O. JONES.

COMPOUND AIR COMPRESSOR.

APPLICATION FILED JAN. 2, 1919.

1,331,111.

Patented Feb. 17, 1920.

3 SHEETS—SHEET 1.

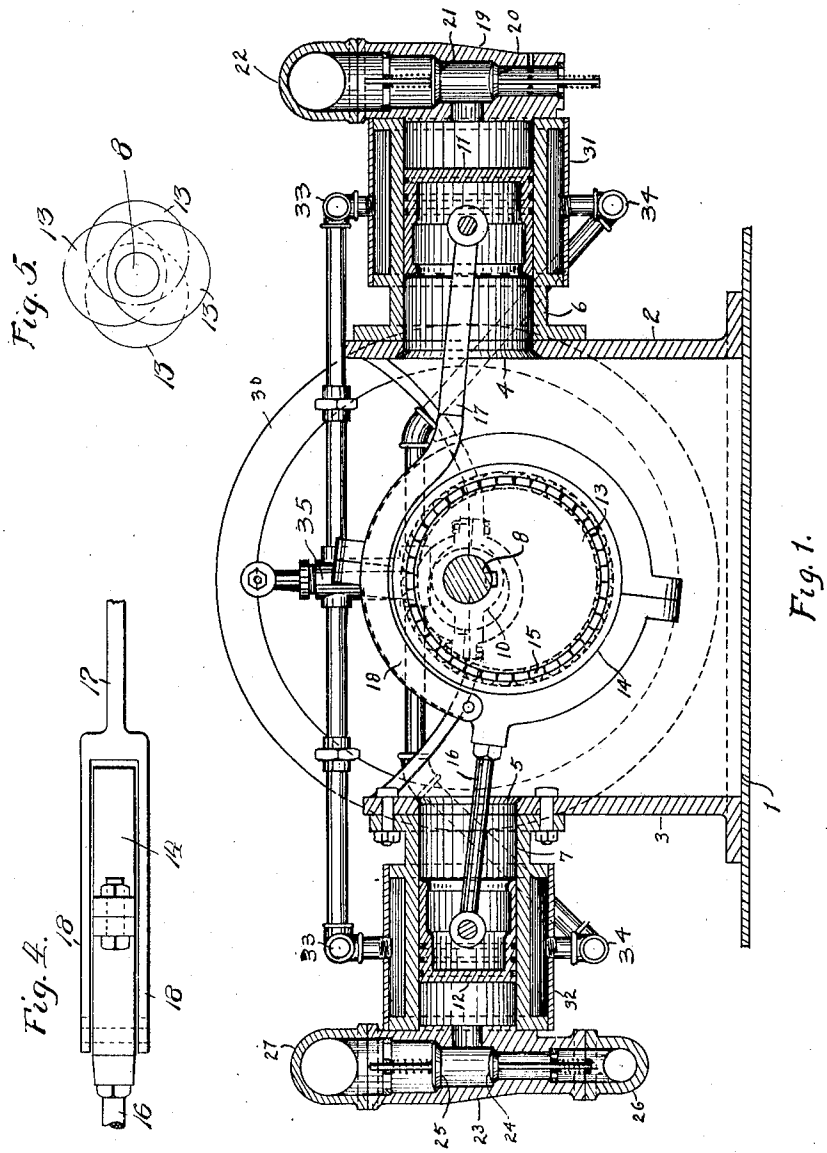


Fig. 1.

Fig. 3.

Fig. 4.

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BY

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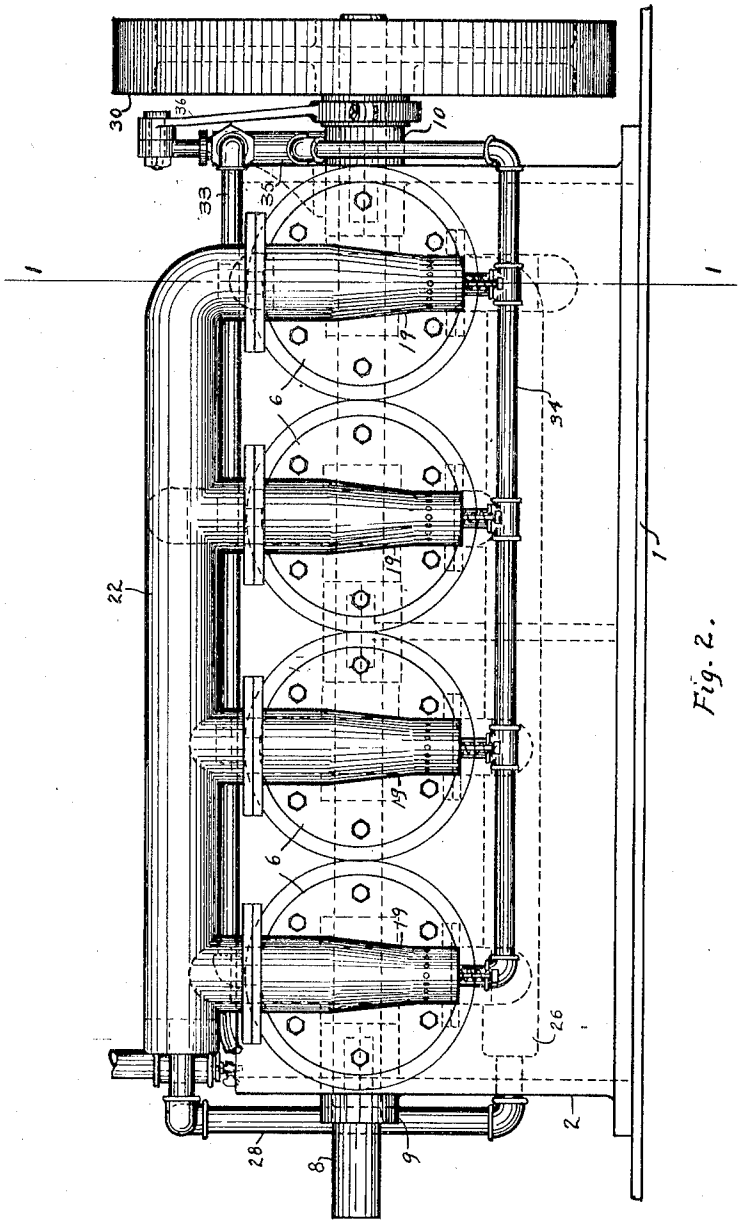


Fig. 2.

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3 SHEETS—SHEET 3.

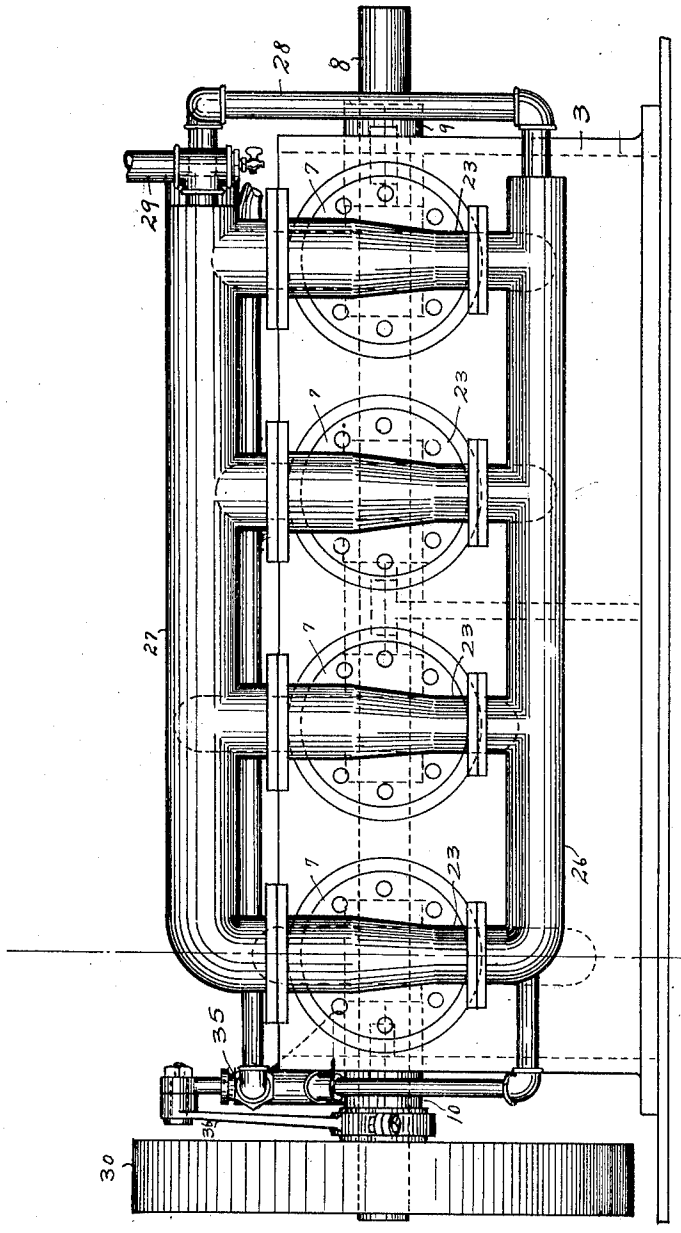


Fig. 3.

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UNITED STATES PATENT OFFICE.

OCEOLA JONES, OF HOUSTON, TEXAS.

COMPOUND AIR-COMPRESSOR.

1,331,111. Specification of Letters Patent. **Patented Feb. 17, 1920.**

Application filed January 2, 1919. Serial No. 269,348.

To all whom it may concern:

Be it known that I, OCEOLA JONES, a citizen of the United States, residing at Houston, in the county of Harris and State of Texas, have invented certain new and useful Improvements in Compound Air-Compressors, of which the following is a specification.

This invention relates to new and useful improvements in a compound air compressor.

The object of the invention is to provide an air compressor of the character described, embodying a plurality of pairs, preferably four pairs of cylinders, the cylinder of each pair being arranged in axial alinement, and including a high pressure cylinder, and a low pressure cylinder, the air compressed in the low pressure cylinder being delivered to the high pressure cylinder, to be further compressed, and being thereafter delivered to the outlet manifold, to be conducted to a pressure tank, or other storage receptacle.

Another object of the invention resides in the provision of pistons in said cylinders, which are operatively connected with a mechanism which operates the pistons in the low pressure and high pressure cylinders, successively, rather than simultaneously, thereby insuring a uniform and constant delivery of air under compression into the pressure tank.

A further feature of the invention resides in the provision of means for cooling the cylinders.

With the above and other objects in view, the invention has particular relation to certain novel features of construction, operation and arrangement of parts, an example of which is given in this specification and illustrated in the accompanying drawings, wherein:

Figure 1, is a transverse sectional view taken on the line 1—1 of Fig. 2.

Fig. 2, is a side elevation of the device.

Fig. 3, is a side view taken from the side opposite that shown in Fig. 1.

Fig. 4 is a plan view of one of the connecting rods employed, and Fig. 5 is a diagrammatical view showing the eccentric disks and the shaft whereon they are mounted.

Referring now more particularly to the drawings, wherein like numerals of reference designate similar parts in each of the figures, the numeral 1 refers to a suitable base plate. Secured to the base plate 1, are the upstanding vertical plates 2 and 3, which are spaced apart and arranged parallel to each other, and formed in these respective plates are the openings 4 and 5, spaced equal distances apart along the respective plates. Bolted or otherwise secured to the vertical plate 2 are the low pressure cylinders 6, alining with the openings 4, respectively, while secured to the vertical plate 3 are the high pressure cylinders 7, corresponding in number to the low pressure cylinders 6, and in alinement with the respective openings 5, of the plate 3. The low pressure cylinders 6 are in alinement with the high pressure cylinders 7, respectively, and between them is the shaft 8, which is rotatably mounted in suitable end bearings 9 and 10, carried by the frame of the compressor. Mounted within the low and high pressure cylinders, respectively, are the pistons 11 and 12, which are capable of reciprocatory movement within said cylinders. Fixed to the shaft 8 are eccentric disks 13, arranged in alinement with the respective alining cylinders, and surrounding each disk is an annular strap 14 and interposed between each strap and its eccentric disk, are the anti-friction bearings 15. The high pressure pistons 12 are connected to the respective straps by means of connecting rods, as 16, which are pivoted at one end to the respective pistons, and which have a rigid connection with the respective strap 14 at their other ends. The corresponding low pressure pistons 11 are connected to the respective straps 14 through connecting rods, as 17. These rods are pivoted at one end to the respective pistons and their other ends are bifurcated, forming arcuate fingers 18, which embrace the corresponding disks 13, and whose ends are pivoted to the opposite side of the corresponding strap 14. This construction has been provided so that less range of movement up and down will be required of the connecting rod 17, as the disks 13 rotate, than would be the case were said connecting rods 17 fastened to the near side of the corresponding straps 14. Secured to the outer end of each low pressure cylinder is a valve casing 19, each casing communicating with the corresponding cylinder chamber. Each valve casing is provided with an intake valve 20, and an outlet valve 21, and these valve casings communicate also with the manifold 22. The high pressure cylinders also have the respective valve casings 23, secured to the

outer ends thereof, and communicating with the respective cylinder chambers. These valve casings are provided with the respective inlet and outlet valves 24 and 25, and connected to the valve casing 23 are the inlet and discharge manifolds 26 and 27. The manifold 22 is connected with the manifold 26 by means of a pipe 28, and leading from the discharge manifold 27 is a pipe 29, through which the compressed air is delivered to the tank or other receptacle. One end of the shaft 8 has a pulley 30 fixed thereon, through which said shaft may be rotated from a suitable source of power. As the shaft 8 is rotated, the eccentric disks also rotate and impart a reciprocatory movement to the pistons 11 and 12, through their respective straps 14, and the corresponding connecting rods 16 and 17. During one part of the revolution of the shaft 8, the pistons in the lower pressure cylinders are successively drawn inwardly to take in charges of air, while in the remaining part of the revolution of the shaft, the low pressure pistons are successively moved outwardly, and the air is forced out through the valves 21 into the manifold 22, and thence through the pipe 28, into the intake manifold 26. While the low pressure pistons are moving outwardly, the corresponding high pressure cylinder pistons are being moved inwardly, and the corresponding high pressure cylinders receive charges of air through the valves 24, and upon outward movement of the high pressure pistons 12, the air is further compressed and discharged through the valves 25, into the discharge manifold 27, and thence out through the pipe 29 into the storage tanks. It is thus obvious that when a low pressure piston is moved outwardly, to compress the air and deliver it through the manifold 22, and the pipe 28, into the manifold 26, the corresponding high pressure piston is moved inwardly to receive a charge of compressed air and when said low pressure piston is moved inwardly, the corresponding high pressure piston is moved outwardly to further compress said charge and force into the discharge manifold 27. The eccentric disks 13 are so positioned relative to each other, that the low pressure pistons, as well as the high pressure pistons, will be moved outwardly and inwardly successively, so as to provide a continuous and uniform delivery of air into the storage receptacles, thus requiring a uniform and continuous amount of work on the part of the driving shaft 8, and minimizing the vibrations incident to the operation of the compressor.

The respective cylinders are provided with suitable water jackets 31 and 32, through which a cooling fluid circulates. The fluid is supplied to these jackets through a circulating system consisting of the delivery pipes 33, 33, and the lead pipes 34, 34, connected to the jackets 31 and 32. A pump 35 is connected to the water circulating system and is operated from the shaft 8, through the eccentric rod 36 and through which the circulation through said cooling system is induced.

What I claim is:

A device of the character described, including in combination spaced plates, arranged parallel, and having openings formed therein, low pressure cylinders secured to one plate in alinement with the respective openings therein, high pressure cylinders secured to the other plate in alinement with the openings therein, valve casings secured to and communicating with the respective low pressure and high pressure cylinders, intake and discharge valves arranged in said casings, a low pressure manifold communicating with the valve casings of the low pressure cylinders, an intake and a discharge manifold communicating with the respective valve casings of the high pressure cylinders, a fluid conduit leading from the low pressure manifold and communicating with the intake manifold of the high pressure valve casings, a shaft rotatably mounted between said plates, and extending longitudinally with respect to said plates, pistons in said cylinders, eccentric disks on said shaft in alinement with the respective coöperating cylinder, straps on said eccentric disks respectively, driving connections between each strap and the adjacent disks being so located on said shaft as to impart corresponding movements successively to the respective pistons in said cylinders.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

OCEOLA JONES.

Witnesses:
E. V. HARDWAY,
IRENE I. BRUNS.