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Datasheet for the decision of 30 June 2021

Case Number: T 0758/19 - 3.2.03

Application Number: 13198879.2

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Language of the proceedings: EN

Title of invention:
Plate heat exchanger with mounting flange

Patent Proprietor:
Alfa Laval Corporate AB

Opponent:
Mahle International GmbH

Headword:

Relevant legal provisions:
EPC Art. 54

Keyword:
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Catchword:

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Case Number: T 0758/19 - 3.2.03

D E C I S I O N
of Technical Board of Appeal 3.2.03
of 30 June 2021

Appellant: (Opponent)	Mahle International GmbH Pragstr. 26-46 70376 Stuttgart (DE)
Representative:	Grauel, Andreas Grauel IP Patentanwaltskanzlei Wartbergstrasse 14 70191 Stuttgart (DE)
Respondent: (Patent Proprietor)	Alfa Laval Corporate AB Box 73 221 00 Lund (SE)
Representative:	Alfa Laval Attorneys Alfa Laval Corporate AB Patent Department P.O. Box 73 221 00 Lund (SE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 6 February 2019 rejecting the opposition filed against European patent No. 2886994 pursuant to Article 101(2) EPC.**

Composition of the Board:

Chairman	C. Herberhold
Members:	B. Goers
	N. Obrovski

Summary of Facts and Submissions

I. European Patent 2 886 994 ("the patent") concerns a plate heat exchanger stack. The stack has an end plate connected to two mounting plates having a decreasing thickness at intersection regions.

II. With the appealed decision, the opposition division rejected an opposition against the patent based on the grounds under Article 100(a) EPC in conjunction with Article 54 and 56 EPC.

III. This decision was appealed by the opponent (hereafter: "appellant").

IV. With the consent of the parties, oral proceedings before the Board were held on 30 June 2021 by video conference using the Zoom platform.

V. At the end of the oral proceedings, the parties confirmed the following requests.

The appellant requested that the decision be set aside and that the patent be revoked in its entirety.

The patent proprietor (hereafter "respondent") requested that the appeal be dismissed.

VI. The following prior art document submitted with the notice of opposition is relevant to the decision:

D8: DE19709601

VII. Claim 1 of the patent as granted reads as follows (feature numbering added in "[]"):

"[M1.1] *A plate heat exchanger, comprising:*
[M1.2] *a plurality of heat exchanger plates (3) which are stacked and permanently connected to form a plate package (2)*
[M1.3] *that defines first and second fluid paths for a first medium and a second medium, respectively, separated by said heat exchanger plates (3),*
[M1.4] *said plate package (2) defining a surrounding external wall (4) that extends in an axial direction (A) between first and second axial ends,*
[M1.5] *an end plate (21; 24) permanently connected to one of the first and second axial ends so as to provide an end surface (5) that extends between first and second longitudinal ends in a lateral plane which is orthogonal to the axial direction (A), and*
[M1.6] *two mounting plates (7) permanently connected to a respective surface portion of the end surface (5) at the first longitudinal end and the second longitudinal end, respectively, such that the mounting plates (7) are spaced from each other in a longitudinal direction (L) on the end surface (5),*
[M1.7] *wherein the respective mounting plate (7) comprises opposing flat engagement surfaces (12, 13) and*
[M1.8] *a peripheral edge that forms a perimeter of the mounting plate (7),*
[M1.9] *wherein the respective mounting plate (7) is arranged with one of its engagement surfaces (12, 13) permanently connected to the end surface (5),*
[M1.10] *wherein the peripheral edge partially extends beyond the outer periphery of the end surface (5),*
[M1.11] *so as to define a mounting flange (9), and*
[M1.12] *partially extends across the end surface (5) in contact with the same,*

[M1.13] *wherein the respective mounting plate (7) comprises intersection regions (11)*
[M1.14] *which are located where the peripheral edge intersects with the perimeter of the surrounding external wall (4) as seen in a normal direction to the end surface (5),*
characterized in that
[M1.15] *predefined intersection regions (11) of said intersection regions (11) have a decreasing thickness towards the peripheral edge*."

VIII. The appellant's arguments relevant to the present decision may be summarised as follows.

The subject-matter of claim 1 was not novel in view of the embodiment of Figures 1 and 2 of D8. Both Figures related to the same embodiment and figure 1 showed a view from below the stack of Figure 2. The intersection regions spanned from the intersection points visible in Figure 1 to a point where a reduced thickness of the mounting plate increased towards the end plate. The patent did not limit the intersection region, neither in size nor direction. Moreover, the claim language did not require the mounting plate and the end plate of the stack to be in contact with each other at the intersection point. This was true even though the embodiments of the patent showed such a contact.

IX. The respondent's arguments relevant to the present decision may be summarised as follows.

The subject-matter of claim 1 was not anticipated by the disclosure of D8. Figures 1 and 2 of D8 did not - due to inconsistencies in the description - unambiguously relate to the same embodiment. The Figures were therefore not a reliable source of

information, and Figures 1 and 2 could not be considered in combination. In particular, although the description stated that Figure 1 was a top view of the heat exchanger stack as shown in the side view of Figure 2, it was not. Moreover, Figures 1 and 2 did not show that the peripheral edge of the mounting plates was in contact with the end plate at the locations where it extended across the end surfaces of the end plates. Furthermore, the thickness of the mounting plates neither decreased in an intersection region nor on the side of the mounting plate facing away from the end plate. However, the latter would be required by the claim language, in particular in view of paragraphs [0031], [0034] and [0036] of the description. Thus, D8 did not disclose features M1.12 and M1.15.

Reasons for the Decision

1. Novelty

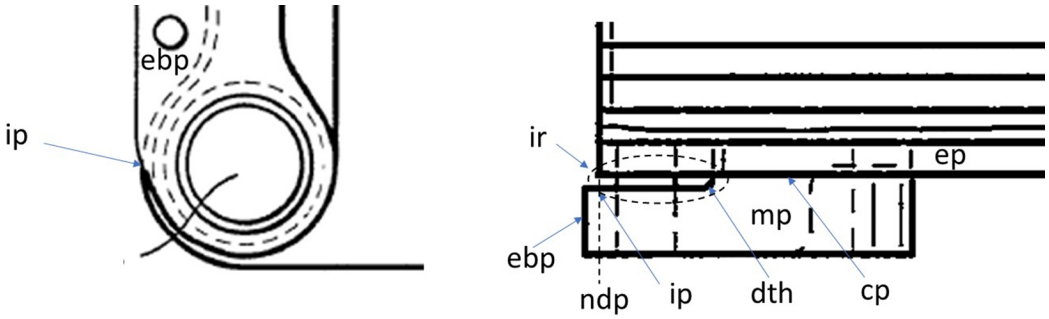
1.1 The embodiment of Figures 1 and 2 of D8 anticipates the subject-matter of claim 1 under Article 54 EPC.

1.2 The Board does not agree with the conclusion of the opposition division (appealed decision, point II.3.3.1) that Figures 1 and 2 relate to different embodiments. The relevant accompanying part of the description in D8 for Figures 1 and 2 is in column 2, lines 29 to 51. Only a single embodiment of an oil cooler is described here with reference to both figures ("*zeigen einen Öl-/ Kühlmittel-Kühler*"/ "*der Ölkühler nach den Fig. 1 und 2*"/ "*beim Ausführungsbeispiel*"). It is therefore directly and unambiguously clear that both figures relate to the same embodiment.

1.3 It is true that column 2, line 16 indicates that Figure 1 shows a top view ("*Draufsicht*") of the oil cooler, while Figure 2 is indicated to show the side view of the plate heat exchanger of Figure 1.

However, mechanical drawings as shown in Figures 1 and 2 address the skilled person, such as a mechanical engineer, who is able to read and understand them. When comparing the two figures, it is straight-forwardly apparent to the skilled reader that the plane view of Figure 1 is a perspective from below the oil cooler as shown in the side view. This is evident since only the lower mounting plates of Figure 2 extend beyond the periphery of the end plate. Furthermore, the side view of the lower mounting plates in Figure 2 matches the drawing in Figure 1 without any inconsistencies, even if considering the indicated cross-sections (dashed lines). Therefore the Board does not subscribe to the opposition division's view that Figures 1 and 2 in combination would not have been a reliable source of disclosure.

1.4 Annotated parts of Figures 1 and 2 are reproduced below for ease of reference (in the following, references in inverted commas refer to these figures):



Figures 1 and 2 disclose a plate heat exchanger with a

stack of heat exchanger plates between end plates ("ep") according to features M1.1 to M1.5.

They further disclose two laterally spaced mounting plates (in Figure 2, the lower attached plates, "mp") each with opposite engagement surfaces one of which is permanently connected ("cp") to respective surface portions of the end surface of one of the end plates (features M1.6, M1.7 and M1.9). As apparent from Figure 1, the peripheral edge of the mounting plates extends partially beyond the outer surface of the end plate to form a flange (features M1.8, M1.10 and M1.11, see also the partially extending portion "ebp").

Intersections ("ip") are formed between the surrounding external wall (including the end plate) of the stack and the peripheral edges of the mounting plates in a projection normal to the stack (see the dashed projection line "ndp" in the drawing reproduced above). Contrary to the opposition division (point II.3.3.3 of the appealed decision), the Board considers that these intersections are clearly visible in Figure 1. These points are referred to as "intersection points" ("ip") hereafter and form part of respective intersection regions ("ir", encircled in the drawing above in dashed lines). Thus, D8 further discloses intersection regions as defined in features M1.13 and M1.14.

1.5 The respondent argued that features M1.12 and M1.15 were not disclosed in D8. With respect to these features, it construed claim 1 as follows:

(a) The peripheral edge of the mounting plate would need to be in contact with the end plate throughout, the only exception being the area extending beyond the outer periphery of the end

surface. Accordingly, the plates would - according to claim 1 - also need to be in contact with each other at the intersection points. This was not the case in D8 (see also point II.3.3.4 of the appealed decision).

(b) The mounting plates had to have a decreasing thickness ("recess" in the embodiments) only on the surface facing away from the engagement surface permanently connected to the end surface.

The Board does not agree with such a narrow interpretation of claim 1.

1.6 Firstly, the Board agrees with the appellant's view that the feature "intersection regions" is to be construed more broadly. The only restrictions defined in the claim are that:

- the regions are located where the intersection point is located, i.e. where the peripheral edge intersects with the perimeter of the surrounding external wall as seen in a normal direction to the end surface (see feature M1.14)
- the intersection regions encompass a region with decreasing thickness of the mounting plate (see feature M1.15)
- the regions extend from the peripheral edge to a location inside the peripheral edge of the mounting plate (compare feature M1.15: "*decreasing thickness towards the peripheral edge*").

However, the claim does not contain any restrictions concerning the directions of extension or the dimensions of the intersection regions.

This claim interpretation is also supported by the patent description. In paragraph [0034], typical extension dimensions are given in the range of 5 to 20 mm, i.e. not only in the region directly adjacent to the peripheral edge. This is not disputed by the respondent.

1.7 Secondly, contrary to the respondent's narrow construction referred to in point 1.5 (a) above, feature M1.9 requires solely that the mounting plate ("mp") be arranged with one of its engagement surfaces permanently connected ("cp") to the end surface ("ep"), but not necessarily over the whole area of their overlap. Features M1.10 and M1.12 define that the peripheral edge must partially extend beyond the outer periphery of the end surface (see "ebp") and must partially extend across the end surface in contact with it (where the mounting plate "mp" is in contact, see "cp", with the end plate "ep"). However, they do not exclude that a part of the peripheral edge not extending beyond the end surface is **not** in contact with the end surface - as is the case for most of the peripheral edge within intersection region "ir" of D8. Feature M1.14 does not support the respondent's view either. It defines the intersection point ("ip") as the location "*where the peripheral edge intersects with the perimeter of the surrounding external wall* ***as seen in a normal direction*** *to the end surface*" (emphasis added). According to this definition, the peripheral edge and surrounding wall must merely intersect **in a vertical projection**. The external wall or the end plate do not have to be in contact with the mounting plate at this projected intersection point.

1.8 Thirdly, contrary to the respondent's narrow construction referred to in point 1.5 (b) above, the

claim language does not define on which side of the mounting plate the thickness decreases. The only further requirement defined in feature M1.15 is that the thickness reduction be part of the intersection region - which is to be interpreted broadly (see point 1.6 above). Accordingly, under claim 1 the decreasing thickness part of the mounting plates can be arranged on either side of the mounting plate - as is the case in D8 (see "dth").

The respondent's reference to paragraphs [0031], [0034] and [0036] of the patent description does not change this assessment. Paragraph [0034] reads: "*each intersection region 11 includes the intersection point and spans an area where the mounting plate 7 overlaps and is attached to the plate package 2*". While the Board considers that this statement indeed refers to a heat exchanger where the mounting plates and the end plate are in contact with each other at the intersection point, it only relates to a specific embodiment of the invention. This does not limit the clear, non-ambiguous and broader definition in the claim itself, which lacks a respective restriction.

A reduced thickness also on the side of the mounting plate towards the end plate is neither illogical (as apparent from D8) nor in contradiction with the problem addressed in paragraph [0013] of the patent. The problem mentioned in the patent is to achieve a locally increased flexibility in the material of the mounting plate without significantly reducing the strength and stiffness of the mounting plate as a whole. This is also achieved in the embodiment of Figures 1 and 2 of D8 where the extending flange portion of the mounting plate with the reduced thickness allows a certain degree of bending.

1.9 In the Board's view, the intersection region ("ir") of the embodiment in Figures 1 and 2 of D8 spans from the intersection point ("ip") visible in Figure 1 to at least the point where the upper surfaces of the mounting plates decrease in thickness ("dth") from the end plate in contact with the mounting plate ("cp") down to a reduced thickness visible in Figure 2. Thus, feature M1.15 is disclosed in D8.

Figure 2 also shows that at least a part of the peripheral edges of the mounting plates is in contact with the end plate (the part surrounding part "cp" of "mp"). Therefore, D8 also discloses feature M1.12.

2. Since the subject-matter of claim 1 of the sole claim request is not novel, the appeal is allowable.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is revoked.

The Registrar: The Chairman:

D. Hampe C. Herberhold

Decision electronically authenticated