Aug. 8, 1933. L. G. KNAPP ET AL 1,921,829

REFRIGERATING MACHINE

Filed Sept. 28, 1929

Fig. 1.

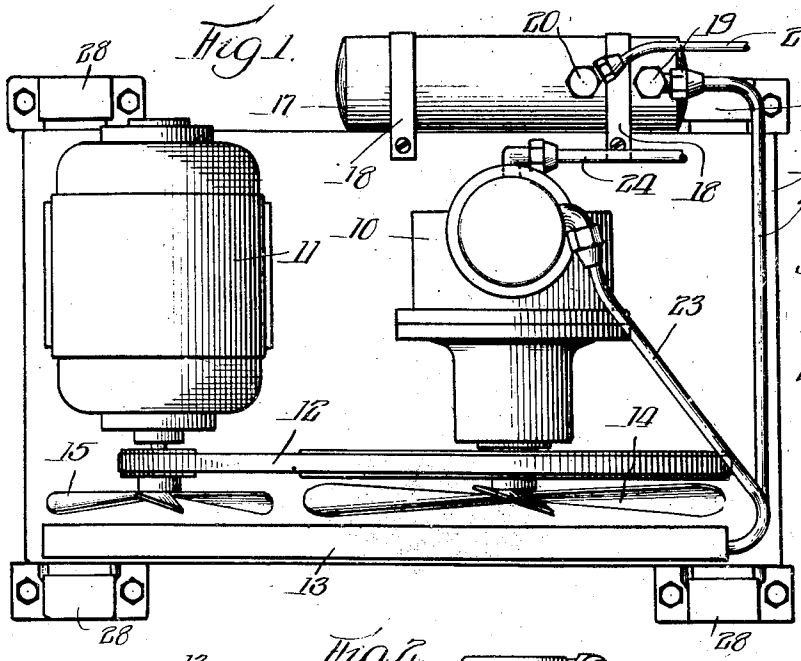


Fig. 3.

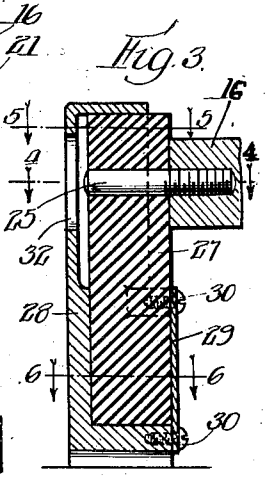


Fig. 2.

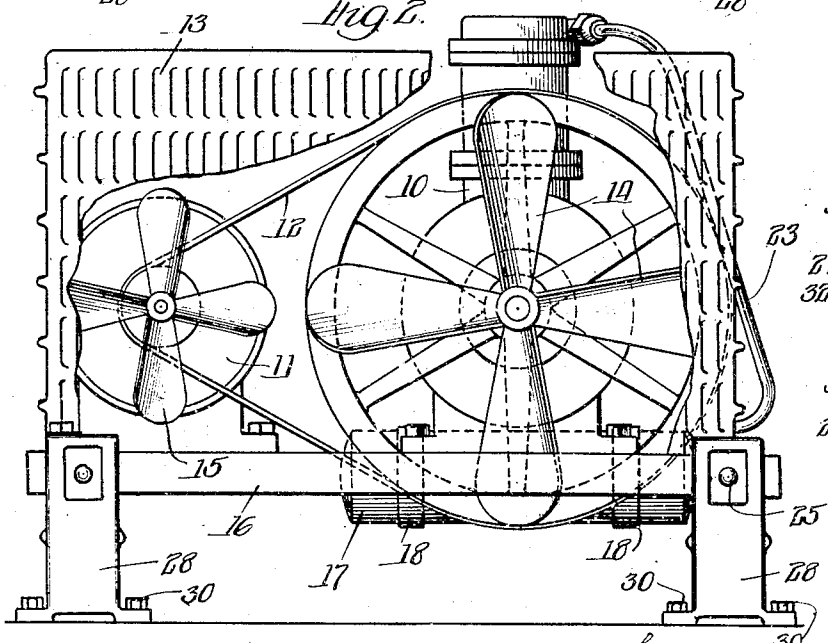


Fig. 4

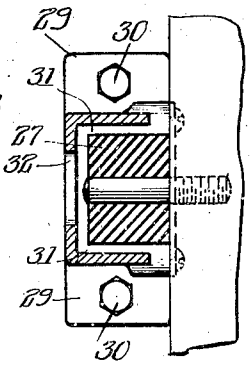


Fig. 6.

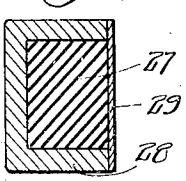


Fig. 5.

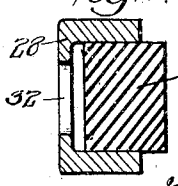
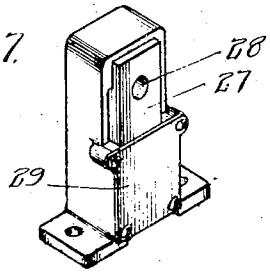


Fig. 7.



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UNITED STATES PATENT OFFICE

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REFRIGERATING MACHINE

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Serial No. 395,860

4 Claims. (Cl. 248—16)

The present invention is related to refrigerating machines of the type intended for household use wherein the compressor, the driving motor thereof, and the condenser are assembled as a unitary structure and organized for introduction to and removal from the refrigerator cabinet as a unit.

The operation of mechanical refrigerators of this type is accompanied by objectionable noises, the humming of the motors when driving the compressors being particularly noticeable, and the vibration of the machinery is transmitted to and through the refrigerator structure. In shipment of these refrigerators they are subject to the shocks of transit. Thus the operative mechanism, when properly adjusted at the factory and in sound working order when leaving the latter, becomes impaired in transit and requires readjustment when the destination or point of use of the refrigerators is reached.

Furthermore, the general organization of the machinery of these refrigerators is such that access to the machinery for adjustment or replacement of parts is difficult. This is true also in relation to the replenishing of the refrigerant when leakage arises in the circulatory system.

The herein described improvements obviate the foregoing objections and incorporate in mechanical refrigerators simple means for effectually reducing the noise of operation, transmission of vibration to and through the refrigerator structure, and preclude transmission to the operative mechanism of the shocks of transit. Ready access to the parts may be had and replenishing of the refrigerant conveniently effected when such is required.

Other objects and advantages will appear as the nature of the improvements is better understood, the invention consisting substantially in the novel construction, combination and arrangement of the parts hereinafter fully described, illustrated in the accompanying drawing, and finally pointed out in the appended claims.

The form of the invention delineated in the accompanying drawing and made the basis of the following description is regarded as a practical embodiment thereof. The invention, however, may be incorporated in other embodiments, and such changes as may be resorted to for defining the invention in other forms are regarded as within the scope of the invention and the subjoined claims definitive thereof.

In the drawing

Fig. 1 is a top plan view of the motor-compressor unit of a refrigerating machine constructed in accordance with the present invention;

Fig. 2 is a side elevation thereof, the condenser being broken away for clarity of illustration;

Fig. 3 is a vertical transverse sectional view of one of the supports for the motor-compressor unit;

Fig. 4 is a sectional plan view thereof on the line 4—4, Fig. 3;

Figs. 5 and 6 are similar views on the lines 5—5 and 6—6, Fig. 3;

Fig. 7 is a perspective view of one of the supports associated with the frame or mounting on which the motor-compressor unit is located.

It is unnecessary to illustrate or describe the refrigerator cabinet as the present invention may be used in connection with cabinets of any desired form adapted for the purposes. Neither is it necessary to illustrate and describe the circulatory system of mechanical refrigerators utilized for household and similar purposes. Such constructions are well understood in the art. The present invention is particularly concerned with the motor-compressor unit of these refrigerators. Having reference to the accompanying drawing, the numeral 10 designates a compressor, 11 the motor for driving the same, which motor is belted to the compressor 10, as at 12, the motor driving the compressor in the usual manner. The condenser 13 is arranged in proximity to the compressor 10 and motor 11 and is cooled by fans 14 and 15 carried by the crank shaft of the compressor and the armature shaft of the motor, respectively. All of these parts may be of any desired construction and make. They are conventional in the art.

The compressor, motor and condenser are anchored suitably to a skeletonized supporting frame or sustaining member 16. In mounting these parts on the frame 16 the condenser 13 is arranged at that side thereof which becomes the rear or innermost side when the unit is introduced into the refrigerator cabinet. At the front or outermost side of the frame 16 is disposed a tank 17 which contains the initial supply of the refrigerant. This tank is supported on the frame 16 by a plurality of fastening clamps 18, preferably of metal, said clamps being bolted or screwed to the frame 16 so as to be readily removable therefrom and replaceable thereon, and thereby to enable the tank 17 to be attached to and disconnected from the frame 16 when so desired. The tank 17 is provided with an inlet valve 19 and an outlet valve 20. The

refrigerant under pressure is contained within the tank 17, and this tank is furnished as an original package in order to supply the circulatory system of the refrigerator with the requisite refrigerant. Connected to the inlet valve 19 is a pipe 21 which leads from the bottom of the condenser 13, and thus permits the liquified refrigerant to flow from the condenser to the tank 17 after it has been cooled by the action of the fans 14 and 15 on the condenser. Likewise connected to the outlet valve 20 is a pipe 22 which leads to the expansion coils of the system. This pipe 22, therefore, constitutes the outlet for the refrigerant from the tank 17.

The condenser 13 also is connected to the compressor 10, in the usual manner, by a pipe 23 so that the compressed refrigerant may flow from the compressor 10 to the top of the condenser 13 and be delivered in the heated condition to the condenser.

Also connected to the compressor 10 is a return pipe 24 which leads from the circulatory system, and by which the refrigerant in its gaseous state is brought back to the compressor from the expansion coils.

As hereinbefore pointed out, the present invention contemplates the absorption of the vibration of the compressor 10 and the motor 11 when these elements are operating, so as to preclude transmission of this vibration to the refrigerator cabinet, and likewise to subdue the noise which accompanies the operation of these elements. To this end the frame 16 is provided adjacent the ends of its opposite sides with outwardly projecting supporting studs 25. Each of these studs penetrates an opening 26 which is formed adjacent to the upper end of a cushioning block 27 formed of elastic material, preferably rubber. The cushioning block 27 is received by an elongated housing 28 of metal, preferably aluminum for lightness, and each of said housings has formed thereon oppositely disposed fastening flanges 29 which receive bolts or screws 30 whereby the housings 28 are anchored to the frame 16. The face of each of the housings 28 which is next adjacent to the frame 16 is open so that the cushioning block 27 may be introduced conveniently to the same and removed therefrom when removal is necessary. The upper and lower ends of each of the blocks 27 and their side walls fit snugly against the adjacent inner walls of the housing 28 at the upper and lower ends of the housing. To hold the block 27 in its housing a covering plate 33 is detachably fitted to the lower portion of the open side of the housing 28, as by screws 34, or their equivalent. The lower end of the block 27 is thereby firmly held in the lower end of the casing 28 with which it is associated. At a point between the upper and lower portions of each casing 28 the side walls of the same, as well as the front wall thereof, are countersunk or cut away, thereby leaving a surrounding space 31 at the side and inner walls of the block 27. This space permits the portion of the block 27 immediately adjacent thereto freely to move with respect to the housing 28 in both a forward and backward direction, as well as a lateral direction, and thereby enable the block 27 to yield under the stresses imposed thereon by the vibration of frame 16 under the working of the compressor 10 and motor 11. In shipment this characteristic of each of the blocks 27 and the housing 28 thereof prevents the shock of transit being communicated to the frame 16 and the parts carried thereby.

Not only is the vibration and shock referred to absorbed by the cushioning blocks 27, but the noises of operation of the compressor 10 and the motor 11 also are absorbed by these blocks. The latter, therefore, act as insulators against the transmission of noise from the frame 16 to the housings 28 and the refrigerator cabinet to which these housings are anchored when the motor-compressor unit has been introduced to the refrigerator cabinet.

To prevent contact of the studs 25 with the housings 28, and at the same time to permit introduction of the studs 25 to and removal of the same from the openings 26, each housing 28 has an opening 32 at its upper end, said openings 32 receiving the outer extremities of the supporting studs 25. These openings 32 are of greater area than the diameter of the studs 25 in order to preclude contact of the projecting ends of the studs with the metallic casings 28. Thus, while the studs 25 may be placed in and removed from the openings 26 with convenience and facility, when assembling the frame 16 with the cushioning blocks 27, possibility of contact of the studs with the housings 28 is precluded, thereby further reducing liability of transmission of the vibration imparted to the frame 16 to the housings 28 and the refrigerator body.

The location of the supply tank 17 at the front of the frame 16 presents advantages in its accessibility for removal from the circulatory system in the event that a new supply of the refrigerant is required, and overcomes the necessity for dismantling other parts of the circulatory system when such replacement is required. It is but necessary to disconnect the pipes 21 and 22 from the valves 19 and 20, and remove the tank 17 from the fastening clamps 18, whereupon a new tank of the refrigerant may be placed in position, the pipes 21 and 22 connected with the valves 19 and 20 thereof, and the system thereby supplied with the additional refrigerant.

We claim:

1. A mounting for motor-compressor units, comprising a sustaining member, supporting vertically-elongated casings, yielding inserts disposed within the casings, the sustaining member anchored in the upper portions of the inserts, the casings closely fitted about and laterally supporting substantially the lower half of the inserts and leaving the upper half free to yield both laterally and vertically.

2. A mounting for motor-compressor units, comprising a sustaining member with projecting studs, supporting vertically-elongated casings of angular cross section, soft rubber inserts disposed within the casings, the studs secured within the upper portions of the inserts, the casings closely fitted about and laterally supporting substantially the lower half of the inserts and leaving the upper half free to yield both laterally and vertically.

3. A mounting for motor-compressor units, comprising a sustaining member, supporting vertically-elongated casings of reduced section in their lower portions, rubber inserts disposed within the casings and extending substantially throughout the portions of dissimilar section, the sustaining member anchored within the upper portions of the inserts, the casings closely fitted about and laterally supporting substantially the lower half of the inserts and leaving the upper half free to yield both laterally and vertically.

4. A mounting for motor-compressor units, comprising a sustaining member with projecting

studs, a plurality of supporting casings vertically-elongated of angular cross section and of reduced cross sectional area in their lower portions, soft rubber inserts disposed within the casings and extending substantially throughout the portions of dissimilar section, the studs secured within the upper portions of the inserts, the casings closely fitted about and laterally supporting substantially the lower half of the inserts and leaving the upper half free to yield both laterally and vertically.

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