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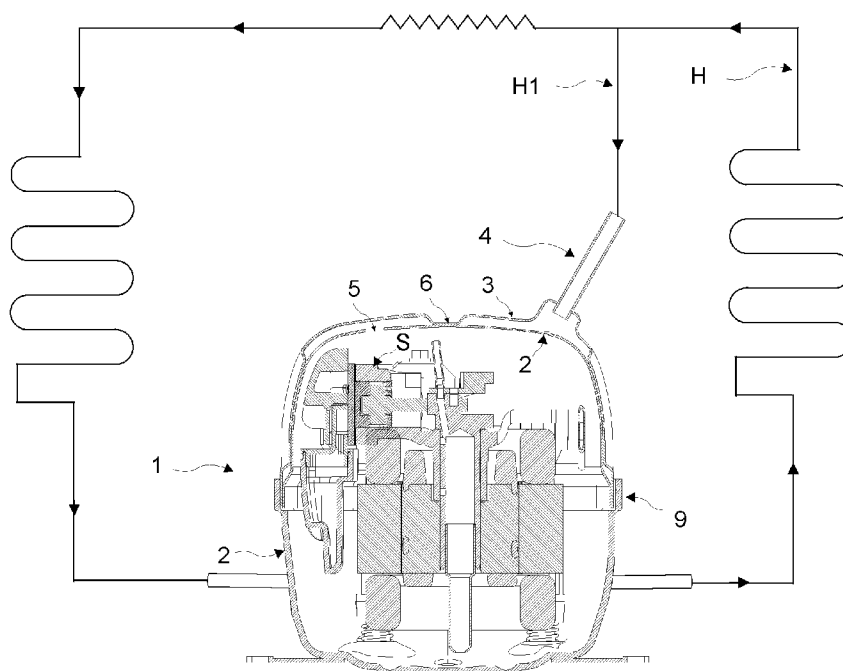
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(54) Title: A COMPRESSOR



(57) Abstract: The present invention relates to a hermetic compressor (1) utilized in cooling devices, providing the circulation of the refrigerant fluid in the cooling cycle line (H) containing the condenser, evaporator and the connection ducts, wherein components like the electric motor, crank-piston rod, piston and the cylinder (S) are emplaced, comprising a casing (2), the performance of which is increased by cooling the casing (2) and the cylinder (S) situated in the casing (2) with the portion of refrigerant fluid received partially from the cooling cycle line (H).

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Description

A COMPRESSOR

- [0001] The present invention relates to a compressor, utilized in cooling devices, the casing and cylinder of which are cooled.
- [0002] The heating of the crank – piston rod mechanism, the cylinder-piston mechanism and the electric motor used in driving these mechanisms operating in hermetic type compressors utilized in cooling devices, for example in refrigerators, results in heating of the refrigerant fluid sucked into the compressor and pumped resulting in loss of volumetric yield. . In addition to the thermal energy generated from the operation of the electric motor and the mechanical losses, the temperature of the refrigerant increasing during the compression in the cylinder results in heat transfer from the vicinity of the cylinder towards the interior of the casing. In cases when the cylinder cannot be cooled as required, performance is decreased because the compressor input power is increased. The thermal energy generated due to operating components in the compressor is transferred to the surroundings through the casing when continuous regime is reached. The increase in the temperatures of the casing and the cylinder decreases the volumetric efficiency since the density of the refrigerant received into the cylinder is decreased and also the work amount required during compression in the cylinder is increased. Therefore, cooling of the compressor plays a major role in the performance of the compressor. In conventional implementations, fans and heat exchangers like vanes situated on the compressor casing are used for cooling the compressor.
- [0003] In the state of the art United States of America Patent numbered US6666043, a second casing is formed over the compressor casing and a heat exchanger is situated in the space between the two casings. A secondary fluid entering the heat exchanger is vaporized by absorbing the heat of the compressor.
- [0004] The aim of the present invention is the realization of a compressor used in cooling devices, wherein performance is increased by lowering the temperature of the casing and the cylinder in the casing.
- [0005] The compressor realized in order to attain the aim of the present invention is explicated in the claims.
- [0006] In cooling devices, for example refrigerators, on the casing of the compressor of the present invention providing the refrigerant cycle, an outer shell is mounted such that a closed space is formed therebetween and some amount of the refrigerant fluid cir-

culating in the refrigerant cycle line is delivered into the closed space between the casing and the outer shell by means of an additional line, thus cooling the casing.

[0007] The refrigerant fluid filling in the closed space between the compressor casing and the outer shell furthermore passes into the casing through the holes on the casing, preferably situated at the level of the cylinder and delivered over the cylinder and cooling performance is enhanced by cooling the cylinder which is likely to be overheated during operation.

[0008] The outer shell is supported on the casing by means of spaced apart supports. The supports are arranged such that the refrigerant delivered into the space between the outer shell and the casing is not prevented from dispersion.

[0009] In another embodiment of the present invention, the compressor comprises one or more flow guides situated at the portion wherein the refrigerant inlet extends into the space between the outer shell and the casing, providing for the uniform dispersion of the refrigerant fluid in between the outer shell and the casing.

[0010] In another embodiment of the present invention, the refrigerant inlet that delivers the refrigerant fluid to the compressor extends from the center point on the apex of the outer shell providing the homogeneous distribution of the refrigerant fluid in between the outer shell and the casing.

[0011] In another embodiment of the present invention, one or more vanes are arranged on the outer shell of the compressor for convection of heat to the outer surroundings thus increasing cooling effectiveness.

[0012] In yet another embodiment of the present invention, the outer shell is made of plastic, providing ease of production and weight reduction and the cooling effectiveness of the refrigerant fluid is increased.

[0013] In another embodiment of the present invention, the outer shell is shaped like a helmet and is mounted on top of the casing and the lower edge of the outer shell is joined to the perimeter of the casing in a leak-proof manner.

[0014] The compressor realized in order to attain the aim of the present invention is illustrated in the attached figures, where:

[0015] Figure 1 – is the schematic view of a compressor that provides the circulation of the refrigerant fluid in a cooling cycle line.

[0016] Figure 2 – is the perspective view of a compressor.

[0017] Figure 3 – is the perspective view of the top portion of a compressor casing.

[0018] Figure 4 – is the perspective view of a compressor comprising an outer shell having vanes arranged thereon.

[0019] Figure 5 – is the sectional view of a compressor comprising a flow guide.

[0020] The elements illustrated in the figures are numbered as follows:

1. Compressor
2. Casing
3. Outer shell
4. Refrigerant inlet
5. Hole
6. Support
7. Flow guide
8. Vane
9. Leak-proofing means

[0021] In cooling devices, for example refrigerators, the circulation of the refrigerant fluid in a cooling cycle line (H) is provided by a compressor (1).

[0022] The compressor (1) comprises a casing (2), preferably made of two parts, an upper one and a lower one in which the elements like the electric motor, crank–piston rod, piston and the cylinder (S) are emplaced, an outer shell (3) mounted on the casing (2) such that a closed space is formed therebetween, a refrigerant inlet (4) that provides the refrigerant received from the cooling cycle line (H), through an additional line (H1) connected to the cooling cycle line (H), to be directed into the closed space between the outer shell (3) and the casing (2) and one or more holes (5) disposed on the casing (2) providing the refrigerant passing through the refrigerant inlet (4) and filling in the closed space between the outer shell (3) and the casing (2) to enter into the casing (2) (Figure 1).

[0023] In the preferred embodiment of the present invention, the hole (5) is positioned on the casing (2) at the level wherein the cylinder (S) is situated and provides the refrigerant fluid filling in the closed space between the outer shell (3) and the casing (2) to be directed over and cool the cylinder (S).

[0024] The compressor (1) furthermore comprises one or more supports (6) formed as corrugations between the casing (2) and the outer shell (3), extending from the outer shell (3) towards the casing (2), providing the outer shell (3) to be supported over the casing (2) (Figure 1, 2).

[0025] The supports (6) are arranged such that the refrigerant delivered through the refrigerant inlet (4) can flow easily between them for being homogeneously dispersed within the closed space between the outer shell (3) and the casing (2) (Figure 2).

[0026] In another embodiment of the present invention, the compressor (1) comprises one

or more flow guides (7) situated preferably on the casing (2) at the place wherein the refrigerant inlet (4) extends into the space between the outer shell (3) and the casing (2), providing the distribution of the refrigerant fluid uniformly between the outer shell (3) and the casing (2) (Figure 5).

[0027] In another embodiment of the present invention, the refrigerant inlet (4) extends to the center portion of the outer shell (3) in order to maintain a homogeneous dispersion of the refrigerant fluid between the outer shell (3) and the casing (2) (Figure 4 - 5).

[0028] In another embodiment of the present invention, the compressor (1) comprises more than one vane (8) situated on the outer shell (3) providing heat convection to the outer surroundings, increasing the cooling effectiveness (Figure 4).

[0029] In yet another embodiment of the present invention, the outer shell (3) is made of plastic. Accordingly, ease of production and weight-reduction of the outer shell (3) is provided and the refrigerant fluid delivered by the refrigerant inlet (4) filling the closed space enclosed by the plastic outer shell (3), in contact with the outer shell (3) is prevented from heating up quickly due to the heat insulation feature of the plastic material and thus cooling effectiveness is increased.

[0030] As the compressor (1) is energized, refrigerant fluid is pumped into the cooling cycle line (H) and some amount of the refrigerant fluid circulating in the cooling cycle line (H) is received by an additional line (H1) from wherever it reaches a suitable temperature for cooling. Some amount of the refrigerant fluid diverted from the cooling cycle is received by the additional line (H1), and delivered by the refrigerant inlet (4), fills in the closed space between the outer shell (3) and the casing (2) that is bound by the leak-proofing means (9), and provides to cool the casing (2). Afterwards, the refrigerant fluid passes through the holes (5) to be directed over the cylinder (S) within the casing (2) and provides to cool the cylinder (S) by acting upon it.

[0031] In another embodiment of the present invention, the outer shell (3) is shaped like a helmet and is mounted over the top portion of the casing (2).

[0032] In this embodiment, the compressor (1) comprises a leak-proofing means (9) that joins the lower edge of the outer shell (3) mounted on top of the casing (2) to the outer perimeter of the casing (2) in a leak-proof manner and provides to form a closed space between the outer shell (3) and the casing (2). The outer shell (3) is seated on the upper portion of the casing (2) by means of the supports (6) such that there is a closed space therebetween that will be filled by the refrigerant fluid and is affixed to the outer perimeter of the casing (2) such that the refrigerant fluid will not leak out from its lower edge and the casing (2). Consequently the refrigerant fluid delivered by the re-

refrigerant inlet (4), cools the upper portion of the casing (2) and reaches inside the casing (2) passing through the holes (5). Since the refrigerant fluid does not reach to the lower portion of the casing (2) from the outside, the temperature of the compressor (1) oil collected in the lower portion of the casing (2) is not affected.

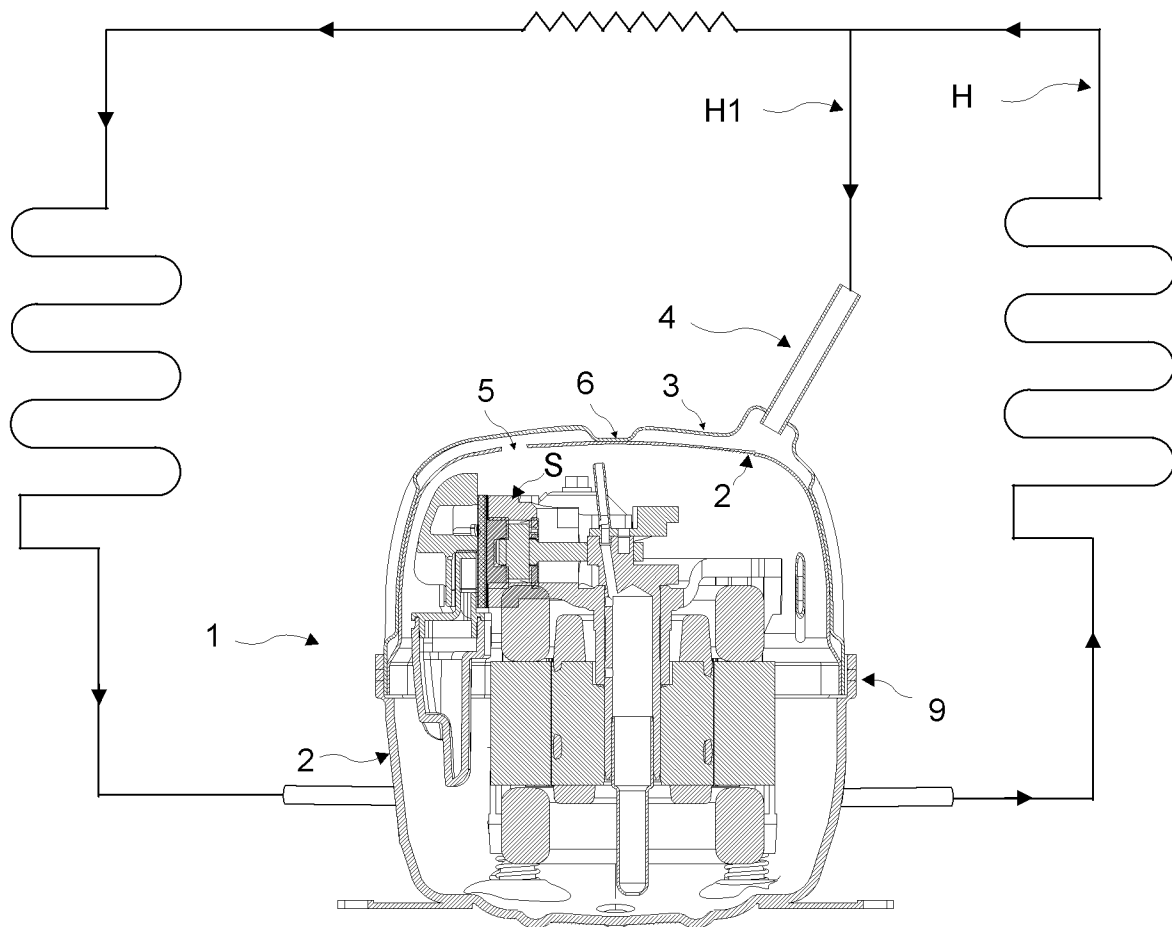
[0033] By means of the configuration of the outer shell (3) mounted on top of the casing (2) such that a closed space is formed between them, the cooling of the casing (2) is provided by filling refrigerant fluid through the refrigerant inlet (4) into the closed space between the outer shell (3) and the casing (2) and afterwards the cylinder (S) is cooled by directing the refrigerant fluid filled in the said closed space over the cylinder (S) by means of the holes (5). Furthermore, if the refrigerant fluid is in the liquid phase while circulating in the segments of the outer shell (3) and the casing (2), time is saved for its vaporization, thus the liquid convection problem that adversely affects the start-up performance of the compressor (1) is eliminated.

Claims

- [0001] A compressor (1) providing the circulation of the refrigerant fluid in the cooling cycle line (H) comprising a casing (2), an outer shell (3) mounted on the casing (2) such that a closed space is formed therebetween, **and characterized by** a refrigerant inlet (4) that provides some amount of the refrigerant fluid received from the cooling cycle line (H) through an additional line (H1) connected to the cooling cycle line (H) to be directed into the closed space between the outer shell (3) and the casing (2) **and** one or more holes (5) disposed on the casing (2) providing the refrigerant passing through the refrigerant inlet (4) and filling in the closed space between the outer shell (3) and the casing (2) to enter into the casing (2).
- [0002] A compressor (1) as in Claim 1, **characterized by** a hole (5) is positioned on the casing (2), situated at the level wherein the cylinder (S) is situated and provides the refrigerant fluid filling in the closed space between the outer shell (3) and the casing (2) to be directed over and cool the cylinder (S).
- [0003] A compressor (1) as in Claim 1, **characterized by** one or more supports (6) between the casing (2) and the outer shell (3), formed as corrugations extending from the outer shell (3) towards the casing (2), providing the outer shell (3) to be supported over the casing (2).
- [0004] A compressor (1) as in Claim 3, **characterized by** supports (6) arranged such that the refrigerant delivered through the refrigerant inlet (4) can flow through them to be homogeneously dispersed within the closed space between the outer shell (3) and the casing (2).
- [0005] A compressor (1) as in any one of the above claims, **characterized by** one or more flow guides (7) situated on the casing (2) at the place wherein the refrigerant inlet (4) extends into the space between the outer shell (3) and the casing (2), providing the distribution of the refrigerant fluid uniformly between the outer shell (3) and the casing (2).
- [0006] A compressor (1) as in any one of the above claims, **characterized by** more than one vanes (8) situated on the outer shell (3) increasing the cooling effectiveness by providing heat convection to the outer surroundings.
- [0007] A compressor (1) as in any one of the above claims, **characterized by** an outer shell (3) made of plastic.

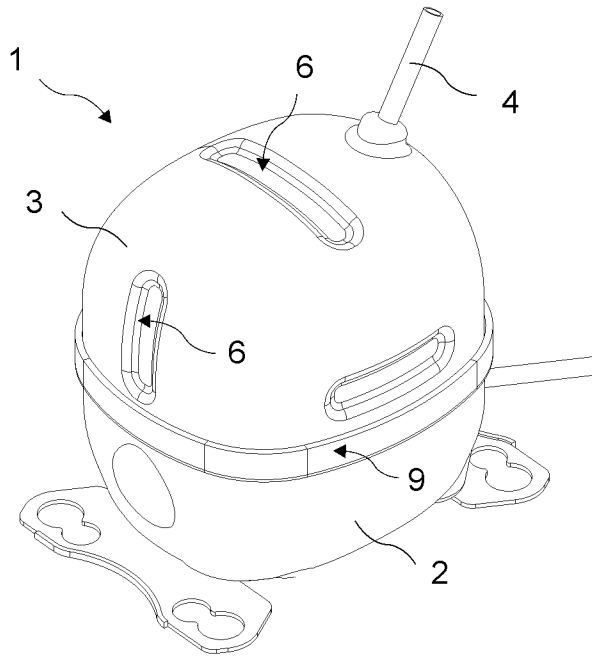
[Fig.]

Figure 1



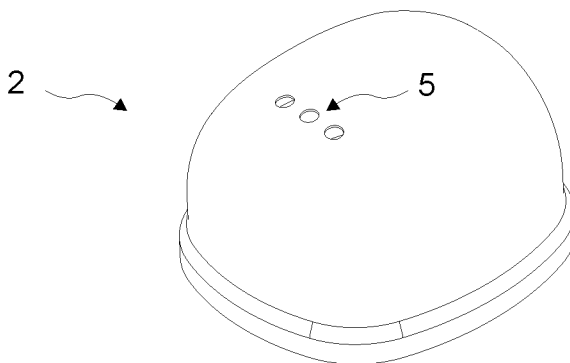
[Fig.]

Figure 2



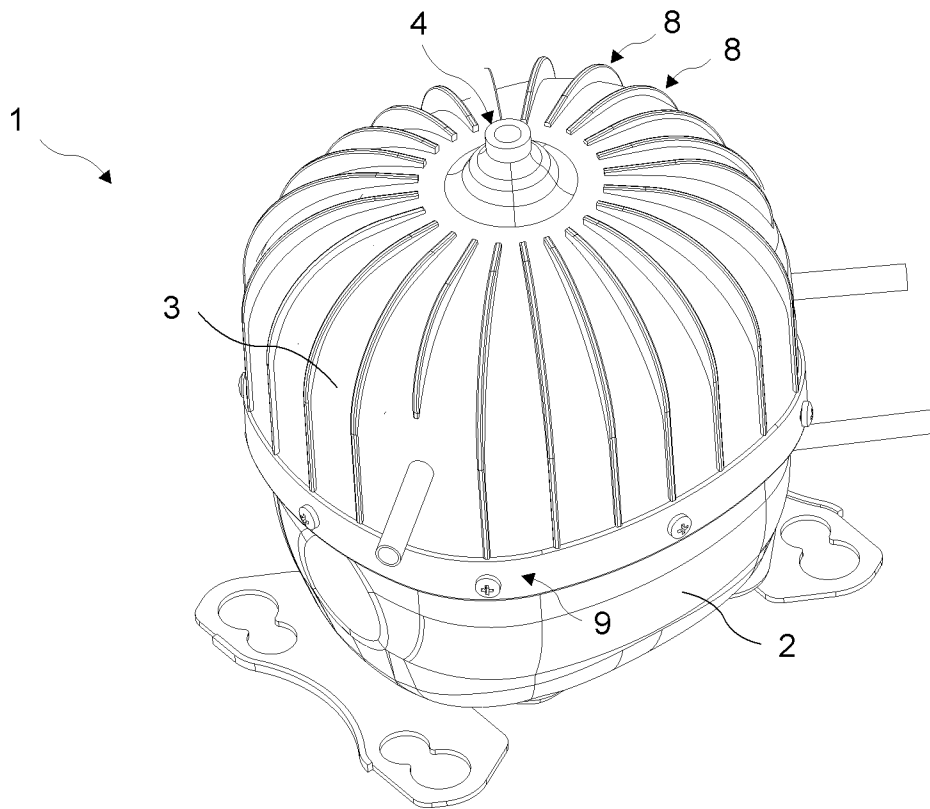
[Fig.]

Figure 3



[Fig.]

Figure 4



[Fig.]

Figure 5

