G. F. BURTON.

ROTARY AIR COMPRESSOR.

APPLICATION FILED JUNE 3, 1907.

899,027.

Patented Sept. 22, 1908.

3 SHEETS—SHEET 1.

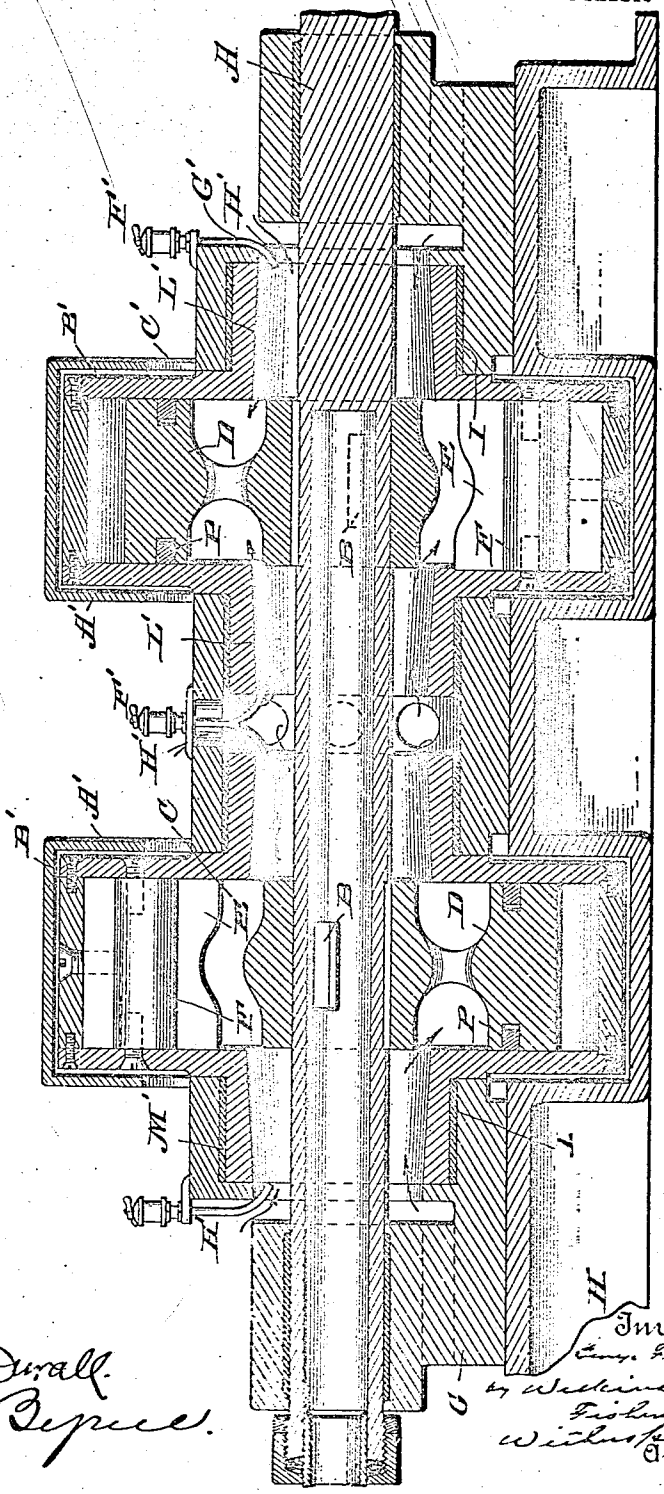


Fig. 1.

Witnesses
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3 SHEETS—SHEET 2.

Fig. 2.

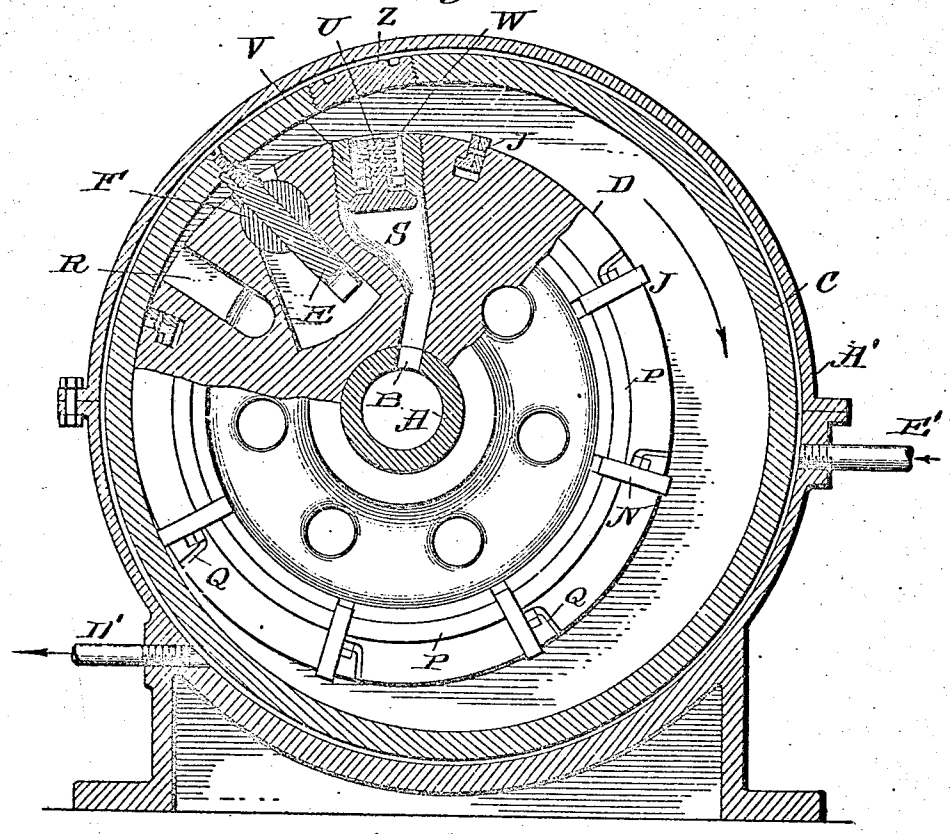


Fig. 5.

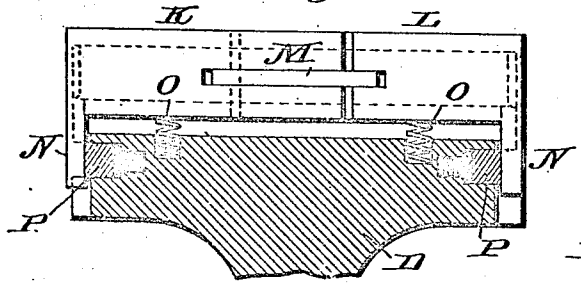


Fig. 7.

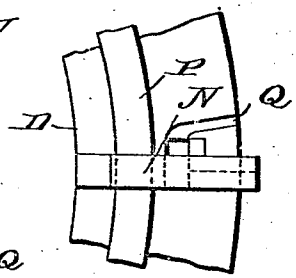
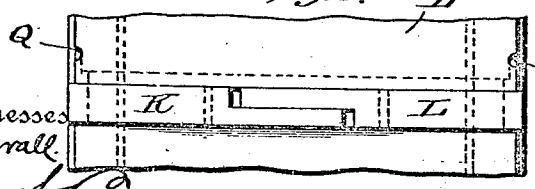


Fig. 6.



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3 SHEETS—SHEET 3.

Fig. 3.

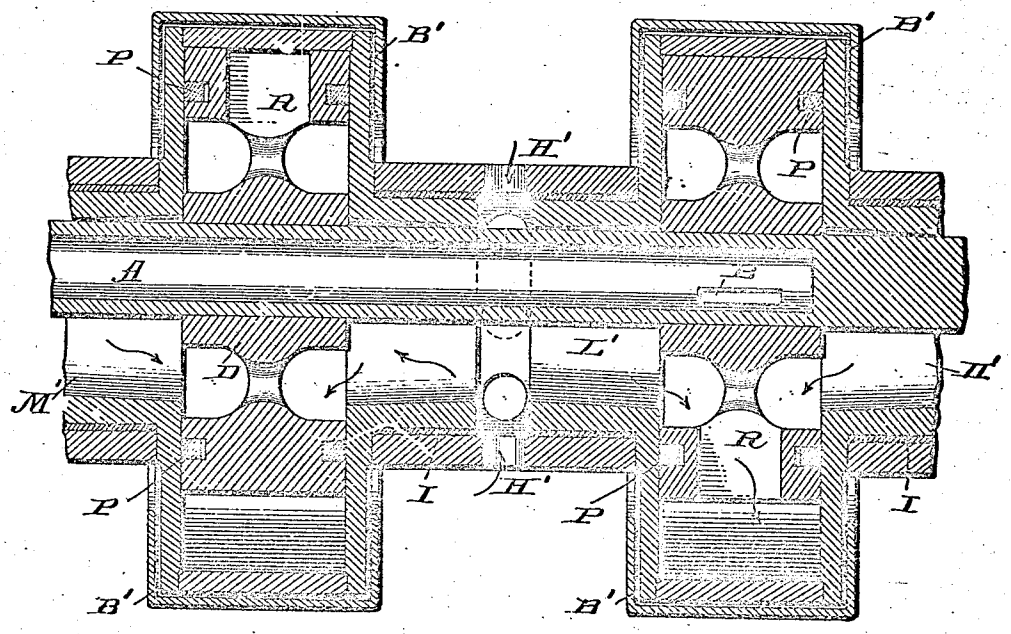
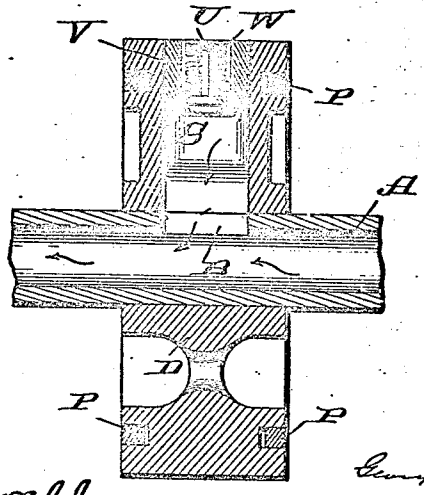


Fig. 4.



Witnesses

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UNITED STATES PATENT OFFICE.

GEORGE F. BURTON, OF WOODLAWN, ALABAMA, ASSIGNOR OF ONE-FOURTH TO LE ROY A. CHRISTIAN, OF WOODLAWN, ALABAMA.

ROTARY AIR-COMPRESSOR.

No. 899,027. Specification of Letters Patent. Patented Sept. 22, 1908.

Application filed June 3, 1907. Serial No. 377,093.

To all whom it may concern:

Be it known that I, GEORGE F. BURTON, a citizen of the United States, residing at Woodlawn, in the county of Jefferson and State of Alabama, have invented certain new and useful Improvements in Rotary Air-Compressors; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to a rotary air compressor and has for its objects to provide such a machine which shall be certain and efficient in operation, easy to build, to put together, to take apart and repair, and which shall be simple in construction and not easy to get out of order.

To these ends my invention consists in the combination of parts hereinafter described and particularly pointed out in the claims.

Referring to the drawings forming a part of this specification:—Figure 1 is a longitudinal sectional view of my machine. Fig. 2, a transverse sectional view taken through one of the cylinders and showing the disk partly broken away to further disclose the piston and exhaust port, and Fig. 3, a longitudinal sectional view similar to Fig. 1 but taken on a plane at right angles thereto, and showing the eccentricity of the cylinders relative to the shaft and disks. Fig. 4 is a detail of the exhaust port and valve controlling the same. Fig. 5, a detail elevational view of one of the packing-boxes. Fig. 6, a plan view of the same, and Fig. 7, an end elevational view of the same.

Like letters of reference indicate like parts in all of the views.

A represents a shaft which may be driven by any suitable power and which, as shown, is hollow and provided with the ports B, for admission of air forced from the cylinders C. Keyed on said shaft, or otherwise permanently attached thereto, are the disks D. These disks are concentric to said shaft and fit air-tight the sides of said cylinders C on the interior thereof, as will be more fully hereinafter disclosed, and are provided with the pistons E. These pistons consist of flat plates permanently attached to the cylinders C and slidingly and pivotally attached to the disks D by means of the split cylindrical pivot-pins F, as shown. The disks D are provided with cavities to accommodate the swinging ends of the pistons, as best shown in Fig. 2. The shaft A is suitably journaled in bearings G, cast integral with, or otherwise secured to, the bed-plate H. These bearings G are also provided with the bearings I, which are eccentric with respect to the journals of the cylinders C, which cylinders are, therefore, eccentric to the shaft A and the disks D, as will appear more fully hereinafter. The disks D are further provided around their periphery with packing-boxes J, which consists of two plates K and L slidingly joined by the third plate M, and provided with flanges N, all as clearly shown in Figs. 5, 6 and 7. Springs O press the plates K and L outward against the inner surfaces of the cylinders C, and rings P extend around the said disks D a short distance from their peripheries, on each side thereof, and are provided with cut-away places in which the said flanges N fit. The said flanges N and rings P form a joint flush with the inner-end surfaces of the cylinders, and thereby constitute an air-tight joint with the interior walls of the same, as above stated.

To one side of each packing-box J the disks D are provided with openings Q leading behind the plates K and L, and thereby serve to relieve the pressure of the air upon their upper surfaces, or, in other words, to counter-balance said boxes and leave the same under the control of the springs O. By thus balancing the pressure on the plates K and L, I am enabled to keep the friction of the same against the interior cylinders under absolute control, and also to regulate to a nicety the tightness of the packing against the interior of the cylinders; for all that it is necessary to do is to adjust the tension of the said springs O.

The disks D are provided with inlet ports R for the air and outlet ports S, the latter registering with the ports B in the shaft A. The ports S are controlled by the spring-pressed valves U seating against thimbles V, screwed into or otherwise secured to the disks D, the pressure of said valves being controlled by that in the reservoir.

A′ represents shells surrounding the cylinders C and constituting the outer walls of water-jackets between the same and said cylinders. These water-jackets B′ are not intended to hold a great deal of water, and are

open to the atmosphere at C', as shown. The centrifugal force is depended upon to carry the water to the outer rims of the cylinders and to hold it there as long as the compressor is operating, or until discharged through the outlet C'. By thus keeping the water jackets open to the atmosphere, I not only get the advantages of readily filling and emptying the jackets and also of employing a small quantity of water; but, at the same time, since the water is kept in violent circulation, and by centrifugal action is forced out against the containing walls of the casings the air is left free access to the interior of the jackets through the openings C'. The air thus entering these openings, naturally takes up more, or less, of the motion of the water, and cylinders; and therefore, circulates in, and out, of said openings; thereby serving to convey away some of the heat imparted to the water, and therefore to keep down the temperature.

E' is an inlet for the water.

F' represents oil reservoirs which deliver oil through the pipes G' to the conical openings L' in the bearings G and journals M' of the cylinders. In operation centrifugal force will carry the oil inward through said conical openings and force it outward to the parts of the machine.

H' represents inlets through which the air is taken from the outside and delivered to the cylinders, and said openings or apertures just mentioned form a continuation of the same.

The operation of my device is as follows:— Upon power being applied to shaft A, the same, together with the disks D and cylinders C, revolve. The disks being concentric with the shaft and the cylinders eccentric thereto, as above described, the space shown in Fig. 2 between the cylinders and the disks is rapidly diminished as the shaft revolves, and therefore the air is compressed. When the pressure gets to a point sufficient to open the valve U, the said valve permits the air to escape through the ports S and B into the shaft A, and is thence delivered to the reservoir or point of use. As the disks revolve, the pistons F, of course, are carried with the cylinders and, therefore, tend to create a vacuum behind the same, which causes the air to rush in from the outside through the inlet ports H', the apertures L' and the ports R in the disks, as above stated. This air thus sucked in as the shaft continues to revolve, is in turn compressed, as above described, and delivered to the point of use, whenever the pressure there maintained permits the valve U to open, and so on, as long as the compressor is operated.

Z represents a plug in the cylinder C, through which the valve U may be adjusted or repaired.

The cylinders are placed at 180 degrees from each other and, therefore, the delivery of air to the shaft A is always kept at a substantially uniform rate.

It will thus be seen that my machine is exceedingly simple, is easy to assemble and disassemble, that the packing between the piston and disk and the cylinder and disk is also simple and not easy to get out of order, and that there are no irregularly shaped parts, so that the whole compressor can be easily built by machinery.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:—

1. In a rotary air compressor, the combination of a shaft, a disk concentric therewith, a cylinder eccentric thereto, a piston fixed to one of said parts and slidably and pivotally connected with the other, packing boxes on said disk consisting of two plates K and L, and a third plate M slidingly joining said plates K and L, means permitting the pressure to be balanced on the outer surfaces of said boxes and means to admit air to said cylinder, substantially as described.

2. In a rotary air compressor, the combination of a rotary shaft, a rotary disk concentric therewith, a rotary cylinder eccentric thereto, a piston fixed to one of said parts and slidably and pivotally connected with the other, packing boxes on said disk consisting of a plurality of plates and provided with flanges, rings P, engaging said flanges, springs to press said rings outward, openings Q, in said disk permitting the pressure to be balanced on the outer surfaces of said boxes, and means to admit air to said cylinder, substantially as described.

3. In a rotary air compressor, the combination of a shaft, a disk concentric therewith, a rotary cylinder eccentric thereto, a piston fixed to said cylinder and slidably and pivotally attached to said disk, means to admit air to said cylinder, means to permit the air to escape from said cylinder after a predetermined pressure has been attained, and a water jacket open to the atmosphere surrounding said cylinder, substantially as described.

4. In a rotary air compressor, the combination of a shaft, a disk, a rotary cylinder eccentric to said shaft, a piston permanently connected to said disk and cylinder, air inlet ports, a spring-controlled air outlet port, and a water jacket open to the atmosphere surrounding said cylinder, substantially as described.

5. In a rotary air compressor, the combination of a shaft, a disk rigidly attached thereto and concentric therewith, a rotary cylinder eccentric thereto, and a series of packing-boxes around the periphery of said disk, each box consisting of two plates and a third plate slidingly connecting said two plates together, said boxes provided with

springs to radially press the same outward, said disk provided with openings Q, for permitting the pressure on the outside of said boxes to be balanced, substantially as described.

6. In a rotary air compressor, the combination of a shaft, a disk rigidly attached thereto and concentric therewith, a rotary cylinder eccentric to the shaft, a series of packing-boxes around the periphery of said disk, each box having flanges and consisting of two plates slidingly connected together and provided with springs to radially press the same outward, and said disk provided with a plurality of rings P, engaging said flanges and a series of openings at each packing-box, serving to balance the pressure on the outer surface of the same, substantially as described.

7. In a rotary air compressor, the combination of a shaft, a disk rigidly attached thereto and concentric therewith, a rotary cylinder eccentric to the shaft, a series of packing-boxes around the periphery of said disk, each box consisting of two plates and a third plate slidingly connecting said two plates together and provided with openings to radially press the same outward, and said disk provided with a series of openings at each packing-box serving to balance the pressure on the outer surface of the same, and also with an air inlet and a valved outlet port, substantially as described.

8. In a rotary air compressor, the combination of a shaft, a disk rigidly attached thereto and concentric therewith, a rotary cylinder eccentric to the shaft, a piston rigidly attached to said cylinder and slidingly and pivotally attached to said disk, a series of packing-boxes around the periphery of said disk, each box consisting of two plates having flanges slidingly connected together and provided with openings to radially press the same outward, and said disk provided with rings P, engaging said flanges and with a series of openings at each packing-box, serving to balance the pressure on the outer surfaces of the same, and also with an air inlet and a valved outlet port, substantially as described.

9. In a rotary air compressor, the combination of a shaft, a disk rigidly and concentrically secured thereto, a rotating cylinder eccentric therewith, a piston rigidly connected to said cylinder and slidingly and pivotally connected to said disk, an air inlet and a spring-pressed valved outlet in said disk and a water-jacket open to the atmosphere surrounding said cylinder, substantially as described.

10. In a rotary air compressor, the combination of a shaft, a disk rigidly and concentrically secured thereto, a rotating cylinder eccentric therewith, a piston rigidly connected to said cylinder and slidingly and pivotally connected to said disk, an air inlet and a spring-pressed valved outlet in said disk and a water-jacket surrounding said cylinder, open to the atmosphere and provided with water inlet and outlet pipes, substantially as described.

11. In a rotary air compressor, the combination of a shaft, a disk rigidly and concentrically secured thereto, a rotating cylinder eccentric therewith, a piston rigidly connected to said cylinder and slidingly and pivotally connected to said disk, a water jacket open to the atmosphere surrounding said cylinder, an air inlet and a spring-pressed valved outlet in said disk, and a plug-closed opening in said cylinder opposite said valve, for repairing and readily removing the same, substantially as described.

12. In a rotary air compressor, the combination of a shaft, a disk concentric therewith, a rotary cylinder eccentric thereto, a piston fixed to said cylinder and slidably and pivotally attached to said disk, rings P carried by said disk, packing boxes carried by said disks, and provided with flanges N fitting against said rings P, and springs for forcing said rings and flanges outward, means to admit air to said cylinder, and means to permit the same to escape therefrom after a predetermined pressure has been attained, and openings Q to permit the pressure on the outside of said boxes to be balanced substantially as described.

13. In a rotary air compressor, the combination of a shaft, a disk concentric therewith, a rotary cylinder eccentric thereto, a piston fixed to said cylinder and slidably and pivotally attached to said disk, means to admit oil to said cylinder consisting of the pipes G', means to admit air to said cylinder consisting of the conical openings L' into which said pipes G' lead, and means to permit the air to escape from said cylinder after a predetermined pressure has been attained substantially as described.

14. In a rotary air compressor, provided with bearings, the combination of a shaft, a plurality of disks concentric therewith, a plurality of rotary cylinders, one for each disk, and eccentric thereto, a piston fixed to each disk and slidably and pivotally attached to its corresponding disk, packing boxes composed of a plurality of spring pressed slidably connected plates around each disk, said bearings being provided with the conical openings L', through which air and oil is adapted to pass, and a water jacket surrounding each cylinder substantially as described.

15. In a rotary air compressor, the combination of a shaft, a disk, a cylinder, a pis-

ton and a water jacket surrounding said cylinder, and at all times open to the atmosphere, substantially as described.

16. In a rotary air compressor, the combination of means for compressing air, including a cylinder, and means for utilizing the surrounding air for carrying off the heat of compression, comprising a water jacket containing water, and provided with openings, permitting a free access of air in said jacket, substantially as described.

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

GEORGE F. BURTON.

Witnesses:
W. F. MILLER,
GEO. L. SMITH.