(No Model.)

E. H. WEATHERHEAD.

HYDRAULIC AIR PUMP.

No. 526,762. Patented Oct. 2, 1894.

Fig. 1.

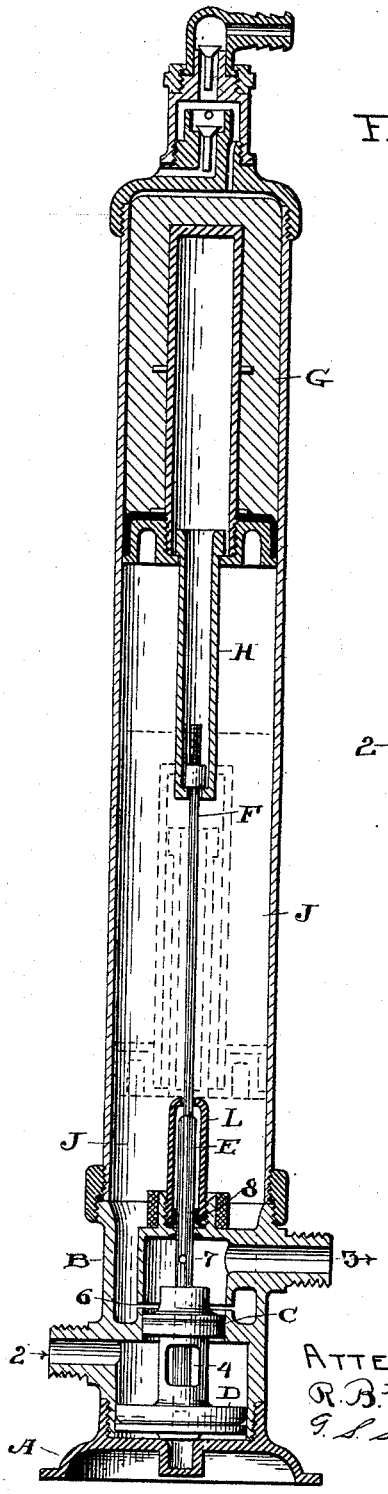
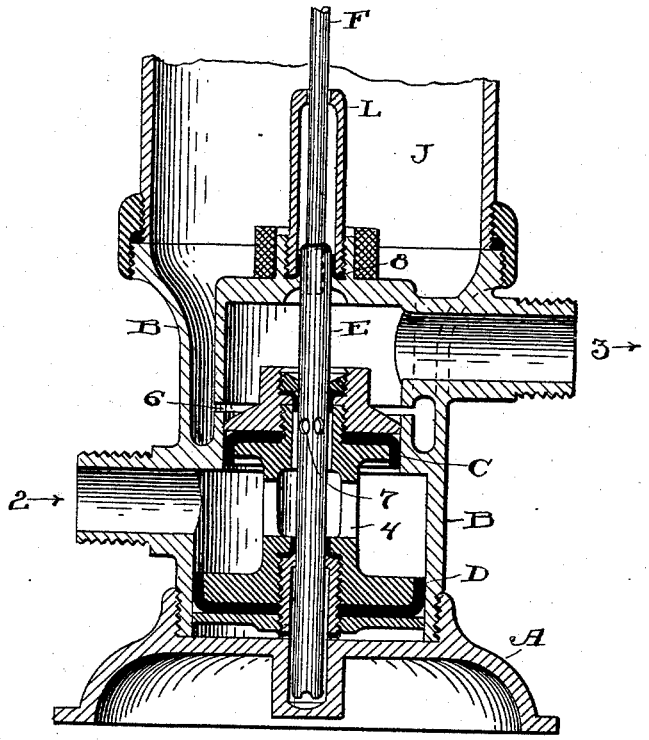


Fig. 2.



ATTEST.
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HYDRAULIC AIR-PUMP.

SPECIFICATION forming part of Letters Patent No. 526,762, dated October 2, 1894.

Application filed March 9, 1894. Serial No. 502,955. (No model.)

To all whom it may concern:

Be it known that I, EDWARD H. WEATHERHEAD, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Hydraulic Air-Pumps; and I do hereby declare that the following is 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 has reference to hydraulic air pumps, and the invention consists in certain parts and combinations of parts substantially as shown and described and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a vertical central sectional elevation of my new and improved pump complete. Fig. 2 is an enlarged vertical central sectional elevation of the pump and its valves, the said pump and parts being in the same position in this figure as they are in Fig. 1 except that the valve tube is down in position to receive water from the main supply to deliver down through its lower end beneath the main piston, as hereinafter more fully described.

A represents the base proper; B the base casing with inlet —2— and outlet —3—.

C is the main valve and D the main valve controlling piston, said parts being rigidly connected by the open neck —4—.

E is a valve tube, which extends centrally through valve C and piston D and is packed in both and designed to have a limited sliding movement therein. A piston or plunger connecting rod F is threaded into or otherwise fixed to the upper end of the tube E, and under certain conditions and positions of associated parts controls the position and relation of said tube to the main valve and piston. Now, these parts in themselves and as associated here are not broadly new, but there is an element or part in this connection which is new alone and in combination. Hitherto in pumps of this style there has been nothing definite to prevent the tube E from being carried up by water pressure independently of the connected parts, which alone should govern its position both as to time and place. Not unfrequently such inpe ndent movement of said tube has occurred especially in cities where the water pressure is high. Thus, suppose the piston or plunger G and telescoping tube or pipe H to be down, as seen in dotted lines, Fig. 1. Then suppose further that they are started up under water pressure issuing into the cylinder J through opening or openings —6— when the valve C is raised above the same. If then the tube E were to immediately follow this upward movement and cover the holes —7— by the packing —8—, and thereby cut off the escape of water from beneath piston D, it will be seen that the pump would be brought to a stand still, as the valve C, in such case, would be held above the port or passage —6— and could not descend below the same as required to reverse the action of the pump. To remedy this defect I provide a dome, cap or stop L into which the tube E extends at its top, and which is constructed to limit the upward movement of said tube, under any circumstances, above operating position. This assures automatic action of the pump whatever the varying conditions of water pressure. The construction and operation of the parts of the pump are in all other respects practically the same as others heretofore patented by me.

Another feature of the invention is found in the tube H. Hitherto the valve rod F has extended directly into the plunger G and there was no intermediate or connecting part H. Now I employ a plunger G as before, but introduce between it and the valve rod F the tube H, which is telescopically connected with the interior of the plunger and slides up and down therein, and the rod F in turn slides in tube H as it formerly did in the plunger. The advantages of this new construction are obvious to one familiar with these pumps. Suppose, for example, that under the old arrangement we had a ten inch cylinder and a five inch plunger. That would give a five inch stroke to the plunger. To increase the length of stroke under that arrangement I would have to increase the length of the plunger, and that would involve additional and undesirable weight and expense; but by introducing a third element, H, I can use the same piston G, and rod F, as before, and then by merely adding, say, five inches to length of cylinder double the

stroke of piston or plunger. Remembering now, that this is an air pump, and that anything which doubles its capacity is of great value and we have some idea of the importance of this improvement. The invention is further emphasized by the simplicity and cheapness with which the change is wrought. Of course this principle could be extended by adding other tubes like H to the arrangement.

The valve and piston mechanism shown in this case is in the main similar to that shown in the patent to Weatherhead, No. 437,806, granted October 7, 1890, and in which the said mechanism is fully described and claimed.

The operation is as follows: Referring to Fig. 1 it will be seen that the main piston and valve C and D are down, and that the water in the cylinder J has just begun to discharge through the water passage —6— and thence out through the exit —3—. This operation will continue until the water is exhausted from said cylinder J, and the plunger G descends to the point shown in dotted lines in Fig. 1. Having reached this point, the plunger will force the rod F, which has the tubular valve E attached thereto, downward so as to carry the opening —7— in said valved tube down to the opening in the neck, which connects the valve C and the piston D, and through which there is open communication with the main water inlet. As soon as this occurs the water will flow into said opening 7 and down thence beneath the piston D, and the said piston and valve C will immediately begin to rise, and in so doing close the exhaust discharge passage —6— and carry the valve C above said passage. Now, having arrived above said passage, the passage is open to the main water supply and there is an inrush of water into the cylinder J and the plunger is carried up into the position shown in Fig. 1. As this occurs the valve E is again reversed in its position in respect to the valve C because it is drawn up through the plunger by the connecting parts F and H and the water below the piston D is then discharged through the opening —7— in the valve E and the said piston and the main valve D descend and this again opens the exit passage —6— above the valve C as shown in Fig. 1. It will be understood that there is a constant pressure present between the main valve and the main piston, but the area of the piston is double that of the valve, and so when the water beneath the piston is discharged through the valve E and out through the opening —7— the said piston will move downward as the discharge occurs and carry the valve C with it. This necessarily opens the passage —6— for the escape of water in the cylinder J.

Having thus described my invention, what I claim is—

1. The main casing provided with ports and ducts and the main valve and piston therein, in combination with the valve tube through said valve and piston and a fixed stop to limit the upward movement of the valve tube, substantially as set forth.

2. The casing having an internal chamber for the main valve and the main valve and piston in said casing, in combination with the valve tube through said main valve and piston, and a stop fixed to and extending above the main valve chamber to limit the upward movement of the valve tube, substantially as set forth.

3. In an hydraulic air pump as described, the main casing provided with ports and ducts and the main valve and piston therein, the valve tube and the cylinder supported on said casing, in combination with the sliding valve tube, the plunger piston, the telescope tube therein and the rod connecting said tube and the valve tube, substantially as set forth.

4. The main casing and the main valve and piston therein, and the cylinder supported on said casing, in combination with a packed and weighted plunger in said cylinder, the sliding valve tube in the main valve and piston, the rod affixed thereto and the part connecting said valve rod with the plunger, substantially as set forth.

Witness my hand to the foregoing specification.

EDWARD H. WEATHERHEAD.

Witnesses:
H. I. FISHER,
GEORGIA SCHAEFFER.