

(12) Indian Patent Application

(21) Application Number: 201641043252

(22) Filing Date: 19/12/2016 (43) Publication Date: 22/06/2018

(71) Applicant(s): L&T TECHNOLOGY SERVICES LIMITED

(72) Inventor(s): ARAVIND, S.

(51) International Classifications: F25B 1/00

(54) Title: MULTIPLE REFRIGERANT COMPRESSOR

(57) Abstract: According to an exemplary embodiment of the invention, a multiple refrigerant compressor 100 is disclosed. The multiple refrigerant compressor 100 may include a single compression enclosure 102. The compression enclosure 102 may be divided into at least two compression chambers 104, 106. The compression chambers 104, 106 may be separated from each other by a partition. The compression chambers 104, 106 may be designed in such a way that each of the compression chambers 104, 106 may have a suction port 108, 110, a discharge port 112, 114 and a common compression arrangement. The compression chambers 104, 106 in the compression enclosure 102 may be further arranged in such a way that each compression chamber 104, 106 may compress a compressible fluid 116, 118 separately.

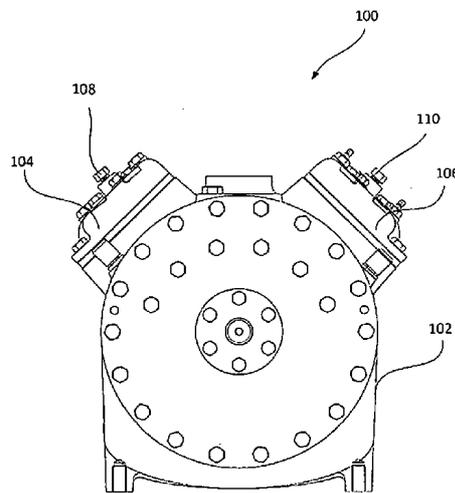


Figure 1

1 2



700178678

FIELD OF INVENTION

The invention generally relates to a compressor and more particularly to a compressor for compressing multiple refrigerants.

BACKGROUND

A conventional refrigerant compressor typically comprises of an outer housing, a suction line, a discharge line and a compression chamber. In a vapour compression system, a refrigerant in a low pressure vapour state enters the compressor through the suction line and undergoes compression in the compression chamber. A high pressure vapour formed after compression leaves the compressor through the discharge line and enters a condenser/heat exchanger where the high-pressure vapour turns into a fluid. A throttling process follows the condensation across an expansion valve or capillary tube to further reduce the pressure and temperature of the fluid. The working fluid then evaporates in an evaporator absorbing the heat from an appliance.

Typically, a standalone compressor is used with each refrigeration appliance such as refrigerator, air-conditioner, etc. Since each of the compressor operate independently and compresses a refrigerant compatible to the respective appliance, it may result in substantial power consumption, may requires increase space requirement for each appliance and increase the overall cost. A known alternative for single compressor system is multiple compressor systems. However, the multiple compressor system typically uses multiple separate compressors connected in a parallel arrangement to a single refrigeration system, where each of the compressor may be operated independently to the other compressors.

PATENT OFFICE CHENNAI 20/12/2017 16:39

19-Dec-2017/78971/201641043252/Description(Complete)

Hence there is a requirement for an improved refrigeration system.

SUMMARY OF THE INVENTION

According to an exemplary embodiment of the invention, a multiple refrigerant compressor is disclosed. The multiple refrigerant compressor may include a single compression enclosure. The compression enclosure may be divided into at least two compression chambers. The compression chambers may be separated from each other by a partition. The compression chambers may be designed in such a way that each of the compression chambers may have a suction port, a discharge port and a common compression arrangement. The compression chambers in the compression enclosure may be further arranged in such a way that each compression chamber may compress a compressible fluid separately.

BRIEF DESCRIPTION OF DRAWINGS

Other objects, features, and advantages of the invention will be apparent from the following description when read with reference to the accompanying drawings. In the drawings, wherein like reference numerals denote corresponding parts throughout the several views:

Figure 1 illustrates a front view of an exemplary multiple refrigerant compressor according to an embodiment of the invention.

Figure 2 illustrates a top view of an exemplary multiple refrigerant compressor according to an exemplary embodiment of the invention; and

Figure 3 illustrates a side view of an exemplary multiple refrigerant compressor according to an embodiment of the invention.

DETAILED DESCRIPTION OF DRAWINGS

The following description with reference to the accompanying drawings is provided to assist in a comprehensive understanding of exemplary embodiments. It includes various specific details to assist in that understanding but these are to be regarded as merely exemplary. Accordingly, those of ordinary skill in the art will recognize that various changes and modifications of the embodiments described herein can be made without departing from the scope and spirit of the invention. In addition, descriptions of well-known functions and constructions are omitted for clarity and conciseness.

A multiple refrigerant compressor is disclosed according to embodiments of the invention. The disclosed multiple refrigerant compressor may include a single compression enclosure. The compression enclosure may be protected by an outer housing and may include at least two compression chambers. The compression chambers may be separated from each other by a partition. The multiple refrigerant compressor may further include more than one partition to divide the compression enclosure into multiple compression chambers.

Each of the compression chambers in the compression enclosure may include a suction port and a discharge port. The compressible fluids may flow into the compression chamber through the suction port, get compressed and discharge through the discharge port. Each compression chamber in the compression enclosure of the multiple refrigerant compressor may be operated with a common compression arrangement. According to an embodiment, the compression arrangement may be a crankshaft arrangement. The arrangement of the compression chambers in the compression enclosure may be such that the flow of compressible fluid in one compression chamber may be independent of the flow of compressible fluid in the other compression chamber. The mixing of compressible fluid among the multiple compression chambers may be further prevented by a baffle plate or any suitable partition. According to an embodiment, the compression of the compressible fluid in one compression chamber and the compression of the compressible fluid in the other compression chamber may operate simultaneously, dependently or independently to each other. Each of the compression chamber may be operated based on the required the load capacity and may be in connection to the compatible appliance.

Figure 1 illustrates a front view of an exemplary multiple refrigerant compressor 100 according to an embodiment of the invention. The multiple refrigerant compressor 100 may include a compression enclosure 102. The compression enclosure 102 may include a first compression chamber 104 and a second chamber 106. According to an embodiment, the shape and volume of the first compression chamber 104 may be same as the shape and volume of the second compression chamber 106. According to another embodiment, the shape and volume of the first compression chamber may be of different than the shape and volume 104 of the second

P A T E N T C O M P R E S S I O N C H A M B E R 1 0 6 . T H E S H A P E A N D V O L U M E O F T H E F I R S T C O M P R E S S I O N C H A M B E R 1 0 4 A N D T H E

second compression chamber 106 may depend on the property of the compressible fluid 116, 118 being compressed in each of the compression chamber 104, 106. According to another embodiment, the shape and volume of the first compression chamber 104 and the second compression chamber 106 may depend on the appliance for which the compressible fluid 116, 118 is being compressed. The first compression chamber 104 may include a first suction port 108 and the second compression chamber 106 may include a second suction port 110. According to an embodiment, each of the compression chambers in the compression enclosure may have a separate suction port.

Figure 2 illustrates a top view of the exemplary multiple refrigerant compressor 100 according to an exemplary embodiment of the invention. The first compression chamber 104 may include a first discharge port 112 and the second compression chamber 106 may include a second discharge port 114. The first compressible fluid 116 may flow through the first suction port 108 and may be compressed in the first compression chamber 104 and discharge through the first discharge port 112. Similarly, a second compressible fluid 118 may flow through the second suction port 110 and get compressed in the second compression chamber 106 and discharge through the second discharge port 116. According to an embodiment, the first compressible fluid 116 and the second compressible fluid 118 may be of same properties. According to another embodiment, the first compressible fluid 116 and the second compressible fluid 118 may be of different properties. The operating pressure and compression property of the first compressible fluid 116 and the second compressible fluid 118 may be same or vary depending on the cooling or heating requirement of the application. The number of compressible fluids that may be compressed in the multiple

refrigerant compressor 100 may be equal to the number of suction ports, the discharge ports and the compression chambers.

Figure 3 illustrates a side view of the exemplary multiple refrigerant compressor 100 according to an embodiment of the invention. The first compression chamber 104 and the second compression chamber 106 of the multiple refrigerant compressor 100 may be operated by a common compression arrangement. The arrangement of the first compressible fluid 116 flow in the first compression chamber 104 may be independent of the second compressible fluid 118 flow in the second compression chamber 106. The arrangement of the compression chambers 104, 106 to the appliances may be such that each compression chamber 104, 106 may be operated independently based on the cooling/heating required in the appliance. The multiple refrigerant compressor 100 may further include an oil port 120 for lubricating the operating parts of the multiple refrigerant compressor 100.

According to embodiments of the invention, the disclosed multiple refrigerant compressor 100 may be used with appliances such as, but not limited to, a refrigerator, an air conditioner, a ventilator etc. According to embodiments, each of the compression chambers 104, 106 in the compression enclosure 102 may compress the compressible fluids 116, 118 having same properties. According to another embodiment, each of the compression chambers 104, 106 in the compression enclosure 102 may compress the compressible fluids 116, 118 having different properties. According to an embodiment, the compression chambers 104, 106 may compress the compressible fluids 116, 118 including multiple refrigerants such as, but not limited to, freon,

The common compression arrangement for compressing multiple compressible fluids in multiple compression chambers may reduce the power consumption in homes, industries etc. The common compression arrangement such as a single crankshaft for compressing multiple compressible fluids may further reduce the number of parts in the compressor. According to an embodiment, the use of multiple refrigerant compressor for operating multiple appliances requires less space and hence may reduce the wastage of space at homes, industries etc.

It is understood that the above description is intended to be illustrative, and not restrictive. It is intended to cover all alternatives, modifications and equivalents as may be included within the spirit and scope of the invention as defined in the appended claims. Many other embodiments will be apparent to those of skill in the art upon reviewing the above description. The scope of the invention should, therefore, be determined with reference to the appended claims, along with the full scope of equivalents to which such claims are entitled. In the appended claims, the terms "including" and "in which" are used as the plain-English equivalents of the respective terms "comprising" and "wherein," respectively.

PATENT OFFICE CHENNAI 20/12/2017 16:39

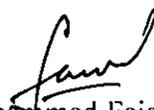


We claim:

1. A multiple refrigerant compressor 100 comprising:
a single compression enclosure 102 with at least two compression chambers 104,106,
wherein each compression chamber 104,106 includes a suction port 108,110, a discharge port 112,114 and a common compression arrangement such that each compression chamber 104,106 compresses a compressible fluid 116,118 separately.
2. The multiple refrigerant compressor 100 as claimed in claim 1, wherein the compression chambers 104, 106 are separated by a baffle plate.
3. The multiple refrigerant compressor 100 as claimed in claim 1, wherein the multiple refrigerant compressor 100 includes an oil port 120 for lubricating the operating parts of the multiple refrigerant compressor 100.
4. The multiple refrigerant compressor 100 as claimed in claim 1, wherein the shape and volume of each of the compressor chambers are same.
5. The multiple refrigerant compressor 100 as claimed in claim 1, wherein the shape and volume of each of the compressor chambers are different.
6. The multiple refrigerant compressor 100 as claimed in claim 1, wherein each of the

7. The multiple refrigerant compressor 100 as claimed in claim 1, wherein each of the compressor chamber compress the compressible fluid having different properties.
8. The multiple refrigerant compressor 100 as claimed in claim 1, wherein the compressible fluids includes refrigerants.

Dated this 19th day of December 2016



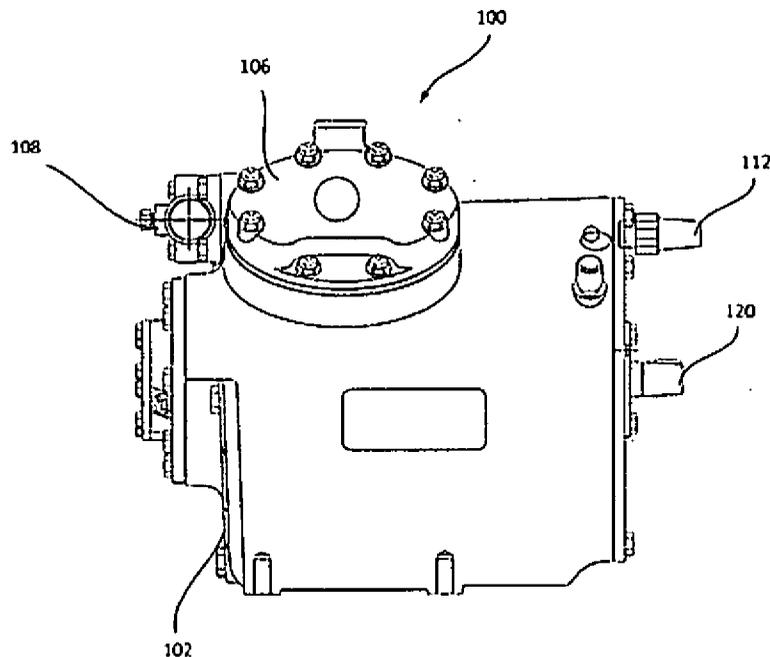
Mohammed Faisal (INPA No: 1941)
Head, IPR Dept.
L&T Technology Services Limited
DLF 3rd Block, 2nd Floor,
Manapakkam, Chennai, TN, 600089



ABSTRACT

Multiple Refrigerant Compressor

According to an exemplary embodiment of the invention, a multiple refrigerant compressor 100 is disclosed. The multiple refrigerant compressor 100 may include a single compression enclosure 102. The compression enclosure 102 may be divided into at least two compression chambers 104, 106. The compression chambers 104, 106 may be separated from each other by a partition. The compression chambers 104, 106 may be designed in such a way that each of the compression chambers 104, 106 may have a suction port 108, 110, a discharge port 112, 114 and a common compression arrangement. The compression chambers 104, 106 in the compression enclosure 102 may be further arranged in such a way that each compression chamber 104, 106 may compress a compressible fluid 116, 118 separately.



PATENT OFFICE CHENNAI 20/12/2017 16:39



700201561

L&T Technology Services Limited

Total number of Sheets: 3

Sheet No. 1 of 3

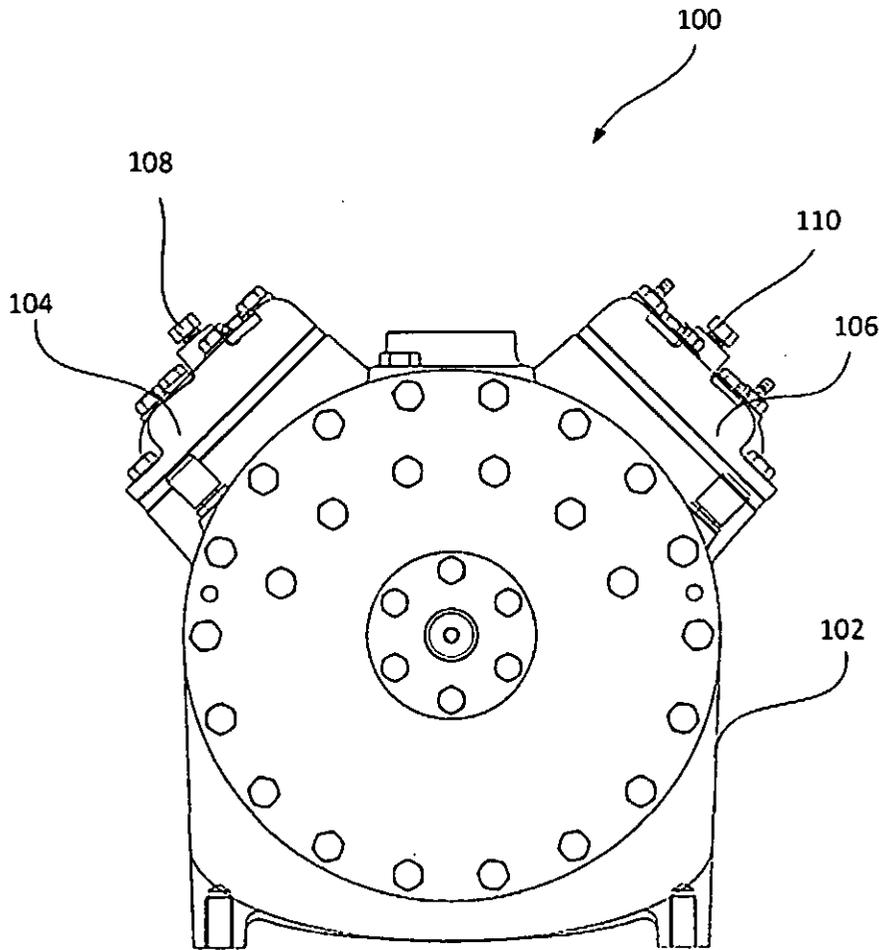


Figure 1


Mohammed Faisal (INPA No: 1941)
Head, IPR Dept.

L&T Technology Services Limited
DLF 3rd Block, 2nd Floor,
Manapakkam, Chennai – 600089

19-Dec-2017/78971/201641043252/Drawing

PATENT OFFICE CHENNAI 20/12

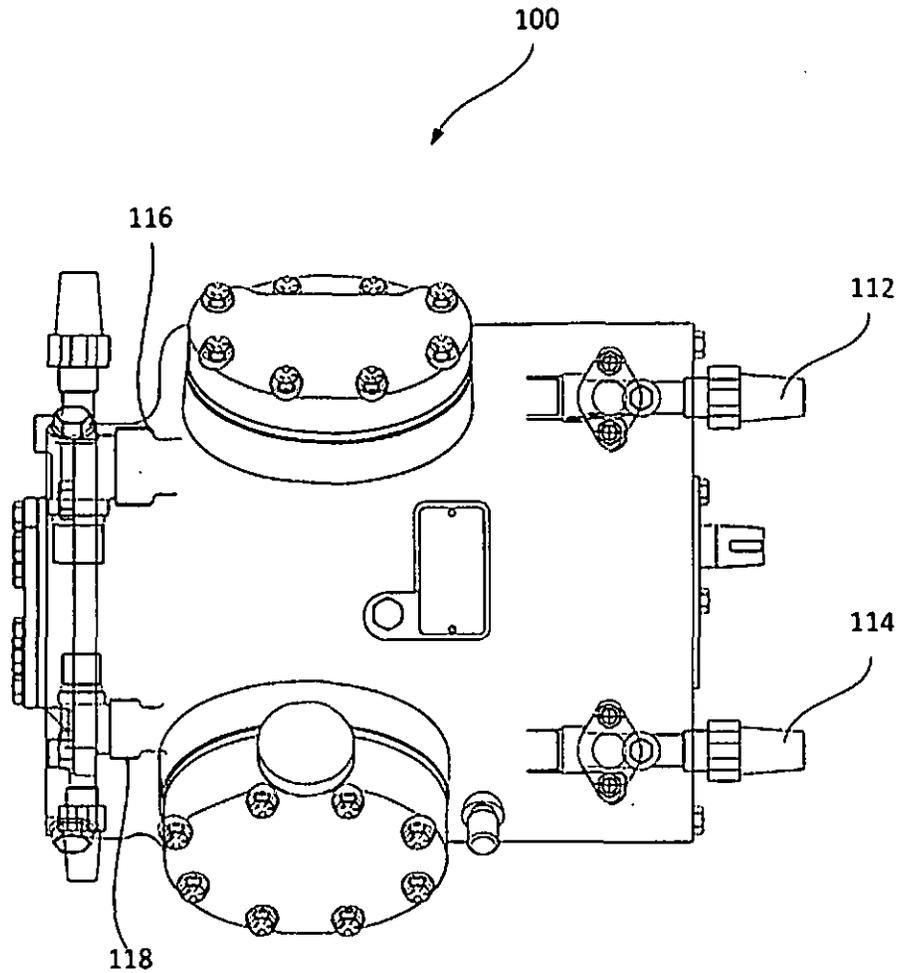


Figure 2

faisal
Mohammed Faisal (INPA No: 1941)
Head, IPR Dept.
L&T Technology Services Limited
DLF 3rd Block, 2nd Floor,
Manapakkam, Chennai – 600089

PATENT OFFICE CHENNAI

20/12/2017

2017/11/16-39

19-Dec-2017/78971/201641043252/Drawing

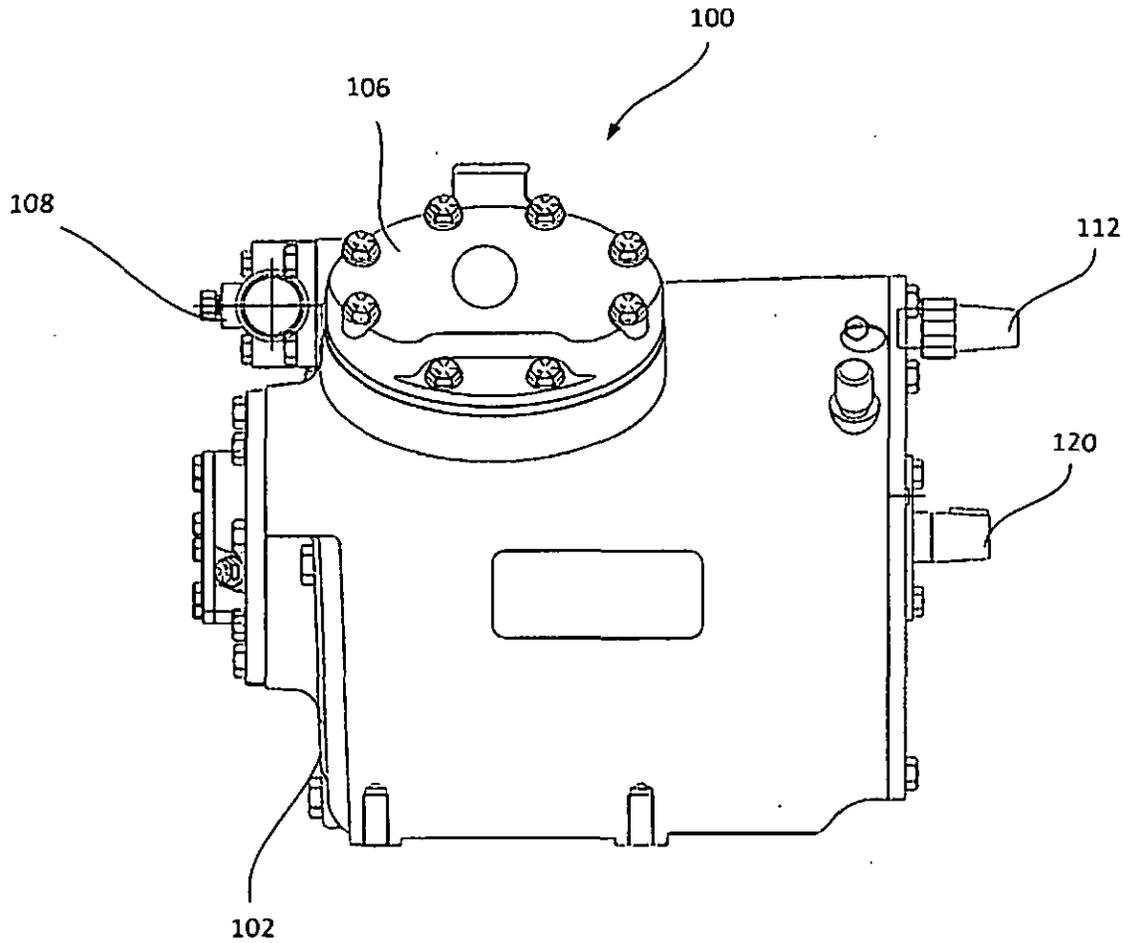


Figure 3

[Signature]
Mohammed Faisal (INPA No: 1941)
Head, IPR, Dept. 6 - 39
L&T Technology Services Limited
DLF 3rd Block, 2nd Floor,
Manapakkam, Chennai - 600089

PATENT OFFICE CHENNAI 20/12

19-Dec-2017/78971/201641043252/Drawing