

Feb. 6, 1968

B. B. LATTER

3,367,609

HERMETIC COMPRESSOR UNIT AND SPRING SUPPORT MEANS THEREOF

Filed July 1, 1966

FIG. 1

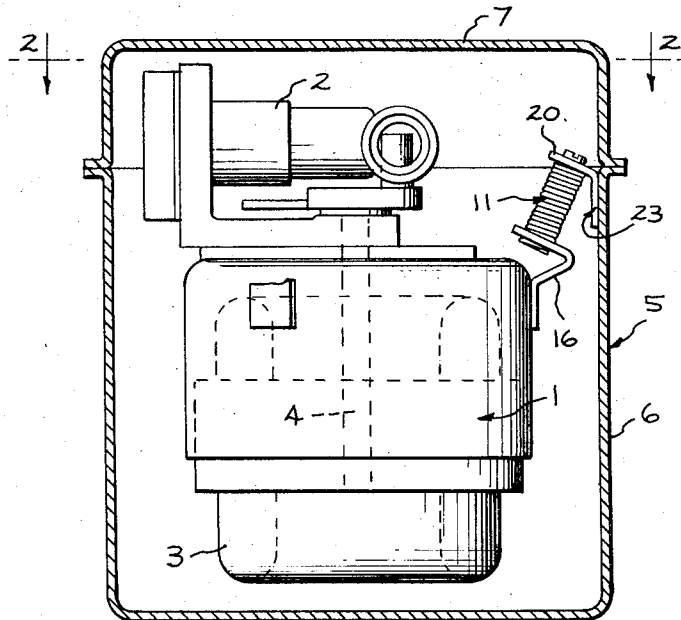
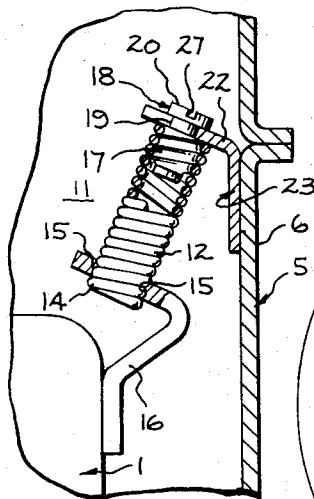


FIG. 3

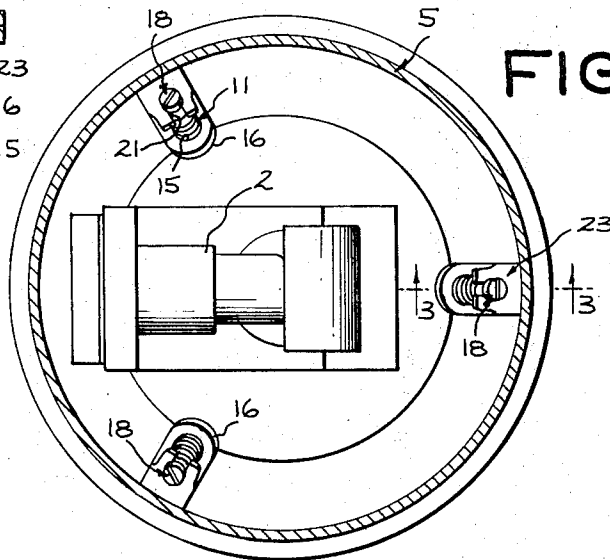


FIG. 2

INVENTOR
BRUCE B. LATTER
BY *Walter E. Gule*
HIS ATTORNEY

1

3,367,609

**HERMETIC COMPRESSOR UNIT AND SPRING
SUPPORT MEANS THEREOF**

Bruce B. Laffer, Anchorage, Ky., assignor to General
Electric Company, a corporation of New York
Filed July 1, 1966, Ser. No. 562,365
1 Claim. (Cl. 248—18)

ABSTRACT OF THE DISCLOSURE

A hermetically sealed compressor comprising a casing and a vertical shaft compressor unit yieldably suspended in the casing by support means comprising a plurality of spaced coil springs each disposed in an inclined position between the casing and the unit. The lower end of each spring is threaded into internally threaded socket means on the unit and the upper end of each spring is rigidly secured to the interior of the casing by anchoring means comprising a slotted bracket rigidly secured to the case and an externally threaded stud threaded into the upper end of the spring and having a shank received in the bracket slot.

The present invention relates to hermetically sealed motor compressor units and is more particularly concerned with a hermetic compressor unit including an improved spring suspension means for supporting the compressor unit within a hermetic casing.

In order to protect the compressor component of a hermetic compressor against damage during handling or operation and to absorb the normal operating vibrations, the compressor component is generally resiliently supported within and in spaced relationship with the hermetic casing walls. It is also desirable that the suspension means be of a type which permits rapid and accurate assembly of the compressor within the casing or housing.

It is a general object of the present invention to provide a hermetic compressor including a new and improved spring suspension means for resiliently supporting the compressor within the hermetic casing.

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

In accordance with the illustrated embodiment of the invention, there is provided a hermetically sealed compressor comprising a casing and a vertical shaft compressor unit disposed within the casing. The compressor unit is yieldably suspended by support means comprising a plurality of spaced coil springs each disposed in an inclined position between the casing and the unit. The lower end of each of the springs is rigidly anchored to the unit by being threaded into internally threaded socket means while the upper end of each spring is rigidly secured to the interior of the casing by anchoring means which maintains the upper and lower ends of each spring in substantial axial alignment. The springs are inclined at a vertical angle of at least 15° but less than 45°, preferably 20 to 35° and are of a closed coil type whereby upward vertical movement of the compressor is limited by the closing of the coils. In accordance with an additional preferred feature of the invention, the anchoring means for anchoring the upper ends of the springs to the case each comprise a slotted bracket rigidly secured to the case and an externally threaded stud threaded into the upper end of the spring and having a shank which is received in the bracket slot. The stud further includes

2

means for rotating the stud and hence the spring for vertical adjustment of the unit relative to the case.

For a more detailed description of the invention reference may be had to the accompanying drawing in which:

FIGURE 1 is a vertical section of a hermetic compressor unit including the improved suspension means of the present invention;

FIGURE 2 is a horizontal sectional view taken generally along line 2—2 of FIGURE 1; and

FIGURE 3 is an enlarged fragmentary sectional view taken generally along line 3—3 of FIGURE 2.

Referring to the drawing, there is shown a motor-compressor unit 1 of the type including a compressor 2 driven by a motor 3 and connected thereto by a vertical drive shaft 4. As a detailed construction of the compressor unit forms no particular part of the present invention, its specific construction features are neither shown nor described in detail.

The compressor unit 1 is supported within a hermetic casing 5 including a lower portion 6 comprising a vertical tubular wall and a cap 7.

For the purpose of resiliently supporting the compressor unit 1 within and in spaced relation to the casing 5, there is provided a plurality of spaced spring assemblies 11. In the illustrated embodiment of the invention three such assemblies 11 are employed but a greater number may be used.

Each of these assemblies 11, as shown in greater detail in FIGURE 3 of the drawing, comprises a tension spring 12 the lower end 14 of which is threaded into an internally threaded socket or hole 15 in a bracket 16 rigidly secured to the compressor unit 1. The upper end of each spring is threaded onto an exterior threaded portion 17 of a stud 18 including a throat or shank portion 19 and a head portion 20. The shank portion 19 of the stud is adapted to be received in a slot 21 provided in the slanting arm 22 of a bracket 23 rigidly secured to the interior vertical wall of the casing portion 6.

Springs 12 are preferably close coiled springs formed with initial tension during the manufacture thereof so that the adjacent coils are in contact with one another under no load conditions. The entire weight of the compressor unit 1 is supported by these three springs which also are of a strength such that the spring elongates well within the elastic limit of the spring as well as properly isolating the compressor motor noise and vibration from the casing when supporting the weight of the unit 1.

The longitudinal axis of the socket 15 and the slope of the arm 22 of bracket 23 are such that under no load conditions, that is when the weight of the compressor unit 1 is not applied to the springs, the upper and lower ends of the spring 12 are in axial alignment. Furthermore, each of the springs are disposed in an inclined position between the unit 1 and the casing 5 such that the spring axis is inclined at a vertical angle of at least 15° and less than 45°, preferably from 20 to 35°. By this construction and arrangement, the axes of the upper and lower portions of the springs remain in substantial alignment when supporting the weight of the compressor unit 1.

In the assembly of the hermetic compressor, the studs 18 are threaded into one end of the springs after which the other or lower ends 14 of the springs are threaded into the sockets 15. The unit 4 is then dropped into the lower portion 6 of the casing and the stud shanks 19 inserted into the slots 21 and locked there. To this end the ends of the arms 22 may be crimped sufficiently to anchor the shanks 19 within the slots 21. In the event it is necessary to adjust the position of the unit 1 within the casing, the heads 20 of the studs are each provided

with a slot 27 for receiving a screw driver whereby the studs and hence the springs 12 can be rotated. The position of the unit 1 within the casing can be adjusted by rotating the head of a stud 18 which in turn causes the lower end 14 of its associated spring to thread a greater or lesser distance into a socket 15. To assure that the vertical adjustment of the unit is obtained by means of the position of a spring in a socket 15, the threaded portion 17 of the stud 18 should have a greater number of the threads or a tighter fit than the number of threads or fit of the lower portion 14 of a spring within a socket 15.

Thereafter, the top or cover 7 is placed on the lower portion of the casing 6 and suitably secured in fluid tight engagement therewith.

The inclination of the springs 12, or more specifically the entire spring assemblies including arms 27, permits the brackets 23 to be permanently attached to the casing while at the same time allowing the unit 1 to be moved past these brackets during assembly of the hermetic compressor with no more radial clearance between the casing and the unit than that required for normal operation of the unit.

During shipping or operation of the compressor, movement of the compressor unit 1 in an upward direction is stopped by the springs 12 going solid. The angling or the inclination of the springs provides a positive centering and torque resisting spring force system for maintaining the unit 1 in spaced relationship with the casing. In addition, the spring supports provide an isolation system characterized by low noise and vibration transmission characteristics and exceptional lateral stability of the unit within the casing since in any direction of movement, at least one of the springs is resiliently resisting such movement.

While the invention has been described with reference to a particular embodiment of the invention, it is to be understood that it is not limited thereto and is intended by the appended claim to cover all such changes and modifications as fall within the true spirit and scope of the invention.

I claim:

1. A hermetic compressor comprising:

a casing,

a vertical shaft compressor unit disposed within said casing;

means for yieldably suspending said unit in spaced relation to said casing comprising a plurality of spaced, closed coil springs formed with initial tension;

a plurality of inclined socket means each having internal threads for threadably receiving the lower end of one of said springs and rigidly anchoring said lower end to said unit;

anchoring means for rigidly securing the upper end of each of said springs to said casing;

each of said anchoring means comprising a bracket rigidly secured to the inner wall of said casing and including an upwardly inclined arm having a slot therein and a stud having a shank portion contained within said slot and a threaded portion threaded into an upper end of a spring;

said socket means and said arms being inclined at angles such that said upper and lower ends of said springs are axially aligned under no load conditions and said springs are inclined at vertical angle of from 20 to 35°;

the inner ends of said arms terminating short of the side wall of said unit whereby said unit can be moved past said arms during assembly of said unit in said casing.

References Cited

UNITED STATES PATENTS

3,089,639	5/1963	Hannibal	230—235
3,182,902	5/1965	Foris	230—235
3,248,044	4/1966	Parker	230—206
3,263,953	8/1966	Shattenfeld et al.	248—358

FOREIGN PATENTS

1,275,660	10/1961	France.
-----------	---------	---------

JOHN PETO, *Primary Examiner*.