W. D. COIL.

AIR PUMP.

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**1,377,752.** **Patented May 10, 1921.**

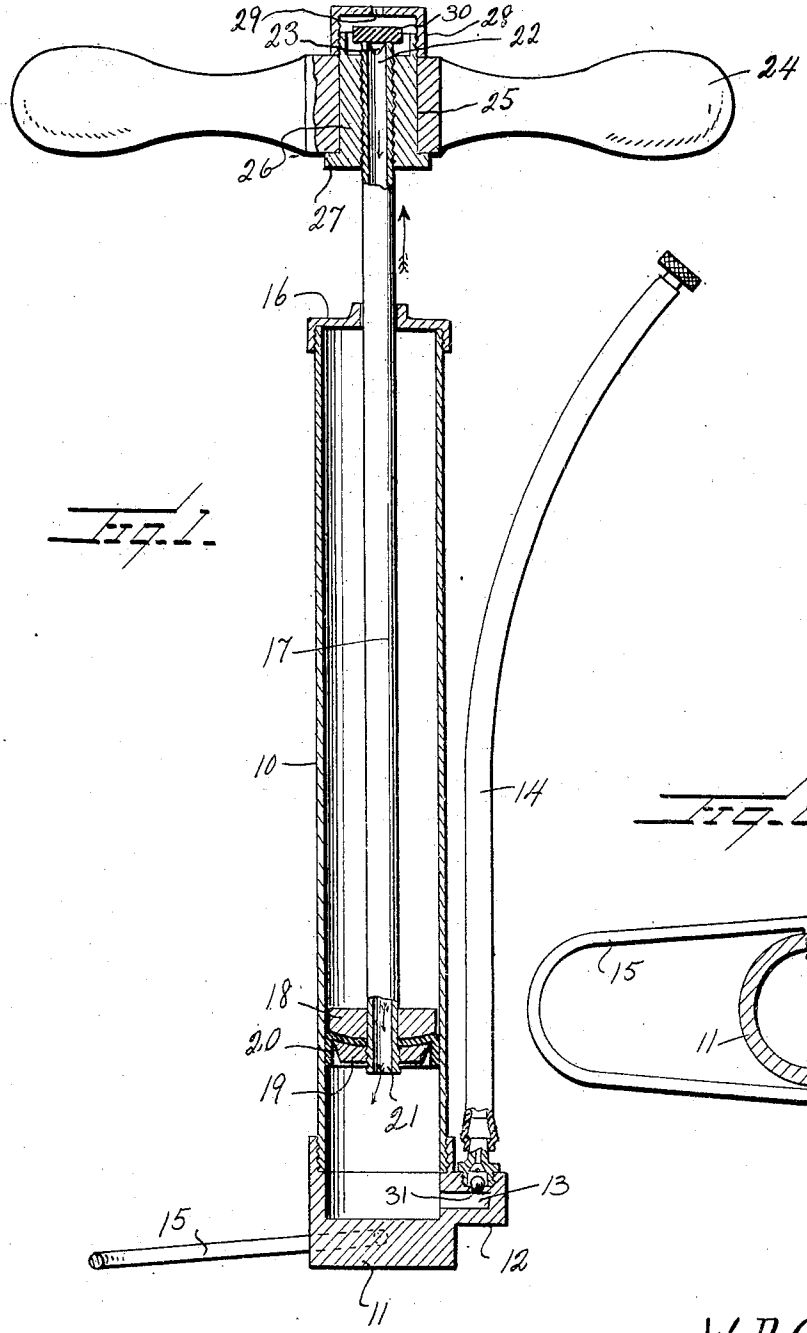



Fig. 1.




Fig. 2.

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## AIR-PUMP.

1,377,752. Specification of Letters Patent. Patented May 10, 1921.

Application filed June 22, 1920. Serial No. 390,716.

*To all whom it may concern:*

Be it known that I, WILLIAM D. COIL, a citizen of the United States, residing at Madisonville, in the county of Hopkins and State of Kentucky, have invented certain new and useful Improvements in Air-Pumps, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to pumps, and particularly to pumps for inflating tires or for like purposes.

The general object of this invention is to provide a pump of this character which is very simple in construction, in which the pump barrel is filled upon the out stroke of the piston and the air discharged from the pump barrel upon the inward stroke of the piston, and in which the valve mechanism is of a very simple and effective character.

A further object of the invention is to provide a pump of this character having a hollow piston rod through which the air passes into the interior of the barrel upon the out stroke of the piston, and provide a valve in the handle end of the piston whereby air may enter upon the out stroke but is held from discharge upon the in stroke of the piston, this valve being so arranged as to be easily accessible and easily renewed and being so placed as to be free from contact with dirt and foreign matter, and being so placed that it cannot become gummed up.

A further object is to so form the valve that it will easily seat and perfectly close the valve seats with which it engages, and to provide means whereby the valve may be readily removed for replacement without taking the pump apart.

Other objects will appear in the course of the following description.

My invention is illustrated in the accompanying drawings, wherein:—

Figure 1 is a longitudinal section of a pump constructed in accordance with my invention;

Fig. 2 is a transverse section through the base of the pump.

Referring to these drawings, 10 designates the barrel of a pump, which at one end is shown as formed with a base 11 into which the pump barrel may be screwed or to which it may be otherwise attached or engaged, this base being formed with a lateral prolongation 12 through which extends the outlet port 13 of the pump. This outlet port is connected in any suitable manner to the discharge pipe 14, which may be of flexible rubber, having at one end means whereby it may be readily connected to the usual inflating valve of a tire. This base is also provided with the foot piece 15, shown as in the form of a yoke pivoted to the base so that it may be swung down into operative position or swung up into a position approximately parallel to the barrel. The opposite end of the barrel from the base is closed by a cap 16.

Operating through the cap 16 is a tubular piston rod 17, the inner end of which carries an annular guide 18 which acts to center the piston rod. The extremity of the rod is screw-threaded for the reception of a nut 19, and disposed between the guide 18 and the nut is the leather or rubber cup 20. The adjacent face of the centering guide 18 is somewhat convex, and the face of the nut 19 which is adjacent the cup 20 is concave. The cup 20 is, of course, angularly bent at its margins to fit within and fit tightly against the inner face of the barrel 10, and the construction of the guide 18 and of the nut 19 is such that the leather cup is constantly forced against the wall of the pump barrel. The nut 19 has one side concaved to conform to the confronting surface of the member 18, and this nut 19 is beveled on its outer edge to the cup leather, allowing the air to form a wedge, as it were, forcing the margin of the cup outward against the wall of the cylinder.

The piston rod is open at its lower end, as at 21, and at its upper end, as at 22, and this last named end is formed with one or more longitudinally extending notches or slots 23. Disposed at the outer end of the piston rod is a handle 24. This handle is cut away, as at 25, and disposed within this cut out portion of the handle is a cylindrical valve casing 26 which has screw-threaded engagement with the upper end of the piston rod and at its lower end is formed with a shoulder 27 against which the handle rests. The valve casing projects beyond the handle at its outer end, and coacting with the body of the valve casing is a cap 28 interiorly screw-threaded to engage the body of the valve casing and formed with an intake port 29. This cap, when in place, bears against the outer face of the handle just as the shoulder 27 bears against its inner face and thus the handle is securely held upon the piston rod. Disposed within the valve casing is a circular, leather

valve 30 having a thickness less than the distance between the inner end face of the valve casing and the extremity of the rod 17. The extremity of the rod 17 forms one seat for this valve and the inner face of the cap 27 forms the other seat for the valve.

In the operation of this mechanism, upon the outward movement of the rod and piston, the valve 30 will drop against the open end 22 of the piston rod but air will enter through the port 29 into the interior of the valve casing and pass through the slots or notches 23 in the extremity of the piston rod and so downward through the piston rod and is discharged into the interior of the barrel. Upon the reverse movement, however, of the piston, the compression of the air within the barrel will cause the air to the hollow piston rod to force the valve 30 against the seat in the end of the valve casing, closing the port 29 and holding the valve in a closed position so long as the piston is being forced inward. Immediately that the piston is drawn outward, however, the pressure of air rushing into the port 29 will cause the valve 30 to be shifted against toward its seat on the extremity of the rod 17, and air will once more pass into the barrel. Of course, there is a check valve 31 disposed in the outlet port of the pump or in the delivery pipe permitting the discharge of air therethrough but preventing the intake of air therein when the piston is retracted or drawn out of the barrel.

The advantages of this construction reside in the fact that the valve is easily accessible and easily renewed, the valve casing being formed in two parts having screw-threaded engagement with each other so that the outer section of the valve casing may be readily detached from the inner section and the valve removed and a new valve put in place. Again, the valve by being placed at the outer end of the piston rod is in a position where it does not come in contact with dirt or the gummy substances which always accumulate in any pump. The valve, being of soft and pliable leather, is easily seated and makes perfect air-tight engagement with the outer end of the valve casing, and when the pump is on the compression stroke, the full pressure of the air holds the valve to its seat. Furthermore, air enters the port 29 upon the outward movement of the piston rod and feeds into the pump directly. This air is clean, for the reason that it does not pass around any valve or through any valve seats which are gummed up, and as the air is clean, there is no chance of its carrying dirt into the valve casing, this dirt acting to prevent the proper seating of the valve. Thus, the valve is not likely to leak or work improperly.

It will be seen that this valve has no springs or intricate parts to get out of order, as the valve opens by gravity and closes by the pressure of air. One of the main features of my invention resides in the provision of the inlet valve at the outer end of the rod 17 where it is readily accessible and where it is not liable to become gummed up.

While I have illustrated a particular form of valve and believe this particular form of valve to be peculiarly effective in the position described, I do not wish to be limited to the details of construction except as embodied in the appended claims.

I claim:—

1. In a pump of the character described, a pump barrel having a discharge opening, a piston operating within the pump barrel, a tubular piston rod having one end discharging below the piston, the opposite end extending out of the pump barrel, means attached to the piston rod for reciprocating it, and an inlet valve disposed at the outer end of the tubular piston rod and controlling the inlet of air thereto.

2. In a pump of the character described, a pump barrel having a discharge opening, a piston operating within the pump barrel, a tubular piston rod having one end discharging below the piston, the opposite end extending out of the pump barrel, the outer end of the piston rod being formed with a valve casing having an inlet opening and communicating with the interior of the piston rod, and a valve disposed within the valve casing and closing against the inlet opening upon the inward movement of the piston rod and piston.

3. In a pump of the character described, a pump barrel having a discharge opening, a piston operating within the pump barrel, a tubular piston rod having one end discharging below the piston, the opposite end extending out of the pump barrel, a valve casing inclosing the extremity of the piston rod and extending beyond it, said extremity of the piston rod being longitudinally slotted and the valve casing in its end wall being provided with an inlet opening, and a disk-like valve of flexible material disposed within the valve casing between the extremity of the piston rod and said end wall of the valve casing.

4. An air pump of the character described comprising a barrel having a valved discharge opening in its lower end, a tubular piston rod extending through the barrel and provided with a piston at its lower end, the piston rod discharging air below the piston, the outer end of the rod being longitudinally slotted, a handle disposed at the outer end of the piston rod, a two-part valve casing extending through the handle and into which the piston rod extends, said valve casing forming the means for connecting the handle to the piston rod, and the valve casing having an inlet port, and a disk valve

disposed within the valve casing and shiftable upon an out stroke of the piston to a position against the end of the piston rod and upon the in stroke of the piston to a position against and closing the port through the wall of the valve casing.

5. An air pump of the character described comprising a barrel having a valved discharge opening in its lower end, a tubular piston rod extending through the barrel and provided with a piston at its inner end, the piston rod discharging air beneath the piston, the outer end of the rod being longitudinally slotted and being exteriorly screw-threaded, a valve casing having a body portion screw-threaded to the outer end of the piston rod and recessed at its inner end to form a valve chamber, a screw-threaded cap forming part of the valve casing and the outer wall of the valve chamber and engaging the body and having an intake port, a handle disposed between a shoulder on the valve casing and said cap and thereby connected to the piston rod, and a valve disposed within the valve casing seating alternately against the slotted end of the piston rod and the cap and closing the inlet port therein upon the inward movement of the piston rod.

In testimony whereof I hereunto affix my signature.

WILLIAM D. COIL.