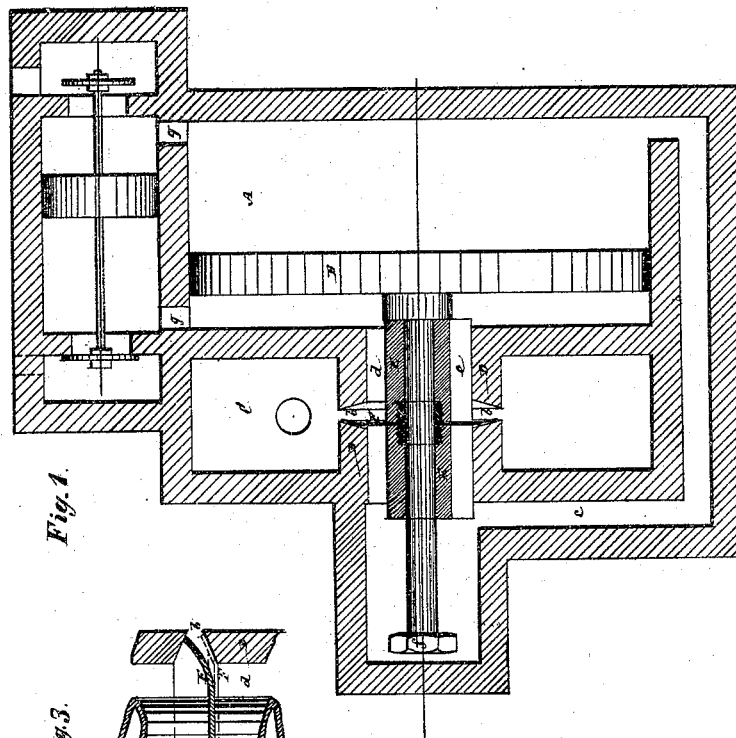


*J. V. V. Boorne,*

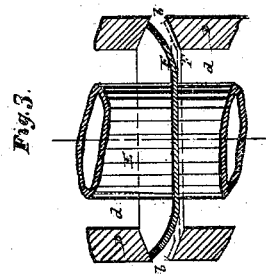
*Pump Valve.*

*No. 113,247.*

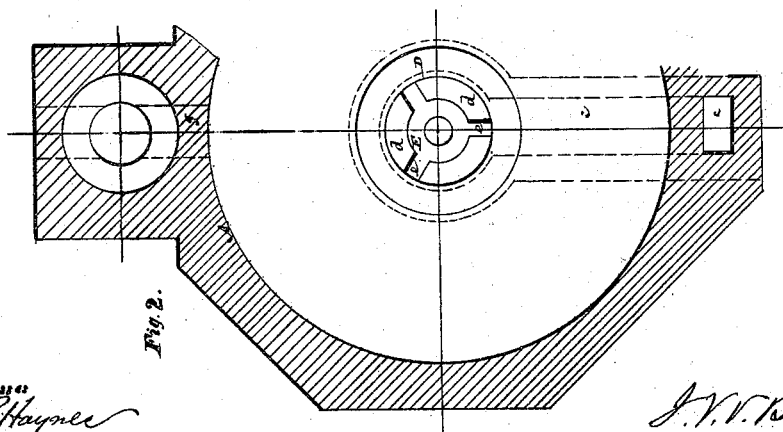
*Patented Apr. 4, 1871.*



*Fig. 1.*



*Fig. 3.*



*Fig. 2.*

*Witness  
Fred. Hayner  
R. L. Rabreau*

*J. V. V. Boorne*

# United States Patent Office.

JOHN V. V. BOORAEM, OF JERSEY CITY, NEW JERSEY.

Letters Patent No. 113,247, dated April 4, 1871; antedated March 23, 1871.

## IMPROVEMENT IN VALVES FOR STEAM-PUMPS.

The Schedule referred to in these Letters Patent and making part of the same.

### *To all whom it may concern:*

Be it known that I, JOHN V. V. BOORAEM, of Jersey City, in the county of Hudson and State of New Jersey, have invented a new and useful Improvement in Valves for Steam-Pumps, Meters, and other purposes, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing forming part of this specification, and in which—

Figure 1 represents a sectional view, taken longitudinally through the working cylinder, of a meter with my improvement in valves applied thereto;

Figure 2, a sectional view, taken transversely through said cylinder, of the one-half or portion thereof; and

Figure 3, a view of the induction-valve and accompanying parts detached, in illustration of my improvement.

Similar letters of reference indicate corresponding parts.

My invention consists in a novel construction and action or arrangement, relatively to the ports or passages which it controls, in connection with a moving diaphragm or piston, by which it is operated, of an induction-valve for communicating a reversed action to said diaphragm or piston.

Said invention is applicable, among other purposes or uses, to gas or fluid-meters and steam-pumps; but it will suffice here to describe it as applied to a liquid meter, the operation being the same with different actuating mediums.

It embraces, as its characteristic feature, a flexible valve of an elastic character, carried by a sliding bush which is free to move in an outside guide or guides, having a passage or passages between it and the hub, which passages establish connection alternately between the inlet-opening controlled by the valve and the chambers or spaces on opposite sides of the moving diaphragm or piston that said valve serves to control, accordingly as the sliding hub is shifted in opposite directions by said piston or knockers connected therewith, and the valve by such action made to suddenly spring at the close of the piston's strokes to opposite sides of its inlet or opening controlled by the valve.

An induction-valve thus constructed and operating in concert with a suitable eduction-valve or valves secures a very rapid, perfect, and easy action as regards its control and reversal of the incoming current in various reciprocating apparatus or devices, and is automatic in its action, requiring no valve-gear to work it.

Referring to the accompanying drawing—

A represents the working or measuring-cylinder of

a reciprocating piston-meter, for water or other liquids, B being its piston.

A flexible diaphragm, fastened down on its edges and capable of playing in opposite directions, may be substituted for the piston.

C is an outside inlet water-chamber, to which the water is freely admitted at all times, and from which it is passed by an inlet-opening or valve-passage, *b*, to the interior of a cylindrical or other hollow guide or guides, D, which establish connection at opposite ends; that is, on reverse sides of the opening *b*, with the opposite ends of the cylinder A.

This connection may be direct, as regards the one end of the cylinder, and by a passage, *c*, as regards the other.

Arranged within the guide or guides D, so as to be capable of freely sliding therein, is a hub, E, constructed to establish a passage or passages, *d*, through the guide D, as by wings *e* on the hub, which latter may be made in sections, united by a coupling, and carries—intermediately of its length, and around or outside of it, for play to opposite sides of the opening *b*—a valve, F, made of any suitable flexible and elastic material.

This valve is primarily operated by the piston B or knockers *f* connected therewith, as said piston approaches the opposite ends of its stroke, by said piston or its knockers striking the opposite ends, alternately, of the sliding hub E, which striking action, however, does not immediately carry the valve F to opposite sides of the opening *b*; but, by reason of the flexible character of said valve and sealing of it by the water under pressure on its back in proximity to its outer edge, the main sliding stroke of the hub E simply acts to give a reversely-protruding action or configuration to the valve within its outside edges, as represented in fig. 3; and it is only at the very extreme motion of the hub that the valve, by its elastic character, springs over to the opposite side of the inlet *b*.

This occurs suddenly at the termination of the piston's stroke, causing a quick reversal of the inlet water to the opposite end of the cylinder A, the direction in the flow being determined by the side of the opening *b*, against which the valve rests or is closed.

Of course a suitable eduction-valve or valves must be provided to relieve the piston B of the water on its back when the incoming current is reversed, and an automatic arrangement which effects this is shown in the drawing, in connection with outlet-ports *g g*; but as any suitable eduction-valve or valves may be employed for operation in combination with the induction-valve F; and as the eduction-valve represented

in the drawing is made the subject of a separate application for Letters Patent, it is unnecessary here to describe the same.

What is here claimed, and desired to be secured by Letters Patent, is—

The flexible and elastic induction-valve F, arranged for operation in relation to the inlet-opening b and passages connected therewith, in combination with the

sliding valve-carrier or hub E, for action on it by a moving diaphragm or piston, substantially as herein set forth.

J. V. V. BOORAEM.

Witnesses:

FRED. HAYNES,  
R. E. RABEAU.