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L. A. PHILIPP
REFRIGERATING APPARATUS, INCLUDING
A LUBRICANT COOLER
Filed Feb. 7, 1947

2,476,764

FIG. 1

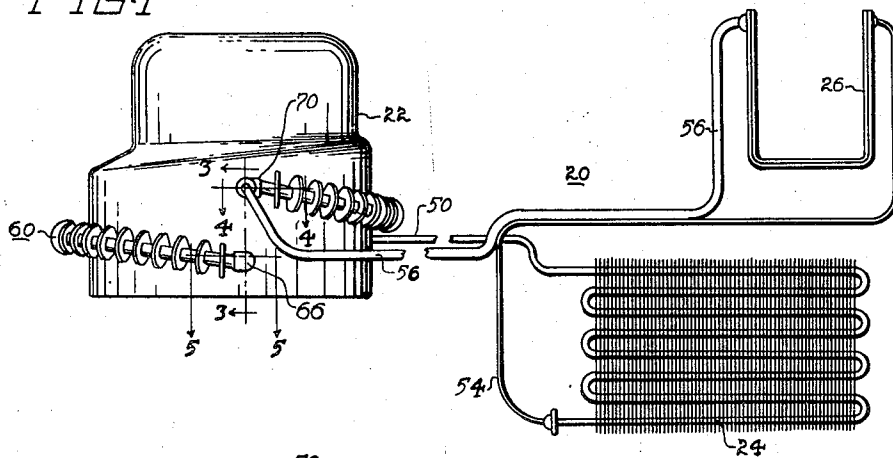


FIG. 2

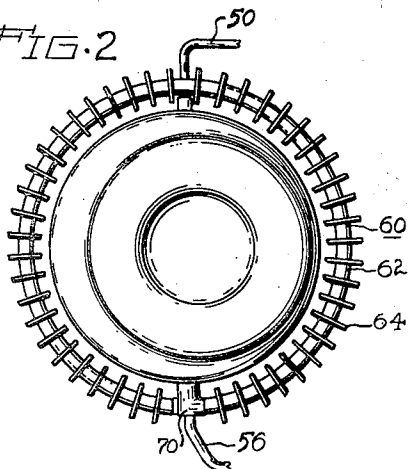


FIG. 4

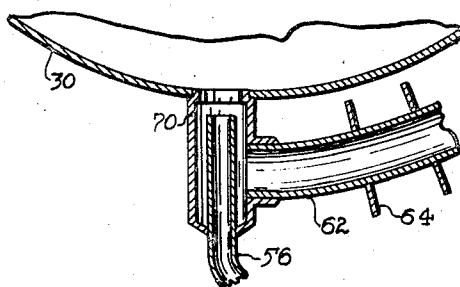
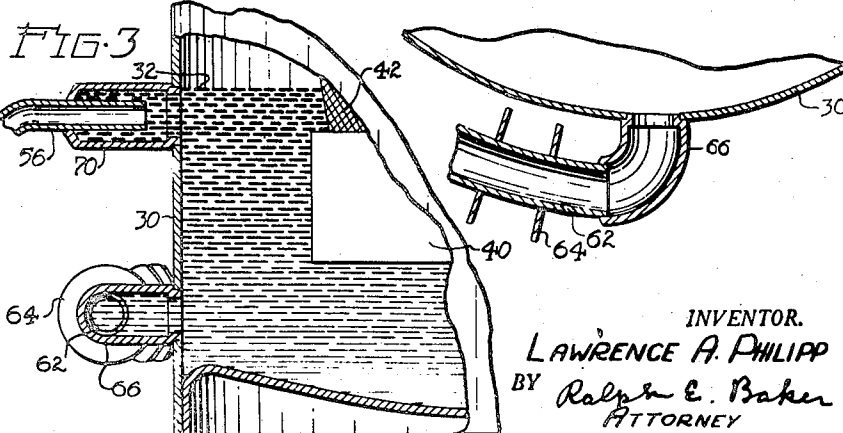


FIG. 5



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7 Claims. (Cl. 62-115)

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This invention relates to refrigerating apparatus and more particularly to the removal of heat from motor compressor units used in such apparatus.

One of the objects of my invention is to provide an improved arrangement for removing heat from a motor compressor unit.

Another object of my invention is to circulate the lubricant used for a compressor unit through a cooler by the action of the compressor to cool the lubricant and thereby remove heat from the compressor.

Another object of my invention is to provide in a refrigerating system of the compression type an improved arrangement for dissipating the heat of the compressing mechanism by circulating the lubricant for said mechanism through a lubricant cooler by utilizing the action of said mechanism and the velocity of the gas to be compressed to promote the flow of said lubricant therethrough.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred form of the present invention is clearly shown.

In the drawings:

Fig. 1 is a side view in elevation of my invention showing my improved motor compressor with the lubricant cooling arrangement and showing diagrammatically a condenser and evaporator connected thereto;

Fig. 2 is a top view in elevation of the motor compressor arrangement shown in Figure 1;

Fig. 3 is a fragmentary view taken along the line 3-3 of Figure 1;

Fig. 4 is a fragmentary view taken along the line 4-4 of Figure 1; and

Fig. 5 is a fragmentary view taken along the line 5-5 of Figure 1.

Referring to the drawings, the numeral 20 designates in general a refrigerating system which includes a motor compressor unit 22, condenser 24 and evaporator 26.

The motor compressor unit 22 includes a sealed casing 30 which provides a reservoir in the lower part thereof for lubricant, the level of which is at 32. The casing 30 encloses a compressor 40 which is driven by an electric motor 42. The motor and compressor may be of any suitable design of the type well known in the art.

The compressor 40 has its inlet in open communication with the interior of the casing 30 and takes in gas to be compressed from the interior of the casing above the level of lubricant.

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The compressor compresses the gas and delivers it through its outlet directly into a conduit 50 whence the gas is conducted through conduit 50 into condenser 24 wherein it is liquified and from where it is delivered to evaporator 26 under the control of a small diameter tube 54. The refrigerant in the evaporator is evaporated and is then withdrawn through conduit 56 by the compressor whence the gas flows into the interior of casing 30 and the cycle is completed.

In the compressing operation considerable heat is produced within the casing and to aid in dissipating this heat the warm lubricant is circulated outside of casing 30 through a lubricant cooler 60 by the action of the compressor. The cooler 60 includes a conduit 62 having fins 64 to increase the effectiveness of the cooler.

The cooler 60 is connected on its inlet end to the casing 30 by a fitting 66 near the lower part of the lubricant reservoir below the level of lubricant therein. The cooler surrounds the casing 30 with the cooler outlet end being above fitting 66 and connected to the casing 30 by a fitting 70 positioned just below the level of lubricant. Due to the gravity head of the lubricant the lubricant will flow into the cooler and completely fill it and fittings 66 and 70 with lubricant.

As will be noted, the outlet end of conduit 56 terminates in fitting 70. Accordingly the gas leaving conduit 56 flows into the lubricant in fitting 70 and into the upper level of the lubricant in casing 30. During operation of the compressor the gas leaving the outlet of conduit 56 will enter fitting 70 and due to the velocity of the gas the gas will blow some of the lubricant out of fitting 70 and some of the upper level of lubricant away from fitting 70 toward the interior of the casing 30. When this takes place the gravity head of the lubricant will cause additional lubricant to enter fitting 66 whence it will flow upwardly through cooler 60 into fitting 70 and upper level of lubricant in casing 30 to replace the lubricant blown away by the action of the compressor and velocity of gas to be compressed. Thus a continuous flow of lubricant in cooler 60 is promoted during operation of the compressor. In flowing through the cooler the heat of the lubricant is being dissipated in the environment air thus removing considerable heat from the interior of the casing and compressor which is immersed in the lubricant in casing 30.

From the foregoing it will be noted that I have provided for dissipating the heat of a motor compressor unit by utilizing the action of the compressor for conducting a quantity of lubricant

outside of the casing which houses the motor compressor unit to thereby dissipate the heat of compression in the environment air surrounding the motor compressor unit. Since the unit is immersed in the lubricant and the lubricant is utilized to lubricate the compressor considerable heat is conducted to the lubricant, and by circulating the lubricant outside of the casing which houses the motor compressor unit where the circulating environment air cools the circulating lubricant an effective arrangement is provided for dissipating the heat of the motor compressor unit.

Although only a preferred form of the invention has been illustrated, and that form described in detail, it will be apparent to those skilled in the art that various modifications may be made therein without departing from the spirit of the invention or from the scope of the appended claims.

I claim:

1. Refrigerating apparatus comprising a casing, lubricant in said casing, a motor compressor unit in said casing, a condenser connected to said compressor, a refrigerant evaporator connected to said condenser, a lubricant cooling conduit located outside said casing and having both ends connected in open communication with the interior of said casing below the level of lubricant in said casing to receive lubricant in said lubricant cooling conduit and a conduit connecting the outlet of said evaporator with one end of the lubricant conduit so that the gas to be compressed must flow through some of the lubricant in the lubricant conduit before reaching the inlet of the compressor to cause lubricant to flow through said lubricant cooling conduit.

2. Refrigerating apparatus comprising a casing, lubricant in said casing, a compressor in said casing, a cooler for said lubricant located outside of said casing but connected in open communication with the lubricant in said casing and an intake conduit for gas to be compressed positioned in the upper part of said cooler to direct said gas through the lubricant in the upper part of said cooler before it is compressed to cause lubricant to circulate from said casing through said cooler.

3. Refrigerating apparatus comprising a casing, lubricant in said casing, a compressor in said casing, a refrigerant condenser, a refrigerant evaporator, a lubricant cooler positioned outside of said casing in open communication with said lubricant in said casing, conduit means for conducting refrigerant to and from the condenser and evaporator respectively under the action of the compressor with one end of said conduit means being connected to said cooler to cause refrigerant to flow through said cooler to promote the flow of lubricant therethrough.

4. Refrigerating apparatus comprising a casing, lubricant in said casing, a lubricant cooler having its outlet end connected to said casing below the level of lubricant therein and being positioned

outside of said casing, a compressor in said casing refrigerant conduit means positioned with its outlet end arranged to discharge refrigerant in said lubricant at the outlet end of said cooler to thereby utilize the action of said compressor and the velocity of refrigerant gas to blow lubricant away from the outlet of said cooler to allow more lubricant to enter the inlet end of the cooler and to flow through the cooler to replace the lubricant blown away by the gas to thus promote the circulation of lubricant through the cooler.

5. Refrigerating apparatus comprising a casing, lubricant in said casing, a lubricant cooler positioned outside said casing with its inlet and outlet ends connected to said casing below the level of lubricant therein, a refrigerant conduit having its outlet end positioned in said lubricant at the outlet end of said cooler for discharging refrigerant into said lubricant and into the interior of said casing and a compressor in said casing for causing refrigerant to flow through said refrigerant conduit.

6. In refrigerating apparatus having a refrigerant evaporator, a casing having a refrigerant inlet, a refrigerant return conduit connecting said evaporator and said refrigerant inlet, a refrigerant compressor within said casing having an outlet connected to said evaporator and having a suction inlet in communication with said casing inlet, lubricant in said casing having a liquid level above said casing inlet, and means forming a lubricant cooling passage externally of said casing having an outlet end connected to said casing below said casing inlet and having an inlet connected to said casing inlet anterior to the discharge end of said return conduit.

7. In refrigerating apparatus having a refrigerant evaporator, a casing having a refrigerant inlet, a refrigerant return conduit connecting said evaporator and said inlet, a refrigerant compressor within said casing having a suction inlet communicating therethrough with said casing inlet and having an outlet for connection to the evaporator, lubricant within said casing for lubricating said compressor and having a liquid level above said casing inlet, a lubricant outlet in said casing below said casing inlet, a lubricant cooling coil mounted on and extending around said casing having one end connected to said casing outlet, and an aspirator tube receiving the discharge end of said return conduit and the other end of said cooling coil and being connected to said casing inlet.

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