

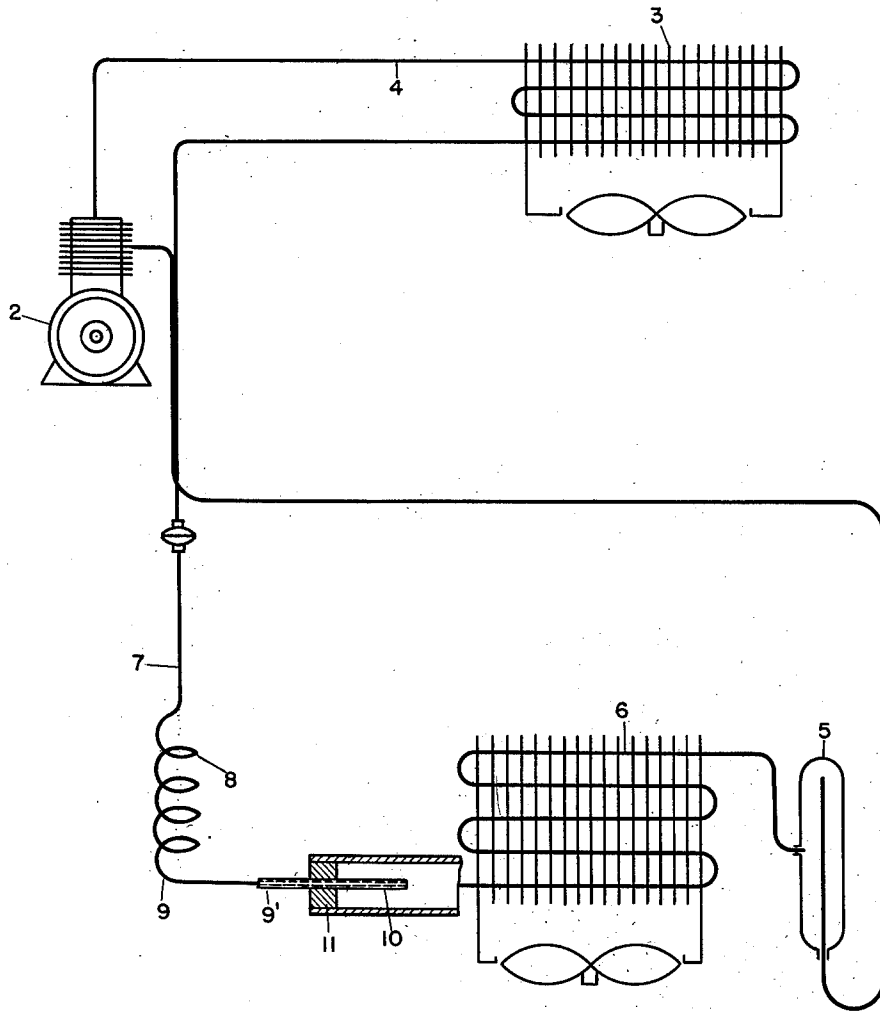
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MEANS FOR REDUCING NOISES IN REFRIGERATION SYSTEMS

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UNITED STATES PATENT OFFICE

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MEANS FOR REDUCING NOISES IN
REFRIGERATION SYSTEMS

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1 Claim. (Cl. 62—127)

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This invention relates to refrigeration systems and more particularly to a refrigeration system employing a capillary tube for regulating refrigerant flow to the evaporator.

In applications such as room conditioners, domestic refrigerators and the like employing refrigeration systems including capillary tubes, it has been found that the use of a capillary tube in place of an expansion valve to regulate refrigerant flow to the evaporator results in excessive and objectionable noise. Frequently, loud hissing sounds occur when the system is in operation and in some cases excessive vibration of the capillary tube occurs which considerably increases the noise level of the system.

The chief object of the present invention is to provide a refrigeration system employing a capillary tube for regulating purposes which includes means for reducing the objectionable noises created by the capillary tube.

An object of the invention is to provide means for reducing the sound level of a refrigeration system employing a capillary tube for regulating purposes.

A further object is to provide a refrigeration system including a capillary tube for regulating refrigerant flow to the evaporator in which the noises created by such tube are substantially or wholly eliminated. Other objects of my invention will be readily perceived from the following description.

This invention relates to a refrigeration system which includes in combination a compressor, a condenser, an evaporator and a capillary tube for regulating refrigerant flow to the evaporator. The capillary tube terminates in an end portion which protrudes within the tube of the evaporator a distance sufficient to eliminate objectionable noises created by the capillary tube when the system is in operation. The portion of the evaporator tube enclosing the protruding capillary tube portion does not engage the capillary tube but serves in effect as a muffler to deaden or to eliminate noises created by the discharge of refrigerant from the capillary tube into the evaporator tube.

The attached drawing is a diagrammatic view of a refrigeration system embodying the present invention.

Referring to the drawing, there is shown a compressor 2 connected to a condenser 3 by a line 4. The system is provided with the usual accumulator 5 disposed between the compressor 2 and the evaporator 6. A line 7 connects condenser 3 with a capillary tube 8. A strainer may be disposed in line 7 between condenser 3 and

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tube 7 if desired. The diameter of capillary tube 8 is less than the diameter of the tube of the evaporator 6 into which it discharges refrigerant.

Capillary tube 8 is provided with an end portion 9. A section of portion 9 protrudes within the evaporator tube as shown at 10. This section 10 of portion 9 protrudes for a distance of at least one inch within the evaporator tube without contacting or engaging the interior surface of the evaporator tube. It is held in position in the evaporator tube by means of a bushing or plug 11 which seals the end of the evaporator tube. The portion 9 extends through an opening in bushing 11 and is held in fixed relation to bushing 11 by means of solder, for example, placed about the opening in bushing 11 through which portion 9 extends.

Preferably, the portion 10 of capillary tube 8 extending within the evaporator 6 is approximately equal in length to the horizontally disposed section 9' of the capillary tube 8 extending without the evaporator tube. The end portion 9 of the capillary tube is suspended or supported at approximately its center by means of bushing 11. Consequently, such portion of the tube is balanced and vibration of the capillary tube when the system is in operation is eliminated. The portion of the evaporator tube surrounding section 10 of the capillary tube may serve as a muffler when the system is in operation thus inhibiting or reducing the sound created by the discharge of refrigerant within the evaporator tube.

In operation, compressor 2 compresses the refrigerant and supplies it to the condenser 3; in condenser 3, the gaseous refrigerant is condensed to liquid form and passes through line 7 to capillary tube 8. The capillary tube 8 serves as a restriction in the line and in effect functions as an expansion valve. The capillary tube 8 discharges the refrigerant within the tube of the evaporator a sufficient distance from the end of the tube to eliminate objectionable hissing noises which heretofore were frequently encountered in systems employing capillary tubes. The end portion of capillary tube 8 is so supported as to eliminate vibration of the tube when the system is in operation. Thus the objectionable noises created by the employment of a capillary tube in the type of refrigeration systems described are reduced or eliminated.

The present invention provides simple and ready means for reducing or eliminating noises created by the employment of capillary tubes in refrigeration systems. Refrigeration systems employing my invention possess a low noise level

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during operation due to the elimination of hissing sounds and vibration. The invention does not increase the cost of the system to any substantial extent while increasing the ready saleability of the product in which it is employed. It is well known that one of the principal objections to the refrigeration systems described when employed in room conditioners, domestic refrigerators and freezers resides in the high level of sound. My invention eliminates such objection by reducing or eliminating the objectionable noises created by the capillary tube and accordingly provides ready acceptance of the product.

While I have described and illustrated a preferred embodiment of my invention, it will be understood my invention is not limited thereto since it may be otherwise embodied within the scope of the following claim.

I claim:

In a refrigeration system, the combination of a compressor, a condenser, an evaporator, and a capillary tube for regulating refrigerant flow to the evaporator, the capillary tube having a diameter less than the diameter of the tube of the evaporator to which it is connected, the end portion of the capillary tube extending within the tube of the evaporator a distance of at least one inch in the direction of flow of refrigerant within the evaporator tube, muffling mechanism comprising the portion of the evaporator tube en-

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closing said end portion of the capillary tube to muffle noise created by the discharge of refrigerant within the evaporator when the system is in operation, the end portion of the capillary tube placed within the evaporator tube having approximately the same length as the portion of the capillary tube in the same plane without the evaporator tube, and means for supporting the end portion of the capillary tube at approximately its center thereby balancing the capillary tube and eliminating vibration thereof when the system is in operation.

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