No. 698,236. Patented Apr. 22, 1902.

J. WEYAND.

HYDRAULIC AIR COMPRESSOR.

(Application filed Dec. 18, 1901.)

(No Model.)

Fig. 1.

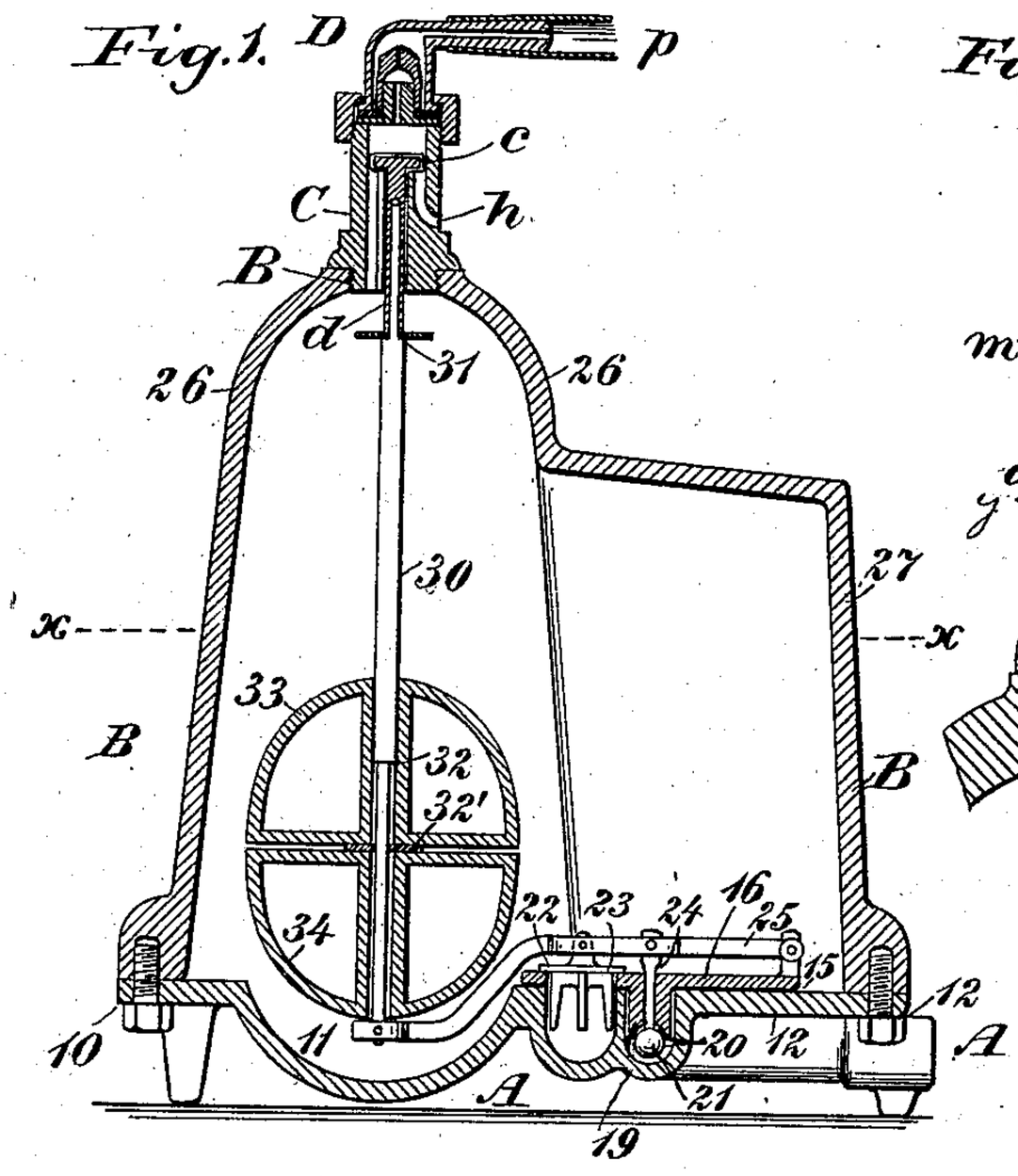


Fig. 2.

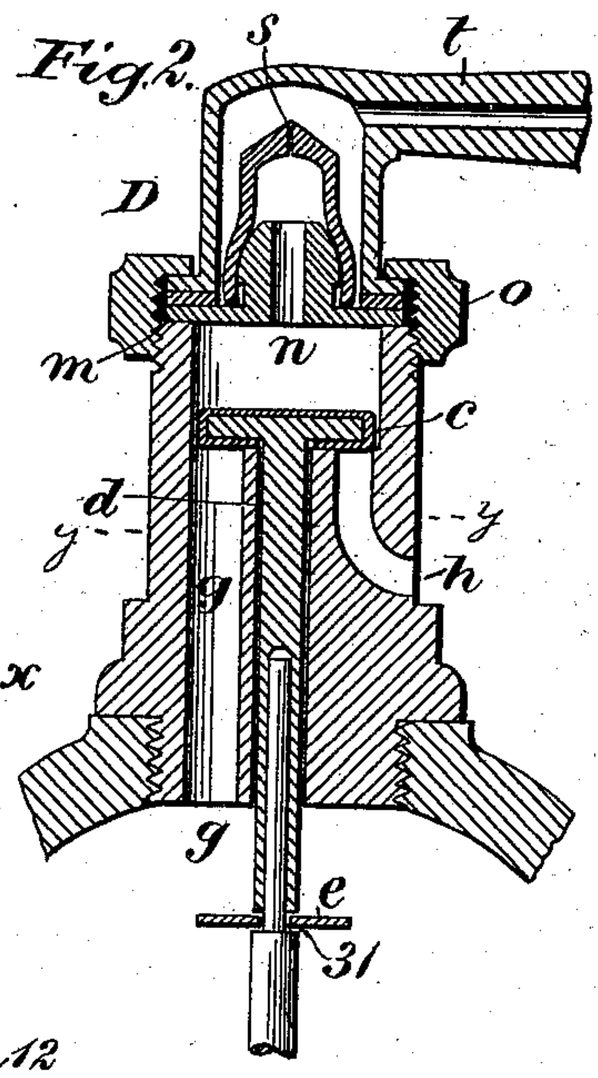


Fig. 3.

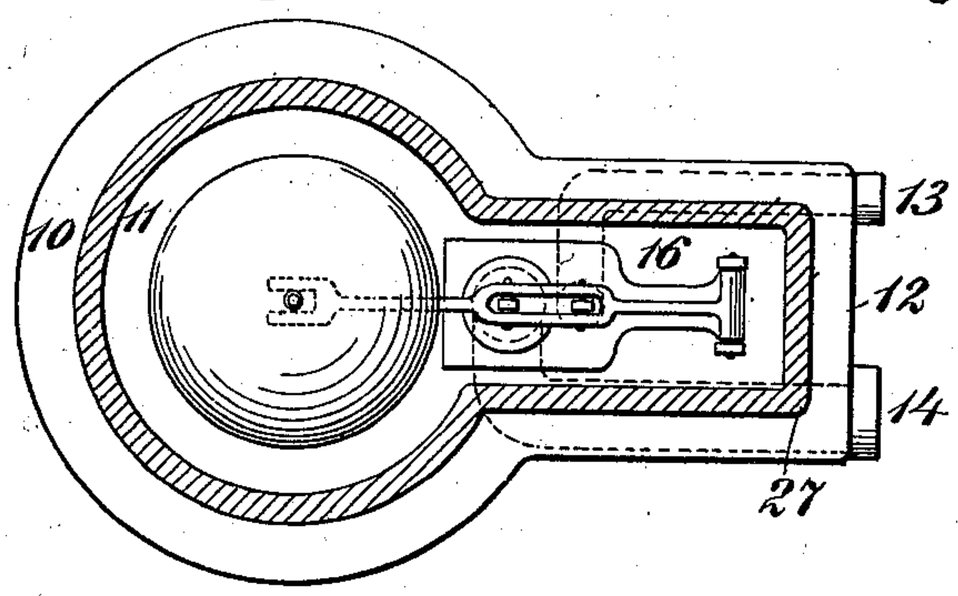
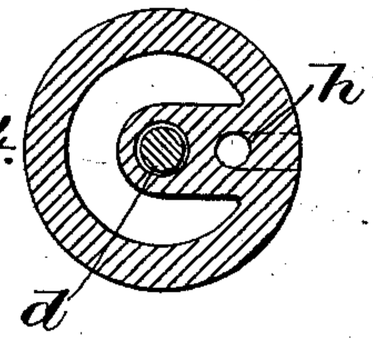


Fig. 4.



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HYDRAULIC AIR-COMPRESSOR.

SPECIFICATION forming part of Letters Patent No. 698,236, dated April 22, 1902.

Application filed December 18, 1901. Serial No. 86,445. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH WEYAND, of Guttenberg, in the county of Hudson and State of New Jersey, have made certain new and useful Improvements in Hydraulic Air-Compressors, of which the following is a description, reference being had to the annexed drawings.

My invention relates to that class of hydraulic air-compressors which work automatically and are employed to supply and maintain air-pressure upon liquids contained in casks or tanks to force such liquid through suitable discharge-pipes, so that it may be conveniently drawn off at a higher level when desired.

My present invention relates to improvements in the air-compressor described in Patent No. 415,931, granted to Joseph Weyand and William Lang, November 26, 1899, and is designed to overcome defects in automatic air-compressors heretofore in use. The improved features are more particularly shown in the drawings annexed, in which—

Figure 1 is a vertical central upright section of my apparatus. Fig. 2 is an enlarged view of the outlet device at the top of Fig. 1. Fig. 3 is a cross-section of the apparatus at the line $x\,x$, Fig. 1. Fig. 4 is cross-section at $y\,y$, Fig. 2.

A is the base, which is cast or otherwise formed of any suitable metal and is preferably shaped to have a circular section 10, provided with a central circular cavity 11, and an essentially rectangular section 12, having elbow-tubes 13 and 14 integral with the under side. The tube 13, which is a water-inlet tube, extends horizontally parallel with one side edge of the base-section 12 and preferably transversely to an abutment with the longitudinal member of the opposite parallel tube 14, which latter tube constitutes the water-outlet. The transverse member of the outlet-tube 14 is preferably located between the base depression 11 and the corresponding member of the inlet-tube, ordinarily near the latter, as shown by dotted lines in Fig. 3.

Upon the upper face of the base-section 12 a flexible washer 15 is secured by a plate 16 bearing thereon, which plate is screwed or otherwise detachably secured to the base.

In the washer 15 and the base A a preferably round opening is produced, leading directly into the transverse member of the inlet-tube 13, which opening is adapted to receive a vertically-bored boss 19 upon the under face of the plate 16, the bore extending through the plate and the boss being of sufficient length to project about half-way into the said tube 13, as shown in Fig. 1.

The wall of the lower end of the bore in the boss 19, which constitutes a valve-opening 20, is concaved to form a seat for a ball-valve 21. A preferably larger and similar opening 22 is made in the plate, washer, and base leading into the transverse member of the outlet-tube 14, which opening is capable of being closed at the top by a disk valve 23. The ball-valve 21 is provided with a stem 24, loosely carried up through the valve-opening 20 and pivotally secured in any approved manner to a lever 25, fulcrumed at one end between posts projected upward from the rear end of the plate 16. The disk valve 23 is also provided with a stem attached to the said lever. The valve-lever 25 extends longitudinally over the plate 16 and downward in a curved line within the base-cavity 11, terminating over the center of the latter.

Upon the base A a perpendicular casing or shell B is bolted or otherwise secured, the said shell consisting of an essentially conical section 26 and a rectangular section 27, the side and end walls whereof are preferably inclined upward. The rectangular section 27 does not extend to the top of the conical section and may be cast integral with it, as shown in Fig. 1.

A float-rod 30 extends from top to bottom of the shell centrally through the conical section, as shown in Fig. 1, in which it will be observed that the central portion of the rod between the ends is of larger diameter than the ends, whereby upper and lower shoulders 31 and 32 are formed.

Two hemispherical floats 33 and 34 are held to slide upon the rod 30. The lower float is limited in its upward movement by the lower shoulder 32, which it cannot pass. I utilize a washer 32′ at this point to assure greater certainty of contact. The upper float, however, is free to rise upward until it contacts with the inner upper surface of the conical top of the shell B. The contour of the shell at this

point is such as to neatly receive the upper float. At the top of the conical portion I provide a threaded outlet B, into which is screwed a valve-tube C. In the valve-tube C is formed a seat for a sliding valve *c*, having a hollow stem *d*, which stem extends down through the valve-seat into the interior of the conical section and fits over the upper reduced portion of the float-rod, so as to rest on a sliding disk or washer *e*.

The valve *c* is slightly smaller than the interior circumference of the valve-tube and does not exactly fill it, as will be seen in Fig. 2. The valve-seat is provided with an opening *g*, leading down into the interior of the conical chamber, by cutting away one side of the valve-seat, as shown in Fig. 4.

In the face of the valve-seat I provide a hole or vent *h*, which extends through the outer wall of the valve-tube. The location of the vent-hole *h* in the valve-seat is such that the valve will rest on and closely cover and close such outlet-vent *h* when resting on the seat. The opening *g* to the interior of the conical section, however, is never completely closed, as the valve does not contact with the interior walls of the valve-tube, as is shown in Fig. 2.

At the top of the valve-tube is a cover-plate carrying a nipple *n*, covered with a flexible jacket *o*, in which is a slit *s* at the top over the bore of the nipple. (Shown in Fig. 2.) Over the nipple and flexible cap is the outlet-chamber D, having a stem *t* to connect with the pipe *p*, through which the compressed air is conducted away for use.

In operation the floats being one upon the other in the bottom of the shell B the disk valve 23 is closed over the outlet-opening 22 and the inlet-opening 20 is opened, so that the water entering through the inlet-tube 13 passes up through the valve-opening 20 into the interior of the shell, whereupon the two floats 33 and 34 are elevated and create an air-pressure in the shell, which bearing downward will retain the disk valve 23 in a closed position. The floats 33 and 34 commence to rise with the inflow of water. The float 34 is arrested by the disk 32′ when it reaches the shoulder 32 on the rod 30. The float 33, however, will continue to rise until it reaches and raises the disk *e* at the base of the stem of the valve *c*, which opens the vent *h*, when the air will immediately flow through it to release the pressure on the interior of the casing and at the same time lift the disk valve 23, allowing the water to flow out through the pipe 14. The elastic jacket on the nipple *n* prevents the return of any compressed air through the stem *t*. It will be observed that when the floats rise so as to raise the valve *c* the upper side of the valve will be pressed against the under side of the cover-plate *m* and close the outlet through the nipple *n*.

The outlet-chamber D and nipple-plate *m* are secured to the valve-tube by means of a coupling-nut *o*, suitable packing being used to make the connection air-tight.

When the floats have reached their lowest limit on the central rod, the conditions will change, the combined weight of the floats being sufficient to bear down the lever 25 and close the disk valve 23, at the same operation opening the valve at 21. The water commences again to flow into the chamber through the inlet-pipe, compressing the air in the chamber, which is forced off through the supply-pipe *p*.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination with a shell having water inlet and outlet openings a lever pivoted within the shell, two valves controlling the said openings and connected with said lever and a vertical rod connected at its lower end with the said lever and provided with vertically-sliding floats the lower float having a limited upward movement on the rod to raise it, of air-delivery and air-vent in the upper end of the shell and a valve covering the air-vent raised by the direct action of the upper float substantially as shown and described.

2. In a hydraulic air-compressor the combination with shell provided with water inlet and outlet openings a lever pivoted within the shell, valves attached to said lever and controlling said openings, a vertical rod pivotally connected at its lower end to said lever and floats movable up and down upon said rod of a valve-tube provided with air-delivery and air-vent, a nipple forming a continuation of the delivery-channel, a flexible apertured jacket covering the nipple, a valve controlling the air-vent, said valve having a hollow stem adapted to slide over the upper end of the float-rod and capable of being operated by contact with the upper one of said floats substantially as shown and described.

3. In a hydraulic air-compressor a shell provided with water inlet and outlet openings, a lever pivoted within the shell, valves attached to said lever and controlling said openings, a vertical rod pivoted to one end of the valve-lever, and floats movable up and down upon said rod in combination with a valve-tube provided with air-delivery and air-vent a nipple forming a continuation of the delivery-channel, a flexible apertured jacket covering the nipple a nozzled cap surrounding and a valve controlling the air-vent with a hollow stem adapted to slide over the float-rod and capable of closing the delivery-outlet by contact with the upper one of said floats substantially as shown and described.

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Witnesses:
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