

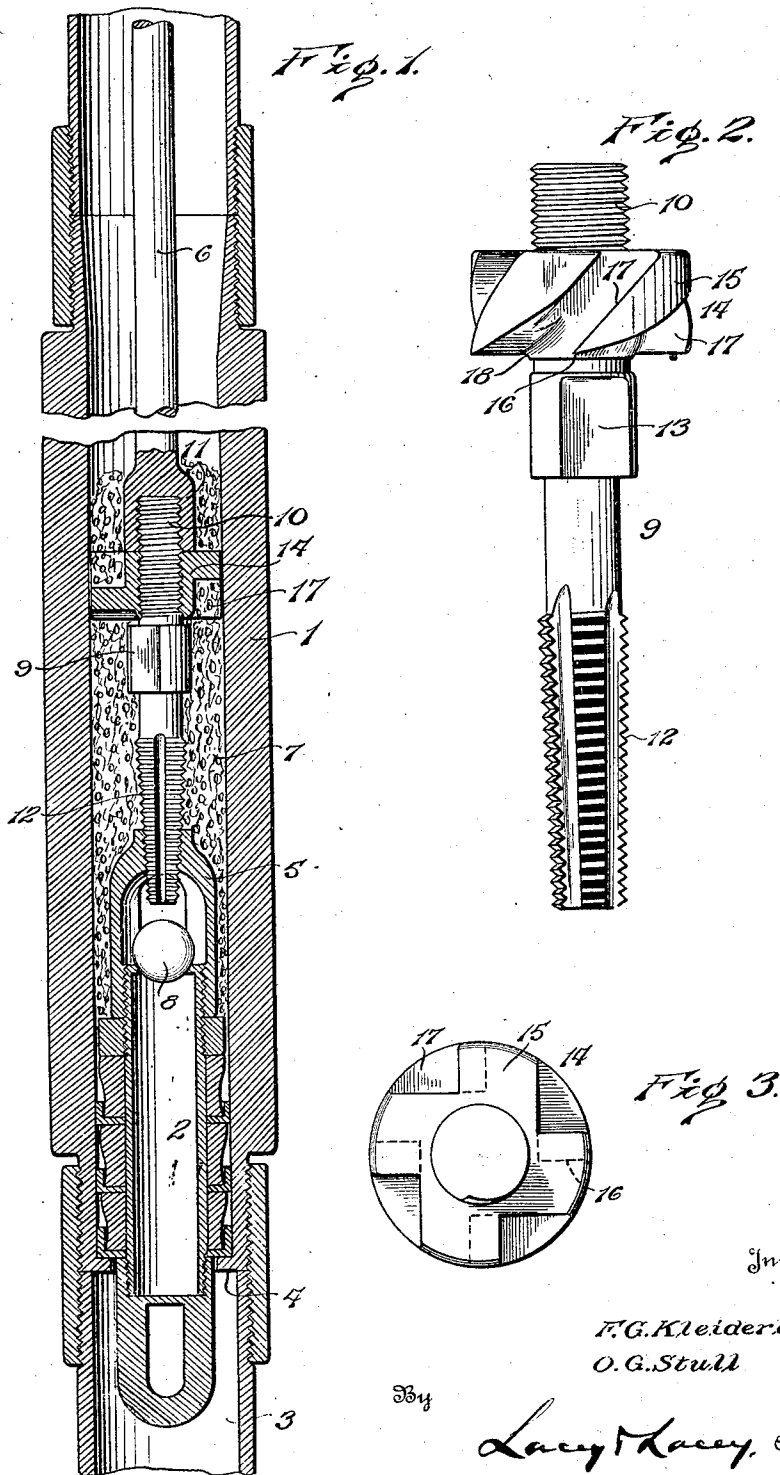
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TAP FOR REMOVING VALVES FROM DEEP WELLS

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TAP FOR REMOVING VALVES FROM DEEP WELLS.

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To all whom it may concern:

Be it known that we, FRED G. KLEIDERLEIN and ORSON G. STULL, citizens of the United States, residing at Bradford and Coleville, respectively, in the county of McKean and State of Pennsylvania, have invented certain new and useful Improvements in Taps for Removing Valves from Deep Wells, of which the following is a specification.

10 In the operation of deep wells, such as oil wells, it is customary to extend tubing to the bottom of the well and to provide a stationary valve at the lower end of the tubing to control the flow thereinto. This stationary or standing valve is supported by a shoulder at the lower end of the tubing and operates automatically to permit an inflow of oil as the plunger or pump rod rises within the tubing. The pump rod is 20 equipped at its lower end with a valve which may or may not be of the same general construction as the standing valve and which operates to permit an upward flow of the liquid upon the down stroke of the pump or plunger rod and to seat upon the upstroke so that the liquid which has passed above the valve will be lifted to the mouth of the well. Notwithstanding the provision of a screen below the standing valve, sand, 30 mud, paraffin and other foreign matter will pass into the cage of the standing valve and through the same so as to accumulate in the cage and above the same within the tubing or barrel so that eventually the valve is 35 locked or clogged and the pump ceases to draw oil to the surface. It, therefore, becomes necessary to frequently withdraw the standing valve from the barrel or tubing in order to clean the valve and renew the packing gaskets employed on the cage to effect a water-tight joint between the cage and the barrel. The devices heretofore employed to withdraw the standing valve were usually 45 equipped with a washer which had the effect of packing the sand, paraffin and other foreign matter upon the cage of the standing valve so that the tap or withdrawing tool failed to enter the valve cage and consequently necessitated the removal of the entire line of tubing from the well in order to clean the standing valve and renew the worn parts of the same. It is the object of our invention to provide a simple, easily operated and efficient device which will readily 55 penetrate the mud, sand and paraffin so that

it will not be packed against the cage of the standing valve and the tap or withdrawing tool will effect engagement with the standing valve cage so that it may be easily withdrawn from the tubing. One embodiment of the invention is illustrated in the accompanying drawing and will be hereinafter fully set forth.

In the drawing:

Figure 1 is a vertical section of a portion 65 of a deep well showing my improved tap or withdrawing tool engaged in the standing valve cage;

Fig. 2 is a side elevation of the tap, and Fig. 3 is a plan view of the tap.

In the drawing, the reference numeral 1 indicates a portion of the barrel or tubing, 2 indicates as an entirety the standing valve, and 3 indicates a portion of the upper end of the sand screen. The standing valve rests upon an internal annular shoulder 4 at the lower end of the tubing, and its cage includes at its upper end a sleeve or collar 5 having openings through its sides to permit the flow of the oil and equipped at its upper extremity with an internally threaded opening to receive the lower end of the withdrawing tool. The reference numeral 6 denotes the pump or plunger rod which is usually employed and, in the operation of the well, has the floating valve secured to its lower extremity.

When the mud, sand or other matter, indicated at 7, accumulates within the barrel to such an extent as to choke the valve proper, indicated at 8, so that the valve is held either in its opened or its closed position, the pump rod 6 is withdrawn from the well, the floating valve is removed therefrom, and our improved tap or withdrawing tool is substituted therefor. The tap or withdrawing tool is indicated as an entirety by the numeral 9 and includes a stem or shank having a threaded upper extremity 10 which is adapted to be engaged in the threaded socket 11 at the lower end of the pump rod 6, and having its lower end provided or constructed with the tapered cutting threads 12 which are adapted to cut through the accumulation 7 and engage in the threaded opening at the head of the sleeve 5. The stem of the tap is provided between its ends with flattened faces 13 whereby it may be readily engaged by a wrench or other tool in order to be firmly secured in the socket 11 and, 110

above the said flattened portions, we secure upon the stem a cutter 14. The cutter may be conveniently fitted upon the shank or stem of the tap by having its threaded bore engaged upon the upper threaded extremity 10 of the shank so that, when the shank is engaged in the socket 11, the said socket will serve as a lock nut to hold the cutter in place. The cutter consists of a substantially circular body having projections 15 formed upon its periphery, and these projections are tapered downwardly and circumferentially of the body to provide cutting edges 16 at their lower ends, the upper or forward face, considered in the direction of rotation of the tool and indicated by the reference numeral 17, being inclined or obliquely arranged, as clearly shown. The projections 15 are, of course, spaced circumferentially of the body so that passages 18 are provided between the successive projections or cutting elements to facilitate the progress of the cutter through the material.

It is thought the operation of the tool will be readily understood from the foregoing description, taken in connection with the accompanying drawing. After the tap has been connected with the pump rod in the manner described, the rod with the tap at its lower end is lowered into the well until the downward movement is stopped by the end of the tap striking the accumulation in the lower portion of the tubing. The pump rod is then rotated by the workmen at the mouth of the well and the tap will be thereby caused to cut through the accumulated sand and other matter so that it will bore its way to and into the cage of the standing valve. The rotation of the pump rod and the tap will, of course, be imparted to the cutter which will cut through and loosen the accumulated material instead of packing the same against the standing valve cage so that the threaded cutter extremity 12 of the tap will enter easily and with certainty into the threaded opening in the upper end of the sleeve 5 and will effect a firm engagement with said sleeve, whereupon a lifting force applied at the upper end of the pump rod will raise the rod and the standing valve from the tubing. When the standing valve is thus removed from the tubing, the oil which may have risen in the tubing will flow out through the sand screen back into the reservoir at the bottom of the well and by this action will remove from the tubing the accumulated sand and other matter. After

the standing valve has been cleaned and repaired, it is returned to the bottom of the well in the usual manner and the floating valve again attached to the pump rod, whereupon the well may be operated as before. It will be readily seen that we have provided an exceedingly simple, inexpensive and efficient means whereby the packing of the accumulation against the cage of the standing valve will be avoided and the valve may be very easily and quickly removed from the well without requiring the removal of the entire line of tubing, thereby effecting a very material reduction in the cost of maintenance and operation of the well.

Having thus described the invention, what is claimed as new is:

1. A tool for withdrawing standing valves from deep wells comprising a member adapted to engage the cage of the standing valve, and a cutter carried by said member above the lower end thereof.

2. A tool for removing standing valves from deep wells comprising a shank having its lower end constructed to engage the cage of the standing valve and its upper end constructed to be secured to the lower end of a pump rod, and a cutter secured upon and encircling said stem adjacent the upper end of the same.

3. A tool for removing standing valves from deep wells comprising a shank having cutting threads at its lower end to engage in the upper end of the standing valve cage and constructed at its upper end to be secured to the lower end of a pump rod, and a cutter secured upon said stem adjacent its upper end and comprising a body to encircle the stem, and circumferentially spaced projections upon said body provided with cutting edges at their lower ends.

4. A tool for withdrawing standing valves from deep wells comprising a stem constructed at its lower end to engage the upper end of the standing valve cage and constructed at its upper end to be secured to the lower end of a pump rod, and a cutter secured upon said stem adjacent the upper end thereof and including a body to encircle the stem and circumferentially spaced projections on said body, the said projections being tapered downwardly and circumferentially of the body to define cutting edges at their forward lower ends.

In testimony whereof we affix our signatures.

FRED G. KLEIDERLEIN. [I. S.]
ORSON G. STULL. [L. S.]