May 8, 1934. J. L. MULERT 1,957,795

SUCKER ROD LOCKING DEVICE

Filed Sept. 22, 1933

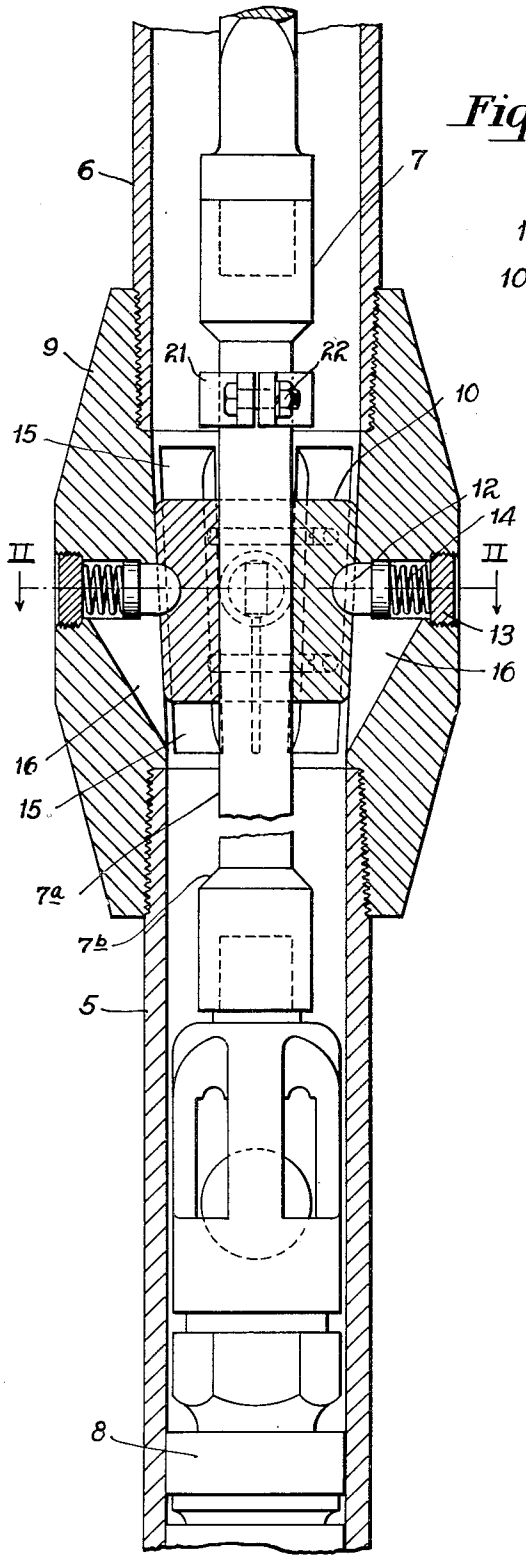


Fig. 1.

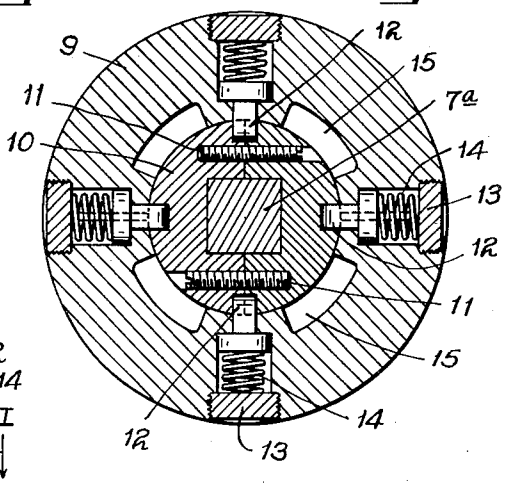


Fig. 2.

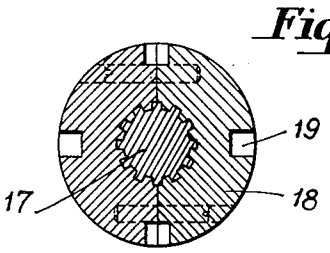


Fig. 3.

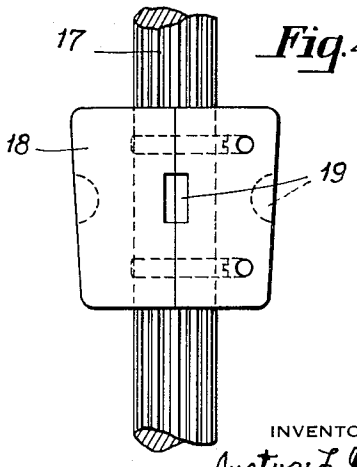


Fig. 4.

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Patented May 8, 1934 1,957,795

UNITED STATES PATENT OFFICE

1,957,795

SUCKER ROD LOCKING DEVICE

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Application September 22, 1933, Serial No. 690,575

2 Claims. (Cl. 103—202)

My invention relates to sucker rods for well pumps and more particularly to devices for holding them against rotation.

In those well pumps which employ a string of pump tubing to the lower end of which the working barrel of a pump is connected, together with a pump rod for operating the pumping piston in the barrel, it frequently happens that reciprocation and consequent vibration of the pump rod causes the sections thereof to gradually become unscrewed and to fall apart. It also happens, in wells which have been drilled crooked, that the pump plunger has a much shorter life than a plunger which is operated in a straight hole, due to the non-alignment of the plunger and the operating rod, whereby the plunger axis does not follow the true center of the working barrel.

My invention has for its object the provision of an improved means for preventing this accidental rotative or unscrewing movement of the pump rods, and particularly to guiding and holding means of such form that it can readily be rendered operative or inoperative, to serve its purpose even while the apparatus is installed in a well, and which will serve as a guide for the pump plunger, to prevent tilting of the plunger on its axis.

Some of the forms which my invention may take are shown in the accompanying drawing wherein Figure 1 is a vertical sectional view of a portion of a well pump installation; Fig. 2 is a view taken on the line II—II of Fig. 1; Fig. 3 is a view similar to that of Fig. 2, but showing a modified form of apparatus, and Fig. 4 is a side elevational view of the structure of Fig. 3.

The working barrel of the pump is indicated by the numeral 5 and the lowermost section of the pump tubing proper by the numeral 6. The working barrel and the tubing may be of conventional form. The necessary number of screw-jointed pump rods may be employed, and these also may be of the usual form, or wire cable in conjunction with pump rods at its lower end may be employed as in the usual practice.

To the lower end of the string of pump rods is connected a guide rod 7 which may have screw connection with or be otherwise secured to the string of pump rods, and in itself functions as one section of the string. However, the guide rod 7 is of particular form as hereinafter described, in order to prevent the unscrewing movement above-referred to. The rod 7 carries the working piston 8 and other working parts usually found in pumps of this character.

The working barrel 5 is connected to the lowermost joint 6 of the string of tubing by a coupling sleeve 9. A guide block 10 is positioned within the coupling sleeve and is preferably tapered somewhat so that it will set against correspondingly-inclined surfaces on the interior of the coupling sleeve and its movement downwardly into the coupling sleeve thereby limited. The guide block is shown as composed of half sections which are held in assembled relation by screws 11 and has a rectangular recess at its center for the reception of a square or rectangular portion 7a of the guide rod 7. The portion 7a of the guide rod is of such length that said rod can have sufficient range of movement during vertical reciprocation, independently of the guide block 10. That is, the rod 7 can be reciprocated to actuate the pump piston 8, without engaging the ends of the guide block 10.

The guide rod is, of course, held against rotation relative to the block 10 by reason of the rectangular contour of the portion 7a and of the adjacent wall of the block 10.

The length of the rod is such that it can be employed with the pump piston 8 working in any one of various lengths of working barrels. A split adjusting collar 21 is adjustably clamped on the portion 7a of the guide rod above the guide block 10, the collar being clamped on the rod by means of bolts 22. The collar 21 is positioned on the rod 7 at a point determined by the length of stroke of the rod and the pump piston 8, when operating in a barrel of a given length, whereby the collar engages the guide block 10 to move the same into locking position, before the piston 8 reaches the bottom of the working barrel.

For locking the barrel against rotative movement, the block 10 is provided with recesses for the reception of flat-sided locking pins 12 when said pins are at their inwardly projected positions. The pins are slidably supported within holes provided in the coupling sleeve 9, and are retained therein by means of screw plugs 13, springs 14 being interposed between said plugs and the enlarged heads of the pins 12, so that such pins are yieldably forced toward their innermost positions.

In assembling the apparatus with the working barrel, the coupling sleeve 9 and the tubing 6 in place in the well, it is necessary only to insert the guide rod 7, with the guide block 10 and adjustable collar 21 in place thereon, through the tubing 6, with the pump rods attached thereto in the usual manner, until the guide rod and the

guide block reach approximately the positions shown in Fig. 1.

The collar 21 is initially positioned on the rod 7*a* at a predetermined point, as heretofore described, to engage the upper end of the guide block 10 and force it between the locking pins 12 into position against the seating surfaces therefor on the interior of the coupling sleeve 9. Thus, when the piston 8 is employed in a short working barrel, the collar 21 will be positioned on the rod 7*a* at a point to engage the guide block 10 and move it into locking position before the lower end of the piston engages the lower end of the working barrel. The pumping movements of the piston and the rod 7 will, of course, be of such length of stroke that there will be no impacting between the collar 21 and the guide block 10.

If the recesses in the side of the guide block are not in registry with the locking pins 12, the rod 7 can be rotated until the pins snap into position within said recesses. Thereupon, the pumping operations may be carried on without danger of the rods rotating through the vibrations due to pumping movements. In order to remove the pump rods from the tubing it is necessary only to lift the rod 7 a sufficient distance. During its upward movement, its shouldered portion 7*b* will engage the lower end of the block 10 to raise said block out of locking engagement with the pins 12, and the elevating movement of the rods can be continued in the usual manner.

Passageways 15 are provided in the inner wall of the coupling sleeve 9 for the flow of oil or water past the block 10. A drainage passage 16 is also provided beneath each recess that contains a locking pin 12 so that the material which may happen to accumulate between said plungers and the screw plugs 13 will drain back into the well, thereby avoiding clogging of the springs and interference with movements of the plungers.

A different form of slidable and non-rotating engagement may be provided between the guide rod and the guide block than that shown in Figs. 1 and 2. For example, as shown in Fig. 3, a guide rod 17 which corresponds to the guide rod 7 has in effect a splined fit with the guide block 18, by reason of the fact that said rod and block have interfitting ribs and grooves that permit longitudinal movement of the rod relative to the block but prevent relative rotative movements thereof. In this case the guide block is provided with recesses 19 for the reception of locking pins such as the pins 12, the recesses being curved in vertical directions, so that the curved noses of the locking pins can readily enter such recesses and be forced therefrom when the guide block is being inserted in place or removed from the coupling sleeve.

I claim as my invention:—

1. The combination with well-pump tubing and reciprocably-mounted screw-jointed sucker rods therein, of a working barrel, a coupling sleeve connecting the working barrel to the tubing, locking pins carried by the sleeve and yieldably-projected inwardly, a guide rod connected to the lower end of the sucker rods and extending into the said working barrel, a guide block embracing said guide rod and having slidable, but non-rotative movement relative to the rod, and stop means on the rod limiting sliding movement of the block with respect to the rod, the block being provided with recesses for receiving the inner ends of said pins, the pins and the recesses having their vertical walls flattened and having cooperative camming surfaces on their lower sides whereby the pins are pushed to inoperative position upon raising of the block, and the sleeve having a seating surface for limiting downward movement of the block.

2. The combination with well-pump tubing and reciprocably-mounted screw-jointed sucker rods therein, of a working barrel, a coupling sleeve connecting the working barrel to the tubing, locking pins carried by the sleeve and yieldably-projected inwardly, a guide rod connected to the lower end of the sucker rods and extending into the said working barrel, a guide block embracing said guide rod and having slidable, but non-rotative engagement with the rod, stop means on the rod limiting sliding movement of the rod, the pins being curved in their upper and lower sides and having their vertical sides extending approxmately radially of the coupling sleeve, and the block being provided with complementally-formed recesses for receiving the inner ends of said pins, and the sleeve having a seating surface for limiting downward movement of the block.

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