

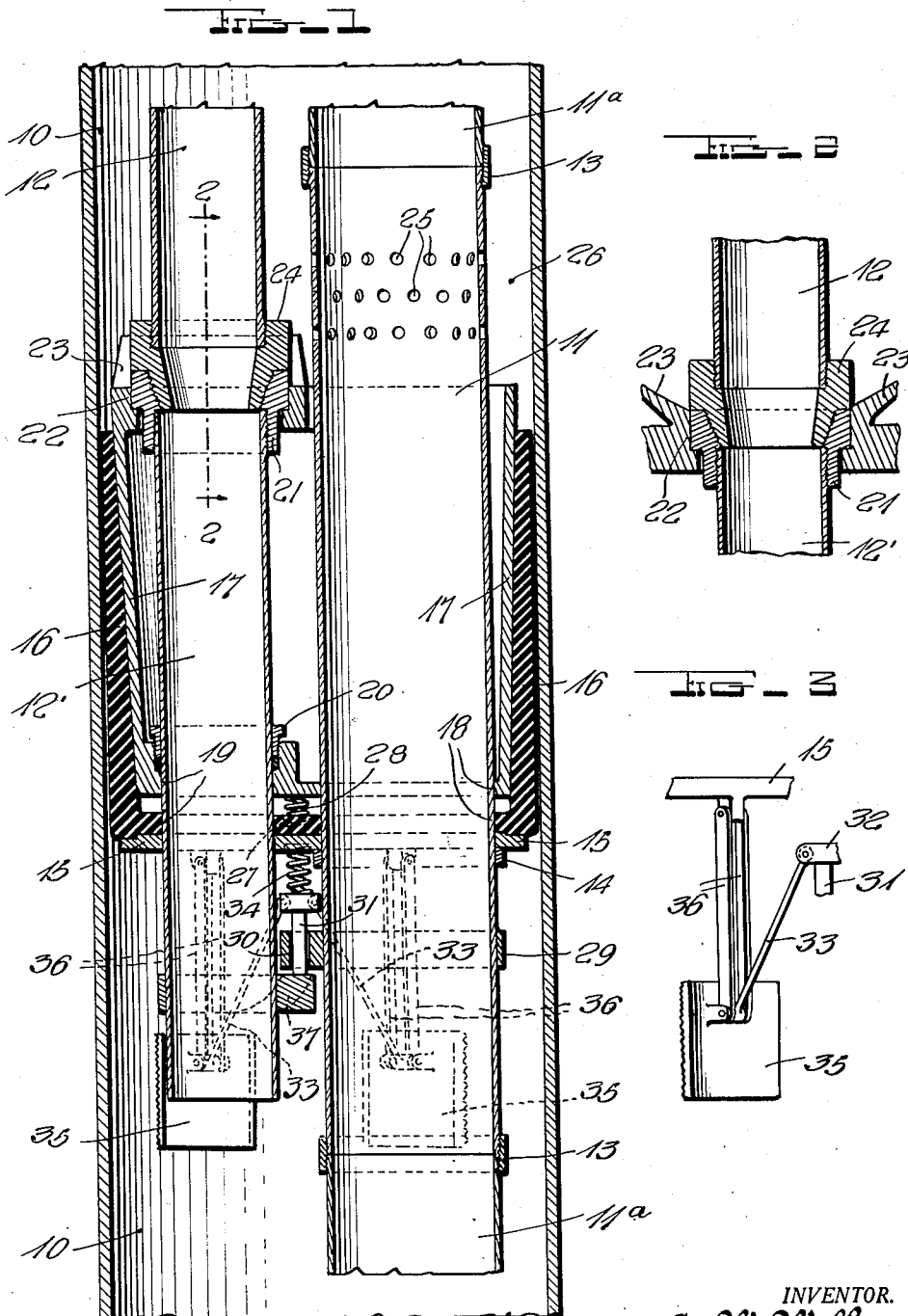
Aug. 16, 1932.

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1,871,867

PUMP

Filed Aug. 19, 1929



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UNITED STATES PATENT OFFICE

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Application filed August 19, 1929. Serial No. 386,926.

My invention relates to pumps and more particularly to that type used in removing oil from wells, and has for its primary object to materially assist the natural lift of the pump in a simple and efficient manner.

In the present devices used for lifting oil from the wells there are three distinct methods namely; the sucker rod pump, the gas lift and the vacuum lift. All of these types have disadvantages which do not lend themselves to the most efficient and speedy recovery of fluid from the well. The quantity of oil removed per cycle in the above mentioned methods are not commensurate with the energy expended so that the reason for their inefficiency is self evident.

It is one of the objects of my invention to produce an efficient and economical device which will materially increase the production from a well.

A further object of my invention being in the combination of the most efficient portions of the above mentioned methods so that they will collectively assist one another in a progressive manner.

With these and other objects in view, my invention will be more fully described and illustrated in the accompanying drawing, in several views in which corresponding numerals indicate like parts and the novel features of the invention will be particularly pointed out in the appended claims.

Figure 1 is a sectional view taken through the center line of the well casing at the combining fixture.

Fig. 2 is a fragmentary detail view taken on line 2-2 of Fig. 1, and

Fig. 3 is a detail view of one of the side wall grab shoes.

Referring to Fig. 1, the numeral 10 indicates a common sectional well casing having contained therein sectional pumping tubing 11 and auxiliary sectional tubing 12. The pump tubing 11 is assembled by the screw collars 13, one section of this tubing is provided with an integral ring 14 adapted to support a packer ring 15, the rubber packer 16 and the cone 17. The packer ring 15, rubber packer 16 and the cone 17 are provided with aligning openings 18 and 19 respectively

through which pass the pump tubing 11 and the auxiliary tubing 12', at this point where the tubing 12' passes through the opening 19 of the cone 17, a stuffing box 20 is provided. At the upper end of the tubing 12' is secured a taper-threaded collar 21 which fits into a shouldered hole 22 in the top of the cone 17. At this point, which is an integral part of this section of 11, is provided with flared guiding lip portions 23. The auxiliary tubing 12 at its lower end is provided with a conical threaded collar 24 adapted to be received by the threaded collar 21.

The pump tubing 11 at a position slightly above the top of the cone 17 is provided with perforations 25 which connect the interior of the tubing 11 with the casing chamber 26. The rubber packing 16 on its bottom surface is provided with recesses 27 into which are received the springs 28 which also bear on the lower surface of the cone 17. Attached to the pump tubing 11 is a plunger guide member 29 provided with a guide hole 30 into which fits a plunger 31. Said plunger at its upper end is provided with a collar 32 to which are secured the radially extending arms 33. The movement of the arms 33 are actuated through the spring 34. The arms are pivoted to the grab shoes 35 which are yieldably suspended by the hangers 36 fulcrumed from the underside of the packer ring 15.

In the integral contact with the lower end of the plunger 31 is a tapered cam member 37 secured to the auxiliary tubing 12'.

The method of assembly and operation is as follows: The usual well casing 10 is lowered into the well and into this casing is lowered the pump tubing 11 on which is secured the packer device assembly. When the pump tubing 11 is at the proper depth, the auxiliary tubing 12 is lowered into place and by means of the taper-threaded members 21 and 24 it is easily screwed into proper position. When these threads have been drawn tightly the continued turning against the resistance of the stuffing box 20 will cause the tubing 12' to turn which will likewise turn the cam 37 releasing the plunger 31 and thereby release the grab shoes 35 so that they

will secure a purchase on the inner wall of the well casing 10 and by so doing will assist in permanently securing the assembly in place. To finally set the apparatus a slight lowering of the tubing 11 will cause the cone 17 to press against the packer 16 engaging it with the casing and thus effectively seal the chamber 26 from the chamber 26'.

In withdrawing oil from the well a suction is drawn in the tube 12 and 12' causing a pressure differential in the chamber 26' which will initially raise the natural level of the oil therein. Natural gas emanating from the oil well will also exhaust through the tubes 12 and 12' assisting the further use in said pressure differential. A pump element (not shown) contained in the tubing 11 is reciprocated to cause the oil to lift therein. The aforesaid pressure differential will allow the pump to withdraw more oil with less effort than heretofore. This lift is further assisted by introducing gas under considerable pressure into the chamber 26 where it will enter the pump tube 11 through the openings 25, the introduction of this gas pressure helps to move the oil column up and consequently relieve the sucker rod of this head pressure. The combined effect of the vacuum and pressure cycles very materially increase the amount of oil that can be lifted to the surface while at the same time relieving the strain on the pumping equipment.

Although I have shown and specifically described a well casing embodying my invention, it is obvious that minor changes may be made in the construction thereof without departing from the spirit or scope of my invention, and I desire therefore that no limitations shall be imposed except such as are indicated in the appended claims.

What I claim and desire to protect in the United States by Letters Patent is:

1. In an oil well construction, a well casing, pump tubing extending longitudinally in said casing, a packing support carried by said tubing, a cup shaped packing disposed about said tubing and resting upon said support, a conical spreader slidably received in said packing, a rotatable coupling carried by said spreader, an auxiliary tube section extending longitudinally in said spreader with its upper end engaged with said coupling and its lower end projecting downwardly through the bottom of the packing and the packing support, an auxiliary tube extending longitudinally in said casing and having its lower end releasably engaged with said coupling whereby the auxiliary tube may be connected with the coupling after insertion of the pump tubing into the casing and turned with the tube section as a unit, casing gripping means below said packing support urged downwardly towards a gripping position, a spring yieldably supporting the spreader in an elevated position until overcome by weight of

the auxiliary tubing, and means to releasably hold the casing gripping means in an inoperative position moved out of retiring relation thereto by turning of the auxiliary tube section.

2. In an oil well construction, a well casing, pump tubing extending longitudinally in said casing, a packing support carried by said tubing, a cup shaped packing disposed about said tubing and resting upon said support, a conical spreader slidably received in said packing, a rotatable coupling carried by said spreader, an auxiliary tube section extending longitudinally in said spreader with its upper end engaged with said coupling and its lower end projecting downwardly through the bottom of the packing and the packing support, an auxiliary tube extending longitudinally in said casing and having its lower end releasably engaged with said coupling whereby the auxiliary tube may be connected with the coupling after insertion of the pump tubing into the casing and turned with the tube section as a unit, a spring yieldably resisting downward movement of said spreader, arms pivoted to said support and extending downwardly therefrom, shoes carried by said arms, a guide carried by said pump tube, a plunger slidable vertically through said guide, links connecting said plunger with said arms, a spring urging said plunger downwardly to spread the arms and move the shoes into position to grip the well casing, and a cam carried by the auxiliary tube section and engaging the lower end of said plunger to hold the plunger elevated and the shoes out of gripping position until the tube section and cam are turned in a determined direction.

3. In an oil well construction, a well casing, a pump tube extending longitudinally through said casing, packing carried by said tube, a spreader for said packing, an auxiliary tube extending through the casing and spreader and rotatably engaged with the spreader, and casing gripping means below said packing urged towards a gripping position and moved into and out of a gripping position by turning the auxiliary tube.

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