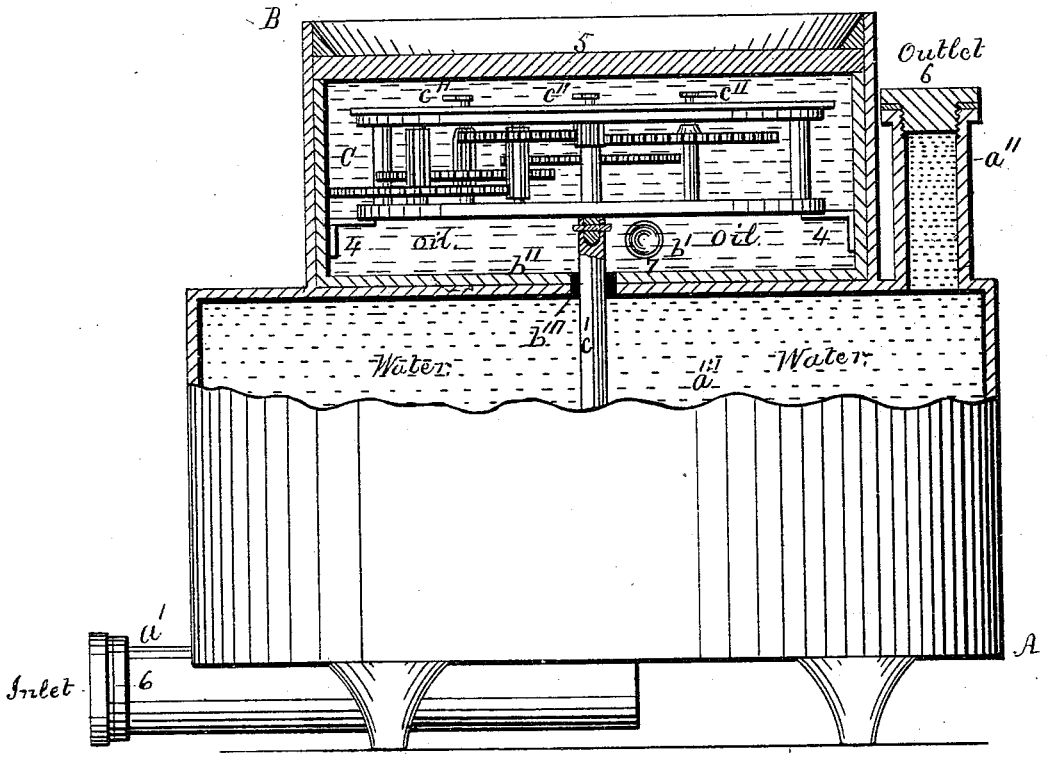
W. HELME.

Water Meter.

No. 165,673. Patented July 20, 1875.



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WILLIAM HELME, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN WATER-METERS.

Specification forming part of Letters Patent No. **165,673**, dated July 20, 1875; application filed May 24, 1875.

To all whom it may concern:

Be it known that I, WILLIAM HELME, of the city of Philadelphia, in the State of Pennsylvania, have invented an Improvement in Water-Meters, of which the following is a specification:

Of the great variety of water-meters that have been invented there is not one of them but what is attended with more or less difficulty in the registering portion. Some of them are quite delicate in their operation, and accurate in measuring the quantity of water passing through them; but, as all water-meters require the index movements to be located in a chamber or apartment separate or distinct from that in which the water to be measured is passing, it is necessary either that the index-chamber be elevated sufficiently above the water-chamber to afford an air-chamber for the registering movements, or that a stuffing-box be used in the dividing partition for the rotary driving-shaft to move in, in order to prevent any water from passing from the water-chamber into the air-chamber above.

In the present case the enameled register-plate and brass movements connected therewith are secured in the upper apartment, with the index-plate in a horizontal position at a short distance below a glass plate, which, being secured in an air-tight manner, forms a transparent cover to the said apartment, which affords a clear view of the whole face of the register-plate and its indexes, in the usual well-known manner.

The rotary motion of the driving-shaft should be as free from friction as possible, and however slender and smooth it may be the packing in the stuffing-box is a serious frictional objection when at first used, and becomes more and more objectionable as it becomes old and wears in use, and consequently impairs the requisite accuracy of the meter. In those meters in which the stuffing-box is dispensed with, the water in the measuring-chamber has free access to the air-tight chamber or apartment above it through the roomy hole for the driving-shaft, and is prevented from reaching the index-movements by the air in the apartment thereof. In this case the supposition would naturally be that, there being no visible place of escape for the air in the upper apartment, it would remain therein an indefinite length of time, and prevent the water from ever reaching the index-movements. Experience has demonstrated that such is not the case. The air is either absorbed by the water, or escapes in some way which cannot be, or at least has not been, detected, and the water slowly rises and eventually submerges the movements and index-plate. This being the case, when the water becomes muddy, as it often does, the face of the index-plate becomes obscured, and the covering glass plate coated beneath with a film of mud also, thus rendering it impossible to read the registration. Besides this obscuration by deposits from muddy water, the small particles of sand and other gritty matter carried by the water into the upper apartment serve to grind and rapidly wear out the spur-wheels of the movements. And, moreover, when pure clear water is being measured during the time it may permit the air to escape or be absorbed, as before stated, the vapor rising from the water becomes condensed on the under surface of the glass covering-plate whenever the temperature of the air surrounding the meter becomes lower than that of the water being measured—conditions which never fail in the fall season of the year; and the condensation, being on the under or inner surface of the glass, cannot be wiped off, and for the time prevents the correct or accurate reading of the registration.

The object of my invention is to afford a simple and infallible mode of overcoming all the difficulties and annoyances hereinbefore pointed out, as consequent in the water-meters in general use; and my invention consists in dispensing entirely with the use of air in the registering apartment, and of packing around the main driving-shaft, and in lieu thereof providing for a constant submergence of the whole registering-plate and index-movements in transparent lubricating-oil, supported and maintained in position under variable temperature, by the water in the measuring-apartment below, as will be fully and clearly described and explained with reference to the accompanying drawing, in which an elevation of my improved water-meter is shown, with the up-

per portion of the case in vertical section, for the purpose of showing the relative positions of the water-apartment, the oil-apartment, and the registering apparatus in the latter, A B being the containing-case; a', the water-inlet pipe; a'', the water-outlet pipe; a''', the water-apartment; b', the oil-apartment; c, the registering apparatus, and c' the main driving-shaft of the registering apparatus extending vertically downward therefrom into the water-apartment a''', and into connection with a suitable measuring-wheel. (Not shown.)

The two chambers or apartments a''' and b' are separated by a partition, b'', in which there is a roomy hole, b''', through which the main driving-shaft c' of the registering apparatus C extends downward, as before mentioned, the latter being firmly supported, and fixed upon suitable brackets 4 4, (secured firmly to the sides of the apartment b',) and at such a height above the partition b'' as will bring the indexes c'' c'' c'' an eighth of an inch, more or less, below the under surface of the glass covering-plate 5 of the apartment b', substantially as represented in the drawing.

The inlet and the outlet pipes a' and a'' are respectively fitted with temporary screw-caps 6 6, and in one side of the apartment C there is fitted a screw-plug, 7. The object of these stoppers is to enable the manufacturer to fill the meter with the oil and water before it leaves the factory, so that the plumber will have only to withdraw the screw-caps 6 6, and connect the meter with the desired supply and discharge pipes.

The meter is filled in the following manner, viz: The cap 6 of the inlet-pipe a' being screwed up water-tight the cap 6 of the outlet-pipe a'' is taken out and water poured down through said pipe until the apartment a''' becomes full. The cap 6 of the outlet-pipe a'' is then reinserted and screwed up water-tight. The meter is then turned upon its side with the screw-stop 7 uppermost, the latter taken out, and the transparent lubricating oil before mentioned poured through the hole until the apartment b' becomes full, and then the screw-plug reinstated in an oil-tight manner, and to remain so after the meter has been attached by the plumber.

In the filled condition just described the meter can be safely packed and transported any distance without permanent derangement of the two liquids, because the oil, being much lighter than the water, will always rise into the upper apartment, which, when the meter is in place, will be apartment b'.

It will be seen that the oil in the apartment b' will, when the meter is placed in communication with the water supply and discharge, always fill the apartment and prevent any access of water to the registering apparatus C; and the oil being transparent a perfectly clear and distinct view of the three series of numerals and their respective indexes on the register-plate will at all times be obtainable by simple inspection under any probable variation in the temperature of the water or the atmosphere above the freezing-point of water; and while all the objections and difficulties attendant upon the use of either air or packing in the water-meters, as before referred to, are by my invention entirely avoided, all the movements of the registering apparatus are not only kept free from grit of any kind, but are kept always thoroughly lubricated, and this automatically.

As the general construction of the case A B in two apartments, separated by a horizontal partition, and provided with a glass plate, 5, over the upper apartment, as described, and the construction of the registering apparatus C, and its arrangement within the said upper apartment b', are well known, and have been long used, I do not desire to make any claim to the invention of either of them; but

What I claim as my invention is confined to the following, viz:

In combination with a water-meter, a transparent lubricating-oil supported upon the water of the measuring apartment, so as to keep the registering apparatus wholly submerged in the said oil, substantially in the manner described and set forth, and for the purposes specified.

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Witnesses:
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