

Pattee & Graham,
Steam Vacuum Pump.
No. 110,933. Patented Jan. 10. 1871.

Fig. 1

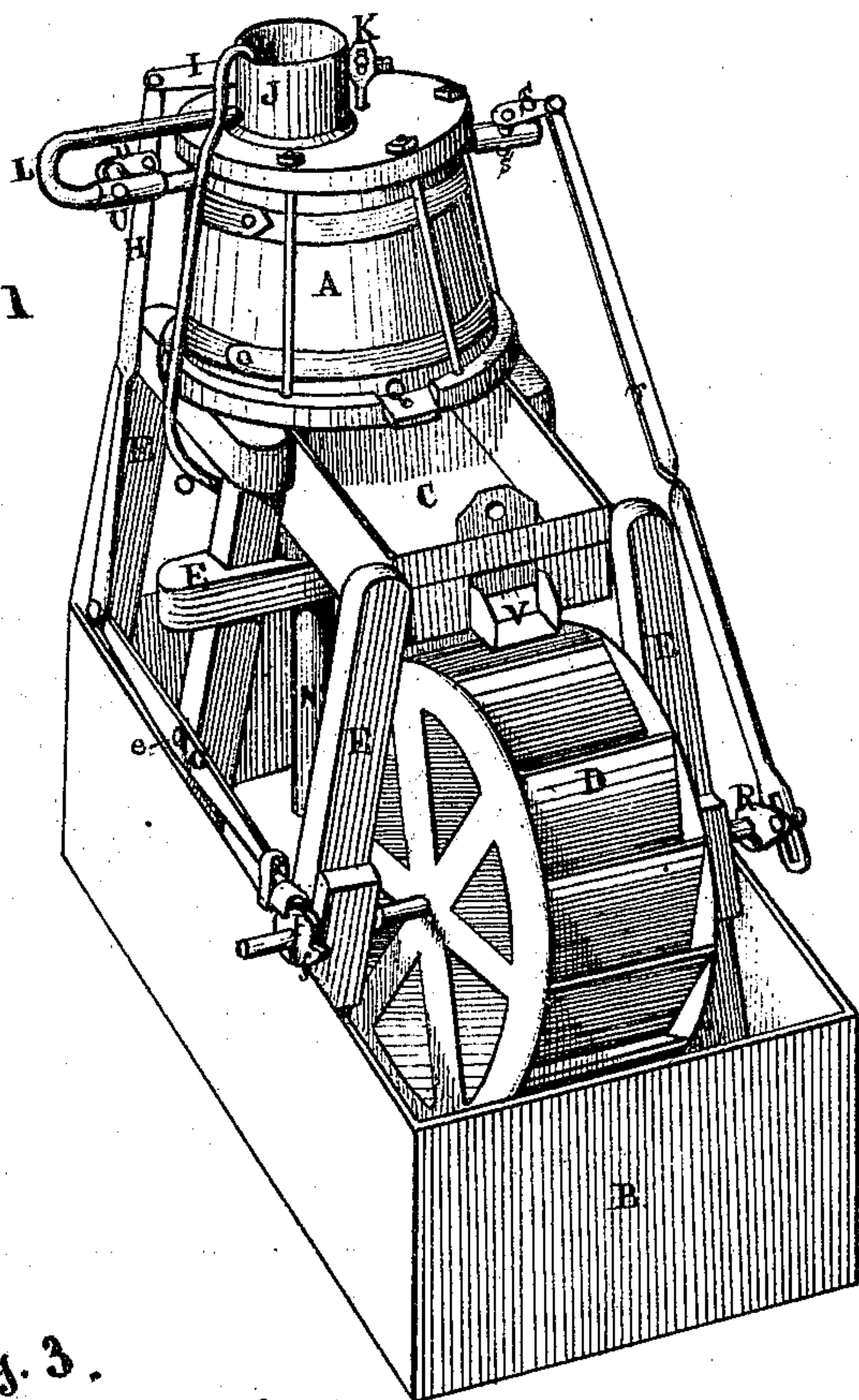


Fig. 3.

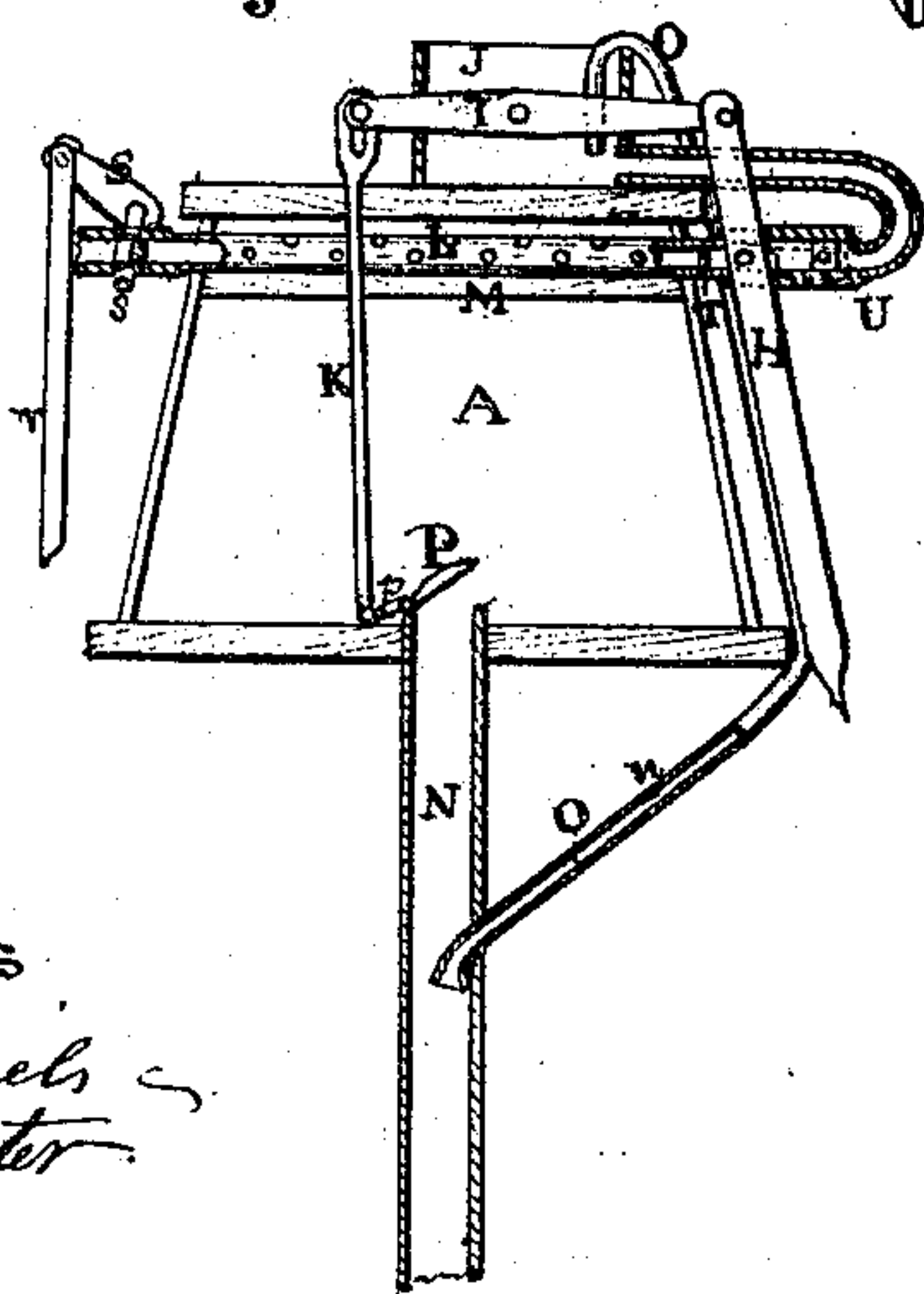
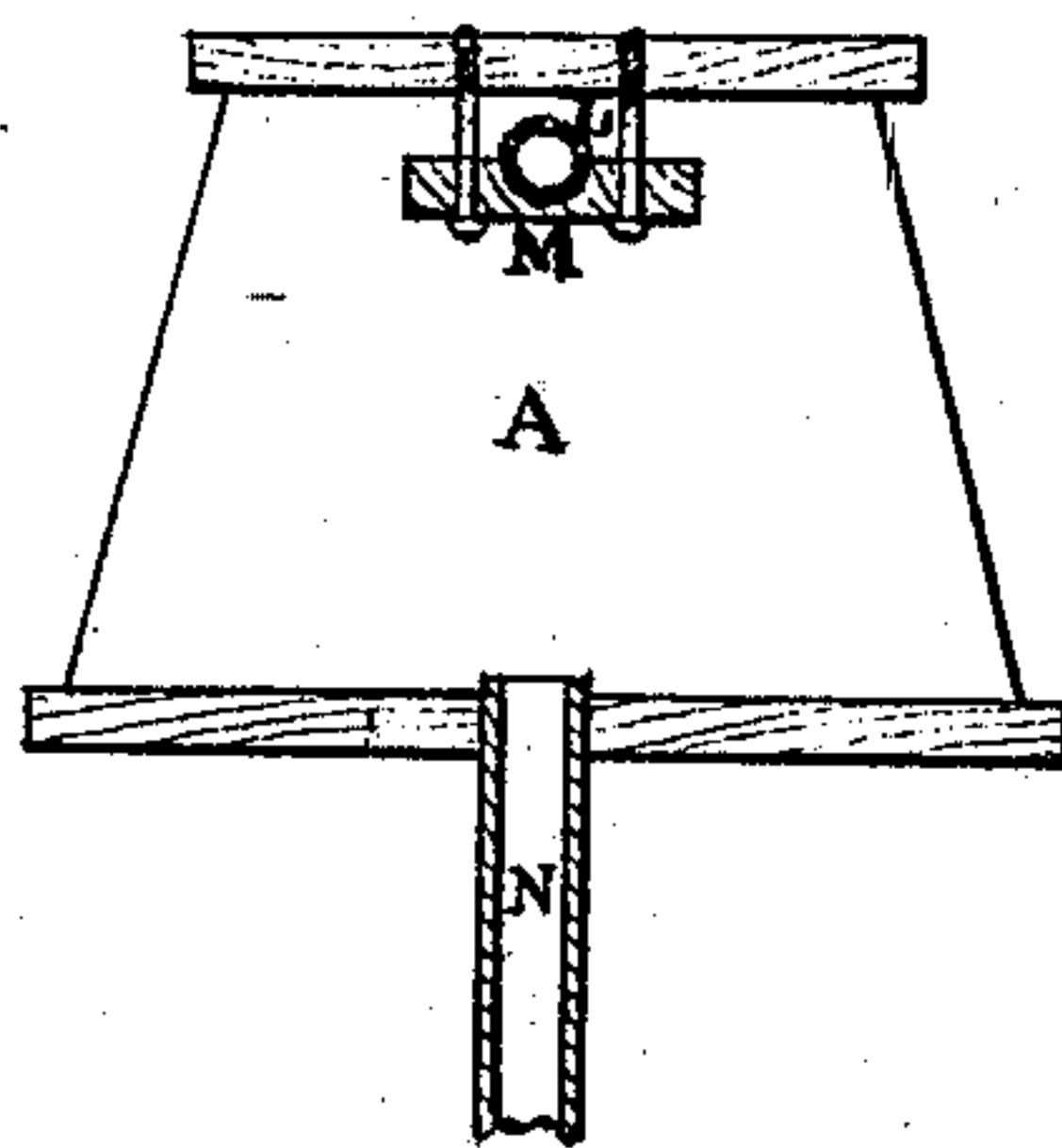


Fig. 2.



Witnesses

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JAMES H. PATTEE AND HUGH J. GRAHAM, OF MONMOUTH, ILLINOIS.

IMPROVEMENT IN STEAM VACUUM-PUMPS.

Specification forming part of Letters Patent No. **110,933**, dated January 10, 1871.

To all whom it may concern:

Be it known that we, JAMES H. PATTEE and HUGH J. GRAHAM, of Monmouth, in the county of Warren and State of Illinois, have invented certain Improvements in Steam Vacuum-Pump Powers, of which the following is a specification:

The first part of our invention relates to the combination and arrangement of an overshot water-wheel with a steam vacuum-pump, an intermediate tank being placed between the two for the purpose of insuring a steady supply of water to the wheel.

The second part of our invention relates to the arrangement of valves and valve-gearing, whereby the operation of the whole device is rendered automatic.

The third part of our invention relates to the arrangement of the condenser for admitting a spray of water to aid in condensing the steam.

In the accompanying drawing, Figure 1 is a perspective view of our invention. Fig. 2 is a vertical cross-section of the tank A, Fig. 1. Fig. 3 is a vertical cross-section, showing the interior of the tank A, the inlet-valve for water, and its connection with other parts of the device.

A is the pump-tank. B is the lower water reservoir or tank. C is an intermediate reservoir or tank. D is an ordinary overshot water-wheel. E E is the frame-work for supporting the tanks and other parts of the device. F is a cam on the end of the wheel (D) shaft. G is a lever pivoted to frame-piece E at e. H is a pitman-rod. I is a lever pivoted to the condensing-water vessel J, and connected at one end, by pivot, with the pitman H, and at the other end with the upper end of valve-stem K. L is a pipe connecting the condense-water vessel J and the tank A, extending through the tank A, and forming, at the far end, the inlet-steam pipe, and is perforated along its upper side in the tank A, to throw the steam against the top of the tank and spread it. M is a wooden bar, with a semicircular longitudinal groove in its upper side, into which the pipe L is seated, the bar M being bolted to the inner side of the tank A, as shown at Fig. 2, a little distance from the tank-head, in order to leave room for the passage of the entering steam and condensing

water, and to act as a deflector in spreading the steam. N is the water-inlet pipe. O is a pipe communicating at its lower end with the interior of the inlet-pipe N, and having a funnel-shaped mouth at its lower end, provided with a check-valve, *n*, opening upward. The upper end of this pipe O is within the condense-water vessel J. P is a clack-valve on the upper end of the inlet-pipe N, and has a handle, *p*, extending back from its pivoted point, to which the valve-stem K is attached at its lower end. Q is a clack-valve at the bottom of tank A, opening outwardly. R is a crank on the shaft of wheel D, and is connected, by a pitman-rod, *r*, and crank S, with the key to the two-way cock *s* in the steam-inlet pipe L. T is a check-valve in the pipe L, opening from the condense-water vessel J. The end of the pitman-rod *r* is slotted where it receives the stud on the end of the crank R. The upper end of the valve-stem K is also slotted where it receives the stud on the end of the lever I. U is a two-way cock in the pipe L, the key of which is operated by a crank, *u*, pivoted to the pitman-rod H.

The operation of our invention is as follows: The revolution of wheel D having brought the crank R into the position shown by Fig. 1, the two-way cock *s* will be opened by the pitman *r* and crank S, and the steam from any suitable generator will enter the tank A through the pipe L, the slot in the lower end of the pitman *r* allowing the motion of the pitman to cease for a short time, following the movement of the wheel D, while the tank A fills sufficiently with steam. The water in the tank A discharges through valve Q while the tank is filling with steam. The continued revolution of wheel D, bringing the crank R directly opposite the position last described, will close the two-way cock *s*, and prevent the further admission of steam, at the same time bringing the high part *f* of the cam F upward. It thereby raises the end of the lever G, which in turn, through pitman H and crank *u*, opens the two-way cock U, and allows the condensing water to flow from the tank J, through pipe L, into the tank A, for the purpose of condensing the steam and forming the necessary vacuum. The rod H at the same time moves the end of lever I up in the slotted end of stem K, without disturbing the position of

that stem until I adjoins the upper end of the slot and comes into position to be operated by the movement of stem K.

When the vacuum is formed, the water rushing in through pipe N will open the valve P, thereby bringing down the stem K, and with it the lever I, and thereby closing the two-way cock U, and preventing the further admission of condensing water; but this does not take place until the wheel D has revolved far enough to carry the cam *f* past the end of the lever G, thus leaving it free to be depressed.

Now, while the tank A is filling with water, the revolution of the wheel D will again bring the crank R into the first position described, opening the two-way cock *s*, admitting steam, and repeating the same operation. Thus steam and the water to condense the steam are alternately admitted through pipe L to tank A by means of the alternate operation of the valves *s* and U, only one of which can be opened at the same time.

The water is supplied to the vessel J by being forced up through pipe O while passing up through pipe N, the check-valve *n* preventing its return at any time while the upward pressure is removed.

The intermediate tank C may be made very large, to hold a supply ahead, which may be fed as desired to the wheel D through the water-gate V, thus insuring a regular and steady flow on the wheel D, which could not be the case if the water flowed directly onto it from the tank A.

By this machine a considerable quantity of water may be elevated, but a small portion of which is required to operate the mechanism, the greater portion of it being available for any desired purposes.

What we claim as our invention is—

1. The combination of a steam vacuum-pump with a water-wheel arranged to operate substantially in the manner and for the purpose set forth.

2. The combination and arrangement of pipe L with valves *s*, U, and P, constructed and operated substantially as for the purpose specified.

3. The arrangement of the valve P, stem K, lever I, and condense-pipe L, in the manner substantially as described, and for the purpose specified.

4. The cam F, lever G, pitman H, and two-way cock U, when arranged to operate substantially as described, and for the purpose specified.

5. The combination of the condense-water vessel J, pipe O, pipe N, tank A, and pipe L, substantially as described, and for the purpose specified.

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Witnesses:

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