

**Internal distribution code:**

- (A) [ ] Publication in OJ  
(B) [ ] To Chairmen and Members  
(C) [X] To Chairmen  
(D) [ ] No distribution

**DECISION**  
of 3 July 2003

**Case Number:** T 0422/00 - 3.2.3

**Application Number:** 93202885.5

**Publication Number:** 0583851

**IPC:** F28D 1/053; F28F 1/02,  
F25B 39/04

**Language of the proceedings:** EN

**Title of invention:**  
Heat exchanger

**Patentee:**  
Modine Manufacturing Company

**Opponents:**  
VALEO THERMIQUE MOTEUR  
BEHR GmbH & Co.  
SHOWA DENKO K.K. and MITSUBISHI HEAVY INDUSTRIES Ltd.  
ADAM OPEL AG  
DELPHI AUTOMATIVE Systems France SA

**Headword:**  
-

**Relevant legal provisions:**  
EPC Art. 123(2)

**Keyword:**  
"Disclosure of end limits of a range on the basis of a graph  
(not disclosed)"

**Decisions cited:**  
G 0001/93, T 0145/87, T 0256/89, T 0398/92, T 0737/90,  
T 0169/83

**Catchword:**  
-



Europäisches  
Patentamt

European  
Patent Office

Office européen  
des brevets

Beschwerdekammern

Boards of Appeal

Chambres de recours

Case Number: T 0422/00 - 3.2.3

**D E C I S I O N**  
of 18 February 2004  
correcting errors in the decision  
of the Technical Board of Appeal 3.2.3  
of 3 July 2003

**Appellant 01:**  
(Opponent 01)  
VALEO THERMIQUE MOTEUR  
8 rue Louis Lormand  
La Verrière  
F-78320 Le Mesnil Saint-Denis (FR)

**Representative:**  
Bezault, Jean  
Cabinet Netter  
36, avenue Hoche  
F-75008 Paris (FR)

**Appellant 02:**  
(Opponent 02)  
BEHR GmbH & Co.  
Mauserstrasse 3  
D-70469 Stuttgart (DE)

**Representative:**  
Wallinger, Michael, Dr.-Ing.  
Wallinger & Partner  
Patentanwälte  
Zweibrückenstrasse 2  
D-80331 München (DE)

**Appellant 03:**  
(Opponent 03)  
SHOWA DENKO K.K.  
13-9, Shiba Daimon 1-chome  
Minato-ku  
Tokyo (JP)

and

MITSUBISHI HEAVY INDUSTRIES, Ltd.  
S-1, Marunouchi 2 chome  
Chiyoda-Ku, Tokyo (JP)

**Representative:**  
von Hellfeld, Axel, Dr. Dipl.-Phys.  
Wuesthoff & Wuesthoff  
Patent- und Rechtsanwälte  
Schweigerstrasse 2  
D-81541 München (DE)

**Party I as of right:**  
(Opponent 04)

ADAM OPEL AG  
Posfach 17 10  
D-65407 Rüsselsheim (DE)

**Representative:**

Manitz, Finsterwald & Partner GbR  
Postfach 31 02 20  
D-80102 München (DE)

**Party II as of right:**  
(Opponent 05)

DELPHI AUTOMATIVE Systems France SA  
89 Boulevard national  
Immeuble Vision Défense  
F-92250 la Garenne Colombes (FR)

**Representative:**

Manitz, Finsterwald & Partner GbR  
Postfach 31 02 20  
D-80102 München (DE)

**Respondent:**  
(Proprietor of the patent)

Modine Manufacturing Company  
1500 DeKoven Avenue  
Racine  
Wisconsin 53301 (US)

**Representative:**

Geissler, Bernhard, Dr. jur., Dipl.-Phys.  
Patent- und Rechtsanwälte  
Bardehle-Pagenberg-Dost-Altenburg-Geissler  
Postfach 86 06 20  
D-81633 München (DE)

**Decision under appeal:**

Interlocutory decision of the Opposition  
Division of the European Patent Office posted  
23 March 2000 concerning maintenance of  
European patent No. 0583851 in amended form.

**Composition of the Board:**

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

In application of Rule 89 EPC the decision given on  
3 July 2003 is corrected as follows:

- On the first covering page, the name of Appellant 03 is  
completed by

"and MITSUBISHI HEAVY INDUSTRIES Ltd."

- On the second covering page, it is added for Appellant 03:  
"and

MITSUBISHI HEAVY INDUSTRIES, Ltd.  
S-1, Marunouchi 2 chome  
Chiyoda-Ku, Tokyo (JP)

The Registrar:



A. Counillon

The Chairman:



C. T. Wilson

BESCHWERDEKAMMERN  
DES EUROPÄISCHEN  
PATENTAMTS

BOARDS OF APPEAL OF  
THE EUROPEAN PATENT  
OFFICE

CHAMBRES DE RECOURS  
DE L'OFFICE EUROPEEN  
DES BREVETS

**Internal distribution code:**

- (A) [ ] Publication in OJ  
(B) [ ] To Chairmen and Members  
(C) [X] To Chairmen  
(D) [ ] No distribution

**D E C I S I O N**  
**of 3 July 2003**

**Case Number:** T 0422/00 - 3.2.3

**Application Number:** 93202885.5

**Publication Number:** 0583851

**IPC:** F28D 1/053; F28F 1/02,  
F25B 39/04

**Language of the proceedings:** EN

**Title of invention:**  
Heat exchanger

**Patentee:**  
Modine Manufacturing Company

**Opponents:**  
VALEO THERMIQUE MOTEUR  
BEHR GmbH & Co.  
SHOWA DENKO K.K.  
ADAM OPEL AG  
DELPHI AUTOMATIVE Systems France SA

**Headword:**  
-

**Relevant legal provisions:**  
EPC Art. 123(2)

**Keyword:**  
"Disclosure of end limits of a range on the basis of a graph  
(not disclosed)"

**Decisions cited:**  
G 0001/93, T 0145/87, T 0256/89, T 0398/92, T 0737/90,  
T 0169/83

**Catchword:**  
-



Europäisches  
Patentamt

European  
Patent Office

Office européen  
des brevets

Beschwerdekammern

Boards of Appeal

Chambres de recours

Case Number: T 0422/00 - 3.2.3

**D E C I S I O N**  
of the Technical Board of Appeal 3.2.3  
of 3 July 2003

**Appellant 01:**  
(Opponent 01)  
VALEO THERMIQUE MOTEUR  
8 rue Louis Lormand  
La Verrière  
F-78320 Le Mesnil Saint-Denis (FR)

**Representative:**  
Bezault, Jean  
Cabinet Netter  
36, avenue Hoche  
F-75008 Paris (FR)

**Appellant 02:**  
(Opponent 02)  
BEHR GmbH & Co.  
Mauserstrasse 3  
D-70469 Stuttgart (DE)

**Representative:**  
Wallinger, Michael, Dr.-Ing.  
Wallinger & Partner  
Patentanwälte  
Zweibrückenstrasse 2  
D-80331 München (DE)

**Appellant 03:**  
(Opponent 03)  
SHOWA DENKO K.K.  
13-9, Shiba Daimon 1-chome  
Minato-ku  
Tokyo (JP)

**Representative:**  
von Hellfeld, Axel, Dr. Dipl.-Phys.  
Wuesthoff & Wuesthoff  
Patent- und Rechtsanwälte  
Schweigerstrasse 2  
D-81541 München (DE)

**Party I as of right:**  
(Opponent 04)  
ADAM OPEL AG  
Postfach 17 10  
D-65407 Rüsselsheim (DE)

**Representative:**  
Manitz, Finsterwald & Partner GbR  
Postfach 31 02 20  
D-80102 München (DE)

**Party II as of right:** DELPHI AUTOMATIVE Systems France SA  
(Opponent 05) 89 Boulevard national  
Immeuble Vision Défense  
F-92250 la Garenne Colombes (FR)

**Representative:** Manitz, Finsterwald & Partner GbR  
Postfach 31 02 20  
D-80102 München (DE)

**Respondent:** Modine Manufacturing Company  
(Proprietor of the patent) 1500 DeKoven Avenue  
Racine  
Wisconsin 53301 (US)

**Representative:** Geissler, Bernhard, Dr. jur., Dipl.-Phys.  
Patent- und Rechtsanwälte  
Bardehle-Pagenberg-Dost-Altenburg-Geissler  
Postfach 86 06 20  
D-81633 München (DE)

**Decision under appeal:** Interlocutory decision of the Opposition  
Division of the European Patent Office posted  
23 March 2000 concerning maintenance of  
European patent No. 0583851 in amended form.

**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 interlocutory decision posted on 23 March 2000 of an opposition division of the European patent office, which maintained the European patent EP-B-0 583 851 in an amended form. This patent is based on a divisional application to European patent application EP-A-0 219 974, hereinafter the earlier application.

Claim 1 of EP-B-0 583 851 as amended reads as follows:

"1. A condenser for exchanging heat between the ambient and a refrigerant that may be in a liquid or vapour phase, comprising a pair of spaced generally parallel headers (10,12), one of said headers having a refrigerant inlet (26 or 32), and one of said headers having a refrigerant outlet (32 or 26), and a heat exchanger tube (20) extending between said headers (10,12) and in fluid communication with each of said headers, said tube having a generally flat cross-section and defining a plurality of hydraulically parallel refrigerant flow paths (46,48,50,52,54,58,60) between said headers, each of said refrigerant flow paths (46,48,50,52,54,58,60) having a hydraulic diameter between 0.381 mm (0.015 inches) and 1.778 mm (0.07 inches); characterised in that: said headers (10,12) each have a series of openings (14) with the openings in the series on one header being aligned with and facing the openings in the series of the other header, said heat exchanger tube comprising a tube row defined



by a plurality of straight tubes (20) of generally flat cross section and extending in parallel between said headers, the opposed ends of said tubes being disposed in corresponding aligned ones of said openings (14) and in fluid communication with the interiors of said headers (10,12), at least some of said tubes (20) being in hydraulic parallel to each other, webs (40) within said tubes extend between and are joined along their entire length to opposed side walls (42) of the tubes at spaced intervals to (a) define a plurality of non-circular flow paths (46-60) within each tube (29), (b) absorb forces resulting from internal pressure within said condenser and tending to expand said tubes (20), and (c) conduct heat between fluid in said flow paths and both said opposed side walls of said tubes, said webs and/or said flat side walls define at least one concave zone at the intersection of converging surface segments in each of said fluid flow paths extending along the length thereof; and serpentine fins (34) incapable of supporting said tubes (20) against substantial internal pressure extend between facing ones of said opposed side walls of adjacent tubes."

In the above mentioned interlocutory decision, the first instance decided that the upper limit of 0.07 inches of the range mentioned in claim 1 for the hydraulic diameters was derivable from Figure 3 of the earlier application, so that the objection under Article 76(1) EPC of the three opponents relative to this feature was rejected.

- II. The notices of appeal were filed by the opponents 01 to 03, hereinafter the appellants 01 to 03, respectively on 5 May, 19 April and 18 May 2000, and the appeal fee paid on 5 May, 19 April and 19 May 2000. The statements of grounds of appeal were received on 20 July, 2 and 1 August 2000 respectively. In their statements, appellants 03 and 02, among other things, reiterated the objection under Article 76(1) EPC as to said upper limit of 0.07 inches.
- III. Two notices of interventions according to Article 105(1) EPC were received on 31 August and 27 December 2000 respectively. Evidence of infringement proceedings were joined (For Adam Opel AG: Klage am 31. Mai 2000 vor dem Landgericht Düsseldorf erhoben. For Delphi Automotive Systems France S.A.: Assignation du 28 Septembre 2000 devant le tribunal de Grande Instance de Paris) and the opposition fees were paid.
- IV. The proprietor of the patent, hereinafter the respondent, contested in a submission received on 9 May 2001 the objections of the appellants and interveners, in particular the objections with respect to Article 76(1) EPC.
- V. The board in a communication sent on 8 February 2002 expressed its provisional view that the claimed upper limit was not clearly derivable from the earlier application and in particular from Figure 3, so that a revocation of the patent in suit on the basis of Article 76(1) EPC could not be excluded.

This opinion was contested by the respondent in a submission received on 15 July 2002. He simultaneously

filed two new claims 1 as auxiliary requests 1 and 2 and a copy of US-A-4688311, which was cited as such in the patent in suit and under the serial No. 887 223 filed on 21 July 1986 in the patent documents as originally filed and, moreover, only in the second priority document.

VI. Summons to oral proceedings were sent on 11 February 2003.

VII. With a letter received on 25 June 2003, the respondent submitted the following subsidiary request:

1. in case, the Board of Appeal does not consider the upper limit of hydraulic diameter of 0.07 inches as being disclosed by Fig.3 of the patent application as filed (in contrast to T 398/92) and consequently intends to revoke the patent in suit, the following questions be submitted to the Enlarged Board of Appeal:

- (a) What are the requirements under which values (numbers) may be derived from x-y-diagrams?
- (b) Are these requirements fulfilled by Figure 3 of European Patent 0219 974 B1?
- (c) What are the requirements to assume a contradiction between a continuous x-y-diagram and the description, which a person skilled in the art cannot resolve in a clear and unambiguous way?
- (d) Are these requirements fulfilled by Figure 3 and the description of European Patent 0 219 974 B1?

2. in case, the Board of appeal does not consider the upper limit of hydraulic diameters of 0.07 inches as being disclosed by US 887,223 in the way of incorporation by reference into the patent application as filed and would decide to revoke the patent in suit, the following questions be submitted to the Enlarged Board of Appeal:

- (a) What are the requirement for an incorporation by reference of a document?
- (b) In particular: Need the document incorporated by reference be accessible to the Examining Division of the European Patent Office at the date of filing of the patent application, or is it sufficient to be accessible at the date of filing the request for examination or at any later date?
- (c) In particular: Need the document incorporated by reference be accessible to the public as of the date of publication of the patent application in any specific way?

Further to (c): Is it sufficient that an interested member of the public can obtain a copy of the document incorporated by reference on request from a person or entity being in possession of such copy, or must the document be accessible in any specific way, e.g. through a library?

The following documents (Exhibits 12 to 15) were joined to the letter:

- a technical expert opinion of Prof. Dr Hans Müller-Steinhagen (Exhibit 12);
- a legal statement of Dr Peter Dihm, regarding German Case Law (Exhibit 13);
- post published documents relating to Multiple pass condensers (Exhibit 14);
- a table generated by program "Graphscan" of the curves B of Fig. 3 of the patent application (Exhibit 15).

VIII. Appellant 02 by a letter received on 30 June 2003 protested against the late filing of these documents and filed a technical opinion of Prof. Dr Mayinger.

IX. By means of two faxes received in the afternoon of the 2 July 2003, the respondent amended its previous auxiliary requests by filing new claims 1 as auxiliary requests I, II, III, III a, III b, IV, IV a, IV b, V, Va, Vb, VI, VIa and VIb, and submitted the following document:

- a legal opinion of Prof. Dr Dr Joseph Straus, Max Planck- Institute for Intellectual Property, Competition and Tax law, Munich.

X. Claim 1 according to each of these auxiliary requests is amended as follows:

*Auxiliary request I:* The upper limit for the hydraulic diameter is changed to "1.727 mm (0,068 inches)".

*Auxiliary request II:* Said same upper limit is changed to "1.651 mm (0,065 inches)".

*Auxiliary request III:*

The upper limit remains that according to the main request, namely "1,778 mm (0,07 inches)", but,

- in the first lines of the claim, the expressions "refrigerant inlet" and "refrigerant outlet" are respectively amended into "vapour inlet" and "condensate outlet", and

- "said tube having a generally flat cross-section" is modified into "said tube being a flattened tube", with the corresponding amendment a bit further: "said heat exchanger comprising a tube row defined by a plurality of straight flattened tubes".

*Auxiliary request IV:* In addition to the amendments brought into the third auxiliary request, the feature "at least some of said tubes being in hydraulic parallel to each other" in the middle of the claim is amended into "a plurality of tubes (20) extending between the headers in hydraulic parallel with each other"; further, the term "web" is replaced by "spacer".

*Auxiliary request V:* This request is identical with the previous request, except that, in the middle of the claim, the following feature concerning the plurality of tubes is deleted:

"in sufficient number as to avoid high resistance to condensate and/or vapor flow".

*Auxiliary request VI* corresponds to the auxiliary request V, except that the feature concerning the tubes

is further amended into: " said tubes being in hydraulic parallel to each other".

*The auxiliary requests with the additional reference (a) correspond each to its identically numbered request, but with the upper limit according to the auxiliary request I. namely 0,068 inches. The auxiliary requests with the reference (b) correspond each to its identically numbered request, but with the upper limit according to the auxiliary request II, namely 0,065 inches.*

- XI. Oral proceedings took place on 3 July 2003
- XII. The arguments of the parties concerning the disclosure or not of the upper limit of 0.07 inches can be summarised as follows:

(A) From the appellants and parties (interveners) as of right:

In several decisions, the boards of appeal have emphasised that the disclosure of a patent should be considered in its entirety. The abstract however is not part of the disclosure of a patent. Since the description of the patent in suit explicitly disclosed an upper limit, the skilled person had no reason to look for another limit and no justification to consider Figure 3 in isolation in order to derive therefrom another upper limit, thus leading to a misrepresentation of the true teaching of the whole patent and to an inconsistency between its description and the limit deduced from Figure 3. There is no

legitimation in the EPC to give priority to a figure over the other parts of the patent disclosure. The US document Serial No.887 283 was not available to the public when the European patent application was published. Moreover, in this patent application, reference was only made to this US document as disclosure of the manufacturing process for heat exchanger tubes like those of the invention in suit, and not as disclosure of the technical data of the tubes.

The submitted questions to the Enlarged board of appeal concern technical, and not legal issues, so that they should be rejected.

The introduction of a number of auxiliary requests by the respondent only one day prior to the oral proceedings is an abuse of procedure. It is not justified and unfair to the other parties, which are taken by surprise. Moreover, the new upper limit values seem to have been picked from a lucky dip bag and it is not clear for which clear reason they should be allowable when the upper limit according to the main request is not.

(B) From the respondent:

The upper limit of 0.07 inches was mentioned in the abstract, so that it cannot be said that the introduction of this value was surprising. Drawings of a patent have the same weight as the remainder of the patent and here, it is the Figure 3 which provides a clear support for the value 0,07. Being a representation in Cartesian coordinates, this figure



clearly discloses values and further, as explained in the description, it shows for which values of the hydraulic diameters the heat transfers are improved in comparison to the prior art. The skilled person can see that the whole curves B and parts of the curves A are concerned and that, in particular, on the right ends of these curves, that is to say with hydraulic diameters above 0.04 inches, the heat transfers are still advantageous, so that the invention also works in this range above 0,04 inches. The curves B are essentially concentrated in this higher range. The person skilled in the art then realizes that the range of about 0,015 to about 0,04 inches explicitly disclosed in the description forms in fact a preferred range, as emphasized by the expression "heat transfer.. advantageously and substantially increased", but that the invention nevertheless works inside of a broader range. By simply drawing a vertical line along the ends of each of curves A and B, he will find that they all end at about 0.07 inches. Taking into account that this value 0,07 is not reached by all curves, he may also consider the point which is surpassed by all curves, namely the value 0,065 inches.

The claimed upper limit 0,07 inches is also disclosed in the description of the US document Serial No. 887,223 (US patent 4688311), which is incorporated by reference in the description of the patent in suit and comprises the same Figure 2 as the patent in suit, thus the same condenser. This reference confirms the above interpretation of Figure 3.

The request for referral to the Enlarged Board of Appeal is justified by the fact that the refusal of the

board of appeal to deduce the claimed upper limit from Figure 3 of the patent in suit will depart from earlier decisions, such as T 398/92 and T 145/87. The question of how a feature can be disclosed by a figure is of legal nature and needs to be clarified.

The late-filing of the auxiliary requests is an attempt to solve the issue under Article 123(2) EPC, taking into account the discussion during the oral proceedings and in particular the questions raised by the board of appeal. They could not constitute a surprise for the other parties, since already in the submission filed on July 2002 the value 0,065 inches was mentioned.

Moreover, as recognised by the appellants, minor amendments are introduced in these requests, so that they can be examined in a rather short time, the scope of discussion remaining the same. It is the right of a patentee to have a fair opportunity to react to a situation in which its patent is put into danger.

- XIII. The appellants and parties as of right requested that the decision under appeal be set aside and that the European patent No. 0 583 851 be revoked.

The respondent requested that the appeal be dismissed, auxiliarily that the questions formulated in its, the respondent's, letter of 2 June 2003 be referred to the Enlarged Board of Appeal, further auxiliarily, that the appeals be rejected with the provisio that the patent be maintained on the basis of claim 1 according to one of the auxiliary requests I, II, III, IIIa, IIIb, IV, IVa, IVb, V, Va, Vb, VI, VIa, VIb filed on 2 June 2003.

## Reasons for the decision

1. The appeals are admissible.

The interventions are also admissible because the notices of intervention were given within three months of the date on which the respective infringement proceedings were instituted (Article 104(1) EPC first sentence).

2. Since, in the patent application as originally filed the hydraulic diameters were expressed in "inches", this unit is used in the present decision without added conversion to SI units.

According to Article 85 EPC, the abstract shall merely serve as technical information and should not be taken into account for any other purpose. Therefore, the fact that the upper limit of 0,07 inches was mentioned in the abstract of the patent application is irrelevant for the present case.

3. It is not disputed that, in the course of proceedings, a feature which can be clearly and unambiguously derived from a drawing can be used to define the subject-matter for which protection is sought. In the course of the examination proceedings, this can result in a broadening of a numerical range *expressis verbis* given in the original disclosure without necessarily contradicting said disclosure and without offending against Article 123(2) EPC; it depends on the circumstances of each case.

4. In the decision under appeal, the first instance held that, since the curves B in Figure 3 are "higher" than the prior art curves at least up to a value of 0.07 inches, the skilled person would conclude that the invention, as far as heat exchanger cores corresponding to the curves B are concerned, should extend up to 0.07 inches.
  
5. In the application as originally filed of the patent in suit, after an introduction setting out the problems which occur in condensers employed in air conditioning or refrigeration systems, a summary of the invention is presented on page 2, which provides the information that each of the fluid flow paths defined in the condenser tube has a hydraulic diameter in the range of about 0.015 to 0.040 inches. The same information is given in the detailed description of the preferred embodiment of the invention, page 7, first lines, immediately followed by the indication that "a hydraulic diameter of 0.035 inches optimizes ultimate heat transfer efficiency and ease of construction". Then, on page 9, the last sentence relating to Figure 3 has the following wording:

"As can be appreciated from Fig.3 , heat transfer is advantageously and substantially increased in the range of hydraulic diameters of about 0.015 inches to about 0.040 inches through the use of the invention with some variance depending upon air flow". As seen, here, the range is given in connection with the disclosure of Figure 3.

Finally, this range is also given in each of the three independent claims 1, 4 and 9, as originally filed.

Thus, in six passages of the patent application as originally filed, the range of 0,015 to 0,040 inches is given *expressis verbis*, and there is no suggestion that other limits could be considered or envisaged, in particular the claimed upper limit of 0.07 inches when in Table 1 of the description an hydraulic diameter of 0.07871 inches for the prior art is given.

6. As support for the claimed upper limit of 0.07 inches, the respondent essentially relies on the disclosure of Figure 3 and, in particular, on the curves B of this figure. Figure 3 is one of four figures, namely Figures 3 to 6, which are all in Cartesian coordinates, these figures - according to the description - aiming at showing a number of advantages of the invention. In Figure 3, the heat transfer rate (Y-axis) is plotted against the hydraulic diameter (X-axis) at air flows varying from 450 to 3200 standard cubic feet per minute ("SCFM" in abbreviated form). The abscissa axis is divided by pairs from 0.00 to 0.18 inches. The left part of Figure 3, which is headed "INVENTION", shows two sets of graphs, namely.

- a first set of four graphs A in plain lines, one above the other, for four different air flows, said graphs extending from the area between 0 and 0.02 inches to the area between 0.06 and 0.08 inches and presenting rather pronounced apices at about 0.02 inches; and
- a second set of four graphs B in broken lines for the same air flows, however with their left ends in the area around 0.04 inches and their right ends between 0.06 and 0.08 inches, as are the

right ends of the curves A; these graphs B are a bit domed or flat with their higher points near 0.04 inches and they each lie respectively above the right parts of the graphs A.

The right side of Figure 3, which is separated from the left side by a blank part, concerns the "PRIOR ART", namely condenser cores previously produced by the applicant, and it shows four rather horizontal curves in dashed lines for the same different air flows. According to the description, the curves A and B were generated by computer, based on a heat transfer model for two condenser cores having the same face area and being made according to the present invention, several common constructional specifications of these cores being given in the description. The core according to the curves B differs from that of the curves A only by the fact that the length of the flow path in each tube was doubled, i.e. the number of tubes was halved and the tube length doubled. In the description, it is also mentioned that various points on the curves A and B have been confirmed by actual tests, however without further details.

7. An examination of the curves shows the following:

The value 0.07 inches neither appears on the abscissa axis of Figure 3, nor is suggested by a particular point or mark on any graphical representation of this figure. The right ends of the curves A and B, which according to the appellant, disclose this value, do not end on a clear single vertical line; they all peter out more or less in the median area between the two values 0,06 and 0,08 inches of the x-axis. Moreover, at least

three curves A have their right ends at a level which is lower than that of the corresponding prior art curves, so that at least in the range from 0.06 to 0.08 inches the condenser core according to these curves A is not shown to be advantageous.

8. According to the description, the object of Figure 3 is to show the relationship between the heat transfer rate and the hydraulic diameters of the refrigerant flow paths. In the documents as originally filed there is no indication or suggestion that this figure is supposed to disclose any ranges or limits of the invention. The fact that the left part of Figure 3 is headed "Invention" does not necessarily imply that the full curves in this left part are to be considered as belonging to the invention or even completely disclose the invention, all the more as the right ends of certain curves A are well under the corresponding curves of the prior art as seen above, so that apparently they do not belong to the invention. The heading "invention" is here only used to distinguish the graphs concerning the invention from those of the prior art. Where the invention begins and finishes is not disclosed in Figure 3. How much the heat transfer rate has to be improved so that the present invention could be considered as showing advantageous effects over the prior art is also not specified. Moreover, in the absence of any information on the curves' ends, the person skilled in the art has no reason to think that these ends are of importance and he may think that in fact the curves are open-ended or were arbitrarily ended by the drawer. This seems to be confirmed by the fact that, considering only the right ends of the curves B, these ends - as said above - are not on a

single vertical line, although they are still above the prior art curves. This is not the indication of a limit. Some right ends of the curves B are even substantially above the corresponding prior art curves and could have been prolonged on the right, while still showing advantages over the prior art. Since the object of Figure 3 was merely to show advantages of the invention, it has to be expected that the object of the graphs was to show the most interesting parts and not necessarily the whole invention; the description by stipulating the range of about 0.015 inches to about 0.040 inches in connection with Figure 3, see also the hydraulic diameter of 0.030 inches given in Table 1, contributes to support this assessment. When graphs, which are merely intended to show advantages of an invention, show that said invention could be performed beyond the ends of the drawn graphs, the person skilled in the art cannot assume on the sole basis of these graphs that said ends represent limits of the invention. Thus, it cannot be recognised that the curves A and B represent ranges of hydraulic diameters according to the invention and that the right ends of these curves must unmistakably represent the upper limits of the present invention.

Already for this reason, the impugned decision, to which Prof. Dr Dr Joseph Strauß in his legal opinion essentially referred, is to be set aside.

9. Supposing that, nevertheless, taking into account the fact that the curves B extend from about 0.04 inches to the median region between 0.06 and 0.08 inches and thus disclose that the invention can be performed above the upper limit of 0.04 inches expressly given in the



original documents, the skilled person looks for the determination of an exact broader range, he receives from Figure 3 no clear indication as to how he can fix an upper limit value. According to the respondent, "all hydraulic diameters are disclosed as part of the invention, for which at least one of the eight curves shows an advantage in heat transfer over the prior art" and " the patentee may choose any value for the lower and upper limits of the claimed hydraulic diameter range for which at least one of the graphs shows advantageous heat transfer over the prior art"(submission dated 2 June 2003, page 18, first lines and lines 12 to 15). Regarding the opinions or statements filed by the respondent, it can be seen that the technical (Prof.Dr H. Müller-Steinhagen) and legal (Dr P. Dihm) experts differ on the determination of the upper limit of the curves A, which they respectively found to be 0.05 or 0.04 inches. Extrapolating the curves B, values about 0.08 inches could form part of the invention, so that it is not understood for which reason the invention, as far as condenser cores according to the curves B are concerned, shall only extend up to 0.07 inches. Moreover, considering the curves as disclosed, the respondent by claiming different values, namely 0.07, 0.068 and 0.065 inches, for said upper limit in the main and auxiliary requests, shows that arbitrary values can be chosen, so that there is in fact, in the patent application as filed, no clear and unambiguous disclosure of an upper limit for the hydraulic diameters.

10. It follows from the foregoing that the criterion "heat exchanger better than the prior art" used by the respondent for supporting the disclosure of an upper

limit in Figure 3, is in fact not relevant. In the absence of any other disclosed criterion, it can only be deduced that, since the teaching of the present invention essentially concerns the use of small hydraulic diameters, an essential object of claim 1 is to define a range of said small diameters which is different from those already used prior to the filing date of the present application, that is to say said range should be under the lower limit of about 0.09 inches shown by the prior art curves of Figure 3. It is therefore a mere question of the choice of the upper limit of said range, as long as the present invention with said hydraulic diameter limit can show an advantage over the prior art. Being a mere question of choice, then a contradiction is to be seen between the now claimed value 0.07 inches and the originally disclosed upper limit of 0.04 inches, so that the upper limit not only is not clearly and unambiguously derivable from Figure 3, but it also does not comply with the conditions set out in T 169/83 (OJ 1985, 193), to which the board adheres. Moreover, the new limit clearly makes a technical contribution to the subject-matter of claim 1, so that the criterion set out in the decision G 1/93 (OJ 1994, 541) also applies.

For all these reasons claim 1 according to the main request infringes Article 123(2) EPC.

11. Contrary to the opinion expressed by Prof. Dr Dr Joseph Strauß, the board in its previous decision T 669/93, which mainly dealt with the valid priority of a claim containing the originally disclosed range of 0.015 to 0.04 inch, did not take position on the claims of another request filed at this time and containing the

range of 0.015 to 0.07 inch, since its decision was to send the case back to the first instance in order to examine the allowability of said claims. The mere fact that the board also drew the attention of the first instance to the possible need of a supplementary search is not to be considered as an implicit acceptance of these claims. The board had no reason at that time to examine in detail the claims or the actual disclosure of the patent in suit.

12. According to Article 112(1) EPC only questions concerning important points of law or concerning a uniform application of the law are to be referred to the Enlarged Board. The first set of questions to the Enlarged Board of Appeal does not concern such issues, since they all relate to the interpretation of a figure which comprises graphs. The interpretation of such a figure is of technical aspect, and not of legal aspect. Already for this reason, the corresponding request of the appellant is to be rejected.

Moreover, contrary to the respondent's view, the situations are not the same between the present case and the cases with which the decisions T 256/89 and T 145/87 had to deal. In case T 256/89 the newly introduced features were derivable from the preferred embodiment of the invention and from real experimental values which were identified by points on the curves. The end points of the curves in particular, which were used to define percentages, were clearly disclosed as being real experimental values. In T 145/87, the graph, which represented a mathematical equation, also comprised identified points, which were used to determine two constants of the formula. Thus, the

circumstances are not comparable and it cannot be concluded that a discrepancy exists between the present decision and the two above cited decisions.

13. A reference to the U.S. application Serial No. 887,223 indeed appears in the description as originally filed of the patent in suit, however only as a disclosure for the method of making the tubes according to the present invention, and not as a disclosure of said invention; it is clearly specified in the patent application as filed that only the details of the means for forming the tubes are incorporated by reference, and nothing more. Thus, contrary to the respondent's allegation, this document cannot be used as support for the claimed upper limit value.

Moreover, said U.S. application, which was published on 25 August 1987, was not available at least at the date of publication of the parent patent application (No. 86307161.9/ EP-A-0 219 974, published on 29 April 1987), so that, being not made available to the public as required by Article 54(2) EPC, it cannot be taken into account. This is in line with the Guidelines, C-II, 4.18 and the case law of the boards of appeals, see T 737/90 (not published), as also acknowledged by Prof. Dr. Dr. Strauss in GRUR Inter. 1995, pages 103 to 112.

14. Under these circumstances, the second set of questions to the Enlarged Board is irrelevant for the present case and, further, already at least partly answered (questions a) to c)).

15. The reasons set out above for the main request would obviously apply to the claims 1 according to the auxiliary requests, so that these requests filed at a late stage of the proceedings are clearly not admissible (Article 114(2) EPC).

**Order**

**For these reasons it is decided that:**

1. The decision under appeal is set aside.
2. The patent is revoked.

The Registrar:



*A. Counillon*  
A. Counillon

The Chairman:

*C. T. Wilson*

C. T. Wilson

