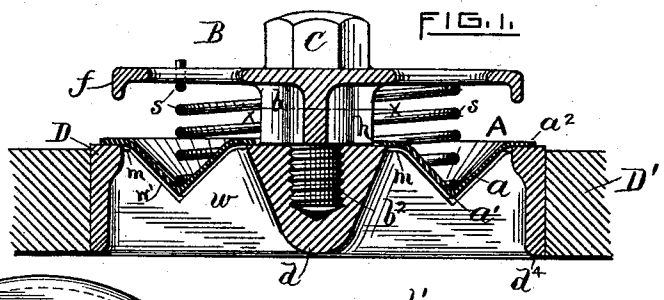
(No Model.)

G. H. REMINGTON & J. T. HENTHORN.

PUMP VALVE.

No. 453,347. Patented June 2, 1891.

FIG. 1.



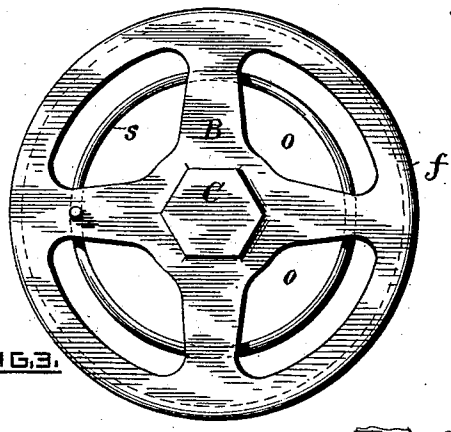


FIG. 3.

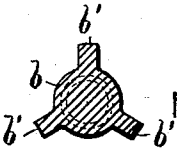


FIG. 6.

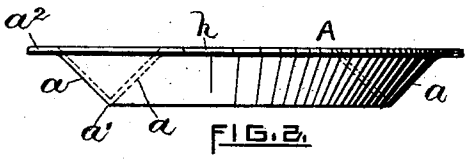


FIG. 2.

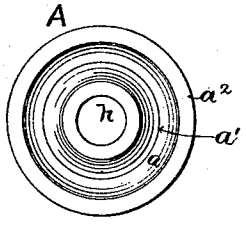


FIG. 2½.

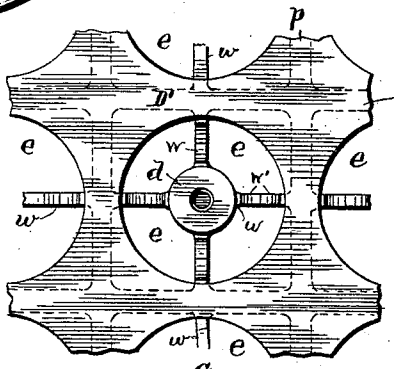


FIG. 5.

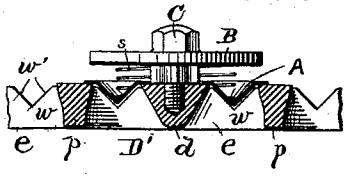


FIG. 4.

WITNESSES.

Fred. A. Fay

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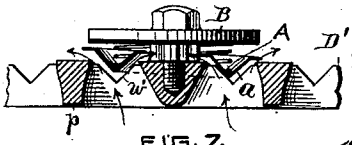

FIG. 7.

INVENTORS.

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UNITED STATES PATENT OFFICE.

GEORGE H. REMINGTON AND JOHN T. HENTHORN, OF PROVIDENCE, RHODE ISLAND.

PUMP-VALVE.

SPECIFICATION forming part of Letters Patent No. 453,347, dated June 2, 1891.

Application filed October 13, 1886. Serial No. 216,122. (No model.)

To all whom it may concern:

Be it known that we, GEORGE H. REMINGTON and JOHN T. HENTHORN, citizens of the United States, both residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Pump-Valves; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

The invention relates to pump-valves of the class adapted to rise and fall bodily in opening and closing.

The object which we have in view is to render the valve light and inexpensive, to fit it to receive the spring by means of which prompt closing is assured, to render it safe against sticking in its seat, and to reduce the friction of the water in its passage through the valve-opening.

Heretofore valves have been devised having features of the combination herein described as of our invention. Valves have been shown, as in the United States Patent of Corliss, No. 190,469, of 1877, in which is a thin sheet-metal valve with a spring held in place by a hub set in the center of an annular valve-seat, with wings to hold the spring in place, and valves also have been shown, as in the French Patent No. 106,491, of January 18, 1875, in which the valve is represented as made of V shape in cross-section, with the point of the V downward. This valve is adapted to turn the water aside as the valve rises from its seat and secure its easy passage; but as the valve itself seats upon a corresponding V-shaped recess it tends to wear and change position as it wears, and also tends to wedge and stick in its seat. To overcome the objections and secure the results attending the use of the forms of valves referred to, we have made our valves to consist in the V-shaped downward projection in an annular valve, combined with inner and outer flat flanges substantially horizontal on the inner and outer edges of the valve and adapted to bear upon flat seats.

It consists, further, of an annular valve made of thin sheet metal, having an annular depression, forming on the lower face an angular rib and on the upper a corresponding groove in combination with the flanges, as aforesaid, the groove in this serving as a seat for the spring and holding the spring in place.

Our invention consists, also, of a combined guide and guard for the valve, which in a single piece serves to guide the movements of the valve and to limit its upward motion.

The accompanying sheet of drawings fully illustrates our present invention, wherein—

Figure 1 represents a vertical sectional view of the improved valve-seat guide or stop and spring combined for use. Fig. 2 is a detached side view of the valve itself. Fig. 2½ is a plan view of the valve. Fig. 3 is a plan view of the stop and spring. Fig. 4 is a reduced cross-sectional view of the valve, &c, as combined with a plate or casting having a series of valves. Fig. 5 is a plan view of the said plate in which the valves are adapted to seat. Fig. 6 is a horizontal sectional view of the guide, taken through line X X, Fig. 1, and Fig. 7 is a sectional view showing the valve open, one side being represented higher than the opposite side.

The following is a more detailed description of the valve and the manner of its operation.

A, referring to the drawings, designates the valve itself made from thin sheet metal. The form of the valve is preferably circular, as indicated in Fig. 2½, and having a central opening *h* therein. About midway between said opening and the outer edge or face a^2 of the valve is formed a V-shaped depression extending around the valve *a a*, indicating the two sides thereof, and *a'* the point of meeting. The cross-section of the valve, as before stated, is V-shaped, each angular side thereof terminating in a flat overhanging rim or edge, as a^2, thereby forming inner and outer seating-flanges, which rest upon corresponding surfaces of the stationary seat when the valve is closed.

D, Fig. 1, indicates the valve-seat fitted

into an opening formed in the plate or casting D'. The said seat is provided with a central hub *d*, which is united to the annular rim d^4 by a series of radial webs or ties *w*, which in turn are cut away at *w'*, corresponding to the depression *a* of the valve A. Said cut *w'* is made a little below the sides of the valve, as at *m*, &c., in order to permit the latter to readily seat itself. (See Fig. 1.)

In Figs. 4, 5, and 7 the seat for the valve forms an integral part of the casting D', wherein a series of valves A are adapted to be mounted, *e e* indicating the water-ways, while *p p* indicate ribs or ties formed on the under side of the casting.

B designates a light metallic casting, which serves the double purpose of a guide and guard for the valve. The guide is provided with a screw-threaded stem b^2, which is screwed into the tapped hub *d* of the seat. The top of the guide is provided with openings *o* and the downwardly-projecting outer flange *f*, said guide being somewhat smaller in diameter than the valve. A short hub or barrel *b*, having short radial wings *b'*, is cast to the under side of the top plate of the guide. The said hub and wings are squared off true and rest firmly upon the hub *d* of the valve-seat.

C indicates a polygonal-shaped head formed on the guide, thereby adapting the latter to be secured to or removed from the seat, as desired.

s designates a spiral spring, formed from small wire, one end thereof being attached to the guide. The diameter of the spring is substantially the same as the diameter of the valve at the bottom of the depression, and in the bottom of which it (the spring) freely rests.

Now assuming the plate D' to be fitted with a series of valve seats in which the wings *w* thereof are made V-shaped, as shown at *w'*, and each seat having a valve A, provided with a circular V-shaped depression, and a spring *s*, secured to and bearing against the underside of the guide B resting in said depression, the operation then would be substantially as follows: The head or pressure of water upon the under side of the valve lifts the latter (against the resistance of the spring) and permits the water to flow freely through the openings *e* of the seat. The water now in its upward passage strikes against the beveled or diverging sides *a a* of the valve and deflects the outflowing current both outwardly and inwardly therefrom, and beneath the inner and outer seating-flanges a^2 of the valve. The flanges also serve as a limit or stop to the lift of the valve, although practically the valve does not rise one-half the distance.

In case of an unequal water-pressure upon the valve the latter is adapted to open freely and not become cramped, as the play or lateral movement of the valve is restricted by the depressed surface *a* bearing against the corresponding side of the depression *w'*, formed in the wings *w*, as represented in Fig. 7.

Upon the removal of pressure from the under side of the valve, or when the pressure on top thereof exceeds that blow, then the valve is quickly seated, the V-shaped portions thereof serving to center the valve and guide it to its seat.

By means of our improvement we are enabled to move water through a pump with a minimum of friction.

We do not claim as our invention a flat annular valve combined with a spring for closing and centering the same. Neither do we claim such valve and spring combined with a top guide; but

What we do claim, and desire to secure by United States Letters Patent, is—

In combination with a suitable seat, an annular valve having a downward-projection V-shaped in cross-section and flat inner and outer flanges adapted to the seat, and a spring bearing against the bottom of the V-shaped groove, which serves as a bearing for the same, substantially as described.

In testimony whereof we have affixed our signatures in presence of two witnesses.

GEO. H. REMINGTON.
JOHN T. HENTHORN.

Witnesses:
WM. R. DUTEMPLE,
JOSEPH SANFORD.