

No. 631,994.

Patented Aug. 29, 1899.

P. H. MONTAGUE.

AIR COMPRESSOR.

(Application filed May 29, 1899.)

(No Model.)

Fig. 1.

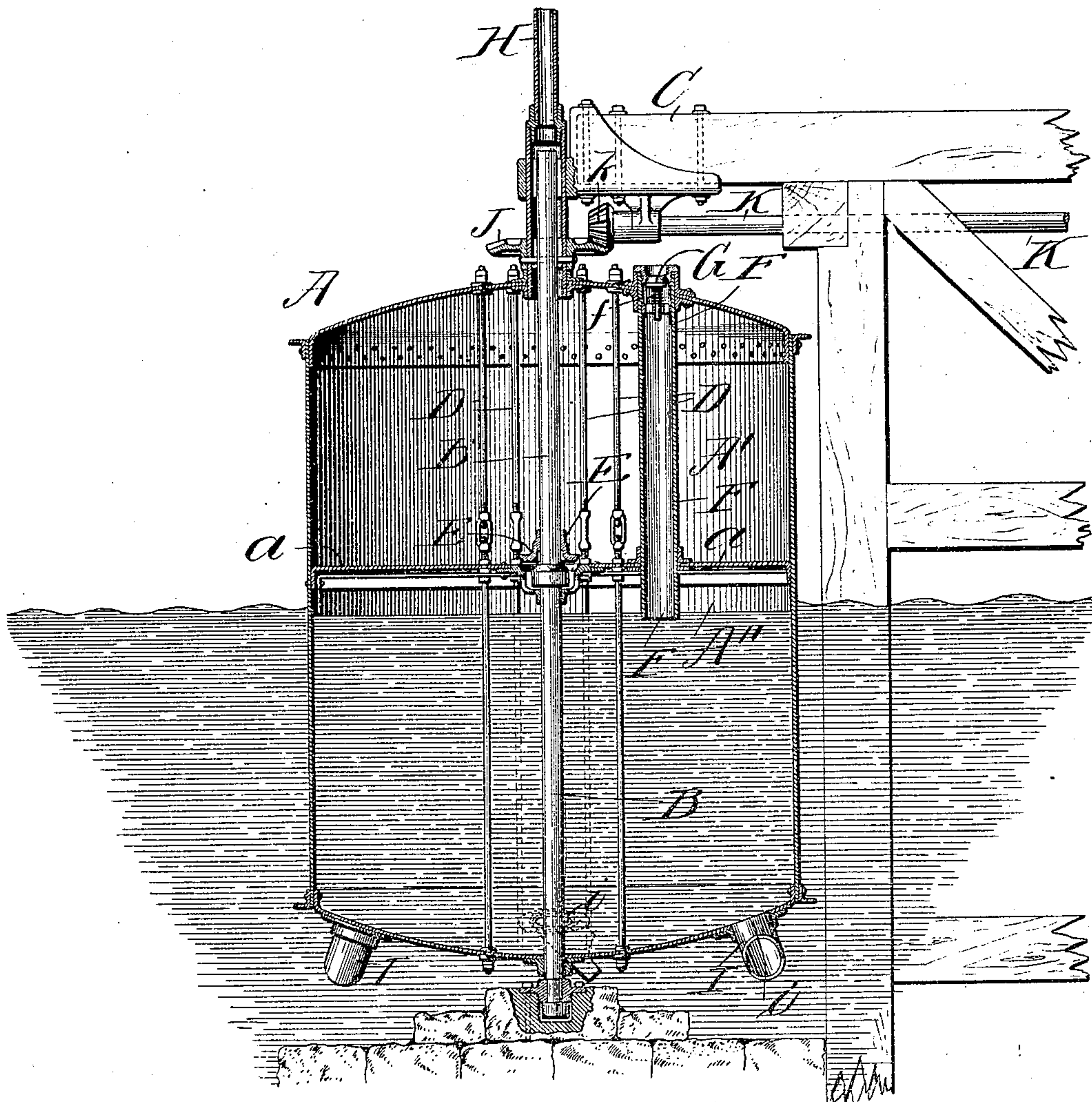


Fig. 2.

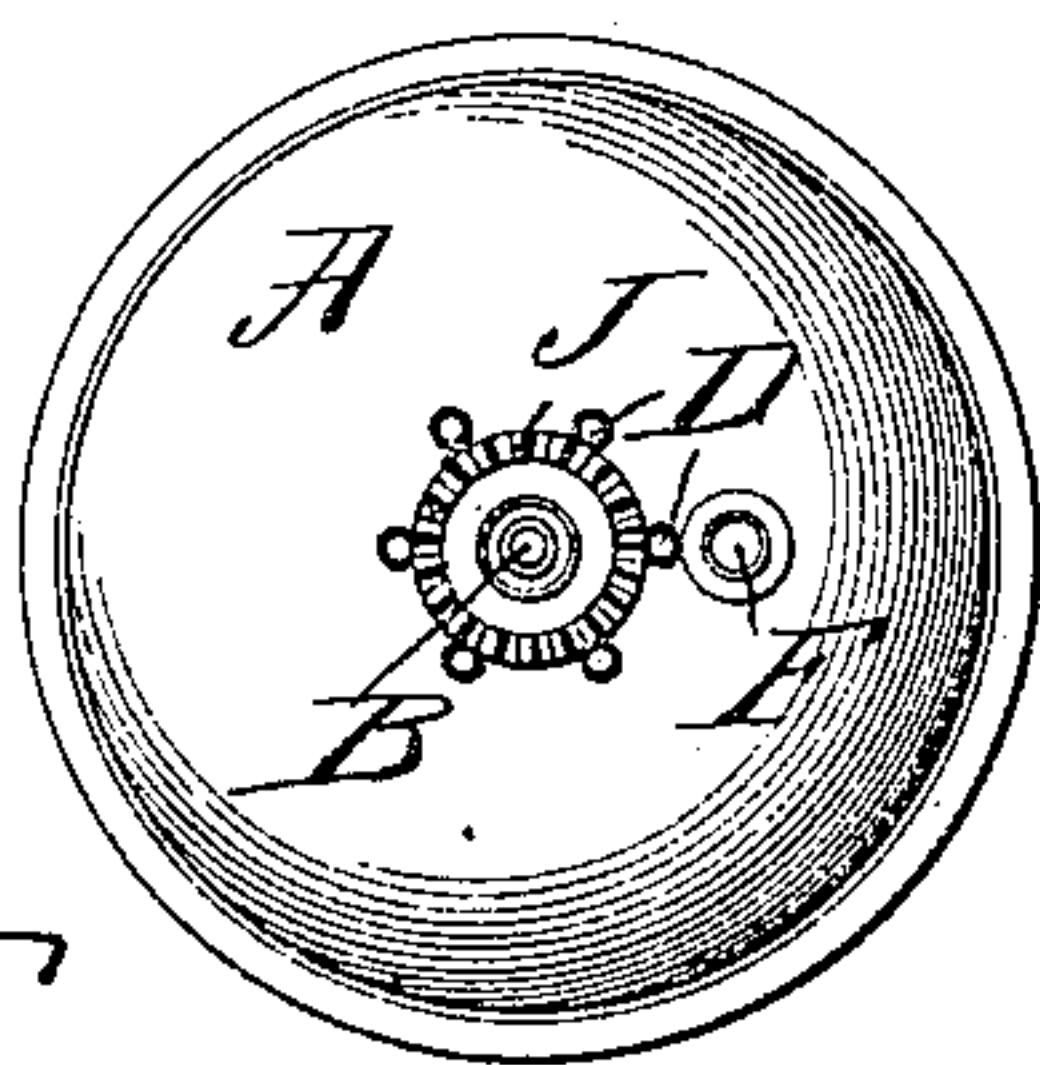
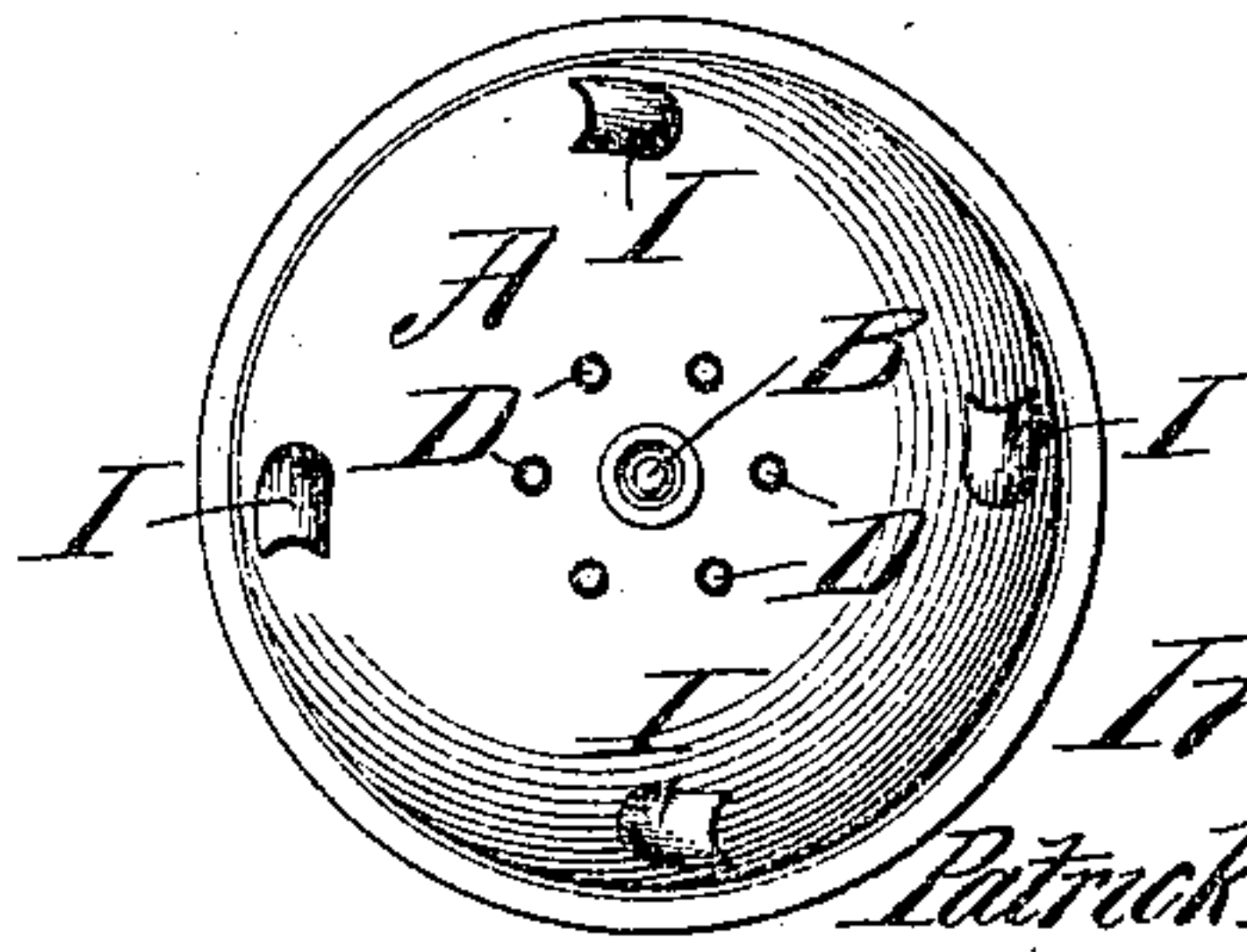


Fig. 3.



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UNITED STATES PATENT OFFICE.

PATRICK H. MONTAGUE, OF ST. LOUIS, MISSOURI, ASSIGNOR OF ONE-HALF
TO LEVERETT BELL, OF SAME PLACE.

AIR-COMPRESSOR.

SPECIFICATION forming part of Letters Patent No. 631,994, dated August 29, 1899.

Application filed May 29, 1899. Serial No. 718,760. (No model.)

To all whom it may concern:

Be it known that I, PATRICK HENRY MONTAGUE, a citizen of the United States, residing at the city of St. Louis, State of Missouri, have invented a certain new and useful Improvement in Air-Compressors, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a sectional view of my improved air-compressor in position. Fig. 2 is a top plan view of the reservoir somewhat reduced in scale; and Fig. 3 is a bottom plan view of said reservoir, also reduced in scale.

This invention relates to a new and useful improvement in air-compressors, the object being to construct a device of the character described which will compress air by the action of a rising column of water. The water for operating the compressor may either rise or fall in the cylinder naturally, as by tidal action, or mechanical means may be provided, as will hereinafter be described.

With these objects in view the invention consists in an air-compressor comprising a cylinder divided into one or more compartments, into or from which lead valve-pipes, whereby when a column of water arises in one of said compartments the air above said column is forced beyond an outwardly-opening valve into a reservoir, in which the same may be carried to any suitable point, while the "water-compartment," as I will term it, has leading into it a pipe controlled by an inwardly-opening valve, so as to admit air above the water at atmospheric pressure whenever a column of water falls in said compartment. Devices are arranged on the lower end of this cylinder for forcing water into or out of the water-compartment, and means are provided for rotating the cylinder whereby this latter may be readily accomplished.

In the drawings, A indicates a suitable cylinder divided into compartments A' and A'', the former being what I will term an "air-reservoir" and the latter a "water-compartment." These compartments are formed, re-

spectively, in the upper and lower portions of the cylinder by a dividing-partition *a*. The cylinder is mounted on a shaft B, which is stepped in a suitable bearing, at whose lower end is arranged a masonry work or other support, while its other end finds a bearing in a framework or scaffolding C. The lower end of the shaft is preferably provided with a head under the bearing to hold the cylinder in its designed position and prevent the same from floating. Suitable stay bolts or rods D are arranged to properly brace the ends or heads and middle partition-wall of the cylinder.

E indicates the valve, which opens outwardly with respect to the water-compartment to admit air from said water-compartment into the air-reservoir. This valve is shown as being arranged upon the shaft B; but it is obvious that said valve may be arranged at any desired locality.

F indicates a pipe passing through the upper head of the cylinder and through the diaphragm or partition-wall *a*, said pipe having arranged therein a valve G, which opens inwardly with respect to the water-compartment. A conduit-pipe H leads from the air-reservoir to any desired point.

The operation of the device as above described is as follows: Assuming the cylinder to be arranged in such position that at high tide the water-line will be just below the diaphragm *a*, as the tide rises the water enters into the water-compartment through suitable openings *i*, formed in the lower head of the cylinder, and compresses the air so as to force the same from the water-compartment into the air-reservoir above, passing valve E in going from the water-compartment into the air-reservoir. Valve G, opening inwardly, will be closed as the water rises, and no air can pass through the pipe F from the water-compartment. A suitable spring *f* is arranged under valve G for the purpose of holding the same to its seat for obvious reasons. When the water-line reaches its highest point, the compressing action ceases, and as the water falls air is admitted into the top of the water-compartment through the pipe F, so as to permit the water to pass out through the openings *i*. This operation continues as the

tides rise and fall, and the air compressed in the reservoir may be utilized by being taken from pipe H.

The above description applies to devices wherein the compression of the air depends upon tides; but it may be desired to use the invention where the tides are either so small that they cannot be relied upon or do not exist, in which event it is necessary to provide some means for perfecting the rising and falling action of the water in the water-compartment, and to accomplish this I arrange angled down-spouts I in the bottom head of the cylinder and near the periphery thereof and provide means, preferably in the form of a beveled gear J on the cylinder, with which meshes a pinion k on a driven shaft K for rotating the cylinder, and thereby causing the water to rise and fall in the water-compartment. By rotating the cylinder in one direction centrifugal force, aided by a siphoning or sucking action, causes the water in the water-compartment to pass out through the angled down-spout, after which rotation of the cylinder may cease, when the water will immediately seek to find its level in the water-compartment, with the result that the air in said compartment above the water is forced beyond the valve E and into the reservoir. Assuming the water-line to be such as shown in the drawings, when the water reaches that line and has compressed the air the cylinder may be again rotated to discharge the water, as before described, when the water may be again permitted to rise, or if it is desired to operate the cylinder so as to force the water into the water-compartment the cylinder may be oppositely rotated, when the down-spouts will have a scooping action and cause the water to fill said compartment much quicker.

While I have shown the device as being partially submerged in water, it will be obvious that to secure a higher pressure the device can be wholly submerged in water, according to the pressure of the air required.

I am aware that minor changes in the arrangement, construction, and combination of several parts of my device can be made and substituted for those herein shown and described without in the least departing from the nature and principle of my invention.

Having thus described my invention, what

I claim, and desire to secure by Letters Patent, is—

1. In an air-compressor, the combination with a cylinder formed with a water-compartment and an air-compartment, a valve admitting air from the water-compartment into the air-compartment, and an inwardly-opening valve for admitting air from the exterior into the water-compartment, and means for rotating said cylinder whereby water is forced into or out of said water-compartment; substantially as described.

2. In an air-compressor, the combination with a cylinder or other casing provided with an air-compartment and a water-compartment, a valve opening outwardly with respect to the water-compartment and admitting air from said water-compartment into the air-compartment, and an inwardly-opening valve for admitting air from the exterior into said water-compartment, means for rotating said cylinder, and devices on the lower end of the cylinder for forcing water into and out of said cylinder; substantially as described.

3. In an air-compressor, the combination with a cylinder formed with an air-compartment and a water-compartment, valves for admitting air into the water-compartment, and from the water-compartment into the air-compartment, angled down-spouts arranged in the bottom of said cylinder, and means for rotating the cylinder; substantially as described.

4. In an air-compressor, the combination with a cylinder provided with heads at each end, and a partition-wall, of a shaft on which said cylinder is mounted, means for rotating said shaft, a valve for admitting air from the lower compartment into the upper compartment, a valve for admitting air from the exterior into the lower compartment, and angled down-spouts I, arranged on the lower head and near the periphery thereof; substantially as described.

In testimony whereof I hereunto affix my signature, in the presence of two witnesses, this 20th day of May, 1899.

PATRICK H. MONTAGUE.

Witnesses:

F. R. CORNWALL,
A. S. GRAY.