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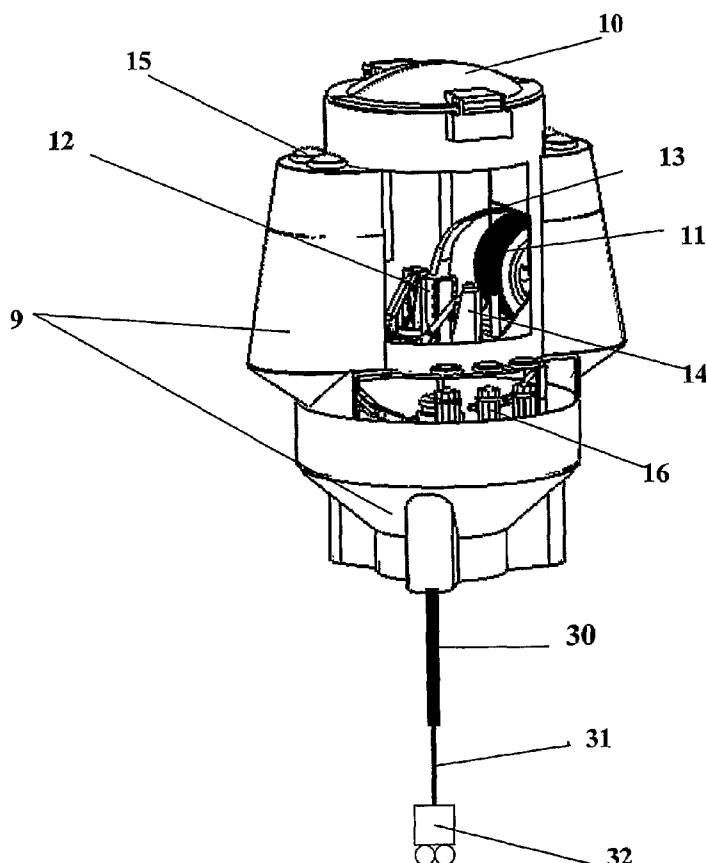
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(54) Title: SEABED RIG WITH COILED TUBING



(57) Abstract: A drilling rig device (7) situated on or near the seabed (8), where the drilling rig (7) is provided with a coiled tubing drum (11) and a feeder device (12) arranged to move coiled tubing (13) into and out of a borehole (30).



For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

SEABED RIG WITH COILED TUBING

This invention regards a drilling rig on the seabed. More particularly, it regards a drilling rig situated on the seabed, and where the drilling rig is provided with a coiled tubing drum and a feeder device for coiled tubing, the feeder device being arranged to move the coiled tubing into and out of a borehole.

As is well known, oil and gas deposits in the earth's crust are produced by drilling a hole down to the deposits, allowing the oil and gas deposits to be drained to the surface.

The equipment used to drill holes in the earth's crust chiefly comprises a drilling derrick in which is arranged a wire-based hoisting system to lift and lower drill pipes. In addition to this, auxiliary equipment is used to handle drill pipes and to set casing in the borehole.

When oil and gas deposits are recovered from deep waters, floating or fixed platforms equipped with the necessary drilling equipment are used. These platforms are relatively large and costly structures.

Besides the actual drilling equipment, there must also be provided a marine riser between the platform and the seabed in order to circulate drilling mud during drilling. Floating platforms must also be provided with heave compensators to
5 accommodate the wave motion of the platform relative to the seabed.

An alternative to drilling from floating drilling platforms is to place the drilling rig directly on the seabed, thus avoiding the need for large and expensive platforms.

10 Today's oil industry has developed a great deal of advanced equipment for remote controlled subsea operations. This technology is available and can be used during a remote controlled drilling operation where the drilling equipment is placed directly on the seabed.

15 Furthermore, it is necessary to meet the relatively strict requirements set by the authorities in connection with environmental pollution and the zero discharge target.

Prior art does not provide a solution to these problems in connection with drilling rigs situated on the seabed.

20 The object of the invention is to remedy or reduce at least one of the drawbacks of prior art.

The object is achieved in accordance with the invention, through the features stated in the description below and in the following claims.

A drilling rig in accordance with the invention is situated on the seabed, and is characterized in that it is provided with a coiled tubing drum and a feeder device for coiled tubing, the feeder device being arranged to move the coiled
5 tubing into and out of a borehole.

The coiled tubing drum is a complementary fit to guides attached to the drilling rig. The coiled tubing drum, which is arranged to be hoisted between the drilling rig and a surface vessel, is guided into the correct position on the
10 drilling rig by the guides.

Typically the drilling rig is provided with at least a first automated handling means arranged to operate at least one of the feeder device and the coiled tubing drum.

At a level below the coiled tubing drum the drilling rig is
15 provided with at least a second automated handling means arranged to handle tools and components between a tool cartridge and the coiled tubing. The tool cartridge is rotatably supported.

Most preferably the drilling rig is enclosed in an enclosure.
20 The enclosure is provided with closable openings to sluice in equipment such as the coiled tubing drum and tool cartridges.

Drilling rig operations may be controlled from a surface vessel, as the drilling rig communicates with the surface vessel via a power and control cable.

25 The drilling rig is also provided with equipment for controlling the well during drilling. Besides the actual

drilling and handling automates, there are installed drill fluid pumps, hydraulic aggregates and also other auxiliary equipment required to carry out the drilling operation.

A drilling rig according to the invention provides a solution
5 for remote-controlled execution of drilling operations by means of a drilling unit situated on the seabed. Use of the device according to the invention makes it possible to achieve a considerable reduction in costs, compared with the use of large floating or fixed installations where the
10 drilling equipment is located above sea level.

The invention will also make the operation less weather-dependent and will allow drilling near the rim of the Arctic ice.

Using coiled tubing instead of screwed pipe sections makes
15 the drilling much easier, among other things by eliminating the need for auxiliary pipe handling equipment, and the making and breaking of pipe joints.

The following describes a non-limiting example of a preferred embodiment illustrated in the accompanying drawings, in
20 which:

Fig. 1 is a schematic diagram of an enclosed drilling rig for coiled tubing drilling, with a connection to a surface vessel;

Fig. 2 is a schematic diagram of the drilling rig with
25 part of the enclosure removed to show a drill floor for coiled tubing drilling;

Fig. 3 shows a section of the drill floor with automated handling means and tool cartridges, plus well control equipment; and

Fig. 4 is a schematic drawing of an automated handling means for tool handling.

In the drawings, reference number 1 denotes a surface vessel equipped with lifting equipment 3 and 4 for deploying and retrieving the drilling rig 7 between the surface 2 of the sea and the seabed 8.

10 Power and control cables 5 run between the surface vessel 1 and the drilling rig 7, together with a hoisting cable 6.

The drilling rig 7 is provided with an enclosure 9, see Figure 2, which encloses all technical devices. The internal hydrostatic pressure of the enclosure 9 is slightly lower
15 than the hydrostatic pressure outside the enclosure 9, so as to prevent any contamination caused by drilling from escaping to the surrounding environment.

The upper portion of the enclosure 9 is provided with closable sluiceways 10 and 15.

20 Inside the enclosed drilling rig 7 there is arranged a coiled tubing drum 11 on which is wound coiled tubing 13, see Figure 2.

The coiled tubing 13 is passed through a feeder device 12 and down into a borehole 30, where a drill bit 32 connected to
25 the coiled tubing 13 is powered by a drill fluid motor 31.

Two first automated handling means 14 are provided for handling of tools and components (not shown), which means have a working range which extends to the feeder device 12 and the coiled tubing drum 11.

- ; The coiled tubing drum 11 comprises a base 18 and guides 19, see Figure 3. On a deck 23 located below the coiled tubing drum 11 there is positioned several tool and component cartridges 16, in addition to a second automated handling means 22 for handling of tools and components between the
-), cartridges 16 and a vertical section of the coiled tubing 13.

Equipment 20 for well control and sealing around the coiled tubing 13 is positioned on the deck 23 to prevent a blowout of fluid from the borehole 30.

- ; The second automated handling means 22, positioned on the drill floor 23, comprises a vertical string section 26 provided with bearing discs 24 at either end, see Figure 4. Thus the string section 26 is arranged for rotation about its vertical axis.

-), The string section 26 is provided with a vertically displaceable carriage 29, to which there is connected an arm 27 via hydraulic cylinders 25 and a hinge joint 33.

The arm 27 is provided with a gripping device 28 for handling tools and components (not shown).

C l a i m s

1. A drilling rig device (7) situated on or near the seabed (8), characterized in that the drilling rig (7) is provided with a coiled tubing drum (11) and a feeder device (12) arranged to move coiled tubing (13) into and out of a borehole (30).
2. A device in accordance with Claim 1, characterized in that the coiled tubing drum (11) is a complementary fit to guides (19) on the drilling rig (7), whereby the coiled tubing drum (11) is arranged to be hoisted between the drilling rig (7) and a surface vessel (1).
3. A device in accordance with Claim 1, characterized in that the drilling rig (7) is provided with at least a first automated handling means (14) arranged to operate at least one of the feeder device (12) and the coiled tubing drum (11).
4. A device in accordance with Claim 1, characterized in that the drilling rig (7) is provided with at least a second automated handling means (22) arranged to handle tools and components between a tool cartridge (16) and the coiled tubing (13).
5. A device in accordance with Claim 4, characterized in that the second

automated handling means (22) is located at deck (23) below the coiled tubing drum (11).

6. A device in accordance with Claim 1,
c h a r a c t e r i z e d i n that, when enclosed in an enclosure (9), the drilling rig (7) is provided with closable openings (10, 15) for sluicing in equipment.
7. A device in accordance with Claim 2,
c h a r a c t e r i z e d i n that the drilling rig (7) is arranged to communicate with the surface vessel (1) via a power and control cable (5).

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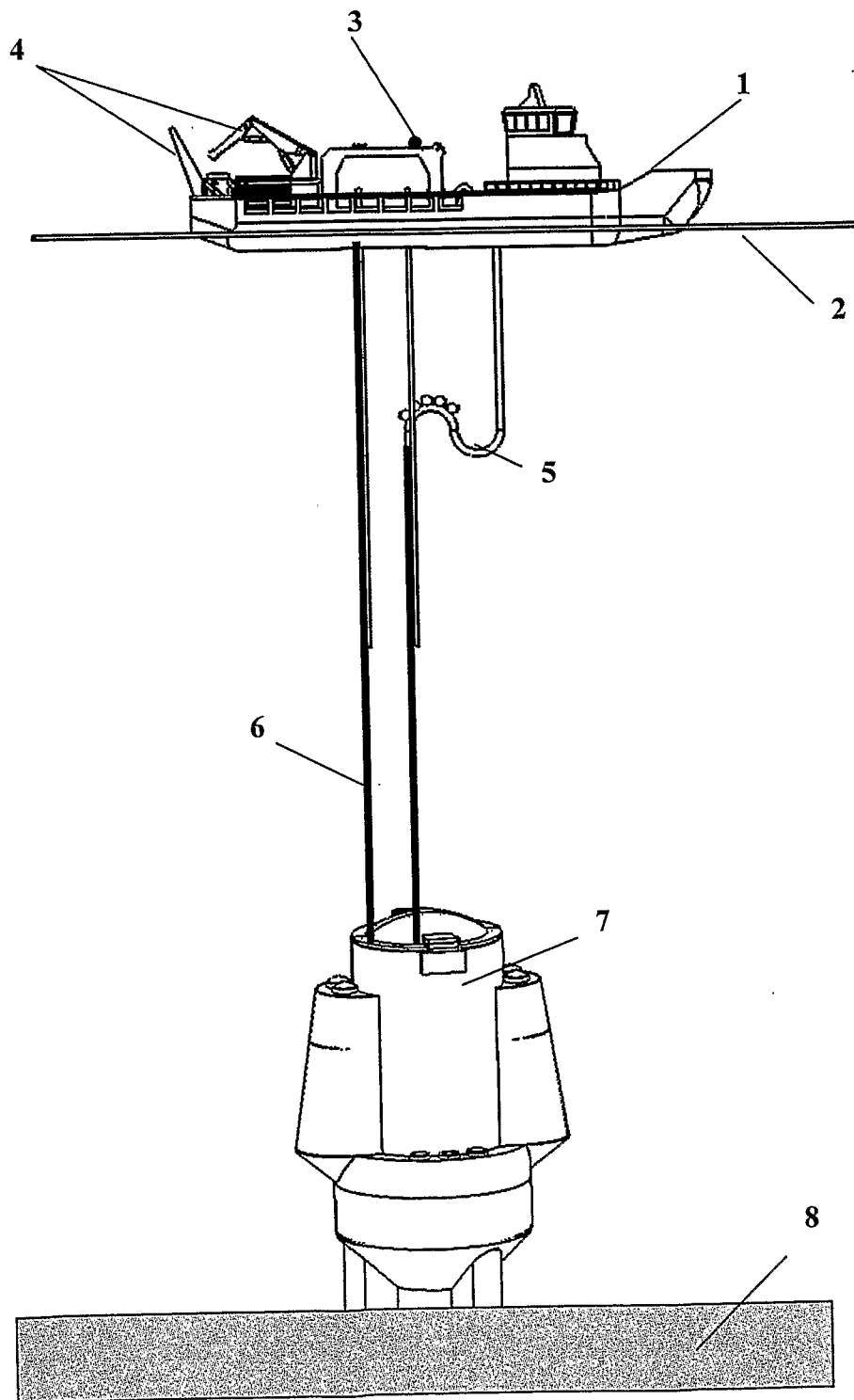


FIG 1

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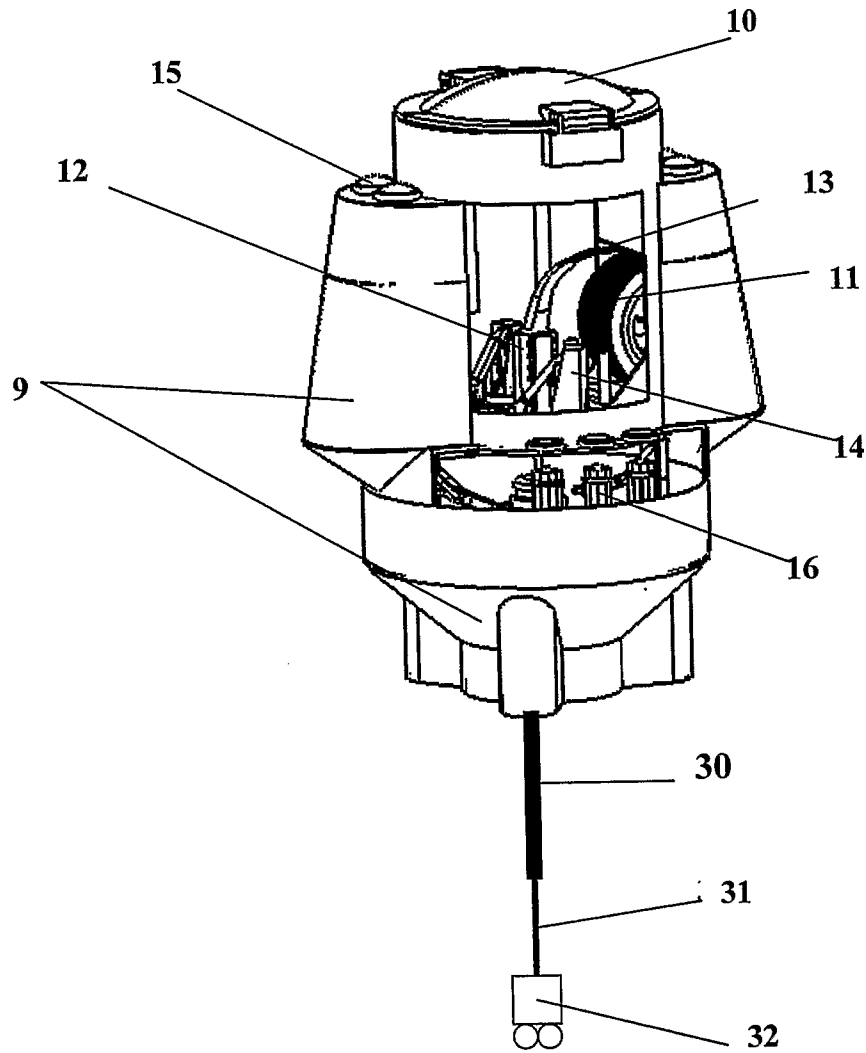


FIG 2

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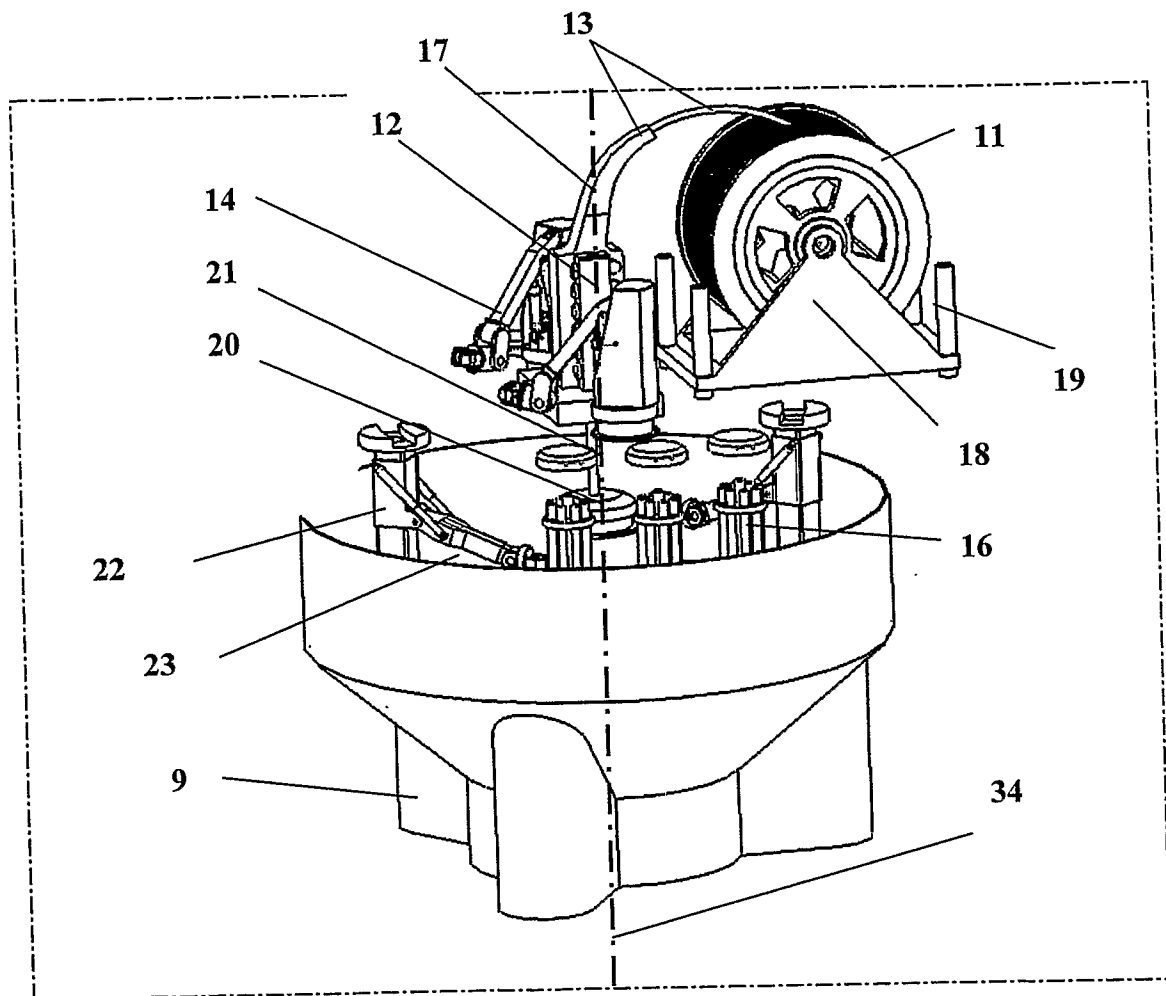


FIG 3

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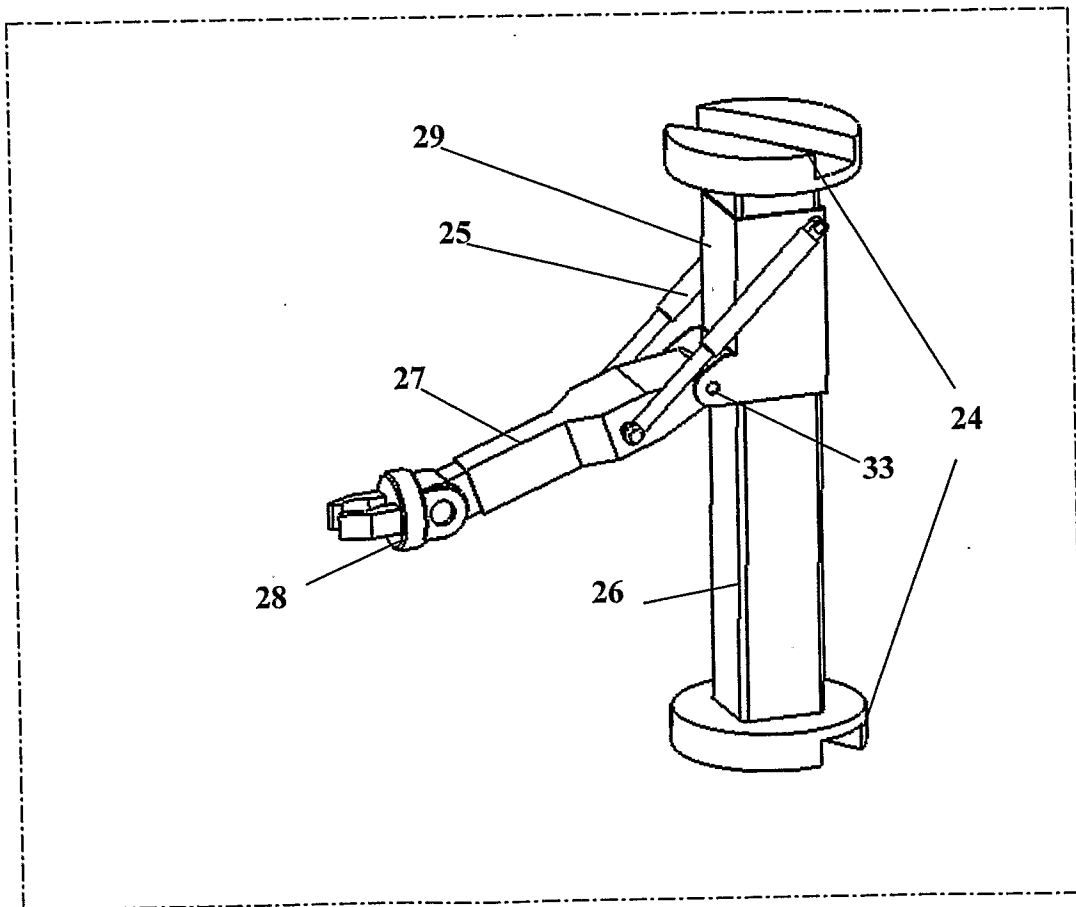


FIG 4

INTERNATIONAL SEARCH REPORT

International application No.

PCT/NO2007/000151

A. CLASSIFICATION OF SUBJECT MATTER

IPC: see extra sheet

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: E21B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 0214651 A1 (EXXONMOBIL UPSTREAM RESEARCH COMPANY), 21 February 2002 (21.02.2002), The whole document	1,4-7
Y	--	2,3
Y	WO 093625 03 (MARIS TDM LIMITED), 13 November 2003 (13.11.2003), The whole document	2-3
A	DE 2056064 A1 (ERNO RAUMFAHRTTECHNIK GMBH), 18 May 1972 (18.05.1972)	1-7
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☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/NO2007/000151**C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 20030106714 A1 (SMITH ET AL), 12 June 2003 (12.06.2003) -- -----	1-7

International patent classification (IPC)**E21B 15/02** (2006.01)**E21B 7/124** (2006.01)**E21B 19/22** (2006.01)**Download your patent documents at www.prv.se**

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Paper copies can be ordered at a cost of 50 SEK per copy from PRV InterPat (telephone number 08-782 28 85).

Cited literature, if any, will be enclosed in paper form.

INTERNATIONAL SEARCH REPORT

Information on patent family members

31/07/2007

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