2 Sheets—Sheet 1.

J. CHASE & S. H. BOWKER.

Fluid-Motor.

No. 212,356. **Patented Feb. 18, 1879.**

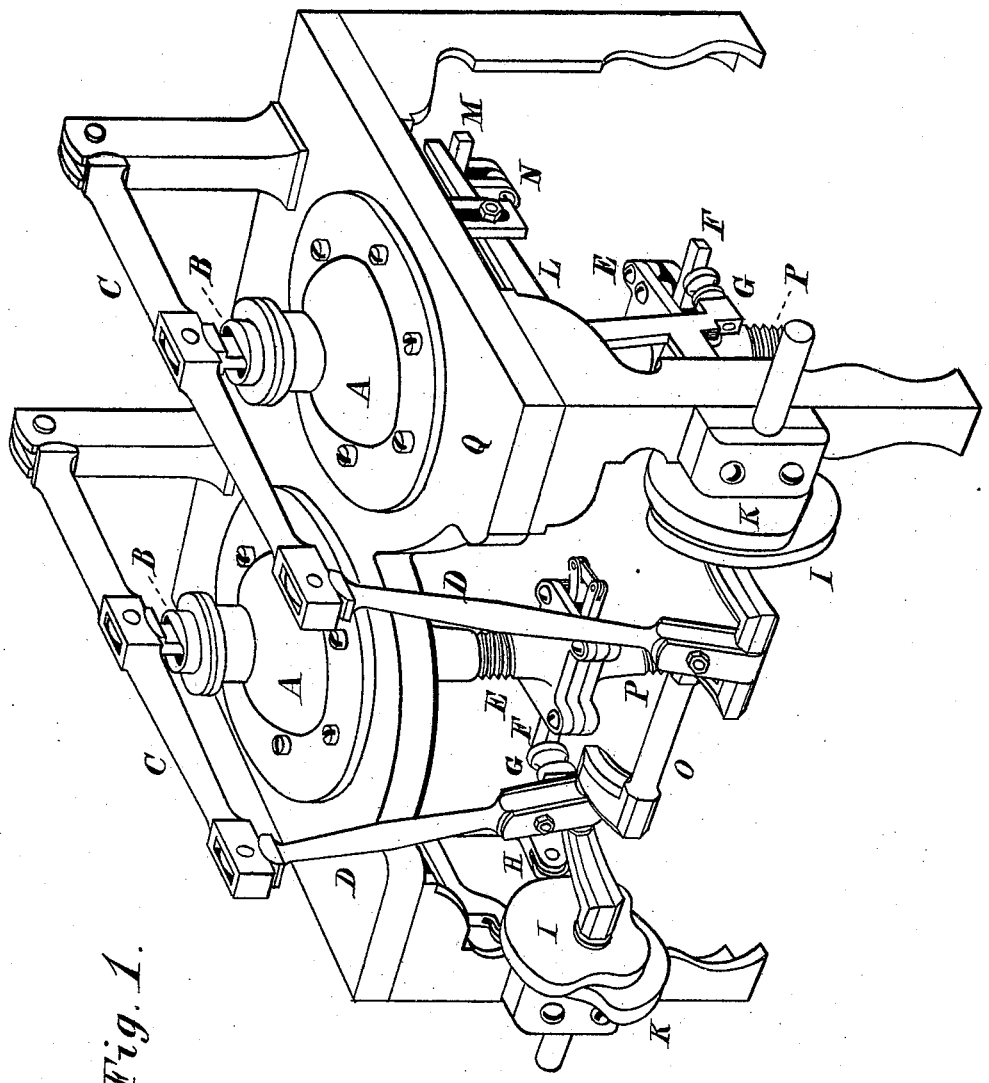


Fig. 1.

WITNESSES;
Edward Hill.
A. H. Howland

INVENTORS;
J. Chase,
S. H. Bowker.
BY THEIR ATT'Y., J. G. Arnold

J. CHASE & S. H. BOWKER.

Fluid-Motor.

No. 212,356. Patented Feb. 18, 1879.

Fig. 2.

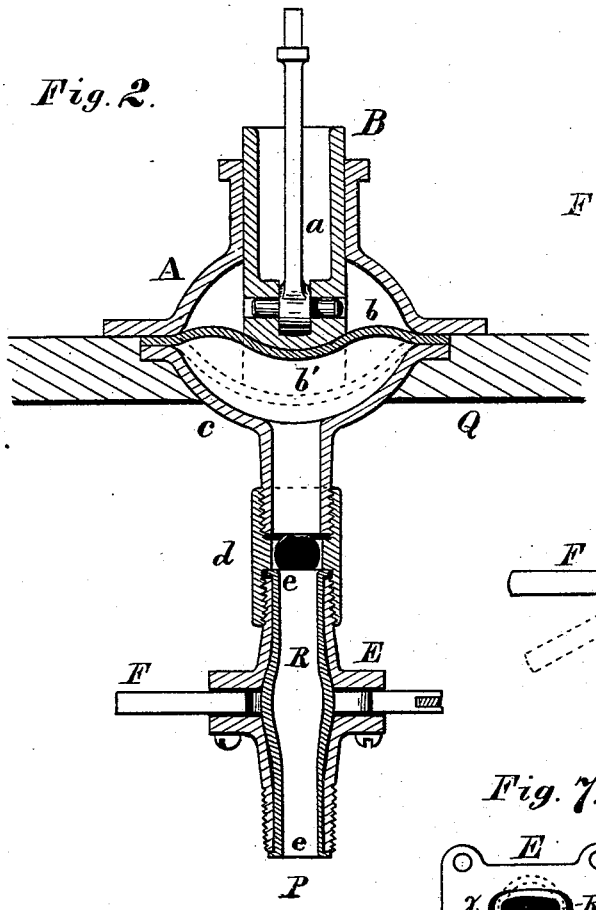


Fig. 4.

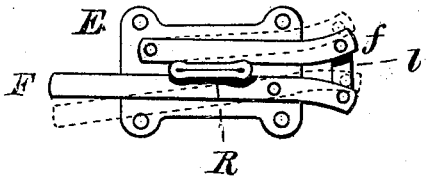


Fig. 5.

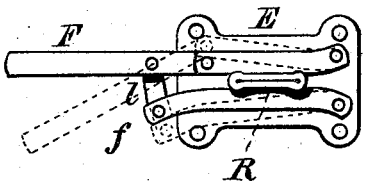


Fig. 7.

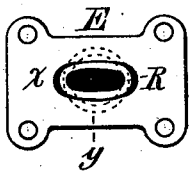


Fig. 6.

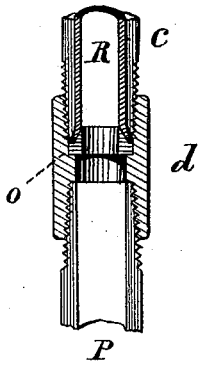
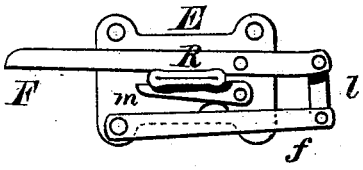


Fig. 3.



WITNESSES;

Edward Hill.
A. H. Howland

INVENTORS;

J. Chase,
S. H. Bowker.

BY THEIR ATT'Y., F. G. Arnold

UNITED STATES PATENT OFFICE.

JOSEPH CHASE AND SEWALL H. BOWKER, OF WORCESTER, MASS.

IMPROVEMENT IN FLUID-MOTORS.

Specification forming part of Letters Patent No. **212,356**, dated February 18, 1879; application filed October 28, 1878.

To all whom it may concern:

Be it known that we, JOSEPH CHASE and SEWALL H. BOWKER, both of the city and county of Worcester, State of Massachusetts, have invented a new and useful Improvement in Fluid-Motors, of which the following is a specification:

Our invention is designed to derive power or motion for various purposes from the use of water under pressure or other fluids in a similar condition, and also to make a valve or gate for admitting and stopping the flow of the fluid through tubes. Its nature is shown and described in the following specification and accompanying drawings of a machine embodying our invention.

In said drawings, Figure 1 is a perspective view, B B being two pistons, operated alternately by diaphragms in the cases A A, and through levers C C and connections D D giving motion to the shaft O, on which the cams I I K K operate the inlet-valves (one of which can be seen at M) and the outlet-valves P P by movements of their levers respectively. Fig. 2 is a sectional view of one of the pistons, its case, diaphragm, and lower valve. Figs. 3, 4, and 5 show three plans of levers for closing the gates or valves, and Figs. 6 and 7 show sections of the flexible tube and its re-enforcing case.

Similar parts are indicated by the same letters wherever they occur.

A is the casing holding the diaphragm *b*, so that the lower part, *c*, forms a water-tight chamber, while the upper is made with a guide for the piston B, and open for the air to have access above the diaphragm at *b'*.

The piston is shown at its lowest position, and water being admitted forces up the diaphragm and the piston until the former nearly or quite fills the upper part of A. The inlet-valve M being then closed, and the outlet P opened, the water escapes and the piston descends, completing a revolution of the shaft O.

We have shown two alternate cranks only, but it is evident that any desired number can be used—the greater the number the more even the power or motion obtained.

The valves or gates we make of a flexible tube, *k*, inclosed in a metal or other outside tube, the ends of the flexible tube having flanges *e e* or other means used—as a conical ring, *o*, Fig. 6—for packing the ends tight in its re-enforcing case, so that no water can escape to its outside, a portion of the flexible tube being left bare for the action of the valve-lever F, and the outer tube made oval at that point, as seen at *g*, Fig. 7, and becoming round at a short distance.

It will be seen that we apply two levers, F *f*, one on each side, and close them together to close the valves by collapsing the flexible tube. The outside tube then receives all the shock or ram in sudden closing. One lever might be made to close it, or other means used for the same purpose; but we prefer the two.

By knowing the volume required for each stroke, and registering the strokes, it is evident that it makes a water-meter.

We claim—

The motor described, consisting of one or more pistons, each operated by an unattached diaphragm secured at its edges to an immovable case or chamber, in combination with its inlet and outlet valves and their operating mechanism, substantially as set forth.

JOSEPH CHASE.
SEWALL H. BOWKER.

Witnesses:
C. H. BOWKER,
FRED A. CHASE.