



(19)

Europäisches Patentamt

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(11)

EP 0 881 393 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
02.12.1998 Bulletin 1998/49

(51) Int. Cl.⁶: **F04C 23/00**

(21) Application number: **97108582.4**

(22) Date of filing: **28.05.1997**

(84) Designated Contracting States:
DE FR GB IT

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(54) Hermetic compressor and refrigerating air conditioners using it

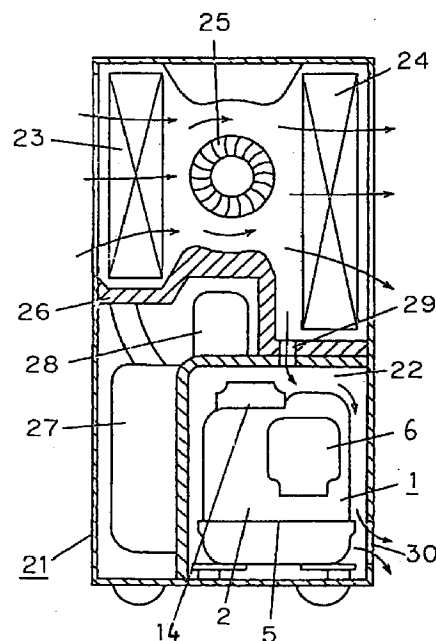
(57) The object of the present invention is to provide equipment that has complete safety against leakage of refrigerants from pin holes produced on a compressor that is intended for refrigerating air conditioners using refrigerants that are heavier than air and flammable.

A junction 5a of a hermetic container, where pin holes are most likely to be formed, is arranged to be located below a control box 28 which has the possibility of becoming a source of ignition.

The mixture ratio between air and refrigerants that might leak from pin holes produced in the welded junction 5a and the like of a hermetic container 2 of a hermetic compressor 1 is prevented from reaching a ratio where ignition takes place inside of an air conditioner.

As a result, a refrigerating air conditioner having complete safety is realized.

Fig. 4



EP 0 881 393 A1

Description

TECHNOLOGICAL FIELD OF THE INVENTION

The present invention relates to a hermetic compressor to be used in refrigerating air conditioners such as a refrigerator, dehumidifier, air conditioner or the like, and refrigerating air conditioners using the foregoing hermetic compressor.

BACKGROUND OF THE INVENTION

As the refrigerant to be used in refrigerating air conditioners, chloro • fluoro • carbons (CFCs) or hydro • chloro • fluoro • carbons (HCFCs) have so far been employed. These refrigerants are non-toxic and non-flammable.

However, it has been pointed out recently that these CFCs and HCFCs have the possibility of destroying the ozone layer and are said to be causing global warming. Therefore, it has become necessary to switch promptly to alternative refrigerants that replace CHCs and HCFCs. As such alternative refrigerants, naturally existing hydrocarbons such as propane, isobutane or the like can be considered for use, but these hydrocarbons are flammable.

Therefore, it is very important to make the products that employ such hydrocarbons safe enough not to start fire even when leakage of the hydrocarbons may occur.

Fig. 5(a) is a perspective view of a prior art hermetic compressor that employs chloro • fluoro • carbons as the refrigerant and is used in refrigerating air conditioners.

In Fig. 5(a), a motor (not shown in the drawing) and a compressor mechanism (not shown in the drawing) are housed in a hermetic container 101.

The hermetic container 101 is formed of an upper shell 102 and a lower shell 103, which are sealed by welding after the foregoing compressor mechanism and motor have been contained.

In general, the welding method employed in sealing the shells is a TIG (Tungsten Inert Gas Arc) welding performed in an atmosphere of inert gas such as argon, carbon dioxide or the like.

The lower shell 103 is provided with a glass terminal 105, through which electric power is supplied to the motor inside of the lower shell 103.

The rim of the glass terminal 105 is hermetically welded to the lower shell 103 by resistance welding and terminal leads are mounted by sealing on and insulated from the shell by use of glass.

Upon completion of assemblage of the hermetic compressor, an operating pressure is applied to the hermetic compressor to check whether or not gas is leaking through welds.

When gas is found to be leaking from the welds, the welds are reworked by additional welding.

During the course of the foregoing checking for gas

leakage, any gas leakage due to relatively large holes can be readily detected. However, when holes are very small like pin holes produced by the TIG welding and especially when the pin holes are covered by oxide scales, the holes are difficult to find. After a long usage time of the compressor, the scales may fall off the pin holes and leakage of gas may start to develop in a couple of years. In addition, such pin holes tend to be formed near the place where the welding begins.

Another place where gas leakage tends to happen is a place where pin holes are formed in the glass part of the glass terminal 105.

When a flammable refrigerant is used as the refrigerant for a refrigerating compressor, the flammable refrigerant may leak from the cooling cycle of the compressor and the like through such pin holes that have not been detected during the course of gas leakage tests and the leaked refrigerant has the danger of catching fire.

The object of the present invention is to provide a refrigerating air conditioner and compressor which assure enhanced safety by not allowing leaked refrigerants to catch fire even when the refrigerants might have leaked through pin holes formed in the hermetic compressor.

SUMMARY OF THE INVENTION

A hermetic compressor of the present invention comprises:

- a hermetic container;
- a motor and a compressor mechanism housed in the hermetic container;
- a terminal member that is provided on the surface of the hermetic container and connected electrically to the motor;
- and refrigerants that are held inside of the hermetic container and compressed by the compressor mechanism.

The foregoing hermetic container includes a upper shell, a lower shell and a junction where the upper shell and lower shell are joined together.

The foregoing refrigerants are heavier than air and flammable.

The foregoing junction is situated below the terminal member.

The foregoing refrigerants are particularly preferred to be composed of hydrocarbons.

The refrigerants are composed of at least one selected from propane and isobutane.

According to the structure as described in the above, when the refrigerants happen to leak from the hermetic container through pin holes that might have been formed in the junction, the leaked refrigerants are diffused in a downward direction.

Therefore, the leaked refrigerants do not come into con-

tact with the terminal member which has the possibility of becoming a source of firing.

As a result, the danger of ignition is eliminated.

Particularly preferred is that the foregoing terminal member is coated with an electric insulating material.

Accordingly, even when pin holes are formed in the terminal member, the refrigerants are prevented from leaking from the hermetic container.

Further, particularly preferred is that a control mechanism for controlling electrically the foregoing compressor mechanism is installed at a different position on the foregoing surface of the hermetic compressor.

The control mechanism is covered by a first cover material and the terminal member is covered by a second cover material, thereby the first cover material and second cover material getting separated from each other.

Accordingly, even when refrigerants leak from the terminal member, the leaked refrigerants are prevented from contacting the control mechanism by means of the cover material. Therefore, the danger of ignition is eliminated.

Still further, particularly preferred is that a control mechanism for controlling electrically the foregoing compressor mechanism is installed at a different position on the foregoing surface of the hermetic compressor and, in addition, above the position where the foregoing terminal member is located.

Accordingly, when refrigerants leak from the terminal member, the leaked refrigerants diffuse in a downward direction.

Therefore, the leaked refrigerants do not come into contact with the control mechanism.

As a result, the danger of ignition is eliminated.

A refrigerating air conditioner of the present invention comprises a hermetic compressor of the structure as described in the above and an air conditioning mechanism for controlling conditions of air by means of the foregoing hermetic compressor.

The foregoing air conditioning mechanism is installed at a position on the upper side of the hermetic compressor.

Particularly preferred is that the air conditioning mechanism is provided with a control means, whereby the air conditioning mechanism is controlled electrically, and the control means is installed at a position above the afore-mentioned welded junction.

Accordingly, when the refrigerants leak from the welded junction or terminal member, the leaked refrigerants diffuse in a downward direction.

Therefore, the leaked refrigerants do not come into contact with the control means.

As a result, the danger of ignition is eliminated.

Further, particularly preferred is that the foregoing hermetic compressor is housed in a first container chamber, the air conditioning mechanism is housed in a second container chamber installed at a position on the upper side of the first container chamber and an open-

ing is formed in the lower part on the side surface of the first container chamber. Even when the refrigerants leak from the hermetic compressor, the leaked refrigerants are exhausted outside the first container chamber through the opening.

Accordingly, the leaked refrigerants are exhausted outside the refrigerating air conditioner.

In addition, before the mixture ratio between refrigerants and air reaches the ratio where ignition or explosion of the refrigerants may take place, the leaked refrigerants are exhausted outside the refrigerating air conditioner. As a result, the dangers of ignition and explosion are eliminated.

Still further, particularly preferred is that the foregoing hermetic compressor has a path for air around the periphery thereof.

Accordingly, refrigerants that have leaked through pin holes in the junction are mixed with the air passing through the path provided around the periphery of the compressor and the mixed gas is exhausted outside the refrigerating air conditioner.

Therefore, the danger of ignition is eliminated.

Still further, particularly preferred is that the foregoing air conditioning mechanism comprises an evaporator, a condenser, a fan installed between the evaporator and the condenser, and a water holding means which is installed beneath the condenser and holds water drips made by condensation. Air having a high water content (or high humidities) passes through the evaporator and then the condenser.

Water drips made by condensation of the water content in the humid air, which takes place in the condenser, are recovered by the water holding means.

Accordingly, a dehumidifier, which has provision for eliminating the danger of ignition, is realized.

BRIEF DESCRIPTION OF DRAWINGS

Fig. 1 shows a perspective view of a hermetic compressor in an exemplary embodiment of the present invention and also explains how to install electrical control components on the hermetic compressor.

Fig. 2 is a cross-sectional view of the glass terminal member as shown in Fig. 1.

Fig. 3 is a cross-sectional view of the overload protector as shown in Fig. 1.

Fig. 4 is a schematic cross-sectional view of a humidifier in an exemplary embodiment of the present invention.

Fig. 5(a) is an external view of a prior art hermetic compressor.

Fig. 5(b) is a cross-sectional view of the glass terminal member as used in the prior art hermetic compressor of Fig. 5(a).

Key to Reference Numerals

- | | |
|---|---------------------|
| 1 | Hermetic Compressor |
| 2 | Hermetic Container |

3	Upper Shell
4	Lower Shell
5	Welded Junction
5a	Welding Start Point
6	Glass Terminal Member
7	Terminal Lead
8	Glass
9	Electric Insulating Material
10	Cluster
11a	Packing
11b	Packing
12	Terminal Cover
13	Leaf Spring
14	Overload Protector (OLP)
15	Nut
16	Leaf Spring
17	OLP Cover
18	Screw
19	Bimetal
20	Contact
21	Humidifier
22	Compressor Chamber
23	Evaporator
24	Condenser
25	Fan
26	Water Vessel
27	Tank
28	Control Box
29	Small Channel
30	Opening

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Some of the preferred embodiments of the present invention will be explained with reference to drawings.

Exemplary Embodiment 1

Fig. 1 shows an external view of a hermetic compressor using flammable refrigerants and intended for use in refrigerating air conditioners in an exemplary embodiment of the present invention and also shows a mounting drawing of electrical control components for the hermetic compressor.

In Fig. 1, a motor (not shown in Fig. 1) and a compressor mechanism (not shown in Fig. 1) are housed inside of a hermetic container 2 of a hermetic compressor 1. The hermetic container 2 is formed of an upper shell 3 and a lower shell 4.

After the compressor mechanism and motor have been placed inside of the lower shell 4, the lower shell 4 is covered with the upper shell 3 and the junction 5 between the two shells is completely sealed by welding. On the upper shell 3 is mounted a glass terminal member 6, through which electricity is supplied to the motor inside of the shell 3.

Fig. 2 is an enlarged cross-sectional view of the

glass terminal member 6 of Fig. 1.

In Fig. 1 and Fig. 2, a flat area is formed on the upper shell 3 and the periphery of the glass terminal member 6 is hermetically sealed by resistance welding.

5 Terminal leads 7 are completely sealed on and insulated from the upper shell 3 by means of glass 8.

The surface of the glass terminal member 6 is covered with a coat of an electric insulating material 9 such as silicon oil and the like.

10 The silicon oil 9 enters into pin holes of the glass 8 and seals the pin holes completely.

In the glass terminal member 6 is inserted a cluster 10, through which a voltage is supplied from outside.

The cluster 10 has a starting relay built therein.

15 The starting relay is preferred to be a contactless relay that does not generate sparks.

A terminal cover 12 is fixed on the glass terminals 6 with a packing 11a placed in between by means of leaf springs 13.

20 Thus, infiltration of moisture from outside is prevented at the glass terminals 6 and also exposure of electrically live portions is prevented.

On the top position of the upper shell 3 of the hermetic compressor 1 is formed a flat area, on which a nut 15 is attached by welding.

25 An overload protector 14 (OLP) is placed on the foregoing flat area and pressed down thereon by means of a leaf spring 16.

30 An OLP cover 17 is fixed on the OLP 14 with a packing 11b placed in between by means of a screw 18 like the glass terminal member 6.

Thus, infiltration of moisture from outside is prevented at the OLP 14 and also exposure of electrically live portions is avoided.

35 Fig. 3 shows a cross-sectional view of the OLP 14. In Fig. 3, a bimetal 19 senses temperatures of the top position of the compressor (indirectly sensing the temperature of the motor inside thereof), and also cuts off the currents to the compressor 1 by breaking a contact 20 according to the effect caused by flowing currents when the load applied is excessive.

In other words, the OLP 14 plays the role of a control mechanism for controlling the compressor mechanism. Refrigerants are contained in the hermetic container 2.

45 Next, an explanation will be made on a case wherein refrigerants leak from a hermetic compressor when refrigerants are flammable and heavier than air like such refrigerants as propane, isobutane or the like. A hermetic compressor 1 is checked to find if leakage of refrigerants occurs under a specified design pressure.

50 In general, the foregoing leakage test is performed by finding air bubbles produced at leaking places when a compressor is filled with air and immersed in water.

Alternatively, a compressor is filled with helium gas and a detector is used to find out existence of any holes.

55 Generally speaking, leakage occurs most of the time at a welded junction 5.

The welding method usually employed for welding the

junction 5 is a TIG welding performed in an atmosphere of inert gas such as argon, carbon dioxide or the like. Leakage through relatively large holes in the junction 5 can be readily detected.

However, pin holes formed by gas that has been produced during the process of welding are very small, and these pin holes are often covered by oxide scales, thus making it difficult to detect these very small holes.

Only after using the compressor 1 for a long period, the afore-mentioned oxide scales may come off and leakage may begin sometimes in several years.

The pin holes that have not been detected during the leakage tests are very small.

The amount of refrigerants leaking from these extremely small pin holes is less than 1 cc/min approximately.

In other words, the rate of leakage is very slow.

The leaked refrigerants (having a specific gravity which is larger than that of air) spread out slowly from the vicinity of the pin holes.

Since the refrigerants are heavier than air, the leaked refrigerants start to flow in a downward direction and continue diffusing.

Hydrocarbons serving as flammable refrigerants do not ignite unless the mixture ratio between hydrocarbons and air reaches a specific ratio.

In the case of propane, for instance, LEL equals to 2% and UEL equals to 10%.

More specifically, when the mixture ratio of propane to air falls within the range of 2% to 10%, ignition or explosion occurs, but as long as the mixture ratio remains outside of the foregoing range the leaked refrigerants do not ignite.

On the other hand, the sources of ignition in the vicinity of the compressor are the starting relay (in the case of contact type relay) attached to the glass terminal member 6 and the contacts of the OLP 14.

According to the present exemplary embodiment, the welded junction 5 is arranged to situate below the glass terminal member 6, which contains a relay and the like.

There is always the possibility that the terminal member 6 becomes a source of ignition.

Refrigerants leaking from pin holes formed in the welded junction 5 flow slowly in a downward direction and diffuse.

Therefore, the leaked refrigerants do not come into contact with the terminal member 6 that has the possibility of becoming a source of ignition.

Even if the leaked refrigerants happen to come into contact with the terminal member 6, the amount of leaked refrigerants that come into contact with the terminal member 6 is minimal.

Therefore, the mixture ratio between flammable refrigerants and air does not reach a ratio, under which ignition takes place.

As a result, a refrigerating air conditioner and compressor having complete safety are realized.

Also, the OLP 14 serving as an electrical control component is located above the welded junction 5.

There is always the possibility that the OLP 14 becomes a source of ignition.

Refrigerants leaking from pin holes formed in the welded junction 5 flow slowly in a downward direction and diffuse.

Therefore, the leaked refrigerants do not come into contact with the OLP 14 that has the possibility of becoming a source of ignition.

Even if the leaked refrigerants happen to come into contact with the OLP 14, the amount of leaked refrigerants that come into contact with the OLP 14 is minimal.

Therefore, the mixture ratio between flammable refrigerants and air does not reach a ratio where ignition takes place.

As a result, a refrigerating air conditioner and compressor having complete safety are realized.

When the upper shell 3 and lower shell 4 are put together by welding, the welding work starts at a welding start point 5a and ends at the same welding start point 5a after the welding of the shells' perimeter has been completed.

Therefore, the welding conditions at the welding start point 5a tend to change since the welding start point 5a becomes the welding end point at the completion of the welding work.

As a result, whenever pin holes are produced in the welding junctions 5, the pin holes tend to be produced in the vicinity of the welding start point 5a.

It is particularly preferred that the welding start point 5a is arranged to be located at a position far from the OLP 14 or opposite thereto on the hermetic container 2.

Since the welding start point 5a where refrigerants are likely to leak and the OLP 14 that may serve as a source of ignition are separated from each other, the mixture ratio of flammable refrigerants to air in the vicinity of the OLP 14 does not reach a mixture ratio where ignition takes place.

As a result, a refrigerating air conditioner and compressor having complete safety are realized.

Further, the place where leakage of refrigerants might occur is glass 8 of the glass terminal member 6 where pin holes might be formed.

The pin holes formed by minute air bubbles are difficult to detect even in the leakage detection test.

In order to seal these pin holes formed in the glass 8 against leakage, coatings of such insulating materials 9 as silicon rubber, silicon oil and the like are applied to the surface of glass 8 and the vicinity thereof.

Thus, refrigerants are prevented from leaking through the glass 8 of the glass terminal member 6.

Even if leakage of refrigerants might occur at the glass terminal member 6, the refrigerants leaked from the glass terminal member 6 do not get near the OLP 14 that may serve as a source of ignition because the terminal cover 12 covering the glass terminal member 6 is installed separately from the OLP cover 17 that covers

the OLP 14.

Therefore, the mixture ratio of flammable refrigerants to air in the vicinity of the OLP 14 does not reach a mixture ratio where ignition takes place.

As a result, a refrigerating air conditioner and compressor having complete safety are realized.

Although the terminal cover 12 and OLP cover 14 are formed by separate two covers in the present exemplary embodiment, it is also possible to use a single cover with a partition formed inside thereof instead of using two separate covers.

The OLP cover 17 is arranged to be located above the terminal cover 12.

Such flammable refrigerants as propane and the like that are heavier than air flow in a downward direction and continue diffusing.

Therefore, the mixture ratio of flammable refrigerants to air inside of the OLP cover 17 does not reach a mixture ratio where ignition takes place.

As a result, a refrigerating air conditioner and compressor having complete safety are realized.

Exemplary Embodiment 2

Next, a refrigerating air conditioner using a hermetic compressor of the present invention will be described in an exemplary embodiment of the present invention.

Fig. 4 is a schematic cross-sectional view of a dehumidifier as an example of the refrigerating air conditioner using a present invention's hermetic compressor.

Refrigerators, room air conditioners and the like are included in the refrigerating air conditioner, and an explanation will be made here on a dehumidifier using a compressor of the present invention.

As the refrigerants of this dehumidifier 21 are used such hydrocarbons as propane, isobutane and the like that are flammable gases and heavier than air.

A hermetic compressor 1 as described in Fig. 1 is contained in a compressor chamber 22 provided in the lower part of the dehumidifier 21.

An evaporator 23 and a condenser 24 are installed in the upper part of the dehumidifier 21 and connected with the compressor 1 by piping.

Thus, a refrigeration cycle is established.

A fan 25 is installed between the evaporator 23 and the condenser 24, thereby air being taken from a room through the evaporator 23 and exhausted through the condenser 24.

When the air passes through the evaporator 23, the air's temperature is lowered and condensation of moisture in the air takes place, resulting in dehumidification of the air.

The condensed water content is held by a water vessel 26 and then flown into a tank 27.

A control box 28 serving as a control means to activate the compressor 1 and fan 25 is installed above the com-

pressor chamber 22.

The control box 28 is installed separately from an air flow channel where the compressor chamber 22, evaporator 23 and condenser 24 are linked.

An opening 30 is provided in the lower part of the side surface of the compressor chamber 22.

A small channel 29 is provided between the air flow channel and the compressor chamber 22.

The air of the air flow channel enters into the compressor chamber 22 and exits from the opening 30 located in the lower part of the compressor chamber 22.

As described in Exemplary Embodiment 1, the welded junctions 5 and glass terminal member 6 are the places where flammable refrigerants are most likely to leak.

In the present exemplary embodiment, the control box 28 serving as an electrical control means is installed above the compressor chamber 22 while the flammable refrigerants that are heavier than air flowing in a downward direction.

Therefore, there is no possibility of leaked refrigerants entering into the control box 28 containing relays and the like that might become a source of ignition.

On the other hand, the mixture ratio of flammable refrigerants to air inside of the control box 28 does not reach a mixture ratio where ignition takes place.

As a result, a refrigerating air conditioner having complete safety is realized.

Flammable refrigerants that are heavier than air and leak from pin holes of the compressor 1 flow in a downward direction and are exhausted from the dehumidifier through the opening 30 provided in the lower part of the compressor chamber 22. Therefore, leaked refrigerants do not stay inside of the dehumidifier.

Moreover, the mixture ratio of flammable refrigerants to air inside of the compressor chamber 22 does not reach a mixture ratio where ignition takes place.

As a result, a refrigerating air conditioner having complete safety is realized.

In addition, since air flows in from the air flow channel through the small channel 29, thereby making the surrounding of the compressor 1 a part of the air flow channel, leaked flammable refrigerants are exhausted from the dehumidifier through the opening 30 provided in the lower part of the compressor chamber 22.

Therefore, flammable refrigerants do not stay inside of the air conditioner.

On the other hand, the mixture ratio of flammable refrigerants to air inside of the air conditioner does not reach a mixture ratio where ignition takes place.

As a result, a refrigerating air conditioner having complete safety is realized.

As described in the foregoing, a hermetic compressor structured according to the present invention and using flammable refrigerants that are heavier than air has provision against the dangers of ignition and explosion that might be caused by leakage of refrigerants from a welded junction or terminal member of a her-

metic container.

As a result, a hermetic compressor having complete safety is realized.

Moreover, a refrigerating air conditioner incorporating the foregoing hermetic compressor has provision against the dangers of ignition and explosion that might be caused by leakage of refrigerants.

As a result, a refrigerating air conditioner having complete safety is realized.

Claims

1. A hermetic compressor (1) comprising :

a hermetic container (2);
a motor and a compressor mechanism housed in said hermetic container (2);
a terminal member (6) that is provided on the surface of said hermetic container (2) and connected electrically to said motor; and
refrigerants that are held inside of said hermetic container (2) and compressed by said compressor mechanism,
wherein said hermetic container (2) includes an upper shell (3), a lower shell (4) and a junction (5) where said upper shell (3) and lower shell (4) are joined together,
said refrigerants are heavier than air and flammable, and said junction (5) is situated below said terminal member (6).

2. The hermetic compressor according to claim 1, wherein said terminal member (6) is applied with a coating of electric insulating material (9).

3. The hermetic compressor according to one of claims 1 or 2, wherein said terminal member (6) have electric contacts (7).

4. The hermetic compressor according to one of claims 1 to 3, wherein said junction (5) is joined by welding.

5. The hermetic compressor according to claim 4, wherein said welded junction (5) has a welding start point (5a) and welding end point (5a) with the portions between said welding start and end points (5a) welded continuously and said welding start point (5a) coincides with said welding end point (5a).

6. The hermetic compressor according to one of claims 1 to 5, further comprising a control mechanism (14) installed at a different place on a surface (3) of said hermetic container (2) and intended for controlling electrically said compressor mechanism,
wherein said control mechanism (14) is covered by

a first cover material (17) and said terminal member (6) covered by a second cover material (12), and said first cover material (17) and second cover material (12) are separated from each other.

7. The hermetic compressor according to one of claims 1 to 5, further comprising a control mechanism (14) installed at a different place on a surface of said hermetic container (2) and intended for controlling electrically said compressor mechanism, wherein said control mechanism (14) is installed at a position above said terminal member (6).

8. The hermetic compressor according to one of claims 1 to 7, wherein said refrigerants are composed of hydrocarbons.

9. The hermetic compressor according to claim 8, wherein said refrigerants are composed of at least one selected from propane and isobutane.

10. A refrigerating air conditioner comprising :

the hermetic compressor according to one of claims 1 to 9; and
an air conditioning mechanism (23, 24, 25) for controlling conditions of air,
wherein said air conditioning mechanism (23, 24, 25) is installed at a position above said hermetic compressor (1).

11. The refrigerating air conditioner according to claim 10, wherein said air conditioning mechanism is provided with a control means for electrical controlling said air conditioning mechanism, and said control means is installed at a position above the welded junction (5) of said hermetic compressor (1).

12. The refrigerating air conditioner according to claim 10, wherein said welded junction (5) has a welding start point (5a) and welding end point (5a) with the portions between said welding start and end points joined continuously by welding, said welding start point (5a) coincides with said welding end point (5a),

said air conditioning mechanism (23, 24, 25) is provided with a control means (28) for electrical controlling, and
said control means (28) is installed at a position apart from said welding start point (5a).

13. The refrigerating air conditioner according to one of claims 10 to 12, wherein said hermetic compressor (1) is housed in a first container (22), said air conditioning mechanism (23, 24, 25) is housed in a second container installed at a position above said first container (22), an opening (30) is formed in the

lower part of the side surface of said first container (22), and in case where said refrigerants leak from said hermetic compressor (1) said leaked refrigerants are exhausted from said first container (22) through said opening (30).

5

14. The refrigerating air conditioner according to one of claims 10 to 13, wherein said hermetic compressor (1) has air flow channels in the surroundings thereof.

10

15. The refrigerating air conditioner according to one of claims 10 to 14, wherein said refrigerants are composed of at least one selected from propane and isobutane.

15

16. The refrigerating air conditioner according to one of claims 10 to 15, wherein said air conditioning mechanism comprises :

20

an evaporator (23);

a condenser (24);

a fan (25) installed between said evaporator (23) and said condenser (24);

and

25

a water holding means (26, 27) installed underneath said condenser (24) for holding condensed water, and is characterized by having moist air passed through said evaporator (23) and then said condenser (24) where the water content of said moist air is condensed to produce said condensed water that is recovered by said water holding means (26, 27).

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Fig. 1

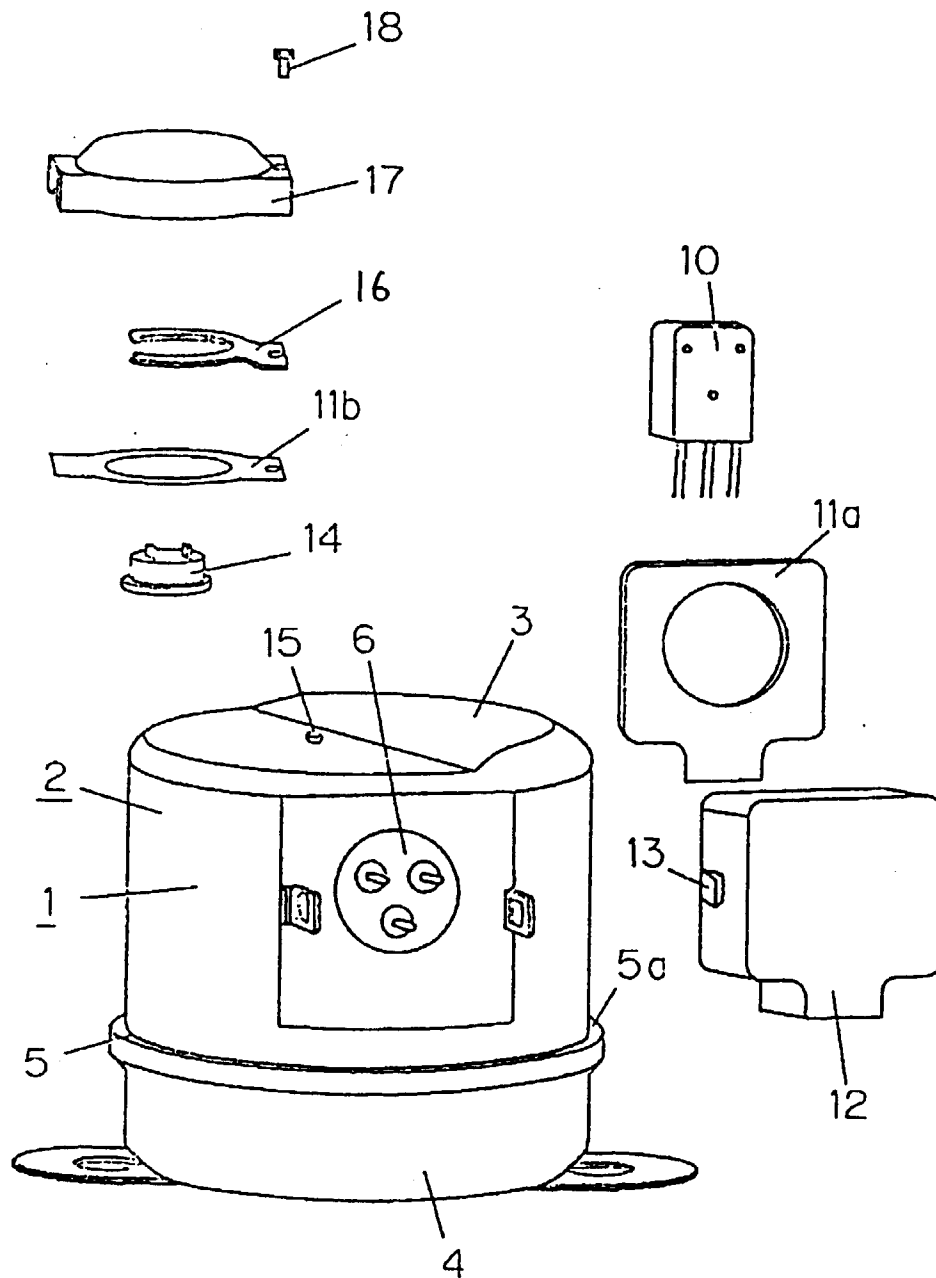


Fig. 2

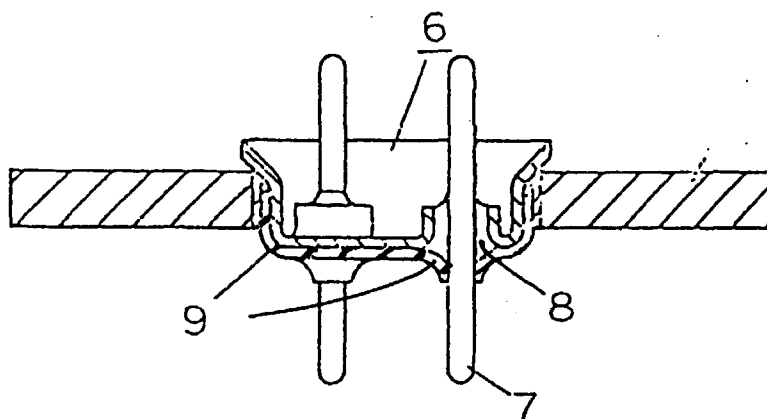


Fig. 3

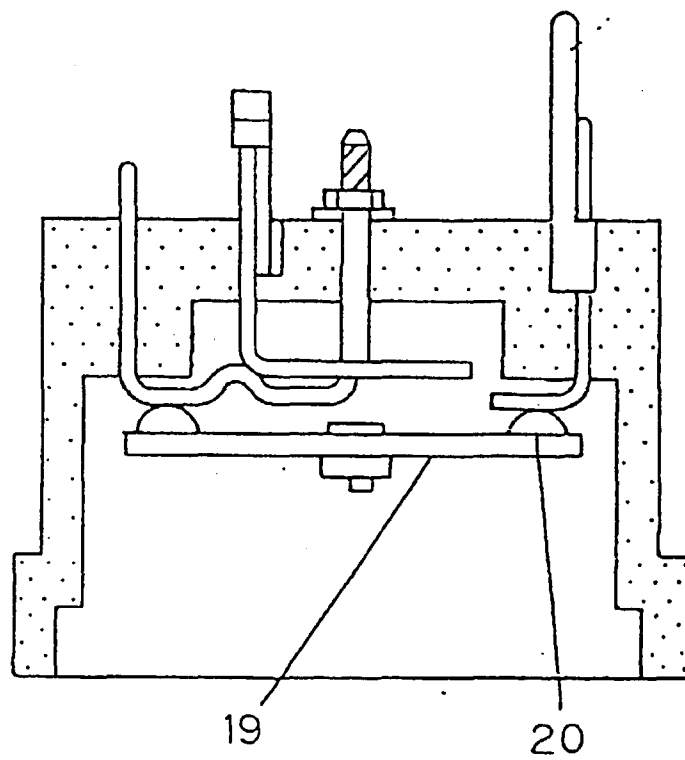


Fig. 4

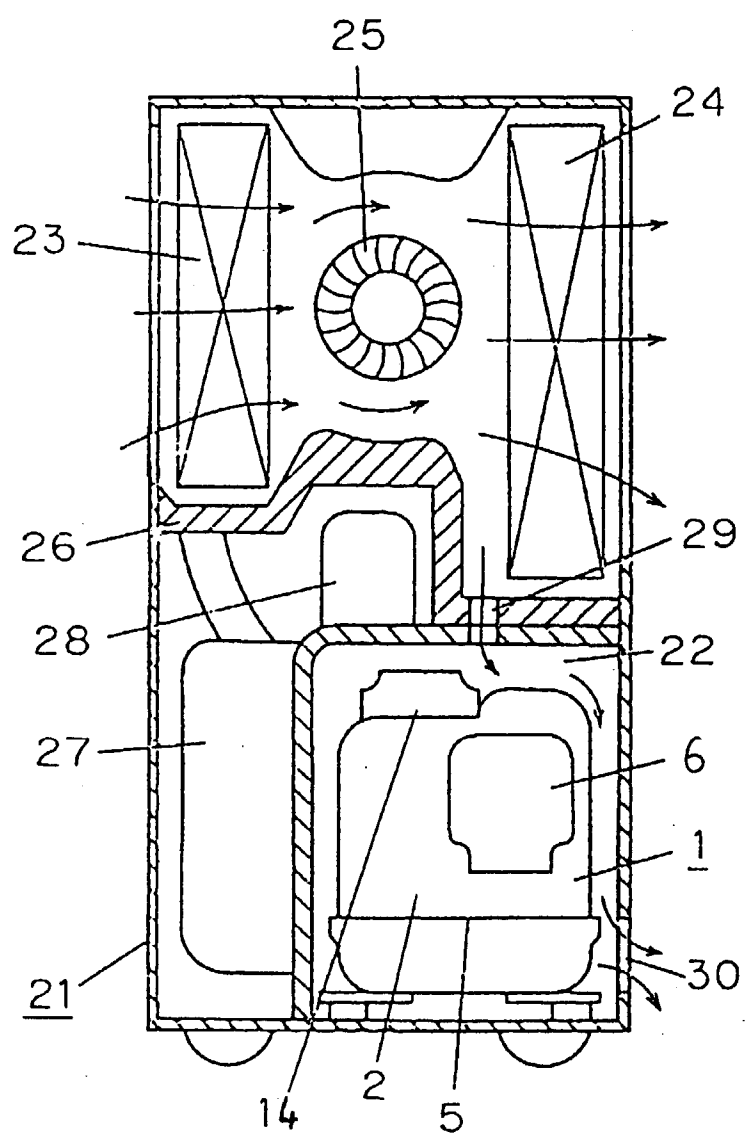


Fig. 5 (a)

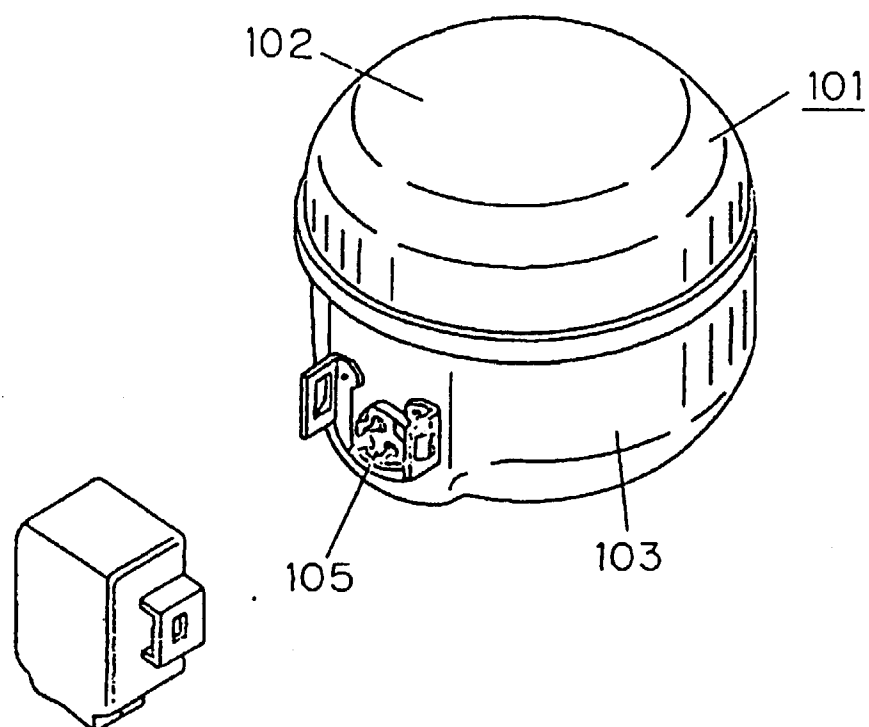
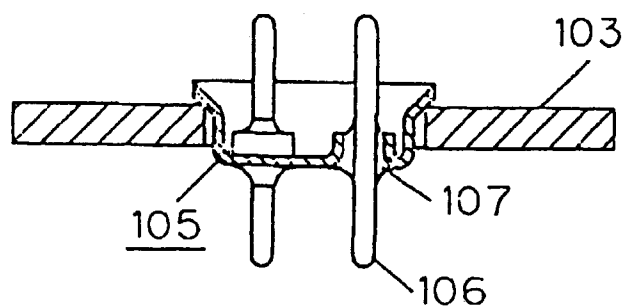


Fig. 5 (b)





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 97 10 8582

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	EP 0 738 024 A (SANYO ELECTRIC) * column 3, line 32 - column 4, line 8; figure 1 *	1	F04C23/00
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The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 6 November 1997	Examiner Kapoulas, T
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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