(No Model.)

3 Sheets—Sheet 1.

E. H. WEATHERHEAD.

HYDRAULIC AIR PUMP.

No. 513,254. Patented Jan. 23, 1894.

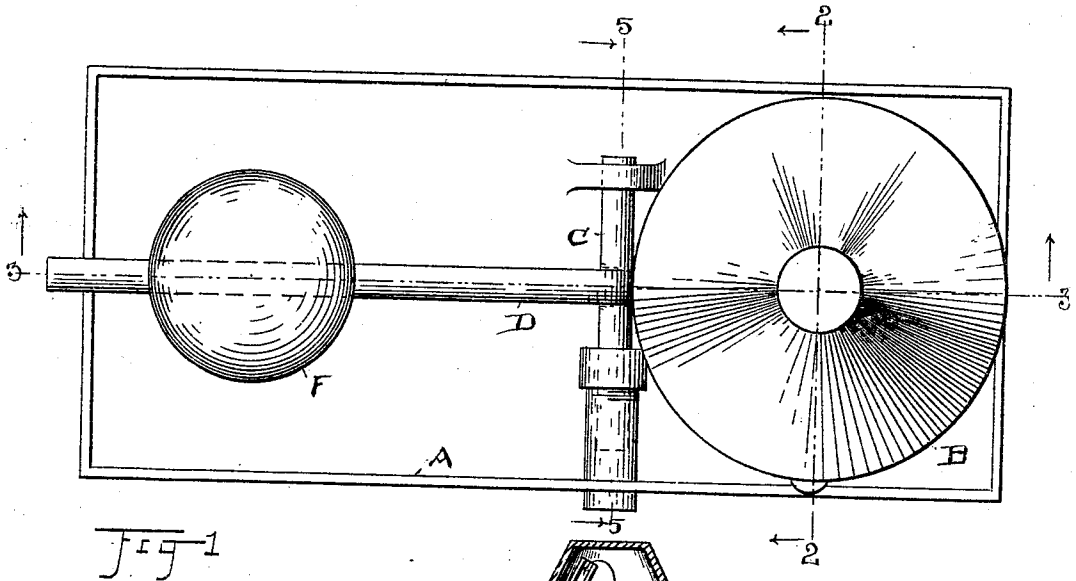

Fig 1

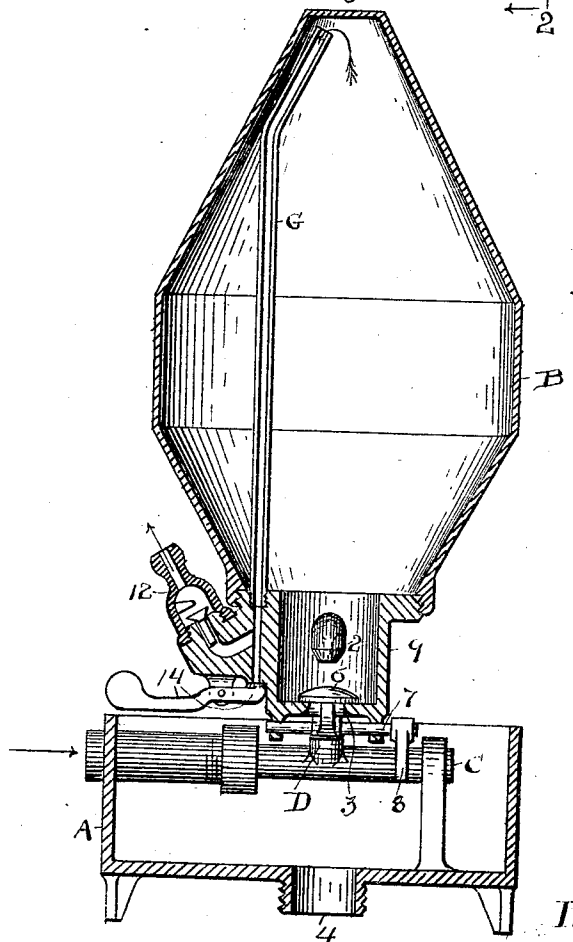

Fig 2

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(No Model.) 3 Sheets—Sheet 2.

E. H. WEATHERHEAD.

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Fig 3

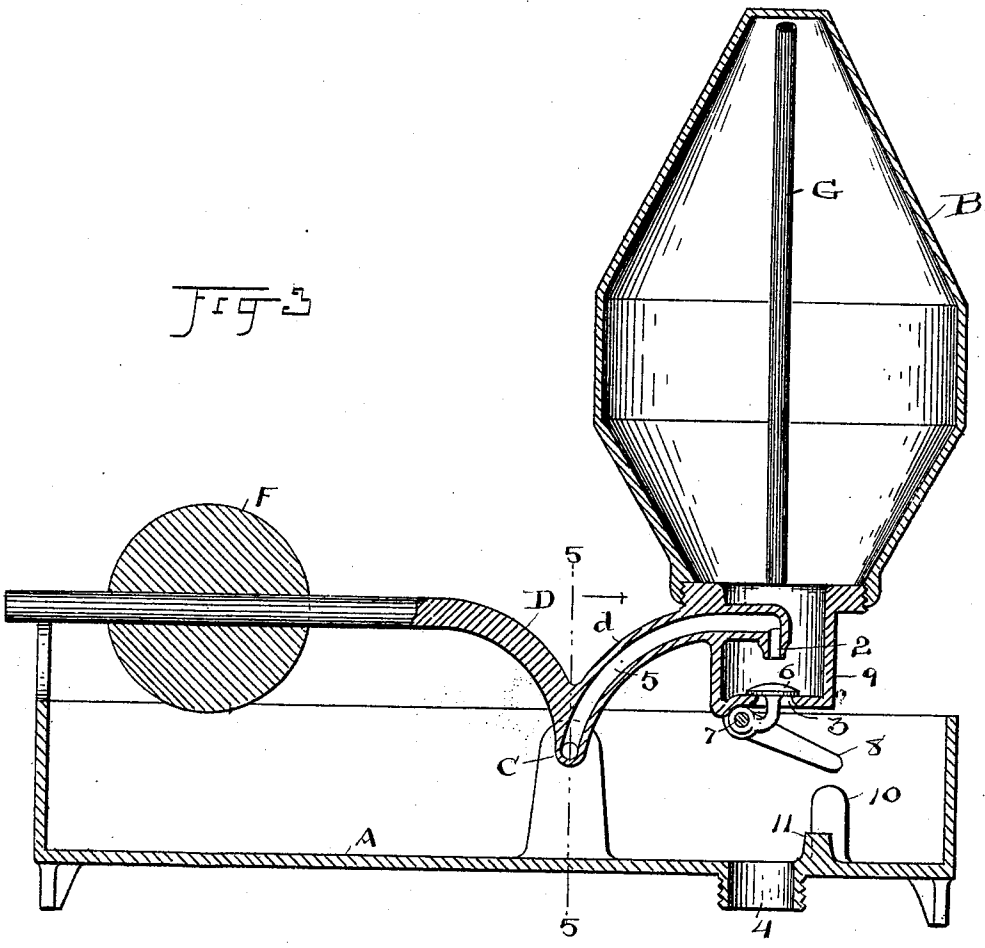
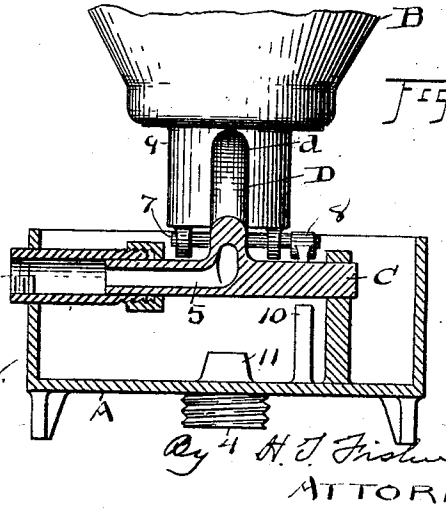


Fig 5



WITNESSES.
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(No Model.) 3 Sheets—Sheet 3.

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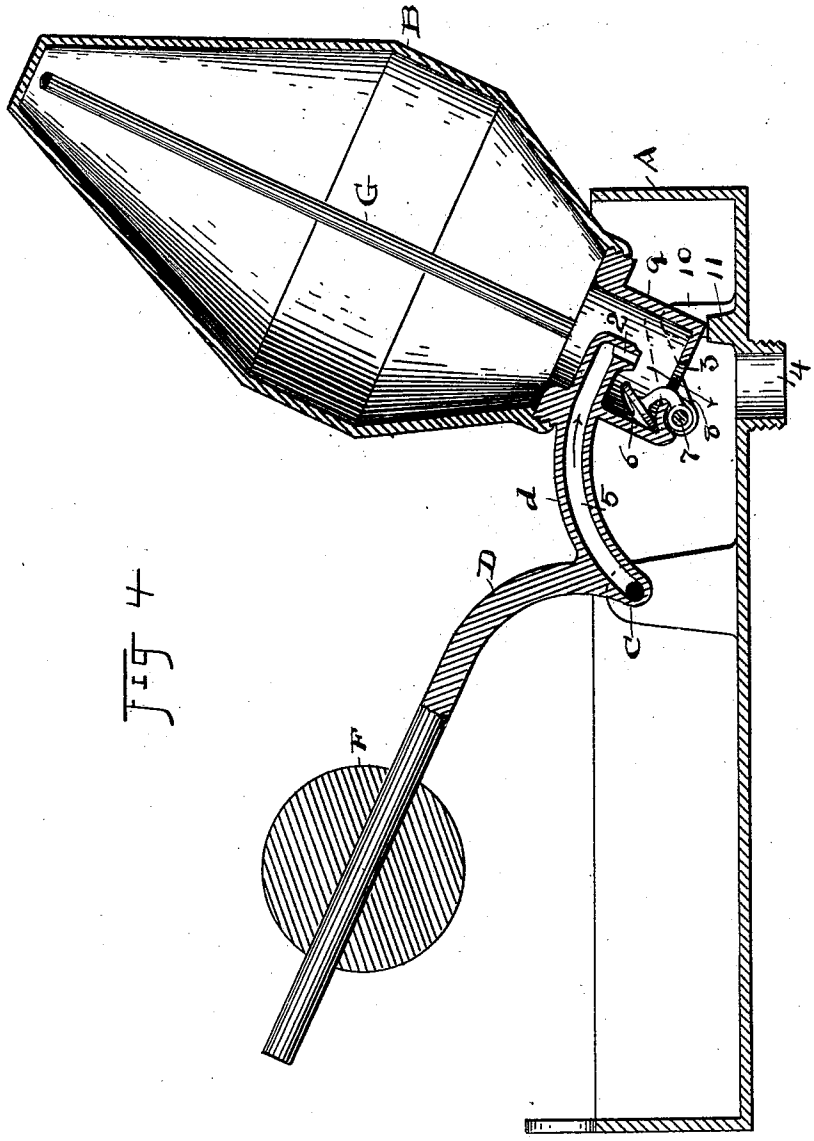

Fig 4

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UNITED STATES PATENT OFFICE.

EDWARD H. WEATHERHEAD, OF CLEVELAND, OHIO, ASSIGNOR TO THE CLEVELAND FAUCET COMPANY, OF SAME PLACE.

HYDRAULIC AIR-PUMP.

SPECIFICATION forming part of Letters Patent No. 513,254, dated January 23, 1894.

Application filed January 31, 1893. Serial No. 460,247. (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, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to hydraulic air pumps, and the invention consists in the construction and combination of parts substantially as shown and described and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a plan view of my improved form of pump, and Fig. 2 is a cross section thereof in elevation on line 2, 2, Fig. 1. Fig. 3 is a longitudinal central vertical section of said pump on line 3, 3, Fig. 1, showing the parts as they appear when the valve is closed and the pump is filling with water. Fig. 4 is a vertical central sectional view taken on a line corresponding to 3, 3, Fig. 1, the same as Fig. 3, but showing the valve open and the pump in a discharging condition. Fig. 5 is a cross section on line 5, 5, Fig. 1, and corresponding to 5, 5, Fig. 3, and designed among other things to show the inlet channel for the water into the pump.

A companion application, of even date of filing, discloses another form of pump in which the broader principles of the pump are more particularly described and claimed. In both cases the fluid inlet opening is contracted or reduced, relatively to the size of the supply pipe, so as to have the water enter the pump in the form substantially of a jet under high pressure; and the inlet is arranged directly opposite the outlet, so that the stream of water, when the pump is discharging, will be injected from the said inlet into and through the outlet, and facilitate the emptying of the pump. This pump, also, like the one above referred to, is automatic in its operations, and depends for its operation upon the relative pressures of the air compressed by the pump and the water which is the motor and compressing fluid. When the two pressures become equalized the pump of course ceases to act for the time being, but the moment the atmospheric pressure produced by the pump falls below that of the water pressure, the pump will resume operations and continue until the two pressures are again substantially equalized. It thus appears that the pump is made to keep up a normal atmospheric pressure on the air side, and it maintains such conditions of its own operation.

A represents a base support resembling a pan in appearances, and having the operating mechanism supported therein.

B represents the air and water chamber supported upon a rocking spindle or shaft C. This shaft or spindle has a water passage entering one end thereof and continuing through the tubular inner extremity of the arm D, shown here as integral with the said shaft into the said chamber. A contracted inlet 2 is formed at the inner terminus of the inlet water passage, and in the immediate bottom of the said air and water chamber is a discharge opening 3 directly opposite said reduced inlet opening 2, so that the water injected through said opening discharges through the opening 3 and passes thence through the opening 4 in the bottom of the base pan A to the waste pipe. The curved extremity *d* of the arm D, which is shown as integral with both the bottom of the air and water chamber and the shaft C, forms the immediate support for said air and water chamber, and the arm or lever D extends outward beyond the pivot C supporting all said parts and carries a counterweight F, adjustable thereon to fix it in the proper working position.

It will be observed that there is no valve interposed in the pump for controlling the inflow of water, and it is of the essence of my invention that there shall be an unobstructed and continuous pressure of water at all times maintained through the channel 5 and the injector or nozzle 2 into the bottom of the air and water chamber; and valve 6 is fixed upon a spindle 7 and arranged with its neck extending through the discharge opening 3 so as to seat on the inside of said opening, when the chamber is tilted back. The short arm 8 on

the outside of the cup shaped bottom 9 of the air and water chamber is fixed upon the spindle 7 and serves to open the said valve when the pump has been filled and tilts forward to discharge, as seen in Fig. 4, when said arm comes down on stud 10, which forms a stop therefor. The parts then remain in this position until the water is practically discharged from its chamber and the counterweight F overbalances the weight of said chamber and restores the parts to the position seen in Fig. 3. Both the valve and the arm 8 contribute to reseat the valve, and then the pump is again closed and ready to be filled with water, as before stated. The pump chamber when it is tilted rests on the stop lug 11, or its equivalent, and the counterweight F may be adjusted upon its arm as the service may require.

An air conveying pipe G, having its inlet near the top of the air and water chamber, extends downward through said chamber to the bottom thereof, where it has a valved outlet 12, whence the air is conveyed where it is wanted. The inlet air passage for the chamber is likewise through this pipe G, and the said inlet is controlled by the valve and valve stem 14. When the said chamber B swings on its pivot, the said valve stem 14 bears upon the edge of base A and opens the inlet air passage. Any suitable construction whereby these inlet and outlet passages for air can be controlled may be employed.

The counterweight F may be placed so that the chamber B will tilt when full or partly full, as may be thought best, and the pump will always stop with the valve 6 closed and with more or less water in the chamber B. Hence, no water is wasted when the pump is not at work.

Having thus described my invention, what I claim is—

1. In a hydraulic air pump, a counter-balanced air and water chamber, a valved discharge opening in the bottom of said chamber, and a valveless water inlet furnishing a continuous supply of water to the pump and opening in direct line with the discharge opening, whereby an ejecting stream is produced through said discharge opening, substantially as set forth.

2. In a pump of the kind described, a pivotally supported air and water chamber having a discharge opening in its bottom, a valve to close said opening, and a valveless water inlet furnishing a continuous supply of water to the pump and having an opening of smaller size than the discharge opening and arranged opposite the discharge opening, substantially as set forth.

3. A hydraulic air pump having a discharge opening in its bottom, a valve to close said opening, and a valveless and unobstructed water inlet furnishing a continuous supply of water to the pump, said inlet having a discharge or delivery end smaller than the outlet passage and arranged opposite the water outlet passage, in combination with a pivoted arm on which said chamber is supported, and a counter-balance for said arm, substantially as described.

4. The air and water chamber herein described having a valveless and unobstructed water inlet within its lower part and a valved discharge opening below said inlet and in line therewith, a pivoted arm supporting said chamber at one end and a counter-balance on the other end, and means to open said outlet valve when the chamber is filled, substantially as described.

5. In a hydraulic air pump, the base, the air and water chamber supported upon a counter-balance arm on said base, a discharge opening in the bottom of said chamber having a valve opening inward and an arm outside controlling said valve, a valveless water inlet smaller than the outlet, and above said outlet and in line therewith and furnishing a continuous supply of water to said air and water chamber, and an air passage connected with the top of said chamber, substantially as described.

Witness my hand to the foregoing specification.

EDWARD H. WEATHERHEAD.

Witnesses:

H. T. FISHER,

GEORGIA SCHAEFFER.