

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

- 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
- 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](#))
- 4/00 Drives for drilling, used in the borehole**
- 4/003 . {Bearing, sealing, lubricating details ([for roller bits E21B 10/22](#))}
- 4/006 . {Mechanical motion converting means, e.g. reduction gearings ([E21B 4/10 takes precedence](#))}
- 4/02 . Fluid rotary type drives ([hydraulic turbines for drilling wells F03B 13/02](#))
- 4/04 . Electric drives ([E21B 4/12 takes precedence](#))
- 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](#))
- 4/08 . . impact being obtained by gravity only, e.g. with lost-motion connection
- 4/10 . . continuous unidirectional rotary motion of shaft or drilling pipe effecting consecutive impacts
- 4/12 . . Electrically operated hammers
- 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
- 4/18 . Anchoring or feeding in the borehole
- 4/20 . combined with surface drive ([E21B 4/10 takes precedence](#))
- 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](#))**
- 6/02 . the rotation being continuous
- 6/04 . . Separate drives for percussion and rotation
- 6/06 . the rotation being intermittent, e.g. obtained by ratchet device
- 6/08 . . Separate drives for percussion and rotation
- 7/00 Special methods or apparatus for drilling**
- 7/001 . {Drilling a non circular hole ([excavating trenches E02F 5/02](#); cutting machines for slitting [E21C 25/00](#))}
- 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](#))}
- 7/003 . {Drilling with mechanical conveying means ([tunnelling E21D](#))}
- 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](#))}
- 7/006 . . . {combined with a bucket-type container}
- 7/007 . {Drilling by use of explosives ([underwater drilling using explosives E21B 7/1245](#))}
- 7/008 . {Drilling ice or a formation covered by ice}
- 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](#))
- 7/021 . . {With a rotary table, i.e. a fixed rotary drive for a relatively advancing tool}
- 7/022 . . {Control of the drilling operation; Hydraulic or pneumatic means for activation or operation ([control circuits for drilling masts E21B 15/045](#))}
- 7/023 . . {the mast being foldable or telescopically retractable}
- 7/024 . . {having means for adapting to inclined terrain; having means for stabilizing the vehicle while drilling}
- 7/025 . . {Rock drills, i.e. jumbo drills}
- 7/026 . . {having auxiliary platforms, e.g. for observation purposes}
- 7/027 . . {Drills for drilling shallow holes, e.g. for taking soil samples or for drilling postholes}
- 7/028 . . . {the drilling apparatus being detachable from the vehicle, e.g. hand portable drills}
- WARNING**
- Group [E21B 7/028](#) is incomplete pending reclassification of documents from group [E21B 11/005](#).
- Groups [E21B 11/005](#) and [E21B 7/028](#) should be considered in order to perform a complete search.
- 7/04 . Directional drilling ({[derricks or masts specially adapted therefor E21B 15/04](#)})
- 7/043 . . {for underwater installations}
- 7/046 . . {horizontal drilling ([drilling with mechanical conveying means E21B 7/003](#))}
- 7/06 . . Deflecting the direction of boreholes
- 7/061 . . . {the tool shaft advancing relative to a guide, e.g. a curved tube or a whipstock}
- 7/062 . . . {the tool shaft rotating inside a non-rotating guide travelling with the shaft ([E21B 7/067](#) and [E21B 7/068 take precedence](#))}
- 7/064 . . . {specially adapted drill bits therefor}
- 7/065 . . . {using oriented fluid jets}
- 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}
- 7/068 . . . {drilled by a down-hole drilling motor ([down-hole drives per se E21B 4/00](#), [E21B 7/067 takes precedence](#))}
- 7/10 . . Correction of deflected boreholes
- 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](#))
- 7/122 . . {with submersible vertically movable guide}
- 7/124 . . with underwater tool drive prime mover, e.g. portable drilling rigs for use on underwater floors
- 7/1245 . . . {using explosive means ([anchors driven in by explosive charges B63B 21/28](#))}
- 7/128 . . from floating support with independent underwater anchored guide base
- 7/132 . . from underwater buoyant support
- 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](#))
- 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-expansible 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 expansible 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](#))

- 10/567 . . . with preformed cutting elements mounted on a distinct support, e.g. polycrystalline inserts

WARNING

Group [E21B 10/567](#) is impacted by reclassification into group [E21B 10/5671](#).

Groups [E21B 10/567](#) and [E21B 10/5671](#) should be considered in order to perform a complete search.

- 10/5671 {with chip breaking arrangements}

WARNING

Group [E21B 10/5671](#) is incomplete pending reclassification of documents from groups [E21B 10/567](#) and [E21B 10/5673](#).

Groups [E21B 10/567](#), [E21B 10/5673](#), and [E21B 10/5671](#) should be considered in order to perform a complete search.

- 10/5673 {having a non planar or non circular cutting face}

WARNING

Group [E21B 10/5673](#) is impacted by reclassification into group [E21B 10/5671](#).

Groups [E21B 10/5673](#) and [E21B 10/5671](#) should be considered in order to perform a complete search.

- 10/5676 {having a cutting face with different segments, e.g. mosaic-type inserts}

- 10/573 characterised by support details, e.g. the substrate construction or the interface between the substrate and the cutting element

- 10/5735 {Interface between the substrate and the cutting element}

- 10/58 . . Chisel-type inserts ([E21B 10/485](#), [E21B 10/52](#), [E21B 10/54](#) take precedence)

- 10/60 . characterised by conduits or nozzles for drilling fluids (for roller bits [E21B 10/18](#); for percussion drill bits [E21B 10/38](#))

- 10/602 . . {the bit being a rotary drag type bit with blades}

- 10/605 . . {the bit being a core-bit}

- 10/61 . . characterised by the nozzle structure

- 10/62 . characterised by parts, e.g. cutting elements, which are detachable or adjustable ([E21B 10/64](#) takes precedence; for roller bits [E21B 10/20](#); for augers [E21B 10/44](#))

WARNING

Groups [E21B 10/62](#) - [E21B 10/633](#) are incomplete pending reclassification of documents from groups [E21B 10/42](#) and [E21B 10/43](#).

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

- 10/627 . . with plural detachable cutting elements

- 10/633 . . . independently detachable

- 10/64 . characterised by the whole or part thereof being insertable into or removable from the borehole without withdrawing the drilling pipe (retrievable core receivers [E21B 25/02](#))

- 10/66 . . the cutting element movable through the drilling pipe and laterally shiftable

11/00 Other drilling tools**WARNING**

Group [E21B 11/00](#) is impacted by reclassification into group [E21B 11/04](#).

Groups [E21B 11/00](#) and [E21B 11/04](#) should be considered in order to perform a complete search.

- 11/005 . {Hand operated drilling tools (hand portable tools detachable from portable drilling rigs [E21B 7/028](#))}

WARNING

Group [E21B 11/005](#) is impacted by reclassification into group [E21B 7/028](#).

Groups [E21B 11/005](#) and [E21B 7/028](#) should be considered in order to perform a complete search.

- 11/02 . Boring rams (percussion drives used in the borehole [E21B 4/06](#); percussion drill bits [E21B 10/36](#))

- 11/04 . Boring grabs

WARNING

Group [E21B 11/04](#) is incomplete pending reclassification of documents from groups [E21B 11/00](#) and [E21B 27/00](#).

Groups [E21B 11/00](#), [E21B 27/00](#), and [E21B 11/04](#) should be considered in order to perform a complete search.

- 11/06 . with driven cutting chains or similarly driven tools

12/00 Accessories for drilling tools

- 12/02 . Wear indicators

- 12/04 . Drill bit protectors

- 12/06 . Mechanical cleaning devices

Other equipment or details for drilling; Well equipment or well maintenance**15/00 Supports for the drilling machine, e.g. derricks or masts**

- 15/003 . {adapted to be moved on their substructure, e.g. with skidding means; adapted to drill a plurality of wells}

- 15/006 . {Means for anchoring the drilling machine to the ground}

- 15/02 . specially adapted for underwater drilling ([E21B 15/04](#) takes precedence; floating drilling platforms [B63B 35/44](#); drilling platforms on legs [E02B 17/00](#))

- 15/04 . specially adapted for directional drilling, e.g. slant hole rigs

- 15/045 . . {Hydraulic, pneumatic or electric circuits for their positioning}

17/00 Drilling rods or pipes; Flexible drill strings; Kellies; Drill collars; Sucker rods; {Cables;} Casings; Tubings (rod couplings in general [F16D](#); tubes or tube couplings in general [F16L](#))

- 17/003 . {with electrically conducting or insulating means ([E21B 17/028](#) and [E21B 17/023](#) take precedence)}

- 17/006 . {Accessories for drilling pipes, e.g. cleaners (wear protectors [E21B 17/10](#); handling drilling pipes [E21B 19/00](#); thread protectors [B65D 59/00](#))}

- 17/01 . Risers ({supporting a riser from a drilling or production platform [E21B 19/004](#);} riser connectors {on well heads} [E21B 33/038](#))
- 17/012 . . {with buoyancy elements ([E21B 17/015](#) takes precedence)}
- 17/015 . . {Non-vertical risers, e.g. articulated or catenary-type}
- 17/017 . . {Bend restrictors for limiting stress on risers}
- 17/02 . Couplings; joints {(expandable couplings or joints [E21B 43/106](#))}

WARNING

Group [E21B 17/02](#) is impacted by reclassification into group [E21B 17/041](#).

Groups [E21B 17/02](#) and [E21B 17/041](#) should be considered in order to perform a complete search.

- 17/021 . . {Devices for subsurface connecting or disconnecting by rotation}
- 17/023 . . {Arrangements for connecting cables or wirelines to downhole devices}
- 17/025 . . . {Side entry subs}
- 17/026 . . . {Arrangements for fixing cables or wirelines to the outside of downhole devices}
- 17/028 . . {Electrical or electro-magnetic connections}

WARNING

Group [E21B 17/028](#) is impacted by reclassification into groups [E21B 17/0283](#) and [E21B 17/0285](#).

Groups [E21B 17/028](#), [E21B 17/0283](#), and [E21B 17/0285](#) should be considered in order to perform a complete search.

- 17/0283 . . . {characterised by the coupling being contactless, e.g. inductive}

WARNING

Group [E21B 17/0283](#) is incomplete pending reclassification of documents from group [E21B 17/028](#).

Groups [E21B 17/028](#) and [E21B 17/0283](#) should be considered in order to perform a complete search.

- 17/0285 . . . {characterised by electrically insulating elements}

WARNING

Group [E21B 17/0285](#) is incomplete pending reclassification of documents from group [E21B 17/028](#).

Groups [E21B 17/028](#) and [E21B 17/0285](#) should be considered in order to perform a complete search.

- 17/03 . . between drilling rod or pipe and drill motor {or surface drive}, e.g. between drilling rod and hammer

- 17/04 . . between rod {or the like} and bit or between rod and rod {or the like}

WARNING

Group [E21B 17/04](#) is impacted by reclassification into group [E21B 17/041](#).

Groups [E21B 17/04](#) and [E21B 17/041](#) should be considered in order to perform a complete search.

- 17/041 . . . {specially adapted for coiled tubing}

WARNING

Group [E21B 17/041](#) is incomplete pending reclassification of documents from groups [E21B 17/02](#) and [E21B 17/04](#).

Groups [E21B 17/02](#), [E21B 17/04](#), and [E21B 17/041](#) should be considered in order to perform a complete search.

- 17/042 . . . Threaded
- 17/0423 {with plural threaded sections, e.g. with two-step threads}
- 17/0426 {with a threaded cylindrical portion, e.g. for percussion rods}
- 17/043 with locking means
- 17/046 . . . with ribs, pins, or jaws, and complementary grooves or the like, e.g. bayonet catches

WARNING

Group [E21B 17/046](#) is impacted by reclassification into group [E21B 17/0465](#).

Groups [E21B 17/046](#) and [E21B 17/0465](#) should be considered in order to perform a complete search.

- 17/0465 {characterised by radially inserted locking elements}

WARNING

Group [E21B 17/0465](#) is incomplete pending reclassification of documents from group [E21B 17/046](#).

Groups [E21B 17/046](#) and [E21B 17/0465](#) should be considered in order to perform a complete search.

- 17/05 . . . Swivel joints
- 17/06 . . . Releasing-joints, e.g. safety joints
- 17/07 . . . Telescoping joints for varying drill string lengths; Shock absorbers (heave compensators in the derrick [E21B 19/09](#); releasing-jars [E21B 31/107](#))
- 17/073 {with axial rotation}
- 17/076 {between rod or pipe and drill bit}
- 17/08 . . Casing joints
- 17/085 . . . {Riser connections (connectors for wellhead [E21B 33/038](#))}

WARNING

Group [E21B 17/085](#) is impacted by reclassification into group [E21B 17/0853](#).

Groups [E21B 17/085](#) and [E21B 17/0853](#) should be considered in order to perform a complete search.

- 17/0853 . . . {Connections between sections of riser provided with auxiliary lines, e.g. kill and choke lines}

WARNING

Group [E21B 17/0853](#) is incomplete pending reclassification of documents from group [E21B 17/085](#).

Groups [E21B 17/085](#) and [E21B 17/0853](#) should be considered in order to perform a complete search.

- 17/10 . . Wear protectors; Centralising devices {, e.g. stabilisers} (drives used in the borehole with anchoring means [E21B 4/18](#); guiding or centralising devices outside the borehole [E21B 19/24](#))
- 17/1007 . . {for the internal surface of a pipe, e.g. wear bushings for underwater well-heads}
- 17/1014 . . {Flexible or expansible centering means, e.g. with pistons pressing against the wall of the well ([E21B 17/1042](#) takes precedence)}
- 17/1021 . . . {with articulated arms or arcuate springs}
- 17/1028 . . . {with arcuate springs only, e.g. baskets with outwardly bowed strips for cementing operations}
- 17/1035 . . {for plural rods, pipes or lines, e.g. for control lines}
- 17/1042 . . {Elastomer protector or centering means}
- 17/105 . . . {split type}
- 17/1057 . . {Centralising devices with rollers or with a relatively rotating sleeve ([E21B 17/1014](#) takes precedence)}
- 17/1064 . . . {Pipes or rods with a relatively rotating sleeve}
- 17/1071 . . {specially adapted for pump rods, e.g. sucker rods}
- 17/1078 . . {Stabilisers or centralisers for casing, tubing or drill pipes (devices for off-center positioning [E21B 17/10](#); [E21B 17/1007](#) - [E21B 17/1064](#) take precedence)}
- 17/1085 . . {Wear protectors; Blast joints; Hard facing (wear protection included in centralising devices, see relevant subgroups)}
- 17/1092 . . {Gauge section of drill bits}
- 17/12 . . Devices for placing or drawing out wear protectors
- 17/14 . . Casing shoes {for the protection of the bottom of the casing}
- 17/16 . . Drill collars
- 17/18 . . Pipes provided with plural fluid passages (([E21B 17/203](#) takes precedence;) circulation of drilling fluid by means of such pipes [E21B 21/12](#))
- 17/20 . . Flexible or articulated drilling pipes {, e.g. flexible or articulated rods, pipes or cables}
- 17/203 . . {with plural fluid passages}
- 17/206 . . {with conductors, e.g. electrical, optical}
- 17/22 . . Rods or pipes with helical structure (drill bits with helical conveying portion [E21B 10/44](#))

19/00 Handling rods, casings, tubes or the like outside the borehole, e.g. in the derrick; Apparatus for feeding the rods or cables (surface drives [E21B 1/02](#), [E21B 3/02](#))

- 19/002 . . {specially adapted for underwater drilling ([E21B 19/09](#), [E21B 19/143](#) take precedence)}

- 19/004 . . {supporting a riser from a drilling or production platform}
- 19/006 . . . {including heave compensators}
- 19/008 . . {Winding units, specially adapted for drilling operations}
- 19/02 . . Rod or cable suspensions (load-engaging elements for hoisting or lowering purposes in general [B66C 1/00](#); crown blocks or pulley blocks [B66D](#); cable guides [B66D 1/36](#))
- 19/04 . . Hooks
- 19/06 . . Elevators, i.e. rod- or tube-gripping devices
- 19/07 . . . Slip-type elevators (slips in rotary tables [E21B 19/10](#))
- 19/08 . . Apparatus for feeding the rods or cables ([E21B 19/22](#) takes precedence; automatic feed [E21B 44/02](#); hoisting drums [B66D](#)); Apparatus for increasing or decreasing the pressure on the drilling tool; Apparatus for counterbalancing the weight of the rods

WARNING

Group [E21B 19/08](#) is impacted by reclassification into groups [E21B 19/081](#), [E21B 19/083](#), [E21B 19/084](#), [E21B 19/086](#), [E21B 19/087](#), [E21B 19/089](#), and [E21B 19/09](#).

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

- 19/081 . . Screw-and-nut feed mechanisms

WARNING

Group [E21B 19/081](#) is incomplete pending reclassification of documents from group [E21B 19/08](#).

Groups [E21B 19/08](#) and [E21B 19/081](#) should be considered in order to perform a complete search.

- 19/083 . . Cam, rack or like feed mechanisms

WARNING

Group [E21B 19/083](#) is incomplete pending reclassification of documents from group [E21B 19/08](#).

Groups [E21B 19/08](#) and [E21B 19/083](#) should be considered in order to perform a complete search.

- 19/084 . . with flexible drawing means, e.g. cables

WARNING

Group [E21B 19/084](#) is incomplete pending reclassification of documents from group [E21B 19/08](#).

Groups [E21B 19/08](#) and [E21B 19/084](#) should be considered in order to perform a complete search.

- 19/086 . . with a fluid-actuated cylinder ([E21B 19/084](#), [E21B 19/087](#), [E21B 19/09](#) take precedence)

WARNING

Group [E21B 19/086](#) is incomplete pending reclassification of documents from group [E21B 19/08](#).

Groups [E21B 19/08](#) and [E21B 19/086](#) should be considered in order to perform a complete search.

- 19/087 . . by means of a swinging arm

WARNING

Group [E21B 19/087](#) is incomplete pending reclassification of documents from group [E21B 19/08](#).

Groups [E21B 19/08](#) and [E21B 19/087](#) should be considered in order to perform a complete search.

- 19/089 . . with a spring or an additional weight

WARNING

Group [E21B 19/089](#) is incomplete pending reclassification of documents from group [E21B 19/08](#).

Groups [E21B 19/08](#) and [E21B 19/089](#) should be considered in order to perform a complete search.

- 19/09 . . specially adapted for drilling underwater formations from a floating support using heave compensators supporting the drill string (drilling-pipe telescoping joints [E21B 17/07](#) {; heave compensators for supporting a riser [E21B 19/006](#)})

WARNING

Group [E21B 19/09](#) is incomplete pending reclassification of documents from group [E21B 19/08](#).

Groups [E21B 19/08](#) and [E21B 19/09](#) should be considered in order to perform a complete search.

- 19/10 . Slips; Spiders {; Catching devices (rotary tables with master bushing or kelly bushing [E21B 3/04](#))}

WARNING

Group [E21B 19/10](#) is impacted by reclassification into group [E21B 19/102](#).

Groups [E21B 19/10](#) and [E21B 19/102](#) should be considered in order to perform a complete search.

- 19/102 . . {using rollers or spherical balls as load gripping elements}

WARNING

Group [E21B 19/102](#) is incomplete pending reclassification of documents from group [E21B 19/10](#).

Groups [E21B 19/10](#) and [E21B 19/102](#) should be considered in order to perform a complete search.

- 19/12 . Rope clamps {; Rod, casings or tube clamps not secured to elevators} (rope clamps in general [F16G 11/00](#))

- 19/14 . Racks, ramps, troughs or bins, for holding the lengths of rod singly or connected; Handling between storage place and borehole ([E21B 19/20](#), [E21B 19/22](#) take precedence)

- 19/143 . . {specially adapted for underwater drilling}

- 19/146 . . {Carousel systems, i.e. rotating rack systems}

- 19/15 . . Racking of rods in horizontal position; Handling between horizontal and vertical position

- 19/155 . . . {Handling between horizontal and vertical position}

- 19/16 . Connecting or disconnecting pipe couplings or joints ([E21B 19/20](#) takes precedence; pipe wrenches or the like [B25B](#))

- 19/161 . . {using a wrench or a spinner adapted to engage a circular section of pipe ([E21B 19/168](#) takes precedence)}

- 19/162 . . . {cathead actuated}

- 19/163 . . . {piston-cylinder actuated}

- 19/164 . . . {motor actuated ([E21B 19/162](#) and [E21B 19/163](#) take precedence)}

- 19/165 . . {Control or monitoring arrangements therefor}

- 19/166 . . . {Arrangements of torque limiters or torque indicators}

- 19/167 . . {using a wrench adapted to engage a non circular section of pipe, e.g. a section with flats or splines}

- 19/168 . . {using a spinner with rollers or a belt adapted to engage a well pipe}

- 19/18 . Connecting or disconnecting drill bit and drilling pipe

- 19/20 . Combined feeding from rack and connecting, e.g. automatically

- 19/22 . Handling reeled pipe or rod units, e.g. flexible drilling pipes { (lifting or hauling appliances using two or more cooperating endless chains [B66D 3/003](#)) }

- 19/24 . Guiding or centralising devices for drilling rods or pipes

- 21/00 Methods or apparatus for flushing boreholes, e.g. by use of exhaust air from motor (freeing objects stuck in boreholes by flushing [E21B 31/03](#); well drilling compositions [C09K 8/02](#))**

WARNING

Group [E21B 21/00](#) is impacted by reclassification into groups [E21B 21/001](#), [E21B 21/002](#), [E21B 21/003](#), [E21B 21/01](#), [E21B 21/012](#), [E21B 21/015](#), [E21B 21/019](#), [E21B 21/02](#), [E21B 21/06](#), [E21B 21/062](#), [E21B 21/063](#), [E21B 21/065](#), [E21B 21/066](#), [E21B 21/067](#), [E21B 21/068](#), [E21B 21/07](#), [E21B 21/08](#), [E21B 21/082](#), [E21B 21/085](#), [E21B 21/10](#), [E21B 21/103](#), [E21B 21/106](#), [E21B 21/12](#), [E21B 21/14](#), [E21B 21/16](#), and [E21B 21/18](#).

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

- 21/001 . {[specially adapted for underwater drilling \(dual gradient drilling E21B 21/082\)](#)}
- WARNING**
- Group [E21B 21/001](#) is incomplete pending reclassification of documents from group [E21B 21/00](#).
- Group [E21B 21/001](#) is also impacted by reclassification into group [E21B 21/082](#).
- Groups [E21B 21/00](#), [E21B 21/001](#), and [E21B 21/082](#) should be considered in order to perform a complete search.
- 21/002 . {[Down-hole drilling fluid separation systems \(containers comprising collecting means with a strainer E21B 27/005; subsoil filtering E21B 43/02; down-hole production separators E21B 43/38\)](#)}
- WARNING**
- Group [E21B 21/002](#) is incomplete pending reclassification of documents from group [E21B 21/00](#).
- Groups [E21B 21/00](#) and [E21B 21/002](#) should be considered in order to perform a complete search.
- 21/003 . {[Means for stopping loss of drilling fluid \(plastering the borehole wall E21B 33/138\)](#)}
- WARNING**
- Group [E21B 21/003](#) is incomplete pending reclassification of documents from group [E21B 21/00](#).
- Groups [E21B 21/00](#) and [E21B 21/003](#) should be considered in order to perform a complete search.
- 21/01 . Arrangements for handling drilling fluids or cuttings outside the borehole, e.g. mud boxes ([arrangements for treating drilling fluids E21B 21/06](#) {; waste disposal systems [E21B 41/005](#)})
- WARNING**
- Group [E21B 21/01](#) is incomplete pending reclassification of documents from group [E21B 21/00](#).
- Group [E21B 21/01](#) is also impacted by reclassification into group [E21B 21/019](#).
- Groups [E21B 21/00](#), [E21B 21/01](#), and [E21B 21/019](#) should be considered in order to perform a complete search.
- 21/011 . . {[Dust eliminating or dust removing while drilling](#)}
- 21/012 . . . {[using exhaust air from the drilling motor for blowing off the dust at the borehole entrance](#)}
- WARNING**
- Group [E21B 21/012](#) is incomplete pending reclassification of documents from group [E21B 21/00](#).
- Groups [E21B 21/00](#) and [E21B 21/012](#) should be considered in order to perform a complete search.
- 21/013 . . . {[by liquids](#)}
- 21/0135 {[Liquid flushing installations](#)}
- 21/014 . . . {[Preventing exhaust air from the drill motor from blowing-off towards the working face](#)}
- 21/015 . . Means engaging the bore entrance, e.g. hoods for collecting dust
- WARNING**
- Group [E21B 21/015](#) is incomplete pending reclassification of documents from group [E21B 21/00](#).
- Group [E21B 21/015](#) is also impacted by reclassification into group [E21B 21/019](#).
- Groups [E21B 21/00](#), [E21B 21/015](#), and [E21B 21/019](#) should be considered in order to perform a complete search.
- 21/019 . . {[Arrangements for maintaining circulation of drilling fluid while connecting or disconnecting tubular joints](#)}
- WARNING**
- Group [E21B 21/019](#) is incomplete pending reclassification of documents from groups [E21B 21/00](#), [E21B 21/01](#), and [E21B 21/015](#).
- All groups listed in this Warning should be considered in order to perform a complete search.
- 21/02 . Swivel joints in hose-lines
- WARNING**
- Group [E21B 21/02](#) is incomplete pending reclassification of documents from group [E21B 21/00](#).
- Groups [E21B 21/00](#) and [E21B 21/02](#) should be considered in order to perform a complete search.
- 21/06 . Arrangements for treating drilling fluids outside the borehole ([treating steps per se, see the relevant subclasses](#))
- WARNING**
- Groups [E21B 21/06](#) - [E21B 21/07](#) are incomplete pending reclassification of documents from group [E21B 21/00](#).
- All groups listed in this Warning should be considered in order to perform a complete search.
- 21/062 . . {[by mixing components](#)}
- 21/063 . . {[by separating components](#)}
- 21/065 . . . {[Separating solids from drilling fluids](#)}
- 21/066 {[with further treatment of the solids, e.g. for disposal](#)}
- 21/067 . . . {[Separating gases from drilling fluids](#)}
- 21/068 . . {[using chemical treatment](#)}
- 21/07 . . for treating dust-laden gaseous fluids

- 21/08 . Controlling or monitoring pressure or flow of drilling fluid, e.g. automatic filling of boreholes, automatic control of bottom pressure ([valve arrangements therefor E21B 21/10](#))

WARNING

Group [E21B 21/08](#) is incomplete pending reclassification of documents from group [E21B 21/00](#).

Group [E21B 21/08](#) is also impacted by reclassification into groups [E21B 21/082](#) and [E21B 21/085](#).

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

- 21/082 . . {Dual gradient systems, i.e. using two hydrostatic gradients or drilling fluid densities}

WARNING

Group [E21B 21/082](#) is incomplete pending reclassification of documents from groups [E21B 21/00](#), [E21B 21/001](#), and [E21B 21/08](#).

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

- 21/085 . . {Underbalanced techniques, i.e. where borehole fluid pressure is below formation pressure}

WARNING

Group [E21B 21/085](#) is incomplete pending reclassification of documents from groups [E21B 21/00](#) and [E21B 21/08](#).

Groups [E21B 21/00](#), [E21B 21/08](#), and [E21B 21/085](#) should be considered in order to perform a complete search.

- 21/10 . Valve arrangements in drilling-fluid circulation systems ([valves in general F16K](#))

WARNING

Groups [E21B 21/10](#) - [E21B 21/106](#) are incomplete pending reclassification of documents from group [E21B 21/00](#).

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

- 21/103 . . {Down-hole by-pass valve arrangements, i.e. between the inside of the drill string and the annulus}

- 21/106 . . {Valve arrangements outside the borehole, e.g. kelly valves}

- 21/12 . using drilling pipes with plural fluid passages, e.g. closed circulation systems ([pipes with plural fluid passages E21B 17/18](#))

WARNING

Group [E21B 21/12](#) is incomplete pending reclassification of documents from group [E21B 21/00](#).

Groups [E21B 21/00](#) and [E21B 21/12](#) should be considered in order to perform a complete search.

- 21/14 . using liquids and gases, e.g. foams

WARNING

Group [E21B 21/14](#) is incomplete pending reclassification of documents from group [E21B 21/00](#).

Groups [E21B 21/00](#) and [E21B 21/14](#) should be considered in order to perform a complete search.

- 21/16 . using gaseous fluids ([E21B 21/14 takes precedence; arrangements for handling drilling fluids outside the borehole E21B 21/01; arrangements for treating drilling fluids E21B 21/06](#))

WARNING

Group [E21B 21/16](#) is incomplete pending reclassification of documents from group [E21B 21/00](#).

Groups [E21B 21/00](#) and [E21B 21/16](#) should be considered in order to perform a complete search.

- 21/18 . Preventing exhaust air from the drill motor from blowing-off towards the working face

WARNING

Group [E21B 21/18](#) is incomplete pending reclassification of documents from group [E21B 21/00](#).

Groups [E21B 21/00](#) and [E21B 21/18](#) should be considered in order to perform a complete search.

- 23/00 **Apparatus for displacing, setting, locking, releasing, or removing tools, packers or the like in the boreholes or wells (setting of casings, screens or liners E21B 43/10)**

- 23/001 . {Self-propelling systems or apparatus, e.g. for moving tools within the horizontal portion of a borehole}

- 23/004 . {Indexing systems for guiding relative movement between telescoping parts of downhole tools}

- 23/006 . . {"J-slot" systems, i.e. lug and slot indexing mechanisms}

- 23/01 . for anchoring the tools or the like ([E21B 23/02](#) - [E21B 23/06 take precedence; anchoring of drives in the borehole E21B 4/18](#))

- 23/02 . for locking the tools or the like in landing nipples or in recesses between adjacent sections of tubing ([E21B 23/03](#) - [E21B 23/06 take precedence](#))

- 23/03 . for setting the tools into, or removing the tools from, laterally offset landing nipples or pockets

WARNING

Group [E21B 23/03](#) is impacted by reclassification into group [E21B 23/12](#).

Groups [E21B 23/03](#) and [E21B 23/12](#) should be considered in order to perform a complete search.

- 23/04 . . . operated by fluid means, e.g. actuated by explosion
([E21B 23/06](#), [E21B 23/08](#) take precedence)

WARNING

Group [E21B 23/04](#) is impacted by reclassification into groups [E21B 23/0411](#), [E21B 23/04115](#), [E21B 23/0412](#), [E21B 23/0413](#), [E21B 23/0414](#), [E21B 23/0415](#), [E21B 23/0416](#), [E21B 23/0417](#), [E21B 23/0418](#), [E21B 23/0419](#), [E21B 23/042](#), [E21B 23/0421](#), [E21B 23/0422](#), [E21B 23/0423](#), and [E21B 34/142](#).

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

- 23/0411 . . . {specially adapted for anchoring tools or the like to the borehole wall or to well tube}

WARNING

Group [E21B 23/0411](#) is incomplete pending reclassification of documents from group [E21B 23/04](#).

Groups [E21B 23/04](#) and [E21B 23/0411](#) should be considered in order to perform a complete search.

- 23/04115 . . . {using radial pistons}

WARNING

Group [E21B 23/04115](#) is incomplete pending reclassification of documents from group [E21B 23/04](#).

Groups [E21B 23/04](#) and [E21B 23/04115](#) should be considered in order to perform a complete search.

- 23/0412 . . . {characterised by pressure chambers, e.g. vacuum chambers}

WARNING

Group [E21B 23/0412](#) is incomplete pending reclassification of documents from group [E21B 23/04](#).

Groups [E21B 23/04](#) and [E21B 23/0412](#) should be considered in order to perform a complete search.

- 23/0413 . . . {using means for blocking fluid flow, e.g. drop balls or darts (using balls or the like for actuating downhole valves [E21B 34/142](#))}

WARNING

Group [E21B 23/0413](#) is incomplete pending reclassification of documents from group [E21B 23/04](#).

Groups [E21B 23/04](#) and [E21B 23/0413](#) should be considered in order to perform a complete search.

- 23/0414 . . . {using explosives}

WARNING

Group [E21B 23/0414](#) is incomplete pending reclassification of documents from group [E21B 23/04](#).

Groups [E21B 23/04](#) and [E21B 23/0414](#) should be considered in order to perform a complete search.

- 23/0415 . . . {using particular fluids, e.g. electro-active liquids}

WARNING

Group [E21B 23/0415](#) is incomplete pending reclassification of documents from group [E21B 23/04](#).

Groups [E21B 23/04](#) and [E21B 23/0415](#) should be considered in order to perform a complete search.

- 23/0416 . . . {characterised by force amplification arrangements}

WARNING

Group [E21B 23/0416](#) is incomplete pending reclassification of documents from group [E21B 23/04](#).

Groups [E21B 23/04](#) and [E21B 23/0416](#) should be considered in order to perform a complete search.

- 23/0417 . . . {Down-hole non-explosive gas generating means, e.g. by chemical reaction}

WARNING

Group [E21B 23/0417](#) is incomplete pending reclassification of documents from group [E21B 23/04](#).

Groups [E21B 23/04](#) and [E21B 23/0417](#) should be considered in order to perform a complete search.

- 23/0418 . . . {specially adapted for locking the tools in landing nipples or recesses}

WARNING

Group [E21B 23/0418](#) is incomplete pending reclassification of documents from group [E21B 23/04](#).

Groups [E21B 23/04](#) and [E21B 23/0418](#) should be considered in order to perform a complete search.

- 23/0419 . . . {using down-hole motor and pump arrangements for generating hydraulic pressure}

WARNING

Group [E21B 23/0419](#) is incomplete pending reclassification of documents from group [E21B 23/04](#).

Groups [E21B 23/04](#) and [E21B 23/0419](#) should be considered in order to perform a complete search.

- 23/042 . . {using a single piston or multiple mechanically interconnected pistons}

WARNING

Group [E21B 23/042](#) is incomplete pending reclassification of documents from group [E21B 23/04](#).

Groups [E21B 23/04](#) and [E21B 23/042](#) should be considered in order to perform a complete search.

- 23/0421 . . {using multiple hydraulically interconnected pistons}

WARNING

Group [E21B 23/0421](#) is incomplete pending reclassification of documents from group [E21B 23/04](#).

Groups [E21B 23/04](#) and [E21B 23/0421](#) should be considered in order to perform a complete search.

- 23/0422 . . {characterised by radial pistons (using radial pistons for anchoring [E21B 23/04115](#))}

WARNING

Group [E21B 23/0422](#) is incomplete pending reclassification of documents from group [E21B 23/04](#).

Groups [E21B 23/04](#) and [E21B 23/0422](#) should be considered in order to perform a complete search.

- 23/0423 . . {using step motors}

WARNING

Group [E21B 23/0423](#) is incomplete pending reclassification of documents from group [E21B 23/04](#).

Groups [E21B 23/04](#) and [E21B 23/0423](#) should be considered in order to perform a complete search.

- 23/06 . for setting packers

- 23/065 . . {setting tool actuated by explosion or gas generating means}

- 23/08 . Introducing or running tools by fluid pressure, e.g. through-the-flow-line tool systems (special provisions on heads therefor [E21B 33/068](#); cementing plugs [E21B 33/16](#); scrapers operated by fluid pressure [E21B 37/04](#))

- 23/10 . . Tools specially adapted therefor

- 23/12 . . Tool diverters

WARNING

Group [E21B 23/12](#) is incomplete pending reclassification of documents from group [E21B 23/03](#).

Groups [E21B 23/03](#) and [E21B 23/12](#) should be considered in order to perform a complete search.

- 23/14 . for displacing a cable or cable-operated tool, e.g. for logging or perforating operations in deviated wells (by fluid pressure [E21B 23/08](#); provision on well heads for introducing or removing cable-operated tools [E21B 33/072](#), [E21B 33/076](#))

- 25/00 Apparatus for obtaining or removing undisturbed cores, e.g. core barrels, core extractors (core bits [E21B 10/02](#); using explosives or projectiles in boreholes [E21B 49/04](#); side-wall sampling or coring [E21B 49/06](#))**

- 25/005 . {Above ground means for handling the core, e.g. for extracting the core from the core barrel}

- 25/02 . the core receiver being insertable into, or removable from, the borehole without withdrawing the drilling pipe (retrievable drill bits [E21B 10/64](#))

- 25/04 . . the core receiver having a core forming cutting edge or element, e.g. punch type core barrels

- 25/06 . the core receiver having a flexible liner or inflatable retaining means

- 25/08 . Coating, freezing, consolidating cores ([E21B 25/06](#) takes precedence); Recovering uncontaminated cores or cores at formation pressure

- 25/10 . Formed core retaining or severing means ([E21B 25/06](#), [E21B 25/08](#) take precedence)

- 25/12 . . of the sliding wedge type

- 25/14 . . mounted on pivot transverse to core axis

- 25/16 . for obtaining oriented cores

- 25/18 . the core receiver being specially adapted for operation under water

- 27/00 Containers for collecting or depositing substances in boreholes or wells, e.g. bailers, {baskets or buckets} for collecting mud or sand; Drill bits with means for collecting substances, e.g. valve drill bits**

WARNING

Group [E21B 27/00](#) is impacted by reclassification into groups [E21B 11/04](#) and [E21B 31/08](#).

Groups [E21B 27/00](#), [E21B 11/04](#), and [E21B 31/08](#) should be considered in order to perform a complete search.

- 27/005 . {Collecting means with a strainer}

- 27/02 . Dump bailers, i.e. containers for depositing substances, e.g. cement or acids

- 27/04 . where the collecting or depositing means include helical conveying means ({drilling with helical conveying means combined with bucket-type container [E21B 7/006](#)})

- 28/00 Vibration generating arrangements for boreholes or wells, e.g. for stimulating production (for drilling [E21B 7/24](#); {for fishing for or freeing objects [E21B 31/005](#);} for transmitting measuring-signals [E21B 47/14](#); for geophysical measurements [G01V 1/02](#))**

- 29/00 Cutting or destroying pipes, packers, plugs, or wire lines, located in boreholes or wells, e.g. cutting of damaged pipes, of windows (perforators [E21B 43/11](#)); Deforming of pipes in boreholes or wells; Reconditioning of well casings while in the ground {(by enlarging drilled holes or counterboring [E21B 7/28](#))}**

- 29/002 . {Cutting, e.g. milling, a pipe with a cutter rotating along the circumference of the pipe}

- 29/005 . . {with a radially-expansible cutter rotating inside the pipe, e.g. for cutting an annular window}
- 29/007 . . {with a radially-retracting cutter rotating outside the pipe}
- 29/02 . by explosives or by thermal or chemical means ({freeing stuck objects by explosives [E21B 31/002](#)}; destroying objects in boreholes or wells by explosives [E21B 31/16](#))
- 29/04 . Cutting of wire lines or the like ([E21B 29/02](#) takes precedence)
- 29/06 . Cutting windows, e.g. directional window cutters for whipstock operations ({[E21B 29/005](#) and} [E21B 29/08](#) take precedence)
- 29/08 . Cutting or deforming pipes to control fluid flow {(shear type blow-out preventers [E21B 33/063](#))}
- 29/10 . Reconditioning of well casings, e.g. straightening
- 29/12 . specially adapted for underwater installations ([E21B 29/08](#) takes precedence)

31/00 Fishing for or freeing objects in boreholes or wells (provisions on well heads for introducing or removing objects [E21B 33/068](#); locating or determining the position of objects in boreholes or wells [E21B 47/09](#))

WARNING

Group [E21B 31/00](#) is impacted by reclassification into group [E21B 31/08](#).

Groups [E21B 31/00](#) and [E21B 31/08](#) should be considered in order to perform a complete search.

- 31/002 . {Destroying the objects to be fished, e.g. by explosive means}
- 31/005 . {using vibrating or oscillating means}
- 31/007 . {fishing tools with means for attaching comprising fusing or sticking}
- 31/03 . Freeing by flushing

WARNING

Group [E21B 31/03](#) is impacted by reclassification into group [E21B 31/035](#).

Groups [E21B 31/03](#) and [E21B 31/035](#) should be considered in order to perform a complete search.

- 31/035 . {controlling differential pipe sticking}

WARNING

Group [E21B 31/035](#) is incomplete pending reclassification of documents from group [E21B 31/03](#).

Groups [E21B 31/03](#) and [E21B 31/035](#) should be considered in order to perform a complete search.

- 31/06 . using magnetic means
- 31/08 . using junk baskets or the like

WARNING

Group [E21B 31/08](#) is incomplete pending reclassification of documents from groups [E21B 27/00](#) and [E21B 31/00](#).

Groups [E21B 27/00](#), [E21B 31/00](#), and [E21B 31/08](#) should be considered in order to perform a complete search.

- 31/107 . using impact means for releasing stuck parts, e.g. jars ([telescoping joints E21B 17/07](#))
- 31/1075 . . {using explosives}
- 31/113 . . hydraulically-operated
- 31/1135 . . . {Jars with a hydraulic impedance mechanism, i.e. a restriction, for initially delaying escape of a restraining fluid}
- 31/12 . Grappling tools, e.g. tongs or grabs
- 31/125 . . {specially adapted for parted wire line or ropes}
- 31/14 . . with means deflecting the direction of the tool, e.g. by use of knuckle joints ([apparatus for deflecting the boring E21B 7/06](#))
- 31/16 . . combined with cutting or destroying means ([cutting or destroying means per se E21B 29/00](#))
- 31/18 . . gripping externally, e.g. overshot
- 31/20 . . gripping internally, e.g. fishing spears

33/00 Sealing or packing boreholes or wells

WARNING

Group [E21B 33/00](#) is impacted by reclassification into groups [E21B 2200/00](#), [E21B 2200/01](#), [E21B 2200/02](#), [E21B 2200/03](#), [E21B 2200/04](#), [E21B 2200/05](#), [E21B 2200/06](#), [E21B 2200/08](#), [E21B 2200/09](#), [E21B 2200/20](#), and [E21B 2200/22](#).

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

- 33/02 . Surface sealing or packing
- 33/03 . . Well heads; Setting-up thereof ([valve arrangements therefor E21B 34/02](#))
- 33/035 . . . specially adapted for underwater installations ([E21B 33/043](#), [E21B 33/064](#), [E21B 33/076](#) take precedence)

WARNING

Group [E21B 33/035](#) is impacted by reclassification into groups [E21B 33/0353](#) and [E21B 33/0387](#).

Groups [E21B 33/035](#), [E21B 33/0353](#), and [E21B 33/0387](#) should be considered in order to perform a complete search.

- 33/0353 {Horizontal or spool trees, i.e. without production valves in the vertical main bore}

WARNING

Group [E21B 33/0353](#) is incomplete pending reclassification of documents from groups [E21B 33/035](#), [E21B 33/0355](#), [E21B 33/037](#), [E21B 33/0375](#), [E21B 33/038](#), [E21B 33/0385](#), and [E21B 33/0422](#).

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

- 33/0355 {Control systems, e.g. hydraulic, pneumatic, electric, acoustic, for submerged well heads}

WARNING

Group [E21B 33/0355](#) is impacted by reclassification into group [E21B 33/0353](#).

Groups [E21B 33/0355](#) and [E21B 33/0353](#) should be considered in order to perform a complete search.

33/037	. . . . Protective housings therefor	33/043	. . . . specially adapted for underwater well heads (E21B 33/0407 , E21B 33/047 take precedence)
	WARNING	33/047	. . . . for plural tubing strings
	Group E21B 33/037 is impacted by reclassification into group E21B 33/0353 .	33/05	. . . . Cementing-heads, e.g. having provision for introducing cementing plugs
	Groups E21B 33/037 and E21B 33/0353 should be considered in order to perform a complete search.	33/06	. . . . Blow-out preventers {, i.e. apparatus closing around a drill pipe, e.g. annular blow-out preventers (rotating blow-out preventers E21B 33/085)}
33/0375	. . . . . {Corrosion protection means}	33/061	. . . . . {Ram-type blow-out preventers, e.g. with pivoting rams}
	WARNING	33/062	. . . . . {with sliding rams}
	Group E21B 33/0375 is impacted by reclassification into group E21B 33/0353 .	33/063	. . . . . {for shearing drill pipes (cutting of wireline E21B 29/04)}
	Groups E21B 33/0375 and E21B 33/0353 should be considered in order to perform a complete search.	33/064	. . . . specially adapted for underwater well heads (control systems for submerged well-heads E21B 33/0355 ; connectors therefor E21B 33/038)
33/038	. . . . Connectors used on well heads, e.g. for connecting blow-out preventer and riser (connecting a production flow-line to an underwater well head E21B 43/013)	33/068	. . . . having provision for introducing objects or fluids into, or removing objects from, wells (cementing heads E21B 33/05 {; wipers, oil savers E21B 33/08)}
	WARNING	33/072	. . . . for cable-operated tools (E21B 33/076 takes precedence)
	Group E21B 33/038 is impacted by reclassification into group E21B 33/0353 .	33/076	. . . . specially adapted for underwater installations
	Groups E21B 33/038 and E21B 33/0353 should be considered in order to perform a complete search.	33/08	. . Wipers; Oil savers
33/0385	. . . . . {electrical connectors}	33/085	. . . . {Rotatable packing means, e.g. rotating blow-out preventers}
	WARNING	33/10	. . in the borehole (sealing the junction between main bore and laterals E21B 41/0042)}
	Group E21B 33/0385 is impacted by reclassification into group E21B 33/0353 .	33/12	. . Packers; Plugs (used for cementing E21B 33/134 , E21B 33/16)
	Groups E21B 33/0385 and E21B 33/0353 should be considered in order to perform a complete search.	33/1204	. . . . {permanent; drillable}
33/0387	. . . . . {Hydraulic stab connectors}	33/1208	. . . . {characterised by the construction of the sealing or packing means (E21B 33/1277 takes precedence)}
	WARNING	33/1212	. . . . . {including a metal-to-metal seal element}
	Group E21B 33/0387 is incomplete pending reclassification of documents from group E21B 33/035 .	33/1216	. . . . . {Anti-extrusion means, e.g. means to prevent cold flow of rubber packing}
	Groups E21B 33/035 and E21B 33/0387 should be considered in order to perform a complete search.	33/122	. . . . Multiple string packers
33/04	. . . . Casing heads; Suspending casings or tubings in well heads (setting of casings in wells E21B 43/10)	33/124	. . . . Units with longitudinally-spaced plugs for isolating the intermediate space
33/0407	. . . . . {with a suspended electrical cable}	33/1243	. . . . . {with inflatable sleeves}
33/0415	. . . . . {rotating or floating support for tubing or casing hanger}	33/1246	. . . . . {inflated by down-hole pumping means operated by a pipe string}
33/0422	. . . . . {a suspended tubing or casing being gripped by a slip or an internally serrated member}	33/126	. . . . with fluid-pressure-operated elastic cup or skirt (E21B 33/122 , E21B 33/124 take precedence)
	WARNING	33/1265	. . . . . {with mechanical slips}
	Group E21B 33/0422 is impacted by reclassification into group E21B 33/0353 .	33/127	. . . . with inflatable sleeve (E21B 33/122 , E21B 33/124 take precedence)
	Groups E21B 33/0422 and E21B 33/0353 should be considered in order to perform a complete search.	33/1272	. . . . . {inflated by down-hole pumping means operated by a pipe string}
		33/1275	. . . . . {inflated by down-hole pumping means operated by a down-hole drive}
		33/1277	. . . . . {characterised by the construction or fixation of the sleeve}
		33/128	. . . . with a member expanded radially by axial pressure (E21B 33/122 , E21B 33/124 {, E21B 33/129 } take precedence {; characterised by the construction of the sealing means E21B 33/1208)}
		33/1285	. . . . . {by fluid pressure}

- 33/129 . . . with mechanical slips for hooking into the casing ([E21B 33/122](#), [E21B 33/124](#) take precedence)
- 33/1291 {anchor set by wedge or cam in combination with frictional effect, using so-called drag-blocks ([E21B 33/1295](#) takes precedence)}
- 33/1292 {with means for anchoring against downward and upward movement}
- 33/1293 {with means for anchoring against downward and upward movement ([E21B 33/1291](#), [E21B 33/1295](#) take precedence)}
- 33/1294 {characterised by a valve, e.g. a by-pass valve}
- 33/1295 actuated by fluid pressure
- 33/12955 {using drag blocks frictionally engaging the inner wall of the well}
- 33/13 . . Methods or devices for cementing, for plugging holes, crevices, or the like ([dump bailers E21B 27/02](#); chemical compositions therefor [C09K 8/00](#))
- 33/134 . . . Bridging plugs
- 33/136 . . . Baskets, e.g. of umbrella type
- 33/138 . . . Plastering the borehole wall; Injecting into the formation ({[packers E21B 33/12](#)})
- 33/14 . . . for cementing casings into boreholes ({[control of cementation quality or level E21B 47/005](#)})
- 33/143 {for underwater installations}
- 33/146 {Stage cementing, i.e. discharging cement from casing at different levels}
- 33/16 using plugs for isolating cement charge; Plugs therefor ({[stage cementing E21B 33/146](#); spacer compositions [C09K 8/424](#)})

WARNING

Group [E21B 33/16](#) is impacted by reclassification into groups [E21B 33/165](#) and [E21B 33/167](#).

Groups [E21B 33/16](#), [E21B 33/165](#), and [E21B 33/167](#) should be considered in order to perform a complete search.

- 33/165 {Cementing plugs specially adapted for being released down-hole ([cementing heads E21B 33/05](#))}

WARNING

Group [E21B 33/165](#) is incomplete pending reclassification of documents from group [E21B 33/16](#).

Groups [E21B 33/16](#) and [E21B 33/165](#) should be considered in order to perform a complete search.

- 33/167 {Cementing plugs provided with anti-rotation mechanisms, e.g. for easier drill-out}

WARNING

Group [E21B 33/167](#) is incomplete pending reclassification of documents from group [E21B 33/16](#).

Groups [E21B 33/16](#) and [E21B 33/167](#) should be considered in order to perform a complete search.

- 34/00 **Valve arrangements for boreholes or wells (in drilling fluid circulation systems [E21B 21/10](#); blow-out preventers [E21B 33/06](#); oil flow regulating apparatus [E21B 43/12](#); valves in general [F16K](#))**
- 34/02 . in well heads

WARNING

Group [E21B 34/02](#) is impacted by reclassification into group [E21B 34/025](#).

Groups [E21B 34/02](#) and [E21B 34/025](#) should be considered in order to perform a complete search.

- 34/025 . . {Chokes or valves in wellheads and sub-sea wellheads for variably regulating fluid flow}

WARNING

Group [E21B 34/025](#) is incomplete pending reclassification of documents from groups [E21B 34/02](#), [E21B 34/04](#), and [E21B 34/045](#).

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

- 34/04 . . in underwater well heads

WARNING

Group [E21B 34/04](#) is impacted by reclassification into group [E21B 34/025](#).

Groups [E21B 34/04](#) and [E21B 34/025](#) should be considered in order to perform a complete search.

- 34/045 . . . {adapted to be lowered on a tubular string into position within a blow-out preventer stack, e.g. so-called test trees}

WARNING

Group [E21B 34/045](#) is impacted by reclassification into group [E21B 34/025](#).

Groups [E21B 34/045](#) and [E21B 34/025](#) should be considered in order to perform a complete search.

- 34/06 . in wells
- 34/063 . . {Valve or closure with destructible element, e.g. frangible disc ([E21B 34/103](#) takes precedence)}
- 34/066 . . {electrically actuated}
- 34/08 . . responsive to flow or pressure of the fluid obtained ([E21B 34/10](#) takes precedence)
- 34/085 . . . {with time-delay systems, e.g. hydraulic impedance mechanisms}

- 34/10 . . . operated by control fluid supplied from outside the borehole ({by a dropped ball or piston [E21B 34/142](#);} control means being outside the borehole [E21B 34/16](#))
- 34/101 . . . {with means for equalizing fluid pressure above and below the valve}
- 34/102 . . . {with means for locking the closing element in open or closed position ([E21B 34/105](#) and [E21B 34/108](#) take precedence)}
- 34/103 {with a shear pin}
- 34/105 . . . {retrievable, e.g. wire line retrievable, i.e. with an element which can be landed into a landing-nipple provided with a passage for control fluid}
- 34/106 {the retrievable element being a secondary control fluid actuated valve landed into the bore of a first inoperative control fluid actuated valve}
- 34/107 {the retrievable element being an operating or controlling means retrievable separately from the closure member, e.g. pilot valve landed into a side pocket ([E21B 34/106](#) takes precedence)}
- 34/108 . . . {with time delay systems, e.g. hydraulic impedance mechanisms}
- 34/12 . . . operated by movement of casings or tubings
- 34/125 . . . {with time delay systems, e.g. hydraulic impedance mechanisms}
- 34/14 . . . operated by movement of tools, e.g. sleeve valves operated by pistons or wire line tools ({[E21B 34/066](#) takes precedence})

WARNING

Group [E21B 34/14](#) is impacted by reclassification into group [E21B 34/142](#).
Groups [E21B 34/14](#) and [E21B 34/142](#) should be considered in order to perform a complete search.

- 34/142 . . . {unsupported or free-falling elements, e.g. balls, plugs, darts or pistons}

WARNING

Group [E21B 34/142](#) is incomplete pending reclassification of documents from groups [E21B 23/04](#) and [E21B 34/14](#).
Groups [E21B 23/04](#), [E21B 34/14](#), and [E21B 34/142](#) should be considered in order to perform a complete search.

- 34/16 . . . Control means therefor being outside the borehole ({control systems for submerged well heads [E21B 33/0355](#)})

35/00 Methods or apparatus for preventing or extinguishing fires (cutting or deforming pipes to control fluid flow [E21B 29/08](#); controlling flow of fluid to or in wells [E21B 43/12](#); fire fighting in general [A62C](#), [A62D](#))

36/00 Heating, cooling, insulating arrangements for boreholes or wells, e.g. for use in permafrost zones (drilling by use of heat [E21B 7/14](#); secondary recovery methods using heat [E21B 43/24](#))

- 36/001 . {Cooling arrangements}
- 36/003 . {Insulating arrangements}

- 36/005 . {Heater surrounding production tube}
- 36/006 . {Combined heating and pumping means}
- 36/008 . {using chemical heat generating means}
- 36/02 . using burners
- 36/025 . . {the burners being above ground or outside the bore hole}
- 36/04 . using electrical heaters

37/00 Methods or apparatus for cleaning boreholes or wells ([E21B 21/00](#) takes precedence; {bailers [E21B 27/00](#);} cleaning pipes in general [B08B 9/02](#))

- 37/02 . Scrapers specially adapted therefor
- 37/04 . . operated by fluid pressure, e.g. free-piston scrapers (operating other tools by fluid pressure [E21B 23/08](#))
- 37/045 . . . {Free-piston scrapers}
- 37/06 . using chemical means for preventing, limiting {or eliminating} the deposition of paraffins or like substances (chemical compositions therefor [C09K 8/52](#))
- 37/08 . cleaning *in situ* of down-hole filters, screens, {e.g. casing perforations,} or gravel packs ([E21B 37/06](#) takes precedence)
- 37/10 . Well swabs

40/00 Tubing catchers, automatically arresting the fall of oil-well tubing ({preventing small objects from falling into the borehole [E21B 41/0021](#)})

WARNING

Group [E21B 40/00](#) is impacted by reclassification into group [E21B 40/001](#).

Groups [E21B 40/00](#) and [E21B 40/001](#) should be considered in order to perform a complete search.

- 40/001 . {in the borehole (anchoring tools in the borehole [E21B 23/01](#))}

WARNING

Group [E21B 40/001](#) is incomplete pending reclassification of documents from group [E21B 40/00](#).

Groups [E21B 40/00](#) and [E21B 40/001](#) should be considered in order to perform a complete search.

41/00 Equipment or details not covered by groups [E21B 15/00](#) - [E21B 40/00](#)

WARNING

Group [E21B 41/00](#) is incomplete pending reclassification of documents from group [E21B 41/0092](#).

Group [E21B 41/00](#) is also impacted by reclassification into group [E21B 41/0099](#).

Groups [E21B 41/0092](#), [E21B 41/00](#), and [E21B 41/0099](#) should be considered in order to perform a complete search.

- 41/0007 . {for underwater installations ([E21B 41/005](#), [E21B 41/04](#), [E21B 41/06](#), [E21B 41/08](#), [E21B 41/10](#) take precedence)}
- 41/0014 . . {Underwater well locating or reentry systems}
- 41/0021 . {Safety devices, e.g. for preventing small objects from falling into the borehole}

- 41/0035 . {Apparatus or methods for multilateral well technology, e.g. for the completion of or workover on wells with one or more lateral branches}
- 41/0042 . . {characterised by sealing the junction between a lateral and a main bore}
- 41/005 . {Waste disposal systems}
- 41/0057 . . {Disposal of a fluid by injection into a subterranean formation}
- 41/0064 . . . {Carbon dioxide sequestration (storing fluids in porous layers [B65G 5/005](#))}
- 41/0071 . . {Adaptation of flares, e.g. arrangements of flares in offshore installations (flares of waste gases or noxious gases [F23G 7/08](#))}
- 41/0078 . {Nozzles used in boreholes (drilling by liquid or gas jets [E21B 7/18](#); drill bits with nozzles [E21B 10/60](#); perforators using direct fluid action [E21B 43/114](#); obtaining a slurry of minerals using nozzles [E21B 43/29](#))}
- 41/0085 . {Adaptations of electric power generating means for use in boreholes}
- 41/0092 . {Methods relating to program engineering, design or optimisation}

WARNING

Group [E21B 41/0092](#) is no longer used for the classification of documents as of May 1, 2020.

The content of this group is being reclassified into groups [E21B 41/00](#), [E21B 43/00](#), [E21B 43/16](#), and [G06Q 10/06](#).

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

- 41/0099 . {specially adapted for drilling for or production of natural hydrate or clathrate gas reservoirs; Drilling through or monitoring of formations containing gas hydrates or clathrates}

WARNING

Group [E21B 41/0099](#) is incomplete pending reclassification of documents from group [E21B 41/00](#).

Groups [E21B 41/00](#) and [E21B 41/0099](#) should be considered in order to perform a complete search.

- 41/02 . in situ inhibition of corrosion in boreholes or wells (dump bailers [E21B 27/02](#); chemical compositions therefor [C09K 8/54](#); inhibiting corrosion in general [C23F](#))
- 41/04 . Manipulators for underwater operations, e.g. temporarily connected to well heads (manipulators in general [B25J](#))
- 41/06 . Work chambers for underwater operations, e.g. temporarily connected to well heads (in general [B63C 11/00](#))
- 41/08 . Underwater guide bases, e.g. drilling templates; Levelling thereof
- 41/10 . Guide posts, e.g. releasable; Attaching guide lines to underwater guide bases

Obtaining fluids from wells**43/00**

Methods or apparatus for obtaining oil, gas, water, soluble or meltable materials or a slurry of minerals from wells (applicable only to water [E03B](#); obtaining oil-bearing deposits or soluble or meltable materials by mining techniques [E21C 41/00](#); pumps [F04](#))

WARNING

Group [E21B 43/00](#) is incomplete pending reclassification of documents from group [E21B 41/0092](#).

Groups [E21B 41/0092](#) and [E21B 43/00](#) should be considered in order to perform a complete search.

- 43/003 . {Vibrating earth formations}
- 43/006 . {Production of coal-bed methane ([E21B 43/243](#) takes precedence)}
- 43/01 . specially adapted for obtaining from underwater installations (underwater well heads [E21B 33/035](#))
- 43/0107 . . {Connecting of flow lines to offshore structures ([E21B 43/013](#) takes precedence)}
- 43/0122 . . {Collecting oil or the like from a submerged leakage (cleaning or keeping clear the surface of open water from oil or the like [E02B 15/04](#))}
- 43/013 . . Connecting a production flow line to an underwater well head
- 43/0135 . . . {using a pulling cable}
- 43/017 . . Production satellite stations, i.e. underwater installations comprising a plurality of satellite well heads connected to a central station (underwater separating arrangements [E21B 43/36](#))

WARNING

Group [E21B 43/017](#) is impacted by reclassification into group [E21B 43/0175](#).

Groups [E21B 43/017](#) and [E21B 43/0175](#) should be considered in order to perform a complete search.

- 43/0175 . . . {Hydraulic schemes for production manifolds}

WARNING

Group [E21B 43/0175](#) is incomplete pending reclassification of documents from group [E21B 43/017](#).

Groups [E21B 43/017](#) and [E21B 43/0175](#) should be considered in order to perform a complete search.

- 43/02 . Subsoil filtering ([E21B 43/11](#) takes precedence; chemical compositions for consolidating loose sand or the like around wells [C09K 8/56](#))
- 43/025 . . {Consolidation of loose sand or the like round the wells without excessively decreasing the permeability thereof}
- 43/04 . . Gravelling of wells
- 43/045 . . . {Crossover tools}
- 43/08 . . Screens or liners {(expandable screens or liners [E21B 43/108](#))}
- 43/082 . . . {Screens comprising porous materials, e.g. prepacked screens}
- 43/084 . . . {Screens comprising woven materials, e.g. mesh or cloth}

- 43/086 . . . {Screens with preformed openings, e.g. slotted liners (comprising porous materials [E21B 43/082](#))}
- 43/088 . . . {Wire screens (comprising porous materials [E21B 43/082](#); comprising woven materials [E21B 43/084](#))}
- 43/10 . . Setting of casings, screens, liners {or the like} in wells (driving or forcing casings into boreholes, simultaneously drilling and casing boreholes [E21B 7/20](#); setting of tools, packers or the like [E21B 23/00](#); suspending casings in well heads [E21B 33/04](#))
- 43/101 . . . {for underwater installations}
- 43/103 . . . {of expandable casings, screens, liners, or the like}
- 43/105 {Expanding tools specially adapted therefor}
- 43/106 {Couplings or joints therefor}
- 43/108 {Expandable screens or perforated liners}
- 43/11 . . Perforators; Permeators
- 43/112 . . Perforators with extendable perforating members, e.g. actuated by fluid means
- 43/114 . . Perforators using direct fluid action {on the wall to be perforated}, e.g. abrasive jets
- 43/116 . . Gun or shaped-charge perforators
- 43/117 . . . Shaped-charge perforators ([E21B 43/118](#) takes precedence)
- 43/118 . . . characterised by lowering in vertical position and subsequent tilting to operating position
- 43/1185 . . . Ignition systems
- 43/11852 {hydraulically actuated}
- 43/11855 {mechanically actuated, e.g. by movement of a wireline or a drop-bar ([E21B 43/11852](#) takes precedence)}
- 43/11857 {firing indication systems}
- 43/119 . . Details, e.g. for locating perforating place or direction

WARNING

Group [E21B 43/119](#) is impacted by reclassification into group [E21B 43/1193](#).
Groups [E21B 43/119](#) and [E21B 43/1193](#) should be considered in order to perform a complete search.

- 43/1193 . . . {Dropping perforation guns after gun actuation}

WARNING

Group [E21B 43/1193](#) is incomplete pending reclassification of documents from group [E21B 43/119](#).

Groups [E21B 43/119](#) and [E21B 43/1193](#) should be considered in order to perform a complete search.

- 43/1195 . . . {Replacement of drilling mud; decrease of undesirable shock waves}
- 43/12 . . Methods or apparatus for controlling the flow of the obtained fluid to or in wells ([E21B 43/25](#) takes precedence; valve arrangements [E21B 34/00](#))

- 43/121 . . {Lifting well fluids (monitoring of down-hole pump systems [E21B 47/008](#))}

WARNING

Group [E21B 43/121](#) is impacted by reclassification into group [E21B 43/13](#).

Groups [E21B 43/121](#) and [E21B 43/13](#) should be considered in order to perform a complete search.

- 43/122 . . . {Gas lift}

WARNING

Group [E21B 43/122](#) is impacted by reclassification into group [E21B 43/13](#).

Groups [E21B 43/122](#) and [E21B 43/13](#) should be considered in order to perform a complete search.

- 43/123 {Gas lift valves}

WARNING

Group [E21B 43/123](#) is impacted by reclassification into groups [E21B 43/1235](#) and [E21B 43/13](#).

Groups [E21B 43/123](#), [E21B 43/1235](#), and [E21B 43/13](#) should be considered in order to perform a complete search.

- 43/1235 {characterised by electromagnetic actuation}

WARNING

Group [E21B 43/1235](#) is incomplete pending reclassification of documents from group [E21B 43/123](#).

Groups [E21B 43/123](#) and [E21B 43/1235](#) should be considered in order to perform a complete search.

- 43/124 . . . {Adaptation of jet-pump systems}

WARNING

Group [E21B 43/124](#) is impacted by reclassification into group [E21B 43/13](#).

Groups [E21B 43/124](#) and [E21B 43/13](#) should be considered in order to perform a complete search.

- 43/126 . . . {Adaptations of down-hole pump systems powered by drives outside the borehole, e.g. by a rotary or oscillating drive (powered by fluid [E21B 43/129](#))}

WARNING

Group [E21B 43/126](#) is impacted by reclassification into group [E21B 43/13](#).

Groups [E21B 43/126](#) and [E21B 43/13](#) should be considered in order to perform a complete search.

- 43/127 {Adaptations of walking-beam pump systems}

WARNING

Group [E21B 43/127](#) is impacted by reclassification into group [E21B 43/13](#).

Groups [E21B 43/127](#) and [E21B 43/13](#) should be considered in order to perform a complete search.

- 43/128 {Adaptation of pump systems with down-hole electric drives}

WARNING

Group [E21B 43/128](#) is impacted by reclassification into group [E21B 43/13](#).

Groups [E21B 43/128](#) and [E21B 43/13](#) should be considered in order to perform a complete search.

- 43/129 {Adaptations of down-hole pump systems powered by fluid supplied from outside the borehole (gas-lift [E21B 43/122](#); jet pumps [E21B 43/124](#))}

WARNING

Group [E21B 43/129](#) is impacted by reclassification into group [E21B 43/13](#).

Groups [E21B 43/129](#) and [E21B 43/13](#) should be considered in order to perform a complete search.

- 43/13 {specially adapted to dewatering of wells of gas producing reservoirs, e.g. methane producing coal beds}

WARNING

Group [E21B 43/13](#) is incomplete pending reclassification of documents from groups [E21B 43/121](#), [E21B 43/122](#), [E21B 43/123](#), [E21B 43/124](#), [E21B 43/126](#), [E21B 43/127](#), [E21B 43/128](#), and [E21B 43/129](#).

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

- 43/14 Obtaining from a multiple-zone well
- 43/16 Enhanced recovery methods for obtaining hydrocarbons (fracturing [E21B 43/26](#); obtaining slurry [E21B 43/29](#); reclamation of contaminated soil in situ [B09C](#) {; chemical compositions therefor [C09K 8/58](#)})

WARNING

Group [E21B 43/16](#) is incomplete pending reclassification of documents from group [E21B 41/0092](#).

Groups [E21B 41/0092](#) and [E21B 43/16](#) should be considered in order to perform a complete search.

- 43/162 {Injecting fluid from longitudinally spaced locations in injection well}

- 43/164 {Injecting CO₂ or carbonated water (in combination with organic material [C09K 8/594](#))}

- 43/166 {Injecting a gaseous medium; Injecting a gaseous medium and a liquid medium (CO₂ injection [E21B 43/164](#); steam injection [E21B 43/24](#))}

- 43/168 {Injecting a gaseous medium}

- 43/17 Interconnecting two or more wells by fracturing or otherwise attacking the formation ({[E21B 43/2405](#),} [E21B 43/247](#) take precedence)

- 43/18 Repressuring or vacuum methods

- 43/20 Displacing by water

- 43/24 using heat, e.g. steam injection (heating, cooling or insulating wells [E21B 36/00](#) {; in combination with organic material [C09K 8/592](#)})

- 43/2401 {by means of electricity}

- 43/2403 {by means of nuclear energy}

- 43/2405 {in association with fracturing or crevice forming processes ([E21B 43/247](#) takes precedence)}

- 43/2406 {Steam assisted gravity drainage [SAGD]}

- 43/2408 {SAGD in combination with other methods}

- 43/241 combined with solution mining of non-hydrocarbon minerals, e.g. solvent pyrolysis of oil shale

- 43/243 Combustion *in situ*

- 43/247 in association with fracturing processes {or crevice forming processes}

- 43/248 using explosives

- 43/25 Methods for stimulating production (dump bailers [E21B 27/02](#); vibration generating arrangements [E21B 28/00](#); {by vibrating earth formations [E21B 43/003](#);} chemical compositions therefor [C09K 8/60](#))

- 43/255 {including the injection of a gaseous medium as treatment fluid into the formation}

- 43/26 by forming crevices or fractures {(chemical compositions therefor [C09K 8/62](#))}

WARNING

Group [E21B 43/26](#) is impacted by reclassification into groups [E21B 43/2605](#), [E21B 43/2607](#), and [E21B 43/27](#).

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

- 43/2605 {using gas or liquefied gas}

WARNING

Group [E21B 43/2605](#) is incomplete pending reclassification of documents from group [E21B 43/26](#).

Groups [E21B 43/26](#) and [E21B 43/2605](#) should be considered in order to perform a complete search.

- 43/2607 {Surface equipment specially adapted for fracturing operations}

WARNING

Group [E21B 43/2607](#) is incomplete pending reclassification of documents from group [E21B 43/26](#).

Groups [E21B 43/26](#) and [E21B 43/2607](#) should be considered in order to perform a complete search.

- 43/261 . . . {Separate steps of (1) cementing, plugging or consolidating and (2) fracturing or attacking the formation}
- 43/263 . . . using explosives {(combustion in situ using explosives E21B 43/248)}
- 43/2635 {by means of nuclear energy}
- 43/267 . . . reinforcing fractures by propping {(chemical compositions therefor C09K 8/80)}
- 43/27 . . . by use of eroding chemicals, e.g. acids

WARNING

Group E21B 43/27 is incomplete pending reclassification of documents from group E21B 43/26.

Groups E21B 43/26 and E21B 43/27 should be considered in order to perform a complete search.

- 43/28 . . Dissolving minerals other than hydrocarbons, e.g. by an alkaline or acid leaching agent (E21B 43/241 takes precedence)
- 43/281 . . {using heat}
- 43/283 . . {in association with a fracturing process}
- 43/285 . . Melting minerals, e.g. sulfur (E21B 43/24 takes precedence; heating, cooling or insulating arrangements for wells E21B 36/00)
- 43/29 . . Obtaining a slurry of minerals, e.g. by using nozzles
- 43/292 . . {using steerable or laterally extendable nozzles}
- 43/295 . . Gasification of minerals, e.g. for producing mixtures of combustible gases (E21B 43/243 takes precedence)
- 43/30 . . Specific pattern of wells, e.g. optimizing the spacing of wells (production satellite stations E21B 43/017)
- 43/305 . . {comprising at least one inclined or horizontal well}
- 43/32 . . Preventing gas- or water-coning phenomena, i.e. the formation of a conical column of gas or water around wells
- 43/34 . . Arrangements for separating materials produced by the well (separating apparatus per se, see the relevant subclasses)

WARNING

Group E21B 43/34 is impacted by reclassification into group E21B 43/35.

Groups E21B 43/34 and E21B 43/35 should be considered in order to perform a complete search.

- 43/35 . . {specially adapted for separating solids (down-hole drilling fluid separation systems E21B 21/002; separating solids from drilling fluids E21B 21/065)}

WARNING

Group E21B 43/35 is incomplete pending reclassification of documents from groups E21B 43/34, E21B 43/36, E21B 43/38, E21B 43/385, and E21B 43/40.

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

- 43/36 . . Underwater separating arrangements (E21B 43/38 takes precedence)

WARNING

Group E21B 43/36 is impacted by reclassification into group E21B 43/35.

Groups E21B 43/36 and E21B 43/35 should be considered in order to perform a complete search.

- 43/38 . . in the well

WARNING

Group E21B 43/38 is impacted by reclassification into group E21B 43/35.

Groups E21B 43/38 and E21B 43/35 should be considered in order to perform a complete search.

- 43/385 . . . {by reinjecting the separated materials into an earth formation in the same well}

WARNING

Group E21B 43/385 is impacted by reclassification into group E21B 43/35.

Groups E21B 43/385 and E21B 43/35 should be considered in order to perform a complete search.

- 43/40 . . Separation associated with re-injection of separated materials {(E21B 43/385 takes precedence)}

WARNING

Group E21B 43/40 is impacted by reclassification into group E21B 43/35.

Groups E21B 43/40 and E21B 43/35 should be considered in order to perform a complete search.

Automatic control, surveying or testing

- 44/00 **Automatic control systems specially adapted for drilling operations, i.e. self-operating systems which function to carry out or modify a drilling operation without intervention of a human operator, e.g. computer-controlled drilling systems (for non-automatic drilling control, see the operation controlled; automatic feeding from rack and connecting of drilling pipes E21B 19/20; controlling pressure or flow of drilling fluid E21B 21/08); Systems specially adapted for monitoring a plurality of drilling variables or conditions (means for transmitting measuring-signals from the well to the surface E21B 47/12)**
- 44/005 . . {Below-ground automatic control systems}
- 44/02 . . Automatic control of the tool feed ({E21B 44/005, E21B 44/10 take precedence})
- 44/04 . . in response to the torque of the drive {; Measuring drilling torque (E21B 44/06 takes precedence; measuring stresses in a well bore pipe E21B 47/007)}
- 44/06 . . in response to the flow or pressure of the motive fluid of the drive
- 44/08 . . in response to the amplitude of the movement of the percussion tool, e.g. jump or recoil

- 44/10 . Arrangements for automatic stopping when the tool is lifted from the working face
- 45/00 Measuring the drilling time or rate of penetration**
- 47/00 Survey of boreholes or wells (monitoring pressure or flow of drilling fluid [E21B 21/08](#))**
- WARNING**
- Group [E21B 47/00](#) is impacted by reclassification into group [E21B 47/006](#).
- Groups [E21B 47/00](#) and [E21B 47/006](#) should be considered in order to perform a complete search.
- 47/001 . for underwater installation
- 47/002 . by visual inspection
- WARNING**
- Group [E21B 47/002](#) is impacted by reclassification into group [E21B 47/0025](#).
- Groups [E21B 47/002](#) and [E21B 47/0025](#) should be considered in order to perform a complete search.
- 47/0025 . . {generating an image of the borehole wall using down-hole measurements, e.g. acoustic or electric}
- WARNING**
- Group [E21B 47/0025](#) is incomplete pending reclassification of documents from group [E21B 47/002](#).
- Groups [E21B 47/002](#) and [E21B 47/0025](#) should be considered in order to perform a complete search.
- 47/003 . Determining well or borehole volumes (determining depth [E21B 47/04](#); diameter [E21B 47/08](#))
- 47/005 . Monitoring or checking of cementation quality or level
- 47/006 . {Detection of corrosion or deposition of substances}
- WARNING**
- Group [E21B 47/006](#) is incomplete pending reclassification of documents from group [E21B 47/00](#).
- Groups [E21B 47/00](#) and [E21B 47/006](#) should be considered in order to perform a complete search.
- 47/007 . Measuring stresses in a pipe string or casing (for locating blocked portions of pipes [E21B 47/09](#))
- 47/008 . Monitoring of down-hole pump systems, e.g. for the detection of "pumped-off" conditions
- 47/009 . . Monitoring of walking-beam pump systems
- 47/01 . Devices for supporting measuring instruments on drill bits, pipes, rods or wirelines; Protecting measuring instruments in boreholes against heat, shock, pressure or the like
- NOTE**
- Devices for both supporting and protecting measuring instruments are only classified in [E21B 47/017](#)

WARNING

Group [E21B 47/01](#) is impacted by reclassification into group [E21B 47/013](#).

Groups [E21B 47/01](#) and [E21B 47/013](#) should be considered in order to perform a complete search.

- 47/013 . . Devices specially adapted for supporting measuring instruments on drill bits

WARNING

Group [E21B 47/013](#) is incomplete pending reclassification of documents from groups [E21B 47/01](#) and [E21B 47/017](#).

Groups [E21B 47/01](#), [E21B 47/017](#), and [E21B 47/013](#) should be considered in order to perform a complete search.

- 47/017 . . Protecting measuring instruments

WARNING

Group [E21B 47/017](#) is impacted by reclassification into groups [E21B 47/013](#) and [E21B 47/0175](#).

Groups [E21B 47/017](#), [E21B 47/013](#), and [E21B 47/0175](#) should be considered in order to perform a complete search.

- 47/0175 . . . {Cooling arrangements}

WARNING

Group [E21B 47/0175](#) is incomplete pending reclassification of documents from group [E21B 47/017](#).

Groups [E21B 47/017](#) and [E21B 47/0175](#) should be considered in order to perform a complete search.

- 47/02 . Determining slope or direction
- 47/022 . . of the borehole, e.g. using geomagnetism
- 47/0224 . . . using seismic or acoustic means
- 47/0228 . . . using electromagnetic energy or detectors therefor
- 47/0232 at least one of the energy sources or one of the detectors being located on or above the ground surface
- 47/0236 . . . using a pendulum
- 47/024 . . of devices in the borehole ([E21B 47/022](#) takes precedence)
- 47/026 . . of penetrated ground layers
- 47/04 . Measuring depth or liquid level
- 47/047 . . Liquid level ([E21B 47/053](#) takes precedence)
- 47/053 . . using radioactive markers
- 47/06 . Measuring temperature or pressure
- 47/07 . . Temperature
- 47/08 . Measuring diameters or related dimensions at the borehole
- 47/085 . . using radiant means, e.g. acoustic, radioactive or electromagnetic
- 47/09 . Locating or determining the position of objects in boreholes or wells {, e.g. the position of an extending arm}; Identifying the free or blocked portions of pipes
- 47/092 . . by detecting magnetic anomalies

- 47/095 . . by detecting an acoustic anomalies, e.g. using mud-pressure pulses
- 47/098 . . using impression packers, e.g. to detect recesses or perforations
- 47/10 . Locating fluid leaks, intrusions or movements {[\(using impression packers E21B 47/098\)](#)}

WARNING

Group [E21B 47/10](#) is impacted by reclassification into groups [E21B 47/113](#) and [E21B 47/114](#).

Groups [E21B 47/10](#), [E21B 47/113](#), and [E21B 47/114](#) should be considered in order to perform a complete search.

- 47/103 . . using thermal measurements {[\(measurement temperature E21B 47/07\)](#)}
- 47/107 . . using acoustic means
- 47/11 . . using tracers; using radioactivity

WARNING

Group [E21B 47/11](#) is impacted by reclassification into group [E21B 47/111](#).

Groups [E21B 47/11](#) and [E21B 47/111](#) should be considered in order to perform a complete search.

- 47/111 . . . {[using radioactivity](#)}

WARNING

Group [E21B 47/111](#) is incomplete pending reclassification of documents from group [E21B 47/11](#).

Groups [E21B 47/11](#) and [E21B 47/111](#) should be considered in order to perform a complete search.

- 47/113 . . using electrical indications; using light radiations

WARNING

Group [E21B 47/113](#) is incomplete pending reclassification of documents from group [E21B 47/10](#).

Group [E21B 47/113](#) is also impacted by reclassification into group [E21B 47/114](#).

Groups [E21B 47/10](#), [E21B 47/113](#), and [E21B 47/114](#) should be considered in order to perform a complete search.

- 47/114 . . . {[using light radiation](#)}

WARNING

Group [E21B 47/114](#) is incomplete pending reclassification of documents from groups [E21B 47/10](#) and [E21B 47/113](#).

Groups [E21B 47/10](#), [E21B 47/113](#), and [E21B 47/114](#) should be considered in order to perform a complete search.

- 47/117 . . Detecting leaks, e.g. from tubing, by pressure testing

- 47/12 . Means for transmitting measuring-signals or control signals from the well to the surface, or from the surface to the well, e.g. for logging while drilling

WARNING

Group [E21B 47/12](#) is impacted by reclassification into group [E21B 47/138](#).

Groups [E21B 47/12](#) and [E21B 47/138](#) should be considered in order to perform a complete search.

- 47/125 . . using earth as an electrical conductor ([E21B 47/13 takes precedence](#))
- 47/13 . . by electromagnetic energy, e.g. radio frequency
- 47/135 . . . using light waves, e.g. infrared or ultraviolet waves
- 47/138 . . {[Devices entrained in the flow of well-bore fluid for transmitting data, control or actuation signals](#)}

WARNING

Group [E21B 47/138](#) is incomplete pending reclassification of documents from group [E21B 47/12](#).

Groups [E21B 47/12](#) and [E21B 47/138](#) should be considered in order to perform a complete search.

- 47/14 . . using acoustic waves
- 47/16 . . . through the drill string or casing {, e.g. by [torsional acoustic waves](#)}
- 47/18 . . . through the well fluid {, e.g. [mud pressure pulse telemetry](#)}
- 47/20 by modulation of mud waves, e.g. by continuous modulation
- 47/22 by negative mud pulses using a pressure relieve valve between drill pipe and annulus
- 47/24 by positive mud pulses using a flow restricting valve within the drill pipe
- 47/26 . Storing data down-hole, e.g. in a memory or on a record carrier

49/00 Testing the nature of borehole walls; Formation testing; Methods or apparatus for obtaining samples of soil or well fluids, specially adapted to earth drilling or wells (sampling in general [G01N 1/00](#))

- 49/001 . {[specially adapted for underwater installations](#)}
- 49/003 . {[by analysing drilling variables or conditions \(E21B 49/005 takes precedence; systems specially adapted for monitoring a plurality of drilling variables or conditions \[E21B 44/00\]\(#\)\)](#)}
- 49/005 . {[Testing the nature of borehole walls or the formation by using drilling mud or cutting data](#)}
- 49/006 . {[Measuring wall stresses in the borehole](#)}
- 49/008 . {[by injection test; by analysing pressure variations in an injection or production test, e.g. for estimating the skin factor \(measuring pressure \[E21B 47/06\]\(#\)\)](#)}
- 49/02 . by mechanically taking samples of the soil ([apparatus for obtaining undisturbed cores \[E21B 25/00\]\(#\); investigation of foundation soil in situ \[E02D 1/00\]\(#\)](#))
- 49/025 . . {[of underwater soil, e.g. with grab devices](#)}
- 49/04 . . using explosives in boreholes; using projectiles penetrating the wall
- 49/06 . . using side-wall drilling tools {[pressing](#)} or scrapers

- 49/08 . . . Obtaining fluid samples or testing fluids, in boreholes or wells
- 49/081 . . . {with down-hole means for trapping a fluid sample ([E21B 49/10](#) takes precedence)}

WARNING

Group [E21B 49/081](#) is impacted by reclassification into groups [E21B 49/0813](#) and [E21B 49/0815](#).

Groups [E21B 49/081](#), [E21B 49/0813](#), and [E21B 49/0815](#) should be considered in order to perform a complete search.

- 49/0813 . . . {Sampling valve actuated by annulus pressure changes}

WARNING

Group [E21B 49/0813](#) is incomplete pending reclassification of documents from groups [E21B 49/081](#) and [E21B 49/083](#).

Groups [E21B 49/081](#), [E21B 49/083](#), and [E21B 49/0813](#) should be considered in order to perform a complete search.

- 49/0815 . . . {Sampling valve actuated by tubing pressure changes}

WARNING

Group [E21B 49/0815](#) is incomplete pending reclassification of documents from groups [E21B 49/081](#) and [E21B 49/083](#).

Groups [E21B 49/081](#), [E21B 49/083](#), and [E21B 49/0815](#) should be considered in order to perform a complete search.

- 49/082 . . . {Wire-line fluid samplers ([E21B 49/083](#) takes precedence)}

- 49/083 . . . {Samplers adapted to be lowered into or retrieved from a landing nipple, e.g. for testing a well without removing the drill string}

WARNING

Group [E21B 49/083](#) is impacted by reclassification into groups [E21B 49/0813](#) and [E21B 49/0815](#).

Groups [E21B 49/083](#), [E21B 49/0813](#), and [E21B 49/0815](#) should be considered in order to perform a complete search.

- 49/084 . . . {with means for conveying samples through pipe to surface}

- 49/086 . . . {Withdrawing samples at the surface}

- 49/087 . . . {Well testing, e.g. testing for reservoir productivity or formation parameters}

WARNING

Group [E21B 49/087](#) is impacted by reclassification into group [E21B 49/0875](#).

Groups [E21B 49/087](#) and [E21B 49/0875](#) should be considered in order to perform a complete search.

- 49/0875 . . . {determining specific fluid parameters}

WARNING

Group [E21B 49/0875](#) is incomplete pending reclassification of documents from group [E21B 49/087](#).

Groups [E21B 49/087](#) and [E21B 49/0875](#) should be considered in order to perform a complete search.

- 49/088 . . . {combined with sampling}
- 49/10 . . . using side-wall fluid samplers or testers

2200/00 Special features related to earth drilling for obtaining oil, gas or water**WARNING**

Group [E21B 2200/00](#) is incomplete pending reclassification of documents from group [E21B 33/00](#).

Groups [E21B 33/00](#) and [E21B 2200/00](#) should be considered in order to perform a complete search.

- 2200/01 . . . Sealings characterised by their shape

WARNING

Group [E21B 2200/01](#) is incomplete pending reclassification of documents from group [E21B 33/00](#).

Groups [E21B 33/00](#) and [E21B 2200/01](#) should be considered in order to perform a complete search.

- 2200/02 . . . Down-hole chokes or valves for variably regulating fluid flow

WARNING

Group [E21B 2200/02](#) is incomplete pending reclassification of documents from group [E21B 33/00](#).

Groups [E21B 33/00](#) and [E21B 2200/02](#) should be considered in order to perform a complete search.

- 2200/03 . . . Valves operated by gear mechanisms, e.g. rack and pinion mechanisms

WARNING

Group [E21B 2200/03](#) is incomplete pending reclassification of documents from group [E21B 33/00](#).

Groups [E21B 33/00](#) and [E21B 2200/03](#) should be considered in order to perform a complete search.

- 2200/04 . . . Ball valves

WARNING

Group [E21B 2200/04](#) is incomplete pending reclassification of documents from group [E21B 33/00](#).

Groups [E21B 33/00](#) and [E21B 2200/04](#) should be considered in order to perform a complete search.

- 2200/05 . Flapper valves

WARNING

Group [E21B 2200/05](#) is incomplete pending reclassification of documents from group [E21B 33/00](#).

Groups [E21B 33/00](#) and [E21B 2200/05](#) should be considered in order to perform a complete search.

- 2200/06 . Sleeve valves

WARNING

Group [E21B 2200/06](#) is incomplete pending reclassification of documents from group [E21B 33/00](#).

Groups [E21B 33/00](#) and [E21B 2200/06](#) should be considered in order to perform a complete search.

- 2200/08 . Down-hole devices using materials which decompose under well-bore conditions

WARNING

Group [E21B 2200/08](#) is incomplete pending reclassification of documents from group [E21B 33/00](#).

Groups [E21B 33/00](#) and [E21B 2200/08](#) should be considered in order to perform a complete search.

- 2200/09 . Detecting, eliminating, preventing liquid slugs in production pipes

WARNING

Group [E21B 2200/09](#) is incomplete pending reclassification of documents from group [E21B 33/00](#).

Groups [E21B 33/00](#) and [E21B 2200/09](#) should be considered in order to perform a complete search.

- 2200/20 . Computer models or simulations, e.g. for reservoirs under production, drill bits

WARNING

Group [E21B 2200/20](#) is incomplete pending reclassification of documents from group [E21B 33/00](#).

Groups [E21B 33/00](#) and [E21B 2200/20](#) should be considered in order to perform a complete search.

- 2200/22 . Fuzzy logic, artificial intelligence, neural networks or the like

WARNING

Group [E21B 2200/22](#) is incomplete pending reclassification of documents from group [E21B 33/00](#).

Groups [E21B 33/00](#) and [E21B 2200/22](#) should be considered in order to perform a complete search.