F. A. EINENKEL & C. O. MÜLLER.

Water Meter.

No. 231,958. Patented Sept. 7, 1880.

Fig. 1.

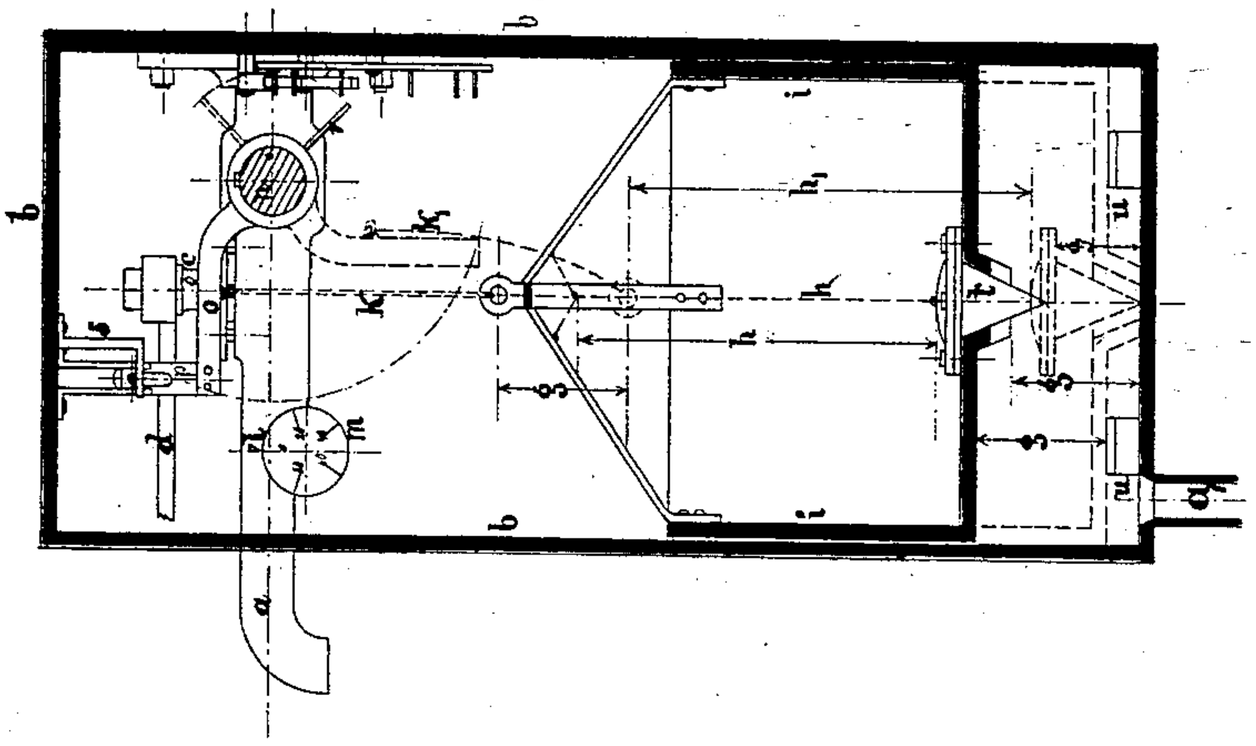


Fig. 2.

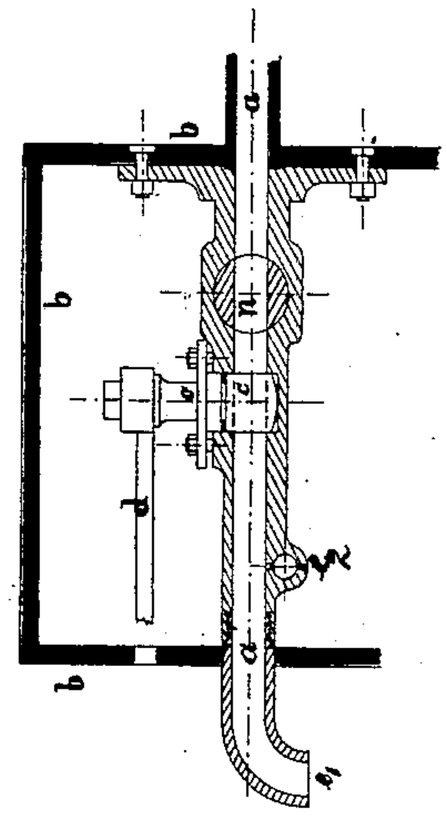


Fig. 3.

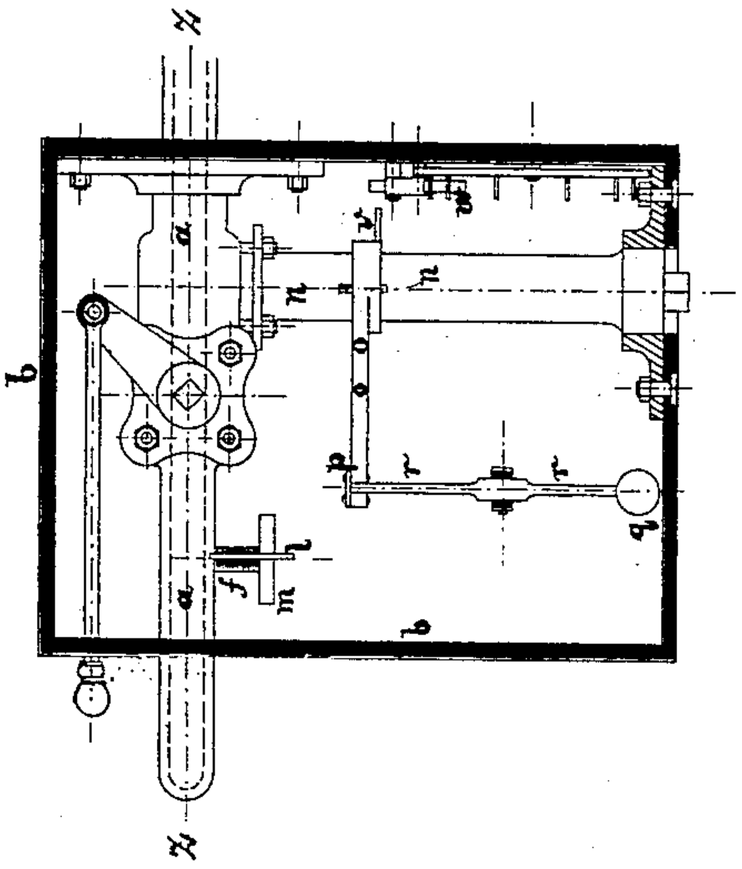


Fig. 4.

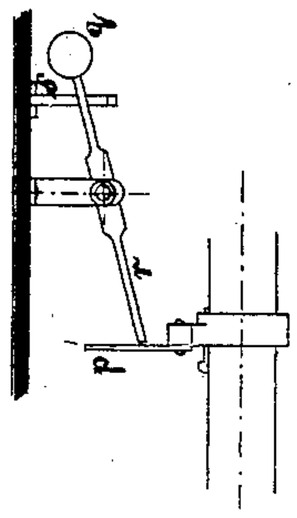


Fig. 5.

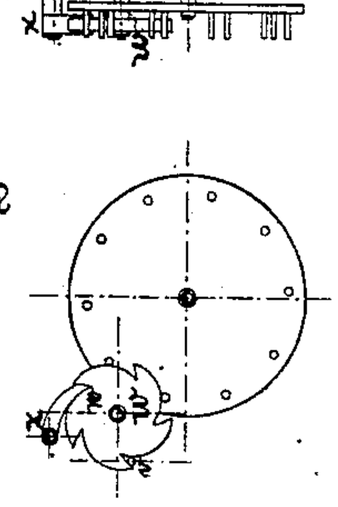
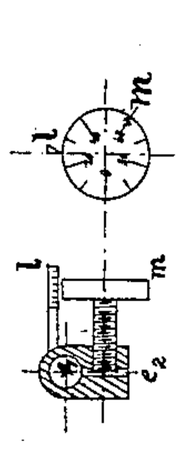


Fig. 6.



Witnesses:

A. P. Grant,

W. F. Fischer

Inventors:

F. A. Einenkel,

C. O. Müller,

by John A. Wiedersheim,

Att'y.

UNITED STATES PATENT OFFICE.

FRIEDRICH A. EINENKEL, OF NEUDÖRFEL, NEAR ZWICKAU, AND CARL O. MÜLLER, OF ZWICKAU, GERMANY.

WATER-METER.

SPECIFICATION forming part of Letters Patent No. 231,958, dated September 7, 1880.

Application filed January 5, 1880.

To all whom it may concern:

Be it known that we, FRIEDRICH A. EINENKEL, of Neudörfel, near Zwickau, and CARL O. MÜLLER, of Zwickau, Germany, have invented a new and useful Improvement in Water-Meters, which improvement is fully set forth in the following specification and accompanying drawings, in which—

Figure 1 is a vertical section of the water-meter embodying our invention. Fig. 2 is a vertical section of a portion in line *z z*, Fig. 3. Fig. 3 is a top view of the interior thereof. Figs. 4, 5, and 6 are views of detached parts.

Similar letters of reference indicate corresponding parts in the several figures.

Our invention consists of improvements in meters, as will be hereinafter set forth and definitely claimed.

Referring to the drawings, the conducting-pipe *a a* enters in the box *b*. The flow-out of water may be regulated by the vertical cylindrical stop-cock *c*, which is bored round and of the same diameter as the pipe. The stop-cock may be manipulated by a crank, *d*, or any other analogous means. The water flows out of the spout *e'*, and in the meantime by the small hole e^2 at the lower side of the pipe *a*. The hole e^2 is much smaller than the hole of the spout *e'*, and the section of it can be regulated and closed by the screw *f*. The water flowing out of the hole e^2 falls in the vessel *i*, of a certain capacity, and which is vertically conducted within the box *b*. This vessel is suspended by the chain *k* to the lever *o*, which is fixed to the horizontal shaft *n*. The end of the lever *o* is fitted with a spring, *p*, which is represented in vertical position, the lever being horizontal. This spring touches with its edge at the upper end the corresponding end of the double-armed lever *r*, which bears at its other arm the weight *q*, and which is arrested in its position of repose by the support *s*. The proportionality of the two arms of the lever—that is to say, the distance of the point of gravity of the weight *q* and that of the edge of the spring *p* from the center of the lever—is such that the horizontal position of the lever *r* is assured until the moment when the contents of the vessel *i* flow out through the small hole e^2. At this moment partial equilibrium takes place. A small increase of the quantity of water in the vessel *i* causes it to descend—that is to say, the lever *o* turns downward; the weight *q* is raised, the edge of the spring *p* leaves the end of the lever *o*, and the vessel *i* descends without any obstacle, and as the end of the shaft *n* is formed as a stop-cock, the outflow of water is prevented by the said shaft and the chain *k* and lever *o*.

The vessel *i* has fitted in its bottom a heavy valve, *t*, which for better vertical movement is suspended by the cord *h*. The valve *t* closes water-tight when the vessel is in its uppermost position, so that the vessel can be filled without loss of water. The descending vessel makes the vertical way *g*, and rests on the bolts *u u*, which are fitted with india-rubber disks.

In the upper position of the vessel *i* the distance *g* of the point of the valve and the bottom of the vessel is less than the way *g*. For this cause the point of the valve touches the bottom of the box *b* while the vessel is yet descending; consequently the water begins to escape from the vessel by the valve *t* and the side holes of its seat into the box *b* and flows out through the pipe *a*. The shaft extends outside of the box *b*, so that the apparatus may be remounted by a key after every descent of the vessel *i*, which will be indicated by the fact that although the stop-cock *c* is opened no water will flow out of the spout of the pipe *a*.

In raising the vessel *i* by the shaft *n* the stop-cock at its end is reopened for the outflow of water.

The principle of measuring.—The amount of friction *z*, which, besides the weight *q*, is to overpower, may be determined by a direct experiment in such a way that at the moment in which the spring *p* is released from the lever *r* the quantity of water that successively flows down into the vessel *i* is $x+z=1$ gallon.

As before said, the small hole e^2 can be regulated by the screw *f*; consequently one is able to determine by direct proof what part of the water flowing out of *e'* flows through the hole e^2 into the suspended vessel *i*.

Suppose the quantity of one gallon in the vessel causes the closing of the pipe *a* in the before-described manner, and the part of water

flowing out of e^2 is found equal to $\frac{1}{200}$ of the quantity flowing out of the spout e' at the same time; the result is that during one descent of the vessel two hundred gallons flow out of the spout e'. To mark this position of the screw f, which indicates this relation— $\frac{e^2}{e'}=\frac{1}{200}$—a scale, l, is established with the pipe a, every part of which corresponds to one revolution of the lower edge of the scale l.

To apply and regulate the whole apparatus it is only necessary to note the found position of the screw, which corresponds to the determined relation.

Within the apparatus a counter is arranged, which notes the different descents of the vessel, so that it is possible to exactly determine the consumption in a certain time.

A spring, v, fixed to the shaft n, gears with a toothed wheel, w, so that every descent of the vessel causes the advance of one tooth of the wheel w, and a pawl, x, prevents the return of the wheel w while the vessel is remounted.

The controller in possession of the key of the box of the apparatus has nothing more to do than to note the position of the counter, to find the number Z of descents, and to determine the consumption as follows: $Z\times 200$ gallons. After having made this notice the counter is turned to its original position, 0.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In combination with suspended vessel i and pipe a, having small opening e^2, which discharges into said vessel, a stop-cock which is operated by the descent of said vessel.

2. In combination with vessel i and pipe a, having opening e^2, which discharges into said vessel, the shaft n, provided with arm o, from which said vessel is suspended, said shaft serving to cut off the flow of water and to actuate the registering devices.

3. In combination with shaft n, arm o, suspended vessel i, and pipe a, having opening e^2, the discharge-valve t, protruding through the bottom of said vessel, as set forth.

FRIEDRICH AUGUST EINENKEL.
CARL OTTO MÜLLER.

Witnesses:
GUSTAV RIEDEL,
JULIUS LANGER.