

March 13, 1928.

C. H. REYNOLDS

1,662,336

WELL PACKER

Filed April 30, 1926

2 Sheets-Sheet 1

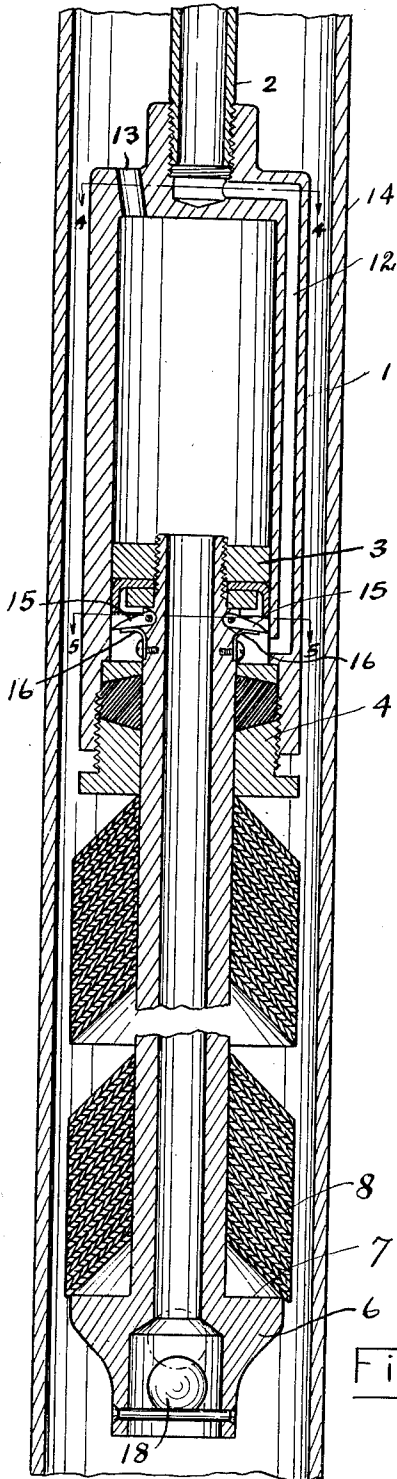


Fig. 1.

By

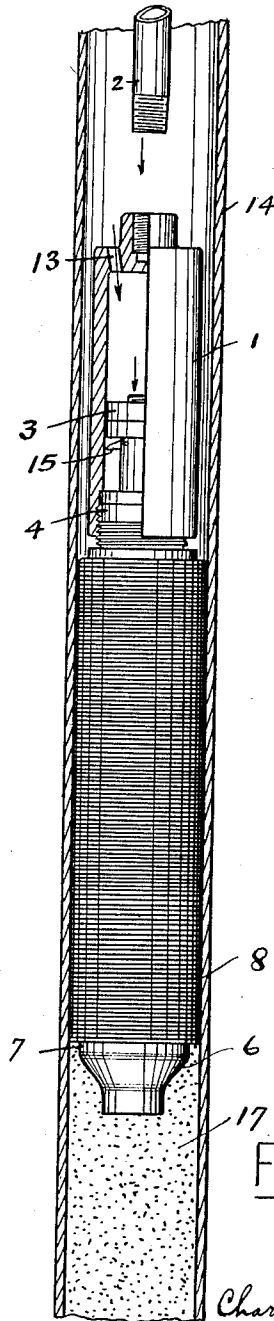


Fig. 2.

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2 Sheets-Sheet 2

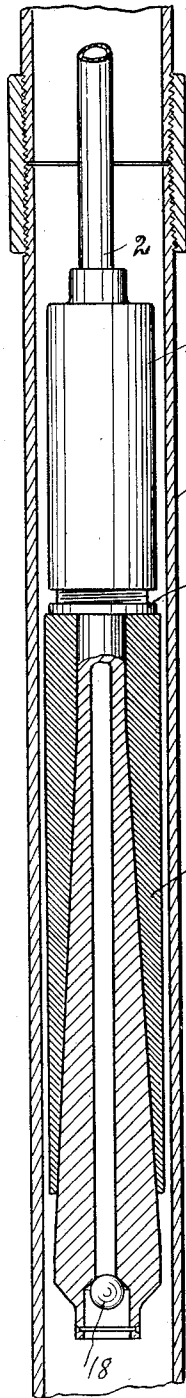


Fig. 3.

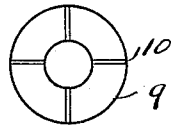


Fig. 7.

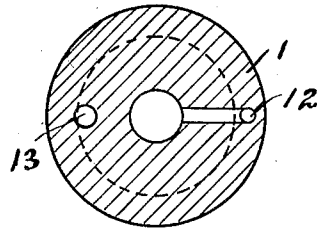


Fig. 4.

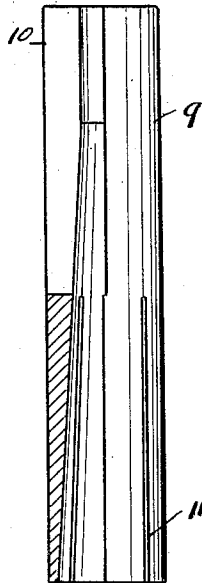


Fig. 6.

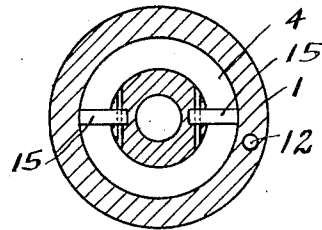


Fig. 5.

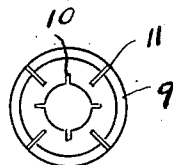


Fig. 8.

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1,662,336

UNITED STATES PATENT OFFICE.

CHARLES H. REYNOLDS, OF HOUSTON, TEXAS.

WELL PACKER.

Application filed April 30, 1926. Serial No. 105,824.

This invention relates to new and useful improvements in a well packer.

One object of this invention is to provide a packer for wells adapted to be set in the well bore or well casing and whereby different fluid strata may be separated; the packer is specially designed for packing off water to prevent it from entering the oil bearing stratum.

Another object of the invention is to provide a packer of the character described adapted to be actuated, or set, by hydraulic pressure exerted from the pump at the ground surface.

A further feature of the invention is to provide a packer which will effectively shut off fluid from beneath and yet will permit the passage of fluid through it from above, in order to wash out the bore, or casing, beneath and which will also permit the introduction of packing material, such as cement into the bore, or casing, beneath the packer.

With the above and other objects in view this invention has particular relation to certain novel features of construction, operation and arrangement of parts, an example of which is given in this specification and illustrated in the accompanying drawings, wherein:—

Figure 1 shows a vertical sectional view of the packer in position for setting in a well casing.

Figure 2 shows a side elevation thereof, partly in section, as set in a well casing.

Figure 3 shows a side view, partly in section, of another form of the packer, in position to be set in a well casing.

Figure 4 shows a cross sectional view taken on the line 4—4 of Figure 1.

Figure 5 shows a cross-sectional view taken on the line 5—5 of Figure 1.

Figure 6 shows a side view, partly in section, of the type of packing element employed in the form shown in Figure 3.

Figure 7 shows a top plan view thereof, and

Figure 8 shows a bottom plan view thereof.

Referring now more particularly to the drawings, wherein like numerals of reference designate similar parts in each of the figures, the numeral 1 designates a cylinder into the upper end of which the lower end of the tubing 2 is connected by left hand threads. There is a plunger 3 fitted into this cylinder, and the lower end of the cyl-

inder is closed by the stuffing box 4. A tubular packer support 5 as in Figure 1, or 5' as in Figure 3, works through the stuffing box and has its upper end threaded through the plunger, 3. The lower end of the support 5 has an enlarged head 6 whose upper side forms an abutment 7 and around this support there is a packing element preferably formed of superimposed rings 8, of fabric, or other suitable packing material.

When in collapsed position, these rings present a side elevation of frusto-conical contour.

The packing support 5' shown in Figure 3, is flared, or enlarged, downwardly, and on it there is a sleeve-like packing element 9 which fits snugly over its support. This element is preferably formed of lead, or other suitable material and has the upper and lower lengthwise slits 10 and 11, in staggered relation.

The gland 4 forms an upper abutment for the respective packing elements 8 and 9.

The wall of the cylinder 1 has a water channel 12 leading from within the lower end of the tubing 2 and entering the cylinder beneath the plunger 3, and the upper end of the cylinder 1 has a port 13 through which the interior of the cylinder communicates with the interior of the casing 14, above said cylinder.

When it is desired to set the packer it is lowered into the casing or well bore, to the desired place and the pump is then started. This pump is connected to the tubing 2, at its upper end.

Pressure will thereby be exerted through the stem 2 and channel 12 into the cylinder 1 beneath the plunger 3 and will elevate said plunger, and the packer support connected thereto. The packing element, will thus be expanded out against the casing, or the walls of the bore so as to form an effective seal against the passage of fluid by it. The upper end of the packer support has radial dogs 15, 15, hinged thereto, whose outer ends are sharp and held against the cylinder walls by the pressure springs 16, 16, which press against their under sides. As the packer support moves upwardly these springs will yield but when the packing is set the dogs will engage the cylinder walls to prevent the packing from collapsing.

It is sometimes necessary to wash out the casing or bore in order to permit the lowering of the packing and in such case water

may be forced down through the casing, or bore, and this water will pass down through the port 13, and the cylinder and tubular packers support and return up around the packer. If desired cement 17 may be, in like manner, forced down beneath the packer and permitted to set to form a more effective seal.

The lower end of the packer support is equipped with a back pressure valve 18 to prevent the upward flow of fluid there-through.

When the packer is set the tubing 2 may be unscrewed therefrom and removed.

15 What I claim is:—

1. A tubular packer for wells including a packer support having a fluid passageway therethrough, an expansible packing element thereon, a fixed abutment against which one end of said element is adapted to abut, and means adapted to be actuated by fluid pressure and adapted to actuate said support to carry the packing element against said abutment whereby said element is expanded and a downwardly opening valve in said support adapted to control said passageway.

2. A packer for wells including a support, an expansible packing element around said support, means connected to the support, and adapted to be actuated by fluid pressure to actuate said support, a fixed abutment adapted to engage said element when said support is actuated and to thereby expand said element, said support having a fluid passageway therethrough and a downwardly opening valve controlling said passageway.

3. A packer for wells including a support, an expansible packing element around said support, means adapted to be actuated by fluid pressure and connected to and adapted to actuate said support, means adapted to confine said element when said support is actuated and to thereby expand said element, said packer having a valve controlled fluid passageway therethrough, and means retaining said element in expanded position.

4. A packer for wells including a support, an expansible packing element around said support, means connected to the support, and adapted to be actuated by fluid pressure to actuate said support, a fixed abutment adapted to engage said element when said support is actuated and to thereby expand said element, said packer having a valve controlled fluid passageway therethrough.

5. A packer for wells including a support, an expansible packing element around said support, means connected to the support and adapted to be actuated by fluid pressure to actuate said support, a fixed abutment adapted to engage said element when said support is actuated and to thereby expand said element, means retaining said element in expanded position, said packer having a

fluid passageway therethrough, from its upper to its lower end, and a valve controlling said passageway.

6. A packer including a cylinder formed with a fluid channel which terminates within the cylinder and also having a port, a plunger in the cylinder between the discharge end of said channel and said port, a packer support connected to said plunger, an expansible packing element on said support, a tubing connected into said channel through which fluid under pressure may be introduced into said cylinder to actuate the plunger and support in one direction.

7. A packer including a cylinder formed with a fluid channel which terminates within the cylinder and also having a port, a plunger in the cylinder between the discharge end of said channel and said port, a packer support connected to said plunger, an expansible packing element on said support, a tubing connected into said channel through which fluid under pressure may be introduced into said cylinder to actuate the plunger and support in one direction and means adapted to prevent the movement of the plunger and support in the opposite direction.

8. A packer adapted to be set in a well bore and including a cylinder, a plunger therein, a packer support connected to said plunger, an expansible packing element around said support, a tubing connected to said cylinder, said cylinder having a channel leading from said tubing and terminating in the cylinder, on one side of the plunger, said cylinder having a port on the other side of the plunger, said packer having a channel through which fluid may pass from the well above the packer and be delivered back into the well beneath the packer.

9. A packer including a cylinder, a plunger therein, a packer support connected to said plunger, an expansible packing element around said support, a tubing connected to said cylinder, said cylinder having a channel leading from said tubing and terminating in the cylinder, on one side of the plunger, said cylinder having a port on the other side of the plunger, and means confining the plunger to a one way movement in the cylinder.

10. A packer including a cylinder, a plunger therein, a tubular packer support connected to the plunger, a valve permitting the one way passage of fluid through said support, an expansible packing element around said support, a tubing connected to the cylinder, said cylinder having a channel leading from the tubing and connected into the cylinder on one side of the plunger, and also having a port on the other side of the plunger.

11. A packer including a cylinder, a plunger therein, a tubular packer support

connected to the plunger, a valve permitting the one way passage of fluid through said support, an expansible packing element around said support, a tubing connected 5 to the cylinder, said cylinder having a channel leading from the tubing and connected into the cylinder on one side of the plunger, and also having a port on the other side of the plunger and means confining the plunger to a one way movement in the cylinder. 10

12. A packer for wells including a packer support, an expansible packing element around said support, means associated with said support and formed to be actuated by 15 fluid pressure to move said support in one direction, means carried by said support and other means associated with said support between which the expansible element is

confined and through which said element is expanded when the support is moved in 20 said direction.

13. A packer for wells including a packer support, an expansible packing element around said support, means associated with said support and formed to be actuated by 25 fluid pressure to move said support in one direction, means carried by said support and other means associated with said support between which the expansible element is confined and through which said element is 30 expanded when the support is moved in said direction, said support having a valve controlled fluid passageway therethrough.

In testimony whereof I have signed my name to this specification.

CHARLES H. REYNOLDS.