

No. 677,776.

Patented July 2, 1901.

J. DEVANTERY.

PUMP.

(Application filed May 12, 1900.)

(No Model.)

Fig. 1.

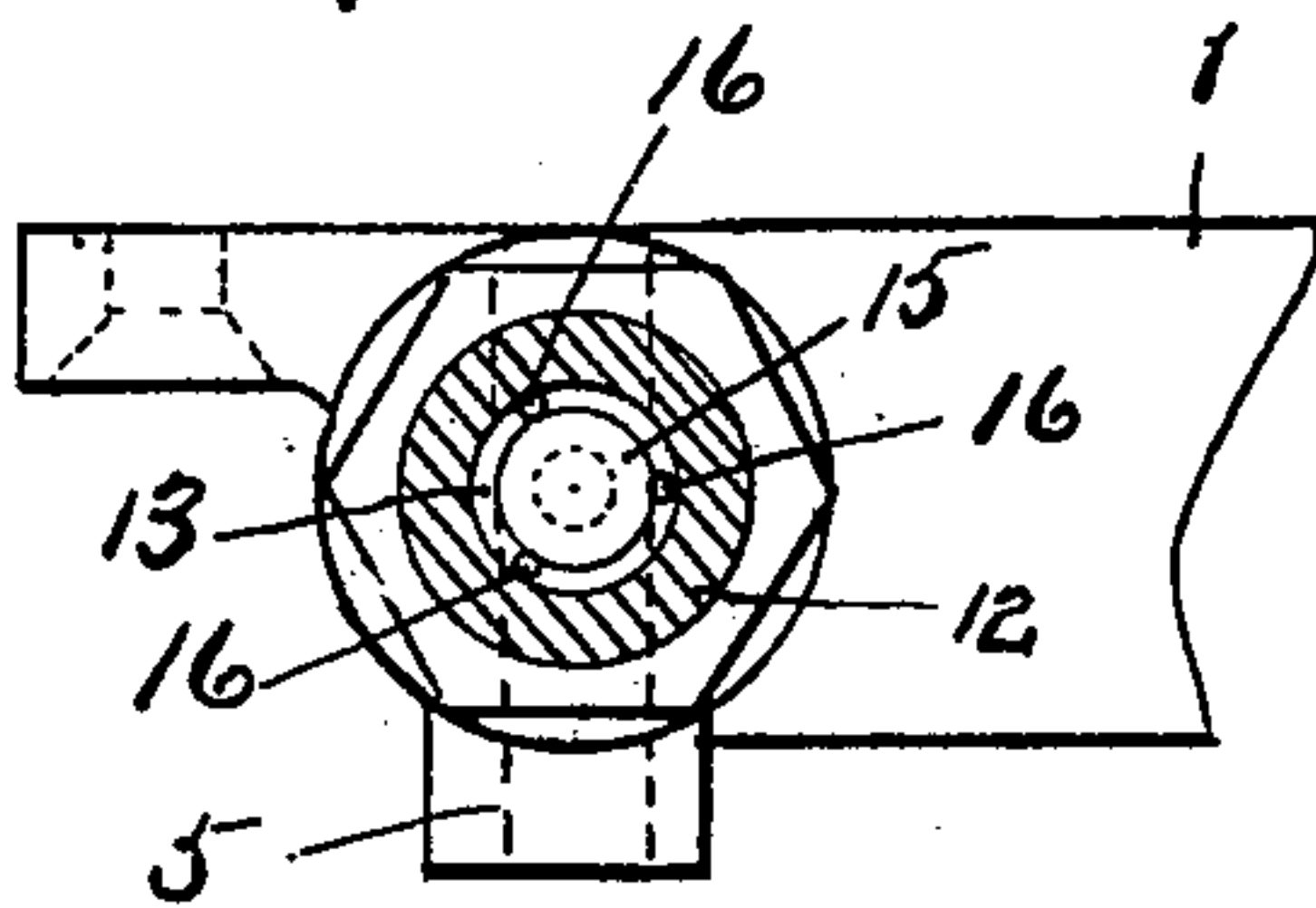
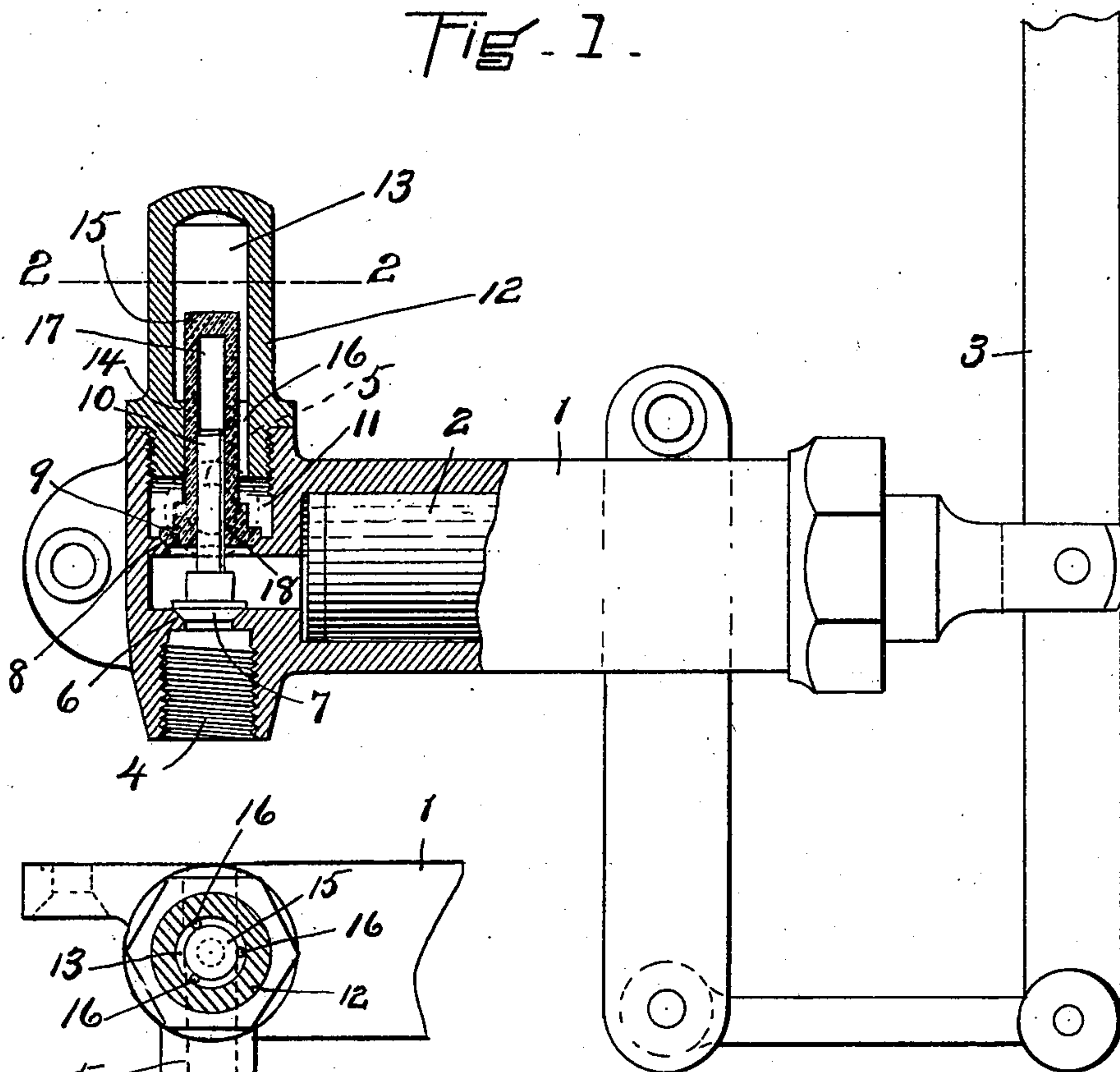


Fig. 2.

WITNESSES:

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# UNITED STATES PATENT OFFICE.

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## 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  
5 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 pump-  
10 ing liquids; and it consists in an air-cushion-  
ing pocket or chamber combined with a check-  
valve and disposed in a novel manner herein-  
after specified, whereby a body of air is re-  
tained to act as a cushion which effects a quick  
closing of the valve.

15 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  
20 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 oscil-  
latory lever 3 or any other suitable operating  
25 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.

30 6 is a valve-seat surrounding the inlet-pas-  
sage, and 7 is a check-valve controlling said  
passage. 8 is a similar valve-seat surround-  
ing the outlet or delivery port, and 9 is a  
check-valve controlling said port. The inlet  
35 check-valve 7 is here represented as having  
a stem 10, guided within a central bore or ap-  
erture in the stem of the outlet check-valve  
9, and the outlet-valve, furthermore, is adapt-  
ed to act as a stop for the inlet-valve. I do  
40 not, however, herein claim this guiding and  
stop construction.

Above or back of the valve-seat 8 is a cham-  
ber 11, which connects with and forms a part  
of the outlet or delivery branch 5. Beyond  
45 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 con-  
stitutes a closed air pocket or chamber. The  
mouth of said chamber is formed as a guide  
50 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  
55 interior of the pump-cylinder 1.

The operation of the above-described struc-  
ture 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  
60 air. It is well known that water under ordi-  
nary 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 cer-  
tain amount of air will be passed through the  
65 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  
70 pocket through the ducts or passages 16 dur-  
ing the operation of pumping, this being par-  
ticularly 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  
75 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 cylin-  
der 1 when the piston 2 is driven inwardly,  
80 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  
85 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  
90 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 liq-  
95 uid in the chamber 11, covering the lower  
ends of ducts 16 and possibly extending part  
way into chamber 13, will prevent the es-  
cape of air from said chamber. A similar  
cushioning action is exerted on the inlet-valve  
100 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.