

No. 670,811.

Patented Mar. 26, 1901.

J. C. PHELPS.
PORTABLE AIR PUMP.
(Application filed Sept. 30, 1899.)

(No Model.)

Fig. 1.

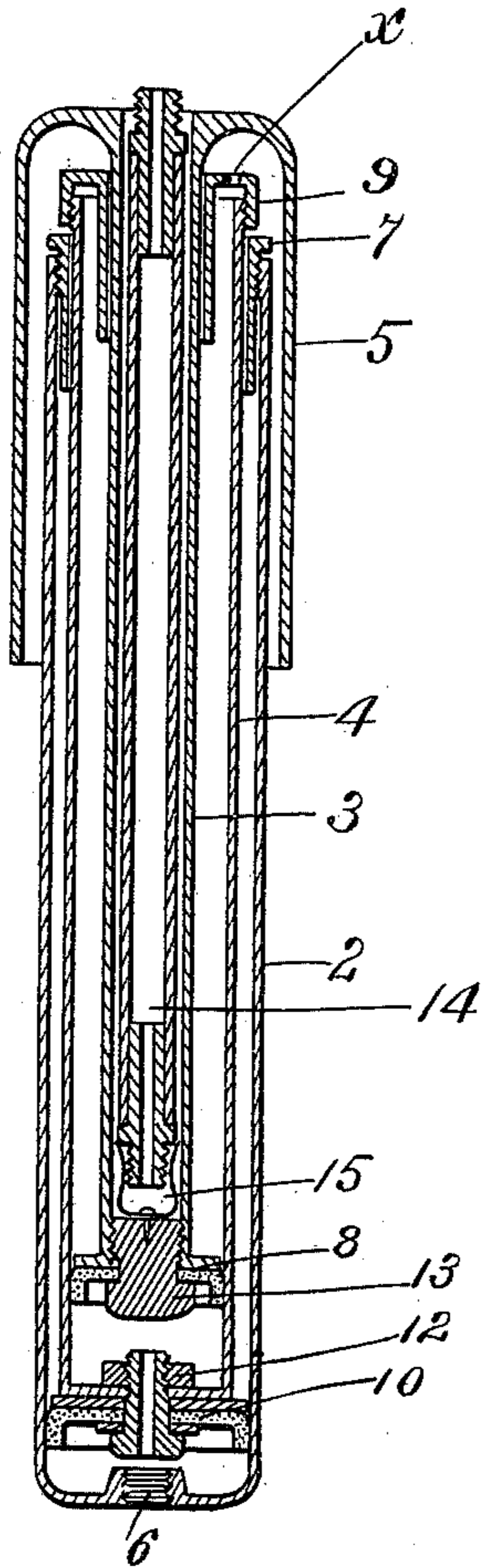
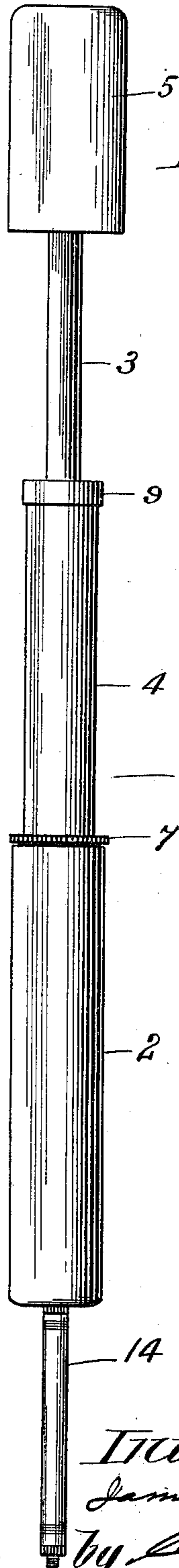


Fig. 2.



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PORTABLE AIR-PUMP.

SPECIFICATION forming part of Letters Patent No. 670,811, dated March 26, 1901.

Application filed September 30, 1899. Serial No. 732,155. (No model.)

To all whom it may concern:

Be it known that I, JAMES C. PHELPS, a citizen of the United States, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Portable Air-Pumps, of which the following is a specification.

This invention relates to portable air-pumps, the object being to provide an improved valveless multiple-piston pump of this class which is adapted for forcing air into different objects with the expenditure of a moderate degree of power and which provides improved means for operating the pump and for guarding the several pistons against injury from handling and against the admission of injurious matters into their exposed extremities; and the invention consists in the peculiar construction and adaptation of the various parts of the instrument, whereby the aforesaid objects are attained.

In the drawings forming part of this specification, Figure 1 is a longitudinal sectional view of an air-pump embodying my improved construction, said view illustrating the closed positions of the several parts and showing in like section an auxiliary air-conductor within the central piston or part. Fig. 2 is a side elevation of the pump, showing the parts thereof in operative positions and said auxiliary conductor connected thereto.

Referring to the drawings, 2 indicates the outer tubular case of the pump or the "barrel" thereof, as ordinarily termed. A thimble-bushing 7 is screw-connected within the upper end of said case, and an air-outlet 6 is provided at the lower end. A hollow piston 4 operates directly within said case or barrel and extends through said bushing and is of slightly less diameter than the interior thereof, to the end that more or less air may be drawn into said case between the latter and the bushing by the movement of said piston inwardly. Said bushing also provides a stop, which limits the outward movement of said piston when the plate over the packing thereof at 10 is brought thereagainst. Said piston 4 has a thimble-bushing 9 screw-connected to its outer end, through the top of which is an air-inlet opening x , which may be utilized in case of need for admitting more air into the case between the pistons than will be provided by

the spaces between the pistons and inner walls of the bushings. A second piston 3 operates within said piston 4 and the said bushing 9 and provides the actuating medium for the last-named piston, the piston 3 and its said inclosing bushing 9 being mutually fitted one to the other in the manner and for the purpose described relative to the piston 4 and the bushing 7. The said piston 4 has a means of air communication between the interior thereof and the space in the lower end of said case 2, consisting of the hollow screw, (shown at 12,) on which is a nut, said screw holding the said packing and its back plate 10 against the end of the piston. The said two pistons 4 and 3 are similarly packed at their inner extremities by means of a "hat-brim" leather packing, as indicated, having a suitable oil or other softening-lubricant applied thereto. Said soft packings are secured against the ends of the pistons or against a plate thereon, as shown at 8 and at 10, Fig. 1, but having the depending circumferential borders of said packings extending sufficiently beyond the borders of their supporting-plates or piston ends to permit the air which is compressed in the spaces above said packings when the pistons are quickly drawn out, as in Fig. 1, to pass by said packings and enter the spaces below each piston in said case 2 and in said piston 4, and thereby supplying air under each of said pistons, which is eventually, as below set forth, forced out through said outlet 6. The said packing on the inner end of said piston 3 is secured thereto by a plug 13, preferably of wood, which is screwed thereto, as shown. The outer end of this last-named piston has thereon, either integral therewith or otherwise, a combined piston-cover 5 and handle for operating the device. Said cover, as shown, effectually incloses and protects the outer extremities of said case 2 and the piston 4 against the entrance of dirt and also protects said inclosed extremities from injury while being transported or handled while in the closed condition. (Shown in Fig. 1.) It is found also in practice that said cover by resting its upper border-rounded end against the palm of the hand and grasping the border of its open end with the fingers provides a most convenient handle for operating the pump.

The herein-described air-pump may be employed for inflating a variety of objects, among which are bicycle-tires, and when so used it is convenient to have an auxiliary (flexible or otherwise) air-conducting pipe at hand for connecting the case 2 with the object to be inflated. Therefore the said central piston 3 is made hollow from the inner end of said plug 13 through the center of the end of said cover and handle 5, and in said piston is shown in Fig. 1 said auxiliary connecting-tube, (there indicated by 14,) the extremities of which are provided with screwed couplings for connection between the air-pump and an object to be inflated, as stated, one end of said tube 14 being screwed into said air-outlet 6 in the lower end of the case 2. For the purpose of retaining said tube 14 within said inner piston 3 any suitable means may be provided similar to a strip of spring metal 15, shown secured to the inner end of said plug 13, having upwardly-extending spring-arms engaging the lower end of said auxiliary tube 14, whereby the latter is prevented from dropping out when the device is handled in the ordinary way.

In operating the within-described pump for inflating an object connected to the pump at 6 the elongating movement of the parts for charging the case 2 and the piston 4 with air brings them substantially to the relative positions shown in Fig. 2, such movements causing air to be drawn into the case 2 through the said openings between the upper ends of said case and of the pistons 3 and 4, as described, and to pass said packing and to be directed into and below the piston 4 downwardly through said hollow screw into the case 2, thereby charging said case and piston 4 with air while the central piston 3 is being drawn outwardly. Fig. 2 does not illustrate said piston 3 drawn entirely out. A quick downward thrust of said piston 3 drives the piston 4 down with a quick cushioned movement, owing to the inability of the air therein

to escape quickly through the restricted passage in said screw 12, and thus considerably compressing the air in the case 2, the continued down movement of said piston 3 now serving to increase the pressure in said case and in the object to which the latter may be connected. Rapid repetitions of the movements of said two pistons quickly increase the air-pressure in said object as desired. The said restricted air-passage in the screw 12 prevents any inconvenient escape of air during said piston movements, and thus the pump, of simple construction, with no valves to become deranged, fully serves the described purpose.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

An air-pump comprising a tubular case, having an air-outlet at one end and a thimble-bushing 7 screwed into the opposite end, a hollow piston 4 operating directly within this case and extending through the bushing, its diameter being slightly less than the latter so that air may be drawn into the case between the piston and bushing, a thimble-bushing screwed to one end of the piston said bushing having an air-inlet opening, a hollow screw in the opposite end of this piston, a packing and backing-plate held on the end of the piston by said hollow screw, an inner hollow piston, a backing-plate and packing on one of its ends, a screw-plug for holding the packing on the piston, the inner ends of the thimble-bushings adapted to strike the backing-plates to act as stops to limit the outward movement of the parts, said screw-plug having spring-clamps thereon, and an auxiliary connecting-tube adapted to enter the inner hollow piston and be held by the spring-clamps.

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