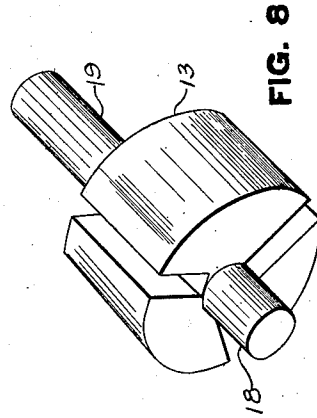
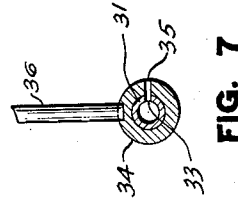
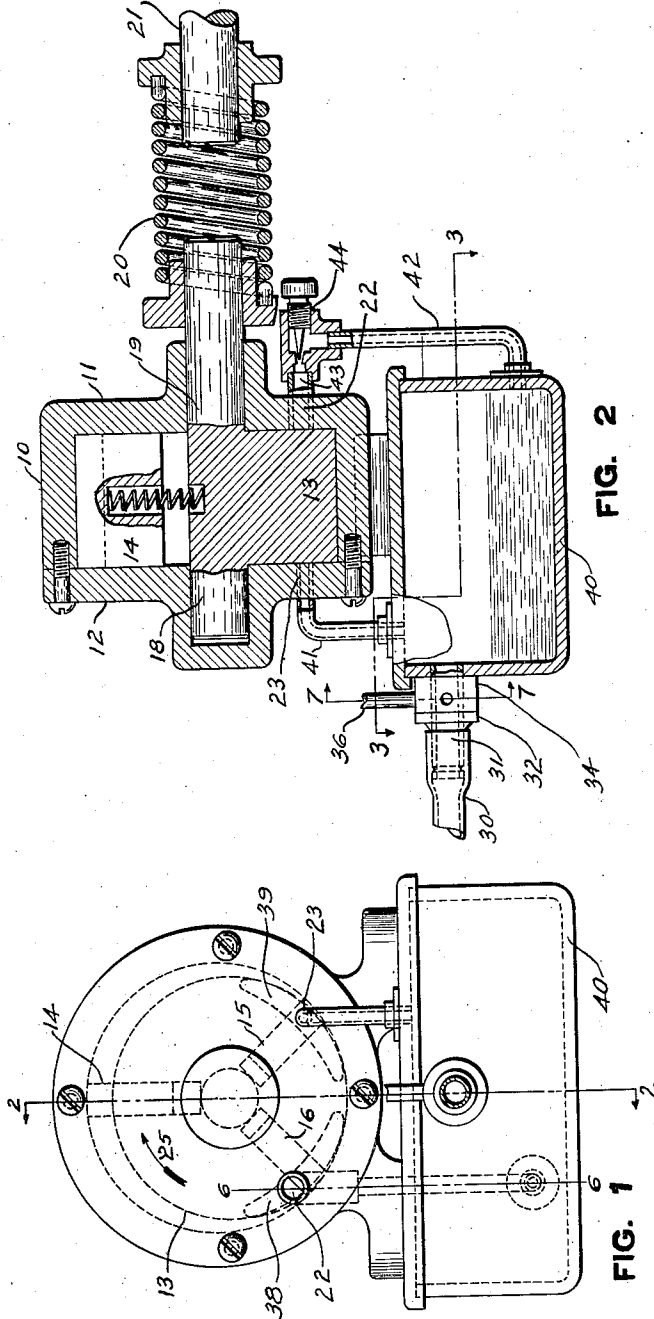


J. B. VERNON.
COMPRESSION AND SUCTION MACHINE.
APPLICATION FILED JULY 3, 1911.

1,056,859.

Patented Mar. 25, 1913.

2 SHEETS—SHEET 1.



WITNESSES

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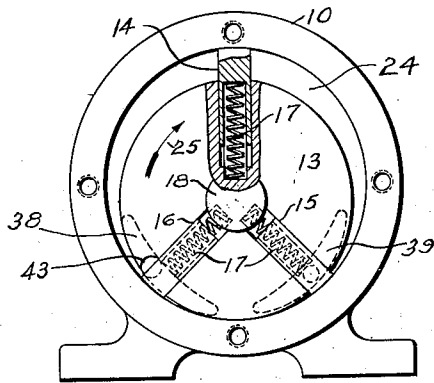


FIG. 4

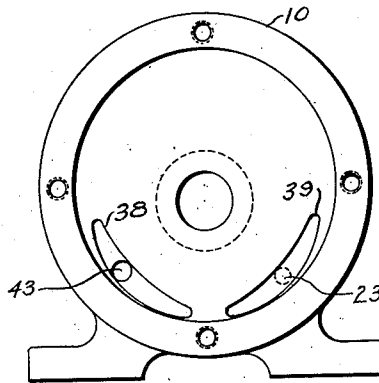


FIG. 5

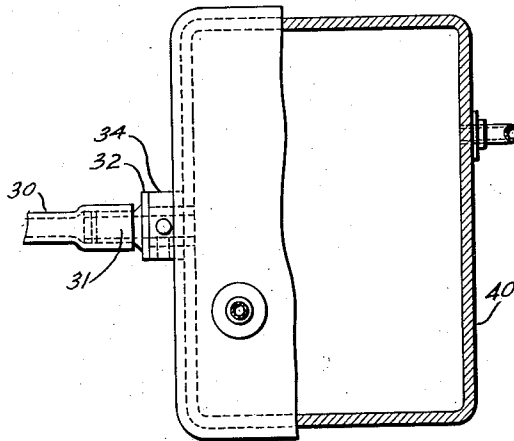


FIG. 3

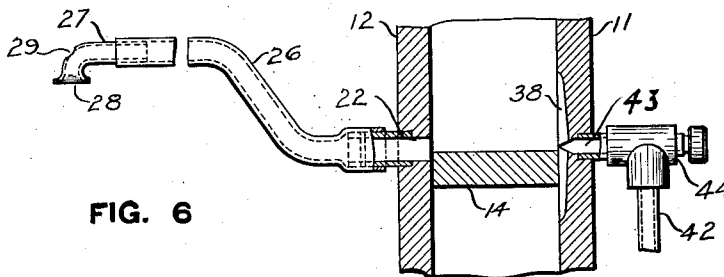


FIG. 6

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UNITED STATES PATENT OFFICE.

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COMPRESSION AND SUCTION MACHINE.

1,056,859.

Specification of Letters Patent.

Patented Mar. 25, 1913.

Application filed July 3, 1911. Serial No. 636,787.

To all whom it may concern:

Be it known that I, JAMES B. VERNON, a resident of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Compression and Suction Machines, of which the following is a specification.

This invention relates to rotary suction and compression apparatus, or rotary pumps, and particularly to that type which comprises a casing having a cylindrical chamber or bore therein with a cylindrical rotor arranged eccentrically in said chamber or bore and provided with yielding piston blades that bear constantly against the walls of the chamber.

The object of the invention is to provide suction or compression apparatus of the type referred to which has a much higher efficiency than similar machines as heretofore constructed and operated, and preferably one which is so designed that when used as a compressor it will deliver a constant or steady stream of fluid or liquid under pressure, and when used as suction apparatus will exert a constant and strong pull.

The invention comprises the construction and arrangement of parts hereinafter described for furnishing a circulation of a fluid, preferably an oil, through the apparatus.

In the accompanying drawings Figure 1 is an end elevation of a device embodying the invention; Fig. 2 is a vertical longitudinal section taken on the line 2-2, Fig. 1; Fig. 3 is a horizontal section on the line 3-3, Fig. 2; Fig. 4 is an end view of the casing with the removable head omitted and one of the piston blades in central section; Fig. 5 is an inside view of the rear head; Fig. 6 is a detail sectional view on the line 6-6, Fig. 1 and showing the suction mouthpiece; Fig. 7 is a sectional view taken on the line 7-7, Fig. 2; and Fig. 8 is a perspective view of the cylindrical rotor or piston.

In the drawings, which illustrate the preferred form of suction or compression device, the numeral 10 illustrates a casing having therein a cylindrical chamber or bore closed at its ends by the heads 11 and 12. Preferably the head 11 is integral with the cylindrical portion of the casing, while the other head is detachable, being secured by tap screws or the like, as shown.

13 indicates the cylindrical rotor or piston which is of such length that it fits snugly between the heads of the casing and is eccentrically located in the chamber or bore and on one side bears against the chamber wall. This rotor is provided with a plurality of piston blades, three such blades being shown and marked respectively 14, 15 and 16. The number of such piston blades, however, may vary from two upward. These piston blades are slidably mounted in radial slots in the cylindrical rotor and are pressed outwardly by suitable means, such as coiled expansion springs 17 mounted in pockets in said piston blades, as shown in Figs. 2 and 4, so that said piston blades are constantly held in contact with the walls of the cylindrical chamber, but can yield inwardly as is necessary on account of the eccentric location of the rotor in said chamber. These piston blades extend for the full length of the rotor and their ends form a close fit against the heads of the casing.

The piston or rotor 13 can be rotated by any suitable means. The drawings show said rotor provided with journal portions 18 and 19 extending into bearings in the heads of the casing. One of these journals extends through the head and has connected thereto a suitable coupling 20 for direct connection to the armature shaft 21 of a suitable motor, or other driver. The particular manner of driving the rotor is unimportant.

The induction or eduction of the fluid or liquid into the casing is through ports or openings in one of the heads of the casing, such as through the removable head 12. The induction port is shown at 22 and the eduction port at 23, these ports being located adjacent to the opposite ends of the crescent shaped chamber 24 which exists between the periphery of the cylindrical rotor 13 and the cylindrical walls of the chamber. The arrow 25 indicates the direction of rotation of the rotor.

When used as suction apparatus there is connected to the induction port a pipe or hose 26 to which is connected the suction mouthpiece 27. The latter may be of any desired form, varying according to the use to which the suction apparatus is to be put. The particular mouthpiece shown is adapted for facial massage and cleaning and con-

sists of a glass tube of the form shown having a bell shaped mouth 28 and provided with a slit or opening 29, so that by pressing the thumb or finger over the same the degree of suction may be regulated as desired without changing the speed of the rotor.

When used as a compressor or blowing apparatus there is connected to the apparatus a suitable hose or other conduit 30 through which the compressed air is conducted to the point of use. The force of the stream passing through the conduit 30 may be varied without changing the speed of the rotor by means of a relief valve which can be so adjusted as to permit some of the fluid to escape. The relief valve shown comprises a pipe 31 to which the hose 30 is secured, said pipe being provided with a flange or collar 32 near its outer end, and also provided with an exhaust port 33. Rotatably mounted on this pipe, between the flange 32 and the cylinder head is a sleeve 34 provided with a port 35 which can be brought into register with the port 33 in the pipe 31 more or less to permit the escape of a portion of the compressed fluid. The sleeve is provided with a suitable handle 36 for turning the same.

In order that a constant flow of compressed fluid from the apparatus or a constant suction effect into the apparatus may be produced, and also to prevent back pressure or back suction in the machine, which would prevent maximum efficiency, suitable by-passes around the piston blades are provided at both ends of the crescent shaped chamber 24. Preferably these by-passes are formed in conjunction with the induction and eduction ports, or longitudinally in line with the same, as shown, and preferably are in the form of grooves cut into the inner face of the head 12 of the cylinder. As shown, an elongated groove 38 is shown in the rear head 11 in line with induction port 22, and a similar groove 39 in line with the eduction port 23. These ports extend circumferentially in the direction of rotation of the piston. The purpose of these grooves is to form by-passes around the piston blades when the latter are traveling past the induction and eduction ports, as shown in Fig. 6. It will be observed that the piston blades are wider than the cross sectional area of the ports. The groove 39 prevents intermittent interruption of the flow of the fluid out of the eduction port and also equalizes the pressure on opposite sides of the piston when it nears the end of the crescent shaped chamber 24 and prevents back pressure thereon. For instance, as a piston blade approaches the eduction port, and particularly from the time it begins to cover the latter and until it uncovers the same, the flow of liquid through the port would be interrupted. Now by having the elongated

groove, as shown, the fluid which is being urged forward by the next succeeding piston blade can pass through the groove underneath the piston blade which is approaching the eduction port and therefore provide a constant flow of fluid out of the machine. When the piston blade passes beyond the eduction port a certain amount of air is trapped in the end of the crescent shaped chamber 24 beyond said port. This would cause a back pressure and reduce the efficiency of the device, were it not for the elongated groove which permits such trapped fluid to escape to the eduction port.

In the case of the induction port the purpose of the grooves is substantially the same. From the time the piston blade comes onto the inlet end of the crescent shaped chamber 24 until it has uncovered the induction port there would be a tendency to create a vacuum behind the piston blade, which vacuum is the reverse of back pressure and would have a tendency to reduce the efficiency of the machine. The elongated groove 38 extends backwardly practically to the end of the crescent shaped chamber 24 and therefore prevents such back suction or vacuum. Furthermore, from the time the piston blade begins to cover the induction port until it fully uncovers the same, there would be an interruption in the inflow of air into the machine. The portion of the groove 28 extending from the induction port toward the eduction port permits the preceding blade to exert its suctional effect and draw fluid underneath the piston blade in question and therefore provide the continuous sucking effect at the induction port.

As a consequence of the elongated grooves described the apparatus acts with a constant and substantially uniform pressure, either under compression or under suction, and all back pressure or back suction or vacuum is prevented so that the maximum efficiency of the rotating pistons is provided.

While the construction of the suction or compression apparatus so far described is preferred, it is only one of several forms that can be used for carrying into effect the principal purposes of the invention which is now to be described.

In order to increase the efficiency of the machine I provide means for circulating through the machine a continuous stream of liquid preferably an oil or glycerin. As shown in the drawings, there is arranged in juxtaposition to the rotary machine, preferably underneath the same, a suitable closed reservoir or vessel 40 for containing the liquid, such as glycerin, to a certain depth therein. The eduction port 23 is connected by means of pipe 41 to this closed reservoir or vessel above the level of the liquid therein. A pipe 42 leads from the reservoir 41 below the level of the liquid

therein and connects on the induction side of the chamber 24, the drawings showing the connection made to an opening 43 through the rear head 11 longitudinally in line with induction port 22. This pipe is provided with a suitable regulating valve, shown as needle valve 44, by means of which the flow of liquid through the rotary machine can be regulated to the desired quantity, which in practice is very small. The pipe 31, to which is connected the compression hose 30, communicates with chamber or reservoir 40 at any suitable point above the level of the liquid in the latter.

15 In the use of the apparatus, a constant small supply of glycerin or other suitable liquid is circulated through the machine, being drawn into the same through pipe 42 and discharged through pipe 41, separating from the compressed air by gravity and falling to the bottom of the reservoir, while the air passes out through discharge pipe 31. This liquid is preferably of a slightly oily nature, and seals the spaces between the blades and cylinder walls so as to prevent the escape of air around the blades. It tremendously increases the efficiency of the machine by providing a circulating means for such liquid so that a uniform supply can be maintained and the action of the machine is therefore uniform. Such circulation is necessary, because any oil or other liquid placed in a machine of this kind is very rapidly discharged therefrom.

35 The machine described can be used for various purposes. When used as compression apparatus it is particularly adapted for operating blow pipes or other devices in which a constant stream of compressed fluid and at substantially a constant pressure is desirable. When used for suction purposes it can be applied to any use for which suction, or vacuum producing apparatus is desirable. It is particularly well adapted for cleaning purposes or facial massage, acting upon the skin by suction to eradicate wrinkles, bring the blood to the surface, and also to cleanse the skin. The device, however, is not limited in its use to the particular purposes mentioned. The machine acts equally as well for suction as for compression, the suction on the one side of the machine being equal to if not greater than the compression on the other side. As a consequence, a single machine can be advantageously used for both purposes.

55 What I claim is:—

1. A machine of the character described,

comprising a casing provided with a chamber or bore and with induction and eduction ports, a piston in said chamber arranged to draw air through the induction port and discharge the same from the eduction port, a closed reservoir for a liquid at a lower level than said casing, connections from the eduction side of the casing to said reservoir above the liquid therein, an air outlet from said reservoir above the liquid therein, and a connection from said reservoir below the level of the liquid therein to the induction side of the casing.

2. A machine of the character described, comprising a casing provided with a chamber or bore and having induction and eduction ports therethrough, a rotor eccentrically located in said chamber leaving a crescent shaped space on one side, piston blades movably mounted in said rotor and held with their free edges in constant contact with the walls of the chamber and arranged to sweep around the same and draw air in through said induction port and force it out through said eduction port, said eduction port being at one end of said casing, a reservoir for liquid at a lower level than said casing, connections therefrom below the level of the liquid therein to the induction side of said rotor and communicating with said space at the other end of the casing from said eduction port, connections from said eduction port to the space in the reservoir above the liquid therein, and an air outlet from the reservoir above the level of liquid therein.

3. A machine of the character described, comprising a casing provided with a chamber or bore and with an induction port and an eduction port, a rotor located in said chamber or bore, blades carried by said rotor and contacting with the walls of the chamber or bore, a closed reservoir for a liquid at a lower level than said casing, connections from the eduction side of the rotor to said reservoir above the liquid therein, an air outlet from said reservoir above the liquid therein, a connection from said reservoir below the level of the liquid therein to the induction side of the rotor, and a regulating valve in said last named connection.

In testimony whereof, I have hereunto set my hand.

JAMES B. VERNON.

Witnesses:

F. W. WINTER,
MARY E. CAHOON.