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H. HJ. AHLGREN

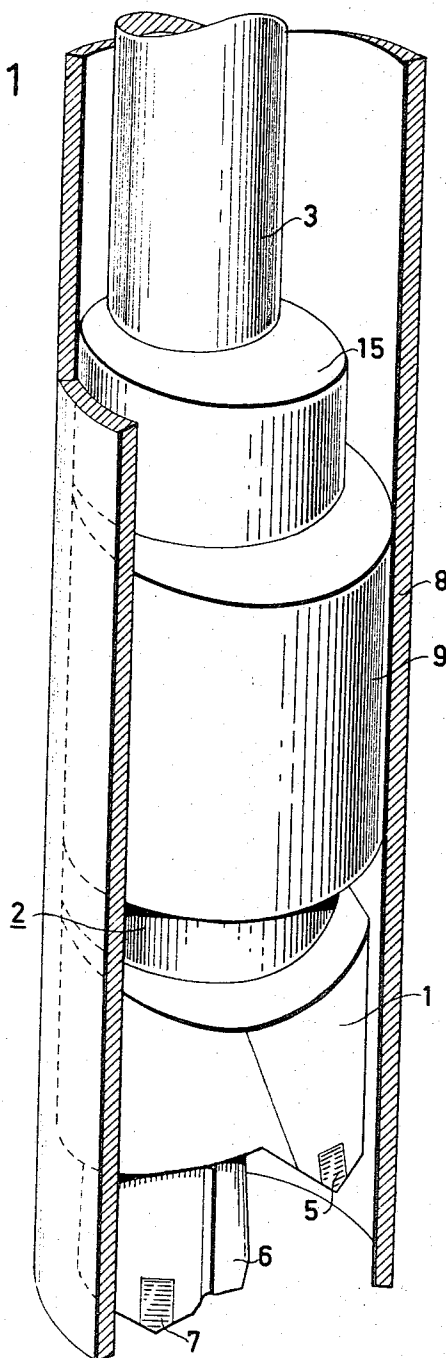
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DEEP DRILLS WITH ECCENTRIC BITS

Filed March 1, 1967

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Fig.1



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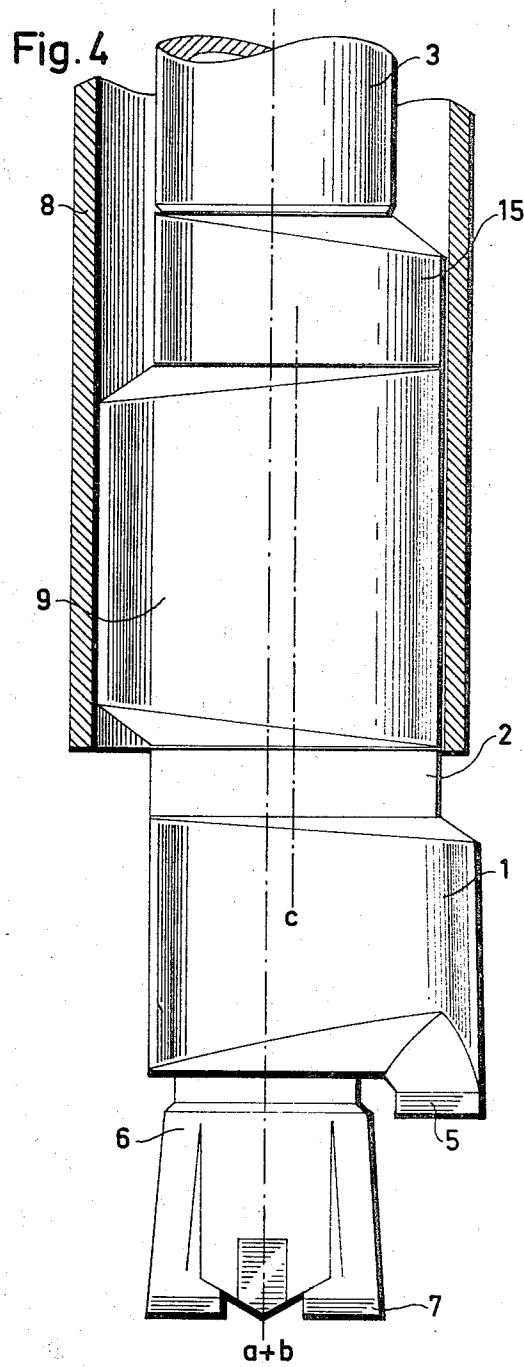
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DEEP DRILLS WITH ECCENTRIC BITS

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2 Claims. (Cl. 175-258)

ABSTRACT OF THE DISCLOSURE

A bit having an eccentric cutting edge and an eccentric sleeve rotatable through 180° about an upper portion of the bit to move the cutting edge laterally to a drilling position under the lower edge of a lining tube or to move the eccentric cutting edge under the interior of the tube thus permitting upward withdrawal of the bit.

The present invention relates to an improvement in deep drills with an eccentric bit adapted to be followed, during drilling, by a tube serving as a lining for the drilled hole. For this purpose an eccentric sleeve is mounted for rotation on an upper portion of the bit, the most eccentric portion of the sleeve being adapted to lie, during drilling, diametrically opposite the most eccentric portion of the active end portion of the bit and which sleeve, for the purpose of enabling the bit to be drawn up through the tube, is adapted to be rotated relative to said upper portion through 180°. The said upper portion may possibly comprise a joining rod, screwed into the drill bit.

Prior art drills of this type, more closely described in U.S. Patent 3,174,563, are encumbered with the disadvantage that, particularly in the case of certain ground characteristics, drilled particles of material enter the lining tube between its wall and the portion of the eccentric sleeve which is not provided with the eccentric portion, designed as a guiding lug; the said material thus making it difficult to rotate the eccentric sleeve relative to the drilling rod, to enable the tube to be drawn up through the drill.

The object of the present invention is to remove the above disadvantage of prior art deep drills, which is achieved in that the deep drill according to the invention has obtained the characteristics disclosed in the claims.

The invention will be more closely described with reference to the accompanying drawings, where

FIG. 1 shows in perspective and partly in section the lower portion of a deep drill according to the invention with a drill bit drawn into the lining tube,

FIG. 2 shows the same with the drill bit in drilling position and

FIGS. 3 and 4 show in side view and partly in section the deep drill in the same position as FIGS. 1 and 2 respectively.

The deep drill in the shown embodiment is intended for impact drilling in which the drill is rotated, in this case counterclockwise, approximately one tenth of a revolution in each impact, and is provided with an eccentric end portion 1, active during drilling, of a drill bit 2 known per se. The drilling rod comprises joining rods connected with joining sleeves up to a shank adapter secured in the drilling apparatus. The lower joining sleeve 3 is screwed onto a pin member 4 made integral with the drill bit 2 and provided with a left-hand thread.

The active end portion 1 of the eccentric bit is provided, in a manner known per se, with a cutting edge 5 of hard metal. In this instance the drill is also provided with a pilot drill bit 6 with four cutting edges 7. The pilot bit, however, is not part of the invention proper since in this respect the drill can just as well be without the same.

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For the purpose of lining the drill hole a lining tube 8 follows the drill during drilling and moves downwards in time with the drill. The eccentric portion of the drill bit projects outside the circumference of the lining tube so that a hole large enough for the lining tube is made. To allow the drill to be drawn up out of the tube the said eccentric portion must consequently be displaced in towards the tube centre. This is effected with an eccentric sleeve 9, which is rotatably mounted 180° around an upper portion 10 of the drill bit 2. The sleeve 9 is provided with an inwardly projecting lug 11 engaged in a peripherally, 180° extending groove 12 in portion 10. The groove 12 is connected with the end face 13 of the portion 10 by means of an axially extending groove 14, whereby the lug 11, when assembling the drill, can be arranged in the groove 12. A locking sleeve 15 abutting the end face 13 fixes the eccentric sleeve 9 axially and builds an abutment surface for the joining sleeve 3. The drill is also provided with rinsing holes (not shown) which connect the centre channel of the drill with suitable positions on the drill bit and remaining portions for flushing away earth, powdered stone and other drilling products.

The eccentric sleeve 9 has a cross section which completely fills the circular lining tube 8, but because the sleeve 9 is eccentrically mounted relative to the drill axis *a*, the latter can be moved relative to the lining tube axis *b* (see FIG. 3). The portion 10 has a centre axis *c* lying centrally between the drill axis *a* and the tube axis *b*, when the most eccentric portion of the eccentric sleeve lies axially in line with the most eccentric portion of the active end portion 1 (FIG. 3) of the drill bit. Since on rotating the eccentric sleeve the tube axis *b* moves in a circular arc around the axis *c* the tube axis *b* will thus coincide with the drill axis *a*, when the most eccentric portion of the eccentric sleeve adopts a position diametrically opposed to the most eccentric portion of the active end portion (FIG. 4) of the drill bit. Rotation of the eccentric sleeve to drilling position occurs automatically on rotating the drill counterclockwise during drilling.

The portion, which has been designated as an upper portion 10 of the drill bit, naturally need not be made integral with the drill bit in general but can, as with the corresponding portions in the drill according to the aforementioned patent be connected by means of threaded joints with the drill bit, and is then called a joining rod.

The described arrangement removes the disadvantages described in the preamble, in that the eccentric sleeve, which completely fills the total cross section of the tube, prevents coarse drilling products from collecting therein and making rotation of the sleeve difficult. Furthermore, better guiding of the drill in the lining tube is obtained.

The invention is naturally not restricted to the described embodiment but, for instance can also be adapted to rotary drills.

I claim:

1. A deep drill with an eccentric drill bit adapted to be followed during drilling by a tube (8) serving as a liner for the drilled hole, an eccentric sleeve (9) being mounted for rotation on an upper portion (10) of the drill bit (2), the most eccentric portion of the sleeve being adapted during drilling to lie diametrically opposite the most eccentric portion of the active end portion (1) of the drill bit and which sleeve is adapted, for the purpose of enabling the drill bit to be drawn up through the tube, to be rotated relative to said upper portion (10) through 180°, characterized in that the eccentric sleeve (9) has a circular cross section which completely fills the lining tube (8) and is eccentrically mounted around an axis (*c*) which lies centrally between the drilling axis (*a*) and the lining tube axis (*b*) in the position where the eccentric portions of the eccentric sleeve (9) and the active end portion (1) lie axially in line with each other, whereby the drill axis

(a) and the lining tube axis (b) coincide when the eccentric sleeve (9) is rotated, during drilling, to its diametrically opposite position.

2. A deep drill as claimed in claim 1, characterized in that the eccentric sleeve (9) is provided with an inwardly projecting lug (11) adapted to move in a peripherally, 180° extending groove (12) in the upper portion (10) of the drill bit (2) on which the eccentric sleeve (9) is mounted.

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