(No Model.) 2 Sheets—Sheet 1.

G. CHAMBERLIN.

AIR COMPRESSOR.

No. 376,141. Patented Jan. 10, 1888.

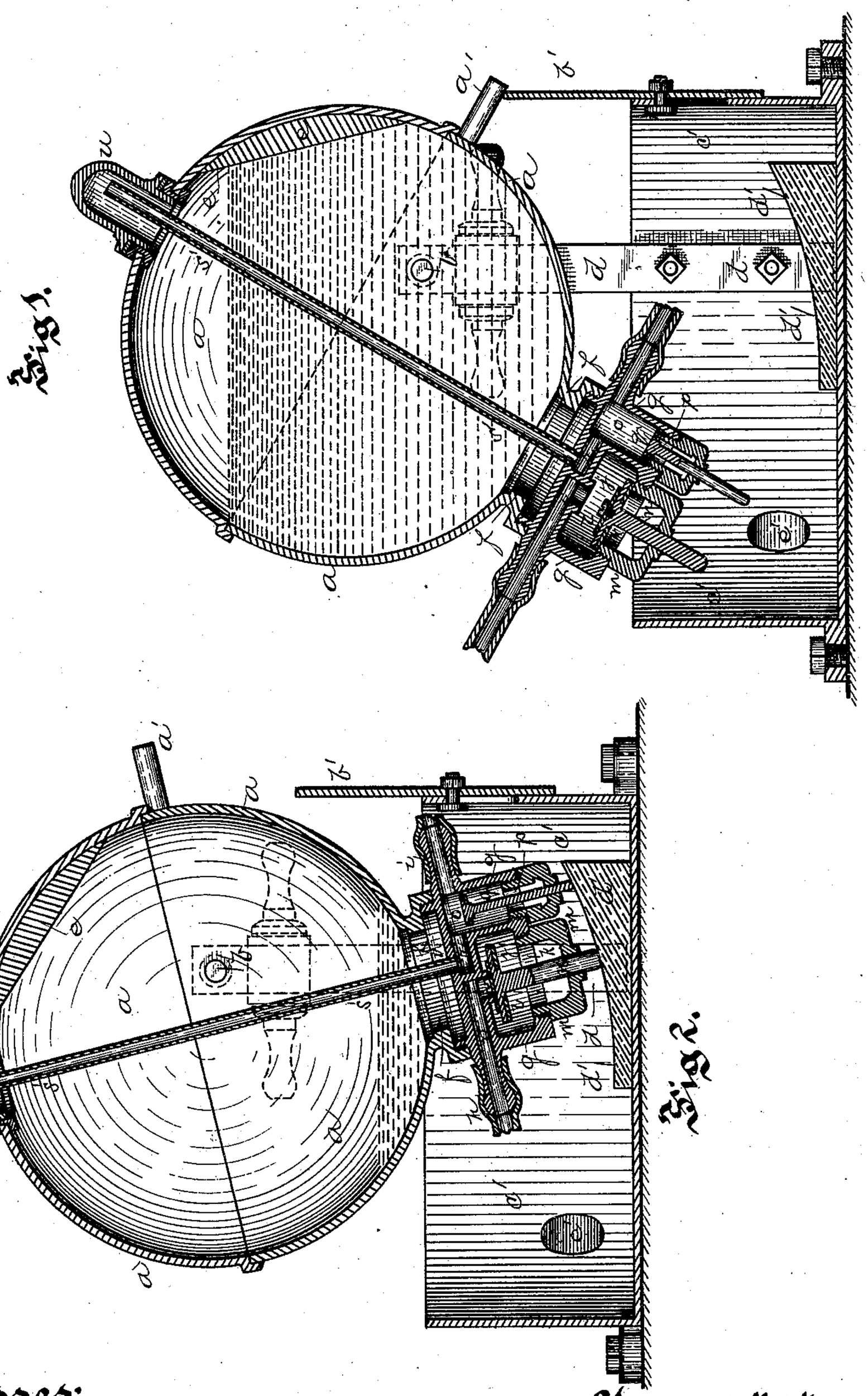

Fig. 1.

Fig. 2.

Witnesses:
J. R. Cooke
N. D. Stockwell

Inventor.
George Chamberlin
By James D. Kay
Attorney

(No Model.) 2 Sheets—Sheet 2.

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Fig 3.

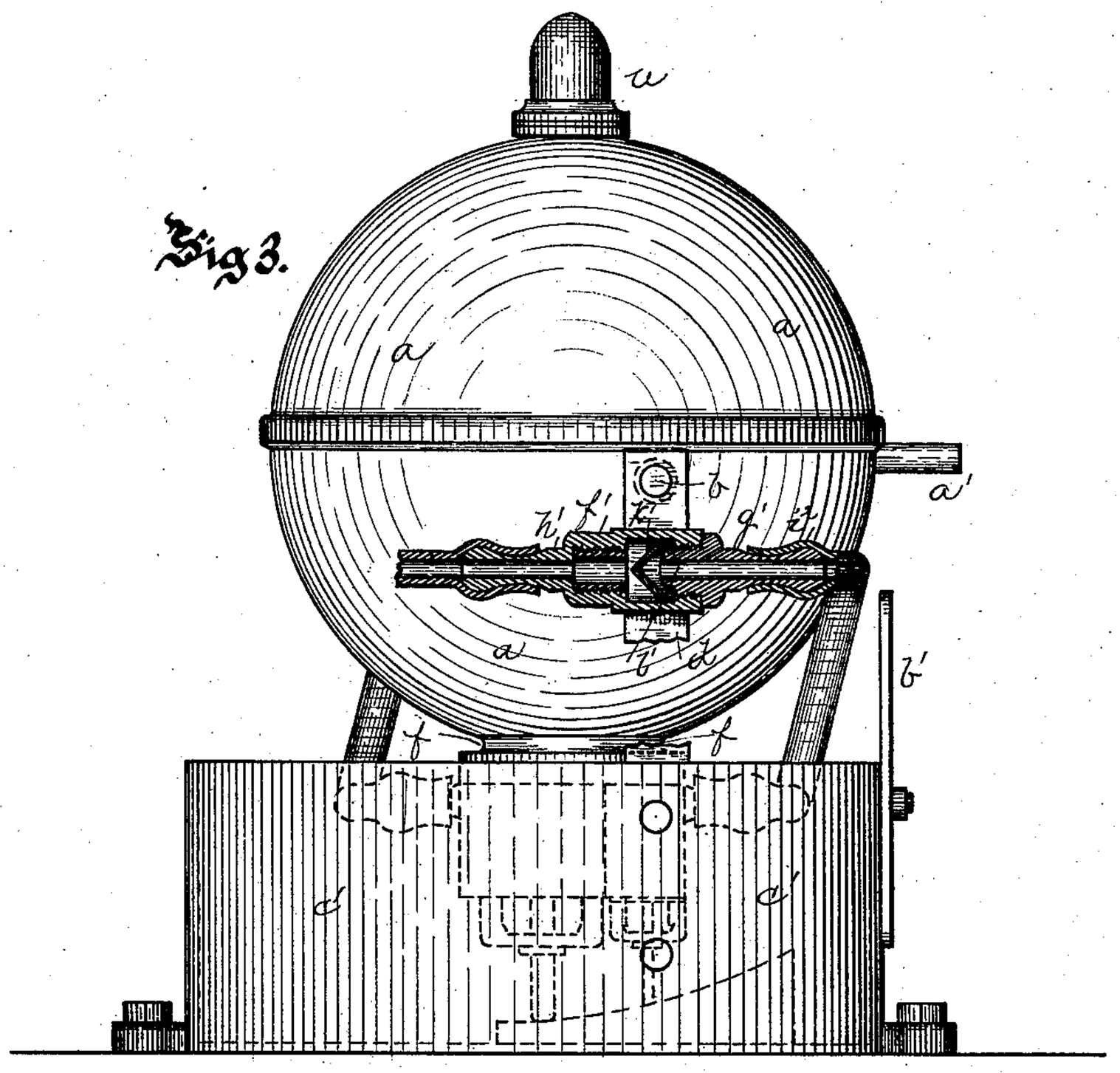
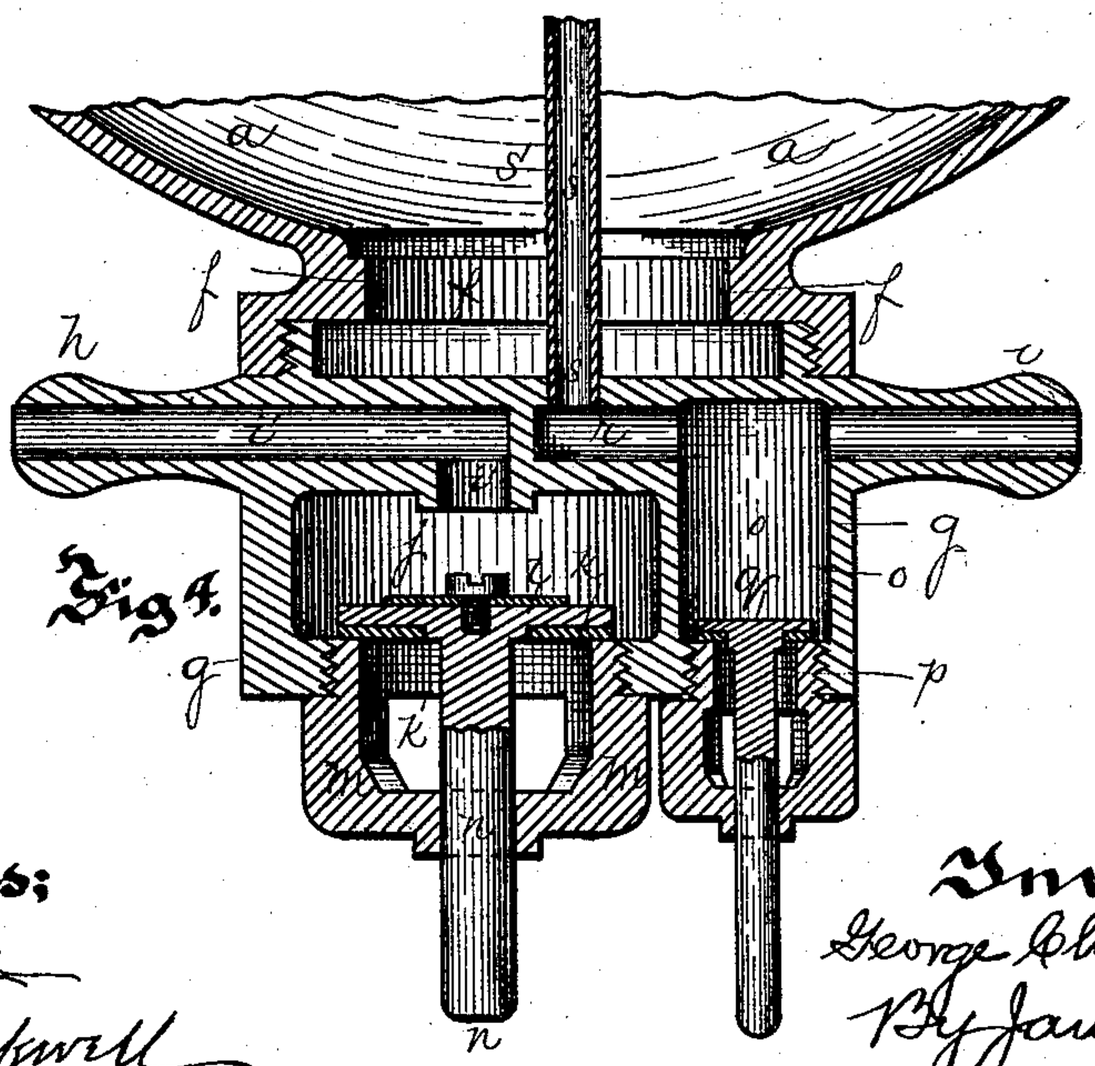


Fig 4.



Witnesses:
J. R. Cooke
N. S. Stockwell

Inventor.
George Chamberlin
By James L. Ray
Attorney

UNITED STATES PATENT OFFICE.

GEORGE CHAMBERLIN, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO JAMES CHAMBERLIN AND JAMES G. CORCORAN, BOTH OF SAME PLACE.

AIR-COMPRESSOR.

SPECIFICATION forming part of Letters Patent No. 376,141, dated January 10, 1888.

Application filed March 15, 1887. Serial No. 230,948. (No model.)

To all whom it may concern:

Be it known that I, GEORGE CHAMBERLIN, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Air-Compressors; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to air-compressors, and more especially to the class of hydraulic compressor used for maintaining a pressure on beer or other liquors in barrels to prevent the same from becoming stale while on draft by the escape of gas therefrom, and also aid in elevating the same to the spigot.

These compressors as heretofore constructed, consisted of a compression chamber or globe in which the water was received and discharged after compressing the air therein, the chamber being pivoted to a fixed support and provided on the other side of the pivot with a weighted arm, and also provided with an inlet and outlet valve for the water, as well as an inlet or vent valve for the air, and a discharge-pipe for the compressed air, which valves were operated by the rocking of the globe on its pivot by the water and the counterpoise.

The object of my invention is to simplify this construction by dispensing with the counterpoised arm, whereby the compressor is made more compact and requires less space for its operation, and to so arrange the valves and their operation that the separate vent-pipe is dispensed with and the compressed-air discharge-pipe serves both as a vent and as a discharge-pipe, and also to simplify the construction of the discharge and inlet valves; and in improvements in certain other parts of the machine, all of which will be more fully hereinafter set forth.

To enable others skilled in the art to make and use the invention, I will describe the same, referring to the accompanying drawings, in which—

Figure 1 is a vertical central section of the compressor, showing the position of the parts during the time the air is being compressed. Fig. 2 is a similar section showing the position of the apparatus when nearly all the water has been discharged and the valves are open. Fig. 3 shows a side view of the apparatus, and Fig. 4 is an enlarged sectional view of the valve attachment.

Like letters refer to like parts in each of the figures of the drawings.

The compression chamber or globe *a* is swung on pivots *b*, which are supported in bearings in the standards *d* on each side of the chamber or globe, said pivots being placed at one side of and below the center of the chamber; and secured to the interior or exterior of said globe or chamber above the pivots, by any suitable means, is the counterpoise material *e*, so located as to make the center of gravity, when the globe is empty, above and on one side of the line of support, which gives a quick return to the globe, as hereinafter set forth. This counterpoise material, which may be of lead poured into the globe while molten and allowed to cool when in the proper position, extends partly over one side of the vertical plane, passing through the pivots, when the globe is tipped by the weight of water to the opposite side of the vertical central line, as in Fig. 2, so that the last modicum of water may run out before the chamber or globe cants back to its normal position to be again filled with water. The lower part of this chamber *a* is provided with a flanged orifice, *f*, into which fits the valve-casing *g*, which is provided with nipples *h* and *i*.

Through a passage, *i'*, in the nipple *h*, the water-supply passes into the chamber *j* in the casing *g*, which chamber communicates with the orifice *f* in the globe and has at its lower end an outlet-orifice, *k*, closed by a puppet-valve, *l*, which valve also serves, when raised, to close the end of the passage *i'* and prevents the water from flowing into the chamber. This outlet-orifice *k* has screwed therein a skeleton nut, *m*, which serves to guide the rod *n* of the puppet-valve in its vertical movement. On the opposite side of the casing *g* the nipple *i* leads, by a suitable passage therein, to a chamber, *o*, within the casing, which chamber has at its lower end an outlet-orifice, *p*, closed by a puppet-valve, *q*, and at its upper end communicates, by a passage, *r*, with a pipe, *s'*, which extends up into the compression-chamber *a*, the latter being provided with

a cap, *u*, Fig. 1, screwed therein on its top, in which the pipe *s* terminates, so that the compression-chamber may be nearly filled with water without danger of the latter running down the pipe.

The rear of the compression-chamber *a* is provided with a lug, *a'*, which, when the chamber is in its normal position, rests on a vertically-adjustable support, *b'*, attached to the waste-water vessel *c'*, to which vessel the standards, which support the compression-chamber pivots, are attached. This vessel is provided on its bottom with a cam-surface, *d'*, for operating the puppet-valves *l* and *q* by acting on their valve-rods, as hereinafter described, and with a suitable outlet, *c'*, for the escape of the waste water therefrom. The tubing which supplies the apparatus with water from the hydrant, and that which conveys the compressed air to the beer keg or barrel, may be attached directly to the nipples *h* and *i*; but to prevent the loss of power due to the dragging of the tubing to and fro as the compression-chamber rocks on its pivots, I prefer to arrange the tubing as follows: Attached to each standard *d* is a sleeve, *f'*, in which are screwed at each end nipples *h'* and *g'*, over one of which, say *g'*, fits the end of a piece of tubing, i^2, which at its other end is attached to the nipple *i* of the valve-casing *g*, and to the other nipple, *h'*, is attached the tubing which conveys the compressed air to the beer-barrel. One of the nipples on the other side of the chamber *a* is attached to the nipple *h* of the valve-casing, and the other has attached to it the tubing which conveys the supply of water from the hydrant to the apparatus.

For the purpose of preventing the escape of the compressed air back into the apparatus when the latter is discharging the water, a check-valve, *k'*, is placed in the sleeve *f'*, which valve may be of any suitable construction, or, as shown in the drawings, consisting of a rubber cone having a slit in the apex, which cone is attached to a projecting end, *l'*, on the inner end of the nipple *g'*. By this arrangement of tubing the compression globe or chamber may swing on its pivots without material retardation from the tubing attached to it, as that tubing does not drag to and fro, as would be the case were it attached directly to the nipples *h* and *i*.

The operation of the apparatus is as follows: The globe *a* being in the position shown in Fig. 1, that is, with the lug *a'* resting on the adjustable support *b'*, the puppet-valves *l* and *q* by their weight fall, so as to close the outlets *k* and *p*, which allows the water to enter the compression-chamber *a*, through the passage *i'*, into the chamber *j*, thence through the opening *f* into the compressor, where the air, as the water rises therein, is gradually compressed, and is conveyed through the pipe *s*, passage *r*, &c., to the storage-reservoir or other place. As soon as the water in the chamber has reached a sufficient height to overcome the weight of the counterpoise material, the globe *a* tips on its pivots to the position shown in Fig. 2, that is, on the other side of the central line. During this movement the valve-rods of the puppet-valves strike against the cam-surface *d'*, and are forced upward, so that the water can flow out of the outlet *k*, and the inflow of the water into the apparatus prevented, by the valve *l* pressing against the end of the passage *i'*, closing the same. At the same time the valve *q* is forced up, so that air necessary to vent the compression-chamber may pass in at the inlet *p*, and thence up through the tube *s* to the chamber *a*. The moment the last of the water has run out of the chamber *a*, the counterpoise material *e* causes the globe *a* to return to its normal position by an accelerated movement, and the valves *l* and *q*, being no longer held up by the cam-surface *d'*, drop back, so as to close the air-inlet and water-outlets *p* and *k*, which allows the water to enter the chamber *a* and again compress the air therein, this operation continuing as long as a supply of water is furnished to the apparatus.

By means of the adjustable rest *b'* the globe *a* may be given more or less inclination when in its normal position, so that the quantity of water required to fill and tip the apparatus may be varied.

It will be seen that the apparatus is very much simplified, as the pipe which serves as a discharge-pipe for the compressed air also serves as a vent-pipe when the water is being discharged from the compression-chamber, and the counterpoise, being attached directly to the compression chamber or globe, condenses the apparatus and materially reduces the cost of manufacture.

Having now described my invention, what I claim is—

1. In a hydraulic air-compressor, the combination, with a pivotally-mounted compression-chamber, of an air discharge and vent pipe extending up into said chamber, said pipe having at its lower end inlet and outlet orifices and a valve for opening said inlet-orifice, substantially as described.

2. In a hydraulic air-compressor, the combination, with a pivotally-mounted compression-chamber, of a valve-casing attached to the lower end of said chamber, said casing being divided into two chambers, one of which has an inlet and an outlet for the water, and a valve for closing said inlet and outlet, and the other chamber being provided with an inlet and outlet for the air, and a valve for closing said inlet, with a discharge and vent pipe connected to the second of said chambers and extending up into the compression-chamber, substantially as described.

3. In a hydraulic compressor, the combination of a compression-chamber, a cap secured to the upper part of said chamber, and an air-discharge pipe extending up within said chamber into said cap, substantially as described.

4. In a hydraulic air-compressor, the com-

bination of a supporting-frame, a pivotally-mounted air-compressor chamber having an inlet for the water and an outlet for the air, with fixed nipples to which the water-supply tubing and the compressed-air delivery-tubing are attached, said nipples being mounted on the supporting-frame, and flexible tubing for connecting said fixed nipples with the outlet and inlet on the chamber, substantially as described.

In testimony whereof I, the said GEORGE CHAMBERLIN, have hereunto set my hand.

GEORGE CHAMBERLIN.

Witnesses:

J. N. COOKE,

N. S. STOCKWELL.