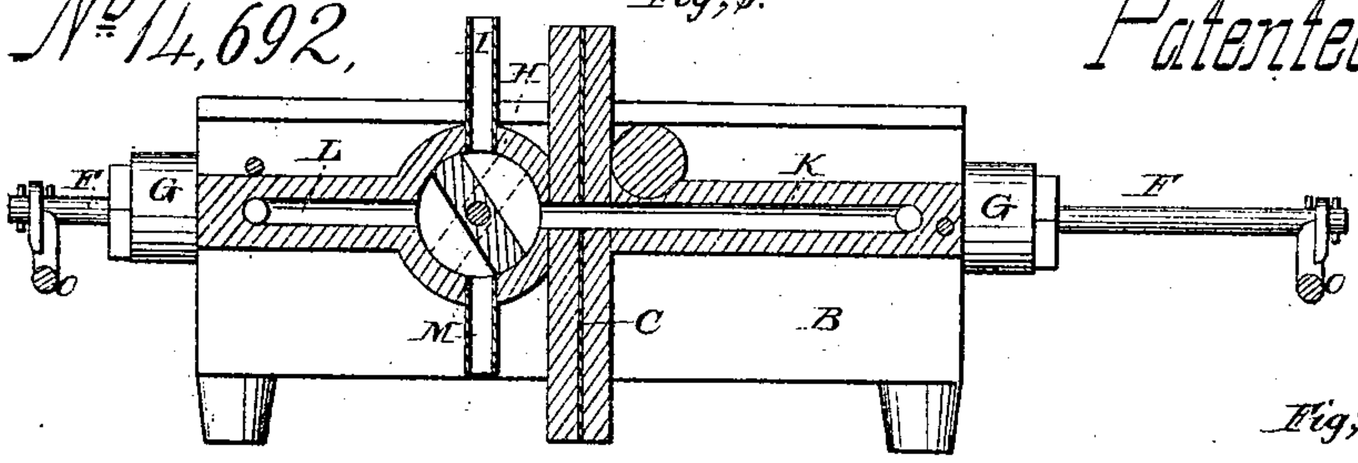
R. L. Harres,

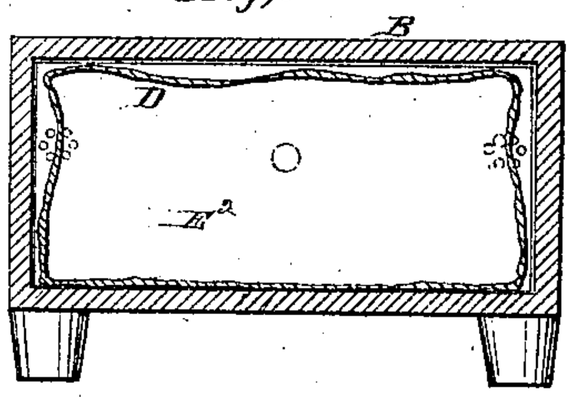
Diaphragm Meter,

No. 14,692. Patented Apr. 15, 1856.

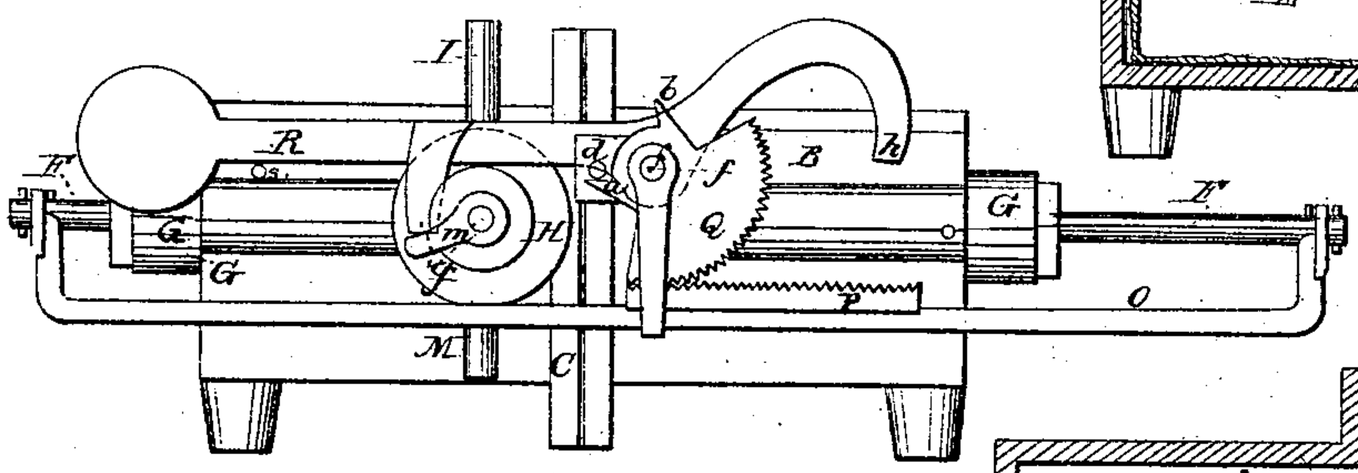
Fig; 3.



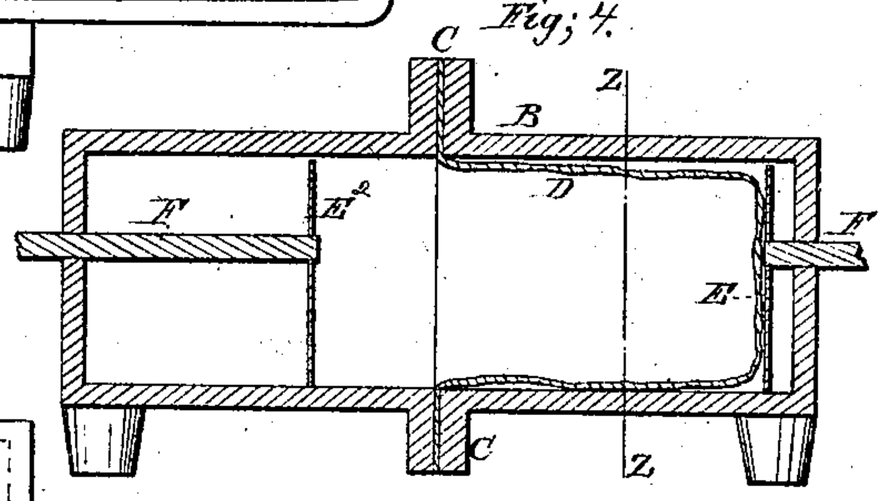
Fig; 5.



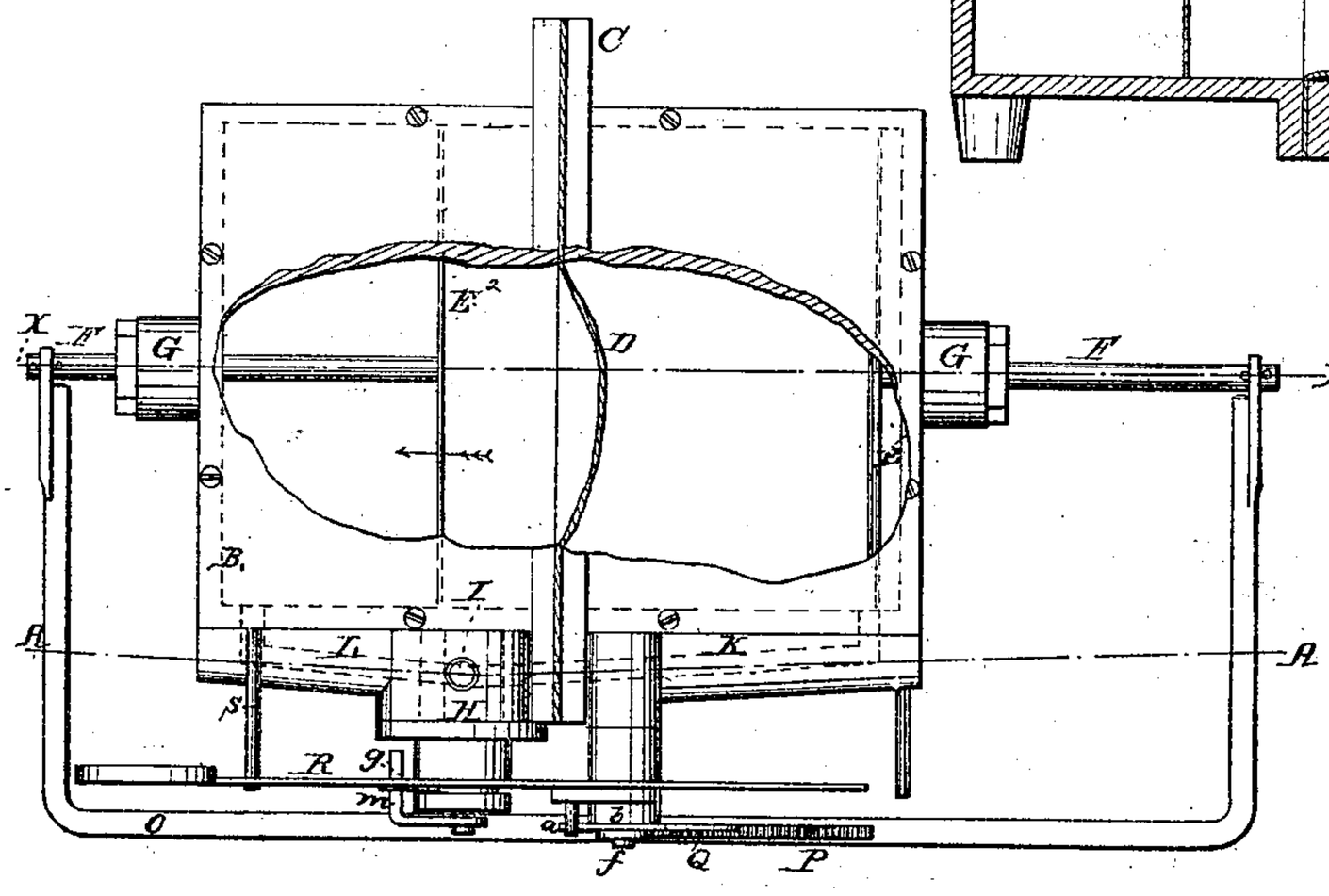
Fig; 2.



Fig; 4.



Fig; 1.



UNITED STATES PATENT OFFICE.

R. L. HAWES, OF WORCESTER, MASSACHUSETTS.

IMPROVED DIAPHRAGM FLUID-METER.

Specification forming part of Letters Patent No. **14,692**, dated April 15, 1856.

To all whom it may concern:

Be it known that I, R. L. HAWES, of Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Water-Meters, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a plan, a portion of the top case being removed to show the parts within; Fig. 2, a front view of the same; Fig. 3, a vertical section upon the line A A of Fig. 1; Fig. 4, a vertical section upon the line X X of Fig. 1; Fig. 5, a vertical section upon the line Z Z of Fig. 4.

In the water-meters heretofore contrived, in which an india-rubber or other elastic diaphragm is employed, the register or counting apparatus is actuated by means of attachments made directly to the diaphragm, by which construction and arrangement the diaphragm is subjected to strain and wear, which causes its speedy destruction.

To obviate this difficulty is the object of my present invention, which consists in the use of a diaphragm or sack of india-rubber or other flexible water-proof material of a capacity greater than that of the portion of the meter in which it operates, this sack as it fills with water and expands being allowed to press against and give motion to a disk to which the registering apparatus is connected.

To enable others skilled in the art to understand my invention, I will proceed to describe the manner in which I have carried it out.

In the accompanying drawings, B is the case of the meter, the parts of which are united by the flanges C, between which are confined the edges of the measuring diaphragm or sack D. This sack is of a capacity slightly exceeding that of one-half of the interior chamber of the meter, and as it expands by the influx of the water it presses against one or other of the disks E E^2. The pressure of the water is thus transferred to these disks, and the motion thus imparted to them is transmitted, by means of the rods F, which pass through the stuffing-boxes G, to the exterior of the meter, where they may be connected with any suitable counting or registering apparatus. The water is admitted to the meter alternately upon one side and the other of the diaphragm in the following manner: H is a four-way cock, which receives its supply from the main through the induction-pipe I. When in the position represented in Figs. 1, 2, and 3, the water passes from the cock by the passage K to the right hand of the meter and upon one side of the diaphragm, the way being now opened through the passage L to the cock, and thence by the eduction-pipe M the water upon the other side of the diaphragm passes off and the latter is forced over into the opposite half of the meter until it presses against the other disk, E^2, which it now moves in the direction of the arrow, Fig. 1, until the cock is again changed and the plug or partition within the same is thrown into the position shown in Fig. 3, when the water enters the meter by the passage L and leaves it by the opposite passage, K.

It now remains to show the manner in which the cock is operated to reverse the flow of the water.

The rods F are connected together by a yoke, O, of the form represented in the drawings. To this yoke is attached the rack-bar P, which engages with a toothed sector, Q, that vibrates around a pin, *f*, projecting from the case of the meter.

R is a tumbling-bob pivoted at *f* and having two projecting arms, *g* and *h*, which alternately, as the ball falls upon one side and the other, strike the arm *m*, secured to the plug of the cock, by which the latter is thrown into the two positions seen in Fig. 3.

a and *b* are teeth upon the sector Q, which alternately engage with the pin *d*, projecting from the tumbling-bob, and thus the latter is thrown from one side to the other, and the cock is operated as before explained.

It is evident that the above-described meter gives a positive and unvarying measure, while the diaphragm, being subjected to no strain, and having no attachments to the moving parts, is not exposed to wear or rupture, as has heretofore been the case in meters of this character.

The disks E E^2 may be made of finely-perforated sheet metal or of wire-gauze, the ap-

ertures through the same being of a size that shall not permit the protrusion of the india-rubber diaphragm.

The throw of the tumbling-bob is limited by the pins *s*, projecting from the case of the meter.

What I claim as my invention, and desire to secure by Letters Patent, is—

The elastic diaphragm D, so constructed and arranged as to operate without attachments to the moving parts and without being subjected to strain, as set forth.

R. L. HAWES.

Witnesses:
HORATIO PHELPS,
T. W. HAMMOND.