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(54) **Drill point and ground drilling device.**

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FR-A- 781 314
FR-A- 1 451 807
GB-A- 1 115 796
US-A- 3 344 871

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Description

The invention relates to a drill point having an outer surface with a helical shape and a device for carrying out well drilling provided with such a drill point.

Such a drill point and device are known from FR-A-781.314, wherein the known drill point has a conical outer surface.

The drawback of the known device and drill point is that it requires a comparatively great deal of energy to force the known drill point into the ground by strokes of driving means, and that a great deal of noise, as much as 120 - 130 dB, is produced as a result of the large amount of energy required, which, even when ear mufflers are used, constitutes a high auditive load for the operators, and that furthermore a lot of undesirable vibrations are produced.

The object of the invention is to provide a drill point and a device whereby the drill point is effectively driven into the ground, and whereby less noise and fewer vibrations are produced.

In order to accomplish that objective the drill point according to the invention has features as recited in claim 1 and the device according to the invention has features as recited in claim 2. The advantage is that as a result of the combination of the substantially continuous rotary motion, with a substantially constant angular velocity, and the specified helical profile of the outer surface of the drill point, said drill point is rotated into the ground, instead of being hammered, as a result of which considerably less noise and fewer vibrations are produced. When an equal amount of mechanical energy is communicated to the means for driving the drill point into the ground, it is surprisingly found that in comparable circumstances it is at the same time possible to drill substantially deeper than with conventional devices. For environmental reasons this constitutes a considerable advantage in circumstances where in particular the structure of the higher ground layers, also after detonation of an explosive charge to be provided near the drill point in the borehole, should remain intact as much as possible, in order that the soil examination affects the ground water regime is as little as possible.

The means for driving the pipe into the ground is preferably a silent and commonly used hydraulic motor.

In a preferred embodiment of the device according to the invention the pipe has two projections, and the drill point has two corresponding recesses.

In practice this has appeared to be the most satisfactory embodiment, which in addition can be produced at a minimal cost price.

The invention will be further explained hereafter, with reference to the drawing, in which like numerals indicate like elements. In the drawing:

Figure 1 is a possible embodiment of the subterranean end of the pipe for use in the device according to the invention;

Figure 2 is an elevational view of the drill point which is to co-operate with the subterranean end of the pipe according to Figure 1;

Figure 3 is a bottom view of the specific helical extension of the outer surface of the drill point of Figure 2; and

Figure 4 is a partial right-hand side elevational view of the drill point of Figure 2.

Description of the Figures.

Figure 1 shows the bottom end of a pipe 1, said pipe 1, together with the drill point 2 illustrated in the Figures 2, 3 and 4, and the means (not shown) for carrying out the rotary motion of the pipe 1 and the drill point 2, forming part of the device for carrying out well drilling. The device comprises a hydraulic motor provided at the other end (not shown) of the pipe 1.

The pipe 1 is detachably coupled to the drill point 2, via projections 3 provided on the subterranean end of the pipe 1 and recesses 4, provided in the drill point 2, which correspond with said projections 3. A cylindrical part 6, provided with O-rings 5, of the drill point 2 fits into the pipe 1, whereby the projections 3 and the corresponding recesses 4 engage one another. By activating the hydraulic motor the drill point 2 is driven into the ground, after which the drill point 2 remains behind in the ground as a lost drill point 2.

The drill point 2 has a substantially conical outer surface 7. In the right-hand side elevational view of the drill point of Figure 2, which is shown in Figure 4, the outer surface 7 is even exactly conical, when seen in elevational view. However, when studying the extension of the section of the outer surface 7, in the direction of the point 8 of the drill point 2, in the elevational view of Figure 2 and the bottom view of Figure 3, in particular in Figure 2, said outer surface 7 appears to be more strongly contracted than can be derived from Figure 4. This stronger contraction, when seen in the elevational view of Figure 2, results from the helical profile of the outer surface 7. Figure 3 shows a bottom view of the helical extension, which is difficult to illustrate in a drawing, of the outer surface 7 of the drill point 2 illustrated in Figure 2.

When the drill point 2 e.g. runs through two fingers, said drill point 2 will be displaced, as a result of the specific helical shape of the outer surface. This property, which is typical of the outer surface 7, is expressed in terms of pitch of the helical outer surface 7. Said pitch is such that when the drill point is moved along its axial length the displacement of the drill point will be in the range of 10 - 40°.

With an axial length which is generally determined by the required mechanical strength of the drill point 2, the pitch of the helical outer surface 7 is to be determined such that, with a certain rotary velocity of the drill point 2 and with certain expected local

soil conditions, the rotating drill point 2 is optimally adapted to the local soil structure and soil density.

Claims

1. A drill point (2) having an outer surface (7) with a helical shape, characterised in that the outer surface (7) in a first elevational side view (fig. 4) shows an exact conical shape, and in a second elevational view (fig. 2) shows a less conical shape which is stronger contracted in the direction of the tip (8), whereas the pitch of the helical outer surface (7) is such that when the drill point (2) is moved over its axial length its angular displacement is in the range of 10 - 40°.

2. A device for carrying out well drilling, said device containing a pipe (1) having a first end and a second end, a drill point (2) according to claim 1, which drill point (2) is detachably attached to the second end of the pipe (1), and rotary driving means coupled to the first end of the pipe (1), whereby the rotary driving means comprise a hydraulic motor being adapted to communicate a substantially continuous rotary motion to the drill point (2).

3. A device according to claim 2, whereby the second end of the pipe (1) has two projections (3) and the drill point (2) has two corresponding recesses (4).

4. A device according to claim 2 or 3, whereby the drill point (2) has a cylindrical part (6) fitting into the pipe (1), which cylindrical part (6) is provided with O-rings (5).

Patentansprüche

1. Eine Bohrspitze (2) mit spiralenförmiger Außenfläche (7), dadurch gekennzeichnet, daß die Außenfläche (7) in einer ersten perspektivischen Seitenansicht (Fig. 4) eine exakte konische Gestalt aufweist und in einer zweiten seitlichen perspektivischen Ansicht (Fig. 2) eine weniger konische Gestalt hat, die spitz in Richtung der Spitze (8) zuläuft, wobei der Gang der sprialenförmigen Außenfläche (7) so gewählt ist, daß wenn die Bohrenspitze (2) über ihre axiale Länge verstellt wird, deren Verdrehung im Bereich von 10 - 40° gelegen ist.

2. Ein Gerät zur Durchführung von bodenbohrungen, welches Gerät ein Rohr (1) mit zwei Enden umfaßt, eine Bohrspitze (2) nach Anspruch 1, wobei die Bohrspitze (2) lösbar an dem zweiten ende des Rohrs (1) befestigt ist, und ein rotierender Antrieb an das erste Ende gekoppelt ist, wobei der rotierende Antrieb einen hydraulischen Motor umfaßt, der in der Lage ist, die Bohrspitze (2) nahezu kontinuierlich drehen zu lassen.

3. Ein Gerät nach Anspruch 2, wobei das zweite Ende des Rohrs (1) mit zwei Nocken (3) versehen ist und die Bohrspitze (2) zwei entsprechende Einschnitte (4) aufweist.

4. Ein Gerät nach Anspruch 2 oder 3, wobei die Bohrspitze einen zylindrischen Teil (6) aufweist, der in das Rohr (1) paßt, wobei der zylindrische Teil (6) mit O-Ringen (5) versehen ist.

Revendications

1. Pointe de forage (2) à surface extérieure hélicoïdale (7), caractérisée en ce que la surface extérieure hélicoïdale (7) présente dans une première perspective de côté (fig. 4) un conoïde parfait et dans une seconde perspective (fig. 2) un conoïde mois parfait se terminant en pointe dans la direction de la pointe (8), le pas de la surface extérieure hélicoïdale (7) étant choisi de manière que lorseque la pointe de forage (8) est déplacée dans sa direction axiale, sa rotation est comprise dans le domaine de 10 à 40°.

2. Appareil de forage dans le sol comprenant un tube (1) à deux extrémités et une pointe de forage (2) selon la conclusion 1, la pointe de forage (2) étant montée à la seconde extrémité du tube (1) de manière à pourvoir être détachée de celui-ci, une propulsion rotative étant accouplée à la première extrémité, ladite propulsion rotative comprenant un moteur hydraulique apte à faire tourner la pointe de forage (2) quasi continuellement.

3. Appareil selon la revendication 2, la seconde extrémité du tube (1) étant pourvue de deux cames (3) et la pointe de forage (2) présentant de crans (4) correspondants.

4. Appareil selon la revendication 2 ou 3, la pointe de forage comprenant une partie cylindrique (6) s'emboîtant dans le tube (1), la partie cylindrique (6) étant pourvue de bagues en O (5).

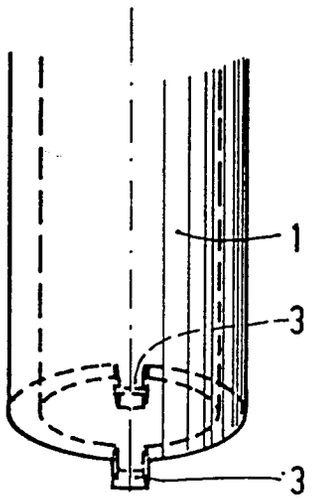

FIG. 1

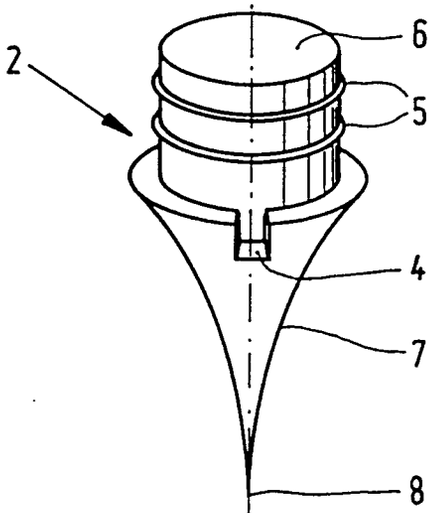

FIG. 2

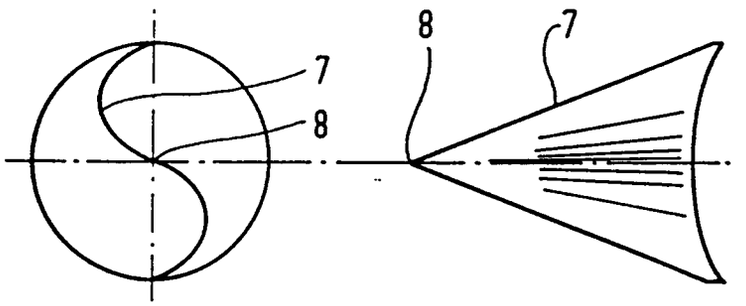

FIG. 3

FIG. 4