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**Datasheet for the decision
of 5 September 2013**

Case Number: T 0390/11 - 3.2.03

Application Number: 07712537.5

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IPC: F25B 31/00

Language of the proceedings: EN

Title of invention:

A cooling device

Applicant:

Arçelik Anonim Sirketi

Headword:

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Relevant legal provisions:

EPC Art. 56

RPBA Art. 13(1)

Keyword:

"Inventive step (no)"

"Admissibility of auxiliary requests (partly)"

Decisions cited:

-

Catchword:

-



Case Number: T 0390/11 - 3.2.03

D E C I S I O N
of the Technical Board of Appeal 3.2.03
of 5 September 2013

Appellant:
(Applicant) Arçelik Anonim Sirketi
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 4 August 2010
refusing European patent application
No. 07712537.5 pursuant to Article 97(2) EPC.

Composition of the Board:

Chairman: U. Krause
Members: C. Donnelly
K. Garnett

Summary of Facts and Submissions

- I. The appeal lies from the decision of the examining division, posted on 4 August 2010, refusing the European Patent application No 07 712 537.5.
- II. In its decision the examining division held that the subject-matter of claim 1 did not involve an inventive step taking US2003/0024262 (D1) as the nearest prior art either taken alone or in combination with US4006602 (D3).
- III. The applicant (hereinafter "the appellant") filed a notice of appeal on 4 October 2010 and paid the fee the same day. The grounds of appeal were received on 26 November 2010 and comprised claims 1 to 5 of a main request, a first auxiliary request also comprising 5 claims, and a second auxiliary request with 3 claims.
- IV. In a communication dated 6 May 2013, pursuant to Article 15(1) RPBA annexed to the summons to oral proceedings, the Board informed the appellant of its provisional opinion. In particular, the Board drew attention to EP-A-976 993 (D4) cited in the description of the application and indicated that it had difficulty seeing any inventive merit in what was effectively the provision of an additional suction line between the compressor and the evaporator in this device.
- V. By letter of 5 August 2013, the appellant filed a new main request and auxiliary requests 1 to 5.
- VI. Oral proceedings were held on 5 September 2013. At the conclusion of the debate, the appellant requested that

the decision under appeal be set aside and a patent be granted on the basis of the main request, alternatively one of the first to fifth auxiliary requests filed with the letter dated 5 August 2013.

VII. Claim 1 according to the main request reads:

"A cooling device (1) comprising

- a) a compressor (5) having a cylinder (7) that provides the circulating fluid to be sucked and pumped, a cylinder head (8) situated above the cylinder (7), directing the sucked and pumped circulating fluid and a casing (6) protecting the motor and the other elements;
- b) a condenser (2) providing the refrigerant leaving the compressor (5) as superheated vapor to be condensed changing to first the liquid-vapor phase then entirely to the liquid phase;
- c) an evaporator (3) providing the refrigerant circulating within to absorb heat, cooling its surroundings;
- d) a capillary tube (4) situated between the condenser (2) and the evaporator (3), providing the refrigerant to be constricted and to enter the liquid-vapor phase with a lower pressure,
- e) the refrigerant entering the evaporator (3) and evaporating by absorbing heat from the surroundings leaves the evaporator (3) as vapor and is disposed into a suction line (9) and a cylinder cooling circuit (10);
- f) the suction line (9) with one end extending to the evaporator (3) exit and the other end to the compressor (5)
- g) the cylinder cooling circuit (10) with one end connected to said evaporator (3) exit and the other end

extending to the compressor (5), the cylinder cooling circuit (10) being positioned parallel to the suction line (9), providing to direct a certain amount of the low temperature refrigerant leaving the evaporator (3) directly to the cylinder (7) or the cylinder head (8)."

Claim 1 of the first auxiliary request corresponds to claim 1 of the main request with an additional feature (h) reading:

"h) the refrigerant that cools the cylinder (7) is directed towards the muffler entrance, is mixed with the refrigerant coming from the suction line (9) and is received into the muffler."

Claim 1 of auxiliary request 2 corresponds to claim 1 of the main request with an additional feature (h) reading:

"h) the suction line (9) and the cylinder cooling circuit (10) having different diameters so that the refrigerant flow rate dispersion can be adjusted and/or a solenoid valve providing to controllably direct the refrigerant to the cylinder cooling circuit (10)."

Claim 1 of the auxiliary request 3 corresponds to claim 1 of the main request except that feature (g) has been amended to read:

"g) the cylinder cooling circuit (10) with one end connected to said evaporator (3) exit and the other end connected to the casing of the compressor (5) via elastic ducts, the cylinder cooling circuit (10) being positioned parallel to the suction line (9), providing

to direct a certain amount of the low temperature refrigerant leaving the evaporator (3) directly to the cylinder (7) or the cylinder head (8)."

Claim 1 of auxiliary request 4 incorporates the amendments made to claim 1 in auxiliary requests 1 and 3.

Claim 1 of auxiliary request 5 corresponds to claim 1 of the third auxiliary request with an additional feature (h) reading:

"h) the suction line and the capillary tube are arranged such that the low temperature refrigerant vapor leaving the evaporator (3) in the suction line absorbs heat from the fluid in the capillary tube (4), thus lowering the dryness level of the refrigerant entering the evaporator and from there directed to the compressor (5)."

VIII. The Appellant's arguments can be summarised as follows:

(a) Main request - Novelty/Inventive step

In the device according to EP-A-976 993 (D4) the compressor 16 is provided with coolant tubes 30 and 32 which extend out through the casing 10 to be connected to an external cylinder coolant fluid circulation circuit for the cylinder 22. There is no intention to use the refrigerant entering the casing through the suction tube 28 from the evaporator to cool the cylinder. In this device, the skilled person would have no incentive to develop cooling using the refrigerant

leaving the evaporator since a dedicated cooling circuit is in place.

Even in a standard compressor arrangement which is not provided with a dedicated cooling circuit the skilled person has no incentive to provide a specific cooling tube from the evaporator to improve the cooling of the cylinder within the casing.

(b) Admissibility of auxiliary requests

Although the features introduced into auxiliary requests 1 and 3 to 5 are based on passages in the description, they can be readily understood and the Board should be able to deal with them.

The amendment to the second auxiliary request is based on dependent claim 3 and 4 as originally filed. Therefore, it should be admitted into the proceedings.

(c) Second auxiliary request - Novelty/Inventive step

By providing different diameters for suction and cooling circuit lines the relative cooling effect maybe controlled. A similar effect is obtained with the provision of a solenoid valve. Neither of these features is either shown or suggested by the available prior art, nor are they obvious on the basis of the skilled person's general knowledge.

Reasons for the decision

1. The appeal is admissible.
2. *Novelty/Inventive step*
 - 2.1 In the Board's opinion the most relevant prior art is the standard refrigerator compressor arrangement corresponding to figures 1 and 5 of D4 since not only is the presence of an external cooling circuit not excluded by claim 1, but also the apparatus disclosed in D4 shows all the elements of conventional vapour-compression arrangement generally known to the skilled person.
 - 2.2 Therefore D4 discloses:
 - a) a compressor (16) having a cylinder (18) that provides the circulating fluid to be sucked and pumped, a cylinder head situated above the cylinder, directing the sucked and pumped circulating fluid and a casing (10) protecting the motor and the other elements;
 - b) a condenser (50) providing the refrigerant leaving the compressor (16) as superheated vapor to be condensed changing to first the liquid-vapor phase then entirely to the liquid phase;
 - c) an evaporator (56) providing the refrigerant circulating within to absorb heat, cooling its surroundings;
 - d) a capillary tube situated between the condenser and the evaporator, providing the refrigerant to be constricted and to enter the liquid-vapor phase with a lower pressure (standard feature implicitly present in conventional vapour-compression cycles),

- e) the refrigerant entering the evaporator and evaporating by absorbing heat from the surroundings leaves the evaporator as vapor and is disposed into a suction line (see paragraph [0044]),
- g) a cylinder cooling suction line (28) with one end connected to said evaporator exit and the other end extending to the compressor (16), the cylinder cooling line (28) providing to direct low temperature refrigerant leaving the evaporator (56) directly to the cylinder head (24) (see paragraph [0021]).
- 2.3 As regards feature (g), although the purpose is not specifically stated in D4, it would be obvious to the skilled person that, since the suction line (28) is intentionally directed at the cylinder head (24) (see paragraph [0021]), a cooling effect is obtained.
- 2.4 Thus, the subject-matter of claim 1 differs from the disclosure of D4 in that a further suction line with one end extending to the evaporator exit and the other end to the compressor is positioned parallel to the cylinder cooling suction line.
- 2.5 It is difficult to know what is the technical effect of this feature in relation to the apparatus as defined by the claim other than that it is essentially a duplicate of an existing feature. Consequently, the objective technical problem can only be defined as providing an alternative route for refrigerant to enter the compressor casing. A direct line from the evaporator exit to some unspecified point on the compressor unit is an obvious response to this problem.

2.6 Thus, the subject-matter of the main request does not meet the requirements of Article 56 EPC since it does not involve an inventive step.

3. *Admissibility of Auxiliary requests*

3.1 All the auxiliary requests were submitted after the grounds of appeal had been filed and oral proceedings had been arranged; the question of their admissibility must therefore be addressed under Article 13(1) and (3) RPBA.

3.2 *First auxiliary request*

The amendment made to the first auxiliary request wherein:

"the refrigerant that cools the cylinder (7) is directed towards the muffler entrance, is mixed with the refrigerant coming from the suction line (9) and is received into the muffler"

is based on the passage in the description from the final line on page 4 to line 2 of page 5. However, the muffler is not defined or explicitly shown in the application.

Thus, since the subject-matter of claim 1 is unclear, not searched and has not been examined by the examining division, the request is not admitted into the proceedings.

3.3 *Second auxiliary request*

Feature (h) introduced into claim 1 of the second auxiliary request is based on dependent claims 3 and 4 as filed. Thus, the Board accepts that this request can be admitted into the proceedings.

3.4 *Third auxiliary request*

The appellant has argued that the amendment to claim 1 of the third auxiliary request specifying:

"the cylinder cooling circuit (10) with one end connected to said evaporator (3) exit and the other end connected to the casing of the compressor (5) via elastic ducts"

is based on paragraph [0011] of the description which states "connection of the cylinder cooling circuit to the casing can be realized by even elastic ducts". However, the passage in the description refers only to the connection to the casing whereas the feature introduced into the claim relates to the connections at both the evaporator and casing. Thus, as well as being taken from the description, the amendment infringes Article 123(2) EPC. Therefore, the request is not admitted into the proceedings.

3.5 *Fourth auxiliary request*

Since claim 1 of the fourth auxiliary request incorporates the amendments made to claim 1 in the first and third auxiliary requests it is also not admissible.

3.6 *Fifth auxiliary request*

Feature (h) introduced into claim 1 of the fifth auxiliary request is based on paragraph [0025] of the description. Thus, once more subject-matter is relied upon which has not been searched nor examined by the examining division. Thus, the fifth auxiliary request is also not admissible.

4. *Second auxiliary request - Novelty/Inventive step*

4.1 Claim 1 of the second auxiliary request comprises the additional feature specifying that "the suction line (9) and the cylinder cooling circuit (10) having different diameters so that the refrigerant flow rate dispersion can be adjusted and/or a solenoid valve providing to controllably direct the refrigerant to the cylinder cooling circuit (10)."

4.2 During the oral proceedings the appellant indicated its willingness to delete one or other of the alternatives in this feature.

4.3 The Board cannot see how setting the diameter of a line which within the terms of the claim is of no particular apparent technical purpose other than duplicating an existing line justifies the recognition of an inventive step. Similarly the provision of a solenoid valve to direct refrigerant to the suction line designated as the cylinder cooling circuit merely reinforces the view that the line designated as the suction line is largely redundant within the context of the claim.

4.4 In particular, since the amount of refrigerant circulating in the circuit is constant, the amount of vapour leaving the evaporator is also essentially fixed such that the degree of cooling that can be achieved is not greatly affected by whether there are one or two suction lines in use or their relative diameters since the quantity of refrigerant entering the casing would be the same in both cases.

4.5 Thus, both alternatives do not involve an inventive step.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

C. Spira

U. Krause