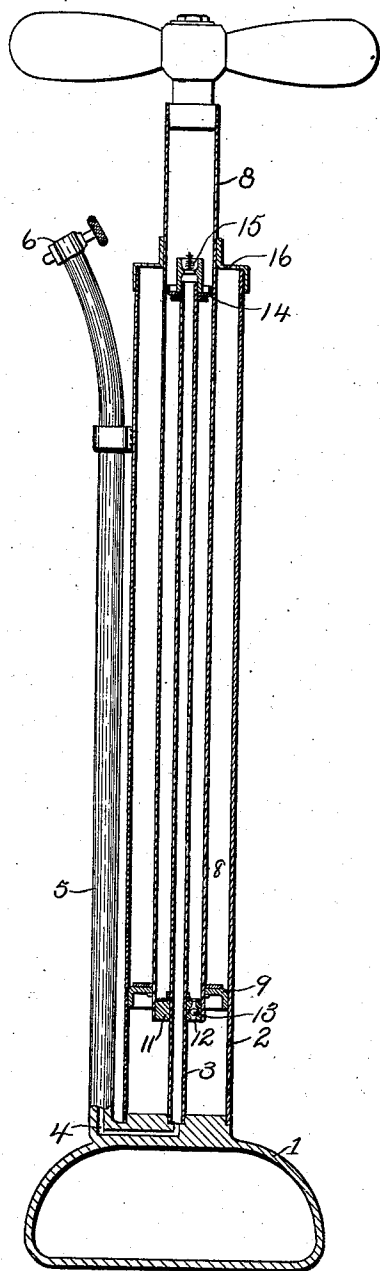


No. 867,616.

PATENTED OCT. 8, 1907.

S. G. SKINNER.  
PUMP.

APPLICATION FILED MAR. 30, 1905.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

STEPHEN GUION SKINNER, OF CHICAGO, ILLINOIS.

## PUMP.

No. 867,616.

Specification of Letters Patent.

Patented Oct. 8, 1907.

Application filed March 30, 1905. Serial No. 252,838.

To all whom it may concern:

Be it known that I, STEPHEN GUION SKINNER, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented new and useful Improvements in Pumps, of which the following is a specification.

My invention relates to improvements in air pumps with a special reference to that class of pumps shown and described in Letters Patent of the United States to Hubert J. Rock dated July 12, 1904.

The object of this invention is to so arrange the interior parts that the work will be principally done on the down stroke, the pumps being designed to be operated manually. It has been found that while greater force may be executed by lifting on the pump handles on a single stroke, there is an advantage in having the work done on the down stroke, as the weight of the person is thus utilized and the operator does not tire as quickly as would otherwise be the case.

In the following description reference is had to the accompanying drawings, in which

The figure is a longitudinal sectional view of a pump embodying my invention.

1 is a base, preferably constructed in the form of a stirrup for the reception of the toe or foot of the operator, 2 is a stationary cylinder mounted upon the base and 3 is a stationary inner cylinder also mounted on the base and arranged in communication with a duct 4, leading to a flexible tube 5, having a clamping thimble at 6, whereby the tube 5 may be connected to the receptacle, to which air is to be supplied. A tubular piston rod 8 is arranged to extend downwardly between the tubes 2 & 3 and is provided at its lower end with a cup leather piston 9, filling the space between the piston rod 8 and the outer cylinder 2. The lower end of the piston rod 8 is also provided with an interior head piece 11 having suitable packing around the inner stationary cylinder 3 as shown through which a passage 12 extends, with a valve at 13 adapted to permit air to pass to the interior of the cylinder 3. The upper end of the inner stationary cylinder 3 is provided with a piston 14 preferably of the cup leather type and with the leather extending upwardly along the inner face of the tubular piston rod, so as to permit air to pass freely upwardly to the upper end of the rod. The upper end of the cylinder 3 is also provided with a spring actuated check valve at 15 which permits air to pass from the upper end of the rod 8 into the central tube 3, but prevents its return.

In operation, air is admitted to the outer cylinder 2 through an aperture at 16. On the upstroke of

the piston rod 8, the air passes the cup leather piston 9 to the lower end of the cylinder 2 and on the down stroke, this air is forced upwardly through the passage 12 to the interior of the piston rod 8. On the next up stroke, this air is driven past the cup leather piston 14, which also serves as a valve, and on the next down stroke, the air is forced past the valve at 15 to the inner cylinder 3.

The up stroke is not a compression stroke, the air being merely delivered past the cup leather 14. All the work is therefore performed on the down stroke, the gain over a single piston pump being due to the fact that the high compression is performed in a cylinder of small diameter, while the low compression, which requires but little work, is performed in a large cylinder and the relative length of stroke against low resistance is therefore greatly reduced, while the force required is distributed owing to the fact that a high compression begins in the small cylinder at the beginning of the stroke and reaches the maximum with the beginning of air delivery through the valve 15 after a short interval.

With the described construction, it will be observed that no packing is required for the tubular piston rod 8, air being permitted to freely enter the outer cylinder above the cup leather piston 9, since the cup leather of this piston is turned downwardly. It will also be observed that the cup leathers of the pistons 9 and 14 both bear outwardly against the inner surfaces of the cylinder 2 and piston rod 8 respectively. By thus avoiding inner bearing cup leathers, either for packing or for the pistons, leakage is avoided, since an inward bearing cup leather tends to form wrinkles which permit the passage of air.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is,

In a pump of the described class, the combination of a base; inner and outer stationary cylinders rigidly connected therewith; a tubular piston rod extending downwardly between the upper ends of the cylinders; a piston on the lower end of said rod having a down-turned cup leather working on the inner surface of the outer cylinder; and a piston on the inner cylinder having an up-turned cup leather working on the inner surface of the tubular piston rod, said piston rod being provided with a valved passage leading to the interior of the rod from below the first mentioned piston, and said inner stationary cylinder being provided with a valved passage leading to the interior of the inner cylinder from above the other piston.

In testimony whereof I affix my signature in the presence of two witnesses.

STEPHEN GUION SKINNER.

Witnesses:

H. H. CANNON,  
G. W. MILLER.