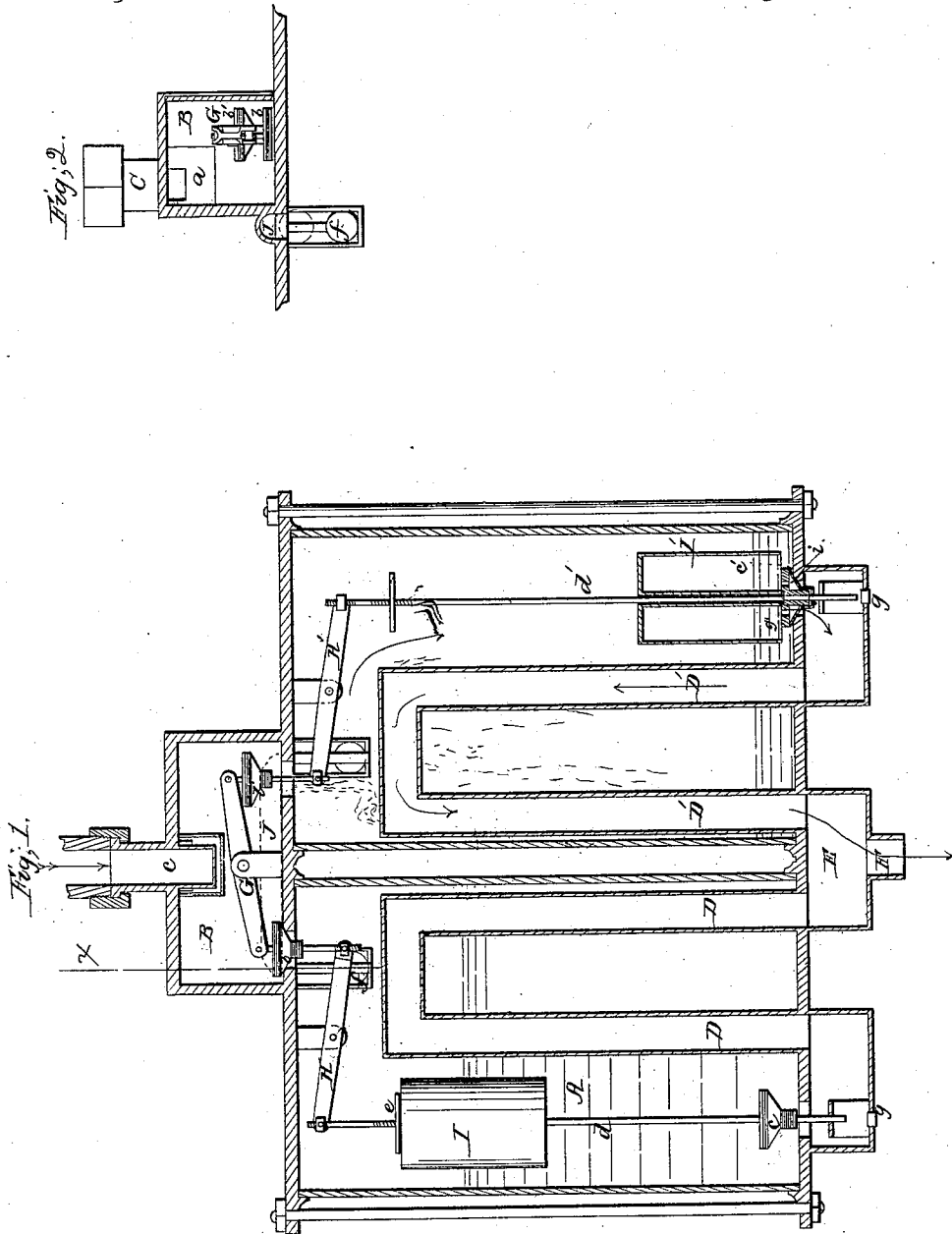


Curtis & Hoard, Piston Meter.

N^o 13,198.

Patented July 3, 1855.



UNITED STATES PATENT OFFICE.

J. CURTIS AND S. HOARD, OF CHICAGO, ILLINOIS.

WATER-METER.

Specification of Letters Patent No. 13,198, dated July 3, 1855.

To all whom it may concern:

Be it known that we, JAMES CURTIS and SAMUEL HOARD, of Chicago, in the county of Cook and State of Illinois, have invented an Improved Meter for Water and other Liquids; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1, is a vertical section of the meter, and Fig. 2, a section of a portion of the same taken at right angles to Fig. 1, in the line *x*, of that figure.

Similar letters of reference indicate corresponding parts in both figures.

A, A', may be two separate cylinders or chambers, or two compartments of the same box, of metal or other material being in any case of equal size, but we propose to make them of two upright cylinders of glass secured between and closed at the ends by suitable heads of metal. Both these cylinders or chambers communicate at the top with the same inlet chest B, which receives the water or other fluid from the inlet pipe C, whose mouth is furnished with a dip trap *a*, and both communicate at the bottom with siphons D, and D', one for each, with the outlet chest E, to which is connected the outlet pipe F. There is also direct communication between the cylinders through a pipe J, at the top, shown dotted in Fig. 1, and in section in Fig. 2, which serves as an air passage. The entrances to the cylinders or chambers A, A', are fitted with inlet valves *b*, *b'*, one for each, the said valves being attached to opposite ends of a lever G, working within the inlet chest one of the said valves being always open for the entrance of water into its respective cylinder or chamber and the other closed. The valves *b*, *b'*, are also connected to other levers H, H', working within their respective cylinders or chambers and to the opposite ends of the said levers, the outlet valves *c*, and *c'*, of the respective cylinders or chambers, which are fitted to the entrances to the siphons, are connected by long rods *d*, and *d'*. The above arrangement of valves enables all to be balanced by the pressure of the water and causes the outlet of either cylinder or chamber to be closed when the inlet is open and vice versa, and the corresponding valves of the two cylinders or

chambers to be at all times in opposite conditions. The rods *d* and *d'*, are fitted with loose pivots I, I', which slide loosely upon them and each carries a flanch or collar *e*, near its top against which its float strikes to operate the valves.

The meter operates by filling the cylinders or chambers alternately with water transferring the air from the one being filled into the other, and employing the said air as a piston to be acted upon by the incoming water in the one cylinder to expel the water from the other. In Fig. 1, of the drawing the cylinder A, has just been filled and A', discharged, and the valves to have been just brought into position to fill A', and discharge A, the water from the inlet chest B, entering the former cylinder by the open valve *b'*, and as it rises driving out the air above through the pipe J, into the upper part of the cylinder A, to force out the water below it by the open valve *c*, from whence it passes through the siphon D, to the outlet chest E, and outlet pipe F. By the time the water is all expelled from A, the water-level in A', will have risen so far as to bring the float I', into contact with the collar *e*, on the outlet valve rod *d'*, and its buoyancy assisted by the weight of the float I, in the empty cylinder will lift the rod *d'*, and depress the rod *d*, thereby reversing the conditions of the whole of the valves and causing the cylinder A, to fill and the air in the upper part to be driven back into A', to discharge the water therefrom through the siphon D'.

In order to protect the water company, or for other reasons, to stop the operation of the meter if the valves do not operate properly, we provide a float valve *f*, in each cylinder at the entrance to the pipe J. These valves while the meter is in proper operation being never reached by the water, keep open as shown in Fig. 1, by their own weight but when the valves fail to operate the water rises in the receiving cylinder, and floats its valve *f*, which soon closes the pipe J, thus effectually stopping the flow of water through the meter.

To commence the operation of the meter it is necessary to hold the valves in position for the entrance of water into one cylinder till the said cylinder is nearly full, for which purpose and for setting the valves, two screw plugged holes are made in the

bottom of the meter at *g, g*, under the valves *c, c'*. These will be sealed by the water company.

The valves we employ in this meter are made as shown at *c'*, in Fig. 1, by distending a piece of india-rubber *i*, in a conical form between the periphery of a disk *j*, and a central stem, the disk being perforated to admit water to the inner side of the india-rubber to press it closely to the seat.

The consumption of water or other liquid is to be registered and indicated by such a system of gearing and indices as is commonly employed in meters, the same receiving motion from the rocker of the lever *G*, or from any part of the valve mechanism.

Having thus described our invention we will proceed to state, what we claim and desire to secure by Letters Patent.

1. Though we do not claim the invention of a meter composed of two cylinders or chambers of which one is filled while the other is discharged, we claim the employment of two chambers having such communication with each other that the incoming water entering each cylinder or cham-

ber, in its turn will expel a volume of air previously contained therein, and drive it into the other cylinder or chamber, and cause the said air to act as a piston to separate from the incoming water and to discharge through the agency of the pressure thereof, the water in the other cylinder or chamber substantially as herein described.

2. Though we do not claim the invention of a float valve to shut off the flow of a fluid through a meter in case of the parts becoming deranged, we claim fitting a float valve *f*, to each end of the pipe *J*, through which the air is transferred from one to the other of the two measuring cylinders or chambers, substantially as herein described, so that in whichever cylinder the water should rise above its proper level by reason of the derangement of the inlet and outlet valves the pipe *J*, will be closed and the flow of water stopped.

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SAML. HOARD.

Witnesses:

A. M. NELSON,
JOHN W. JACKSON.