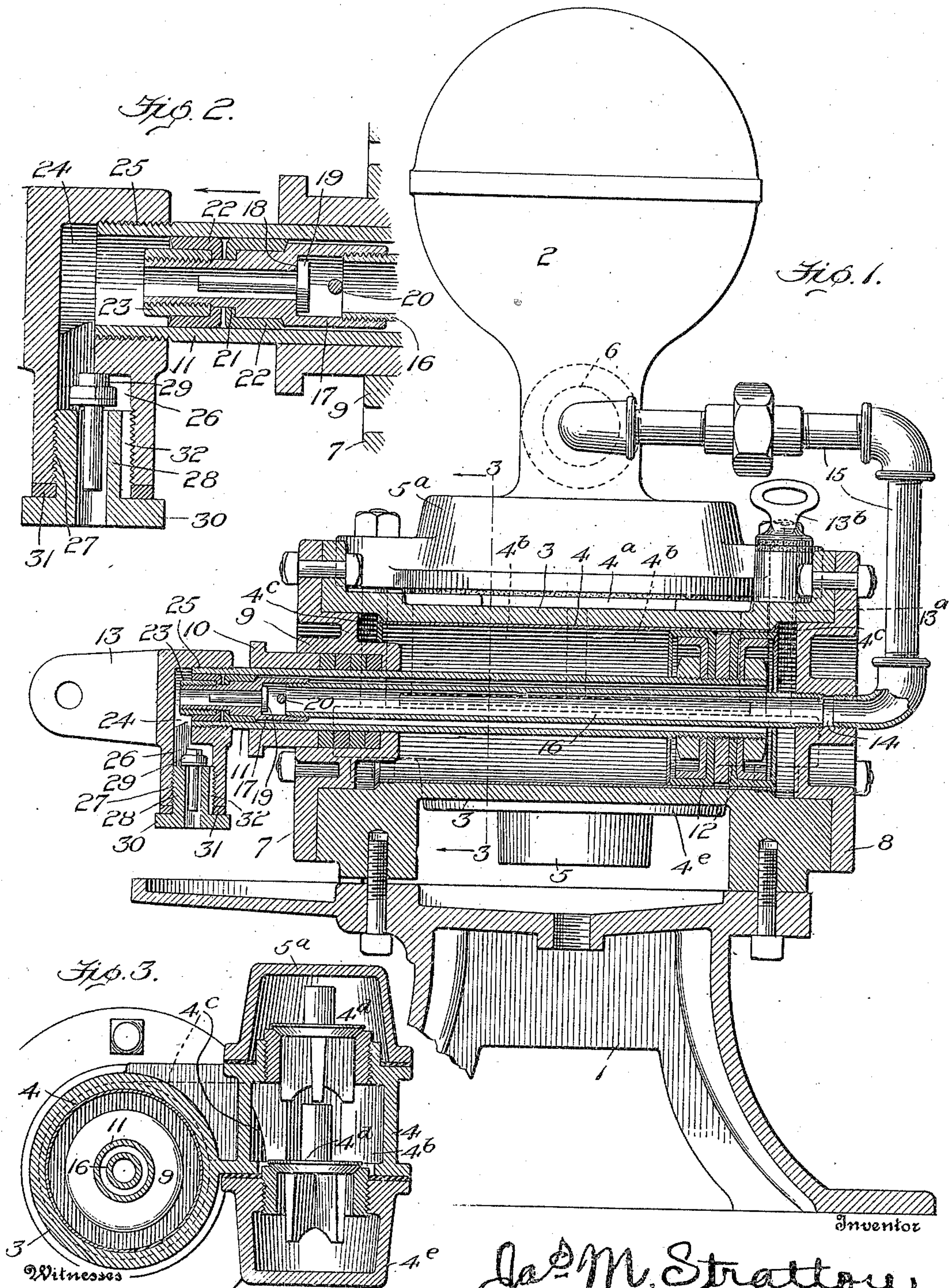


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PUMP.

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# UNITED STATES PATENT OFFICE.

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## PUMP.

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*To all whom it may concern:*

Be it known that I, JAMES M. STRATTON, a citizen of the United States, residing at Salem, in the county of Columbiana and State of Ohio, have invented certain new and useful Improvements in Pumps; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to pumps, or, more particularly stated, to double acting force pumps in conjunction with an air pumping appliance for compressed air systems of water distribution. These systems, as is well understood, employ an air-tight tank as the source of supply to various outlets and connections throughout a building or a number of buildings, hydrants or plugs, the contents of said tank being subjected to pressure for the purpose of elevating same to points above the level of the tank when desired. This pressure must not only be supplied initially but must be maintained, and to this end the present invention combines with a double acting force pump an air pump partially contained within the piston-rod of the water pump, and suitable connections whereby water may be aerated and in such condition delivered into the supply tank for future use.

The invention will be hereinafter particularly described and pointed out by the claims following.

In the accompanying drawings which form part of this application and whereon corresponding reference numerals indicate the same parts wherever they occur in all figures: Figure 1 represents a longitudinal central section through my invention, the pump base and superposed air chamber, the latter appearing in side elevation, Fig. 2 is a relatively enlarged fragmentary view, also in longitudinal vertical central section, of the air pumping valves, and Fig. 3 is a transverse vertical section on the line 3-3, Fig. 1, looking in the direction indicated by arrows.

Reference being had to the drawings and numerals thereon, 1 indicates a cast base, and 2 an air chamber common to double act-

ing pumps. The body 3 of pump is bored out horizontally and suitably lined as at 4 to serve as a pumping cylinder, it is also provided with a side extension 4<sup>a</sup> comprising two tubular compartments or valve cases 4<sup>b</sup>, the latter respectively communicating at opposite ends with cylinder 4 by way of laterally extending ports 4<sup>c</sup>, 4<sup>e</sup> opening directly into said valve cases and cylinder. Within each of said valve cases 4<sup>b</sup> are located alternating pump valves 4<sup>d</sup> arranged in pairs and adapted to reciprocate vertically as shown by Fig. 3, such as are common to pump structures generally. Bolted beneath said side extension 4<sup>a</sup> is a hollow funnel shaped casting 4<sup>e</sup> underlying both of said valve cases 4<sup>b</sup> and terminating in a downwardly projecting inlet port 5. In like manner, said valve cases 4<sup>b</sup> are both covered above by a single hollow casting 5<sup>a</sup> in open communication with the interior of the surmounting air chamber 2 aforesaid; while from said air chamber is projected, as indicated at 6, Fig. 1, by dotted lines, the outlet or pump discharge.

As usual in pumps of this type, the interior of pumping cylinder 4 communicates with both the inlet 5 and the air chamber 2, having discharge outlet 6, by way of the valves and ports aforesaid, the ends of said cylinder being closed as usual by removable front and back cylinder heads 7 and 8 respectively. The said head 7 is provided with a properly packed stuffing box 9, and a stuffing box cap 10, extending longitudinally and centrally through which is a hollow piston rod 11 carrying a piston 12 upon its inner end, and a bifurcated coupling link 13 upon its outer projecting end by agency whereof it may be reciprocated in any approved manner.

At one end of the structure beyond the throw of piston 12, the pump cylinder and its lining 4 are broken by a vent 13<sup>a</sup> shown by dotted lines in Fig. 1, same being guarded by a screw plug 13<sup>b</sup>, for the purpose of admitting air to the interior of the pump cylinder at such times as it may be desired to drain it, a practice common to such structures. And, as will also be seen by reference to Fig. 1, the back cylinder-head 8 is perforated centrally as at 14 and screw-



threaded, being connected on the outside by an air tube 15 with the air chamber 2 above, for purposes that will later appear, while from the inside of this head 8 is projected centrally an air compressing tube 16 fixed with relation to the piston-rod 11 and extending longitudinally therethrough a distance approximately equal to the length of the cylinder 4. Upon the outer end of tube 16 is threaded a valve cage 17 shouldered as at 18 to afford a seat for the air valve 19 and equipped with a pin 20 crossing said cage transversely to serve as a limit stop for this valve. Beyond the valve-seat 18, cage 17 is reduced in diameter as at 21 to receive annular packing glands 22, 22, the latter being held in place by a screw thimble 23 threaded upon the extremity of the cage member 17, whereby the fixed compression tube 16 is securely packed with relation to its surrounding reciprocating pump piston rod 11.

As will be seen by inspection of enlarged Fig. 2 the body of coupling 13 is hollow to form an air compression chamber 24, and is secured at 25 to the reciprocating rod 11 in screw threaded relation. It is furthermore counterbored vertically at 26, threaded as at 27, and fitted with a vertically adjustable nipple 28, its inner end serving as a seat for the vertically movable check valve 29, and its outer end flanged as at 30 to retain a suitable packing 31, while this air valve 29 is grooved longitudinally as at 32 to serve as an air by-pass when the nipple 28 is unscrewed.

This being a description of my invention in its best form of construction at present known to me, its operation may be briefly set forth as follows: Presuming the piston 12 to be at the end of its stroke as shown by the drawings, and a charge of water to have been forced thereby into the air chamber 2 in the usual and well known manner, withdrawal of coupling 13, either manually or mechanically, now serves to withdraw piston rod 11, and, by agency of its piston 12, to force the water upon its opposite side into the air chamber 2, as with double acting pumps generally. During this outward movement of hollow piston rod 11, valve 19 is seated by back pressure from air chamber 2 through air pipe 15 and tube 16, the air contained in chamber 24 being rarefied as the outward movement progresses. As a consequence check valve 29 is lifted by atmospheric pressure, the said chamber 24 and the interior of piston rod 11 being thus recharged with a fresh supply of air. This accomplished, the reverse or inward thrust of coupling 13 serves to compress the air now contained within chamber 24, unseat valve 19, and deliver the charge into the air chamber 2 via tube 16 and air pipe 15, so that obviously there is a charge of air with

each alternate charge of water delivered to the air chamber 2 by each intrust of the piston, and thence by way of the outlet or discharge 6 to a suitable air tight tank (not shown). If, however, it should be desired to discontinue or cut out the pumping of air, this may readily be accomplished by unscrewing nipple 28 until packing 31 ceases to perform its intended function, whereupon the interior of compression chamber 24 is opened to the atmosphere via groove 32 in one side of said screw nipple, so that within and without the chamber 24 will balance.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A pump provided with a pumping cylinder, a piston and a hollow piston rod, in combination with an air compressing tube within said hollow rod and fixed with relation thereto, a tubular connection between one end of said air compressing tube and the pump discharge, a valve guarding the intake of said air compressing tube, a compression chamber carried by said rod, and a second valve guarding an inlet to said chamber, substantially as described.

2. A pump provided with a pumping cylinder, a piston, and a hollow piston rod, in combination with an air compressing tube concentrically arranged within said rod and fixed with relation thereto, a tubular connection between one end of said air compressing tube and the pump discharge, a compression chamber carried by said rod, and suitable intake valves for said tube and chamber respectively, substantially as described.

3. A pump provided with a hollow piston-rod, in combination with an air compressing tube located within said rod, a valve guarding the intake of said tube, a compression chamber carried by said rod, a check valve guarding an inlet to said chamber, and an air by-pass around said check valve, substantially as described.

4. A horizontal double acting force pump having a hollow piston-rod in combination with an air compressing tube operatively connected at one end with the pump discharge, a valve guarding the intake of said tube, a compression chamber carried by said rod, and a check-valve guarding an inlet to said chamber, substantially as described.

5. As an article of manufacture a valve-case, a ported nipple adjustably secured in said case, and a by-pass in said nipple around said valve adapted to be opened or closed by the adjustment referred to, substantially as described.

6. A pump provided with a pumping cylinder, a piston and a hollow piston rod, in combination with an air compressing tube within said hollow rod and fixed with rela-

tion thereto, a common discharge for said  
pump and air compressing tube, a valve  
guarding the intake of said tube, a compres-  
sion chamber carried by the projecting end  
5 of said rod, and a valve controlling the in-  
let to said chamber, substantially as de-  
scribed.

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

JAMES M. STRATTON.

Witnesses:

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