J. R. KINNEY.

WATER METER.

APPLICATION FILED JAN. 10, 1910.

981,660. Patented Jan. 17, 1911.

2 SHEETS—SHEET 1.

Fig. 1.

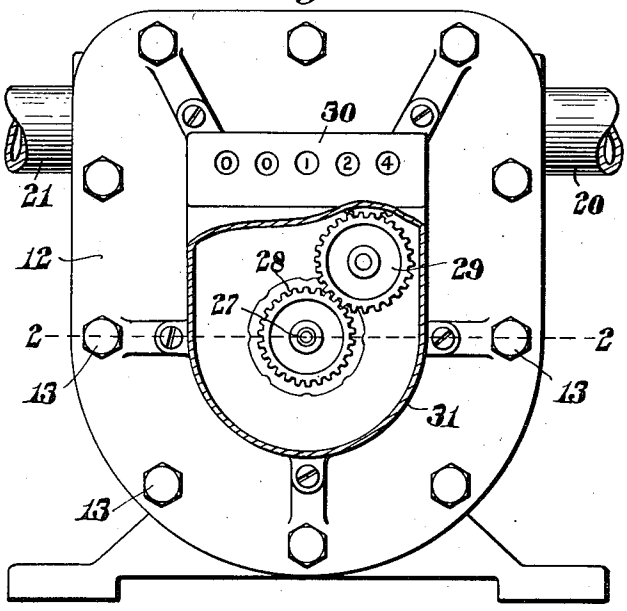

Fig. 2

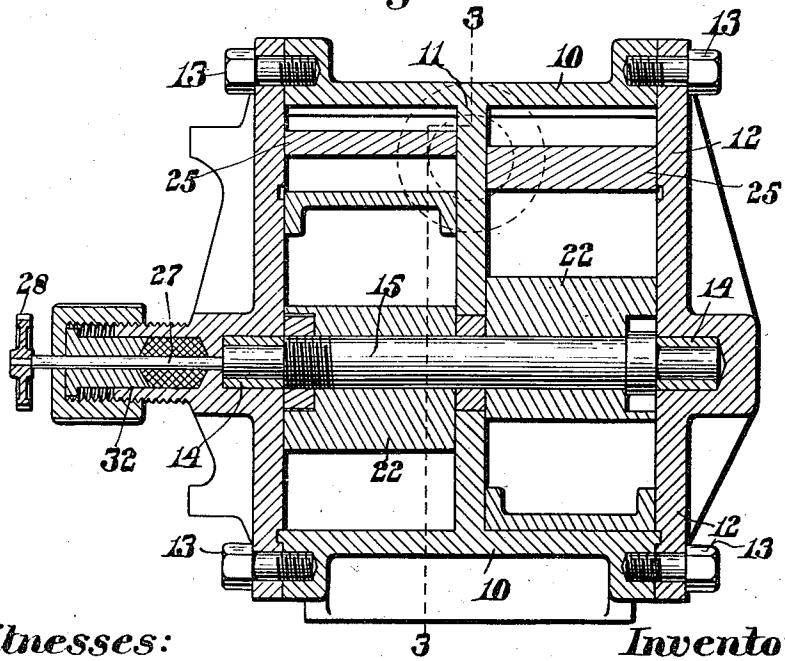

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Fig. 3.

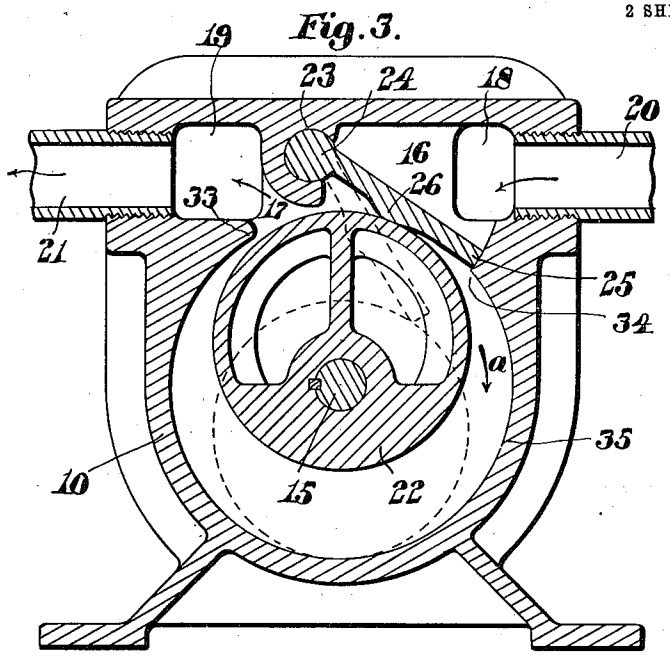
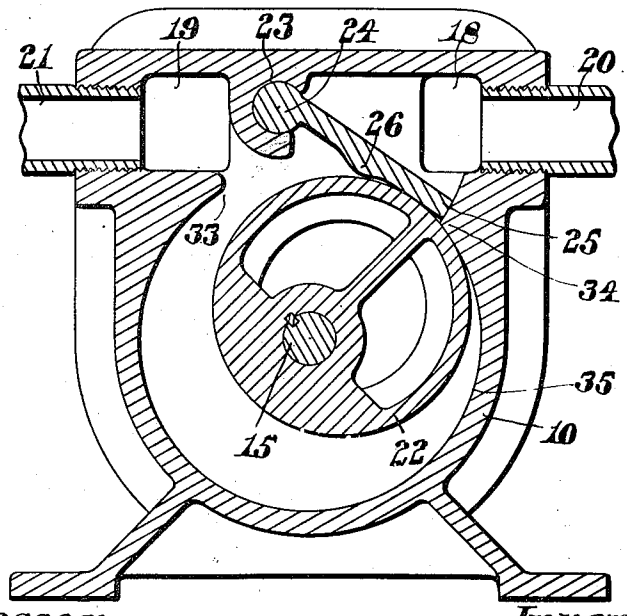


Fig. 4.



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UNITED STATES PATENT OFFICE.

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WATER-METER.

981,660. Specification of Letters Patent. Patented Jan. 17, 1911.

Application filed January 10, 1910. Serial No. 537,344.

To all whom it may concern:

Be it known that I, JUSTUS ROYAL KINNEY, a citizen of the United States of America, and a resident of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Water-Meters, of which the following is a specification.

This invention relates to water meters and has for its object the production of a device of this class which will be effective and noiseless in its operation.

The invention consists in certain novel features and arrangement of parts which will be readily understood by reference to the drawings and to the claims hereinafter given.

Of the drawings: Figure 1 represents an elevation of the meter embodying the features of the present invention a portion of the register casing being broken in section. Fig. 2 represents a horizontal section of the same, the cutting plane being on line 2—2 of Fig. 1. Fig. 3 represents a vertical section of the same, the cutting plane being on line 3—3 of Fig. 2. Fig. 4 represents a similar section showing the piston and its pivoted bearing member in another position.

In the drawings, 10 represents a cylindrical casing having a division wall 11 intermediate its ends, preferably made integral therewith. To each end of this casing 10 is secured an end plate 12 by suitable bolts 13. Each of the end plates 12 is provided with a bushing member 14 adapted to receive the reduced ends of a revoluble shaft 15 and form a bearing therefor.

In the casing 10 between the division wall 11 and the two end plates 12 are formed two alined cylindrical chambers each communicating with an inlet chamber 16, and each communicating with an outlet chamber 17. The two inlet chambers 16 are connected by means of an opening 18 through the division wall 11, while the two outlet chambers 17 are similarly connected by means of an opening 19 in said division wall 11. An inlet pipe, 20 admits fluid to the inlet chambers 16 while the fluid contained within the outlet chambers 17 passes therefrom through the outlet pipe 21. In each cylindrical chamber, mounted upon and keyed to the shaft 15 is a cylindrical piston 22. The shaft 15 is centrally disposed within the piston chambers and the pistons 22 are eccentrically mounted thereon with the highest points thereof diametrically opposite one another. In the rotation of the shaft 15 the highest point of the pistons 22 is adapted to contact with the cylindrical wall of the piston chamber and prevents leakage thereby.

Intermediate the inlet and outlet chambers 16 and 17 is a seat 23 for the pivotal end 24 of a blade or plate 25, the outer face of which is in the path of the fluid admitted to the interior of said casing 10 through the inlet pipe 20. The pressure of the fluid admitted through the pipe 20 retains the blade 25 in contact with the periphery of the piston 22, it being obvious that a greater pressure is always maintained on the inlet side of the blade 25 than upon the opposite side owing to the power consumed in forcing the piston 22 about the axis of the shaft 15 thus reducing the pressure of the fluid passing through the outlet chamber 17 and pipe 21. The blade 25 is always thus retained in contact with the periphery of the piston 22 by the excess pressure on the outer face of the blade, over that upon its inner face. In this manner any leakage of the fluid between the two is prevented.

In the position shown in full lines and dotted lines in Fig. 3 of the drawings, the fluid entering the inlet chambers 16 is prevented from entering the nearest piston chamber by the blade 25 which acts as a valve to prevent such admission. The fluid passing through the pipe 20 will pass through the opening 18 in the division wall 11 into the farther piston chamber in which the piston 22 and blade 25 are in the positions shown in dotted lines in said figure. It is obvious therefore that the fluid entering the piston chamber will act upon the piston to move it about the axis of the shaft 15 in the direction of the arrow on said figure. The fluid passing through this pipe 20 will continue to be admitted to the farther piston chamber until the outlet port has been uncovered by the highest point of the piston, and acting upon the blade 25, is moved into the position shown in full lines in Fig. 3 of the drawings to prevent any further admission to said piston chamber. When this point has been reached, the entering fluid will enter the other piston chamber and by rotating the shaft 15 will force the fluid in advance of the first mentioned piston 22 into the outlet chamber.

It is obvious from an inspection of the

drawings that the blade 25 in moving about its pivot 24 will have a varying movement owing to the fact that at some time during the rotation of the piston 22, the extreme outer end of the blade is in contact with the periphery of the piston as indicated in dotted lines in Fig. 3,—while at other times its inner face is in contact with said periphery. In order, however, to still further vary the movement of said blade and to secure a quick cut-off, a projection 26 is provided on its inner face, which during certain portions of the revolution of the piston 22 will be acted upon thereby to accord a quicker movement to the blade 25 than would be the case if the contact was made at a greater distance from the pivot.

It is obvious that at each revolution of the piston, a certain amount of fluid is admitted to the piston chamber and passes through the same into the outlet chamber 17 and therefrom through the outlet pipe 21. This can be accurately measured and the amount of liquid passing through the meter registered by providing the shaft 15 with an extension or stem 27 extending through one of the end plates 12 and securing to the outer end of said stem a gear 28 which is adapted to operate another gear 29 forming a part of a register 30 which may be of any well known description. This register is mounted in a casing 31 secured to one of the end plates 12. The stem 27 passes through a stuffing box 32 by which any leakage is prevented from the piston chambers. By such a construction as is shown in the drawings and herein described, the fluid passing through the casing may be accurately measured and registered,—while owing to the piston being cylindrical and the piston chamber also being cylindrical, with only that portion of the piston farthest removed from its axis contacting with the cylindrical wall of its chamber,—the device will be perfectly noiseless.

The cam projection 26 is so shaped that it will retain the blade 25 in position to shut off all communication between the inlet chamber 16 and the piston chamber, while the contacting portion of the piston 22 is passing from the point 33 to the point 34,—thereby preventing any fluid passing around the piston 22 in the direction of arrow "*a*" and out through the outlet pipe 21, while the highest point of the piston is intermediate these two points 33—34. It is obvious that if this should be permitted a certain portion of the fluid would pass from the inlet 20 to the outlet 21 that could not be measured. The blade 25 does not open, therefore to admit fluid behind the piston 22 until the highest point of said piston reaches the point 35 when the inlet fluid passes into the piston chamber and this fluid thus admitted is prevented from passing therefrom until the highest point of said piston 22 reaches the point 33 when it will be permitted to pass into the outlet pipe 21. By this means a known quantity of fluid passes through the piston chamber at each revolution of the piston, the amount of which may be readily determined and therefore accurately registered by the devices provided for this purpose. This forms a most important feature of the present invention.

The operation of the invention and the many advantages thereof, it is believed, will be fully understood without further description.

Having thus described my invention, I claim:

1. In a device of the class described, the combination of a casing having a cylindrical chamber, an opening in its cylindrical wall and inlet and outlet passages communicating with said chamber through said opening; a revoluble shaft concentrically disposed in said chamber, and provided with an extension through an end wall of said casing; a register mechanism operable thereby; a cylindrical piston eccentrically mounted upon said shaft; and a pivoted blade extending across the inlet passage and adapted to be retained in contact with said piston by the pressure of the fluid passing through said inlet passage and to close said inlet during portions of the revolution of said piston.

2. In a device of the class described, the combination of a casing having two cylindrical chambers, openings in the cylindrical walls of said chambers and inlet and outlet passages communicating with said chambers through said openings; a revoluble shaft concentrically disposed in said chambers, and provided with an extension through an end wall of said casing; a register mechanism operable thereby; a cylindrical piston eccentrically mounted upon said shaft in each of said chambers; and pivoted blades extending across the inlet passage and adapted to be retained in contact with said pistons by the pressure of the fluid passing through said inlet passage and to close the inlet to each chamber during portions of the revolution of its pistons.

3. In a device of the class described, the combination of a casing having two alined cylindrical chambers and two inlet and two outlet chambers communicating with each cylindrical chamber; a wall for separating said chambers having communicating openings between the two inlet chambers and between the two outlet chambers; a revoluble shaft concentrically disposed in said cylindrical chambers; a register mechanism operable thereby; a cylindrical piston eccentrically positioned upon said shaft in each cylindrical chamber; and a pivoted

blade opposite each inlet and adapted to be retained in contact with its piston by the pressure of the fluid and to close the inlet to each chamber during portions of the revolution of its piston.

4. In a device of the class described, the combination of a casing having two alined cylindrical chambers each having an opening in its cylindrical wall; a wall separating said cylinders and having openings therethrough forming inlet and outlet passages common to both cylinders with which they communicate through said openings in their cylindrical walls; a revoluble shaft concentrically disposed in said chambers; a register mechanism actuated by said shaft; cylindrical pistons in said chambers eccentrically mounted on said shaft and oppositely disposed thereon; and a pivoted blade for each piston, the pivot of which is interposed between the inlet and outlet passage communicating with said piston chambers.

5. In a device of the class described, the combination of a casing having two alined cylindrical chambers each having an opening in its cylindrical wall; a wall separating said cylinders and having openings therethrough forming inlet and outlet passages common to both cylinders with which they communicate through said openings in their cylindrical walls; a revoluble shaft concentrically disposed in said chambers; a register mechanism actuated by the rotation of said shaft; cylindrical pistons in said chambers eccentrically mounted on said shaft and oppositely disposed thereon; and a pivoted blade for each piston, the pivot of which is interposed between the inlet and outlet passages communicating with said piston chambers; and a cam projection thereon intermediate its pivot and outer end adapted to contact with the piston and retain said blade in position to close the inlet to its cylinder while the contacting portion of said piston is passing from one edge of the outlet port to the opposite edge of the inlet port.

6. In a device of the class described, the combination of a casing having a cylindrical chamber, an opening in its cylindrical wall and inlet and outlet passages communicating with said chamber through said opening; a revoluble shaft concentrically disposed in said chamber; a register mechanism actuated thereby; a cylindrical piston eccentrically mounted thereon; and a pivoted blade co-acting therewith, the pivot of which is intermediate said inlet and outlet passages with the outer face of the blade in the path of the fluid entering said chamber through said inlet and adapted to close the inlet to said chamber during a portion of the revolution of said piston.

7. In a device of the class described, the combination of a casing having a cylindrical chamber, an opening in its cylindrical wall and inlet and outlet passages communicating with said chamber through said opening; a revoluble shaft concentrically disposed in said chamber; a register mechanism actuated thereby; a cylindrical piston eccentrically mounted thereon; and a pivoted blace co-acting therewith, the pivot of which is intermediate said inlet and outlet passages with the outer face of the blade in the path of the fluid entering said chamber through said inlet, said blade being provided with means for varying the movement of said blade during the rotation of said piston whereby the blade is retained in position to prevent the inlet of fluid while the contacting portion of the piston is passing from one edge of the outlet port to the opposite edge of the inlet port.

8. In a device of the class described, the combination of a casing having a cylindrical chamber, an opening in its cylindrical wall and inlet and outlet passages communicating with said chamber through said opening; a revoluble shaft concentrically disposed in said chamber; a register mechanism actuated thereby; a cylindrical piston eccentrically mounted thereon; a pivoted blade co-acting therewith, the pivot of which is intermediate said inlet and outlet passages with the outer face of the blade in the path of the fluid entering said chamber through said inlet; and a projection on said blade adapted to serve as a bearing point for said piston during a portion of the revolution of said piston and thereby retain the blade in position to prevent the inlet of fluid while the contacting portion of said piston is passing from one edge of the outlet port to the opposite edge of the inlet port.

9. In a device of the class described, the combination of a casing having a cylindrical chamber, an opening in its cylindrical wall and inlet and outlet passages communicating with said chamber through said opening; a revoluble shaft concentrically disposed in said chamber; a register mechanism actuated thereby; a cylindrical piston eccentrically mounted thereon; and a pivoted blade co-acting with said piston retained in contact with the piston by the pressure of the entering fluid and including means for retaining said blade in position to close the inlet while the contacting portion of the piston is passing from one edge of the outlet port to the opposite edge of the inlet port.

10. In a device of the class described, the combination of a casing having a cylindrical chamber, an opening in its cylindrical wall and inlet and outlet passages communicating with said chamber through said opening; a revoluble shaft concentrically disposed in said chamber; a register mechanism actuated thereby; a cylindrical piston eccentrically mounted thereon; a pivoted blade co-acting with said piston and retained in

contact therewith by the pressure of the entering fluid; and means formed upon said pivoted blade for retaining said blade in position to close the inlet while the contacting portion of the piston is passing from one edge of the outlet port to the opposite edge of the inlet port.

11. In a device of the class described, the combination of a casing having a piston chamber, an opening in its cylindrical wall and inlet and outlet passages communicating with said chamber through said opening; a revoluble shaft positioned within said chamber; a piston thereon, a portion of which during the revolution of said shaft is in contact with the chamber wall; and a pivoted blade co-acting with said piston and retained in contact therewith by the pressure of the entering fluid, said blade being provided with means for retaining said blade in position to close the inlet port while the contacting portion of said piston is passing from one edge of the outlet port to the opposite edge of the inlet port.

12. In a device of the class described, the combination of a casing having a piston chamber, an opening in its cylindrical wall and inlet and outlet passages communicating with said chamber through said opening; a revoluble shaft positioned within said chamber; a piston thereon, a portion of which during the revolution of said shaft is in contact with the chamber wall; a pivoted blade co-acting with said piston and retained in contact therewith by the pressure of the entering fluid; and means formed upon said blade for retaining said blade in position to close the inlet port while the contacting portion of said piston is passing from one edge of the outlet port to the opposite edge of the inlet port.

Signed by me at #4 Post Office Square, Boston, Mass., this 29th day of December, 1909.

JUSTUS ROYAL KINNEY.

Witnesses:
NATHAN C. LOMBARD,
LUCY E. AREY.