O. B. KIBELE.

REMOVABLE DEEP WELL PUMP.

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1,421,253. Patented June 27, 1922.

Fig. 1.

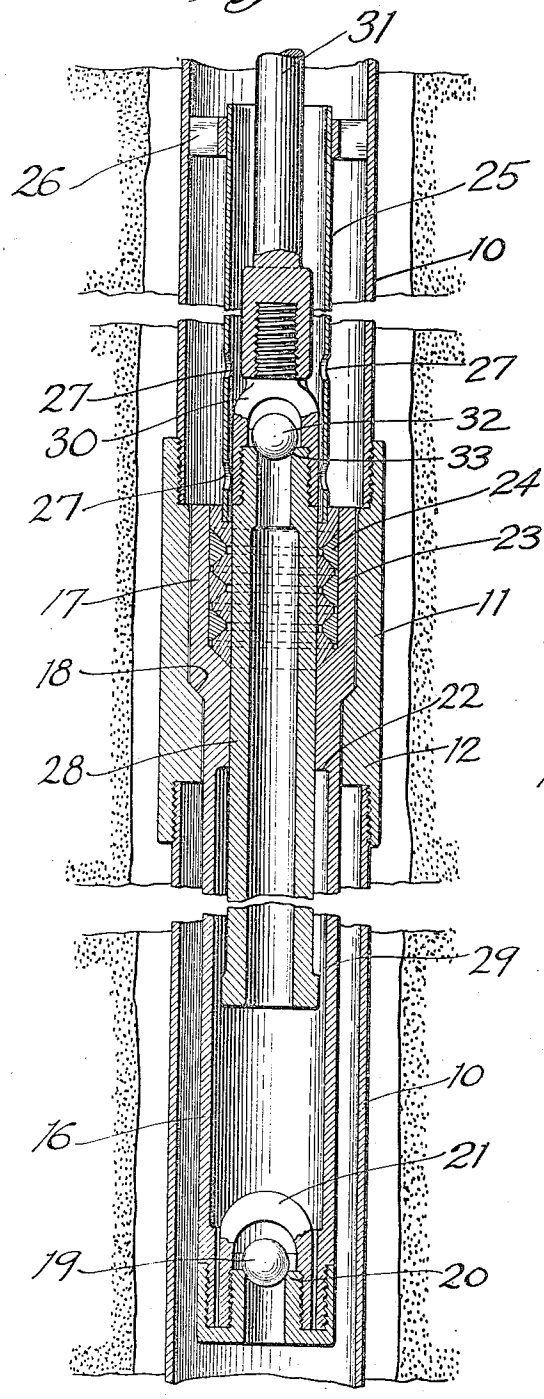
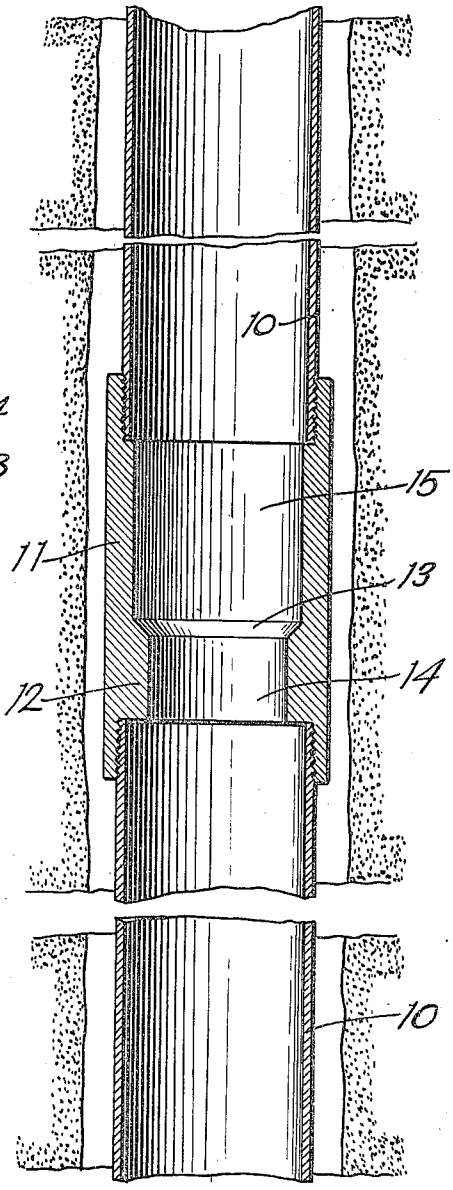


Fig. 2.



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UNITED STATES PATENT OFFICE.

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REMOVABLE DEEP-WELL PUMP.

1,421,253. Specification of Letters Patent. Patented June 27, 1922.

Application filed June 20, 1921. Serial No. 479,028.

To all whom it may concern:

Be it known that I, OTTO B. KIBELE, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Removable Deep-Well Pumps, of which the following is a specification.

My invention relates to new and useful improvements in pumps for deep wells, the principal objects of my invention being to generally improve upon and simplify the construction of the existing types of deep well pumps, to provide a relatively simple and efficient pump that comprises a minimum number of parts and which may be readily removed from the well without disturbing any part of the well tubing.

Further objects of my invention are to provide an improved form of coupling for the well tube sections, which coupling is specially formed in order to receive a main cylinder or barrel of my improved pump, to provide relatively simple means for effectively packing the joint between the pump cylinder or barrel and the plunger that operates therein, to provide gravity means for retaining the packing in proper position within the pump cylinder, and, further, to provide a deep well pump that is capable of being easily and cheaply produced, readily assembled or taken apart and which will be very effective in performing its intended functions.

With the foregoing and other objects in view, my invention consists in certain novel features of construction and arrangement of parts that will be hereinafter more fully described and claimed, and illustrated in the accompanying drawings, in which:

Fig. 1 is a vertical section taken lengthwise through the center of a deep well pump of my improved construction.

Fig. 2 is a vertical section taken lengthwise through the center of the adjacent ends of a pair of well tube sections, and showing said tube sections connected by a coupling of my improved construction and which is designed to receive the improved pump.

Referring by numerals to the accompanying drawings, which illustrate a practical embodiment of my invention, 10—10 designate the adjacent end portions of a pair of well tube sections, the ends thereof being externally threaded, and seated on said threaded ends are the internally threaded ends of a coupling member 11, the same being tubular in form and provided with a relatively heavy wall between its threaded end portions.

Formed integral with the lower portion of the body of the coupling and immediately above the lower internally threaded end portion, is an inwardly projecting flange 12 the upper face of which is inclined and finished to form a shoulder or seat 13 for the cylinder or barrel of my improved pump. The provision of the flange 13 forms a circular opening 14 in the lower portion of the coupling that is substantially smaller in diameter than the cylindrical opening 15 in the upper portion thereof.

My improved pump includes an elongated hollow cylindrical member 16, the external diameter of which is such that it will slide freely through opening 14 in the lower portion of the coupling 11, and the upper portion of said cylindrical body is enlarged as designated by 17 in order to fit snugly within the larger chamber 15 in the upper portion of the coupling.

The shoulder 18 between the main body portion of the cylindrical barrel 16 and the enlarged upper portion 17, is beveled and finished so as to co-operate with the finished surface 13 in producing a ground joint between the inclined or beveled joints when the barrel is properly positioned within the coupling.

The lower end of the pump cylinder or barrel 16 is provided with a suitable upwardly opening check valve, preferably of the type employing a ball 19 that normally rests on a suitably formed seat 20 and the movement of said ball away from its seat being limited by a suitable stop or cage 21.

Formed within the pump barrel or cylinder 16 and at a point near its upper end, is an internally arranged shoulder 22, and the opening through said cylinder is enlarged at the upper end thereof to form a chamber 23 that is occupied by suitable packing 24, preferably a series of metal rings arranged in superimposed relation.

Bearing on the upper end of this packing is the lower end of a hollow cylindrical member 25 that is concentrically arranged within the well tube 10 that is connected to

the upper end of the coupling 11, and the upper portion of said tubular member 25 carries a spider 26 which is effective in retaining said tubular member in concentric position within the well tubing.

The weight of tube 25 causes it to perform the functions of a gravity member in retaining the metallic packing 24 in proper position within the chamber 23 and against the plunger of the pump, which reciprocates through said packing, and in order to permit the free passage of liquid from the chamber within the lower portion of said gravity member into the chamber between said member and the well tube above the coupling 11, the lower portion of the wall of said member 25 is provided with suitable apertures 27.

Arranged for reciprocating movement through the metallic packing 24 and through the upper portion of the pump cylinder or barrel 16, is the pump plunger 28, the same being tubular in form and provided on its external surface, adjacent to its lower end, with a shoulder 29 that is adapted to engage against shoulder 22 on the pump cylinder when the pump is lifted from the well tube.

The upper end of the plunger 28 is detachably connected in any suitable manner to the lower end of a coupling member 30, and the upper end of the latter is detachably connected in any suitable manner to the lower end of a sucker rod 31.

Arranged between the upper end of the plunger 28 and the intermediate portion of the coupling 30, is a suitable upwardly opening check valve, preferably of the type employing a ball 32 that normally rests on a seat 33 that is formed on the upper end of the plunger and the movement of said ball away from its seat being limited by a part of the coupling 30.

During the operation of my improved pump, valve 32 will be unseated on the downward movement of plunger 28, thereby permitting liquid to pass upwardly through said plunger, and said liquid will flow past open check valve 32, from thence upwardly through gravity member 25 and out through the openings 27 therein.

Upon the upward movement of plunger 28, check valve 32 will close, and check valve 19 at the lower end of the pump barrel or cylinder 16 will be drawn open by the suction produced by the upward movement of the pump cylinder, and liquid will be drawn into the chamber within the lower portion of said cylinder or barrel 16 past said open check valve 19.

When it is desired to remove the pump from the well tubing it is only necessary to lift the sucker rod 31 until the shoulder 29 on the plunger 28 engages against shoulder 22 on the barrel 16, and as a result of such engagement, said barrel will be lifted and drawn upwardly with the sucker rod, and thus all parts of the pump may be removed from the well tubing without disconnecting any sections thereof.

The ground joint between the beveled or inclined shoulders 13 and 18 and the arrangement of the metallic packing between the upper portion of the pump barrel and plunger effectively prevents leakage of liquid in either direction past the pump and its operating parts. The relatively simple structure of the pump minimizes the initial expense of installation and likewise minimizes expense of maintenance and repairs, and, by constructing the pump so that it is lifted from the well tubing by the sucker rod, it is not necessary to provide and maintain additional mechanism for lifting said pump from the well.

Thus it will be seen that I have produced a relatively simple and efficient pump that may be advantageously and economically employed in deep wells and the construction and mounting of said pump being such that it can be readily withdrawn from the well tubing by means of the sucker rod without disturbing any parts of said well tubing.

It will be readily understood that minor changes in the size, form and construction of the various parts of my improved pump may be made and substituted for those herein shown and describel without departing from the spirit of my invention, the scope of which is set forth in the appended claims.

I claim as my invention:

1. In a deep well pump, a tubular member having an internal shoulder, a barrel arranged in said tubular member and resting upon said shoulder, an inlet check valve at the lower end of said barrel, a plunger arranged for reciprocatory movement through the upper portion of said barrel, an outlet check valve arranged at the upper end of said plunger, a metallic packing arranged between said plunger and said barrel and a perforated tube bearing on top of said packing and serving to retain the same in position between said plunger and barrel.

2. In a deep well pump, a tubular member having an internal shoulder, a barrel arranged in said tubular member and resting upon said shoulder, an inlet check valve at the lower end of said barrel, a plunger arranged for reciprocatory movement through the upper portion of said barrel, there being an inwardly extending shoulder at the upper end of the barrel, and an outwardly extending shoulder on the lower end of the plunger so as to pull the barrel upwardly with the plunger and sucker rod, an outlet check valve arranged at the upper end of said plunger, metallic packing arranged between said plunger and said barrel, and a gravity member bearing upon said packing

for retaining the same in position between said barrel and plunger.

3. In a deep well pump, a relatively stationary barrel, an inlet valve at the lower end thereof, a tubular plunger arranged for reciprocating movement through the upper portion of said barrel, a check valve at the upper end of said plunger, metallic packing between said barrel and plunger, and a gravity member engaging the upper packing ring and extending upwardly around the upper valve and sucker rod for retaining the packing in position between said barrel and plunger.

In testimony whereof I have signed my name to this specification.

O. B. KIBELE.