(118.)

P. GIFFARD.

Pump Pistons.

No. 122,825.

Patented Jan. 16, 1872.

fig. 3

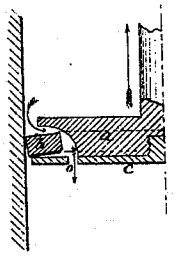


fig. 1

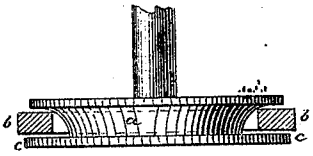


fig. 4

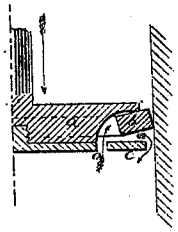


fig. 12

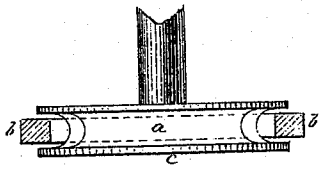


fig. 2

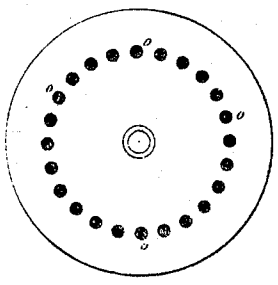


fig. 13

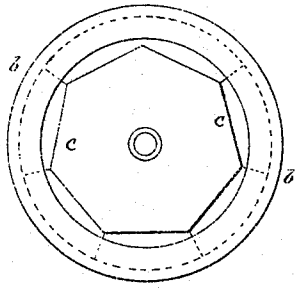


fig. 10.

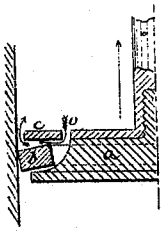


fig. 9

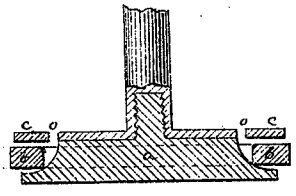


fig. 11

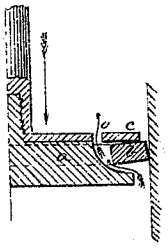


fig. 14

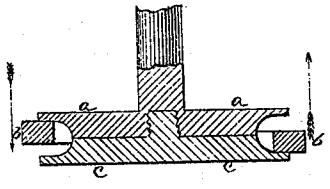


fig. 5

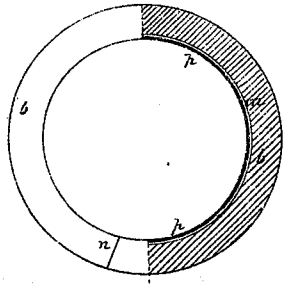


fig. 7

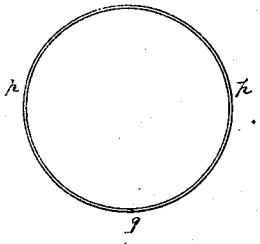
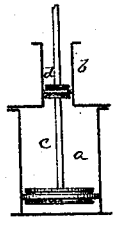


fig. 15



Witnesses.

A. J. Tibbits

J. V. Shumway

fig. 6

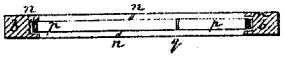
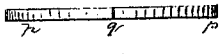


fig 8



Paul Giffard
Inventor

By his Atty

Thos. G. Tibbits

UNITED STATES PATENT OFFICE.

PAUL GIFFARD, OF PARIS, FRANCE.

IMPROVEMENT IN PUMP-PISTONS.

Specification forming part of Letters Patent No. 122,825, dated January 16, 1872.

To all whom it may concern:

Be it known that I, PAUL GIFFARD, of Paris, in the Republic of France, have invented a new Improvement in Pistons of Pumps and other Machinery; and I do hereby declare the following, when taken in connection with the accompanying drawing and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawing constitutes part of this specification and represents, in—

Figure 1, a side view of the piston, showing a section of the valve or packing; Fig. 2, an under-side view of the piston; Fig. 3, a central section of the piston as in its upward movement; Fig. 4, a central section of the piston as in its downward movement; Figs. 5, 6, 7, 8, modifications of the construction of the packing-ring or valve; Figs. 9, 10, 11, respectively, the reverse of Figs. 1, 3, and 4; Figs. 12, 13, 14, views, showing the ring used only as a packing; and in Fig. 15, an illustration of the further use of this invention.

This invention relates to an improvement in pistons of pumps and like purposes; and it consists: First, in the employment of a ring, washer, or disk of flexible material in an annular groove formed in the edge of the piston, performing the double part of valve and stop. Second, employing the pressure of the fluid within the cylinder to expand the ring or washer, to counteract the wear, and to insure a perfect filling of the cylinder around the piston.

In the drawing I have represented three arrangements of my piston, which I will proceed to describe.

First arrangement—piston for compression or force downward, shown in Figs. 1, 2, 3, and 4. The body of the piston *a* is formed of suitable material, and is of less diameter than the cylinder of the pump, in order to form a space for the admission of the fluid through the piston. Its sides are hollowed out, having the form of a quarter of a circle for the insertion of the ring *b*, serving the purpose of a valve, as seen in section, Figs. 3 and 4. The ring *b* may be of any flexible material—by preference caoutchouc—and is held in the groove by a metallic disk, *c*, which is securely fastened to the body *a* of the piston by screwing or otherwise, thus forming an annular groove, within which the ring *b* rests. The diameter of the disk *c* is a little less than the diameter of the cylinder. The disk has perforations *o o*, more or less in number, near its edge for the passage of fluids, as seen in Fig. 2. The edge of the flexible ring *b* is slightly rounding at that point which is directly above the perforations *o*, as denoted in sections, Figs. 3 and 4.

The operation of the piston will be understood by reference to Figs. 3 and 4, which show the two positions of the ring *b*, according as the piston moves up or down. At the up-stroke, Fig. 3, the fluid above the piston falls below, following the course denoted by the arrows. During its passage through the piston the fluid presses laterally upon the inside of the ring *b*, which rests upon the disk *c* and forces the ring hard against the cylinder, as seen in Fig. 3. This action or tendency to expand the ring is greater during the downward movement, because the fluid is compressed and cannot escape through the piston to the upper part of the cylinder. The ring *b* is pressed with great force against the outside of the piston *a* by the fluid which passes through the openings *o* in the disk and through the space between the upper edge of the piston and the cylinder. On the return stroke, as seen in Fig. 4, the ring *b* rises and closes the space between the upper edge of the piston and cylinder, the fluid pressing up against and within the ring to cause its expansion, as before described.

I will now describe my method of strengthening the ring *b* when I employ pistons of large diameter, as, for example, when applied to blast-engines. This arrangement is illustrated in Figs. 5, 6, 7, and 8. On the inside of the flexible washer *b* I make a groove, *m*, which serves to hold the ring *p* fitted thereon, the said ring formed of a strip of metal by preference steel. An oblique or diagonal cut, *n*, in the washer *b*, and a straight cut, *q*, in the ring *p*, permit the expansion of the washer and ring to make a perfect joint between the piston and cylinder. The metal ring *p*, by its elasticity, permits the greater expansion of the washer, and also strengthens it and gives

to it a certain rigidity vertically, which prevents all liability of displacing the flexible material.

Second arrangement is for pistons of exhaust-valves, and is illustrated in Figs. 9, 10, and 11. This arrangement is the same as the first, the position of the parts being simply reversed, and consequently the action is reversed.

Third arrangement is for what are termed solid pistons—that is, pistons through which no passage of fluid occurs in either movement of the piston, as in double-acting force-pumps—and is illustrated in Figs. 12, 13, 14. In this arrangement the action is concentrated in the working or expanding of the ring, which, as is shown in Fig. 14, moves up and down, on the down stroke against the part *a*, and on the up stroke against *c*, the parts *a* and *c* being of the same diameter, but of less diameter than the cylinder. The spaces formed between the outer surface of the piston and the inner surface of the ring permits the entrance of the fluid required to produce a circumferential pressure upon the inside of the ring.

In Fig. 15 my piston is shown as applied to stuffing-boxes, &c. For this purpose I form a small additional cylinder, *b*, which is fixed directly above the body of the pump *a*. The piston-rod *c* supports in the cylinder *b* a small piston, *d*, the automatic working of which, as before described, causes the stuffing-box to be hermetically closed.

I claim as my invention—

The ring *b* arranged in an annular groove in the edge of a piston, the said piston being constructed substantially as described, so that the force applied to the fluid may cause the fluid to pass within and so as to bear against the said ring to cause its expansion, substantially as specified.

In testimony whereof I have signed my name to this specification before two subscribing witnesses.

PAUL GIFFARD.

Witnesses:
JULES ARMENGAUD,
C. LAFOUD.

(118)