H. F. READ.
Liquid-Meters.

No. 150,611. Patented May 5, 1874.

fig. 1.

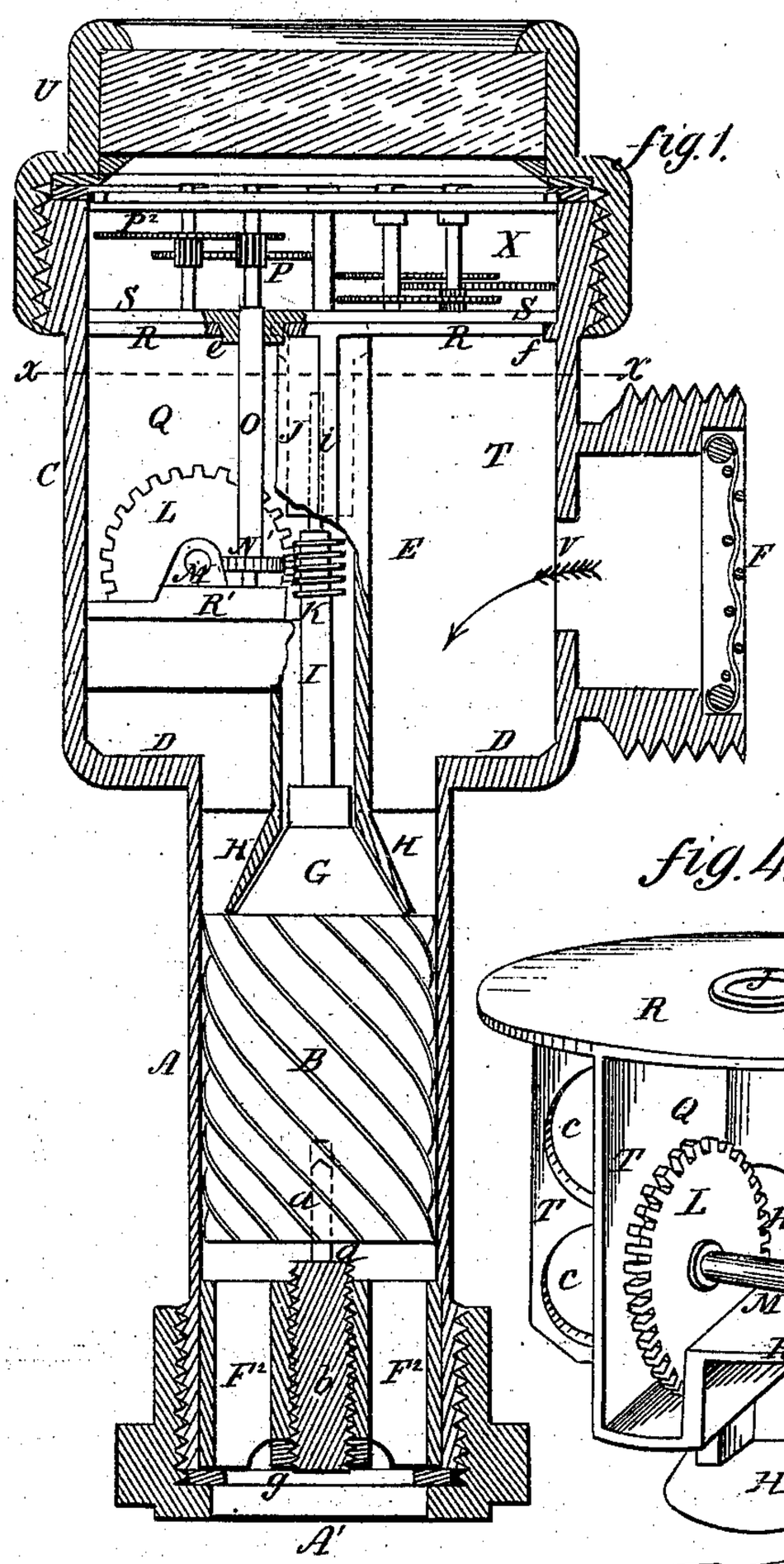


fig. 2

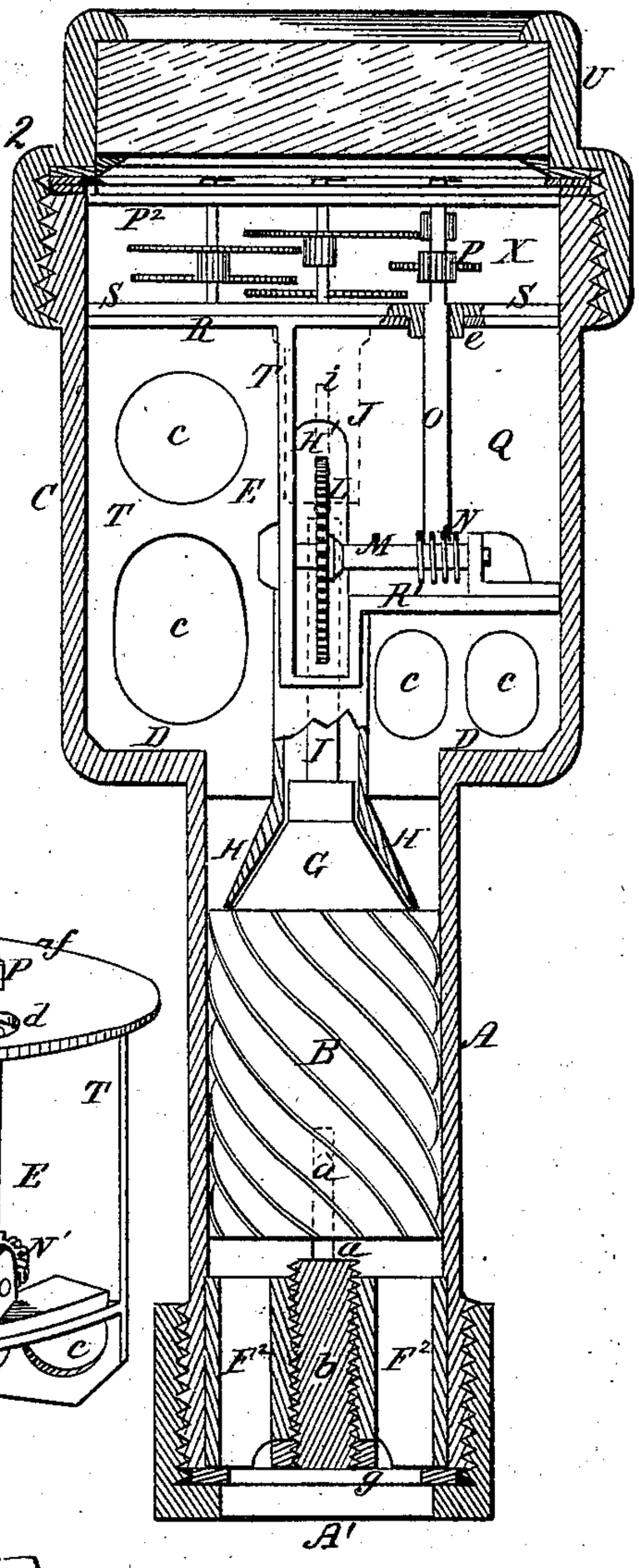
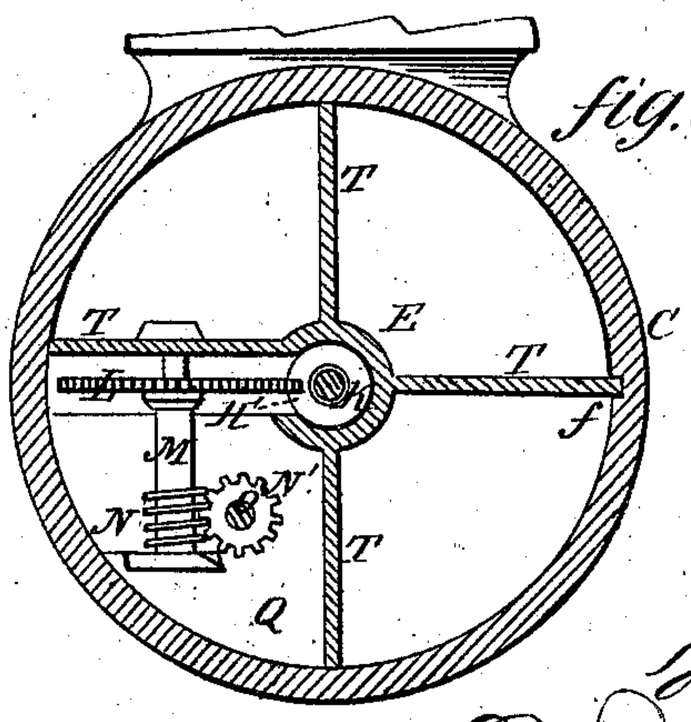
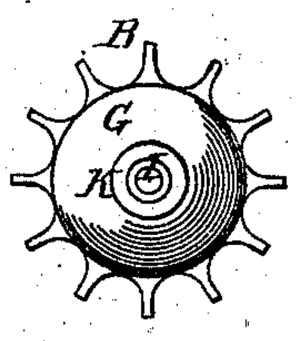


fig. 4.

fig. 3.





Witnesses:

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UNITED STATES PATENT OFFICE.

HENRY F. READ, OF BROOKLYN, NEW YORK, ASSIGNOR TO THE NATIONAL METER COMPANY, OF NEW YORK CITY.

IMPROVEMENT IN LIQUID-METERS.

Specification forming part of Letters Patent No. **150,611**, dated May 5, 1874; application filed November 11, 1873.

To all whom it may concern:

Be it known that I, HENRY F. READ, of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Liquid-Meters, of which the following is a specification:

My improved meter is designed for use with a hard-rubber screw-propeller, and in which the dial-face, the indicating-hands, and their operating mechanism work in water; and the invention, under this patent, consists, first, of a separate winged frame, having a gearing-compartment, a bearing for the propeller-stem, and a deflecting-shield, as a unitary for the support of the gearing which transmits the motion of the propeller, and for easy insertion into the meter-shell and removal therefrom, when desired; second, of a compartment for the connecting and operating gearing, formed within the said separate frame, by its top, bottom, and wing plates, in combination with the inclosing-shell, whereby the gearing is isolated from the influence of the direct force of the water, and maintained in position for gearing connection, both with the propeller-stem and the dial mechanism, and affording easy and instant working connection with these parts; third, the separate dial-gearing frame, seated and supported directly upon the separate gearing-frame, and put together separately, the one upon the other in the same line, and within the same shell, to obtain the best advantages for being readily put together, and intermatching the gearing of the two frames without other adjustments or fastenings for the purpose; fourth, of an intermatching sleeved sealing-joint, in combination with the contiguous bearing-plates of the dial and the propeller-gearing frames, and a spindle, which connects the two mechanisms, whereby the two mechanisms are joined for joint action, without the use of stuffing-boxes, to effect the exclusion of the mud and sediment from the indicating mechanism; and, finally, in the combination of the inclosed sealing-joint, formed by the propeller-stem, and the separate gearing-frame, with the inclosed gearing-compartment, its central opening, and the intermatching sealing-joint, whereby the water is caused to pass up through this circuitous route before it can enter the dial compartment, and preventing the entrance therein of mud by the agitation of the water by the propeller. The said improvements, while relieving the dial mechanism of the direct force of the propeller, are designed with special purpose to render the meter compact, easily made and put together, and insure the least possible amount of friction of all the parts.

In the accompanying drawings, Figure 1 represents a vertical section of a meter embracing my invention; Fig. 2, a similar section, the interior parts being shown in elevation in both figures; Fig. 3, a horizontal section, taken on the line *x x* of Fig. 1; and Fig. 4 a view in perspective of the gearing-winged frame.

The meter can be made for any size of supply-pipe or main required.

In the example shown, the cast shell has two unequal diameters in its length; the lower or smaller diameter A, to receive and inclose the hard-rubber screw-propeller B, and the upper or larger diameter C to receive and inclose the frame of the working mechanism, with the dial arranged and opening to view in a compartment at the top end of the cylinder, so that it can be easily and conveniently seen from above, whether arranged within a pit or a room, and thereby dispensing with a separate side chamber for the dial and gearing. The division D between the chambers of the shell form the seat and support for the frame E, which carries the working mechanism.

This construction, as shown, has been found most convenient for small meters; but in large meters—say, four or six inches—the wing-piece is inserted in the case from the bottom, the top part being very slightly smaller, so that the wing-piece must be forced in, and held up in place by screws.

The supply pipe or main connects, at F, with the upper portion C of the shell, and the service-pipe connects at the lower end A′ of said shell. The rubber propeller B has its lower bearing upon a stem, *a*, which extends up some distance into the rubber hub, and bears upon a steel agate-point or other suitable material inserted into the opening within which the pivot-stem *a* fits, and thus holds the propeller upon a smooth stem, which is carried by, and forms part of, a screw-stem, *b*, passing through an interior screw in the hub of an open-armed bearing-cylinder, F^2, fitted within the shell at its lower end,

thus effecting a very secure guide and bearing for the lower end of the propeller with the least possible friction, and affording facility for putting together and separating the parts of the meter. The upper end of the propeller B is provided with a conical projection, G, whose base covers the solid surface of the hub between the propeller-vanes, and the cone G fits within an inverted funnel-shaped shield, H, on the lower end of the gearing carrying-frame E, which should be below the inlet-opening. The object of this is to cause the water in entering the shell to strike directly upon the vanes, and to lose none of its force upon solid surface. A metallic axis-stem, I, projects from the propeller up into a rubber tubular guide-bearing, J, in the gearing carrying-frame E, and a worm, K, upon the stem I, matches with a toothed-wheel, L, on a horizontal axis; M, on which a worm, N, matches with a smaller toothed-wheel, N^1, on the end of a vertical axis, O, whose upper end carries a pinion, P, which, receiving motion from the propeller-shaft I, transmits it through a train of gearing to a suitable number of dial-hands arranged in an upper compartment, X. The gearing, however, which connects with the propeller-spindle is arranged within a quarter division, Q, of the frame E, between an upper and a lower plate, R R^1, while the train of gearing which operates the index-hands is arranged above this division Q, and in a compartment, X, between the dial and a disk, S, which fits snugly upon the cap-plate R of the gearing carrying-frame. This frame has a number of wings, T, and its upper and lower plates R R^1 fit within the shell-chamber, the inner surface of which is turned out to form a close joint with the plates R R′ and the wings T, and the gearing is thereby shielded from the direct action of the flowing water, which, entering the shell at F, passes through openings *c* in the wings T for full action upon the propeller. The joints of the frame E and shell are fitted tight, so that the water can only enter the dial-compartment X, by passing down to the lower end of the cone H, and then up between cones H G through the hub-opening H′, into the division Q, and then up through an opening, *d*, through which the upright shaft O communicates with the indicator. The axis-spindle O, which forms the communication between the propeller and the dial-indicating gearing, passes through openings in the top plate R and the bottom plate S of the dial and gearing frames, and to seal this joint a sleeve, *e*, projects from the bottom dial-plate S into the opening *d* in the top plate R, and forms a close joint therewith and with the axis-spindle O, and thereby compels the water to work its way slowly into the dial-compartment X, which is thereby kept free from mud and grit, and as the lower end of the sleeve *e* opens into the closed compartment Q, it will be impossible for the water to rise under the agitation of the propeller and drive into the dial-place and cover it with mud. The shell is fitted with a screw-cap, U, with a top glass over the dial, and a packing-ring to render the joint water-tight. The wing-piece E is held in position by a steady-pin, *f*, projecting from the edge of the top plate R, (see Fig. 4,) and fitting into a groove in the shell, so that in screwing down the cap U upon a ring, the wing-piece is thus prevented from turning or getting out of gear. The inlet-opening V for the water into the shell is oblong, to direct the water more in a flat than in a cylindrical body upon the propeller. The upper guide-bearing J, for the propeller-stem I, is a rubber plug driven into the hub of the winged frame, and the stem I fits into a bore in this plug, and both propeller-bearings *a* and *i* are designed to have the least possible amount of friction.

The propeller being of hard rubber is light, and not in any way subject to corrosion, or to accumulate matter upon its vanes, but remains perfectly smooth, and all the parts of the meter are designed and adjusted for the freest action of the working parts.

The propeller B and the gearing carrying-frame E are inserted into the shell in the same axis-line, and both may be removed, if desired, for any cause. All this adds to the convenience and economy in constructing and using the meter.

The screw-stem *b* has a lock-nut, *g*, which acts against the open bearing-cylinder F^2, and thereby allows the guide-bearing stem *a* to adjust the propeller, so that it shall have no bearing-friction except at the point of said stem.

I claim—

1. The separate winged frame E T R R′, having the gearing-compartment Q, upper rubber bearing J for the propeller-stem I *i*, and the deflecting sealing-shield H of a water-meter, as and for the purposes described.

2. The separate gearing-frame E, with its end plates R R′ and wings T, in combination with the inclosing-shell C whereby an inclosed compartment, Q, for the gearing is obtained, as described.

3. The separate gearing-frame E as a seat and support for the dial gearing-frame S P^2, and put together, the one upon the other, in the same line for convenient and ready connection of the propeller-stem with the operating-gearing of said frames, as described.

4. The intermatching sleeved sealing-joint, *e*, in combination with the separate contiguous disks R S of the dial and gearing frames, and their gearing-connecting spindle O, as and for the purpose described.

5. The combination of the inclosed sealing-joint, formed by the parts G H, with the inclosed gearing-compartment Q, and the intermatching sealing-joint *e*, for joint action in retarding the course of the water from the propeller into the dial-compartment through the intermediate opening H′, as described.

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