

D. B. SPOONER.
LIQUID-METER.

No. 173,685.

Patented Feb. 15, 1876.

Fig 2.

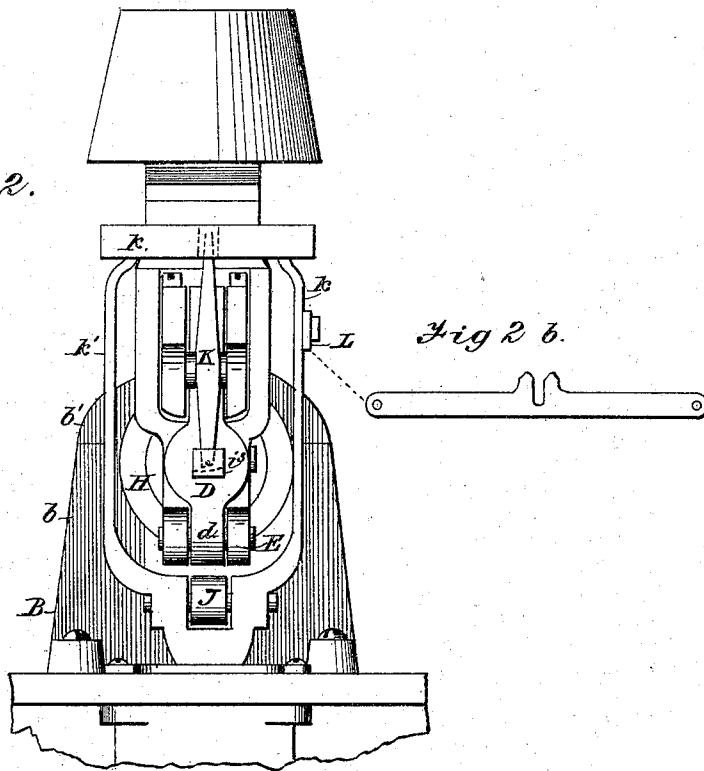
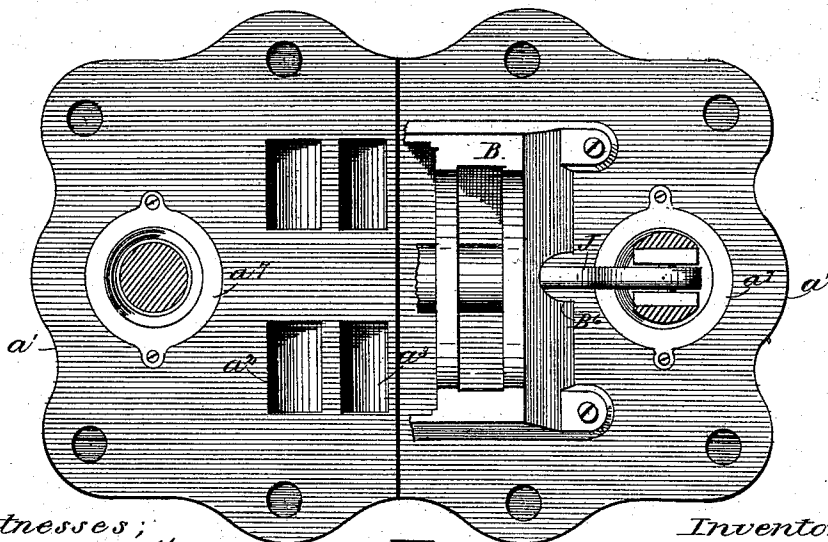
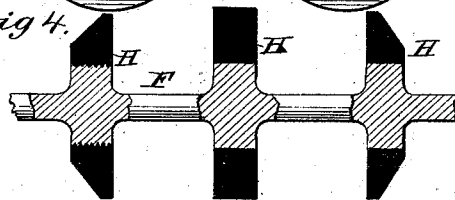


Fig 3.



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UNITED STATES PATENT OFFICE

D. BRAINARD SPOONER, OF SYRACUSE, NEW YORK.

IMPROVEMENT IN LIQUID-METERS.

Specification forming part of Letters Patent No. 173,685, dated February 15, 1876; application filed February 8, 1876.

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 Water-Meters; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings and to the letters of reference marked thereon.

This invention relates generally to the class of diaphragm-meters, but more particularly to the meter shown in my Letters Patent, No. 132,496 and No. 132,497, granted October 22, 1872.

The novelty in this application consists mainly, first, in the peculiar construction of the castings forming the shell or case of the meter, the same being provided, in addition to the usual water-ways, communicating with the chambers upon the sides of the diaphragm, with an additional water-way, through which the measured water is discharged; second, broadly, in the employment, in connection with valves of any suitable construction, and primary mechanism for shifting them, of independent auxiliary mechanism for starting them when the primary mechanism fails to act; and, third, in the peculiar construction of certain parts of the valve mechanism, all of which will be fully described hereinafter.

In the drawings, Figure 1 represents a central sectional elevation of my improved meter; Fig. 1^a, an enlarged view of the fulcrum of the apex-weight; Fig. 1^b, an enlarged view of the pin or shaft *d'*; Fig. 2, an end elevation of the mechanism for starting the valves. Fig. 2^b, a side elevation of the recessed bar which operates directly or indirectly the registering or dial mechanism; Fig. 3, a plan view of the top plates of the shell casting; Fig. 4, a sectional elevation of the valve-rod and valves.

To enable others skilled in the art to make my improved meter, and properly use the same, I will proceed fully to describe its construction and manner of operation.

For convenience of description, the several mechanisms will be described under different heads, as follows: first, the castings forming the shell or case; second, the valves and the primary mechanism for actuating them; and, third, the independent auxiliary mechanism

for starting the valves when the primary mechanism fails to act.

First, the castings forming the shell or case: These are constructed substantially like those described in my Patent No. 132,496, with the exception of the features now pointed out.

A represents the shell or case, consisting of the castings *a a*, of identical form, which are bolted together at their edges, to form the body of the meter. *a' a'* represent the top plates, each of which is provided with a main water-way, *a²*, leading to the chamber upon the side of the diaphragm, and an auxiliary water-way, *a³*, leading to the discharge-opening *a⁴*, as shown.

These main and auxiliary water-ways formed in each half of the shell lie in parallel planes, which are inclined as they extend in an upward direction, toward the vertical center line of the meter. *a⁵ a⁵*, represent recesses cast in the outer ends of the top plates, which are adapted to receive the outer edge or periphery of the flexible partition *a⁶*, as shown. *a⁷ a⁷* represent clamping-rings, provided with screw-holes or other means of fastening to the casting, which are adapted to rest in the recesses of the top plate, and securely hold the flexible partition in place.

Some of the advantages of the construction described are as follows: By locating the discharge water-way in the lower casting, the independent top plate employed in the meter covered by the patent above referred to is dispensed with, and the construction consequently much simplified. By locating the water-ways in parallel lines, inclined toward the center, as described, the space is economized and the parts compactly arranged.

By means of the recesses and clamping-rings a ready and secure means of attaching the partition to the casting is provided, and each also is held entirely independent of the other, and of the remaining parts of the machine.

Second, the valves and the primary mechanism for actuating them: The construction of the valve mechanism and its manner of operation are substantially like that described in my Patent No. 132,497, with the exception of such points of difference as will be pointed out.

B represents the valve-box, constructed in

two parts, b^1 , and provided with the ports b^2 b^3 b^4 , and the water-ways b^4 b^4 b^5 , communicating with the water-ways in the lower casting, as shown. b^6 represents a recess formed in the lower part of the valve-box, upon the outside, by means of which space is provided for the bar J, uniting the disk-levers, as shown. C C represent arms projecting from the top of the casting, each of which is provided with journal-ears, c c , as shown. D D represent links provided at each end with a closed eye, d d , by means of which, and a transverse shaft or pin, d^1 , they are secured above to the ears c c of the arm C, and below to the ears of the swinging carrier-frame, as shown. Each is provided also with an opening, d^2 , located at right angles to the eyes d , which is adapted to permit the center-pin of the valve-shaft to have proper play, without interference. The pins d^1 are also provided with shoulders d^3 , by means of which the links are centrally held and accurately guided in all their movements. E represents the carrier-frame supported by the links, as before described, and provided also with the transverse block f , having a dovetailed recess adapted to hold the base of the prismatic block f' , as shown. F represents the valve-shaft, consisting of a metal rod of suitable length, which is held at its ends by center-pins, as described in my Patent No. 132,456. g g represent disks forming a part of the shaft, which are located at the proper points, as shown. H represents the valves proper, consisting of rings of hard rubber, of suitable form, which may be attached to the disks of the shaft, or to the shaft itself, by screw-threads, or by molding them onto the metal, or in any other proper manner. I represents a lever, provided at one end with a socket or eye, having a friction-sleeve or bushing, i , of hard rubber, and at the other end with a weight, having below a dovetailed recess adapted to hold the prismatic block i' , as shown. This friction-sleeve, it will be observed, extends beyond the sides of the eye, and bears at its end against the inner sides of the lever-arm. This lever is pivoted between the arms of the disk-lever by means of a pin or shaft, i^2 , as shown. J represents a bar, by means of which the disk-levers are united and caused to move together.

The general operation of this valve mechanism is similar to that described in my patent above referred to, and it need not, therefore, be particularly described here.

Some of the advantages of this improved construction are as follows:

By locating the bar connecting the disk-levers below the valve-box, the parts are more compactly arranged, and space is economized.

By the employment of hard-rubber valves in connection with a metal valve-rod, the advantages of both materials are obtained, the rubber being especially adapted for the valves and the metal for the rod.

By the employment of a friction-sleeve of

hard rubber in the eye of the lever of the apex-weight, metal surfaces are separated from each other, and consequently the friction is reduced.

By the employment of hard rubber in connection with the metal surfaces, also the corrosion which would arise from the impurities and chemical substances in the water, if metal surfaces were brought in contact, is entirely avoided.

Third, the independent auxiliary mechanism for starting the valves when the primary mechanism fails to act: K represents a lever supported in any proper bearing attached to the stationary portion of the machine, one end of which is secured in any suitable manner to a bar, k , attached to the upper ends of the arms k' k' of the disk-lever, as shown. The other end extends in a downward direction, and is adapted to move between the limiting-shoulders of the extension i^3 of the center-pin of the valve-shaft, as shown. L represents a bar uniting the disk-arms, which is provided with a central recess, adapted, when the valve is in operation, to give movement to any proper mechanism for actuating the registering or dial mechanism.

The operation of this mechanism is as follows: The valves are ordinarily actuated by the primary mechanism, as described in my former patent, the movement of the lever-arms being communicated to the apex-weight which actuates the swinging frame carrying the valves. If from any cause, however, this weight should hang in its movement after having passed the apex, or the valves should fail to move from any cause, the continued movement of the lever-arms will actuate the starting-lever, and consequently move the valve-rod and valves. As soon as the valve is started, the primary mechanism acts to complete the movement.

Certain modifications may be made in the construction shown, without departing from the spirit of my invention.

If desired, the valve mechanism, or the starting mechanism, or both, may be employed in connection with other measuring mechanism, such as a sliding or rotary piston.

The valve-shaft, if desired, may be provided with an enlarged bearing-surface at its ends, adapted to rest against a corresponding surface upon the inner face of the carrying-frame, and the two be rigidly connected together for the purpose of strongly uniting the parts to resist shock and wear.

The starting mechanism, constructed substantially as described, or its equivalent, may be employed in connection with any valve which leaves its seat, and with any primary mechanism for shifting the valves.

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

1. The castings a a having the main water-ways a^2 a^2 , and the discharge water-way a^3 , substantially as described.

2. The combination of the recessed castings with the clamping-rings and flexible partitions, substantially as described.

3. The combination of the recessed valve-box and the bar J uniting the disk-levers, substantially as described.

4. The combination of the metal valve-rod and the hard-rubber valves, substantially as described.

5. The employment of a friction sleeve or bushing of hard rubber, of greater length than the bearing-surface it protects, for the purpose of preventing friction upon the sides, substantially as described.

6. The combination, broadly, of valves of suitable construction, and primary mechanism for shifting them, of auxiliary independent mechanism for starting the valves when the

primary mechanism fails to act, substantially as described.

7. In combination with a moving piston or diaphragm, and primary mechanism for actuating the valves, I claim auxiliary independent mechanism for starting the valves, when the primary fails to act, substantially as described.

8. The combination of the levers pivoted to the fixed portion of the meter with the measuring disk-lever, and the valve-rod provided with limiting-shoulders, substantially as described.

This specification signed and witnessed this 8th day of February, 1876.

D. B. SPOONER.

Witnesses:

H. CLAY SMITH,
HARRY C. CLARK.