device forms the passageway as the vehicle follows the cutting means into and along the passageway.
- 180, Motor Vehicles, appropriate subclass for a motor vehicle for operating or advancing a mining machine and particularly subclasses 153.1+ for vehicles in which the motor of the vehicle is utilized as an external source of power.
- 198, Conveyors: Power-Driven, appropriate subclass for a conveyor for handling mined material and particularly subclasses 300+ and 506+ inclusive for a loading machine type endless conveyor with a coacting gatherer, which may be described as gathering material from a mine floor.
- 209, Classifying, Separating, and Assorting Solids, appropriate subclass for a means of general utility to classify, separate or assort solids and including a cooperating means to pick up and convey material from a location such as a floor or the like.
- 241, Solid Material Comminution or Disintegration, appropriate subclass for subject matter directed to comminuting or disintegrating material of general utility. Class 299 provides for devices specialized to comminuting or disintegrating material in situ while Class 241 generally involves opposed or cooperating comminuting

- surfaces which break up material to reduce the size of elements thereof.
- 404, Road Structure, Process, or Apparatus, appropriate subclasses for road making and particularly subclass 90, which includes means for in situ comminution of earth or road surface and subclass 133 for tamping means. Subject matter relating to merely breaking up a pavement or earth crust is classified in Class 299.
- 405, Hydraulic and Earth Engineering, appropriate subclasses for a process or apparatus relating to structures formed in water or the earth, particularly subclasses 55+ for construction of underground fluid storage cavities; and subclasses 132+ for subject matter relating to shaft or tunnel structure or method or apparatus for their construction. Underground structures or supports, per se, are classified in Class 405 and also permanent shaft or tunnel lining combined with excavating hard material to form a shaft or tunnel, but shaft or tunnel excavation, per se, or combined with the temporary supporting of the walls or roof of a shaft or tunnel is classified in Class 299.
- 414, Material or Article Handling, subclass 311 for a static receptacle and means of a nongravity type for discharging the receptacle and wherein the means includes at least one discharge assistant of the compound motion type and further wherein the assistant is located proximate to the bottom of the receptacle and is displaceable generally parallel thereto, and additionally wherein the assistant comprises a screw conveyor which includes means for loosening packed material.
- 451, Abrading, for abrading, generally.
- 454, Ventilation, appropriate subclasses for ventilation of general utility and particularly subclasses 168+ for ventilation specialized to use in mines. Subject matter directed to a mining plan or layout, but involving no more than features relating to ventilating the mine is classified in Class 474.
- 520, Synthetic Resins or Natural Rubbers, appropriate subclasses, particularly Class 523, subclasses 132+ for a composition containing a synthetic resin and having utility in situ as a soil conditioner or stabilizer or to processes of preparing said composition.

SUBCLASSES

1.05 AUTOMATIC CONTROL; SIGNALING, OR INDICATING:

This subclass is indented under the class definition. Process or apparatus comprising (1) sensing a condition which may or may not occur and initiating, modifying, or terminating the operation of a power operated means or (2) providing a visual or audible manifestation or representation of the operation of a device for the benefit of an observer.

- (1) Note. The sensing means may comprise a cutter and may be integrally connected to the control means.
- (2) Note. A valve which senses and controls with the same surface (i.e., a check valve) is not included as a sensing and control means under this definition. However, a valve which senses with one surface and controls the flow of motive fluid to a motor with a separate surface is included as a sensing and control means.

SEE OR SEARCH CLASS:

- 173, Tool Driving or Impacting, subclasses 2+ and the search there noted for automatic control of a tool driving or impacting device and subclasses 20+ for indicating or signaling means.
- 175, Boring or Penetrating the Earth, subclasses 24+ for automatic control of an earth boring means, subclass 39 for bit wear signal generating, and subclasses 40+ for an earth boring means or process with signaling, indicating, testing, or measuring.
- 340, Communications: Electrical, subclass 690 for geophysical position responsive indicating systems.
- 700, Data Processing: Generic Control Systems or Specific Applications, subclasses 1 through 89 for generic data processing control systems.

1.1 Ore/rock interface determination during cutting:

This subclass is indented under subclass 1.05. Process or apparatus where cutting means are adjusted to remove a mineral in response to the detection of a point where the mineral ends and the nonvaluable material begins.

1.2 On cutter head:

This subclass is indented under subclass 1.1. Process or apparatus where the sensor is located at or near the mineral contacting point.

1.3 Of tunneling apparatus having a wall temporary support:

This subclass is indented under subclass 1.05. Process or apparatus where a subterranean corridor is formed by an earth penetrating machine with a wall engaging means, where the machine is adjusted to follow a predetermined path.

SEE OR SEARCH CLASS:

405, Hydraulic and Earth Engineering, subclasses 141+ for boring a tunnel with the cutting device including a shield.

1.4 Of hard material disintegrating machine:

This subclass is indented under subclass 1.05. Process or apparatus where power operated means drives or advances a cutting means.

1.5 Floor working:

This subclass is indented under subclass 1.4. Process or apparatus in which the cutter breaks up material on the lower limit of a working location as distinct from a sidewall, endwall, or roof.

1.6 Sidewall working:

This subclass is indented under subclass 1.4. Process or apparatus in which the cutter breaks up material which forms a substantially vertical wall as the cutter advances parallel to the wall.

1.7 Of advancing material handling means or roof support:

This subclass is indented under subclass 1.6. Process or apparatus where a conveying means or an upper wall supporting means are moved with the cutter.

1.8 Of rotary cutter with advance direction coincident to rotary axis:

This subclass is indented under subclass 1.4. Process or apparatus in which the cutter is continuously moved unidirectionally about an axis and is caused to translate along said axis.

1.9 Of material handling means:

This subclass is indented under subclass 1.05. Process or apparatus where a means for moving or carrying material away from the position at which it is broken up is controlled in response to the sensed condition.

- (1) Note. See SEARCH CLASS notes of the class definition, for distinction between this subclass and Classes 198 and 405.

2

This subclass is indented under the class definition. Process or apparatus comprising recovering valuable material in the fluid state from the earth and including (1) process steps involving the construction or use of a horizontal passage in which a human may work or (2) the structure of a horizontal passage in which a human may work.

- (1) Note. Valuable material which is recovered from or through a tunnel is included under this definition even though the material may not be fluid in the native state (e.g., leached copper recovered in solution or coal gas formed by burning are included).

SEE OR SEARCH CLASS:

166, Wells, appropriate subclasses for a process or apparatus for recovering fluids from the earth in which a tunnel is not involved, and particularly subclass 50 for a well with a lateral conduit.

3

This subclass is indented under the class definition. Process or apparatus including a step or means for changing the physical state of a material from solid to liquid or gaseous in a location in the earth where it naturally occurs.

SEE OR SEARCH THIS CLASS, SUBCLASS:

17, for a process of obtaining valuable solid material from the earth as solid particles in a fluent state.

SEE OR SEARCH CLASS:

166, Wells, appropriate subclass for a process or apparatus for converting solid hydrocarbon to a fluid in situ and

- recovering the valuable hydrocarbon through a well solely in the fluid state. If any of the valuable material is recovered through a well as a solid, or a valuable material other than hydrocarbon is converted to fluid and recovered, classification is in Class 299.
- 405, Hydraulic and Earth Engineering, subclass 58 for subject matter relating to the construction of an underground fluid storage cavity by dissolving earth material; and subclass 131 for a process or apparatus for thawing the earth.
- 4** This subclass is indented under subclass 3. Subject matter directed to a plurality of cooperating wells, one of which receives a fluid for insertion into the earth, the other of which produces a fluid from the earth.
- SEE OR SEARCH CLASS:
- 166, Wells, subclasses 269+ and see the search there noted, for a process comprising the use of input and output wells, especially subclasses 272.1+ for such wells including heating and subclass 52 for plural wells.
- 5** This subclass is indented under subclass 3. Subject matter in which the state of the material is changed by (1) undergoing chemical change (e.g., entering into combustion or other chemical change) or (2) passing into solution in another material (e.g., salt in water).
- (1) Note. A state of colloidal dispersion or suspension is considered a dissolved condition of material.
- 6** This subclass is indented under subclass 3. Subject matter in which the material that is commercially desirable is converted to a fluid for recovery.
- SEE OR SEARCH CLASS:
- 166, Wells, subclasses 302+ for a well process involving heating and subclasses 57+ for well apparatus including heating means.
- 7** This subclass is indented under the class definition. Process or apparatus including a step or means for separating matter mined or excavated from the earth into at least two different components.
- (1) Note. This subclass includes an excavating step or means as provided for in Class 37, Excavating, when combined with a step or means to separate components of the excavated material.
- SEE OR SEARCH CLASS:
- 37, Excavating, appropriate subclass for a step or means for recovering alluvial or soft material from an in situ location. Class 37 includes selectively picking up materials, (e.g., using a screen in the intake of a suction nozzle), but excavation which includes any separation after the material is picked up is classified in Class 299.
- 171, Unearthing Plants or Buried Objects, appropriate subclass for process or apparatus for removing nonmineral objects close to the surface of the earth or from the earth and separating into constituent parts and subclass 16 for railroad ballast removal and assorting or separating.
- 172, Earth Working, subclass 32 for an earth working means combined with a means for separating parts of the earth from each other.
- 209, Classifying, Separating, and Assorting Solids, appropriate subclass for a process or means to separate solid materials into component parts, and including means to convey material to or from the excavating or separating means.
- 8** This subclass is indented under subclass 7. Subject matter in which the components of the material are separated without first conveying the mined or excavated material above the surface of the earth in which it is naturally located or above the surface of a body of water beneath which it.
- 9** This subclass is indented under subclass 7. Subject matter which the material is removed from a submerged location.

- SEE OR SEARCH CLASS:
37, Excavating, subclasses 307+ for dredgers.
- 10** This subclass is indented under the class definition. Processes .
- (1) Note. Processes for the subject matter of subclasses 1-9 are excluded from this definition.
- SEE OR SEARCH CLASS:
37, Excavating, subclass 195 for a process of recovering alluvial or soft material.
166, Wells, subclasses 244.1+ for a process of recovering valuable fluid material through a well in the earth.
175, Boring or Penetrating the Earth, subclass 61 and see the search there noted for a process of boring or penetrating the earth.
405, Hydraulic and Earth Engineering, appropriate subclasses for processes for treating or controlling earth formation, or for forming a structure therein.
- 11** This subclass is indented under subclass 10. Process in which a step is included for preventing a mining shaft or tunnel sidewall, roof or floor from caving, shifting or heaving.
- (1) Note. This subclass includes for example, a process including a step of constructing mine prop means, filling mine workings, controlling pressures in the mine to prevent dislocation of matter, removing pillars or other roof supports, etc. However, a process including a mere step of removing material to leave roof supporting sections or columns of material in place is classified on other features.
- SEE OR SEARCH CLASS:
405, Hydraulic and Earth Engineering, subclasses 132+ for a process or apparatus for making a shaft or tunnel. Class 405 provides for (1) excavating a tunnel or shaft and lining it, or (2) preventing a tunnel shaft or sidewall, roof, or floor from caving, shifting, or heaving if not combined with an excavating step or means.
- 12** This subclass is indented under subclass 10. Process in which a step is included for preventing injury to a human working in a mine or mining operation.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
11, for a process including a step for stabilizing the mine roof, sidewall or floor.
- SEE OR SEARCH CLASS:
169, Fire Extinguishers, subclass 45 for a process of preventing fire, and subclass 64 for apparatus for preventing or extinguishing a fire in a mine.
454, Ventilation, particularly subclasses 168+ for a process or apparatus for ventilating a mine for the safety and comfort of workers, including mine safety doors and means for supplying entombed miners with air.
- 13** This subclass is indented under subclass 10. Process in which material is disintegrated by means of a violently expansive chemical reaction.
- SEE OR SEARCH CLASS:
102, Ammunition and Explosives, subclasses 301+ for apparatus and methods of blasting.
175, Boring or Penetrating the Earth, subclasses 2+ for a process of boring in which an explosion in the bore hole is utilized.
- 14** This subclass is indented under subclass 10. Process in which a step is included for breaking up hard material in which (1) heat energy is directed into the material or (2) vibrational energy is applied to the material.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
3+, for a process of apparatus for in situ conversion of solid to fluid and usually involving the use of heat energy.

- SEE OR SEARCH CLASS:
- 166, Wells, subclass 177.5 and 177.6 for vibrating or fracturing apparatus in a well, subclass 249 for well processes comprising vibrating the earth.
- 175, Boring or Penetrating the Earth, subclasses 11+ for boring by directly applying heat to fluidize or comminute, subclass 17 for boring comprising heating within the bore and subclass 56 for vibration boring.
- 15** This subclass is indented under subclass 10. Process in which hard material in situ is removed as a relatively large, integral block of a predetermined shape.
- 16** This subclass is indented under subclass 10. Process in which a source of fluid at above atmospheric pressure is applied directly to material to mine or disintegrate the material.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 13, for a process of mining or disintegrating material by a violently expansive chemical reaction.
- SEE OR SEARCH CLASS:
- 166, Wells, subclasses 305.1+ for a well process relating to placing fluid into or fracturing the formation.
- 405, Hydraulic and Earth Engineering, subclass 248 for a method or apparatus for installing a pile in the earth utilizing fluid jets.
- 17** This subclass is indented under subclass 16. Process in which direct fluid action is impacting against the material.
- SEE OR SEARCH CLASS:
- 175, Boring or Penetrating the Earth, subclass 67 and see the search there noted for a process of boring by fluid erosion.
- 239, Fluid Sprinkling, Spraying, and Diffusing, subclasses 1+ for a process involving a fluid jet.
- 18** This subclass is indented under subclass 10. Processes in which a step is included for carrying the material away from the position at which it is mined or disintegrated.
- 19** This subclass is indented under the class definition. Apparatus comprising the structure or arrangement of an opening into the earth which is utilized to recover a valuable material.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 11, for a mine layout involving a process of stabilizing underground structure.
- 12, for a mine layout involving a process relating to mine safety.
- SEE OR SEARCH CLASS:
- 405, Hydraulic and Earth Engineering, subclasses 132+ for the structure of a shaft or tunnel, per se, including means to support shaft and tunnel walls, etc.
- 454, Ventilation, subclasses 168+ for mine structure relating to providing proper air supply and circulation for workers in a mine.
- 20** This subclass is indented under the class definition. Apparatus comprising a device which is inserted into an opening in hard material and is described as operated to apply such expansive pressure to the walls of the opening as to relatively move and break up the hard material.
- (1) Note. A means which is sealed into an opening and is described as supplying fluid pressure into the opening to break down material by expansive pressure, even though the fluid directly engages the material, is included under this definition.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 16+, for a process of breaking down material by direct fluid pressure.
- SEE OR SEARCH CLASS:
- 102, Ammunition and Explosives subclasses 301+ for a process or apparatus for rendering a heavy mass by the

- sudden release of gases under heavy pressure, such as an explosion.
- 166, Wells, subclass 177.5 for a means for fracturing a formation traversed by a well, and subclasses 179+ and the subclasses there noted for expansible packers or plugs, and subclasses 206+ and the subclasses there noted for expansible anchors.
- 21** This subclass is indented under subclass 20. Apparatus in which one element of the device is expanded relative to another by the application of fluid pressure to the elements.
- SEE OR SEARCH CLASS:
166, Wells, subclass 187 and the subclasses there noted for a packer or plug expanded by fluid pressure and subclass 212 and the subclasses there noted for an anchor expanded by fluid pressure.
- 22** This subclass is indented under subclass 21. Apparatus in which one fluid pressed element comprises a piston.
- 23** This subclass is indented under subclass 20. Apparatus in which the device comprises relatively movable elements, and an inclined face on one element cooperates with a face on another element to generate expansive pressure.
- SEE OR SEARCH CLASS:
166, Wells, subclass 217 and the subclasses there noted for a wedge operated expanding anchor.
254, Implements or Apparatus for Applying Pushing or Pulling Force, subclass 104 for a wedge type pushing device of general utility.
411, Expanded, Threaded, Driven, Headed, Tool-Deformed or Lock-Threaded Fastener, subclasses 15+ for expanding core and sleeve type fasteners.
- 24** This subclass is indented under the class definition. Apparatus comprising a machine or cutter which is described as for the purpose of disintegrating or cutting ice.
- (1) Note. This subclass provides an art group search for machines or cutters for a specifically disclosed use of working on ice. While in some cases the claimed device is not structurally limited to such function and the search must be continued in other subclasses, many features are found in these patents which are of limited use such as sled runner mounted and floating machines, ice block forming guides, and cutters which do not appear to be efficiently adaptable to the working of a material as hard as rock.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
3, for a process of apparatus for converting a solid such as ice to a fluid.
- SEE OR SEARCH CLASS:
114, Ships, subclasses 40+ for a vessel having means to break an ice flow or open a harbor or the like.
175, Boring or Penetrating the Earth, subclass 18 for a process or apparatus for boring or penetrating a hole in ice.
- 25** This subclass is indented under subclass 24. Apparatus in which the machine is provided with a cutter which, in addition to being advanced, has another movement (e.g. rotational) to accomplish the cutting or disintegrating action.
- SEE OR SEARCH CLASS:
114, Ships, subclass 42 for a vessel having a relatively driven cutter to break an ice flow or open a harbor or the like.
- 26** This subclass is indented under subclass 25. Apparatus in which the additional motion of the tool is reciprocatory.
- SEE OR SEARCH CLASS:
30, Cutlery, subclasses 164.5+ for ice pick or chipper type cutlery.
- 27** This subclass is indented under subclass 25. Apparatus in which the function of the cutting is described as for the purpose of cutting out blocks of ice.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
15, for a method of forming blocks of ice or other material in situ.

- 26, for a reciprocating cutter that is described as for the purpose of cutting out blocks of ice.
- 28** This subclass is indented under subclass 27. Apparatus including separate cutting blades.
- (1) Note. Separate cutting blades which are integrally connected are included under this definition.
- 29** This subclass is indented under the class definition. Apparatus comprising a cutting means and a power operated means to drive or advance said cutting means to cut, sever or break up hard material.
- (1) Note. For classification under this definition more of the machine must be claimed than a cutter tooth, plural cutter teeth or their immediate supporting or driving means, such structure merely comprising a cutter head. A cutter head or tooth is defined in subclass 79 of this class.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 1.05+, for a mining machine having an automatic control, signaling or indicating feature.
 20+, for an expansible device for breaking down material.
- SEE OR SEARCH CLASS:
 173, Tool Driving or Impacting, appropriate subclass for an apparatus of general utility for driving a tool.
- 30** This subclass is indented under subclass 29. Apparatus including a device to control the operation from a distant point such that an operator does not have to be located in the immediate area where the machine is working.
- (1) Note. A control that is specifically described as "remote" from the machine is included under this definition and includes control from a position in a tunnel of a machine located in a stop or drift, for example, as well as control from a location completely outside of an underground mine.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 1.05+, for a mining device having automatic control, signaling or indicating means and which may be remotely controlled.
- 31** This subclass is indented under subclass 29. Apparatus in which the advance causing means comprises a device having feet or plate type anchors which alternately engage and disengage the ground or the sidewalls of a tunnel to cause the apparatus to move forward.
- SEE OR SEARCH CLASS:
 180, Motor Vehicles, subclasses 8.1+ for a stepper type motor driven vehicle.
 254, Implements or Apparatus for Applying Pushing or Pulling Force, subclass 134.6 for a step by step type tractor for pulling cable in wire or stand placing.
 305, Wheel Substitutes for Land Vehicles, subclasses 1+ for a stepper type wheel substitute.
 405, Hydraulic and Earth Engineering, subclasses 299+ for a walking roof support for use in a mine, and which may be utilized for advancing a mining machine.
- 32** This subclass is indented under subclass 31. Apparatus in which a cutter, that comprises a blade which shaves off material layer by layer by advance motion only, is moved by the advance-causing means.
- 33** This subclass is indented under subclass 29. Apparatus including means to prevent material which comprises the upper wall of an underground mine chamber from descending into the chamber.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 11, for a process of stabilizing underground mine structure, including supporting the mine roof.
 31+, for a stepper type advance causing means which may also function as a walking roof support.

- SEE OR SEARCH CLASS:
 248, Supports, subclasses 351+ for a prop or brace of general utility.
 405, Hydraulic and Earth Engineering, subclasses 132+ for shaft and tunnel linings, per se, or combined with excavating means; and subclasses 288+ for temporary mine roof supports (props).
- 34.01 Cutter attached to endless chain or cable (e.g., planer type):**
 This subclass is indented under subclass 29. Machine in which a blade, plow (plough), tooth, bit, pick, or disk scraper, fixed to a length of flexible power transmission means connected at the ends, shaves off material layer by layer by advance motion only.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
 24, for a planer cutter for working ice.
 32, for a planer type cutter and a stepper type means causing the advance thereof.
- 34.02 With auxiliary cutter:**
 This subclass is indented under subclass 34.01. Planer-type cutter including an additional, separate or distinct mining machine (e.g., drum cutter, another planer cutter).
- 34.03 Roof-type cutter:**
 This subclass is indented under subclass 34.02. Auxiliary cutter in which the shaving means is for an overhead portion, relative to the floor.
- 34.04 Planer, plow, or knife details:**
 This subclass is indented under subclass 34.01. Planer-type cutter having a particular type of mounting means, having particular connections between members or portions, or having a particular arrangement of the shaving device.
- 34.05 With fluid supply:**
 This subclass is indented under subclass 34.04. Planer, plow, or knife detail including a gas or liquid container.
- 34.06 With vibrator:**
 This subclass is indented under subclass 34.04. Planer, plow, or knife detail including a device to create an rapid oscillating motion to enhance the shaving device.
- 34.07 Drive details:**
 This subclass is indented under subclass 34.01. Planer-type cutter having a particular type of gearing, transmission, clutch, etc.
- 34.08 Vertical height adjustment of entire installation:**
 This subclass is indented under subclass 34.01. Planer-type cutter in which the elevation of the mining machine and associated devices; e.g., conveyor, is changed relative to the floor.
- 34.09 Chain features and connected to miner:**
 This subclass is indented under subclass 34.01. Planer-type cutter which is attached to the endless power transmission means; e.g., chain, in a particular arrangement.
- 34.1 Guide, associated with conveyor, for chain or supply lines:**
 This subclass is indented under subclass 34.01. Planer-type cutter which includes a device, attached to the material handling means, that directs the endless power transmission means or utility pipes or cables.
- 34.11 Guide for adjustment of cutter:**
 This subclass is indented under subclass 34.01. Planer-type cutter which has its orientation changed by a directing device.
- 34.12 Pivoting cutter body:**
 This subclass is indented under subclass 34.01. Planer-type cutter which is mounted to allow rotation.
- 35** This subclass is indented under subclass 29. Apparatus in which the cutter comprises (1) a flexible, cable-like element which directly contacts the hard material to break it down or (2) a flexible, cable-like element which carries separate cutter teeth which directly contact the hard material, the portion of the hard material being cut being situated between guides over which the flexible cable element is drawn and the portion of the cable between said guides being

effectively shortened in length as the cutting proceeds.

36.1 Floor-working:

This subclass is indented under subclass 29. Machine in which the cutter breaks up material on the bottom surface of the working location, as distinct from the side or end walls or top surface.

(1) Note. Floor working use must be specifically disclosed for classification under this definition.

(2) Note. These devices are generally of the type supported by wheels or the like on a surface and the driven tool works the material of the supporting surface.

(3) Note. This definition includes devices described as disintegrating linoleum or the like from floors as well as concrete or asphalt road surfaces.

(4) Note. A device supported by a vessel floating on a body of water and working material on the submerged floor is included under this definition.

SEE OR SEARCH THIS CLASS, SUBCLASS:

24+, for a device for working ice on the bottom surface of a working location.

SEE OR SEARCH CLASS:

15, Brushing, Scrubbing, and General Cleaning, subclasses 78+ for a street sweeping machine, subclasses 93.1+ for a scraping machine and subclasses 98+ for a floor and wall wiping machine.

172, Earth Working, subclasses 777+ for scraper type tools, subclasses 133+ for diverse tools, and subclasses 518+ for rolling, rotating, or orbitally moving tool that works on the surface of the earth.

404, Road Structure, Process or Apparatus, subclasses 90+ for cutting, scarifying or disintegrating the pavement plus structure; e.g., drag, tamper, roller, to level or smooth the cut road pieces.

37.1 Reciprocating or oscillating cutter:

This subclass is indented under subclass 36.1. Floor working machine in which the cutter has a cyclic to and fro motion.

SEE OR SEARCH THIS CLASS, SUBCLASS:

26, for an ice working device driving a reciprocating cutter.

37.2 Resonant vibrator driven:

This subclass is indented under subclass 37.1. Reciprocating or oscillating cutter which is of the nonlinear motion sonic generator type; e.g., eccentric weight.

37.3 Impact or hammering-type cutter:

This subclass is indented under subclass 36.1. Floor working machine in which a falling weight, with appreciable striking velocity, hits the cutting means or is the cutting means.

37.4 Hydraulic piston and cylinder-type:

This subclass is indented under subclass 37.3. Impact or hammering cutter wherein the falling weight is assisted by compressed fluid pushing on a solid mass within a tubular vessel.

37.5 Hammer and anvil-type:

This subclass is indented under subclass 37.3. Impact or hammering cutter wherein the falling weight pounds a specific hardened or enlarged portion of the cutting means.

38.1 Narrow channel-forming type:

This subclass is indented under subclass 37.1. Reciprocating or oscillating cutter in which the cutter is described as forming a slot which has a relatively small width in the horizontal extent.

39.1 Rotary cutter:

This subclass is indented under subclass 36.1. Floor working machine in which the breaking up device turns about an axis.

SEE OR SEARCH THIS CLASS, SUBCLASS:

25+, for an ice working device having a rotary cutter.

- 39.2 With material handling:**
This subclass is indented under subclass 39.1. Rotary cutter including means to convey the broken up bottom surface.
- 39.3 Slot-type cutter; e.g., pavement saw:**
This subclass is indented under subclass 39.1. Rotary cutter in which a circular relatively thin, flat blade grooves the bottom surface.
- 39.4 Drum-type:**
This subclass is indented under subclass 39.1. Rotary cutter in which the breaking up device is mounted on a cylindrical member.
- 39.5 Shiftable horizontally:**
This subclass is indented under subclass 39.4. Drum rotary cutter which is movable in a direction transverse to the direction of travel.
- 39.6 Height adjustment:**
This subclass is indented under subclass 39.4. Drum rotary cutter which is movable in a direction substantially perpendicular to the bottom surface.
- 39.7 Yieldably mounted cutter:**
This subclass is indented under subclass 39.4. Drum rotary cutter in which the breaking up device connection is designed to fracture.
- 39.8 Specific mount for fixed projecting cutters:**
This subclass is indented under subclass 39.4. Drum rotary cutter in which the breaking up device has a particular type of attachment.
- 39.9 And having rotatable cutting element:**
This subclass is indented under subclass 39.1. Rotary cutter in which the bottom surface breaking up device is mounted to turn relative to the axis.
- 40.1 Freely rolling cutter:**
This subclass is indented under subclass 39.1. Rotary cutter in which the breaking up device is caused to move about an axis while in rolling contact with the bottom surface, due to the translation of the axis over the bottom surface rather than due to means driving the breaking up device about the axis.
- 41.1 Vertical cutter axis:**
This subclass is indented under subclass 39.1. Rotary cutter in which the cutter axis is disposed substantially perpendicular to the floor.
- 42** This subclass is indented under subclass 29. Apparatus in which the cutter is described as breaking up material which forms a substantially vertical wall as the cutter advances parallel to said wall.
- (1) Note. Sidewall working must be specifically disclosed for classification under this definition.
- (2) Note. This definition provides for mining machines of the "longwall" type. The principal distinction of machines under this definition is in the relatively long distance of sustained advance and the problem of handling the broken up material from the sidewall of an underground passage.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
34.1, and the search there noted for a machine which advances a planer type cutter, such cutter commonly disclosed as working on a sidewall.
- 43** This subclass is indented under subclass 42. Apparatus combined with means for moving or carrying material away from the position at which it is broken up.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
18, for a process of mining which includes a step of conveying the material.
34.1, and see the search there noted for a planer type cutting machine, usually of the sidewall working type and including material handling means.
64+, and see the search there noted for other hard material disintegrating machines having material handling means.
- 44** This subclass is indented under subclass 43. Apparatus in which the means to move or carry material is combined with a cutter that is

described as forming a cut at the bottom of a block of material, such material being subsequently dislodged to be handled by the moving or carrying means.

- (1) Note. A separate dislodging means does not necessarily have to be claimed for a patent to be included under this definition, as long as the cutter and conveyor are claimed and dislodging is described.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

65+, for a hard material disintegrating machine having undercutting, dislodging and material handling features.

- 45** This subclass is indented under subclass 43. Apparatus in which means to move or carry material away bodily follows the cutter into an opening being formed by the cutter during cutter operation.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

67, for a hard material disintegrating machine having material handling means which enter the cut with the cutter.

- 46** This subclass is indented under subclass 43. Apparatus in which means to move or carry material away is continuously, unidirectionally rotated about an axis.

- (1) Note. A rotary impeller which causes material to be moved or carried away is included under this definition whether the impeller directly contacts the material or not. For example, a fluid current conveyor system in which a rotary impeller causes the fluid circulation which moves material but does not directly contact the material is included hereunder.

- (2) Note. An orbitally moving material handling means, such as an endless belt conveyor is not included under this definition.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

68, for a hard material disintegrating machine having a rotary impeller type material handling means.

- 47** This subclass is indented under subclass 42. Apparatus in which the cutter is caused to advance by means of a cable or similar flexible element to which power is applied to pull the apparatus along, and which is generally described as having one extremity anchored against a fixed point in the working area, the power usually being applied by coiling the other end of the flexible member about a drum.

SEE OR SEARCH CLASS:

173, Tool Driving or Impacting, subclass 151 for a tool driving device of general utility combined with a driven flexible advance causing or controlling means.

254, Implements or Apparatus for Applying Pushing or Pulling Force, subclasses 264+ for apparatus for hauling or hoisting a load including a driven device which contacts and pulls on a cable.

- 48** This subclass is indented under subclass 47. Apparatus in which the cutter is connected to supporting structure in a manner such that the cutter may be swung or otherwise moved as a unit relative to said supporting structure in a substantially horizontal direction.

- (1) Note. For the definition of cutter see this class, subclass 79.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

73+, and see the search there noted for a machine having a cutter shiftable horizontally.

- 49** This subclass is indented under subclass 47. Apparatus in which the flexible element is coiled about an element (e.g., a drum) which rotates about a substantially horizontal axis.

- 50** This subclass is indented under subclass 49. Apparatus in which the axis of rotation of the element is substantially perpendicular to the vertical wall.
- 51** This subclass is indented under subclass 42. Apparatus in which the cutter teeth move through a path unidirectionally in a substantially horizontal plane.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
77, and see the search there noted for machines having cutters with teeth moving in a substantially horizontal orbit.
- 52** This subclass is indented under subclass 51. Apparatus in which the cutter is connected to supporting structure in a manner such that the cutter may be swung or otherwise shifted as a unit relative to the supporting structure in a substantially horizontal direction.
- (1) Note. For the definition of cutter see this class, subclass 79.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
48, for a sidewall working machine having a cutter shiftable horizontally and advanced by a flexible member.
74, for cutter shiftable horizontally which has a cutter with teeth moving in a substantially horizontal plane.
- 53** This subclass is indented under subclass 42. Apparatus in which the cutter teeth move through a path unidirectionally in a substantially vertical plane.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
78, and the search there noted for a machine having cutter teeth which move in a vertical orbit.
- 54** This subclass is indented under subclass 53. Apparatus in which the cutter is connected to supporting structure in a manner such that the cutter may be swung or otherwise shifted as a unit relative to the supporting structure in a substantially horizontal direction.
- (1) Note. For the definition of cutter see this class, subclass 79.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
48, for a sidewall working machine having a cutter shiftable horizontally and advanced by a flexible member.
73, and the search there noted for a cutter which is shiftable horizontally.
- 55** This subclass is indented under subclass 29. Apparatus in which the cutter is continuously moved unidirectionally about an axis and is caused to advance in the direction of a line corresponding to said axis.
- (1) Note. For the definition of cutter see this class, subclass 79.
- 56** This subclass is indented under subclass 55. Apparatus combined with means for moving or carrying material away from the position at which it is broken up.
- 57** This subclass is indented under subclass 56. Apparatus in which the cutting means comprises a plurality of cutter heads and the axes about which the heads are moved are spaced in a direction transverse to said axes.
- 58** This subclass is indented under subclass 55. Apparatus in which the entire machine follows the cutting means into the opening being formed by the cutting means as the cutting progresses.
- SEE OR SEARCH CLASS:
175, Boring or Penetrating the Earth, subclasses 92+ for a tool drive prime mover that follows a cutter below ground in an earth boring operation.
- 59** This subclass is indented under subclass 58. Apparatus in which the cutter means comprises two or more rotary heads which are driven so as to move relative to one another during operation.
- 60** This subclass is indented under subclass 59. Apparatus in which the cutter teeth on one of the rotary heads form a path of rotation which falls entirely within a circle described by the

path of rotation of the cutter teeth on another rotary head.

- 61** This subclass is indented under subclass 58. Apparatus in which means are provided to change the radius of the effective cutting area encircled by the cutter teeth.

SEE OR SEARCH CLASS:

175, Boring or Penetrating the Earth, subclass 202 for an above ground means to relatively move below ground earth boring tool elements and subclasses 263+ for an earth boring tool having a cutter element laterally shiftable below ground.

- 62** This subclass is indented under subclass 58. Apparatus including cutter teeth which cyclically impact upon or against the hard material.

- 63** This subclass is indented under subclass 29. Apparatus in which the means severs a large block of material in one cutting movement relative to the material, the cutting means comprising an endless loop which is described as arcuately swinging into and behind a block of material to sever the block in one sweep.

SEE OR SEARCH THIS CLASS, SUBCLASS:

15, for a mining process in which relatively large blocks of predetermined shape are severed.
 24+, for an ice working process in which relatively large blocks of ice are severed.
 44, for a sidewall working machine in which a conveyor cooperates with an undercutter, the material generally being handled in large chunks.
 55+, for a rotary cutter head with an advance direction coincident to the rotary axis and which may comprise an annular core forming type cutter which forms a core on advance movement and may include means to break the core loose from the formation as a chunk upon retraction.
 65+, for a mining machine in which a conveyor cooperates with an undercutter, the material generally being handled in large chunks.

SEE OR SEARCH CLASS:

175, Boring or Penetrating the Earth, subclasses 403+ and see the search notes therein for a core forming type earth boring tool.

- 64** This subclass is indented under subclass 29. Apparatus combined with means for moving or carrying material away from the position at which it is broken up.

SEE OR SEARCH THIS CLASS, SUBCLASS:

18, for a mining process including a step of material handling.
 34.1, and the search notes therein for a mining machine operating a planer type cutter and usually including a material handling means.
 43+, for a sidewall working machine combined with material handling means.
 56+, for a machine having a rotary cutter head with advance direction coincident to rotary axis combined with material handling means.
 63, for a machine having an endless loop or rotary chunk severing cutter and usually including a material handling means.

- 65** This subclass is indented under subclass 64. Apparatus in which the means to move or carry material is combined with a cutter that is described as forming a cut at the bottom of a block of material, such material being subsequently dislodged to be handled by the moving or carrying means.

(1) Note. A separate dislodging means does not necessarily have to be claimed for a patent to be included under this definition, as long as the cutter and conveyor are claimed and dislodging is described.

SEE OR SEARCH THIS CLASS, SUBCLASS:

44, for a sidewall working machine having an undercutter, dislodging and a conveying means.

- 66** This subclass is indented under subclass 65. Apparatus in which the cutter is connected to supporting structure in a manner such that the

cutter may be swung or otherwise shifted as a unit relative to said supporting structure in a substantially horizontal direction.

- (1) Note. For the definition of cutter see this class, subclass 79.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

73+, and see the search there noted for a machine having a cutter shiftable horizontally.

- 67** This subclass is indented under subclass 64. Apparatus in which means to move or carry material away bodily follows the cutter into an opening being formed by the cutter during cutter operation.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

45, for a sidewall working machine having a material handler that enters the cut with the cutting means.

56+, for a rotary head mining machine with advance direction coincident to rotary cutter axis combined with material handling means that generally follow the rotary head into the opening being formed.

- 68** This subclass is indented under subclass 64. Apparatus in which means to move or carry material away is continuously, unidirectionally rotated about an axis.

- (1) Note. A rotary impeller which causes material to be moved or carried away is included under this definition whether the impeller directly contacts the material or not. For example, a fluid current conveyor system in which a rotary impeller causes the fluid circulation which moves material but does not directly contact the material is included hereunder.

- (2) Note. An orbitally moving material handling means, such as an endless belt conveyor is not included under this definition.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

46, for a sidewall working machine having a material handling means of the rotary impeller type.

- 69** This subclass is indented under subclass 29. Apparatus in which the power operated means causes the cutter to cyclically longitudinally impact upon or against the hard material.

- (1) Note. For the definition of cutter see this class, subclass 79.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

62, for a rotary cutter head with advance direction coincident to rotary axis in which the drive follows the cutter into an opening formed thereby, and in which the rotary head carries an impact type cutter.

SEE OR SEARCH CLASS:

173, Tool Driving or Impacting, subclasses 90+ and see the search there noted for a tool impacting device.

- 70** This subclass is indented under subclass 69. Apparatus in which the cutter is connected to supporting structure in a manner such that the cutter may be swung or otherwise shifted as a unit relative to the supporting structure in a substantially horizontal direction.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

73+, and see the search there noted for a machine having a cutter shiftable horizontally.

- 71** This subclass is indented under subclass 29. Apparatus including plural, separate cutters, the cutters being connected to supporting structure in such a manner as to permit the cutters to be bodily swung or otherwise shifted relative to each other and to the supporting structure.

- (1) Note. For the definition of cutter see this class, subclass 79.

- 72** This subclass is indented under subclass 29. Apparatus in which the cutter is movable relative to its support so that the cutter teeth are operable in an orbit located in either a horizontal or a vertical plane.
- (1) Note. For the definition of cutter see this class, subclass 79.
- 73** This subclass is indented under subclass 29. Apparatus in which the cutter is connected to supporting structure in a manner such that the cutter may be swung or otherwise shifted as a unit relative to said supporting structure in a substantially horizontal direction.
- (1) Note. For the definition of cutter see this class, subclass 79.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 52, for a sidewall working machine having a cutter with a horizontal cutter tooth orbit in which the cutter is bodily movable in a horizontal plane.
- 54, for a sidewall working machine having a cutter with a vertical cutter tooth orbit in which the cutter is bodily movable in a horizontal plane.
- 66, for an undercutting and conveying machine having an undercutter bodily movable in a horizontal plane.
- 70, for an impact type mining machine having a cutter bodily movable in a horizontal plane.
- 74** This subclass is indented under subclass 73. Apparatus in which the cutter teeth move through a path unidirectionally in a plane which is substantially horizontal.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 52, for a sidewall working machine having a horizontal tooth orbit cutter which is bodily movable in a horizontal plane.
- 75** This subclass is indented under subclass 73. Apparatus in which the cutter is connected to the supporting structure in such a manner that the cutter may be swung or otherwise shifted as a unit relative to said supporting structure in a substantially vertical direction as well as in a horizontal direction.
- 76** This subclass is indented under subclass 29. Apparatus in which the cutter is connected to supporting structure in such a manner that the cutter may be swung or otherwise shifted as a unit relative to said supporting structure in a substantially vertical direction.
- (1) Note. For the definition of cutter see this class, subclass 79.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 72, for a machine having a cutter swivelled to operate in either a vertical or horizontal cutter tooth orbit.
- 75, for a machine having a cutter bodily movable in a horizontal plane which is also bodily movable in a vertical plane.
- 77** This subclass is indented under subclass 29. Apparatus in which the cutter teeth move through a path unidirectionally in a plane which is substantially horizontal.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 74, for a machine having a horizontal cutter tooth orbit cutter which is bodily movable in a horizontal plane.
- 78** This subclass is indented under subclass 29. Apparatus in which the cutter teeth move through a path unidirectionally in a plane which is substantially vertical.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 55+, for a vertical cutter tooth orbit rotary cutter head with advance direction coincident to rotary axis.
- 63, for a machine having an endless loop or rotary chunk severing cutter, the teeth of which generally circulate or rotate in a vertical orbit.
- 72, for a machine having a cutter which is swiveled to supporting structure to permit the cutter to operate as a vertical or horizontal cutter tooth or bit cutter.

73+, for a machine having a cutter bodily movable in a horizontal plane, which may be a vertical cutter tooth orbit cutter.

76, for a machine having a cutter bodily movable in a vertical plane, generally a vertical cutter tooth orbit cutter.

79.1 Cutter tooth or tooth head:

This subclass is indented under the class definition. Apparatus comprising (1) an element which is disclosed as specifically adapted to mechanically contact and selectively break up, scarify, or dislocate hard material, such hard material being described as in situ relative to the earth or (2) the immediate supporting means for such element.

(1) Note. The term “cutter” or “cutter head” as used in the title of this subclass and elsewhere in the titles and the definitions of this class comprises at least one element as defined in this subclass and the immediate supporting and driving means for an element. However, a motor or plural, relatively moving motion-transmitting elements are not included as immediate driving means for an element.

(2) Note. The term “cutter tooth” as used in the title of this subclass and elsewhere in the titles and definitions of this class, comprises the cutting element, per se.

SEE OR SEARCH THIS CLASS, SUBCLASS:

20+, for a device comprising relatively movable parts which are adapted to be inserted into an opening in material and dislocate the material by expansion therein.

24+, for a device adapted to cut, disintegrate or dislocate ice.

SEE OR SEARCH CLASS:

30, Cutlery, subclasses 165+ for cutting tools.

37, Excavating, subclasses 446+ for the digging edge and separable teeth of a scoop.

125, Stone Working, subclasses 36+ for a tool adapted to work hard material

which is not in situ relative to the earth.

172, Earth Working, subclasses 681+ for earth working tools.

175, Boring or Penetrating the Earth, subclasses 327+ for a bit or bit element.

241, Solid Material Comminution or Disintegration, subclasses 291+ for elements for breaking up solid material, which is not in situ relative to the earth.

433, Dentistry, subclasses 25+ for tools to cut natural teeth.

80.1 Adjustable head:

This subclass is indented under subclass 79.1. Cutter tooth or tooth head in which a portion of the elements' supporting means is relatively movable and maintains the elements in two or more different relative positions whereby the area of the hard material engaged by the tool is selectively variable.

(1) Note. The elements may be moved from one relative position to another either while the tool is operative or idle.

SEE OR SEARCH THIS CLASS, SUBCLASS:

61, for a mining machine having a rotary cutter head with advance direction coincident to the rotary axis, the drive following the cutter into the opening formed thereby, in which the cutting area is radially adjustable.

71, for a mining machine having relatively movable cutters.

SEE OR SEARCH CLASS:

175, Boring or Penetrating the Earth, subclasses 263+ for earth boring or penetrating tools which are expansible during operation, and subclass 382 for an earth boring or penetrating tool having an adjustable cutting element.

81.1 Cleansing fluid passage:

This subclass is indented under subclass 79.1. Cutter tooth or tooth head in which the elements' supporting means is provided with a conduit for a fluid to make wet the hard material contacting portion thereof or the adjacent area of the work.

SEE OR SEARCH CLASS:

175, Boring or Penetrating the Earth, subclasses 339+ for a rolling cutter bit or bit element having drilling fluid conduit details, subclass 393 for a bit or bit element having a fluid conduit lining or element, and subclasses 414+ for an impact bit having an internal fluid passage.

81.2 Fluid feed distributor or controller (e.g., manifold):

This subclass is indented under subclass 81.1. Cleansing fluid passage including a device with at least one inlet and more than two outlets.

81.3 Nozzle or seal details:

This subclass is indented under subclass 81.1. Cleansing fluid passage having a particular type of projecting vent or fluid-tight joint.

82.1 Endless-chain type head:

This subclass is indented under subclass 79.1. Cutter tooth or tooth head in which the element is moved by an articulated or flexible member such as a series of links or a cable.

- (1) Note. Specific structure of the flexible or articulated means or the supporting structure therefor must be claimed for classification under this definition. Merely reciting the cutter as a “chain cutter” and limiting the claim to cutter tooth or tooth mounting details is excluded and classified on other features.

SEE OR SEARCH THIS CLASS, SUBCLASS:

35, for a wire saw type cutting machine.
63, for an endless loop or rotary chunk severing cutting machine.

SEE OR SEARCH CLASS:

37, Excavating, subclasses 353+, 394+, and 462+ for excavating devices having cutting elements carried by flexible means.
172, Earth Working, subclass 100 and 542 for earth working tools carried on flexible means.

175, Boring or Penetrating the Earth, subclasses 89+ for an earth boring or penetrating tool carried on a continuously driven flexible or articulated member.

83.1 Plural teeth on single link:

This subclass is indented under subclass 82.1. Endless-chain type head in which one of the series carries at least two cutting elements.

SEE OR SEARCH THIS CLASS, SUBCLASS:

101, for a cutter having plural teeth, but which recites no specific flexible or articulated member structure or support therefor.

84.1 Nontracking tooth arrangement:

This subclass is indented under subclass 82.1. Endless-chain type head in which the elements carried by the flexible member are such that one element will describe a different path of travel than another element.

85.1 Plural heads moving relative to each other:

This subclass is indented under subclass 79.1. Cutter tooth or tooth head in which at least two of the supporting means operate at different speeds or translate in different directions.

- (1) Note. The relatively movable parts may comprise separate cutter teeth.
(2) Note. Relative movement between the parts during normal cutting operation must be specifically described for classification under this definition. For example, merely connecting a cutter element to a cutter head by means of resiliently biased retaining means is not included.

SEE OR SEARCH THIS CLASS, SUBCLASS:

59+, for a mining machine having relatively driven cutters, in which the drive follows a cutter into an opening formed by a rotary cutter head having advance direction coincident to rotary axis.
71, for a mining machine having relative bodily movable cutters.
80.1, for a tool having relatively adjustable head.
82.1, for a chain-type cutter head.

- 107, for a rotatable bit mounting including resiliently biased retaining means
- 109, for a planar bit mounting including resiliently biased retaining means.
- 85.2 Adjustable tooth:**
This subclass is indented under subclass 79.1. Cutter tooth or tooth head in which the element is movable relative to its support means.
- 87.1 Tooth mounted on helical head portion or head with helical conveying portion:**
This subclass is indented under subclass 79.1. Cutter tooth or tooth head in which the element is fastened to a spiral-shaped supporting means or the supporting means has a spiral shape member used to move material.
- (1) Note. The helix does not necessarily have to be continuous in extent through 360 degrees for classification herein, but may comprise a series of teeth describing, in overall extent, a broken convolution of 360 degrees.
- SEE OR SEARCH CLASS:
175, Boring or Penetrating the Earth, subclasses 394+ for an earth boring or penetrating bit having a helical conveying portion.
- 95** This subclass is indented under the class definition. Apparatus not provided for in other subclasses.
- (1) Note. This subclass includes, for example, devices for transporting mining apparatus in a mine shaft or tunnel.
- 100 Percussive tooth or bit::**
This subclass is indented under subclass 79.1. Cutter tooth or tooth head in which the element is operated by cyclic impact upon or against the hard material.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
26, for an ice working device having or comprising a reciprocating cutter.
69+, for a mining machine having an impact type cutter.
- SEE OR SEARCH CLASS:
175, Boring or Penetrating the Earth, subclasses 414+ for an impact type earth boring bit or bit element.
- 101 Plural cutting edges on tooth, pick, or bit:**
This subclass is indented under subclass 79.1. Cutter tooth or tooth head in which the element has more than one distinct contact point or line.
- 102 Clamped tooth holder or tooth mount:**
This subclass is indented under subclass 79.1. Cutter tooth or tooth head in which a means to connect the element to the supporting means is at least two members urged toward one another with a portion of the supporting means between the members.
- (1) Note. A mere bolt and nut or the like is not included as a clamping means under this definition.
- 103 Clamped tooth:**
This subclass is indented under subclass 79.1. Cutter tooth or tooth head in which the element is held by at least two members urged toward one another with a portion of the element between the members.
- (1) Note. A mere bolt and nut or the like is not included as a clamping means under this definition.
- 104 Wear shield or replaceable wear sleeve:**
This subclass is indented under subclass 79.1. Cutter tooth or tooth head including a component designed to abrade before the element or supporting means.
- 105 Wear resistant feature for tool body (e.g., hard facing):**
This subclass is indented under subclass 79.1. Cutter tooth or tooth head including a material; e.g., tungsten carbide, placed on the element or supporting means or both in order to abrade or erode before the element or supporting means due to the higher hardness.
- 106 Rolling or rotatable-type bit mount:**
This subclass is indented under subclass 79.1. Cutter tooth or tooth head comprising a means to connect the cutting element to the supporting means in order to enable turning.

- (1) Note. A connection between a cutter head and drive shaft or between plural sections of drive shaft is not included under this definition.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 101, for plural cutting edges on tooth, pick, or bit.

SEE OR SEARCH CLASS:

- 175, Boring or Penetrating the Earth, subclasses 412+ for an earth boring bit having plural separable cutter elements.

- 279, Chucks or Sockets, subclasses 9.1+ for a socket type holder.

- 107 Having a spring biased retainer:**
This subclass is indented under subclass 91.1. Rolling or rotatable type bit mount in which the connection includes a resilient member.

- 108 Planar-type bit mount:**
This subclass is indented under subclass 79.1. Cutter tooth or tooth head in which a means to connect the element is for an endless chain or cable.

- 109 Tooth mounting spring biased:**
This subclass is indented under subclass 91.2. Planar type bit mount in which the connection includes a resilient member.

- 110 Rolling or rotatable bit:**
This subclass is indented under subclass 79.1. Cutter tooth or tooth head in which the element able to spin, turn, or tend to spin on the material being contacted.

SEE OR SEARCH CLASS:

- 175, Boring or Penetrating the Earth, subclass 331, for an earth boring-type rolling cutter bit or rolling cutter bit element.

- 111 Insert or tip shape:**
This subclass is indented under subclass 79.1. Cutter tooth or tooth head in which the contact portion of a turnable element has a particular geometry.

- 112 Planer-type cutter insert or tip shape:**
This subclass is indented under subclass 79.1. Cutter tooth or tooth head in which the contact portion of an endless chain or cable element has a particular geometry.

- 113 Insert or tip mounting feature (e.g., soldering, brazing, friction or interference fit):**
This subclass is indented under subclass 79.1. Cutter tooth or tooth head in which the contact portion of the element is fastened in a particular manner.

END