No. 828,111. PATENTED AUG. 7, 1906.

G. HERMANSEN.

ROTARY AIR COMPRESSOR.

APPLICATION FILED MAR. 17, 1905.

2 SHEETS—SHEET 1.

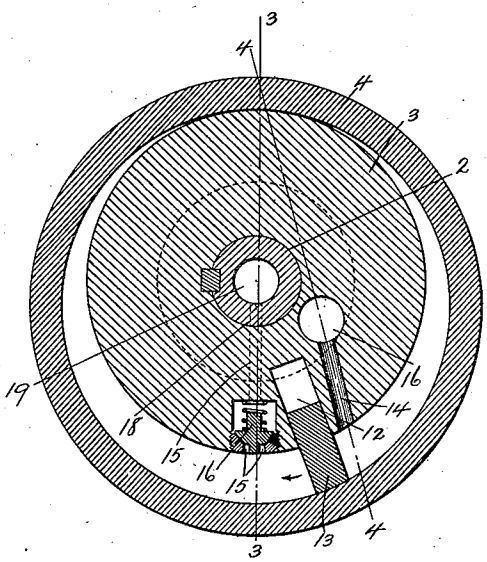

FIG 2

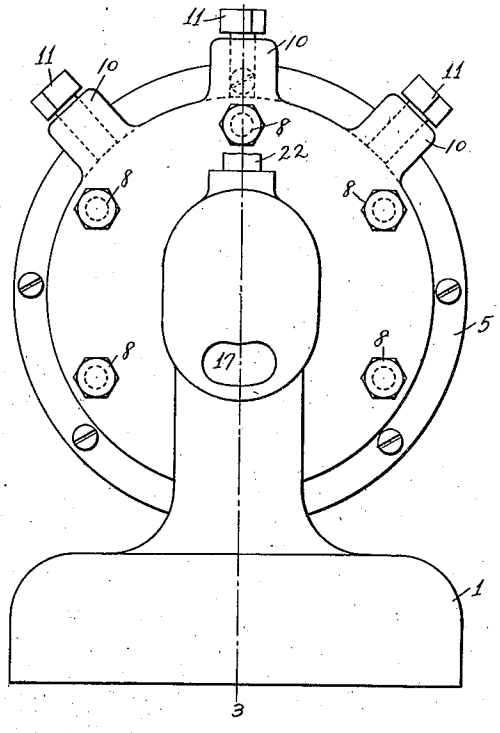

FIG 1

WITNESSES

S. C. Booth.

H. E. Curtis.

INVENTOR

Gustav Hermansen

By Mosher & Curtis

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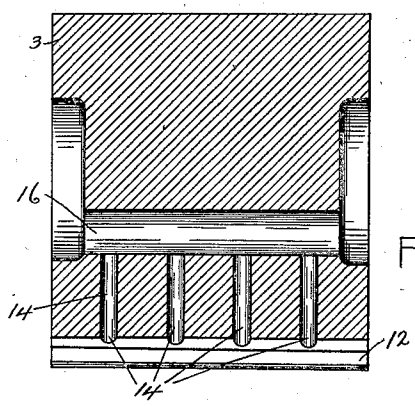

FIG 4

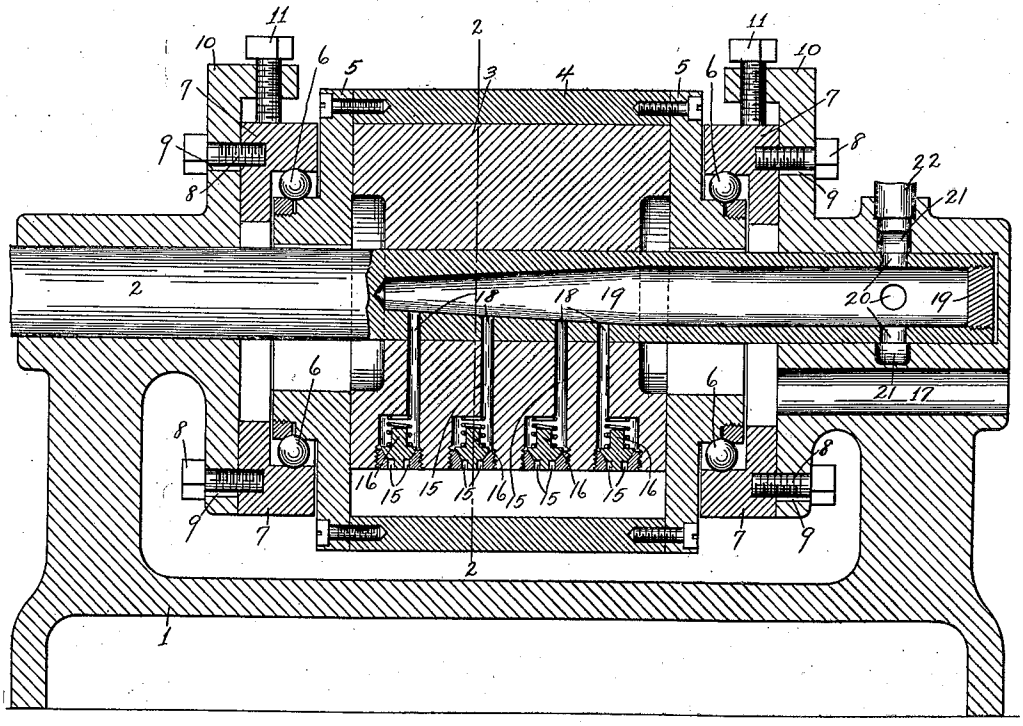

FIG 3

WITNESSES

S. E. Booth.

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INVENTOR

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UNITED STATES PATENT OFFICE.

GUSTAV HERMANSEN, OF ALBANY, NEW YORK.

ROTARY AIR-COMPRESSOR.

No. 828,111. Specification of Letters Patent. Patented Aug. 7, 1906.

Application filed March 17, 1905. Serial No. 250,508.

To all whom it may concern:

Be it known that I, GUSTAV HERMANSEN, a citizen of the United States, residing at Albany, county of Albany, and State of New York, have invented certain new and useful Improvements in Rotary Air-Compressors, of which the following is a specification.

The invention relates to such improvements; and it consists of the novel construction and combination of parts hereinafter described and subsequently claimed.

Reference may be had to the accompanying drawings, and the reference characters marked thereon, which form a part of this specification.

Similar characters refer to similar parts in the several figures therein.

Figure 1 of the drawings is an end elevation of a fluid pump or compressor constructed in accordance with my invention. Fig. 2 is a vertical cross-section of the same, taken on the broken line 2 2 in Fig. 3. Fig. 3 is a central vertical longitudinal section of the same, taken on the broken line 3 3 in Figs. 1 and 2. Fig. 4 is a longitudinal section of the piston, taken on the broken line 4 4 in Fig. 2.

The object of my invention is to provide a simple, durable, and effective pump or compressor for fluids.

In describing my invention I shall refer to it more particularly as an "air-compressing" apparatus, although it is also adapted for use as a pump.

I have shown in the drawings and will describe the invention as applied to a simple fluid compressor or pump operating singly; but the apparatus shown may form one of a plurality or series of elements in a compound compressor or pump when suitably connected up with other similar elements.

Referring to the drawings, 1 is the frame of the machine containing bearings for the drive-shaft 2, which may be rotatively operated in any known manner, as by a belt and pulley. (Not shown.) Upon the drive-shaft is fixed a piston 3, adapted to rotate within and eccentrically of a cylinder 4, having heads 5, adapted to bear upon the ends of the piston to make a comparatively tight joint therewith.

The cylinder is rotatively mounted by means of ball-bearings 6 at each end upon a bearing-plate 7, which is adjustably mounted upon the frame of the machine by means of screws 8, inserted through slotted apertures 9 in the frame of the machine into said bearing-plate, whereby said bearing-plates are made adjustable perpendicularly to the drive-shaft. Said ball-bearings may be of any known form. The bearing-plates 7 and the heads 5 of the cylinder are provided with central apertures somewhat larger than the drive-shaft 2, which passes therethrough. The piston is adapted to rotate within the cylinder eccentrically and in contact therewith, and the cylinder is adapted to be rotated by the frictional engagement therewith of the periphery of the piston. The bearing-plates 7 are adjusted upon the frame of the machine, so as to cause the cylinder to thus engage the piston with the desired degree of force to accomplish the rotative movement of the cylinder and also to make a comparatively tight joint between the piston and cylinder at such point of contact, and when the bearing-plates are so adjusted they are locked in position by means of the screw-bolts 8.

To facilitate the adjustment and add to the stability of the structure, the frame of the machine is provided with one or more lugs 10, overhanging each bearing-plate 7, through each of which lugs is inserted a screw-bolt 11, adapted to engage the periphery of the bearing-plate. I have shown the frame thus provided with three of such lugs and screw-bolts for each bearing-plate; but a lesser number may be employed, if desired.

As shown, the cylinder and piston are adapted for contact with each other at the top of the machine, and the slots 9 in the frame of the machine are elongated vertically to permit of a downward vertical adjustment of the bearing-plate screw-bolts 8.

The piston is provided with a slot 12, extending from its periphery inwardly approximately in a radial direction, which slot is adapted to receive a sliding piston-plate or abutment 13, which is adapted to be held outwardly by centrifugal force in engagement with the inner surface of the cylinder as the machine is operated. The piston is provided with one or more inlet-ports 14 opening through its periphery to the space between the piston and cylinder adjacent to the piston-plate on one side thereof and with one or more outlet-ports 15 opening through its periphery to the space between the piston and cylinder adjacent to the piston-plate on the opposite side thereof.

The inlet-ports 14, of which four are shown,

extend inwardly to a common inlet-aperture 16, extending longitudinally through the body of the piston between its shaft aperture and periphery and communicating with the atmosphere through the central apertures in the cylinder-head 5 and bearing-plate 7 and an inlet-aperture 17 in the frame of the machine.

Each of the outlet-ports 15 is provided with an automatic check-valve 16, which may be of any known form which is adapted to yield only to pressure applied thereto from the space between the cylinder and piston, and each of said ports extends approximately radially through the body of the piston to its shaft-aperture, whereat it registers with an opening 18, leading from the periphery of the drive-shaft to a central chamber formed in said shaft, which is hollow.

The end of the hollow shaft is closed by a plug at 19, near which closed end the shaft is provided with one or more outlet-holes 20, communicating with an annular chamber 21, formed in the bearing on the frame of the machine, which chamber is connected by a pipe 22 with a storage-reservoir (not shown) for the compressed air.

The operation of the apparatus is as follows: The inlet-ports 14 being always open, at each rotation of the piston the space between the piston and cylinder is filled with air, which as the piston rotates is driven before the piston-plate and compressed between said piston-plate and the walls of the cylinder and piston. As the piston-plate approaches its highest position the air so confined becomes sufficiently compressed to force open the check-valves 16 and escape through the outlet-ports 15 to the supply-reservoir. As the air in advance of the piston-plate is thus compressed the space between the cylinder and piston in rear of the piston-plate is automatically refilled with air entering through the inlet-ports 14, which new supply of air is in like manner compressed at the next rotation of the piston.

Certain of the structural features of my invention are adapted for use in a rotary engine.

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

1. In a machine of the class described, the combination with a rotatively-mounted cylinder; of a piston rotatively mounted eccentrically within the cylinder in contact therewith, capable of unlimited rotative movement relatively thereto and adapted to rotate said cylinder said piston being provided with a longitudinal slot in its periphery, and with an inlet-port in its periphery on one side of said slot, and an outlet-port in its periphery on the opposite side of said slot; a piston-plate movably mounted in said slot, and adapted to make contact with the inner surface of the cylinder; an automatically-operated valve controlling said outlet-port; and means for rotating said piston.

2. In a machine of the class described, the combination with a rotatively-mounted cylinder having a continuous interior cylindrical surface; of a rotatively-mounted drive-shaft extending through enlarged apertures in the heads of the cylinder eccentrically thereto; a piston fixed upon said shaft adapted to rotate eccentrically within the cylinder in contact therewith, and to rotate the cylinder by frictional engagement with its cylindrical interior surface, said piston being provided with a longitudinal slot in its periphery, and with an inlet-port in its periphery on one side of said slot, and an outlet-port in its periphery on the opposite side of said slot; a piston-plate movably mounted in said slot, and adapted to make contact with the inner surface of the cylinder; an automatic check-valve controlling said outlet-port adapted to yield to internal pressure in the space between the cylinder and piston; means for varying the relative eccentric positions of the cylinder and piston and means for rotating said piston.

3. In a machine of the class described, the combination with the frame of the machine having shaft-bearings; of a shaft rotatively mounted in said bearings; a pair of bearing-plates adjustable upon the frame of the machine perpendicularly to said shaft and provided with enlarged central apertures through which said shaft extends; means for securing said bearing-plates in adjusted position upon the frame of the machine; a cylinder rotatively mounted upon said bearing-plates eccentrically to said shaft; and a piston mounted upon said shaft adapted to rotate within said cylinder eccentrically thereof and in contact therewith.

4. In a machine of the class described, the combination with the frame of the machine having shaft-bearings; of a shaft rotatively mounted in said bearings; a pair of bearing-plates adjustabie upon the frame of the machine perpendicularly to said shaft and provided with enlarged central apertures through which said shaft extends; means for securing said bearing-plates in adjusted position upon the frame of the machine; a cylinder rotatively mounted upon said bearing-plates eccentrically to said shaft; by means of ball-bearings interposed between the cylinder and the respective bearing-plates; and a piston mounted upon said shaft eccentrically within the cylinder.

5. In a machine of the class described, the combination with the frame of the machine; of a shaft rotatively mounted thereon; a pair of bearing-plates adjustable upon the frame of the machine perpendicularly to said shaft and provided with enlarged central ap-

ertures through which said shaft extends; lugs on said frame overhanging the peripheries of the respective bearing-plates; screws inserted through said lugs engageable with the peripheries of the respective bearing-plates; a cylinder rotatively mounted upon said bearing-plates eccentrically to said shaft; and a piston mounted upon said shaft adapted to rotate eccentrically within said cylinder in contact therewith.

6. In a machine of the class described, the combination with a rotatively-mounted cylinder having a continuous interior cylindrical surface; of a rotatively-mounted driveshaft extending through enlarged apertures in the heads of the cylinder eccentrically thereto; a piston fixed upon said shaft adapted to rotate eccentrically within the cylinder in contact therewith and to rotate the cylinder by frictional engagement with its cylindrical interior surface, said piston being provided with a longitudinal slot in its periphery, and with an inlet-port in its periphery on one side of said slot, and an outlet-port in its periphery on the opposite side of said slot; a piston-plate movably mounted in said slot, and adapted to make contact with the inner surface of the cylinder; an automatically-operated valve controlling said outlet-port; means for varying the relative eccentric positions of the cylinder and piston; and means for rotating said piston.

7. In a machine of the class described, and in combination, a pair of members each rotatively mounted and capable of unlimited rotative movement relatively to the other, the same comprising a cylinder, and a cylindrical piston rotatively mounted within the cylinder eccentrically thereto in contact therewith, one of said members being provided with a slot and with an inlet-port on one side and an outlet-port on the opposite side of said slot; a piston-plate movably mounted in said slot and adapted to make contact with the surface of the other member; an automatically-operated valve controlling said outlet-port; and means for rotating one of said members.

In testimony whereof I have hereunto set my hand this 11th day of March, 1905.

GUS. HERMANSEN.

Witnesses:

HENRY E. STERN,

A. W. SANDSTROM.