

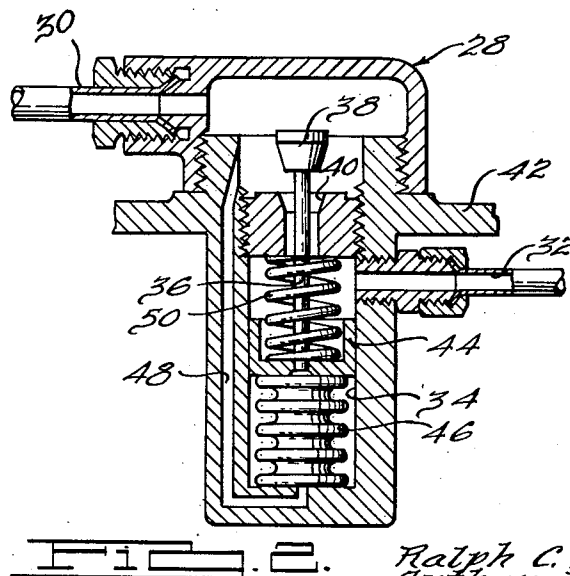
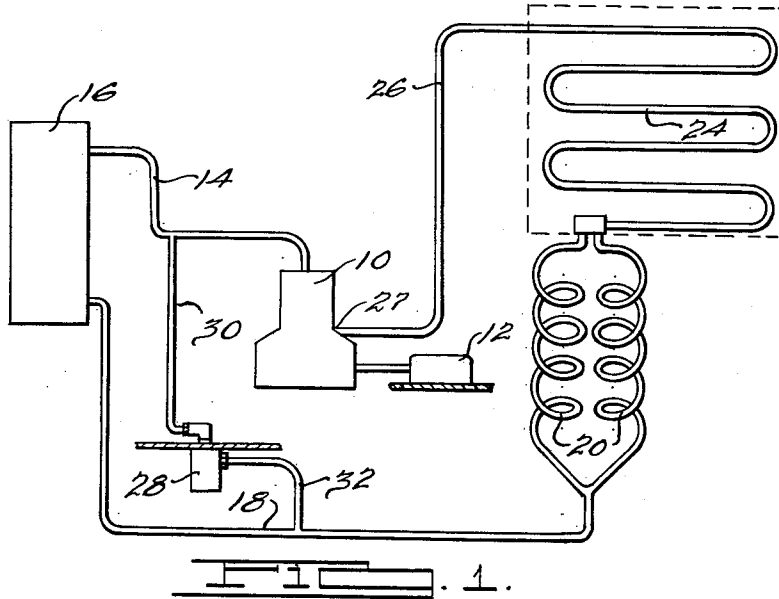
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REFRIGERATION SYSTEM WITH MEANS TO PREVENT OVERLOADING

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REFRIGERATION SYSTEM WITH MEANS TO
PREVENT OVERLOADING

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1 Claim. (Cl. 62-196)

This invention concerns improvements in air conditioning systems of the package or split system types, which improvements have for their main purpose the prevention of overloading, stalling or burning out of the compressor motor at certain ambient temperature conditions.

In the above air conditioning systems, the compressor motor frequently becomes overloaded when the ambient temperature becomes relatively high, for example about 110° F. This overloading condition is caused by the increased intake pressure and increased amount of refrigerant pumped.

An object of this invention is to automatically prevent this overloading condition from occurring regardless of the ambient temperature and with relatively minor reduction in the cooling capacity of the refrigerant system.

This object is accomplished by providing a bypass or relief conduit and an automatically operating pressure responsive valve for connecting the compressor discharge line to the feed line for the system's capillaries connected to the evaporator intake. The pressure responsive valve is set to open when the compressor discharge pressure reaches a predetermined value corresponding approximately to the desired peak torque output of the compressor motor. When the valve opens, hot and compressed discharge refrigerant will be bypassed to the feed line of the aforesaid capillaries and will displace liquid refrigerant therein. This vapor lock condition will naturally reduce the weight of refrigerant normally flowing into the evaporator and the outlet pressure of the evaporator will be correspondingly reduced. This reduced pressure will then cause the compressor to compress a reduced weight of gas and the discharge pressure of the compressor will also be reduced. When the discharge pressure of the compressor drops below the aforesaid predetermined value, the relief valve will close and no more hot refrigerant gas will be bypassed to the evaporator feed line.

Further objects and advantages of this invention will become apparent from the following description and drawings, in which:

FIGURE 1 diagrammatically represents a typical refrigerant system embodying the present invention; and

FIGURE 2 is a cross-sectional view of a type of pressure responsive relief valve which may be used to bypass the hot discharge refrigerant gas.

In FIGURE 1 of the drawings, a refrigerant compressor 10 connected to an electric motor or other power

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source 12 for driving the same is provided with a discharge line 14 connected into a condenser 16. This condenser discharges into an evaporator feed line 18 which is provided with capillary tubes 20. The capillaries are connected into the inlet of the evaporator which discharges through line 26 back into the compressor intake 27. The compressor, condenser, capillary tubes, evaporator, and drive motor may be of any conventional type.

A pressure relief valve 28 shown in FIGURE 2 is connected to the compressor discharge line 14 by conduit 30 and to the evaporator feed line 18 through conduit 32. This valve comprises a cylinder 34 in which is slidably mounted a valve stem 36 having a valve head 38 therein which cooperates with a valve seat 40 connected to the valve body 42. The stem 36 may be conveniently connected to a piston element 44 and a gas-tight bellows 46 which is connected at its bottom through conduit 48 to conduit 30. A spring 50 urges the valve head 38 toward its seat 40. It is seen that as the pressure increases in conduit 30 and is transmitted to the bellows 46, the valve head 38 will move off the seat 40 and allow the refrigerant gas to bypass the condenser into evaporator feed line 18 and thence to the capillaries. The particular structure of the valve 28 shown may obviously be modified by one skilled in the art and the details as shown are not a critical feature of the invention. In other words, any valve that is pressure responsive and can bypass gas may be employed.

We claim:

In a refrigeration system, an evaporator, a compressor and a condenser, arranged in series fluid flow relationship, capillary tube means connected to and controlling the flow of fluid to said evaporator, conduit means forming a liquid line interconnecting said condenser and said capillary tube means, and a by-pass for restricting the flow of liquid refrigerant through said capillary tube means under abnormal operating conditions, said by-pass including a normally closed valve in fluid flow communication with the discharge of said compressor and in fluid flow communication with said liquid line interconnecting said condenser and capillary tube means, the sole control of said valve comprising spring opposed pressure responsive means in communication with the discharge of said compressor and operable to open said valve when the compressor discharge pressure exceeds a predetermined value thereby feeding discharge from said compressor directly into said liquid line to reduce the capacity of said capillary tube means to handle refrigerant flowing from said condenser.

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