May 11, 1965 V. G. FORIS 3,182,902

REFRIGERATION APPARATUS

Filed Feb. 6, 1963 2 Sheets-Sheet 1

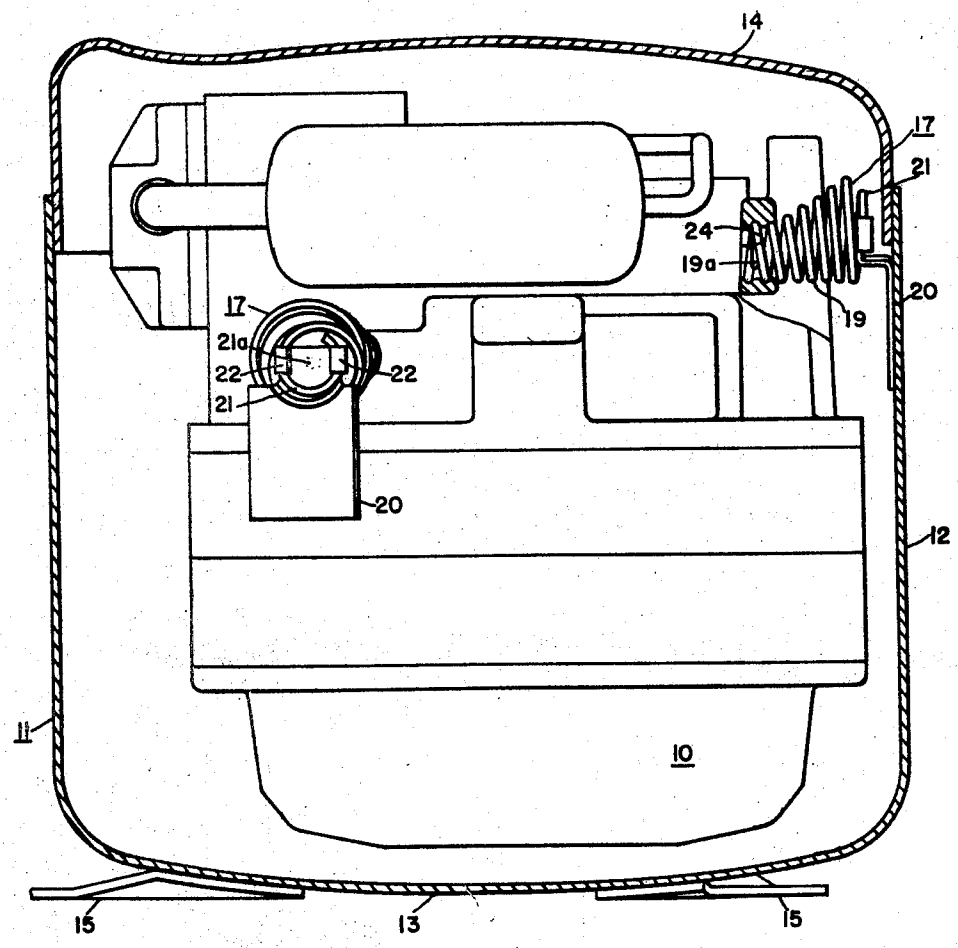

Fig. 1.

WITNESSES

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REFRIGERATION APPARATUS

Filed Feb. 6, 1963 2 Sheets-Sheet 2

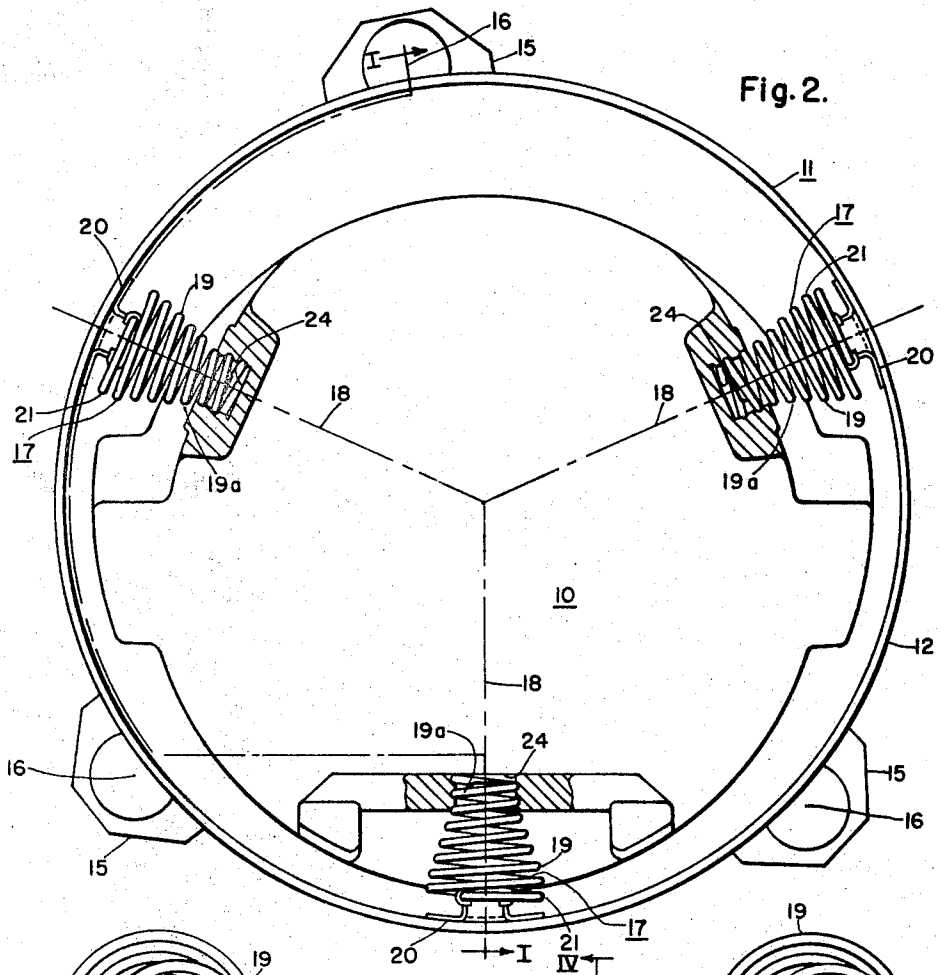

Fig. 2.

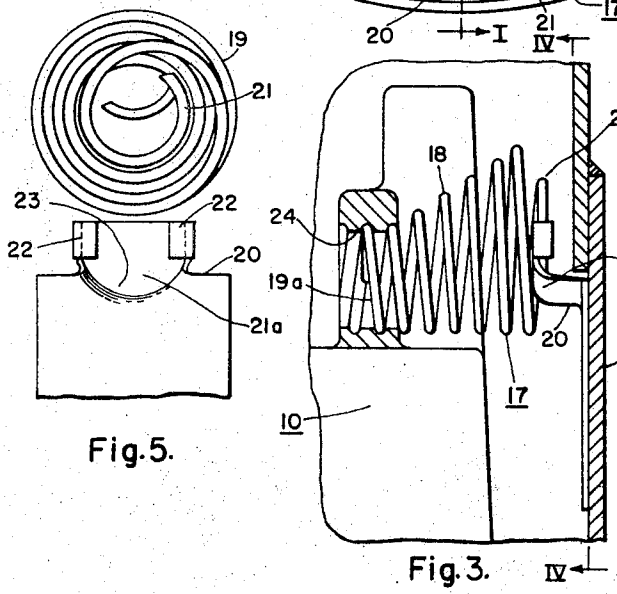

Fig. 5.

Fig. 3.

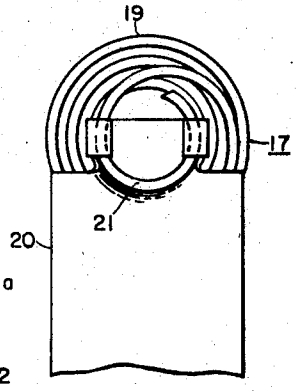

Fig. 4.

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3,182,902

REFRIGERATION APPARATUS

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5 Claims. (Cl. 230—235)

This invention relates generally to motor-compressor units, such as for example, those used in domestic refrigerators and air conditioners and more particularly to such units wherein the motor-compressor is resiliently suspended in a fluid tight casing.

It is an object of this invention to facilitate assembly of motor-compressor units in their casings.

Another object of this invention is to provide a supporting means for a motor-compressor unit, which is easily and inexpensively manufactured and facilitates mounting of the unit in the compressor casing.

The aforesaid objects, and other objects which will become apparent as the description proceeds, are effected by the invention and will be apparent from the following description and claims taken in connection with the accompanying drawings in which:

FIG. 1 is a vertical sectional view taken along line I—I of FIG. 2 showing the casing of a motor-compressor unit employing the present invention, the motor and compressor being shown in elevation and a portion thereof being broken away;

FIG. 2 is a plan view of the motor-compressor and casing with the end cover omitted;

FIG. 3 is an enlarged, fragmentary, vertical sectional view showing one of the supporting members shown in FIGS. 1 and 2;

FIG. 4 is a fragmentary sectional view taken along line IV—IV of FIG. 3, looking in the direction indicated by the arrows; and

FIG. 5 is a detail view similar to FIG. 4, but with the spring disassembled from the bracket.

Referring to the drawings, especially FIG. 1, there is shown a vertical shaft motor-compressor unit **10** disposed in a fluid tight casing **11**. The illustrated motor-compressor unit **10** is of the reciprocal type having its shaft vertically disposed. As the motor-compressor unit may be of any type, further detailed description thereof is deemed unnecessary.

The casing **11** comprises a tubular wall **12** having a circular wall **13** closing its lower end and a circular cap **14** for closing the upper end. Outwardly extending flanges **15** are located at the outer surface of the wall **13**, and are provided with holes **16** through which bolts or other attaching devices may be inserted for securing the casing **11** to a suitable support.

Referring now to FIG. 2, the motor-compressor unit **10** is shown supported in the casing **11** by a plurality of spring assemblies **17**, each disposed such that the axis **18** of the spring **19** is located radially with respect to the casing.

In the present embodiment, three spring assemblies **17** are employed in supporting the unit **10**, however, it will be appreciated that the number of assemblies used could vary with the type of spring and size of the unit to be supported.

For a more detailed description of the spring assembly **17**, reference should be had to FIG. 3 wherein a spring assembly is shown connecting the motor compressor unit **10** to the tubular wall **12** of the casing **11**. In the embodiment shown the spring assembly **17** comprises a conical-shaped helical spring **19** and a spring-supporting bracket **20**. The conical spring **19** has a straight portion **19***a* formed at the inner end thereof and an outer end

coil **21**, of lesser diameter than the base of the conical coil, at the base or outer end thereof.

The bracket **20** is attached to the wall **12** with an inwardly projecting portion **21***a*, having tabs **22** located thereon, forming a pocket **23**. The pocket **23** opens upwardly and is so constructed as to provide an interference fit with the outer end coil **21** when the latter is positioned therein.

A circular hole **24**, formed in the unit **10**, is threaded internally, and so disposed as to threadedly receive the straight portion **19***a* of the spring **19**.

With the cap **14** removed from the casing **11**, the motor-compressor unit **10** is assembled in the casing in the following manner. The brackets **20** are located on the inside of the tubular wall **12**, and may be attached by spot welding or any other suitable method. While the unit **10** is located outside the casing **11**, straight portions **19***a* of the springs **19** are screwed into the internally threaded holes **24**. The straight portion **19***a* of each spring **19** may be of a length slightly less than the depth of the hole **24** so that it need not bottom in the hole.

The unit **10** may now be lowered through the top opening in the casing **11**, to a position where each spring **19** is radially aligned with, and disposed above, a bracket **20**. By further lowering the unit **10** into the casing **11**, while guiding the end coils **21** into the pockets **23**, the unit will come to rest with each coil **21** positioned in a corresponding pocket as shown in FIGS. 2 and 4. The unit **10** is thereby attached to the casing **11** solely by the springs **19**, each having its inner end substantially fixed against rotation by engagement in the threaded hole **24**, and its outer end substantially fixed against rotation by engagement of its end coil **21** in the pocket **23** of the corresponding bracket **20**.

It will be apparent that when subjected to the weight of the motor-compressor unit, the springs **19** will be deflected or deformed downwardly, as shown in FIGS. 1 and 3, but will maintain the unit in spaced relation to the casing **11** at the bottom as well as at the sides. The springs will deflect circumferentially, within limits, to permit limited rotation of the unit relative to its casing at starting and stopping of the motor.

The use of a small diameter outermost coil at **21** serves to space the adjacent largest coil of the conical spring a sufficient distance from the casing **12** to insure that the largest diameter coil does not engage the casing upon occurrence of maximum deflection of the spring, which occurs upon starting of the motor. Such contact of the spring with the casing could, if permitted, produce an objectional sound.

The assembly is completed by the addition of circular cap **14**, which may be secured by welding or other fastening means, to provide a fluid tight casing.

It will be recognized that the objects of the invention have been achieved by providing an improved arrangement for resiliently mounting a motor compressor unit in a casing, which arrangement comprises radial spring supports, having their ends substantially fixed against rotation.

Further, the spring assemblies are easy and inexpensive to manufacture and are so designed as to facilitate mounting of a motor-compressor unit in a casing.

While the invention has been shown in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications without departing from the spirit thereof.

What is claimed is:

1. A hermetically sealed compressor comprising a cylindrical, fluid tight casing having

a vertical tubular wall,

a vertical shaft motor-compressor unit disposed therein, and means for supporting said unit in said casing,

said means including a helical spring disposed between said tubular wall and said unit,

said spring having its axis located radially with respect to said tubular wall and having one end substantially fixed against rotation at said unit,

and a bracket for supporting the opposite end of said spring, said bracket being attached to the interior of said tubular wall, and having a vertical facing pocket adapted to receive a coil of said spring in interference fit, whereby said spring is substantially fixed against rotation, said spring and said bracket thereby serving to resiliently support said unit in the vertical direction in said casing.

2. A hermetically sealed compressor comprising a cylindrical, fluid tight casing having

a vertical tubular wall,

a vertical shaft motor-compressor unit disposed therein,

and means for supporting said unit in said casing,

said means including a plurality of helical springs disposed between said tubular wall and said unit,

said springs having their axes located radially with respect to said tubular wall,

a plurality of circular holes in said unit, said holes having helical grooves formed therein for threadedly receiving one end of said springs,

and a plurality of brackets for supporting the opposite ends of said springs said brackets being attached to the interior of said tubular wall, and each having a vertically facing pocket adapted to receive a coil of said springs whereby said springs are substantially fixed against rotation, said springs and said brackets thereby serving to resiliently support said unit in the vertical direction in said casing.

3. A hermetically sealed compressor as set forth in claim 2, further characterized by said helical springs being conical in shape and having straight portions formed opposite the base ends,

said straight portions being received in said circular holes in said unit.

4. A hermetically sealed compressor comprising a cylindrical, fluid tight casing having

a vertical tubular wall,

a vertical shaft motor-compressor unit disposed therein,

and means including a plurality of helical springs disposed between said tubular wall and said unit,

said springs having their axes located radially with respect to said tubular wall,

a plurality of circular holes in said unit, said holes having helical grooves formed therein for threadedly receiving the inner end of said springs,

a coil at the outer end of said springs formed of lesser diameter than an adjacent coil,

and a plurality of brackets for supporting the outer ends of said springs, said brackets being attached to the interior of said tubular wall, and each having a vertically facing pocket adapted to receive said outer end coil of said springs, whereby said springs are substantially fixed against rotation, said springs and said brackets thereby serving to resiliently support said unit in the vertical direction in said casing.

5. A hermetically sealed compressor as set forth in claim 4, further characterized by said helical springs being conical in shape and having straight portions formed opposite the base ends and said smaller diameter coils formed at the base ends,

said straight portions being received in said circular holes in said unit.

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