R. D. DODDS.

DEVICE FOR TAKING SAMPLES FROM WELLS.

APPLICATION FILED AUG. 12, 1919.

1,335,880.

Patented Apr. 6, 1920.

2 SHEETS—SHEET 1.

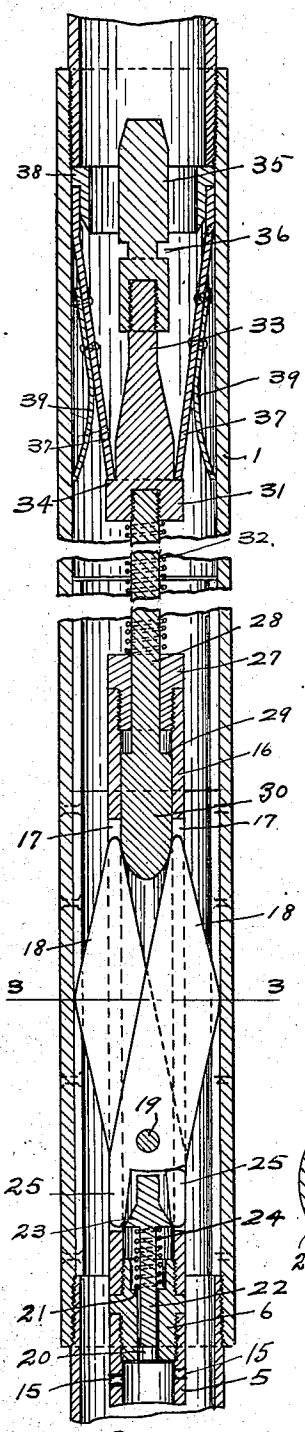


Fig. 1.

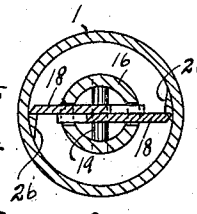


Fig. 3.

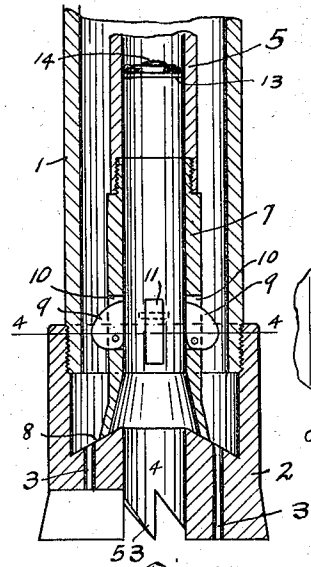


Fig. 2.

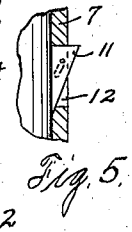


Fig. 5.

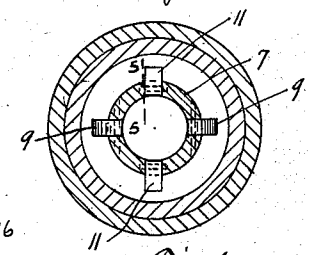


Fig. 4.

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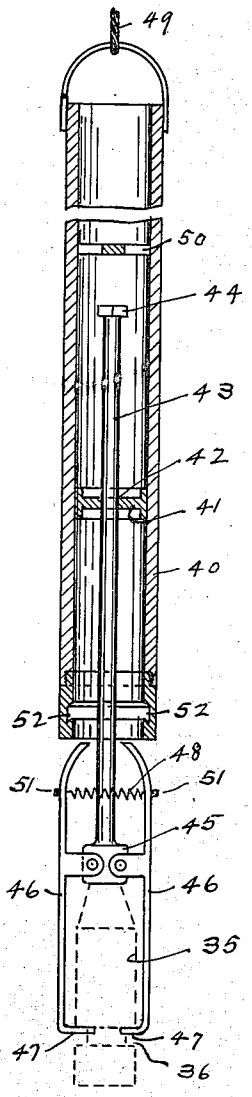


Fig. 6.

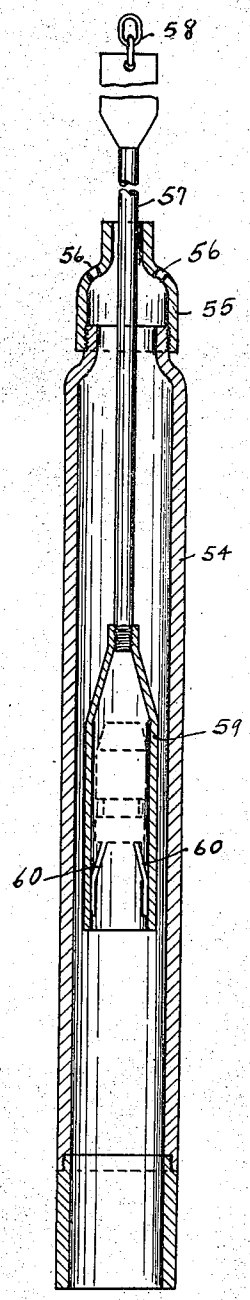


Fig. 7.

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DEVICE FOR TAKING SAMPLES FROM WELLS.

1,335,880. Specification of Letters Patent. Patented Apr. 6, 1920.

Application filed August 12, 1919. Serial No. 316,994.

To all whom it may concern:

Be it known that I, REDUS D. DODDS, a citizen of the United States, residing at Houston, in the county of Harris and State of Texas, have invented certain new and useful Improvements in Devices for Taking Samples from Wells, of which the following is a specification.

This invention relates to new and useful improvements in a device for taking samples from wells.

One object of the invention is to provide a device of the character described which has been specially designed for the purpose of obtaining samples of the formation through which the drill bit is passing, as the boring of the well progresses.

In drilling wells, particularly oil wells, it is usually desirable to obtain samples of the formation for the purpose of determining the presence or absence of oil, or other minerals; and the device herein described has been provided for the purpose of obtaining accurate samples of the formation through which the bit may pass and withdrawing the same to the surface for inspection during the drilling process.

With the above and other features in view, the invention has particular relation to certain novel features of construction, arrangement of parts and use, an example of which is given in this specification and illustrated in the accompanying drawings, wherein:

Figures 1, and 2, taken in combination, show a vertical sectional view of the device, Fig. 1, showing the upper portion thereof, and Fig. 2, the lower end thereof.

Fig. 3, is a transverse sectional view taken on the line 3—3 of Fig. 1.

Fig. 4, is a transverse sectional view taken on the line 4—4 of Fig. 2.

Fig. 5, is a fragmentary vertical sectional view taken on the line 5—5 of Fig. 4.

Fig. 6, is a vertical sectional view of the implement employed for lowering the device in the stem, and

Fig. 7, shows a vertical sectional view of a fishing tool for withdrawing the device from the well.

Referring now more particularly to the drawings, wherein like numerals of reference designate similar parts in each of the figures, the numeral 1 refers to a tubular drill stem, having the shoe 2, secured to the lower end thereof, and provided with the water passageways 3, 3, on each side. The shoe also has the vertical bore 4 therethrough, for the purpose to be hereinafter stated.

The numeral 5 refers to a tubular barrel into the upper end of which the internal collar 6 is threaded, and whose lower end has the detachable section 7, attached thereto, the lower end of said section being flared and resting upon the internal annular shoulder 8, of the shoe 3. The section 7 also has the opposing dogs, 9, 9, pivoted therein and which work through slots 10, 10, in said section, and also has the opposing vertically movable wedges 11, 11, which are slidably mounted in corresponding slots, 12, cut through the section 7, said slots 12 being arranged between the slots 10. Within the barrel there is a valve seat 13, which is controlled by the valve 14, and which permits the fluid to pass upwardly through the barrel and said fluid may pass thence out in the drill stem through the orifices 15, 15.

Threaded onto the upper end of the collar 6, there is a tubular anchor 16, having the oppositely disposed vertical slots 17, 17, through which the anchor blades 18, 18, project. The blades are pivoted to the anchor 16 at their lower ends by means of a bearing pin 19, which passes through said anchor and through alined bearings in the lower ends of the blades. The collar 6 has a central bearing 20, whose upper end is enlarged forming the annular shoulder 21. A stem 22 operates in the bearing 20 and the upper end of this stem is formed into a conical shaped head 23. Surrounding the stem 22 and interposed between the shoulder 21 and the head 23, there is a strong coil spring 24. The lower ends of the blades 18 are formed into fingers 25, 25, and the spring 24 normally holds the head 23 projected between said fingers 25, so as to hold the blades open and projected through the slots 17, as shown in Fig. 1, and riveted to the inner sides of the drill stem are the oppositely disposed vertical ribs 26, 26, which engage against said blades as the stem rotates and force the same to rotate therewith, thus driving the shoe 2. The upper end of the tubular anchor 16 carries the gland 27 through which the rod 28 extends. The lower end of this rod is enlarged, forming the annular shoulder 29 and the enlarged head 30, with sufficient clearance to allow it to move up and down without friction. Screwed upon

the upper end of the rod 28, there is the coupling 31, and surrounding the rod 28, and interposed between the gland 27, and the coupling 31, there is a strong coil spring 32. The coupling 31 is extended upwardly, forming the reduced neck 33, and the annular shoulder 34, and threaded upon the upper end of the neck 33, there is a cylindrical head 35, whose upper end is conical shaped and has the annular groove 36. Within the drill stem 1, are the fingers 37, 37, whose upper ends are hinged to the anchor 38, within said stem. The lower ends of the fingers 37 are free and are held in engagement with the shoulder 34 by means of the flat springs 39, 39, whose upper ends are secured respectively, to the fingers and whose lower ends are outwardly curved and rest against the inner wall of the drill stem 1. For the purpose of letting the device down in the well, I have provided an implement shown in Fig. 6, wherein the numeral 40 refers to a tubing having a spider 41, fixed thereon near its lower end with a central orifice 42, through which the rod 43 passes, said rod having an enlarged head 44, at its upper end to prevent its detachment from the spider. The lower end of this rod has a head 45, to the opposite sides of which are pivoted the levers 46, 46. The lower ends of said levers are turned inwardly forming the fingers 47, 47, provided to engage in the groove 36 of the head 35. The upper ends of the levers are arcuate in form, being curved inwardly, and interposed between them, is the push spring 48, which passes through the rod 43, and is provided to hold the fingers 47 in engagement in said groove. In order to lower the device into the well, the fingers 47 are engaged over the head as shown in Fig. 6, and the entire device then lowered, through the medium of a bailing line 49, attached to the tubing 40, the head 44 engaging against the spider 41. The device is lowered in the stem until the section 7 rests upon the annular shoulder 8, the lower end of said section being flared as above explained, so as to entirely surround the bore 4. The weight of the implement will then be sustained by the head 35, and is sufficient to overcome the resistance of the spring 32, and forces the shoulder 34 below the free ends of the fingers 37, and said free ends will be forced inwardly by the springs 39, to engage the shoulder 34, and at the same time, the lower end of the head 30 will be forced between the upper ends of the blades 18, to hold them locked in engaged position. As the tubing 40 is further lowered, it will pass over the upper ends of the levers 46, and force them together, disengaging the fingers 47, from the head 35. Thereupon the upper end of the rod 43 contacts against the stop 50, fixed thereabove in the tubing 40, and at the same time, the catches 51, 51, carried by the outer sides of the upper ends of the levers 48 engage in corresponding recesses 52, 52, in the inner sides of the tubing 40, and the implement may then be lifted out of the well, leaving the device in position for operation in the drill stem 1. When the drill stem is rotated, the ribs 25 will engage against the outwardly projecting edges of the blades 18, and will force the sample taking device to rotate with said stem. The lower end of the shoe is serrated forming sharp cutting teeth 52, and as the shoe progresses down through the formation, the core is formed which passes through the bore 4, up into the barrel. The surplus water admitted, passes up through the valve 14, and out through the water passageways 15.

In Fig. 7, I have shown a form of fishing tool for withdrawing the device from the drill stem. This tool consists of a casing 54, whose upper end is reduced forming a bearing 55, which is provided with fluid outlets 56, 56. A stem 57 operates through said bearing to the upper end of which a chain or the cable 58, is attached. To the lower end of the stem, there is secured a hood 59, of a size and form to fit over the head 35. Flexible fingers 60, 60, are secured at their lower ends to the inner side of the hood and their upper ends are free. The fishing tool is let down into the drill stem by means of the cable 58, and the casing 54 passes over the head and forces the fingers 37, 37, outwardly, disengaging them from the shoulder 34, and releasing the spring 32, which immediately operates to withdraw the head 30 from between the upper ends of the blades 18. The casing then passes on downwardly, engaging against the outer edges of the blades 18, and forcing them inwardly. The lower ends of the fingers 25 operate against the sloped sides of the head 23 which overcomes the pressure of the spring 24, and thereupon the fingers 60 engage under the head 35, as shown in Fig. 7.

Meanwhile, the lower end of the casing 54 has engaged the outwardly projecting sides of the dogs 9, and forces them into engagement with the core within the barrel, and has also engaged against the upper ends of the wedges 11, and forces them downwardly between the core and the barrel, thus securely holding said core in said barrel. The entire device may be then withdrawn from the drill stem by an upward pull on the cable 58, carrying with it, the samples thus secured in said barrel.

What I claim is:

1. The combination with a drill stem, having a core forming boring tool secured to the lower end thereof, and provided with a bore to receive said core, of a tubular bar-

rel, secured in said stem and when in operative position, resting upon said tool and whose lower end is provided with slots, interengaging means carried by the stem and barrel, respectively, whereby the barrel is forced to rotate with the stem, and dogs working through said slots, and a tubular casing adapted to fit over said barrel and to force said dogs into engagement with said core.

2. The combination with a drill stem, having a core forming boring tool secured to the lower end thereof, which is provided with a bore to receive the core, of a tubular barrel secured in said stem and when in operative position, resting upon said tool and whose lower end is provided with a plurality of slots, interengaging means carried by the stem and barrel, respectively, whereby the barrel is forced to rotate with the stem, dogs pivoted in some of said slots and vertically movable wedges working through the other slots and a casing adapted to fit over said barrel and to engage against said dogs and wedges to force them into engagement with the core, whereby said core may be withdrawn by the withdrawal of said barrel.

3. In a device of the character described, a tubular barrel, whose lower end is provided with slots, core engaging dogs pivoted in some of the said slots and core engaging wedges slidably mounted in the other slots.

4. In a device for taking samples, from wells, a tubular barrel, whose lower end is provided with slots, a core engaging dog pivoted in one of said slots and a core engaging wedge slidably mounted in the other slot and means for engaging said dog and wedge against the core within said barrel, whereby said core is withdrawn with said barrel.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

REDUS D. DODDS.

Witnesses:
F. W. HOMEYER,
M. LOCKWOOD.