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CORE DRILLING ATTACHMENT

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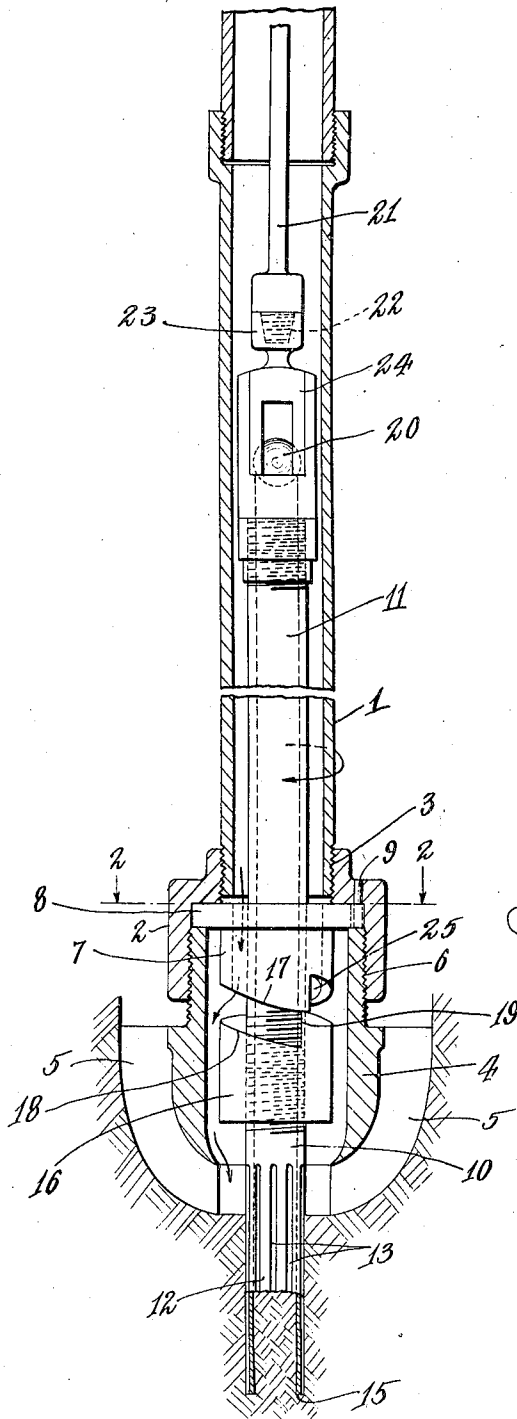


Fig. 1.

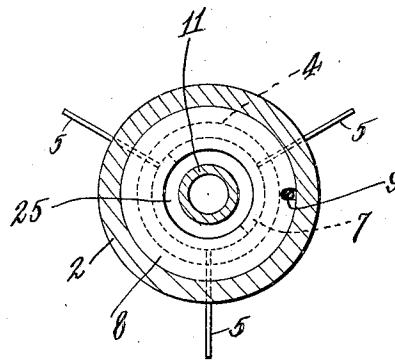


Fig. 2.

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CORE DRILLING ATTACHMENT

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This invention relates to core barrels such as used for taking cores in rotary drilling operations. As usually constructed the core barrel rotates with the rotating drill string and consequently, the core passing up into the core barrel tends to break up. This detracts from the value of the core as regards its capacity to give information as to the strata being drill through at the bottom of the well.

The general object of this invention is to produce a core taking drill or reamer which will operate in such a way as to take a core without rotation. In other words, one of the objects of the invention is to provide a construction which will hold the core in a substantially fixed position and cause it to penetrate the formation without rotation.

Further objects of the invention will appear hereinafter.

The invention consists of novel parts and combination of parts to be described hereinafter, all of which contribute to produce an efficient core drilling attachment.

A preferred embodiment of the invention described herein is only one of the many embodiments this invention may take and we do not wish to be limited in the practice of the invention, nor in the claims, to the particular embodiment set forth.

In the drawings:

Figure 1 is an ideal section through a core taking reamer embodying our invention.

Figure 2 is a cross section taken about on the line 2—2 of Figure 1.

Before proceeding to a detail description of the present embodiment of the invention, it should be understood that the principle of the invention may be applied in combination with a drill or a reamer. In operation of the device the core barrel remains substantially fixed against rotation. As the drill tubing rotates around the core barrel, automatic means delivers a blow or down jar to the barrel which will cause it to force its way down through the formation as the drilling progresses.

Referring to the parts illustrated in the drawing, 1 indicates the lower end of a drill string of tubing. In applying our invention

we provide a head 2 which is attached to the lower end of the drill string, for example, by means of screw threads 3. To this head a drill or reamer is attached. In the present instance, we attach a reamer having a substantially tubular casing 4 with substantially radially projecting blades 5 that ream the hole as the drill string rotates. This casing 4 may have a thread connection 6 with the interior of the head 2.

Within the casing 4 we mount a collar 7 which is fixed to rotate with the drill string. This collar has an integral disc-collar or flange on it. For this purpose we prefer to provide the collar 7 with a flange 8 held in place between the inner end of the casing 4 and the body of the head 2, being held against relative rotation by means of a pin 9.

The core barrel 10 extends up through the tubular casing 4 and its upper portion or body 11 is located in the lower end of the tubing above the head 2. The lower end of the core barrel is formed into a cutter 12 which is preferably provided with projections in the form of longitudinal flutes 13 on its exterior that prevent its rotation in rocky formation, and is brought to a cutting edge 15 at its lower end. At this point the inner diameter of the barrel is slightly less than it is further up in the barrel. This is done to insure that the core will move easily in the barrel after it passes up from the cutter portion 12.

The core barrel is provided with a rigid collar 16 which is located just below the collar 7. The adjacent faces of these collars 7 and 16 are correlated in such a way that as the collar 7 rotates with the tubing, the weight of the tubing will be supported on the collar 16 and the tubing will be slightly raised; after which the tubing is permitted to descend through a short distance, thereby delivering a jar or hammer blow to the core barrel cutter to drive it down through the formation.

In the present instance, we prefer to accomplish this by providing cam faces 17 and 18, respectively, on the collar 7 and the collar 16. These cam faces are formed so that deep notches 19 are formed at diametrically

opposite points. With the same arrangement illustrated, the rotation of the drill string 1 would be right hand, as indicated by the arrow. This would cause the cam 17 to climb up on the cam 18 and when the notch 19 is reached by the high point of the cam 17, the cam 16 will permit the cam 7 to descend a distance substantially equal to the vertical depth of the notch 19. In this way at each rotation or half rotation, a blow will be delivered to the core barrel. The collar 16 may be secured to the core barrel in any suitable manner, for example by a thread connection, as illustrated.

The upper end of the core barrel may be provided with the core barrel valve 20 which affords a pressure relief and permits the upper end of the core to exude from the core barrel in case the core being taken is longer than the barrel.

The construction described above will operate effectively to take a core without rotation of the core when the drill is passing through rocky formation, but if desired we may provide means for positively holding the core barrel against rotation. This means may include a rod 21 extending down from the mouth of the well and constructed as usual, of disconnectible sections. The lower end of the rod 21 will be provided with a tapered pin 22 to be received in a tapered box 23 formed as an integral part of the upper end of the valve cage 24.

The threads of the pin 22 and box 23 should be of such character that the friction developed between the cam faces 17 and 18 will not unscrew the box 23 from the tapered pin 22. In the present instance, the thread on the pin 22 should therefore be left hand thread.

In order to permit water or drilling liquid to be circulated down the drill tubing while the core is being taken, the collar 7 is preferably constructed with an inside diameter somewhat larger than the outside diameter of the core barrel so as to form an annular space 25 around the core barrel down which liquid can pass.

It is understood that the embodiment of the invention described herein is only one of the many embodiments this invention may take, and we do not wish to be limited in the practice of the invention, nor in the claims, to the particular embodiment set forth.

We claim:

1. In a core-taking drill or reamer, the combination of rotatable drill tubing, a non-rotating core barrel passing upwardly through the tubing, a collar mounted to rotate with the tubing, a collar carried by the core-barrel, and correlated cam means on the said collars operating to support the tubing and raise the same on the collar of the core-barrel and thereafter to permit the tub-

ing to descend, thereby driving the core-barrel through the formation without rotation.

2. In a core-taking drill or reamer, the combination of a rotatable drill tubing, a casing carried by the lower end of the tubing, a collar fixed in said casing, a non-rotating core barrel passing upwardly through the tubing having projections on its exterior to prevent its rotation in rocky formation, and having a collar rigid therewith within the casing, said collars having cam faces on their adjacent sides cooperating when the tubing is rotated, to support the tubing and raise the same on the collar of the core barrel and thereafter to permit the tubing to descend, thereby driving the core barrel through the formation without rotation.

3. In a core-taking drill or reamer, the combination of a rotatable drill tubing, a head having a thread connection to the lower end of the tubing, a casing secured in the head, a cam collar having a flange held between the casing and the head and fixed to rotate with the casing, a core barrel passing upwardly through the tubing, means for preventing rotation of the core barrel, a cam collar rigid therewith, said cam collars having adjacent cam faces cooperating when the tubing is rotated to support the tubing and raise the same on the collar of the core barrel and thereafter to permit the tubing to descend, thereby driving the core barrel through the formation without rotation.

Signed at Inglewood, California this 15th day of October 1929.

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