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Datasheet for the decision of 23 November 2012

Case Number: T 1200/10 - 3.2.03

Application Number: 99122223.3

Publication Number: 1001241

IPC: F28F 9/00

Language of the proceedings: EN

Title of invention:
Side member for heat exchanger and heat exchanger incorporating side plate

Patentee:
Valeo Inc.

Opponent:
Behr GmbH & Co. KG

Headword:
-

Relevant legal provisions:
EPC Art. 123(2), 54, 56

Keyword:
"Extended subject-matter (no)"
"Novelty (yes)"
"Inventive step (yes)"

Decisions cited:
-

Catchword:
-

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Case Number: T 1200/10 - 3.2.03

D E C I S I O N
of the Technical Board of Appeal 3.2.03
of 23 November 2012

Appellant: (Opponent)
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Decision under appeal:
Interlocutory decision of the Opposition Division of the European Patent Office posted 30 March 2010 concerning maintenance of European patent No. 1001241 in amended form.

Composition of the Board:

Chairman: U. Krause
Members: C. Donnelly
I. Beckedorf

Summary of Facts and Submissions

I. The appeal lies from the decision of the opposition division, posted on 30 March 2010, maintaining European Patent no. EP-B-1001241 in amended form.

II. The opponent (hereinafter: the "appellant") filed a notice of appeal on 28 May 2010 and paid the fee on the same day. The grounds of appeal were received on 29 July 2010.

III. In support of its case the appellant referred to the following documents:

D1: US-A-4719967;
D2: US-A-3939908;
D3: US-A-2933291;
D4: DE-T2-69404108;
D5: Abstract of JP-A-1-131898, May 1989 and JP-A-1-131898;
D6: US-A-4721069;
D7: Brockhaus, Naturwissenschaften und Technik, Erster Band, A-Ek, F.A. Brockhaus, 1989, Page 138.

IV. The patent-proprietor (hereinafter: the "respondent") presented its initial arguments against the appeal in letter of 14 February 2011.

V. In a communication dated 14 August 2012, pursuant to Article 15(1) RPBA annexed to the summons to oral proceedings, the Board informed the parties of its provisional opinion.

VI. By letter of 23 October 2012 the respondent filed auxiliary requests 1 to 4.

VII. Oral proceedings before the Board were held on 23 November 2012.

VIII. The appellant (opponent) requested that the decision under appeal to be set aside and that the European patent No. 1 001 241 be revoked. The respondent (patentee) requested that the appeal be dismissed or, alternatively that in setting aside the decision under appeal the patent be maintained in amended form on the basis of one of sets of claims filed as auxiliary requests 1 to 4 with letter of 23 October 2012.

IX. Claim 1 as maintained by the opposition division reads:

"A side member (2,20) for a heat exchanger (10), the side member having a portion (1) comprising an expansion joint system consisting of at least one sharp fold (27,32) provided in the side member characterised in that said expansion joint system is adapted to break under relatively low tension"

X. The appellant's arguments can be summarised as follows:

(a) Main request, Article 123(2)

The term "expansion joint system" is not specified in any part of the originally filed documents concerned with the invention itself, but is only used when describing the state of the art contained in US-A-3939908. The use of this term introduces the notion of a joint with combined expansion and

fracturing properties which is not originally disclosed. As originally filed, the emphasis of the invention was on a system which immediately fractures since there is no suggestion at any point in the description of joint expansion, whereas there is mention of a "region of weakness" and a "score line". Also, the expression "relatively low tension" used in the claim indicates that the joint system must necessarily break the first time it is heated up in operation. Thus, the introduction of the term "expansion joint system" contravenes Article 123(2) EPC.

Further, a joint system consisting of just a sharp fold is not disclosed in the application as filed since all the embodiments explicitly described also comprise gaps and slits. Although original claim 5 depends on claim 1 there is no example of such an embodiment in the application.

(b) Main request, novelty

The term "sharp fold" does not necessarily mean that the fold is "V"-shaped and a certain amount of rounding of the apex is permissible. Furthermore, the respondent has indicated that the fracture need not take place the first time the member is heated during operation. Since all of the documents D2, D3 and D4 show a fold which can break, claim 1 lacks novelty.

D5 discloses a side member which has a channel profile consisting of a base plate and two upraised lateral portions. The side member also comprises a "brittle part" 19 created by a cut-out extending across the base

plate and up into the lateral portions (see figure 3). This part "elongates or contracts or is cut off in accordance with the elongation of contraction of the tube 3'". Since the cut-out extends up into the lateral portions of a channel shaped member a sharp fold must necessarily be present in the brittle part which fractures under relatively low tension. Thus, D5 is also novelty destroying.

(c) Inventive step

The subject-matter of claim 1 is not inventive in view of a combination of D5 with D2, D3, D4 D6 or D7.

D5 is the nearest prior art since it discloses a side member including an expansion joint system which fractures once the heat-exchanger has been installed and is in operation.

If it is not accepted that D5 implicitly discloses a sharp fold then it would be obvious for the skilled person to incorporate such a feature into the brittle part of the side member.

Further, D2, D3, D4 and D6 all disclose an expansion joint system consisting of at least a sharp fold and it would be obvious for the skilled person to use such a fold in the device known from D5 in order to arrive at the subject-matter of claim 1 in an obvious manner.

Starting out from D3 or D4 it would be obvious for the skilled person seeking to avoid the build up of stresses which could fracture the tubes, to incorporate the teachings of D5 to include a portion which

fractures at relatively low tension and thus arrive at the subject-matter of claim 1 without exercising any inventive activity.

XI. The arguments of the Respondent can be summarised as follows:

(a) Article 123(2) EPC

The expansion joint system is now defined as "consisting" of at least one sharp fold. Thus, in the amended wording of claim 1, the term "expansion joint system" is effectively rendered redundant and the claim should be understood to read as:

"A side member for a heat exchanger, the side member having a portion comprising at least one sharp fold provided in the side member characterised in that the sharp fold is adapted to break under relatively low tension."

Since the term "expansion joint system" is redundant it cannot infringe Article 123(2).

Originally filed claim 1 does not limit the type of side member and original claim 5, which defines the sharp fold, is dependent on claim 1 Thus, there is no necessity to limit the claim to the specific type of side-member shown by way of example in the figures.

(b) Novelty

Documents D2, D3, D4 and D6 all deal with expansion joints. However, none of the folds shown in these

documents D2 ("heat expansion equalizing element 7"), D3 ("expansion bellows type joint 34), D4 ("Rohrbogenausgleicher 32") and D6 ("expansion elements 76,86,96,106", see figures 7 to 10) is designed to fracture. Document D1 describes a shear zone in the side members, but there is no hint at the use of a sharp fold. D5 also shows a shear system, but again there is no hint of a sharp fold.

As regards D5, the remaining material in the area of the cut-out brittle part 19'' is merely a linear continuation of the existing side-member and exhibits the same thickness. An absence of material cannot be construed to form a sharp fold.

Thus, none of the available prior art documents show a side-member with sharp fold designed to rupture at relatively low tension. Hence, the subject-matter of claim 1 is new.

(c) Inventive step

D5 shows the most relevant state of the art. However, the skilled person seeking to modify the expansion and/or rupture characteristics of the side member is not encouraged by any of the available prior art documents to modify the brittle part such that it is a weakened sharp fold. Faced with such a problem the skilled person would either modify the existing notch or add notches.

D3 is not a suitable starting out point for the invention since the expansion bellows-type joint 34 must remain fluid tight (see column 3, lines 26 to 30).

This also applies to D4 because part 28 comprising the fold is not supposed to break. Thus, the skilled person would reject any modification which would facilitate the rupture of the bellow folds.

Reasons for the Decision

1. The appeal is admissible.

2. Article 123(2), Claim 1 as maintained.

2.1 The term "expansion joint system" is not redundant since it implies that the joint system is capable of allowing expansion. Although there is no explicit mention that the joint allows expansion in the application as filed, it is obvious that a joint comprising a sharp fold made of non-brittle material will allow some amount of expansion on account of its geometry. Also, the passage at col. 5, lines 18 to 19 of the published application, refers to the region of reduced structural integrity suffering "fatigue" before fracture. The use of the word "fatigue" implies that there is not immediate fracture of the joint when the exchanger is heated for the first time, but that there are several cycles of expansion and contraction which lead to a failure by fatigue at the portion adapted to break under relatively low tension.

2.2 Claim 1 as filed simply defines a side member in general terms. Original claim 5 is dependent on claim 1 and specifies the sharp fold. Thus, although the patent only comprises explicit examples of a channel shaped

side member there is a basis in the application as filed for the general formulation used.

2.3 Further, the amendment made during the opposition proceedings whereby the expression "including at least one sharp fold" was replaced by "consisting of at least one sharp fold" does not alter the scope of the claim since the term "at least" nullifies the limitation normally associated with the word "consisting". Both formulations allow other elements to be part of the expansion joint system in addition to the at least one sharp fold. Thus, there is no need to exclude the majority of the illustrated embodiments from the patent.

3. Novelty

3.1 As argued by the respondent none of the folds shown in any of the documents of the available prior art is intended to rupture.

3.2 D1 describes U-channel side members 22 incorporating either a piercing 30 or a slot 44 (see column 1, lines 47 to 52) which can be easily sheared after the brazing operations are finished.

3.3 D2 discloses an expansion joint system comprising a fold ("heat expansion equalizing element 7"). However, there is no indication that the fold is intended to fracture. On the contrary, in the heat-exchanger of D2 the cooling fins and flanges provide support to the flat tubes in order to prevent these bursting in operation (see column 3, lines 3 to 5 and lines 32 to 36). Adapting the optional loop 7 to fracture at low tension would therefore defeat this object.

3.4 D3 does not describe a fold which is designed to fracture since it is part of an expansion joint which is required to remain fluid-tight (see column 1, lines 50 to 53 and column 3, lines 26 to 30).

3.5 D4 concerns a box type construction and there is no indication that the expansion loop ("Rohrbogenausgleicher 32") might fracture.

3.6 D5 also shows a shear system employing a notched ("brittle part" 21) side member (19) which either shears or allows expansion and contraction (see Abstract). However, a sharp fold which is adapted to break under relatively low tension is not present. The appellant's argument that such a fold is formed between the base plate and the lateral portions of the channel shaped side member is not convincing since the rupture of the side member shown in D5 would occur in the material bridging the cut-out where the stress bearing area is a minimum. Since the base area and the adjoining parts of the lateral portions have been removed this is in fact the only part of the side member which does not exhibit a fold of any kind.

3.7 D6 refers to expansion elements 76, 86, 96, 106 (see figures 7 to 10) for connecting two portions of a boiler casing.

3.8 Thus, the subject-matter of claim 1 as maintained is new.

4. Inventive step

4.1 The most relevant prior art is considered to be D5 since this is the only document which discloses a side member including an expansion joint system which fractures due to the cycle of thermal expansion and contraction occurring once the heat-exchanger has been installed and is in operation.

4.2 In detail D5 discloses a side member (19) for a heat exchanger (17), the side member having a portion (19) comprising an expansion joint system (21) consisting of at least one brittle part provided in the side member wherein said expansion joint system is adapted to break under relatively low tension.

4.3 The apparatus according to claim 1 differs there from in that the at least one brittle part consists of a sharp fold.

4.4 The use of a sharp fold as the brittle part solves the objective technical problem of providing a side member which provides full reinforcement when the heat-exchanger undergoes the brazing operation during manufacture yet which also ruptures easily when subjected to the longitudinal stress imposed by thermal expansion of the fluid carrying tubes once the exchanger is installed and in operation.

4.5 Although sharp folds which allow expansion are known from documents D2, D3, D4 and D6 it would not be obvious for the skilled person faced with the above problem to locate any of these known expansion loops at the brittle part of the side member of D5.

4.6 The loop 7 of D2 is an optional element intended to equalize the differential expansions between the different parts of the radiator during the welding or brazing operations (see column 3, lines 10 to 15). There is no suggestion in D2 that the loop 7 should be weakened in any way such that it fractures under a relatively low tension.

4.7 As indicated above the expansion loop of D3 is part of an expansion joint which is required to remain fluid-tight (see column 1, lines 50 to 53 and column 3, lines 26 to 30).

4.8 Although in terms of geometry the "Rohrbogenausgleicher 32" shown in figures 1 and 2 of D4 appears similar to the fold of the invention it is part of a joint which is only designed to expand. The heat-exchanger of D4 is of the box type in which the flat tubes 10 and the fins 26 are placed in a frame unit composed of cross member 28 comprising the plate 30, in which the fold 32 is placed, and two flanges 42 and 44. The frame unit is intended to closely envelope the tubes and fins whatever the extent of expansion imposed by temperature difference between the inlet and outlet. In order to achieve this, the fold 32 must be capable of expanding and contracting since its failure would result in the loss of the required closely supporting envelope which the frame unit is intended to provide.

4.9 D6 does not concern a side member for a heat-exchanger and does not disclose a fold which is designed to fracture.

4.10 D7 is merely cited in the grounds of appeal without any supporting arguments. In the absence of any reasoning from the appellant the Board cannot see how this document is relevant.

4.11 Therefore, any attempt to combine D5 with the teachings of either D2, D3, D4 or D6 to arrive at the subject-matter of claim 1 is only possible with the benefit of hindsight.

4.12 Thus, the subject-matter of claim 1 as maintained involves an inventive and meets the requirements of Article 56 EPC.

5. Since the respondent's main request has been accepted there is no need to consider its auxiliary requests.

Order

For these reasons it is decided that:

The appeal is dismissed.

Registrar: Chairman:

D. Hampe U. Krause