No. 665,613. Patented Jan. 8, 1901.

A. MacLEAN.

AIR COMPRESSOR.

(Application filed July 31, 1897.)

(No Model.) 4 Sheets—Sheet 1.

Fig. 1

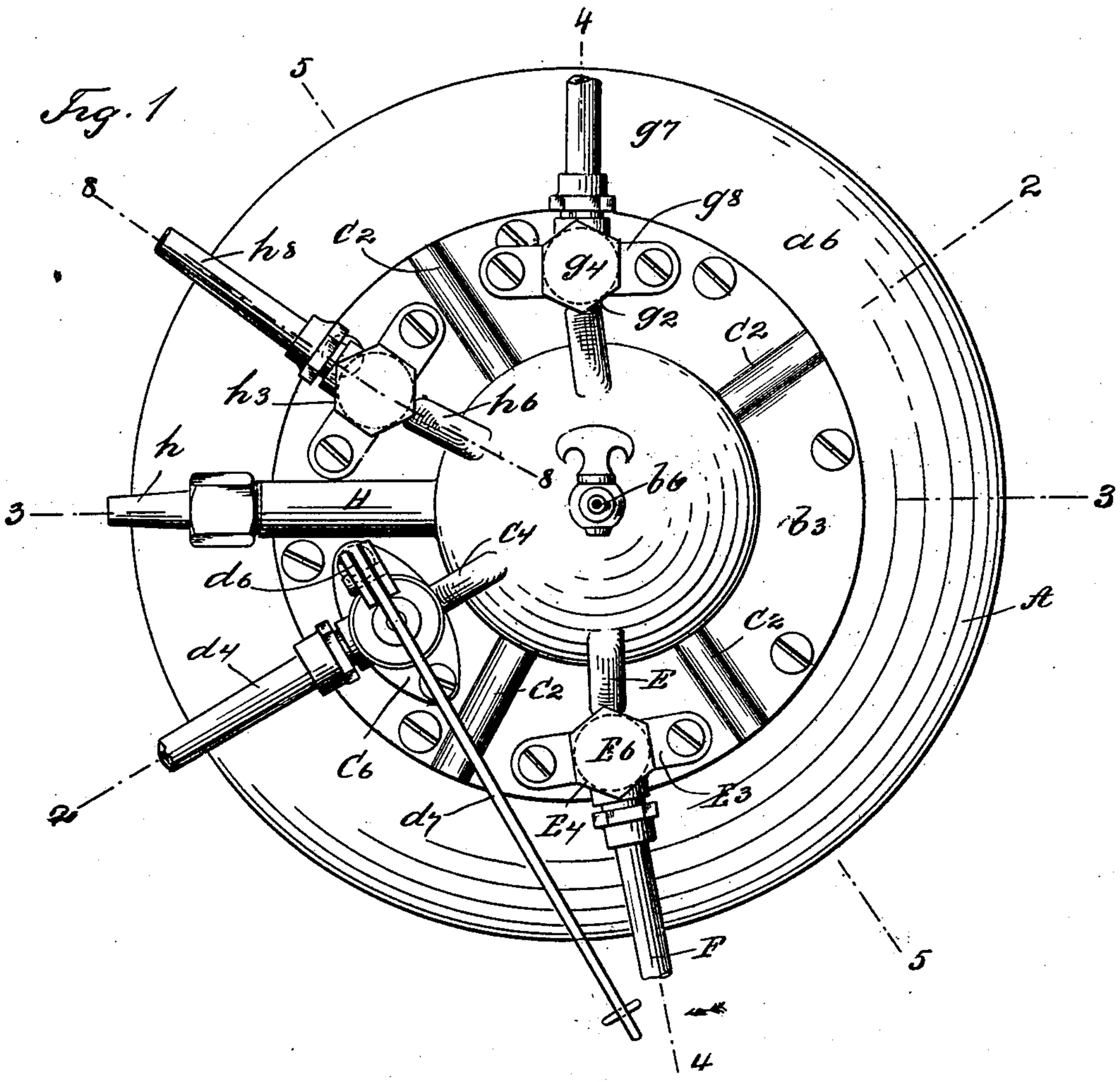
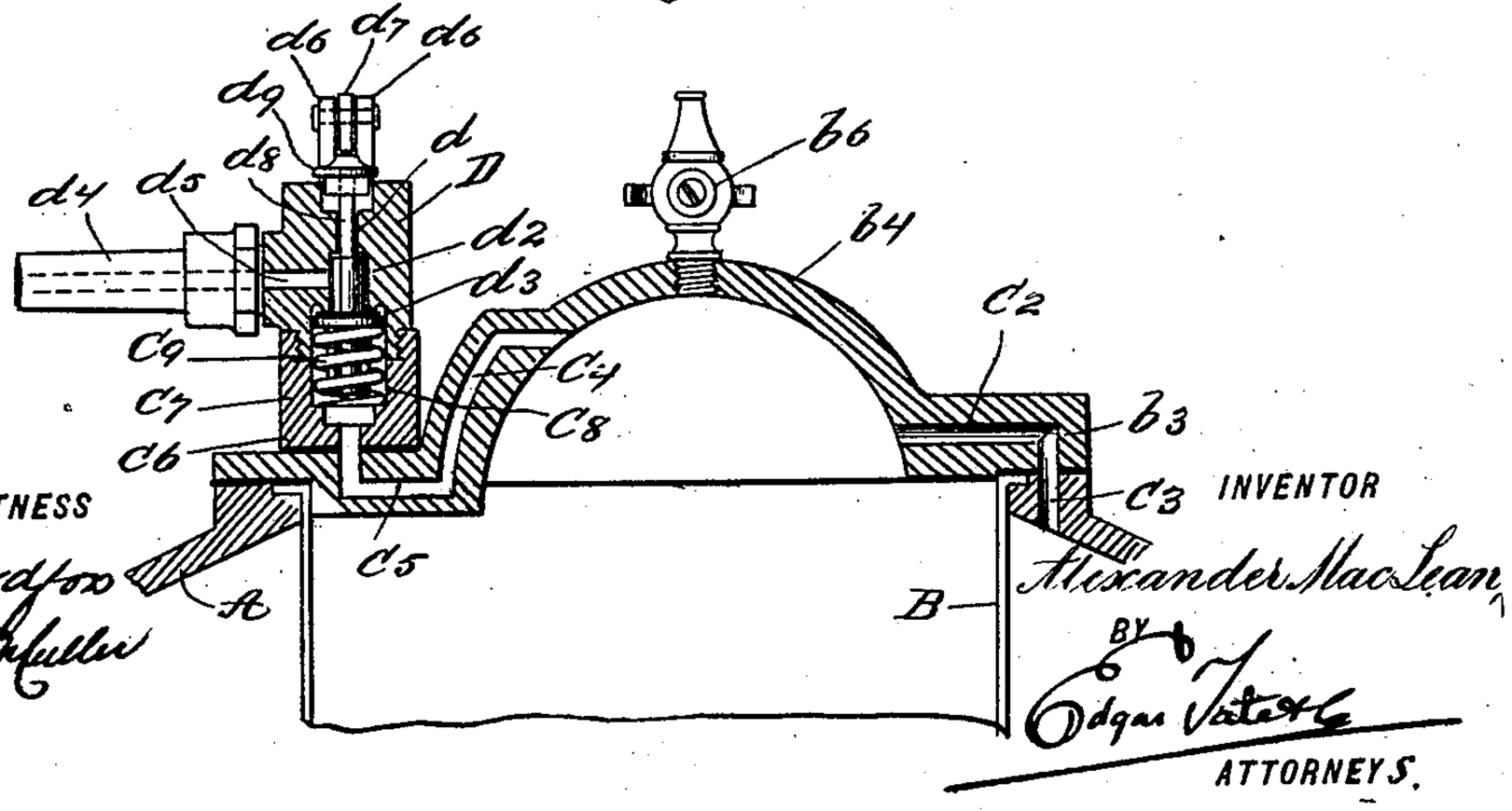


Fig. 2



WITNESS

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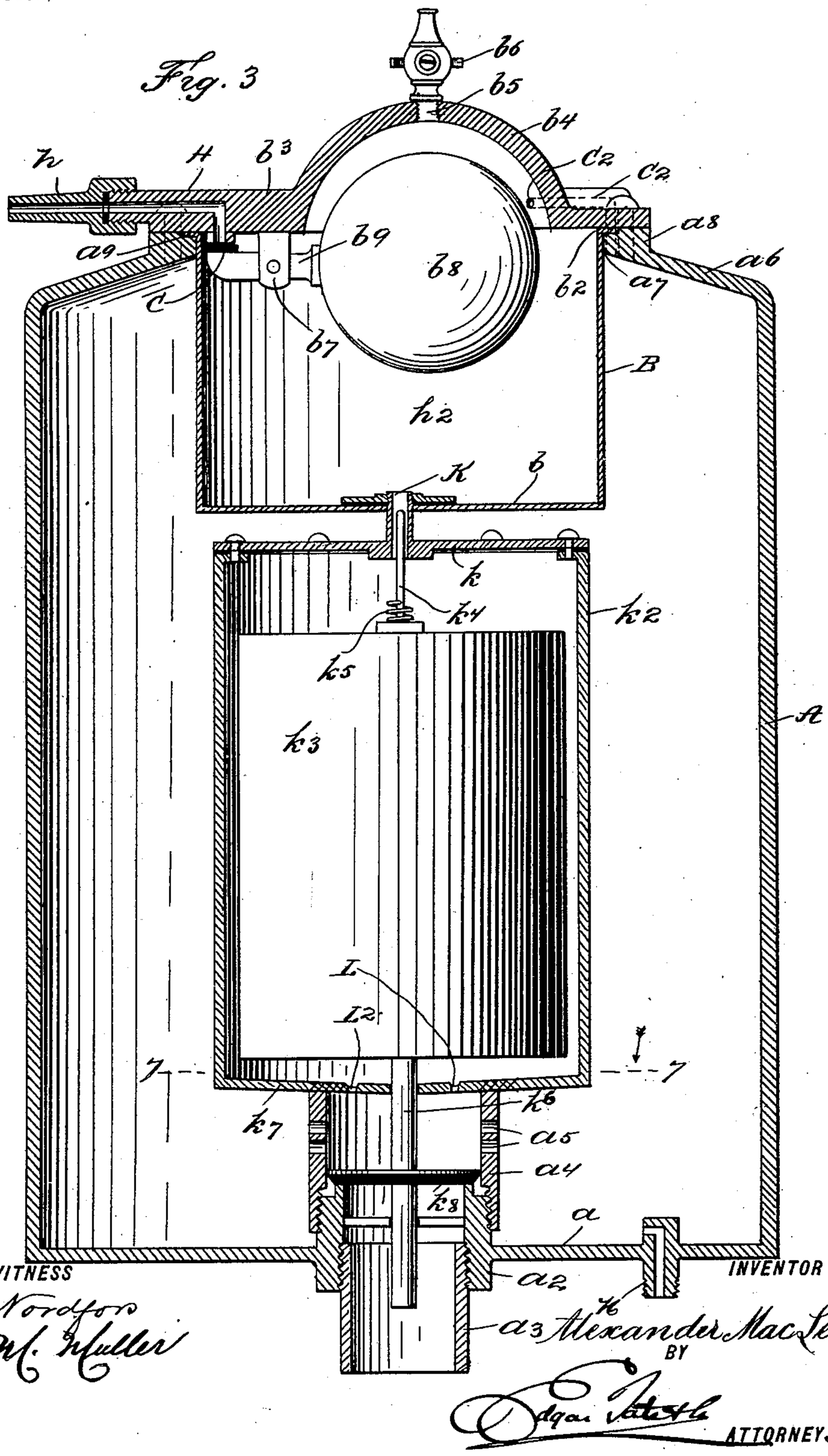
Fig. 3



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(No Model.) 4 Sheets—Sheet 3.

Fig. 4

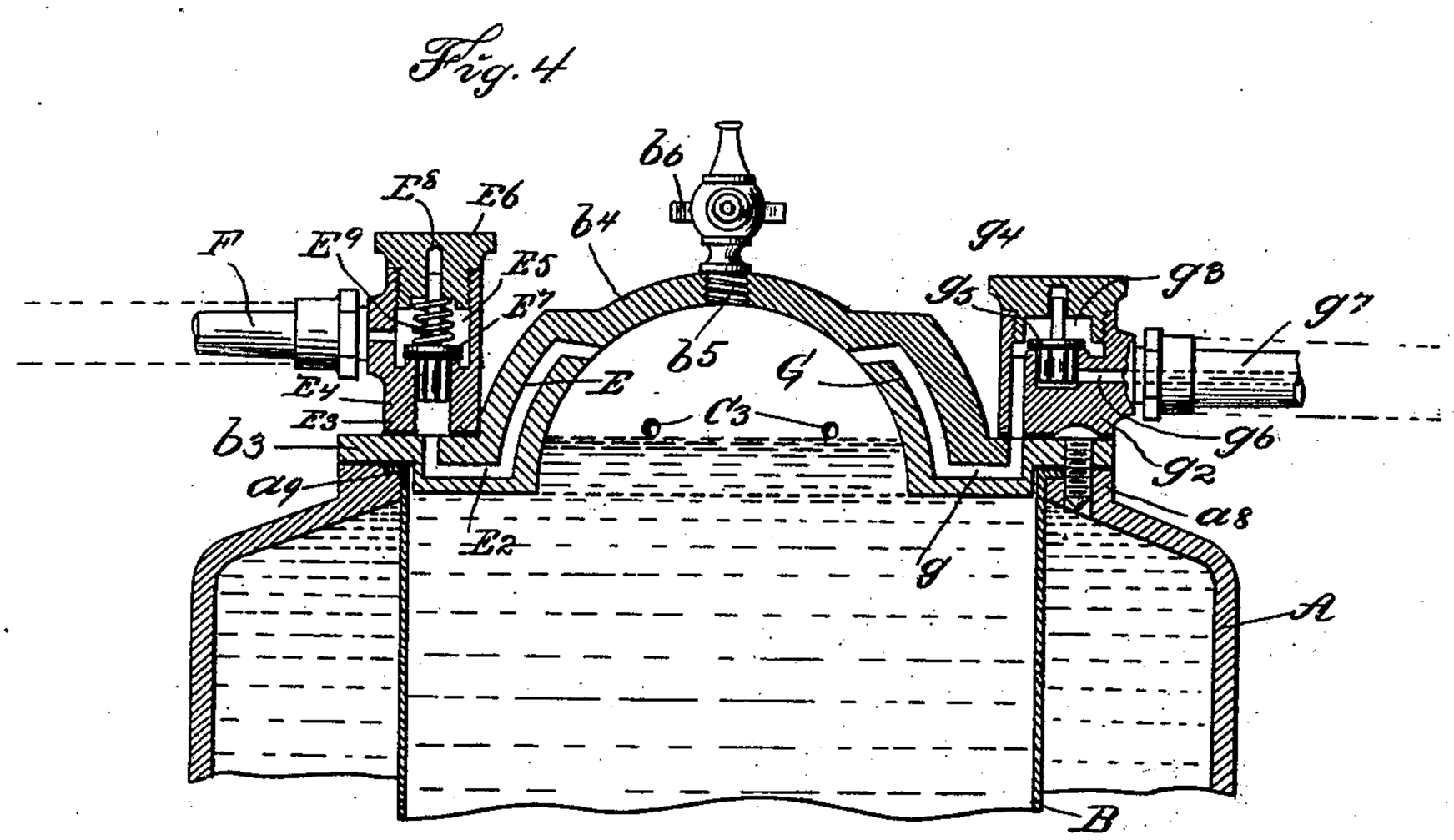
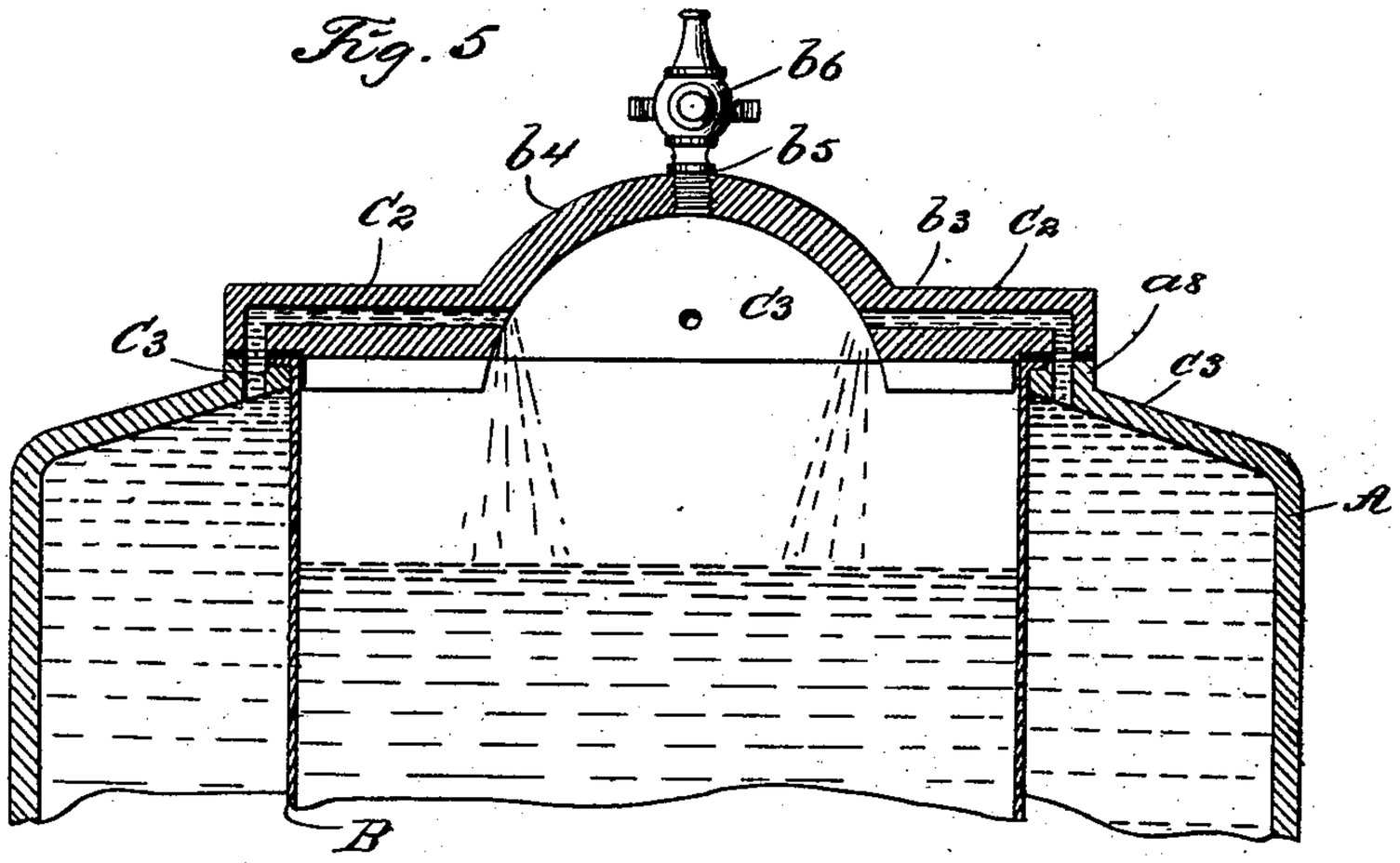


Fig. 5



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(No Model.) 4 Sheets—Sheet 4.

Fig. 6

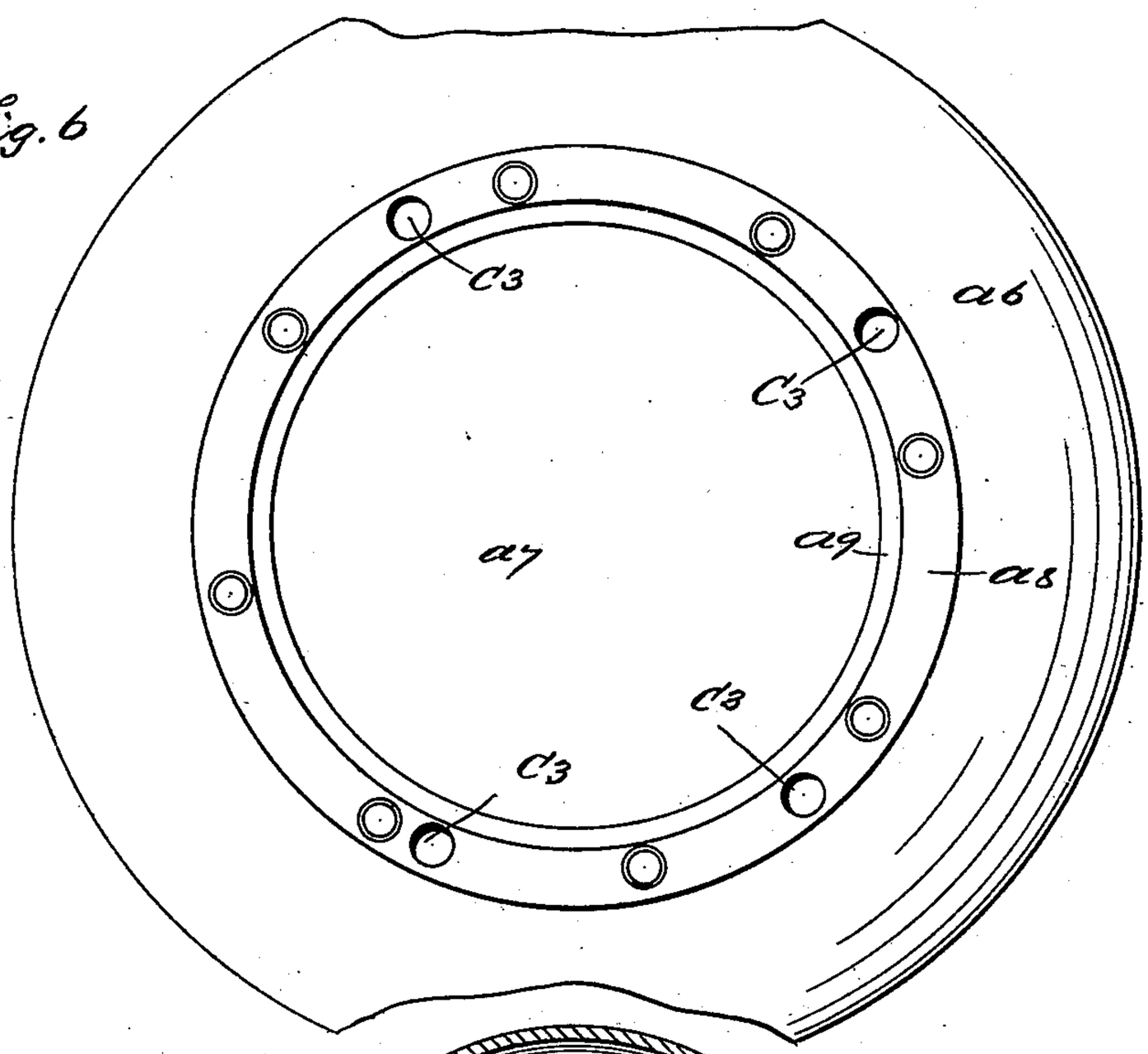


Fig. 7

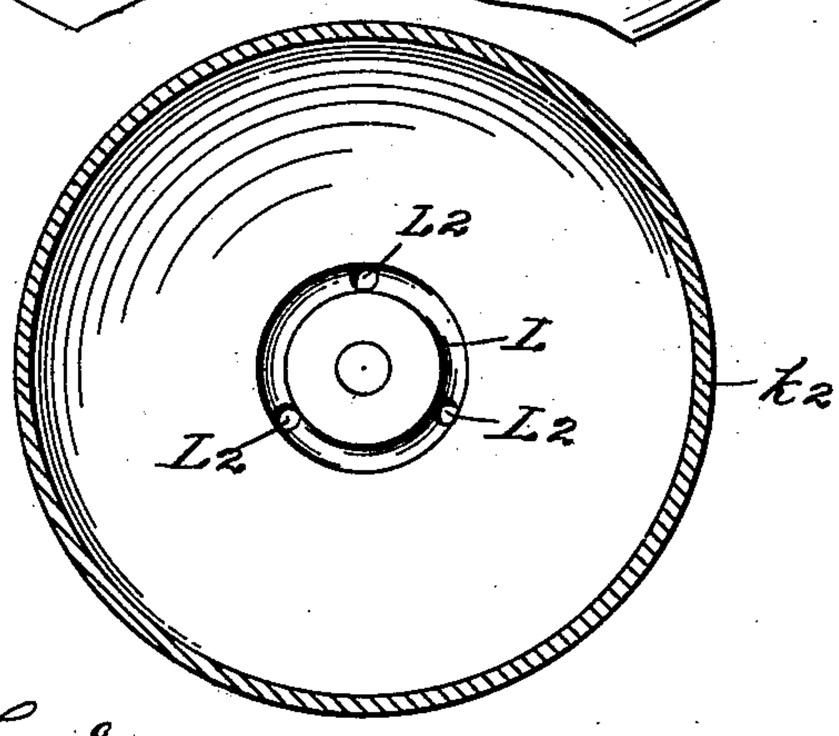
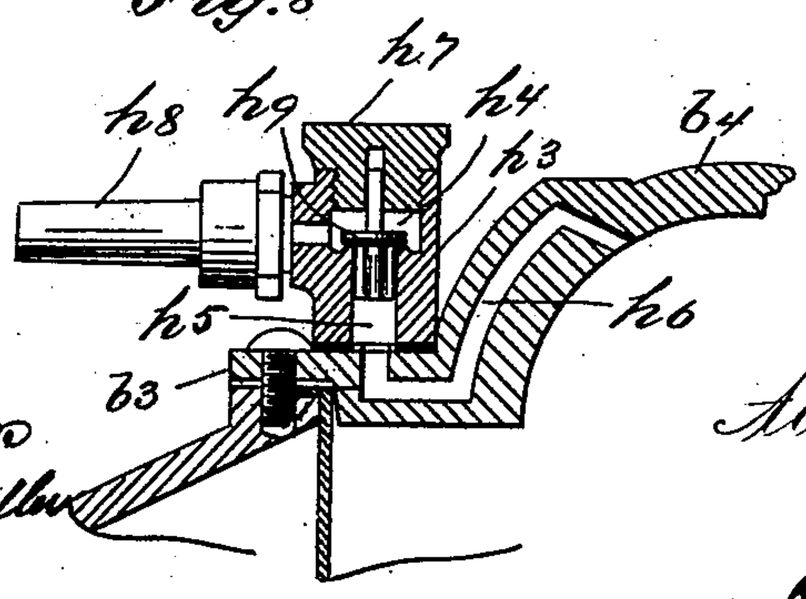


Fig. 8



WITNESS

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UNITED STATES PATENT OFFICE.

ALEXANDER MACLEAN, OF NEW YORK, N. Y., ASSIGNOR TO JULIA J. MACLEAN, OF SAME PLACE.

AIR-COMPRESSOR.

SPECIFICATION forming part of Letters Patent No. 665,613, dated January 8, 1901.

Application filed July 31, 1897. Serial No. 646,613. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER MACLEAN, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Air-Compressors, of which the following is a full and complete specification, such as will enable those skilled in the art to which it appertains to make and use the same.

This invention relates to air-compressors; and the object thereof is to provide an improved device of this class which is particularly adapted for use in raising and preserving beer and similar liquids, but may be employed wherever air-compressors are required, and which may also be used for flushing purposes in water-closets and similar places.

The invention is fully disclosed in the following specification, of which the accompanying drawings forms a part, in which—

Figure 1 is a plan view of my improved air-compressor; Fig. 2, a partial section on the line 2 2 of Fig. 1; Fig. 3, a section on the line 3 3 of Fig. 1; Fig. 4, a section on the line 4 4 of Fig. 1; Fig. 5, a section on the line 5 5 of Fig. 1; Fig. 6, a plan view of the outer casing of my improved air-compressor; Fig. 7, a section on the line 7 7 of Fig. 3, and Fig. 8 a section on the line 8 8 of Fig. 1.

In the drawings forming part of this specification the separate parts of my improvement are designated by the same letters of reference in each of the views, and in the practice of my invention I provide a casing A, which is provided with a bottom a, in the center of which is fixed a short tube a^2, which projects upwardly therein, and the upper end of which is screw-threaded on its outer side and the lower end screw-threaded on its inner side, and connected with the lower end of the tube a^2 is a flushing-tube a^3, and connected with the upper end of the tube a^2 is a supplemental tube a^4, which is provided with a plurality of perforations a^5, which are preferably arranged in two rows, so as to lessen the strength of said tube as little as possible.

The casing A is provided with a top a^6, which is slightly conical in form and in the center of which is a central circular opening a^7, around which is formed an annular shoulder or rim a^8, in the inner side of which is an annular groove a^9, and suspended through the opening a^7 is a cylindrical tank B, which is provided with a bottom b and at the top with an outwardly-directed projection or flange b^2, which rests in the annular groove a^9. The central opening a^7 is closed by a cap b^3, which is bolted to the annular shoulder or rim a^8 and which is provided centrally with a semi-spherical or conical dome b^4, in the top of which is fixed a tube b^5, in which is placed a pressure-regulating valve b^6, and pivotally connected with the bottom of the cap b^3, at one side thereof, as shown at b^7, is a float b^8, which is provided with an arm b^9, by means of which the pivotal connection at b^7 is made, and said arm b^9 projects and supports at its outer end a valve C.

The outer portion of the cap b^3 is flat, and formed therein, as shown in Fig. 5, are ports or passages C^2, which communicate with ports or passages C^3 in the top of the casing A and which open into the interior of said casing, and in the drawings I have shown four of these ports or passages, and the cap b^3 where these ports or passages are formed is provided with radial raised portions, as clearly shown in Figs. 1, 2, and 3. The cap b^3 is also provided on one side thereof, as shown in Figs. 1 and 2, with a port or passage C^4, which communicates with the upper portion of the dome b^4 and which extends downwardly through the side of said dome and outwardly through the flat portion of the cap, as shown at C^5, and then upwardly through said cap and into and through a plate C^6, secured to the top of said cap and which is provided centrally with an upwardly-directed tubular extension C^7, in which is formed a chamber C^8, in which is mounted a spiral spring C^9, and connected with the top of the tubular extension C^7 is a coupling-head D, which is also provided with a central vertical passage d, the lower end of which is enlarged to form a valve-chamber d^2, in which is mounted a valve d^3, which is supported by the spring C^9, which holds said valve upon its seat, and connected with one side of the coupling-head D is a pipe or nozzle d^4, which communicates with a bore or passage d^5, which communicates with the up-

per end of the valve-chamber d^2, and secured to or formed on one end of the plate C^6 are standards d^6, to which is pivoted a lever d^7, and the valve d^3 is provided with a valve-rod d^8, which is provided with a head d^9, on which the lever d^7 bears when the free end thereof is depressed, this construction being for the purpose of opening the valve d^3 against the operation of the spring C^9 and being also designed for use when the apparatus is intended as a flushing apparatus for water-closets, as hereinafter described. The cap b^3 is also provided, as shown in Figs. 1 and 4, with another port or passage E, which communicates with the upper portion of the dome b^4 and extends downwardly through the sides thereof and outwardly through the body portion of said cap, as shown at E^2, and then upwardly through the top of said cap and into and through a plate E^3, on which is formed an upwardly-directed tubular extension E^4, in which is a valve-chamber E^5, which is closed by a cap E^6, and mounted in the valve-chamber E^5 is a valve E^7, provided with a valve-rod E^8, on which is placed a spiral spring E^9, which is adapted to force the valve E downwardly onto its seat, and connected with one side of the tubular extension E^4 is a pipe F, which communicates with the valve-chamber E^5. The dome b^4 is also provided at the opposite side thereof with a port or passage G, similar to the port or passage E, and which extends downwardly through the side of said dome and upwardly through the outer portion of the cap b^3, as shown at g in Fig. 4, and then upwardly through a valve-casing g^2 into a valve-chamber g^3, which is closed by a cap g^4 and in which is mounted a valve g^5, which is adapted to close a port or passage g^6 at the bottom of the valve-chamber g^3, which communicates with a pipe g^7.

The valve-casing g^2 is provided with a plate g^8, by which it is secured to the cap b^3 of the casing, and the valve g^5 in the casing g^2 is designed to admit air into the dome of the cap through the pipe g^7, while the valve E^7 is designed to allow the air to escape from said dome through the pipe F.

The valve C, which is mounted on the arm b^9 of the float b^8, is intended to close a passage H, which is formed in a raised portion of the cap b^3, and connected with said port or passage H is a discharge-nozzle h, and said port or passage and said discharge-nozzle is also designed to allow the air to escape from the dome b^4 or from the chamber h^2, formed by the tank B, and mounted on one side of said cap is a valve-casing h^3, in which is formed a valve-chamber h^4, at the bottom of which is a vertical passage h^5, which communicates with said valve-chamber h^4 and with a port or passage h^6, formed in the side of the dome b^4, and the valve-chamber h^4 is closed by a cap h^7, and said valve-casing is provided at one side with a discharge nozzle or pipe h^8, and mounted in the valve-chamber h^4 is a valve h^9, which is adapted to open upwardly, and this valve is also adapted to allow the air to escape from the dome b^4 through the pipe h^8.

Formed in the bottom of the tank B, which is air-tight, is an opening through which passes a tube K, formed on or secured to the cap k of a supplemental tank k^2, and mounted in the supplemental tank k^2 is a cylindrical float k^3, the upper end of which is provided centrally with a rod k^4, which extends upwardly into the tube K and on which is mounted a spiral spring k^5, which is adapted to strike against the top k of the supplemental tank k^2 when the float k^3 moves upwardly, as hereinafter described, so as to break the force with which said float will strike the top of said tank. The float k^3 is provided at its lower end and centrally thereof with a downwardly-directed rod k^6, which passes through the bottom k^7 of the tank k^2 and which is free to move vertically therethrough, and mounted on the rod k^3 is a valve k^8, which is adapted to close the upper end of the tube a^2. The bottom k^7 of the tank k^2 is concave on its upper side, and formed therein is an annular groove L, in which is formed a plurality of perforations L^2, as shown in Figs. 3 and 7, and the bottom a of the casing A is provided with a screw-threaded pipe M, which is adapted to be connected with a hydrant-pipe or with any suitable water-supply pipe and by means of which water is conveyed into the casing A.

The supplemental tube a^4 is rigidly secured to or formed on the bottom k^7 of the tank k^2, and the object in forming the groove L in the bottom of the supplemental tank k^2 is to provide means for collecting the sediment or other substances in the water and conducting the same through the bottom of said tank, the said substances passing through the perforations L^2.

The operation will be readily understood from the foregoing description when taken in connection with the accompanying drawings and the following statement thereof. The casing A may be connected with the water-supply pipe by means of a pipe M or in any desired manner, and in practice the pipe h^8 on the top of the casing is connected with a compressed-air tank into which the air passes, said tank being not shown, and the air from this tank may be used for any desired purpose for which compressed air may be employed. The pipe g^7 at the top of the casing is an air-supply pipe by which air is supplied to the casing A, while the pipe F is a safety-pipe through which the air at certain times or when the pressure becomes too great escapes, and the valve E^7 in the valve-casing E^4, with which said pipe F is connected, is a safety-valve. The pipe d^4, the passage to which is controlled by the valve d^3, is a flush-pipe and is adapted to be opened and closed by hand, as hereinafter described, when the apparatus is used for flushing a water-closet or for similar purposes, and the pipe or nozzle h, which is controlled by the float

b^8, is intended to allow the air to escape under certain conditions from the tank B, as hereinafter described.

The perforations L in the bottom of the supplemental tank k^2 are preferably of much less capacity than the perforations a^5 in the tube a^4, and in the operation of the device the water passes into the main outer tank or casing A through the pipe M and gradually rises into and fills said tank or casing A. During this operation the water also flows through the perforations a^5 in the tube a^4 and rises in the supplemental tank k^2, and as the water rises in the main outer casing A and in the supplemental tank k^2 air is forced into and compressed in the tank B. The water also rises in the tank B and aids to compress the air in said tank, the air being forced from the tank or casing A and from the supplemental tank k^2 into the tank B. The float k^3 is of considerable weight, and because of this fact and the pressure of the air in the tank B the float k^3 is not raised by the water in the supplemental tank k^2 until the pressure of the water in the tank B is sufficient to lift the valve b^8 and allow the air to escape through the pipe or nozzle h. In this operation and before the valve b^8 is lifted or raised, as above described, the air which is under process of compression in the tank B passes through the pipe h^8, the valve h^9 opening for this purpose into the compressed-air tank, (not shown,) and this operation continues until the water rises in the main outer casing A and in the tanks B and k^2 sufficiently to raise the valve b^8, at which time the remainder of air within the tank B will pass out through the nozzle H, and the float k^3 will move upwardly and carry with it the valve k^8, and the operation of flushing will be performed, the water passing out of the casing A and out of the tanks B and k^2 through the pipe a^3. The main operation of flushing is performed by the rushing of water through the pipe a^3 at this time; but by reason of the capacity of the perforations L in the bottom of the tank k^2 the water flows very slowly from the tanks B and k^2, and by reason of this fact the float k^3 gradually falls and the valve k^8 is seated a considerable time after the main flushing process is completed and the gradual flow of the water from the tank k^2, as above described, preventing the breaking of the seal in the trap of the basin when this apparatus is used for flushing water-closets and for similar purposes.

It will be understood that the pipe M, perforations a^5 in the tube a^4, and perforations L in the bottom of the tank k^2, and also the tube K in the bottom of the tank B, may be of any desired capacity, and the flow of the water, as hereinbefore described, may thus be regulated as desired, and it will be understood that this operation will be repeated as long as the apparatus is in operation or as long as the water flows through the pipe M into the main outer tank or casing A.

When my improved apparatus is used for flushing a water-closet and for other and similar purposes, the flushing is performed whenever desired by pulling on the lever d^7, which allows air to escape, as will be readily understood, by depressing the valve d^3, and the operation of flushing will be performed, as hereinbefore described, and by means of the valve b^6 and the top of the dome b^4 the pressure of the air may be regulated, this device being of any suitable construction for this purpose, and said device being particularly adapted for use when the apparatus is used as means for flushing a water-closet and for similar purposes.

This device is simple in construction and operation and is well adapted to produce the result for which it is intended, and it will be apparent that changes in and modifications of the construction herein described may be made without departing from the spirit of my invention or sacrificing its advantages.

Having fully described my invention, I claim as new and desire to secure by Letters Patent—

1. An air-compressor for the purpose herein specified, consisting of a main casing provided with means for supplying water thereto, said casing being provided centrally of the bottom thereof, with a tube, and centrally of the top thereof with a large opening, a tank suspended through said opening, a cap secured to the casing and closing the upper end of said tank, ports or passages forming a communication between said main casing and said tank at the top thereof, a supplemental tank mounted in the casing below said first-named tank, and provided at its bottom with a tube which is connected with the tube in the bottom of the main casing, a tube connecting the supplemental and the first-named tank, a float mounted in the supplemental tank and provided with a rod which passes downwardly through the bottom thereof, a valve mounted on said rod and adapted to close the tube in the bottom of the main casing, a float mounted in the first-named tank, and adapted to close a port or passage through said cap, and means for supplying air to said first-named tank, and allowing the same to escape therefrom, substantially as shown and described.

2. An air-compressor consisting of a main casing which is provided with means for supplying water thereto, and centrally of the bottom thereof, with a tube, said tank being also provided at the top with a large circular opening, a tank suspended therefrom, a supplemental tank mounted below said first-named tank, and the bottom of which is perforated and provided with a tube which is mounted on the tube in the bottom of the main casing, a tube connecting said tanks, a float mounted in the supplemental tank, and carrying a valve which is adapted to close the tube in the bottom of the main casing, and means for supplying air to said first-named tank and for allowing the same to escape therefrom, said

main casing and said first-named tank being also in communication by means of ports or passages, substantially as shown and described.

3. An air-compressor, comprising a main casing, the bottom of which is provided with a central tube, said casing being also provided with a top in which is formed a central opening, a tank suspended in said opening, a dome-shaped cap secured to the main casing, and closing said tank, a supplemental tank mounted in said casing below said first-named tank, and in communication therewith a float mounted in said supplemental tank and carrying a valve which is adapted to close the tube in the bottom of the main casing, said supplemental tank being connected with said tube by means of a perforated tube, and the bottom of said supplemental tank being perforated, said main casing and said first-named tank being in communication by ports or passages which extend through the top of the main casing, and through said dome-shaped cap, and means for supplying air to said dome-shaped cap and for allowing the same to escape therefrom, substantially as shown and described.

4. An air-compressor comprising a main casing in the bottom of which is a tube, and in the top of which is a central opening, a tank suspended through said central opening, a supplemental tank mounted in said casing below said first-named tank, and provided at its lower end with a perforated tube, a float mounted in said supplemental tank and provided with a rod which passes through the bottom thereof, a valve mounted on said rod for closing the tube in the bottom of the main casing, a dome-shaped cap mounted on said main casing, and closing said first-named tank, a float pivotally supported in said first-named tank, and adapted to close a port or passage through said cap, air ports or passages for supplying air to said cap, and for allowing the same to escape therefrom, said ports or passages being provided with automatic valves, said cap being also provided with an escape port or passage provided with a safety-valve, and with an escape port or passage provided with a flushing-valve, substantially as shown and described.

5. An air-compressor constructed as herein described, and provided with a dome-shaped cap, a float pivotally suspended from said cap at one side thereof, and adapted to close a port or passage therethrough, air ports or passages adapted to supply air to said cap, and to allow air to escape therefrom, said ports or passages being provided with automatic valves, an air port or passage also communicating with said cap, and provided with a safety-valve and another port or passage communicating with said cap, and provided with a flushing-valve which is adapted to be operated by a lever, substantially as shown and described.

6. An air-compressor, comprising a main casing as A, which is provided in the top thereof with a central opening, and in the bottom thereof, with a central tube, a tank as B, suspended from said central opening in the top, a supplemental tank as k^2, supported beneath said first-named tank and connected therewith by means of a tube, said supplemental tank being provided at its lower end with a perforated tube by means of which connection is made with the tube in the bottom of the main casing, a float mounted in the supplemental tank and adapted to close the tube in the bottom of the main casing, said main casing being also provided with a dome-shaped cap by which the first-named tank is closed, and said cap being provided with air ports or passages, and means for controlling the same, substantially as shown and described.

7. An air-compressor constructed as herein described, consisting of a main casing as A, a tank as B, suspended through the top thereof, a conical cap by which said tank is closed, and which is provided with air ports or passages, and means for controlling the same, a supplemental tank mounted below said first-named tank, and in communication therewith, said supplemental tank being in communication with a passage through the bottom of the main casing, and a float mounted in said supplemental tank and adapted to close said passage, substantially as shown and described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of the subscribing witnesses, this 13th day of July, 1897.

ALEXANDER MACLEAN.

Witnesses:
C. GERST,
A. C. VAN BLARCOM.