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Datasheet for the decision of 6 June 2007

Case Number: T 0481/05 - 3.2.03

Application Number: 00115565.4

Publication Number: 1070929

IPC: F28F 9/02

Language of the proceedings: EN

Title of invention:
Automotive air conditioning system evaporator

Applicant:
Valeo Klimatechnik GmbH

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step - main request (no) - auxiliary request (yes)"

Decisions cited:
-

Catchword:
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Case Number: T 0481/05 - 3.2.03

D E C I S I O N
of the Technical Board of Appeal 3.2.03
of 6 June 2007

Appellant: Valeo Klimatechnik GmbH
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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 23 November 2004 refusing European application No. 00115565.4 pursuant to Article 97(1) 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 23 November 2004, to refuse European Patent application no. 00115565.4 filed on 19 July 2000. The examining division essentially argued that claim 1 of the main request lacked an inventive step in the light of documents WO-A-9 851 983 (D4) and US-A-5 479 985 (D5), and claim 1 of an auxiliary request did not comply with the requirements of Article 123(2) EPC.

II. The appellant (applicant) filed a notice of appeal on 20 January 2005 and paid the appeal fee the same day. In the grounds of appeal of 22 March 2005, the appellant filed main and first auxiliary requests and further made reference to the existence of a second auxiliary request.

III. In a communication pursuant to Article 11(1) RPBA, annexed to the summons to oral proceedings, the Board indicated that it could not immediately accede to the appellant's main request and that the situation regarding the second auxiliary request was not clear.

IV. Oral proceedings were held on 6 June 2007. During these proceedings the appellant filed a further auxiliary request and withdrew the first and second auxiliary requests. The appellant also made minor amendments to correct the grammar of the main request.

V. Claim 1 of the main request as corrected during the oral proceedings reads:

"An automotive air conditioning system evaporator (2) having a longitudinally-extending collector (4) defining a first and a second compartment (8,10), with respectively a coolant inlet (14) and a coolant outlet (16), the collector defining plural slots (18) each extending into both said compartments (8,10) the evaporator further comprising plural pipes (20) extending from the slots (18) to a flow-return device (28),
characterised in that
both compartments (8,10) of the collector have the shape of a rounded pipe to provide pressure stability."

Claim 1 of the auxiliary request filed during the oral proceedings reads:

"An automotive air conditioning system evaporator (2) having a longitudinally-extending collector (4) defining a first and a second compartment (8,10), with respectively a coolant inlet (14) and a coolant outlet (16), the collector defining plural slots (18) each extending into both said compartments (8,10),
the evaporator further comprising plural pipes (20) extending from the slots (18) to a flow-return device (28),
characterised in that
both compartments (8,10) of the collector have the shape of a rounded pipe to provide pressure stability,
the collector comprises a single-piece structure having a longitudinal slot and a divider member (36) disposed in said slot provided in the collector and inserted from the outside thereof to separate said compartments."

VI. **Main request**

Both the examining division and the appellant consider D5 to be the closest prior art and both agree that this document describes:

an automotive air conditioning system evaporator (50 also see column 1, line 2) having a longitudinally-extending collector (54) defining a first and a second compartment (64,65), with respectively a coolant inlet (62) and a coolant outlet (63), the collector defining plural slots ("long holes" see column 3, line 54) each extending into both said compartments (64,65)
the evaporator further comprising plural pipes (51) extending from the slots to a flow-return device (56).

The device according to claim 1 of the main request differs therefrom in that both compartments of the collector have the shape of a rounded pipe to provide pressure stability.
The examining division and the applicant have both taken the objective problem to be one of providing an evaporator which has increased pressure stability.

The examining division argued that D4 gives a direct teaching that this problem may be solved by both compartments of the collector having the shape of a rounded pipe.

In response the applicant argues that:
(i) The skilled person would not combine the teachings of D4 with D5 because D4 relates to a condenser rather than an evaporator. Since these are two very different

types of heat-exchanger, the skilled person would not consult D4 to solve a problem concerning an evaporator.
(ii) Even if the skilled person did consider D4, it would not lead to the device of claim 1 in an obvious manner since by applying the collector disclosed in D4 to the device of D5 the skilled person would obtain a collector wherein each compartment would have the shape of two juxtaposed rounded pipes in the manner of a double-barrelled shot-gun.
(iii) The appellant further argued that there are other ways of increasing the pressure resistance of the evaporator according to D5 such as eliminating the joint between the two C-shaped members and modifying the design of the tubes.

Reasons for the Decision

1. The Board concurs with the examining division and the appellant that D5, in particular figure 25, describes the nearest prior art. The Board also shares the view that the subject-matter of claim 1 according to the main request differs therefrom in that:
- both compartments of the collector have the shape of a rounded pipe to provide pressure stability.

The application explains that the problem the invention aims to solve is that posed in automotive air-conditioning units by the pending introduction, on environmental grounds, of natural coolants and in particular that of CO_2 which requires evaporator operating pressures of 40 to 80bars. Since these pressures are significantly higher than those required by present coolants such as R134a modifications to the

evaporator design are required (see application as filed, page 4, lines 11 to 25).

Accordingly, the Board also sees the objective problem to be one of providing an evaporator which has increased pressure stability.

However, the Board does not accept the appellant's argument that the teachings of D4 are limited to condensers and cannot be applied to evaporators. Not only does the passage of D4 at page 1, line 8 to page 2, line 4, cited by the examining division, refer to "heat-exchangers", it also specifically mentions the problem of increased pressure occasioned by the use of CO_2 at both the low (evaporator) and high (condenser) pressure sides of the refrigeration cycle. In fact the word "condenser" does not appear in D4. In conclusion, the teaching of D4 is not limited to condensers.

Further, even if this were the case, it cannot be accepted that the skilled person, in the search for a solution to the objective problem of increasing the pressure resistance of the evaporator collector, would neglect a document dealing with the same problem affecting a heat-exchanger, albeit of a different family, making up an essential part of the same refrigeration circuit.

The Board is also of the opinion that D4 gives the skilled person, taking figure 25 of D5 as the nearest prior art, the necessary teaching to obtain the subject-matter of claim 1 without the necessity to exercise any inventive activity.

The teachings of D4 are not just limited to the specific embodiment depicted in figures 1 and 2. In the passage from page 1, line 22 to page 2, line 4, D4 confirms the basic mechanical engineering precept that at constant pressure and wall-thickness the hoop stress in a pipe of circular section is directly proportional to the diameter. The passage also tells the skilled person how to exploit this fact by employing at least two parallel tubes with common wall portions to replace the traditional single circular header (or collector). By so doing, an increased pressure resistance for a given wall-thickness is obtained, thus minimising the problems of large size and weight which would otherwise be created by increasing operating pressures.

The skilled person faced with the problem of adapting the evaporator of figure 25 in D5 to operate at high pressure is, thus, told by D4 to replace the single circular collector, formed by the two C-shaped plates 84 and 85, by at least two parallel pipes of a smaller diameter with a common wall section. At the same time it is evident that the function of the separator 66 must be maintained, otherwise the necessary flow pattern would be lost, and that the common wall section serves this purpose in the manner of the configuration shown in figure 2 of the application.

The appellant has argued that the specific example given in figures 1 and 2 of D4 would lead the skilled person to replace not the collector as a whole, but rather the compartment on either side of the separator, by at least two parallel tubes, since the collector on each side of the exchanger in D4 is equivalent, in terms of flow, to the compartments in figure 25 of D5.

Accordingly, the skilled person would not obtain a collector wherein both compartments have the shape of a rounded pipe, but rather one wherein the compartments consist of two pipes arranged in the manner of a double-barrelled shot-gun.

The Board cannot accept this reasoning since it considers the problem to be solved to be one of pressure resistance and structural stability as opposed to one of flow. Consequently, the suggestion of D4 to replace a single circular header by at least two parallel tubes applies to the structure of the collector which is responsible for pressure resistance, i.e. the circular wall, rather than the internal flow channels. In conclusion, the teaching of D4 must correspond to the replacement of the whole collector 54 in figure 25 of D5, rather than to the internal flow compartments, by at least two parallel tubes. The Board would add that the role of the skilled person cannot be reduced to one of trawling through the explicit examples of the prior art in an attempt to solve technical problems by finding exactly matching components in the manner of a jig-saw puzzle. On the contrary, the Board considers that the skilled person is capable of displaying a certain amount of versatility to adapt specific examples of the prior art. In this case therefore, it is considered within the skilled person's capacity to apply the teaching of D4 to the flow pattern of the evaporator of D5 and obtain the subject-matter of claim 1 without the need to exercise any inventive skill even if the specific example of D4 does not depict an identical collector arrangement in terms of flow.

The appellant has also argued that the skilled person could increase the pressure resistance by eliminating the joint in the evaporator of D5 and redesigning the tubes. The Board agrees when trying to increase the pressure resistance of a structure it is good engineering practice to eliminate any joints. However, it is not considered that the skilled person would take such a measure in isolation, particularly in the light of the fact that D4, as well as teaching the application of two parallel tubes, suggests that these should not comprise joints (see claim 5 which specifies "multiple port extruded tubes"). It may also be that the tubes will need redesigning if the pressure is increased, however, this will not alter the fundamental fact that the collector itself will still have to resist the pressure increase and that D4 gives a teaching as to how this may be achieved.

Hence, the subject-matter of claim 1 according to the main request does not meet the requirements of Article 56 EPC.

2. **Auxiliary request**

2.1 **Article 123(2) EPC**

The subject-matter of claim 1 according to the main request combines the subject-matter of the originally filed claims 1 and 8. Thus, the requirements of Article 123(2) EPC are met.

2.2 **Novelty (Art. 54 EPC)**

The nearest prior art is again considered to be D5, in particular figure 25. The subject-matter of claim 1 differs therefrom in that:

-both compartments of the collector have the shape of a rounded pipe to provide pressure stability,
-the collector comprises a single-piece structure having a longitudinal slot and
-a divider member is disposed in said slot provided in the collector and inserted from the outside thereof to separate said compartments.

Hence, the requirements of Article 54 EPC are met.

2.3 **Inventive step (Article 56 EPC)**

The additional feature of a divider member disposed in a longitudinal slot provided in the collector and inserted from the outside thereof to separate said compartments, does not appear to be disclosed or suggested by any of the available prior art documents. In particular, the divider 132 disclosed in US-A-4381033 (see in particular figures 10 to 12 and line 52, column 7 to line 29, column 8), cited against original claim 8 in the search report, cannot be inserted from outside the collector.

This feature solves the technical problem of facilitating the manufacture of the heat-exchanger with respect to adjusting the dividing member to ensure correct sealing, since it can be inserted in the final stages of the fabrication process.

Hence, the requirements of Article 56 EPC are met.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the examining division with the order to grant a patent on the basis of:
(i) - claims 1 to 7 of the auxiliary request filed during the oral proceedings;
(ii) - the description as filed during the oral consisting of pages 1 to 21;
(iii) figures 1 to 5a as originally filed.

Registrar: Chairman:

A. Counillon U. Krause