

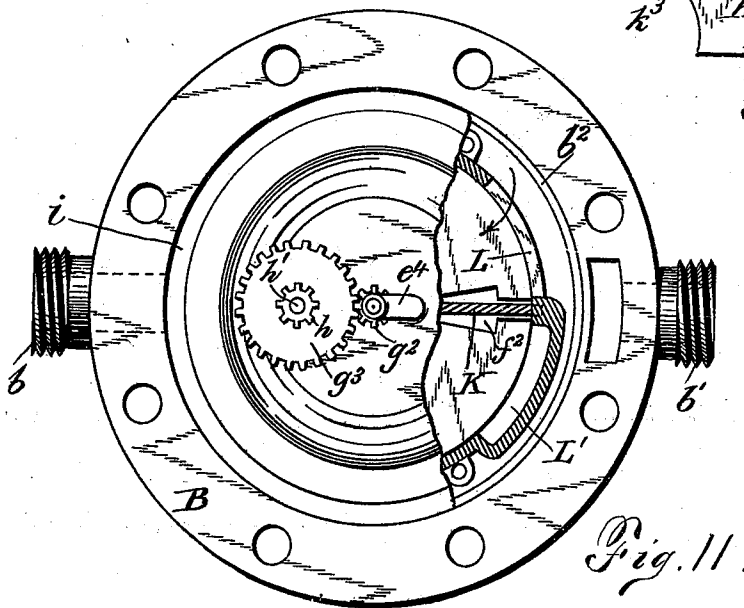
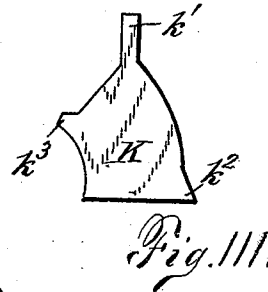
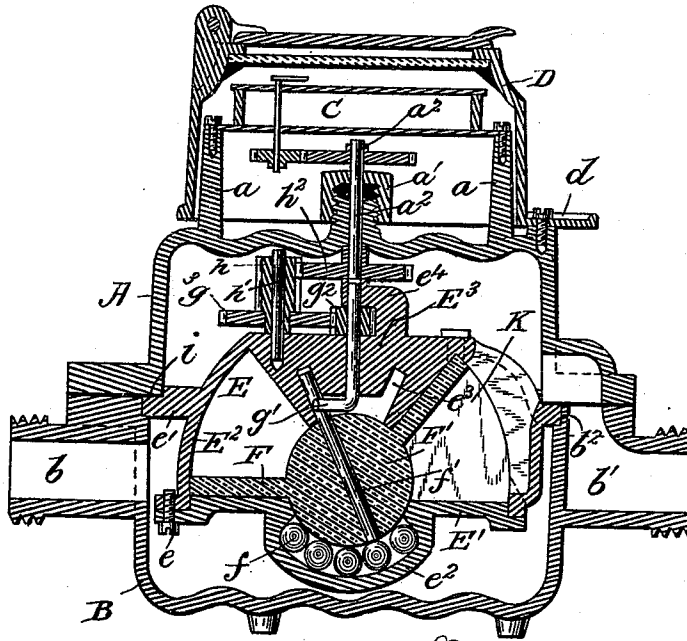
(No Model.)

4 Sheets—Sheet 1.

G. B. BASSETT.
DISK WATER METER.

No. 501,203.

Patented July 11, 1893.



Witnesses:

O. E. Hoddick.
Geo Adair

Inventor.

George B Barrett

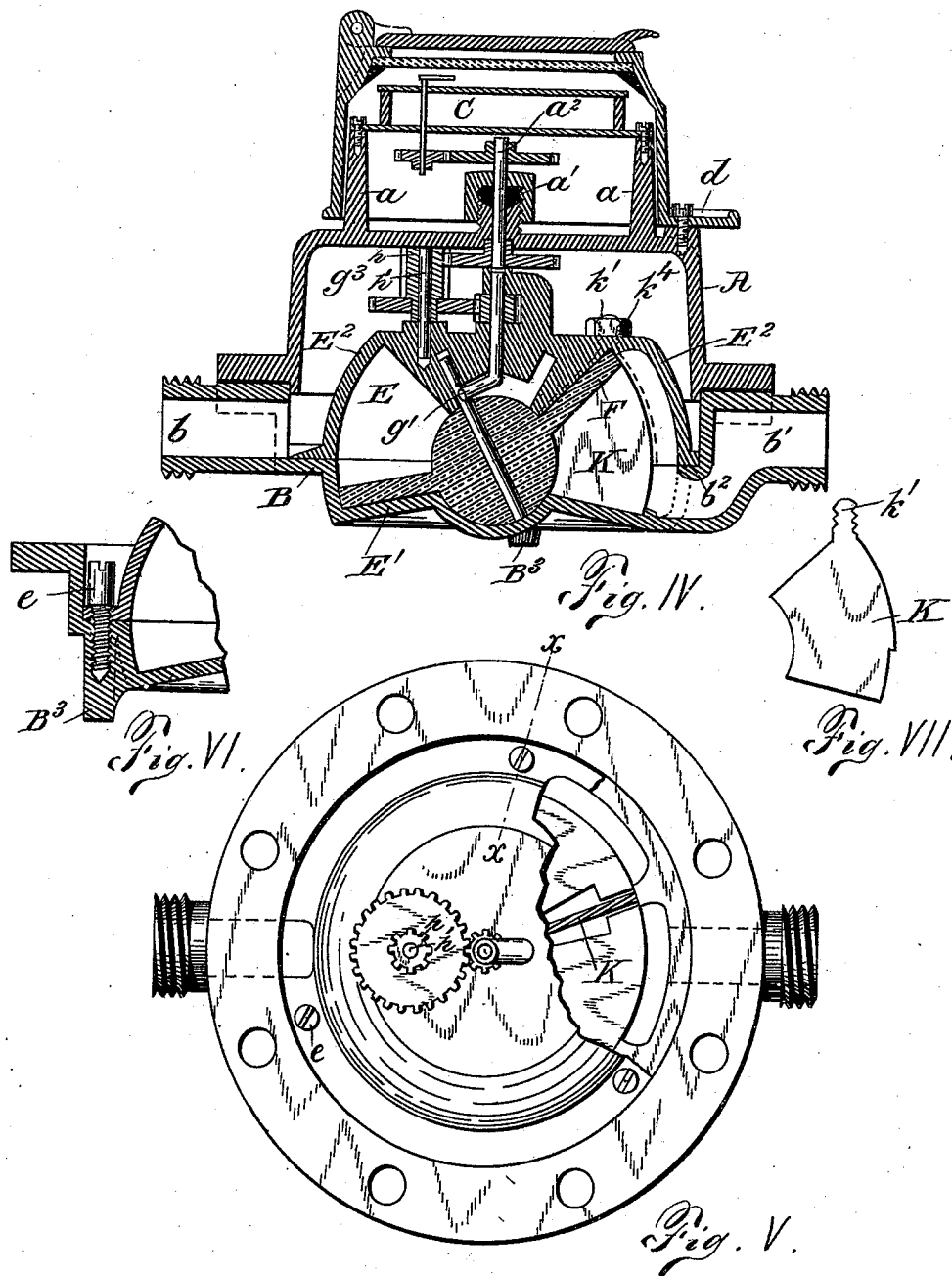
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4 Sheets—Sheet 3.

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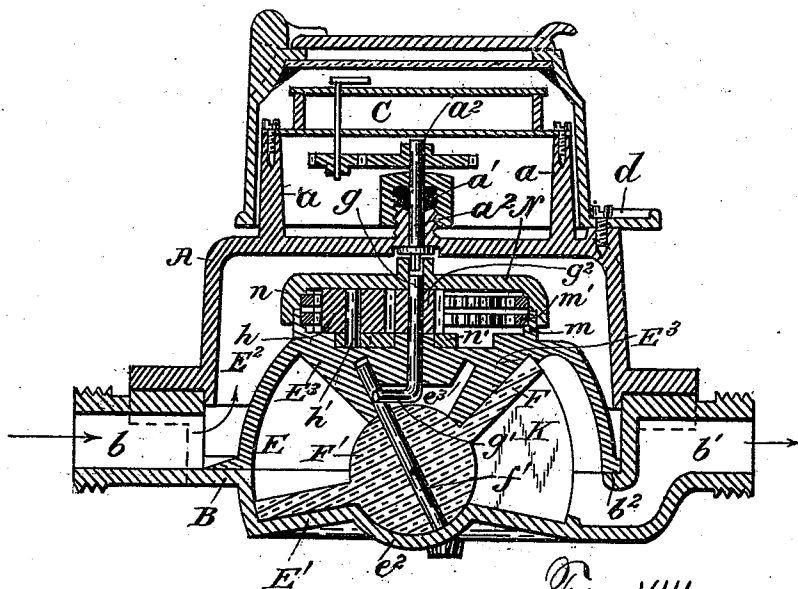


Fig. VIII.

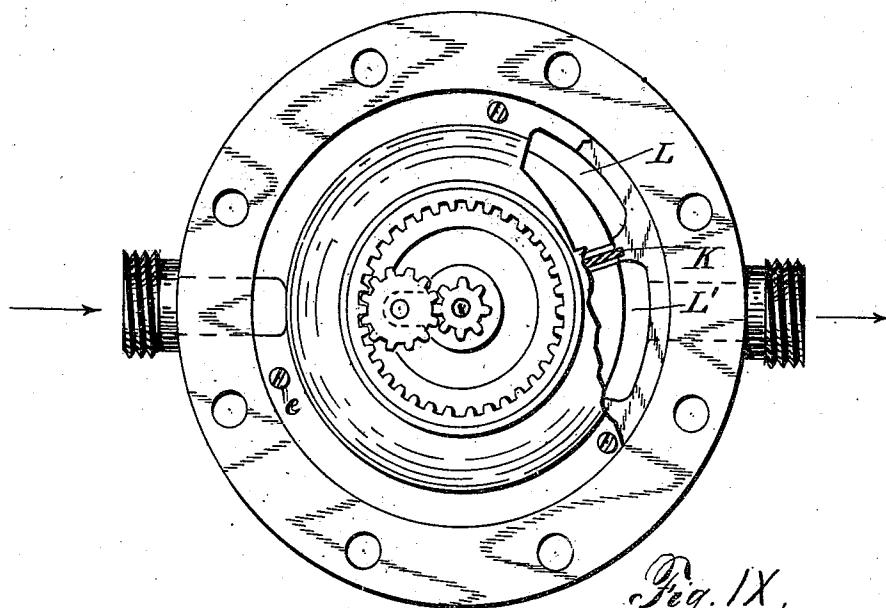


Fig. IX.

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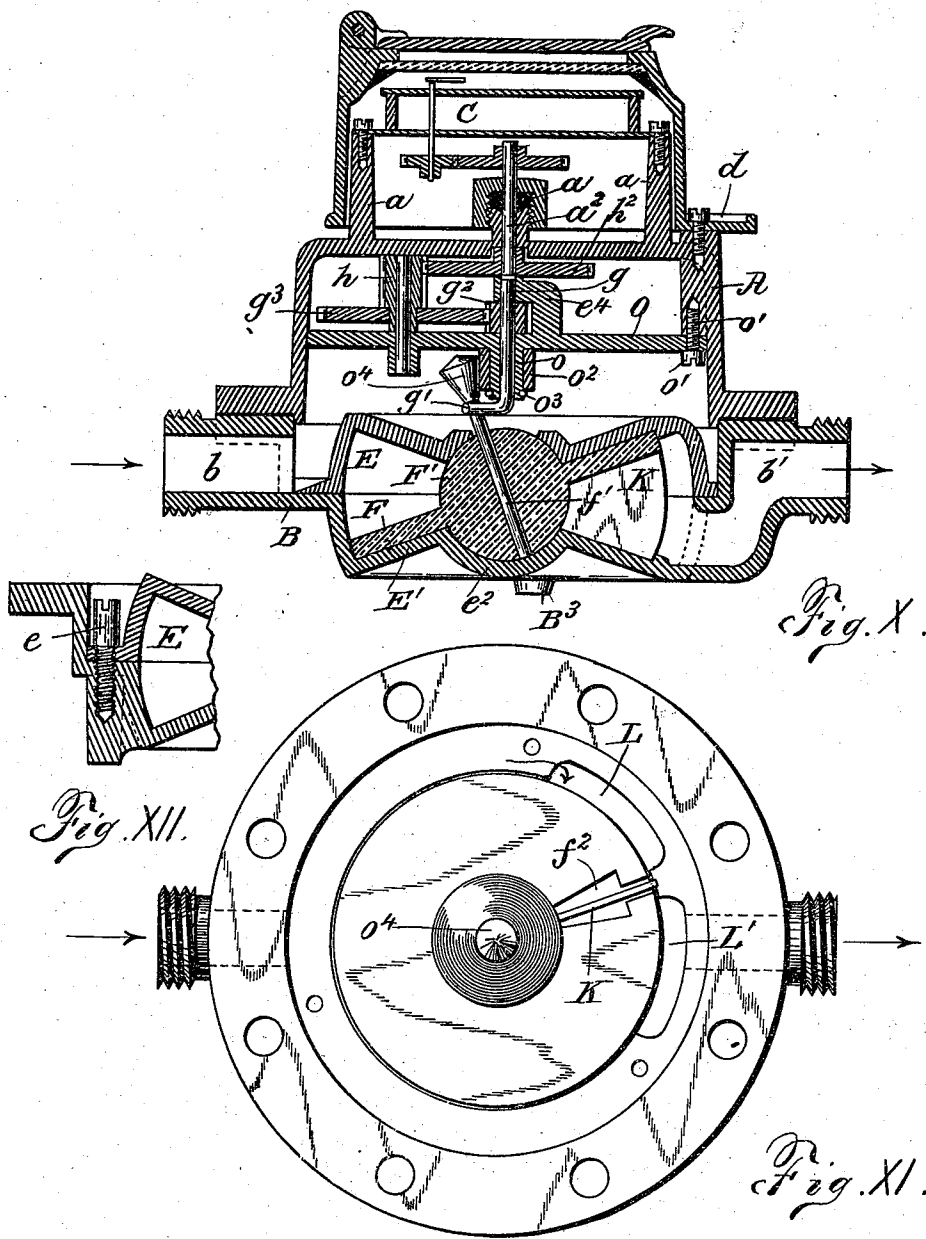
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UNITED STATES PATENT OFFICE.

GEORGE B. BASSETT, OF BUFFALO, NEW YORK.

DISK WATER-METER.

SPECIFICATION forming part of Letters Patent No. 501,203, dated July 11, 1893.

Application filed February 1, 1893. Serial No. 460,522. (No model.)

To all whom it may concern:

Be it known that I, GEORGE B. BASSETT, of Buffalo, New York, have invented a new and useful Improvement in Water-Meters, which is fully set forth in the following specification.

The present invention has reference to water or other fluid meters of the class known as "disk meters." It is not necessary here to rehearse the principle of operation and general construction of meters of this class, which are well understood in the art.

The objects of the present invention are principally to improve the construction and arrangement of the casing, bearings for the disk, disk chamber, intermediate-gearing and other points in the construction of these meters for the purpose of producing a more effective operation, cheapening the manufacture, allowing the more ready assemblage and separation of the parts for the purpose of repair and removal of foreign matter, preventing damage by freezing of the water in the meter, and at the same time increasing the durability and giving other advantageous results. According to the present invention the end of the disk-spindle (which is made shorter than usual), is completely inclosed by the top casing of the disk-chamber, which is provided with a bearing and guiding surface for this spindle, and the latter communicates motion to a shaft which passes through the top wall into the interior of the disk-chamber. The intermediate gearing is so constructed and mounted that it can with great facility be put together and taken apart for cleaning, and so as to run with great delicacy and precision. It may be supported directly on the disk-chamber, or on a plate detachably secured to the main-casing above the disk-chamber. In either case the support is provided with an overhanging arm, which contains the upper bearing of the driving shaft. This shaft carries a pinion which lies between the support and overhanging arm. These and other improvements which are included in the present invention can be most conveniently described in connection with the accompanying drawings, in which—

Figure I, is a vertical section through one form of my improved meter. Fig. II, is a top plan view (partly in section), the upper por-

tion of the casing being removed, and Fig. III, is a detail of the diaphragm. Fig. IV, is a vertical section through a desirable form of my improvement. Fig. V, is plan view (of Fig. III) similar to Fig. II. Fig. VI, is a vertical section on line $x-x$ Fig. V, and Fig. VII is a detail of the diaphragm. Figs. VIII and IX are views similar to Figs. I and II showing a modification of the intermediate gearing for the registering mechanism. Fig. X is a vertical section showing a modification of the intermediate gearing and its connection with the oscillating disk. Fig. XI is a plan view of the lower part of the casing (of Fig. X) showing the disk in place and arranged in a horizontal position, for simplicity in illustration, and Fig. XII is a detail view in vertical section.

In the drawings A represents the upper portion and B the lower portion of the main casing, the flanged meeting edges of which are secured together by bolts passing through holes in said flanges.

C is the register of any well known construction, resting on pins a projecting upwardly from casing A.

D is a cap for the register provided with the usual sealing space d .

a^2 is a shaft passing through stuffing box a' into the interior of the main casing, where it is connected with the intermediate gearing, which will be hereinafter described.

The lower portion B of the main casing and the inlet and outlet spuds b and b' as well as the lower portion of the disk-chamber (see Fig. IV) are formed of a single casting.

In Fig. I, I have shown the top and bottom of the main casing corrugated (either concentrically or otherwise) so as to allow the expansion of the latter in case of freezing, thereby preventing the bursting of the casing. In this figure I have shown the bottom E' of disk chamber E, as being formed of a separate casting which is secured to the lower edge of the downwardly projecting bulged flange E^2 of the upper portion E^3 of the disk chamber by screws e , and is supported by an annular flange e' which rests against annular seat b^2 in the main casing B. This flange e' has an annular step i which receives the edge or corner of the upper main casing A. By this

construction top A and the disk-chamber are accurately centered and the shafts attached to the former brought into proper relative position with those carried by the latter.

- 5 F is the oscillating disk having a central ball F' both of which are preferably formed integrally of hard rubber. The ball F' rests on balls f (Fig. I) of any suitable material, which are placed in a socket or recess e² 10 formed in the bottom E' of the disk-chamber, thus producing a minimum amount of friction during the operation of the meter. When the disk and the central ball are made of hard rubber, the construction shown in Fig. IV 15 gives good results, and works without appreciable friction. The reason for this is that the material of which the disk and ball are made has nearly the same specific gravity as water, and because moreover there is between 20 the ball and its seat a film of water which acts as a lubricant for rubber. For large meters, however it is more practical and economical to employ metal for all or part of the disk and ball, and when metal is used the 25 construction shown in Fig. I is more advantageous. Likewise for measuring hot water, in which case the use of a hard rubber disk is inadvisable, the construction shown in Fig. I is preferred.
- 30 The ball F' is provided with a spindle f' which projects upwardly into an inwardly inclined circular channel or groove e³ formed in the inwardly projecting solid portion, in the shape of an inverted frustum of a cone, 35 on the under side of the flat top of the upper casing E³. The upper end of the spindle f' engages an angular extension g' on the shaft g which projects upwardly through the top E³ of the disk-chamber its upper end bearing 40 in the overhanging arm e⁴. The arm or extension g' is as shown in one piece with shaft g and is formed by simply bending a straight rod. Preferably this bend forms an oblique angle with reference to the main-portion of 45 the shaft, so as to engage the inclined spindle f' at approximately a right angle, as shown in Fig. IV.

In meters of this class the construction of the means for transmitting the movement of 50 the oscillating disk is of great importance, the desirable objects being to secure extreme delicacy of action combined with durability, and to permit the ready dismemberment and reassemblage of the parts. The construction 55 herein shown, which is the result of many experiments, realizes these objects, the delicacy of the movement being such that the device will respond to a very feeble current of water, or even air.

- 60 The shaft g carries a pinion g² which is situated between the overhanging arm e⁴ and the top E³ of the disk-chamber, and engages gear-wheel g³, secured to the hub of a pinion h which rests against the top of the upper 65 casing and rotates on a pin h' which is permanently secured to said top. The pinion h with its hub has thus a long bearing on the

fixed pin h' and can be readily lifted off and replaced on the same. Heretofore this intermediate gearing has been carried on a rotating shaft supported in bearings at its ends. 70 The pinion h engages another gear-wheel h² which rests against the top of arm e⁴, and is carried by the lower end of shaft a² hereinbefore referred to. The pinions g² and h are 75 preferably made of hard-rubber or other anti-friction material allowing the parts to run with little friction in water. This form of mounting is employed whether the parts are supported by a removable plate, as in Fig. X, 80 or by the top of the disk chamber itself, as in the other figures.

K is the diaphragm between the inlet and outlet ports. The disk F has a slot f² in which the diaphragm is set. The latter is 85 provided with projections k', k² and k³ the former of which passes through the top E³ of the disk-chamber and is fastened by having its end riveted or spread by a hammer, while the projections k² and k³ engage in recesses 90 in the inner face of the disk-chamber. By this construction the diaphragm is very firmly attached without the use of solder, or other fastening means, and at the same time it may be readily removed if desired, by filing off the 95 enlarged end of the projection k'.

On either side of and adjacent to the diaphragm are the usual inlet and outlet openings L and L' of the disk chamber.

In Fig. IV the lower portion of the disk-chamber is formed by the lower casting of the 100 main casing, and the lower flanged edge of the upper portion of the disk-chamber rests directly against the seat b², the securing screws e passing through said flange into the main 105 casing. The lower casting B rests upon legs B³, and as shown in Fig. VI, these legs are cored out and internally threaded for the reception of the holding bolts e. This construction conduces to lightness and a saving of 110 material.

In Figs. IV and VII I have shown the diaphragm K, held in place by a nut k⁴ engaging a screw-thread on the projection k' of the diaphragm. 115

In Fig. VIII, I have shown a modified form of intermediate gearing for the registering mechanism, in which m is an upwardly projecting circular flange on the upper face of the disk-casing E³, to which flange is secured 120 the circular internal gear m'. N is an internal gear wheel having an overhanging flange n which fits around the flange m and protects the intermediate gearing from foreign matter. Shaft g carries pinion g², which engages 125 pinion h on spindle h' the latter being secured to a rotatable arm n'. The pinion h is arranged so as to engage the stationary gear m' and the internal gear wheel N, the latter having a different number of teeth from said 130 stationary gear. The lower squared end of shaft a² engages a squared socket in the gear-wheel N. From the above description it will be seen that the speed of the registering mech-

anism proper depends upon the difference between the number of teeth on the internal gear wheel N and the stationary gear m' and that the revolutions of the shaft g are greatly reduced by the intermediate gearing.

In Figs. X and XI instead of mounting the intermediate gearing on top of the upper casing E^3 I have mounted it on a separate plate O , having a downwardly extending flange o around the shaft g' . A rubber collar o^2 , held in place by a wire o^3 fits around said flange o . The plate O is secured in place by screws o' . The upper end of the spindle f' is in this instance provided with a cone-shaped extension o^4 , which engages against the rubber collar o^2 which serves to take up wear. It will be observed that the collar o^2 has a vertical bearing surface, and the cone is of such an angle that its side adjacent to this collar is also vertical.

In securing together the two parts of the main casing it is impossible to use invariably packing of the same thickness between the flanges, so that there is considerable variation in the relative position of the spindle and its upper bearing surface. By making the bearing surface parallel with the axis of oscillation of the spindle, and with the line of adjustment (*i.e.* at right angles to the joint between the parts of the casing) the thickness of the packing may be varied as required.

It is unnecessary to describe the operation of my improved meter as it does not differ materially from that of other meters of the same class.

From the foregoing description it will be obvious to persons skilled in the art that other modifications may be made in details of construction, and that the improvements described, or some of them, are applicable to machines analogous to water-meters.

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

1. In a water-meter the combination with an oscillating disk having a projecting spindle, of a disk-chamber inclosing said disk and spindle and having a bearing and guiding surface for the latter, a shaft projecting into said chamber and engaging said spindle, a register and intermediate gearing between said shaft and register, substantially as described.

2. In a water-meter of the kind described, the combination with the intermediate gearing, disk and disk-chamber formed with a bearing and guiding surface in the under side of the top thereof, of a spindle on the disk controlled by said guiding surface, a shaft connected with the intermediate gearing and extending downwardly through the top of said disk-chamber, and an angular extension on the lower end of the shaft engaging said spindle, substantially as set forth.

3. In a water meter the combination with the disk-chamber of the main casing having corrugations therein above said disk chamber, substantially as described.

4. In a water meter of the kind described the combination with the disk-ball, of ball bearings upon which said disk-ball rests and means for communicating motion from said disk to the registering mechanism, substantially as described.

5. In a water meter of the kind described the combination with the main casing, registering mechanism, oscillatory disk and a support having an overhanging arm thereon, of gearing mounted on said support and consisting of a shaft projecting up through the support and arm, and receiving motion at its lower end from the oscillating disk, a pinion carried by said shaft between the overhanging arm and the support, and an intermediate gear and pinion mounted on a pin secured to the support, substantially as and for the purpose described.

6. The combination with the oscillating disk of a disk-chamber having in its top wall a recess and an annular groove extending upwardly from said recess, a spindle attached to said disk and extending into said groove, and a shaft extending through the wall and having an angular arm working in said recess and engaging said spindle, substantially as described.

7. The combination with the register, the disk, its spindle and inclosing disk-chamber, of intermediate gearing turning on pins permanently set in the top piece of said disk chamber, substantially as described.

8. The combination with the disk chamber having inlet and outlet ports, of a diaphragm having projections at the corners which set in recesses in the disk chamber, and an upper projection extending through the top of said chamber and having its end spread or riveted, substantially as set forth.

9. The combination with the main casing having legs containing threaded sockets, of the top piece of the disk chamber secured to said casing by screws engaging in said sockets, substantially as described.

10. In a water meter, the combination with the oscillatory disk, of the disk chamber formed of two separable pieces, the upper of which has the conical projection containing the guiding groove for the disk-spindle, and has also the inlet and outlet ports formed therein, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

GEORGE B. BASSETT.

Witnesses:

CHAS. M. HARRINGTON,
ALBERT C. SPANN.