

H. D. YATES.
METER.

APPLICATION FILED NOV. 16, 1909.

1,046,244.

Patented Dec. 3, 1912.

Fig. 1.

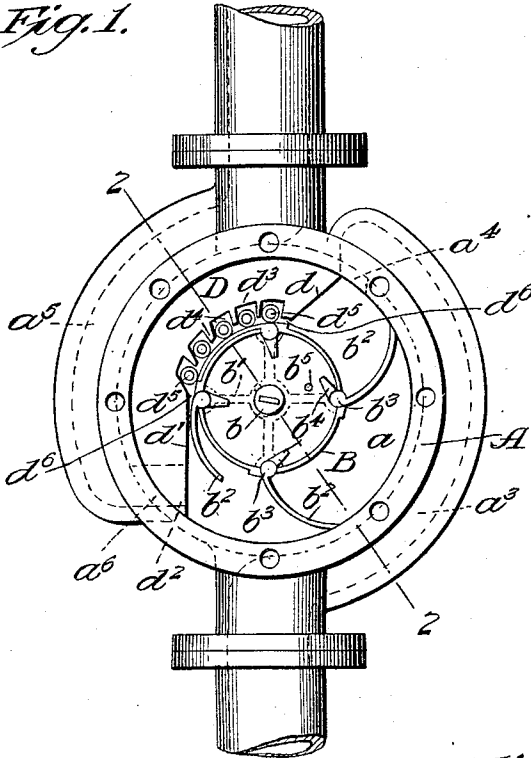


Fig. 2.

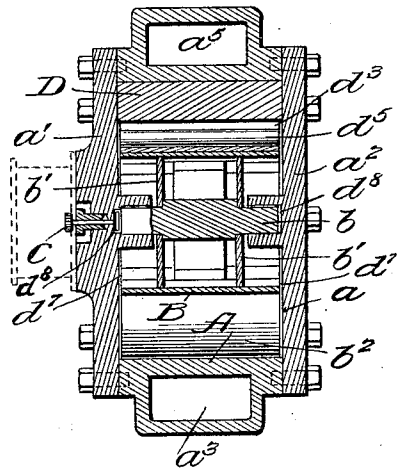
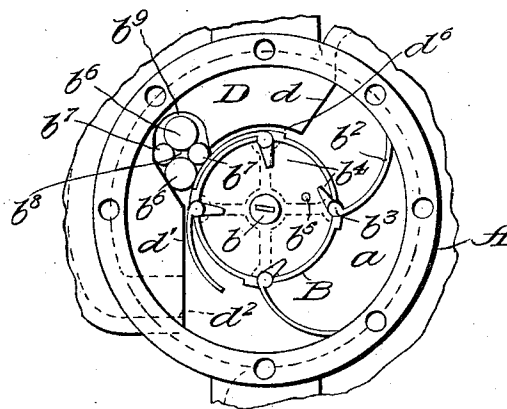


Fig. 3.



Inventor

Harry D. Yates

By

Chas. E. Pierson

Attorney

Witnesses

T. L. Mochel
E. Williams

UNITED STATES PATENT OFFICE.

HARRY D. YATES, OF WASHINGTON, DISTRICT OF COLUMBIA.

METER.

1,046,244.

Specification of Letters Patent.

Patented Dec. 3, 1912.

Application filed November 16, 1909. Serial No. 528,411.

To all whom it may concern:

Be it known that I, HARRY D. YATES, a citizen of the United States, and resident of Washington, District of Columbia, have invented certain new and useful Improvements in Meters, of which the following is a full, clear, and exact specification.

This invention relates to certain new and useful improvements in water meters and pertains more particularly to meters of the rotary type.

The permanency of registration, both as regards accuracy and sensitiveness is of vital importance in any water meter, and great difficulty is experienced, in practice, in securing such permanency of registration, particularly when measuring hot water. This fact is in a large measure due to the binding of the working parts by expansion. Other causes of error, and grave ones, are due to the varying slip on account of expansion and to the increased slip as wear occurs.

The main object of the present invention is to provide improved means arranged to cooperate with a rotary piston to overcome the foregoing objection by compensating for expansion and wear, whereby the same degree of accuracy in registration, under similar conditions in operation, is assured.

The invention will be hereinafter fully set forth and particularly pointed out in the claims.

In the accompanying drawings, wherein similar letters of reference are used to indicate corresponding parts in each of the several views:—Figure 1 is a side elevation of one form of my improved water meter with one of the side plates removed. Fig. 2 is a transverse sectional view on the line 2—2 of Fig. 1; and Fig. 3 is a view similar to Fig. 1 of a modification.

Referring to the drawings, and particularly to Figs. 1 and 2, A designates a casing formed with a piston chamber *a* provided with end plates *a'*, *a''*, secured in position in any suitable manner. The water supply channel *a³* connected with any suitable source of supply extends partially around the exterior of the chamber *a* to a point above the horizontal diameter thereof and discharges through an opening *a⁴* into said chamber. The discharge channel *a⁵* passes around the chamber *a* on the side opposite channel *a³*, and communicates with the interior of said chamber through the discharge opening *a⁶*. The piston comprises a cylinder

B secured to a shaft *b* by means of radiating arms *b'*. On the periphery of said cylinder is a plurality of curved wings *b²*, pivotally mounted at *b³*, and free to swing out to engage the wall of the chamber *a*. To the shaft *b* is connected the actuating pinion C for the registering mechanism, which may be of any suitable or preferred type and is not illustrated. The wings *b²* are each provided with a finger or projection *b⁴* which is adapted to engage pins *b⁵* secured on each side of the chamber *a*. By this arrangement the said wings are tripped as the cylinder rotates, to insure their moving to operative position as they pass the inlet opening *a⁴*. It will be noted that the wings *b²* fit within correspondingly shaped recesses formed in the periphery of the cylinder B, whereby said wings will be flush with the surface of said cylinder when folded thereon. Secured within the chamber *a* is a segmental abutment D provided with wall *d* leading from the upper edge of the opening *a⁴* to a point adjacent the cylinder B, said abutment being also provided with a second wall *d'* leading over the outlet opening *a⁶* and provided with an opening *d²* communicating with the latter. A chamber *d³* is formed in said abutment which chamber is provided with ribs or projections *d⁴* forming chambers in which are freely mounted rollers *d⁵*, the peripheries of which rest upon the periphery of the cylinder B, and on the ribs. The relative dimensions of the rollers and chambers are to be such as to allow sufficient clearance for the expansion of the rollers, and to permit the movement of the rollers caused by the expansion of the cylinder, to prevent binding of the rollers, when measuring hot water.

In practice the water entering through the opening *a⁴* is directed by the wall *d* toward the extended wing *b²* that is nearest said opening, and the pressure of the water in passing through the chamber *a* effects the rotation of cylinder B and the consequent actuation of the registering mechanism. The wall *d'* of the abutment effects the folding of the wings *b²* as the piston rotates, thus allowing the water to escape through the opening *d²* and allowing the passage of the wings past the abutment. It will thus be observed that by this construction ordinary wear on the wings *b²* and rollers *d⁵* will be automatically taken up and adjusted by the action of the wings and rollers themselves, thus insuring a uniform slip, if any

occurs, under similar conditions in operation.

From the foregoing it will be seen that the rollers d^5 prevent the leakage of the supply water between the cylinder B and the abutment, and wear on the rollers d^5 or wings b^2 will not appreciably affect the accuracy in measurement as long as the peripheries of said rollers d^5 come in close contact with said cylinder and the abutment or the ribs thereof, and the wings b^2 come in close contact with the interior wall of the chamber a .

In Fig. 3 I have shown a modification wherein the ribs d^4 are dispensed with and a series of rollers b^6 , b^7 , mounted in the chamber b^8 , the rollers b^6 , b^7 , being somewhat larger in diameter and heavier than rollers b^7 , b^7 , and which tend to retain the peripheries of two of the rollers against the periphery of the cylinder, thus giving two close points of contact. A space b^9 in said chamber b^8 is provided above one of the rollers b^6 to allow for the movement or play of said rollers, due to the expansion of the cylinder in use as a hot water meter.

In the operation of the meter the water is delivered to the chamber a through the inlet opening a^4 , in the upper portion of said chamber, and passes through the lower portion of the chamber to the outlet opening d^2 through which it is discharged. The energy of the entering water acts upon the inner face of the fully extended wing b^2 that is nearest the inlet opening, and also upon the periphery of the roller d^5 or b^7 nearest said opening. The effect of this arrangement on the roller and wing is to reduce the pressure on the sides toward the outlet, thus producing an unbalanced pressure that makes the piston revolve and always keeps the periphery of the rollers in close contact with the piston and the abutment. As shown in the drawings a space or clearance d^6 is provided between the periphery of the cylinder B and the abutment D, and clearance d^7 , d^7 and d^8 , d^8 between the end plates a^1 , a^2 , respectively, and the ends of the cylinder B and shaft b , to allow for expansion of the parts in using the meter with hot water.

In my improvement the working parts of the meter are such that they will not bind when hot water is used and wear on the working parts will not affect the accuracy in measurement.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:—

1. A water meter comprising a casing provided with a piston chamber, and water inlet and outlet openings, a piston in said chamber, wings pivotally mounted on the periphery of the piston, an abutment secured in said piston chamber, said abutment being provided with a chamber, and

rollers located in said chamber and contacting with said piston and a wall of the abutment, substantially as and for the purpose specified.

2. A water meter comprising a casing provided with a piston chamber, and water inlet and outlet openings, a piston in said chamber, wings pivotally mounted on the periphery of the piston, an abutment secured in said piston chamber, said abutment being provided with a chamber, and rollers located in said chamber and contacting with said piston, substantially as and for the purpose specified.

3. A water meter comprising a casing provided with a piston chamber, and water inlet and outlet openings, a piston in said chamber, wings pivotally mounted on the periphery of the piston, an abutment secured in said piston chamber, said abutment being provided with a chamber, and a roller located in said chamber and contacting with said piston, substantially as and for the purpose specified.

4. A water meter comprising a casing provided with a piston chamber, and water inlet and outlet openings, a piston mounted in said chamber, wings pivotally mounted on the periphery of the piston, an abutment secured in said piston chamber, said abutment being provided with a chamber, ribs in said chamber forming recesses, and rollers located in said recesses and contacting with said piston, substantially as and for the purpose specified.

5. A water meter comprising a casing provided with a piston chamber, and water inlet and outlet openings, a piston mounted in said chamber, wings pivotally mounted on the periphery of said piston, a chamber formed in the interior wall of said casing, and a roller located in said last named chamber and contacting with said piston, substantially as and for the purpose specified.

6. A water meter comprising a casing provided with a piston chamber, and water inlet and outlet openings, a piston mounted in said chamber, wings pivotally mounted on the periphery of said piston, a chamber formed in the interior wall of said casing, ribs in said last named chamber forming recesses, and rollers located in said recesses and contacting with said piston, substantially as and for the purpose specified.

7. A hot water meter comprising a casing provided with a piston chamber, and water inlet and outlet openings, a piston mounted in said chamber, wings pivotally mounted on the periphery of said piston, said piston and the pivoted wings when folded on the periphery thereof being at a distance from any part of the interior periphery of the chamber to allow for expansion and contraction in use, a chamber formed in the

interior wall of said casing, and rollers located in said last named chamber and constantly in contact with the piston, substantially as and for the purpose specified.

8. A water meter comprising a casing provided with a piston chamber, and water inlet and outlet openings, a piston mounted in said chamber, wings pivotally mounted on the periphery of the piston, an abutment secured in said piston chamber, said piston and the pivoted wings when folded on the periphery thereof being at a distance from any part of the abutment to allow for expansion and contraction in use, said abutment being provided with a chamber, and rollers located in said last named chamber and contacting with said piston, substantially as and for the purpose specified.

9. A water meter comprising a casing provided with a piston chamber, and water inlet and outlet openings, a piston in said

chamber, wings pivotally mounted on the periphery of the piston, an abutment secured in said piston chamber, said abutment being provided with a chamber and arranged in said piston chamber so that the inner surface of the abutment is spaced apart from the outer surface of the wings when closed on the piston, and anti-friction devices located in said abutment chamber and freely movable therein and contacting with said piston and a wall of the abutment, substantially as and for the purpose specified.

In testimony whereof I have signed my name to this specification in the presence of two witnesses.

HARRY D. YATES.

Witnesses:

M. H. YATES,

POWELL P. WITHERS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."