(No Model.)

J. DAVIES.

DISK WATER METER.

No. 384,024. Patented June 5, 1888.

FIG. 8.

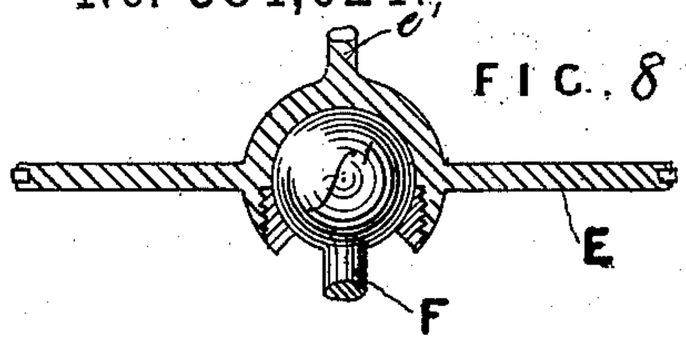


FIG. 7.

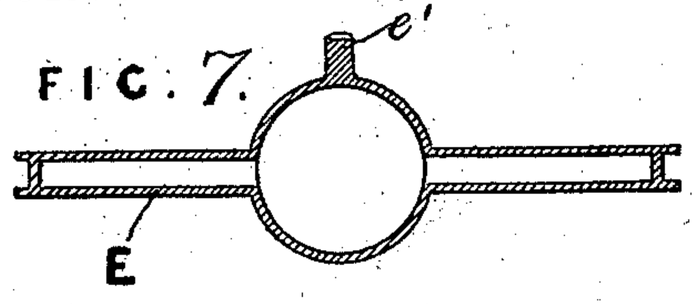


FIG. 2

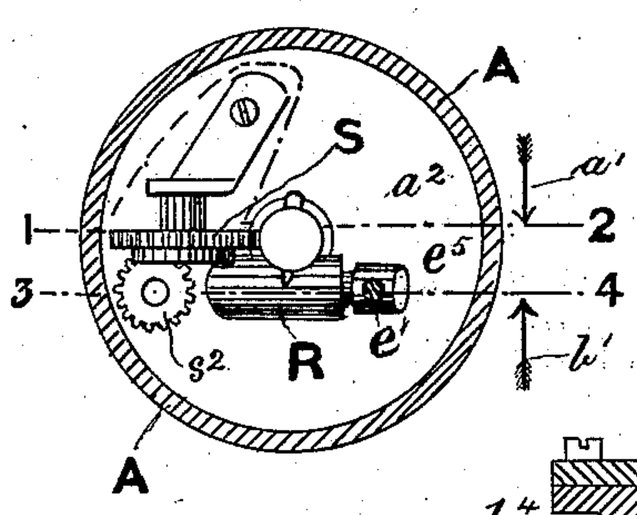


FIG. 1.

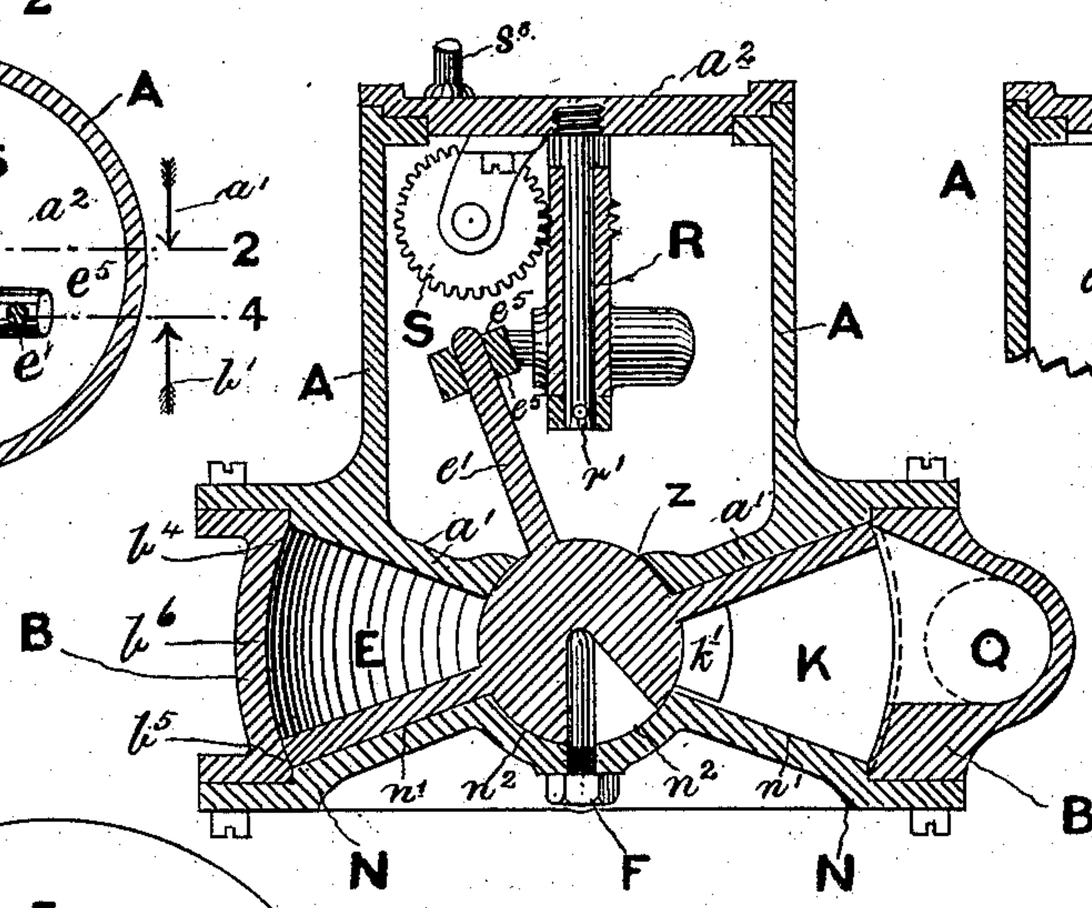


FIG. 3.

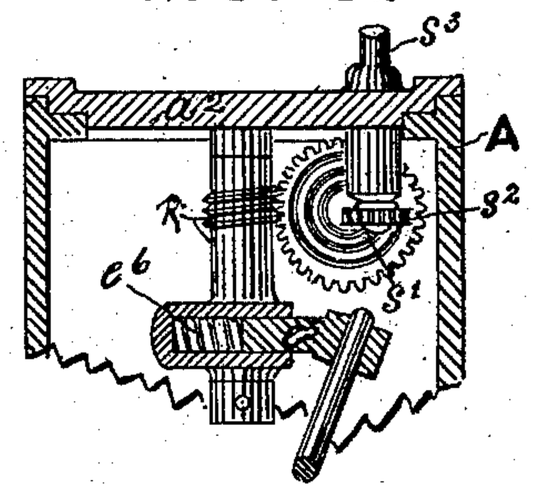


FIG. 5.

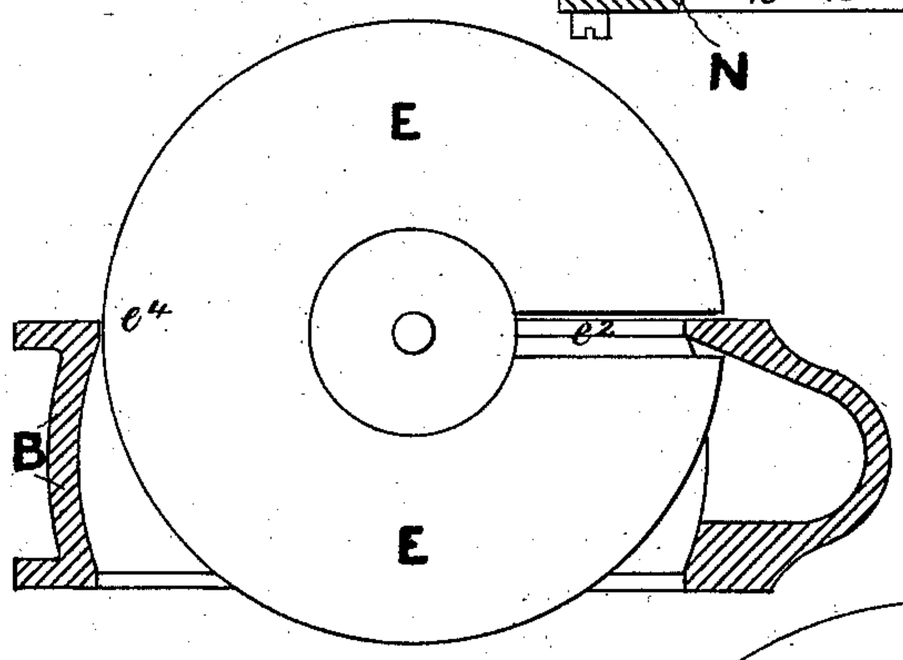


FIG. 4.

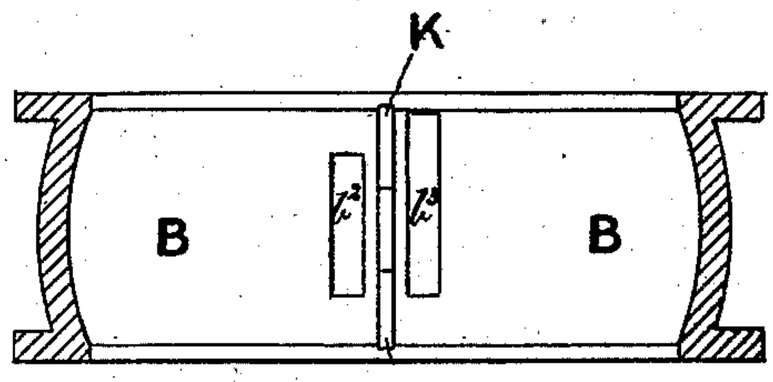


FIG. 10.

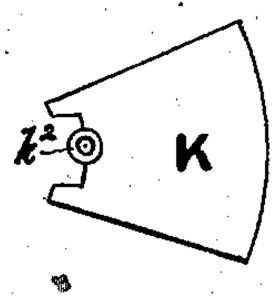


FIG. 6.

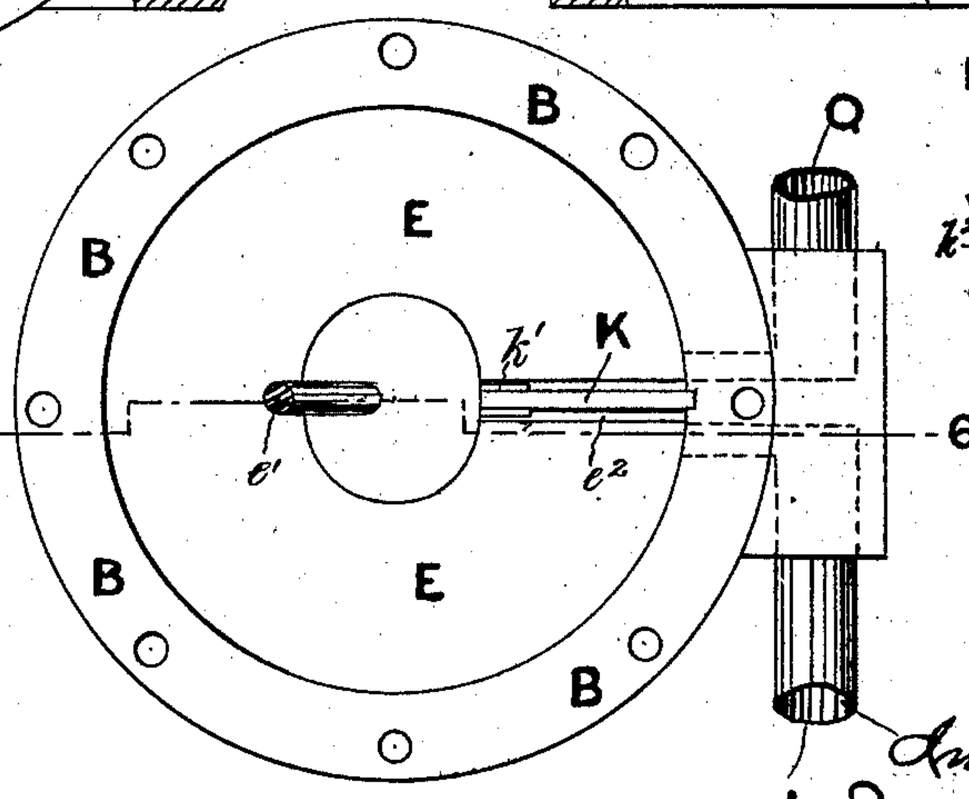
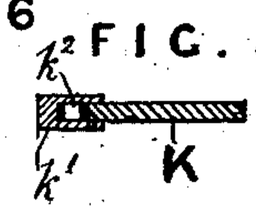


FIG. 9.



Witnesses:
L. B. Nicholson.
W. Hawkins.

Inventor,
James Davies,
by Wm. H. Babcock,
Attorney

UNITED STATES PATENT OFFICE.

JAMES DAVIES, OF WEDNESBURY, COUNTY OF STAFFORD, ENGLAND.

DISK WATER-METER.

SPECIFICATION forming part of Letters Patent No. 384,024, dated June 5, 1888.

Application filed August 3, 1887. Serial No. 246,020. (No model.) Patented in England October 23, 1886, No. 13,571.

To all whom it may concern:

Be it known that I, JAMES DAVIES, of Wednesbury, in the county of Stafford, England, mechanical engineer and iron-founder, and a subject of the Queen of Great Britain, have invented certain new and useful Improvements in Meters for Measuring Water and Gas, which are also Applicable to Pumps, Blowers, Exhausters, and Engines, (the same having been patented in England by Letters Patent No. 13,571, dated October 23, 1886;) and I do hereby declare that the following is a sufficient description of the invention to enable those skilled in the art to which it appertains to carry the same into practical effect.

This invention relates to that class of rotary meters in which an oscillating disk is employed; and the said invention consists chiefly in an oscillating disk, E, provided with a central ball having a recess in its under side, in combination with a bearing-pin, F, which enters said recess and has its point rounded, a lower cone provided with a recess which fits said ball, an upper curve, and a cylinder, B, the ball rocking partly on the bearing-pin F and partly on the concave face n^2, as shown.

The invention also consists in the combination of the upper cone and the disk, having a central ball, either the ball or the cone having a hole, Z, provided with the lower cone, the cylinder having ports b^2 b^3 and the partition K, as herein described and claimed.

The following drawings will serve to assist the explanation of the details thereof.

Figure 1 is a part section and part elevation of a meter with the registering train not shown, as it forms no part of my present invention. The upper part or cover, A, is a section on line 1 2, looking in the direction of the arrow a'. (See Fig. 2.) The lower part or cylinder, B, is a section on line 5 6, Fig. 6. Fig. 2 is a cross-section through the cover or casing A, looking upward. Fig. 3 is a sectional elevation of a portion of the upper part, A, on line 3 4 and looking in the direction of the arrow b'. (See Fig. 2.) Fig. 4 is a cross-section of the cylinder B through the division-plate K and looking at the passages or ports b^2 and b^3. Fig. 5 is a section through the cylinder B at, say, port b^3, showing how the disk-plate or piston E is placed therein. Fig. 6 is a plan with the upper part or cover, A, removed, thus showing the disk or piston E in plan while in the position indicated by Fig. 1. The disk-shaft e' is in section. Fig. 7 represents a modification of the disk in section. Fig. 8 is a similar view of another modification. Fig. 9 represents a sectional detail view; and Fig. 10 an elevation of the division-plate, sliding shoe, and spring.

I make the body or cylinder B of one casting, which enables me to obtain an exact inner working-surface, which is a portion of a sphere without a break or joint; and to overcome the difficulty of placing the disk E inside the cylinder, which is smaller in diameter at b^4 and b^5 than at the center b^6, and also smaller than the diameter of the disk, I extend one of the passages b^3, Fig. 4, toward the edge of the casting, so that the slot e^2 of the disk E, Fig. 5, will pass over, as there shown, to allow the opposite part, e^4, to pass the end of the body B, when it may be easily turned into its natural position, as shown in Fig. 1. In the case of water-meters they would generally be fixed to stand as shown by Fig. 1—that is, with the disk E in a horizontal position and supported upon the small rounded end of the pin F, which enters an outwardly flaring recess in the ball of the disk. This ball also fits a concave face, n^2, formed in the conical end N of the casing. The pin F may be removed and this concave face n^2 used as the only bearing for the ball. The upper end of the disk-shaft e' is provided with a lateral arm, e^5, that enters a recess in the worm-spindle R, which therefore receives motion therefrom, this motion being transmitted by said worm-shaft to the registering mechanism, as hereinafter stated. A spring, e^6, in the bottom of said recess prevents by its yielding any injury to the disk-shaft or worm-spindle in case any obstruction gets between the disk and the cones. A division-plate, K, is fixed between the cones a' and n', and a slot, e^2, is cut into the disk E to pass over it. This serves as a division between the passages b^2 and b^3, either of which may be inlet or outlet; but in this case I am treating b^3 as the inlet from pipe L and b^2 as the outlet to pipe Q. Now, as water enters at the pipe L the position of the disk E is changed, so that its inclined position as

now shown is continually changed all around the whole circle or cylinder, so that the shaft e' is carried around the pin r', carrying with it the worm-spindle R, which gives motion to the wheel S, which carries the worm-wheel s', working into the smaller wheel, s^2, thus giving very slow motion to the spindle s^3, which passes through the cover a^2, where it is connected to any convenient kind of registering mechanism, which does not constitute any part of my present invention. By this means the wear upon the spindle s^3 and in the cover or bearing of a^2 will be minimized.

The disk E, I make from vulcanite, compressed paper, or other such like material for meters where the temperature of the water or liquids to be measured is not high. The outer edges of the disk may have packing placed in a groove or grooves in its edge—such, for instance, as shown at Fig. 9—either in the shape of an elastic ring or rings, or abestus, or other suitable material, or a number of small grooves may be made to constitute water-packing, as in actual practice practically no contact is required—that is, at least no hard contact in the case of meters, at any rate.

A small hole, z, is made through the upper cone, a, or the proximate part of the ball, to allow the escape of a part of the contents of the cylinder into the upper chamber, A, and thereby lessen the oblique upward pressure of said contents against the ball of the disk. Such pressure, if not relieved, would make the friction too great between the ball and its upper bearing.

The disks may be constructed of sheet metal, as shown at Fig. 7, for lightness—*i. e.*, in two parts made under the stamp or press and then placed together. A spring-ring having grooves cut around its face may then be inserted, or soft packing. The division-plate K may be made either in one piece solid or with an end shoe, k', having a spring, k^2, which constantly keeps it to a bearing against the center of the disk and the inner part of the cylinder, which are shown in detail at Figs. 9 and 10.

What I claim, then, is—

1. An oscillating disk, E, provided with a central ball having a recess in its under side, in combination with a bearing-pin, F, which enters said recess and has its point rounded, a lower cone provided with a recess which fits said ball, an upper cone, and a cylinder, B, the ball rocking partly on the bearing-pin F and partly on the concave bearing-face n^2, substantially as shown.

2. The combination of the upper cone and disk having a central ball, either the ball or cone having a hole, z, therein, with the lower cone, the cylinder having parts b^2 b^3, and the partition K, substantially as set forth.

In testimony that I claim the foregoing as my own I affix my name in the presence of two witnesses.

JAMES DAVIES.

Witnesses:
LEWIS WM. GOOLD,
GEORGE BARKER.