

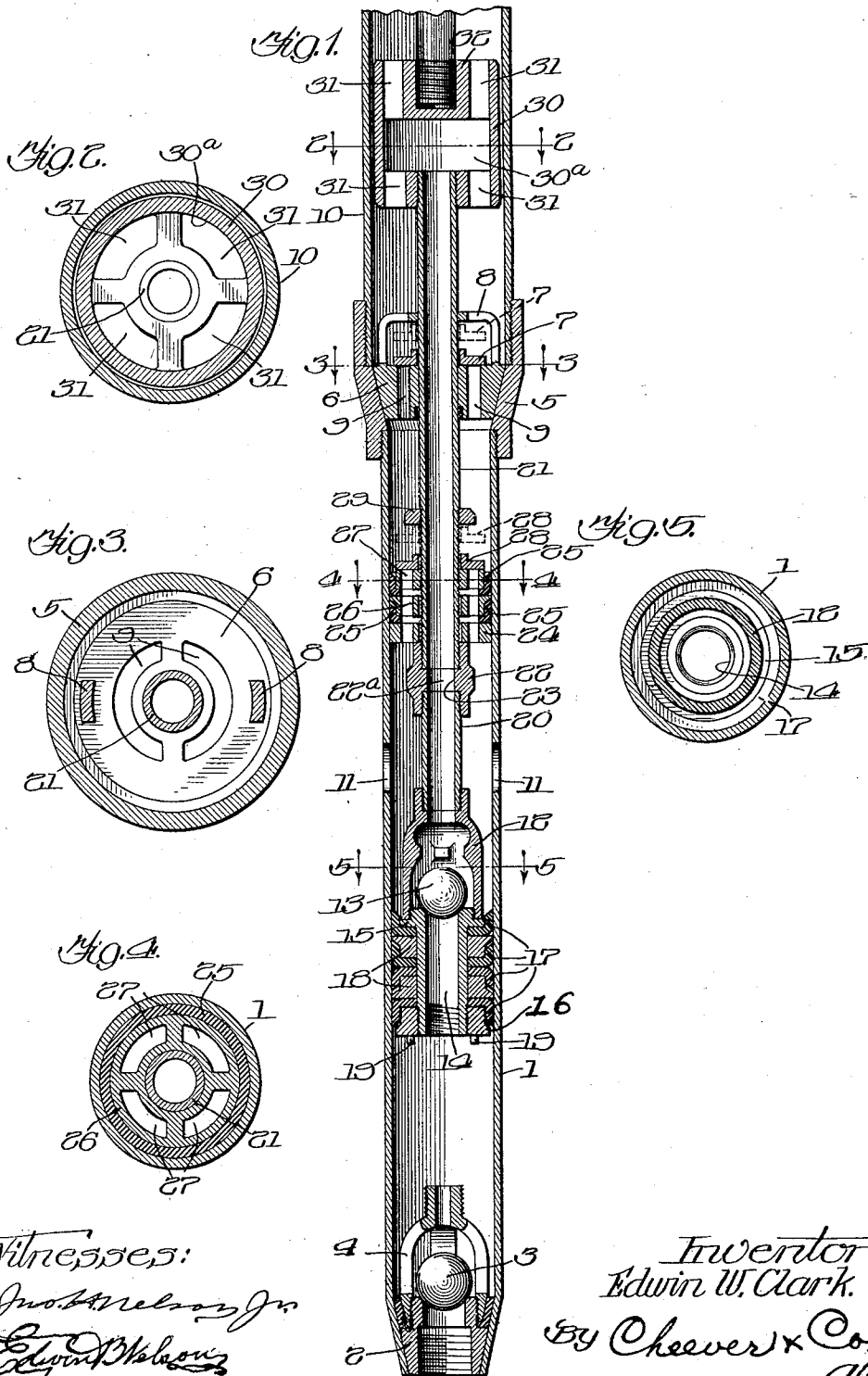
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PUMP.

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1,104,962.

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UNITED STATES PATENT OFFICE.

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1,104,962.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, EDWIN W. CLARK, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Pumps, of which the following is a specification.

My invention relates more particularly to deep well pumps, mine pumps, and the like, in which there is a vertically reciprocating plunger working in a cylinder or barrel.

The general object of the invention is to reduce the number of parts in a pump of this character and to simplify their construction and arrangement.

It is my purpose also to produce a construction in which the parts may be assembled and disassembled quickly and conveniently and yet be held securely when assembled.

Another object, contributory to the ones suggested, is to provide a combination guide and outlet coupling for guiding the piston tube and pump rod and coupling them together.

I accomplish my objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal central view of the complete pump. Figs. 2, 3, 4 and 5 are transverse sectional views of the pump taken at various points in Fig. 1, indicated by the lines of section 2—2, 3—3, 4—4, 5—5 respectively.

Similar numerals refer to similar parts throughout the several views.

The cylinder or barrel proper 1 is open at its lower end and provided with a check comprising a seat 2 and ball 3 coöperating therewith and the cage 4 which prevents displacement of the ball. In my construction the coupling usually required at the lower end of the cylinder (see for example my prior Patent Number 967,498, issued August 16, 1910) is dispensed with, and the valve seat is held in place by the convergence of the walls of the cylinder itself. In other words, I secure the check by swaging the walls of the cylinder. By this means the check may be withdrawn upward but is prevented from escaping out through the lower end of the cylinder. A coupling 5 is screwed or otherwise fastened to the upper end of the cylinder, this coupling having tapered walls in which is seated a check consisting of the seat 6 and valve 7 coöperating therewith

and the cage 8 for limiting the upward movement of the valve. The valve seat 6 has vertical passages 9 for the up-flow of the liquid. The drop pipe 10 is screwed or otherwise fastened to the coupling 5 and forms a duct for conveying the liquid upward.

My pump is double acting and is provided with two plungers, one above the other located respectively above and below the lateral inlet apertures 11 formed in the side of the cylinder. The lower plunger consists of a closed cage 12 containing a check ball 13 seating upon a follower 14. In the design shown, the cage screws onto the follower and abuts against a flange 15 formed thereon. The follower is longitudinally apertured and is internally screw threaded at the lower end to take the screw threaded upper end of the cage 4 above mentioned. The follower is also externally screw threaded at the lower end to take the nut 16 which serves to retain in place the cup leathers 17. These leathers alternate with the spacers 18, the uppermost leather being retained by the flange 15 of the follower and the lowest being retained by the nut 16. By removing said nut from the follower, the cup leathers and spacers may be simultaneously removed for renewal or repairs. By preference two pairs of lugs 19 are formed on the underside of nut 16 for receiving any suitable tool for unscrewing the nut. As said nut screws upon the outside of the follower and the cage screws into the inside of the follower there is no danger of the cage causing the nut to be unscrewed when the follower is lowered onto the cage and screwed up thereinto for lifting the lower check out of its seat.

In the best design the piston tube is formed in two sections 20 and 21 connected by a coupler nut 22, which has an internal passage 22^a registering with the internal passage of the tube sections, and has an annular shoulder 23 against which the proximate ends of the tube sections screw.

The upper plunger consists of a plate 24 loosely fitting over the threaded lower end of tube section 21 and resting upon the upper end of the coupler nut 22. Arranged upon the coupler nut are cup leathers 25 held apart by a spacer 26. The uppermost cup leather is held in position by a plate 27 which screws upon tube section 21. The parts 24, 25 and 26 are provided with suit-

able vertical passages for the up travel of liquid. A check valve 28 seats upon plate 27 and permits upward movement of liquid and prevents downward movement thereof. The upward movement of the check valve is limited by a collar 29 which screws upon tube section 21 above the plunger.

At the upper end of the upper piston-tube section 21 is a combination guide and outlet coupling 30 which makes a sliding fit within the drop pipe 10. This coupling screws onto the upper end of tube section 21 and is provided with appropriate vertical passage 31 for the up travel of liquid. At the upper end said coupling has a threaded socket 32 for receiving and engaging the lower end of the pump rod. Said socket is closed at the bottom, thereby preventing entrance of liquid into the pump rod, which latter usually is formed of standard iron pipe and need not be illustrated. Coupling 30 has a central internal chamber 30^a into which liquid is delivered both from the inside of the piston tube and from the space in the drop pipe surrounding said tube. Thus the chamber 30^a is a receiving chamber for all of the liquid which is delivered from the cylinder.

When in use, the pump may be inclosed in a well casing, as is common in apparatus of this kind, or it may be simply lowered into an ordinary well or sump, the only requisite being that the water level shall be above the top of the inlet apertures 11 in the side of the cylinder. When the moving parts are reciprocated they will cause the liquid to pass in through the lower check and apertures 11 and be passed in a substantially continuous flow up through the plungers and through the passages inside and outside of the piston tube, all of the liquid being delivered into the chamber 30^a formed in the coupling 30. The liquid passes thence up through the upper passages 31 and into the drop pipe 10.

It will be noted that the coupling 30 maintains the proper centralized position of the lower end of the pump rod and of the upper end of the piston tube 21. Said coupling prevents lateral displacement of the proximate ends of the parts mentioned and at the same time permits the liquid to pass freely up into and through it. The coupling also seals the lower end of the pump rod. As a result, the operation of these particular parts of the apparatus is rendered certain and yet the coupling consists of but a single piece which would in any event be required to connect the piston tube with the element operating it. I desire also to call particular attention to the construction at the lower end of the cylinder in which the lower check is held in position simply by the swaged lower end of the cylinder and without the aid of any extra cou-

pling, it being remembered that the lower end of the cylinder is open in distinction to the types of pumps in which the lower end of the cylinder is closed. Attention is also directed to the fact that in my construction, by reason of forming the piston tube in two sections connected by the coupler nut 22 it becomes possible when the reciprocating parts have been withdrawn from the cylinder, to renew the cup leathers in either one of the plungers without disturbing the leathers in the other plunger. If the lower leathers are to be renewed the nut 16 only need be removed to release the leathers. If the leathers of the upper plunger are to be renewed it is merely necessary to unscrew the nut 22 from the upper piston tube section 21, the lower plunger in the meantime remaining intact.

I claim as my invention:

1. In a double acting pump, the combination of a cylinder having an inlet in the side, plungers in said cylinder above and below said inlet, a two section piston tube, and a coupler nut connecting the sections of the piston tube, said nut having a central passage in communication with the internal passage of the tube and said nut supporting the upper plunger.

2. In a double acting pump, the combination of a cylinder having an inlet in the side, plungers in said cylinder above and below the inlet, a two section piston tube, and a coupler nut engaging the sections of the piston tube, said nut having a central passage in communication with the internal passage of the tube, the upper plunger consisting of a plate screwing onto the upper section of the tube, cup leathers encircling the upper section of the tube, and spacer plates loosely encircling said tube, the lowest spacer plate resting upon said coupler nut.

3. In combination, a single integral pump cylinder, a check secured to the upper end thereof, a check in the lower end of said cylinder, said cylinder having swaged converging sides at the lower end, open at the bottom and supporting the lower check, and said cylinder having an inlet in the side, and two plungers, one above and the other below said inlet and both located between said checks.

4. In a pump, the combination of a cylinder open at the bottom and having an inlet opening at the side, checks at the lower and upper ends of said cylinder, plungers in said cylinder one above and one below the lateral inlet, a piston tube operating said plungers and passing through the upper check, a drop pipe fastened to the upper end of the cylinder, and a combination guide and outlet coupling secured to the upper end of the piston tube, said coupling fitting slidably within said drop pipe and having vertical passages for the up flow of liquid,

said coupling also having an internally threaded socket at the upper end, said socket being closed at the bottom for the purpose described.

5 5. In a pump, the combination with the cylinder, plungers, checks and piston tube of a drop pipe connecting with the upper end of the cylinder and receiving the upper end of the piston tube, and a combination
10 guide and outlet coupling, said coupling having a central chamber for receiving liquid from the tube and said coupling also having passages leading from said chamber both to the space beneath and outside of

the piston tube and to the space above the 15 coupling, whereby liquid from both the inside and the outside of the piston tube is delivered into said chamber and may pass from said chamber up into the drop pipe, and means for securing the coupling to a 20 pump rod above.

In witness whereof, I have hereunto subscribed my name in the presence of two witnesses.

EDWIN W. CLARK.

Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."