

F. S. CARVER.
AIR PUMP.

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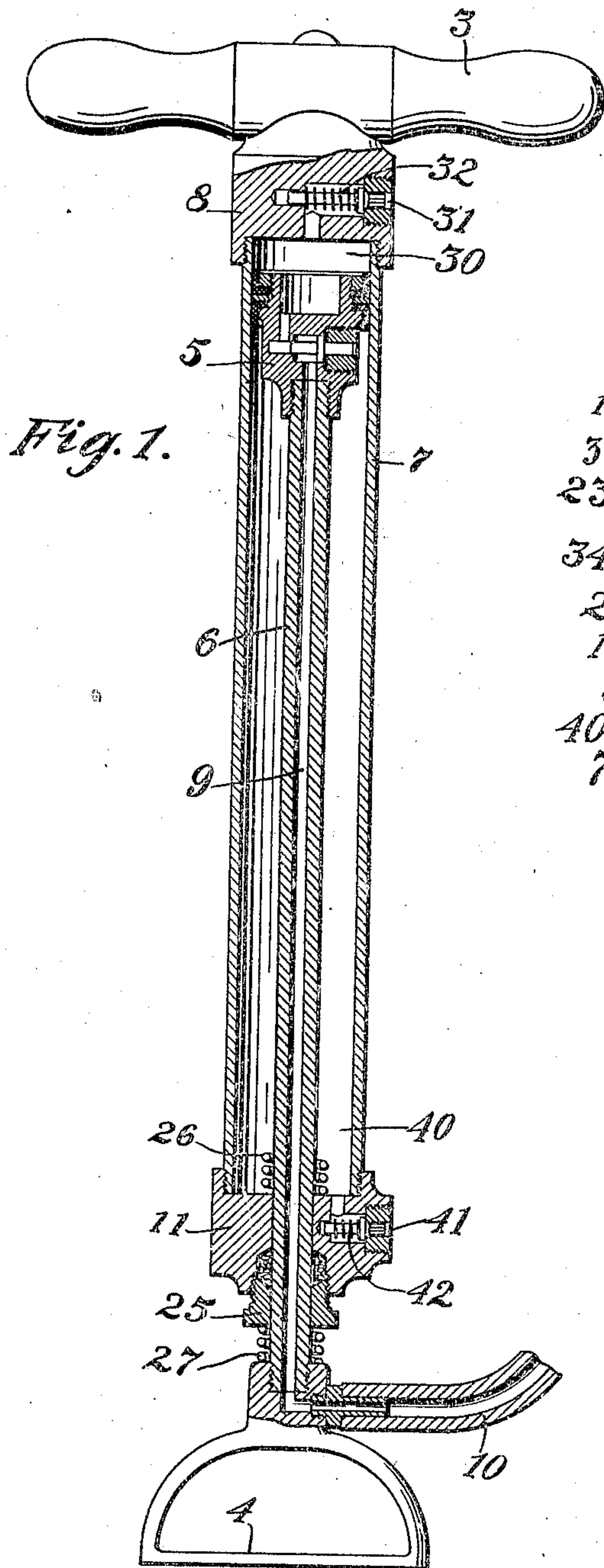


Fig. 1.

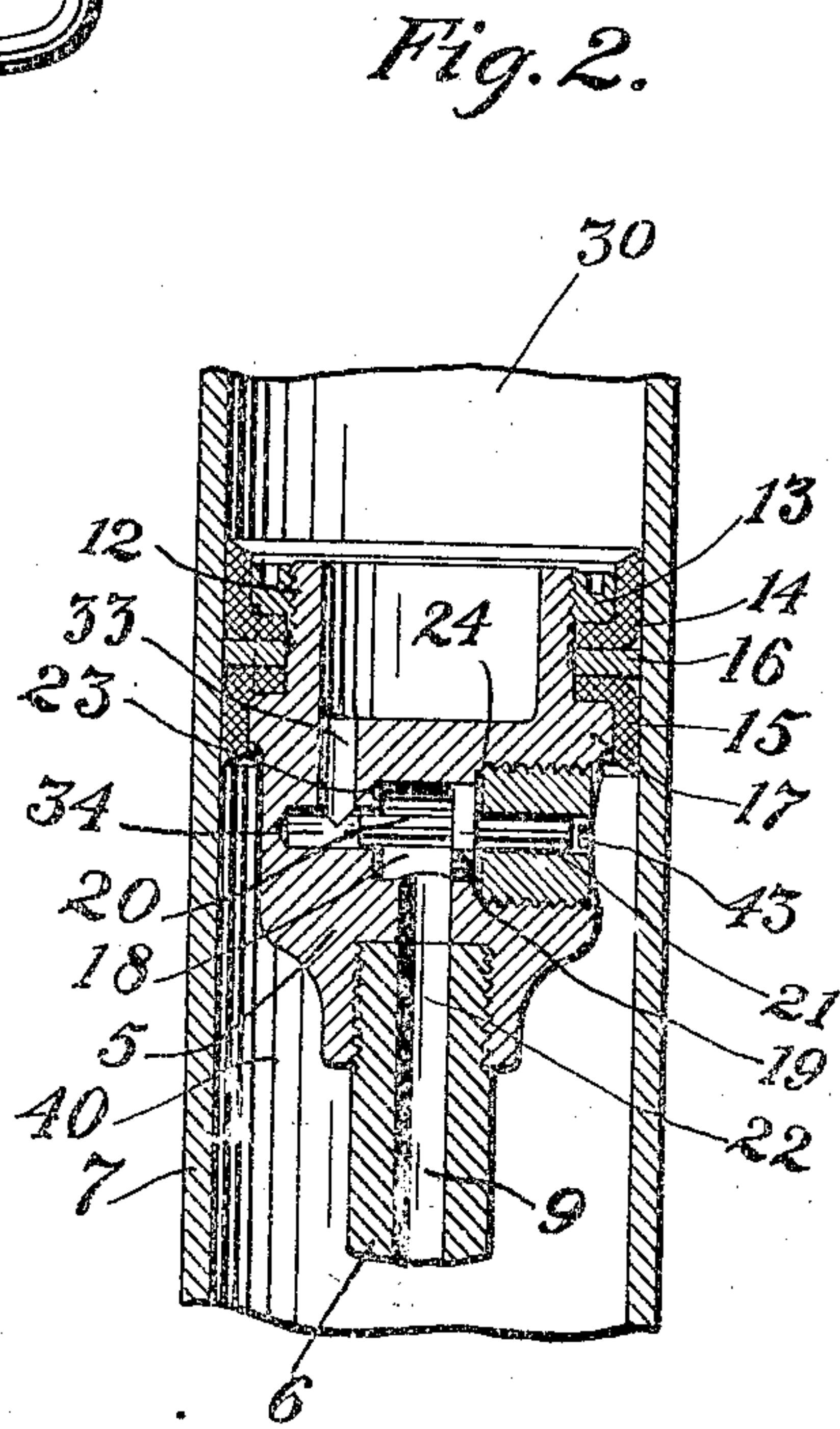


Fig. 2.

Witnesses:

C. L. Rumer,
H. D. Penney

Inventor;
Fred S. Carver;

By his Attorney, F. H. Richard.

UNITED STATES PATENT OFFICE.

FRED S. CARVER, OF BROOKLYN, NEW YORK.

AIR-PUMP.

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To all whom it may concern:

Be it known that I, FRED S. CARVER, a citizen of the United States, residing in Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Air-Pumps, of which the following is a specification.

This invention relates to air pumps and is particularly useful in connection with pumps designed for the inflation of pneumatic tires.

The invention comprises a pump in which equal amounts of air will be discharged at its stroke in each direction.

In the drawings accompanying and forming a part of this specification, Figure 1 represents a practicable embodiment of a form of my invention, the pump therein being shown in central section; and Fig. 2 is an enlarged view on a similar section of a portion of the cylinder and the piston.

In the form herein illustrated the pump is shown provided with a suitable form of handle 3 and a stirrup 4 so that relative movement may be produced between the piston and the cylinder.

In the present embodiment the piston 5 is carried by a piston rod 6 which is fast with the stirrup and the cylinder or casing 7 is secured to a head 8 which is fast with the handle 3; so that in this form of construction the piston, while the pump is in operation, will remain stationary and the cylinder will be reciprocated. The piston rod 6 is provided with a discharge channel 9 which communicates by means of suitable passages in the present instance with the flexible tube 10. The device being particularly applicable for use for the inflation of pneumatic tires, the connection 10 will be that which is used to connect the pump with the valve of the tire. This, however, is a detail of construction. The casing 7 will constitute, as it reciprocates, in its excursions and recessions, of reciprocation, a cylinder for each end of the piston, and these ends for the purpose of simplifying the description will be designated by 30 and 40 respectively; the head 8 constituting the head for the cylinder 30 and the head 11 constituting the head for the cylinder 40. It will be seen that the head 11 is securely fastened to the casing 7. The head 8 is provided with an inlet port 31 controlled by the valve 32 which will yield inwardly to suction from the piston and will be closed by its spring upon the cessation of

suction, and will be forced to its seat by compression within the cylinder. The head 11 is provided with a similar port 41 and valve 42.

The piston is shown as having a reduced portion 12 screw threaded upon its exterior for receiving a compression ring 13. The packing, for the piston, which constitutes packing members 14 and 15 is disposed about this reduced portion 12 and separated by a more or less rigid disk 16 and pressed by means of the screw threaded ring 13 against the shoulder presented by the flange 17. The ring 16 fits the reduced portion 12 closely and has a working fit with the cylinder, and is thus enabled to act as a guide for the piston and prevents the packing being jammed on one side and drawn away from the cylinder on the other side when the relative movement of the piston and cylinder are not in a straight line. Since this piston has to perform equal functions in both directions the structure of the packing is preferably such that it presents faces which will expand outwardly against the walls of the cylinder as the piston is moving in the direction of that particular portion of the packing. The members 14 and 15 are shown as cup shaped and the cup of one opens and is supported by the flange 17 and the cup of the other by the compression ring 13.

The piston is provided with ports 33 and 43 leading from the respective cylinders through the piston head and into the channel 9 of the piston rod. In the present form of construction, a valve chamber 18 is located within the piston head. When the device is intended for automobile use, it will preferably be so organized that the cylinder and piston rod will be disposed in a vertical position when the device is in use, and the valve which is disposed within the piston head, when it is desired to employ a valve which will remain in whatever position the currents of air have forced it, will have a horizontal movement. The valve illustrated comprises a valve body 19 which will conform to the size and shape of the valve chamber and will move horizontally therein. In constructing the piston head, the hole which is bored for the port opening 43 may be carried on across the valve chamber as at 34. This will constitute not only a communication from the port 33 with the valve chamber but will also together with the port opening 43 constitute

aligned horizontally disposed guides for the valve stems 20 and 21. These valve stems may be of angular formation in cross-sectional direction so that they will permit free passage of air past them and into the valve chamber without impairing their efficiency as supports for the valve body. The valve chamber is shown having a port 22 in communication with the channel 9 of the piston rod. Packing rings 23, 24 may be placed at the respective ends of the valve chamber for the engagement of the valve 19 so that when the piston is moving into the cylinder 30 and compressing the air therein against the valve 32, the valve 19 will be forced against the packing 24 thereby valving the port 43 and opening communication between the port 22, which, as above stated, opens into the discharge channel 9, and the interior of the cylinder 30 through the port 33 and extension 34 and valve chamber 18. While the piston is moving into the cylinder 30, it will be moving out of the cylinder 40 and drawing a charge of air in through the inlet port 41 drawing the valve 42 for this purpose away from its seat. Upon a reversal of movement, the charge of air which has been drawn into the cylinder 40 will be compressed and force the valve 42 against its seat. The valve 19 will then be moved to the other end of the valve chamber and against the packing 23 thereby valving the port 33—34 and forcing the charge of air which is in the cylinder 40 through the port 43, the valve chamber 18 and port 22 into the discharge channel 9.

The piston rod 6 is shown as being packed where it passes through the head 11, and the packing will be held in position by a suitable gland 25. Springs 26 and 27 are shown for buffing the head 11 upon its upward and downward movements respectively.

Having thus described my invention, I claim:

1. In a pump, the combination with a horizontally disposed valve chamber pro-

vided with aligned horizontally disposed inlet ports at its respective ends and a medially disposed outlet port, packing within said chamber surrounding each of said inlet ports, a valve body conforming in size and shape to and located within said chamber and adapted to reciprocate therein, and supporting and guiding stems projecting from the ends of said valve body and extending into and engaging the walls of the said inlet ports, said stems differing in cross sectional formation from that of the inlet ports.

2. In a pump, the combination with a cylinder, of a piston therein having a valve chamber, an inlet port at each end of said valve chamber, said ports being in alignment, one of said ports being in communication with one end of the cylinder and the other port with the other end thereof, an outlet port from said chamber disposed medially of the ends thereof, packing within said chamber surrounding each of said inlet ports, a valve body conforming in size and shape to and located within said chamber and adapted to reciprocate therein, and supporting and guiding stems carried by the valve body and projecting from both ends thereof and extending into and engaging the walls of the said inlet ports, said stems differing in cross sectional formation from that of the inlet ports.

3. In a pump, the combination with a valve chamber provided with aligned ports at its respective ends, and a medially disposed port, a valve body conforming in size and shape to and located within the said chamber and adapted to reciprocate therein, and supporting and guiding stems projecting from the ends of said valve body and extending into and engaging the walls of said aligned ports, said stems differing in cross sectional formation from that of the said ports.

FRED S. CARVER.

Witnesses:

CHAS. LYON RUSSELL,
HENRY E. GREENWOOD.