Sept. 29, 1936. J. D. BRACK 2,055,648

CORE TAKING DEVICE FOR WELLS

Filed May 5, 1936

Fig. 2

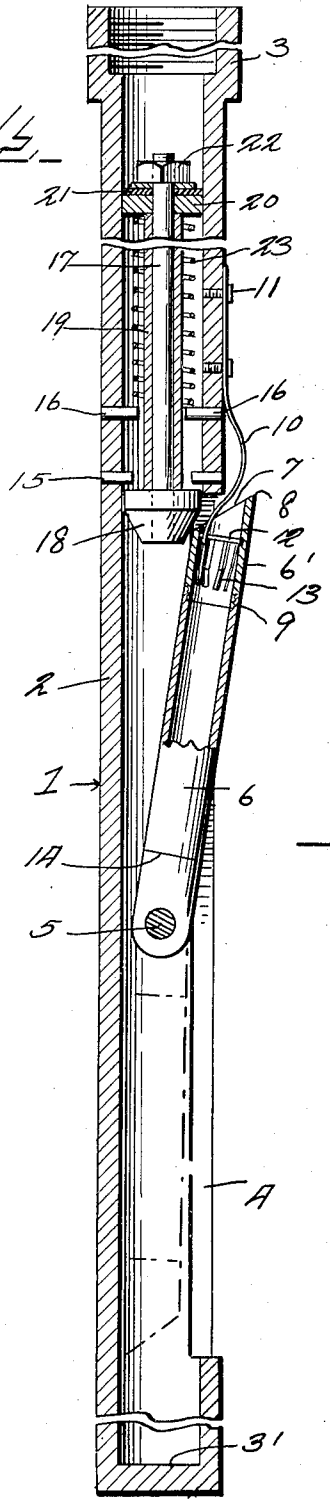


Fig. 1

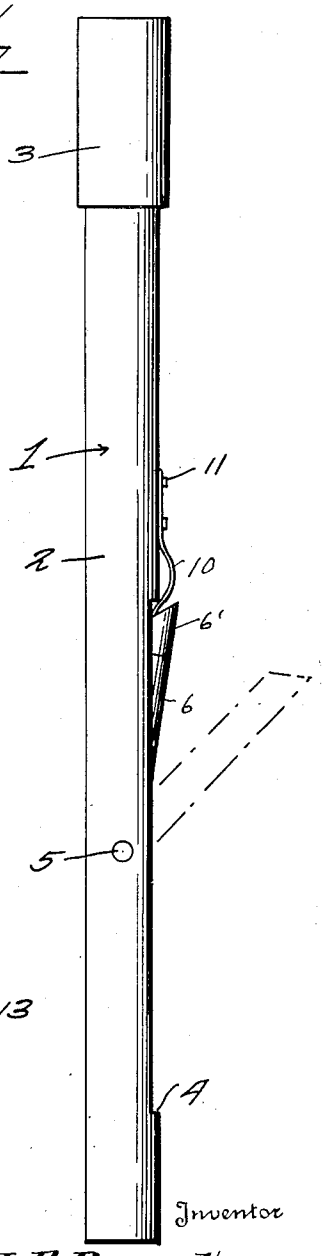
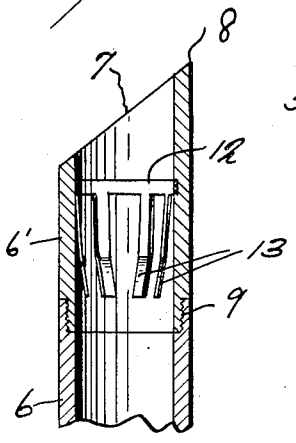


Fig. 3



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CORE TAKING DEVICE FOR WELLS

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8 Claims. (Cl. 255—1)

This invention relates to well drilling apparatus and pertains particularly to improvements in core taking devices.

The primary object of the present invention is to provide an improved form of core taking apparatus for oil wells which is adapted to be introduced into the well at the end of the well drill stem and to be operated in the starting of the core taking operation by the application to a movable element of the device of water pumped thereinto.

Another object of the invention is to provide an improved core taking device which is so designed that the core can be taken with certainty from a particular previously selected or desired area of the well hole.

The invention broadly contemplates the provision of an elongated cylinder closed at its lower end and open at its upper end for attachment to the lower end of a drill stem with an open-ended tube oscillatably mounted therein to swing through an opening in the wall of the pipe and a fluid pressure actuated plunger slidably disposed above the tube and operating, when forced downwardly by water introduced into the drill stem, to force the open end of the tube outwardly into the wall of the well hole, so that when the drill stem and device is drawn upwardly, the core taking tube will immediately penetrate the wall of the hole to take a sample therefrom instead of slipping over the surface of the well hole for some distance before penetrating the wall.

The invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawing forming part of this specification, with the understanding, however, that the invention is not confined to any strict conformity with the showing of the drawing but may be changed or modified so long as such changes or modifications mark no material departure from the salient features of the invention as expressed in the appended claims.

In the drawing:—

Figure 1 is a view in side elevation of the core taking barrel embodying the present invention;

Figure 2 is a view in longitudinal section of the same, the device being shortened by breaking away portions adjacent its upper end;

Figure 3 is an enlarged detailed view of the open end of the core receiving tube.

Referring now more particularly to the drawing, wherein like numerals of reference designate corresponding parts throughout the several views, the numeral 1 generally designates the outside cylinder or barrel proper of the present core taking device, which comprises the tubular lower portion 2 and the interiorly threaded collar 3 upon the open upper end, by means of which the upper end of the barrel is attached to the lower end of a well drill stem. The lower end of the barrel 2 is closed, as indicated at 3', and the wall of the barrel is provided with the relatively long slot 4 for the purpose hereinafter described.

Extending transversely of the barrel 2 across the wall slot 4 and at a point approximately midway between the upper and lower ends thereof, is a pin 5 upon which is oscillatably mounted the core receiving tube 6. The end of the tube 6 which is mounted upon the pin 5 is closed, while the opposite end is opened and is cut obliquely, as indicated at 7, to form the penetrating edge or point 8. This tube 6 preferably is divided at the point 9, so that there is thus formed the outer end portion 6' which is detachably coupled with the main body portion and which may be readily replaced when the outer edge becomes damaged or when replacement for any other reason is necessary.

When the sample taking tube 6 is in the raised position illustrated in Figure 1, the penetrating point will lie outside of the slotted area 4 and the tube will be held in this raised position by the free lower end of the leaf spring 10, which is secured to the wall of the barrel above the slot 4 by the cap screws 11. The free lower end of the leaf spring 10 extends into the open end of the tube 6 and engages in the ring 12, which is secured within the removable portion 6' of the tube and which has the inwardly extending and converging resilient fingers 13 formed integral therewith. These fingers permit a core of earth to move into the tube but will prevent it slipping out therefrom when the tube is hanging down or in reversed position from the way it is illustrated in Figure 2. This position is assumed by the tube when the barrel is withdrawn from the well hole after a core has been taken.

The tube 6 may also be divided adjacent its inner or pivoted end, as indicated at 14, so that the central part thereof can be detached from the part which is mounted upon the pin 5, as well as from the outer end portion 6'.

The barrel 2 is provided with a pair of inwardly extending pins 15 which are secured in the wall thereof above the opening 4 and which have their inner ends in spaced relation within the barrel, as shown in Figure 2, and above these

pins 15 are two other pins, each of which is indicated by the numeral 16 and which extend inwardly in more closely spaced relation than the spaced ends of the pins 15.

Extending longitudinally within the barrel 2 adjacent the upper end of the slot 4, is a reciprocating pin 17, which carries upon its lower end the downwardly tapering head 18, which lies below and has its upward movement limited by the pins 15. This head normally is positioned at the very top of the opening 4 with its tapered downwardly directed face in contact with the upper end of the core tube 6.

Surrounding the reciprocating pin 17 is a sleeve 19 which maintains in spaced relation with the head 18, a disk 20 which snugly fits within the barrel 2 and which is covered upon its upper side by a gasket or washer 21 and these, the disk 20 and washer 21, are secured in place against the end of the sleeve 19 by the nut 22.

Encircling the sleeve 19 and bearing at one end against the upper pair of pins 16 and at its other end against the underside of the disk 20, is a coil expansion spring 23, which normally tends, due to its constant tendency to expand between the pins 16 and the disk 20, to draw the camming head 18 to the limit of its position upwardly.

In the operation of the present core taking device, the upper end thereof is attached to a drill stem, as previously described, and the device at the lower end of the drill stem is lowered into the well hole or bore to the depth at which it is desired to take a sample of the earth forming the wall of the bore. The pump mechanism by which the flushing or wash water is ordinarily pumped through the drill stem, is then started so as to pump water downwardly against the piston-like upper end of the reciprocable unit lying in the barrel above the tube 6, so as to force this unit downwardly and force the head 18 against the tube 6, so that the pointed upper end 8 will be forced out and into the wall of the drill hole. The drill stem and core barrel are then raised so that the pointed end of the core taking tube will be forced laterally further into the wall of the hole and a specimen of the formation will be forced into the core past the resilient holding fingers 13. Continued upward movement of the core barrel will swing the tube 6 down to a hanging position and at the same time withdraw it from the wall of the bore until the tube will occupy the hanging position illustrated in broken lines in Figure 2 and the entire device may then be withdrawn from the well, the sample of the wall formation being securely held in the tube 6 by the fingers 13.

From the foregoing, it will be readily apparent that the device embodying the present invention has the advantage over other devices designed for a similar purpose of being positive in its action so that when a sample is taken from a well, there will be no doubt of the depth at which the sample was extracted for the reason that the pointed end of the core tube will be made to enter the wall formation while the barrel is stationary, by the forcing of fluid down against the tube actuating unit, and when the device is withdrawn, the tube will not slip from position but will immediately penetrate the wall at the desired location.

What is claimed is:—

1. A core taking device for drilled wells, comprising a tubular body having one end closed and having the other end open, means facilitating the attachment of the open end to the lower end of a drill stem, the body having a longitudinal wall opening, a core tube oscillatably secured in the barrel at one end and having its other end open, the said tube being oscillatable from the barrel through the wall opening thereof from an upwardly extending to a depending position, and means within the core barrel above the tube for forcing the tube from the upwardly extending position downwardly under the urge of fluid introduced through the drill stem.

2. A core taking device for drilled wells, comprising an elongated tubular barrel having one end closed and having its other end opened, the said open end being adapted for attachment to the lower end of a drill stem, said barrel having a longitudinally extending wall opening, a core taking tube having an open end and formed at said end to provide a penetrating point, means pivotally coupling the other end of the tube in the barrel whereby the tube is adapted to swing from an upwardly directed position in said wall opening to a depending position within the barrel, a reciprocable unit within the barrel above the tube and including a piston disk snugly engaging the inner wall of the barrel, and a cam head below the disk, said cam head being adapted to engage the tube adjacent its open end when the latter is directed upwardly in the wall opening.

3. A core taking device for drilled wells, comprising an elongated tubular barrel having one end closed and having its other end open, the said open end being adapted for attachment to the lower end of a drill stem, said barrel having a longitudinally extending wall opening, a core taking tube having an open end and formed at said end to provide a penetrating point, means pivotally coupling the other end of the tube in the barrel whereby the tube is adapted to swing from an upwardly directed position in said wall opening to a depending position within the barrel, a reciprocable unit within the barrel above the tube and including a piston disk snugly engaging the inner wall of the barrel, a cam head below the disk, said cam head being adapted to engage the tube adjacent its open end when the latter is directed upwardly in the wall opening, and resilient means carried by the wall of the barrel and engageable in the open end of the tube to maintain the latter in the said upwardly directed position.

4. A core taking device for drilled wells, comprising a barrel having an open end adapted for attachment to the lower end of a drill stem, said barrel having a longitudinal wall opening, a core taking tube, means pivotally securing the tube at one end within the barrel whereby the tube may oscillate through the wall opening from a raised upwardly directed position to a depending position, a resilient finger secured to the barrel and engageable in the other end of the tube to maintain the latter in raised position, the said other end of the tube being open to receive a core, reciprocable means in the upper part of the barrel for forcing an initial movement of the tube outwardly from its raised position, said open end of the tube being formed to provide a penetrating point.

5. A core taking device for drilled wells, comprising a barrel having an open end adapted for attachment to the lower end of a drill stem, said barrel having a longitudinal wall opening, a core taking tube, means pivotally securing the tube at one end within the barrel whereby the

tube may oscillate through the wall opening from a raised upwardly directed position to a depending position, a resilient finger secured to the barrel and engageable in the other end of the tube to maintain the latter in raised position, the said other end of the tube being open to receive a core, reciprocable means in the upper part of the barrel for forcing an initial movement of the tube outwardly from its raised position, said open end of the tube being formed to provide a penetrating point, and resilient means disposed within the tube adjacent the open end thereof for preventing the escape of a core from the tube when the latter is in depending position.

6. A core taking device for drilled wells, comprising a barrel having an open end adapted for attachment to the lower end of a drill stem, the barrel having a longitudinally extending wall opening, a core taking tube adapted to move through said wall opening, pivotal means securing the tube within the barrel adjacent the transverse center of the wall opening permitting the tube to oscillate in the opening from an upwardly extending position to a depending position in the barrel, the tube at its other end being open to receive a core, a unit having free reciprocable movement in the barrel adjacent the upper end of said wall opening comprising a piston disk reciprocable in the barrel, and a camming head connected in spaced relation with the disk and engageable with the tube when the latter is in raised position, and resilient means for releasably holding the tube in said raised position.

7. A core taking device for drilled wells, comprising a barrel having an open end adapted for attachment to the lower end of a drill stem, the barrel having a longitudinally extending wall opening, a core taking tube adapted to move through said wall opening, pivotal means securing the tube within the barrel adjacent the transverse center of the wall opening permitting the tube to oscillate in the opening from an upwardly extending position to a depending position in the barrel, the tube at its other end being open to receive a core, a unit having free reciprocable movement in the barrel adjacent the upper end of said wall opening, comprising a piston disk reciprocable in the barrel, a camming head connected in spaced relation with the disk and engageable with the tube when the latter is in raised position, resilient means for releasably holding the tube in said raised position, and spring means within the barrel for normally urging said unit to move upwardly away from contact with the sampling tube.

8. A core taking device for drill wells, comprising a barrel having an open end formed for attachment to the lower end of a drill stem, the barrel having a longitudinal wall opening, a core tube adapted to move through said opening and having an open end for receiving a core, means oscillatably securing the other end of the tube within the barrel whereby the tube may swing from a raised upwardly extending position to a position where it depends within the barrel, a reciprocable pin disposed longitudinally within the barrel adjacent the upper end of the wall opening, a downwardly tapering cam head carried by the lower end of said reciprocable pin for engagement with the tube at its open end when the tube is raised, a piston disk carried by the reciprocable pin in spaced relation with the head and snugly working in the barrel, a spring surrounding said reciprocable pin and having one end engaging said disk, means carried by the wall of the bearing against which the other end of the spring engages, the spring normally tending to draw the disk and cam-head upwardly, and spring means adapted to releasably hold the core tube in raised position in the said wall opening.

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