

(No Model.)

2 Sheets—Sheet 1.

B. FITTS & J. F. WILSON.

ROTARY WATER METER.

No. 267,174.

Patented Nov. 7, 1882.

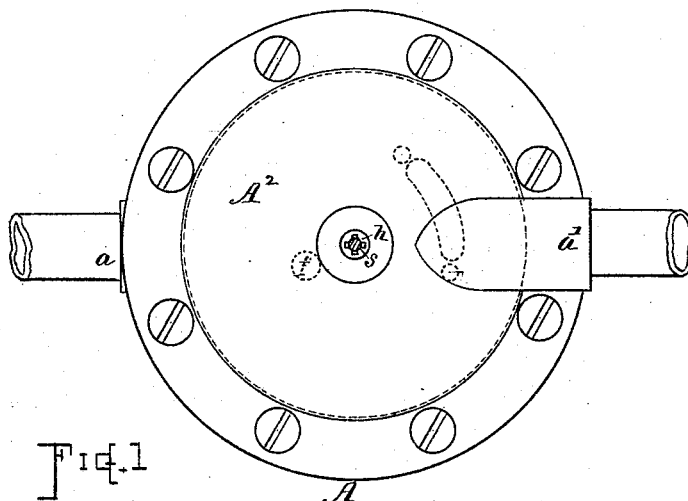


Fig. 1

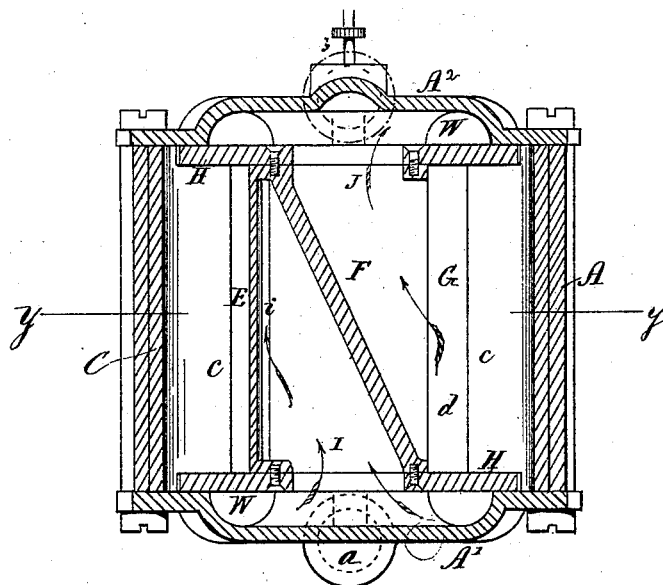


Fig. 2

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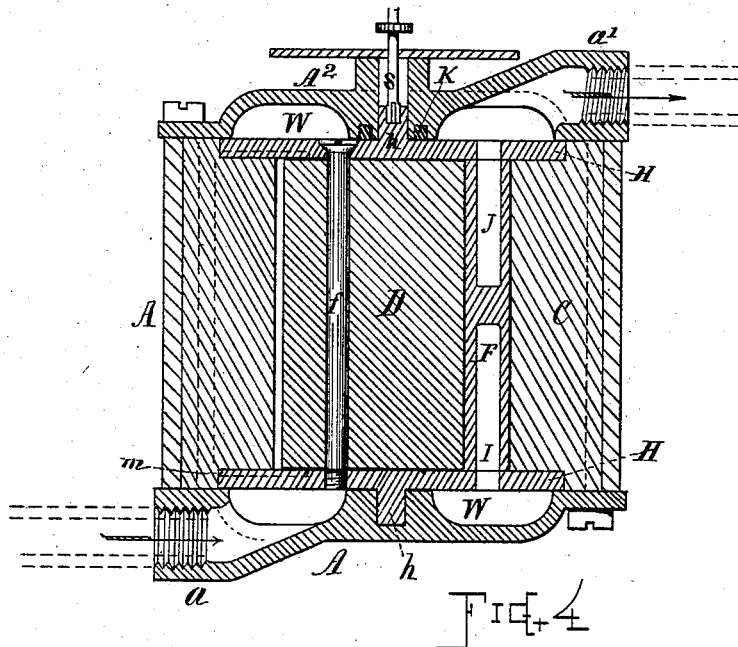
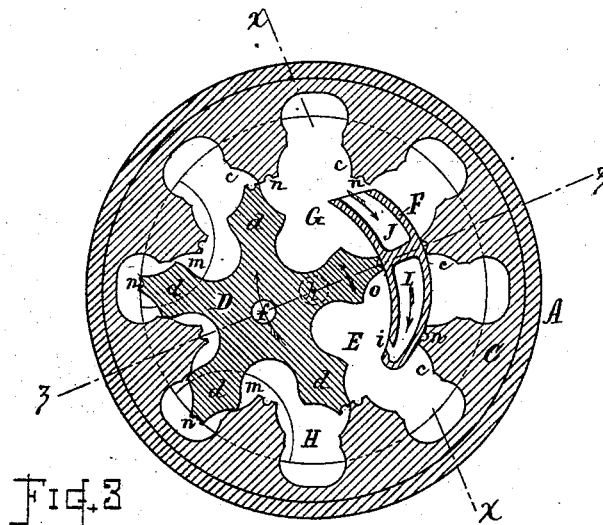
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UNITED STATES PATENT OFFICE.

BENAI AH FITTS AND JAMES F. WILSON, OF WORCESTER, MASSACHUSETTS.

ROTARY WATER-METER.

SPECIFICATION forming part of Letters Patent No. 267,174, dated November 7, 1882.

Application filed June 5, 1882. (No model.)

To all whom it may concern:

Be it known that we, BENAI AH FITTS and JAMES F. WILSON, both of Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Rotary Meters; and we declare the following to be a description of our said invention sufficiently full, clear, and exact to enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

Our present invention relates to certain improvements in the construction of rotary meters, the object being to afford a meter adapted for water and other liquids, or for steam and gases, which shall be efficient and positive in its action, simple, practical, and inexpensive for manufacture, and which shall not be subject to rapid deterioration and derangement by reason of wear. We attain these objects by mechanism constructed and organized for operation substantially as shown and described, the particular features claimed being herein-after definitely specified.

In the drawings, Figure 1 represents a plan view of our improved rotary meter. Fig. 2 is a vertical sectional view at line *x x*, Fig. 3. Fig. 3 is a horizontal sectional view at line *yy*, and Fig. 4 is a vertical sectional view at line *zz*.

The body of the meter consists of a cylinder or casing, A, provided with ends or heads A' A², properly bolted or otherwise secured thereto. Said heads are made with annular internal chambers or passages, W, and are furnished with suitable nipples or hollow bosses, *a a'*, for the connection of the supply and delivery pipes.

Within the cylinder A, and concentric therewith, is an internally-toothed ring or gear-piece, C, having inward-projecting cogs or ribs *c* for engaging or meshing with the cogs or blades *d*, on a star-wheel or revolving piston, D, that is located within the ring C and adapted to revolve about a journal or axis eccentric to the ring, and arranged for rotating about the main central axis of the cylinder or shell. The piston-wheel D and ring C are so proportioned, and their cogs *c* and *d* are so fitted, that the parts roll upon each other in the manner of toothed gears, the relative size of the piston and its degree of eccentricity being such that while the teeth or cogs *c* and *d* mesh closely

at one side a considerable space is left between their extremities at the opposite side or at the point of their greatest eccentricity. A barrier or partition, F, is arranged between the parts within this space, which is of such size and form as will separate the space into two chambers, E and G, and cut off or prevent the flow of liquid from one chamber to the other, except such as may be conveyed between the respective cogs or teeth *c d*. The outer and inner surfaces of the partition are made to conform to the respective curves or circles of motion of the piston D and ring-gear C, so that as the parts move past each other the extremities of the cogs form a close junction with the surfaces of the partition F. The ends of the partition F are supported by plates or revoluble disks H, fitted within and forming the internal facings of the head A' A², and against which the squared ends of the piston D and ring C have bearings, as illustrated. A bolt or rod, *f*, connects the two plates H and passes through the center of the piston D, forming the axial bearing about which said piston revolves. The plates H are fitted to the heads A' A² with studs or axial journals *h*, located concentric with the axis of the cylinder and ring C, so as to form a support for the partition F and piston-axle *f*, which rotates within the cylinder, while retaining said partition F and piston D in proper relative position as regards each other and the gear-ring C, and to permit the piston, as it revolves, to travel around the inner circle of the ring C, the piston and partition moving in the directions indicated by the arrows on Fig. 3. The cogs *d* of the piston, by meshing with the cogs *c* of the ring C at one side, close the passage against the escape of the fluid, water, or steam at that point, while the partition F, arms *d* of the piston D, and cogs *c* of the ring C serve to separate the chambers E and G at the opposite point, as illustrated, so that passage of liquid from chamber E to chamber G effects the revolution of the piston D.

The barrier or partition F is in the present instance formed hollow or with internal conduits, I and J, and serves as a mouth-piece for conducting the fluid into and from the respective chambers E and G, suitable opening being provided through the plates into the conduits I and J, as illustrated. Small depressions or channels *m* are formed in the plate H,

as indicated, to relieve the pressure in the recesses between the parts C and D, and prevent the fluid from obstructing the movement of the piston by close confinement between the inter-

5 meshing cogs or teeth.
The mouth *i* of the inlet-conduit I may be directed backward toward the cogs of the piston, so that the impact of the fluid will correspond with the direction of movement of the
10 piston D, and its reactive force will be exerted in the direction of the movement of the partition or mouth-piece F. The division between the conduits I and J may be inclined, as shown, so as to give large openings through the plates
15 H without extending beyond the limits of the end area of the partition.

If desired, the barrier F could be formed solid, and the inlet and outlet passages to the chambers E and G could be formed through
20 the casing or head-plates H at convenient position for entering the respective spaces or chambers E G; or the fluid may be taken in through the conduit I and permitted to pass out at any convenient position. We prefer,
25 however, the form shown.

The extremities of the blades or cogs *c* and *d* may be fitted with grooves *n*, as illustrated, to form water-packings when in conjunction with the piece F, for preventing leakage past
30 the piston. If preferred, any other suitable form may be given to the cogs *c* and *d* in lieu of that herein shown.

A suitable registering mechanism of ordinary construction may be combined with the
35 axle-stud *h* for indicating the quantity of fluid passed through the meter. Said register can be connected by an irregular-shaped spindle, S, fitted in a corresponding-shaped opening in the end of the stud *h*, or in other suitable manner, as desired. A packing-ring, K, is arranged
40 in the head A about the axle-stud *h* to prevent leakage at that point.

In the operation of the meter the fluid enters in the direction indicated by arrows, through
45 the pipe to the annular chamber W, and from there passes through the conduit I and mouth *i* into the chamber or space E, where its pressure, acting upon the piston D at the position *o*, forces the blade or cog *d* of the piston D
50 past the side of the partition F, which permits the flowage or transfer of the fluid contained between the blades *d* to the chamber or space G, from which it escapes through the conduit J into the annular chamber W and passes out
55 through the exit-opening. By this movement the piston D is caused to roll around the gear or ring C, thereby effecting the revolution of the plates H H and partition, so that the movement of the plate-journal *h* is transmitted to the register, which records the number of revolutions in the ordinary manner; or, if the register is properly speeded and regulated to correspond with the capacity of the piston, or amount passed at each revolution of the piston,
60 the quantity may be indicated on the register in gallons, cubic feet, or other desired unit of measure.

In the construction of the meter the ring C and cylinder A can, if desired, be formed integral or in a single piece, or be made separate and secured together in any suitable
70 convenient manner. Then again, if desired, as a modification of our invention, in lieu of making the partition F and axis-bearing of the piston to rotate or travel around the main axis of the
75 apparatus, said parts may be confined to the cylinder, and the gear-ring C be made to revolve around the piston D and partition F. In such case the registering devices would be combined for operation with the ring C or the
80 piston-axle, instead of the axle-stud *h*.

What we claim as of our invention, and desire to secure by Letters Patent, is—

1. In a meter mechanism, a partition or bulk-head piece introduced between the eccentric-
85 ally-arranged piston and the surrounding cylinder or ring-gear, for separating the intermediate space into receiving and delivering chambers, substantially as set forth.

2. The combination, in a meter, of an outer
90 ring or cylinder having internally-arranged projections or cogs, an externally-toothed intermeshing piston mounted upon an axial support or journals eccentric to and revoluble about the main or central axis, and an intermediate barrier or partition adapted to move
95 about the main axis in unison with the axial bearing of said piston, substantially as hereinbefore set forth.

3. The combination, with the ring-gear and
100 intermeshing piston-gear, of revoluble end plates concentrically journaled within the cylinder-heads, and adapted for supporting the partition or bulk-head piece and the piston-journal, substantially as set forth. 105

4. The partition or barrier-piece F, constructed with one or more conduits or passages, in combination with the cylinder-gear and revoluble piston, whereby said partition is adapted to serve as a mouth-piece for the entrance or exit of fluid to or from (either or
110 both) the piston-chamber of the meter, substantially as hereinbefore set forth.

5. The combination, with the cylinder-gear, revoluble piston, and revoluble end plates having conduits or openings to the piston-cham-
115 bers, of the heads A' A², provided with connecting-bosses *a a'*, and having annular chambers W, whereby fluid can be taken and discharged irrespective of the varied positions of
120 the internal revoluble parts, substantially as set forth.

6. The combination, with the intermeshing cylinder-gear and piston-gear, of heads or end plates having the recesses or channels *m*, as
125 and for the purpose set forth.

Witness our hands this 31st day of May, A. D. 1882.

BENAIH FITTS.
JAMES F. WILSON.

Witnesses:

CHAS. H. BURLEIGH,
A. U. MATHEWS.