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**D E C I S I O N**  
**of 1 June 1995**

**Case Number:** T 1045/93 - 3.2.3

**Application Number:** 91100767.2

**Publication Number:** 0440073

**IPC:** F25B 49/02

**Language of the proceedings:** EN

**Title of invention:**

Thermostatic expansion valve with electronic controller

**Applicant:**

EATON CORPORATION

**Opponent:**

-

**Headword:**

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**Relevant legal provisions:**

EPC Art. 54

**Keyword:**

"Novelty (no)"

**Decisions cited:**

T 0153/85

**Catchword:**

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Case Number: T 1045/93 - 3.2.3

**D E C I S I O N**  
of the Technical Board of Appeal 3.2.3  
of 1 June 1995

**Appellant:** EATON CORPORATION  
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**Representative:** Wagner, Karl H.  
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**Decision under appeal:** Decision of the Examining Division 074 of the  
European Patent Office dated 28 June 1993, posted  
with written reasons on 19 July 1993, refusing  
European patent application No. 91 100 767.2  
pursuant to Article 97(1) EPC.

**Composition of the Board:**

**Chairman:** C. T. Wilson  
**Members:** H. Andrá  
L. C. Mancini

### Summary of Facts and Submissions

- I. European patent application No. 91 100 767.2, filed on 22 January 1991, was refused by a decision of the Examining Division dated 28 June 1993 and posted with written reasons on 19 July 1993.
- II. The decision was based on Claims 1 to 4 filed with the letter dated 24 February 1993. The reason given for the refusal was that the subject-matter of Claim 1 lacked novelty with regard to the document US-A-4 835 976, and would lack inventive step in view of the documents US-A-4 794 762 and US-A-4 841 734.
- III. On 4 August 1993, the Appellant (Applicant) filed a Notice of Appeal against this decision paying the appeal fee on the same day. The Statement of Grounds of Appeal was submitted on 29 November 1993.
- IV. In a communication pursuant to Article 11(2) RPBA dated 27 February 1995, the Board set out its preliminary opinion that the subject-matter of Claim 1 did not seem to be novel having regard to the disclosure of US-A-4 835 976 and US-A-4 841 734 referred to therein. Further, the Board pointed out that the Appellant had put forward only in a very general manner that US-A-4 835 976, even in combination with US-A-4 841 734, did not disclose the combination of features comprised in Claim 1, without substantiating which of these features were not considered to be disclosed in the citations, thus depriving the Board of the possibility of trying to verify in detail the objection raised by the Appellant.

- V. No written response to the Board's communication in preparation for oral proceedings was filed.

In the oral proceedings held on 1 June 1995, the Appellant requested that the decision under appeal be set aside and the patent be granted on the basis of the single Claim 1 filed with the letter dated 24 February 1993, as amended redactionally in accordance with the Statement of Grounds of Appeal.

- VI. The single claim reads as follows:

"A refrigerant control system comprising:

- (a) pump means including condenser means providing a source of pressurized liquid refrigerant;
- (b) expansion valve means with a body having an inlet and outlet including conduit means operative to communicate pressurized liquid refrigerant from said pump means to the inlet thereof and having a valve member disposed in said body and movable therein for controlling flow of said liquid to said outlet for expansion;
- (c) blower means operative for circulating air over said condenser means;
- (d) evaporator means having an inlet and outlet and connected for receiving refrigerant flow at the inlet thereof from the outlet of said valve means and operative to absorb heat from a compartment to be refrigerated and effect vaporization of said refrigerant for discharge at the outlet thereof;
- (e) said valve means body including a continuous passage therethrough connected to receive refrigerant flow from said evaporator means outlet and discharge refrigerant flow to the inlet of said pump means;

- (f) said valve means further including actuator means responsive to the temperature of the refrigerant in said continuous passage operable for moving said valve member;
- (g) first thermistor means disposed in said inlet of said valve means body and including current limiting resistance means electrically in series with said thermistor means;
- (h) first circuit means operative to provide a flow of current to said thermistor means sufficient to cause boiling of refrigerant coming into contact therewith including means operative to determine the temperature of said flow at said boiling;
- (i) second circuit means operative to compare said temperature with saturation values in a look-up table and convert said temperature to saturation pressure, said second circuit means operative to cycle said blower means responsive to said pressure;
- (j) second thermistor means disposed at the outlet of said evaporator for sensing the temperature of the flow of refrigerant thereof; and
- (k) third circuit means receiving a signal from said second thermistor means and operative to energize said pump means when said sensed temperature is greater than a predetermined "ON" temperature and operative to de-energize said pump means when said sensed temperature is less than a predetermined "OFF" temperature."

VII. In his written and oral statements, the Appellant argues essentially as follows:

- The invention, with the features set forth in Claim 1, takes into account a possible evaporator pressure drop and thus avoids excessive frosting of

the cold outlet of the evaporator. None of the references cited is concerned with this topic and achieves this advantage.

- Having regard to the decision T 153/85 which deals with the question whether a reference in a first prior art document to a second prior art document would have the effect of incorporating the disclosure of the second document into that of the first document, it is not permissible in the present case to incorporate the complete document cited in column 8, lines 44 to 51 of US-A-4 835 976 into the disclosure of the latter citation. Nothing more than what is actually indicated in US-A-4 835 976 in this respect can in fact be regarded as being disclosed in the citation, that is only the feature that the thermistor 44 may be of the self-heated type.
  
- In the refrigerant control system known from US-A-4 841 734, only one thermistor is provided and arranged at the inlet to the refrigerant expansion means whereas the invention comprises additionally a second thermistor at the outlet of the evaporator. Analogously, the refrigerant control system known from US-A-4 794 762 does also not provide a thermistor at the evaporator outlet so that the refrigerant pressure drop across the evaporator cannot be taken into account.
  
- The refrigerant control system described in US-A-4 835 976 uses a valve block having three thermistors, the system being very complicated. With regard to the first thermistor 44 two alternatives are described, the thermistor being either of the self-heated or of the non-self-heated type. The self-heated thermistor cycles the

compressor whereas, according to the invention, the self-heated thermistor is provided to cycle the blower means.

### Reasons for the Decision

1. The appeal is admissible.
2. The present single claim corresponds in substance to the original Claim 1, the amendment in cipher (k) from "second circuit means" to "third circuit means" being a correction which is immediately evident from the claim (cf. the term "second circuit means" under cipher (i)) in the sense of Rule 88 EPC.

The claim, therefore, meets the requirement of Article 123(2) EPC.

3. The nearest prior art with regard to the subject-matter of the claim is described by US-A-4 835 976.

In the oral proceedings before the Board, it was no longer disputed that US-A-4 835 976 describes the features (a) to (f), (j), (k) and the feature concerning the arrangement of the first thermistor means in the inlet of the valve means body, according to feature (g) of the claim. Having regard to the feature (i) of the claim, the Appellant stated that US-A-4 835 976 did not disclose the feature that the self-heated thermistor cycles the blower means. This argument is not, however, convincing. In this respect, reference is made to column 9, lines 16 to 20 of the citation according to which the control system (microcomputer 44) may be operative to disable and enable, respectively, the

condenser fan in dependence on the temperature sensed by the thermistor 44.

4. In US-A-4 835 976, column 8, lines 44 to 51, the following is indicated (a clerical error in the following citation being corrected):

"Alternatively, thermistor 44 may be self-heated and sense saturation temperature which is then converted to saturation pressure and the compressor disabled when the saturation pressure exceeds a predetermined limit value ... in the manner shown and described in commonly owned copending application "Indicating Liquid Refrigeration Saturation Point", Ser. No. 119009, filed Nov. 12, 1987".

As regards the function and mode of operation of such a self-heated thermistor, the attention of the reader is directed to the cited copending application from which the corresponding patent specification US-A-4 841 734 originates.

In the section "Summary of the invention" in columns 1 and 2 of US-A-4 841 734, the following is set out:

"The present invention provides a unique and novel way of sensing the condition of excessive or low refrigerant charge and insufficient or excessive refrigerant pressure for providing an electrical control signal to cycle the condenser fan and disable the compressor clutch. The present invention employs a saturation temperature sensing thermistor disposed in the refrigerant line in the high side, or upstream of the expansion valve means. An electrical current is applied to the thermistor to heat the thermistor a sufficient amount to cause boiling of refrigerant on the surface



thereof thus bringing the temperature of the thermistor to the saturation temperature of the refrigerant. A resistance is provided in series with the thermistor ...

The thermistor thus measures saturation temperature which may be converted to saturation pressure from known properties of the refrigerant. During normal operation, the fan is energized at a predetermined saturation temperature, and de-energized when the temperature falls below a second predetermined saturation temperature."

It follows from the preceding passage that US-A-4 841 734 describes the features (h), (i) and the feature that the first thermistor means includes current limiting resistance means electrically in series with the thermistor means, according to the remaining part of feature (g). This disclosure includes also the feature that second circuit means operative to compare the refrigerant boiling temperature with saturation values and to convert the saturation temperature to saturation pressure are operative to cycle the condenser blower means responsive to said pressure.

5. The question now to be answered is whether these features have to be regarded as falling within the disclosure of US-A-4 835 976.

As already illustrated in the Board's communication dated 27 February 1995, the decision T 153/85 (OJ EPO 1988, 1) emphasises:

"Where there is a specific reference in one prior document (the "primary document") to a second prior document, when construing the primary document (i.e. determining its meaning to the skilled person) the presence of such specific reference may necessitate that part or all of the disclosure of the second document be

considered as part of the disclosure of the primary document."

In the present case, the reference in US-A-4 835 976 is made specifically in relation to the construction and operation of the thermistor 44. Details relating thereto can be found in particular in the section "Summary of the invention" of US-A-4 841 734 as cited in above Section 4.

The Board following the above-cited decision considers that the details of the construction and operation of the thermistor disposed in the inlet of the valve means body as described in US-A-4 841 734 have to be seen as being part of the disclosure of US-A-4 835 976.

Thus, all the features of the single claim are known from US-A-4 835 976.

6. It derives from the foregoing that the Board fully agrees with the conclusion drawn by the first instance that the subject-matter of the single independent claim lacks novelty. This claim is not therefore, allowable in view of Articles 52(1) and 54 EPC.
7. In his Statement of Grounds of Appeal the Appellant has put forward that the Examining Division should have expressed its view about the relevance of the citation US-A-4 835 976 prior to the oral proceedings, e.g. by phone, so that the Appellant's representative would have had time to study the citation, possibly with the assistance of the Appellant. Further according to the Appellant, the interruption during the oral proceedings for studying the citation was not appropriate, at least for the Appellant.

The Appellant does not dispute the circumstance that during an interruption of the oral proceedings the representative had an opportunity to study the document US-A-4 835 976 referred to by the Examining Division, but holds that this opportunity was not appropriate.

As already set forth in the communication of the Board dated 27 February 1995, neither the minutes of the oral proceedings nor the Statement of Grounds of Appeal suggest that, due to a possibly insufficient interval for studying the citation, an extension of the interruption in the oral proceedings was requested by the representative.

The argument that the representative could not study the citation with the assistance of the Applicant can also not be accepted. A professional representative is expected to act in full representation of his client and the EPC does not provide for the case that the Applicant is entitled additionally to the representative to an opportunity to present his comments. Moreover, in the present case the document US-A-4 835 976 is discussed in the introductory part of the present application so that it must be expected that the Appellant is familiar with the contents of this citation commonly owned with the present application.

The Board concludes, therefore, that in the proceedings before the first instance no procedural violation in view of Article 113 EPC occurred.

Since the issue relating to a violation of the rules of procedure was no longer brought up in the oral proceedings before the Board, no further discussion is necessary.

**Order**

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

The appeal is dismissed.

The Registrar:



N. Maslin

The Chairman:



C. T. Wilson

