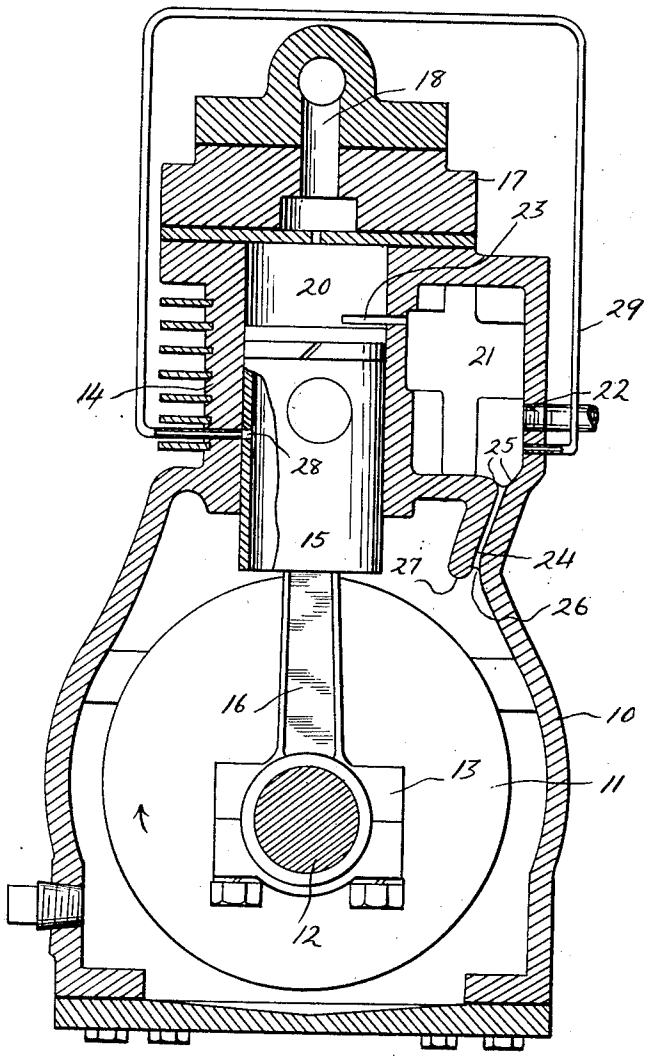
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COMPRESSOR

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COMPRESSOR.

Application filed May 9, 1927. Serial No. 189,999.

The invention relates generally to pump assemblies and refers more particularly to those designed for use in connection with refrigerating apparatus.

One of the essential objects of the present invention is to provide a pump assembly in which means is provided for relieving the pressure in the crank case and to obviate the knocks caused by the collection of oil above the piston.

The invention has also among its objects to simplify, render more efficient and improve generally devices of this character, and these as well as other objects, advantages and novel details of construction will be made more apparent as this description proceeds especially when considered in connection with the accompanying drawings wherein the pump is illustrated in sectional elevation.

In general construction the pump comprises a casing 10 adapted to contain a supply of lubricant and to enclose a fly wheel 11 mounted upon a crank 12 journalled in suitable bearings 13. Formed preferably, although not necessarily, integrally with the casing 10 is a cylinder 14 within which a piston 15 is reciprocably mounted. The piston is connected by means of a connecting rod 16 to the crank shaft 12. The head 17 of cylinder 14 is provided with a port 18 which communicates with a suitable conduit (not shown) by means of which the refrigerant or the gas compressed in the chamber 20 is conducted away. In the present instance the port 18 is connected to a condenser.

As shown in the drawing the cylinder 14 has a chamber 21 formed at one side thereof and provided with an intake opening 22, which, when the invention is used as a part of a refrigerating apparatus, communicates with the expansion coils.

Communication between chamber 21 and chamber 20 of cylinder 14 is established by means of a slot like aperture 23 in the wall of cylinder 14 near the top of chamber 21 and spaced somewhat above aperture 22. Consequently on the down or suction stroke of piston 15, the refrigerant or other gas will be drawn in from chamber 21 through opening 23 into chamber 20 and upon a compression stroke will be compressed therein and forced out through the port 18. Obviously upon the downward or suction stroke of the piston 15 the lower pressure thus created in chamber 20 will cause a corresponding lower pressure to obtain in chamber 21 thus drawing the refrigerant in through the opening 22.

The wall of casing 10 adjacent the lower side of chamber 21 is formed with an inclined restricted opening or passageway 24, the walls 25 of chamber 21 adjacent thereto being inclined and merging into the passageway 24. This passage way affords communication between chamber 21 and the interior of casing 10 wherein lubricating oil is contained. The casing 10 is provided adjacent the passageway 24 with a downwardly projecting lug or projection 26 forming a baffle wall which is spaced from the wall of the casing 10 around the lower end of the passage 24 so as to form therearound an inverted cup-like depression 27.

In practice a certain percentage of the lubricant contained in the casing 10 becomes mixed or intermingles with the refrigerating medium and is pumped by the compressor through the refrigerating system. While this cannot be very easily avoided it has been found to be unobjectionable and in fact desirable, if the amount of lubricant thus distributed around through the refrigerating system can be curtailed or restricted.

In accordance with the present invention however, the refrigerant containing a certain percentage of the lubricant which is drawn into chamber 21 upon the suction stroke of the pump is separated from the lubricant suspended therein in the chamber 21. This occurs because of the greater specific gravity of the oil, which, upon entering chamber 21 is not sufficiently suspended by the refrigerant to be drawn upward through the aperture 23 into chamber 20 but instead falls in chamber 21 flowing on to and being collected by the inclined walls 25 and passing through passage 24 into crank case 10. This action is accentuated by reason of the fact that when the piston is in its compression stroke a downward suction takes place in the passage 24. In this connection it will be noted that when the fly wheel is rotated at a high rate of speed, a film of oil will extend across the passage 24 forming a seal for the passage whereby the oil is prevented from backing up when the piston is in its lowermost position. When, however, the fly wheel is rotated at a comparatively low rate of

speed a suitable check valve (not shown) may be provided in the passage 24.

In practice it has also been found that a certain amount of refrigerant accumulates in the crank case and is confined therein. While this cannot be very easily avoided the present invention contemplates means whereby the refrigerant is permitted to escape and join the refrigerant in circulation. For accomplishing this result the piston is formed with the passage 28 so positioned within the skirt as to register with the passage 29 when the piston is in substantially its lowermost position, thus relieving the gas in the crank case when the pressure is the greatest. As shown in the drawing the passage 29 extends from a point substantially adjacent the bottom of the cylinder and communicates with the chamber 21 at a point below the inlet opening 22. Thus, considering the fact that when the piston is moved downwardly, a suction is set up in the chamber 21 and accordingly in the passage 29, it will be readily understood that any oil that finds its way into this passage is drawn therethrough and discharged adjacent to the restricted passage 24 and flows therethrough back into crank case 10 in the manner heretofore set forth.

Furthermore, with pumps of the type used in refrigerating apparatus it has been found that a considerable amount of refrigerant leaks past the piston into the crank case. This objectionable feature is also obviated by the present invention as obviously a great percentage of this refrigerant will pass through the passage 29 and be conveyed back into the chamber 21. In a like manner any oil that is forced past the piston will also be drawn into the passage and conveyed into the chamber 21.

From the foregoing it will be readily apparent that with a pump constructed in accordance with this invention the greater part of the lubricant suspended in the refrigerant is arrested as it enters the chamber 21 at the pump and is separated from the refrigerant which is permitted to flow through the passage 23 and into the pump cylinder, while the arrested lubricant is collected and conducted back into the crank case of the pump. Furthermore, due to the pressure changes in the crank case, caused by the reciprocation of the piston, an alternate suction of oil and discharge of gas in and from the crank case is accomplished. Moreover, the refrigerant trapped by the lubricant in the crank case is permitted to escape to join the refrigerant in circulation while the lubrication is conveyed back to the crank case.

While it is believed that from the foregoing description the nature and advantages of the invention will be readily apparent, I desire to have it understood that I do not limit myself to what is herein shown and described, and that such changes may be resorted to when desired as fall within the scope of what is claimed.

What I claim as my invention is:

1. The combination with a pump having a crank case, and a lubricant arresting chamber positioned near the pump cylinder having intake and outlet ports therein, of means permitting a return of the gas entrapped in the crank case to the chamber when the pressure in the former is greatest including a passage extending from the cylinder and communicating with the chamber.

2. The combination with a pump having a crank case, a cylinder, a piston reciprocable in said cylinder, and a lubricant arresting chamber positioned at one side of said cylinder and communicating therewith, of means permitting a return of the gas entrapped in the crank case to the chamber including a passage extending from the cylinder to the chamber, and a passage in the skirt of the piston registerable with the passage aforesaid when the piston is in substantially its lowermost position.

3. The combination with a pump having a crank case, a cylinder and a lubricant arresting chamber having an inlet port, of means permitting a return of the gas entrapped in the crank case to the cylinder including a passage extending from a point substantially adjacent the bottom of the cylinder and communicating with said chamber at a point substantially below the intake port, whereby any oil that is discharged from the passage aforesaid will be prevented from intermingling with the gas contained in said chamber.

4. The combination with a pump having a crank case, a cylinder, a piston reciprocable in said cylinder, and a lubricant arresting chamber positioned at one side of the pump cylinder and communicating therewith, of means permitting a return of the gas entrapped in the crank case to the chamber and for collecting the gas leaking past the piston prior to the escape of the gas into the crank case.

5. The combination with a pump having a crank case, a cylinder, a piston reciprocable in said cylinder, and a lubricant arresting chamber positioned at one side of and communicating with the cylinder, of means permitting a return of the gas entrapped in the crank case to the chamber and for collecting the gas leaking past the piston prior to the escape of the gas into the crank case, including a passage extending from the cylinder and communicating with the chamber, said passage also collecting any lubricant that leaks past the piston preventing the same from communicating with the space in the cylinder above the piston.

6. The combination with a pump having a crank case, and a cylinder, of a lubricant

arresting chamber positioned at one side of the cylinder and communicating with said crank case, a piston reciprocable in said cylinder operating upon movement in one direction to draw lubricant and refrigerant into said crank case, and means establishing communication between said chamber and crank case for conducting the refrigerant from the latter to the chamber.

7. The combination with a pump having a crank case, and a cylinder, of a lubricant arresting chamber positioned at one side of the cylinder and communicating therewith, means including a passage forming a communication between the crank case and chamber, a second passage extending from the cylinder to the chamber, and a piston reciprocable in said cylinder operating upon movement in one direction to draw lubricant and refrigerant into the crank case through said first mentioned passage and upon movement in the opposite direction to conduct the refrigerant from the crank case to the chamber through said second passage.

8. The combination with a pump having a crank case, a cylinder, a piston reciprocable in said cylinder, and a lubricant arresting chamber arranged in communication with the pump cylinder, of means permitting a return of the gas entrapped in the crank case to the chamber, said means including a passage in the side wall of said piston communicating with the crank case and operable in one position of the piston to establish communication between the crank case and lubricant arresting chamber.

In testimony whereof I affix my signature.

HAROLD A. GREENWALD.