Feb. 5, 1924. 1,482,734

C. C. CARROW

PUMP

Filed March 16, 1921

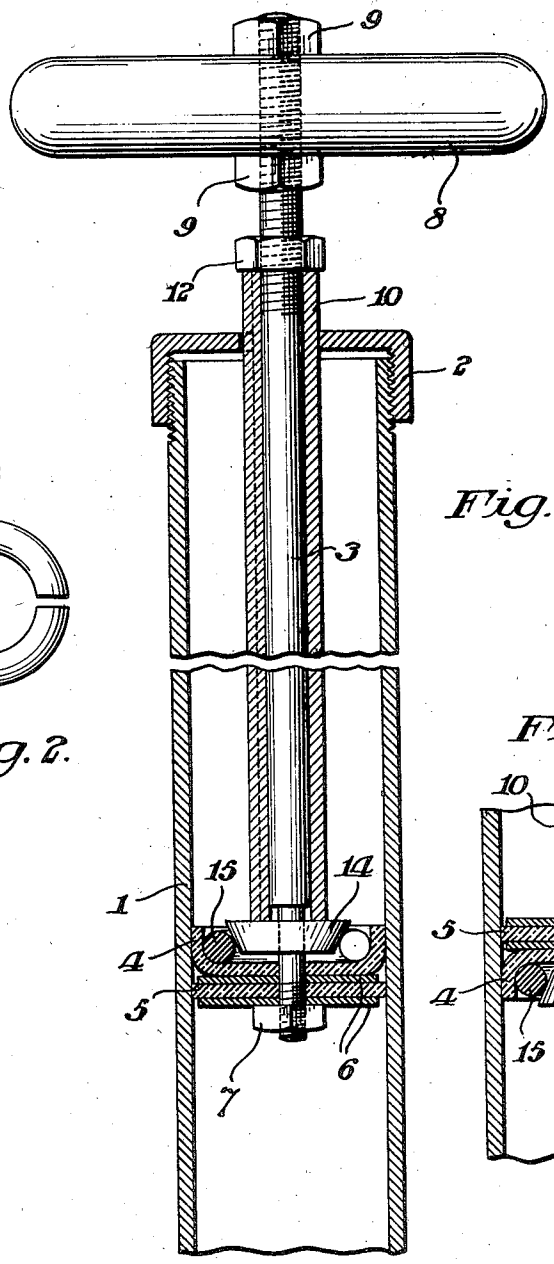


Fig. 1.

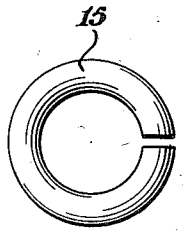
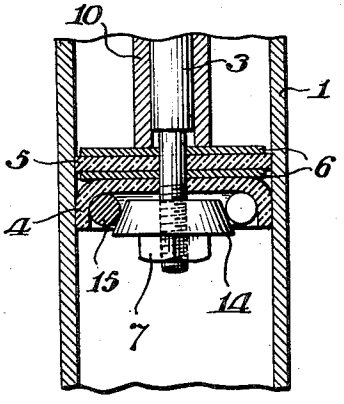


Fig. 2.

Fig. 3.



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UNITED STATES PATENT OFFICE.

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PUMP.

Application filed March 16, 1921. Serial No. 452,702.

To all whom it may concern:

Be it known that I, CLAUDE C. CARROW, a citizen of the United States, and a resident of the city of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Pumps, of which the following is a specification, reference being had to the accompanying drawing.

My invention more particularly relates to air pumps such as used for inflating tires of automobiles although it is equally well adapted for use in connection with other kinds of pumps. It is well known that the valves of pumps of the character aforesaid often shrink or contract within the cylinder especially when the pump has not been used for a considerable period of time, thereby rendering the pump entirely inoperative, or operative at less than maximum efficiency, and necessitating the removal of the piston from the cylinder and the expansion or adjustment of the valve to restore the pump to a satisfactorily operative condition.

As tire pumps are ordinarily carried in the tool box of the automobile, frequently for months at a time, without being used, it is often found when the pump is put into service that it is entirely or substantially inoperative for the reasons stated, requiring the expenditure of a considerable length of time and the disassembling and reassembling of the pump before it can be used to inflate the tire.

A principal object of the invention is to obviate these disadvantages by the provision of means in a pump for expanding and adjusting from the outside of the pump cylinder the leather or other valve of the piston within the cylinder so that if it be found when the pump is placed in service that it does not operate satisfactorily on account of the shrinkage or contraction of the valve, the latter may be readily and conveniently expanded into intimate contact with the cylinder wall and thus put in a condition to operate at maximum efficiency by an extremely simple adjustment performed entirely from the outside of the pump and without in any way necessitating taking the pump apart or soiling the hands or clothes of the operator.

Further objects of my invention are to provide means of the character and for the purposes aforesaid which are extremely simple in operation, not liable to get out of order, and which may be readily embodied in pumps designed to effect the compression of the air or other fluid in the cylinder either on the up or down stroke of the piston therein.

My invention further includes all of the other various novel objects and features of construction and arrangement hereinafter more definitely specified and described.

In the accompanying drawing I have shown certain embodiments of means adapted for effecting the purposes and objects of my invention, but I do not thereby desire or intend to limit myself to any precise form and arrangement of the various elements or parts, as the same may be varied in minor particulars from those shown as may be desired. In the said drawings, Figure 1 is a fragmentary central vertical section of a tire pump embodying one form of my invention, certain of the parts being shown in elevation, the particular form of pump illustrated being effective to compress the air within the cylinder on the up stroke of the piston; Fig. 2 is a detail view in elevation of one of the parts shown in Fig. 1, and Fig. 3 is a fragmentary view in central section, with certain parts shown in elevation, of the piston and adjacent parts of a pump embodying my invention and adapted to effect the compression of the air in the cylinder on the down stroke of the piston. Like numerals are used to designate corresponding parts in the several figures.

Referring to the drawing, the pump shown in Fig. 1 comprises the usual cylinder 1 having a cap 2 which may be provided with an outlet for the air compressed within the cylinder and controlled by a check valve in the ordinary manner, the outlet and check valve not being shown. The usual plunger 3 passes centrally through the cap and is adapted to carry adjacent its lower end the usual cup-shaped valve washer 4 of leather or other suitable material. Below the washer and more nearly adjacent the end of the plunger may be positioned a plain washer 5 of leather or other suitable material located between a pair of spaced metallic washers 6, 6, a nut 7 threaded onto the end of the plunger 3 being effective to maintain these parts in position on the end of the plunger. The upper end of the plunger is provided with the usual handle 8 conveniently positioned between a pair of nuts 9, 9, threaded onto the upper end of the plunger and serv-

ing to secure the handle in rigid operative relation therewith. The arrangement of the several parts to which reference has hitherto been made is common to most pumps of this general character and will be readily understood by those familiar with the art.

A tube or sleeve 10 is arranged to surround the major portion of the plunger 3 and is adapted to move unitarily therewith in the operation of the pump. This sleeve passes through the cap 2 and abuts at its upper end against an adjusting nut 12 which is positioned on the threaded upper end of the plunger below the lower locking nut 9, while the lower end of the tube or sleeve abuts against an adjusting disc 14 which is loosely positioned on the lower end of the plunger above the valve washer 4, the plunger preferably being conveniently slightly reduced in diameter adjacent its lower end as shown. The adjusting disc is preferably in the form of an inverted truncated cone and is adapted to slightly enter the interior of a split ring or annulus 15 which is positioned within the cup-shaped valve washer 4 in such manner as to lie in the curve or angle formed between the bottom and sides of the washer as clearly shown in Fig. 1.

With the parts constructed and arranged substantially as described it will be evident that by screwing down on the adjusting nut 12, while holding the plunger from revolving, the tube or sleeve 10 may be forced downwardly relatively to the plunger to impart, through its abutting contact with the adjusting disc 14, a similar movement thereto, which is effective to force the disc progressively into the split ring or annulus 15 to expand the same and thus force the sides of the valve washer 4 radially outward and into intimate contact with the interior of the cylinder 1, the degree of frictional engagement between the washer and the cylinder being regulated by the distance the nut 12 is moved on the plunger. In this manner the valve washer may be very nicely adjusted so as to bring about the necessary degree of engagement between the washer and the cylinder without causing excessive friction therebetween and without in any manner disassembling the pump or removing the washer and adjacent parts from the cylinder.

In Fig. 3 I have shown a slightly modified form of the invention as embodied in a pump adapted to effect compression of the air or other fluid in the cylinder on the down stroke thereof. In this case the washer 4 is positioned on the plunger with its open end directed downwardly, the washer 5 and metallic washers 6 being positioned above the valve washer with the uppermost of the metallic washers in contact with the lower end of the tube or sleeve 10. The adjusting disc 14, which may be similar in construction to the corresponding disc shown in Fig. 1, is supported on the plunger below the valve washer in normal as distinguished from inverted position, and is adapted to contact with and enter the split ring or annulus 15 positioned within the valve washer, the nut 7 on the lower end of the plunger abutting against the lower face of the adjusting disc and preventing the disc from moving downwardly on the plunger. In this form of the invention the adjustment is accomplished in a manner similar to that already described, namely, by movement of the nut 12 (not shown) positioned on the upper end of the plunger 3 against the upper end of sleeve 10 which is effective to draw the plunger 3 upwardly within the sleeve and in turn the adjusting disc upwardly into the annulus 15 to expand the same and force the walls of the valve washer radially outward into contact with the interior of the cylinder 1.

It will be evident that in either form of the invention shown, the adjustment of the valve washer may be readily performed from the outside of the pump by the simple movement of the adjusting nut 12 so that at any time if it is found that the valve washer is not properly contacting with the interior of the cylinder so as to produce the maximum efficiency of the pump, a slight movement of the adjusting nut is effective to bring the valve washer into proper position and the pump to maximum efficiency.

While I have herein described certain forms of my invention with considerable particularity and have shown them as embodied in an air pump adapted for the inflation of tires and the like, it will be understood that the invention may be employed with equal facility in other forms of pumps intended for the pumping of air or other fluids, and additionally that the details of construction and arrangement of the several parts may be varied in minor particulars from those illustrated and described without departing from the spirit and scope of the invention as defined in the appended claims.

Having thus described my invention, I claim and desire to protect by Letters Patent of the United States:

1. In a pump having a cylinder, the combination of a cup-shaped expandible valve washer disposed in the cylinder, a plunger extending through the washer and outside of the cylinder, means carried by the plunger and contacting with the outer face of the washer to afford support thereto, a split ring disposed within the washer, a conical adjusting disk disposed on the plunger and adapted to enter the ring, a sleeve surrounding and longitudinally movable relatively to the plunger, and means disposed outside of the

cylinder for effecting relative movement between the sleeve and the plunger to force said disk into the ring to expand the washer against the wall of the cylinder.

2. In a pump having a cylinder, the combination of a cup-shaped valve washer disposed within the cylinder, a plunger extending through the washer and outside of the cylinder, a washer disposed on the plunger and contacting with the outer face of the bottom of the cup-shaped washer to afford support thereto in one direction, a ring of circular cross section and transversely split at a single point disposed in the cup-shaped washer at the junction of the bottom and peripheral wall thereof, a conical adjusting disk disposed on the plunger and adapted to engage and expand the ring when forced thereinto, a sleeve surrounding and relatively movable with respect to the plunger, and means disposed outside of the cylinder for effecting relative longitudinal movement between the sleeve and the plunger to force the disk into the ring and in turn effect radial expansion of the cup-shaped washer against the wall of the cylinder.

In witness whereof I have hereunto set my hand this 14th day of March, A. D. 1921.

CLAUDE C. CARROW.