

W. F. JACOBS.
EXPANSION PLUNGER FOR PUMP CYLINDERS.
APPLICATION FILED JULY 1, 1905.

965,466.

Patented July 26, 1910.

Fig. 1

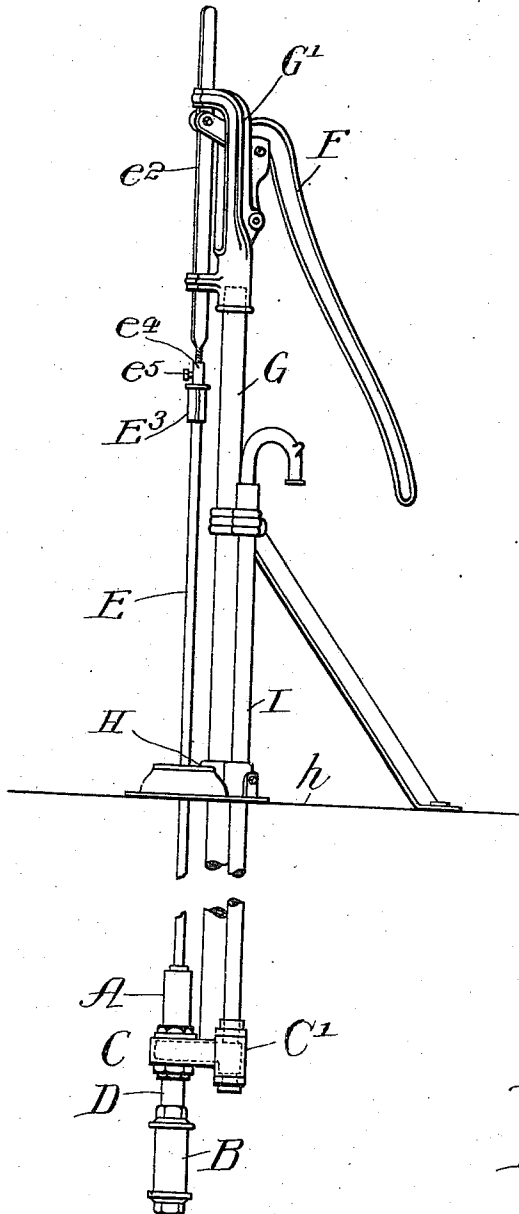
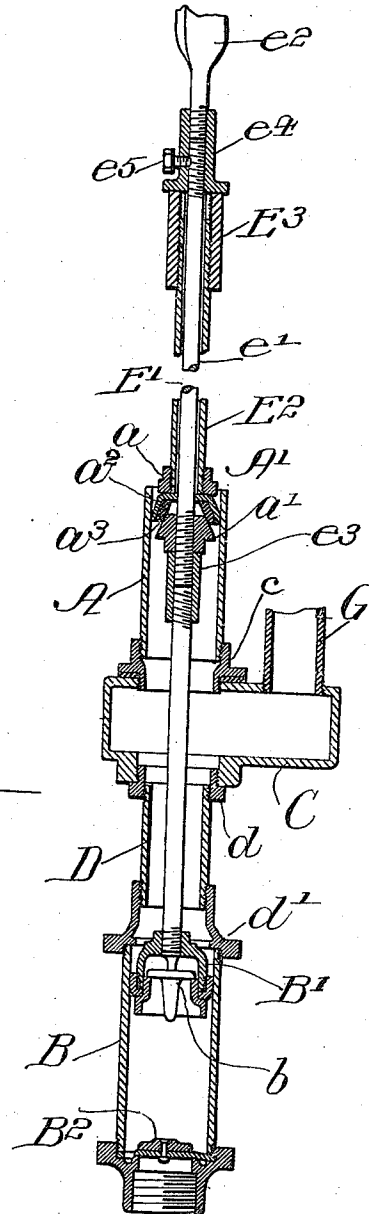


Fig. 2



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UNITED STATES PATENT OFFICE.

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EXPANSION-PLUNGER FOR PUMP-CYLINDERS.

965,466.

Specification of Letters Patent.

Patented July 26, 1910.

Application filed July 1, 1905. Serial No. 267,927.

To all whom it may concern:

Be it known that I, WILLIAM F. JACOBS, a citizen of the United States, of Ottawa, in the county of Lasalle and State of Illinois, have invented certain new and useful Improvements in Expansion-Plungers for Pump-Cylinders; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in pumps for pumping liquids and refers more specifically to the construction of the pumping piston, whereby the same is properly packed in the cylinder, and also to means accessible, without removal of the piston, for adjusting the packing member of the piston to take up wear and maintain a fluid tight packing between the piston and cylinder.

The invention consists in the matters hereinafter set forth and more particularly pointed out in the appended claims.

My improvements are herein shown as applied to a single acting force pump, but it will be understood that it may be applied to other types of pumps wherein the principle of its action is available.

In the drawings:—Figure 1 is a side elevation, broken between its ends, of a single acting force pump to which my invention may be practically applied. Fig. 2 is a vertical section of the connected upper and lower cylinders of the pump and their pistons, and showing also the pump rod and the means for effecting adjustment of the packing of the upper piston through the medium of said pump rod.

As shown in the drawings, A and B designate alined upper and lower cylinders of a single acting force pump. The upper cylinder A is open at its upper end and communicates at its lower end with the upper end of the lower cylinder through a chambered casting C that is joined to the upper cylinder by a coupling *c*, and to the lower cylinder, through the medium of a short tube D, that is joined to the chambered casting and the lower cylinder, respectively, through the medium of suitable coupling sleeves *d* *d*¹.

A¹ designates, as a whole, the piston of the upper cylinder A, and B¹ designates the piston of the lower cylinder B which is provided with a downwardly closing check valve

controlling the port or passage of said piston. The lower wall of the cylinder B is provided with a port that is controlled by a downwardly closing check valve B². Said pistons A¹ B¹ are attached to a pump rod E extending axially therethrough and through the connecting chamber C, and said rod is connected at its upper end with an operating handle F or other operating device or mechanism.

The cylinders A and B are suspended from a vertical tubular support or stand G which extends through and is supported by a suitable casting H that rests on the platform *h* of a well, or other suitable support. The lower end of said tube G enters an opening in the upper wall of the chambered casting C and said tube is closed at its upper end to constitute an air chamber which communicates with the casting and the pump cylinder. I designates the discharge pipe of the pump which extends upwardly through and has suitable connection with the platform plate H and is in communication at its lower end with a tubular branch C¹ of the chambered casting C, whereby the liquid is discharged from said casting into the discharge pipe at each pumping stroke of the piston A¹. To the upper end of the tube G is attached the usual guide bracket G¹ for the upper sections *e*² of the pump rod and to which also is hinged the pump handle.

The foregoing parts of the pump are familiar and the operation thereof need not be further described.

The pump rod consists essentially of two parallel vertical members which have relative longitudinal movement, and the upper pumping piston is formed of relatively movable parts which act upon the packing members of said piston through relative longitudinal movement of the piston rod members to adjust the piston packing. The relatively movable parts of the pump rod consists, as herein shown, of an inner rod E¹ and a surrounding tube E². Said inner rod is, for structural reasons, made of three sections joined by coupling sleeves *e*³ *e*⁴. The upper coupling sleeve has screw-threaded connection with the lower end of the upper section *e*² of the pump rod and is locked to the intermediate section by a set-screw *e*⁵ which prevents said coupling from turning on the rod.

The piston A¹ of the upper cylinder com-

prises, in detail, a ring or follower a fixed to the lower end of the tubular part of the pump rod, a conical expansion sleeve a^1 , fixed to the inner member E^1 of the pump rod below said follower, a cup-leather a^2 interposed between said sleeve and follower or ring, and an elastic or cushion sleeve a^3 within the flange of the cup leather which sleeve is itself made interiorly conical to receive the conical expansion sleeve. The said sleeve a^3 is preferably made of rubber, but it may be made of any other yielding material. With this construction relative movement of the two members of the rod, longitudinally thereof, acts to bring together or separate said follower ring and expansion sleeve. When said sleeve and follower are moved toward each other, the expansion sleeve enters the interiorly conical elastic sleeve a^3 and expands the same and the flange or marginal part of the cup leather radially outwardly, with the effect of pressing the cup leather against the inner surface of the pump cylinder. The means herein shown for effecting relative endwise movement of the members of the pump rod consists of an elongated nut E^3 which surrounds and has screw-threaded engagement with the outer or upper end of the tubular member of the pump rod and engages at its outer or upper end a shoulder fixed to the inner member of said rod. As herein shown, said shoulder is formed by the lower end of the coupling sleeve e^4 by which the two upper sections of the inner member of the rod are connected. With this construction it will be observed that when the adjusting nut E^3 is turned in one direction, the outer, tubular member of the rod is forced downwardly and the inner member is forced upwardly. Such action has the effect to move the follower and expansion sleeve toward each other with the result of expanding the cup leather outwardly against the inner surface of the cylinder.

From an inspection of the drawings it is manifest that the tubular member and the upper piston member may be readily moved upwardly by disconnecting the parts of the inner or solid rod member at the joint formed by the sleeve e^4 . When the inner rod member is thus disconnected said tubular rod member and the upper piston member are free to be pulled upwardly to move the upper piston member out of the cylinder and entirely away from the solid rod member. This work may be accomplished without going into the well, and when the parts are so removed a worn packing is accessible for removal from the lower member of the piston and a new packing may be applied by slipping it downwardly over the solid member of the piston rod. Thereafter the upper piston member and its tubular rod

member may be applied over the upper end of the disjointed solid rod member and the parts assembled as before.

An important feature of the construction described is the provision of the two part pump rod, the members of which are joined or attached at their lower ends to the relatively movable parts of the pump piston, and the means acting upon the upper or outer ends of said members to effect endwise movement thereof and consequent adjustment of the piston packing to the cylinder. This construction permits a ready adjustment of the piston packing without the necessity of removing the pump piston or otherwise disturbing the pump setting.

A further feature of importance is the construction of the piston or plunger whereby a resilient body or sleeve is interposed between the expansion sleeve or nut and the cup leather, inasmuch as the pressure of the expanding member is thus yieldingly transmitted to the cup leather and avoids the tendency of cutting the cup leather between the piston and the inner wall of the cylinder, as would tend to occur if said expanding nut were arranged to act directly against the leather.

I claim as my invention:—

1. In a well pump, the combination with the pump cylinder or barrel and the support or stand therefor mounted on and located above the platform of the well, of a piston having an expansible packing member, a non-rotative pump rod comprising two relatively endwise movable members, an operating device mounted on said stand or support above the platform and connected with the upper end of said pump rod, means at the piston operated by relative endwise movement with said piston rod members for expanding the packing member against the inner face of the cylinder, and adjusting means located at the outer end of the piston rod adjacent to said operating device for giving relative endwise movement to said piston rod members.

2. In a well pump, the combination with the pump cylinder or barrel and a stand or support therefor mounted on and located above the well platform, of a piston, a non-rotative pump rod, to the lower end of which the piston is attached, an operating device mounted on said stand or support and connected with the upper end of said piston rod, said rod comprising two relatively endwise movable members, the piston comprising two parts each fixed to the lower end of one of the rod members, a packing member between said piston members, and means located at the upper end of the rod adjacent to the operating device and acting on the upper ends of the rod members to give relative endwise movement to said

members for forcing together the piston members and expanding the packing member against the inner surface of the cylinder.

3. In a well pump, the combination with
5 the pump cylinder or barrel and the stand or support therefor mounted on and located above the well platform, of a piston reciprocating in the cylinder, a non-rotative pump rod to the lower end of which the
10 piston is attached, and an operating device mounted on said support or stand and operatively connected with the upper end of said rod, said piston comprising two members movable toward and from each other
15 and an interposed packing member, the pump rod comprising an inner member and a relatively endwise movable tubular, surrounding member, said members of the rod being severally attached to the members of
20 the piston, and an adjusting device at the outer end of the pump rod adjacent said operating device acting to give relative endwise movement to said rod members for forcing the piston members together and
25 expanding the packing member outwardly against the inner surface of the cylinder.

4. In a well pump, the combination with the pump cylinder or barrel and the stand or support therefor mounted on and located
30 above the well platform, of a reciprocating piston in said cylinder, a non-rotative pump rod to the lower end of which said piston is attached, an operating device mounted on said stand or support and connected with
35 the upper end of said piston rod, said piston comprising two opposing members movable toward and from each other and an interposed packing member, the pump rod comprising an inner member and a relatively
40 endwise movable tubular surrounding member, said members of the rod being severally

attached to the members of the piston, and a rotative adjusting sleeve having screw-threaded engagement with the outer end of the tubular member of the rod adjacent to
45 the actuating device and adapted to bear against a shoulder on the inner member of said rod.

5. In a well pump, the combination with the pump cylinder or barrel open at its
50 upper end and the support therefor sustained on and located above the well platform, of a piston reciprocating in the cylinder, an operating device mounted on said support, a nonrotative pump rod the lower
55 end of which carries the piston and connected at its upper end with said operating device, said rod comprising an outer tubular member to which the upper piston member is attached and an inner member to which
60 the lower piston member is attached, and an adjusting device at the outer end of the pump rod acting to give relative endwise movement to the rod members for forcing the piston members together, said inner rod
65 member having means located above the well platform for disjoining it, whereby the tubular rod member and the piston member carried thereby may be removed upwardly
70 from the lower piston member through the top of the cylinder and upwardly away from the upper end of the disjoined rod member.

In testimony, that I claim the foregoing as my invention I affix my signature in
75 presence of two witnesses, this 22nd day of June A. D. 1905.

WILLIAM F. JACOBS.

Witnesses:

WM. C. GLOVER,
B. S. JORDAN.