No. 871,837. PATENTED NOV. 26, 1907.

H. WALTHER.

ROTARY BLOWER.

APPLICATION FILED MAR. 27, 1907.

2 SHEETS—SHEET 1.

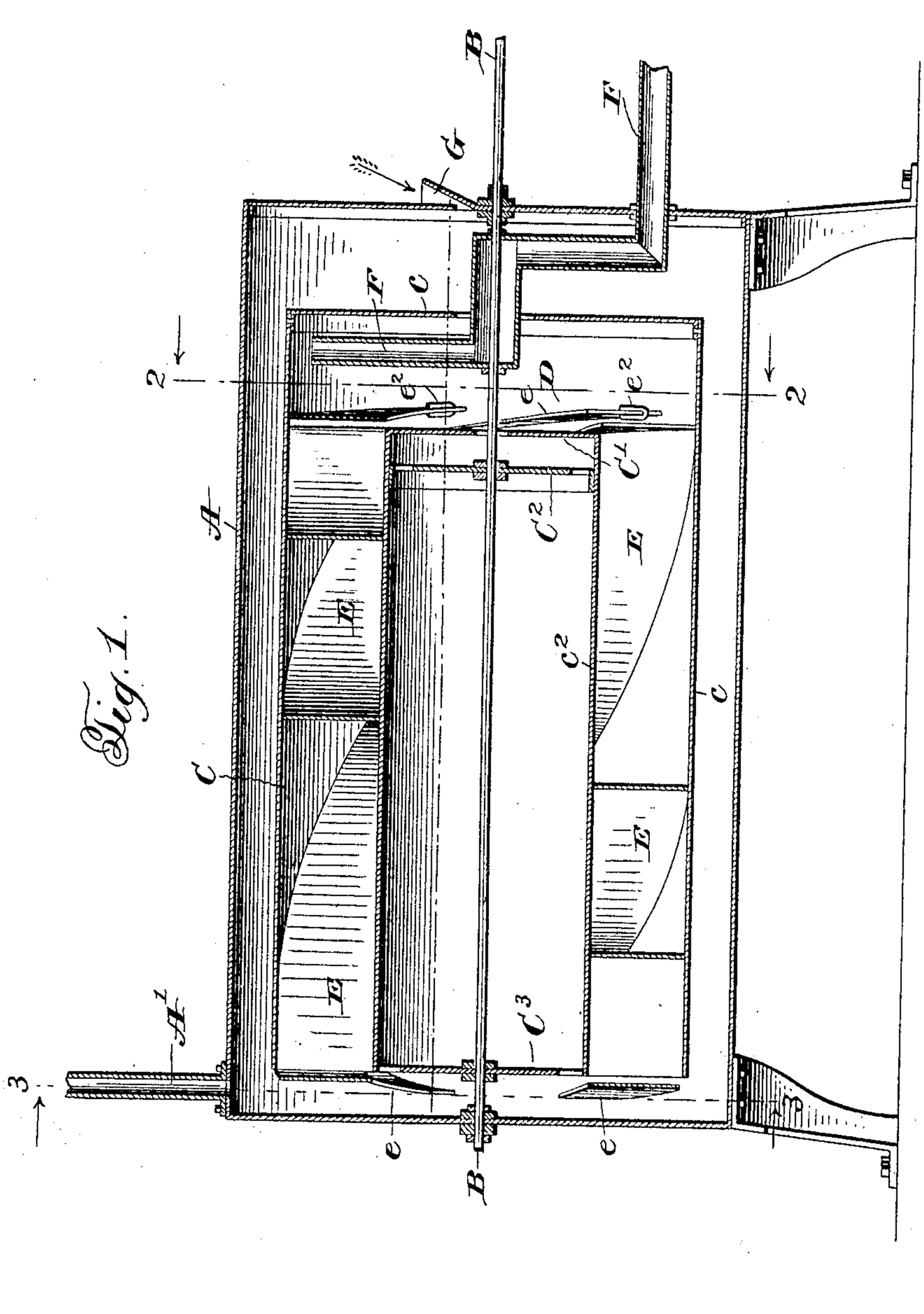

Fig. 1.

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2 SHEETS—SHEET 2.

Fig. 2.

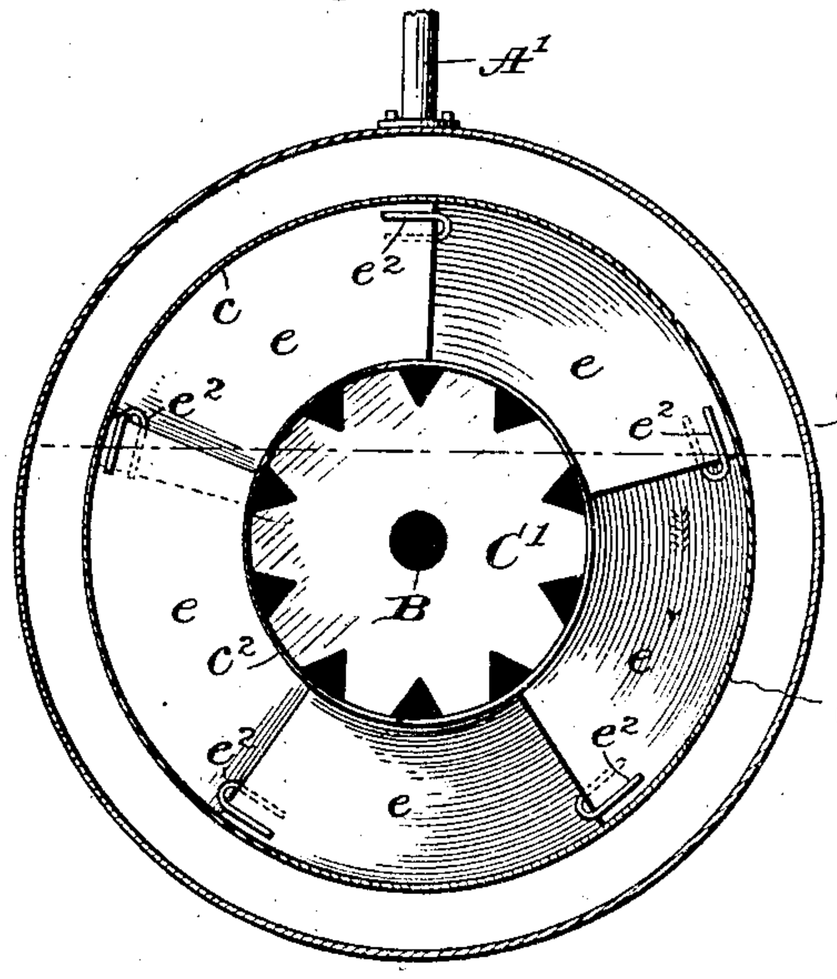


Fig. 3.

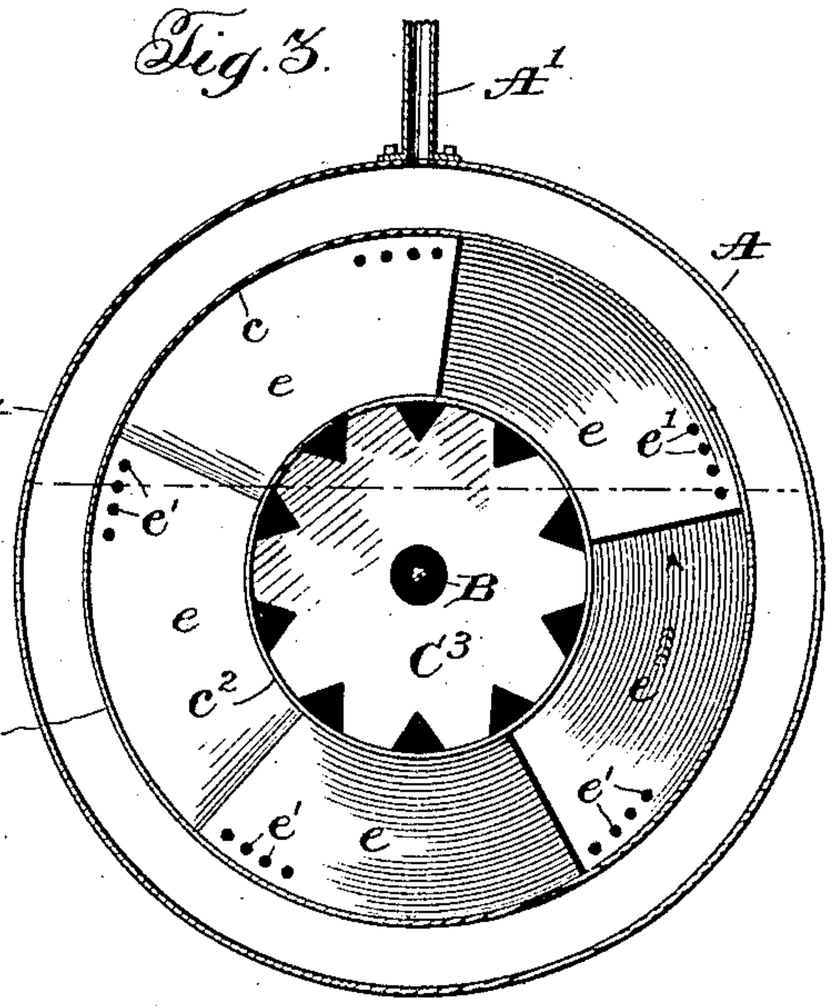
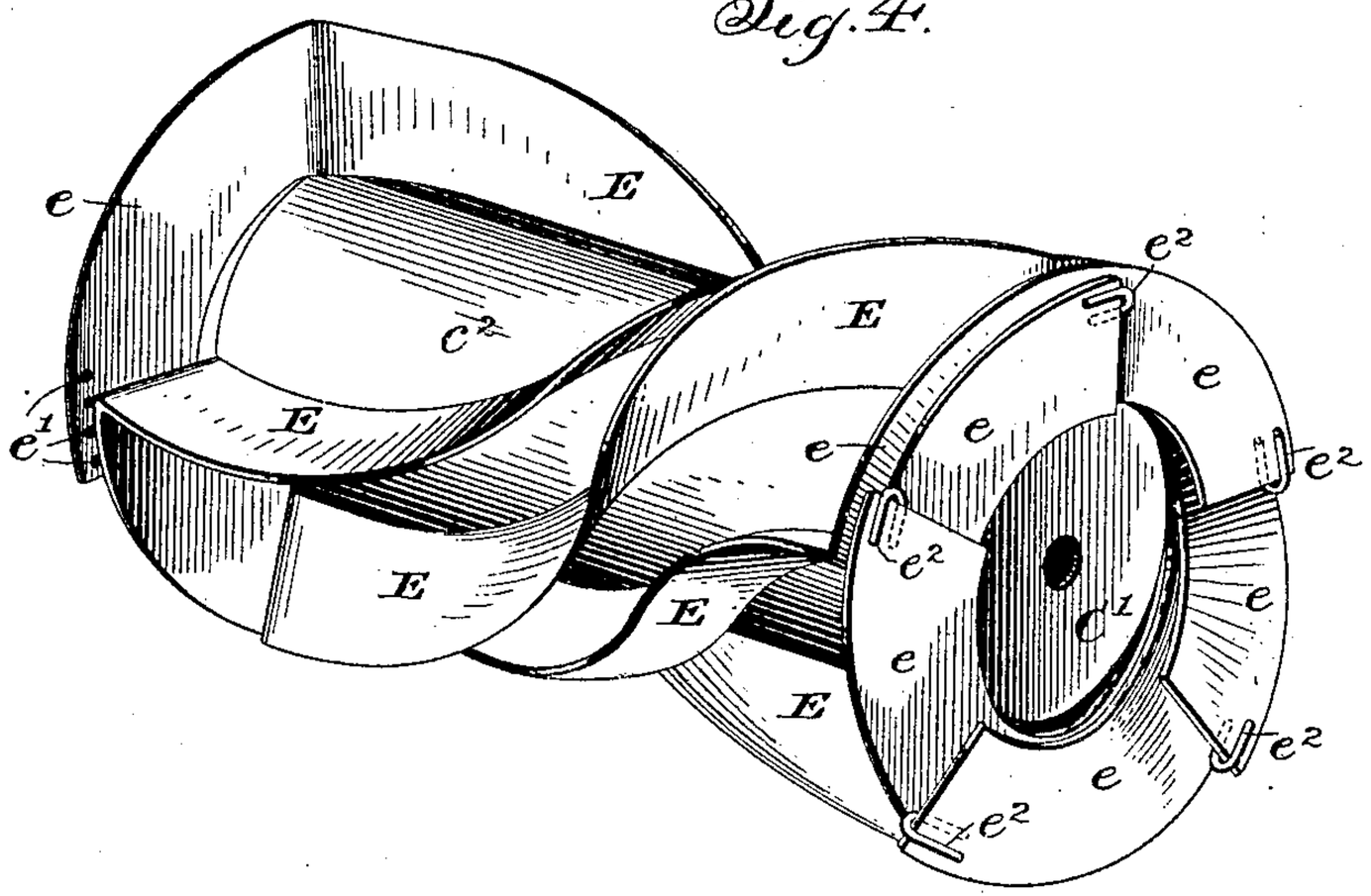


Fig. 4.



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HERMAN WALTHER, OF DAVENPORT, IOWA.

ROTARY BLOWER.

No. 871,837. Specification of Letters Patent. Patented Nov. 26, 1907.

Application filed March 27, 1907. Serial No. 364,820.

To all whom it may concern:

Be it known that I, HERMAN WALTHER, a citizen of the United States, residing at Davenport, in the county of Scott and State of Iowa, have invented certain new and useful Improvements in Rotary Blowers, of which the following is a specification.

This invention relates to an improvement in rotary air blowers, and more particularly to those air blowers designed for use with gas machines.

The object of the present invention is the provision of a blower of this type in which means are provided for preventing the air in the high pressure chamber from working back into the low pressure chamber.

A further object of the invention is the provision of means for maintaining a constant pressure in the high pressure chamber.

Other objects of the invention will be apparent from the detailed description hereinafter when read in connection with the accompanying drawings forming a part hereof, wherein a preferable embodiment of my invention is shown, and wherein like numerals of reference refer to similar parts in the several views.

In the drawings, Figure 1 is a longitudinal section of my improved blower. Fig. 2 is a sectional view on line 2—2 of Fig. 1 looking in the direction of the arrow. Fig. 3 is a similar view on the line 3—3 same figure, and Fig. 4 is a perspective view of the inner cylinder and the spiral partitions with extensions.

Referring now more particularly to the drawings, A designates a cylindrical casing, mounted on suitable supports, the interior of which constitutes the high-pressure chamber of the blower. The casing A is provided with a suitable outlet pipe A′ in the top thereof permitting the air under pressure to be conveyed to the desired point. Journaled in suitable bearings secured to the ends of the casing A and extending longitudinally therethrough is a shaft B upon which is mounted a drum C, which upon rotation serves to compress air in the high-pressure chamber. The drum C comprises an outer cylinder c, the forward end of which is closed by a suitable wall, and an inner cylinder c^2, which is substantially half the diameter of the outer cylinder c and which is concentrically disposed with reference thereto. The inner cylinder c^2 terminates short of the forward end of the outer cylinder c to form a space D in the forward end of the outer cylinder which constitutes the low-pressure chamber of the blower. The forward end of the inner cylinder c^2 of the drum is closed by a cylinder head C′, which is provided with an opening centrally thereof to permit water to pass therethrough. A second cylinder head C^2 is secured to the shaft B directly in rear of the cylinder head C′, the periphery of said cylinder head extending to the interior of the inner wall of the inner drum c^2 and being provided with a plurality of openings therein to permit the passage of air and water therethrough. The rear end of the inner cylinder c^2 is closed by a cylinder head C^3, the periphery of which is provided with a plurality of openings therein to permit the passage of air and water therethrough.

Interposed between the inner wall of the cylinder c and the outer wall of the cylinder c^2 are a plurality of spirally arranged partitions E, which extend longitudinally of the cylinders and serve to divide the space therebetween into a number of chambers which run spirally around the cylinder c^2 and constitute the pumping chambers of the device. The partitions E are provided at the ends thereof with the extensions e extending at an obtuse angle therefrom, the extensions extending in opposite directions from the opposite ends of said partitions, those at the inlet end of the cylinder being extended in the direction in which the machine is to be rotated, while those at the outlet end are extended in a direction contrary to that in which the machine is to be rotated. The extensions e of the partitions E are of considerable length so that they each overlap the extension on the next adjacent partition for about two-thirds its length for a purpose to be hereinafter more particularly set forth. The forward edge of each of the extensions e of the partitions E at the inlet end of the machine are provided with U-shaped open-ended tubes, said extensions being straddled by said tubes so that one of the arms thereof will communicate with one of the pumping chambers of the device, while the other arm thereof will be in communication with the low-pressure chamber D, for a purpose to be hereinafter more particularly set forth. The extensions e of the partitions E at the outlet end of the machine are provided with a plurality of apertures e' extending for a slight distance inwardly from the rear ends thereof.

F designates a pipe of any suitable construction for supplying air to the low pressure chamber D. G designates a half funnel secured to the exterior of one end of the casing A just above one of the bearings for the shaft B, which constitutes a means for partially filling the casing A with water. The funnel F also serves as a water seal to prevent the escape of the air under pressure from the interior of the casing A.

In the operation of the device, the casing A is first filled with water to a point just above the shaft B. If now the shaft B is actuated to effect the rotation of the drum C, it will be obvious that the partition extensions *e* at the inlet end of the machine will be caused to pass successively beneath the surface of the water in the casing E and that air will be compressed successively in the chambers formed by the spiral partitions E, and, as the rear end of each chamber rises out of the water at the outlet end of the machine, the compressed air therein will begin to escape first from the holes *e'* in the extensions *e* at the outlet end of the machine, and finally directly from under the edge of each extension as it is lifted from the water, the compressed air being stored in the casing A for blowing purposes.

In machines of this character heretofore in use trouble has been experienced by reason of the fact that the air in the high pressure chamber displayed a tendency to enter the pumping chambers as soon as the outlet ends thereof were lifted from the water and just at the time when the forward ends were dipping into the water at the inlet end of the machine, and as the water seal which had just been formed at the forward end of the chamber was not deep enough to withstand the high pressure, the air frequently forced its way into the low pressure chamber. In the present invention, this objection has been obviated by making the extension *e* of the partitions E of such a length that before the outlet end of any of the pumping chambers has emerged from the liquid, a water seal of sufficient depth has been formed at the forward end to prevent the air in the high pressure chamber from reaching the low pressure chamber. It is essential, however, in machines of this character that to insure a constant pressure of air in the high pressure chamber, the number of pumping chambers operating should at all times remain constant, and it has been found that when the extensions *e* are made of such a length to obtain the result above referred to, that, unless means are provided to prevent it, a chamber in excess of this constant member will temporarily exert its additional pumping pressure which would cause a variation of the pressure of the air in the high pressure chamber, which is particularly undesirable when the device is designed for use with a gas machine. To obviate this difficulty, the extensions *e* of the partition E are provided with U-shaped tubes e^2, herein before referred to.

In the use of applicant's machine, when the forward end of one of the extensions E passes below the surface of the water, compression of course commences in that particular chamber, and as, by virtue of the length of said extensions, the forward edge of the next succeeding extension will pass below the surface of the liquid before the rear end of the first chamber has emerged from the liquid, and were it not for the U-shaped tube air would also be compressed in the succeeding chamber, but by reason of said tube, although the edge of the partition of the succeeding chamber passes below the surface of the water, the air within said chamber will escape by way of the U-shaped tube e^2 into the low pressure chamber until both ends of the tube e^2 simultaneously pass beneath the surface of the water which then pops in both ends of said tube, thus quickly and sharply sealing the pumping chamber connected with the tube and preventing any of the air in said chamber from bubbling out from under its forward end, by which time, however, the rear end of said chamber has sunk beneath the liquid. As each chamber is brought into pumping operation, the rear end of one of the chambers which has completed its pumping operation emerges from the liquid, so that the number of pumping chambers in operation is at all times constant, such number depending largely upon the construction of the apparatus. In this construction it will be obvious that as with the present machine the number of pumping chambers in operation is always constant, the air in the high pressure chamber will always be maintained at a constant pressure.

I do not desire to limit myself to the precise form and construction shown in the drawings, as it is obvious that many minor changes may be made thereto without departing from the spirit of the invention as defined in the appended claims.

Having thus described the invention, what is claimed is:—

1. In a device of the character described, a high pressure chamber adapted to contain a supply of liquid, a drum journaled within the high pressure chamber and partially submerged in the liquid contained therein, a plurality of pumping chambers extending longitudinally of said drum and terminating short of the front wall thereof, the opposite ends of said pumping chambers being extended laterally in opposite directions, means for admitting air to the forward end of the drum, and means establishing a communication between the forward end of the drum and the inlet end of each of said pumping chambers at some distance from the extremity thereof.

2. In a device of the character described, a high pressure chamber adapted to contain a supply of liquid, a drum journaled therein and partially submerged in the liquid, a plurality of pumping chambers extending longitudinally of said drum and terminating short of the front wall thereof, the opposite ends of said pumping chambers being extended laterally in opposite directions, means for admitting air to the forward end of the drum, and pipes connecting the inlet end of each of the pumping chambers at some distance from the end thereof with the forward end of the drum.

3. In a device of the character described, a high pressure chamber adapted to contain a supply of liquid, a drum journaled therein and partially submerged in the liquid, a plurality of pumping chambers extending longitudinally of said drum and terminating short of the front wall thereof, the opposite ends of said pumping chambers being extended laterally in opposite directions and the laterally extending portion of each of said chambers overlapping the laterally extending portion of the adjacent chamber for an appreciable portion of its length, means for admitting air to the forward end of the drum, and a plurality of U-shaped tubes secured to the inlet ends of said pumping chambers, one of the arms of each of said tubes being arranged to extend upwardly into the pumping chambers and the other arm being arranged to lie along side of said pumping chamber and communicate with the forward end of the drum.

4. In a device of the character described, a high pressure chamber adapted to contain a supply of liquid, a drum journaled therein and partially submerged in the liquid, a plurality of pumping chambers extending longitudinally of said drum and terminating short of the front wall thereof, the inlet and outlet ends of said pumping chambers being extended laterally in opposite directions, the inlet ends of said chambers being provided with means affording a communication with the forward end of the drum after said ends have become submerged in the liquid contained therein, and the outlet ends of said chambers being provided with apertures affording communication with the high pressure chamber, and means for admitting air to the front end of the drum.

5. In a device of the character described, a casing adapted to contain a supply of liquid, a drum journaled within said casing and partially submerged in the liquid contained therein, a plurality of pumping chambers extending longitudinally of said drum, the opposite ends of said pumping chambers being extended in opposite directions, a low pressure chamber with which the ends of the said pumping chambers are arranged to be successively brought into communication, and means establishing a communication between the low pressure chamber and the inlet ends of each of said pumping chambers at some distance from the extremity thereof.

In testimony whereof I affix my signature, in presence of two witnesses.

HERMAN WALTHER.

Witnesses:
LOUIS BLOCK,
AIMEE FLEXNER.