

ECLA**EUROPEAN CLASSIFICATION****E21B**

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

[N: **WARNING** [C0808]

- The following IPC groups are not used in the internal ECLA classification scheme. Subject matter covered by these groups is classified in the following ECLA groups:

[E21B1/12](#) to [E21B1/38](#) covered by [E21B1/00](#)
[E21B7/08](#) covered by [E21B7/06](#)
[E21B11/04](#) covered by [E21B27/00](#)
[E21B23/12](#) covered by [E21B23/00D](#)
[E21B31/08](#) covered by [E21B27/00](#)
[E21B43/22](#) covered by [C09K8/58](#)

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Guide heading: **Methods or apparatus for drilling**

- E21B1/00** **Percussion drilling** (drives used in the borehole [E21B4/00](#); rotary drilling machines in general [B23B](#))
- E21B1/02** . Surface drives for percussion drilling
- E21B1/04** . . Devices for reversing the movement of the rod or cable at the surface [N: not used, see [E21B1/02](#)]
- E21B3/00** **Rotary drilling** (drives used in the borehole [E21B4/00](#); rotary drilling machines in general [B23B](#))
- E21B3/02** . Surface drives for rotary drilling
- E21B3/025** . . with a to-and-fro rotation of the tool [N0010]
- E21B3/03** . . with an intermittent unidirectional rotation of the tool [N0010]
- E21B3/035** . . with slipping or elastic transmission [N0010]
- E21B3/04** . . Rotary tables [N: (portable drilling rigs with rotary tables [E21B7/02B](#))]
- E21B3/04A** . . . [N: movably mounted on the drilling structure or platform (derricks adapted to be moved on their substructure [E21B15/00F](#); specially adapted for underwater drilling, [E21B15/02](#))]
- E21B3/06** . . . Adaptation of rotary draw works to drive rotary tables (connecting or disconnecting couplings or joints [E21B19/16](#); rope, cable, or chain winding mechanisms, capstans [B66D](#))
- E21B4/00** **Drives used in the borehole**
- E21B4/00B** . [N: Bearing, sealing, lubricating details (for roller bits [E21B10/22](#); bearings in general [F16C](#); sealing in general [F16J](#); lubricating in general [F16N](#))]

- E21B4/00F . [N: Mechanical motion converting means, e.g. reduction gearings ([E21B4/10](#) takes precedence; gearings in general [F16H](#))]
- E21B4/02 . Fluid rotary type drives (hydraulic turbines for drilling wells [F03B13/02](#))
- E21B4/04 . Electric drives ([E21B4/12](#) takes precedence)
- E21B4/06 . Down-hole impacting means, e.g. hammers (percussion drill bits [E21B10/36](#); boring rams [E21B11/02](#); releasing-jars [E21B31/107](#))
- E21B4/08 . . impact being obtained by gravity only, e.g. with lost-motion connection
- E21B4/10 . . continuous unidirectional rotary motion of shaft or drilling pipe effecting consecutive impacts
- E21B4/12 . . Electrically operated hammers
- E21B4/14 . . Fluid operated hammers
- E21B4/14B . . . [N: of the self propelled-type, e.g. with a reverse mode to retract the device from the hole]
- E21B4/16 . Plural down-hole drives, e.g. for combined percussion and rotary drilling ([E21B4/10](#) takes precedence); Drives for multi-bit drilling units
- E21B4/18 . Anchoring or feeding in the borehole [\[C9807\]](#)
- E21B4/20 . combined with surface drive ([E21B4/10](#) takes precedence)
- E21B6/00** **Drives for combined percussion and rotary drilling (drives used in the borehole [E21B4/00](#))**
- E21B6/02 . the rotation being continuous [\[N0004\]](#)
- E21B6/04 . . Separate drives for percussion and rotation [\[N0004\]](#)
- E21B6/06 . the rotation being intermittent, e.g. obtained by ratchet device [\[N0004\]](#)
- E21B6/08 . . Separate drives for percussion and rotation [\[N0004\]](#)
- E21B7/00** **Special methods or apparatus for drilling**
- E21B7/00C . [N: Drilling a non circular hole (excavating trenches [E02F5/02](#); cutting machines for slitting [E21C25/00](#))]
- E21B7/00G . [N: Drilling with diversely driven shafts extending into the borehole (simultaneously drilling and casing [E21B7/20](#); plural down-hole drives [E21B4/16](#); [E21B7/00C](#) takes precedence)]
- E21B7/00K . [N: Drilling with mechanical conveying means (bailers, e.g. baskets, buckets [E21B27/00](#); tunnelling [E21D](#))] [\[C9608\]](#)
- E21B7/00K2 . . [N: with helical conveying means ([E21B7/20B](#) takes precedence; augers [E21B10/44](#); drilling rods or pipes with helical structure [E21B17/22](#))]
- E21B7/00K2B . . . [N: combined with a bucket-type container (bailers with helical conveying means [E21B27/04](#))] [\[C0608\]](#)
- E21B7/00P . [N: Drilling by use of explosives (underwater drilling using explosives [E21B7/124B](#);

setting-tools actuated by explosives [E21B23/04](#), [E21B23/06D](#); cutting or destroying objects in boreholes by explosives [E21B29/02](#); freeing objects using explosives [31/107B](#); gun or shaped-charge perforators [E21B43/116](#); fracturing by explosives [E21B43/263](#), [E21B43/248](#); taking samples using explosives [E21B49/04](#)]

- E21B7/00W . [N: Drilling ice or a formation covered by ice]
- E21B7/02 . Portable drilling rigs, truck-or skid-mounted, with their own drive ([portable drilling rigs for use on underwater floors E21B7/124](#))
- E21B7/02B . . [N: With a rotary table, i.e a fixed rotary drive for a relatively advancing tool ([rotary tables E21B3/04](#))]
- E21B7/02C . . [N: Control of the drilling operation; Hydraulic or pneumatic means for activation or operation (control circuits for drilling masts [E21B15/04C](#))] [N0708]
- E21B7/02F . . [N: the mast being foldable or telescopically retractable] [N0708]
- E21B7/02I . . [N: having means for adapting to inclined terrain; having means for stabilizing the vehicle while drilling] [N0708]
- E21B7/02J . . [N: Rock drills, i.e. jumbo drills] [N0708]
- E21B7/02P . . [N: having auxiliary platforms, e.g. for observation purposes] [N0708]
- E21B7/02S . . [N: Drills for drilling shallow holes, e.g. for taking soil samples or for drilling postholes] [N0708]
- E21B7/02S2 . . . [N: the drilling apparatus being detachable from the vehicle, e.g. hand portable drills] [N0708]
- E21B7/04 . Directional drilling ([derricks or masts specially adapted therefor E21B15/04](#))
- E21B7/04A . . [N: for underwater installations]
- E21B7/04B . . [N: horizontal drilling ([drilling with mechanical conveying means E21B7/00K](#))]
- E21B7/06 . . Deflecting the direction of boreholes [N: ([directional window cutting E21B29/06](#); [deflecting the direction of fishing tools E21B31/14](#))]
- E21B7/06B . . . [N: the tool shaft advancing relative to a guide, e.g. a curved tube or a whipstock]
- E21B7/06C . . . [N: the tool shaft rotating inside a non-rotating guide travelling with the shaft ([E21B7/06K](#) and [E21B7/06M](#) take precedence)]
- E21B7/06D . . . [N: specially adapted drill bits therefor] [N0302]
- E21B7/06F . . . [N: using oriented fluid jets]
- E21B7/06K . . . [N: with means for locking sections of a pipe or of a guide for a shaft in angular relation, e.g. adjustable bent sub]
- E21B7/06M . . . [N: drilled by a down-hole drilling motor ([down-hole drives per se E21B4/00](#), [E21B7/06K](#) takes precedence)]
- E21B7/10 . . Correction of deflected boreholes
- E21B7/12 . Underwater drilling ([derricks or masts specially adapted therefor E21B15/02](#); [telescoping joints E21B17/07](#); using heave compensators [E21B19/09](#))
- E21B7/12K . . [N: with submersible vertically movable guide]
- E21B7/124 . . with underwater tool drive prime mover, e.g. portable drilling rigs for use on underwater floors
- E21B7/124B . . . [N: using explosive means ([Anchors driven in by explosive charges B63B21/28](#))]
- E21B7/128 . . from floating support with independent underwater anchored guide base [N: guide

- line systems [E21B33/035F](#)
- E21B7/132 . . from underwater buoyant support
- E21B7/136 . . from non-buoyant support ([E21B7/124](#) takes precedence)
- E21B7/14 . Drilling by use of heat, e.g. flame drilling [N: (by use of explosives [E21B7/00P](#))]
- E21B7/14A . . [N: underwater]
- E21B7/14C . . [N: Thermal lances]
- E21B7/15 . . of electrically generated heat
- E21B7/16 . Applying separate balls or pellets by the pressure of the drill, so-called shot-drilling
- E21B7/18 . Drilling by liquid or gas jets, with or without entrained pellets ([E21B7/14](#) takes precedence; [N: obtaining a slurry of minerals [E21B43/29](#)]; hydraulic monitors [E21C45/00](#))
- E21B7/18A . . [N: underwater]
- E21B7/20 . Driving or forcing casings or pipes into boreholes, e.g. sinking; Simultaneously drilling and casing boreholes (surface means for applying to-and-fro rotation movements to the casing [E21B3/025](#); [N: pushing means outside of the borehole [E21B19/08](#)]; placing piles [E02D7/00](#); sinking shafts while moving the lining downwards [E21D1/08](#); [N: making galleries by forcing prefabricated elements through the ground [E21D9/00D](#)] [C0010])
- E21B7/20B . . [N: with helical conveying means (drilling with helical conveying means [E21B7/00K2](#); augers [E21B10/44](#); drilling rods or pipes with helical structure [E21B17/22](#))]
- E21B7/20B2 . . . [N: using down-hole drives (down-hole drives per se [E21B4/00](#))]
- E21B7/20C . . [N: without earth removal ([E21B7/30](#) takes precedence)] [C9912]
- [N: **Note**
[C0711]
Special methods or apparatus for drilling without earth removal [E21B7/26](#)]
- E21B7/20C2 . . . [N: using down-hole drives (down-hole drives per se [E21B4/00](#))]
- E21B7/20M . . [N: using down-hole drives (down-hole drives per se [E21B4/00](#); [E21B7/20B2](#) and [E21B7/20C2](#) take precedence)]
- E21B7/24 . Drilling using vibrating or oscillating means, e.g. out-of-balance masses (percussion drilling [E21B1/00](#))
- E21B7/26 . Drilling without earth removal, e.g. with self-propelled burrowing devices ([N: [E21B7/20C](#) and] [E21B7/30](#) take precedence; down-hole drives [E21B4/00](#), [N: e.g. self-propelled fluid-operated hammers [E21B4/14B](#)] [C9502])
- E21B7/26B . . [N: Combined with earth removal]
- E21B7/28 . Enlarging drilled holes, e.g. by counterboring (drill bits for enlarging the borehole [E21B10/26](#))
- E21B7/30 . . without earth removal [N9502]

Guide heading: **Drilling tools**

E21B10/00 **Drill bits (specially adapted for deflecting the direction of boring [E21B7/06D](#); with means for collecting substances [E21B27/00](#)) [C0608]**

- E21B10/00C . [N: with cutting edges facing in opposite axial directions]
- E21B10/00S . [N: providing a cutting edge which is self-renewable during drilling] [N9503]
- E21B10/02 . Core bits (characterised by wear resisting parts [E21B10/46](#); obtaining undisturbed cores [E21B25/00](#))
- E21B10/04 . . with core destroying means
- E21B10/06 . . Roller core bits
- E21B10/08 . Roller bits (roller core bits [E21B10/06](#); with leading portion [E21B10/26](#); characterised by wear resisting parts [E21B10/46](#))
- E21B10/08B . . [N: with longitudinal axis, e.g. wobbling or nutating roller bit (longitudinal axis roller reamers [E21B10/30](#))]
- E21B10/08D . . [N: with excentric movement]
- E21B10/10 . . with roller axle supported at both ends (with disc-cutters [E21B10/12](#))
- E21B10/12 . . with discs cutters
- E21B10/14 . . combined with non-rolling cutters other than of leading-portion type
- E21B10/16 . . characterised by tooth form or arrangement
- E21B10/18 . . characterised by conduits or nozzles for drilling fluids (drilling fluid supply to the bearings [E21B10/23](#)) [C0608]
- E21B10/20 . . characterised by detachable or adjustable parts, e.g. legs or axles (cross axle roller bits [E21B10/10](#))
- E21B10/22 . . characterised by bearing, lubrication or sealing details [C0608]
- E21B10/23 . . . with drilling fluid supply to the bearings [N0608]
- E21B10/24 . . . characterised by lubricating details [C0608]
- E21B10/24P [N: with pumping means for feeding lubricant] [N0010]
- E21B10/25 . . . characterised by sealing details [N0608]
- E21B10/26 . 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 [E21B10/40](#); augers with leading portion [E21B10/44](#))
- E21B10/28 . . with non-expansible roller cutters
- E21B10/30 . . . Longitudinal axis roller reamers, e.g. reamer stabilisers
- E21B10/32 . . with expansible cutting tools
- E21B10/32B . . . [N: cutter shifted by fluid pressure ([E21B10/34B](#) takes precedence)]
- E21B10/32D . . . [N: the cutter being shifted by a spring mechanism]
- E21B10/32M . . . [N: the cutter being pivoted about a longitudinal axis ([E21B10/34](#) takes precedence)]
- E21B10/34 . . . of roller-cutter type
- E21B10/34B [N: cutter shifted by fluid pressure]
- E21B10/36 . Percussion drill bits (characterised by wear resisting parts [E21B10/46](#)) [N: with helical conveying portion [E21B10/44B](#)]
- E21B10/38 . . characterised by conduits or nozzles for drilling fluids
- E21B10/40 . . with leading portion
- E21B10/42 . 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 E21B10/54, by conduits or nozzles for drilling fluid E21B10/60, by detachable or adjustable parts E21B10/62) [C0608]
- E21B10/43 . . characterised by the arrangement of teeth or other cutting elements [N0608]
- E21B10/44 . Bits with helical conveying portion, e.g. screw type bits; Augers with leading portion or with detachable parts ([N: Rotary drag type drill bits E21B10/42]; drilling rods with helical structure E21B17/22) [C0608]
- E21B10/44B . . [N: percussion type, e.g. for masonry (percussion drill bits in general E21B10/36)]
- E21B10/46 . characterised by wear resisting parts, e.g. diamond inserts [N: (drill bits with self-renewable cutting edge E21B10/00S)] [C9503]
- E21B10/48 . . the bit being of core type [N: (saw cylinders having their cutting rim equipped with abrasive particles for drilling stone or glass B28D1/04A)]
- E21B10/48B . . . [N: with inserts in form of chisels, blades or the like]
- E21B10/50 . . the bit being of roller type
- E21B10/52 . . . with chisel or button type inserts
- E21B10/54 . . the bit being of the rotary drag type, e.g. fork-type bits [C0608]
- E21B10/55 . . . with preformed cutting elements [N: with blades having preformed cutting elements mounted on a distinct support, e.g. polycrystalline inserts] [N0608]
- E21B10/56 . . Button type inserts (E21B10/52 takes precedence)
- E21B10/567 . . . with preformed cutting elements mounted on a distinct support, e.g. polycrystalline inserts [N0608]
- E21B10/567B [N: having a non planar or non circular cutting face (E21B10/571 takes precedence)] [N0608]
- E21B10/567D [N: having a cutting face with different segments, e.g. mosaic-type inserts] [N0608]
- E21B10/573 characterised by support details [N0608]
- E21B10/573B [N: Interface between the substrate and the cutting element] [N0608]
- E21B10/58 . . Chisel type inserts ([N: E21B10/48B, E21B10/52, E21B10/54 take precedence])
- E21B10/60 . characterised by conduits or nozzles for drilling fluids (for roller bits E21B10/18; for percussion drill bits E21B10/38; [N: mining picks with arrangement of fluid-spraying nozzles E21C35/187])
- E21B10/60B . . [N: the bit being a rotary drag type bit with blades] [N9911]
- E21B10/60C . . [N: the bit being a core-bit] [N9911]
- E21B10/61 . . characterised by the nozzle structure [N0608]
- E21B10/62 . characterised by parts, e.g. cutting elements, which are detachable or adjustable (E21B10/64 takes precedence; for roller bits E21B10/20; [N: for rotary drag type drill bits E21B10/42]; for augers E21B10/44) [C0608]
- E21B10/627 . . with plural detachable cutting elements [N0608]
- E21B10/633 . . . independently detachable [N0608]
- E21B10/64 . characterised by the whole or part thereof being insertable into or removable from the borehole without withdrawing the drilling pipe (retrievable core receivers E21B25/02)
- E21B10/66 . . the cutting element movable through the drilling pipe and laterally shiftable
- E21B11/00 **Other drilling tools** [N: (boring grabs E21B27/00)]

- E21B11/00B . [N: Hand operated drilling tools]
- E21B11/02 . Boring rams (percussion drives used in the borehole [E21B4/06](#); percussion drill bits [E21B10/36](#))
- E21B11/06 . with driven cutting chains or similarly driven tools
- E21B12/00** **Accessories for drilling tools** [N: (connecting and disconnecting drill bit and drilling pipe [E21B19/18](#); sharpening stone drill bits [B24B3/33](#))]
- E21B12/02 . Wear indicators
- E21B12/04 . Drill bit protectors
- E21B12/06 . Mechanical cleaning devices
- Guide heading:** **Other equipment or details for drilling; Well equipment or well maintenance**
- E21B15/00** **Derricks; Masts;** [N: Other supports (drill rigs with movable understructures [E21B7/02](#))]
- E21B15/00F . [N: adapted to be moved on their substructure, e.g. with skidding means; adapted to drill a plurality of wells (slant-hole rigs [E21B15/04](#))]
- E21B15/00K . [N: Means for anchoring the drilling machine to the ground]
- E21B15/02 . specially adapted for underwater drilling ([E21B15/04](#) takes precedence; floating drilling platforms [B63B35/44](#); drilling platforms on legs [E02B17/00](#); [N: with skidding means [E21B15/00F](#)])
- E21B15/04 . specially adapted for directional drilling, e.g. slant hole rigs [N: (with skidding means [E21B15/00F](#))]
- E21B15/04C . . [N: Hydraulic, pneumatic or electric circuits for their positioning]
- E21B17/00** **Drilling rods or pipes; Flexible drill strings; Kellies; Drill collars; Sucker rods;** [N: Cables]; **Casings; Tubings** (rod couplings in general [F16D](#); tubes or tube couplings in general [F16L](#)) [C0110]
- E21B17/00K . [N: with electrically conducting or insulating means ([E21B17/02E](#) and [E21B17/02C](#) take precedence)] [C0505]
- E21B17/00M . [N: Accessories for drilling pipes, e.g. cleaners (wear protectors [E21B17/10](#); handling drilling pipes [E21B19/00](#); thread protectors [B65D59/00](#))]
- E21B17/01 . Risers ([N: connections between riser sections [E21B17/08A](#); supporting a riser from a drilling or production platform [E21B19/00A2](#); riser connectors [N: on well heads] [E21B33/038](#)) [C0004]
- E21B17/01B . . [N: with buoyancy elements ([E21B17/01F](#) takes precedence)] [N9807]
- E21B17/01F . . [N: Non-vertical risers, e.g. articulated or catenary-type] [N9807]
- E21B17/01R . . [N: Bend restrictors for limiting stress on risers] [N9901]

E21B17/02	• Couplings; joints [N: Expandable couplings or joints E21B43/10F2] [C0802]
E21B17/02B	• • [N: Devices for subsurface connecting or disconnecting by rotation (connecting or disconnecting pipe couplings or joints E21B19/16 ; fishing tools for frozen rods, casings, ropes, bits or the like E21B31/00)]
E21B17/02C	• • [N: Arrangements for connecting cables or wirelines to downhole devices] [N0501]
E21B17/02C2	• • • [N: Side entry subs] [N0501]
E21B17/02C4	• • • [N: Arrangements for fixing cables or wirelines to the outside of downhole devices (protectors and centralisers for cables and control lines E21B17/10D)] [N0501]
E21B17/02E	• • [N: Electrical or electro-magnetic connections] [C9510]
E21B17/03	• • between drilling rod or pipe and drill motor, e.g. between drilling rod and hammer [N0004]
E21B17/04	• • between rod [N: or the like] and bit or between rod and rod [N: or the like]
E21B17/042	• • • threaded [N: (readily releasing joints E21B17/06)]
E21B17/042B	• • • • [N: with plural threaded sections, e.g. with two-step threads] [N0110]
E21B17/042P	• • • • [N: with a threaded cylindrical portion, e.g. for percussion rods]
E21B17/043	• • • • with locking means
E21B17/046	• • • with ribs, pins or jaws, and complementary grooves or the like, e.g. bayonet catches
E21B17/05	• • • Swivel joints
E21B17/06	• • • Releasing-joints, e.g. safety joints
E21B17/07	• • • Telescoping joints for varying drill string lengths; Shock absorbers (heave compensators in the derrick E21B19/09 ; releasing-jars E21B31/107 ; [N: shock-absorbers in general F16F])
E21B17/07D	• • • • [N: with axial rotation]
E21B17/07P	• • • • [N: between rod or pipe and drill bit]
E21B17/08	• • Casing joints
E21B17/08A	• • • [N: Riser connections (connectors for wellhead E21B33/038)]
E21B17/10	• Wear protectors; Centralising devices, [N: e.g. stabilisers] (drives used in the borehole with anchoring means E21B4/18 ; guiding or centralising devices outside the borehole E21B19/24) [C0607]
E21B17/10A	• • [N: for the internal surface of a pipe, e.g. wear bushings for underwater well-heads]
E21B17/10C	• • [N: Flexible or expansible centering means, e.g. with pistons pressing against the wall of the well (E21B17/10F takes precedence)]
E21B17/10C2	• • • [N: with articulated arms or arcuate springs (measuring the diameter E21B47/08)]
E21B17/10C2B	• • • • [N: with arcuate springs only, e.g. baskets with outwardly bowed strips for cementing operations]
E21B17/10D	• • [N: for plural rods, pipes or lines, e.g. for control lines]
E21B17/10F	• • [N: Elastomer protector or centering means]
E21B17/10F2	• • • [N: split type]
E21B17/10R	• • [N: Centralising devices with rollers or with a relatively rotating sleeve (E21B17/10C takes precedence)] [C0004]
E21B17/10R3	• • • [N: Pipes or rods with a relatively rotating sleeve] [N0004]
E21B17/10S	• • [N: specially adapted for pump rods, e.g. sucker rods] [N0607]

- E21B17/10T . . [N: Stabilisers or centralisers for casing, tubing or drill pipes (devices for off-center positioning E21B17/10; E21B17/10A to E21B17/10R3 take precedence)] [N0607]
- E21B17/10W . . [N: Wear protectors; Blast joints; Hard facing (wear protection included in centralising devices, see relevant subgroups)] [N0607]
- E21B17/10Z . . [N: Gauge section of drill bits] [N0607]
- E21B17/12 . . Devices for placing or drawing out wear protectors
- E21B17/14 . Casing shoes [N: for the protection of the bottom of the casing]
- E21B17/16 . Drill collars
- E21B17/18 . Pipes provided with plural fluid passages ([N: E21B17/20B takes precedence;] circulation of drilling fluid by means of such pipes E21B21/12; [N: general F16L39/00])
- E21B17/20 . Flexible or articulated drilling pipes, [N: e.g. flexible or articulated rods, pipes or cables (risers E21B17/01; swivel joints E21B17/05)] [C0110]
- E21B17/20B . . [N: with plural fluid passages]
- E21B17/20D . . [N: with conductors, e.g. electrical, optical (hoses with electrically conducting means in general F16L11/127)] [C9809]
- E21B17/22 . Rods or pipes with helical structure (drill bits with helical conveying portion E21B10/44)
- E21B19/00 Handling rods, casings, tubes or the like outside the borehole, e.g. in the derrick (surface drives E21B1/02, E21B3/02)**
- E21B19/00A . [N: specially adapted for underwater drilling (E21B19/09, E21B19/14A take precedence; risers with buoyancy elements E21B17/01B, E21B17/01F)] [C0004]
- E21B19/00A2 . . [N: supporting a riser from a drilling or production platform] [N0004]
- E21B19/00A2B . . . [N: including heave compensators] [N0004]
- E21B19/00D . [N: Winding units, specially adapted for drilling operations (capstans, winches B66D; cathead actuated pipe wrenches or spinners E21B19/16B2)]
- E21B19/02 . Rod or cable suspensions (load-engaging elements for hoisting or lowering purposes in general B66C1/00; Crown blocks or pulley blocks B66D; cable guides B66D1/36)
- E21B19/04 . . Hooks
- E21B19/06 . . Elevators, i.e. rod or tube gripping devices
- E21B19/07 . . . Slip-type elevators (slips E21B19/10)
- E21B19/08 . Apparatus for feeding the rods or cables (E21B19/22 takes precedence; automatic feed E21B44/02; hoisting drums B66D); Apparatus for increasing or decreasing the pressure on the drilling tool; Apparatus for counterbalancing the weight of the rods [C0003]
- E21B19/081 . . Screw-and-nut feed mechanisms [N9912]
- E21B19/083 . . Cam, rack or like feed mechanisms [N9912]
- E21B19/084 . . with flexible drawing means, e.g. cables [N9912]
- E21B19/086 . . with a fluid-actuated cylinder (E21B19/084, E21B19/087, E21B19/09 take precedence) [N9912]
- E21B19/087 . . by means of a swinging arm [N9912]

- E21B19/089 . . with a spring or an additional weight [N9912]
- E21B19/09 . . specially adapted for drilling underwater formations from a floating support using heave compensators supporting the drill string ([drilling-pipe telescoping joints E21B17/07](#); [N: heave compensators for supporting a riser [E21B19/00A2B](#)]) [C0004]
- E21B19/10 . Slips; Spiders; [N: [Catching devices \(rotary tables with master bushing or kelly bushing E21B3/04](#); [slip-type elevators E21B19/07](#); casing heads with slips [E21B33/04M](#))] [C0009]
- E21B19/12 . Rope clamps ([rope clamps in general F16G11/00](#)) [N: rod, casings or tube clamps not secured to elevators]
- E21B19/14 . Racks, ramps, troughs or bins, for holding the lengths of rod singly or connected; Handling between storage place and borehole ([E21B19/20](#), [E21B19/22](#) take precedence; [N: storing elongated articles in general [B65G1/04D](#)])
- E21B19/14A . . [N: specially adapted for underwater drilling]
- E21B19/14C . . [N: Carousel systems, i.e. rotating rack systems] [N9802]
- E21B19/15 . . Racking of rods in horizontal position; Handling between horizontal and vertical position
- E21B19/15B . . . [N: Handling between horizontal and vertical position]
- E21B19/16 . Connecting or disconnecting pipe couplings or joints ([E21B19/20](#) takes precedence; [Pipe wrenches or the like B25B](#))
- E21B19/16B . . [N: using a wrench or a spinner adapted to engage a circular section of pipe ([E21B19/16R](#) takes precedence)]
- E21B19/16B2 . . . [N: cathead actuated]
- E21B19/16B3 . . . [N: piston-cylinder actuated] [N9510]
- E21B19/16B4 . . . [N: motor actuated ([E21B19/16B2](#) and [E21B19/16B3](#) take precedence)] [C9510]
- E21B19/16C . . [N: Control or monitoring arrangements therefor] [N0110]
- E21B19/16C2 . . . [N: Arrangements of torque limiters or torque indicators] [N0110]
- E21B19/16F . . [N: using a wrench adapted to engage a non circular section of pipe, e.g. a section with flats or splines]
- E21B19/16R . . [N: using a spinner with rollers or a belt adapted to engage a well pipe]
- E21B19/18 . Connecting or disconnecting drill bit and drilling pipe
- E21B19/20 . Combined feeding from rack and connecting, e.g. automatically
- E21B19/22 . Handling reeled pipe or rod units, e.g. flexible drilling pipes [N: ([lifting or hauling appliances using two or more cooperating endless chains B66D3/00B](#))]
- E21B19/24 . Guiding or centralising devices for drilling rods or pipes [N0003]
- E21B21/00** **Methods or apparatus for flushing boreholes, e.g. by use of exhaust air from motor (freeing objects stuck in boreholes by flushing E21B31/03; well drilling compositions C09K8/02) [C0709]**
- E21B21/00A . [N: specially adapted for underwater drilling]

- E21B21/00F . [N: Down-hole drilling fluid separation systems (containers comprising collecting means with a strainer [E21B27/00F](#); subsoil filtering [E21B43/02](#); down-hole production separators [E21B43/38](#))] [C0009]
- E21B21/00M . [N: Means for stopping loss of drilling fluid (plastering the borehole wall [E21B33/138](#))]
- E21B21/01 . Arrangements for handling drilling fluids or cuttings outside the borehole, e.g. mud boxes ([N: swivel joints in hose-lines [E21B21/02](#);] arrangements for treating drilling fluids [E21B21/06](#); [N: waste disposal systems [E21B41/00M](#)]) [N0011] [C0012]
- E21B21/01Q . . [N: using exhaust air from the drilling motor for blowing off the dust at the borehole entrance] [N1204]
- E21B21/015 . . Means engaging the bore entrance, e.g. hoods for collecting dust [N0011]
- E21B21/02 . Swivel joints in hose-lines [N: (hose connections in general [F16L31/00](#), [F16L33/00](#))]
- E21B21/06 . Arrangements for treating drilling fluids outside the borehole (treating steps per se, see the relevant subclasses) [C0011]
- E21B21/06M . . [N: by mixing components] [N0012]
- E21B21/06N . . [N: by separating components] [N0012]
- E21B21/06N2 . . . [N: Separating solids from drilling fluids] [N0012]
- E21B21/06N2C [N: with further treatment of the solids, e.g. for disposal] [N0012]
- E21B21/06N4 . . . [N: Separating gases from drilling fluids] [N0012]
- E21B21/06P . . [N: using chemical treatment] [N0011]
- E21B21/07 . . for treating dust-laden gaseous fluids [N0011]
- E21B21/08 . Controlling or monitoring pressure or flow of drilling fluid, e.g. automatic filling of boreholes, automatic control of bottom pressure (valve arrangements therefor [E21B21/10](#))
- E21B21/10 . Valve arrangements in drilling fluid circulation systems (valves in general [F16K](#))
- E21B21/10C . . [N: Down-hole by-pass valve arrangements, i.e. between the inside of the drill string and the annulus] [N9701]
- E21B21/10S . . [N: Valve arrangements outside the borehole, e.g. kelly valves] [N9701]
- E21B21/12 . using drilling pipes with plural fluid passages, e.g. closed circulation systems (pipes with plural fluid passages [E21B17/18](#))
- E21B21/14 . using liquids and gases, e.g. foams [C0011]
- E21B21/16 . using gaseous fluids ([E21B21/14](#) takes precedence; arrangements for handling drilling fluids outside the borehole [E21B21/01](#); arrangements for treating drilling fluids [E21B21/06](#)) [N0011]
- E21B21/18 . Preventing exhaust air from the drill motor from blowing-off towards the working face [N0011]
- E21B23/00** **Apparatus for displacing, setting, locking, releasing, or removing tools, packers or the like in the boreholes or wells (setting of casings, screens or liners [E21B43/10](#))**
- E21B23/00D . [N: Tool diverters, e.g. for through-the-flow line tool systems or for wire-line tools ([E21B23/03](#) takes precedence; for drilling [E21B7/06](#))] [N9710]

- E21B23/00M . [N: Indexing systems for guiding relative movement between telescoping parts of downhole tools] [C0408]
- E21B23/00M2 . . [N: "J-slot" systems, i.e. lug and slot indexing mechanisms] [N0804]
- E21B23/01 . for anchoring the tools or the like ([E21B23/02](#) to [E21B23/06](#) take precedence; anchoring of drives in the borehole [E21B4/18](#); [N: packers [E21B33/12](#)]) [N9502]
- E21B23/02 . for locking the tools or the like in landing nipples or in recesses between adjacent sections of tubing ([E21B23/03](#) to [E21B23/06](#) take precedence)
- E21B23/03 . for setting the tools into, or removing the tools from, laterally offset landing nipples or pockets
- E21B23/04 . operated by fluid means, e.g. actuated by explosion ([E21B23/06](#), [E21B23/08](#) take precedence)
- E21B23/06 . for setting packers
- E21B23/06D . . [N: setting tool actuated by explosion or gas generating means]
- E21B23/08 . Introducing or running tools by fluid pressure, e.g. through-the-flow-line tool systems ([N: tool diverters [E21B23/00D](#)]; special provisions on heads therefor [E21B33/068](#); cementing plugs [E21B33/16](#); scrapers operated by fluid pressure [E21B37/04](#)) [C9710]
- E21B23/10 . . Tools specially adapted therefor
- E21B23/14 . for displacing a cable or cable-operated tool, e.g. for logging or perforating operations in deviated wells ([N: side entry sub [E21B17/02D](#); control line protectors [E21B17/10D](#)]; by fluid pressure [E21B23/08](#); provision on well heads for introducing or removing cable-operated tools [E21B33/072](#), [E21B33/076](#)) [N9505]
- E21B25/00** **Apparatus for obtaining or removing undisturbed cores, e.g. core barrels, core extractors** (core bits [E21B10/02](#); using explosives or projectiles in boreholes [E21B49/04](#); side-wall sampling or coring [E21B49/06](#))
- E21B25/00C . [N: Above ground means for handling the core, e.g. for extracting the core from the core barrel]
- E21B25/02 . the core receiver being insertable into, or removable from, the borehole without withdrawing the drilling pipe (retrievable drill bits [E21B10/64](#))
- E21B25/04 . . the core receiver having a core forming cutting edge or element, e.g. punch type core barrels
- E21B25/06 . the core receiver having a flexible liner or inflatable retaining means
- E21B25/08 . Coating, freezing, consolidating cores ([E21B25/06](#) takes precedence); Recovering uncontaminated cores or cores at formation pressure
- E21B25/10 . Formed core retaining or severing means ([E21B25/06](#), [E21B25/08](#) take precedence)
- E21B25/12 . . of the sliding wedge type
- E21B25/14 . . mounted on pivot transverse to core axis
- E21B25/16 . for obtaining oriented cores

- E21B25/18
 - the core receiver being specially adapted for operation under water

- E21B27/00

Containers for collecting or depositing substances in boreholes or wells, e.g. bailers, [N: baskets or buckets] for collecting mud or sand; Drill bits with means for collecting substances, e.g. valve drill bits [C0608]

- E21B27/00F
 - [N: Collecting means with a strainer] [N0009]

- E21B27/02
 - Dump bailers, i.e. containers for depositing substances, e.g. cement or acids [C0608]

- E21B27/04
 - where the collecting or depositing means including helical conveying means [N: drilling with helical conveying means combined with bucket-type container E21B7/00K2B] [N0608]

- E21B28/00

Vibration generating arrangements for boreholes or wells, e.g. for stimulating production (for drilling E21B7/24; [N: for fishing for or freeing objects E21B31/00C]; for transmitting measuring-signals E21B47/14; for geophysical measurements G01V1/02) [N9710]

[N: **WARNING**
Group E21B28/00 is not complete. See also E21B43/00C
]

- E21B29/00

Cutting or destroying pipes, packers, plugs, or wire lines, located in boreholes or wells, e.g. cutting of damaged pipes, of windows(perforatorsE21B43/11); Deforming of pipes in boreholes or wells; Reconditioning of well casings while in the ground[N: (by enlarging drilled holes or counterboringE21B7/28)]

- E21B29/00R
 - [N: Cutting, e.g. milling, a pipe with a cutter rotating along the circumference of the pipe] [N9602]

- E21B29/00R2
 - . [N: with a radially-expansible cutter rotating inside the pipe, e.g. for cutting an annular window] [N9602] [C9701]

- E21B29/00R4
 - . [N: with a radially-retracting cutter rotating outside the pipe] [N9602]

- E21B29/02
 - by explosives or by thermal or chemical means ([N: freeing stuck objects by explosives E21B31/00B6]; destroying objects in boreholes or wells by explosives E21B31/16)

- E21B29/04
 - Cutting of wire lines or the like (E21B29/02 takes precedence)

- E21B29/06
 - Cutting windows, e.g. directional window cutters for whipstock operations ([N: E21B29/00R2 and] E21B29/08 take precedence [N: (whipstocks E21B7/06B)]) [C9602]

- E21B29/08
 - Cutting or deforming pipes to control fluid flow (shear type blow-out preventers E21B33/06B2S) [C0505]

- E21B29/10
 - Reconditioning of well casings, e.g. straightening

- E21B29/12
 - specially adapted for underwater installations (E21B29/08 takes precedence)

- E21B31/00

Fishing for or freeing objects in boreholes or wells ([N: using junk baskets or the like

[E21B27/00](#); provisions on well heads for introducing or removing objects [E21B33/068](#);
Locating or determining the position of objects in boreholes or wells [E21B47/09](#))

- E21B31/00B6 . [N: Destroying the objects to be fished, e.g. by explosive means (cutting by explosives [E21B29/02](#))]
- E21B31/00C . [N: using vibrating or oscillating means (vibration generating arrangements for boreholes or wells [E21B28/00](#))] [C9710]
- E21B31/00F . [N: fishing tools with means for attaching comprising fusing or sticking]
- E21B31/03 . Freeing by flushing; [N: Controlling differential pipe sticking]
- E21B31/06 . using magnetic means
- E21B31/107 . using impact means for releasing stuck parts, e.g. jars (telescoping joints [E21B17/07](#))
- E21B31/107B . . [N: using explosives]
- E21B31/113 . . hydraulically-operated
- E21B31/113T . . . [N: Jars with a hydraulic impedance mechanism, i.e. a restriction, for initially delaying escape of a restraining fluid] [N9511]
- E21B31/12 . Grappling tools, e.g. tongs or grabs
- E21B31/12B . . [N: specially adapted for parted wire line or ropes]
- E21B31/14 . . with means deflecting the direction of the tool, e.g. by use of knuckle joints (apparatus for deflecting the boring [E21B7/06](#))
- E21B31/16 . . combined with cutting or destroying means (cutting or destroying means per se [E21B29/00](#))
- E21B31/18 . . gripping externally, e.g. overshot
- E21B31/20 . . gripping internally, e.g. fishing spears

E21B33/00 Sealing or packing boreholes or wells

- E21B33/02 . Surface sealing or packing
- E21B33/03 . . Well heads; Setting-up thereof (valve arrangements therefor [E21B34/02](#))
- E21B33/035 . . . specially adapted for underwater installations ([E21B33/043](#), [E21B33/064](#), [E21B33/076](#) take precedence)
- E21B33/035C [N: Control systems, e.g. hydraulic, pneumatic, electric, acoustic, for submerged well heads]
- E21B33/037 Protective housing therefor
- E21B33/037B [N: Corrosion protection means (in general [C23F](#))]
- E21B33/038 Connectors used on well heads, e.g. for connecting blow-out preventer and riser (connecting a production flow-line to an underwater well head [E21B43/013](#))
- E21B33/038B [N: electrical connectors (underwater electrical connections in general [H01R13/523](#))]
- E21B33/04 . . . Casing heads; Suspending casings or tubings in well heads (setting of casings in wells [E21B43/10](#))

E21B33/04E	. . . .	[N: with a suspended electrical cable]
E21B33/04F	. . . .	[N: rotating or floating support for tubing or casing hanger]
E21B33/04M	. . . .	[N: a suspended tubing or casing being gripped by a slip or an internally serrated member (slips in rotary table E21B19/10)]
E21B33/043	. . . .	specially adapted for underwater well heads ([N: E21B33/04E ,] E21B33/047 take precedence)
E21B33/047	. . . .	for plural tubing strings
E21B33/05	. . . .	Cementing-heads, e.g. having provision for introducing cementing plugs
E21B33/06	. . . .	Blow-out preventers, [N: i.e. apparatus closing around a drill pipe, e.g. annular blow-out preventers (rotating blow-out preventers E21B33/08B ; valves E21B34/00)]
E21B33/06B	. . . .	[N: Ram-type blow-out preventers, e.g. with pivoting rams]
E21B33/06B2	. . . . .	[N: with sliding rams]
E21B33/06B2S	. . . . .	[N: for shearing drill pipes (cutting of wireline E21B29/04 ; cutting pipes E21B29/08)] [N0505]
E21B33/064	. . . .	specially adapted for underwater well heads (connectors therefor E21B33/038 ; [N: control systems for submerged well-heads E21B33/035C])
E21B33/068	. . . .	having provision for introducing objects or fluids into, or removing objects from, wells (cementing heads E21B33/05 ; [N: wipers, oil savers E21B33/08])
E21B33/072	. . . .	for cable-operated tools (E21B33/076 takes precedence)
E21B33/076	. . . .	specially adapted for underwater installations
E21B33/08	. . . .	Wipers; Oil savers
E21B33/08B	. . . .	[N: Rotatable packing means, e.g. rotating blow-out preventers]
E21B33/10	. . . .	in the borehole [N: sealing the junction between main bore and laterals E21B41/00L2] [C0012]
E21B33/12	. . . .	Packers; Plugs ([N: locking packers or plugs in landing nipples E21B23/02]; used for cementing E21B33/134 , E21B33/16)
E21B33/12D	. . . .	[N: permanent; drillable]
E21B33/12F	. . . .	[N: characterised by the construction of the sealing or packing means (E21B33/127S takes precedence)] [C9806]
E21B33/12F2	. . . .	[N: including a metal-to-metal seal element] [N9707]
E21B33/12F4	. . . .	[N: Anti-extrusion means, e.g. means to prevent cold flow of rubber packing] [N9806]
E21B33/122	. . . .	Multiple string packers
E21B33/124	. . . .	Units with longitudinally-spaced plugs for isolating the intermediate space
E21B33/124B	. . . .	[N: with inflatable sleeves]
E21B33/124B2	. . . . .	[N: inflated by down-hole pumping means operated by a pipe string] [N9410]
E21B33/126	. . . .	with fluid-pressure-operated elastic cup or skirt (E21B33/122 , E21B33/124 take precedence)
E21B33/126B	. . . .	[N: with mechanical slips]
E21B33/127	. . . .	with inflatable sleeve (E21B33/122 , E21B33/124 take precedence)
E21B33/127B	. . . .	[N: inflated by down-hole pumping means operated by a pipe string] [N9410]
E21B33/127D	. . . .	[N: inflated by down-hole pumping means operated by a down-hole drive] [N9511]
E21B33/127S	. . . .	[N: characterised by the construction or fixation of the sleeve] [N9410]

- E21B33/128 . . . with a member expanded radially by axial pressure ([E21B33/122](#), [E21B33/124](#), [N: [E21B33/129](#)] take precedence; [N: characterised by the construction of the sealing means [E21B33/12F](#)]) [C9806]
- E21B33/128C [N: by fluid pressure] [N9806]
- E21B33/129 . . . with mechanical slips for hooking into the casing ([E21B33/122](#), [E21B33/124](#) take precedence)
- E21B33/129F [N: anchor set by wedge or cam in combination with frictional effect, using so-called drag-blocks ([E21B33/1295](#) takes precedence)] [C9502]
- E21B33/129F2 [N: with means for anchoring against downward and upward movement]
- E21B33/129L [N: with means for anchoring against downward and upward movement ([E21B33/129F](#), [E21B33/1295](#) take precedence)] [C9502]
- E21B33/129N [N: characterised by a valve, e.g. a by-pass valve]
- E21B33/1295 actuated by fluid pressure [N9502]
- E21B33/1295F [N: using drag blocks frictionally engaging the inner wall of the well] [N9502]
- E21B33/13 . . . Methods or devices for cementing, for plugging holes, crevices, or the like (dump bailers [E21B27/02](#); [N: methods or apparatus for grouting offshore structures [E02B17/00B](#)] chemical compositions therefor [C09K8/00](#)) [[C0608](#)]
- E21B33/134 . . . Bridging plugs [N: ([packers](#) [E21B33/12](#))]
- E21B33/136 . . . Baskets, e.g. of umbrella type
- E21B33/138 . . . Plastering the borehole wall; Injecting into the formations [N: ([packers](#) [E21B33/12](#); consolidation of loose sand or the like round the wells without excessively decreasing the permeability thereof [E21B43/02B](#), compositions therefor [C09K8/56](#))] [[C0709](#)]
- E21B33/14 . . . for cementing casings into boreholes [N: ([using special cement compositions](#) [E21B33/13B](#); [control of cementation quality or level](#) [E21B47/00F](#))] [[C9704](#)]
- E21B33/14A [N: for underwater installations]
- E21B33/14C [N: Stage cementing, i.e. discharging cement from casing at different levels] [N9608]
- E21B33/16 using plugs for isolating cement charge; Plugs therefor [N: ([spacer compositions](#) [E21B33/13B5](#); [stage cementing](#) [E21B33/14C](#))] [[C9608](#)]
- E21B34/00** **Valve arrangements for boreholes or wells** (in drilling fluid circulation systems [E21B21/10](#); [N: tool diverters [E21B23/00D](#)]; blow-out preventers [E21B33/06](#); oil flow regulating apparatus [E21B43/12](#); valves in general [F16K](#)) [[C9809](#)]
- E21B34/02 . . . in well heads [[C9809](#)]
- E21B34/04 . . . in underwater well heads
- E21B34/04R [N: adapted to be lowered on a tubular string into position within a blow-out preventer stack, e.g. so-called test trees] [N9701]
- E21B34/06 . . . in wells
- E21B34/06B . . . [N: Valve or closure with destructible element, e.g. frangible disc ([E21B34/10L2](#) takes precedence)]
- E21B34/06M . . . [N: electrically actuated] [N9608]
- E21B34/08 . . . responsive to flow or pressure of the fluid obtained ([E21B34/10](#) takes precedence)
- E21B34/08T [N: with time-delay systems, e.g. hydraulic impedance mechanisms]
- E21B34/10 . . . operated by control fluid supplied from above ground ([N: by a dropped ball or

- piston [E21B34/14](#);) above-ground control means [E21B34/16](#))
- E21B34/10E . . . [N: with means for equalizing fluid pressure above and below the valve] [N9510]
 - E21B34/10L . . . [N: with means for locking the closing element in open or closed position
([E21B34/10R](#) and [E21B34/10T](#) take precedence)]
 - E21B34/10L2 [N: with a shear pin]
 - E21B34/10R . . . [N: 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]
 - E21B34/10R2 [N: the retrievable element being a secondary control fluid actuated valve
landed into the bore of a first inoperative control fluid actuated valve]
 - E21B34/10R4 [N: the retrievable element being an operating or controlling means
retrievable separately from the closure member, e.g. pilot valve landed into a
side pocket ([E21B34/10R2](#) takes precedence)]
 - E21B34/10T . . . [N: with time delay systems, e.g. hydraulic impedance mechanisms]
 - E21B34/12 . . . operated by movement of casings or tubings
 - E21B34/12T . . . [N: with time delay systems, e.g. hydraulic impedance mechanisms]
 - E21B34/14 . . . operated by movement of tools, e.g. sleeve valves operated by pistons or wire line
tools [N: ([E21B34/06M](#) takes precedence)] [C9608]
 - E21B34/16 . . Above-ground control means therefor [N: (control systems for submerged well heads
[E21B33/035C](#))]
 - E21B35/00** **Methods or apparatus for preventing or extinguishing fires** (cutting or deforming
pipes to control fluid flow [E21B29/08](#); controlling flow of fluid to or in wells [E21B43/12](#); fire
fighting in general [A62C](#), [A62D](#))
 - E21B36/00** **Heating, cooling, insulating arrangements for boreholes or wells, e.g. for use in
permafrost zones** (drilling by use of heat [E21B7/14](#); secondary recovery methods using
heat [E21B43/24](#))
 - E21B36/00B . . [N: Cooling arrangements] [N0311]
 - E21B36/00C . . [N: Insulating arrangements] [N0311]
 - E21B36/00D . . [N: Heater surrounding production tube]
 - E21B36/00F . . [N: Combined heating and pumping means]
 - E21B36/00M . . [N: using chemical heat generating means] [N0110]
 - E21B36/02 . . using burners
 - E21B36/02B . . . [N: the burners being above ground or outside the bore hole] [N9902]
 - E21B36/04 . . using electrical heaters
 - E21B37/00** **Methods or apparatus for cleaning boreholes or wells** ([E21B21/00](#) takes precedence;
[N: bailers [E21B27/00](#)]; cleaning pipes in general [B08B9/02](#))
 - E21B37/02 . . Scrapers specially adapted therefor

- E21B37/04 . . . operated by fluid pressure, e.g. free-piston scrapers ([operating other tools by fluid pressure E21B23/08](#))
- E21B37/04B . . . [N: Free-piston scrapers]
- E21B37/06 . using chemical means for preventing, limiting [N: or eliminating] the deposition of paraffins or like substances (chemical compositions therefor C09K8/52) [C0608]
- E21B37/08 . cleaning in situ of down-hole filters, screens, [N: e.g. casing perforations,] or gravel packs ([E21B37/06 takes precedence](#))
- E21B37/10 . Well swabs [N: (pistons in general [F16J](#))]
- E21B40/00** **Tubing catchers, automatically arresting the fall of oil-well tubing [N: (preventing small objects from falling into the borehole [E21B41/00B](#))]**
- E21B41/00** **Equipment or details not covered by groups [E21B15/00](#) to [E21B40/00](#)**
- E21B41/00A . [N: for underwater installations ([E21B41/00M](#), [E21B41/04](#), [E21B41/06](#), [E21B41/08](#), [E21B41/10](#) take precedence)] [C0001]
- E21B41/00A2 . . [N: Underwater well locating or reentry systems] [N0001]
- E21B41/00B . [N: Safety devices, e.g. for preventing small objects from falling into the borehole]
- E21B41/00L . [N: Apparatus or methods for multilateral well technology, e.g. for the completion of or workover on wells with one or more lateral branches (whipstocks [E21B7/06B](#); tool diverters [E21B23/00D](#); cutting casing windows [E21B29/06](#); specific well pattern [E21B43/30](#))] [N0012]
- E21B41/00L2 . . [N: characterised by sealing the junction between a lateral and a main bore] [N0012]
- E21B41/00M . [N: Waste disposal systems (treatment of drilling fluid outside the borehole [E21B21/06](#); collecting oil or the like from a submerged leakage [E21B43/01M](#))] [C0012]
- E21B41/00M2 . . [N: Disposal of a fluid by injection into a subterranean formation]
- E21B41/00M2C . . . [N: Carbon dioxide sequestration (storing fluids in porous layers [B65G5/00B](#))] [N0903]
- E21B41/00M4 . . [N: Adaptation of flares, e.g. arrangements of flares in offshore installations (flares of waste gases or noxious gases [F23G7/08](#))] [N0012]
- E21B41/00P . [N: Nozzles used in boreholes (drilling by liquid or gas jets [E21B7/18](#); drill bits with nozzles [E21B10/60](#); perforators using direct fluid action [E21B43/114](#); obtaining a slurry of minerals using nozzles [E21B43/29](#); nozzles in general [B05B](#))]
- E21B41/00R . [N: Adaptations of electric power generating means for use in boreholes (generation of electric power per se [H02](#))]
- E21B41/00T . [N: Methods relating to program engineering, design or optimisation] [N0202]
- E21B41/02 . in situ inhibition of corrosion in boreholes or wells (dump bailers [E21B27/02](#); chemical compositions therefor C09K8/54; inhibiting corrosion in general C23F) [C0608]
- E21B41/04 . Manipulators for underwater operations, e.g. temporarily connected to well heads ([manipulators in general B25J](#))

- E21B41/06 . Work chambers for underwater operations, e.g. temporarily connected to well heads (in general [B63C11/00](#))
- E21B41/08 . Underwater guide bases, e.g. drilling templates; Levelling therefor [N0001]
[N: **WARNING**
This group was introduced in January 2000. Patent documents are continuously being reclassified to this group from groups [E21B7/12](#), [E21B33/035](#), [E21B43/017](#)]
- E21B41/10 . Guide posts, e.g. releasable; Attaching guide lines to underwater guide bases [N0001]

Guide heading: **Obtaining fluids from wells**

E21B43/00 **Methods or apparatus for obtaining oil, gas, water, soluble or meltable materials or a slurry of minerals from wells** (applicable only to water [E03B](#); obtaining oil-bearing deposits or soluble or meltable materials by mining techniques [E21C41/00](#); pumps [F04](#))

- E21B43/00C . [N: Vibrating earth formations (vibration generating arrangements for boreholes or wells [E21B28/00](#))] [C9710]
- E21B43/00M . [N: Production of coal-bed methane ([E21B43/243](#) takes precedence; methods or devices for drawing-off gases for safety purposes in mines [E21F7/00](#))] [N9511]
- E21B43/01 . specially adapted for obtaining from underwater installations (underwater well heads [E21B33/035](#))
- E21B43/01F . . [N: Connecting of flow lines to offshore structures ([E21B43/013](#) takes precedence)]
- E21B43/01M . . [N: Collecting oil or the like from a submerged leakage (cleaning or keeping clear the surface of open water from oil or the like [E02B15/04](#))]
- E21B43/013 . . connecting a production flow line to an underwater well head
- E21B43/013B . . . [N: using a pulling cable]
- E21B43/017 . . Production satellite stations, i.e. underwater installations comprising a plurality of satellite well heads connected to a central station (underwater separating arrangements [E21B43/36](#))
- E21B43/02 . Subsoil filtering ([E21B43/11](#) takes precedence, chemical compositions for consolidating loose sand or the like around wells [C09K8/56](#)) [C0608]
- E21B43/02B . . [N: Consolidation of loose sand or the like round the wells without excessively decreasing the permeability thereof (sealing borehole walls [E21B33/138](#))]
- E21B43/04 . . Graveling of wells
- E21B43/04C . . . [N: Crossover tools] [N0607]
- E21B43/08 . . Screens or liners [N: (expandable screens or liners [E21B43/10F3](#); obtaining drinking water; filters [E03B3/18](#))] [C0802]
- E21B43/08P . . . [N: Screens comprising porous materials, e.g. prepacked screens] [N0101]
- E21B43/08R . . . [N: Screens comprising woven materials, e.g. mesh or cloth] [N0101]
- E21B43/08S . . . [N: Screens with preformed openings, e.g. slotted liners (comprising porous materials [E21B43/08P](#))] [N0101]
- E21B43/08W . . . [N: Wire screens (comprising porous materials [E21B43/08P](#); comprising woven materials [E21B43/08R](#))] [N0101]

- E21B43/10 . . . Setting of casings, screens, liners [N: or the like] in wells (driving or forcing casings into boreholes, simultaneously drilling and casing boreholes [E21B7/20](#); setting of tools, packers or the like [E21B23/00](#); suspending casings in well heads [E21B33/04](#)) [C0802]
- E21B43/10A . . . [N: for underwater installations]
- E21B43/10F . . . [N: of expandable casings, screens, liners, or the like] [N9511] [C0802]
- E21B43/10F1 [N: Expanding tools specially adapted therefor] [N0307]
- E21B43/10F2 [N: Couplings or joints therefor] [N0802]
- E21B43/10F3 [N: Expandable screens or liners] [N0802]
- E21B43/11 . . . Perforators; Permeators
- E21B43/112 . . . Perforators with extendable perforating members, e.g. actuated by fluid means
- E21B43/114 . . . Perforators using direct fluid action [N: on the wall to be perforated], e.g. abrasive jets
- E21B43/116 . . . Gun or shaped charge perforators [N: (projectiles with shaped or hollow charge [F42B12/10](#))]
- E21B43/117 Shaped charge perforators ([E21B43/118](#) takes precedence)
- E21B43/118 characterised by lowering in vertical position and subsequent tilting to operating position
- E21B43/1185 Ignition systems
- E21B43/1185B [N: hydraulically actuated]
- E21B43/1185D [N: mechanically actuated, e.g. by movement of a wireline or a drop-bar ([E21B43/1185B](#) takes precedence)]
- E21B43/1185F [N: firing indication systems]
- E21B43/119 . . . Details, e.g. for locating perforating place or direction
- E21B43/119D [N: Replacement of drilling mud; decrease of undesirable shock waves]
- E21B43/12 . . . Methods or apparatus for controlling the flow of the obtained fluid to or in wells ([E21B43/25](#) takes precedence; valve arrangements [E21B34/00](#))
- E21B43/12B . . . [N: Lifting well fluids (survey of down-hole pump systems [E21B47/00P](#))] [C0102]
- E21B43/12B2 [N: Gas lift] [C9603]
- E21B43/12B2C [N: Gas lift valves] [N9603]
- E21B43/12B6 [N: Adaptation of jet-pump systems] [N9603]
- E21B43/12B9 [N: Adaptations of down-hole pump systems powered by drives outside the borehole, e.g. by a rotary or oscillating drive (powered by fluid [E21B43/12B12](#))] [N0102] [C0109]
- E21B43/12B9C [N: Adaptations of walking-beam pump systems] [N0102]
- E21B43/12B10 [N: Adaptation of pump systems with down-hole electric drives] [N0002]
- E21B43/12B12 [N: Adaptations of down-hole pump systems powered by fluid supplied from outside the borehole (gas-lift [E21B43/12B2](#); jet pumps [E21B43/12B6](#))] [N0102]
- E21B43/14 . . . Obtaining from a multiple-zone well
- E21B43/16 . . . Enhanced recovery methods for obtaining hydrocarbons (fracturing [E21B43/26](#); obtaining slurry [E21B43/29](#); reclamation of contaminated soil in situ [B09C](#); [N: chemical compositions therefor [C09K8/58](#)]) [C0704]
- E21B43/16D . . . [N: Injecting fluid from longitudinally spaced locations in injection well]

- E21B43/16E . . [N: Injecting CO₂ or carbonated water (in combination with organic material [C09K8/594](#))] [C0909]
- E21B43/16G . . [N: Injecting a gaseous medium; Injecting a gaseous medium and a liquid medium (CO₂ injection [E21B43/16E](#); steam injection [E21B43/24](#))] [N0010]
- E21B43/16G2 . . . [N: Injecting a gaseous medium] [N0010]
- E21B43/17 . . Interconnecting two or more wells by fracturing or otherwise attacking the formation ([N: [E21B43/24K](#),] [E21B43/247](#) take precedence)
- E21B43/18 . . Repressuring or vacuum methods
- E21B43/20 . . Displacing by water
- E21B43/24 . . using heat, e.g. steam injection (heating, cooling or insulating wells [E21B36/00](#)) [N: (in combination with organic material [E21B43/22D](#))]
- E21B43/24B . . . [N: by means of electricity]
- E21B43/24F . . . [N: by means of nuclear energy (nuclear reactors [G21](#))]
- E21B43/24K . . . [N: in association with fracturing or crevice forming processes ([E21B43/247](#) takes precedence)]
- E21B43/24S . . . [N: Steam assisted gravity drainage (SAGD)] [N0911]
- E21B43/24S2 [N: SAGD in combination with other methods] [N0911]
- [N: **WARNING** [N0911]
Not complete pending a reorganisation. See also [E21B43/24](#) and subgroups
]
- E21B43/241 . . . combined with solution mining of non-hydrocarbon minerals, e.g. solvent pyrolysis of oil shale
- E21B43/243 . . . Combustion in situ
- E21B43/247 in association with fracturing processes [N: or crevice forming processes]
- E21B43/248 using explosives
- E21B43/25 . . Methods for stimulating production (dump bailers [E21B27/02](#); vibration generating arrangements [E21B28/00](#); by vibrating earth formations [E21B43/00C](#)] chemical compositions therefor [C09K8/60](#)) [C0608]
- E21B43/25G . . [N: including the injection of a gaseous medium as treatment fluid into the formation] [N0012]
- E21B43/26 . . by forming crevices or fractures [N: (chemical compositions therefor [C09K8/62](#))] [C0709]
- E21B43/26P . . . [N: Separate steps of (1) cementing, plugging or consolidating and (2) fracturing or attacking the formation]
- E21B43/263 . . . using explosives [N: (Combustion in situ using explosives [E21B43/248](#))]
- E21B43/263F [N: by means of nuclear energy (peaceful applications of nuclear explosive devices in general [G21J3/00](#))]
- E21B43/267 . . . reinforcing fractures by propping [N: (chemical compositions therefor [C09K8/80](#))] [C0709]
- E21B43/28 . . Dissolving minerals other than hydrocarbons, e.g. by an alkaline or acid leaching agent ([E21B43/241](#) takes precedence; [N: using steerable or laterally extendable nozzles [E21B43/29D](#)])
- E21B43/28B . . [N: using heat (heating, cooling or insulating wells [E21B36/00](#))]
- E21B43/28K . . [N: in association with a fracturing process]
- E21B43/285 . . Melting minerals, e.g. sulfur ([E21B43/24](#) takes precedence; heating, cooling or insulating arrangements for wells [E21B36/00](#))

- E21B43/29 . Obtaining a slurry of minerals, e.g. by using nozzles
- E21B43/29D . . [N: using steerable or laterally extendable nozzles]
- E21B43/295 . Gasification of minerals, e.g. for producing mixtures of combustible gases ([E21B43/243](#) takes precedence)
- E21B43/30 . Specific pattern of wells, e.g. optimizing the spacing of wells (production satellite stations [E21B43/017](#))
- E21B43/30B . . [N: comprising at least one inclined or horizontal well]
- E21B43/32 . Preventing gas- or water- coning phenoma, i.e. the formation of a conical column of gas or water around wells
- E21B43/34 . Arrangements for separating materials produced by the well (separating apparatus per se, see the relevant subclasses)
- E21B43/36 . . Underwater separating arrangements ([E21B43/38](#) takes precedence)
- E21B43/38 . . in the well
- E21B43/38B . . . [N: by reinjecting the separated materials into an earth formation in the same well] [N9807]
- E21B43/40 . . Separation associated with re-injection of separated materials [N: ([E21B43/38B](#) takes precedence)] [C9807]

Guide heading: **Automatic control, surveying or testing**

E21B44/00 **Automatic control systems specially adapted for drilling operations, i.e. self-operating systems which function to carry out or modify a drilling operation without intervention of a human operator, e.g. computer-controlled drilling systems** (for non-automatic drilling control, see the operation controlled; automatic feeding from rack and connecting of drilling pipes [E21B19/20](#); controlling pressure or flow of drilling fluid [E21B21/08](#); control systems in general [G05](#)); **Systems specially adapted for monitoring a plurality of drilling variables or conditions** (means for transmitting measuring-signals from the well to the surface [E21B47/12](#))

- E21B44/00B . [N: Below-ground automatic control systems]
- E21B44/02 . Automatic control of the tool feed ([N: [E21B44/00B](#)], [E21B44/10](#) take precedence) [N0003]
- E21B44/04 . . in response to the torque of the drive; [N: Measuring drilling torque ([E21B44/06](#) takes precedence; measuring stresses in a well bore pipe [E21B47/00K](#))] [N0003]
- E21B44/06 . . in response to the flow or pressure of the motive fluid of the drive [N0003]
- E21B44/08 . . in response to the amplitude of the movement of the percussion tool, e.g. jump or recoil [N0003]
- E21B44/10 . Arrangements for automatic stopping when the tool is lifted from the working face [N: informative reference: arrangements for automatic stopping for portable percussive tools [B25D9/26B](#)] [N0003] [C0202]

E21B45/00 **Measuring the drilling time or rate of penetration**

E21B47/00 **Survey of boreholes or wells** (monitoring pressure or flow of drilling fluid [E21B21/08](#);

ophysical logging [G01V](#))

- E21B47/00A . [N: for underwater installations]
- E21B47/00C . [N: Survey of boreholes or wells by visual inspection (photographing internal surfaces, e.g. of pipes [G03B37/00B](#), [E21B57/A7B8](#); closed circuit television systems [H04N7/18](#))]
- E21B47/00D . [N: Determining well or borehole volumes (determining depth [E21B47/04](#), diameter [E21B47/08](#); measuring volumes in general [G01F](#))]
- E21B47/00F . [N: control of cementation quality or level (measuring temperature [E21B47/06B](#))]
- E21B47/00K . [N: Measuring stresses in a well bore pipe string or casing (for locating stuck pipe [E21B47/09](#))]
- E21B47/00P . [N: Survey of down-hole pump systems] [C9804]
- E21B47/00P2 . . [N: Survey of walking-beam pump systems, e.g. for the detection of so called "pumped-off" conditions] [N9804]
- E21B47/01 . Devices for supporting measuring instruments on a drill pipe, rod or wireline (setting or locking tools in boreholes or wells [E21B23/00](#)); [N: (flexible centering means per se [E21B17/10C](#))] Protecting measuring instruments in boreholes against heat, shock, pressure or the like [N9505] [C0303]

[N: **Note**
Devices for both supporting and protecting measuring instruments are only classified in [E21B47/01P](#)
]
- E21B47/01P . . [N: Protecting measuring instruments (cooling or insulating arrangements for boreholes or wells [E21B36/00](#))] [N0303]
- E21B47/02 . Determining slope or direction (clinometers or direction meters [G01C](#))
- E21B47/022 . . of the borehole, [N: e.g. using geomagnetism]
- E21B47/022C . . . [N: using seismic or acoustic means]
- E21B47/022M . . . [N: using at least one source of electromagnetic energy and at least one detector therefor]
- E21B47/022M2 [N: at least one of the sources or one of the detectors being located above ground]
- E21B47/022P . . . [N: using a pendulum]
- E21B47/024 . . of devices in the borehole ([E21B47/022](#) takes precedence)
- E21B47/026 . . of penetrated ground layers (apparatus for obtaining oriented cores [E21B25/16](#); formation testing [E21B49/00](#))
- E21B47/04 . Measuring depth or liquid level (measuring liquid level in general) [N: and telerecorders for level of liquids] [G01F](#); [N: measuring depth in general [G01B7/26](#)]
- E21B47/04B . . [N: Measuring or locating liquid level ([E21B47/04R](#) takes precedence)]
- E21B47/04R . . [N: using radioactive markers]
- E21B47/06 . Measuring temperature or pressure (measuring temperature in general [G01K](#); measuring pressure in general [G01L](#)) [N: telerecorders for pressure [G01L](#);

- ders for temperature [G01K](#)
- E21B47/06B . . [N: Measuring temperature]
- E21B47/08 . Measuring the diameter (measuring diameter in general [G01B](#))
- E21B47/08C . . [N: using radiant means, e.g. acoustic, radioactive, electromagnetic]
- E21B47/09 . Locating or determining the position of objects in boreholes or wells, [N: e.g. the position of an extending arm]; Identifying the free or blocked portions of pipes (measuring depth [E21B47/04](#); measuring diameter [E21B47/08](#)) [[C9710](#)]
- E21B47/09B . . [N: by detecting magnetic anomalies (investigating materials by investigating magnetic variables [G01N27/72](#))]
- E21B47/09D . . [N: by detecting an acoustic anomaly, e.g. a mud-pressure pulse] [[N9511](#)]
- E21B47/09F . . [N: using impression packers, e.g. to detect recesses or perforations]
- E21B47/10 . Locating fluid leaks, intrusions or movements [N: using impression packers [E21B47/09F](#); flow measurement in general [G01F](#); examining density and leaking in general [G01M](#)]
- E21B47/10B . . [N: using thermal measurements (measurement temperature [E21B47/06B](#))]
- E21B47/10D . . [N: using acoustic energy]
- E21B47/10G . . [N: using tracers: using radioactivity]
- E21B47/10K . . [N: using electrical indications: using light radiations]
- E21B47/10R . . [N: Detecting leaks, e.g. of tubing, by pressure testing (investigating fluid-tightness of structures by using fluid or vacuum [G01M3/02](#))]
- E21B47/12 . Means for transmitting measuring-signals [N: or control signals] from the well to the surface [N: or from the surface to the well], e.g. for logging while drilling (remote signalling in general [G08](#)) [[C0101](#)]
- E21B47/12E . . [N: using earth as an electrical conductor ([E21B47/12M](#) takes precedence; in general [H04B13/02](#); electric prospecting [G01V3/00](#))]
- E21B47/12M . . [N: by electromagnetic energy, e.g. radio frequency (in general [H04B](#) magnetic prospecting [G01V3/00](#))]
- E21B47/12M2 . . . [N: using light waves (optical transmission in general [H04B10/00](#); light guides, e.g. optical fibres [G02B6/00](#))]
- E21B47/12S . . [N: Storing data down-hole, e.g. in a memory or on a record carrier (recording in connection with measuring in general [G01D](#); information storage in general [G11](#))]
- E21B47/14 . . using acoustic waves [[N9602](#)]
- E21B47/16 . . . through the drill string or casing, [N: e.g. by torsional acoustic waves] [[N9602](#)]
- E21B47/18 . . . through the well fluid, [N: e.g. mud pressure pulse telemetry] [[N9602](#)]
- E21B47/18C [N: by continuous mud waves with modulation of the waves] [[N0207](#)]
- E21B47/18N [N: by negative mud pulses using a pressure relieve valve between drill pipe and annulus] [[N0207](#)]
- E21B47/18P [N: by positive mud pulses using a flow restricting valve within the drill pipe] [[N0207](#)]
- E21B49/00** **Testing the nature of borehole walls; Formation testing; Methods or apparatus for obtaining samples of soil or well fluids, specially adapted to earth drilling or wells (sampling in general [G01N1/00](#))**
- E21B49/00A . [N: specially adapted for underwater installations]

- E21B49/00D . [N: by analysing drilling variables or conditions ([E21B49/00G](#) takes precedence; Systems specially adapted for monitoring a plurality of drilling variables or conditions [E21B44/00](#))]
- E21B49/00G . [N: Testing the nature of borehole walls or the formation by using drilling mud or cutting data (investigating chemical or physical properties of materials per se [G01N](#))]
- E21B49/00M . [N: Measuring wall stresses in the borehole (investigation of mechanical properties of foundation soil [E02D1/02B](#))]
- E21B49/00P . [N: by injection test; by analysing pressure variations in an injection or production test, e.g. for estimating the skin factor (measuring pressure [E21B47/06](#); obtaining fluid samples or testing fluids [E21B49/08](#))]
- E21B49/02 . by mechanically taking samples of the soil (apparatus for obtaining undisturbed cores [E21B25/00](#); investigation of foundation soil in situ [E02D1/00](#))
- E21B49/02A . . [N: of underwater soil, e.g. with grab devices (underwater coring [E21B25/18](#))]
- E21B49/04 . . using explosives in boreholes; using projectiles penetrating the wall [N: drilling by use of explosives [E21B7/00P](#); gun or shaped charge perforators [E21B43/116](#)]
- E21B49/06 . . with side-wall drilling tools [N: pressing] or scrapers
- E21B49/08 . Obtaining fluid samples or testing fluids, in boreholes or wells [N: (packers [E21B33/12](#); valves [E21B34/00](#); analysing pressure variations in an injection or production test [E21B49/00P](#))]
- E21B49/08B . . [N: with down-hole means for trapping a fluid sample ([E21B49/10](#) takes precedence)]
- E21B49/08B2 . . . [N: Wire-line fluid samplers ([E21B49/08B4](#) takes precedence)] [C0001]
- E21B49/08B4 . . . [N: Samplers adapted to be lowered into or retrieved from a landing nipple, e.g. for testing a well without removing the drill string] [N0001]
- E21B49/08C . . [N: with means for conveying samples through pipe to surface] [N0607]
- E21B49/08S . . [N: Withdrawing samples at the surface] [N0607]
- E21B49/08T . . [N: Well testing, e.g. testing for reservoir productivity or formation parameters] [N0607]
- E21B49/08T2 . . . [N: combined with sampling] [N0607]
- E21B49/10 . . using side-wall fluid samplers or testers