

J. C. GUERRANT.

LIQUID-METER.

No. 171,665.

Patented Jan. 4, 1876.

Fig. 1.

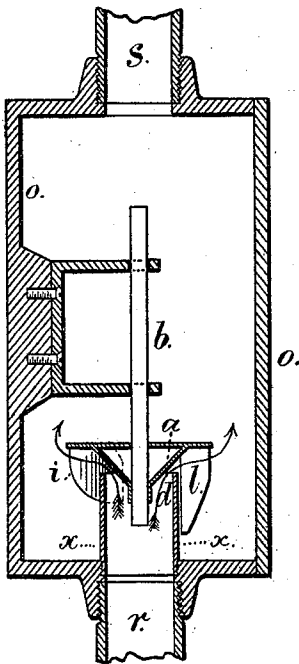


Fig. 3.

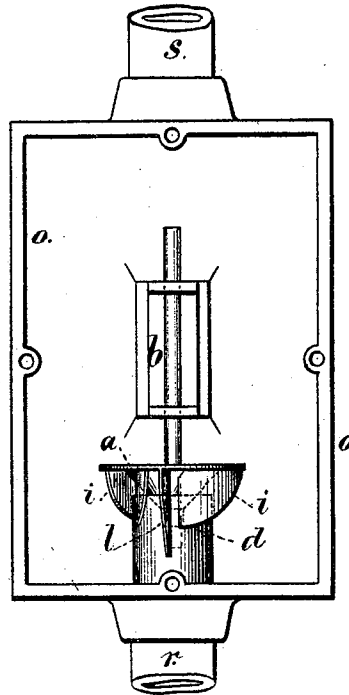
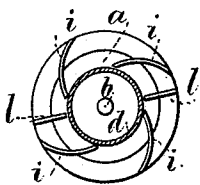


Fig. 2.



Witnesses

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UNITED STATES PATENT OFFICE.

JOHN C. GUERRANT, OF DANVILLE, VIRGINIA, ASSIGNOR TO HIMSELF AND COLLETT LEVENTHORPE, OF RUTHERFORDTON, NORTH CAROLINA.

IMPROVEMENT IN LIQUID-METERS.

Specification forming part of Letters Patent No. 171,665, dated January 4, 1876; application filed October 6, 1875.

To all whom it may concern:

Be it known that I, JOHN C. GUERRANT, of Danville, in the State of Virginia, have invented an Improvement in Meters for Liquids and Fluids; and I do hereby declare the following to be a correct description thereof.

This invention is for the purpose of approximately measuring the flow of water or other fluid through a pipe; and it consists in a floating or balanced valve that is upon a sliding spindle, in combination with wings that extend from the valve past the seat and outside the tube, the end of which forms said seat, and these wings are formed and proportioned with reference to communicating a rotation to the valve and spindle proportionate to the height that the valve is raised from its seat, so that when the valve is raised but little the speed will be slow, and when the flow of the water or gas is rapid, so as to open wide the valve, the revolution of the valve and spindle will be proportionately rapid, so that a registering mechanism of any suitable character connected with the valve-spindle will indicate the quantity of liquid or fluid passing by said valve.

In the drawing, Figure 1 is a vertical section of the said meter. Fig. 2 is a cross-section at the line *x x*, and Fig. 3 is an elevation.

The valve *a* is upon a spindle, *b*, that is mounted in bearings that are as free from friction as possible, and to the spindle there is connected any suitable registering device to record its number of revolutions. This valve *a* is hollow, so as almost to float, or it may be balanced by a spring or weight to open and close with a slight pressure of water or fluid. The valve is conical, and its seat *d* is tubular, so that the fluid or liquid issuing from the space between the valve and the end of the tube passes away in the direction of the arrows, leaving the liquid or fluid around the tubular seat *d* quiescent. The valve is in the case *o*, and the fluid enters by the pipe *r* and passes away by the pipe *s*. From the valve *a* there are wings *i* extending down around the tube *d*, but not in contact with the same, and these wings are curved similar to the blades of a water-wheel,

except that they are made so as to unite the feature of resistance in the quiescent portion of the liquid with that of propulsion from the issuing liquid. These wings may be all alike, or some may be propelling wings and others resisting wings.

For convenience of illustration I have shown the wings *i* at an inclination, to act as propelling wings, and the wings *l* as radial, to form resisting wings.

When the valve is almost closed the issuing water or fluid will turn the valve but slowly, because the resisting portions of the wings that are in the quiescent water or fluid around the tube *d* check the motion.

When the valve is wide open, or nearly so, the resisting wings are lifted above the seat at the end of *d*; hence the issuing fluid turns the valve with the rapidity due to the inclination of the wings unresisted, and at intermediate points the speed of revolution will be proportionate; hence, by properly shaping the wings to produce the necessary speed in proportion to the opening of the valve and the resistance of the wings in the quiescent fluid, the meter can be made to give a reliable record of the fluid passing by the valve, and the risk of undue motion is prevented by the peculiar resisting wings.

When the exact shape of the wings is determined for a given size of valve and seat, others made precisely the same will register correctly.

I am aware that a meter has been made with a cone having spiral wings and entering within the pipe through which the water flows.

In this case the wings are entirely in the water that is moving through the pipe, and give rotary motion to the cone and registering apparatus. There is nothing to act as a resistance to the rotation of the cone, and hence a small flow of water may produce as rapid a revolution as a larger flow.

In my meter the inclined wings come more and more into action as the valve moves off its seat, and the portions of the wings that are in quiescent water lessen, and the reverse, so that the wings become both reactionary, to lessen the speed, and propelling, to increase

the speed, and these forces preponderate, more or less, according to the distance the valve is open; hence the accuracy of the registration is promoted.

I claim as my invention—

The combination, with the balanced valve *a* and tubular seat *d*, of wings *l i*, that extend from such valve outside of, and around,

such tubular seat, to regulate the revolution of the valve, in the manner specified.

Signed by me this 2d day of October, 1875.

JOHN C. GUERRANT.

Witnesses:

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