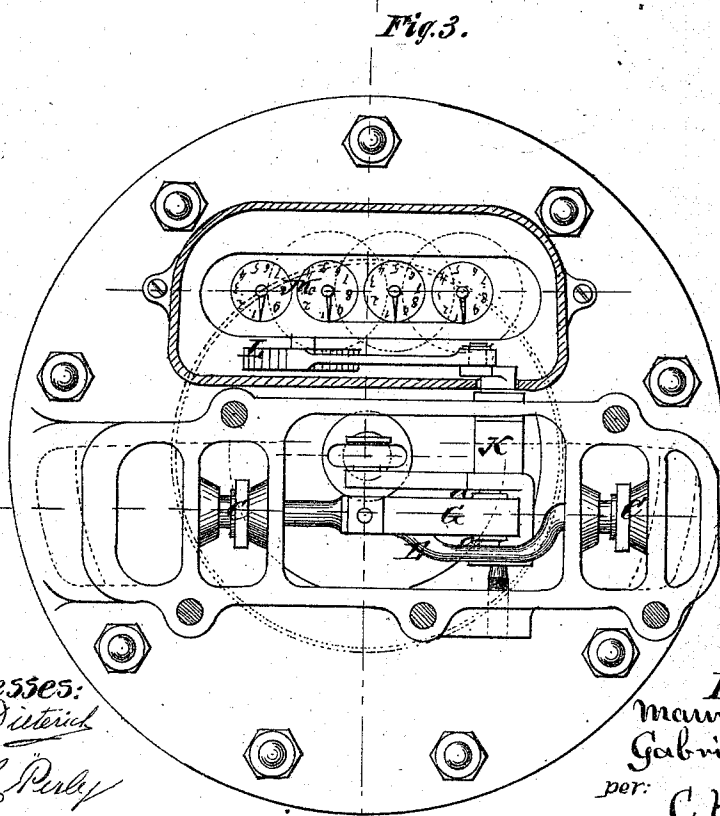
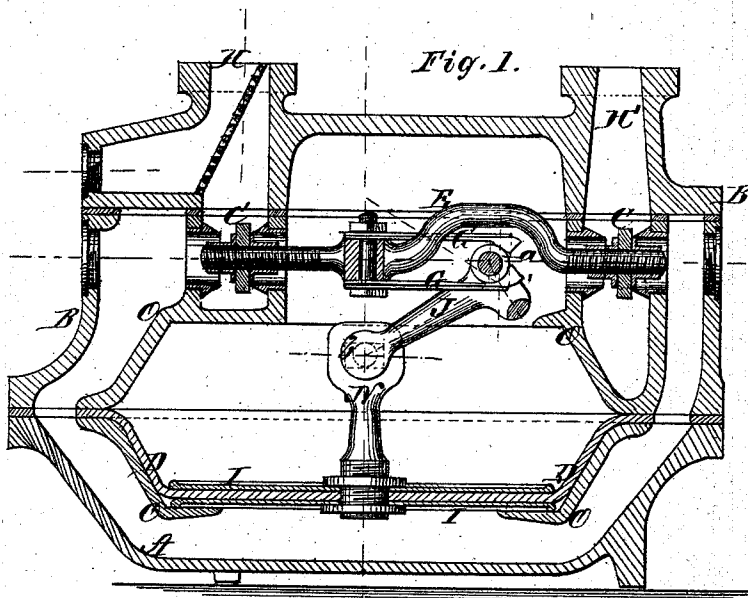


M. NICOLAS & G. CHAMON.
Water-Meters.

No. 146,469.

Patented Jan. 13, 1874.



Witnesses:

P. C. Dietrich

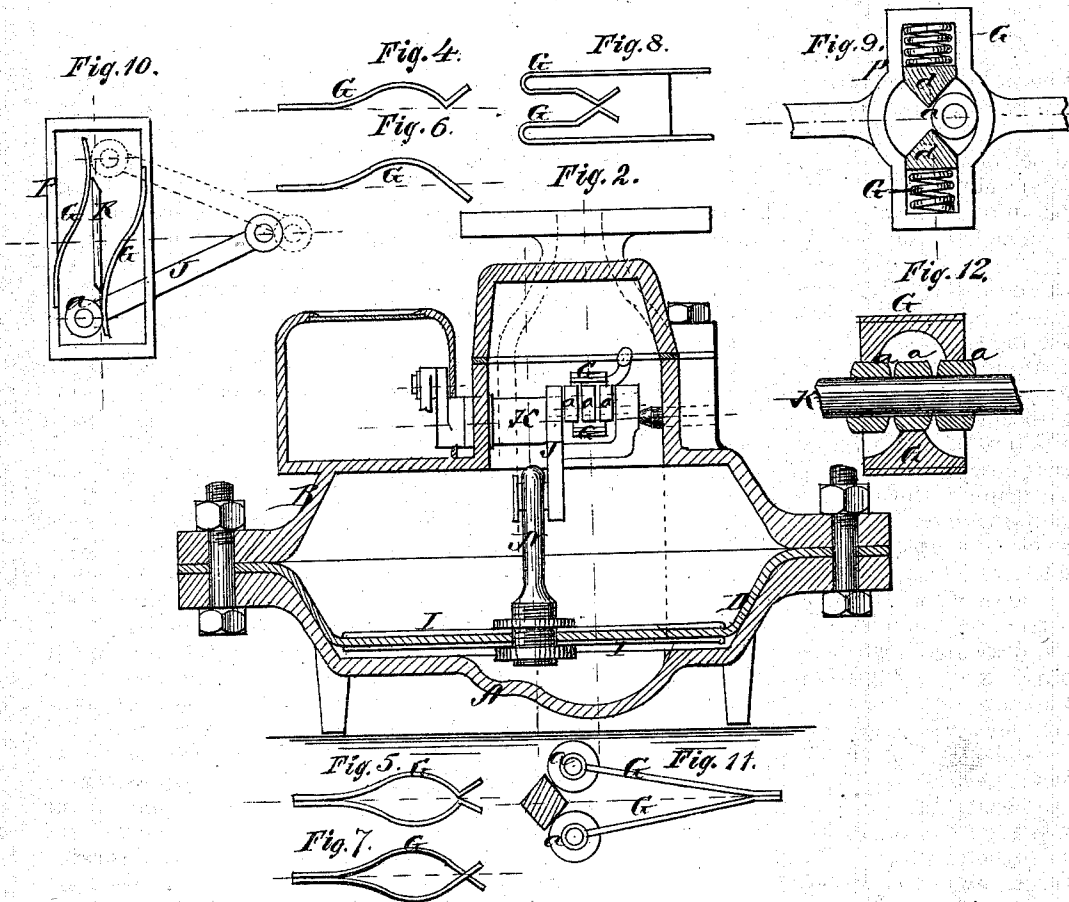
J. L. Parley

Inventors,
Maurice Nicolas
Gabriel Chamon
per: C. H. Watson & Co
Attorneys.

M. NICOLAS & G. CHAMON.
Water-Meters.

No. 146,469.

Patented Jan. 13 1874.



Witnesses:
P. C. Deterick
W. S. Parley

Inventors,
Maurice Nicolas
Gabriel Chamon
per: C. H. Watson & Co
Attorneys.

UNITED STATES PATENT OFFICE.

MAURICE NICOLAS AND GABRIEL CHAMON, OF PARIS, FRANCE.

IMPROVEMENT IN WATER-METERS.

Specification forming part of Letters Patent No. **146,469**, dated January 13, 1874; application filed September 9, 1873.

To all whom it may concern:

Be it known that we, MAURICE NICOLAS and G. CHAMON, of Paris, France, have invented certain new and useful Improvements in Water-Meters, for which a patent was granted to us in France and Belgium, April 27, 1872; and we do hereby declare that the following is a full, clear, and exact description thereof, that 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 a part of this specification.

The nature of our invention consists in the construction and arrangement of a machine for measuring water or other liquids, as will be hereinafter more fully set forth.

In order to enable others skilled in the art to which our invention appertains to make and use the same, we will now proceed to describe its construction and operation, referring to the annexed drawing, in which—

Figure 1 is a longitudinal vertical section, Fig. 2 a transverse vertical section, and Fig. 3 a plan view, of our apparatus. Figs. 4 to 11 show modifications of the springs used in the apparatus.

A represents the lower, and B the upper, cup or part of the shell, which are joined together by bolts *a a*. C C represent the balanced valve, admitting water alternately above and below the movable diaphragm D. E is the valve-stem, controlled by a spring or springs, G, regulating the entrance and exit of the water; H being the inlet, and H' the outlet, ports. I I are plates supporting the india-rubber diaphragm D. J is a bent lever, moving the valve-stem E by means of the spring or springs G and roller *a*, as well as the arbor K, which in its turn communicates motion to the ratchet-wheel L of the registering apparatus. M is the dial of the registering apparatus. N is a central stud, having an eye, *b*, at the top, and its lower end attached to the diaphragm D, with which it moves, thus causing the lever J to describe an arc of a circle. O O show the measuring capacity, which is variable with each size of the instrument, and which show the volume flowing through with the oscillation of the diaphragm.

The main part of the apparatus is the valve-stem E, which bears the valves C C, and the spring or springs G, for the purpose of giving them motion. This valve-stem is completely isolated, having no guides or bearings of any kind, and, as the valves C C at its ends are perfectly counterbalanced, the water or liquid has no effect upon it, and it is, therefore, exclusively controlled by the action of the spring or springs G, whose object is to communicate to it its oscillating movement.

The water or liquid, pressing on the upper and lower sides of the diaphragm alternately, causes an up-and-down reciprocating motion of the same, moving the stud N and lever J, making the center of the roller *a* vary and spread out the springs G, and when their angles and the centers of the rollers are on a line, there is produced a tripping motion, which has the effect to change or close the valves in contrary directions, and to throw alternately the pressure of the liquid above or below the diaphragm. At the same time, as this change is effected, the arbor K is turned so as to move the index of the registering apparatus. In order that the flow may be more rapid, the lever J is provided with three rollers, *a a*, as shown in Fig. 12, the upper spring resting on the two side rollers, and the lower one on the middle roller. The number of rollers and springs employed may be varied, as desired.

This apparatus may be advantageously applied as an elevating apparatus by the addition of pistons to the valve-stem E. It can also be applied as a motor with steam or gas, the object in all cases being to reduce the friction in the working parts.

As the spring or springs G form the most essential part of our invention, we have shown in the drawing various modifications of the same, all answering the same purpose.

Fig. 4 shows a single spring; Fig. 5, the combination of two of that kind. Figs. 6 and 7 show one and two springs of different shape; Fig. 8, two springs of still another shape. Fig. 9 shows two wedges, *d d*, sliding freely in a frame, P, and driven toward the center by spiral springs on rollers *a*, which, in opening or separating them, cause the tripping. In Fig. 10 the roller descends along the frame P, which is divided in two parts by a partition,

R. In bearing on the springs G, at the ends of the partition, the tripping is caused. Fig. 11 shows that the rollers may be placed at the extremities of the springs, either fixed or movable on their axes.

The machine may also be used as an apparatus for measuring the speed of vessels.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The spring or springs G, valve-stem E, carrying valves C C, and the rollers *a*, in combination with the diaphragm D of a water-meter, all constructed and arranged as and for the purpose specified.

2. The combination of the diaphragm D, stud N, lever J with rollers *a*, arbor K, springs G, and valve-stem E, all constructed and arranged substantially as and for the purposes herein set forth.

In testimony that we claim the foregoing we have hereunto set our hands.

MAURICE NICOLAS.
GABRIEL CHAMON.

Witnesses:

RD. FRIDPONPITS,
J. MARTUET.