

## E21B

### EARTH DRILLING, e.g. DEEP DRILLING; OBTAINING OIL, GAS, WATER, SOLUBLE OR MELTABLE MATERIALS OR A SLURRY OF MINERALS FROM WELLS

#### Definition statement

*This subclass/group covers:*

Earth drilling, e.g. deep drilling;obtaining oil, gas, water, soluble or meltable materials or a slurry of minerals from wells.

#### References relevant to classification in this subclass

*This subclass/group does not cover:*

|   |                      |
|---|----------------------|
| Mining, quarrying                           | <a href="#">E21C</a> |
| Making shafts, driving galleries or tunnels | <a href="#">E21D</a> |

## E21B 1/00

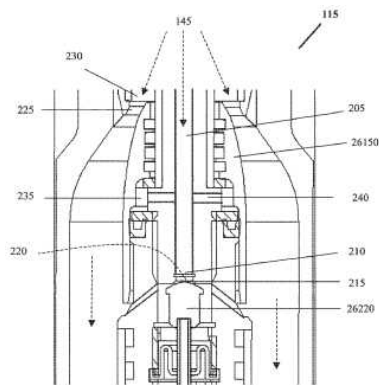
Percussion drilling(drives used in the borehole [E21B 4/00](#) ; rotary drilling machines in general [B23B](#))

#### Definition statement

*This subclass/group covers:*

Machines and methods in which the drilling action is done principally by percussion.

The percussive drive is placed outside of the borehole, and the drilling can be for any depth, including drillholes and mining applications:



## References relevant to classification in this group

*This subclass/group does not cover:*

|                             |                           |
|-----------------------------|---------------------------|
| Drives used in the borehole | <a href="#">E21B 4/00</a> |
|-----------------------------|---------------------------|

## Informative references

*Attention is drawn to the following places, which may be of interest for search:*

|  |                            |
|--|----------------------------|
| Portable drilling rigs                             | <a href="#">E21B 7/20</a>  |
| Drives for combined percussion and rotary drilling | <a href="#">E21B 6/00</a>  |
| Derricks, masts                                    | <a href="#">E21B 15/00</a> |
| Rotary drilling machines in general                | <a href="#">B23B</a>       |

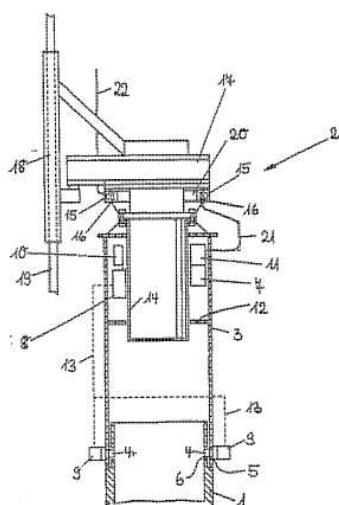
## E21B 3/00

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

## Definition statement

*This subclass/group covers:*

Machines and methods in which the drilling action is done principally by rotation:



## Informative references

Attention is drawn to the following places, which may be of interest for search:

|  |                            |
|--|----------------------------|
| Drives for combined percussion and rotary drilling | <a href="#">E21B 6/00</a>  |
| Portable drilling rigs                             | <a href="#">E21B 7/20</a>  |
| Derricks, masts                                    | <a href="#">E21B 15/00</a> |
| Rotary drilling machines in general                | <a href="#">B23B</a>       |

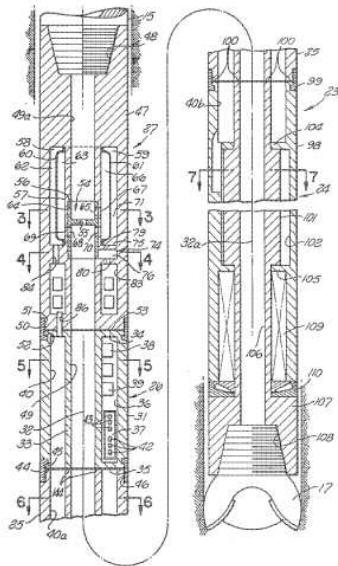
## E21B 4/00

### Drives used in the borehole

#### Definition statement

*This subclass/group covers:*

Drives located inside the borehole for powering drilling units:



## Informative references

Attention is drawn to the following places, which may be of interest for search:

|                                 |                            |
|---------------------------------|----------------------------|
| Rotary-piston machines or pumps | <a href="#">F04C 2/00</a>  |
| Moineau motors                  | <a href="#">F04C 2/107</a> |

|  |                           |
|--|---------------------------|
| Arrangements for handling mechanical energy structurally associated with the machine, e.g. structural association with mechanical driving motor or auxiliary dynamo-electric machine | <a href="#">H02K 7/00</a> |
|--|---------------------------|

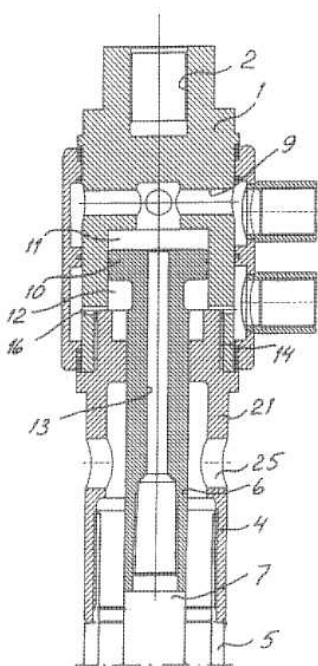
## E21B 6/00

### Drives for combined percussion and rotary drilling

#### Definition statement

*This subclass/group covers:*

Drives outside the borehole for combined percussion and rotary drilling:



#### References relevant to classification in this group

*This subclass/group does not cover:*

|                             |                           |
|-----------------------------|---------------------------|
| Drives used in the borehole | <a href="#">E21B 4/00</a> |
|-----------------------------|---------------------------|

#### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

|  |                            |
|--|----------------------------|
| Drives for combined percussion and rotary drilling   | <a href="#">E21B 6/00</a>  |
| Portable drilling rigs   | <a href="#">E21B 7/20</a>  |
| Derricks, masts  | <a href="#">E21B 15/00</a> |
| Methods or apparatus for generating mechanical vibrations of infrasonic, sonic or ultrasonic frequency | <a href="#">B06B 1/00</a>  |

## **E21B 7/00**

### **Special methods or apparatus for drilling**

#### **Definition statement**

*This subclass/group covers:*

Drilling methods and apparatus characterised by any aspect that differs from those of conventional drilling, which is understood as drilling a vertical borehole with a roller or drag type bit, using a derrick or mast.

#### **References relevant to classification in this group**

*This subclass/group does not cover:*

|  |                            |
|--|----------------------------|
| Rotary or percussion drill bits  | <a href="#">E21B 10/00</a> |
| Derricks or masts  | <a href="#">E21B 15/00</a> |
| Drilling rods or pipes   | <a href="#">E21B 17/00</a> |
| Setting of casings when not simultaneous with drilling of the borehole | <a href="#">E21B 43/10</a> |

#### **Informative references**

*Attention is drawn to the following places, which may be of interest for search:*

|   |                             |
|---|-----------------------------|
| Machines for drilling and setting anchoring bolts | <a href="#">E21D 20/003</a> |
| Details of, or accessories for, portable          | <a href="#">B25D 17/00</a>  |

|  |                             |
|--|-----------------------------|
| power-driven percussive tools                              |                             |
| Erecting posts for fences                                  | <a href="#">E04H 17/263</a> |
| Underwater drilling for submerged foundations              | <a href="#">E02D 27/52</a>  |
| Vehicles adapted to transport or to comprise special loads | <a href="#">B60P 3/00</a>   |
| Details of hydraulic circuits                              | <a href="#">F15B</a>        |

## **E21B 7/04**

**Directional drilling (derricks or masts specially adapted therefor [E21B 15/04](#) )**

### **Definition statement**

*This subclass/group covers:*

Directional drilling in the general sense of producing a borehole in a direction other than vertical. The drilling direction can be essentially horizontal, such as for laying a pipe under an obstruction or in an urban environment.

## **E21B 7/20**

**Driving or forcing casings or pipes into boreholes, e.g. sinking; Simultaneously drilling and casing boreholes (surface means for applying to-and-fro rotation movements to the casing [E21B 3/025](#); [N: pushing means outside of the borehole [E21B 19/08](#)]; placing piles [E02D 7/00](#); sinking shafts while moving the lining downwards [E21D 1/08](#); [N: making galleries by forcing prefabricated elements through the ground [E21D 9/005](#) ])**

### **Definition statement**

*This subclass/group covers:*

Methods in which the drilling action takes place simultaneously with the installation of a casing or of the pipe to be installed, with the borehole being horizontal or not.

### **References relevant to classification in this group**

*This subclass/group does not cover:*

|  |                            |
|--|----------------------------|
| Surface means for applying to-and-fro rotation movements to the casing | <a href="#">E21B 3/025</a> |
| Pushing means outside of the borehole                                  | <a href="#">E21B 19/08</a> |
| Placing piles  | <a href="#">E02D 7/00</a>  |
| Sinking shafts while moving the lining downwards                       | <b>E21D21/08</b>           |
| Making galleries by forcing prefabricated elements through the ground  | <a href="#">E21D 9/005</a> |

## **E21B 7/28**

**Enlarging drilled holes, e.g. by counterboring (drill bits for enlarging the borehole [E21B 10/26](#) )**

### **Definition statement**

*This subclass/group covers:*

Vertical or horizontal drilling, in which means are provided for enlarging a borehole made previously, which borehole may have been made by the same machine carrying out the enlargement, or by a different machine or in a previous operation:

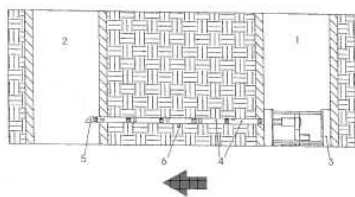


Fig. 1

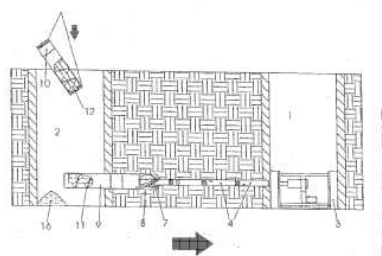
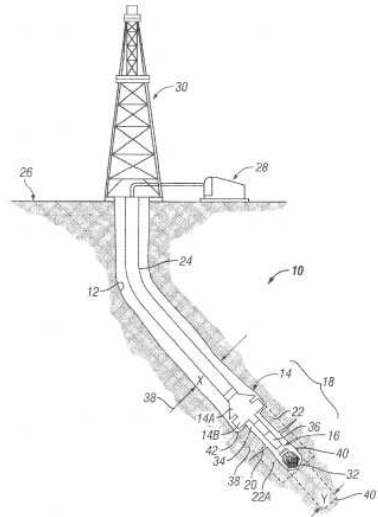


Fig. 2



## References relevant to classification in this group

*This subclass/group does not cover:*

|                                       |                            |
|---------------------------------------|----------------------------|
| Drill bits for enlarging the borehole | <a href="#">E21B 10/26</a> |
|---------------------------------------|----------------------------|

## E21B 10/00

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

### Definition statement

*This subclass/group covers:*

Drill bits for any application in earth drilling, be it deep drilling for oil and gas or rock drilling for mining or for use in an underground space.

## References relevant to classification in this group

*This subclass/group does not cover:*

|   |                            |
|---|----------------------------|
| Drill bits for stone or stone-like material                         | <a href="#">B28D 1/00</a>  |
| Bulkheads, piles specially adapted to foundation engineering        | <a href="#">E02D 5/00</a>  |
| Drill bits specially adapted for deflecting the direction of boring | <a href="#">E21B 7/064</a> |
| Drill bits with means for collecting                                | <a href="#">E21B 27/00</a> |



|            |  |
|------------|--|
| substances |  |
|------------|--|

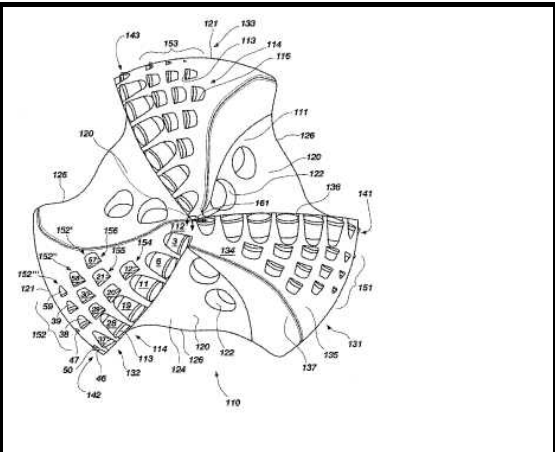
**Informative references**

*Attention is drawn to the following places, which may be of interest for search:*

|   |                            |
|---|----------------------------|
| Cutting tools of which the bits or tips are of special material                         | <a href="#">B23B 27/14</a> |
| Manufacture of articles from metal powder   | <a href="#">B22F</a>       |
| Special treatment of metallic powder, e.g. to facilitate working, to improve properties | <a href="#">B22F 1/00</a>  |
| Alloys containing diamond   | <a href="#">C22C</a>       |

**Glossary of terms**

*In this subclass/group, the following terms (or expressions) are used with the meaning indicated:*

|   |  |
|---|--|
| Arrangement of teeth or other cutting elements: placement or number of elements on a bit body   |  |
| Wear resisting parts: materials on the body of the bit adapted for withstanding wear caused by the flow of drilling fluid having cuttings entrained therein |  |

|  |  |
|--|--|
|  |  |
| <p>Chisel or button type inserts:</p>                            |  |
| <p>Preformed cutting elements mounted on a distinct support:</p> |  |

**E21B 11/00**

Other drilling tools [N: (boring grabs [E21B 27/00](#) )]

**Definition statement**

*This subclass/group covers:*

Other drilling tools different from the drill bits of [E21B10](#)

## E21B 12/00

Accessories for drilling tools [N: (connecting and disconnecting drill bit and drilling pipe [E21B 19/18](#); sharpening stone drill bits [B24B 3/33](#) )]

### References relevant to classification in this group

*This subclass/group does not cover:*

|  |                            |
|--|----------------------------|
| Connecting and disconnecting drill bit and drilling pipe | <a href="#">E21B 19/18</a> |
| Sharpening stone drill bits                              | <a href="#">B24B 3/33</a>  |

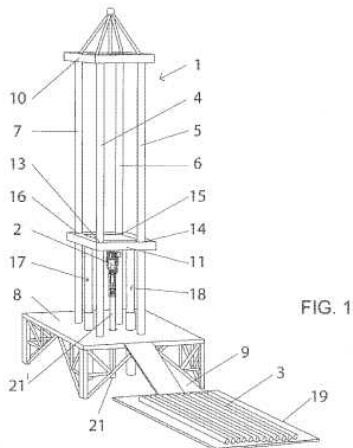
## E21B 15/00

Derricks; Masts [N: Other supports (drill rigs with movable understructures [E21B 7/02](#) )]

### Definition statement

*This subclass/group covers:*

Drilling derricks or masts having such dimensions that require considerable complication for assembling and disassembling them, so that they cannot be considered as "movable" or "portable" units:



### References relevant to classification in this group

*This subclass/group does not cover:*

|                             |                            |
|-----------------------------|----------------------------|
| Floating drilling platforms | <a href="#">B63B 35/44</a> |
|-----------------------------|----------------------------|

|                            |                            |
|----------------------------|----------------------------|
| Drilling platforms on legs | <a href="#">E02B 17/00</a> |
|----------------------------|----------------------------|

### Informative references

Attention is drawn to the following places, which may be of interest for search:

|   |                           |
|---|---------------------------|
| Drill rigs with movable understructures | <a href="#">E21B 7/02</a> |
|---|---------------------------|

### E21B 17/00

**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](#))**

### Definition statement

*This subclass/group covers:*

Pipes for use in wellbores, for drilling but also for subsequent operations, such as casings or risers. Couplings between pipes. Centralisers and other accessories for pipes.

### References relevant to classification in this group

*This subclass/group does not cover:*

|   |                              |
|---|------------------------------|
| Connecting flow lines to offshore structures    | <a href="#">E21B 43/0107</a> |
| Connecting flow lines to an underwater wellhead | <a href="#">E21B 43/013</a>  |
| Expansible tubulars                             | <a href="#">E21B 43/103</a>  |
| Simple threads for coupling of rods             | <a href="#">F16L</a>         |
| Subsea flow lines                               | <a href="#">F16L 1/00</a>    |
| Pipeline systems                                | <a href="#">F17D 1/00</a>    |

## Informative references

Attention is drawn to the following places, which may be of interest for search:

|  |                            |
|--|----------------------------|
| Details of, or accessories for, portable power-driven percussive tools | <a href="#">B25D 17/00</a> |
| Rod couplings in general   | <a href="#">F16D</a>       |
| Tubes or couplings in general  | <a href="#">F16L</a>       |

## E21B 19/00

Handling rods, casings, tubes or the like outside the borehole, e.g. in the derrick (surface drives [E21B 1/02](#), [E21B 3/02](#) )

### Definition statement

*This subclass/group covers:*

Machines or methods performed in the surface for assembling pipes, hoisting pipes, pushing pipes into a borehole, storing pipes and similar. The application is typically for drilling, i.e. vertical, horizontal, deep drilling, mining or other earth drilling, but can also be for well treatment or other.

## Informative references

Attention is drawn to the following places, which may be of interest for search:

|                           |                           |
|---------------------------|---------------------------|
| Surface percussion drives | <a href="#">E21B 1/00</a> |
| Surface rotary drives     | <a href="#">E21B 3/00</a> |

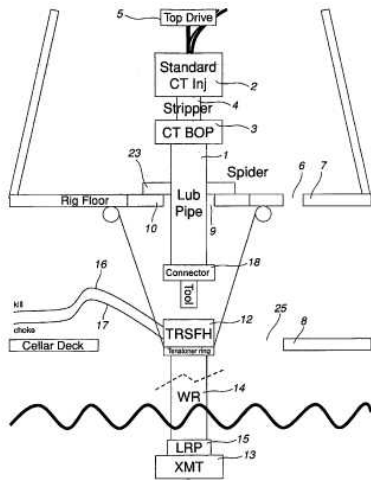
## E21B 19/002

[N: specially adapted for underwater drilling ([E21B 19/09](#), [E21B 19/143](#) take precedence; risers with buoyancy elements [E21B 17/012](#), [E21B 17/015](#) )]

### Definition statement

*This subclass/group covers:*

Handling and supporting of tubulars in relation to underwater drilling operations other than feeding the drill string into the borehole or controlling the weight on bit:



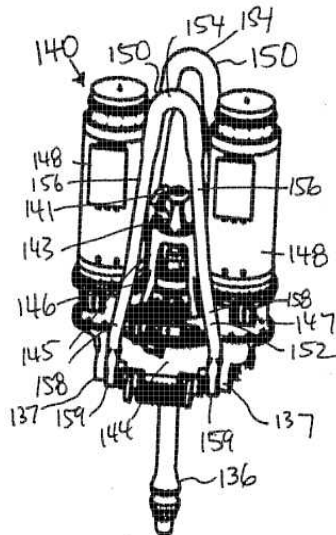
## E21B 19/02

Rod or cable suspensions (load-engaging elements for hoisting or lowering purposes in general [B66C 1/00](#); Crown blocks or pulley blocks [B66D](#); cable guides [B66D 1/36](#) )

### Definition statement

*This subclass/group covers:*

Apparatus for suspension by rods or cables that have normally no capacity of applying rotation. A spinner or other rotary drive may be suspended from the suspension apparatus.



## E21B 19/08

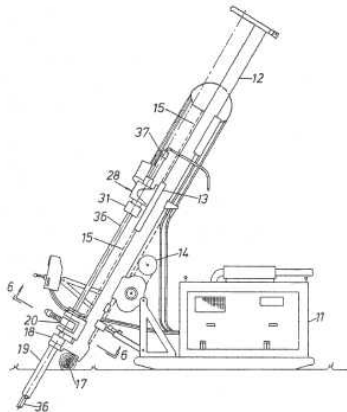
Apparatus for feeding the rods or cables ([E21B 19/22](#) takes precedence; automatic feed [E21B 44/02](#) ; hoisting drums [B66D](#)); Apparatus for increasing or decreasing the pressure

## on the drilling tool; Apparatus for counterbalancing the weight of the rods

### Definition statement

*This subclass/group covers:*

Apparatus for pushing drilling tools into the borehole. All kinds of earth drilling tools are classified in these groups, such as deep drilling tools, rock drills for mining, horizontal drills or coiled tubing:



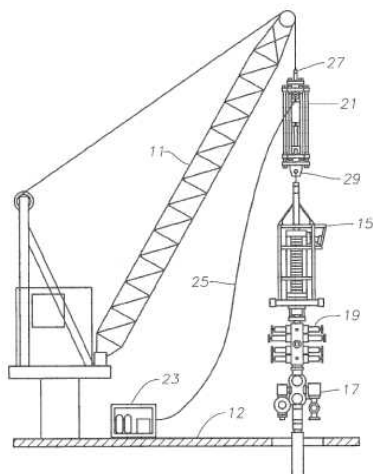
## E21B 19/09

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

### Definition statement

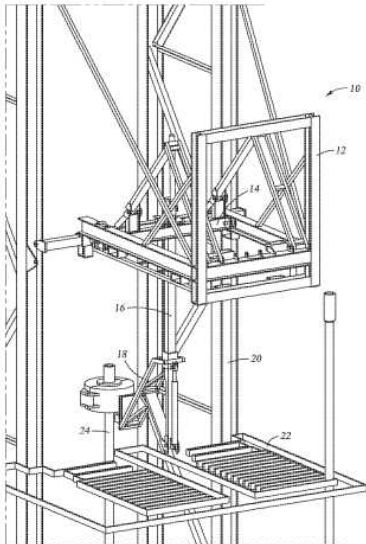
*This subclass/group covers:*

Feeding the drill string for underwater drilling:









## E21B 21/00

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

### Definition statement

*This subclass/group covers:*

Control of circulation and pressure of fluids in a borehole, typically drilling fluids, tools for filling a borehole, treatment of drill cuttings, various types of drilling fluids.

### References relevant to classification in this group

*This subclass/group does not cover:*

|  |                            |
|--|----------------------------|
| Well drilling compositions                     | <a href="#">C09K 8/02</a>  |
| Cementing                                      | <a href="#">E21B 33/13</a> |
| Freeing objects stuck in boreholes by flushing | <a href="#">E21B 31/03</a> |
| Enhanced recovery methods                      | <a href="#">E21B 43/16</a> |
| Fracturing formations                          | <a href="#">E21B 43/26</a> |

### Informative references

Attention is drawn to the following places, which may be of interest for search:

|  |                              |
|--|------------------------------|
| Destroying or transforming solid or contaminated waste into something useful or harmless | <a href="#">B09B 3/00</a>    |
| Floating drilling platforms, e.g. carrying water-oil separating devices                  | <a href="#">B63B 35/4413</a> |

## **E21B 23/00**

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

### **Definition statement**

*This subclass/group covers:*

Actuators for installing tools used for any application in a borehole, wherein the way of installation is more relevant than the function of the tool as such.

### **References relevant to classification in this group**

*This subclass/group does not cover:*

|                                       |                            |
|---------------------------------------|----------------------------|
| Setting of casings, screens or liners | <a href="#">E21B 43/10</a> |
|---------------------------------------|----------------------------|

### **Informative references**

Attention is drawn to the following places, which may be of interest for search:

|  |   |
|--|---|
| Fishing for or freeing objects in boreholes or wells | <a href="#">E21B 31/00</a>                              |
| Borehole thrusters                                   | <a href="#">E21B 4/18</a> , <a href="#">E21B 44/005</a> |

### **Special rules of classification within this group**

If a document discloses specific details of actuation or installation according to the meaning of [E21B 23/00](#), and the actuation is done by elements incorporated in the tool, then those details are also classified in [E21B 23/00](#).

The tool in question may in addition be classified in the group that

corresponds to its function or construction.

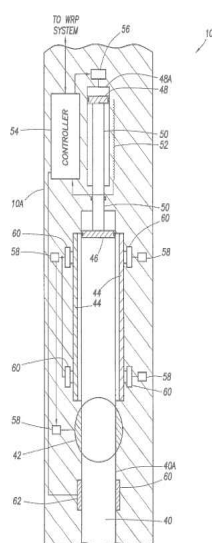
## E21B 25/00

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

### Definition statement

*This subclass/group covers:*

Tools for receiving, preserving, transporting etc. a core:



### References relevant to classification in this group

*This subclass/group does not cover:*

|  |                            |
|--|----------------------------|
| Core bits                                    | <a href="#">E21B 10/02</a> |
| Using explosives or projectiles in boreholes | <a href="#">E21B 49/04</a> |
| Side-wall sampling or coring                 | <a href="#">E21B 49/06</a> |

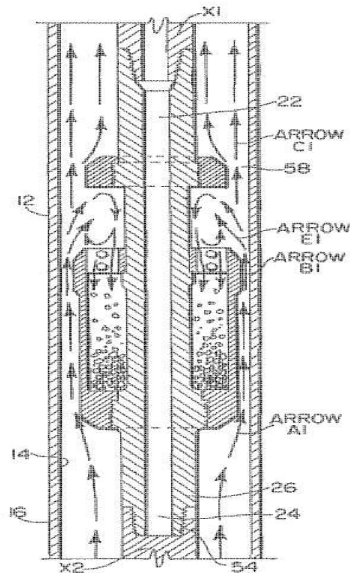
## E21B 27/00

**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

### Definition statement

*This subclass/group covers:*



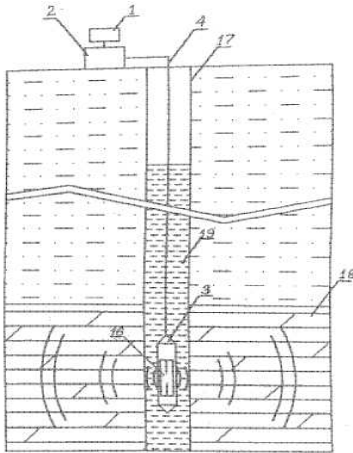
### E21B 28/00

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

### Definition statement

*This subclass/group covers:*

The vibration is normally generated by tools inside the borehole:



Фиг. 1

### References relevant to classification in this group

*This subclass/group does not cover:*

|  |                             |
|--|-----------------------------|
| Vibration for drilling                       | <a href="#">E21B 7/24</a>   |
| Vibration for fishing for or freeing objects | <a href="#">E21B 31/005</a> |
| Vibration for transmitting measuring-signals | <a href="#">E21B 47/14</a>  |
| Vibration for geophysical measurements       | <a href="#">G01V 1/02</a>   |

### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

|                            |                             |
|----------------------------|-----------------------------|
| Vibrating earth formations | <a href="#">E21B 43/003</a> |
|----------------------------|-----------------------------|

### **E21B 29/00**

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

## [E21B 7/28](#))]

### Definition statement

*This subclass/group covers:*

Cutting or deforming methods and apparatus for pipes, lines etc. inside the wellbore.

### References relevant to classification in this group

*This subclass/group does not cover:*

|  |                             |
|--|-----------------------------|
| Reconditioning of well casings while in the ground by enlarging drilled holes or counterboring | <a href="#">E21B 7/28</a>   |
| Shear-type blow-out preventers   | <a href="#">E21B 33/063</a> |
| Expanding tubulars   | <a href="#">E21B 43/103</a> |
| Perforators  | <a href="#">E21B 43/11</a>  |

## [E21B 31/00](#)

**Fishing for or freeing objects in boreholes or wells ([N: using junk baskets or the like [E21B 27/00](#)]; provisions on well heads for introducing or removing objects [E21B 33/068](#); Locating or determining the position of objects in boreholes or wells [E21B 47/09](#) )**

### References relevant to classification in this group

*This subclass/group does not cover:*

|   |                             |
|---|-----------------------------|
| Fishing for or freeing objects in boreholes or wells using junk baskets or the like | <a href="#">E21B 27/00</a>  |
| Provisions on well heads for introducing or removing objects                        | <a href="#">E21B 33/068</a> |
| Locating or determining the position of objects in boreholes or wells               | <a href="#">E21B 47/09</a>  |

## E21B 33/00

### Sealing or packing boreholes or wells

#### Definition statement

*This subclass/group covers:*

Apparatus and methods for sealing, both at the surface and in the interior of a borehole

#### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

|   |                           |
|---|---------------------------|
| Apparatus or methods for producing mixtures of cement with other substances, e.g. slurries, mortars, porous or fibrous compositions | <a href="#">B28C 5/00</a> |
|---|---------------------------|

#### Special rules of classification within this group

Pitless wells are also classified in [E21B 33/00](#)

## E21B 33/02

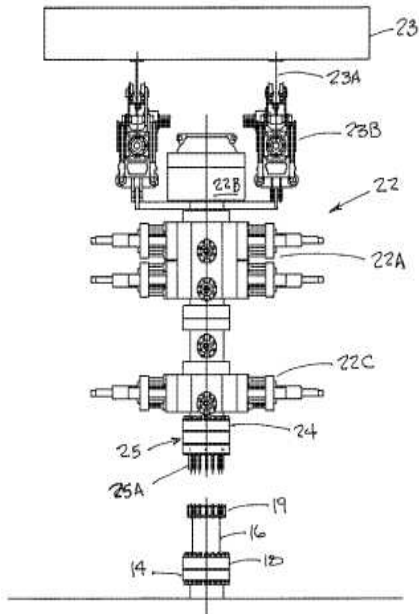
### Surface sealing or packing

#### Definition statement

*This subclass/group covers:*

Apparatus for sealing a wellbore and placed outside the wellbore, be it at the surface or subsea, such as wellheads, casing or tubing hangers,

Christmas trees or blow-out preventers:



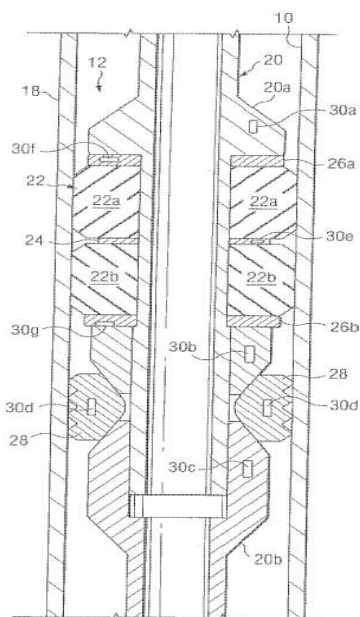
## E21B 33/12

**Packers; Plugs ([N: locking packers or plugs in landing nipples [E21B 23/02](#)]; used for cementing [E21B 33/134](#), [E21B 33/16](#) )**

### Definition statement

*This subclass/group covers:*

Packers, tools lowered with a reduced diameter and expanded by various means to establish an annular seal between an outer tubular or wall and an inner tubular:





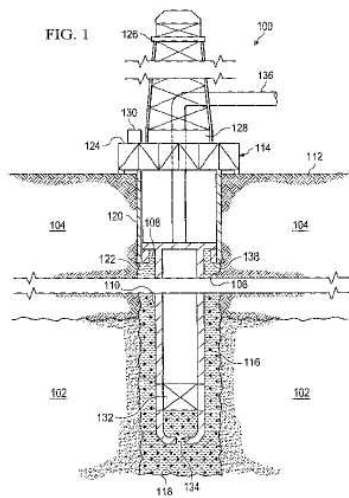
## E21B 33/13

Methods or devices for cementing, for plugging holes, crevices, or the like (dump bailers [E21B 27/02](#); [N: methods or apparatus for grouting offshore structures [E02B 17/0008](#)] chemical compositions therefor [C09K 8/00](#) )

### Definition statement

*This subclass/group covers:*

Tools for plugging the bore or a well, and to methods for cementing parts of a wellbore, for cementing a casing in the wellbore and similar:



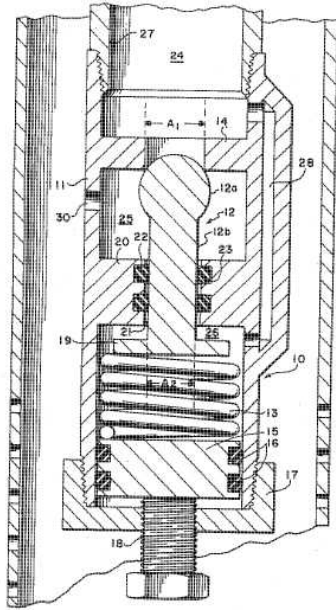
## E21B 34/00

Valve arrangements for boreholes or wells (in drilling fluid circulation systems [E21B 21/10](#); [N: tool diverters [E21B 23/002](#)]; blow-out preventers [E21B 33/06](#); oil flow regulating apparatus [E21B 43/12](#) ; valves in general [F16K](#))

### Definition statement

*This subclass/group covers:*

Constructive details of valves specifically adapted for use at the surface of a wellbore or in the interior of a wellbore:



## References relevant to classification in this group

*This subclass/group does not cover:*

|  |                             |
|--|-----------------------------|
| Valve arrangements in drilling fluid circulation systems | <a href="#">E21B 21/10</a>  |
| Tool diverters   | <a href="#">E21B 23/002</a> |
| Blow-out preventers                                      | <a href="#">E21B 33/06</a>  |
| Oil flow regulating apparatus                            | <a href="#">E21B 43/12</a>  |
| Gas lift valves  | <a href="#">E21B 43/123</a> |

## Informative references

*Attention is drawn to the following places, which may be of interest for search:*

|                   |                      |
|-------------------|----------------------|
| Valves in general | <a href="#">F16K</a> |
|-------------------|----------------------|

## E21B 35/00

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

in general [A62C](#), [A62D](#))

## Informative references

Attention is drawn to the following places, which may be of interest for search:

|  |   |
|--|---|
| Cutting or deforming pipes to control fluid flow | <a href="#">E21B 29/08</a>                  |
| Controlling flow of fluid to or in wells         | <a href="#">E21B 43/12</a>                  |
| Prevention of fires in mines or tunnels          | <a href="#">E21F 5/00</a>                   |
| Fire fighting in general                         | <a href="#">A62C</a> , <a href="#">A62D</a> |

## E21B 36/00

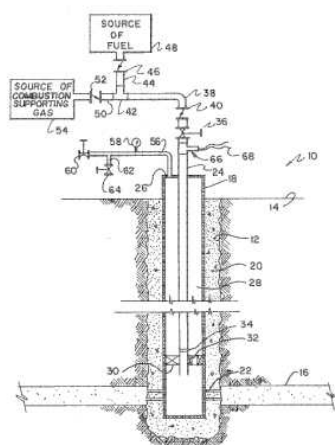
Heating, cooling, insulating arrangements for boreholes or wells, e.g. for use in permafrost zones (drilling by use of heat [E21B 7/14](#); secondary recovery methods using heat [E21B 43/24](#) )

### Definition statement

*This subclass/group covers:*

Equipment for generating heat at the surface or in the wellbore, for transmitting heat into a wellbore, or for cooling wellbores.

Heating or cooling in the wellbore of fluids produced or of treatment fluids



### References relevant to classification in this group

*This subclass/group does not cover:*

|                                       |                            |
|---------------------------------------|----------------------------|
| Drilling by use of heat               | <a href="#">E21B 7/14</a>  |
| Secondary recovery methods using heat | <a href="#">E21B 43/24</a> |

### Special rules of classification within this group

If a document describes the extension of the heating action into a reservoir or formation for enhanced recovery, then this operation is classified in [E21B 43/24](#).

### E21B 37/00

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

### Definition statement

*This subclass/group covers:*

Methods or apparatus for cleaning boreholes or wells; Cleaning by physical or chemical action:

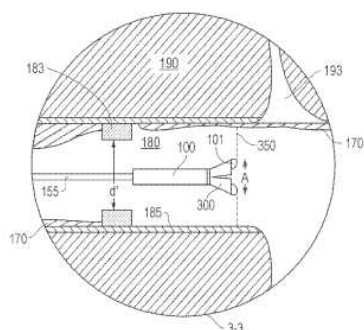


FIG. 3

### References relevant to classification in this group

*This subclass/group does not cover:*

|                           |                            |
|---------------------------|----------------------------|
| Flushing of wellbores     | <a href="#">E21B 21/00</a> |
| Bailers                   | <a href="#">E21B 27/00</a> |
| Inhibition of corrosion   | <a href="#">E21B 41/02</a> |
| Cleaning pipes in general | <a href="#">B08B 9/02</a>  |

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## E21B 40/00

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

### Definition statement

*This subclass/group covers:*

Tubing catchers, automatically arresting the fall of oil-well tubing

### References relevant to classification in this group

*This subclass/group does not cover:*

|   |                              |
|---|------------------------------|
| Slips, spiders  | <a href="#">E21B 19/10</a>   |
| Preventing small objects from falling into the borehole | <a href="#">E21B 41/0021</a> |

## E21B 41/00

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

### Definition statement

*This subclass/group covers:*

Equipment as specified in the subgroups of [E21B 41/00](#). Equipment specifically adapted for use in earth drilling and not covered by other groups of [E21B](#) or by the subgroups of [E21B 41/00](#). Timers and actuators.

### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

|  |                            |
|--|----------------------------|
| Power stations, adaptations for drilling wells | <a href="#">F03B 13/00</a> |
| Fuel cells; Manufacture thereof                | <a href="#">H01M 8/00</a>  |

## Special rules of classification within this group

The technical field [E21B](#) is an application field, wherein many different tools performing various functions find use. Care should be taken not to classify in [E21B 41/00](#) documents describing methods or apparatus marginally related to oil and gas drilling and production for which no suitable class in [E21B](#) can be found. Such documents should instead be classified in the groups corresponding to their specific function.

## E21B 43/00

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

### Definition statement

*This subclass/group covers:*

Methods and equipment for completion of wellbores and control and improvement of production.

### References relevant to classification in this group

*This subclass/group does not cover:*

|  |                              |
|--|------------------------------|
| Installations for obtaining or collecting drinking water or tap water from underground | <a href="#">E03B 3/06</a>    |
| Survey of wellbore pump systems  | <a href="#">E21B 47/0007</a> |
| Obtaining oil-bearing deposits or soluble or meltable materials by mining techniques   | <a href="#">E21C 41/00</a>   |
| Production methods applicable only to water  | <a href="#">E03B</a>         |

### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

|           |                           |
|-----------|---------------------------|
| Pumps     | F04                       |
| Jet pumps | <a href="#">F04F 5/00</a> |

|                  |                            |
|------------------|----------------------------|
| Multiphase pumps | <a href="#">F04D 31/00</a> |
|------------------|----------------------------|

## Special rules of classification within this group

Enhanced recovery methods ([E21B 43/16](#)), methods for stimulating production ([E21B 43/25](#)) and methods of fracturing ([E21B 43/26](#)) are sometimes carried out on the basis of specific chemical compositions. In these cases, the use of those compositions is seen as a method carried out by chemists, and therefore classified respectively in [C09K 8/58](#), [C09K 8/60](#) and [C09K 8/62](#).

## E21B 43/01

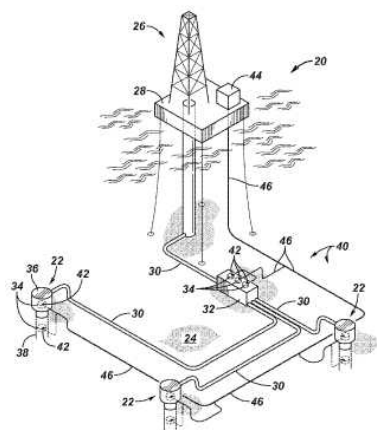
### Methods specially adapted for obtaining from underwater installations

#### Definition statement

*This subclass/group covers:*

Methods specially adapted for obtaining from underwater installations;

Subsea production equipment:



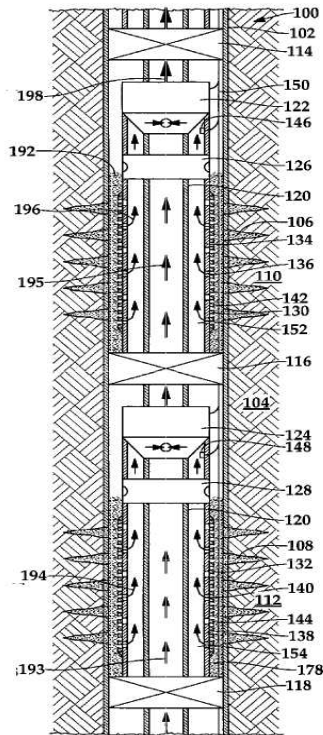
## E21B 43/02

### Subsoil filtering

#### Definition statement

*This subclass/group covers:*

Subsoil filtering; Production screens and gravelling;



## E21B 43/10

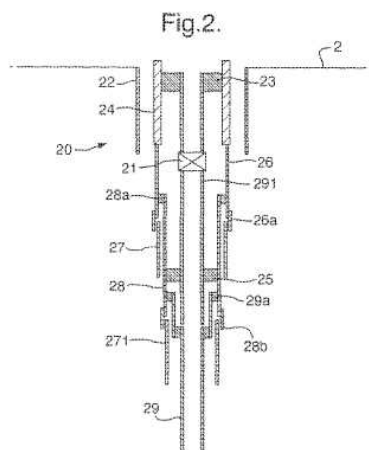
Setting of casings, screens, liners or the like in wells [N: or the like] in wells (driving or forcing casings into boreholes, simultaneously drilling and casing boreholes [E21B 7/20](#); setting of tools, packers or the like [E21B 23/00](#); suspending casings in well heads [E21B 33/04](#) )

### Definition statement

*This subclass/group covers:*

Setting of casings, screens, liners or the like in wells;

Running in and installation of tubulars, expandable tubulars:





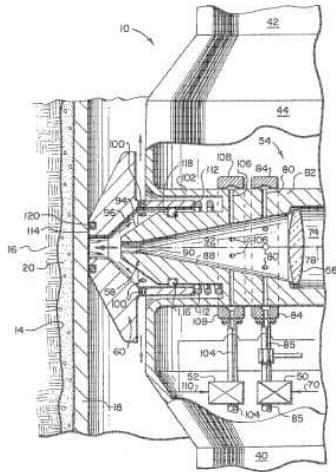
## E21B 43/11

### Perforators; Permeators

#### Definition statement

*This subclass/group covers:*

Perforators and guns, including details about construction, ignition, communication and placement.



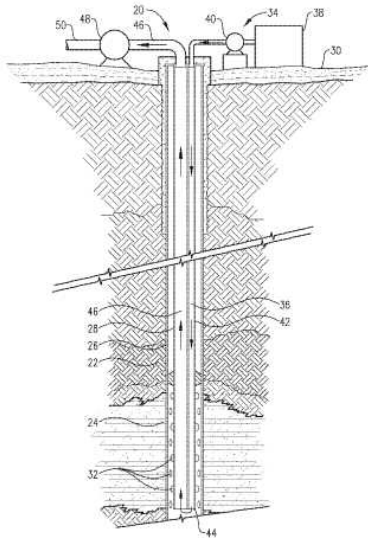
## E21B 43/12

**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](#) )**

#### Definition statement

*This subclass/group covers:*

Production pumps, lifting wellbore fluids, production chokes:



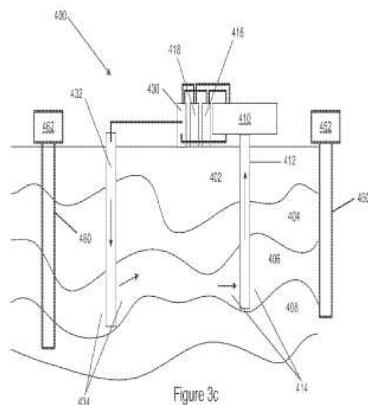
## E21B 43/16

Enhanced recovery methods for obtaining hydrocarbons (fracturing [E21B 43/26](#); obtaining slurry [E21B 43/29](#); reclamation of contaminated soil in situ [B09C](#); [N: chemical compositions therefor [C09K 8/58](#) ])

### Definition statement

*This subclass/group covers:*

Increasing the fraction of original oil recovered in place in a reservoir, including waterflooding, chemical flooding, gas injection, and thermal methods:



## E21B 43/25

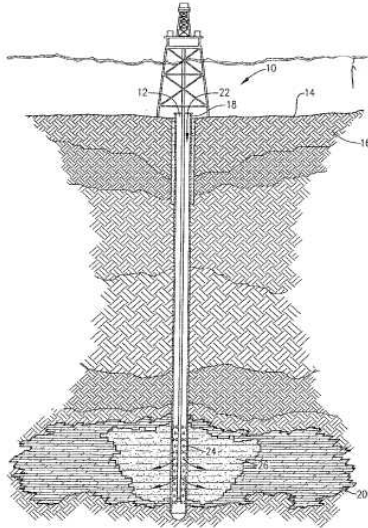
Methods for stimulating production (dump bailers [E21B 27/02](#); vibration generating arrangements [E21B 28/00](#); by vibrating earth formations [E21B 43/003](#)) chemical compositions

therefor [C09K 8/60](#) )

### Definition statement

*This subclass/group covers:*

Treatment to restore or enhance the permeability of a well, typically hydraulic fracturing treatments and matrix treatments (acidizing):



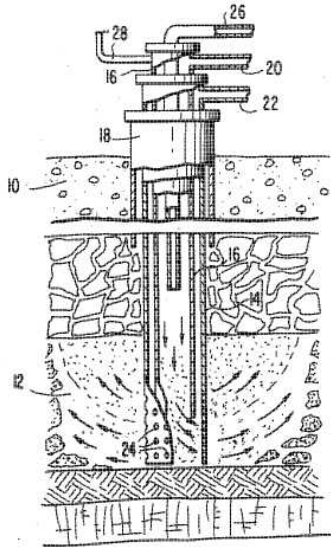
### E21B 43/28

Dissolving minerals other than hydrocarbons, e.g. by an alkaline or acid leaching agent ([E21B 43/241](#) takes precedence; [N: using steerable or laterally extendable nozzles [E21B 43/292](#) ])

### Definition statement

*This subclass/group covers:*

Production of minerals other than hydrocarbons by dissolving them in situ with a dissolving agent:



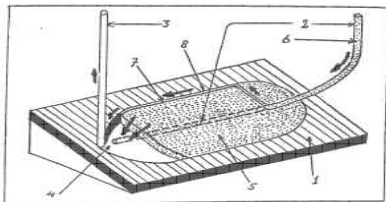
## E21B 43/295

**Gasification of minerals, e.g. for producing mixtures of combustible gases ([E21B 43/243](#) takes precedence)**

### Definition statement

*This subclass/group covers:*

Obtention of combustible gas from mineral bodies, usually from coal underground.



### Glossary of terms

*In this subclass/group, the following terms (or expressions) are used with the meaning indicated:*

|                  |  |
|------------------|--|
| Coal underground | A method for exploiting poor-quality mineral and thin seams by burning the mineral in place to produce combustible gas which can be burned to generate power or processed into chemicals and fuels |
|------------------|--|

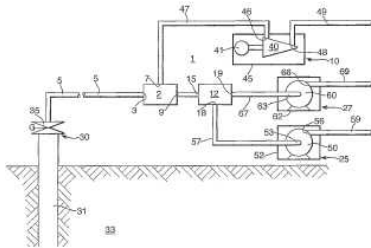
## E21B 43/34

Arrangements for separating materials produced by the well (separating apparatus per se, see the relevant subclasses)

### Definition statement

*This subclass/group covers:*

Separation of materials produced by the well:



## E21B 44/00

Automatic control systems specially adapted for drilling operations, i.e. self-operating systems which function to carry out or modify a drilling operation without intervention of a human operator, e.g. computer-controlled drilling systems (for non-automatic drilling control, see the operation controlled; automatic feeding from rack and connecting of drilling pipes [E21B 19/20](#); controlling pressure or flow of drilling fluid [E21B 21/08](#); 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 [E21B 47/12](#) )

### Definition statement

*This subclass/group covers:*

Methods and devices such as sensors for monitoring drilling operations and for controlling the drilling operation in response to the information obtained:



## Definition statement

*This subclass/group covers:*

Sensors or devices for obtaining data relative to the wellbore itself. Means for sending information from the well to the surface or from the surface into the well.

## Relationship between large subject matter areas

[E21B 47/00](#) includes a wide range of measurements of very different nature. In case the disclosure relates to the specific construction or functioning of a sensor or measuring method, classification in one of the subclasses of G01 as specified in the subgroups should be considered.

Measurements of fluid properties as they flow into the wellbore are classified in [E21B 47/10](#), but devices and methods for obtaining fluid samples are classified in [E21B 49/08](#).

Telecommunication techniques used in an oilfield but other than between wellbore and surface, such as to communicate data from a plurality of producing wells to a centralised location, should not be classified in [E21B 47/12](#), but in the corresponding group relative to its specific application, in this example oil production, if they have an influence in the operation of the production control. If a document mentions only the application to an oilfield or the like, and no specific application in an oilfield operation, but only the details of a communications system are disclosed, that document should be classified in [H04L](#).

## References relevant to classification in this group

*This subclass/group does not cover:*

|  |                            |
|--|----------------------------|
| Testing of formations and obtaining samples of fluids or of borehole walls | <a href="#">E21B 49/00</a> |
| Monitoring pressure or flow of drilling fluid                              | <a href="#">E21B 21/08</a> |

## Informative references

*Attention is drawn to the following places, which may be of interest for search:*

|   |                             |
|---|-----------------------------|
| Details, e.g. power supply systems for well logging instruments | <a href="#">G01V 11/002</a> |
| Geophysical logging   | <a href="#">G01V</a>        |

## Special rules of classification within this group

Documents are classified in [E21B 47/00](#) if they disclose a specific application in a downhole environment.

Commonplace measurements such as temperature or pressure should only be classified in [E21B 47/06](#) if specific measurement techniques are disclosed, or if the temperature or pressure data is relevant for the execution of another operation.

## E21B 49/00

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

### Definition statement

*This subclass/group covers:*

### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

|                     |                           |
|---------------------|---------------------------|
| Sampling in general | <a href="#">G01N 1/00</a> |
|---------------------|---------------------------|