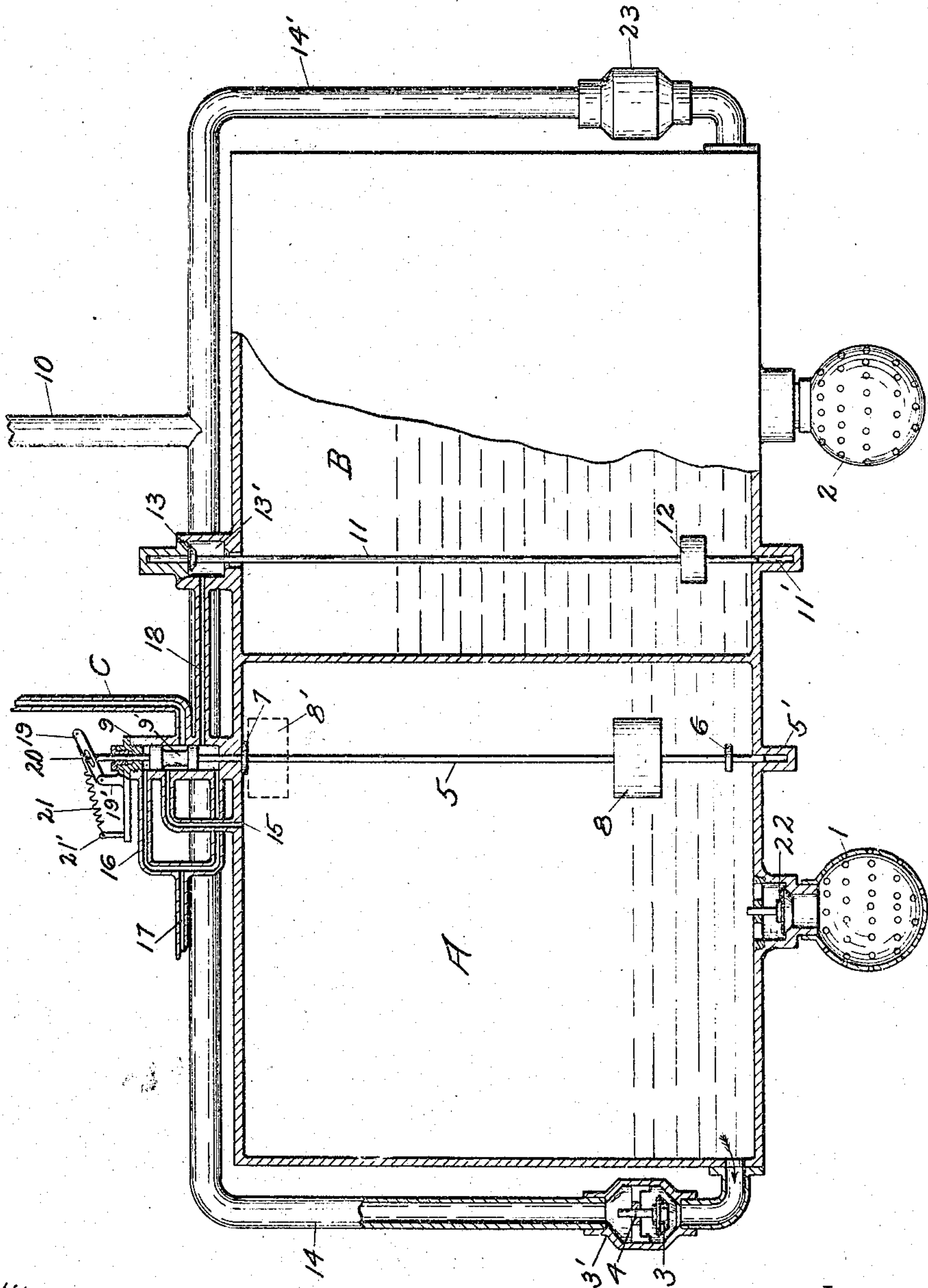


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PNEUMATIC PUMP.
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PNEUMATIC PUMP.

No. 905,210.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, CALEB W. MOORE, a citizen of the United States, residing at Vancouver, in the county of Clark and State of Washington, have invented a new and useful Improvement in Pneumatic Pumps, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to the class of machines in which water is pumped by means of compressed air.

The object of my invention is to provide a pneumatic pump, with a specially arranged valve mechanism operated by a single float in one cylinder. This and other advantages are attained by the mechanism, construction, combination and arrangement of parts illustrated in the accompanying drawings which form a part hereof.

Figure 1 is a view in vertical section with parts not broken away.

A and B are two chambers.

C is a pipe through which pneumatic power is supplied from a convenient source of such power.

1 and 2 are perforated globe receivers, secured to the bottom of chambers A and B respectively and each of them is provided with a foot valve 22 as appears in 1.

Discharge pipes 14—14' extend from near the bottoms of chambers A and B to a common discharge pipe 10. The discharge pipe 14 has a valve chamber 3' within which is a valve 3 provided with a slidably mounted valve stem 4. Within the valve chamber 23 of the pipe 14' is a similar valve.

Within chamber A is a vertical rod 5 mounted at its lower end in a recess 5'. Upon this rod 5, buttons 6 and 7 are rigidly secured in convenient places near its ends. A float 8 is slidably mounted upon the rod 5 between the buttons. The upper end of said rod extends above and without the chamber A and into a cylinder 9. Rigidly secured to the upper end of the rod 5 and within the cylinder 9, is a piston valve 9'. The pipe C opens into the cylinder 9. Extending from the upper and lower ends of the cylinder 9 is an exhaust pipe 16 which opens into a common exhaust pipe 17.

A cylinder pipe 15 extends from near the upper end of the cylinder 9 into the upper end of the chamber A.

A cylinder pipe 18 extends from near the lower end of the cylinder 9 into a valve chamber 13 which opens into the upper end

of the chamber B. The rod 5 also extends upwardly and out of the cylinder 9 and has a transverse pin 20 secured to its upper end, which pin is mounted in the slot of a forked arm 19, pivotally mounted in a bearing 19'. A spring 21 is secured at one end to an arm 21' and to the forked arm 19 at its other end.

Within chamber B is a vertical rod 11 mounted at its lower end in a recess 11'. The said rod has a float rigidly secured in a suitable position near its lower end. The upper end of the rod 11 extends into a valve chamber 13 upon the upper end of the chamber B. Within this valve chamber, the rod 11 is provided with a check valve 13'.

In operation the chambers A and B are submerged. In the position shown chamber A is discharging and chamber B receiving liquid. It will thus be seen that pneumatic power being admitted from the pipe C into the cylinder 9 while valve 9' is in the position shown, the air passes through the cylinder into chamber A by means of the connecting pipe 15 and forces the liquid to close the foot valve 22 and to discharge through the pipe 14. At the same time the foot valve in globe 2 of chamber B is open and water is flowing into the chamber, forcing the air therein through cylinder 13 and pipe 18 out through exhaust pipes 16 and 17 while its valve in chamber 23 is closed by downward pressure. The float 8 is in the dotted line position 8' at the beginning and had then engaged the button 7 and raised the piston valve 9' to the position shown. As the water recedes the float 7 slides downward until it engages button 6 and by its weight in conjunction with the spring 21, depresses the rod 5, which in turn lowers the piston valve 9' to the lower end of its cylinder 9. When this occurs the pipe 15 will be opened through the cylinder into communication with exhaust pipes 16—17, the foot valve 22 opens, admitting the water and the check valve 3 closes by downward pressure in the pipe 14. At the same time the spring 21 holds the rod 5 in the lower position by means of the arm 19, and the power pipe delivers the air pressure through the cylinder 9 and the pipe 18 and valve chamber 13 into chamber B forcing the liquid out of same as previously described regarding chamber A.

The function of the rod 11 in chamber B is to provide against a difference in time or

quantity of water when the air pressure is about to be changed from chamber A to chamber B. That is to say, when chamber B is sufficiently emptied the float 12, by its weight at low water, will depress the rod 11 thereby closing the check valve 13' and preventing any further pressure of air in chamber B should the rod 5 in chamber A not respond at the proper time to move the piston valve 9' and shift the pressure to that chamber. The object of the check valve is therefore auxiliary, while the piston valve 9' is the single air controlling valve of the entire device.

It is my intention that my pump shall be composed of either one or two chambers and the same mechanism I have herein described may be adapted to and placed within and upon a single chamber with like results as herein described and the elimination of one chamber with the use of my arrangement of valves and inlets or outlets for air or liquid will not be a new device composed of a less number of parts than mine. There is no other device known to me in which a single controlling pressure valve is arranged to control pneumatic pressure as mine does. It may be used by fire engines to take water from rivers, for irrigating land, or hydraulic engines.

Reference is hereby made to my application Ser. No. 422,756 filed on the same day, for an improvement in air compressors, and in which a valve mechanism somewhat similar to this is shown but wherein the combinations and arrangements are different.

Having thus described my invention I claim:

1. A pump of the character described, comprising chambers A and B each having a valved liquid inlet at bottom, a valved discharge pipe from near the bottom extending into a common discharge pipe, pressure controlling mechanism consisting of a vertical rod 5 within chamber A, slidably mounted at its lower end in the bottom of said chamber, the rod having rigid buttons thereon near its upper and lower ends and carrying a slidably mounted float between the buttons, a cylinder 9 above chamber A, having a pipe C extending from near its center to a power source, a pipe 15 extending from near its center into the upper end of said chamber, a pipe 18 extending from near the lower end of said cylinder into the upper end of chamber B, exhaust pipes extending from the upper and lower ends of the cylinder, a piston valve 9' rigidly secured within the cylinder upon and near the upper end of the rod 5, valve moving means consisting of a forked arm pivoted at one end and receiving

in slots in its arms a transverse pin of the rod 5 which extends without the cylinder 9, and an actuating spring 21, also auxiliary pressure stopping mechanism, consisting of a vertical rod 11 within chamber B, slidably mounted at its upper and lower ends and carrying a float 12 rigidly secured upon and near the lower end of the rod which extends into a valve chamber 13 at the top of the chamber B, and a downward seating valve 13' within the chamber 13, rigidly secured to the rod 11, substantially as described.

2. In a pump of the character described, having chambers A and B, each provided with valved inlets and outlets, the combination of pressure controlling mechanism consisting of a vertical rod 5 within chamber A, slidably mounted at its lower end in the bottom of said chamber, the rod having rigid buttons thereon near its upper and lower ends and carrying a slidably mounted float between the buttons, a cylinder 9 above the chamber A, having a pipe C extending from near its center to a power source, a pipe 15 extending from near its center into the upper end of said chamber, a pipe 18 extending from near the lower end of said cylinder into the upper end of chamber B, exhaust pipes extending from the upper and lower ends of the cylinder, a piston valve 9' rigidly secured within the cylinder upon and near the upper end of the rod 5, with auxiliary pressure stopping mechanism, consisting of a vertical rod 11 within chamber B, slidably mounted at its upper and lower ends and carrying a float 12 rigidly secured upon and near its lower end, a valve chamber 13, into which the rod extends at its upper end, and a downward seating valve 13' rigidly secured upon and near the upper end of said rod within valve chamber 13, substantially as described.

3. In a pump of the character described, having chambers A and B, provided with valved inlets and outlets and pressure controlling means, an auxiliary pressure stopping mechanism consisting of a vertical rod 11 within chamber B slidably mounted at its upper and lower ends, and carrying a float 12 rigidly secured upon and near its lower end, a valve chamber 13 into which the rod extends, and a downward seating valve 13' rigidly secured upon and near the upper end of said rod within the valve chamber, substantially as described.

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Witnesses:

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