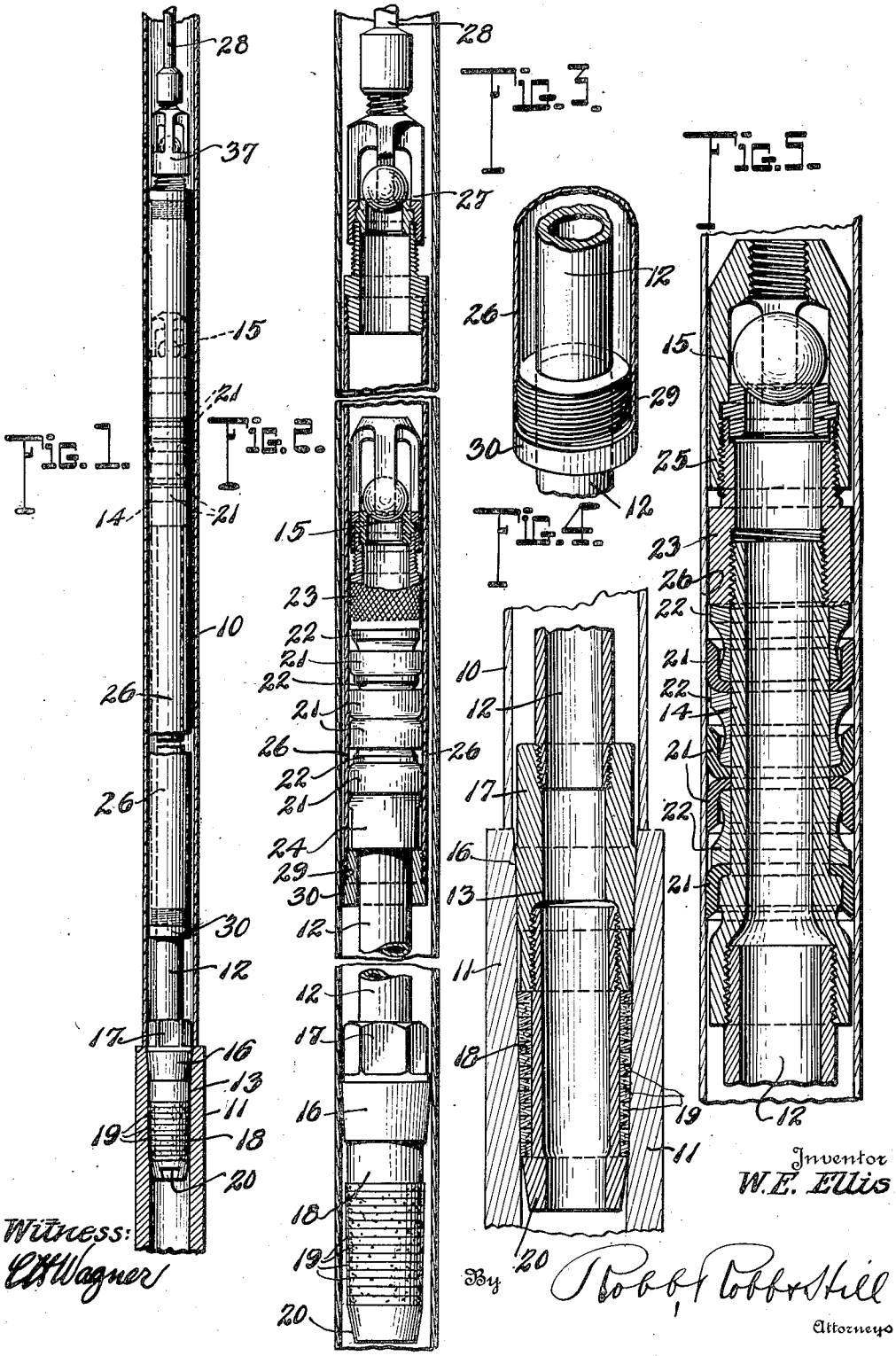
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W. E. ELLIS

DEEP WELL PUMP

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UNITED STATES PATENT OFFICE.

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DEEP-WELL PUMP.

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To all whom it may concern:

Be it known that I, WARREN E. ELLIS, a citizen of the United States, residing at Lebo, in the county of Coffey and State of Kansas, have invented certain new and useful Improvements in Deep-Well Pumps, of which the following is a specification.

This invention relates to a deep well pump and particularly to a construction embodying a relatively fixed plunger cooperating with a traveling barrel.

In the form of deep well oil pumps generally in use practical experience develops a serious objection incident to the "cutting" of the oil as the cups upon the working valve become worn, due to the repeated leakage of the oil past such cups in the opposite movements of the valve. Such damage renders the oil worthless and large quantities of crude oil are thus ruined. In this prior form where the working valve traveled the action of the oil with the incidentally mixed sand and water quickly cut out the cups and rendered it necessary to frequently "pull" the well or remove the pumping elements therefrom for replacement. This removal in prior constructions has required several operations in order to withdraw the working valve and also its barrel when the latter becomes scored or damaged. Another objection to the usual construction is that the weight or load of the oil to be pumped is carried by the working valve and the pressure thereon quickly distorts and wears the cups as the oil is forced past the same.

The present invention avoids these difficulties by providing a relatively stationary tubular member provided with a working and standing valve while the traveling barrel acts as a plunger and the valve at its upper portion carries the weight of the oil. Such a structure protects the cups of the working valve by enclosing them within the barrel and as the load is lifted by the latter and not the cups the wear upon the cups is materially reduced so that replacement and repairs are seldom required. The construction also provides for the "pulling" or removal of all of the pumping parts at a single operation which renders the repair and replacement quick and convenient when found necessary, while the capacity of the pump may be readily varied or increased by lengthening the barrel which determines the quantity of oil to be carried at a single stroke.

Other and further objects and advantages of the invention will be hereinafter set forth and the novel features thereof defined by the appended claims.

In the drawing:

Figure 1 is an elevation showing the pump applied.

Figure 2 is an enlarged elevation, with parts in section, showing the parts in position for withdrawal.

Figure 3 is a detail sectional perspective showing the stop cap.

Figure 4 is a vertical section through the frictional holder.

Figure 5 is a similar view of the working valve upon the standard.

Like numerals refer to like parts in the several figures of the drawings and the numeral 10 designates a well casing which may be of any desired size or character. At the lower portion of this casing the usual standard barrel 11 is applied and adapted to receive the intake of the fluid from the well. Supported upon the barrel 11 is a tubular standard or member 12 which carries at its lower portion a friction holder 13 fitting within said barrel and at its upper portion a piston 14 and also a ground or check valve 15. These several parts may be of any desired construction but the preferable form thereof is herein shown and described.

In the present instance the holding member 13 is shown as of conical configuration and threaded upon the lower end of the tubular standard 12. The tapering face 16 of this holder is adapted to snugly fit the interior of the barrel 11 and the upper portion of the holder is provided with a suitable wrench hold 17. The lower portion of the holder is interiorly threaded and receives the threaded end of a guide 18. This guide carries a series of friction or leather rings 19 and is formed with a wrench hold 20 at its lower end. This guide is of tubular form and snugly fits the interior of the barrel so as to increase the frictional hold of the tapered portion and properly center the same in application. When the guide is firmly screwed in position the packing face thereof will be expanded sufficiently to effect a tight joint against the walls of the barrel.

The piston 14 may be of any usual construction and is herein shown as comprising a series of cups 21 separated by spacers 22 and held in position upon the standard by clamps 23 and 24 thereon. The standing valve 15 is of the usual ball and seat type and is threaded at 25 upon the standard.

Cooperating with the elements just described is a traveling barrel 26 within which the piston snugly fits. This traveling barrel is provided at its upper portion with a check or working valve 27 of the usual ball and seat form and from which the operating rod 28 extends to the upper portion of the well. The opposite end of this traveling barrel is interiorly threaded at 29 to receive a threaded stop cap 30 which is slidingly mounted upon the standard 12. It will be seen that this cap limits the extreme upward movement of the barrel by engagement with the clamp 24 beneath the piston. This engagement of the cap and clamp permits the pulling or withdrawal of the standard together with the working barrel when it is desired to remove these parts from the well. This traveling barrel acts as the pumping plunger and the working valve at its upper portion carries the lifting load of the oil which is entirely relieved from the relatively stationary working valve upon the standard. The barrel has a sufficiently close fit within the casing to prevent side play which would effect or release the friction holding of the standard but has sufficient clearance to permit its ready operation and withdrawal. Furthermore, the capacity of the pump may be varied or increased by lengthening the traveling barrel so that the quantity of oil received in each stroke is greater.

The operation of this pump will be generally apparent from the description and it will be seen that the oil or liquid is drawn through the tubular standard in the upward movement of the barrel and fills the same so that in the return downward stroke the oil is expelled from the barrel and lies above the working valve thereof. In the next upward stroke of the barrel the body of oil within the well is correspondingly lifted. In this construction the cups of the piston, which are the most readily damaged members of an oil pump, are fully protected by the enclosing barrel and are only subject to sufficient pressure to expel the oil within the barrel while the main lifting pressure of the column of oil in the well is carried by the head of the barrel. This invention is readily adapted for application to wells having the usual standard barrel as shown in this case. When such replacement is made the traveling valve cooperating with such barrel is withdrawn and the standard frictionally engaged with the upper end of such barrel so as to be firmly supported against the upward pull in the pumping action. The structure places the weight and working load upon parts which are not susceptible of quick deterioration so that the wear upon the pump is effectually reduced. In the application of the pump the fixed barrel at the end of the well tubing may be formed with an interior taper to snugly fit the friction holder and assist in firmly retaining the same during the pumping action, as shown in Figures 1 and 4.

While the specific construction of the details of this invention have been shown and described it is not confined thereto as changes and alterations may be made therein without departing from the spirit of the following claims.

What I claim is:

1. In a pump, a tubular standard provided at its upper portion with a piston and a superposed valve, a holder comprising a coupling member for the standard and having an outer tapering wall, a sleeve provided with a tool hold at one end and having its opposite end adjustably threaded into said holder, frictional packing rings upon said sleeve between said hold an the end of the coupling member, and a traveling plunger barrel enclosing the valve upon said standard and provided at its upper portion with a lifting valve.

2. In a pump, an anchor coupling comprising a tubular member interiorly threaded at opposite ends and having a tapering outer wall, a sleeve threaded into said coupling and provided at its free end with a head having tapering outer walls and a tool hold, and a packing carried by said sleeve intermediate its head and the end of said coupling member whereby adjustment of the sleeve effects a clamping action against said packing.

In testimony whereof I affix my signature.

WARREN E. ELLIS.