E21B  EARTH DRILLING; MINING

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

WARNINGS
1. The following IPC groups are not in the CPC scheme. The subject matter for these IPC groups is classified in the following CPC groups:
   - E21B 7/08 covered by E21B 7/06
   - E21B 43/22 covered by C09K 8/58
2. In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.

Methods or apparatus for drilling

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

NOTE
When classifying in groups E21B 1/12 - E21B 1/38, a symbol from one of the following main groups of B25D should also be given:
- B25D 9/00 Portable percussive tools with fluid-pressure drives
- B25D 11/00 Portable percussive tools with motor drive
- B25D 16/00 Portable percussive machines with superimposed rotation
- B25D 17/00 Details of, or accessories for, portable power-driven percussive tools

WARNING
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.

1/02  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.

1/12  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.
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
. . . formed as centrifugal hammers
. . . 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.

. . . 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.

. . . by liquid pressure
. . . working with pulses
. . . by air, steam or gas pressure
. . . working with pulses
. . . . . . . . . the impulse member being a piston of an internal-combustion engine
. . . . 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.

. . . 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.

. . . Rotary drilling (drives used in the borehole E21B 4/00; rotary drilling machines in general B23B)

**WARNING**


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

. . . 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.

. . . 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.

. . . 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.

. . . 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.

. . . 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.

. . . movably mounted on the drilling structure or platform (derricks adapted to be moved on their substructure E21B 15/003)
Methods or apparatus for drilling

E21B

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 31/07)

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 modus 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; ) telescopically jointed 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
Methods or apparatus for drilling

Drilling tools

10/00 Drill bits (specially adapted for deflecting the direction of boring E21B 7/065; 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 eccentric movement}

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

10/12 . . . with disc cutters

10/14 . . . combined with non-rolling cutters other than of leading-portion type

10/16 . . . characterised by tooth form or arrangement

10/18 . . . characterised by conduits or nozzles for drilling fluids (drilling fluid supply to the bearings E21B 10/23)

10/20 . . . characterised by detachable or adjustable parts, e.g. legs or axles (cross axle roller bits E21B 10/10)

10/22 . . . characterised by bearing, lubrication or sealing details

10/23 . . . with drilling fluid supply to the bearings

10/24 . . . characterised by lubricating details

10/246 . . . . . . . . . . . {with pumping means for feeding lubricant}

10/25 . . . . . . . . . . . . . . . . {characterised by sealing details}

10/26 . . Drill bits with leading portion, i.e. drill bits with a pilot cutter; Drill bits for enlarging the borehole, e.g. reamers (percussion drill bits with leading portion E21B 10/40; augers with leading portion E21B 10/44)

WARNING

Group E21B 10/06 is impacted by reclassification into group E21B 10/265.

Groups E21B 10/26 and E21B 10/265 should be considered in order to perform a complete search.

10/265 . . . {Bi-center drill bits, i.e. an integral bit and eccentric reamer used to simultaneously drill and underream the hole}

WARNING


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

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)
Drilling tools

10/67 . . . with preformed cutting elements mounted on a distinct support, e.g. polycrystalline inserts

WARNING
Group E21B 10/657 is impacted by reclassification into group E21B 10/5671.
Groups E21B 10/657 and E21B 10/5671 should be considered in order to perform a complete search.

10/671 . . . {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.

10/673 . . . {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.

10/676 . . . {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 10/64 - 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)}
Other equipment or details for drilling; Well equipment or well maintenance

17/01 . Risers ([supporting a riser from a drilling or production platform E21B 19/004];) riser connectors (on well heads) E21B 33/038

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.

17/03 . . 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.

17/05 . . 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)

17/08 . . Casing joints

17/09 . . [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.

17/012 . . [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]

17/01 . . Risers ([supporting a riser from a drilling or production platform E21B 19/004];) riser connectors (on well heads) E21B 33/038

17/023 . . . [Arrangements for connecting cables or wirelines to the outside of downhole devices]

17/028 . . . [Characterised by electrically insulating elements]

17/0283 . . . [characterised by the coupling being contactless, e.g. inductive]

17/0285 . . . [characterised by a threaded cylindrical portion, e.g. for percussion rods]

17/0286 . . . [Characterised by radially inserted locking elements]

17/032 . . . [Devices for subsurface connecting or disconnecting by rotation]

17/034 . . . [Side entry subs]

17/036 . . . [Arrangements for fixing cables or wirelines to the outside of downhole devices]

17/028 . . . [With locking means]

17/042 . . . Threaded

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.

17/073 . . . [With axial rotation]

17/076 . . . [Between rod or pipe and drill bit]

17/083 . . . [Heave compensators (heave compensators in the derrick E21B 19/09; releasing-jars E21B 31/107)]

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.
Other equipment or details for drilling; Well equipment or well maintenance

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 expandable 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 . . . {Elastomper 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 . . . {especially 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 100; 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.

19/083 . . . 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 19/081 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.
Other equipment or details for drilling; Well equipment or well maintenance

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)

**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 (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.

19/12 . . . 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]

19/165 . . . [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**


All groups listed in this Warning should be considered in order to perform a complete search.
Other equipment or details for drilling; Well equipment or well maintenance

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]

21/014  [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
Other equipment or details for drilling; Well equipment or well maintenance  

**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
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.
Other equipment or details for drilling; Well equipment or well maintenance

E21B

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]
Other equipment or details for drilling; Well equipment or well maintenance

E21B

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 . Grapping 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 7/061))
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 33/037.
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

**WARNING**

Group E21B 33/037 is impacted by reclassification into group E21B 33/0353.

Groups E21B 33/037 and E21B 33/0353 should be considered in order to perform a complete search.

33/0375 . . . . [Corrosion protection means]

**WARNING**

Group E21B 33/0375 is impacted by reclassification into group E21B 33/0353.

Groups E21B 33/0375 and E21B 33/0353 should be considered in order to perform a complete search.

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)

**WARNING**

Group E21B 33/038 is impacted by reclassification into group E21B 33/0353.

Groups E21B 33/038 and E21B 33/0353 should be considered in order to perform a complete search.

33/0385 . . . . [Electrical connectors]

**WARNING**

Group E21B 33/0385 is impacted by reclassification into group E21B 33/0353.

Groups E21B 33/0385 and E21B 33/0353 should be considered in order to perform a complete search.

33/0387 . . . . [Hydraulic stab connectors]

**WARNING**

Group E21B 33/0387 is incomplete pending reclassification of documents from group E21B 33/035.

Groups E21B 33/035 and E21B 33/0387 should be considered in order to perform a complete search.

33/04 . . . Casing heads; Suspending casings or tubings in well heads (setting of casings in wells E21B 43/10)

33/0407 . . . . [with a suspended electrical cable]

33/0415 . . . . [rotating or floating support for tubing or casing hanger]

33/0422 . . . . [a suspended tubing or casing being gripped by a slip or an internally serrated member]

**WARNING**

Group E21B 33/0422 is impacted by reclassification into group E21B 33/0353.

Groups E21B 33/0422 and E21B 33/0353 should be considered in order to perform a complete search.

33/043 . . . . specially adapted for underwater well heads (E21B 33/0407, E21B 33/047 take precedence)

33/047 . . . . for plural tubing strings

33/05 . . . . Cementing-heads, e.g. having provision for introducing cementing plugs

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)

33/061 . . . . [Ram-type blow-out preventers, e.g. with pivoting rams]

33/062 . . . . [with sliding rams]

33/063 . . . . [for shearing drill pipes (cutting of wireline E21B 29/04)]

33/064 . . . . specially adapted for underwater well heads (control systems for submerged well-heads E21B 33/0355, connectors therefor E21B 33/038)

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)

33/072 . . . . for cable-operated tools (E21B 33/076 takes precedence)

33/076 . . . . specially adapted for underwater installations

33/08 . . . . Wipers; Oil savers

33/085 . . . . [Rotatable packing means, e.g. rotating blow-out preventers]

33/10 . . . . in the borehole (sealing the junction between main bore and laterals E21B 41/0042)

33/12 . . . . Packers; Plugs (used for cementing E21B 33/13, E21B 33/16)

33/1204 . . . . [permanent; drillable]

33/1208 . . . . [characterised by the construction of the sealing or packing means (E21B 33/1277 takes precedence)]

33/1212 . . . . [including a metal-to-metal seal element]

33/1216 . . . . [Anti-extrusion means, e.g. means to prevent cold flow of rubber packing]

33/122 . . . . Multiple string packers

33/124 . . . . Units with longitudinally-spaced plugs for isolating the intermediate space

33/1243 . . . . [with inflatable sleeves]

33/1246 . . . . [inflated by down-hole pumping means operated by a pipe string]

33/126 . . . . with fluid-pressure-operated elastic cup or skirt (E21B 33/122, E21B 33/124 take precedence)

33/1265 . . . . [with mechanical slips]

33/127 . . . . with inflatable sleeve (E21B 33/122, E21B 33/124 take precedence)

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]
Other equipment or details for drilling; Well equipment or well maintenance

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 33/129 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]
Other equipment or details for drilling; Well equipment or well maintenance

E21B

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 . . . Scapers 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 41/009.

Group E21B 41/00 is also impacted by reclassification into group E21B 41/009.

Groups E21B 41/002, E21B 41/00, and E21B 41/009 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)
Other equipment or details for drilling; Well equipment or well maintenance

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 or for 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; 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]

CPC - 2021.08 18
Obtaining fluids from wells

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

43/1182 . . . [hydraulically actuated]

43/11855 . . . [mechanically actuated, e.g. by movement of a wireline or a drop-bar (E21B 43/1185 takes precedence)]

43/11857 . . . [firing indication systems]

43/119 . . . Details, e.g. for locating perforating place or direction

**WARNING**

Group E21B 43/19 is impacted by reclassification into group E21B 43/119. 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.

43/12 . . . 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.

43/128 . . . [Replacement of drilling mud; decrease of undesirable shock waves]

**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.
Obtaining fluids from wells

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**


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 8/581])

**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 43/16; 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 43/2427 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 43/3003; 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.
Obtaining fluids from wells

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
Automatic control, surveying or testing

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 47/00.
Groups E21B 47/00 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

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, E21B 47/013, 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
47/024 . . . using seismic or acoustic means
47/028 . . . 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

CPC - 2021.08
Automatic control, surveying or testing

E21B

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 47/113.

Groups E21B 47/11 and E21B 47/113 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 47/13.

Groups E21B 47/12 and E21B 47/13 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
Automatic control, surveying or testing

E21B

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 49/0813, and E21B 49/0815 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 49/0813, 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 49/0813, 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.

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.