Nov. 26, 1940. J. J. ROGERS 2,222,724

REFRIGERATING MACHINE

Filed April 25, 1939

Fig. 1.

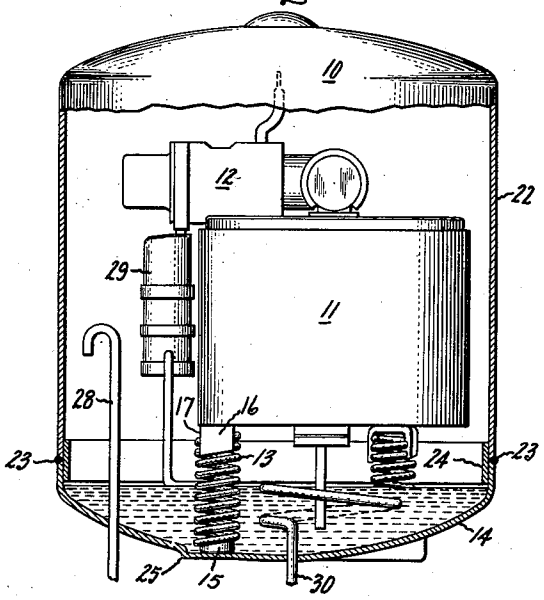


Fig. 2.

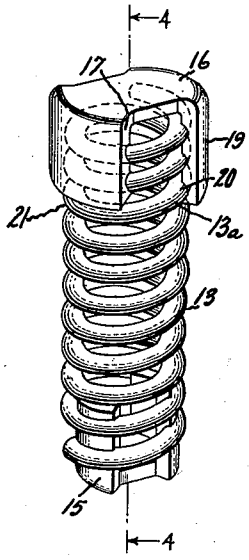


Fig. 3.

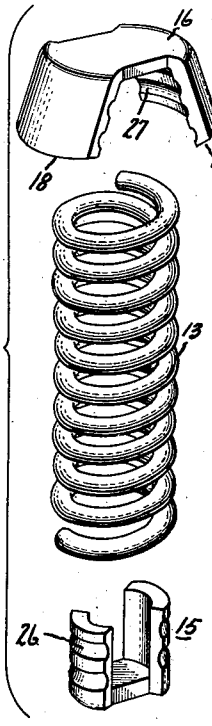
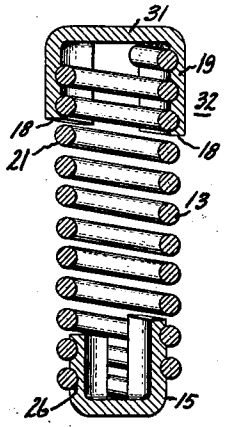


Fig. 4.



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2,222,724

REFRIGERATING MACHINE

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Application April 25, 1939, Serial No. 269,896

3 Claims. (Cl. 248—20)

My invention relates to refrigerating machines of the compression type and more particularly to a resilient mounting arrangement for the motor and compressor units thereof.

In many refrigerating machines, and particularly those designed for household use, a cabinet is provided having a food storage compartment therein. The machine also includes a motor compressor unit for compressing gaseous refrigerant which is liquefied in a suitable condenser and supplied to an expansion type cooling unit located in the food storage compartment of the cabinet. In order to provide a self-contained refrigerating machine it is desirable that the motor compressor unit be enclosed in a sealed casing and that this casing be mounted in the cabinet. The motor-compressor unit is resiliently mounted on a series of helical compression springs carried by the bottom wall of the enclosing casing in order to minimize the transmission of vibration from the motor compressor unit to the cabinet.

It is an object of my invention to provide a motor compressor unit with an improved arrangement for resiliently mounting the motor compressor unit in an enclosing casing which has a minimum number of parts, is readily assembled, inexpensive to manufacture, and quieter in operation.

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 elevational view, partly in section, of a motor-compressor unit having a resilient mounting embodying my invention; Fig. 2 is an enlarged view in perspective of the resilient mounting shown in Fig. 1; Fig. 3 is an exploded view in perspective of the resilient mounting arrangement shown in Fig. 2; and Fig. 4 is a sectional view of the resilient mounting arrangement shown in Fig. 2 taken along the line 4—4.

Referring to the drawing, in Fig. 1 I have shown a refrigerating machine of the household type provided with a helical sealed casing 10 enclosing an electric motor 11 and a compressor 12. The compressor 12 is secured to the upper end of the motor 11 as shown in Fig. 1 thus forming a compact motor-compressor unit which is resiliently mounted in the enclosing casing 10 on three upwardly extending helical compression springs 13. The springs 13 are secured to the lower portion or base 14 of the casing 10 by means of lower supports 15 and the motor 11 and compressor 12 are supported on the springs 13 by means of upper supports 16. Supports 15 and 16 comprise a body or base portion 31 and a spring-engaging portion 32.

From the drawing, especially Fig. 4, it will be seen that the supports 15 and 16 are preferably substantially U-shaped, the spring-engaging portion 32 comprising arms 19, the end or free edges 18 of which are formed in such a manner as to lie on a helix corresponding to the pitch of the coils of the spring 13. It will be observed that the inner surface of the arms 19 of the supports 16 and the outer surface of the arms 19 of the supports 15 are provided with indentations or grooves 27 serving as threads for engaging the coils of the spring 13. Sufficient material is provided on the outer edge of the last groove or indentation of each support to provide adequate strength at the end edges 18 of the supports. Thus, the arms 19 of the supports 15 and 16 project into the space between adjacent turns of the spring 13, the end edges 18 being substantially parallel to the coils of the spring. The side edges 17 of the supports 15 and 16, as best shown in Figs. 1 and 2, are substantially perpendicular to the coils, so that the last coil 13a of the spring 13 in engagement with arms 19 emerges or departs abruptly from the side edge 17 of one of the arms 19 as indicated by the numeral 20.

If the end edges 18 of supports 15 and 16, respectively, lie in a plane perpendicular to the axis of the spring 13, the last coil 13a engaging the support 16, for example, emerges relatively slowly from the support 16. In such a case the resilient mounting will be noisy in operation because portion 21 of the coil which is adjacent the outer or end edges 18 of the support 16 will strike or rub against one of the edges 18 of the support 16 during flexure of the spring 13, thereby creating undesirable noise. Even if the edges of the supports are chamfered, some noise will be created. In the arrangement illustrated in drawing, however, this source of noise is eliminated because the end edge 18 is cut away sufficiently to render it practically impossible for the coils of spring 13 to strike or rub against the supports 15 and 16. It will be understood that spring 13 is sufficiently stiff to prevent striking of adjacent coils during normal operation of the apparatus.

Describing my invention in greater detail, the

casing 10 is formed of an upper casing section 22 and a lower casing section 14, the adjacent edges of these casing sections being welded together at 23 over a reinforcing ring 24. The casings 14 and 22 are preferably made of steel and are suitably mounted with respect to the refrigerated cabinet. For example, the casing may be mounted in a machinery compartment in the lower portion of the refrigerated cabinet.

As best shown in Fig. 1 the bottom wall of the lower casing section 14 is provided with three equally spaced-apart and horizontally disposed portions 25 which provide supporting surfaces for the springs 13. A substantially U-shaped support 15 is spot-welded or otherwise rigidly secured to each of the horizontally disposed portions 25 of the lower casing section 14. Each of the supports 15 is provided with indentations or grooves 26 on the outer surface thereof constituting threads for engagement with the lower portion of one of the springs 13 to form a tight frictional connection therebetween. The upper portion of the spring 13 is engaged by a substantially U-shaped member or support 16 having indentations or grooves 27 in the inner surface thereof constituting threads for engagement with the coils of the upper portion of the spring 13.

The springs 13 accommodate lateral and upward vibratory movements of the motor-compressor unit within the enclosing casing 10 incident to normal operation thereof and prevent the vibration of the motor compressor unit from being transmitted therefrom to the refrigerator cabinet.

The supports 15 and 16 are preferably formed from metal, as steel, in a suitable stamping operation from a suitable preformed blank. The lower support 15 is preferably formed into a substantially U-shaped member having curved arms 19 substantially at right angles to the base portion of the support 15, as best shown in Fig. 3. The upper supports 16 are preferably formed into substantially U-shaped members having curved arms 19 but the arms 19 are preferably spread outwardly at an angle to the horizontal so that the supports 16 may be readily placed down over the upper portions of the springs 13, as best shown in Fig. 3.

In assembling the refrigerating machine the lower portions of the springs 13 are threaded over the lower supports 15 to form frictional connections therebetween. The three upper supports 16 are positioned about the motor-compressor unit in equally-spaced relationship to correspond to the spacing of the springs 13 about the base of the casing and the body portion of the supports 16 is secured as by welding to the lower portion of the motor-compressor unit. The unit having the supports 16 attached thereto is then placed in superposed relation with respect to the upper ends of the upstanding springs. The upper end of each of the springs 13 is then placed between the extending arms of brackets or supports 16 with the coils of the spring in substantial registry with the indentations or grooves 27. The arms 19 of the leg portions of the support 16 are then bent or pressed towards each other about the spring bringing the indentations into registry and threaded engagement with the coils of the spring. The upper casing section 22 is then lowered into place upon the lower casing section 14 and secured thereto.

During normal operation of the refrigerating machine illustrated, gaseous refrigerant enters the casing 10 by means of inlet conduit 28. The gaseous refrigerant is drawn into the compressor 12 through an intake (not shown) and compressed and discharged into an exhaust muffler 29. The compressed refrigerant is conducted from the exhaust muffler 29 through the conduit 30 to a condenser (not shown).

Modifications of the supports 15 and 16 will readily occur to those skilled in the art. For example, each of the arms of the supports 15 and 16 extend around approximately one-fourth of the circumference of the spring 13. If desired, the amount of surface engaging the spring 13 may be decreased so that a relatively narrow support may be used. Moreover, the supports 15 and 16 may be provided with any number of arms 19. Finally, the supports may be in the form of a cylinder having its free or end edge arranged to fall on a helix corresponding to the pitch of the coils of the spring 13.

While I have shown a particular embodiment of my invention in connection with a 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. In a resilient mounting for a machine, a helical spring and means for maintaining said spring in position to resiliently support said machine, said means comprising a substantially U-shaped support, the arms of said support having indentations formed in a surface thereof for engaging the coils of said spring, the end edges of said arms being disposed substantially on a helix corresponding to the pitch of the coils of said spring and extending into the space between adjacent coils of said spring.

2. In a resilient mounting for a machine, a helical spring and means for maintaining said spring in position to resiliently support said machine, said means comprising a substantially U-shaped support, the arms of said support having indentations formed in a surface thereof for engaging the coils of said spring, the end edges of said arms being disposed substantially on a helix corresponding to the pitch of the coils of said spring and extending into the space between adjacent coils of said spring, the side edges of said arms being so formed that said spring makes an abrupt departure from said support at the point of emergence of said spring from said support.

3. In a resilient mounting for a machine including a base and a helical spring, means to secure said spring to said base including a substantially U-shaped member, the arms of said member having indentations formed in the outer surface thereof for engaging the inner surfaces of a portion of said spring, and means including a second substantially U-shaped member for supporting said machine on said spring, the arms of said second member having indentations formed on the inner surface thereof for engaging the outer surfaces of another portion of said spring.

JAMES J. ROGERS.