COOPERATIVE PATENT CLASSIFICATION

E FIXED CONSTRUCTIONS

EARTH DRILLING; MINING

E21 MINING DRILLING; MINING

E21C MINING OR QUARRYING

NOTES

1. This subclass covers methods or apparatus specific to mining or quarrying
2. 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

WARNINGS

1. The following IPC groups are not in the CPC scheme. The subject matter for these IPC groups is classified in the following CPC groups:

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2. In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.
Drilling machines

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))

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

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))

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

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

3/06  . (Means for driving the impulse member (not used, see subgroups and B25D))

3/16  . . [by electromagnets]

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

3/24  . . [directly by air, steam, or gas pressure]

3/26  . . . [working with pulses]

Details of drilling apparatus

5/00  (Devices for feeding to tool to working face (feeding devices for metal-boring machines B23B not used, see subgroups and E21B 19/08))

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

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

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 25/20))

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

7/08  . . [by liquids]

7/10  . . [Liquid flushing installations]

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

11/00  (Supports or guides for drilling machines; Columns to which the machine is clamped (feed legs E21C5/11; slitting machines mounted on supports E21C 25/64; guiding, slitting, or dislodging machines E21C 35/08))

Cutting, Slitting, Dislodging

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)

25/02  . . Machines slitting solely by one or more percussive tools moved through the seam

25/04  . . Cutting crowns or other tools (percussion drill bits E21B 10/36)

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

25/08  . . Mountings for the rods or drums

25/10  . . Rods; Drums

25/14  . . with equipment for cleaning the slit (associated with cutter chain machines E21C 25/50)

25/15  . . . . [Cowls]

25/16  . Machines slitting solely by one or more rotating saws, cutting discs, or wheels

25/18  . . Saws; Discs; Wheels

25/20  . . Machines slitting solely by one or more reciprocating sawing implements or reciprocating cutter chains; Shaker conveyors with cutting means

25/22  . Machines slitting solely by one or more cutter chains moving unidirectionally along jibs

25/24  . . with flat jibs only

25/26  . . with curved jibs only

25/28  . . Chains or chain guides

25/30  . . . . Chain guides

25/32  . . . . specially adapted for curved jibs

25/34  . . . . Chains

25/36  . . . . . Couplings for links

25/365  . . . . . . [allowing the bending into at least two planes (chains for conveyors which are allowed to bend into at least two planes B65G 17/385)]

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

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)

25/56  . . 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 conveyor, by a guide parallel to a conveyor (pressing the conveyor equipped with tools towards the working face E21C 35/14)

25/58  . . Machines slitting by drilling hole on hole

25/60  . . Slitting by jets of water or other liquid (picks with arrangements of fluid-spraying nozzles E21C 35/18; distribution of spraying fluids in rotating cutter-heads E21C 35/23)

25/62  . . Machines for making slits approximately perpendicular to the seams either level with, or above or below the level of, the machine

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)

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

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)

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

27/01  . . specially adapted for removing overhanging coal
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)
27/04. . . by a single chain guided on a frame with or
without auxiliary slitting means
27/06. . . . with a slewing frame
27/08. . . with additional means for cutting the mineral into
blocks
27/10. . . by both slitting and breaking-down
27/12. . . breaking-down effected by acting on the vertical
face of the mineral, e.g. by percussive tools
27/122. . . {with breaking-down members having a
striking action}
27/124. . . {with rotatable cutters provided with breaking-
down members}
27/126. . . [with slitting and breaking-down members
situated in parallel on an intermediary level]
27/128. . . {with breaking-down members functioning on the
slitting level}
27/14. . . breaking-down effected by force or pressure
applied to side of slit, e.g. by wedges (breaking-
down by means inserted in boresholes
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 [, 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)]
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)]
27/26. . . by closely adjacent cutter chains acting on the full
working face
27/28. . . by percussive drills with breaking-down means, e.g.
edge-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 (propulsion using fixed racks along which
the machine is running E21C 29/02)
29/08. . . . Anchoring arrangements (for anchoring of
conveyors 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
29/145. . . . [Means for tensioning the haulage chains or
cables]
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
29/185. . . . [with coupling or uncoupling of the machine
at will]
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 (propulsion
using fixed racks along which the machine is
running E21C 29/02))
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
31/025. . . [by another slitting or extracting member]
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
33/025. . . . [the unloaded machine remaining connected to
the transport vehicle]

35/00 Miscellaneous items relating to machines for
slitting or completely freeing the mineral from the
seam
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)
35/043. . . {Protection against overload during transfer of
machines for slitting or completely freeing the
mineral from the seam}
35/046. . . . {Protection of cables or pipes for supplying
power}
35/06. . . Equipment for positioning the whole machine in
relation to its substructure
35/08. . . Guiding the machine
35/10. . . by feelers contacting the working face
35/12. . . along a conveyor for the cut mineral
35/125. . . . [Means for inclining the conveyor]
35/14. . . . Equipment for pressing the conveyor towards
the working face
Cutting, Slitting, Dislodging

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

37/005 by projectiles
37/02 by wedges
37/04 by devices with parts pressed mechanically against the wall of a borehole [or a slit]
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 ([E21C 37/10 takes precedence])
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 (methods or apparatus for obtaining oil, gas, water, soluble or meltable materials or a slurry of minerals from wells E21B 43/00)

41/00 Methods of underground or surface mining ([E21C 45/00 takes precedence]; Layouts therefor (for peat E21C 49/00)

WARNING Groups E21C 41/28 - E21C 41/14 are no longer used for classification. Documents are reclassified to groups E21C 41/16, E21C 41/26 and E21C 41/32

41/04 for hard coal
41/10 for oil-bearing deposits
41/14 for other specified minerals, e.g. gold, mercury, other heavy metals, sulfur, slate; for clay
41/16 Methods of underground mining (winning machines therefor E21C 25/00 - E21C 39/00); Layouts therefor

WARNING Group E21C 41/16 is incomplete. See Warning after E21C 41/00

41/18 for brown or hard coal
41/20 for rock salt or potash salt
41/22 for ores, e.g. mining placers
41/24 for oil-bearing deposits
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

41/28 for brown or hard coal
41/30 for ores, e.g. mining placers
41/31 for oil-bearing deposits
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
43/00 [Methods for preparing for the gasification of coal underground (methods for generating gas C10B)]

45/00 Methods of hydraulic mining; Hydraulic monitors (E21C 25/60 takes precedence)
45/02 . Means for generating pulsating fluid jets
45/04 . . by use of highly pressurised liquid
45/06 . . by use of compressed gases
45/08 . Automatic or remote control of hydraulic monitors

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)
47/04 . . Conveyor bridges used in co-operation with the winning apparatus
47/06 . . Cableway conveyors 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)
50/02 . dependent on the ship movements (vessels or floating structures adapted for special purposes B63B 35/00)

51/00 Apparatus for, or methods of, winning materials from extraterrestrial sources (cosmonautics B64G)