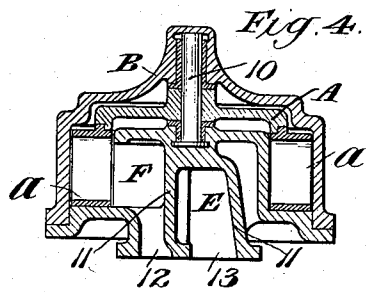
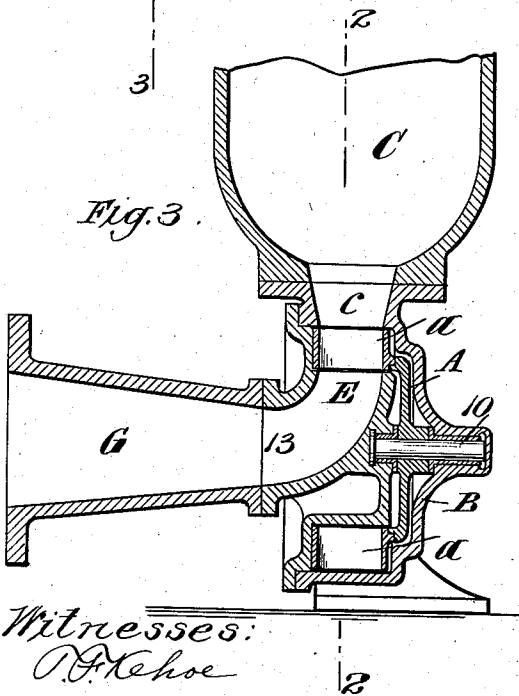
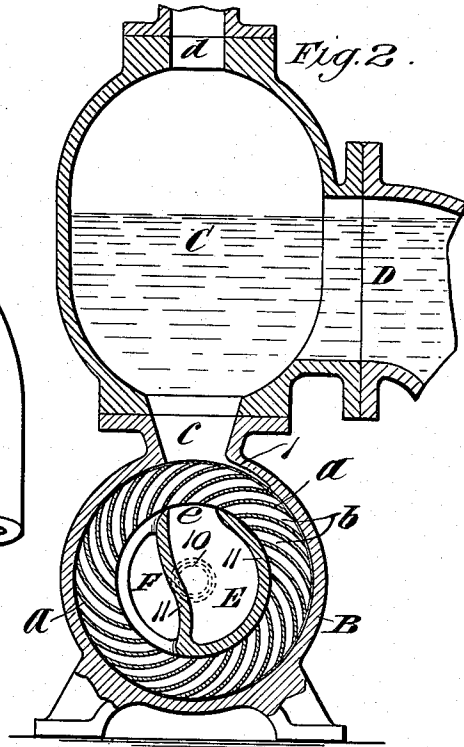
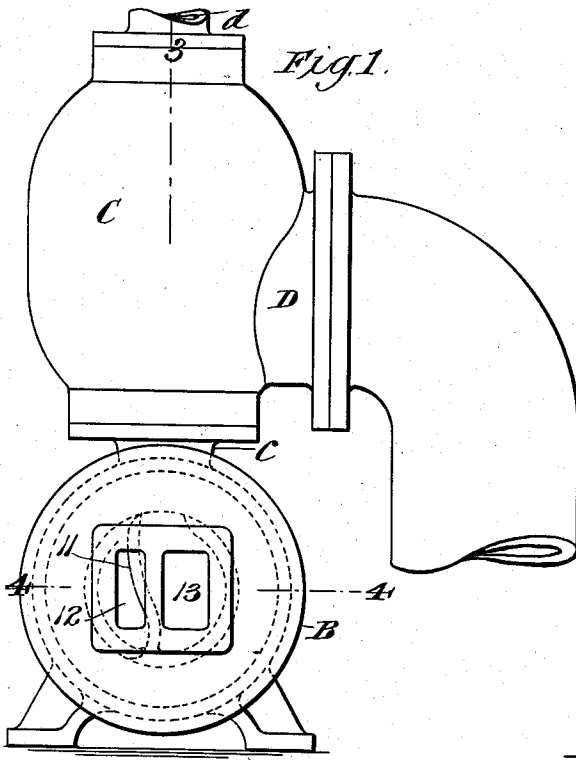


W. SCHEURMANN.
AIR AND GAS PUMP OR COMPRESSOR AND THE LIKE.
APPLICATION FILED OCT. 15, 1908.

933,346.

Patented Sept. 7, 1909.



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UNITED STATES PATENT OFFICE.

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AIR AND GAS PUMP OR COMPRESSOR AND THE LIKE.

933,346.

Specification of Letters Patent.

Patented Sept. 7, 1909.

Application filed October 15, 1908. Serial No. 457,765.

To all whom it may concern:

Be it known that I, WALTER SCHEURMANN, a citizen of the Republic of Switzerland, residing at Newark-on-Trent, England, have invented certain new and useful Improvements in Air and Gas Pumps or Compressors and the Like, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

The present invention relates to an improved pump or compressor for gaseous fluids in which the fluid is pumped or compressed by means of jets of water or other liquid, the especial object of the invention being to provide a simple and reliable pump, running at a high speed, occupying small space, and cheap of manufacture.

The invention consists in the employment of a system of ports or nozzles moved across one or more continuous jets of liquid, the inlets and outlets of the said ports being so controlled that a portion of the liquid jet and a volume of air or gas are alternately admitted and discharged to and from the ports or nozzles without the discharge pressure being allowed to reënter the ports or nozzles after the compression of each volume of air or gas and after the liquid has left the ports or nozzles.

In constructing an air pump operating with water according to the invention the ports or nozzles are preferably arranged in a wheel adapted to turn or rotate in a casing. The ports or nozzles preferably extend from near the center outward to the periphery of the wheel. In the casing are provided air and water inlets leading to the inner end of the ports or nozzles of which there may be any convenient number. The water is supplied under pressure and in passing outward may be used as a means for rotating the wheel, but the wheel may be rotated by other means and the pressure water used only for pumping or compressing the air. The inner ends of the ports or nozzles in the wheel alternately pass the air and water inlets so that air and water alternately enter therein. The momentum of the water compresses the air and discharges it from the outer ends of the ports or nozzles with

the water when the ports or nozzles arrive opposite the discharge outlet in the casing.

In case the apparatus is to be used as a compressor the discharge is into a tank closed to the atmosphere and large enough to allow of the air or gas and liquid separating before the liquid is flowed off. When the apparatus is used as a vacuum pump or for exhausting air from an apartment or other exhausting purposes the tank may be open to the atmosphere so as to allow the air or gas to escape. The apparatus may be used also as a condenser, the exhaust steam or other vapor entering at the inlet for the air or gas.

In the accompanying drawings forming a part of this specification, a compressor embodying the invention in a preferred form is illustrated, and this construction will now be described in detail and the features forming the invention then specifically pointed out in the claims.

In the drawings:—Figure 1 is an elevation of the compressor looking toward the inlet side. Fig. 2 is a vertical section on the line 2 of Fig. 3. Fig. 3 is a vertical section on the line 3 of Fig. 1. Fig. 4 is a horizontal section on the line 4 of Fig. 1.

Referring to the drawings, A is a wheel mounted to rotate on shaft 10, and having the vanes *a* forming between them the ports or nozzles *b*. The wheel rotates in a casing B the wall of which surrounding the wheel closes the outer ends of the ports or nozzles *b* except at the discharge port *c* through which the wheel discharges from the outer ends of the ports or nozzles *b* into the discharge chamber C, from which the air passes off through an air outlet *d*, the liquid flowing off through pipe D. The casing B is preferably cut away on the side of the discharge opening from which the wheel approaches the opening to form the narrow passage 1, so as to open the outer ends of the ports or nozzles *b* to the discharge before the ports or nozzles reach the discharge port *c*, the air and water then being forced through this narrow opening to the discharge port, before the discharge port is fully open to the ports or nozzles. As shown, the discharge chamber C is above the wheel

A, and the discharge pipe D arranged so that the wheel is always liquid sealed.

The ports or nozzles *b* take suction at their inner ends from liquid inlet chamber E, the wall 11 of which is formed to close the inner ends of the ports or nozzles *b* except at the suction port *e* extending through a suitable portion of the inner circumference of the wheel. The wheel takes suction from the air inlet chamber F, which is shown as open to the inner ends of the ports or nozzles *b* through its entire extent, although this may be varied if desired. Liquid inlet chamber E connects with the inlet nozzle G through port 13, which nozzle G is preferably shaped as shown so as to change pressure into velocity, and the air inlet F connects through port 12 with the chamber or vessel to be evacuated or with the atmosphere if the machine be a compressor.

The operation of the device will be understood from a brief description, in connection with the above.

The pressure liquid admitted through the inlet chamber E and port *e* to the inner ends of the ports or nozzles *b*, and striking the curved vanes *a*, rotates the wheel A, so that each passes successively the liquid and air inlets. The ports or nozzles *b* receive pressure liquid at their inner ends as they pass the port *e*, and this liquid or part of it is thrown out by momentum as the other ends of the ports or nozzles pass the discharge port *c*, leaving a partial vacuum into which the air will rush as the inner ends of the ports or nozzles pass the partition between the liquid chamber and the air chamber. As the wheel with this air filling or partially filling the ports or nozzles reaches the discharge port *c*, or, in the construction shown, the cut away portion 1 of the casing B, the pressure liquid enters the inner ends of the ports and by momentum and the pressure the liquid is thrown outward and upward through the discharge opening, compressing and carrying with it the air in the ports or nozzles.

The apparatus shown is an air compressor, so that the tank C is closed except for the air and liquid discharge connections *d*, D, the opening *d* connecting with the receiver, and the chamber C being large enough to permit the air to separate from the liquid before the liquid flows off. If the apparatus is to be used as a vacuum pump or other exhausting purposes, the tank C may be of any suitable size and open to the atmosphere.

In the construction shown, the series of ports or nozzles are arranged as a wheel, and the wheel is driven by the pressure liquid. It will be understood, however, that the arrangement of the ports or nozzles may be varied, and that the wheel may be driven

by means other than the pressure of the liquid, the latter being then used only for compressing and discharging the air.

What is claimed is:—

1. In an air pump or the like, the combination with a series of moving ports, of air and pressure liquid inlets across which the ports pass successively to open the air and liquid inlets alternately to the ports, a discharge passage passed by the ports, and stationary walls co-acting with the moving ports to open the ports for the discharge of air and liquid from the ports and to close the ports to the discharge.

2. In an air pump or the like, the combination of a series of moving ports, of air and pressure liquid inlets across which the suction ends of the ports pass successively to open the air and liquid inlets alternately to the ports, a discharge passage passed by the outer ends of the ports, and stationary walls co-acting with the ports to open the ports for the discharge of air and liquid from the ports and to close the ports to the discharge.

3. In an air pump or the like, the combination with a series of rotating ports, of air and pressure liquid inlets across which the ports pass successively to open the air and liquid inlets alternately to the ports, a discharge passage passed by the ports, and stationary walls co-acting with the moving ports to open the ports for the discharge of air and liquid and to close the ports to the discharge.

4. In an air pump or the like, the combination with a wheel having a series of vanes forming ports between them, of air and pressure liquid inlets across which the vanes and ports pass successively to open the air and liquid inlets alternately to the ports, the vanes and pressure liquid inlets being arranged to rotate the wheel by the pressure liquid, a discharge passage passed by the ports, and stationary walls co-acting with the moving ports to open the ports for the discharge of air and liquid and to close the ports to the discharge.

5. The combination with wheel A, having vanes forming ports *b* between them, of liquid inlet chamber E and air inlet chamber F opening successively to the inner ends of the ports and a stationary wall surrounding the wheel and having discharge port *c* for the outer ends of the ports *b*, substantially as described.

6. The combination with wheel A, having vanes forming ports *b* between them, of liquid inlet chamber E and air inlet chamber F opening successively to the inner ends of the ports, a stationary wall surrounding the wheel and having discharge port *c* above the wheel for the ports *b*, and discharge cham-

ber C above the discharge port having air and liquid outlets *d*, D, substantially as described.

7. The combination with wheel A, having
5 vanes forming ports *b* between them, of liquid inlet chamber E and air inlet chamber F opening successively to the inner ends of the ports, a stationary wall surrounding the wheel and having discharge port *c* for
10 the outer ends of the ports *b*, and narrow

passage 1 connecting the ports *b* with the discharge ports as the ports *b* approach the discharge port, substantially as described.

In testimony whereof I have hereunto set my hand, in the presence of two subscribing
15 witnesses.

WALTER SCHEURMANN.

Witnesses:

E. W. HUSTED,

J. ANDERSON.