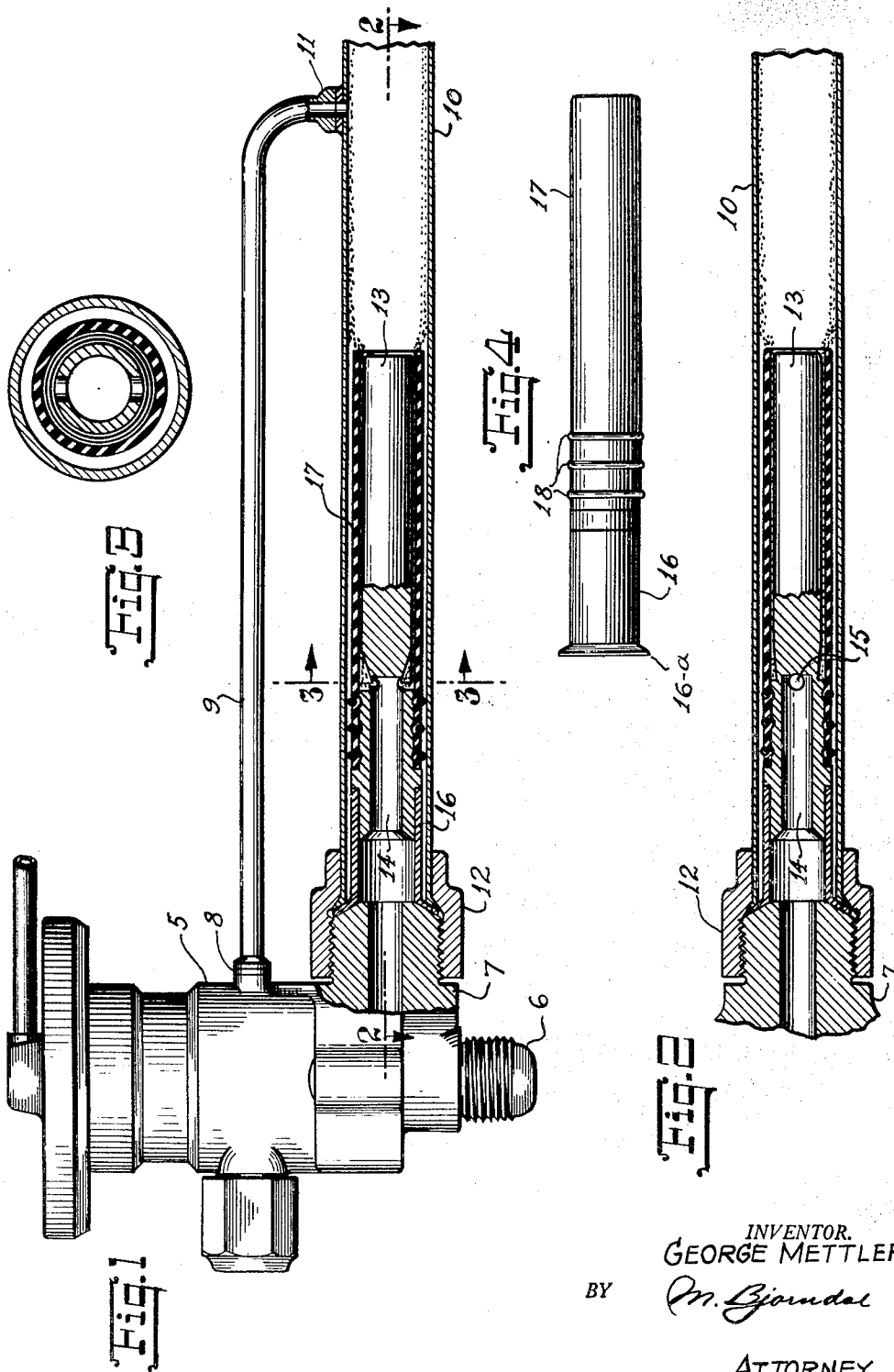


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REFRIGERANT EXPANSION DEVICE

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REFRIGERANT EXPANSION DEVICE

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2 Claims. (Cl. 62-127)

1

2

This invention relates to refrigerant expansion device and particularly it refers to an improved valve which will prevent freeze-up due to moisture in the refrigerant.

In present day refrigeration the most frequently appearing difficulty is the freezing up of the expansion valve due to a small amount of moisture which collects in the refrigerant. On the high pressure side of the valve this moisture cannot freeze because of the high pressure but on the low pressure side, the moisture freezes easily and clogs up the valve, thus stopping the refrigeration system from functioning.

In my present invention I have eliminated this difficulty by the use of a new and novel valve mechanism as hereinafter described.

The object of my invention is to provide an expansion valve which will not freeze-up due to moisture in the refrigerant.

Another object of my invention is to provide an expansion valve of simple construction which will continue to function even though a certain amount of moisture freezes up in same.

A further object of my invention is to provide an expansion valve of simple and low cost construction which will eliminate service difficulties and provide troublefree operation.

Other objects and advantages of the invention will be apparent from the course of the following description:

In the accompanying drawing, forming a part of this specification, and in which like numerals are employed to designate like parts throughout the same,

Fig. 1 is a view showing an expansion valve partly in section, embodying my invention,

Fig. 2 is a section taken along line 2-2 in Fig. 1.

Fig. 3 is a section taken along line 3-3 in Fig. 1, and

Fig. 4 is a side elevation of the new valve element which embodies my invention.

In the drawings, wherein for the purpose of illustration is shown a preferred embodiment of my invention, the numeral 5 designates the body portion of an ordinary expansion valve such as used in refrigeration. This valve 5 has an intake connection 6 and an outlet connection 7. The regular expansion valve also has a smaller connection 8 where the external equalizer tube 9 is connected, which again is connected to the outlet 10 at the point 11. The outlet tube 10 has a flare on the one end by means of which it is connected to the outlet connection 7 through nut 12.

The new and novel importance of this invention is particularly embodied in the element 13 which

consists of a metal core with a central hole 14 at one end. The hole 14 extends only approximately one-third into the metal core 13. At the bottom of the hole 14 there is a transverse hole 15 connecting the hole 14 to the outside of the core 13. At the end which has the hole 14, the metal core 13 has a metal tube 16 fastened, the end of which is flared with an oversized flare 16a so as to fit between the flare of the tube 10 and the slanting shoulder of the outlet connection 7, thereby leaving a small space between the outer diameter of said metal tube 16, and the inner diameter of the outlet tube 10. The core 13 is covered by a flexible tube 17 which is fastened with wires 18 at one end and extends to the end of core 13 as shown in Figures 1, 2 and 4. This flexible tube may be made from neoprene or any other suitable flexible tubing which is not chemically affected by the refrigerant.

The new valve element may be removed for cleaning or service merely by loosening nut 12 and removing the outlet tube 10. After cleaning the valve element may be inserted again in similar fashion with its flange 16a being squeezed between the flare of tube 10 and the shoulder of connection 7.

The operation of my invention is as follows:

The refrigerant enters the tube 16 and hole 14 in the metal core 13 and escapes through the transverse hole 15 in the metal core 13. In so doing, it has to squeeze out through the opening formed between the flexible tubing 17 and the metal core 13 and thus overcomes the flexible pressure exerted by said tubing 17. By traveling between the core 13 and the flexible tubing 17 the pressure and temperature of the refrigerant is gradually reduced until it escapes into the evaporator or whatever other device may be connected. If moisture should appear in the refrigerant, the same will freeze and form ice between the flexible tube and the metal core 13. Due to the flexibility of the tube 17, however, nothing will happen inasmuch as the refrigerant will continue to find other paths around or above the ice formation and no stoppage of refrigerant flow will occur.

The outlet tube 10 by limiting the expansion of the tube 17 will prevent that an excessive amount of ice will form sufficient to break the rubber tube 17. I have found from long experience that this arrangement will give complete troublefree service. In actual operation, the new assembly, as shown in Fig. 4 in the drawing, forms the expansion valve while the valve 5 is used only as a metering device for the refrigerant and the actual

3

expansion takes place underneath the flexible tube 17.

It is to be understood that the form of my invention, herewith shown and described, is to be taken as a preferred embodiment of the same and that various changes in the shape, size and arrangement of parts may be resorted to, without departing from the spirit of my invention, or the scope of the sub-joined claims.

Having thus described my invention, I claim: 10

1. An expansion device for refrigeration of the character described, comprising an expansion valve in combination with a cylindrical element connected to the outlet of said valve, said cylindrical element having an axial, longitudinal hole 15 communicating with said valve outlet and a transverse, radial hole near the bottom of said axial hole; a piece of flexible tubing surrounding said cylindrical element under pressure, and fastening means securing one end of said flexible 20 tubing, said fastening means being located between said outlet connection of said expansion valve and said transverse, radial hole.

4

2. An expansion device for refrigeration of the character described, comprising an expansion valve in combination with a tubular, cylindrical element closed at one end, said element having a transverse, radial hole communicating with its tubular cavity; means for connecting the tubular cavity of said cylindrical element to the outlet connection of said valve; a piece of flexible tubing placed over said tubular, cylindrical element under pressure, said tubing covering said transverse, radial hole, and fastening means securing one end of said flexible tubing to said tubular, cylindrical element.

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REFERENCES CITED

The following references are of record in the file of this patent:

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