

No. 860,258.

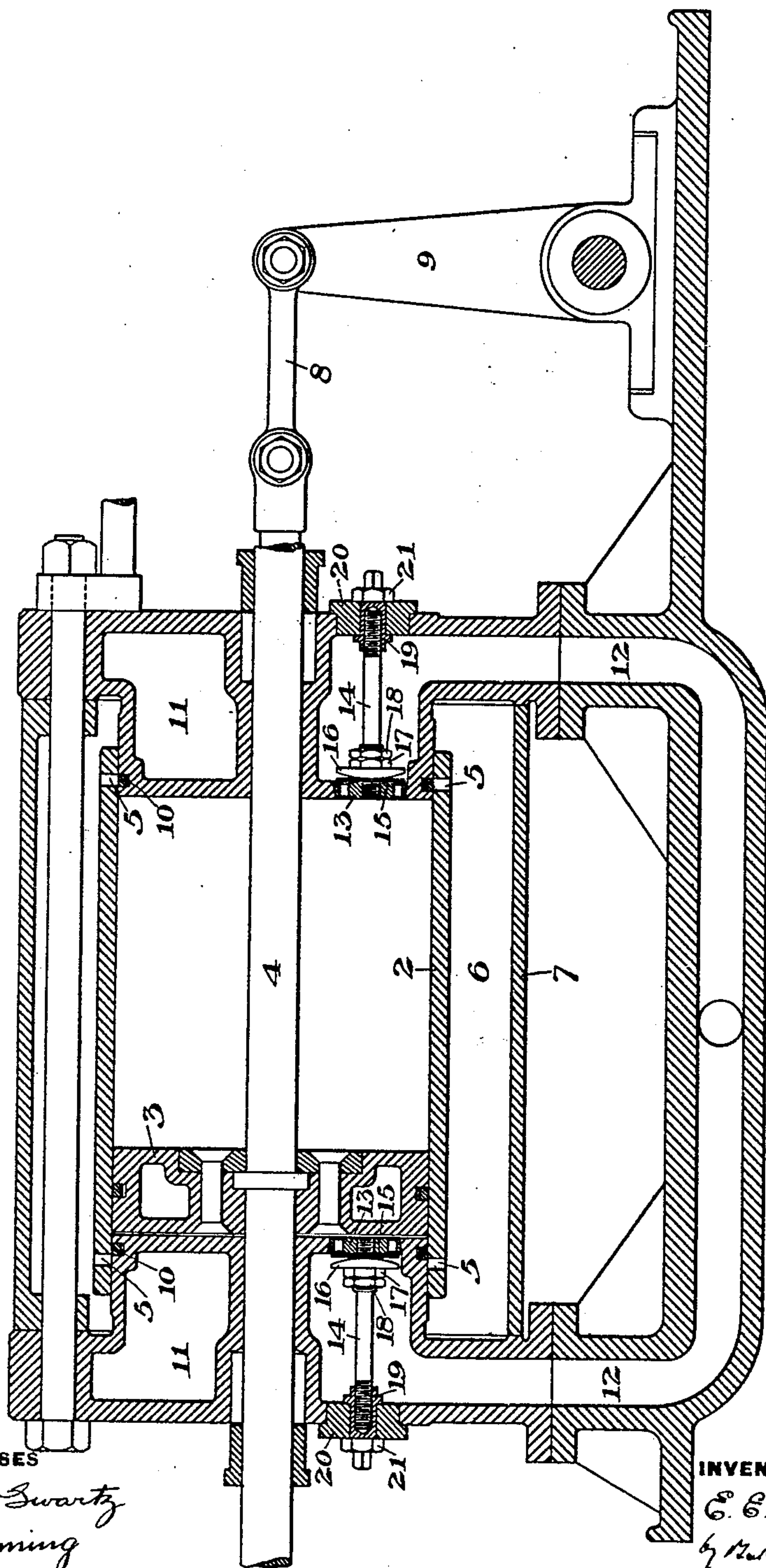
PATENTED JULY 16, 1907.

E. E. SLICK.  
PUMP.

APPLICATION FILED DEC. 27, 1904.

2 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

Warren W. Swartz  
G. B. Blaming

INVENTOR

E. E. Slick  
by McNamee & Sykes  
his attys



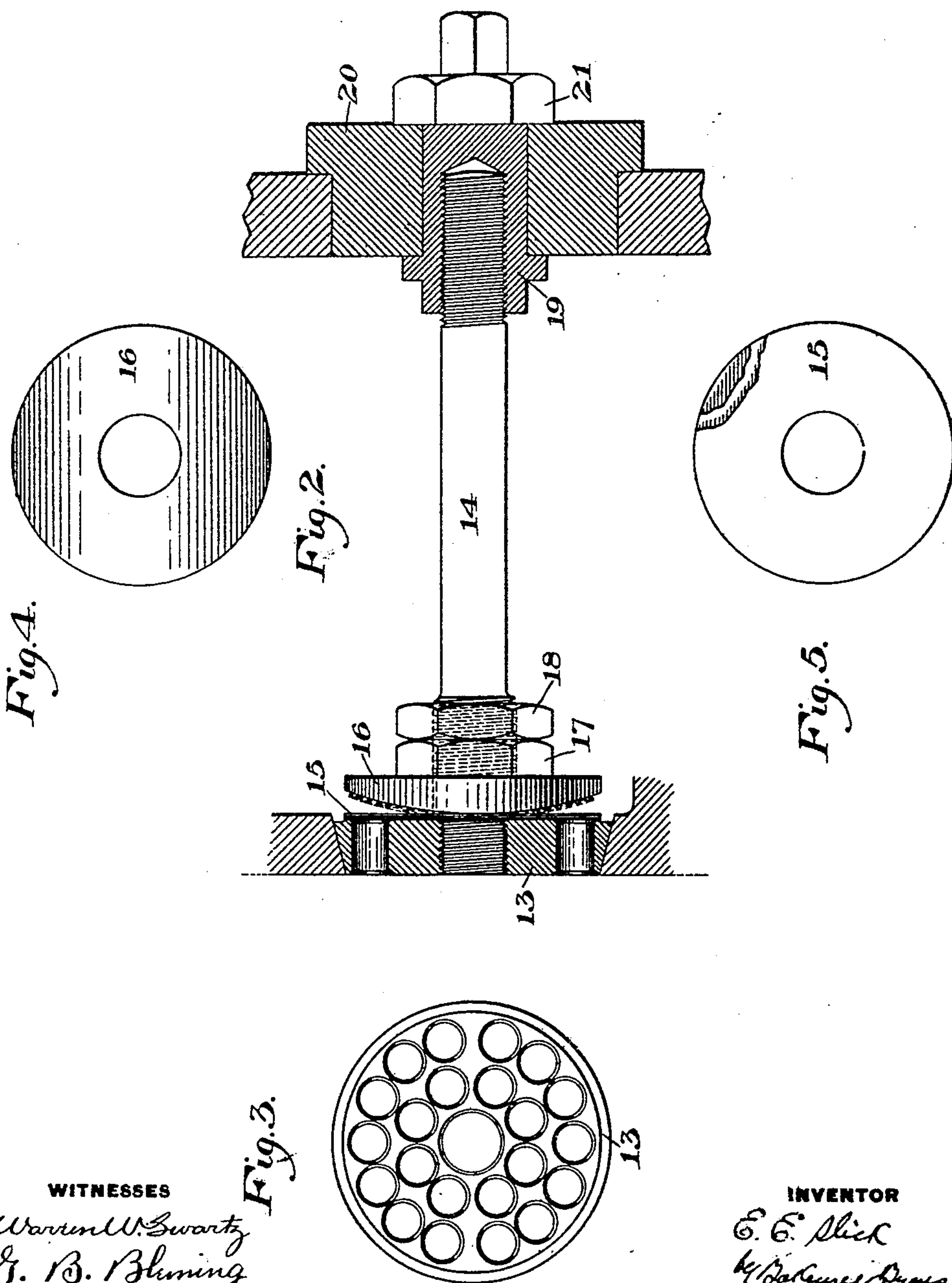
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2 SHEETS—SHEET 2.



WITNESSES  
Warren W. Swartz  
G. B. Blumling

INVENTOR  
E. E. Slick  
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# UNITED STATES PATENT OFFICE.

EDWIN E. SLICK, OF PITTSBURG, PENNSYLVANIA.

## PUMP.

No. 860,258.

Specification of Letters Patent.

Patented July 16, 1907.

Application filed December 27, 1904. Serial No. 238,298.

*To all whom it may concern:*

Be it known that I, EDWIN E. SLICK, of Pittsburg, Allegheny county, Pennsylvania, have invented a new and useful Pump, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a sectional side elevation of a pump constructed in accordance with my invention; Fig. 2 is a sectional elevation of the outlet valve structure; Fig. 3 is a plan view of the valve seat; Fig. 4 is a face view of the back stop; and Fig. 5 is a plan view partly broken away of the valve.

My invention relates to the class of pumps for pumping liquids or gases, and is designed to provide an improved construction of the pump and its valves.

In the drawings, 2 represents the cylinder containing the piston 3, whose piston rod 4 is connected to a similar rod extending from any suitable motive cylinder or other source of power. The cylinder is provided near each end with an annular series of inlet ports 5 leading out of an annular chamber 6 formed between the cylinder and a surrounding casing 7 which has an inlet port connected to the source of supply for the fluid being pumped. The cylinder 2 is moved endwise by links 8 pivotally connected to rocking levers 9 actuated by any suitable connections. The stationary heads of the cylinder are provided with suitable packings 10 which contact with the cylinder as it reciprocates over the heads. The cylinder heads are connected and supported by oppositely located distance pieces.

The heads are hollow, each being provided with a box or outlet chamber 11 from which chambers the channels 12 lead out, and are connected to an outlet pipe. The inner faces of the heads are provided with valve seats and outlet valves shown in detail in Figs. 2 to 5. In these figures 13 is a removable valve seat having preferably a beveled or inclined edge which fits within a correspondingly beveled hole in the head of the cylinder; and is held therein by the screw-bolt 14. The seat is provided on opposite sides of a diameter with sets of outlet holes each of comparatively small area. The valve proper consists of a plurality of thin steel disks 15 which are superimposed and clamped at their centers between the back-stop 16 and the valve seat. The face of the back-stop with which the valve contacts is preferably shaped as a portion of a cylinder, so that as the valve leaves bend backwardly on opposite sides, they will be forced against the stop which will prevent their breakage. The cylindrical surface allows them to fit against it without crumpling or injuring the valve. The use of a number of layers of thin disks is an important feature of the valve, since I thereby obtain the necessary strength for resisting the pressure, while at the same time the valve is much more

flexible than it would be if a single valve plate were used of sufficient thickness to withstand the pressures. Also by making a series of outlet holes beneath each half of the valve I decrease the tendency of the valve to be forced into the outlet hole under the back pressure. The back-stop is held by nut 17 and lock nut 18 on the bolt, the outer end of which enters an internally screw-threaded plug 19 held within a removable plate 20 by nut 21.

In the operation of the device the piston and the cylinder are reciprocated in a suitable manner, so that the cylinder ports act alternately as inlet ports, while the air is forced alternately out of the cylinder through the series of valves in the opposite heads. As many of these valves as can be arranged within the circle of the head around the piston rod, are preferably used so as to give a large area of outlet, the cylinder ports giving a large area for the inlet.

The advantages of my invention result from providing the casing around a cylinder having ports extending through it in connection with outlet ports in the heads; also from the peculiar form and arrangement of the valve and seat which avoids breaking and gives an easy and effective action. The pump is specially adapted for gas engine driving where the action is more rapid than in ordinary cases.

The shape of the valve disks and the manner of securing them may be changed; and variations in the arrangement and construction of the parts may be made without departing from my invention.

I claim:—

1. A pump having inlet and outlet ports, one set of said ports extending through the cylinder wall and the other through the cylinder head, a stationary casing surrounding the ports in the cylinder wall and means independent of the casing for alternately opening and closing the ports in said cylinder wall; substantially as described.
2. A pump having inlet ports extending through the cylinder walls and outlet ports in the cylinder head, a stationary casing surrounding said inlet ports and means independent of the casing for alternately opening and closing said inlet ports; substantially as described.
3. A pump having an outlet valve comprising a series of thin metallic sheets or disks of substantially the same size, clamped at their center and arranged to bend backwardly at both sides in opening; substantially as described.
4. A pump having an outlet valve comprising a series of thin metallic sheets or disks of substantially the same size, clamped at their center and arranged to bend backwardly on both sides in opening and a back stop against which the valve is pressed; substantially as described.
5. A pump having an outlet valve comprising a series of thin metallic sheets or disks of substantially the same size clamped at their center and arranged to bend backwardly on both sides in opening, and a back stop against which the valve is pressed; substantially as described.
6. A pump having a movable cylinder, a stationary casing surrounding said cylinder and forming a passage between the cylinder and casing, ports extending through



said cylinder walls and affording communication between said passage and the cylinder and means for moving said cylinder to alternately open and close said ports; substantially as described.

5 7. In a pump, a head having outlet valves located in the head, consisting of two or more thin metallic sheets of substantially the same size superimposed on each other and clamped in one portion and adapted to bend backwardly on both sides in opening, and a cylinder having  
10 inlet ports extending through its walls; substantially as described.

8. In a pump, a head having outlet valves located in the head, consisting of a plurality of thin metallic sheets of substantially the same size superimposed on each other  
15 and clamped in one portion and adapted to bend backwardly on both sides in opening, and a valve seat having a multiplicity of circular openings under the bending portions of the valve; substantially as described.

9. A pump having an outlet valve comprising a plurality  
20 of metallic sheets superimposed on each other and clamped

in one portion thereof, said sheets being of substantially the same size and arranged to bend backwardly on both sides of the clamp; substantially as described.

10. A pump having an outlet valve comprising a plurality of metallic sheets superimposed on each other and  
25 clamped in one portion thereof, said sheets being of substantially the same size and arranged to bend backwardly on both sides of the clamp, and a back stop against which the valve is pressed; substantially as described.

11. A pump having an outlet valve comprising a plurality of metallic sheets of varying thicknesses superimposed on each other and clamped in one portion thereof,  
30 said sheets being of substantially the same size and arranged to bend backwardly in opening; substantially as described.

In testimony whereof, I have hereunto set my hand.

EDWIN E. SLICK.

Witnesses:

N. M. GRIFFIN,

H. M. CORWIN.

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