April 28, 1925. 1,535,141

J. D. WADE

APPARATUS FOR PUMPING WELLS

Original Filed March 1, 1923

Fig. 1.

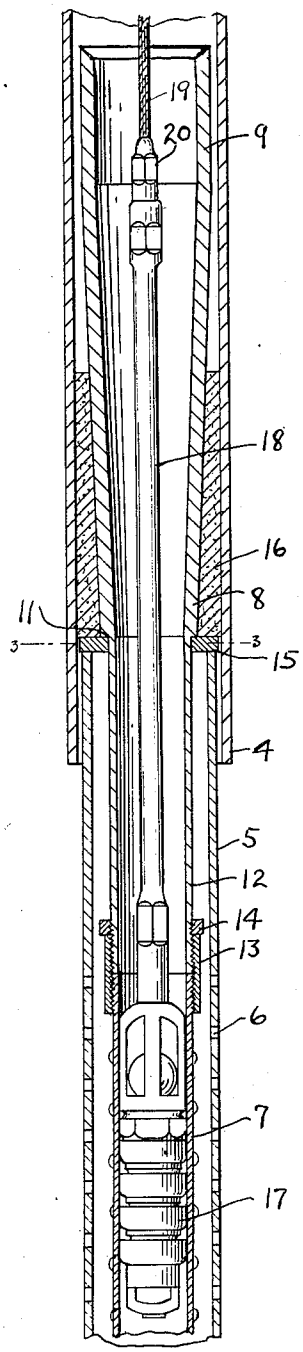


Fig. 2.

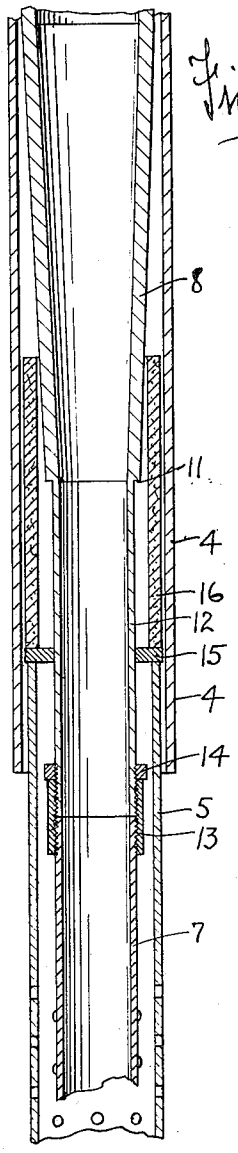
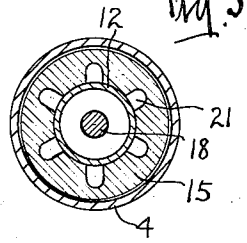


Fig. 3.



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UNITED STATES PATENT OFFICE.

JAMES D. WADE, OF GONZALES, TEXAS.

APPARATUS FOR PUMPING WELLS.

Application filed March 1, 1923, Serial No. 622,072. Renewed March 10, 1925.

To all whom it may concern:

Be it known that I, JAMES D. WADE, a citizen of the United States, residing at Gonzales, Gonzales County, Texas, have invented a certain new and useful Improvement in Apparatus for Pumping Wells, 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 relates to pumping oil or water from deep wells and contemplates the use of a device whereby the well may be conveniently and economically operated.

An object of my invention is to provide an apparatus whereby the use of tubing may be dispensed with in the pumping of a well.

Another object is to provide a construction whereby the cable may be used instead of a sucker rod in operating the plunger.

These and other objects and advantages are set forth in the specification which follows:

Referring to the drawing wherein one form of apparatus is shown by which my invention may be understood, Fig. 1 is a central longitudinal section through a well casing and liner showing my device installed therein, the plunger being shown in elevation; Fig. 2 is a similar view without the plunger and showing the parts in slightly different position; Fig. 3 is a transverse section on the plane 3—3 of Fig. 1. Like numerals of reference are applied to like parts in all the views.

In drilling oil wells, it is a common practice to drill the well down to the oil stratum and to then set a casing to retain the walls of the hole and shut off the formation above the pay. The well is then drilled into the pay stratum with a smaller bit. When the well is completed, the pay stratum is retained by a perforated liner fitting up a short distance into the casing previously set.

In the drawing, the casing is designated by the numeral 4 and the liner by 5, the liner being perforated as shown at 6.

In fitting the well up for pumping with my apparatus, I connect a pump barrel 7 of ordinary construction to the lower end of a specially constructed mandrel 8. This mandrel has an upper cylindrical portion 9 of large diameter, into which the pump plunger may be received loosely. Below the cylindrical portion the hollow mandrel is tapered downwardly both on its outer and inner diameters. At the lower end of the tapered portion 10 is an outer shoulder 11 below which the mandrel wall may be somewhat thinner and cylindrical as shown at 12. The lower end is threaded for connection by means of a coupling 13 to the working barrel 7. On the cylindrical portion 12 is a ring nut 14 immediately above the collar 13. A washer 15 is slidable on said mandrel between the shoulder 11 and the nut 14 and is adapted to support a cylindrical packer sleeve 16 of rubber or some similar compressible material.

The mandrel, with the pump barrel attached thereto, is lowered into the well after fitting the packer sleeve 16 thereon, said packer being supported upon the washer 15 which in turn rests upon the nut 14. The device thus assembled is lowered by means of a setting tool until the washer 15 comes in contact with the upper end of the liner 5 as shown in Fig. 2. The mandrel is then forced down into the packer which is compressed and forced into the space between the mandrel and casing above the liner, thus firmly sealing off the ends of casing and liner as shown in Fig. 1.

When the mandrel and pump barrel are thus firmly set in the liner, the pump plunger 17 may be lowered into the same. If the pump is to be operated by a cable, as shown, a sinker bar 18 is attached to the plunger, said bar being of sufficient weight to force the plunger down in operation of pumping. The sinker bar is secured to the operating cable 19 by means of a rope socket 20 of ordinary construction, threaded upon the upper end of the bar. It will be clear that said plunger will be received in the upper end 9 of the mandrel and be guided down into the pump barrel ready for operation.

When it is desired to remove the pump barrel for any reason, the pump plunger may be quickly withdrawn by means of the cable. A spear of the bulldog type is then let down into the mandrel and expanded to grip the same so that it may be jerked upwardly and released, allowing the packer and washer 5 to drop back, so that the packer will assume its original form. The washer may be provided with openings 21 therein, to allow liquid above the same to more readily drain back into the bottom of the well.

The advantages of this construction lie in the fact that no tubing is necessary. The oil forced up by the plunger will fill the casing and pour out the upper end through a lateral pipe provided therefor. Furthermore, where this apparatus is employed the action of the plunger exerts more suction directly on the pay stratum. This is due to the fact that the pump barrel is sealed to the casing as described, and the pump will then act, when the oil is flowing into the well slowly, to draw it into the pump forcibly, there being no chance for fluid to enter from above. Either cable or sucker rod may be employed to operate the plunger, the advantage in the use of cable being that the installation is cheaper and more quickly accomplished and that the device may be more easily repaired when desired. The further objects and advantages of my invention may be clearly understood without further description.

What I claim as new and desire to protect by Letters Patent is:

1. In a well having a casing and liner therein, said casing and liner being of uniform internal diameter, a pump barrel support comprising a mandrel adapted for attachment on the upper end of a pump barrel, and means on said mandrel to seal the space outside said mandrel and between said casing and liner comprising a packing sleeve slidable on said mandrel and compressed at said mandrel on contacting with said liner.

2. In a well having a casing and liner therein, a mandrel having a downwardly tapered portion and a lower cylindrical portion, a pump barrel secured to said mandrel, a washer slidable on said cylindrical portion of said mandrel, means to limit its movement in both directions, and a packer on said washer adapted when said washer contacts with said liner, to be forced upwardly on said mandrel as said mandrel descends and to be thereby expanded.

3. In a well casing and liner therein, both being of uniform internal diameter, a pump barrel, a mandrel thereon having its upper end enlarged and flared upwardly, and a packer of compressible material on said mandrel, said packer being adapted to be expanded on contact with said liner to seal the space between said mandrel and said casing and between said casing and liner.

4. In a well having a casing and liner therein, a downwardly tapered mandrel, a pump barrel secured at the lower end thereof, a washer on said mandrel adapted to contact with the upper end of said liner, a packing sleeve on said mandrel above said washer, said sleeve adapted to be supported on said washer and liner as said mandrel is moved downwardly, whereby said packer is expanded laterally to seal said pump barrel and casing above said liner.

5. In a well having a casing and liner therein, a pump barrel having an upwardly flaring mandrel at the upper end thereof, means on said mandrel to support a slidable packing sleeve, a packing sleeve of compressible material thereon, said means being adapted to contact with the upper end of said liner to expand said packer on said mandrel in the manner described.

In testimony whereof, I hereunto affix my signature this the 26th day of February, A. D. 1923.

JAMES D. WADE.