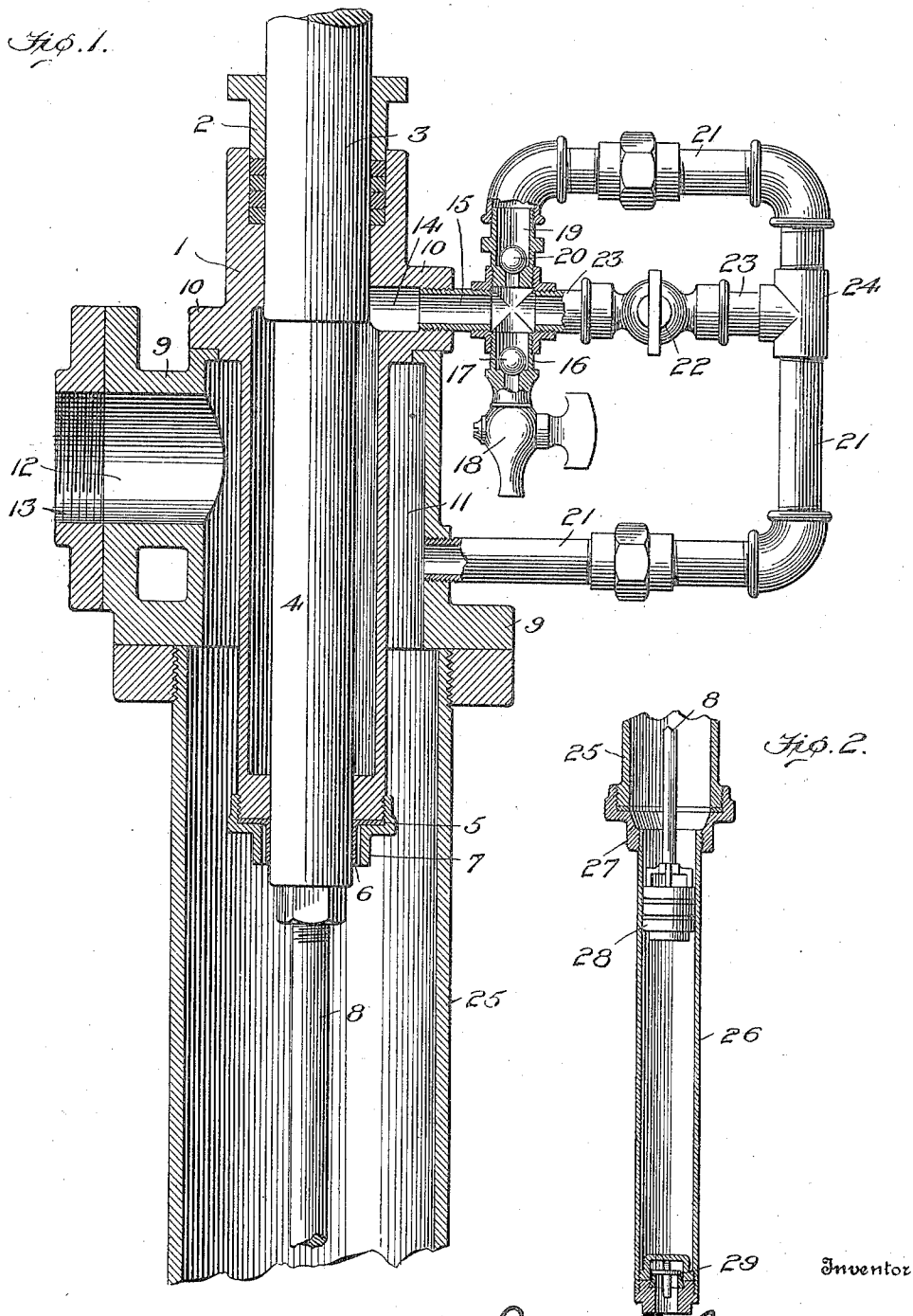


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PUMP.

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To all whom it may concern:

Be it known that I, JESSE B. GARBER, 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, but has reference more particularly to an air pumping device for use with power working heads and deep well cylinders, or for use in connection with any form of pumping apparatus. It is designed primarily for use with independent water service systems; in which connection it is adapted for pumping both air and water into an air tight storage tank, from whence it may be distributed under pressure afforded by the air thus pumped, to various outlets or points of utilization.

As a further object this invention contemplates a simplification of this class of devices, a reduction in their cost of construction, and greater general efficiency than heretofore obtained by analogous devices.

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

In the accompanying drawings which form part of this application and whereon corresponding numerals of reference indicate like parts in the different figures, Figure 1 represents a vertical central section through the novel features of the present invention a cooperating by-pass appearing partly in side elevation, and Fig. 2 represents upon a smaller scale and in longitudinal central section a deep well pumping cylinder, its working piston and foot valve.

Reference being had to the drawings and numerals thereon, 1 indicates a stuffing box and air pumping cylinder by preference combined in a single casting, but obviously these elements may, if desired, be made in two parts as usual. Surmounting said cylinder is a suitably packed stuffing box cap 2 through which, as also through the entire length of said cylinder 1 projects a differential piston formed of upper and lower sections 3, 4 respectively, the former of greater displacement than the latter, and

adapted to be reciprocated in any approved manner. The lower protruding end of the piston member 4 is surrounded by an annular packing 5 having a downwardly projecting flexible central portion 6 and retained in position beneath the head of cylinder 1 by agency of a second stuffing box cap 7, while concentrically coupled to the lower end of said differential piston is an ordinary piston rod 8, as clearly shown by Figs. 1 and 2.

Surrounding the upper end of the air pumping cylinder 1 is a casting 9 bolted or otherwise secured in watertight relation to a flange 10 at upper end of the said cylinder and constituting a pump head. This casting is provided with a central mixing chamber 11 which consequently surrounds the upper portion of said cylinder 1, and communicates directly with a discharge port 12 at one side, to which latter a discharge pipe may be coupled as indicated by the screw threads 13, leading to an air tight and water tight pressure tank (not shown).

Communicating with the interior of air pumping cylinder 1 by port 14 through the flange 10 is a screw nipple 15 intersected at one side by a depending tubular connection 16 provided with a check-valve 17 and an air cock 18; while in like manner above, there is a tubular connection 19 also guarded by a ball valve 20, forming part of a by-pass 21 leading from the interior of said cylinder 1 to and directly into the mixing chamber 11 aforesaid. And, as clearly shown by Fig. 1, the by-pass 21 at some point intermediate of its ends is equipped with an additional air cock 22 for purposes that will later appear, the present illustrations showing such cock in a short horizontal cut-out section of tubing 23 leading from the inlet port or nipple 15 to a T coupling 24.

Depending from the pump head or casting 9 and concentrically surrounding the lower end of the cylinder 1, is a water tube or pipe 25 of any desired length through which all water raised by the pump must flow, this pipe is coupled as shown by Fig. 2, to a pumping cylinder 26, by means of a suitably packed cap coupling 27, or if desired in the case of a deep well, by an interposed tubular connection not shown, but in any event the piston rod 8 extending longitudinally through said pumping cylinder is

provided with the usual piston 28, and the cylinder itself with an ordinary foot valve 29.

This being a description of my invention in its preferred form of construction, it will be noted that various structural changes may be made, and equivalent parts variously substituted for those herein shown and described without departing from the spirit of my invention, the operation whereof is as follows: Presuming foot valve 29 to be properly submerged, and the pump to stand primed almost to its point of discharge, also that pistons 3—4 and 28 are at the highest positions in their respective cylinders 1 and 26, also that the air cock 18 is open, and the cock 22 closed, all as shown. A downstroke of the differential piston 3—4 now displaces a quantity of air in the cylinder 1 with the result that same is forced past check valve 20 through by-pass 21 and delivered into the mixing chamber 11 to commingle with the water and be discharged therewith through outlet 12 upon the next succeeding upstroke. The upstroke, in addition to discharging the contents of mixing chamber 11 as stated, also tends to produce a partial vacuum in air cylinder 1 as the piston member 3 of greater diameter is withdrawn, this is immediately filled by inflowing air via cock 18 past check-valve 17, whereupon the operation previously described is repeated upon each return or downstroke of the pistons, thus producing continuous flow of water and air through outlet port 12 to a suitable tank and thence under pressure to its various points of utilization. If now it is desired to cut out the air pumping apparatus and operate by agency of the pumping cylinder 26 alone, this may readily and conveniently be accomplished by opening the auxiliary air cock 22, and consequently opening the interior of cylinder 1 to the water from 11 to balance the stroke of piston member 3 in both directions.

This being a description of my invention, what I claim and desire to secure by Letters Patent is:

1. In a pumping apparatus the combination with independent fluid pumping cylinders, of a pump head containing one of said cylinders, a mixing chamber surrounding the cylinder within said head, a piston

in each of said cylinders, a rod connecting said piston, a by-pass from one of said cylinders to the mixing chamber, and a discharge port common to both cylinders.

2. In a pumping apparatus the combination with independent fluid pumping cylinders, of a pump head containing one of said cylinders, a mixing chamber surrounding the cylinder within said head, a piston in each of said cylinders, a rod connecting said pistons, a line of pipe forming a by-pass from one of said cylinders to the mixing chamber, a check-valve in said line of pipe, and a discharge port common to both cylinders.

3. In a pumping apparatus the combination with independent fluid pumping cylinders, of a pump head containing one of said cylinders, a mixing chamber surrounding the cylinder within said head, a piston in each of said cylinders, a rod connecting said pistons, a by-pass from the last named cylinder to the mixing chamber, and a discharge port common to both cylinders.

4. In a pumping apparatus the combination with water and air pumping cylinders, of a pump head containing one of said cylinders, pistons and piston rods for said cylinders, a mixing chamber surrounding said air pumping cylinder, an inlet for said air cylinder guarded by a check-valve, a by-pass from the last named cylinder to said mixing chamber, a check-valve guarding said by-pass, and a common discharge port for both of said cylinders.

5. In a pumping apparatus the combination with water and air pumping cylinders, of a pump head through which said air pumping cylinder projects downwardly, a mixing chamber surrounding said air pumping cylinder, a piston in each of said cylinders, a rod connecting said pistons, a by-pass from the air pumping cylinder to the mixing chamber, and a discharge port common to both cylinders.

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

JESSE B. GARBER.

Witnesses:

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