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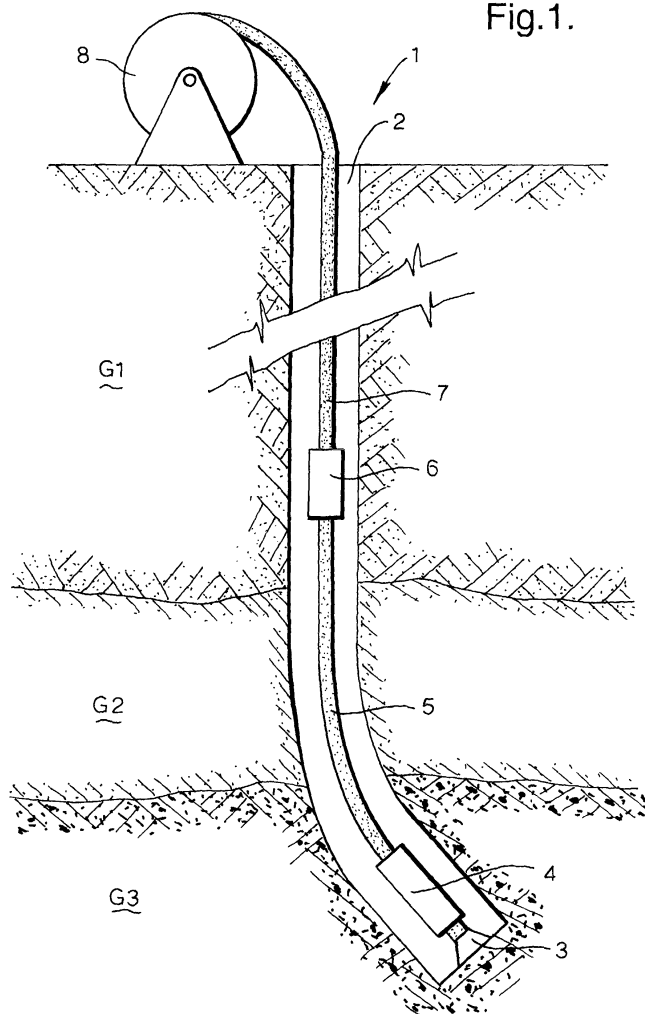
(72) Inventor: **The designation of the inventor has not
yet been filed**

(54) **Rotary coiled tubing**

(57) Drilling device for drilling a hole into geological formations, which drilling device comprises a drill head (13), a first motor (4,14) for driving the drill head, a first drill string (5,15) arranged with one end to the first motor

(4,14), a second motor (6,16) arranged to the other end of the first drill string (5,15) for rotary driving the first drill string, and a second drill string (7,17) arranged with one end to the second motor (6,16).

Fig.1.



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Description

[0001] The invention relates to a drilling device for drilling a hole into geological formations.

[0002] When drilling a hole through a sticky or depleted formation, there is a risk that due to friction and/or geological conditions, the drill string gets stuck. In standard practice, this risk is eliminated by reciprocating and/or rotating the drill string. This reduces the friction and borehole contact considerably and as a result reduces the risk that the drill string gets stuck.

[0003] However, when using coiled tubing, rotating of the coiled tubing is not possible as the coiled tubing is wound on a reel. Furthermore, coiled tubing has a limited torsional strength, so it is difficult to rotate a full coiled tubing drill string.

[0004] So, with coiled tubing only reciprocating of the drill string is currently possible. This has the disadvantage that the friction is reduced less than when the drill string is rotated. So the risk that the drill string gets stuck is larger than with a rotated drill string.

[0005] It is an object of the invention to provide a drilling device, which has a lower risk of getting stuck in a sticky or depleted formation.

[0006] This object is reached by a drilling device according to the invention, which drilling device comprises:

- a drill head;
- a first motor for driving the drill head;
- a first drill string arranged with one end to the first motor;
- a second motor arranged to the other end of the first drill string for rotary driving the first drill string; and
- a second drill string arranged with one end to the second motor.

[0007] The second motor causes just a part of the full drill string to rotate. By positioning this second motor before the sticky or depleted formation, it will rotate the first drill string which extends through this sticky or depleted formation.

[0008] In a preferred embodiment of the drilling device according to the invention the number of revolutions of the first motor deviate from the number of revolutions of the second motor. Especially when the direction of rotation of the first motor is opposite to the direction of rotation of the second motor, rotating the first motor with the same number of revolutions as the second motor, will cause the drill head to be stationary and thus not to perform any drilling action.

[0009] If the number of revolutions of the first and second motor deviates, then this risk is always avoided.

[0010] On the other hand, if the direction of rotation of both first and second motor is the same, then driving the second motor will speed up the drill head. The number of revolutions of the drill head is then the summation of both numbers of revolutions.

[0011] Another preferred embodiment of the drilling

device according to the invention comprises a third motor arranged to the other end of the second drill string for driving the second drill string and a third drill string arranged with one end to the third motor.

[0012] With this third motor it is possible to rotate two parts with different speeds of rotation and it is even possible to let the first drill string to be stationary, while the second drill string rotates and the third drill string is again stationary. Especially when the distance from the sticky geological formation to the bottom of the hole is quite large, this is a preferred embodiment as only the drill string, extending through this sticky geological formation is subjected to torsional stresses.

[0013] It is of course possible to install more than three motors in the drill string, such that for example for each sticky formation a rotating part of the drill string is provided.

[0014] In such a case it is preferred that the direction of the rotation of the second motor is opposite to the direction of rotation of the third motor. It makes it possible to have the first drill string to rotate at a low speed or even, when the number of revolutions of the second motor is equal to the number of revolutions of the third motor to be stationary.

[0015] In another embodiment of the drilling device according to the invention, at least one of the first, second and third drill strings is a modular drill string. This modularity makes it possible to locate the motors at desired depths of the hole.

[0016] In yet another embodiment of the drilling device according to the invention, at least one of the first, second and third drill strings is coated with a wear resistant coating.

[0017] These and other features of the invention will be elucidated in the following with reference to the accompanying drawings.

[0018] Figure 1 shows a first embodiment of a drilling device according to the invention.

[0019] Figure 2 shows a second embodiment of a drilling device according to the invention.

[0020] Referring to figure 1, a drilling device 1 is schematically shown. With this drilling device 1 a hole 2 is drilled into a number of geological formations G1, G2 and G3.

[0021] The device 1 has a drill head 3, which is driven by a first motor 4. This first motor 4 is connected to a first drill string 5. The first drill string 5 is in turn driven by a second motor 6, which is attached to a second drill string 7. This drill string 7 is wound around a reel 8. Because the second drill string 7 is wound around the reel 8, this second drill string 7 is stationary. So by driving the second motor 6, the first drill string 5 will be rotated. This will reduce any friction, which the second drill string 7 encounters in the geological formation G2.

[0022] The first motor 4 is used to drive the drill head 3. If the direction of rotation of both motors 4 and 6 are the same, the drill head 3 will be extra driven by the first motor 6.

[0023] In figure 2 a second embodiment 11 of the invention is shown. This second embodiment 11 is used to drill a hole 12 into again geological formations G1, G2 and G3.

[0024] The drilling device 11 has a drill head 13, which is driven by a first motor 14. This first motor 14 is arranged to a first drill string 15. The first drill string 15 is in turn driven by a second motor 16. To this second motor 16 a second drill string 17 is attached, which is again driven by a third motor 18. This third motor 18 is attached to a third drill string 19, which is wound around reel 20.

[0025] When the second and third motor 16 and 18 are rotated in opposite directions and with the same number of revolutions, then the second drill string will be rotated, while the first drill string 15 is stationary. So just the part, which extends through the sticky formations G2 is rotated in order to decrease friction, while the remaining drill strings 15, 19 are not subjected to torsional forces.

7. Drilling device according to any of the claims 1-6, wherein at least one of the first, second and third drill string is coated with a wear resistant coating.

5 8. The drilling device substantially as described hereinbefore with reference to the drawings.

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Claims

1. Drilling device for drilling a hole into geological formations, which drilling device comprises:

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- a drill head;
- a first motor for driving the drill head;
- a first drill string arranged with one end to the first motor;
- a second motor arranged to the other end of the first drill string for rotary driving the first drill string; and
- a second drill string arranged with one end to the second motor.

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2. Drilling device according to claim 1, wherein the number of revolutions of the first motor deviates from the number of revolutions of the second motor.

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3. Drilling device according to claim 1 or 2, comprising a third motor arranged to the other end of the second drill string for driving the second drill string and a third drill string arranged with one end to the third motor.

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4. Drilling device according to claim 3, wherein the direction of rotation the second motor is opposite to the direction of rotation of the third motor.

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5. Drilling device according to claim 4, wherein the number of revolutions of the second motor is equal to the number of revolutions of the third motor.

6. Drilling device according to any of the claims 1-5, wherein at least one of the first, second and third drill string is a modular drill string.

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Fig.1.

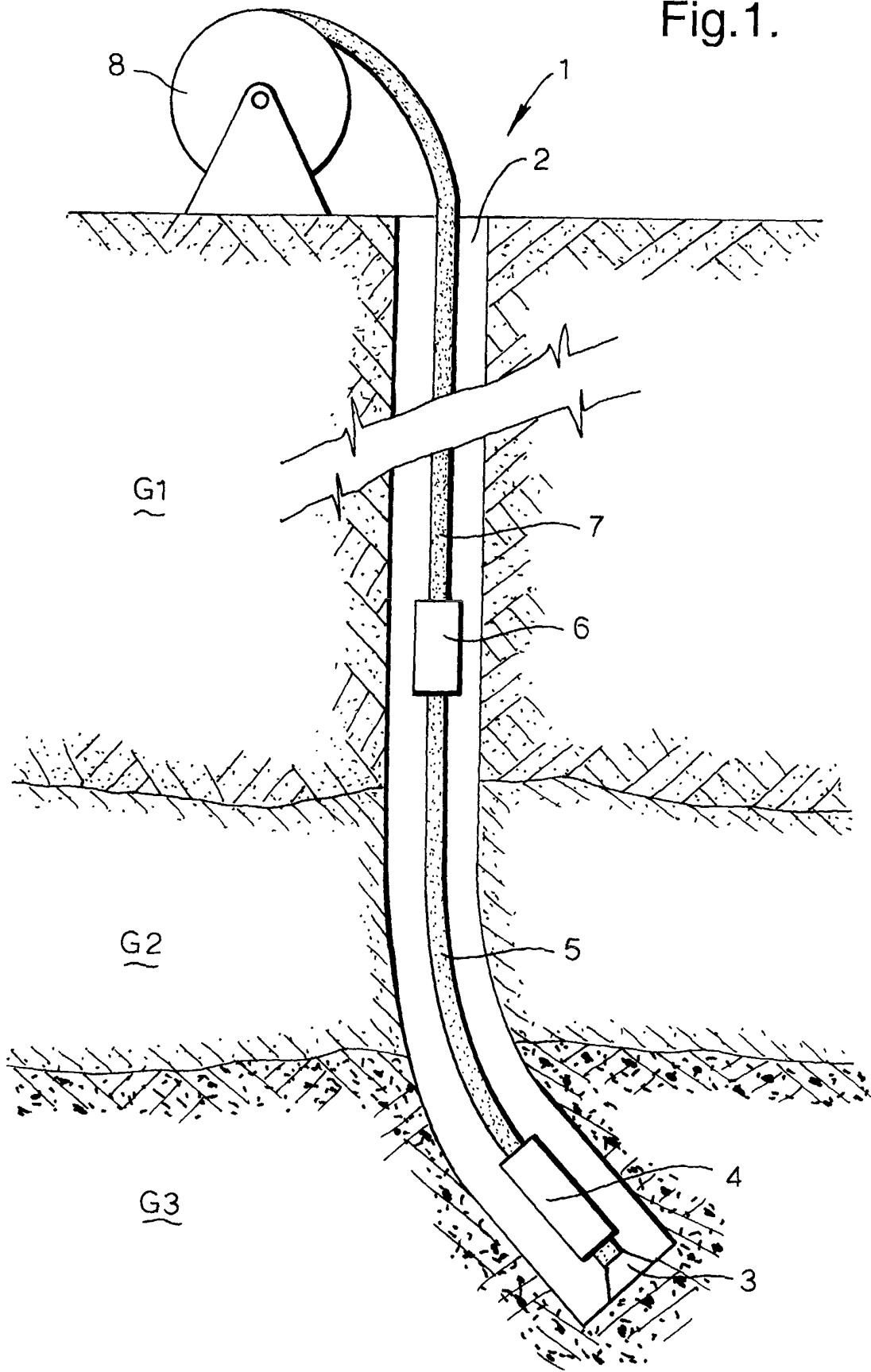
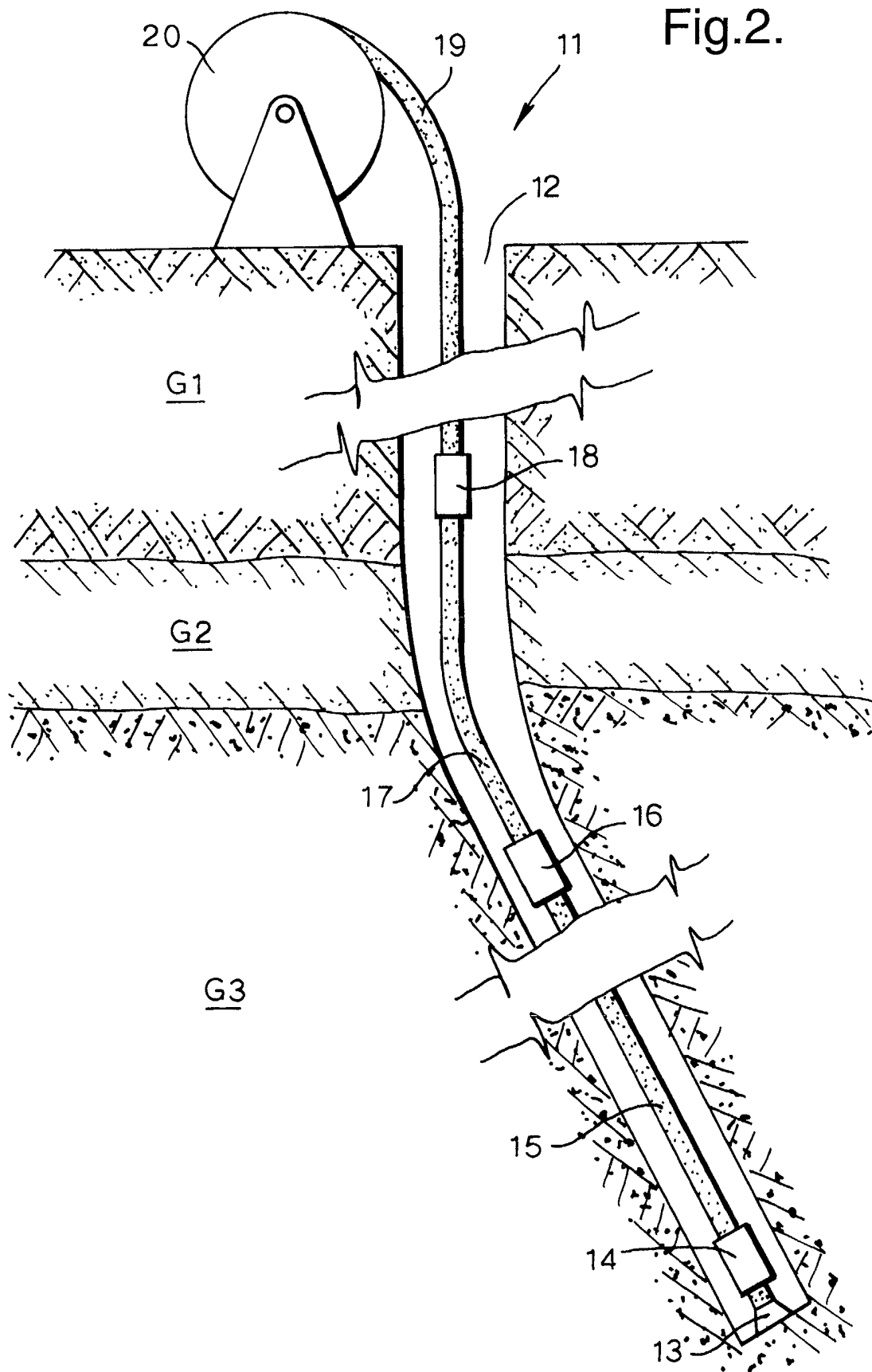


Fig.2.





European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 01 30 7623

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Y	EP 0 770 759 A (CAMCO DRILLING GROUP LTD) 2 May 1997 (1997-05-02) * page 5, line 18-20; figures 1-3 *	4,5	
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The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 5 March 2002	Examiner van Berlo, A
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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