

CPC COOPERATIVE PATENT CLASSIFICATION

E FIXED CONSTRUCTIONS

EARTH DRILLING; MINING

E21 EARTH OR ROCK DRILLING; MINING

E21B EARTH OR ROCK DRILLING; OBTAINING OIL, GAS, WATER, SOLUBLE OR MELTABLE MATERIALS OR A SLURRY OF MINERALS FROM WELLS

WARNINGS

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

Methods or apparatus for drilling

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

1/00 Percussion drilling

NOTE

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

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

WARNING

Group [E21B 1/00](#) is impacted by reclassification into groups [E21B 1/12](#), [E21B 1/14](#), [E21B 1/16](#), [E21B 1/18](#), [E21B 1/20](#), [E21B 1/22](#), [E21B 1/24](#), [E21B 1/26](#), [E21B 1/28](#), [E21B 1/30](#), [E21B 1/32](#), [E21B 1/34](#), [E21B 1/36](#), and [E21B 1/38](#).  
All groups listed in this Warning should be considered in order to perform a complete search.

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

WARNING

Group [E21B 1/02](#) is incomplete pending reclassification of documents from group [E21B 1/12](#).  
Group [E21B 1/02](#) is also impacted by reclassification into groups [E21B 1/04](#), [E21B 1/36](#) and [E21B 1/38](#).  
All groups listed in this Warning should be considered in order to perform a complete search.

WARNING

Group [E21B 1/04](#) is incomplete pending reclassification of documents from groups [E21B 1/02](#) and [E21B 1/12](#).  
All groups listed in this Warning should be considered in order to perform a complete search.

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

WARNING

Group [E21B 1/12](#) is incomplete pending reclassification of documents from group [E21B 1/00](#).  
Group [E21B 1/12](#) is also impacted by reclassification into groups [E21B 1/02](#), [E21B 1/04](#), [E21B 1/14](#), [E21B 1/16](#), [E21B 1/18](#), [E21B 1/20](#), [E21B 1/22](#), [E21B 1/24](#), [E21B 1/26](#), [E21B 1/28](#), [E21B 1/30](#), [E21B 1/32](#), [E21B 1/34](#) and [E21B 1/38](#).  
All groups listed in this Warning should be considered in order to perform a complete search.

- 1/14 . . driven by a rotating mechanism

WARNING

Groups [E21B 1/14](#) - [E21B 1/20](#) are incomplete pending reclassification of documents from groups [E21B 1/00](#) and [E21B 1/12](#).  
All groups listed in this Warning should be considered in order to perform a complete search.

- 1/16 . . . with spring-mounted reciprocating masses, e.g. with air cushion  
1/18 . . . . with elastic joining of the drive to the push-rod by double buffer springs  
1/20 . . . formed as centrifugal hammers

- 1/22 . . driven by electromagnets

**WARNING**

Group [E21B 1/22](#) is incomplete pending reclassification of documents from groups [E21B 1/00](#) and [E21B 1/12](#).

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

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

**WARNING**

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

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

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

**WARNING**

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

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

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

**WARNING**

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

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

- 3/00 Rotary drilling**

**WARNING**

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

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

- 3/02 . Surface drives for rotary drilling

**WARNING**

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

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

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

- 3/022 . . {Top drives}

**WARNING**

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

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

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

**WARNING**

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

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

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

**WARNING**

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

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

- 3/035 . . with slipping or elastic transmission

**WARNING**

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

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

- 3/04 . . Rotary tables

**WARNING**

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

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

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

- 3/06 . . . Adaptation of rotary draw works to drive rotary tables
- 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
- 4/04 . Electric drives ([E21B 4/12](#) takes precedence)
- 4/06 . Down-hole impacting means, e.g. hammers (boring rams [E21B 11/02](#))
- 4/08 . . impact being obtained by gravity only, e.g. with lost-motion connection
- 4/10 . . continuous unidirectional rotary motion of shaft or drilling pipe effecting consecutive impacts
- 4/12 . . Electrically operated hammers
- 4/14 . . Fluid operated hammers
- 4/145 . . . {of the self propelled-type, e.g. with a reverse mode to retract the device from the hole}
- 4/16 . Plural down-hole drives, e.g. for combined percussion and rotary drilling ([E21B 4/10](#) takes precedence); Drives for multi-bit drilling units
- 4/18 . Anchoring or feeding in the borehole
- 4/20 . combined with surface drive ([E21B 4/10](#) takes precedence)
- 6/00 Drives for drilling with combined rotary and percussive action**
- 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 ([E21B 7/001](#) takes precedence)}
- 7/003 . {Drilling with mechanical conveying means}
- 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 characterised by means for land transport {with their own drive}, e.g. skid mounting or wheel mounting
- 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
- 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 (using heave compensators [E21B 19/09](#))
- 7/122 . . {with submersible vertically movable guide}
- 7/124 . . with underwater tool drive prime mover, e.g. portable drilling rigs for use on underwater floors
- 7/1245 . . . {using explosive means (anchors driven in by explosive charges [B63B 21/28](#))}
- 7/128 . . from floating support with independent underwater anchored guide base
- 7/132 . . from underwater buoyant support
- 7/136 . . from non-buoyant support ([E21B 7/124](#) takes precedence)
- 7/14 . Drilling by use of heat, e.g. flame drilling
- 7/143 . . {underwater}
- 7/146 . . {Thermal lances}
- 7/15 . . of electrically generated heat
- 7/16 . Applying separate balls or pellets by the pressure of the drill, so-called shot-drilling
- 7/18 . Drilling by liquid or gas jets, with or without entrained pellets ([E21B 7/14](#) takes precedence)
- 7/185 . . {underwater}
- 7/20 . Driving or forcing casings or pipes into boreholes, e.g. sinking; Simultaneously drilling and casing boreholes
- 7/201 . . {with helical conveying means}
- 7/203 . . . {using down-hole drives}
- 7/205 . . {without earth removal ([E21B 7/30](#) takes precedence)}

**NOTE**

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

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

**WARNING**

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

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

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

**WARNING**

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

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

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

**WARNING**

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

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

- 7/28 . Enlarging drilled holes, e.g. by counterboring
- 7/30 . . without earth removal

**Drilling tools**

- 10/00** **Drill bits** (specially adapted for deflecting the direction of boring {[E21B 7/064](#)}; with means for collecting substances [E21B 27/00](#))
- 10/003 . {with cutting edges facing in opposite axial directions}
- 10/006 . {providing a cutting edge which is self-renewable during drilling}
- 10/02 . Core bits ([characterised by wear resisting parts E21B 10/48](#))
- 10/04 . . with core destroying means
- 10/06 . . Roller core bits
- 10/08 . Roller bits ([E21B 10/26](#) takes precedence; roller core bits [E21B 10/06](#); characterised by wear resisting parts [E21B 10/50](#))
- 10/083 . . {with longitudinal axis, e.g. wobbling or nutating roller bit (longitudinal axis roller reamers [E21B 10/30](#))}
- 10/086 . . {with excentric movement}
- 10/10 . . with roller axle supported at both ends
- 10/12 . . with discs cutters
- 10/14 . . combined with non-rolling cutters other than of leading-portion type
- 10/16 . . characterised by tooth form or arrangement

- 10/18 . . characterised by conduits or nozzles for drilling fluids
- 10/20 . . characterised by detachable or adjustable parts, e.g. legs or axles
- 10/22 . . characterised by bearing, lubrication or sealing details
- 10/23 . . . with drilling fluid supply to the bearings
- 10/24 . . . characterised by lubricating details ([E21B 10/23](#) takes precedence)
- 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](#))

**WARNING**

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

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

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

**WARNING**

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

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

- 10/28 . . with non-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 10/46](#); 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)

- 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

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

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

**WARNING**

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

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

- 10/5671 . . . . {with chip breaking arrangements}

**WARNING**

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

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



- 10/5673 . . . . {having a non planar or non circular cutting face}
- WARNING**
- Group [E21B 10/5673](#) is impacted by reclassification into group [E21B 10/5671](#).
- Groups [E21B 10/5673](#) and [E21B 10/5671](#) should be considered in order to perform a complete search.
- 10/5676 . . . . {having a cutting face with different segments, e.g. mosaic-type inserts}
- 10/573 . . . . characterised by support details, e.g. the substrate construction or the interface between the substrate and the cutting element
- 10/5735 . . . . . {Interface between the substrate and the cutting element}
- 10/58 . . Chisel-type inserts ({[E21B 10/485](#),} [E21B 10/52](#) take precedence)
- 10/60 . characterised by conduits or nozzles for drilling fluids (for roller bits [E21B 10/18](#); for percussion drill bits [E21B 10/38](#))
- 10/602 . . {the bit being a rotary drag type bit with blades}
- 10/605 . . {the bit being a core-bit}
- 10/61 . . characterised by the nozzle structure
- 10/62 . characterised by parts, e.g. cutting elements, which are detachable or adjustable ([E21B 10/64](#) takes precedence; for roller bits [E21B 10/20](#); for augers [E21B 10/44](#))
- WARNING**
- Groups [E21B 10/62](#) - [E21B 10/633](#) are incomplete pending reclassification of documents from groups [E21B 10/42](#) and [E21B 10/43](#).
- All groups listed in this Warning should be considered in order to perform a complete search.
- 10/627 . . with plural detachable cutting elements
- 10/633 . . . independently detachable
- 10/64 . characterised by the whole or part thereof being insertable into or removable from the borehole without withdrawing the drilling pipe
- 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}
- 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

- 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)
- 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**
- 17/003 . {with electrically conducting or insulating means ([E21B 17/028](#) and [E21B 17/023](#) take precedence)}
- 17/006 . {Accessories for drilling pipes, e.g. cleaners (wear protectors [E21B 17/10](#); handling drilling pipes [E21B 19/00](#); thread protectors [B65D 59/00](#))}
- 17/01 . Risers
- 17/012 . . {with buoyancy elements ([E21B 17/015](#) takes precedence)}
- 17/015 . . {Non-vertical risers, e.g. articulated or catenary-type}
- 17/017 . . {Bend restrictors for limiting stress on risers}
- 17/02 . Couplings; joints {(expandable couplings or joints [E21B 43/106](#))}
- WARNING**
- Group [E21B 17/02](#) is impacted by reclassification into group [E21B 17/041](#).
- Groups [E21B 17/02](#) and [E21B 17/041](#) should be considered in order to perform a complete search.
- 17/021 . . {Devices for subsurface connecting or disconnecting by rotation}
- 17/023 . . {Arrangements for connecting cables or wirelines to downhole devices}
- 17/025 . . . {Side entry subs}
- 17/026 . . . {Arrangements for fixing cables or wirelines to the outside of downhole devices}

17/028 . . . {Electrical or electro-magnetic connections}

#### **WARNING**

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

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

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

#### **WARNING**

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

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

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

#### **WARNING**

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

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

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

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

#### **WARNING**

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

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

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

#### **WARNING**

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

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

17/042 . . . Threaded

17/0423 . . . {with plural threaded sections, e.g. with two-step threads}

17/0426 . . . {with a threaded cylindrical portion, e.g. for percussion rods}

17/043 . . . with locking means

17/046 . . . with ribs, pins, or jaws, and complementary grooves or the like, e.g. bayonet catches

#### **WARNING**

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

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

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

#### **WARNING**

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

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

17/05 . . . Swivel joints

17/06 . . . Releasing-joints, e.g. safety joints

17/07 . . . Telescoping joints for varying drill string lengths; Shock absorbers

17/073 . . . {with axial rotation}

17/076 . . . {between rod or pipe and drill bit}

17/08 . . Casing joints

17/085 . . . {Riser connections (connectors for wellhead [E21B 33/038](#))}

#### **WARNING**

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

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

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

#### **WARNING**

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

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

17/10 . . Wear protectors; Centralising devices {, e.g. stabilisers}

17/1007 . . {for the internal surface of a pipe, e.g. wear bushings for underwater well-heads}

17/1014 . . {Flexible or expansible centering means, e.g. with pistons pressing against the wall of the well ([E21B 17/1042](#) takes precedence)}

17/1021 . . . {with articulated arms or arcuate springs}

17/1028 . . . {with arcuate springs only, e.g. baskets with outwardly bowed strips for cementing operations}

17/1035 . . {for plural rods, pipes or lines, e.g. for control lines}

17/1042 . . {Elastomer protector or centering means}

17/105 . . . {split type}

- 17/1057 . . {Centralising devices with rollers or with a relatively rotating sleeve ([E21B 17/1014](#) takes precedence)}
- 17/1064 . . {Pipes or rods with a relatively rotating sleeve}
- 17/1071 . . {specially adapted for pump rods, e.g. sucker rods}
- 17/1078 . . {Stabilisers or centralisers for casing, tubing or drill pipes (devices for off-center positioning [E21B 17/10](#); [E21B 17/1007](#) - [E21B 17/1064](#) take precedence)}
- 17/1085 . . {Wear protectors; Blast joints; Hard facing}
- 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)}
- 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

#### **19/00 Handling rods, casings, tubes or the like outside the borehole, e.g. in the derrick; Apparatus for feeding the rods or cables**

- 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
- 19/04 . . Hooks
- 19/06 . . Elevators, i.e. rod- or tube-gripping devices
- 19/07 . . . Slip-type elevators
- 19/08 . Apparatus for feeding the rods or cables ([E21B 19/22](#) takes precedence; automatic feed [E21B 44/02](#)); Apparatus for increasing or decreasing the pressure on the drilling tool; Apparatus for counterbalancing the weight of the rods

#### **WARNING**

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

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

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

#### **WARNING**

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

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

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

#### **WARNING**

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

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

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

#### **WARNING**

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

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

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

#### **WARNING**

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

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

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

#### **WARNING**

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

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

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

#### **WARNING**

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

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

- 19/09 . . specially adapted for drilling underwater formations from a floating support using heave compensators supporting the drill string

#### **WARNING**

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

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



- 19/10 . Slips; Spiders {; Catching devices (rotary tables with master bushing or kelly bushing [E21B 3/04](#))}
- WARNING**
- Group [E21B 19/10](#) is impacted by reclassification into group [E21B 19/102](#).
- Groups [E21B 19/10](#) and [E21B 19/102](#) should be considered in order to perform a complete search.
- 19/102 . . {using rollers or spherical balls as load gripping elements}
- WARNING**
- Group [E21B 19/102](#) is incomplete pending reclassification of documents from group [E21B 19/10](#).
- Groups [E21B 19/10](#) and [E21B 19/102](#) should be considered in order to perform a complete search.
- 19/12 . Rope clamps {; Rod, casings or tube clamps not secured to elevators}
- 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)
- 19/161 . . {using a wrench or a spinner adapted to engage a circular section of pipe ([E21B 19/168](#) takes precedence)}
- 19/162 . . . {cathead actuated}
- 19/163 . . . {piston-cylinder actuated}
- 19/164 . . . {motor actuated ([E21B 19/162](#) and [E21B 19/163](#) take precedence)}
- 19/165 . . {Control or monitoring arrangements therefor}
- 19/166 . . . {Arrangements of torque limiters or torque indicators}
- 19/167 . . {using a wrench adapted to engage a non circular section of pipe, e.g. a section with flats or splines}
- 19/168 . . {using a spinner with rollers or a belt adapted to engage a well pipe}
- 19/18 . Connecting or disconnecting drill bit and drilling pipe
- 19/20 . Combined feeding from rack and connecting, e.g. automatically
- 19/22 . Handling reeled pipe or rod units, e.g. flexible drilling pipes {(lifting or hauling appliances using two or more cooperating endless chains [B66D 3/003](#))}
- 19/24 . Guiding or centralising devices for drilling rods or pipes

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

**WARNING**

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

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

- 21/001 . {specially adapted for underwater drilling (dual gradient drilling [E21B 21/082](#))}

**WARNING**

Group [E21B 21/001](#) is incomplete pending reclassification of documents from group [E21B 21/00](#).

Group [E21B 21/001](#) is also impacted by reclassification into group [E21B 21/082](#).

Groups [E21B 21/00](#), [E21B 21/001](#), and [E21B 21/082](#) should be considered in order to perform a complete search.

- 21/002 . {Down-hole drilling fluid separation systems (containers comprising collecting means with a strainer [E21B 27/005](#); subsoil filtering [E21B 43/02](#); down-hole production separators [E21B 43/38](#))}

**WARNING**

Group [E21B 21/002](#) is incomplete pending reclassification of documents from group [E21B 21/00](#).

Groups [E21B 21/00](#) and [E21B 21/002](#) should be considered in order to perform a complete search.

- 21/003 . {Means for stopping loss of drilling fluid (plastering the borehole wall [E21B 33/138](#))}

**WARNING**

Group [E21B 21/003](#) is incomplete pending reclassification of documents from group [E21B 21/00](#).

Groups [E21B 21/00](#) and [E21B 21/003](#) should be considered in order to perform a complete search.

- 21/01 . Arrangements for handling drilling fluids or cuttings outside the borehole, e.g. mud boxes

**WARNING**

Group [E21B 21/01](#) is incomplete pending reclassification of documents from group [E21B 21/00](#).

Group [E21B 21/01](#) is also impacted by reclassification into group [E21B 21/019](#).

Groups [E21B 21/00](#), [E21B 21/01](#), and [E21B 21/019](#) should be considered in order to perform a complete search.

- 21/011 . . {Dust eliminating or dust removing while drilling}
- 21/012 . . . {using exhaust air from the drilling motor for blowing off the dust at the borehole entrance}

**WARNING**

Group [E21B 21/012](#) is incomplete pending reclassification of documents from group [E21B 21/00](#).

Groups [E21B 21/00](#) and [E21B 21/012](#) should be considered in order to perform a complete search.

- 21/013 . . . {by liquids}
- 21/0135 . . . . {Liquid flushing installations}
- 21/014 . . . {Preventing exhaust air from the drill motor from blowing-off towards the working face}
- 21/015 . . Means engaging the bore entrance, e.g. hoods for collecting dust

**WARNING**

Group [E21B 21/015](#) is incomplete pending reclassification of documents from group [E21B 21/00](#).

Group [E21B 21/015](#) is also impacted by reclassification into group [E21B 21/019](#).

Groups [E21B 21/00](#), [E21B 21/015](#), and [E21B 21/019](#) should be considered in order to perform a complete search.

- 21/019 . . {Arrangements for maintaining circulation of drilling fluid while connecting or disconnecting tubular joints}

**WARNING**

Group [E21B 21/019](#) is incomplete pending reclassification of documents from groups [E21B 21/00](#), [E21B 21/01](#), and [E21B 21/015](#).

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

- 21/02 . Swivel joints in hose-lines

**WARNING**

Group [E21B 21/02](#) is incomplete pending reclassification of documents from group [E21B 21/00](#).

Groups [E21B 21/00](#) and [E21B 21/02](#) should be considered in order to perform a complete search.

- 21/06 . Arrangements for treating drilling fluids outside the borehole

**WARNING**

Groups [E21B 21/06](#) - [E21B 21/07](#) are incomplete pending reclassification of documents from group [E21B 21/00](#).

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

- 21/062 . . {by mixing components}
- 21/063 . . {by separating components}
- 21/065 . . . {Separating solids from drilling fluids}
- 21/066 . . . . {with further treatment of the solids, e.g. for disposal}
- 21/067 . . . {Separating gases from drilling fluids}
- 21/068 . . {using chemical treatment}
- 21/07 . . for treating dust-laden gaseous fluids
- 21/08 . Controlling or monitoring pressure or flow of drilling fluid, e.g. automatic filling of boreholes, automatic control of bottom pressure (valve arrangements therefor [E21B 21/10](#))

**WARNING**

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

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

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

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

**WARNING**

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

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

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

**WARNING**

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

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

- 21/10 . Valve arrangements in drilling-fluid circulation systems

**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 (valves specifically for maintaining circulation of drilling fluid while connecting or disconnecting tubular joints [E21B 21/019](#))}

- 21/106 . . {Valve arrangements outside the borehole, e.g. kelly valves (valves specifically for maintaining circulation of drilling fluid while connecting or disconnecting tubular joints [E21B 21/019](#))}

- 21/12 . using drilling pipes with plural fluid passages, e.g. closed circulation systems

**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)

**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 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 23/08](#) takes precedence)

**WARNING**

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

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

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

**WARNING**

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

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

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

**WARNING**

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

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

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

**WARNING**

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

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

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

**WARNING**

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

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

- 23/0414 . . {using explosives}

**WARNING**

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

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

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

**WARNING**

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

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

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

**WARNING**

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

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

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

**WARNING**

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

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

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

**WARNING**

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

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

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

**WARNING**

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

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

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

**WARNING**

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

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

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

**WARNING**

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

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

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

**WARNING**

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

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

- 23/0423 . . {using step motors}

**WARNING**

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

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

- 23/06 . . for setting packers

- 23/065 . . {setting tool actuated by explosion or gas generating means}
- 23/08 . Introducing or running tools by fluid pressure, e.g. through-the-flow-line tool systems
- 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 a cable-operated tool, e.g. for logging or perforating operations in deviated wells

**25/00 Apparatus for obtaining or removing undisturbed cores, e.g. core barrels or core extractors (core bits [E21B 10/02](#))**

- 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
- 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

**28/00 Vibration generating arrangements for boreholes or wells, e.g. for stimulating production ({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; Deforming of pipes in boreholes or wells; Reconditioning of well casings while in the ground**

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

**31/00 Fishing for or freeing objects in boreholes or wells**

**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
- 31/1075 . . {using explosives}
- 31/113 . . hydraulically-operated
- 31/1135 . . . {Jars with a hydraulic impedance mechanism, i.e. a restriction, for initially delaying escape of a restraining fluid}
- 31/12 . Grappling tools, e.g. tongs or grabs
- 31/125 . . {specially adapted for parted wire line or ropes}
- 31/14 . . with means deflecting the direction of the tool, e.g. by use of knuckle joints
- 31/16 . . combined with cutting or destroying means
- 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
- 33/035 . . . specially adapted for underwater installations ([E21B 33/043](#), [E21B 33/064](#), [E21B 33/076](#) take precedence)

**WARNING**

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

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

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

**WARNING**

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

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

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

**WARNING**

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

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

- 33/037 . . . . Protective housings therefor

**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

**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

- 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
- 33/068 . . . having provision for introducing objects or fluids into, or removing objects from, wells ([cementing-heads E21B 33/05](#))
- 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 33/134](#), [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](#) take precedence)
- 33/1285 . . . . {by fluid pressure}
- 33/129 . . . with mechanical slips for hooking into the casing ([E21B 33/122](#), [E21B 33/124](#) take precedence)
- 33/1291 . . . . {anchor set by wedge or cam in combination with frictional effect, using so-called drag-blocks ([E21B 33/1295](#) takes precedence)}
- 33/1292 . . . . . {with means for anchoring against downward and upward movement}
- 33/1293 . . . . . {with means for anchoring against downward and upward movement ([E21B 33/1291](#), [E21B 33/1295](#) take precedence)}
- 33/1294 . . . . {characterised by a valve, e.g. a by-pass valve}
- 33/1295 . . . . actuated by fluid pressure
- 33/12955 . . . . . {using drag blocks frictionally engaging the inner wall of the well}
- 33/13 . . Methods or devices for cementing, for plugging holes, crevices or the like
- 33/134 . . . Bridging plugs
- 33/136 . . . Baskets, e.g. of umbrella type
- 33/138 . . . Plastering the borehole wall; Injecting into the formation
- 33/14 . . . for cementing casings into boreholes
- 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**

- 34/02 . in well heads

**WARNING**

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

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

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

**WARNING**

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

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

- 34/04 . . in underwater well heads

**WARNING**

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

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

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

**WARNING**

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

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

- 34/06 . in wells
- 34/063 . . {Valve or closure with destructible element, e.g. frangible disc ([E21B 34/103](#) takes precedence)}
- 34/066 . . {electrically actuated}
- 34/08 . . responsive to flow or pressure of the fluid obtained ([E21B 34/10](#) takes precedence)
- 34/085 . . . {with time-delay systems, e.g. hydraulic impedance mechanisms}
- 34/10 . . operated by control fluid supplied from outside the borehole
- 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****36/00 Heating, cooling or insulating arrangements for boreholes or wells, e.g. for use in permafrost zones**

- 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)**

- 37/02 . Scrapers specially adapted therefor

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

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

#### **WARNING**

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

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

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

#### **WARNING**

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

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

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

#### **WARNING**

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

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

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

- 41/0007 . {for underwater installations ([E21B 41/005](#), [E21B 41/04](#), [E21B 41/06](#), [E21B 41/08](#), [E21B 41/10](#) take precedence)}
- 41/0014 . . {Underwater well locating or reentry systems}
- 41/0021 . {Safety devices, e.g. for preventing small objects from falling into the borehole}
- 41/0035 . {Apparatus or methods for multilateral well technology, e.g. for the completion of or workover on wells with one or more lateral branches}
- 41/0042 . . {characterised by sealing the junction between a lateral and a main bore}
- 41/005 . {Waste disposal systems}
- 41/0057 . . {Disposal of a fluid by injection into a subterranean formation}
- 41/0064 . . . {Carbon dioxide sequestration (storing fluids in porous layers [B65G 5/005](#))}
- 41/0071 . . {Adaptation of flares, e.g. arrangements of flares in offshore installations (flares of waste gases or noxious gases [F23G 7/08](#))}

- 41/0078 . {Nozzles used in boreholes (drilling by liquid or gas jets [E21B 7/18](#); drill bits with nozzles [E21B 10/60](#); perforators using direct fluid action [E21B 43/114](#); obtaining a slurry of minerals using nozzles [E21B 43/29](#))}
- 41/0085 . {Adaptations of electric power generating means for use in boreholes}
- 41/0092 . {Methods relating to program engineering, design or optimisation}

#### **WARNING**

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

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

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

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

#### **WARNING**

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

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

- 41/02 . in situ inhibition of corrosion in boreholes or wells
- 41/04 . Manipulators for underwater operations, e.g. temporarily connected to well heads
- 41/06 . Work chambers for underwater operations, e.g. temporarily connected to well heads
- 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](#))**

#### **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
- 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
- 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
- 43/025 . . {Consolidation of loose sand or the like round the wells without excessively decreasing the permeability thereof}
- 43/04 . . Graveling of wells
- 43/045 . . . {Crossover tools}
- 43/08 . . Screens or liners {(expandable screens or liners [E21B 43/108](#))}
- 43/082 . . . {Screens comprising porous materials, e.g. prepacked screens}
- 43/084 . . . {Screens comprising woven materials, e.g. mesh or cloth}
- 43/086 . . . {Screens with preformed openings, e.g. slotted liners (comprising porous materials [E21B 43/082](#))}
- 43/088 . . . {Wire screens (comprising porous materials [E21B 43/082](#); comprising woven materials [E21B 43/084](#))}
- 43/10 . . Setting of casings, screens, liners {or the like} in wells
- 43/101 . . . {for underwater installations}
- 43/103 . . . {of expandable casings, screens, liners, or the like}
- 43/105 . . . . {Expanding tools specially adapted therefor}
- 43/106 . . . . {Couplings or joints therefor}
- 43/108 . . . . {Expandable screens or perforated liners}
- 43/11 . Perforators; Permeators
- 43/112 . . Perforators with extendable perforating members, e.g. actuated by fluid means
- 43/114 . . Perforators using direct fluid action {on the wall to be perforated}, e.g. abrasive jets
- 43/116 . . Gun or shaped-charge perforators
- 43/117 . . . Shaped-charge perforators ([E21B 43/118](#) takes precedence)
- 43/118 . . . characterised by lowering in vertical position and subsequent tilting to operating position
- 43/1185 . . . Ignition systems
- 43/11852 . . . . {hydraulically actuated}
- 43/11855 . . . . {mechanically actuated, e.g. by movement of a wireline or a drop-bar ([E21B 43/11852](#) takes precedence)}

- 43/11857 . . . . {firing indication systems}
- 43/119 . . Details, e.g. for locating perforating place or direction

**WARNING**

Group [E21B 43/119](#) is impacted by reclassification into group [E21B 43/1193](#).

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

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

**WARNING**

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

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

- 43/1195 . . . {Replacement of drilling mud; decrease of undesirable shock waves}
- 43/12 . Methods or apparatus for controlling the flow of the obtained fluid to or in wells ([E21B 43/25](#) takes precedence; valve arrangements [E21B 34/00](#))
- 43/121 . . {Lifting well fluids (monitoring of down-hole pump systems [E21B 47/008](#))}

**WARNING**

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

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

- 43/122 . . . {Gas lift}

**WARNING**

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

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

- 43/123 . . . . {Gas lift valves}

**WARNING**

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

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

- 43/1235 . . . . . {characterised by electromagnetic actuation}

**WARNING**

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

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



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

**WARNING**

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

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

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

**WARNING**

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

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

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

**WARNING**

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

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

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

**WARNING**

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

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

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

**WARNING**

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

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

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

**WARNING**

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

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

- 43/14 . Obtaining from a multiple-zone well  
43/16 . Enhanced recovery methods for obtaining hydrocarbons

**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 CO<sub>2</sub> 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 (CO<sub>2</sub> injection [E21B 43/164](#); steam injection [E21B 43/24](#))}

- 43/168 . . . {Injecting a gaseous medium}

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

- 43/18 . . Repressuring or vacuum methods

- 43/20 . . Displacing by water

- 43/24 . . using heat, e.g. steam injection

- 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 {(by vibrating earth formations [E21B 43/003](#))}

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

- 43/26 . . by forming crevices or fractures

**WARNING**

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

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

- 43/2605 . . . {using gas or liquefied gas}

**WARNING**

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

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

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

#### **WARNING**

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

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

- 43/261 . . . {Separate steps of (1) cementing, plugging or consolidating and (2) fracturing or attacking the formation}

- 43/263 . . . using explosives

- 43/2635 . . . {by means of nuclear energy}

- 43/267 . . . reinforcing fractures by propping

- 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](#))

- 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. optimising the spacing of wells

- 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

#### **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; Systems specially adapted for monitoring a plurality of drilling variables or conditions

- 44/005 . . {Below-ground automatic control systems}

- 44/02 . . Automatic control of the tool feed ([E21B 44/005](#), [E21B 44/10 take precedence](#))

- 44/04 . . in response to the torque of the drive {;  
Measuring drilling torque (E21B 44/06 takes  
precedence; measuring stresses in a well bore  
pipe E21B 47/007)}
- 44/06 . . in response to the flow or pressure of the motive  
fluid of the drive
- 44/08 . . in response to the amplitude of the movement of  
the percussion tool, e.g. jump or recoil
- 44/10 . Arrangements for automatic stopping when the tool  
is lifted from the working face

#### 45/00 Measuring the drilling time or rate of penetration

#### 47/00 Survey of boreholes or wells (monitoring pressure or flow of drilling fluid E21B 21/08)

##### **WARNING**

Group E21B 47/00 is impacted by reclassification  
into group E21B 47/006.

Groups E21B 47/00 and E21B 47/006 should be  
considered in order to perform a complete search.

- 47/001 . for underwater installation
- 47/002 . by visual inspection

##### **WARNING**

Group E21B 47/002 is impacted by  
reclassification into group E21B 47/0025.

Groups E21B 47/002 and E21B 47/0025 should  
be considered in order to perform a complete  
search.

- 47/0025 . . {generating an image of the borehole wall  
using down-hole measurements, e.g. acoustic or  
electric}

##### **WARNING**

Group E21B 47/0025 is incomplete pending  
reclassification of documents from group  
E21B 47/002.

Groups E21B 47/002 and E21B 47/0025  
should be considered in order to perform a  
complete search.

- 47/003 . Determining well or borehole volumes
- 47/005 . Monitoring or checking of cementation quality or  
level
- 47/006 . {Detection of corrosion or deposition of substances}

##### **WARNING**

Group E21B 47/006 is incomplete pending  
reclassification of documents from group  
E21B 47/00.

Groups E21B 47/00 and E21B 47/006 should  
be considered in order to perform a complete  
search.

- 47/007 . Measuring stresses in a pipe string or casing (for  
locating blocked portions of pipes E21B 47/09)
- 47/008 . Monitoring of down-hole pump systems, e.g. for the  
detection of "pumped-off" conditions
- 47/009 . . Monitoring of walking-beam pump systems

- 47/01 . Devices for supporting measuring instruments  
on drill bits, pipes, rods or wirelines; Protecting  
measuring instruments in boreholes against heat,  
shock, pressure or the like

##### **NOTE**

Devices for both supporting and protecting  
measuring instruments are only classified in  
E21B 47/017

##### **WARNING**

Group E21B 47/01 is impacted by  
reclassification into group E21B 47/013.

Groups E21B 47/01 and E21B 47/013 should  
be considered in order to perform a complete  
search.

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

##### **WARNING**

Group E21B 47/013 is incomplete pending  
reclassification of documents from groups  
E21B 47/01 and E21B 47/017.

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

- 47/017 . . Protecting measuring instruments

##### **WARNING**

Group E21B 47/017 is impacted by  
reclassification into groups E21B 47/013 and  
E21B 47/0175.

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

- 47/0175 . . . {Cooling arrangements}

##### **WARNING**

Group E21B 47/0175 is incomplete pending  
reclassification of documents from group  
E21B 47/017.

Groups E21B 47/017 and E21B 47/0175  
should be considered in order to perform a  
complete search.

- 47/02 . Determining slope or direction
- 47/022 . . of the borehole, e.g. using geomagnetism
- 47/0224 . . . using seismic or acoustic means
- 47/0228 . . . using electromagnetic energy or detectors  
therefor
- 47/0232 . . . . at least one of the energy sources or one of  
the detectors being located on or above the  
ground surface
- 47/0236 . . . . using a pendulum
- 47/024 . . of devices in the borehole (determining slope or  
direction of the borehole E21B 47/022)
- 47/026 . . of penetrated ground layers
- 47/04 . Measuring depth or liquid level
- 47/047 . . Liquid level (measuring depth or liquid level  
using radioactive markers E21B 47/053)
- 47/053 . . using radioactive markers
- 47/06 . Measuring temperature or pressure
- 47/07 . . Temperature

- 47/08 . . Measuring diameters or related dimensions at the borehole
- 47/085 . . . using radiant means, e.g. acoustic, radioactive or electromagnetic
- 47/09 . . Locating or determining the position of objects in boreholes or wells {, e.g. the position of an extending arm}; Identifying the free or blocked portions of pipes
- 47/092 . . . by detecting magnetic anomalies
- 47/095 . . . by detecting an acoustic anomalies, e.g. using mud-pressure pulses
- 47/098 . . . using impression packers, e.g. to detect recesses or perforations
- 47/10 . . Locating fluid leaks, intrusions or movements

**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
- 47/107 . . . using acoustic means
- 47/11 . . . using tracers; using radioactivity

**WARNING**

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

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

- 47/111 . . . {using radioactivity}

**WARNING**

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

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

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

**WARNING**

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

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

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

- 47/114 . . . {using light radiation}

**WARNING**

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

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

- 47/117 . . . Detecting leaks, e.g. from tubing, by pressure testing
- 47/12 . . Means for transmitting measuring-signals or control signals from the well to the surface, or from the surface to the well, e.g. for logging while drilling

**WARNING**

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

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

- 47/125 . . . using earth as an electrical conductor (by electromagnetic energy [E21B 47/13](#))
- 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**

- 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
- 49/025 . . . {of underwater soil, e.g. with grab devices}
- 49/04 . . . using explosives in boreholes; using projectiles penetrating the wall
- 49/06 . . . using side-wall drilling tools {pressing} or scrapers
- 49/08 . . Obtaining fluid samples or testing fluids, in boreholes or wells

- 49/081 . . . {with down-hole means for trapping a fluid sample ([E21B 49/10](#) takes precedence)}

**WARNING**

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

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

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

**WARNING**

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

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

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

**WARNING**

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

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

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

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

**WARNING**

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

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

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

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

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

**WARNING**

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

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

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

**WARNING**

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

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

- 49/088 . . . {combined with sampling}

- 49/10 . . . using side-wall fluid samplers or testers

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

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

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

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

**WARNING**

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

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

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

**WARNING**

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

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

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

**WARNING**

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

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

- 2200/04 . . . Ball valves

**WARNING**

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

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



- 2200/05 . Flapper valves

**WARNING**

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

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

- 2200/06 . Sleeve valves

**WARNING**

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

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

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

**WARNING**

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

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

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

**WARNING**

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

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

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

**WARNING**

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

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

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

**WARNING**

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

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