(No Model.)

2 Sheets—Sheet 1.

L. H. NASH.

DISK WATER METER.

No. 547,179. Patented Oct. 1, 1895.

Fig. 1.

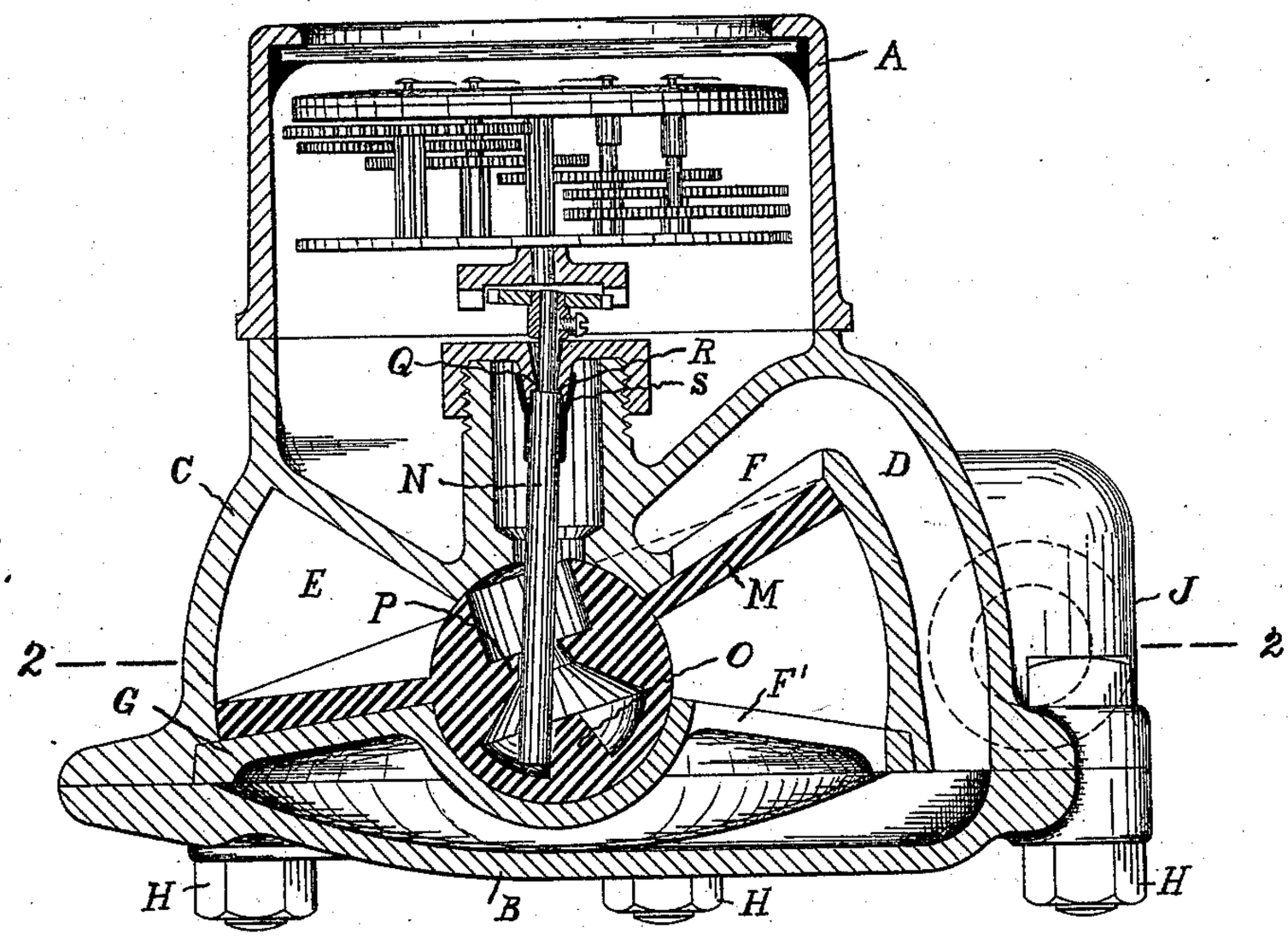
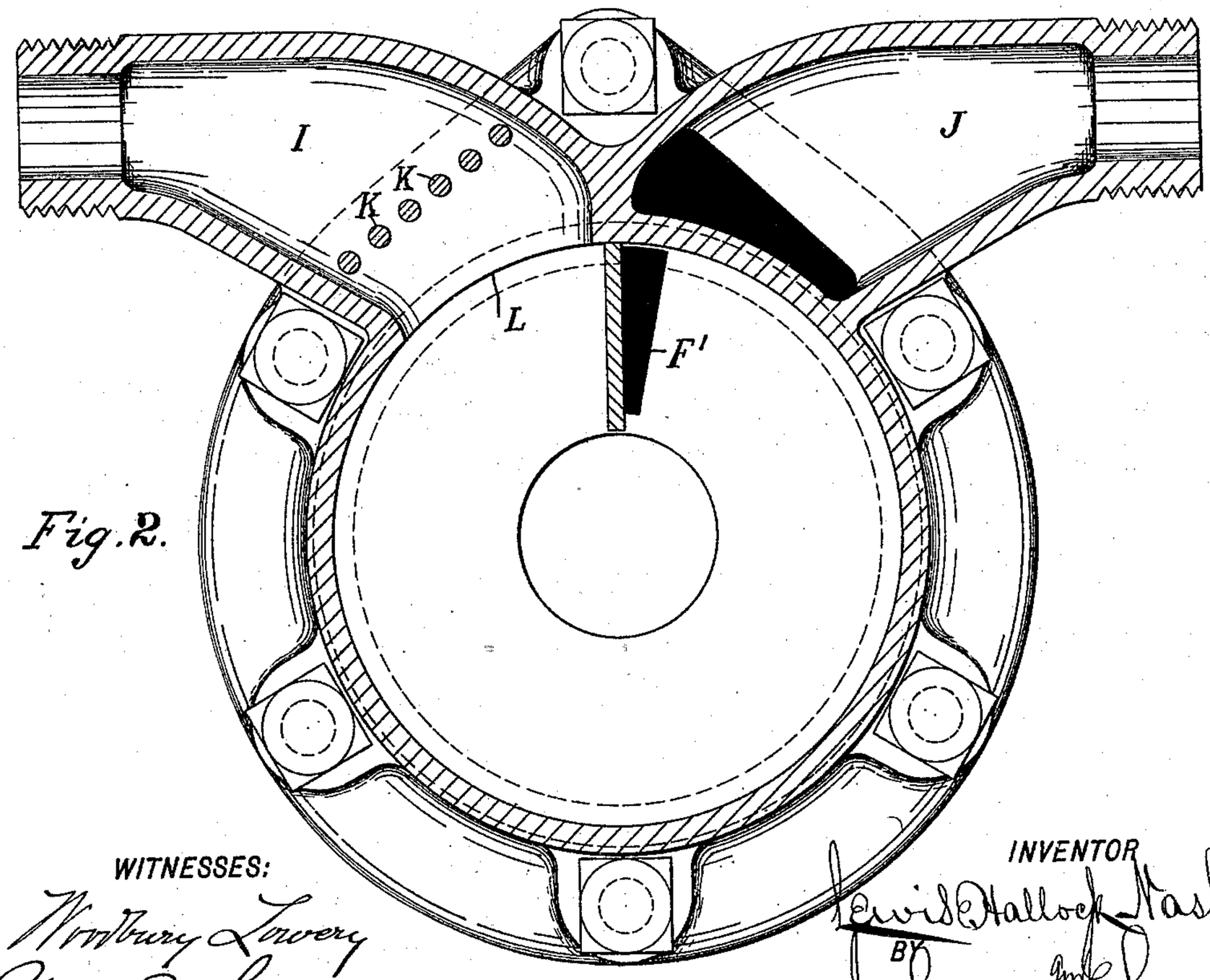


Fig. 2.



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INVENTOR

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(No Model.) 2 Sheets—Sheet 2.

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DISK WATER METER.

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Fig. 5.

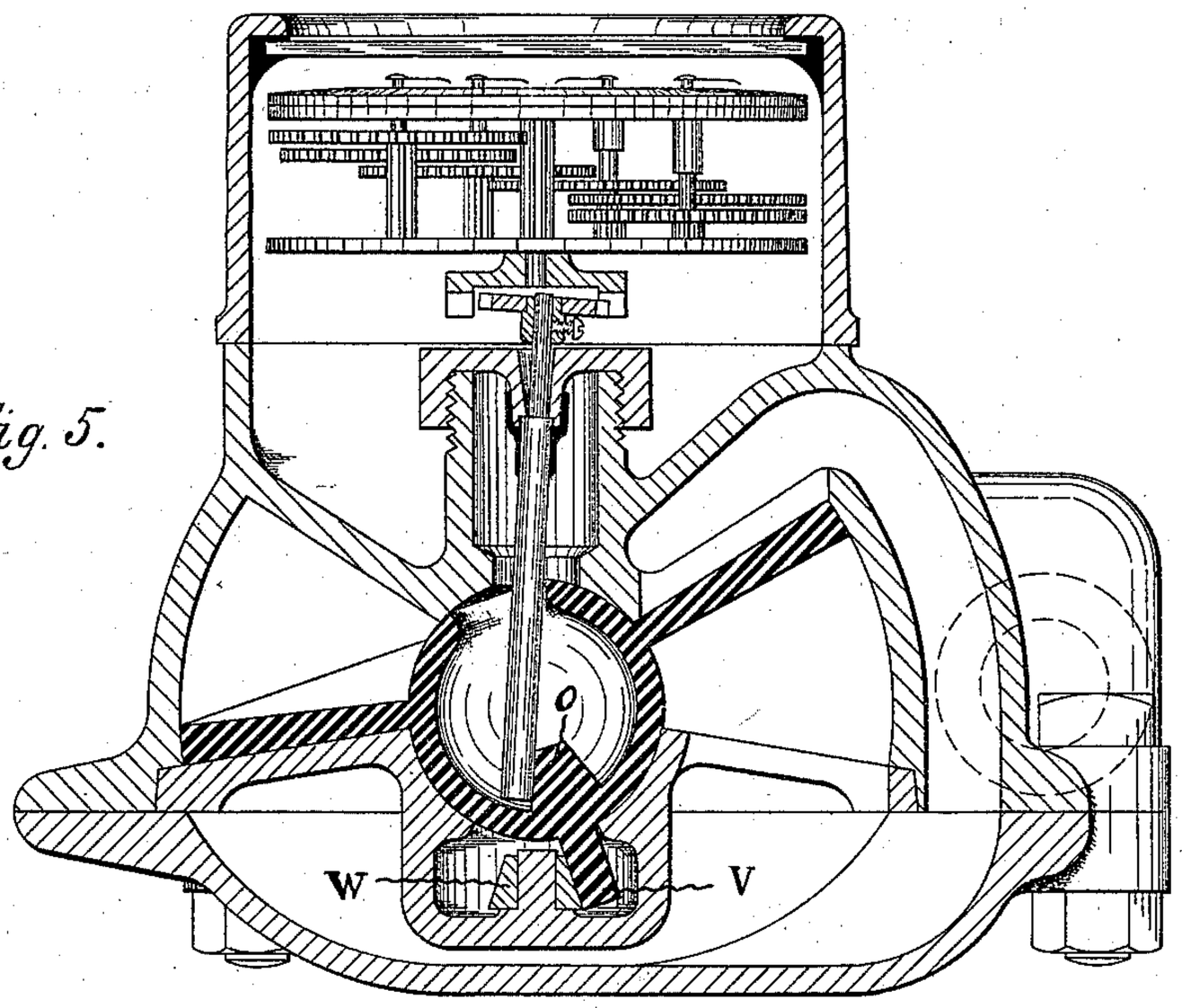


Fig. 4.

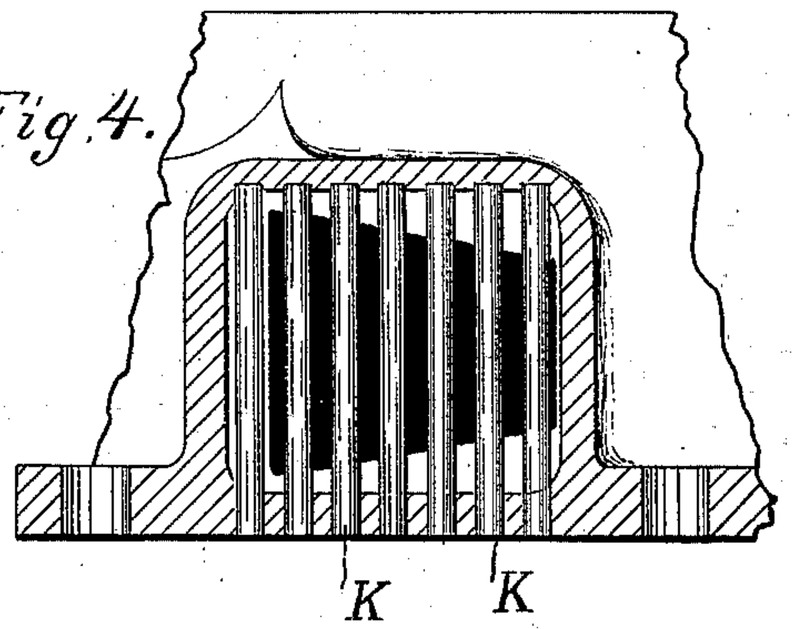
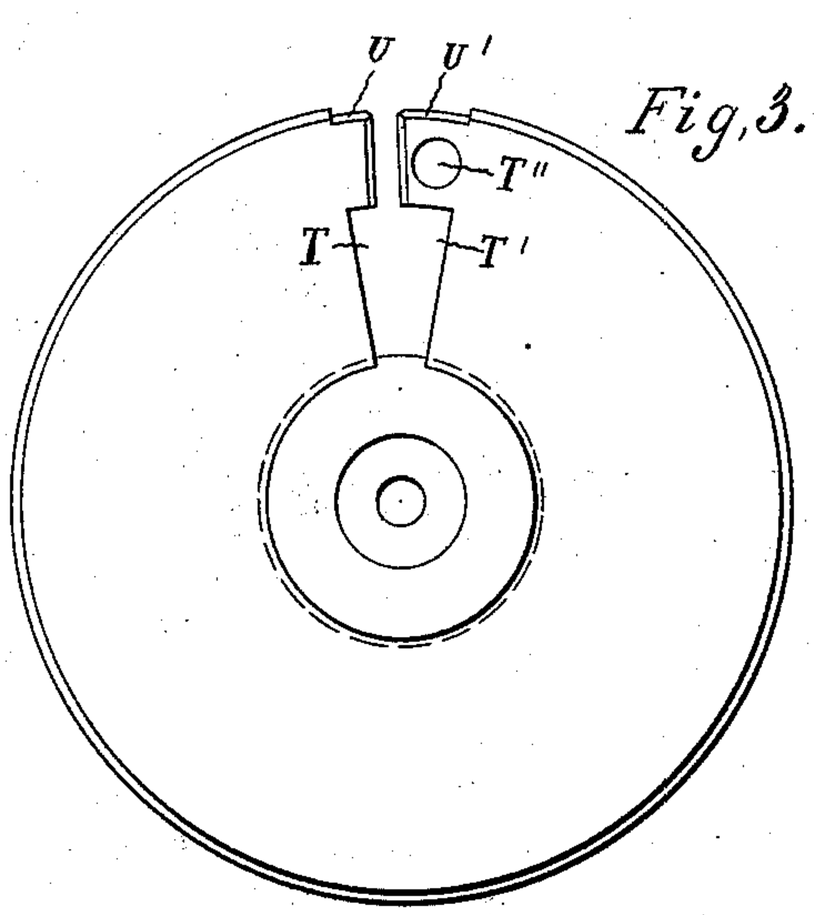


Fig. 3.



WITNESSES:

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UNITED STATES PATENT OFFICE.

LEWIS HALLOCK NASH, OF SOUTH NORWALK, CONNECTICUT, ASSIGNOR TO THE NATIONAL METER COMPANY, OF NEW YORK, N. Y.

DISK WATER-METER.

SPECIFICATION forming part of Letters Patent No. 547,179, dated October 1, 1895.

Application filed June 18, 1892. Serial No. 437,149. (No model.)

To all whom it may concern:

Be it known that I, LEWIS HALLOCK NASH, a citizen of the United States, residing at South Norwalk, county of Fairfield, and State of Connecticut, have invented certain new and useful Improvements in Disk Water-Meters, of which the following is a specification.

My invention consists of certain novel parts and combinations of parts, the several features of which will be separately pointed out in the claims concluding this specification. Before specifying such claims I will describe the meter which is illustrated in the annexed drawings, showing a structure embodying the several features of my said invention in combination.

The following description, read in connection with the accompanying drawings, will enable persons skilled in the art to which my invention relates to understand its nature and to practice it in forms in which I at present prefer to embody it; but it will be understood that my invention is not limited to the precise devices or combinations of devices shown, as various modifications may be made without departing from the spirit of my invention and without exceeding the scope of the concluding claims.

Similar letters of reference indicate the same or corresponding parts in all the figures of drawings.

Referring to the drawings, Figure 1 is a vertical section of a meter involving my present invention. Fig. 2 is a horizontal section of the same on the line 2 2, Fig. 1. Fig. 3 is a plan view of the piston. Fig. 4 is a detailed view of the inlet-passage, showing the strainer in elevation. Fig. 5 is a vertical section through the modified form of meter, also embodying my invention.

A is the case containing the dial mechanism, which, being of ordinary form, does not require specific description.

B is the lower casting of the meter.

C is the upper casting, including the upper head-plate and the spherical walls of the measuring-chamber. In this head-plate is formed the outlet-passage D, communicating with the measuring-chamber E by means of port F in the upper head-plate and F′ in the lower head-plate.

G is the lower head-plate of the meter, including the spherical seat for the ball of the piston held between the castings C and D by means of bolts H H.

I is the inlet-passage, and J the outlet-passage.

K K are pins or bars forming a strainer for the inlet-passage, as shown in detail in Fig. 4. The casting in which the inlet-passage is formed is perforated, and these bars K K are driven up through the perforations, dividing the inlet-passage into a series of parallel openings.

L is the inlet-port, which is in the spherical side walls of the measuring-chamber.

M is a piston having a nutating motion.

N is a spindle projecting in the interior of the ball-bearing of the piston N. The interior of this ball-bearing is provided with a projection O, which occupies the central position, and hence keeps the spindle N constantly tilted. The interior of the ball-bearing is also provided with inwardly-projecting flange P, which, in connection with the spindle N, forms a guide for the piston. This inwardly-projecting flange P may be made to be constantly in contact with the spindle, in which case the piston will have no capacity for lifting away from contact with the cones in the measuring-chamber, or it may be made to approach but not to touch the spindle, in which case more or less freedom of motion will be permitted. The spindle N is provided with a shoulder Q, which abuts against a seat R at its upper end. Surrounding the spindle and the seat is an elastic sleeve S, which prevents the water passing through the meter from entering the case containing the dial mechanism. The fluid pressure to which the lower part of the spindle N is subjected constantly tends to force the spindle into a vertical position, and thus exerts a force acting on the projection O, which constantly tends to keep the piston in joint-forming contact with its case.

Referring to Fig. 3, the piston is provided with ports T and T′, the port T communicating between the two inlet-chambers on one side of the abutment or diaphragm and the port T′ communicating between the two outlet-passages on the opposite side of the dia-

phragm. Besides this port T′, between the outlet-chambers, there is provided an additional port T″ on this side. The object of ports in the piston is to establish communication between chambers on opposite sides of the piston, and it is obvious that this communication might be established in any other suitable way. The piston is also cut away at its rim at U and U′, where it straddles the abutment, so that it does not at this point come in contact with the spherical sides of the walls of the case. I have found by experience that in order to obtain a perfectly-balanced piston with the case-ports shown the port in the piston between the outlet-passages should be of larger capacity than that between its inlet-passages, and I believe this to be due to the fact that the crowding of the water in the outlet-chambers tends to lift the piston away from joint-forming contact and so to establish communication between the inlet and outlet chambers. The supplemental port T″ on the outlet side increases the portage capacity without diminishing the bearing-surface of the piston in contact with the sides of the abutment. I find that sediment or foreign particles are most apt to lodge at the junction of the abutment and the spherical walls of the case and that this portion of the piston, having less support than other portions, is more liable to break. I have, therefore, shown a piston cut away at its rim at this point, which not only prevents the piston jamming when foreign matter passes through the meter, but also prevents it jamming in case this part of the piston is distorted. Besides, the bridge being at this point fastened to the case a burr is sometimes formed, which would cause the piston to jam if a close fit. The accuracy of the meter is not affected by so cutting away its rim, because these spaces only add to the size of the ports between the chambers on opposite sides of the piston. This feature is not claimed herein, but is claimed in a pending application, filed December 12, 1892, Serial No. 454,863.

Referring to Fig. 5, it will be seen that the piston in this case is provided with a central projection O above described, but does not have the inwardly-projecting flange P. It is, however, provided with a downwardly-projecting stud V, which works on a roller W, carried on a stationary support, which controls the action of the piston. I prefer to attach the roller to the stationary part, as shown, rather than to the stud on the piston, because the piston is thereby relieved of all unnecessary weight, which would interfere more or less with its accuracy.

In the foregoing specification I have referred to a few of the modifications which may be adopted in practicing my invention; but I have not endeavored to specify all the modifications which might be employed, the object of this specification being to instruct persons skilled in the art to practice the several novel features of my invention in their preferred form and to enable them to understand its nature, and I desire it to be distinctly understood that mention by me of a few modifications is not in any way intended to exclude others not referred to, but which are within the spirit and scope of my invention.

Many of the combinations and details illustrated and above described are not essential to the several features of my invention separately and broadly considered. All this will be indicated in the concluding claims, where the omission of an element or the omission of reference to the particular features of the elements mentioned is intended to be a formal declaration of the fact that the omitted elements or features are not essential to the inventions therein severally covered.

Having thus described a meter embodying in preferred form the several features of my present invention in combination, what I separately claim, and desire to secure by Letters Patent, is—

1. In a water meter, a piston having a motion of nutation combined with a spindle for operating the dial mechanism, said piston being provided in the interior of its ball with bearing surfaces on opposite sides of the spindle.

2. In a water meter, a piston having a motion of nutation combined with a spindle for operating the dial mechanism, said piston in the interior of its ball being provided with a centrally placed stud bearing on one side of said spindle and an internal flange bearing on the other side.

3. In a water meter, the combination of a piston having a motion of nutation, a measuring chamber having inlet ports in the spherical side walls thereof and outlet ports in the heads thereof.

4. In a water meter, the combination with a suitable casing, of a piston having a motion of nutation and a port or ports on each side of the abutment establishing communication between chambers on opposite sides of the piston, the port area between the inlet chambers being smaller than the port area between the outlet chambers.

5. In a water meter, the combination with a suitable casing, of a piston having a motion of nutation, a port on one side of the abutment establishing communication between chambers on opposite sides of the piston, said port extending in a radial line toward, but not to, the circumference of the piston, and a supplemental port between said chambers on the same side of the abutment.

6. In a water meter, the combination of a piston containing ports on both sides of the abutment with a case having an inlet port in the spherical side walls thereof and an outlet port in the head plate.

LEWIS HALLOCK NASH.

Witnesses:
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M. WILSON.