

June 2, 1936.

H. H. BIXLER

2,042,497

REFRIGERATING MACHINE

Filed May 24, 1935

Fig. 1.

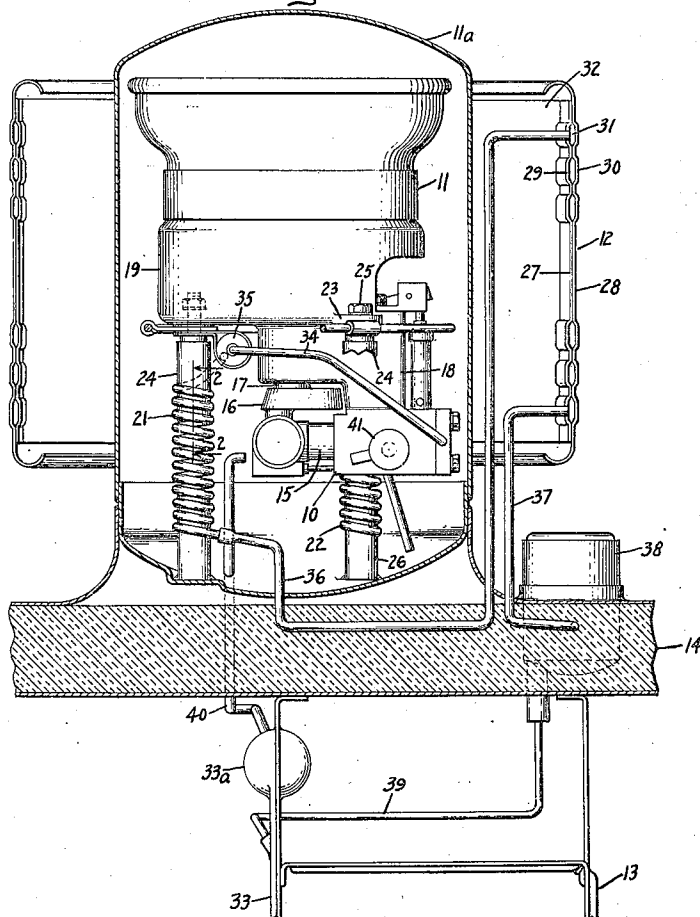
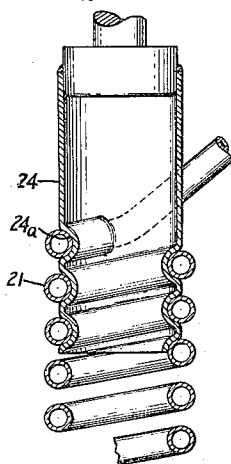


Fig. 2.



Inventor:
Harley H. Bixler,
by *Harry E. Dunham*
His Attorney.

UNITED STATES PATENT OFFICE

2,042,497

REFRIGERATING MACHINE

Harley H. Bixler, Schenectady, N. Y., assignor to
General Electric Company, a corporation of
New York

Application May 24, 1935, Serial No. 23,178

10 Claims. (Cl. 62—115)

My invention relates to refrigerating machines.

In refrigerating machines it is desirable to resiliently mount the refrigerant compressor in order to minimize the vibration transmitted therefrom to the refrigerator cabinet in which the compressor is mounted. The refrigerant condenser may also be resiliently mounted or it may be rigidly mounted on the cabinet depending upon the particular design employed. In either case the refrigerant evaporator which forms the third principal element of the system is usually rigidly mounted within one of the compartments of the refrigerator cabinet. As a consequence, it is necessary to employ some sort of flexible connection for conveying refrigerant between the parts of the refrigerating machine which are resiliently mounted and those which are rigidly mounted on the cabinet.

It is an object of my invention to provide a refrigerating machine of the type described in which at least one of the elements for successively compressing, condensing and evaporating the vaporizable refrigerant is resiliently mounted and in which an arrangement is provided for utilizing such resilient mounting to convey the refrigerant between at least two of the elements included in the machine.

Further objects and advantages of my invention will become apparent as the following description proceeds and the features of novelty which characterize my invention will be pointed out with particularity in the claims annexed to and forming a part of this specification.

For a better understanding of my invention, reference may be had to the accompanying drawing in which Fig. 1 is a side elevation, partly in section, of a refrigerating machine embodying my invention, and Fig. 2 is an enlarged fragmentary view in section along the line 2—2 of the hollow supporting spring included in the refrigerating machine shown in Fig. 1.

Referring to the drawing, I have shown in Fig. 1 a refrigerating machine designed for household use, which includes as its principal elements, a reciprocating type refrigerant compressor 10 and an electric driving motor 11 therefor arranged in a hermetically sealed casing 11a, a natural draft air cooled condenser 12 made of sheet metal arranged about and carried by the casing 11a, and a flooded type sheet metal evaporator 13. This refrigerating machine is mounted on a base 14, which in the particular form of my invention illustrated, is the removable top wall of a household type refrigerator cabinet. The compressor 10 is of the Scotch yoke type and includes a recip-

roating piston 15 which is actuated through a crank having a counterweight 16 by a vertical shaft 17 of the electric driving motor 11. The compressor 10 is secured to a lower extension 18 of a cylindrical frame 19 which surrounds the lower portion of the stator of the electric driving motor 11. The stator of the electric driving motor 11 is rigidly secured to the frame 19 so that the compressor 10 and motor 11 are secured together as a unitary structure. This unitary structure is resiliently mounted within the hermetically sealed steel casing 11a on a plurality of vertical helical compression springs 21, 22 and a third spring not shown.

Three integral radially extending feet 23 are formed on the frame 19 to which are secured by bolts 25 depending sheet metal cups 24. The lower portions of the cups 24 are provided with a helical groove 24a in which the compression springs are tightly fitted. The lower ends of the compression springs are also tightly fitted in similar helical grooves formed in studs 26 which are welded, or otherwise rigidly secured, to the bottom of the casing 11a.

The helical compression spring 21 is preferably made of a resilient material such as spring steel tubing, to provide a refrigerant conduit as well as a resilient supporting member. I am thus enabled to utilize this hollow spring as a portion of the system of refrigerant conduits for conveying refrigerant between the various elements constituting the refrigerating machine illustrated. This arrangement is particularly advantageous in that I have found that vibrations are transmitted from the motor and compressor unit to the base on which they are mounted when a separate flexible refrigerant conduit is used. This transmission of vibration to the base is minimized, however, in the arrangement illustrated since one of the supporting springs of the motor and compressor is itself utilized to form the conduit.

I prefer to connect the hollow spring 21 as a part of the discharge line connecting the compressor 10 and condenser 12 since the gaseous refrigerant flowing therethrough in such case is at relatively high pressure. As a consequence, the spring 21 may be made with a relatively small diameter and still be capable of conducting a sufficient amount of compressed gas without undue back pressure.

The condenser 12 is formed of a pair of cylindrical sheets of metal 27 and 28 having complementary indentations 29 and 30 respectively formed therein. The sheets 27 and 28 are se-

cured together in face engagement being welded, or otherwise rigidly secured, together about the edges thereof and between the indentations 29 and 30 formed therein. The indentations 29 and 30 thus form a refrigerant circulatory passage 31 extending about the condenser 12. The passage 31 is divided into upper and lower sections which are connected in series by a conduit (not shown). The condenser 12 is rigidly supported on the casing 11a by a series of radial metal fins 32.

The evaporator 13 is of the sheet metal type and includes a plurality of refrigerant circulatory passages 33 formed by indentations in one of the sheets forming the evaporator. The circulatory passages 33 communicate with a longitudinal cylindrical header 33a formed by complementary indentations in the sheets of the evaporator.

In the operation of the machine described above, gaseous vaporizable refrigerant such as sulphur dioxide is compressed by the motor driven compressor 10 and is discharged therefrom through a conduit 34 through which it is conveyed to a discharge muffler 35. The gaseous refrigerant leaving the muffler 35 passes therefrom through the passage formed within the hollow compression spring 21 to a conduit 36 through which it is conveyed to the refrigerant circulatory passage 31 of the condenser 12. The compressed gaseous refrigerant circulating through the passage 31 of the condenser 12 is liquefied by the transfer of heat therefrom to the cooling air circulating upwardly over the surfaces of the condenser 12 and fins 32 by natural draft. Liquefied refrigerant flows from the lower portion of the refrigerant circulatory passage 31 through a conduit 37 to a flow controlling float valve 38. Liquid refrigerant is supplied from the float valve 38 to the passages 33 of the evaporator 13 through a conduit 39, the passages 33 being maintained flooded with liquid refrigerant and the header 33a being maintained about half full of liquid refrigerant. The liquid refrigerant in the passages 33 is vaporized by the absorption of heat from the interior of a compartment in which the evaporator 13 is located and the vaporized refrigerant is collected above the level of the liquid refrigerant in the header 33a. The vaporized refrigerant collected in the header 33a above the level of the liquid refrigerant therein is returned to the interior of the casing 11a through a suction conduit 40. The interior of the casing 11a is thus maintained at the low side pressure, that is, the pressure existing in the evaporator 13. The low pressure refrigerant vapor in the casing 11a is drawn into the compressor 10 through an intake muffler 41 and the cycle described above is repeated until the temperature of the compartment in which the evaporator 13 is located is reduced as desired.

While I have shown a particular embodiment of my invention in connection with a compression type refrigerating machine of the household type, I do not desire my invention to be limited to the particular construction shown and described and I intend, in the appended claims, to cover all modifications within the spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States, is:—

1. A refrigerating machine including a plurality of elements for successively compressing condensing and evaporating a vaporizable refrigerant, means including a resilient member

having a passage formed therein for conveying refrigerant from one of said elements to another of said elements, and means utilizing said resilient member for resiliently supporting at least one of said elements.

2. A refrigerating machine including a plurality of elements for successively compressing condensing and evaporating a vaporizable refrigerant, means including a helical resilient conduit for conveying refrigerant from one of said elements to another of said elements, and means utilizing said resilient conduit for resiliently supporting one of said elements.

3. A refrigerating machine including a refrigerant compressor and a refrigerant condenser, means including a resilient member having a refrigerant passage formed therein for supplying compressed gaseous refrigerant from said compressor to said condenser, and means utilizing said resilient member for resiliently supporting said compressor.

4. A refrigerating machine including a refrigerant compressor and a refrigerant condenser, means including a helical resilient conduit for supplying compressed gaseous refrigerant from said compressor to said condenser, and means utilizing said resilient conduit for resiliently supporting said compressor.

5. A refrigerating machine including a refrigerant compressor and a driving motor therefor, said driving motor and compressor constituting a unitary structure, a refrigerant condenser, means including a helical resilient conduit for supplying compressed gaseous refrigerant from said compressor to said condenser, and means utilizing said resilient conduit for resiliently supporting said unitary structure.

6. A refrigerating machine including a refrigerant compressor and a refrigerant condenser, means including a plurality of vertical helical compression springs for resiliently mounting said compressor, one of said compression springs being hollow, and means utilizing said hollow compression spring for conveying compressed gaseous refrigerant from said compressor to said condenser.

7. A refrigerating machine including a refrigerant compressor, a refrigerant condenser, a refrigerant evaporator, a supporting base for said machine, means including a plurality of conduits for conveying refrigerant to said compressor, said condenser and said evaporator in series, means including a plurality of vertical helical compression springs for resiliently supporting said compressor on said base, one of said springs being hollow, and means connecting said hollow spring in series with one of said conduits for utilizing said hollow spring to convey refrigerant.

8. A refrigerating machine including a refrigerant compressor, a refrigerant condenser, a refrigerant evaporator, a supporting base for said machine, said condenser and said evaporator being rigidly supported on said base, means including a plurality of conduits for conveying refrigerant to said compressor, said condenser and said evaporator in series, means including a plurality of vertical helical compression springs for resiliently supporting said compressor on said base, one of said springs being hollow, and means connecting said hollow spring in series with one of said conduits for utilizing said hollow spring to convey refrigerant.

9. A refrigerating machine including a hermetically sealed casing, a refrigerant condenser

surrounding said casing and supported thereby, a refrigerant compressor, means including a plurality of vertical helical compression springs for supporting said compressor in said casing, one
5 of said compression springs being hollow, and means utilizing said hollow compression spring for conveying compressed gaseous refrigerant from said compressor to said condenser.

10 10. A refrigerating machine including a hermetically sealed casing, a refrigerant condenser surrounding said casing and supported thereby, a refrigerant compressor, means in-

cluding a plurality of vertical helical compression springs for supporting said compressor in said casing, a supporting base for said casing, an evaporator supported on said base, means including a plurality of conduits for conveying re-
5 frigerant to said compressor, said condenser and said evaporator in series, and means connecting said hollow spring in series with one of said conduits for utilizing said hollow spring to convey refrigerant.

HARLEY H. BIXLER.

10

CERTIFICATE OF CORRECTION.

Patent No. 2,042,497.

June 2, 1936.

HARLEY H. BIXLER.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, second column, line 64, claim 8, for the syllable "includ-" read including; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 1st day of September, A. D. 1936.

Leslie Frazer

(Seal)

Acting Commissioner of Patents.