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D E C I S I O N
of 20 February 2001

Case Number: T 0033/98 - 3.2.3

Application Number: 91610057.1

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Language of the proceedings: EN

Title of invention:
Heat exchanger with multi-walled plate elements

Applicant/Patentee:
APV BAKER AS

Opponent:
ALFA LAVAL THERMAL AB

Headword:
-

Relevant legal provisions:
EPC Art. 123(2), (3)

Keyword:
"New interpretation of the litigious feature (refused)"
"Technical contribution of the feature (yes)"

Decisions cited:
G 0001/93

Catchword:
-

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Case Number: T 0033/98 - 3.2.3

D E C I S I O N
of the Technical Board of Appeal 3.2.3
of 20 February 2001

Appellant: (Proprietor of the patent)
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Decision under appeal: **Decision of the Opposition Division of the European Patent Office posted 4 November 1997 revoking European patent No. 0 526 679 pursuant to Article 102(1) EPC.**

Composition of the Board:

Chairman: C. T. Wilson
Members: J. du Pouget de Nadaillac
M. K. S. Aúz Castro

Summary of Facts and Submissions

I. The appeal is directed against the decision dated 4 November 1997 of an Opposition Division of the EPO, which revoked the European Patent EP-B1-0 526 679 on the ground that Claim 1 of this patent contains subject-matter, more precisely its last feature, which extends beyond the content of the application as filed (Articles 123 (2) and 100 (c) EPC).

Claim 1 of this patent reads as follows:

"A plate exchanger comprising a plurality of stacked plate elements (10) made of multilayered sheet material (110,112,114,116,118), each of said plate elements (10) having a plurality of holes (12) which, when the plate elements (10) are stacked, are aligned to form distribution channels (15,16,17,18) for cavities (14) formed between the stacked plate elements (10), intermediary gaskets (24,100) arranged between every two adjacent pair of plate elements (10) at areas which are boundaring the cavities (14) and the aligned holes (12),
characterized in that in respective areas boundaring the holes (12) and which are overlayered by the gaskets (100), the plate elements (10) are constructed such that the sheet layer of a plate element (10) being the most distant layer (110) from a gasket (100) has a smaller hole diameter than the sheet layers (112;112,114,116) nearest to the gasket (100) and **that in the other areas boundaring the cavities (14) the plate elements (10) are constructed such that the terminations of the respective sheet layers of a plate element (10) are staggered to be overlayered by the**

gaskets (24)."

(The bold type used for the last feature of the claim has been introduced by the board and emphasizes the feature qualified as "litigious" in the following.)

The opposition division held that the added subject-matter in the form of the litigious feature inserted during the granting procedure provided a technical contribution consisting in the provision of an additional sealing of the areas boundaring the cavities which completed the sealing around the holes in the originally filed application. This additional sealing had a precise technical meaning and could not be considered as a mere limitation of the invention as granted in the sense as defined by Decision G 1/93 of the Enlarged Board (OJ EPO 1994, 541). The argument of the patent proprietor, appellant in the following, that there was no technical contribution because the feature related to the sealing of another part of the plate, namely around the cavities and did not contribute anything to the originally disclosed invention was not accepted.

II. The appellant filed the appeal and paid the appeal fee on 12 January 1998. The statement of grounds was received on 12 March 1998.

Oral proceedings took place on 20 February 2001.

III. The arguments submitted by the appellant in his letter of 15 June 1999 and in the oral proceedings are summarized as follows:

As indicated in the description as originally filed the

problem underlying the present invention is to solve the problem of the corrosion specifically provided by a corrosive liquid inside the heat exchanger and more particularly around the port holes of said exchanger. Thus, the last feature of Claim 1 is to be interpreted having regard to this problem.

Each plate element comprises two pairs of holes, each pair for respectively one of the two heat exchanging fluids. The description clearly distinguishes the gasket (22), which substantially follows the periphery of each plate element, sealing the cavity with its pair of port holes between two plate elements, and the gaskets (24), also referenced (100), which are ring-shaped and seal the port holes which are not in communication with the cavities. In Claim 1, two different references (24) and (100) are used to make a distinction between the ring-shaped gaskets of one plate element and these of one adjacent plate element. The term "terminations" is always used in the application as originally filed in connection with the port holes, and not with the periphery of the plate elements, so that the phrase "that the terminations of the respective sheet layers" can only concern the edges of the layers around the holes. Then, from the word "respective" in this phrase, it follows that the "other areas boundaring the cavities" are the areas around the holes which are in fluid communication with the cavity, and since the first feature of the characterising part of Claim 1 concerns the respective areas boundaring the holes overlayed by the gasket (100), the "other areas" of the following litigious feature can only be those on the other side of the plate element, that is to say those which **are to be overlayed** by the gasket, now referenced 24, of the adjacent plate element when this

one is positioned against the first considered plate element. Interpreted in this way, the litigious feature is fully supported by the patent specification as originally filed.

The other interpretation of the litigious feature, namely that considered in the contested decision, provides no technical contribution to the solution of the problem to be solved. There is no need to have a staggered seal on the outside of the plate element, since the external edges of the plate layers are not exposed to any heat exchange fluid and thus, no corrosion occurs at these edges. The feature is rather to be considered as being a negative one, since it excessively limits the scope of the claim without bringing any advantage to the solution of the problem underlying the invention. Thus, according to the decision G 1/93, such added feature is not to be considered as subject-matter within the meaning of Article 123 (2) EPC.

V. The arguments of the respondent can be summarised as follows:

It is first questionable whether there is a need to re-interpret the feature, since this feature seems to be perfectly clear and moreover supported by the description of the patent as granted. After all, the appellant himself has interpreted this feature during more than three years in the way followed in the contested decision. The only discrepancy, which can be seen, concerns the reference numeral (24) at the end of the claim, but the same reference numeral is also used in the dependent Claims 2 and 4, and this time clearly in connection with the gasket extending along the

periphery of the plate elements, so that, looking to the description, the reader at once thinks that (22) should be the correct reference numeral.

With the new interpretation of the appellant, it is necessary to escape from the whole wording of the claim and to try to understand it only in the light of the description, since this new interpretation is inconsistent with the rest of the claim, which for example indicates that both intermediary gaskets are arranged between every two adjacent pair of plate elements, and not on both sides of a plate element. Moreover, "areas boundaring the cavities" cannot mean "areas surrounding the port holes". The term "termination" is constantly used through the description with the mere meaning of edge or rim, whatever the element is, and finally the description of the patent as granted indicates a corrosion problem in general as the problem to be solved, and not the corrosion of only the port holes. Therefore, the new interpretation is to be rejected.

VI. The appellant requests that the decision under appeal be set aside und that the case be remitted to the first instance for further prosecution.

The respondent requests that the appeal be dismissed.

Reasons for the Decision

1. The appeal is admissible

2. *Interpretation of Claim 1*

2.1 First interpretation of the litigious feature, namely that considered in the contested decision.

According to the description of the patent in suit **as granted** the sheet layers of the plate elements of a multi-layered plate heat exchanger were in the prior art welded at the rim of the port holes, so that, the rims being damaged by the rough heat treatment, the risk of corrosion by a possibly corrosive fluid of the heat exchanger was increased and, further, a separation of the plate elements for inspecting them was difficult. The basic solution of the present patent is to assemble the multi-layered plate elements only by using gaskets as sealing means. Ring-shaped gaskets are provided for the pair of port holes of a plate element, which are not in communication with the cavity of this plate element, whereas said cavity, together with the other pair of port holes communicating with it, is bounded by a gasket, which consequently follows a substantial length of the periphery of the plate element.

Since the first feature of the characterising portion of Claim 1 relates to the areas boundaring the port holes, the expression "the other areas boundaring the cavities" of the litigious feature leads the skilled reader of Claim 1 to consider the areas which are not around the holes and these areas can only be those following the periphery of the plate elements. Such an interpretation is moreover suggested by the first paragraph of the description as granted, which mentions intermediary gaskets between the plate elements at areas which are boundaring the cavities **and** the aligned port holes. According to the same description, one problem to be solved is to ensure that no corrosion

occurs between two adjacent sheet layers of a plate element and it is further explained that, with the solution according to the granted Claim 1, "all of the exposed terminations of the sheet layers are overlayered and safely covered by the gaskets during assembly of the plate heat exchanger. Thereby liquid or gas passing through the plate heat exchanger is never able to penetrate the crevice gaps between individual sheet layers of a plate element". This passage as well as the above mentioned object of the invention were added to the description during the last stage of the examination proceedings. The interpretation, which immediately comes to mind, is that, additionally to the sealing of the port holes by means of ring-shaped gaskets, the external edge of one sheet layer, namely that adjacent to the cavity, is protected against any external corrosion by means of the staggered arrangement of the sheet layers which is overlayered by the gaskets. The last sentence of the above given passage of the description does not make mention of the port holes and, thus, should be understood as concerning the gasket at the periphery of the plate layers, which impedes the passage towards this periphery of the fluid passing through the heat exchanger.

Hence, the last feature of Claim 1 as granted, even read in the light of the description of the patent in suit as granted, has a meaning which seems to be quite logical; in fact, this feature was understood in this way by the appellant himself at least during the whole proceedings before the Opposition Division and when filing the grounds of appeal.

2.2 The new interpretation of the litigious feature

2.2.1 It has not been contested by the appellant that the litigious feature with its above interpretation is not supported by the specification of the patent in suit, as originally filed. Thus, a deficiency appears in the patent. Also, the reference numeral (24) at the end of the claim does not correspond to the above interpretation. Therefore, the appellant argues, it may be that the skilled reader, faced by these two anomalies, tries to see whether another interpretation could be deduced from the original documents of the patent in suit. A need for a new interpretation cannot therefore be excluded, but it has nevertheless to be kept in mind that the amendments brought in the description of the patent seem to support the above first interpretation.

Then, the question to be examined is whether the skilled reader of Claim 1 could in the light of the originally filed specification understand this claim in such a way corresponding to the new interpretation put forward by the appellant.

2.2.2 The description of the patent **as originally filed** mainly deals with the problem of the corrosion which occurs on the areas surrounding the port holes. However, the problem underlying the invention as given in this description is not limited to this corrosion problem, looking more generally for a plate heat exchanger which "can be assembled without any need for other sealing than the one obtained by the gaskets, which ensures that a cavity formed between two plate elements just communicates with a set of liquid inlet and outlet." Having regard to this problem the skilled reader is left in some doubt as to the relative importance of the corrosion problem limited essentially

to the port holes and the problem of the assembly of the plate elements which provides liquid-tight cavities.

2.2.3. Moreover, according to the preamble of Claim 1, the intermediary gaskets are said to be arranged between **every two adjacent pair** of plate elements **at areas which are boundaring the cavities and the aligned holes.** The skilled person is as a consequence directed to consider the gaskets as those which are located between a pair of plate elements. This is contrary to the newly introduced interpretation, which requires that the skilled reader understands that the first characterising feature concerns the ring-shaped gaskets boundaring **one set** of the port holes on **one side** of a plate element, whereas the second feature, namely the litigious feature, also deals with the same kind of gaskets, however with those which overlay the **second set** of holes on the **other side** of the plate element.

According to the appellant, the person skilled in the art would nevertheless have been directed towards this interpretation because of the number (24) referencing the gaskets at the end of the claim and because of the expression "terminations of the respective sheet layers" in the litigious feature. It is however noticed that the same reference number (24) appears in the following dependent Claims 2 and 4, and in each of these two claims it is associated with the gasket, which is said to extend along the periphery of the two plate elements. In Claim 4, in particular, this last gasket is opposed to the gasket referenced (100) of the first characterising feature of Claim 1, so that it must concern a different and not identical gasket.

Thus, the skilled reader sees at once that, at least in these dependent claims, this reference number is wrong and he has no reason to conclude that this would not be the case also for Claim 1. As to the term "termination", it is merely used through the whole description as originally filed as a synonym for the terms "edge" or "rim", and this also in connection with the walls or layers of the plate elements, see for example column 6, lines 27 to 35 of the original description: "One wall of the plate element is terminated at a distance from the edge of the port hole. The wall facing the gasket has a termination or an edge which is disposed preferably centrally in the ring-shaped gasket...". Thus, for the skilled reader, the expression "terminations of the respective sheet layers of a plate element" is equivalent to the "edges of the respective sheet layers". It is true that, in the original description, the term "termination" is never used to describe the outer edges of the plates, but this only confirms that the litigious feature was not originally disclosed. To then conclude therefrom, as is done by the appellant, that it can only mean the edges of the port holes is a further intellectual step which is not suggested by and has no basis in the description as originally filed.

The appellant has also argued that, in Claim 1, the areas boundaring the port holes are said in the first characterising feature to **be overlayed** by the gaskets, whereas in the litigious feature the other areas **are to be overlayed,** implying a difference in time, thus an action, which can only be the assembly of the plate elements. This view cannot be followed by the board, since in the litigious feature the true expression is "are staggered to be overlayed", so that the words "to

be overlayed" merely indicate a result and are equivalent to "are overlayed".

2.2.4 It follows that the wording of Claim 1 is such, that a person skilled in the art, even after a study of the description of the patent in suit as originally filed, cannot arrive at the new interpretation submitted for the last feature of this claim. As seen above, there is already a contradiction between the preamble of this claim and the intellectual steps which are necessary to reach this interpretation and, moreover, too many indications are missing in the wording itself of this feature, which could have led the skilled person to such an interpretation, for example a clear indication of the areas concerning the edges of the port holes and the location of the involved port holes at the opposite side of the plate element.

2.3 Hence, the litigious feature of Claim 1 is to be interpreted in that the other areas boundaring the cavities are those followed by the gasket extending along the periphery of two plate elements.

3. *Technical contribution of this feature*

The board agrees with the appellant that this feature does not contribute to solve the problem of either the corrosion at the edges of the port holes or the corrosion due to an agressive heat exchange medium. However, there are other possible corrosion problems which can concern a heat exchanger, for example those created by the external environment. These corrosion problems are not excluded by the object of the patent in suit, as seen above in point 3.1, and it is clear that the staggered arrangement of the sheet layers on

the periphery of the plate elements as claimed protects the external edges of the internal sheet layers, namely these facing directly the cavities, against the aggression of external corrosive fluids. Also the assembly of the plate elements can be improved by this stepped arrangement of the gaskets along the periphery of the plates. It may be that the claimed feature prevents any heat exchange fluid leaking between the sheet layers from escaping at the plate edges and thus is disadvantageous in this respect, since no leak sign appears, but this is compensated for by an easier dismounting of the plate elements. Moreover, an existing technical contribution does not necessarily mean an improvement in all respects.

The board therefore concludes that the litigious feature provides a technical contribution to the subject-matter of Claim 1.

5. As a consequence, according to the decision G 1/93 of the Enlarged Board of appeal (OJ EPO 1994, 541), the litigious feature, although infringing Article 123, paragraph 2, EPC, cannot be deleted from Claim 1 without infringing Article 123, paragraph 3, EPC, because of the technical contribution that it provides, thus resulting inevitably in that the revocation of the patent must be confirmed.

Order

For these reasons it is decided that:

The appeal is dismissed

The Registrar: The Chairman:

A. Counillon C. T. Wilson