

CPC**COOPERATIVE PATENT CLASSIFICATION****E21C****MINING OR QUARRYING****NOTE**

This subclass covers methods or apparatus specific to mining or quarrying

This subclass does not cover, even though they may be disclosed only for mining or quarrying, drill bits, bore reamers, core taking devices, drilling pipes or rods, handling, racking or connecting arrangements for drilling pipes or rods, counterboring or enlarging drilled holes, flame drilling, or other drilling apparatus, which are covered by subclass [E21B](#)

WARNING

The following IPC groups are not used in the CPC scheme. Subject matter covered by these groups is classified in the following CPC groups:

[E21C 1/02](#) covered by [E21B 3/02](#)
[E21C 1/04](#) " " [E21B 3/02S](#)
[E21C 1/06](#) " " [E21B 3/02B](#)
[E21C 1/08](#) " " [E21B 3/02D](#)
[E21C 1/12](#) " " [E21B 6/00](#)
[E21C 3/08](#) " " [B25D 9/06](#), [B25D 15/00](#)
[E21C 3/10](#) " " [B25D 15/02](#)
[E21C 3/12](#) " " [B25D 11/00](#)
[E21C 3/14](#) " " [B25D 11/00](#)
[E21C 3/20](#) " " [B25D 9/12](#)
[E21C 3/22](#) " " [B25D 9/125](#)
[E21C 3/28](#) " " [B25D 16/00B](#)
[E21C 3/30](#) " " [B25D 16/00B2](#)
[E21C 3/32](#) " " [B25D 9/265](#)
[E21C 3/34](#) " " [B25D 17/08](#)
[E21C 5/02](#) " " [E21B 19/08B](#)
[E21C 5/04](#) " " [E21B 19/08D](#)
[E21C 5/06](#) " " [E21B 19/08F](#)
[E21C 5/11](#) " " [E21B 19/08K](#), [E21B 19/08L](#)
[E21C 5/12](#) " " [E21B 19/08S](#)
[E21C 5/14](#) " " [E21B 44/00G2](#)
[E21C 5/16](#) " " [E21B 44/00](#)
[E21C 7/02](#) " " [E21B 21/00P](#)
[E21C 7/06](#) " " [E21B 21/14](#)
[E21C 11/02](#) " " [E21B 7/02](#)
[E21C 37/24](#) " " [B25D](#)
[E21C 37/26](#) " " [B25D](#)
[E21C 41/18](#) " " [E21C 41/16](#)
[E21C 41/20](#) " " [E21C 41/16](#)
[E21C 41/22](#) " " [E21C 41/16](#)
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[E21C 41/28](#) " " [E21C 41/26](#)
[E21C 41/30](#) " " [E21C 41/26](#)
[E21C 45/02](#) " " [E21C 25/60](#), [E21C 45/00](#)
[E21C 45/04](#) " " [E21C 25/60](#), [E21C 45/00](#)
[E21C 45/06](#) " " [E21C 25/60](#), [E21C 45/00](#)
[E21C 45/08](#) " " [E21C 25/60](#), [E21C 45/00](#)
[E21C 50/00](#) " " [E02F 3/88](#)
[E21C 50/02](#) " " [E02F 3/88](#), [E21C 7/00B](#)

Guidance heading: Drilling machines

E21C 1/00 **Rotary-drilling machines** (rotary-drilling machines in general [B23B](#) ; rotary earth drilling [E21B 3/00](#); driving of shafts, galleries or tunnels [E21D](#)) { not used, see subgroup and [E21B 3/00](#) }

[E21C 1/10](#) . with a built-in feeding device (feeding devices [E21C 5/00](#))

E21C 3/00 **Drilling machines with reciprocating tool that is intermittently turned when out of contact with the working face** (portable percussion tools in general [B25D](#))

[E21C 3/02](#) . Machines in which the tool is connected to an impulse member

[E21C 3/04](#) . Hammer drilling machines in which the tool is hit by an impulse member

[E21C 3/06](#) . Means for driving the impulse member { (not used, see subgroups and [B25D](#)) }

[E21C 3/16](#) . . by electromagnets

[E21C 3/18](#) . . directly by a piston of an internal-combustion engine

[E21C 3/24](#) . . directly by air, steam, or gas pressure

[E21C 3/26](#) . . . working with pulses

Guidance heading: Details of drilling apparatus

E21C 5/00 **Devices for feeding tool to working face** (feeding devices for metal-boring machines [B23B](#)) { not used, see subgroups and [E21B 19/08](#) }

[E21C 5/08](#) . Means for driving feed mechanism { not used, see subgroups and [E21B 19/08](#) }

[E21C 5/10](#) . . Separate motor, e.g. compressed-air motor or cylinder

E21C 7/00 **Dust eliminating or dust removing while drilling** ({see also [E21B 21/00](#) } ; equipment for preventing the formation of dust by slitting or dislodging machines [E21C 35/22](#); {by foam [E21B 21/14](#) };exhausting dust from mines [E21F 5/20](#))

[E21C 7/04](#) . using exhaust air from the drill motor for blowing-off the dust

[E21C 7/08](#) . by liquids

[E21C 7/10](#) . . Liquid flushing installations

[E21C 7/12](#) . Preventing exhaust air from the drill motor from blowing-off towards the working face

E21C 11/00 **Supports or guides for drilling machines ; Columns to which the machine is clamped** (feed legs [E21C 5/11](#); slitting machines mounted on supports [E21C 25/64](#); guiding, slitting, or dislodging machines [E21C 35/08](#))

Guidance heading: Cutting, Slitting, Dislodging

E21C 25/00 **Cutting machines, i.e. for making slits approximately parallel or perpendicular to the seam** (dislodging machines with slitting means [E21C 27/02](#), [E21C 27/10](#), [E21C 27/18](#))

- E21C 25/02 . Machines slitting solely by one or more percussive tools moved through the seam
- E21C 25/04 . . Cutting crowns or other tools ([percussion drill bits E21B 10/36](#))
- E21C 25/06 . Machines slitting solely by one or more cutting rods or cutting drums which rotate, move through the seam, and may or may not reciprocate
- E21C 25/08 . . Mountings for the rods or drums
- E21C 25/10 . . Rods; Drums
- E21C 25/14 . . with equipment for cleaning the slit ([associated with cutter chain machines E21C 25/50](#))
- E21C 25/145 . . . {COWLS }
- E21C 25/16 . Machines slitting solely by one or more rotating saws, cutting discs, or wheels
- E21C 25/18 . . Saws; Discs; Wheels
- E21C 25/20 . Machines slitting solely by one or more reciprocating sawing implements or reciprocating cutter chains; Shaker conveyers with cutting means
- E21C 25/22 . Machines slitting solely by one or more cutter chains moving unidirectionally along jibs
- E21C 25/24 . . with flat jibs only
- E21C 25/26 . . with curved jibs only
- E21C 25/28 . . Chains or chain guides
- E21C 25/30 . . . Chain guides
- E21C 25/32 . . . specially adapted for curved jibs
- E21C 25/34 . . Chains
- E21C 25/36 . . . Couplings for links
- E21C 25/365 {allowing the bending into at least two planes (chains for conveyers which are allowed to bend into at least two planes [B65G 17/385](#)) }
- E21C 25/40 . . . having links with integrally formed picks
- E21C 25/50 . . with equipment for cleaning the slit ([associated with rotary-rod or rotary-drum machines E21C 25/14](#))
- E21C 25/52 . Machines incorporating two or more of the slitting means according to groups [E21C 25/02](#), [E21C 25/06](#), [E21C 25/16](#), [E21C 25/20](#) and [E21C 25/22](#)
- E21C 25/54 . Slitting by unguided cutter cables or cutter chains, or by unguided tools drawn along the working face by cables or the like ([dislodging by planing means E21C 27/32](#); [propulsion by haulage cables E21C 29/14](#))
- E21C 25/56 . Slitting by cutter cables or cutter chains or by tools drawn along the working face by cables or the like, in each case guided parallel to the face, e.g. by a conveyer, by a guide parallel to a conveyer ([pressing the conveyer equipped with tools towards the working face E21C 35/14](#))
- E21C 25/58 . Machines slitting by drilling hole on hole
- E21C 25/60 . Slitting by jets of water or other liquid ([picks with arrangements of fluid-spraying nozzles E21C 35/187](#); [distribution of spraying fluids in rotating cutter-heads E21C 35/23](#))
- E21C 25/62 . Machines for making slits approximately perpendicular to the seams either level with,

or above or below the level of, the machine

E21C 25/64 . Slitting machines guided solely by hand and either carried by hand or mounted on supports ([supports or guides for drilling machines E21C 11/00](#); [hand-held power-operated tools E21C 37/22](#))

E21C 25/66 . Machines for making slits with additional arrangements for drilling

E21C 25/68 . Machines for making slits combined with equipment for removing, e.g. by loading, material won by other means ([slitting machines combined with planing means E21C 27/18](#); [removing chippings E21C 35/20](#))

E21C 27/00 Machines which completely free the mineral from the seam

E21C 27/01 . specially adapted for removing overhanging coal

E21C 27/02 . solely by slitting ([rods, drums, for same E21C 25/10](#); [saws, discs, wheels E21C 25/18](#); [chains, chain guides, for same E21C 25/28](#))

E21C 27/04 . . by a single chain guided on a frame with or without auxiliary slitting means

E21C 27/06 . . . with a slewing frame

E21C 27/08 . . with additional means for cutting the mineral into blocks

E21C 27/10 . by both slitting and breaking-down

E21C 27/12 . . breaking-down effected by acting on the vertical face of the mineral, e.g. by percussive tools

E21C 27/122 . . . {with breaking-down members having a striking action }

E21C 27/124 . . . {with rotatable cutters provided with breaking-down members }

E21C 27/126 . . . {with slitting and breaking-down members situated in parallel on an intermediary level }

E21C 27/128 . . . {with breaking-down members functioning on the slitting level }

E21C 27/14 . . breaking-down effected by force or pressure applied to side of slit, e.g. by wedges ([breaking-down by means inserted in boreholes E21C 37/00](#))

E21C 27/16 . . . with means for both slitting and breaking-down

E21C 27/18 . by both slitting and planing

E21C 27/20 . Mineral freed by means not involving slitting

E21C 27/22 . . by rotary drills with breaking-down means, e.g. wedge-shaped drills, {i.e. the rotary axis of the tool carrier being substantially perpendicular to the working face, e.g. [MARIETTA-type \(similar machines for tunneling E21D 9/102\)](#) }

E21C 27/24 . . by milling means acting on the full working face, {i.e. the rotary axis of the tool carrier being substantially parallel to the working face ([similar machines for tunneling E21D 9/1026](#)) }

E21C 27/26 . . by closely adjacent cutter chains acting on the full working face

E21C 27/28 . . by percussive drills with breaking-down means, e.g. wedge-shaped tools

E21C 27/30 . . by jaws, buckets or scoops that scoop-out the mineral

E21C 27/32 . . by adjustable or non-adjustable planing means with or without loading arrangements ([by percussed planing means E21C 27/46](#))

- E21C 27/34 . . . Machine propelled along the working face by cable or chain
- E21C 27/35 Ram-ploughs
- E21C 27/36 . . . Machine self-propelled along the working face
- E21C 27/38 . . . Machine stationary while planing in an arc
- E21C 27/40 . . . Machine and its planing tool making alternative step-wise movements along the working face
- E21C 27/42 . . . combined with scraper or collector box
- E21C 27/44 . . . Planing knives ([mining picks E21C 35/18](#))
- E21C 27/46 . . by percussed planing means

E21C 29/00 Propulsion of machines for slitting or completely freeing the mineral from the seam

- E21C 29/02 . by means on the machine exerting a thrust against fixed supports
- E21C 29/04 . by cable or chains
- E21C 29/06 . . anchored at one or both ends to the mine working face { ([propulsion using fixed racks along which the machine is running E21C 29/02](#)) }
- E21C 29/08 . . . Anchoring arrangements ([for anchoring of conveyers only E21F 13/00](#))
- E21C 29/10 . . . Cable or chain co-operating with a winch or the like on the machine
- E21C 29/12 . . . Machines propelled by thrust or pull against a part alternately anchored to and released from a cable or chain
- E21C 29/14 . . by haulage cable or chain pulling the machine along the working face
- E21C 29/145 . . . {[Means for tensioning the haulage chains or cables](#) }
- E21C 29/16 . . . Winches or other means for pulling cable or chain ([winches in general B66D](#))
- E21C 29/18 . . . Coupling and uncoupling machine to cable or chain
- E21C 29/185 {[with coupling or uncoupling of the machine at will](#) }
- E21C 29/20 . . with safety devices operating in the event of breakage of the cable or chain
- E21C 29/22 . by wheels, endless tracks or the like { ([propulsion using fixed racks along which the machine is running E21C 29/02](#)) }
- E21C 29/24 . . Trucks carrying the machine while working
- E21C 29/26 . . . with means for adjustably positioning the machine on the truck
- E21C 29/28 adjusting the height of the whole machine

E21C 31/00 Driving means incorporated in machines for slitting or completely freeing the mineral from the seam

- E21C 31/02 . for cutting or breaking-down devices
- E21C 31/025 . . {[by another slitting or extracting member](#) }
- E21C 31/04 . . imparting both a rotary and reciprocating motion
- E21C 31/06 . . actuated by an endless cable or chain
- E21C 31/08 . for adjusting parts of the machines
- E21C 31/10 . for slewing parts of the machines

- E21C 31/12 . Component parts
- E21C 33/00 Trucks or other devices for transporting machines for slitting or completely freeing the mineral from the seam**
- E21C 33/02 . with equipment for loading or unloading the machine on to or from the truck
- E21C 33/025 .. {the unloaded machine remaining connected to the transport vehicle }
- E21C 35/00 Miscellaneous items relating to machines for slitting or completely freeing the mineral from the seam**
- E21C 35/02 . Locking equipment for slewable parts
- E21C 35/04 . Safety devices (operating in the event of breakage of a haulage cable or chain [E21C 29/20](#))
- E21C 35/043 .. {Protection against overload during transfer of machines for slitting or completely freeing the mineral from the seam }
- E21C 35/046 .. {Protection of cables or pipes for supplying power }
- E21C 35/06 . Equipment for positioning the whole machine in relation to its substructure
- E21C 35/08 . Guiding the machine
- E21C 35/10 .. by feelers contacting the working face
- E21C 35/12 .. along a conveyer for the cut mineral
- E21C 35/125 ... {Means for inclining the conveyer }
- E21C 35/14 ... Equipment for pressing the conveyer towards the working face
- E21C 35/16 .. by making use of the timbering, filling, or other supports
- E21C 35/18 . Mining picks; Holders therefor (planing knives [E21C 27/44](#); { pick-like bits for milling stone like materials [B28D 1/186](#) })
- E21C 2035/1803 .. Inserts or layers of wear-resistant material
- E21C 2035/1806 ... Fixing methods or devices
- E21C 2035/1809 ... Multiple inserts
- E21C 2035/1813 ... Chemical composition or specific material
- E21C 2035/1816 ... characterised by the shape
- E21C 2035/182 .. Reversible picks, i.e. having two working ends, one operating, the other in reserve
- E21C 2035/1823 .. using a locking piston actuated hydraulically, e.g. by spraying-fluid pressure
- E21C 2035/1826 .. characterised by adaptations to use an extraction tool
- E21C 35/183 .. with inserts or layers of wear-resistant material { (drill bits with wear-resistant parts [E21B 10/46](#)) }
- E21C 35/187 .. with arrangement of fluid-spraying nozzles (supply of fluid to the nozzles [E21C 35/22](#))
- E21C 35/19 .. Means for fixing picks or holders
- E21C 2035/191 ... for fixing holders
- E21C 35/193 ... using bolts as main fixing elements

- E21C 35/1933 {the picks having a cylindrical shank }
- E21C 35/1936 {the picks having a square- or rectangular-section shank }
- E21C 35/197 . . . using sleeves, rings or the like, as main fixing elements

- E21C 35/20 . General features of equipment for removal of chippings e.g. for loading on conveyor

- E21C 35/22 . Equipment for preventing the formation of, or for removal of, dust (removing dust while drilling [E21C 7/00](#); picks with arrangement of fluid-spraying nozzles [E21C 35/187](#))
- E21C 35/223 . . {Equipment associated with mining machines for sucking dust-laden air from the cutting area, with or without cleaning of the air }
- E21C 2035/226 . . Control valves for the spraying liquid used in dust suppression systems
- E21C 35/23 . . Distribution of spraying-fluids in rotating cutter-heads

- E21C 35/24 . Remote control specially adapted for machines for slitting or completely freeing the mineral (control in general [G05](#))

- E21C 37/00** **Other methods or devices for dislodging with or without loading (breaking-down by means inserted in slits [E21C 27/14](#))**

- E21C 37/005 . {by projectiles }
- E21C 37/02 . by wedges
- E21C 37/04 . by devices with parts pressed mechanically against the wall of a borehole {or a slit }
- E21C 37/06 . by making use of hydraulic or pneumatic pressure in a borehole
- E21C 37/08 . . Devices with pistons, plungers, or the like, pressed locally against the wall of the borehole { ([E21C 37/10](#) takes precedence) }
- E21C 37/10 . . Devices with expanding elastic casings
- E21C 37/12 . . by injecting into the borehole a liquid, either initially at high pressure or subsequently subjected to high pressure, e.g. by pulses, by explosive cartridges acting on the liquid (slitting by jets of water [E21C 25/60](#); blasting by explosives [F42D](#))
- E21C 37/14 . . by compressed air; by gas blast; by gasifying liquids

- E21C 37/16 . by fire-setting or by similar methods based on a heat effect (drilling by use of heat [E21B 7/14](#))

- E21C 37/18 . by electricity
- E21C 37/20 . by ultrasonics

- E21C 37/22 . Hand tools or hand-held power-operated tools specially adapted for dislodging minerals (slitting machines guided solely by hand [E21C 25/64](#))
- E21C 37/24 . . Pick hammers (pneumatic hammers in general [B25D](#) ; percussion drilling [E21B 1/00](#))

- E21C 37/26 . Chisels or other cutting tools not mentioned before

- E21C 39/00** **Devices for testing in situ the hardness or other properties of minerals, e.g. for giving information as to the selection of suitable mining tools**

Guidance heading: **Methods of mining or quarrying; Open-pit mining; Layouts therefor** (methods or apparatus for obtaining oil, gas, water, soluble or meltable materials or a slurry of minerals from wells [E21B 43/00](#))

E21C 41/00 **Methods of underground or surface mining** ([E21C 45/00](#) takes precedence) ; **Lay-outs therefor** (for peat [E21C 49/00](#))

WARNING

Groups [E21C 41/02](#) to [E21C 41/14](#) are no longer used for classification. Documents are reclassified to groups [E21C 41/16](#), [E21C 41/26](#) and [E21C 41/32](#)

[E21C 41/04](#) . for hard coal

[E21C 41/10](#) . for oil-bearing deposits

[E21C 41/14](#) . for other specified minerals, e.g. gold, mercury, other heavy metals, sulfur, slate ; for clay

[E21C 41/16](#) . Methods of underground mining ([winning machines therefor E21C 25/00 to E21C 39/00](#)) ; Layouts therefor

WARNING

Group [E21C 41/16](#) is incomplete. See Warning after [E21C 41/00](#)

[E21C 41/18](#) . . for brown or hard coal

[E21C 41/20](#) . . for rock salt or potash salt

[E21C 41/22](#) . . for ores, e.g. mining placers

[E21C 41/24](#) . . for oil-bearing deposits

[E21C 41/26](#) . Methods of surface mining ([machines for obtaining, or the removal of, materials in open-pit mines E21C 47/00](#)) ; Layouts therefor

WARNING

Group [E21C 41/26](#) is incomplete. See Warning after [E21C 41/00](#)

[E21C 41/28](#) . . for brown or hard coal

[E21C 41/30](#) . . for ores, e.g. mining placers

[E21C 41/31](#) . . { for oil-bearing deposits }

[E21C 41/32](#) . Reclamation of surface-mined areas ([machines or methods for treating or working soil for agricultural purposes A01B 77/00, A01B 79/00; machines for back-filling E02F 5/22](#))

WARNING

Group [E21C 41/32](#) is incomplete, see other groups of [E21C 41/00](#)

E21C 43/00 **Methods for preparing for the gasification of coal underground** (methods for

generating gas [C10B](#))

E21C 45/00 **Methods of hydraulic mining; Hydraulic monitors** ([E21C 25/60](#) takes precedence)

- E21C 45/02 . Means for generating pulsating fluid jets
- E21C 45/04 . . by use of highly pressurised liquid
- E21C 45/06 . . by use of compressed gases
- E21C 45/08 . Automatic or remote control of hydraulic monitors

E21C 47/00 **Machines for obtaining or the removal of materials in open-pit mines** ([obtaining peat E21C 49/00](#))

- E21C 47/02 . for coal, brown coal, or the like ([dredgers or soil-shifting machines in general E02F](#))
- E21C 47/04 . . Conveyer bridges used in co-operation with the winning apparatus
- E21C 47/06 . . Cableway conveyers used in co-operation with the winning apparatus ([underground hauling E21F 13/00](#))
- E21C 47/08 . . Devices for cutting-out partings, e.g. layers of sand between seams of coal
- E21C 47/10 . for quarrying stone, sand, gravel, or clay

E21C 49/00 **Obtaining peat; Machines therefor** ([treating peat C10F](#))

- E21C 49/02 . by excavating
- E21C 49/04 . by digging in the form of peat sods

E21C 50/00 **Obtaining minerals from underwater, not otherwise provided for** ([suction dredgers or component parts thereof E02F 3/88](#); [equipment for conveying or separating excavated material E02F 7/00](#); [dippers G01N 1/12](#))

- E21C 50/02 . dependent on the ship movements ([vessels or floating structures adapted for special purposes B63B 35/00](#))

E21C 51/00 **Apparatus for, or methods of, winning materials from extraterrestrial sources** ([cosmonautics B64G](#))