April 30, 1929. T. A. OWEN 1,711,125

SAND TESTER

Filed Feb. 11, 1928

Fig. 1.

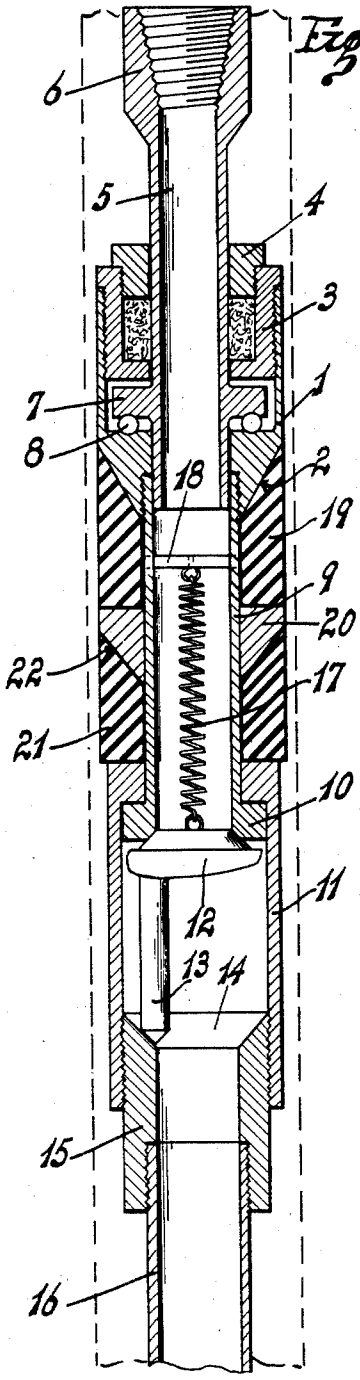
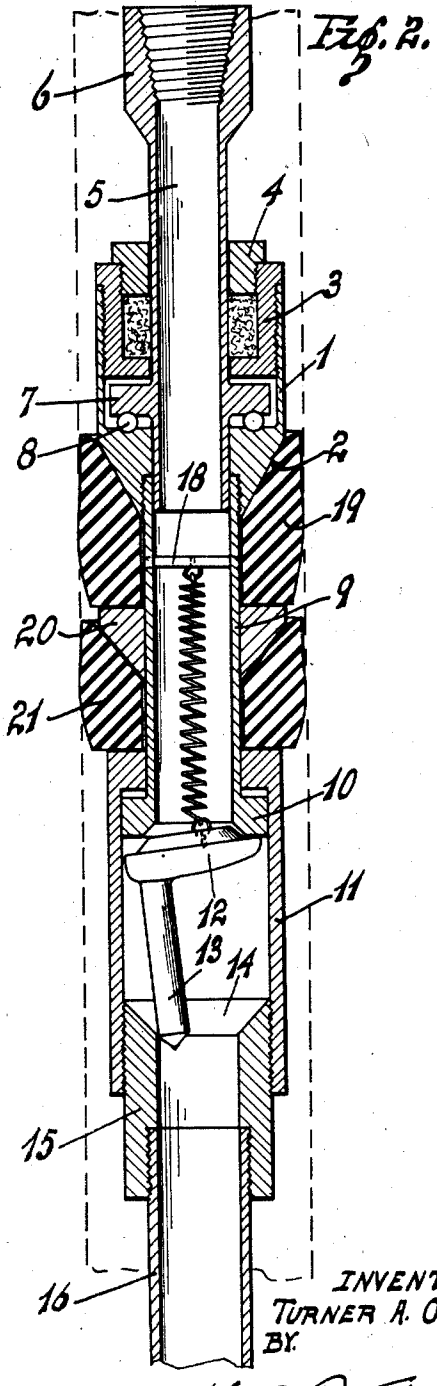


Fig. 2.



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SAND TESTER.

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This invention relates to a sand tester, by means of which it is possible to determine whether any sand encountered during the drilling of an oil well contains oil in commercial quantities.

An object of my invention is to provide a sand tester which can be operated on the drill pipe and which may be set in position adjacent the sand area to be tested, and which when so positioned leaves the drill pipe open for the flow of oil and will prevent the drilling mud from entering the sand area.

Another object is to provide a sand tester which is set in position by the weight of the drill pipe and the lowering of the drill pipe will also serve to open a valve giving access to the drill pipe.

Still another object is to provide a sand tester including a packer, which packer is expanded against the walls of the hole by a tapered head, the head being forced into the packer by the weight of the drill pipe.

A still further object is to provide a sand tester in which the drill pipe may be rotated while the tester is in position thus preventing the sticking of the drill pipe.

Other objects, advantages and features of invention may appear in the accompanying drawings, the subjoined detailed descriptions, and the appended claims.

In the drawing—

Fig. 1, is a longitudinal sectional view of my tester in contracted position.

Fig. 2, is a longitudinal sectional view of the same in expanded or operative position.

Referring more particularly to the drawing, the numeral 1, indicates the head, the lowered end of which is tapered as at 2, the purpose of which taper will be further described.

A cup 3, screws into the top of the head 1, and a packing gland 4, is mounted in the cup 3, for the purpose of preventing leakage of drilling mud around the tube 5, which last named tube extends downwardly into the head 1, and a tool joint 6, is provided at the top of the tube to which the usual drill pipe (not shown) is connected.

A shoulder 7, is provided on the tube 5, which shoulder forms the top race of the annular bearing 8, the lower race of the bearing being formed in the head 1, thus it will be seen that the tube 5, and drill pipe above it can be rotated while the head 1, and other parts depending therefrom remain stationary.

A pipe 9, screws into the lower end of the head 1, and the pipe is provided with a shoulder 10, in the bottom thereof; the shoulder co-operating with a sleeve 11, which sleeve is slidably mounted on the pipe 9, and extends below said pipe.

A valve 12, is normally seated in the bottom of the pipe 9, and an eccentrically mounted post 13, depends from the valve, the bottom of which post engages the top chamfered edge 14, of the hollow block 15, which block screws into the bottom of the sleeve 11. A perforated pipe 16, is mounted in the block 15, and extends downwardly a suitable distance. The valve 12, is normally held on its seat as shown in Fig. 1, by means of a spring 17, secured to the valve and to a pin 18 in the pipe 9. It will be understood by those skilled in the art that during the drilling of a well by a rotary rig that mud in a semi-fluid condition is forced into the hole under high pressure, which mud acts as a lubricant for the bit and also serves to sustain the walls of the hole. The pressure of this mud is normally sufficient to prevent any oil from coming into the hole and passing outwardly to the surface, therefore in order to test any sand it is necessary to prevent this mud from coming in contact with the sand. I accomplish this in the following manner: A rubber or composition packer 19, surrounds the pipe 9 and the top of the packer is cut to conform with the taper 2. A ring 20 is slidably mounted on the pipe 9 and the packer 19 sets on the ring. A second packer 21, surrounds the pipe 9, and sets on the top of the sleeve 11, and the ring 20 is provided with a lowered tapered surface 22, similar to the taper 2. Now it will be seen that when the sand tester reaches the bottom of the hole with the perforated pipe 16 extended into the sand to be tested, the weight of the drill pipe will force the head 1, and pipe 9 downwardly while the pipe 16, blocks 15, and sleeve 11 remain stationary. Thus the tapered surfaces 2, 22, will act against the rubber packers 19, 21, expanding said packer against the wall of the hole and will thus prevent the drilling mud from passing downwardly into the sand area. The downward movement of the head 1, and pipe 9, as previously described, will also act to carry the pin 13 against the chamfer 14, thus tilting the valve 12 off of its seat and will give free access upward through the tester to the drilling tub-

ing. If there is any oil in the sand under a considerable gas pressure, this gas pressure will force the oil through the perforated pipe 16, and thence upwardly past the valve 12, and to the drill pipe to the surface.

As previously described, the drilling mud is effectively packed off and is prevented from passing downwardly into the sand area. While the tester is in position, the tubing may continue to rotate and will prevent its sticking because of the bearing 8.

Sand, dirt, etc., is prevented from getting into the bearing because of the cup 3, and packing gland 4.

Having described my invention, I claim:

1. In a sand tester for oil wells adapted to be positioned on the drill pipe, comprising a head, a tube extending into the head to which the drill pipe is secured, an annular bearing between the tube and head, a pipe depending from the head, a valve in the pipe, packer means surrounding the pipe and co-operating with the head, whereby said packer means is extended against the sides of the hole when said head is lowered and means co-operating with the valve adapted to unseat said valve when the head is lowered to expand the packer.

2. In a sand tester for oil wells adapted to be positioned on the drill pipe, comprising a head, a tube extending into the head to which the drill pipe is secured, an annular bearing between the tube and head, a pipe depending from the head, a valve in the pipe, packer means surrounding the pipe and co-operating with the head, whereby said packer means is extended against the sides of the hole when said head is lowered and means co-operating with the valve adapted to unseat said valve when the head is lowered to expand the packer, spring means engaging the valve to normally hold said valve in seated position, said valve unseating means including a post depending from the valve, a block having a chamfered edge thereon, said post engaging the chamfered edge which unseats the valve when the head is lowered to expand the packer.

3. A sand tester for oil wells adapted to be positioned on the drill pipe, comprising a head, a tube extending into the head, a shoulder on the tube, an annular bearing between the shoulder and head, a pipe depending from the head, a valve means in the said pipe, spring means engaging the valve to normally hold the valve seated, packer means surrounding the pipe and means adapted to engage the valve to unseat the same when the head is lowered to expand the packer.

4. A sand tester for oil wells adapted to be positioned on the drill pipe, comprising a head, a tube extending into the head, a shoulder on the tube, an annular bearing between the shoulder and head, a pipe depending from the head, a valve means in said pipe, spring means engaging the valve to normally hold the valve seated, a sleeve depending from the pipe and slidable thereon, a perforated pipe depending from the sleeve, a post depending from the valve and means adapted to be engaged by said post when the head is lowered to unseat said valve.

5. In a sand tester for oil wells adapted to be mounted on the drill pipe, comprising a head, a tube extending into the head, means rotatably mounting the tube in the head, a pipe depending from the head, a packer surrounding the pipe, said head having a tapered surface thereon, adapted to engage the packer to expand the same, valve means in said pipe, a sleeve depending from the pipe and slidable thereon, a hollow block secured to the sleeve, a perforated pipe depending from the blocks, a post depending from the valve, said block having a chamfered edge against which the post rests to unseat the valve when the head is lowered, and spring means engaging the valve and normally holding the same seated.

In testimony whereof, I affix my signature.

TURNER A. OWEN.