

UNITED STATES PATENT OFFICE

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COMPRESSOR OR PUMP

Application filed June 8, 1929. Serial No. 369,338.

This invention relates to compressors or pumps and is specially designed for use for refrigerating purposes but may well be applied to other purposes.

5 Objects of the invention are to provide an improved compressor or pump having operating mechanism mounted within a housing which has a partition dividing the housing into separate compartments, one of which
10 contains the operating mechanism and the other of which is arranged to receive the compressed air or gas, and both of which contain oil for lubricating the operating mechanism and maintaining the device in condition for efficient operation; a motor mounted
15 in the same compartment which contains the operating mechanism and arranged in such a relationship that it is subjected to the cooling effect of the return air or gas instead
20 of to the heating effect of the compressed air or gas, and means for maintaining the oil in the different compartments at approximately unvarying levels automatically and
25 as an incident to the operation of the machine.

Other objects will appear from the following description reference being made to the drawing, in which—

Fig. 1 is a vertical sectional view of a compressor or pump embodying the present invention.

Fig. 2 is a cross sectional view approximately on the line 2—2 of Fig. 1.

Fig. 3 is a detailed sectional view showing features of the invention for controlling the discharge of the compressed air or gas from the compressor or pump.

Fig. 4 is a sectional view of the same device approximately at right angles to the sectional view of Fig. 3.

Fig. 5 is a detailed view of a type of valve suitable for use in the outlet passage of the compressing mechanism.

45 In the embodiment of the invention shown, the machine comprises a base 1 having integral therewith an impervious depending wall 2 forming an enclosure confining a bearing 3. Oil is permitted to pass into and out of the
50 enclosure 2 so as to lubricate the bearing 3

through a passage 4 opening through the base 1.

A housing 5 is bolted or otherwise secured to the base 1 and forming therewith an hermetic joint so as to prevent leakage of air or gas or oil. Within the housing 5 there is an
55 impervious partition 6 having at its center a bearing 7 in axial alinement with the bearing 3. The bearing 3 contains bushing 8 and the bearing 7 is fitted with a bushing 9.

The base 1 has rigid therewith a support
60 10 on which is secured an electric motor 11 for rotating the shaft 12 which is journaled for rotation in the bushings 8 and 9 in the bearings 3 and 7. The shaft 12 has therein
65 a bore or passage 13 extending downwardly from its upper end and terminating above the lower end of said shaft. A head or piston 14 is rigid or integral with the shaft 12
70 above the lower end of the passage 13. This head or piston seats upon and abuts against the lower end wall 15 of a cylinder 16. This cylinder 16 is free to rotate within a bushing 17 located in an opening in the base 1
75 above the enclosure 2. The cylinder 16 is eccentric with respect to the axis of the shaft 12 so that there is constant peripheral contact along a longitudinal portion of the surface of the head 14 and the inside of said
80 cylinder 16. This peripheral contact is constantly maintained along a line on the inner periphery of the cylinder nearest the axis of the head 14, irrespective of the fact that the head 14 and the cylinder may rotate at
85 different speeds. The lower end wall 15 of the cylinder 16 is supported and operates upon a washer or plate 20^a mounted on the upper end of the bearing 3 while the lower end of the head 14 is supported and operates
90 upon the inner side of the lower end wall 15.

The port 18 opens through two superimposed plates 21 and 22 detachably secured together by screws 23 and forming the upper end wall of the compression chamber which is the space between the head 14 and the
95 cylinder 16. The port 18 opens through the periphery of the head 14 into the space between the head 14 and the cylinder 16.

The port 20 opens through the plates 21 and 22 at such a radial distance from the 100

axis of the shaft 12 that the opening of said port 20 into the cylinder 16 becomes closed by being brought over the upper end wall 24 of the cylinder 16 (Fig. 4). Thus the port 20 is alternately opened and closed during rotation of the shaft 12. A valve plate 25 for the port 20 is located within a valve chamber 26 and is guided and centered by pin and slot device 27 (Fig. 5). The port 20 has communication with the passage 13 through an opening 28.

The shaft 12 functions as a piston under the pressure of the compressed air or gas to hold the head 14 compressed upon the inner surface of the wall 15. The pressure of the compressed air or gas supplements gravity to hold the parts in this desired relationship. As shown, the shaft 12 is formed with a circumferential shoulder 29 immediately above the bushing 9. Since the compressed air or gas is discharged into the chamber 30 which is above the partition 6, the pressure of this compressed air or gas is exerted against the upper end of the shaft 12 and the shoulder 29 and cooperates with gravity to hold the head 14 seated on the wall 15.

The chamber 31, which is below the partition 6, contains oil which remains at a constant level in the plane of the upper edge of the plate 21. The oil fills the enclosure 2. The chamber 30 also contains a quantity of oil which keeps the bearing 7-9 lubricated. The supports 10 are formed with inwardly extended radial webs or flanges 32 which restrict the tendency of the oil in the chamber 31 to be swirled and thrown outwardly and upwardly by centrifugal force when the machine is operating. These webs or flanges 32 cause the oil in the chamber 31 to remain nearly level during the operation of the machine.

A plate or blade 33 is mounted for sliding movements in a radial slot in the head 14 between the ports 18 and 20 and is actuated outwardly into contact with the inner periphery of the cylinder 16 by pressure admitted against the inner edge of said plate or blade through ports 34 opening from the passage 13. Thus the outer edge of the plate or blade 33 is kept in constant sealing contact with the inner periphery of the cylinder 16. This plate or blade 33 extends the full length of the compression chamber, having its lower end in contact with the wall 15 and its upper end in contact with the plate 22.

Compressed air or gas is conducted from the chamber 30 through a pipe 35 to the place of use, in a refrigerator for instance, and the air or gas is returned to the chamber 31 through a pipe 36. Thus the machine is subjected to the cooling effect of the returned air or gas instead of being subjected to the heating effect of the initially compressed air or gas.

Should any of the oil in the chamber 30

leak through the bearing 7-9 it will, of course, enter the chamber 31 and raise the level of the oil in said chamber 31. Or, should any of the oil contained in the chamber 30 be drawn through the system through the pipe 35, such oil will, of course, be discharged into the chamber 31 through the pipe 36. This places an excess amount of oil in the chamber 31 which flows over the plate 21 and enters the compression chamber through the port 18. Consequently when the machine operates, the oil is discharged from the compression chamber through the passage 13 into the chamber 30. Thus the oil is maintained at approximately constant levels in the chambers 30 and 31 and this result is obtained automatically and as an incident to the operation of the machine.

The compressed air or gas contained in the chamber 30 holds all of the rotative parts of the compressor in cooperative relationship. That is to say, cooperating with gravity to force the shaft 12 downwardly the compressed air or gas also causes the shaft 12 to hold the plate 22 in sealing contact with the upper end of the cylinder 16 as well as to hold the lower end of the member 14 in sealing contact with the lower end wall 15 of the cylinder. Circulation of oil is permitted through a passage 36 to the under side of the head 14 so as to maintain the parts properly lubricated, and thence upwardly through a bore 37 through the head 14 and through the plates 21 and 22. The parts are thus lubricated in a very effective manner.

I claim:

1. A compressor or pump comprising a housing, a lower end wall for said housing, a partition dividing the inside of said housing into two separate compartments, a shaft journaled for rotation in said lower end wall and in said partition and having a passage opening into one of said compartments, a motor supported in the other compartment for rotating said shaft, a cylinder eccentrically supported about said shaft, a device in connection with said shaft within said cylinder and cooperating with said cylinder to compress air or gas and to discharge said air or gas into the compartment into which said shaft opens, an outlet pipe for the compressed air or gas from said compartment into which said shaft opens, and a return pipe for said compressed air or gas opening into said compartment for said motor and said cylinder.

2. A compressor or pump comprising a housing containing a body of oil, a lower end wall for said housing having a passage there-through, a bearing supported below said lower end wall, a wall forming an enclosure around said bearing, a cylinder rotatively supported by said lower end wall and said bearing, a compression device cooperating with said cylinder, a partition dividing the inside of said housing into an upper com-

partment for containing a body of oil and receiving the compressed fluid and a lower compartment, a shaft journaled in said bearing and extending into said upper compartment and having a passage for conducting compressed fluid from said cylinder to said upper compartment, and mechanism mounted in said lower compartment for rotating said shaft.

10 3. A compressor or pump comprising a housing, a partition dividing the inside of the housing into an upper compartment and a lower compartment each for containing a
15 body of oil separate from the other, compression mechanism mounted in said lower compartment below the body of oil therein, mechanism mounted in said lower compartment
20 above said body of oil for operating said compression mechanism, and means for conducting the compressed fluid from said compression mechanism into said upper compartment.

4. A compressor or pump comprising a housing, a lower end wall for said housing
25 having a passage therethrough, a bearing supported below said lower end wall, a body of oil confined in said housing and immersing said bearing, compression mechanism supported by said lower end wall and immersed in said
30 body of oil, a wall dividing the inside of said housing into an upper compartment and a lower compartment and said compression mechanism being enclosed in said lower compartment, a motor enclosed in said lower
35 compartment for operating said compression mechanism, and means for conducting the compressed fluid from said compression mechanism into said upper compartment.

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