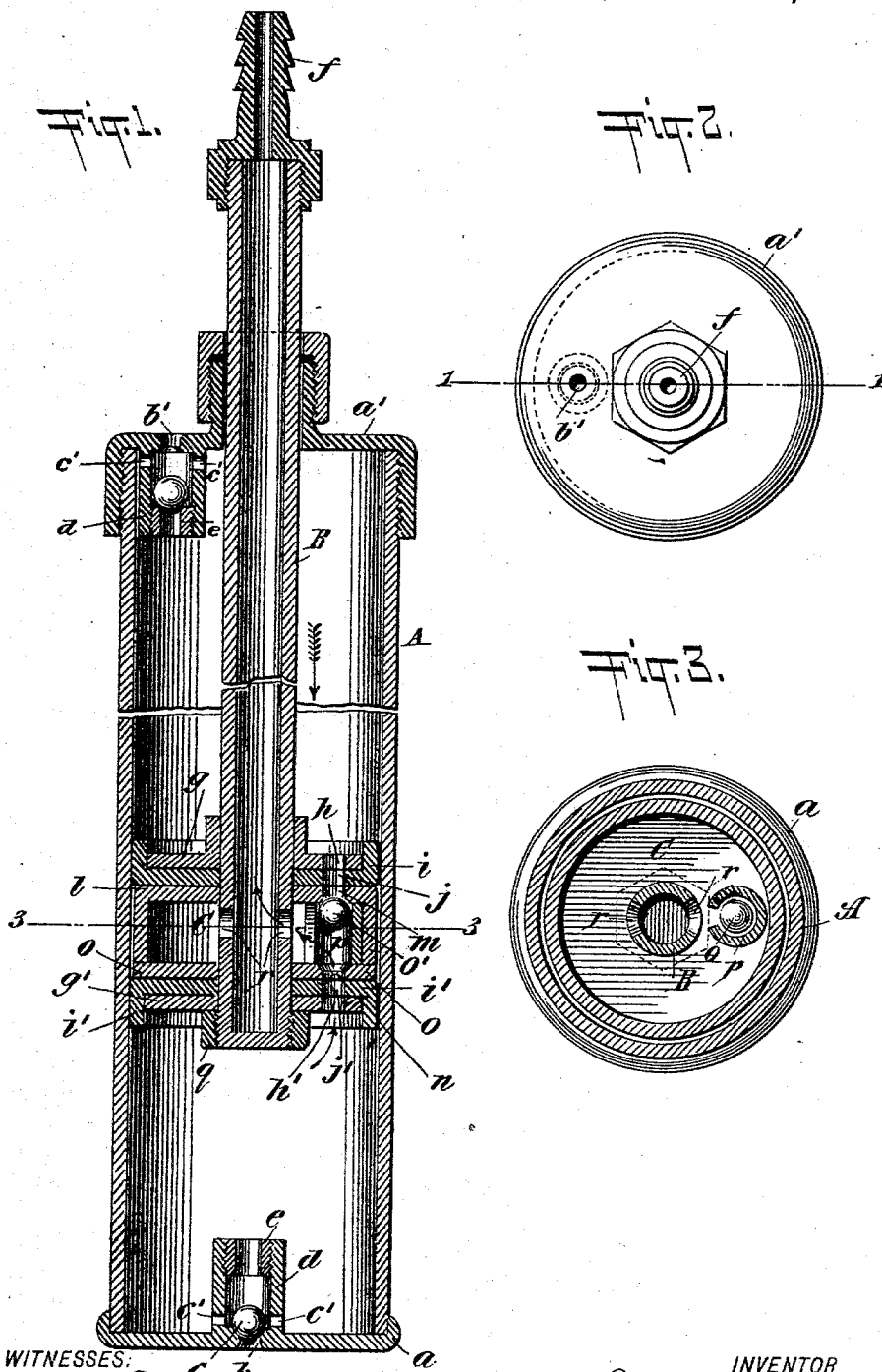


(No Model.)

J. DICKENS.
AIR PUMP.

No. 514,590.

Patented Feb. 13, 1894.



WITNESSES:

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JOHN DICKENS, OF NEW BRUNSWICK, NEW JERSEY, ASSIGNOR TO THE
DICKENS MANUFACTURING COMPANY, OF SAME PLACE.

AIR-PUMP.

SPECIFICATION forming part of Letters Patent No. 514,590, dated February 13, 1894.

Application filed August 4, 1892. Serial No. 442,098. (No model.)

To all whom it may concern:

Be it known that I, JOHN DICKENS, a citizen of the United States, and a resident of New Brunswick, in the county of Middlesex and State of New Jersey, have invented certain new and useful Improvements in Air-Pumps, of which the following is a specification.

My invention relates to pneumatic pumps, and more particularly to that class or kind thereof commonly known and referred to as double acting pumps, for use principally in inflating hollow bicycle tires the object being to provide a device of this character which shall obviate the necessity of utilizing expensive and intricate valve systems now commonly employed with this class of pumps and which shall be as simple in construction and economical to manufacture, or nearly so, as single acting pumps, and with these and other ends in view, my invention consists in certain novel features of construction and combination of parts as will be hereinafter fully described and pointed out in the claims.

In the accompanying drawings Figure 1 is a view in longitudinal section of my improved pump, taken on a line 1—1 of Fig. 2. Fig. 2 is an end view thereof. Fig. 3 is a view in cross section taken on the line 3—3 of Fig. 1.

Referring to the drawings, A represents a cylinder or barrel preferably made of metal, the dimensions of which will, of course, depend upon the use to which the pump is to be put. The rear end of this cylinder is fitted with a cap or head *a*, soldered or otherwise secured to said cylinder to form an air tight joint and is provided with an air inlet or port *b* fitted with a ball *c* contained within the valve chamber *d* secured to, or made integral with, the head *a*, a sleeve *e* being threaded into said chamber for the purpose of retaining the ball *c* within the same. This chamber *d* is provided with the inlets or ports *c'*, and which are formed close up to the cap or head *a* in order that the air may enter through the inlet *b* and ports *c'* into the cylinder A simultaneously with the change in the stroke or direction of the piston and at the same moment of time that the ball *c* moves from its seating in the cap or head *a*. The opposite or front end of the cylinder is also provided with a head *a'* threaded thereon, and

constructed with an air inlet or port *b'*, and a ball valve constructed and arranged like that in the rear end of the cylinder.

B represents a hollow piston rod, provided, if desired, at its end, from which the air is delivered, with a nozzle *f*. The rear end of this hollow piston rod which is closed, has fitted thereon a piston incased and moving within the cylinder A. This piston consists of the two buckets *i* and *i'*, made of rubber, leather or other desired material, the said bucket *i* being held in place against the metal disk *g*, soldered or otherwise secured to the hollow piston rod B, and the bucket *i'* against the disk *g'* secured on the piston rod by means of the nut *q* which is itself threaded on the extreme end of said rod. Between these buckets *i* and *i'* which form the piston, is located a receiving chamber C, constructed in the form of a box or cylinder and adapted to receive the air from the cylinder A and deliver it into the piston rod B as will be hereinafter understood. This receiving chamber is constructed with the plates *l* and *o*, the latter being made separate from the other parts, to allow of access to the interior of the receiving chamber to fit or secure the valve therein, but these plates *l*, *o*, may be soldered together after the valve has been fitted therein to render said receiver air-tight.

The disk *g*, bucket *i* and plate *l* of the receiving chamber are provided with registering ports or air inlets *h*, *j* and *m*, respectively, and the disk *g'*, bucket *i'*, and plate *o* with the registering ports or air inlets *h'*, *j'* and *n*, respectively, said ports or openings *m* and *n* leading into a valve chamber or receptacle *p*, the ends of which are soldered or otherwise secured to the plate *o*, said chamber being provided for the purpose of containing, and guiding the movements of the ball *o'*, and is split as shown in Fig. 3 for purpose of allowing the passage of the air from the cylinder A into the receiving chamber C.

Having described the construction of my improved pump, I will now proceed to describe or set forth its operation. The several arrows indicate that the piston is being forced from the forward end of the cylinder toward the rear, in which case, the air contained within the cylinder and located back of the

piston will force the ball *c* against its seating in the head or cap *a* and thereby prevent said contained air from escaping through the rear end of the cylinder. This air pressure also
 5 forces the ball *o'* against its seating in the plate *l*, thereby causing the escape of the air through the ports *h'*, *j'* and *n* through the valve chamber *p* into the receiving chamber *C*, and from there through the openings or
 10 ports *r* formed in the hollow piston rod, into the latter and out through the nozzle *f*. When the piston is reversed, the valves before referred to will, also be reversed, that is, the ball *c* in the rear of the cylinder will be
 15 moved to the opposite end of the chamber by the external air pressure, which will allow the entrance of the air through the inlet *b* and ports *c'* into the rear end of the cylinder, and the ball *o'* forced by the pressure
 20 of air in the forward end of the cylinder against its opposite seating in the plate *o*, and the ball in the forward end of the cylinder forced against its seating in the head *a'*, thereby causing the air, contained within the forward
 25 end of the cylinder to pass through the ports *h*, *j* and *m*, through the slotted chamber or receptacle and into the receiving chamber *C*, from which it passes through the ports *r* into the piston rod and out through the nozzle
 30 as before described. It will thus be seen that the article or device is double acting, that is, the air is forced out of the cylinder through the piston rod or nozzle, during both the forward and backward stroke of the piston,
 35 and this, without any complicated valve system, which has heretofore been necessary. It will also be noted that by this arrangement and construction of parts, the air is received
 40 into the cylinder through both the forward and rear ends thereof, but delivered from one end only, thereby overcoming the necessity of using delivery pipes connecting with both the rear and forward ends, and allowing my improved double acting pump to be of the

same external construction or formation as
 the single acting pump, now commonly used.

It will, of course, be understood that many changes may be made in the detail construction of my improved pump without departing from the principle or spirit thereof; and I
 50 therefore reserve the right to make all such changes as fairly fall within the scope of my invention.

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

1. In a double-acting pump for inflating rubber tires, the cylinder *A* having inlets or ports in its ends, the valve chambers *d* rigid with the heads of the cylinder and arranged
 60 around the inlets or ports wholly within the cylinder, the lateral openings in the valve chambers close to the cylinder heads, the balls contained within said chambers and the hollow sleeves secured in the ends of the chambers to retain the balls in place, substantially
 65 as and for the purpose set forth.

2. In a double-acting pump for inflating rubber tires, a cylinder *A* having valve controlled inlets *b*, *b'*, in its ends, a piston arranged within the cylinder and comprising
 70 the angular plate *l*, and the plate *o*, secured together and forming a receiving chamber *C*, the buckets *i*, *i'*, the disks *g*, *g'*, clamping said buckets rigidly in place against the plates *l*, *o*,
 75 a valve arranged within the receiving chamber to control inlets formed in the piston, and a hollow piston rod extending entirely through the piston and having lateral openings *r*, communicating with the receiving chamber, substantially
 80 as and for the purpose set forth.

Signed at New Brunswick, in the county of Middlesex and State of New Jersey, this 2d day of August, A. D. 1892.

JOHN DICKENS.

Witnesses:

J. B. KIRKPATRICK,
 THEO. W. WELSH.