

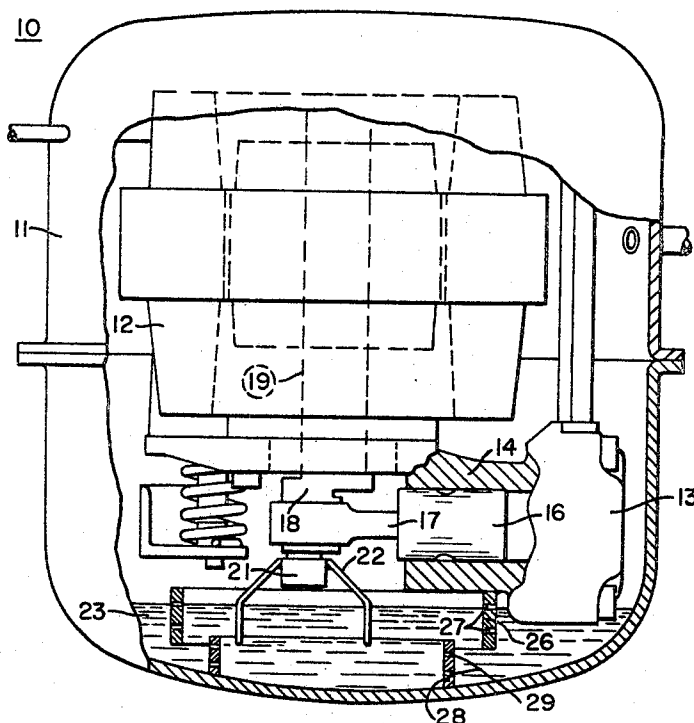
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B. W. HATTEN

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OIL NOISE Baffle

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WITNESSES:

Walter M. Farhad

Robert C. Baird

INVENTOR
Bernard W. Hatten

BY

Ralph V. French
ATTORNEY

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OIL NOISE BAFFLE

Bernard W. Hatten, Columbus, Ohio, assignor to Westinghouse Electric Corporation, Pittsburgh, Pa., a corporation of Pennsylvania

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5 Claims

ABSTRACT OF THE DISCLOSURE

A hermetically-sealed motor-compressor unit for refrigeration, having a body of liquid lubricant in the shell which partially submerges the unit, means for aerating the lubricant to reduce its ability to transmit noise from the unit to the shell and baffle structure at least partially surrounding the aerating means to reduce sloshing noises in the oil as the latter is aerated.

BACKGROUND OF THE INVENTION

Motor compressor units, of the type to which the present invention relates, have found a wide field of usage in domestic appliances; for example, domestic refrigerators, freezers and room air conditioners. With motor compressor refrigeration units for domestic appliances, improvements which reduce noise from the units are of prime importance.

Various features and improvements have been utilized to reduce noise levels in motor compressor units. One of the important being presently utilized is the resilient mounting of the motor compressor unit within the hermetically-sealed shell which surrounds and houses the unit. Prior to use of the resilient mounting, the motor compressor unit was secured directly and rigidly to the shell structure with the result that all noises emanating from within the unit were transmitted directly and immediately to the shell and from the latter to the appliance generally. The resilient mounting resulted in a substantial reduction in transmission of noise from the motor compressor unit to the shell on which it was resiliently mounted.

However, it was found that the body of liquid lubricant which is maintained within the unit shell served as a sound-transmitting medium where any portion of the motor compressor unit was submerged in the lubricant, as is frequently the situation in such devices. This problem was alleviated to a considerable and practical extent by aerating the lubricant to reduce its sound transmitting capabilities (see for example Patent No. 3,155,312 in the name of Richard T. Douglas granted Nov. 3, 1964 and assigned to the assignee of the present application).

It is believed that the type of aerating device most commonly used at present is a mechanical stirrer attached to and driven by the vertically disposed motor shaft, the stirrer extending into the body of lubricant in the lower portion of the shell and during rotation serving to mix the lubricant with the air and/or gases present in the shell above the lubricant to provide a foam of the lubricant and gas which serves to reduce the sound transmitting abilities of the lubricant body.

It has also been found that where this stirrer is not more or less surrounded by portions of the motor compressor unit extending into the body of lubricant in the horizontal plane of the stirrer, there may be produced a sloshing noise apparently resulting from flow of lubricant from the stirrer to the sidewalls of the shell or in the reverse direction from the shell sidewalls to the stirrer, probably depending upon the particular design of impeller utilized.

It is an object of the present invention to provide, in a motor compressor shell assembly of the type discussed

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above, a baffle structure surrounding the stirrer to reduce or eliminate such flow of lubricant between the stirrer and the shell wall as has heretofore produced the objectionable sloshing noise.

SUMMARY OF THE INVENTION

In accordance with the present invention, the stirrer which produces aeration of the body of lubricant is surrounded, in whole or in part, by a baffle of generally cylindrical shape and carried by either the motor-compressor unit itself (in which case it preferably extends downwardly into the oil bath in the general horizontal plane of the impeller), or is carried by the shell bottom or lower sidewalls and extends upwardly therefrom into the oil bath, again in the general horizontal plane of the stirrer. It may be found desirable to perforate this baffle to a degree sufficient to permit restricted flow of lubricant from one side to the other of the baffle structure.

DRAWING DESCRIPTION

Various objects, features, and advantages of the invention will appear more fully from the detailed description which follows, taken in connection with the accompanying drawings, forming a part of this application, in which:

The single figure is a vertical sectional side view of the hermetically sealed shell, with portions of the shell eliminated to reveal internal portions of the motor compressor unit, portions of latter being shown in cross-section.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In the single figure, the reference character 10 indicates, in its entirety, an hermetically-sealed motor-compressor refrigeration unit comprising an hermetically-sealed shell 11 housing an electric motor 12 adapted to drive a piston type compressor 13 disposed therebelow with the motor operating about a vertical axis and the compressor piston reciprocating in a horizontal path.

The compressor 13 includes a housing 14 in which the piston 16 reciprocates, the latter being driven by a connecting rod 17 having driving connection with an eccentric 18 formed adjacent the lower end of the motor shaft 19.

Carried by the lowermost end of the motor shaft 19 is a stirrer 21 having one or more arms 22 extending into a body 23 of liquid lubricant, disposed in the lower portion of the space enclosed by the hermetically-sealed shell 11. The structure so far described may be considered as typical of prior art devices of this general character.

A baffle 26, herein disclosed as generally annular or cylindrical, is secured to the underside of the compressor housing 14, and extends downwardly into the body of lubricant 23, well below the surface thereof. Preferably, this baffle is provided with a plurality of perforations 27, which permit limited flow of lubricant from one side to the other of the cylindrical or annular baffle 26. It will be noted that this baffle extends in the same general horizontal plane as do the arms 22 of the stirrer 21 with a result that any miniature waves which might otherwise be established and perpetuated by the stirrer are interrupted in their flow between the impeller and the sidewalls of the shell 11.

There is also provided a second baffle 28, also annular in formation, extending upwardly from the bottom wall of the shell 11 into the region of the stirrer arms 22. It will be noted that these two baffles 26 and 28 overlap slightly in axial directions. It should further be apparent that either baffle could be omitted and the retained baffle extended vertically to any extent found desirable. That is, the upper baffle 26 could extend downwardly almost into contact with the shell bottom wall or the lower baffle 28

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could be extended upwardly to or above the surface of the lubricant body 23. The only limitation with respect to vertical extent of these baffles would be that the upper baffle 26 should not extend downwardly into contact with the shell bottom wall nor should the lower baffle 28 extend upwardly sufficiently far to be contacted by the compressor housing 14 as such contact by either baffle would result in direct transmission of noise from the motor-compressor unit to the shell.

It is believed clear that, in the construction illustrated, if the baffles 26 and 28 were omitted, miniature waves could be set up in the body of lubricant by the stirrer, which waves would produce an objectionable sloshing sound, readily transmitted to the shell 11. The provision of the herein disclosed baffles, either singly or in combination, are found to provide satisfactory reduction in, or elimination of, objectionable sloshing noises.

While the invention has been shown in but one form, it will be apparent 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.

I claim:

1. Refrigeration apparatus comprising
 - a motor-compressor unit,
 - a sealed shell housing said unit,
 - a body of liquid lubricant in said shell,
 - means resiliently mounting said unit in said shell in spaced relation to the latter,
 - means for aerating said body of lubricant to reduce the ability of the latter to transmit noise from the unit to the shell, and

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means for limiting movement of said lubricant towards and away from the vicinity of said aerating means to reduce sloshing noise, said means for limiting movement of lubricant comprises a first baffle structure at least partially surrounding said aerating means and extending upwardly from the shell bottom.

2. Structure according to claim 1 wherein said means for limiting movement of lubricant also includes a second baffle structure at least partially surrounding said aerating means and extending downwardly from the motor-compressor unit.

3. Structure according to claim 1 wherein said aerating means comprises a stirrer.

4. Structure according to claim 1 wherein at least one of said baffle structures is provided with perforations to permit limited flow of lubricant from one side of said baffle structure to the other side.

5. Structure according to claim 1 wherein said first and second baffle structures overlap in the axial direction.

References Cited

UNITED STATES PATENTS

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ROBERT M. WALKER, Primary Examiner

U.S. Cl. X.R.

230—58, 206