June 19, 1923. 1,459,368

G. C. HENSHAW ET AL

AUTOMATIC PACKER, FLOWHEAD, AND PUMPING DEVICE

Filed Aug. 27, 1921

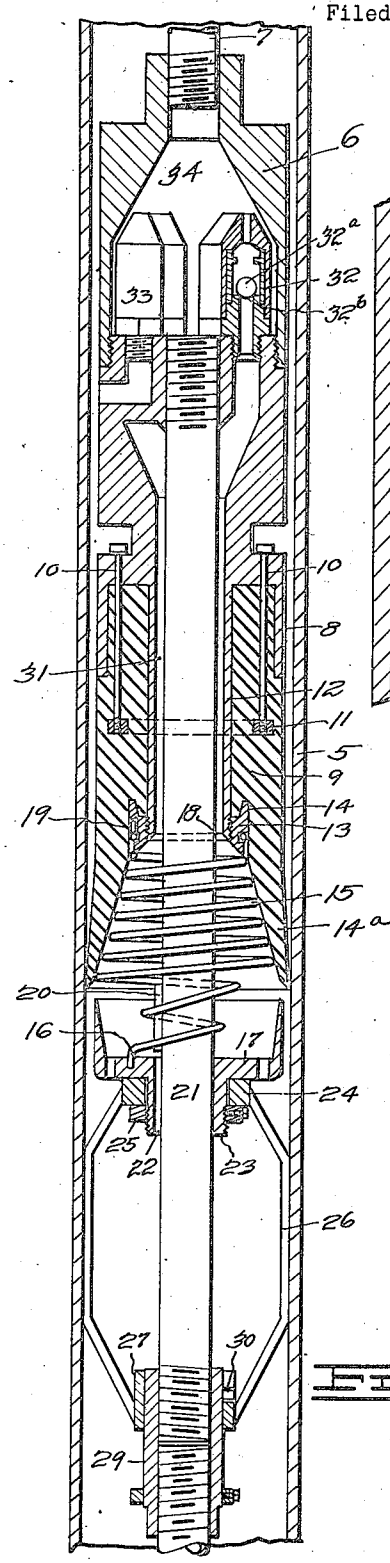

Fig. 1.

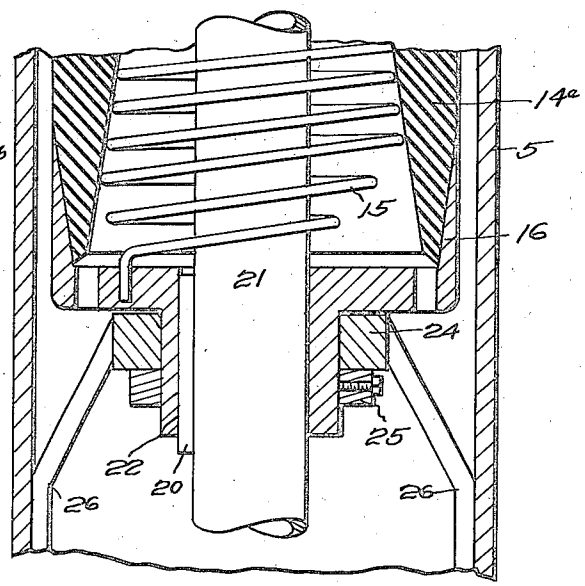

Fig. 2.

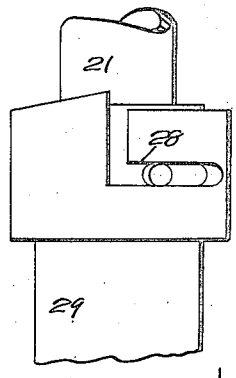

Fig. 3.

Inventor

G. C. Henshaw

W. H. Myers,

By Wilson B. Thumbler,

Attorneys

Patented June 19, 1923. 1,459,368

UNITED STATES PATENT OFFICE.

GEORGE C. HENSHAW AND WILLIAM H. MYERS, OF RANGER, TEXAS.

AUTOMATIC PACKER, FLOWHEAD, AND PUMPING DEVICE.

Application filed August 27, 1921. Serial No. 496,058.

To all whom it may concern:

Be it known that we, GEORGE C. HENSHAW and WILLIAM H. MYERS, citizens of the United States, residing at Ranger, in the county of Eastland and State of Texas, have invented new and useful Improvements in Automatic Packer, Flowhead, and Pumping Devices, of which the following is a specification.

This invention relates to an oil well mechanism and it has for its object to provide means whereby gas under pressure in an oil well may be trapped and utilized in the expulsion of the oil from the well either in conjunction with and as an aid to a pump or independently thereof, according to the degree of pressure existing in the well.

Further objects and advantages of the invention will be set forth in the detailed description which follows.

In the drawing:

Fig. 1. is a sectional view of the lower portion of an oil well having the invention applied thereto;

Fig. 2 is an enlarged sectional view illustrating the packer in its compressed condition; and

Fig. 3 is a fragmentary view illustrating a bayonet joint hereinafter described.

Like numerals designate corresponding parts throughout the several figures of the drawing.

In the drawing 5 designates the well casing. The apparatus constituting the subject matter of the present invention consists of a flow head 6 into which the lower end of the tubing 7 is threaded. The lower end of the flow head is provided with an apron 8 within which the upper part of a rubber packer 9 is received, said packer being secured in place by means of the bolts 10, the lower ends of which are threaded into a ring 11 which is embedded in the rubber of the packer 9. A tubular extension 12 of the flow head has a sleeve 13 threaded upon its lower end and this sleeve carries an upstanding flange 14 which is engaged with the rubber packer 9. The lower end of the packer 9 is of flaring or bell formation, as indicated at 14^a and a spiral spring 15 is located in the portion 14^a, said spring having its lower end engaged at 16 with a cup-like guide 17 and having its upper end engaged in a groove 18 of the sleeve 13, said end terminating in an upturned tongue 19, which is engaged with said sleeve. The guide 17 serves the purpose of holding the lower edge of the portion 14^a of the packer in compressed condition against the tension of the spring 15 during the time that the device is being lowered into the well. At this time the parts are in the position illustrated in Fig. 2. With the parts as illustrated in Fig. 1 and before the device is lowered into the well, the guide 17 may be turned to wind the spring 15 to such an extent that the guide 17 may be slipped upwardly over the collapsed lower end of the packer 14. While being slipped up to this position, a key 20 carried by a section of tubing 21, enters a keyway 22 formed in the guide and prevents turning movement of the guide after the operator releases the same. A downward extension 23 of the guide 17 carries a ring 24 and a collar 25 by which the ring is held in place. The upper end of expansion springs 26 are soldered or otherwise secured to the ring 24 and the lower ends of these springs are secured to a collar 27 having a bayonet slot 28 formed therein. A coupling 29 of the tubing 21 carries a pin 30 adapted to coact with the bayonet slot, it being understood that when the guide is moved upwardly into packer compressing position, the pin 30 enters the vertical portion of the bayonet slot and that thereafter the collar 27, springs 26 and ring 24 are given a slight rotation to cause the pin 30 to enter the horizontal portion of the slot. At this time all of the parts are bound together and are in position to be lowered into the well casing 5. As the device is lowered into the well casing the springs 26 frictionally engage casing 5 and when the device has been lowered to the proper position the tubing may be given a partial rotation with respect to the springs 26 to move the pin 30 out of the horizontal portion of the bayonet slot. It is then possible to pull the tubing upwardly a short distance, this upward movement of the tubing carries the key 20 out of the keyway 22 and this permits the guide 17 to turn and consequently permits

the spring 15 to unwind. When the spring unwinds it expands the portion 14a of the packer and binds the lower edge of this portion firmly against the inner surface of the well casing 5. However, it is to be understood that it is not this action alone that is depended upon to prevent the escape of gas from the lower portion of the well. Upon the contrary it will be observed that the shape of the lower portion of the packer is such that the gas pressure itself will aid in forcing this yieldable lower edge firmly into contact with the inner wall of the casing. Consequently any gas in the lower portion of the well will be trapped therein and cannot escape from the well past the structure shown but must pass through the structure in escaping from the well, and it is in utilizing this passage of the gas through the structure to aid in expelling the oil from the well that the present invention particularly resides. The gas from the lower portion of the well passes upwardly through the channel 31 between the tubular extension 12 and the tube 21 and is discharged through the jet valves 32 of which there may be any desired number. Preferably, these valves are arranged in annular relation around the upper end of the tube 21 and since the various ports leading to said valves decrease in size toward the upper ends of said valves, it follows that these valves act after the manner of ejectors to create a reduction of pressure in the space 33 at the mouth of the tube 21. Additionally, the walls of the flow head 6 above the mouths of the jet valves are convergent, as indicated at 34 and this further aids in creating an ejector action which serves to aid in discharging the oil upwardly through the tube 7. The tubes 7 and 21 may be plain tubes, the lower end of the tube 21 or an extension thereof receiving the oil supply or these tubes may constitute extensions of a pump structure. Where the pressure within the well is sufficient the pump structure may be dispensed with, but where the pressure is not sufficient to discharge the oil alone then the structure shown may be used. The jet valves 32 comprise ball valves 32a which rest upon seats 32b and consequently the gas is prevented from passing through the jet valves until it accumulates in sufficient quantity to raise these ball valves from their seats and this must be done against the pressure of the oil thereabove. Consequently it will be seen that the apparatus is designed to not only trap the gas but to hold it from acting at all until it has accumulated in sufficient quantity and pressure to effectively aid in ejecting oil from the well.

It is to be understood that the invention is not limited to the precise construction set forth but that it includes within its purview whatever changes fairly come within either the terms or the spirit of the appended claims.

Having described our invention what we claim is:

1. A device of the character described comprising a flow head provided with a chamber having a liquid inlet and a liquid outlet, a plurality of ejector nozzles in the chamber around the liquid inlet, and discharging in the direction of the outlet, and a packer on the flowhead for preventing the passage of gas past the outside thereof, said packer also having an internal gas passage and the flow head having a continuation of said gas passage leading to the ejector nozzles.

2. A device of the character described comprising a flow head provided with a chamber having a liquid inlet and a liquid outlet, a plurality of ejector nozzles in the chamber around the liquid inlet, and discharging in the direction of the outlet, a packer on the flowhead for preventing the passage of gas past the outside thereof, said packer also having an internal gas passage and the flow head having a continuation of said gas passage leading to the ejector nozzles, and means associated with the ejector nozzles for preventing a discharge of gas therefrom until a predetermined pressure is attained.

3. A device of the character described comprising a flow head provided with a chamber having a liquid inlet and a liquid outlet, a plurality of ejector nozzles in the chamber around the liquid inlet, and discharging in the direction of the outlet, a packer on the flowhead for preventing the passage of gas past the outside thereof, said packer also having an internal gas passage and the flow head having a continuation of said gas passage leading to the ejector nozzles, and check valves associated with the ejector nozzles, said valves resisting the discharge of gas from the nozzles until a predetermined gas pressure is attained.

4. A device of the character described comprising a flow head, an elastic packer having a bell-like lower end, a spring for effecting expansion of said bell-like lower end, means for restraining said bell-like lower end in its expansive movement and means controllable from the top of the well for releasing said restraining means.

5. A device of the character described comprising a flow head, a packer, an expansion spring for the packer, a winding element for the spring, casing engaging springs and connections between said casing engaging springs and the winding element for preventing retrograde movement of the winding means.

6. A device of the character described comprising a flow head, a plurality of jet

valves carried thereby, a tubular member associated therewith and opening into the space between said jet valves, a packer upon the lower end of the flow head, a spring for expanding the lower end of said packer, a winding element for the spring constituting a restraining element for the lower edge of the packer, a casing engaging member and a bayonet joint between said casing engaging member and said tubular member.

In testimony whereof we affix our signatures.

GEORGE C. HENSHAW.
WILLIAM H. MYERS.