

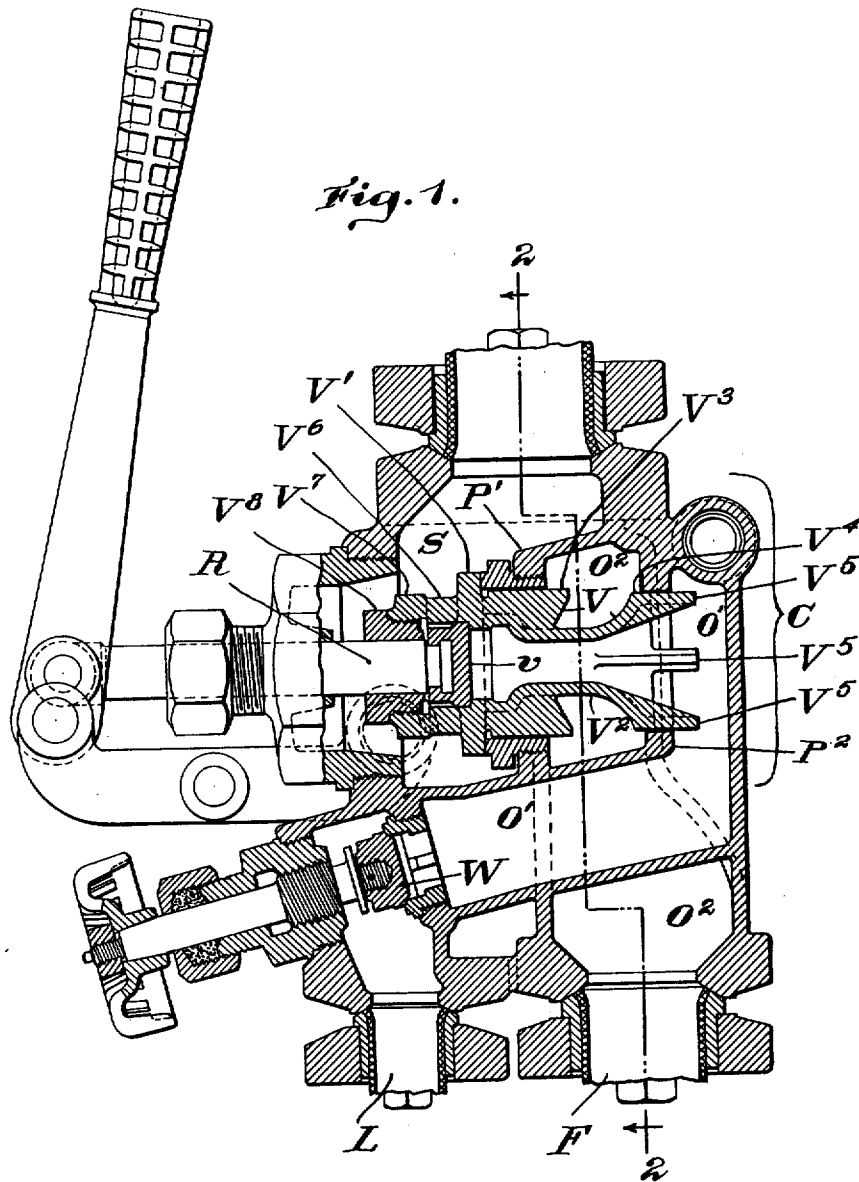
B. T. WILLISTON.
VALVE.

APPLICATION FILED OCT. 6, 1911.

1,012,492.

Patented Dec. 19, 1911.

2 SHEETS—SHEET 1.



Witnesses:

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Inventor:

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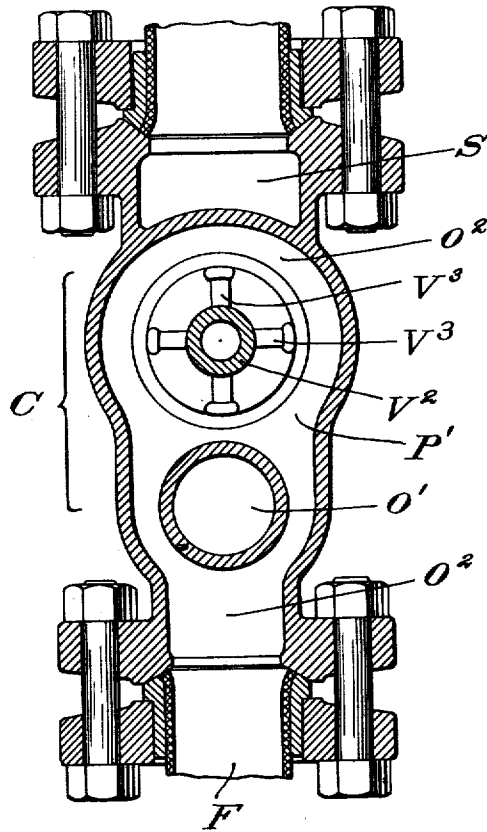
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2 SHEETS—SHEET 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

BELVIN T. WILLISTON, OF SOMERVILLE, MASSACHUSETTS, ASSIGNOR TO THE UNITED INJECTOR COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

VALVE.

1,012,492.

Specification of Letters Patent.

Patented Dec. 19, 1911.

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To all whom it may concern:

Be it known that I, BELVIN T. WILLISTON, a citizen of the United States, and resident of Somerville, in the county of Middlesex and State of Massachusetts, have invented new and useful Improvements in Valves, of which the following is a specification.

My invention relates in general to the construction of valves, more particularly to the construction of valves of the balanced type, and more particularly still to the construction of valves adapted to the operation and control of double tube injectors, and consists in certain improvements hereinafter described by which the manipulation of such valves is made easy, and by which in the particular and special instance mentioned the operation of a double tube injector may be controlled with great certainty in situations where the injector is located below the water supply, and therefore acts as a non-lifting injector.

In the drawings hereto annexed which illustrate an example of my invention,—Figure 1 is a vertical section through the valve casing taken longitudinally; and Fig. 2 is a vertical cross section along the dotted line 2—2 of Fig. 1.

The valve illustrated in the drawings is designed and adapted to be used in connection with a non-lifting injector mounted in the manner shown in Letters Patent of the United States No. 886,849, dated May 5, 1908. The pipe connections L and F shown in Fig. 1 lead respectively to the induction and forcing sets of tubes in the injector. When an injector is mounted in this manner the water supply stands at a higher level than the injector itself and consequently when the injector is not working, water flows through the supply pipes into the injector and rises into the pipes such as L and F which are provided to conduct steam to the instrument. This water must necessarily be forced back and out of the instrument before it can go to work as an injector.

The controlling valve casing is generally designated by the letter C. It is divided into compartments by partitions P', P²; these partitions divide the casing into a supply chamber S, a primary outlet O' and a secondary outlet O², and the partitions are apertured so as to provide aligned openings which constitute a way in which the main

valve may be moved. The main valve V extends from the supply chamber S through partition P', secondary outlet chamber O², through partition P² and into the primary outlet chamber O'. The valve V is provided with a preferably integral portion V' which seats on the supply chamber side of the partition P'. The valve is furthermore provided with a central longitudinal passage defined by the tubular portion V²; also has guiding wings V³ which slide in the aperture in the partition P', a piston portion V⁴ and spurs V⁵ the intervals between which constitute ports which are normally masked by the partition P² through which the piston portion V⁴ slides. Preferably, for purposes to be stated, the piston portion of the valve V slides in a rather loose fit in the partition P² so that there is a leakage clearance between the piston part V⁴ and the cylindrical aperture in which it slides. The supply chamber end of the tubular passage in the valve C is controlled by a starting valve v which slides between the ribs V⁶ and is limited in its movement by the nut V⁸ which screws into the ring V⁷. A valve stem such as R slides in the nut V⁸ and controls the movements of the starting valve v. For the purpose of further regulation of steam, a regulating valve W may be provided in the primary outlet O'.

The operation of the above described mechanism is as follows: At the initial movement of the stem R the valve v is lifted from its seat on the main valve V so that steam passes from the supply chamber S through the tubular portion V² of the valve and into the primary outlet O', whence the steam passes (the valve W being open) to the pipe L leading to the induction tubes of the injector. The presence of steam in the primary outlet passage O' exerts a back pressure upon the valve so as in part to balance the live steam pressure bearing on the valve at the supply chamber side. Furthermore, steam which leaks into the secondary outlet O² through the clearance provided in the partition P² assists in producing this balancing back pressure. Also, steam which is allowed to pass through this clearance from the outlet O' to the outlet O², will exert sufficient pressure on water standing in the pipes such as F to force that water down and out of the injector. By this means when the secondary outlet O² is finally

opened to steam the steam will find a clear passage to the forcer tubes of an injector. When the valve *v* comes in contact with the nut V^8 , further movement of the stem R draws the seating portion V' of the main valve V off its seat on the partition P' and steam is then admitted to the secondary outlet O^2 whence it may pass in the instance described to the forcer tubes of an injector.

As the valve stem R is drawn still farther back, for the purpose of admitting steam more liberally into the outlets, the ports between the spurs V^5 are unmasked so that steam passes directly from the passage O^2 into the outlet O' supplementing steam which passes through the tubular passage V^2 .

What I claim and desire to secure by Letters Patent is:

1. The combination with a casing having inner partitions dividing it into a supply chamber, a primary outlet, and a secondary outlet, said partitions having alined openings forming a valve way from the supply chamber through the secondary outlet and into the primary outlet, of a main valve seated on the supply chamber side of the partition between said chamber and the secondary outlet and sliding piston-wise in the opening between the secondary and primary outlets, the said main valve provided with a passage from its steam chamber end to its primary outlet end, a starting valve seated on the main valve and controlling said passage, and a controlling stem to first move the starting valve and subsequently the main valve from their seats respectively.

2. The combination with a casing having inner partitions dividing it into a supply chamber, a primary outlet and a secondary outlet, said partitions having alined openings forming a valve way from the supply chamber through the secondary outlet and into the primary outlet, of a main valve seated on the supply chamber side of the partition between said chamber and the secondary outlet and sliding piston-wise in the opening between the secondary and primary outlets, the said main valve provided with a passage from its steam chamber end to its primary outlet end, and with ports in its piston portion, normally masked by

the partition wall, a starting valve seated on the main valve and controlling said passage, and a controlling stem to first move the starting valve and subsequently the main valve from their seats respectively.

3. The combination with a casing having inner partitions dividing it into a supply chamber, a primary outlet, and a secondary outlet, said partitions having alined openings forming a valve way from the supply chamber through the secondary outlet and into the primary outlet, of a main valve seated on the supply chamber side of the partition between said chamber and the secondary outlet and sliding piston-wise in the opening between the secondary and primary outlet, but with leakage clearance in said opening, the said main valve provided with a passage from its steam chamber end to its primary outlet end, a starting valve seated on the main valve and controlling said passage, and a controlling stem to first move the starting valve and subsequently the main valve from their seats respectively.

4. The combination with a casing having inner partitions dividing it into a supply chamber, a primary outlet, and a secondary outlet, said partitions having alined openings forming a valve way from the supply chamber through the secondary outlet and into the primary outlet, of a main valve seated on the supply chamber side of the partition between said chamber and the secondary outlet and sliding piston-wise in the opening between the secondary and primary outlets, but with leakage clearance in said opening and with ports in its piston portion normally masked by the partition wall, the said main valve provided with a passage from its steam chamber end to its primary outlet end, a starting valve seated on the main valve and controlling said passage, and a controlling stem to first move the starting valve and subsequently the main valve from their seats respectively.

Signed by me at Boston, Massachusetts, this 20th day of September, 1911.

BELVIN T. WILLISTON.

Witnesses:

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