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HERMETICALLY ENCLOSED SMALL REFRIGERATING MACHINE

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FIG.1

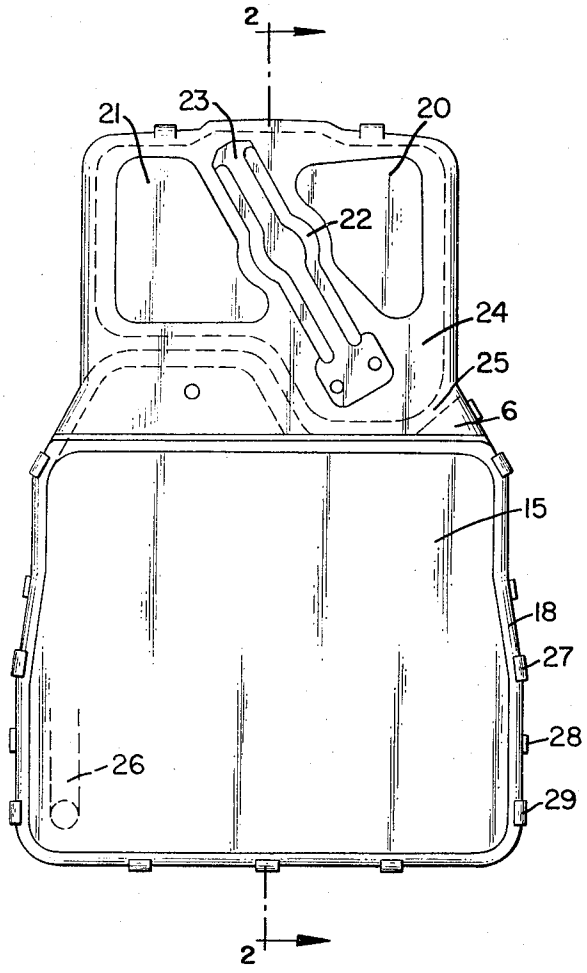
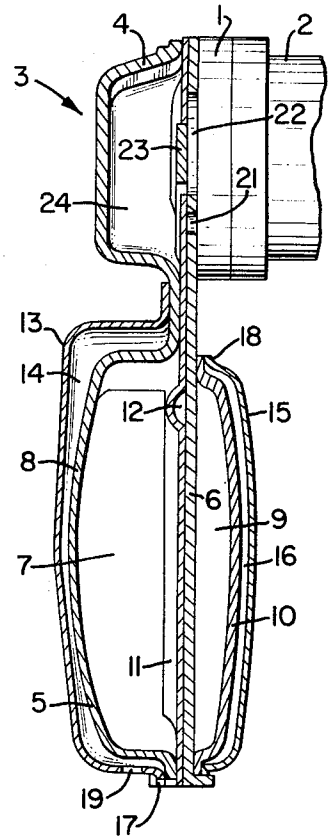


FIG.2



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HERMETICALLY ENCLOSED SMALL REFRIGERATING MACHINE

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ABSTRACT OF THE DISCLOSURE

The invention relates to a noise reducing assembly for a refrigeration unit of the hermetically sealed type. The assembly includes walls forming a heat insulation chamber surrounding the noise reducing chamber with a substantially statically contained gas in said heat insulation chamber.

The invention relates to a hermetically enclosed small refrigerating machine, the interior of which is under suction pressure and the sound reducing unit of which is provided with means for limiting the dissipation of heat.

In a known construction of this kind, the means for limiting the dissipation of heat consist of a coating comprised of a film of plastics material, or of a porous layer of plastics material. This sheathing prevents the hot surface of the noise-reducing unit from being directly swept by the suction gas, so that, due to the low heat-conducting capacity of the filler material, the transfer of heat to the suction gas is reduced. Moreover, the surface of the noise-reducing unit is prevented from being wetted with oil, so that the transfer of heat to the oil is also prevented. This results in the hot pressure gas carrying a fairly large proportion of its thermal energy outwards and the case is kept at a lower temperature. The sheathings of plastics material are difficult to apply, however. They require steps which cannot readily be incorporated in the assembly-line method that is usually employed in the manufacture of such refrigerating machines and that consist mainly of metal-working operations. Furthermore, the sheathings of plastics material can suffer damage. The further machining and assembly operations, including the unavoidable welding operations, must therefore be carried out with extra care.

A construction is also known wherein the noise-reducing unit, freely swept by the suction gas, is positioned beneath a protective plate or another component of the compressor in such a manner that it is largely protected against being wetted by sprayed oil. Here, direct heat-exchange between the noise-reducing unit and the suction gas has to be accepted.

The object of the invention is to provide the noise-reducing unit with means for limiting the dissipation of heat, which means can be readily applied in the normal production line handling small refrigerating machines, are largely immune from damage and nevertheless have a very good effect as regards the prevention of heat-transfer.

According to the invention, this object is achieved by forming the limiting means as a static gas-cushion, which is contained between the wall of the noise-reducing unit and a metal wall surrounding it at a distance therefrom. The metal wall prevents the surface of the noise-reducing unit from being wetted by oil and prevents the suction gas from sweeping said surface. Here, the metal wall itself may be heat-conducting and also be supported on the

noise-reducing unit, since the area of contact is relatively small and the whole of the rest of the surface is separated from the noise-reducing unit by the thermally insulating gas-cushion. Since the metal wall forms a rigid shaped part, the distance from the wall of the noise-reducing unit, i.e. the size of the gas-cushion, and therefore the effect of the limitation of the heat-transfer can be predetermined quite accurately in terms of construction.

In a preferred construction, the metal wall is soldered directly on to the noise-reducing unit and the gas-cushion consists of the protective gas used in the soldering. A subatmospheric pressure will have been set up in the enclosed gas-cushion compartment during cooling after soldering. The smaller number of gas molecules in the gas-cushion results in a particularly poor heat-transfer.

In order to avoid having to deal with problems of soundness, however, it is also possible to provide an opening at the bottom of the metal wall and to use the refrigerant gas as the gas-cushion. Since the refrigerant gas does not move, this likewise results in low heat-transfer.

Furthermore, use can be made of two noise-reducing chambers which are each provided with a metal wall on one side only and which lie against each other at their other sides. Despite using only two gas-cushions, both noise-reducing chambers are fully protected against excessive heat dissipation.

It is also of advantage for at least two sheet-metal walls, defining a noise-reducing chamber, to have extensions which accommodate part of the pressure piping and form the cylinder head containing the pressure and suction valve chambers, at least the cylinder head projecting beyond the zone of the metal walls enclosing the gas-cushion. By uniting the cylinder head and the noise-reducing unit manufacture is simplified. Additionally, the noise-reducing unit is held in a safe and vibration-free manner. In order to enable the suction valve chambers of the noise-reducing unit to be properly cooled, however, this part of the component projects from the metal walls.

The invention will now be described in more detail by reference to an embodiment illustrated in the drawing, wherein:

FIG. 1 is a side elevation of a noise-reducing chamber according to the invention, and

FIG. 2 is a longitudinal section on the line A—A of FIG. 1.

Attached to the valve plate **1** of a cylinder **2** of an enclosed small refrigerating machine, which is positioned in the interior of a case under suction pressure, is a component **3** which forms a cylinder head **4** and a noise-reducing unit **5**.

The noise-reducing unit is composed of six sheet-metal shaped parts, which are all soldered together. A middle plate **6**, together with a dished sheet-metal part **8**, forms a first noise-reducing chamber **7** on one side and, together with a second dished sheet-metal part **10**, forms a second noise-reducing chamber **9** on the other side. Between the middle plate **6** and the sheet-metal part **8** is inserted a channel plate **11** which, together with the middle plate **6**, forms throttle passages **12** for the gas entering the chamber **7** and for the gas passing into the chamber **9** through an orifice, not illustrated, in the middle plate **6**.

A limiting wall of the chamber **7** lies against a limiting wall of the chamber **9**. The free limiting walls are covered by a first sheet-metal wall **13** for forming a gas-cushion chamber **14** and by a second sheet-metal wall **17** for forming a second gas-cushion chamber **16**. These sheet-metal walls are connected to the sheet-metal parts **8** and **10** only by a narrow edge portion **17** and **18** respectively. Openings **19** at the lower end of the sheet-metal wall **13** and similar openings at the lower end of the sheet-metal wall

15 permit the refrigerant to pass into the gas-cushion chambers 14 and 16 and there to form a static gas-cushion.

The middle plate 6, the channel plate 11 and the first dished sheet-metal part 8 project beyond the sheet-metal walls 13 and 15 and form the cylinder head 3. For this purpose the middle plate 6 contains two suction-gas orifices 20 and 21 and a pressure-gas orifice 22. The latter is covered by a pressure-valve element 23. The channel plate 11 incorporates protuberant portions, not visible in the drawing, which seal off from each other suction-valve chambers associated with the orifices 20 and 21 and a pressure valve chamber 24 associated with the orifice 22. The pressure-valve chamber communicates with the noise-reducing unit by way of the pressure passage 25 which is likewise formed between the channel plate 11 and the metal plate 6. The orifices 20 and 21 serve both to supply suction gas through passages in the valve plate 1 and to introduce the suction gas into the cylinder 2 by way of the valve plate. The pressure gas is discharged from the noise-reducing unit through a pipe 26.

The middle plate 6 has at its edge tabs 27, which are bent over to one side, alternating therewith, tabs 28 bent over to the other side. The remaining sheet-metal parts 8, 10, 11, 13 and 15, contain slots 29 adapted to receive the tabs 27 and 28. For assembling the component 3, the prepared sheet-metal parts 8, 10, 11, 13 and 15 are simply pushed on to the middle plate 6 from both sides, their positions being accurately defined by the tabs 27 and 28 and the slots 29. The parts are then held together by the application of light pressure and passed through a soldering furnace and soldered together, a very stable component 3 then resulting.

We claim:

1. A noise reducing assembly for a refrigeration unit of the hermetically sealed type in which the interior thereof is under subatmospheric pressure during operation of the unit, comprising, a compressor, first unperforated wall means forming a noise reducing chamber for receiving a refrigerant gas exhausted by said compressor, second unperforated wall means in spaced relation to said first wall means forming an outer insulating chamber for said noise reducing chamber, a gas substantially statically contained in said outer chamber, said second wall means being soldered to said first wall means and said gas being a protective gas of the type used for soldering.

2. A noise reducing assembly for a refrigeration unit of the hermetically sealed type in which the interior thereof is under subatmospheric pressure during operation of the unit, comprising, a compressor, first unperforated wall means forming a noise reducing chamber for receiving a refrigerant gas exhausted by said compressor, second wall means in spaced relation to said first wall means forming an outer insulating chamber for said noise reducing chamber, a refrigerant gas substantially statically contained in said outer chamber, said second wall means having an opening formed therein for admitting a refrigerant gas to said outer chamber.

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U.S. Cl. X.R.

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