

May 7, 1929.

H. J. WEPFLO

1,711,914

PUMP

Filed Aug. 31, 1927

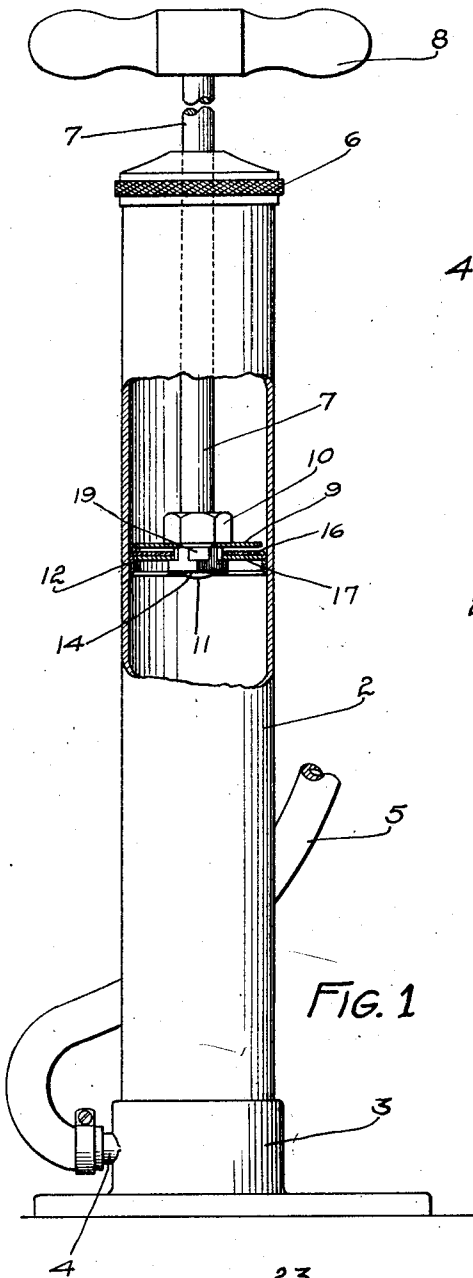


FIG. 1

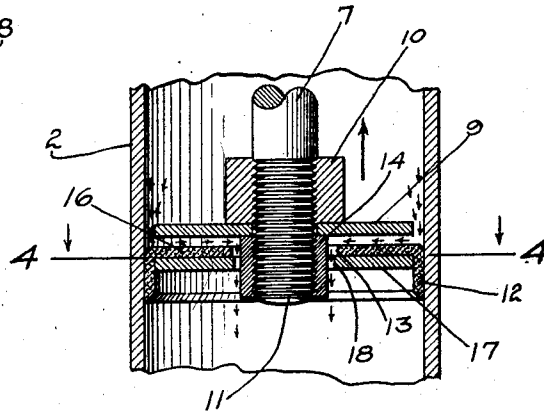


FIG. 2

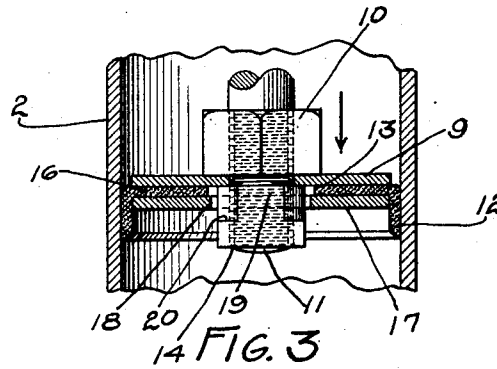


FIG. 3

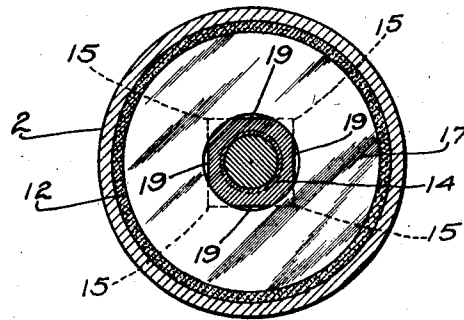


FIG. 4

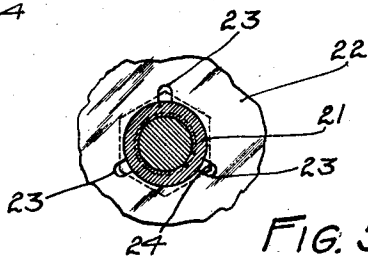


FIG. 5

Inventor
HENRY J. WEPFLO
By *Paul, Paul, Moore*
Attorneys

UNITED STATES PATENT OFFICE.

HENRY J. WEPPO, OF MINNEAPOLIS, MINNESOTA.

PUMP.

Application filed August 31, 1927. Serial No. 216,648.

This invention relates to new and useful improvements in fluid pressure pumps and more particularly relates to the construction of the piston provided therein.

5 An object of the invention is to provide an improved piston for a fluid pressure pump, comprising a leather cup mounted for relative axial movement upon the piston rod and having air-circulating passages provided therein adapted to be opened to permit the entrance of air into the lower portion of the pump barrel beneath the piston, during its return stroke, and the relative movement of the leather cup upon the piston rod, automatically causing said air-circulating passages to be closed, during the pressure stroke of the piston, whereby the piston will act as a valve.

A further object of the invention is to provide an improved piston for a fluid pressure pump, comprising a disc adapted to be fixed to the lower end of the piston rod and having a member clampingly engaged therewith for securing it to the rod, and a leather cup being adapted to be seated against the disc and having a central opening therein traversed by the clamping member, and means being provided upon the clamping member for preventing the leather cup from becoming detached from the piston rod, but permitting relative axial movement of the piston thereon, and a plurality of air-circulating passages being provided around the periphery of said clamping member to permit the entrance of air into the lower portion of the pump barrel, beneath the piston, during the return stroke of the piston, at which time the leather cup will be disengaged from the disc and, when the piston rod is moved downwardly during its pressure stroke, the disc will be moved into engagement with the upper wall of the leather cup and interrupt the circulation of air through the piston, whereby the air confined within the pump barrel beneath the piston may be forced outwardly therefrom through the usual connection provided therein.

The particular object of the invention therefore is to provide an improved piston for a fluid pressure pump, comprising the usual leather cup and supporting discs between which the upper wall of the cup is mounted, and the leather cups and retaining disc being secured to the piston rod in a manner to permit relative movement of the cup

with respect to the piston rod, so that during the upstroke of the rod, air may circulate through the piston and, when forced downwardly during its pressure stroke, the circulation of air through the piston will automatically be interrupted.

Other objects of the invention will appear from the following description and accompanying drawings and will be pointed out in the annexed claims.

In the accompanying drawings there has been disclosed a structure designed to carry out the various objects of the invention, but it is to be understood that the invention is not confined to the exact features shown, as various changes may be made within the scope of the claims which follow.

In the accompanying drawings forming part of this specification:

Figure 1 is an elevational view of a conventional form of pump, partially broken away to show the invention applied thereto;

Figure 2 is an enlarged detailed sectional view illustrating the general construction of the improved piston and showing the parts positioned to permit the circulation of air through the piston during its return or upward stroke;

Figure 3 is a view similar to Figure 2, showing the position of the parts during the pressure stroke;

Figure 4 is a sectional plan view on the line 4-4 of Figure 2, showing the air-circulating passages provided around the clamping member secured to the lower end of the piston rod; and

Figure 5 is a detailed sectional view showing a modified form.

In the selected embodiment of the invention here shown, for purposes of disclosure, there is illustrated a conventional fluid pressure pump, comprising the usual barrel 2, suitably mounted in a base 3 having an outlet 4 provided therein to which a flexible connection 5 may be connected, as shown. A cap 6 is suitably secured to the upper end of the barrel and has a central aperture therein traversed by the usual piston rod 7, having a hand grip 8, as shown.

The particular feature of this invention resides in the general construction of the piston, provided at the lower end of the piston rod 7. This piston is constructed in such a manner as to permit the circulation of air therethrough from the upper portion of the

pump barrel into the lower portion beneath the piston, during the return stroke of the latter, and without the use of additional valves, as is customary in devices of this kind.

5 The improved piston here shown comprises a disc 9 adapted to be seated against a nut 10 received in threaded engagement with the lower end 11 of the piston rod, as particularly shown in Figure 2.

10 A suitable leather cup 12, such as are commonly used in devices of this kind, is mounted beneath the fixed disc 9 and has a central aperture 13 adapted to be traversed by a clamping member or nut 14, received in
15 threaded engagement with the terminal 11 of the rod and clampingly engaged with the disc 9 to secure it to the rod against the nut 10. The clamping member 14 is preferably constructed or turned from a square rod as shown
20 in Figure 4, so that projections 15 are provided thereon which overhang the upper horizontal wall 16 of the packing 12, as shown in Figures 1 and 4. A retaining disc 17 is mounted within the leather cup 12 and also
25 has a central aperture 18 adapted to receive the reduced or turned portion of the clamping member 14, as shown.

A plurality of flat faces 19 are provided on the turned portion of the clamping member
30 14, or that portion thereof which passes through the retaining disc 17 and the upper wall 16 of the packing. These flat faces provide air-circulating passages, through which air may circulate through the piston and into
35 the lower portion of the pump barrel, during the upstroke of the piston, as shown in Figure 2. The upper faces 20 of the projections 15 of the clamping member are spaced from the upper face of the clamping member or the fixed disc 9, a distance sufficient to
40 permit relative axial movement of the packing and the retaining disc 17 upon the piston rod, during the reciprocal movement of the rod 7 and as shown in Figures 2 and 3. Thus,
45 when the piston rod is moved upwardly, as indicated by the arrow in Figure 2, the retaining disc 17 will engage the upper faces 20 of the projections 15, thereby providing a space between the lower face of the disc 9 and the upper face of the wall 16 of the packing,
50 and permitting air to flow from the upper portion of the pump barrel between the fixed disc 9 and the upper wall 16 of the packing, and through the air-circulating passages, provided around the turned portion of the
55 clamping member 14, and into the lower portion of the barrel, as indicated by the arrows in Figure 2. Conversely, when the piston rod is forced downwardly during its pressure stroke, the fixed disc 9 will engage the
60 upper wall 16 of the packing, thereby automatically interrupting the circulation of air through the piston, with the result that the air confined within the pump barrel beneath
65 the piston will be forced outwardly therefrom

through the connection 5. By thus loosely mounting the packing upon the piston rod 7, and in the particular manner above described, the piston itself will function as a valve, permitting air to circulate there-
70 through during its up-stroke, and interrupting the passage of air therethrough upon its down-stroke. No additional valves are therefore required, with the result that the piston may be manufactured at a greatly re-
75 duced cost, as compared with devices of this kind now in use. It has been found that by constructing a piston in this particular manner, the leather cup will give prolonged service, resulting primarily from the fact that
80 the annular vertical wall 12 thereof is constantly retained in engagement with the bore of the barrel and, it is therefore not subjected to unnecessary strains, such as are
85 prevalent in pumps constructed in a manner as to permit the air to circulate between the periphery of the annular wall 12 of the packing and the bore of the barrel 2. The operation of the pump is also greatly improved
90 because of the fact that very little effort is required to operate the piston rod during its return stroke, the air-circulating passages through the piston being of ample size to permit freedom of air-circulation therethrough
95 without offering any material resistance to the movement of the piston rod.

Figure 5 illustrates a modified form where-
in the clamping member 14, provided beneath the fixed disc 9, is provided with a
100 cylindrical portion 21 adapted to traverse the openings provided in the disc 22 and the upper wall 16 of the leather cup 12. In this instance, the disc 22 is provided with a plurality of slots or recesses 23 communicating with
105 the bore or aperture therein and extending outwardly therefrom beyond the head 24 of the clamping member, in this case shown to be hexagonal. The slots 23 provide air-circulating passages through the piston in a
110 manner similar to the flat faces 19 provided in the clamping member 14, shown and described in the previous figures.

I claim as my invention:

1. In a pump, the combination of a barrel having a piston rod mounted for reciprocal
115 movement therein and having a shoulder adjacent its lower end, a disc seated against said shoulder, a leather cup having a central opening therein adapted to be seated against said disc, a nut received in threaded engagement
120 with the lower end of the rod and having a reduced portion passing through the aperture in said packing and clampingly engaged with said disc, said nut having a head adapted to retain said packing thereon and spaced from
125 the disc sufficiently to permit axial movement of the leather cup with respect to the piston rod, when the latter is operated, and air-circulating passages between the reduced portion of said nut and the walls of the aperture
130

in said cup to permit the flow of air through the piston when the rod is drawn upwardly.

2. In a pump, the combination of a barrel having a piston rod mounted for reciprocal movement therein and having its lower end threaded, a nut secured to the lower threaded end of said rod, a disc seated against said nut, a leather cup adapted to be seated against said disc and having a central opening therein, a second disc mounted within said cup and also having a central opening therein, a member received in threaded engagement with the threaded terminal of said rod and clampingly engaged with said first mentioned disc, said member passing through the apertures in said packing and said second mentioned disc and having means thereon adapted to engage the disc mounted within the cup, to prevent the latter from becoming detached from the piston rod, said means permitting axial movement of said leather cup with respect to the piston rod, and said member also having a plurality of flat faces providing air-circulating passages between it and the walls of the apertures in the packing and the disc mounted therein whereby, during the suction stroke of the piston rod, air will circulate between the fixed disc and the leather cup and through the air passages provided around said mem-

ber and into the lower portion of the pump barrel beneath the piston, and during the pressure stroke of the piston rod, the fixed disc will be moved into engagement with the upper wall of the leather cup and automatically interrupt the circulation of air through the piston.

3. In a pump, the combination of a barrel having a piston rod therein provided with a piston comprising an abutment washer secured to the lower portion of the piston rod and spaced from the adjacent terminal thereof, a leather cup adapted to be seated against said washer and having a central aperture adapted to receive the terminal of said piston rod, a member secured to said terminal, traversing said aperture and having one end seated against said washer, air circulation passages between the walls of said aperture and said member, and means on said member for retaining the leather cup on said piston rod and permitting relative axial movement of the cup thereon, whereby the cup will act as a valve to permit the passage of air through the piston, when the latter is operated in one direction.

In witness whereof, I have hereunto set my hand this 29th day of August, 1927.

HENRY J. WEPFLO.