

## SECTION E — FIXED CONSTRUCTIONS

## E21 EARTH OR ROCK DRILLING; MINING

## E21C MINING OR QUARRYING

**Subclass index**

## CUTTING; SLITTING; DISLODGING

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**Cutting; Slitting; Dislodging**

<b>25/00</b>	<b>Cutting machines, i.e. for making slits approximately parallel or perpendicular to the seam</b> (dislodging machines with slitting means E21C 27/02, E21C 27/10, E21C 27/18)	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)
25/02	• Machines slitting solely by one or more percussive tools moved through the seam	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 toward the working face E21C 35/14)
25/04	• • Cutting crowns or other tools (percussion drill bits E21B 10/36)	25/58	• Machines slitting by drilling hole on hole
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	25/60	• Slitting by jets of water or other liquid (picks with arrangement of fluid-spraying nozzles E21C 35/187; distribution of spraying fluids in rotating cutter-heads E21C 35/23) [6]
25/08	• • Mountings for the rods or drums	25/62	• Machines for making slits approximately perpendicular to the seams either level with, or above or below the level of, the machine
25/10	• • Rods; Drums [6]	25/64	• Slitting machines guided solely by hand and either carried by hand or mounted on supports (hand-held power-operated tools E21C 37/22)
25/14	• • with equipment for cleaning the slit (associated with cutter chain machines E21C 25/50)	25/66	• Machines for making slits with additional arrangements for drilling
25/16	• Machines slitting solely by one or more rotating saws, cutting discs, or wheels	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)
25/18	• • Saws; Discs; Wheels	<b>27/00</b>	<b>Machines which completely free the mineral from the seam</b>
25/20	• Machines slitting solely by one or more reciprocating sawing implements or reciprocating cutter chains; Shaker conveyers with cutting means	27/01	• specially adapted for removing overhanging coal
25/22	• Machines slitting solely by one or more cutter chains moving unidirectionally along jibs	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)
25/24	• • with flat jibs only	27/04	• • by a single chain guided on a frame with or without auxiliary slitting means
25/26	• • with curved jibs only	27/06	• • • with a slewing frame
25/28	• • Chains or chain guides [6]	27/08	• • with additional means for cutting the mineral into blocks
25/30	• • • Chain guides	27/10	• by both slitting and breaking-down
25/32	• • • specially adapted for curved jibs		
25/34	• • • Chains		
25/36	• • • Couplings for links		
25/40	• • • having links with integrally formed picks		
25/50	• • with equipment for cleaning the slit (associated with rotary-rod or rotary-drum machines E21C 25/14)		
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

- 27/12 • • breaking-down effected by acting on the vertical face of the mineral, e.g. by percussive tools
- 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)
- 27/16 • • • with means for both slitting and breaking-down
- 27/18 • by both slitting and planing
- 27/20 • Mineral freed by means not involving slitting
- 27/22 • • by rotary drills with breaking-down means, e.g. wedge-shaped drills
- 27/24 • • by milling means acting on the full working face
- 27/26 • • by closely adjacent cutter chains acting on the full working face
- 27/28 • • by percussive drills with breaking-down means, e.g. wedge-shaped tools
- 27/30 • • by jaws, buckets, or scoops that scoop-out the mineral
- 27/32 • • by adjustable or non-adjustable planing means with or without loading arrangements (by percussed planing means E21C 27/46)
- 27/34 • • • Machine propelled along the working face by cable or chain
- 27/35 • • • • Ram-ploughs
- 27/36 • • • Machine self-propelled along the working face
- 27/38 • • • Machine stationary while planing in an arc
- 27/40 • • • Machine and its planing tool making alternative step-wise movements along the working face
- 27/42 • • • combined with scraper or collector box
- 27/44 • • • Planing knives (mining picks E21C 35/18)
- 27/46 • • by percussed planing means
- 29/00 Propulsion of machines for slitting or completely freeing the mineral from the seam**
- 29/02 • by means on the machine exerting a thrust against fixed supports
- 29/04 • by cable or chains
- 29/06 • • anchored at one or both ends to the mine working face
- 29/08 • • • Anchoring arrangements (for anchoring of conveyers only E21F 13/00)
- 29/10 • • • Cable or chain co-operating with a winch or the like on the machine
- 29/12 • • • Machines propelled by thrust or pull against a part alternately anchored to, and released from, a cable or chain
- 29/14 • • by haulage cable or chain pulling the machine along the working face
- 29/16 • • • Winches or other means for pulling cable or chain (winches in general B66D)
- 29/18 • • • Coupling and uncoupling machine to cable or chain
- 29/20 • • with safety devices operating in the event of breakage of the cable or chain
- 29/22 • by wheels, endless tracks, or the like
- 29/24 • • Trucks carrying the machine while working
- 29/26 • • • with means for adjustably positioning the machine on the truck
- 29/28 • • • • adjusting the height of the whole machine
- 31/00 Driving means incorporated in machines for slitting or completely freeing the mineral from the seam**
- 31/02 • for cutting or breaking-down devices
- 31/04 • • imparting both a rotary and reciprocating motion
- 31/06 • • actuated by an endless cable or chain
- 31/08 • for adjusting parts of the machines
- 31/10 • for slewing parts of the machines
- 31/12 • Component parts
- 33/00 Trucks or other devices for transporting machines for slitting or completely freeing the mineral from the seam**
- 33/02 • with equipment for loading or unloading the machine on to, or from, the truck
- 35/00 Details of, or accessories for, machines for slitting or completely freeing the mineral from the seam, not provided for in groups E21C 25/00-E21C 33/00, E21C 37/00 or E21C 39/00**
- 35/02 • Locking equipment for slewable parts
- 35/04 • Safety devices (operating in the event of breakage of a haulage cable or chain E21C 29/20)
- 35/06 • Equipment for positioning the whole machine in relation to its sub-structure
- 35/08 • Guiding the machine
- 35/10 • • by feelers contacting the working face
- 35/12 • • along a conveyer for the cut material
- 35/14 • • • Equipment for pressing the conveyer towards the working face
- 35/16 • • by making use of the timbering, filling, or other supports
- 35/18 • Mining picks; Holders therefor (planing knives E21C 27/44) **[6]**
- 35/183 • • with inserts or layers of wear-resisting material **[6]**
- 35/187 • • with arrangement of fluid-spraying nozzles (supply of fluid to the nozzles E21C 35/22) **[6]**
- 35/19 • • Means for fixing picks or holders **[6]**
- 35/193 • • • using bolts as main fixing elements **[6]**
- 35/197 • • • using sleeves, rings or the like, as main fixing elements **[6]**
- 35/20 • General features of equipment for removal of chippings, e.g. for loading on conveyer
- 35/22 • Equipment for preventing the formation of, or for removal of, dust (picks with arrangement of fluid-spraying nozzles E21C 35/187; methods or apparatus for flushing boreholes E21B 21/00)
- 35/23 • • Distribution of spraying-fluids in rotating cutter-heads **[6]**
- 35/24 • Remote control specially adapted for machines for slitting or completely freeing the mineral (control in general G05)
- 37/00 Other methods or devices for dislodging with or without loading** (breaking-down by means inserted in slits E21C 27/14)
- 37/02 • by wedges
- 37/04 • by devices with parts pressed mechanically against the wall of a borehole
- 37/06 • by making use of hydraulic or pneumatic pressure in a borehole
- 37/08 • • Devices with pistons, plungers, or the like pressed locally against the wall of the borehole
- 37/10 • • Devices with expanding elastic casings
- 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)
- 37/14 • • by compressed air; by gas blast; by gasifying liquids
- 37/16 • by fire-setting or by similar methods based on a heat effect (drilling by use of heat E21B 7/14)
- 37/18 • by electricity
- 37/20 • by ultrasonics

- 37/22 • Hand tools or hand-held power-operated tools specially adapted for dislodging minerals (slitting machines guided solely by hand E21C 25/64)
- 37/24 • • Pick hammers (pneumatic hammers in general B25D; percussion drilling E21B 1/00)
- 37/26 • Chisels or other cutting tools not mentioned before
- 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**

**Methods of mining or quarrying; Open-pit mining; Layouts therefor**

- 41/00 Methods of underground or surface mining** (E21C 45/00 takes precedence); **Layouts therefor** (for peat E21C 49/00) [5]
- 41/16 • Methods of underground mining (winning machines therefor E21C 25/00-E21C 39/00); Layouts therefor [5]
- 41/18 • • for brown or hard coal [5]
- 41/20 • • for rock salt or potash salt [5]
- 41/22 • • for ores, e.g. mining placers [5]
- 41/24 • • for oil-bearing deposits [5]
- 41/26 • Methods of surface mining (machines for obtaining, or the removal of, materials in open-pit mines E21C 47/00); Layouts therefor [5]
- 41/28 • • for brown or hard coal [5]
- 41/30 • • for ores, e.g. mining placers [5]
- 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) [5]
- 45/00 Methods of hydraulic mining; Hydraulic monitors** (E21C 25/60 takes precedence) [5]

- 45/02 • Means for generating pulsating fluid jets [5]
- 45/04 • • by use of highly pressurised liquid [5]
- 45/06 • • by use of compressed gases [5]
- 45/08 • Automatic or remote control of hydraulic monitors [5]
- 47/00 Machines for obtaining, or the removal of, materials in open-pit mines** (obtaining peat E21C 49/00)
- 47/02 • for coal, brown coal, or the like (dredgers or soil-shifting machines in general E02F) [3]
- 47/04 • • Conveyer bridges used in co-operation with the winning apparatus [3]
- 47/06 • • Cableway conveyers used in co-operation with the winning apparatus (underground hauling E21F 13/00)
- 47/08 • • Devices for cutting-out partings, e.g. layers of sand between seams of coal
- 47/10 • for quarrying stone, sand, gravel, or clay
- 49/00 Obtaining peat; Machines therefor** (treating peat C10F)
- 49/02 • by excavating
- 49/04 • by digging in the form of peat sods
- 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) [5]
- 50/02 • dependent on the ship movements (vessels or floating structures adapted for special purposes B63B 35/00) [5]
- 51/00 Apparatus for, or methods of, winning materials from extraterrestrial sources** (cosmonautics B64G) [2]