

W. S. STAPLEY.

TIRE PUMP.

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947,513.

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Fig. 1.

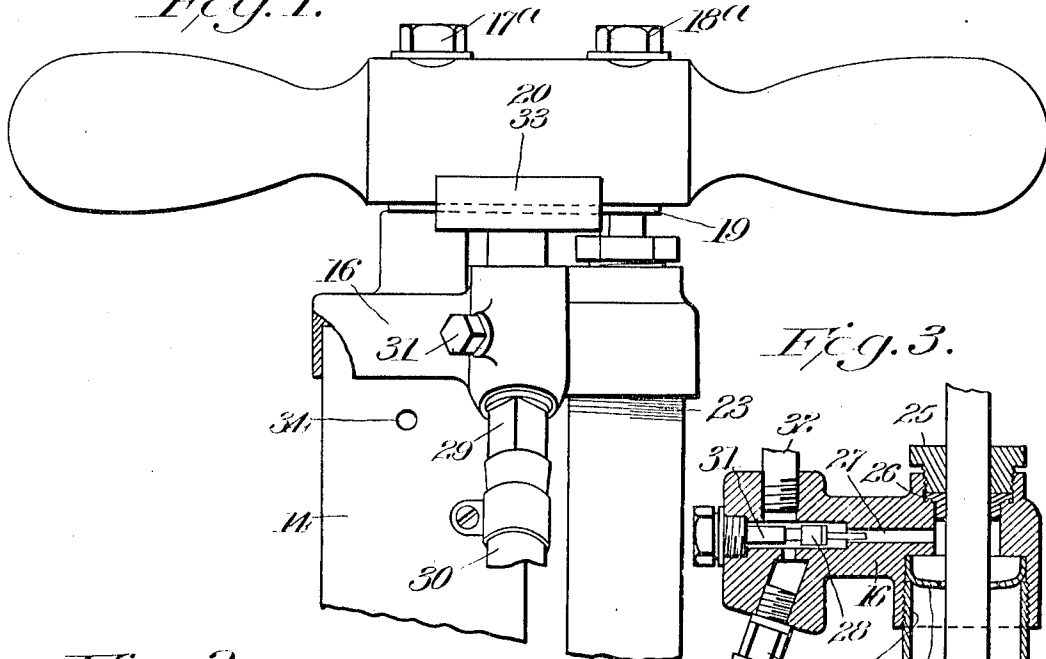


Fig. 3.

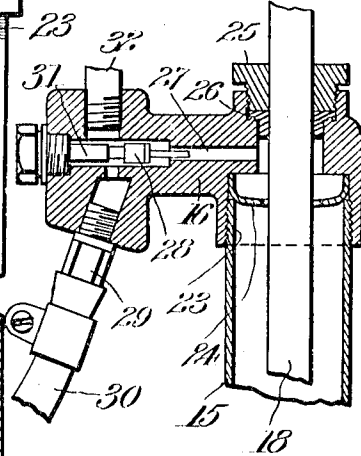
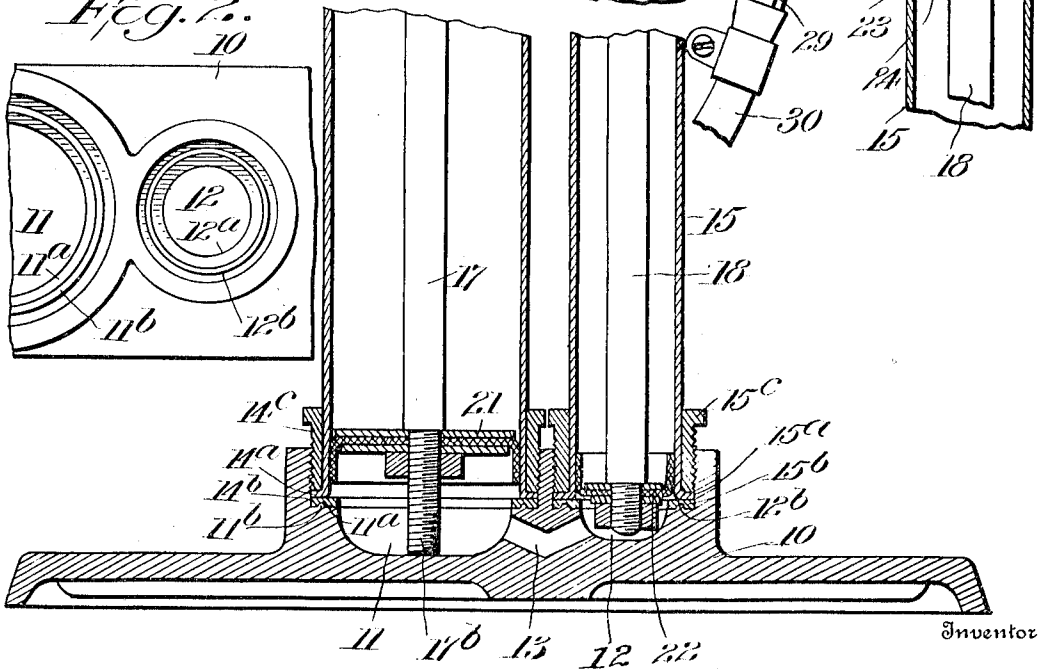
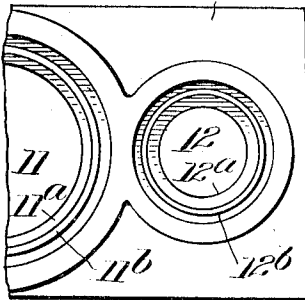


Fig. 2.



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TIRE-PUMP.

947,513.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WILLIAM S. STAPLEY, a citizen of the United States, residing at Bridgeport, county of Fairfield, State of Connecticut, have invented an Improvement in Tire-Pumps, of which the following is a specification.

This invention relates to air pumps of the type generally used for inflating pneumatic tires by hand, and has particular reference to such pumps of the double acting compound type in which two parallel cylinders of different sizes are secured together, the pistons and piston rods being connected to work in unison, but in which the effective stroke of the two pistons takes place in opposite directions as in Letters Patent 855026 granted to me May 28, 1907. In said patent, however, the cylinders are mounted one within the other.

The objects of my present invention are to provide an improved pump of the type referred to, in a simplified, cheapened and practical form and the parts of which may be easily assembled.

To these ends the invention consists in the construction and combination of parts substantially as hereinafter described and claimed.

Of the accompanying drawings:—Figure 1 is an elevation, partly in section, of a pump embodying my present invention, the middle portion being broken away to reduce the height of the figure. Fig. 2 is a plan view of a portion of the base removed. Fig. 3 is a detail sectional view through the cap and the upper portion of the small cylinder.

Similar reference characters indicate the same or similar parts in all of the views.

The base 10 having suitable lateral portions or wings on which the foot or feet of the user may bear, is formed with two circular recesses 11 and 12, the latter being smaller than the former. The large recess 11 is formed with a shoulder 11^a, a circular rib 11^b rising from said shoulder. The smaller recess 12 is also formed with a shoulder 12^a and a circular rib 12^b. The two recesses are connected by a port 13.

The large cylinder 14 is formed with an outwardly turned flange 14^a, and a washer 14^b is compressed between said flange and the shouldered rib, by means of a nut 14^c, which is threaded to fit a correspondingly

threaded upper portion of the wall of recess 11. By means of said nut the large cylinder has its lower end clamped in its recess in the base, while the washer and the circular rib 11^b constitute a tight joint.

The small cylinder 15 is similarly formed with an outwardly turned flange 15^a, a washer 15^b being clamped between said flange and the ribbed shoulder below it by means of a nut 15^c fitting a threaded portion of the wall of the recess 12.

The upper end of the cylinder 15 enters a recess in the underside of cap 16 which is preferably a casting. No tight joint is needed at the upper end of the large cylinder.

The two piston rods are indicated at 17 and 18, said piston rods passing through the cap and through a tie plate 19 which bears on the under side of the handle 20, said piston rods also preferably passing through the handle and having nuts 17^a and 18^a secured to their upper ends above the handle. The piston rods are provided respectively with pistons 21 and 22 secured to their lower ends. Said piston rods have their cup-shaped flexible members turned in opposite directions, said cup-shaped members being held between two disks one of which bears against a shoulder of the piston rod and the other disk being clamped in place by a nut on the threaded lower end of the piston rod. The shoulders of the two piston rods are located at different heights so that the piston on the rod 18 will be located in a lower plane than the piston 21. This is in order that, in the up-stroke, the top disk of the piston 21 will contact with the cap 16 before the piston 22 can be raised high enough to have its flexible member injured by contact with said cap. The extreme lower end of the rod 17 is elongated as at 17^b to form a stop which, by contact with the bottom of recess 11, will limit the downward movement so as to prevent injury to either piston.

The upper end of the small cylinder 15 is externally threaded as at 23, this thread being shown as a left-hand thread, it being understood that the thread of the nut 15^c is a right-hand thread. If the end 23 has a right-hand thread, then the nut 15^c will be left-hand threaded. The reason for this will be presently described.

Above the upper end of cylinder 15, and partly within it, is a steel reinforced cup 24, which is sufficiently tapered so that when cylinder 15 is screwed into its recess in the cap 16, the said cup 24 will be forced against the top of the recess and the said cup will be forced somewhat into the cylinder so as to crowd a portion of the thread of the latter into the threads of the cap so as to make an air-tight joint, dispensing with the use of any gasket, litharge, or solder. The reason for the reverse thread arrangement above described is that when the parts are being assembled, there is so much friction between the nut 15^c and the flanged-lower end of the cylinder 15, that said nut and cylinder are likely to be turned together as one. By the reverse thread arrangement, rotation in the proper direction draws the cap and base toward each other so that both ends of the cylinder 15 will be firmly seated.

The piston rod 18, above the cup 24, passes through the only stuffing box that the pump requires, said stuffing box comprising a nut 25 and a washer 26. The cap 16 is formed with an outlet port 27, the outer end of which is provided with a check valve 28, said port then communicating with a nozzle 29 to which a suitable hose 30 may be connected. A stop screw 31 is provided for the check valve. Also a nipple pipe 32 which leads to a pressure gage 33. This structure of check valve and stop screw and nozzle and pressure gage may be substantially the same as in my Patent 855,026 before referred to.

The supply of air to the larger cylinder may be around its upper end or around the upper end of the piston rod 17, as no tight joints need be formed at these points. Or a small hole may be provided as indicated at 34.

In operation, down stroke of the two pistons forces air from the large cylinder through port 13 and around piston 22 into the small cylinder from which it may escape through port 27 if the resistance is not too great in the tire which is being inflated. During this down stroke air enters the large cylinder above the piston 21. On the up

stroke, the air above the small piston is forced out through 27. While the vacuum produced in the small cylinder below the upwardly moving piston 22 results in drawing air from the large cylinder past the piston 21 and through port 13, as has been stated the upper disk of the piston 21 strikes the cap 16 in time to prevent injury to the flexible member of the small piston, while on the down stroke, the end 17^a of piston 17 strikes the bottom of recess 11 in time to prevent injury to the flexible member of piston 21.

Having now described my invention, what I claim is:

1. A pump comprising a base having two recesses which are internally threaded, said recesses having also internal shoulders each having an upwardly projecting rib, washers mounted on said shoulders, cylinders having outwardly turned flanges bearing on said washers, and nuts engaging the threads of the recesses and clamping the flanges of the cylinders on said washers.

2. A pump having a base provided with a shouldered recess, a cylinder having a flange at its lower end, a washer interposed between the flange and shoulder, and means for clamping the flange of the cylinder against said washer.

3. A pump including in its construction a cylinder, a metal cup fitting partly within the cylinder, a recessed member into which said cylinder and its cup extend, and means for forcing the said member and cylinder together to cause the cup to expand the end of the cylinder.

4. A pump including in its construction a cylinder having an externally threaded end, a cap having a threaded recess for said cylinder, a tapered metal cup fitting partly within the end of the cylinder and having its edge bearing on the end of the recess, and a piston and piston rod the latter passing through said cup.

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

WILLIAM S. STAPLEY.

Witnesses:

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