

CPC COOPERATIVE PATENT CLASSIFICATION

E FIXED CONSTRUCTIONS

EARTH DRILLING; MINING

E21 EARTH DRILLING; MINING

E21B EARTH DRILLING, e.g. DEEP DRILLING (mining, quarrying [E21C](#); making shafts, driving galleries or tunnels [E21D](#)); OBTAINING OIL, GAS, WATER, SOLUBLE OR MELTABLE MATERIALS OR A SLURRY OF MINERALS FROM WELLS

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:

E21B 7/08	covered by	E21B 7/06
E21B 43/22	covered by	C09K 8/58
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.

Methods or apparatus for drilling

1/00 Percussion drilling (drives used in the borehole [E21B 4/00](#))

NOTE

When classifying in groups [E21B 1/12](#) - [E21B 1/38](#), a symbol from one of the following main groups of [B25D](#) should also be given:

- [B25D 9/00](#) Portable percussive tools with fluid-pressure drives
- [B25D 11/00](#) Portable percussive tools with motor drive
- [B25D 16/00](#) Portable percussive machines with superimposed rotation
- [B25D 17/00](#) Details of, or accessories for, portable power-driven percussive tools

WARNING

Group [E21B 1/00](#) is impacted by reclassification into groups [E21B 1/12](#), [E21B 1/14](#), [E21B 1/16](#), [E21B 1/18](#), [E21B 1/20](#), [E21B 1/22](#), [E21B 1/24](#), [E21B 1/26](#), [E21B 1/28](#), [E21B 1/30](#), [E21B 1/32](#), [E21B 1/34](#), [E21B 1/36](#), and [E21B 1/38](#).

All groups listed in this Warning should be considered in order to perform a complete search.

1/02 . Surface drives for drop hammers {or percussion drilling}, e.g. with a cable

WARNING

Group [E21B 1/02](#) is incomplete pending reclassification of documents from group [E21B 1/12](#).

Group [E21B 1/02](#) is also impacted by reclassification into groups [E21B 1/04](#), [E21B 1/36](#) and [E21B 1/38](#).

All groups listed in this Warning should be considered in order to perform a complete search.

1/04 . . Devices for reversing the movement of the rod or cable at the surface

WARNING

Group [E21B 1/04](#) is incomplete pending reclassification of documents from groups [E21B 1/02](#) and [E21B 1/12](#).

All groups listed in this Warning should be considered in order to perform a complete search.

1/12 . with a reciprocating impulse member ([E21B 1/02](#), [E21B 1/38](#) take precedence)

WARNING

Group [E21B 1/12](#) is incomplete pending reclassification of documents from group [E21B 1/00](#).

Group [E21B 1/12](#) is also impacted by reclassification into groups [E21B 1/02](#), [E21B 1/04](#), [E21B 1/14](#), [E21B 1/16](#), [E21B 1/18](#), [E21B 1/20](#), [E21B 1/22](#), [E21B 1/24](#), [E21B 1/26](#), [E21B 1/28](#), [E21B 1/30](#), [E21B 1/32](#), [E21B 1/34](#) and [E21B 1/38](#).

All groups listed in this Warning should be considered in order to perform a complete search.

1/14 . . driven by a rotating mechanism

WARNING

Groups [E21B 1/14](#) - [E21B 1/20](#) are incomplete pending reclassification of documents from groups [E21B 1/00](#) and [E21B 1/12](#).

All groups listed in this Warning should be considered in order to perform a complete search.

1/16 . . . with spring-mounted reciprocating masses, e.g. with air cushion

1/18 with elastic joining of the drive to the push-rod by double buffer springs

- 1/20 . . . formed as centrifugal hammers
- 1/22 . . driven by electromagnets
- WARNING**
- Group [E21B 1/22](#) is incomplete pending reclassification of documents from groups [E21B 1/00](#) and [E21B 1/12](#).
- All groups listed in this Warning should be considered in order to perform a complete search.

- 1/24 . . the impulse member being a piston driven directly by fluid pressure

WARNING

Groups [E21B 1/24](#) - [E21B 1/34](#) are incomplete pending reclassification of documents from groups [E21B 1/00](#) and [E21B 1/12](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 1/26 . . . by liquid pressure
- 1/28 working with pulses
- 1/30 . . . by air, steam or gas pressure
- 1/32 working with pulses
- 1/34 the impulse member being a piston of an internal-combustion engine
- 1/36 . Tool-carrier piston type, i.e. in which the tool is connected to an impulse member

WARNING

Group [E21B 1/36](#) is incomplete pending reclassification of documents from groups [E21B 1/00](#), [E21B 1/02](#) and [E21B 1/12](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 1/38 . Hammer piston type, i.e. in which the tool bit or anvil is hit by an impulse member

WARNING

Group [E21B 1/38](#) is incomplete pending reclassification of documents from groups [E21B 1/00](#), [E21B 1/02](#) and [E21B 1/12](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 3/00 Rotary drilling** (drives used in the borehole [E21B 4/00](#); rotary drilling machines in general [B23B](#))

WARNING

Group [E21B 3/00](#) is impacted by reclassification into groups [E21B 3/02](#), [E21B 3/022](#), [E21B 3/025](#), [E21B 3/03](#), [E21B 3/035](#), [E21B 3/04](#), [E21B 3/045](#), and [E21B 3/06](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 3/02 . Surface drives for rotary drilling

WARNING

Group [E21B 3/02](#) is incomplete pending reclassification of documents from group [E21B 3/00](#).

Group [E21B 3/02](#) is also impacted by reclassification into group [E21B 3/022](#).

Groups [E21B 3/00](#), [E21B 3/02](#), and [E21B 3/022](#) should be considered in order to perform a complete search.

- 3/022 . . {Top drives}

WARNING

Group [E21B 3/022](#) is incomplete pending reclassification of documents from groups [E21B 3/00](#) and [E21B 3/02](#).

Groups [E21B 3/00](#), [E21B 3/02](#), and [E21B 3/022](#) should be considered in order to perform a complete search.

- 3/025 . . with a to-and-fro rotation of the tool

WARNING

Group [E21B 3/025](#) is incomplete pending reclassification of documents from group [E21B 3/00](#).

Groups [E21B 3/00](#) and [E21B 3/025](#) should be considered in order to perform a complete search.

- 3/03 . . with an intermittent unidirectional rotation of the tool

WARNING

Group [E21B 3/03](#) is incomplete pending reclassification of documents from group [E21B 3/00](#).

Groups [E21B 3/00](#) and [E21B 3/03](#) should be considered in order to perform a complete search.

- 3/035 . . with slipping or elastic transmission

WARNING

Group [E21B 3/035](#) is incomplete pending reclassification of documents from group [E21B 3/00](#).

Groups [E21B 3/00](#) and [E21B 3/035](#) should be considered in order to perform a complete search.

- 3/04 . . Rotary tables {(portable drilling rigs with rotary tables [E21B 7/021](#))}

WARNING

Groups [E21B 3/04](#) – [E21B 3/06](#) are incomplete pending reclassification of documents from group [E21B 3/00](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 3/045 . . . {movably mounted on the drilling structure or platform (derricks adapted to be moved on their substructure [E21B 15/003](#))}

3/06	. . . Adaptation of rotary draw works to drive rotary tables (connecting or disconnecting couplings or joints E21B 19/16 ; rope, cable, or chain winding mechanisms, capstans B66D)	7/022	. . {Control of the drilling operation; Hydraulic or pneumatic means for activation or operation (control circuits for drilling masts E21B 15/045)}
4/00	Drives for drilling, used in the borehole	7/023	. . {the mast being foldable or telescopically retractable}
4/003	. {Bearing, sealing, lubricating details (for roller bits E21B 10/22)}	7/024	. . {having means for adapting to inclined terrain; having means for stabilizing the vehicle while drilling}
4/006	. {Mechanical motion converting means, e.g. reduction gearings (E21B 4/10 takes precedence)}	7/025	. . {Rock drills, i.e. jumbo drills}
4/02	. Fluid rotary type drives (hydraulic turbines for drilling wells F03B 13/02)	7/026	. . {having auxiliary platforms, e.g. for observation purposes}
4/04	. Electric drives (E21B 4/12 takes precedence)	7/027	. . {Drills for drilling shallow holes, e.g. for taking soil samples or for drilling postholes}
4/06	. Down-hole impacting means, e.g. hammers (percussion drill bits E21B 10/36 ; boring rams E21B 11/02 ; releasing-jars E21B 31/107)	7/028	. . . {the drilling apparatus being detachable from the vehicle, e.g. hand portable drills}
4/08	. . impact being obtained by gravity only, e.g. with lost-motion connection	WARNING	
4/10	. . continuous unidirectional rotary motion of shaft or drilling pipe effecting consecutive impacts	Group E21B 7/028 is incomplete pending reclassification of documents from group E21B 11/005 .	
4/12	. . Electrically operated hammers	Groups E21B 11/005 and E21B 7/028 should be considered in order to perform a complete search.	
4/14	. . Fluid operated hammers		
4/145	. . . {of the self propelled-type, e.g. with a reverse mode to retract the device from the hole}		
4/16	. Plural down-hole drives, e.g. for combined percussion and rotary drilling (E21B 4/10 takes precedence); Drives for multi-bit drilling units	7/04	. Directional drilling ({derricks or masts specially adapted therefor E21B 15/04)}
4/18	. Anchoring or feeding in the borehole	7/043	. . {for underwater installations}
4/20	. combined with surface drive (E21B 4/10 takes precedence)	7/046	. . {horizontal drilling (drilling with mechanical conveying means E21B 7/003)}
6/00	Drives for drilling with combined rotary and percussive action (drives used in the borehole E21B 4/00; portable percussive machines with superimposed rotation B25D 16/00)	7/06	. . Deflecting the direction of boreholes
6/02	. the rotation being continuous	7/061	. . . {the tool shaft advancing relative to a guide, e.g. a curved tube or a whipstock}
6/04	. . Separate drives for percussion and rotation	7/062	. . . {the tool shaft rotating inside a non-rotating guide travelling with the shaft (E21B 7/067 and E21B 7/068 take precedence)}
6/06	. the rotation being intermittent, e.g. obtained by ratchet device	7/064	. . . {specially adapted drill bits therefor}
6/08	. . Separate drives for percussion and rotation	7/065	. . . {using oriented fluid jets}
7/00	Special methods or apparatus for drilling	7/067	. . . {with means for locking sections of a pipe or of a guide for a shaft in angular relation, e.g. adjustable bent sub}
7/001	. {Drilling a non circular hole (excavating trenches E02F 5/02 ; cutting machines for slitting E21C 25/00)}	7/068	. . . {drilled by a down-hole drilling motor (down-hole drives per se E21B 4/00 , E21B 7/067 takes precedence)}
7/002	. {Drilling with diversely driven shafts extending into the borehole (simultaneously drilling and casing E21B 7/20 ; plural down-hole drives E21B 4/16 ; E21B 7/001 takes precedence)}	7/10	. . Correction of deflected boreholes
7/003	. {Drilling with mechanical conveying means (tunnelling E21D)}	7/12	. Underwater drilling ({derricks or masts specially adapted therefor E21B 15/02 ; } telescoping joints E21B 17/07 ; using heave compensators E21B 19/09 ; well heads specially adapted for underwater installations E21B 33/035)}
7/005	. . {with helical conveying means (E21B 7/201 takes precedence; augers E21B 10/44 ; drilling rods or pipes with helical structure E21B 17/22)}	7/122	. . {with submersible vertically movable guide}
7/006	. . . {combined with a bucket-type container}	7/124	. . with underwater tool drive prime mover, e.g. portable drilling rigs for use on underwater floors
7/007	. {Drilling by use of explosives (underwater drilling using explosives E21B 7/1245)}	7/1245	. . . {using explosive means (anchors driven in by explosive charges B63B 21/28)}
7/008	. {Drilling ice or a formation covered by ice}	7/128	. . from floating support with independent underwater anchored guide base
7/02	. Drilling rigs characterized by means for land transport {with their own drive}, e.g. skid mounting or wheel mounting (portable drilling rigs for use on underwater floors E21B 7/124)	7/132	. . from underwater buoyant support
7/021	. . {With a rotary table, i.e. a fixed rotary drive for a relatively advancing tool}	7/136	. . from non-buoyant support (E21B 7/124 takes precedence)
		7/14	. Drilling by use of heat, e.g. flame drilling
		7/143	. . {underwater}
		7/146	. . {Thermal lances}
		7/15	. . of electrically generated heat

- 7/16 . Applying separate balls or pellets by the pressure of the drill, so-called shot-drilling
- 7/18 . Drilling by liquid or gas jets, with or without entrained pellets ([E21B 7/14](#) takes precedence; [hydraulic monitors E21C 45/00](#))
- 7/185 . . {underwater}
- 7/20 . Driving or forcing casings or pipes into boreholes, e.g. sinking; Simultaneously drilling and casing boreholes (surface means for applying to-and-fro rotation movements to the casing [E21B 3/025](#); placing piles [E02D 7/00](#); sinking shafts while moving the lining downwards [E21D 1/08](#) {; making galleries by forcing prefabricated elements through the ground [E21D 9/005](#)})
- 7/201 . . {with helical conveying means}
- 7/203 . . . {using down-hole drives}
- 7/205 . . {without earth removal ([E21B 7/30](#) takes precedence))}

NOTE

Special methods or apparatus for drilling without earth removal [E21B 7/26](#)

- 7/206 . . . {using down-hole drives}
- 7/208 . . {using down-hole drives ([E21B 7/203](#) and [E21B 7/206](#) take precedence)}
- 7/24 . Drilling using vibrating or oscillating means, e.g. out-of-balance masses ([percussion drilling E21B 1/00](#))
- 7/26 . Drilling without earth removal, e.g. with self-propelled burrowing devices ([E21B 7/30](#) takes precedence; down-hole drives [E21B 4/00](#) {, e.g. self-propelled fluid-operated hammers [E21B 4/145](#)})

WARNING

Group [E21B 7/26](#) is impacted by reclassification into group [E21B 7/267](#).

Groups [E21B 7/26](#) and [E21B 7/267](#) should be considered in order to perform a complete search.

- 7/265 . . {Combined with earth removal}

WARNING

Group [E21B 7/265](#) is impacted by reclassification into group [E21B 7/267](#).

Groups [E21B 7/265](#) and [E21B 7/267](#) should be considered in order to perform a complete search.

- 7/267 . . {Drilling devices with senders, e.g. radio-transmitters for position of drilling tool}

WARNING

Group [E21B 7/267](#) is incomplete pending reclassification of documents from groups [E21B 7/26](#) and [E21B 7/265](#).

Groups [E21B 7/26](#), [E21B 7/265](#), and [E21B 7/267](#) should be considered in order to perform a complete search.

- 7/28 . Enlarging drilled holes, e.g. by counterboring ([drill bits for enlarging the borehole E21B 10/26](#))
- 7/30 . . without earth removal

Drilling tools

10/00

Drill bits (specially adapted for deflecting the direction of boring [E21B 7/064](#); with means for collecting substances [E21B 27/00](#))

10/003

. {with cutting edges facing in opposite axial directions}

10/006

. {providing a cutting edge which is self-renewable during drilling}

10/02

. Core bits (characterised by wear resisting parts [E21B 10/46](#); obtaining undisturbed cores [E21B 25/00](#))

10/04

. . with core destroying means

10/06

. . Roller core bits

10/08

. Roller bits (roller core bits [E21B 10/06](#); with leading portion [E21B 10/26](#); characterised by wear resisting parts [E21B 10/46](#))

10/083

. . {with longitudinal axis, e.g. wobbling or nutating roller bit (longitudinal axis roller reamers [E21B 10/30](#))}

10/086

. . {with excentric movement}

10/10

. . with roller axle supported at both ends (with disc-cutters [E21B 10/12](#))

10/12

. . with discs cutters

10/14

. . combined with non-rolling cutters other than of leading-portion type

10/16

. . characterised by tooth form or arrangement

10/18

. . characterised by conduits or nozzles for drilling fluids (drilling fluid supply to the bearings [E21B 10/23](#))

10/20

. . characterised by detachable or adjustable parts, e.g. legs or axles (cross axle roller bits [E21B 10/10](#))

10/22

. . characterised by bearing, lubrication or sealing details

10/23

. . . with drilling fluid supply to the bearings

10/24

. . . characterised by lubricating details

10/246

. . . . {with pumping means for feeding lubricant}

10/25

. . . characterised by sealing details

10/26

. Drill bits with leading portion, i.e. drill bits with a pilot cutter; Drill bits for enlarging the borehole, e.g. reamers ([percussion drill bits with leading portion E21B 10/40](#); augers with leading portion [E21B 10/44](#))

WARNING

Group [E21B 10/26](#) is impacted by reclassification into group [E21B 10/265](#).

Groups [E21B 10/26](#) and [E21B 10/265](#) should be considered in order to perform a complete search.

10/265

. . {Bi-center drill bits, i.e. an integral bit and eccentric reamer used to simultaneously drill and underream the hole}

WARNING

Group [E21B 10/265](#) is incomplete pending reclassification of documents from groups [E21B 10/26](#), [E21B 10/28](#), [E21B 10/30](#), [E21B 10/32](#), [E21B 10/322](#), [E21B 10/325](#), [E21B 10/327](#), [E21B 10/34](#), and [E21B 10/345](#).

All groups listed in this Warning should be considered in order to perform a complete search.

10/28 . . . with non-expandible roller cutters

WARNING

Group [E21B 10/28](#) is impacted by reclassification into group [E21B 10/265](#).

Groups [E21B 10/28](#) and [E21B 10/265](#) should be considered in order to perform a complete search.

10/30 . . . Longitudinal axis roller reamers, e.g. reamer stabilisers

WARNING

Group [E21B 10/30](#) is impacted by reclassification into group [E21B 10/265](#).

Groups [E21B 10/30](#) and [E21B 10/265](#) should be considered in order to perform a complete search.

10/32 . . . with expandible cutting tools

WARNING

Group [E21B 10/32](#) is impacted by reclassification into group [E21B 10/265](#).

Groups [E21B 10/32](#) and [E21B 10/265](#) should be considered in order to perform a complete search.

10/322 . . . {cutter shifted by fluid pressure ([E21B 10/345](#) takes precedence)}

WARNING

Group [E21B 10/322](#) is impacted by reclassification into group [E21B 10/265](#).

Groups [E21B 10/322](#) and [E21B 10/265](#) should be considered in order to perform a complete search.

10/325 . . . {the cutter being shifted by a spring mechanism}

WARNING

Group [E21B 10/325](#) is impacted by reclassification into group [E21B 10/265](#).

Groups [E21B 10/325](#) and [E21B 10/265](#) should be considered in order to perform a complete search.

10/327 . . . {the cutter being pivoted about a longitudinal axis ([E21B 10/34](#) takes precedence)}

WARNING

Group [E21B 10/327](#) is impacted by reclassification into group [E21B 10/265](#).

Groups [E21B 10/327](#) and [E21B 10/265](#) should be considered in order to perform a complete search.

10/34 . . . of roller-cutter type

WARNING

Group [E21B 10/34](#) is impacted by reclassification into group [E21B 10/265](#).

Groups [E21B 10/34](#) and [E21B 10/265](#) should be considered in order to perform a complete search.

10/345 {cutter shifted by fluid pressure}

WARNING

Group [E21B 10/345](#) is impacted by reclassification into group [E21B 10/265](#).

Groups [E21B 10/345](#) and [E21B 10/265](#) should be considered in order to perform a complete search.

10/36 . Percussion drill bits ({with helical conveying portion [E21B 10/445](#);} characterised by wear resisting parts [E21B 10/46](#))

10/38 . . characterised by conduits or nozzles for drilling fluids

10/40 . . with leading portion

10/42 . Rotary drag type drill bits with teeth, blades or like cutting elements, e.g. fork-type bits, fish tail bits (characterised by wear resisting parts [E21B 10/54](#)); by conduits or nozzles for drilling fluid [E21B 10/60](#); by detachable or adjustable parts [E21B 10/62](#))

WARNING

Group [E21B 10/42](#) is impacted by reclassification into groups [E21B 10/62](#), [E21B 10/627](#), and [E21B 10/633](#).

All groups listed in this Warning should be considered in order to perform a complete search.

10/43 . . characterised by the arrangement of teeth or other cutting elements

WARNING

Group [E21B 10/43](#) is impacted by reclassification into groups [E21B 10/62](#), [E21B 10/627](#), and [E21B 10/633](#).

All groups listed in this Warning should be considered in order to perform a complete search.

10/44 . Bits with helical conveying portion, e.g. screw type bits; Augers with leading portion or with detachable parts ([E21B 10/42](#) takes precedence; drilling rods with helical structure [E21B 17/22](#))

10/445 . . {percussion type, e.g. for masonry}

10/46 . characterised by wear resisting parts, e.g. diamond inserts

10/48 . . the bit being of core type

10/485 . . . {with inserts in form of chisels, blades or the like}

10/50 . . the bit being of roller type

10/52 . . . with chisel- or button-type inserts

10/54 . . the bit being of the rotary drag type, e.g. fork-type bits

10/55 . . . with preformed cutting elements ([inserts per se E21B 10/56](#), [E21B 10/58](#))

10/56 . . Button-type inserts ([E21B 10/52](#) takes precedence)

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