May 27, 1924.

1,495,474

H. W. FLETCHER

PROCESS OF SAMPLING

Filed April 14, 1922

Fig. 1.

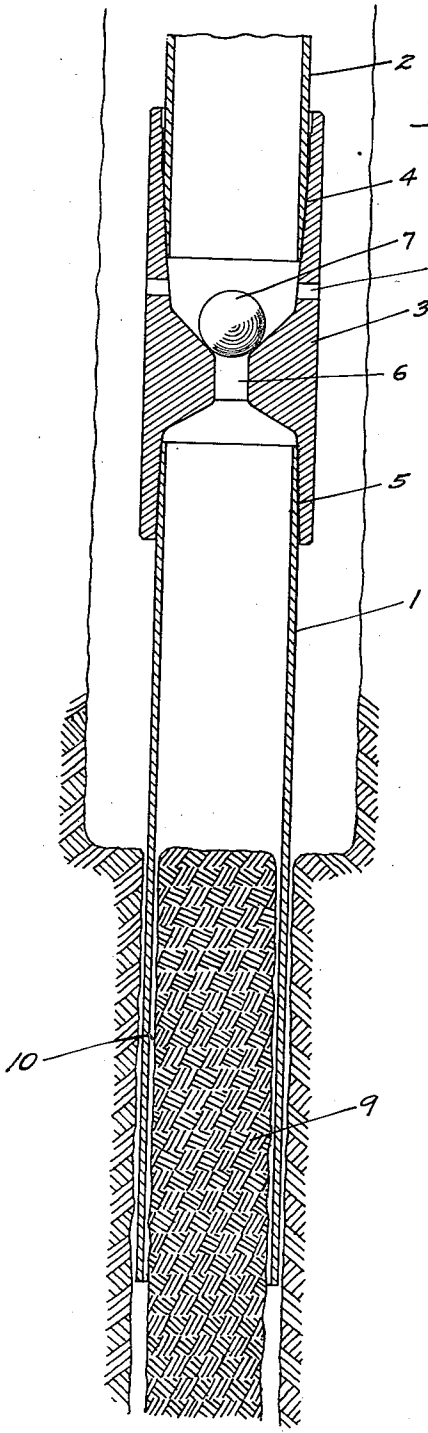
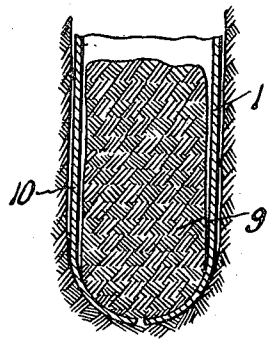


Fig. 2.



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By Jesse R. Stone

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Patented May 27, 1924. 1,495,474

UNITED STATES PATENT OFFICE.

HAROLD W. FLETCHER, OF HOUSTON, TEXAS, ASSIGNOR TO HUGHES TOOL COMPANY, OF HOUSTON, TEXAS, A CORPORATION OF TEXAS.

PROCESS OF SAMPLING.

Application filed April 14, 1922. Serial No. 552,645.

To all whom it may concern:

Be it known that I, HAROLD W. FLETCHER, a citizen of the United States, residing at Houston, Harris County, Texas, have invented a certain new and useful Improvement in Processes of Sampling, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention is for use in drilling wells and has particular application to the drilling of wells for oil, gas, sulphur, etc. It consists particularly in the process of obtaining a sample of the material being drilled.

The object of my invention is to provide a process of handling the drilling apparatus whereby a sample of the material may be obtained without the usual objectionable washing away of the core as the pipe is withdrawn from the well.

Another object is to provide a process of core drilling by means of which the foreign material in the bottom of the well and the core drill may be efficiently flushed away before the sample is obtained.

Other objects and advantages will be apparent from the more detailed description which follows. In the drawing Fig. 1 illustrates a central longitudinal section through a well being bored, showing the arrangement of the device used in obtaining the sample and Fig. 2 shows the core barrel closed to engage the core.

In carrying out my invention I contemplate securing a core barrel 1 of ordinary construction, to the lower end of a drill stem 2. Both the core barrel and drill stem will be of ordinary tubular pipe customarily used for this purpose.

The core barrel is joined to the lower end of the drill stem by means of a coupling 3. This coupling is threaded internally at 4 toward the upper end for attachment to the drill stem, and is similarly threaded at 5 for attachment to the core barrel. Between these points of attachment the interior diameter of the coupling is materially reduced to form a central passage 6 adapted to be closed at the upper end by means of the ball valve 7. To accommodate this ball valve the upper end of passage 6 is tapered and formed into a seat into which the said valve is adapted to fit. Above the valve the walls of the coupling are perforated by means of one or more lateral openings 8.

In the carrying out of my process I secure the core barrel to the lower end of the drill stem by means of the coupling 3, omitting to place the ball valve in its seat as shown. The core barrel and drill stem thus coupled together are inserted downwardly into the well in the usual manner. When the core barrel reaches the bottom of the hole it is filled to a greater or less extent with gumbo and other formation scraped off the wall, and a sufficient amount of flushing fluid must be pumped down through the core barrel to clean out these accumulations, and to wash all loose material from the bottom of the hole. The core barrel is then allowed to rest firmly upon the bottom of the hole, and it will be apparent that there will be no foreign matter from the upper strata within the core barrel at the time the core is started.

The ball valve 7 will then be inserted into the upper end of the drill stem at the surface of the ground to drop downwardly inside thereof. The action of the pumps in forcing the flushing fluid downwardly will assist in bringing the ball down to its proper seat in the coupling 3 as shown in the drawing. The flushing fluid will thereby be cut off from the upper end of the core barrel and will find an exit through the openings 8 above the barrel. The circulation of the fluid will then be downwardly through the drill stem and the openings 8 and upwardly outside the drill stem to the surface of the ground. The rotation of the drill stem and core barrel will serve to cut away the formation in the usual manner until the proper amount of core or sample shown at 9 has been received within the core barrel.

It will be obvious that the fluid remaining in the core barrel above the bottom of the hole when the drilling operation is started will be trapped within the core barrel above the upper end of the core. The force of the pumps and the size of the outlets 8 will be so adjusted as to exert enough pressure upon the valve 7 to retain it in its seat. The fluid in the upper end of the core barrel will therefore be forced downwardly through the space between the core barrel and the core into the lower end of the hole.

This will serve to lubricate the surfaces both inside and outside the core barrel sufficiently to obtain the proper action.

When the core has been obtained the drill stem will be used to force the core barrel downwardly against the bottom of the hole so as to bend the lower ends of the core barrel inwardly to grip the core as shown in Fig. 2. The assembled device will then be withdrawn from the well carrying with it the core thus obtained. With the valve 7 in its seat above the core no fluid within the drill stem will find entrance into the core barrel to wash away any part of the core already obtained and the sample will thus be withdrawn from the well in its original form as cut from the strata.

The advantages of this process lie in the manner in which the apparatus is operated. The valve 7 is omitted until the bottom of the well has been completely cleaned. This assures that when the apparatus is operated to obtain the core no foreign formation is within the core barrel or lying upon the bottom of the well. The valve is then used to close off the core barrel from the drill stem so that thereafter none of the flushing fluid will be forced downwardly into the core barrel by the pumps, or by the withdrawal of the pipe from the well. This assures that a proper core will be obtained under all conditions and that when thus obtained it will not be washed away by the fluid in the drill stem.

Having thus described my invention which I claim is new and desire to protect by this patent is:

1. In the drilling of wells, the process of obtaining a sample of the material, comprising securing a core barrel to the forward end of the drill stem, inserting said core barrel and drill stem downwardly into the hole, washing the hole by pumping fluid downwardly through the drill stem and core barrel, then closing the upper end of the core barrel, circulating the fluid upwardly outside the drill stem above the core barrel, rotating the core barrel until a core has been cut and raising the core barrel and core from the well.

2. In the drilling of wells, the process of obtaining a sample of the material, comprising securing a core barrel to the forward end of the drill stem, inserting said core barrel and drill stem downwardly into the hole, pumping flushing fluid downwardly through said core barrel to clean the well, closing the lower end of the drill stem above the core barrel, providing an outlet from the drill stem for flushing fluid above said core barrel, rotating the core barrel and raising the core barrel and core from the well.

3. In the drilling of wells, the process of obtaining a sample of the material comprising securing a length of pipe constituting a core barrel to the forward end of the drill stem, providing a passage from the drill stem through the core barrel, inserting the core barrel into the well, pumping fluid through said core barrel to clean the bottom of the well, closing the passage from the drill stem, rotating the core barrel and removing the core barrel and the sample from the well.

4. In the drilling of wells, the process of obtaining a sample of the material comprising securing a length of pipe constituting a core barrel to the forward end of the drill stem, providing a passage from the drill stem through the core barrel, inserting the core barrel into the well, pumping fluid through said core barrel to clean the well, inserting a valve into said passage, rotating the core barrel, clamping on the core and removing the core barrel from the well.

In testimony whereof, I hereunto affix my signature, this the 10th day of April, A. D., 1922.

HAROLD W. FLETCHER.