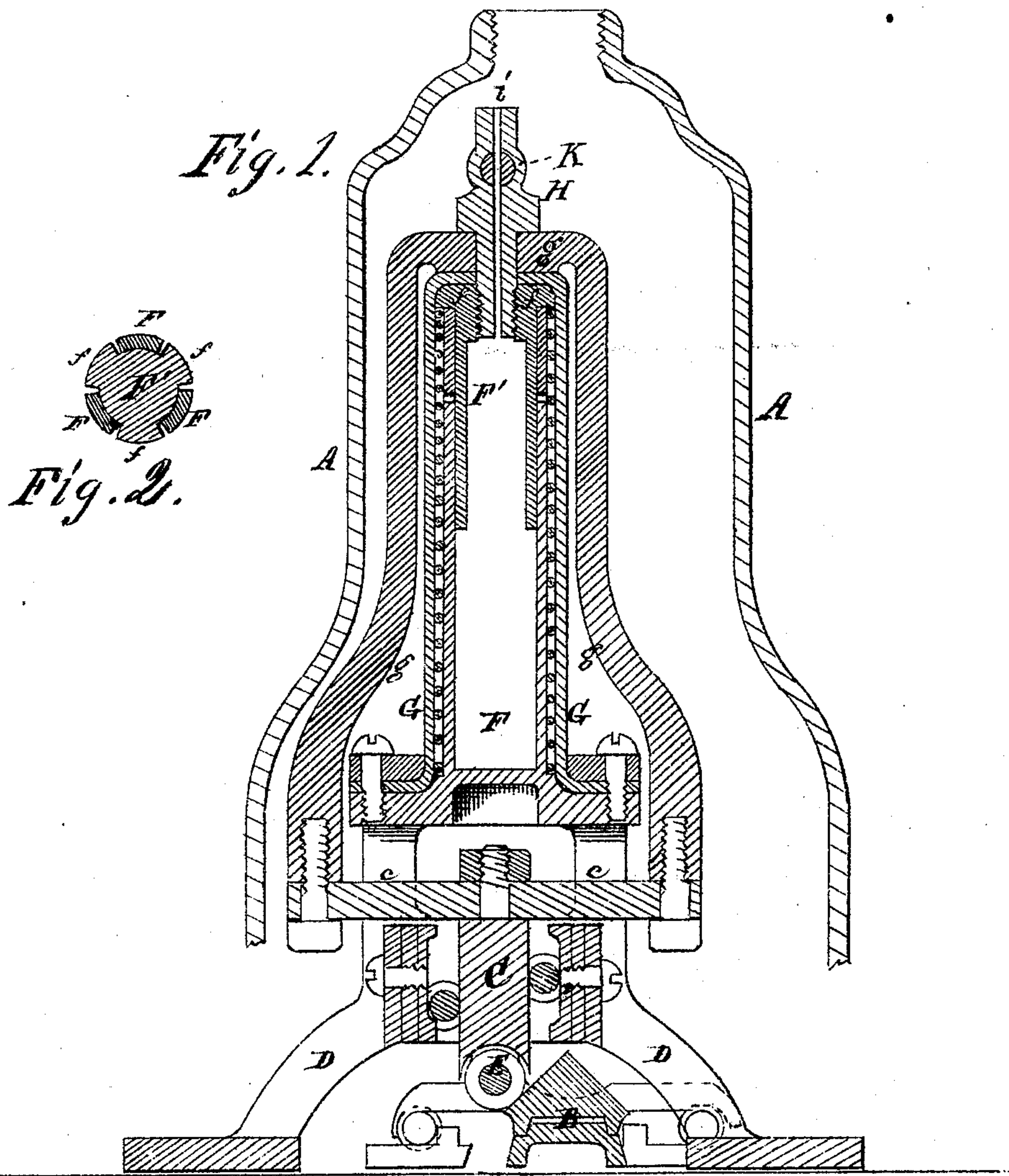


D. BRAINARD SPOONER.

Improvement in Fluid Meters.

No. 118,755.

Patented Sep. 5. 1871.

Witnesses.

A. Allgier
 H. A. Morley

Inventor.

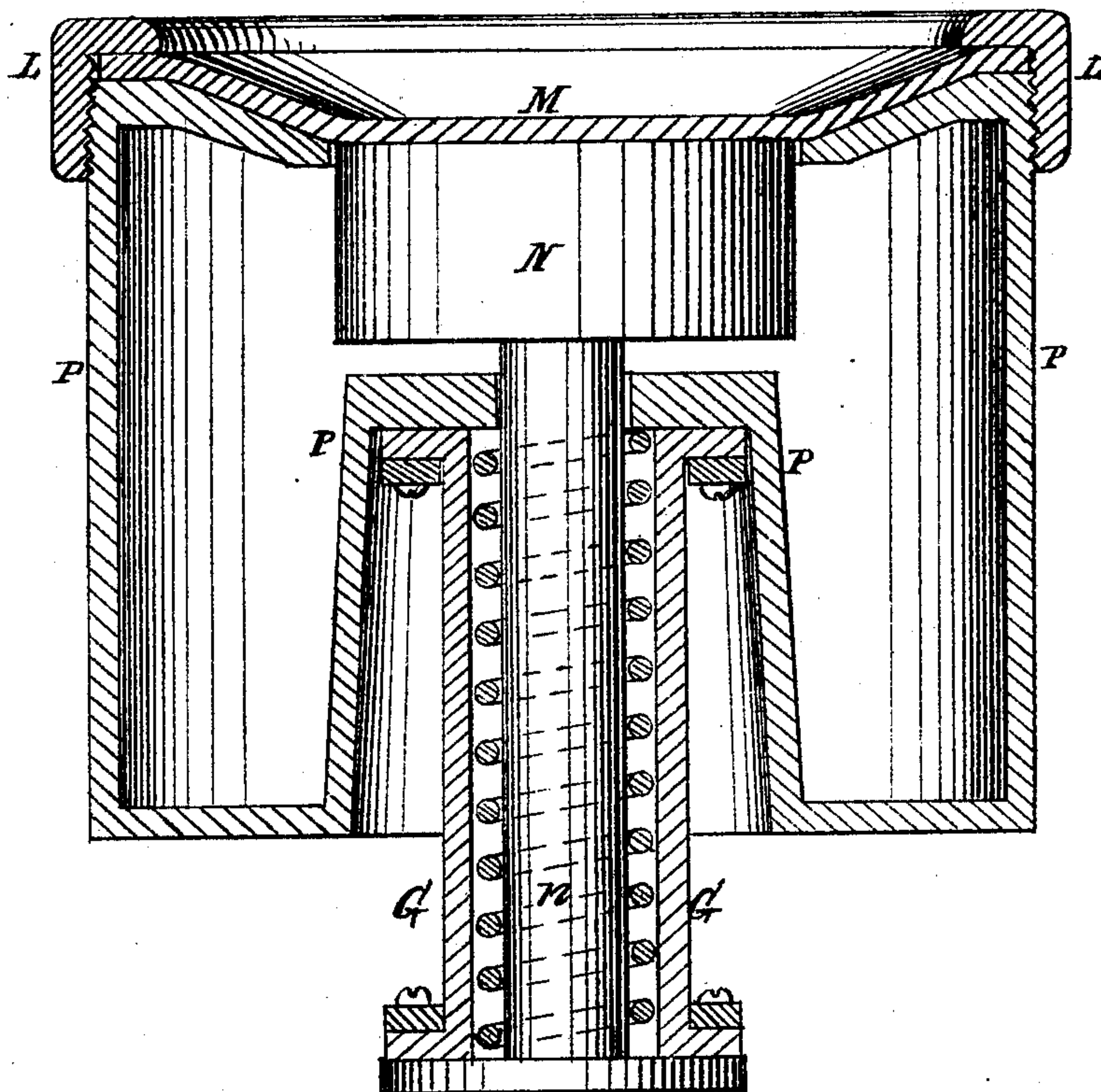
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Fig. 3.Witnesses.A. Algier
J. A. MorleyInventor.

D. B. Spooner

UNITED STATES PATENT OFFICE.

D. BRAINARD SPOONER, OF SYRACUSE, NEW YORK.

IMPROVEMENT IN FLUID-METERS.

Specification forming part of Letters Patent No. 118,755, dated September 5, 1871.

To all whom it may concern:

Be it known that I, D. BRAINARD SPOONER, of Syracuse, in the county of Onondaga and State of New York, have invented a new and useful Improvement in Liquid and Gas-Meters; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others to make and use the same, reference being had to the accompanying drawing forming part of this specification, in which—

Figure 1 is a central vertical section, Fig. 2 is a detail view, and Fig. 3 shows a modification.

Similar letters of reference indicate like parts in the several figures.

This invention relates to certain improvements and modifications made on a patent granted to me the 11th day of April, 1871, and numbered 113,591, the improved construction being made to more perfectly protect the flexible or rubber parts of the air-chamber from wear.

In the accompanying drawing, A is the cap that forms the valve-chamber, its lower part being broken off and the case of the meter omitted. B is the valve, C is the spindle, and E the apex-roller, as in my above-named patent. The spindle C is firmly affixed to a cross-piece, *e*, to which a yoke or bale, *g*, is connected that extends up over an air-chamber about to be described. D is the yoke, on the top of which the air-chamber F is mounted. The cylinder forming said air-chamber is closed at its lower end, and has a cap of metal, F', that slides up and down in it, with ribs *f* that occupy slots in the sides of the cylinder F at its top, as clearly shown by a horizontal section, Fig. 2, of the parts; over these I fit a tubular cap or sleeve, G, of rubber or some flexible material, that in form corresponds to the exterior of the cylinder F, and covering over the top of the cap F'. This sleeve G has a flange or projecting rim around the bottom, over which a collar, *h*, is put and screwed down to the projecting bottom of the cylinder F to make a tight joint. Between the flexible cap or sleeve G and the sides of the cylinder F, all around, there is space, in which is coiled a wire, against which the inner surface of the rubber sleeve rests, to relieve it from friction against the sides of the cylinder F and cause it to stretch equally from end to end. The bale or yoke *g*, as before stated, passes over the top above the rubber sleeve G, and a screw,

H, is put down through them both into cap F', and secures them firmly together. Through the screw H a hole, *i*, can be made for exhausting the air from the chamber. This hole is stopped with an ordinary stop-cock, K. It is obvious that this exhaust-opening may be placed elsewhere in the chamber F.

When the device is put in motion by the power of water pressing on the working diaphragm or piston in the meter, the apex-roller is forced up the incline of the apex, thereby raising the yoke or bale and elongating the rubber or flexible sleeve to the extent the roller rises, and as soon as the said roller has balanced over the apex the head or pressure of water upon the top of the cap G drives it down the opposite incline, thereby shifting the valve.

The modification shows a device much like that in my patent No. 113,591 before mentioned, only one of the diaphragms therein are displaced by a sleeve, G, as shown in Fig. 3. By this construction a good degree of elasticity is obtained by the greater length of the rubber, and the material is more durable, as it is supported at short distances by the spiral wire, and the strain is always uniform on it, or comparatively so, the constant pressure of the water not straining the rubber between its supports, as heretofore.

The device can be so constructed that the pressure of the water can be applied to the inside of the sleeve instead of the outside, with nearly the same facility, and in such case the supporting barrel or wire is placed outside of the rubber—that is to say, the sustaining devices are reversed, and the outside of the sleeve kept free from the pressure of water. I, however, consider the construction shown as most simple in its action. When used with a low pressure of water the air is partially exhausted from it, so that more or less of a vacuum is formed in the cylinder, and with a considerable portion of the air removed, the cylinder can be placed entirely outside of the meter and made to operate by the pressure of the atmosphere.

The tubing or sleeve G, Fig. 1, can be pieces of tubing cut off into suitable lengths, and fastened at each end by copper wire or other well-known means; but to prevent tendency to wear, and to secure certainty of tight joints, I mold the sleeves or caps G with flanges on the ends, the

said flanges being outside like the lower flange, shown in Fig. 1, or inside flanges like the upper one shown in this figure.

Rings can be substituted for supporting the cap or sleeve in place of the coiled wire.

By thus using the rubber or flexible material in a tubular form, as described, the overstraining and wear of the rubber are obviated or reduced to the minimum.

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

1. A device for actuating the valves of liquid and gas-meters, composed of a cylinder or chamber surrounded by a movable or flexible sleeve resting on a coiled wire or other movable support, said sleeve or covering receiving the pressure of the water for shifting or throwing the valve, substantially as described.

2. The flexible or rubber tubing G, combined with the valve of a liquid or gas-meter in such manner that when the diaphragm or piston is moved by the pressure of water from one position in its stroke to another, the said tubing is thereby increased or diminished in length or dimensions for actuating the valves, substantially as described.

3. The rubber sleeve G, forming an elastic chamber for throwing the valves of liquid or gas-meters, molded with flanges, as and for the purpose herein described.

The above specification of my invention signed by me this 29th day of June, 1871.

D. B. SPOONER.

Witnesses:

A. ALLGIEAR,
F. A. MORLEY.