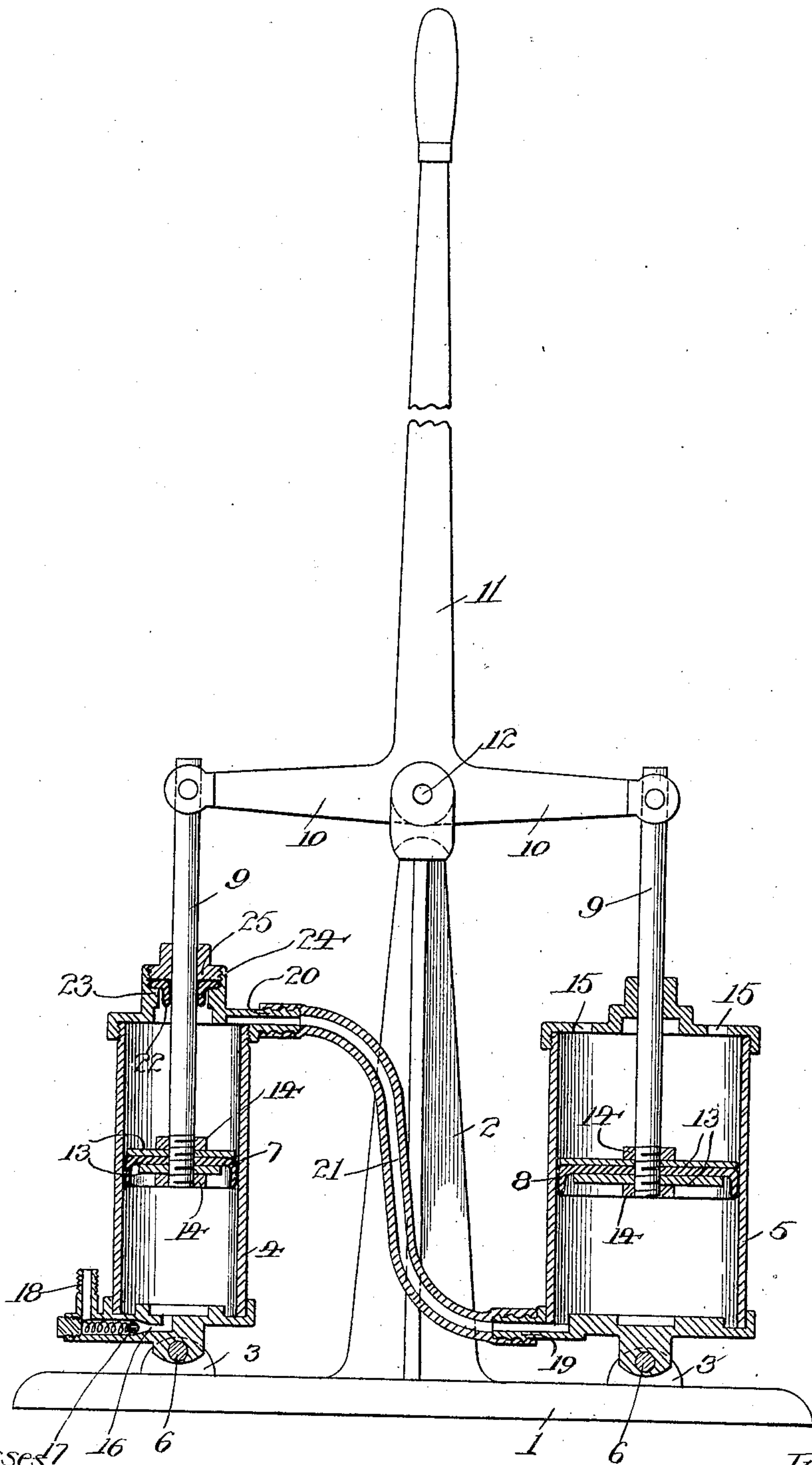


No. 832,567.

PATENTED OCT. 2, 1906.

H. WIXON.  
COMPOUND AIR PUMP.  
APPLICATION FILED APR. 13, 1905.



Witnesses  
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# UNITED STATES PATENT OFFICE.

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## COMPOUND AIR-PUMP.

No. 832,567.

Specification of Letters Patent.

Patented Oct. 2, 1906.

Application filed April 13, 1905. Serial No. 255,291.

*To all whom it may concern:*

Be it known that I, HOWARD WIXON, a citizen of the United States, and a resident of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Compound Air - Pumps, of which the following is declared to be a full, clear, and exact description.

The invention relates to compound air-pumps, and seeks to provide a simple inexpensive construction which dispenses largely with the necessity of employing valves and packings and which can be operated by hand to quickly compress a large volume of air to high pressure.

The invention consists in the features of construction and arrangement of parts hereinafter set forth, illustrated in the accompanying drawings, and more particularly pointed out in the appended claims.

In the drawings, a side elevation of the improved pump is shown with the cylinders in section. The base-plate 1 is provided with an upright standard 2 and lugs or abutments 3. The upright high and low pressure cylinders 4 and 5 are preferably arranged to oscillate upon the base-plate and are therefore connected at their lower ends by pivots 6 to the lugs 3. The pistons 7 and 8 are mounted on piston-rods 9, which extend upwardly through the cylinder-heads and are pivotally connected to oppositely-arranged rock-arms 10 of the handle or shift lever 11. The latter is pivotally mounted, as it 12, to the upper end of the standard 2, and the parts are so arranged that as the handle is moved in one direction the pistons are shifted in opposite directions, while the cylinders oscillate to a slight extent upon their pivots to allow for the wobbling or oscillatory movement of the pistons. Each cylinder is provided with an inlet at one end and an outlet at the other, and the outlet of the low-pressure cylinder is connected directly to the inlet of the high-pressure cylinder through an unobstructed or valveless passage. The pistons 7 and 8 are formed of leather or like yielding material and are flanged or cup-shaped, as shown, so that they are one-way acting and yield when moved in one direction to permit the passage of air around their edges. These cup-shaped pistons are held upon the piston-rods between plates or washers 13 by nuts 14 and are turned downwardly toward the out-

lets, which are preferably arranged in the lower ends of the cylinders.

The main inlet port or ports 15 in the upper head of the low-pressure cylinder 5 is freely open or valveless. The main outlet 16, formed in the lower head of the high-pressure pump, may, if desired, be provided with an outwardly-opening spring-held check-valve 17 of any suitable construction. The main outlet 16 is provided with a nipple 18, which may be conveniently connected to a receptacle or tire by a flexible hose. The outlet-nipple 19 in the lower head of the low-pressure pump is connected to the inlet-nipple 20 in the upper head of the high-pressure cylinder by a flexible hose or tube 21. The nipple and hose are preferably valveless, so that the two cylinders are at all times freely in communication through an unobstructed passage. The opening in the head of cylinder 5, through which the piston-rod passes, does not have to be packed; but the opening in the head of cylinder 4 must be tight when piston 8 moves downwardly and piston 7 moves upwardly, so that a downwardly-flanged washer 22 may be used as a packing. This washer is arranged about the piston-rod, and its outer edge is gripped between an internal shoulder 23 on the thimble or stuffing-box 24 and a perforated collar 25 or gland, which is threaded into the stuffing-box.

In operation both cylinders fill with air on the high-pressure stroke—i. e., when the high-pressure piston 7 moves downwardly—forcing the air beneath it out of the discharge-outlet 16 to the receptacle or tire. On this high-pressure stroke air is drawn past the yielding low-pressure piston as it moves upwardly into the space below it, and air also passes through connection 21 and is drawn into the space in the high-pressure cylinder 4 above piston 7 by the partial vacuum formed therein. On the reverse or low-pressure stroke the air in both cylinders is compressed by the descent of the piston 8 and flows past the yielding high-pressure piston 7 into the space beneath it, so as to be finally compressed on the next high-pressure stroke.

It will be noted that an amount of air sufficient to fill both cylinders at atmospheric pressure will be compressed at each complete stroke, so that the capacity of the pump is much larger than if limited to that of the low-pressure pump alone, as is the case with most



compound pumps. Moreover, by reason of this arrangement the low-pressure cylinder is not necessarily larger than the high-pressure cylinder. It will further be noted that  
 5 the double or compound compression is effected without employing valves and other packings between the cylinders. The valve 17 at the outlet may be dispensed with in a pump for tires, since the valve in the tire-inlet  
 10 will perform its function. This valve is, however, preferably employed, as it cuts down the amount of clearance. It should also be noted that the only packing exposed to high pressure is the cupped piston 7.

15 The pistons and packings for the moving parts are all cupped or flanged leathers which are so arranged as to be expanded by the air and by the relative movement between them and the surfaces with which they engage, so  
 20 as to form tight joints when tight joints are needed and yield when necessary to permit the passage of air.

It is obvious that details of structure may be changed without departure from the es-  
 25 sentials of the invention.

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

1. A compound pump comprising high and  
 30 low pressure cylinders having inlets at adjacent ends and outlets at the opposite adjacent ends and having an unobstructed passage leading from the outlet end of the low-pressure cylinder to the inlet end of the high-  
 35 pressure cylinder, and one-way yielding, cupped pistons in said cylinders connected to shift simultaneously in opposite directions, substantially as described.

2. A compound pump comprising high and  
 40 low pressure cylinders having an unobstructed passage leading from the lower end of the

low-pressure cylinder to the upper end of the high-pressure cylinder, an inlet at the upper end of the low-pressure cylinder and an outlet at the lower end of the high-pressure cylinder, and one-way yielding pistons in said cylinders connected to shift simultaneously in opposite directions, substantially as described. 45

3. A compound pump comprising a pair of  
 50 oscillating cylinders pivotally mounted on a suitable support and having inlets at their upper ends and outlets at their lower ends, said cylinders having an unobstructed communication comprising a flexible connection  
 55 extending from the outlet of the low-pressure cylinder to the inlet of the high-pressure cylinder, downwardly-turned, cupped pistons in said cylinders and a pivotally-mounted shift-lever having oppositely-arranged rock-arms  
 60 connected to said pistons to simultaneously actuate the same in opposite directions, substantially as described.

4. A compound pump comprising a pair of  
 65 oscillating cylinders pivotally mounted on a suitable support, one-way yielding, downwardly-turned cupped pistons in said cylinders acting on their downstrokes, a pivoted shift-lever having oppositely-arranged rock-arms  
 70 for simultaneously shifting said pistons in opposite directions, an inlet at the upper end of the low-pressure cylinder, an outlet at the lower end of the high-pressure cylinder and an unobstructed flexible connection between  
 75 the lower end of the low-pressure cylinder and the upper end of the high-pressure cylinder, substantially as described.

HOWARD WIXON.

Witnesses:

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