March 13, 1934. M. L. BOLES 1,950,654

FORMATION TESTER

Filed Feb. 8, 1932

Fig. 1.

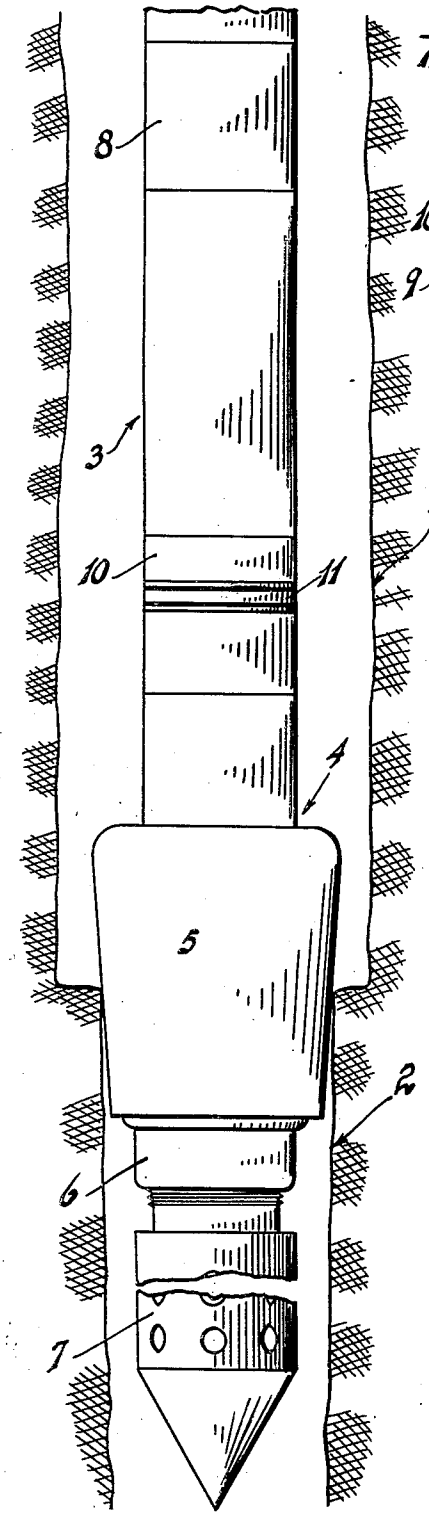
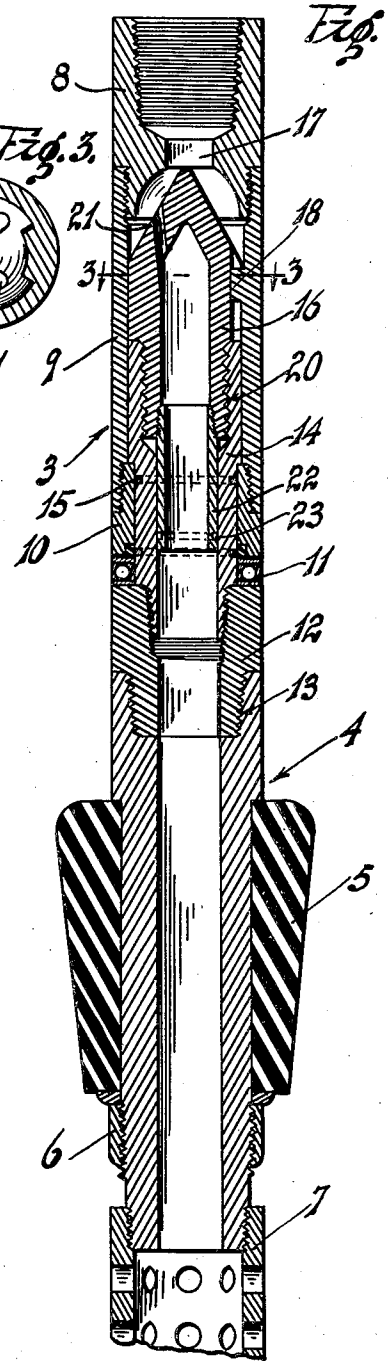


Fig. 3.

Fig. 2.



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FORMATION TESTER

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2 Claims. (Cl. 166—1)

This invention relates to a formation tester by means of which it is possible to determine whether any strata encountered during the drilling of a well contains oil or gas in commercial quantities.

An object of my invention is to provide a novel formation tester which is operated on the drill pipe and which may be set in position in or adjacent to the stratum to be tested, and which when so positioned leaves the drill pipe open for the flow of oil and the drilling mud is packed off and prevented from entering or exerting a pressure upon the area to be tested.

Another object is to provide a novel formation tester provided with a valve therein which is opened or closed by rotation of the drill pipe.

A feature of my invention resides in the novel assembly of the formation tester whereby the upper portion of the tester can be readily removed if the packer should become wedged in the hole.

Other objects, advantages and features of invention may appear from the accompanying drawing, the subjoined detailed description and the appended claims.

In the drawing:

Figure 1 is a side elevation of my formation tester.

Figure 2 is a longitudinal, sectional view of my tester.

Figure 3 is a sectional view taken on line 3—3 of Figure 2. The valve being shown in elevation.

Referring more particularly to the drawing, the numeral 1 indicates the bore of the well formed by the drilling bit, and 2 is a bore of smaller diameter formed by the core drill or the like and extending downwardly into the formation to be tested. My formation tester comprises in general an upper tubular section 3 and a lower tubular section 4. The sections are coupled together as will be further described.

A packing ring 5 is mounted on the lower section 4 and may be formed of rubber, fabric, fiber or the like. This ring rests against a shoulder at the top and a nut 6 screws against the bottom thereof thereby holding the ring in position. A perforated screen 7 screws on to the bottom of the section 4 and the gas and/or oil passes through this screen and thence upwardly through the tester and the drill pipe to the surface. The ring 5 is set in the smaller diametered bore 2, as shown in Figure 1, when so positioned it acts to pack off the drilling mud in the hole 1 and prevents said drilling mud from exerting any pressure in the bore 2, thus a true test of the pressures and quantity of fluid is obtained in the tested stratum.

The upper section 3 comprises a coupling 8 into which the drill pipe screws with a right hand thread. The coupling in turn screws into the pipe 9 with a right hand thread. A fitting 10 screws into the bottom of the pipe 9 with a right hand thread. A ball thrust bearing 11 bears against the bottom of the fitting 10 and against the top of a sub 12. The sub screws into the top of the section 4 with a left hand thread, the purpose of this latter arrangement being to enable the drill pipe and the upper part of the tester to be removed from the well if the ring 5 should stick in position. Continued right hand rotation of the drill pipe would cause the left hand threads 13 to unscrew.

A liner 14 screws into the top of the sub 12 and fits closely within the pipe 9. Packing rings 15 are provided on the outside of the liner to prevent possible leakage. A valve 16 is provided with a conical head which seats in the opening 17 in the coupling 8. The valve 16 moves longitudinally in the tester and is actuated by splines 18 in the pipe 9 which splines fit into longitudinal grooves 19 in the valve. The valve screws into the top of the liner 14 with the left hand threads 20, thus right hand rotation of the pipe 9 and the parts 4, 12 and 14 being held stationary will cause the valve to move upwardly into closing position. Conversely, left hand rotation of the drill pipe will open the valve.

The tool is run into the well with the valve closed. When the bottom is reached and the ring 5 is seated, the valve is opened by turning the pipe to the left thereupon the oil and/or gas from the formation will rush upwardly through the tester and through ports 21 in the valve and thence into the drill pipe to the surface. To stop the flow, the drill pipe is rotated to the right thus seating the valve 16 against its seat 17. A nipple 22 screws into the bottom of the valve 16 and is provided with an external packing ring 23 to prevent leakage. The operation of my invention will be evident from the foregoing description.

Having described my invention, I claim:

1. A formation tester comprising a lower tubular section, a packing ring on said section, an upper tubular section, a sub threaded into said lower tubular section with left hand thread, a liner secured to said sub and seating within said upper tubular section, a ball bearing between the sub and upper tubular section, a conical valve threaded into said liner with a left hand thread said valve being positioned above the sub, a coupling secured to the top of the upper tubular section, a seat in the coupling for said valve, and

means slidably coupling said upper tubular section and valve together whereby rotation of the upper tubular section will move the valve into seated and unseated position.

2. A formation tester comprising a lower tubular section, a packing ring on said section, an upper tubular section, a sub threaded into said lower tubular section with left hand thread, a liner secured to said sub and seating within said upper tubular section, a ball bearing between the sub and upper tubular section, a valve threaded into said liner with a left hand thread said valve being positioned above the sub, a coupling secured to the top of the upper tubular section, a seat in the coupling for said valve, splines on said upper tubular section, said valve having grooves formed therein to receive the splines, and said valve having a plurality of ports through the top thereof through which the gas or oil is adapted to pass.

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