

(No Model.)

M. CROSSMAN, Dec'd.

W. P. SLAYTON, Adm'r.

Force Pump.

No. 243,639.

Patented June 28, 1881.

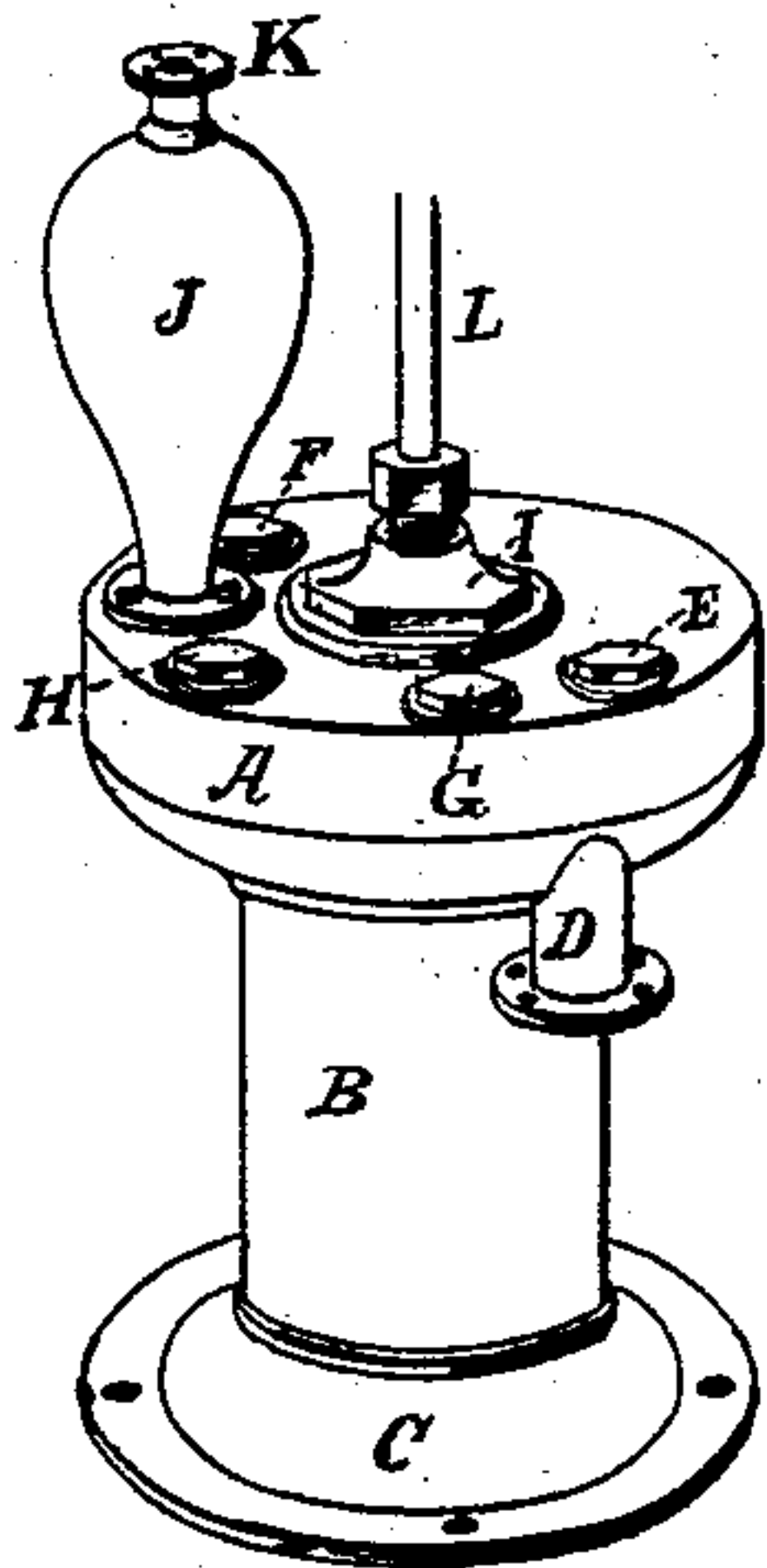


Fig. 1

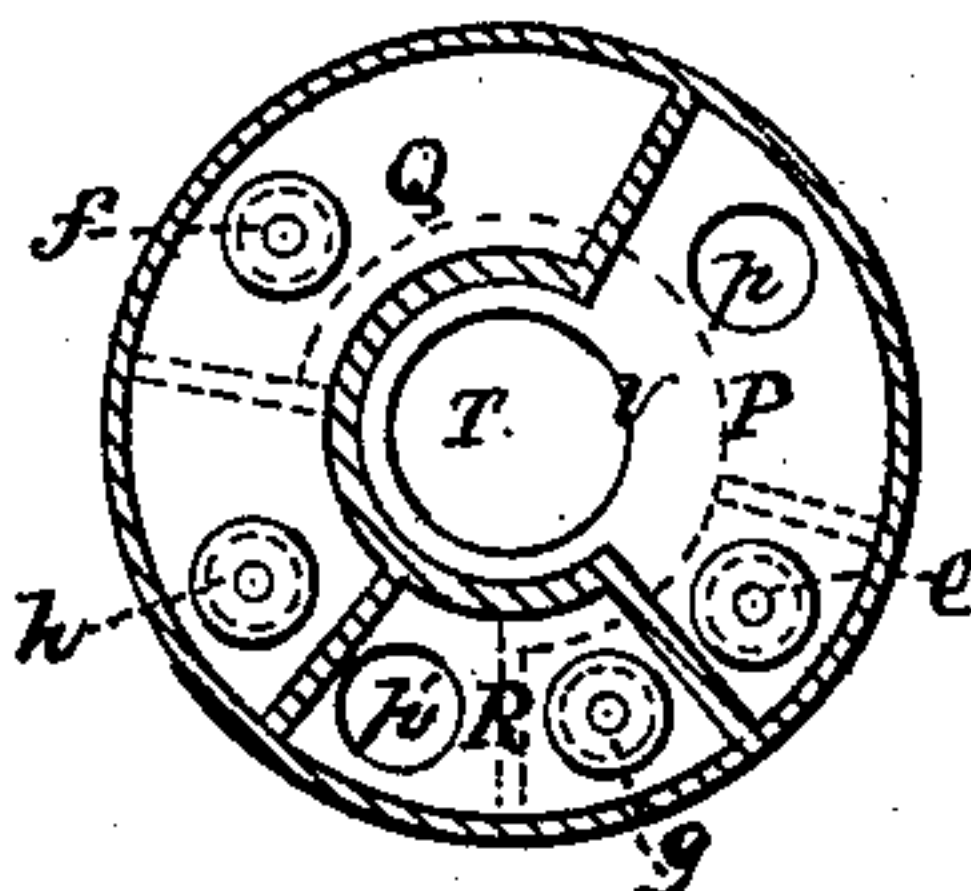


Fig. 2

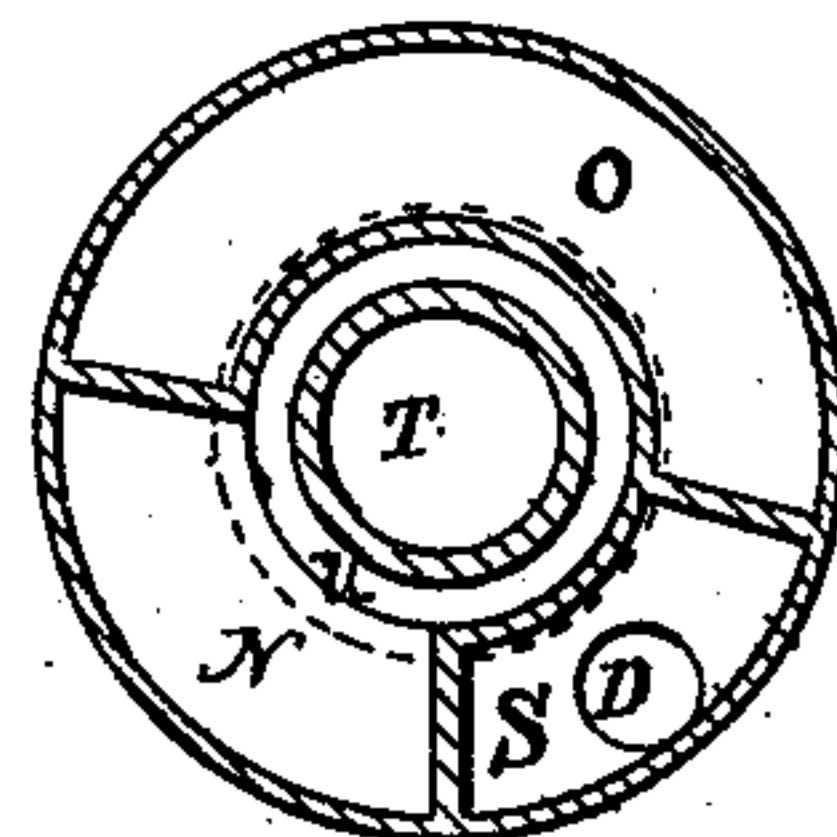


Fig. 3

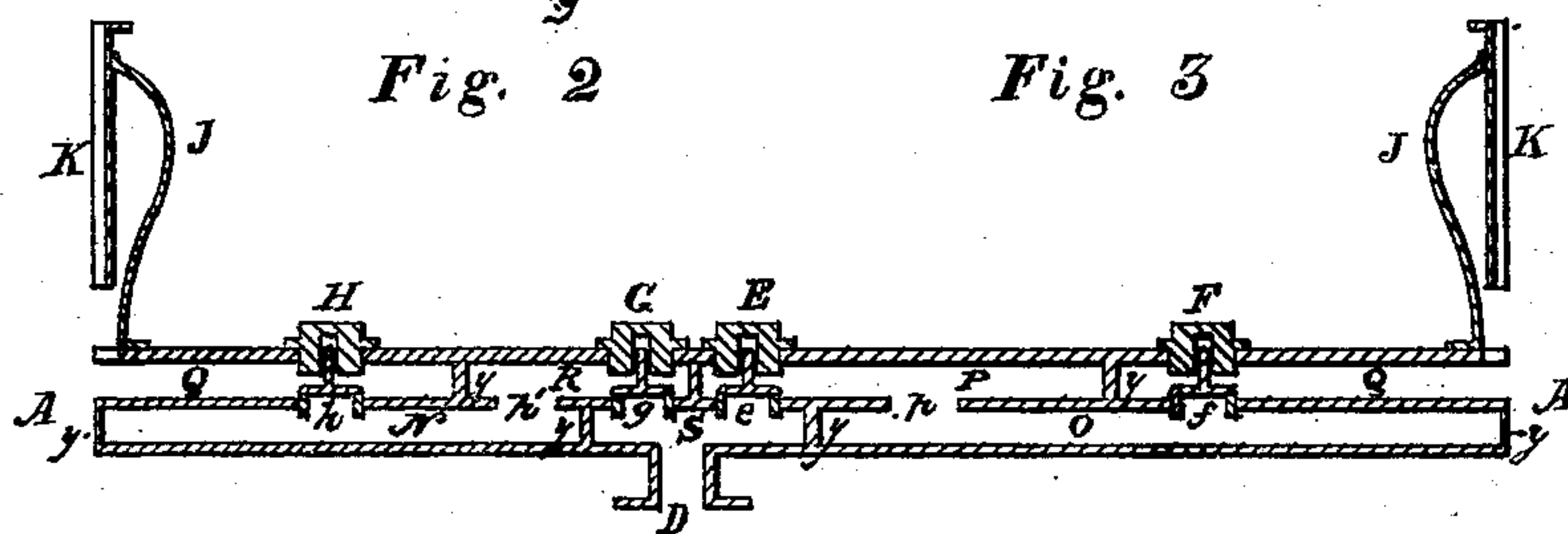


Fig. 4

Fig. 6

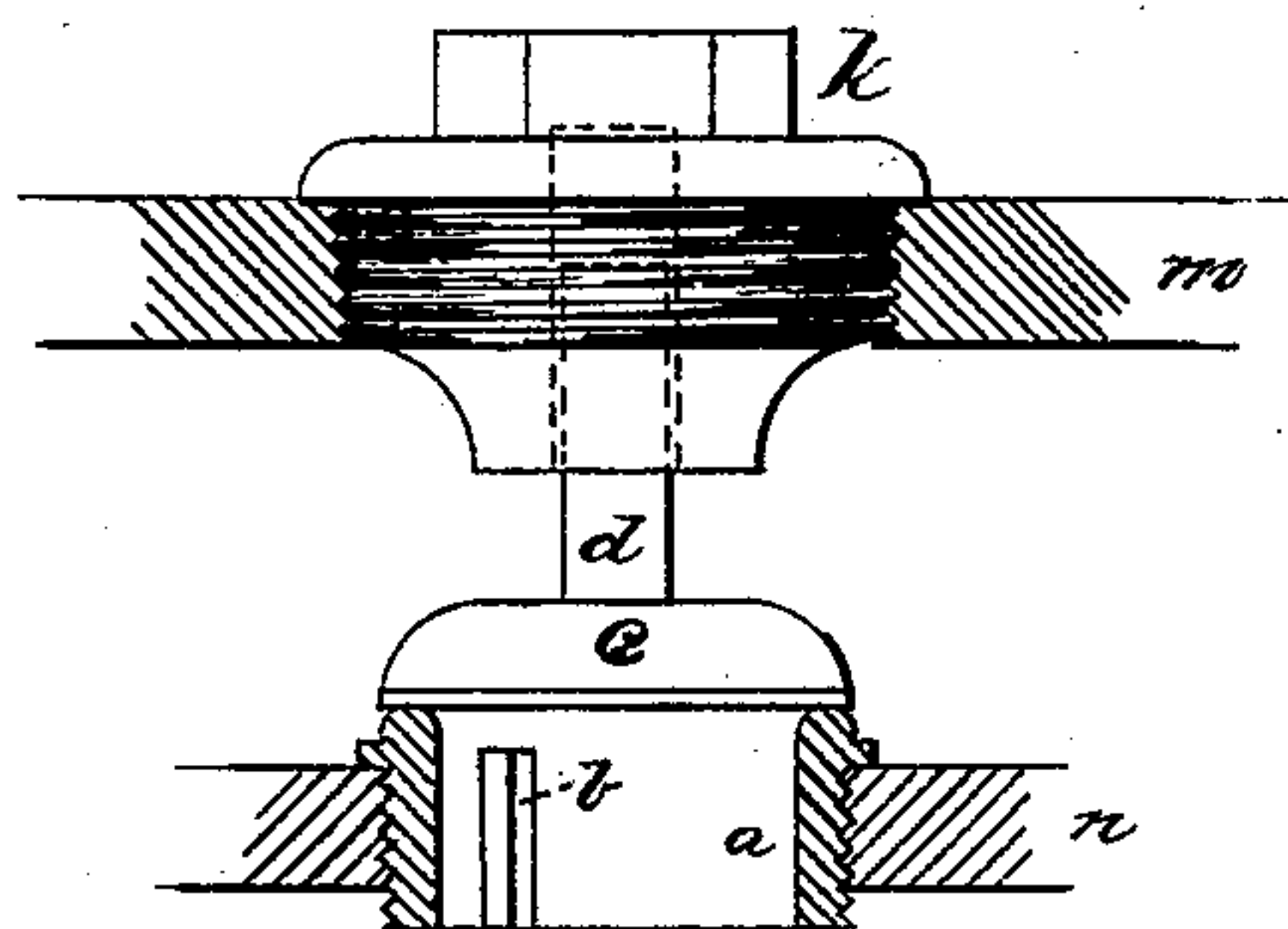
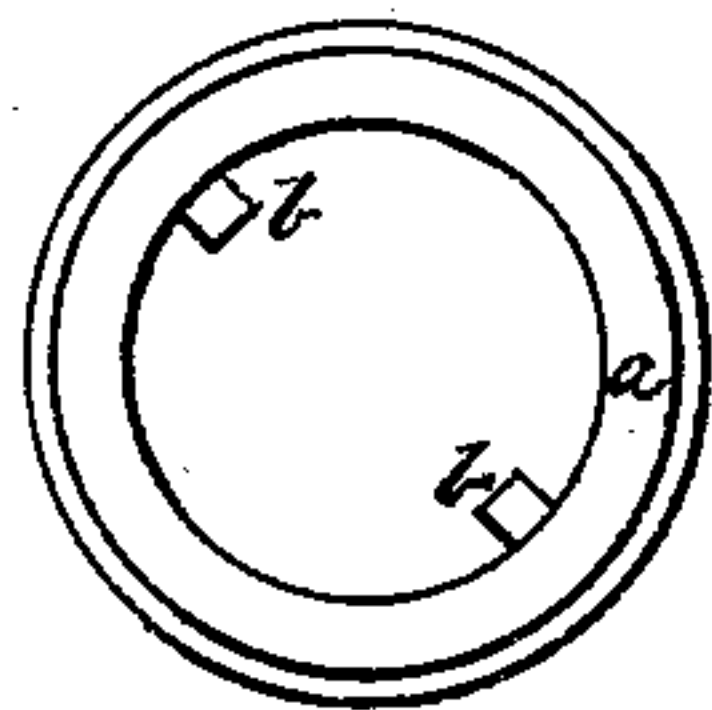


Fig. 7

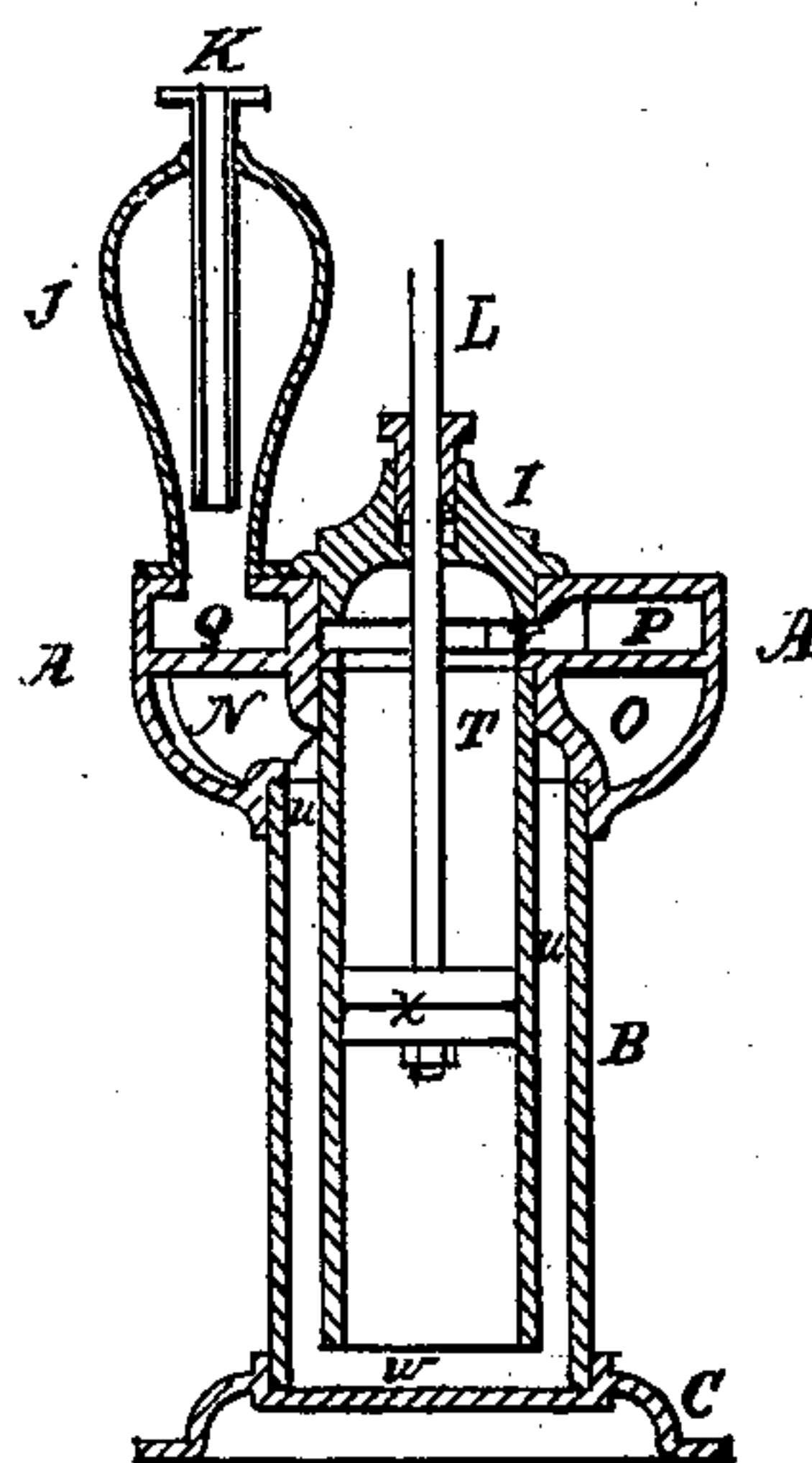


Fig. 5

WITNESSES

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INVENTOR

MONTGOMERY CROSSMAN, Deceased

Wm P. Slayton, Adm'r.

per B. F. Welles, Att'y

UNITED STATES PATENT OFFICE.

WILLIAM P. SLAYTON, (ADMINISTRATOR OF MONTGOMERY CROSSMAN, DECEASED,) OF MARENGO, MICHIGAN, ASSIGNOR OF ONE-HALF TO CHARLES H. MORSE, OF CHICAGO, ILLINOIS.

FORCE-PUMP.

SPECIFICATION forming part of Letters Patent No. 243,639, dated June 28, 1881.

Application filed March 9, 1881. (No model.)

To all whom it may concern:

Be it known that MONTGOMERY CROSSMAN, late a resident of the city of Marshall, in the county of Calhoun, State of Michigan, (deceased,) did invent certain new and useful Improvements in Double-Acting Force-Pumps, of which the following specification is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to the general construction and arrangement of the valves, valve-chambers, and cylinders of force-pumps, the object being to make them more compact and the parts liable to wear out easily and separately accessible for repairs. I attain these objects by means of the construction and arrangement illustrated by the accompanying drawings, in which—

Figure 1 is a perspective view. Fig. 2 is a horizontal section through the upper valve-chambers and water-passages of the head A A. Fig. 3 is a horizontal section through the lower valve-chambers and water-passages of the head A A. Fig. 4 is a vertical annular section through the valve-chambers and water-passages of the head A A, developed into a straight section. Fig. 5 is a vertical section of the pump as a whole. Fig. 6 is a plan of the valve-seats. Fig. 7 is a vertical section, showing the arrangement and construction of the valve-caps, valves, and valve-seats on a larger scale.

The upper head, A A, containing the valve-chambers and water-passages P Q R N O S, is cast in one piece, the chambers being formed with cores.

The inner or piston cylinder, T, is open at both ends, and is secured to the valve-head A A by flanges and bolts, or by being screw-threaded at its upper end. It is preferably made of seamless drawn brass tubing.

The outer cylinder, B, which is concentric with cylinder T, so as to leave a free passage, *u*, on all sides, may be connected to both heads A A and base C by thread or by flange and bolts; or it may be cast in one piece with the base C and screw-threaded at top or connected by flange and bolts with head A A. The inner

cylinder, T, does not quite reach the base C, so as to leave a passage, *w*, at the bottom.

The valve-caps E, F, G, and H give access to the valves *e*, *f*, *g*, and *h*, (shown in section in Fig. 4, and more clearly in Figs. 6 and 7, where the valve-cap *k* is shown screw-threaded into the upper shell, *m*, of the valve-chamber.) This valve-cap is bored partly through from the under side, as shown by dotted lines, to receive the valve-stem *d* of the valve *e*, which plays freely up and down, closing on the valve-seat *a*. By making the valve-stem *d* long the need of a projection from the under side of the valve is avoided, leaving the water-way unobstructed. The valve-seat *a* may be formed, as shown, of brass or other metal, screw-threaded into the middle horizontal partition of the head A A, with small lugs *b b* for convenience of screwing or unscrewing; or it may be formed upon the partition itself.

D is the inlet-passage, opening directly into the chamber S, beneath the two inlet-valves *e* and *g*.

J is the air-chamber, and K is the discharge-pipe. The air-chamber communicates directly with the chamber Q, containing the discharge-valves *f* and *h*.

L is the piston-rod, and X is a solid piston.

I is the head closing the top of the pump.

The action of the pump will be understood by reference to Figs. 2, 3, 4, and 5. Take the upper end of the piston-cylinder and trace the action of the pump through one descent and ascent of the piston *x*. When the piston descends a vacuum is formed in chamber P and water rushes in through D into chamber S, up through valve *e* into chamber P, thence through passage V into the top of cylinder T, following the piston to the end of its stroke. As the piston returns toward the top of the cylinder valve *e* closes and the water is forced through passage V into chamber P, down through port *p* into chamber O, up through valve *f* into chamber Q, and, since the pressure closes valve *h*, it is forced into air-chamber J and discharged through pipe K. Now, consider the action taking place with reference to the lower end of cylinder T. As the piston ascends a

vacuum is formed in the space *u* between the two cylinders. Water rushes in through D into S, up through valve *g* into R, down through *p'* into N, thence into passage *u* and *w*, and follows the piston to the end of the stroke. When the piston begins to descend valve *g* closes and the water returns through *w* and *u* to chamber N, raises valve *h*, and passes into chamber Q, closing valve *f*, and escapes through pipe K, as in the other case. So, while water is being taken in at one end of the cylinder, water is also being discharged at the other end.

In the pumps in common use, both single and double acting, whenever the inside or piston cylinder is worn out, the whole pump must be replaced with new, because there is no provision made for renewing the separate parts, the piston-cylinder being made in one piece with the top. With my arrangement every part—cylinder, valve, and valve-seats, &c.—is easily accessible for examination and repairs without removing the pump from its foundation. This is facilitated by arranging and connecting everything at the top—inlet D, valves, and discharge—all in one compact head at top of the pump.

I am aware that double cylinders have been before used in pumps; but these have all been single-acting, having a valve at the bottom and passing the water through the plunger. I am also aware that valves having stems have been heretofore used; but these have had also a projection below, thus obstructing the water-way, while mine has a long stem above, passing into the valve-cap sufficiently to steady the valve and allow a free and unobstructed

play. I therefore do not broadly claim either the use of two concentric cylinders in pumps or, broadly, the use of valves with stems.

I am aware that a series of valves placed at the upper end of the cylinder of a pump, so that by removing the cover all the valves and the plungers are exposed to view, is old, and such I do not wish to be understood as claiming, broadly, as of my invention.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a double-acting force-pump, the combination of the two concentric cylinders B T, the head A A, arranged at the top of said cylinders, and having the upper chambers, P Q R, and lower chambers, O N S, valves and inlet and discharge openings, and the plunger *x*, the several parts constructed and arranged relatively to each other substantially in the manner as and for the purpose herein shown and described.

2. In a double-acting force-pump, the combination of two concentric cylinders, B and T, having a free unobstructed space between the sides and bottom thereof, and the chambered head A A, arranged at the top of said cylinders, and containing the inlet-opening, valves, and discharge-opening, substantially as and for the purpose herein shown and described.

WILLIAM P. SLAYTON,

Administrator of the estate of Montgomery Crossman, deceased.

Witnesses:

WM. H. PORTER,
GEORGE INGERSOLL.