

(No Model.)

A. J. HOPKINS.
PUMP VALVE.

No. 474,579.

Patented May 10, 1892.

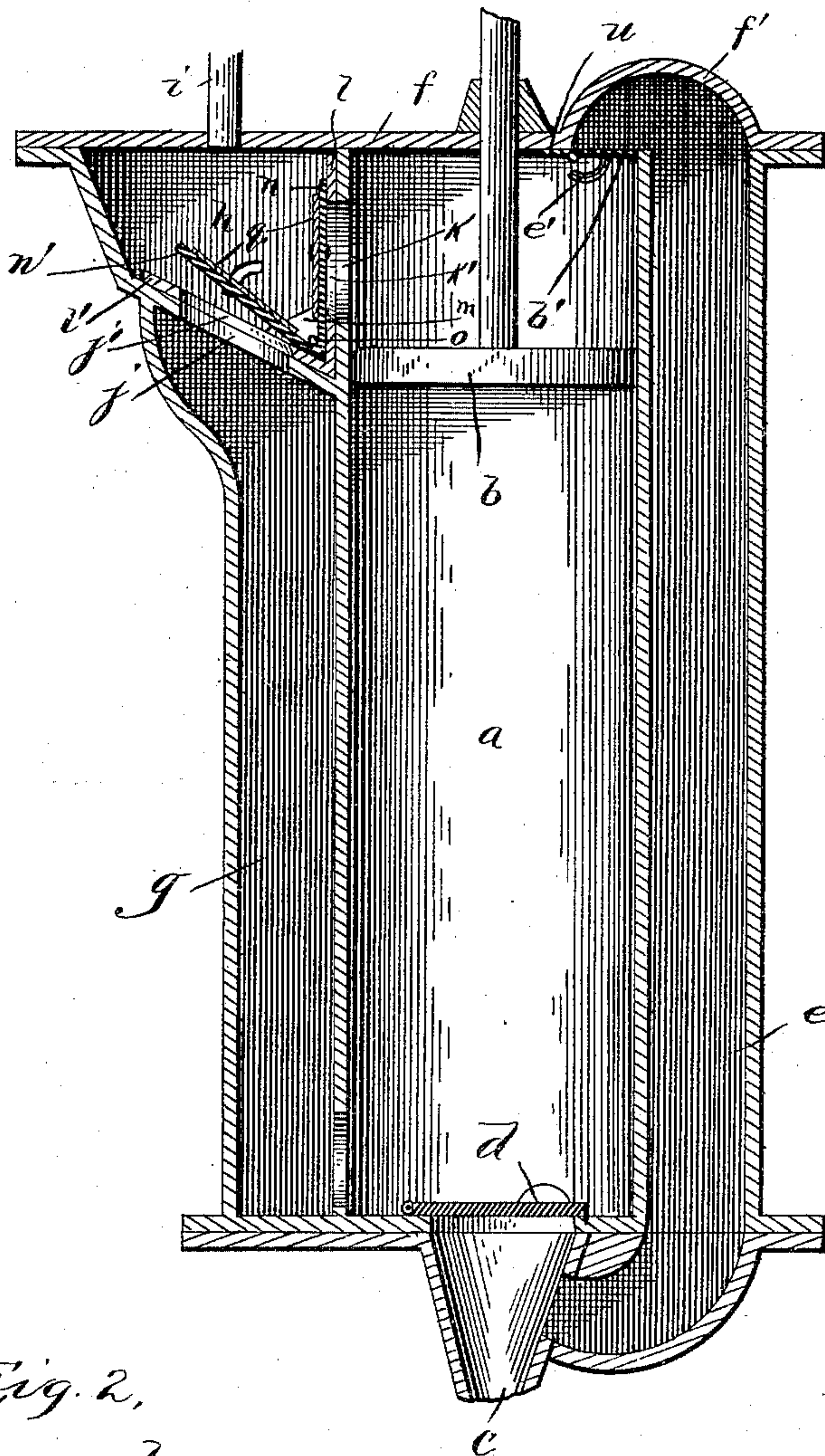


Fig. 1.

Fig. 2.

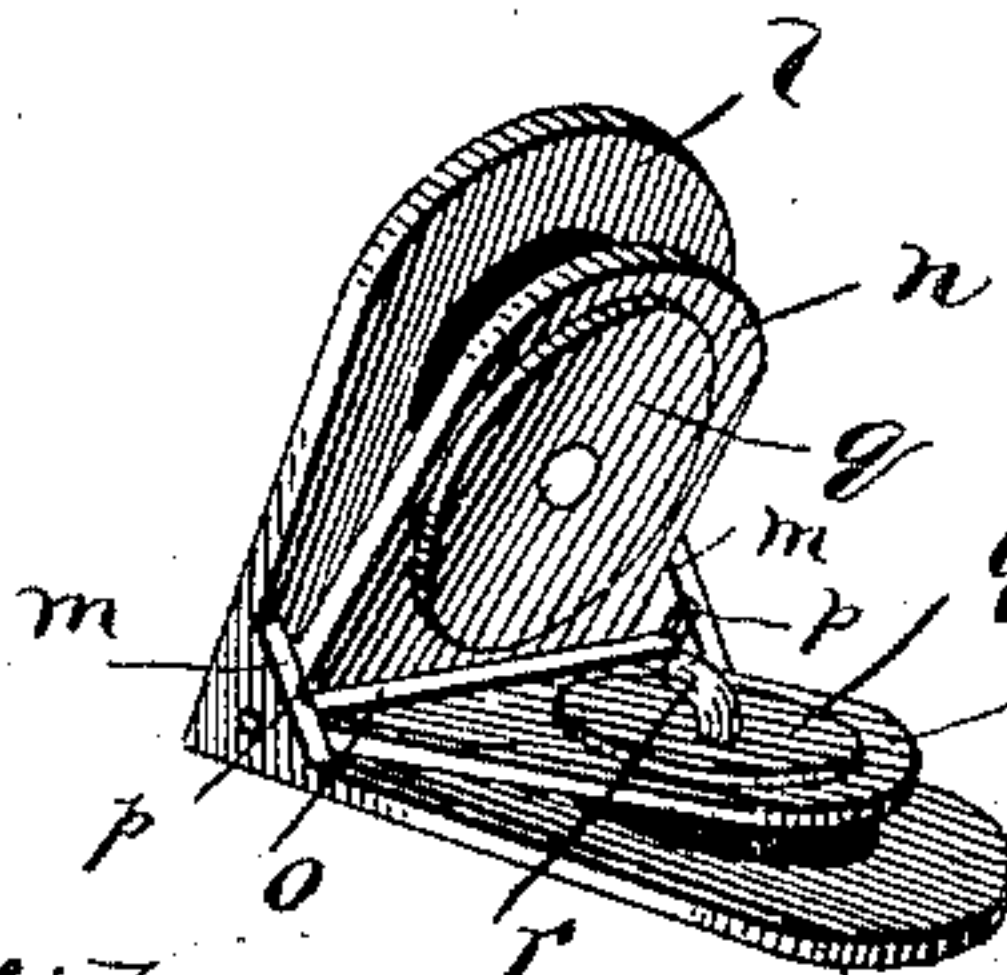


Fig. 3.

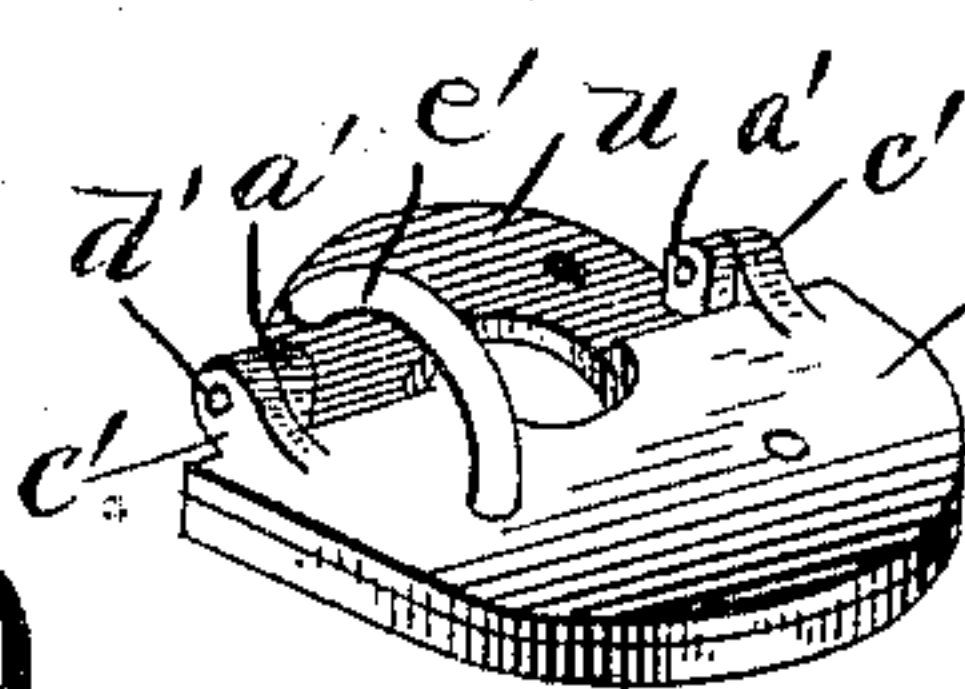
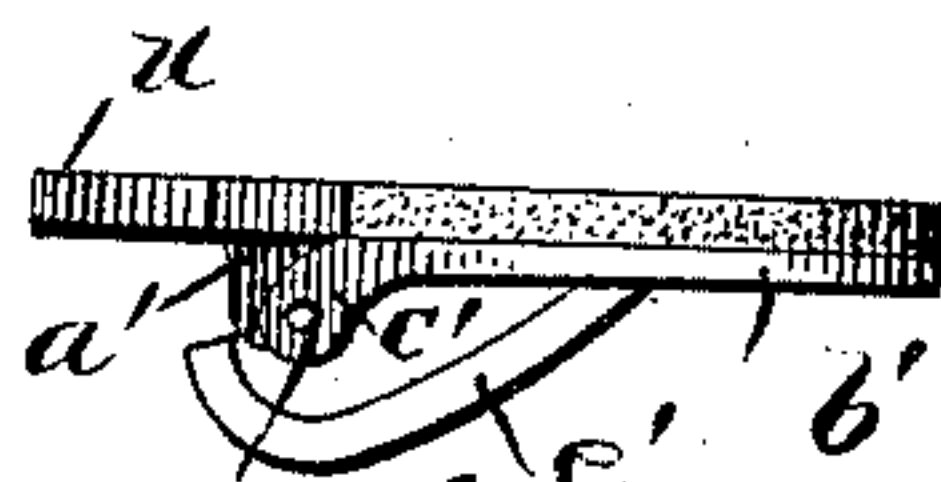


Fig. 4.



Witnesses:

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UNITED STATES PATENT OFFICE.

ANDREW J. HOPKINS, OF BEAVER FALLS, PENNSYLVANIA.

PUMP-VALVE.

SPECIFICATION forming part of Letters Patent No. 474,579, dated May 10, 1892.

Application filed June 5, 1890. Serial No. 354,328. (No model.)

To all whom it may concern:

Be it known that I, ANDREW J. HOPKINS, of Beaver Falls, in the county of Beaver and State of Pennsylvania, have invented certain new and useful Improvements in Pump-Valves; and I do hereby declare that the following is a full, clear, and exact description of the invention, which 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 the letters of reference marked thereon, which form part of this specification.

This invention relates to certain improvements in pumps.

The object of the invention is to provide improved valves for use in such pumps as described in my pending application, Serial No. 351,096.

This invention consists in certain novel features of construction and in combinations of parts more fully described hereinafter, and particularly pointed out in the claims.

Referring to the accompanying drawings, Figure 1 is a vertical longitudinal section of a double-acting pump. Figs. 2, 3, and 4 are perspective views and an elevation of the different and improved constructions of valve employed in the pump.

In the drawings the reference-letter *a* indicates the main chamber of a double-acting pump in which the piston *b* reciprocates and is carried by a suitable piston-rod, as shown.

c is the suction-pipe into the bottom of the main cylinder, normally closed by the check-valve *d* to prevent backflow from said main cylinder.

e is a side conduit extending from the upper end of the suction-pipe longitudinally up the exterior of the main cylinder into one end of a U-passage *f'*, formed in the upper cap *f* of the main cylinder, the opposite end of said passage discharging into the upper end of the cylinder. *g* is a similar side conduit on the other side of the main cylinder, at its lower end opening into the lower end of the main cylinder. At its upper end this side conduit *g* opens into the lower end or bottom of a valve-chamber *h*, formed on the side of the main chamber. The open top of this chamber is closed by the cap *f*, and the discharge-pipe *i* of the pump opens through said cap into the top of

the valve-chamber. The bottom of the valve-chamber is inclined downwardly and inwardly toward the wall of said main cylinder and is provided with the port *j*, and the vertical wall separating said valve-chamber and the main cylinder is provided with port *k* from the main cylinder into said chamber. A valve-frame rests in said chamber and is formed to fit snugly in the acute angle formed by said bottom and vertical side of said chamber, and said frame consists of the two leaves or wings *l l'*, cast together and integral and forming an acute angle, as shown, said leaves at the outer edges of their inner ends being connected by bracing cross-webs *m*, integral with the leaves. The leaf *l* rests snugly against said vertical wall of the valve-chamber and is provided with a port *k'*, registering with port *k*, and the other wing *l'* is provided with a port *j'*, registering with port *j*, and rests on and snugly fits the inclined bottom of said chamber. This frame carries the two valves *n n'* for the ports *k'* and *j'*, respectively. These valves are formed by a single piece of leather or other suitable material bent at the center and pressed in between the two leaves of the valve-frame and retained in this position by a rod *o*, extending above the fold in the leather and through perforations in said cross bracing-webs, and said webs on their inner sides are provided with vertical grooves *p* to allow the rod to be easily removed from said webs when desired. Circular metal plates *q* are secured on the two valves opposite said ports in the valve-frame to render said valves rigid and prevent them from drawing through the ports, and one of said valves is provided with an inwardly-extending stop-pin *r* to engage the opposite valve, thereby limiting the swing of said valves away from their respective seats and ports, so as to allow just sufficient room for the water to pass through the port and around the valve, whereby the two valves will quickly assume their normal positions, closing the ports, and will work quicker and easier, and the pump will work smoothly and regularly and entirely free from the irregular and jerking motion more or less common with all other forms of valves.

The port from the U-passage *f'* in the upper cap into the upper end of the main cylinder is provided with a hinged valve to close

said port when the piston moves up, and this valve consists of the metal plate *u*, bolted or secured to the under side of the cap *f* by bolts or screws passing therethrough and provided
5 with the depending perforated ears *a'* integral therewith, and the valve proper, consisting of the plate *b'*, having perforated ears *c'*, corresponding and registering with ears *a'*, and the plate *b'*, is hinged to said stationary
10 plate by the bolts, screws, or pins *d'*, passed through the perforations in each pair of ears *a' c'*, and this plate *b'* is faced with leather on its upper side to form a tight joint with and
15 tightly close the said port when the valve is formed up, and when the piston moves down the valve drops and is limited in its movement by the stop-pin *e'* engaging stationary plate *a'*. This pin is preferably formed integral with the swinging valve-plate. When
20 the piston is raised, the water passes out through ports *k k'* into the valve-chamber *h*, pressing back valve *n* and pressing down valve *n'* tightly on its seat, closing ports *j j'*, and when the piston is forced down the water
25 passes up passage *g* into the valve-chamber through ports *j j'*, opening valve *n'* and closing valve *n*.

It is evident that various changes might be made in the form and arrangements of the

parts described without departing from the 30 spirit and scope of my invention. Hence I do not wish to limit myself to the exact construction herein set forth.

What I claim is—

1. The combination, with the integral valve- 35 frame consisting of the two diverging leaves having ports and leaves forming an acute angle and the perforated cross-webs at the outer ends of their inner edges, of the valves for
40 said ports, formed of a single piece of flexible material bent and inserted between said leaves, having their free ends strengthened, and the rod passing through said webs and retaining the valves, as set forth.

2. In a pump, the combination of the valve- 45 chamber having the inclined bottom wall provided with a port and the vertical side wall having a port, the valve-frame snugly fitting in said chamber, and the valves carried by
50 said frame to alternately close and open said ports, substantially as described.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

ANDREW J. HOPKINS.

Witnesses:

G. L. EBERHART,
S. WALLACE MILLER.