No. 677,776. Patented July 2, 1901.

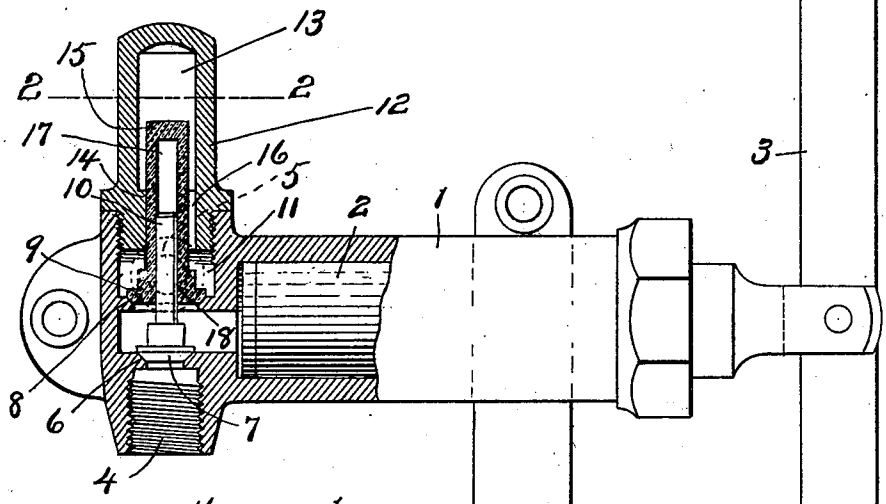
J. DEVANTERY.

PUMP.

(Application filed May 12, 1900.)

(No Model.)

Fig. 1.



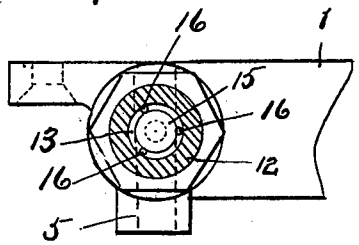


Fig. 2.

WITNESSES:
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UNITED STATES PATENT OFFICE.

JOSEPH DEVANTERY, OF NEW YORK, N. Y., ASSIGNOR TO THE LOCOMOBILE COMPANY OF AMERICA, OF SAME PLACE.

PUMP.

SPECIFICATION forming part of Letters Patent No. 677,776, dated July 2, 1901.

Application filed May 12, 1900. Serial No. 16,457. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH DEVANTERY, of New York, (Brooklyn,) in the county of Kings and State of New York, have invented certain new and useful Improvements in Pumps, of which the following is a specification.

This invention has for its object to increase the capacity or delivery of pumps for pumping liquids; and it consists in an air-cushioning pocket or chamber combined with a check-valve and disposed in a novel manner hereinafter specified, whereby a body of air is retained to act as a cushion which effects a quick closing of the valve.

Of the accompanying drawings, Figure 1 represents a side elevation, partly in section, of a pump embodying my improvement. Fig. 2 represents a section on line 2 2 of Fig. 1.

The same reference characters indicate the same parts in both the figures.

Referring to the drawings, 1 designates the pump-cylinder, and 2 is the contained piston operated in a suitable manner, as by an oscillatory lever 3 or any other suitable operating mechanism.

4 is an inlet branch or passage leading to the interior of cylinder 1, and 5 is an outlet branch represented in plan in Fig. 2 and in dotted lines in Fig. 1.

6 is a valve-seat surrounding the inlet-passage, and 7 is a check-valve controlling said passage. 8 is a similar valve-seat surrounding the outlet or delivery port, and 9 is a check-valve controlling said port. The inlet check-valve 7 is here represented as having a stem 10, guided within a central bore or aperture in the stem of the outlet check-valve 9, and the outlet-valve, furthermore, is adapted to act as a stop for the inlet-valve. I do not, however, herein claim this guiding and stop construction.

Above or back of the valve-seat 8 is a chamber 11, which connects with and forms a part of the outlet or delivery branch 5. Beyond said chamber 11 is a threaded opening formed in the pump-casing, into which is screwed a casing 12, the interior space 13 of which constitutes a closed air pocket or chamber. The mouth of said chamber is formed as a guide 14, which closely fits and guides the stem 15 of outlet check-valve 9. One or more small ports or ducts 16, bored through the inner end of the casing 12, form contracted passages connecting the air pocket or chamber 13 with the delivery-chamber 11, and hence with the interior of the pump-cylinder 1.

The operation of the above-described structure is as follows: The water or other liquid handled by the pump may be supposed to be accompanied by a greater or less quantity of air. It is well known that water under ordinary conditions always contains a certain quantity of air in a dissolved or entrained condition. It may furthermore happen that at the beginning of pumping operations a certain amount of air will be passed through the pump along with or prior to the passage of the water. This air or a portion thereof will either be compressed out of the water into the air pocket or chamber 13 or when present in any quantity will find its way into said pocket through the ducts or passages 16 during the operation of pumping, this being particularly the case when the air-pocket 13 is uppermost, the tendency of the air being to rise. It is to be noted that the valve-stem 15 projects within the air pocket or chamber 13, and when the check-valve 9 is unseated, due to the overflow of the contents of cylinder 1 when the piston 2 is driven inwardly, said stem will act as a piston entering the chamber and reducing the size of the space therein. The air in the pocket or chamber is thereby compressed and acts as a cushion, which immediately the inward stroke of the piston ceases reacts on the valve-stem 15 and returns the outlet check-valve 9 to its seat. The air, owing to its great elasticity, acts much more quickly than any spring could act, and by quickly seating the valve it prevents the return of any of the liquid. The capacity or delivery of the pump is thereby increased over what it would be with a spring-closed or liquid-pressure-closed check-valve. During the movements of the valve the pumped liquid in the chamber 11, covering the lower ends of ducts 16 and possibly extending part way into chamber 13, will prevent the escape of air from said chamber. A similar cushioning action is exerted on the inlet-valve 7 by virtue of the air chamber or pocket 17, which exists within the hollow valve-stem 15

above inlet-valve stem 10. To provide a duct or passage for the collection of the air within said pocket 17, the side of stem 10 may be slightly flattened or grooved longitudinally, as shown at 18, whereby a contracted passage to the cylinder-space is formed.

I claim—

1. In a pump, the combination of a cylinder and contained piston, a port or passage connected with the interior of the cylinder, a freely-movable check-valve controlling said port, and a closed air pocket or chamber located behind the valve and connecting through a contracted passage with the interior of the pump-cylinder, said pocket being adapted to retain a small body of air, which acts as a cushion to seat the valve, said contracted passage being located in position to be sealed by the liquid being acted upon by the pump.

2. In a pump, the combination of a cylinder and contained piston, a port or passage connected with the interior of the cylinder, a freely-movable check-valve controlling said port, and a closed air pocket or chamber located behind the valve and connecting through a contracted passage with the interior of the pump-cylinder, said pocket being adapted to retain a small body of air, which acts as a cushion to seat the valve, and having a valve-stem guide at its mouth, the valve having a stem which projects through said guide into the pocket and operates as a piston therein, said contracted passage being located in position to be sealed by the liquid being acted upon by the pump.

3. In a pump for liquids, the combination of a cylinder and contained piston, a port or passage connected with the interior of the cylinder, a freely-movable check-valve controlling said port and having a stem, a guide closely fitting said stem except at one or more points where relatively small air-passages are formed alongside of the stem, the said air-passages being located in position to be sealed by the liquid being acted upon by the pump, and a closed air chamber or pocket of substantial size, located behind the stem and connecting with the interior of the cylinder through said air passage or passages, said pocket being adapted to retain a small body of air which acts as a cushion to seat the valve, and is retained in the pocket by the pumped liquid sealing said air passage or passages.

In testimony whereof I have affixed my signature in presence of two witnesses.

JOSEPH DEVANTERY.

Witnesses:
V. E. SCHAUMBURG,
R. M. PIERSON.