Dec. 6, 1960 H. M. TOWER 2,963,218

ENCLOSED MOTOR-COMPRESSOR UNIT

Filed July 3, 1959

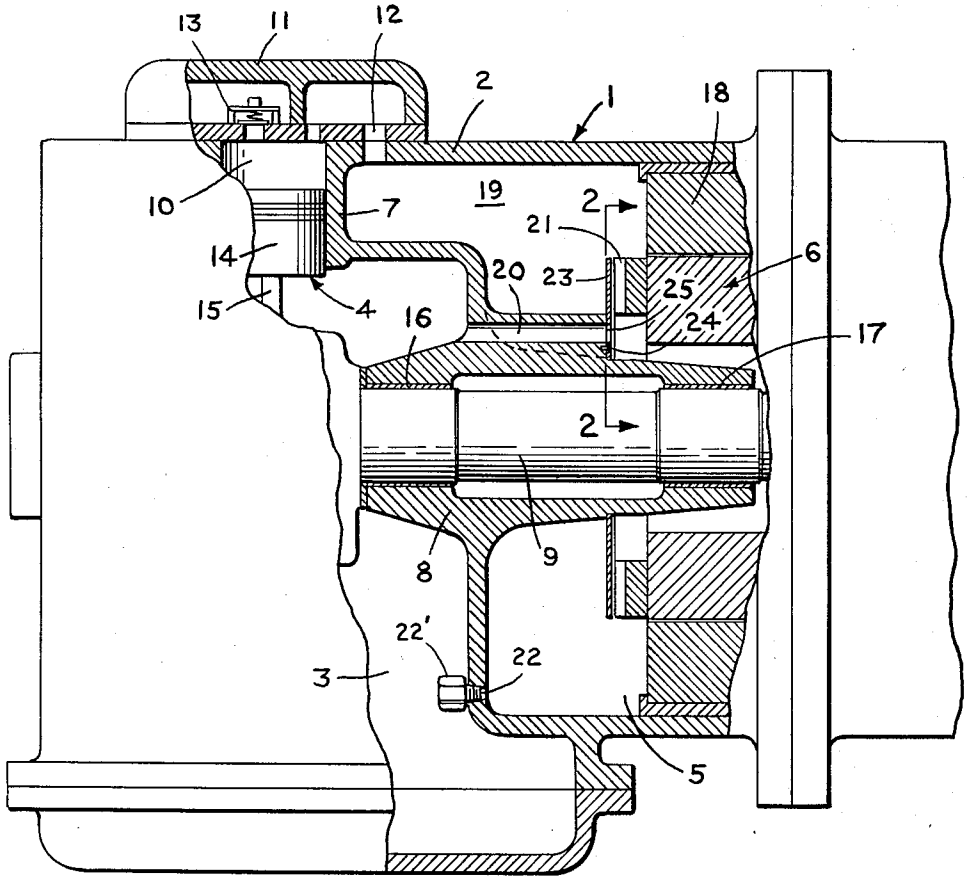


FIG. 1

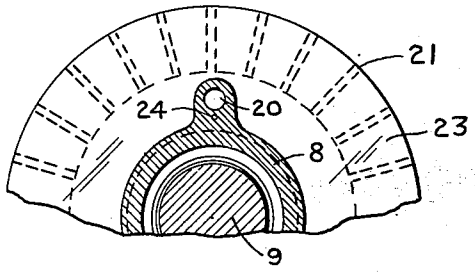


FIG. 2

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2,963,218

Patented Dec. 6, 1960

2,963,218

ENCLOSED MOTOR-COMPRESSOR UNIT

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Filed July 3, 1959, Ser. No. 824,809

6 Claims. (Cl. 230—206)

This invention relates to an enclosed motor-compressor unit, commonly called a hermetic compressor, and discloses means for association with the compressor which maintains sufficient lubricant supply for the components of the compressor usually located in the compression compartment.

The application of enclosed motor compressor units as a circulating implement in a refrigeration circuit has distinct advantages over prior type units, both from a standpoint of manufacture and operational effectiveness. By way of example, incorporating the compression and driving portions of the compressor into a common casing provides for the elimination of many components such as coupling devices, bearings and the like.

However, there are operational disadvantages in these prior type units; by way of example, there results a lubricant shortage in the compression portion which is caused by loss of same through the piston portion of the unit. This condition is further aggravated due to the dilution of the lubricant by refrigerant collected in the crankcase on shutdown.

More specifically and after shutdown for a period of time the refrigerant is absorbed by the lubricant in the compression compartment. Accordingly, upon compressor start-up much of the lubricant flows out of the compression portion with the refrigerant and there results an insufficient amount of this lubricant for the components in the compression compartment of the unit.

Furthermore, the lubricant leaving the unit with the refrigerant tends to collect in the driving compartment and its return to the compression portion is arrested by the abovementioned higher pressure refrigerant collected in the compression portion during shutdown.

There are a number of prior type compressors embodying means for providing return of lubricant collected in the driving compartment to the compression compartment but from a practical standpoint the devices employed embody components which are complex and detract from the simplicity of the hermetic compressor. Components which appreciably increase the overall cost of manufacture are usually added to the unit to accomplish the above.

It is an object of the present invention to eliminate the arresting influence that the refrigerant in the compression portion of the unit has on the lubricant collected in the driving compartment and to accomplish the foregoing in an efficient and economical fashion.

It is a further object of the present invention to provide means for returning lubricant collected in the driving portion to the compression portion of the compressor which is simple in construction and readily incorporated in a standard unit without costly redesign.

With the foregoing objectives in view, and others as may appear from the accompanying specification, the invention consists of various features of construction and combination of parts, which will be first described in connection with the accompanying drawings, showing an enclosed motor-compressor embodying the novel means for maintaining an adequate supply of lubricant in the compression portion of the compressor, and the features of the invention will be specifically pointed out in the claims.

In the drawings:

Figure 1 is a longitudinal view in part section showing the enclosed motor-compressor embodying the invention.

Figure 2 is a part section taken on line 2—2 of Figure 1 showing the baffle means.

Referring more particularly to the drawings, Figure 1 thereof illustrates the enclosed motor-compressor unit generally designated 1 embodying the present invention. The motor-compressor unit is of the usual type and comprises a casing 2 divided into the usual compression compartment 3 including the usual compression means generally designated 4 and a driving compartment 5 including a driving means generally designated 6 by a partition means 7 which maintains the respective compartments substantially sealed from one another. The bearing housing 8 is formed in the central portion of the partition and is adapted to accommodate the usual shaft 9 which interconnects the compression means 4 to the driving means 6, the compression means receiving power from the driving means, shown as an electric motor, as is customary and in order to circulate the working fluid of the refrigeration system with which it is associated.

Referring to Figure 1 in greater detail, a cylinder 10 is formed in the compression compartment 3 which can be an integral portion of the casing. The usual cylinder head 11 is secured to the casing and any suitable arrangement of intake and exhaust valves 12 and 13 for controlling the passage of working fluid from and to the compressor may be employed. In order to compress the working fluid I have provided a piston 14 adapted for reciprocation in the cylinder 10. The driving mechanism for the piston 14 comprises the usual connecting rod 15 shown in part driven from the shaft 9 which turns in bearings 16 and 17 suitably retained in the portion of the partition 7 forming the bearing housing 8. Provision of the bearing housing as an integral portion of the partition 7 as shown substantially reduces the manufacturing costs of the compressor contemplated by this invention.

In a normal application working fluid from the low side of the refrigeration cycle is received by the compressor through an inlet, not shown, usually provided on the outboard side of the driving compartment 5. This fluid is then passed in heat exchange relationship with the motor 18 and from there to the suction chamber 19 formed adjacent the partition 7 and in operative communication with the compression portion of the compressor through intake valve means 12 and cylinder means 10 for passage to the high side of the cycle through exhaust valve 13.

In order to alleviate the arresting effect that the high pressure build-up of refrigerant in the compression compartment has on lubricant collected in the driving compartment as discussed hereinabove and in such fashion so as not to interfere with the cooling action that the system fluid has on the motor of the unit; an opening taking the form of a passageway 20 is disposed in the upper portion of the bearing housing 8 in order to provide communication between the compression portion 3 and the suction chamber 19 formed in the driving compartment. Vane-like means 21 are fashioned on the movable portion or rotor of the motor 18 mounted in the driving compartment. These vane-like elements 21 which are equally spaced about the rotor of the motor and formed as an integral portion thereof as by casting are in proximate relation with the passageway 20 and function to flow fluid or refrigerant from the compression portion of the compressor to the suction chamber through passageway 20.

Disposition of the fan formed by the vanes 21 in proximate relation with the port 20 in the bearing housing 8 to circulate refrigerant as was mentioned hereinabove

causes a reduction in the pressure in the compressor compartment whereby lubricant collected in the base of the driving compartment can readily flow or return through vent means **22**, including check valve means **22'** mounted therein, in the lower portion of the partition **7** to the compression compartment of the compressor. In order to provide a more efficient action by the fan formed by the vane-like elements **21** formed on the rotor of the motor a baffle **23** is mounted on the bearing housing as by threaded means **24** and in proximate relation with the vanes **21** to form a partial housing for the fan to thereby increase the fluid-flowing capacity thereof. Accordingly, refrigerant is more effectively passed from the compression compartment through the passageway through the opening **25** in the circular-like baffle **23** to the suction chamber and from there to the suction side of the compression compartment.

Accordingly, it is evident with this construction and during operation of the compressor that the fan provided by the vane-like elements mounted on the rotor causes a flow of refrigerant through the port **20** in the bearing housing **8** to thereby eject the refrigerant collected in the compression compartment and permit a return of lubricant to the driving compartment of the compressor.

It will be understood that the invention is not to be limited to the specific construction or arrangement of parts shown, but that they may be widely modified with the invention defined by the claims.

What is claimed is:

1. In a compressor of the hermetic type including a casing, partition means for dividing the casing into a driving compartment and a compression compartment, compression means in the compression compartment and driving means in the driving compartment, said partition means forming a bearing housing for accommodating a shaft, said shaft mounted in said bearing housing to operatively interconnect said driving means to said compression means, passage means in the portion of the partition forming said bearing housing for providing communication between the driving compartment and the compression compartment, fan means on the driving means and in spaced relation with said passage means to flow fluid from said compression compartment to the driving compartment, and means in the lower portion of the partition providing operative communication between the driving compartment and the compression compartment whereby lubricant flows from the driving compartment to the compression compartment.

2. In a compressor of the hermetic type including a casing, partition means for dividing the casing into a driving compartment and a compression compartment, compression means in the compression compartment and driving means in the driving compartment, said partition means forming a bearing housing for accommodating a shaft, said shaft operatively interconnecting said driving means to said compression means, passage means in the portion of the partition forming a bearing housing for providing communication between the driving compartment and the compression compartment, fan means on the driving means and in spaced relation with said passage means to flow fluid from said compression compartment to the driving compartment, baffle means on said bearing housing and about said passage means and in proximate relation with said fan means to provide a portion of a housing about said fan means whereby fluid conveying efficiency of said fan means is increased, and means in the lower portion of the partition providing operative communication between the driving compartment and the compression compartment whereby lubricant flows from the driving compartment to the compression compartment.

3. In a compressor of the hermetic type including a casing, partition means for dividing the casing into a driving compartment and a compression compartment, compression means in the compression compartment and driving means in the driving compartment, said partition means forming a bearing housing for accommodating a shaft, said shaft operatively interconnecting said driving means to said compression means, a suction chamber in the driving compartment and adjacent said partition means and in communication with said compression compartment, passage means through the portion of the partition forming said bearing housing for providing communication between said compression compartment and said suction chamber, fan means provided as an integral portion of said driving means and in spaced relation with said passage means to flow fluid from said compression compartment to said suction chamber, and means in said partition providing communication between the driving compartment and the compression compartment whereby lubricant flows from the driving compartment to the compression compartment.

4. In a compressor of the hermetic type including a casing, partition means for dividing the casing into a driving compartment and a compression compartment, compression means in the compression compartment and driving means in the driving compartment, said partition means forming a bearing housing for accommodating a shaft, said shaft operatively interconnecting said driving means to said compression compartment, a suction chamber formed in the driving compartment of said casing and adjacent said partition means and said suction chamber in operative communication with said compression compartment, passage means through the portion of the partition forming said bearing housing for providing communication between the driving compartment and the suction chamber, fan means on the driving means and in spaced relation with said passage means to flow fluid from said compression compartment to said suction chamber, baffle means mounted on said bearing housing and about said passage means and in spaced relation with said fan means to provide a portion of a housing for said fan means whereby the operative efficiency of said fan means is increased, and means in the lower portion of said partition providing communication between the driving compartment and the compression compartment whereby lubricant flows from the driving compartment to the compression compartment.

5. In a compressor of the hermetic type including a casing, partition means for dividing the casing into a driving compartment and a compression compartment, compression means in the compression compartment and driving means in the driving compartment, said partition means forming a bearing housing for accommodating the shaft, said shaft operatively interconnecting the driving means to said compression means, a suction chamber in the driving compartment and adjacent said partition means and in operative communication with said compression compartment, passage means through the portion of said partition forming said bearing housing for providing communication between the driving compartment and the compression compartment, a plurality of vane-like elements formed as integral portions of the movable portion of said driving means and said vane-like elements in spaced relation with said passage means to flow fluid from said compression compartment to said driving compartment through said passage means, and a port in the lower portion of said partition providing operative communication between the driving compartment and the compression compartment whereby lubricant flows from the driving compartment to the compression compartment.

6. In a compressor of the hermetic type including a casing, partition means for dividing the casing into a driving compartment and a compression compartment, compression means in the compression compartment and driving means in the driving compartment, said partition means forming a bearing housing for accommodating a shaft, said shaft operatively interconnecting said driving means to said compression means, a suction chamber

formed in the driving compartment and adjacent to said partition means and said suction chamber in operative communication with said compression compartment, a port through the portion of said partition forming said bearing housing and said port providing communication between said driving compartment and said compression compartment, a plurality of equally spaced vanes on the movable portion of said driving means and said vanes in spaced relation with said passage means to flow fluid from said compression compartment to said driving compartment, a circular baffle element mounted on said bearing housing and about said port and said baffle in proximate

relation with said vane-like elements to provide a portion of housing for said vanes whereby the efficiency of said vanes is increased, and a port in the lower portion of said partition for providing communication between the driving compartment and the compression compartment whereby lubricant flows from the driving compartment to the compression compartment.

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