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Bezeichnung der Erfindung: Method of and apparatus for forecasting and giving
Title of invention: warning of automotive abnormalities.
Titre de l'invention :

Klassifikation / Classification / Classement : B60Q 9/00, G06F 15/20

ENTSCHEIDUNG / DECISION

vom / of / du 20 February 1990

Anmelder / Applicant / Demandeur :

Patentinhaber / Proprietor of the patent /
Titulaire du brevet :

Nippondenso Co Ltd

Einsprechender / Opponent / Opposant :

01 VDO Adolf Schindling AG
02 Bayerische Motoren Werke AG

Stichwort / Headword / Référence :

EPÜ / EPC / CBE Articles 56, 84, 123(2) and (3)

Schlagwort / Keyword / Mot clé :
"Main and first alternative request: amended to include added subject-matter, extended scope of protection"
"Second alternative request: inventive step (no)"
"Third alternative request: inventive step (yes)"

Leitsatz / Headnote / Sommaire



Case Number : T 241/88 - 3.2.1

D E C I S I O N
of the Technical Board of Appeal 3.2.1
of 20 February 1990

Appellant 01 :
(Opponent) VDO Adolf Schindling AG
Gräfstrasse 103
D-6000 Frankfurt/Main (DE)

Representative :
Zmyi, Erwin Dipl.-Ing.
Rosenheimerstr. 52
D-8000 München 80 (DE)

Appellant 02 :
(Opponent) Bayerische Motoren Werke AG
Petuelring 130, BMW Haus
Postfach 40 02 40
D-8000 München 40 (DE)

Representative :

Respondent :
(Proprietor of the patent) Nippondenso Co. Ltd.
1, 1-chome Showa-cho
Kariya-shi Aichi-ken (JP)

Representative :
Thomas, Christopher Hugo et al
D. Young & Co.
10 Staple Inn
London WC1V 7RD (GB)

Decision under appeal : Interlocutory decision of the Opposition Division of
the European Patent Office dated 5 April 1988
concerning maintenance of European Patent
No. 0 043 731 in amended form.

Composition of the Board :

Chairman : F. Gumbel
Members : P. Alting van Geusau
F. Benussi

Summary of Facts and Submissions

- I. European patent No. 0 043 731 was granted on 12 October 1983 on the basis of European patent application No. 81 303 100.2 filed on 7 July 1981.
- II. Opposition to the granted patent was filed by VDO Adolf Schindling AG (Opponent I) and Bayerische Motoren Werke AG (Opponent II) on the ground that the granted claims did not define novel and/or inventive subject-matter. The Opponents' arguments were essentially based upon the prior art disclosed in US-A-3 775 745 (D1) and DE-A-2 736 465 (D2).
- III. The Opposition Division in their interlocutory decision dated 5 April 1988 maintained the patent in amended form.
- IV. An appeal was lodged against this decision on 18 May 1988 by Opponent I (Appellant I) with payment of the appeal fee on the same date. A Statement of Grounds of Appeal was filed on 16 August 1988.
- V. In a communication dated 6 October 1989 the Board set out a preliminary opinion that the amended claims were not considered acceptable for reasons of clarity, added subject-matter and extended protection and that therefore the patent should be revoked if these claims were maintained.

In view of a subsidiary request for oral proceedings filed by the Respondent the parties were summoned to oral proceedings.

- VI. In the oral proceedings held on 20 February 1990 the Respondent requested maintenance of the patent on the

basis of claims filed on 30 January 1990 which comprised a main request and 3 subsidiary requests.

Former requests by the Respondent for rejection of the appeal as inadmissible and an award of costs under Rule 63 EPC were withdrawn.

The Appellants requested revocation of the patent in its entirety.

After discussion with regard to points of original disclosure and extended protection of the independent claims of the main request and first alternative request, the Board decided that these claims were not acceptable.

In further discussions as regards novelty and inventive step concerning Claim 1 according to the second and third alternative requests, the Appellants expressed the opinion that although these claims defined novel subject-matter an inventive step must be denied.

After deliberation the Board decided that the subject-matter according to the second alternative request lacked an inventive step. Maintenance of the patent on the basis of the claims of the third alternative request was considered to be possible.

The Respondent then filed on the basis of this request amended claims and an adapted description, on the basis of which documents the Board decided maintenance of the patent in amended form.

- VII. In support of his request for revocation the Appellant I argued in his written submissions and during the oral proceedings essentially as follows:

- (i) The claims of the main request and first alternative request are unclear. As far as their subject-matter can be understood the claims relate to a warning system in which shorter intervals for calculating a temperature increase rate dT are selected when a sensed temperature comes closer to a maximum permissible temperature. Such a measure must be considered as self-evident to the skilled man because in order to be able to make a forecast near the maximum temperature the calculation interval must of course be chosen such that the maximum temperature is not reached during measuring. Moreover, the text in column 1, lines 20 to 27 of D1 gives a clear indication for shortening the permissible interval as the temperature rises.
- (ii) The characterising features of Claim 1 according to the above requests and also of the second alternative request thus follow directly from the prior art disclosed in D1.

Even when considering that the alleged invention defined in these claims should be seen in the selection of a changing datum rate for judging whether the rate of temperature increase is acceptable or not as put forward by the Respondent, such idea is already disclosed in D1. The reference rate is indicated on line 68 in column 4 as "for example 300°C" which, when considering the temperature curve of the maximum permissible temperature (B) in Fig. 2 of D1, must be regarded as giving just an example on the curve: the curve itself clearly shows a variety of reference rates.

- (iii) Since further the forecasting and warning steps disclosed in the patent do not differ in substance

from these steps in D1 the means for carrying out the method steps should be essentially the same to arrive at the same results. Therefore the details of Claim 1 according to the third alternative request cannot substantiate an inventive step either.

VIII. In support of his request Appellant II argued during the oral proceedings essentially as follows:

- (i) Considering that the invention as claimed might relate to datum rates represented by the borderline between the hatched and blank regions in Fig. 5 of the patent there is neither a disclosure of the relevance of the sloping part of this line which is presented as essential nor is there an indication of values in a manner that the exact nature of the line can be understood. As a consequence Claim 1 of the main request and Claim 1 of the first alternative request are not supported by the description as far as they relate to this line in Fig. 5.
- (ii) As regards the second alternative request the sole difference resides in selecting shorter calculating intervals near the maximum permissible temperature. This is however shown in D1 as put forward by Appellant I.
- (iii) Considering that the idea underlying the patent is known from D1 the apparatus according to Claim 1 of the third alternative request does not represent more than what the skilled man would do in order to substantiate an apparatus for carrying out the known method. The detail according to which both a visual alarm and voice alarm is given is already disclosed in D2, page 13, last paragraph.

Therefore also this claim does not contain inventive subject-matter.

IX. The Respondent in his written submissions and during the oral proceedings argued:

- (i) Concerning the original disclosure of the subject-matter of Claim 1 of the main request and Claim 1 of the first alternative request, Fig. 5 of the patent must be considered in combination with the text of column 6, lines 11 to 24. Further, when comparing the known method for forecasting and warning disclosed in D1 to the method according to Claim 1 of the main request (and the first alternative request which essentially defines the method of Claim 1 of the main request in different terms) the known method relies on a fixed temperature rate which is "for example 300°C" (last line of column 4). Seen in the proper context the rate can be selected lower or higher but is not a floating rate as contended by the Appellant I. In this respect the temperature line B in Fig. 2 of D1 represents a borderline temperature curve which is used for temperature comparisons only but clearly not for comparison of rates of increase of temperature.

- (ii) As regards Claim 1 of the second alternative request and Claim 1 of the third alternative request, D1 discloses a system in which the monitoring of the rate of temperature is continuous. Hence it is not self-evident that intervals between two calculation cycles are becoming shorter, as alleged by the Appellants. D1 further nowhere suggests that the datum rate of increase should vary with the value of the temperature and clearly the embodiment disclosed

does not contain circuitry for achieving such variability, in the manner as defined in Claim 1 of the third alternative request.

- X. The first independent claims of the four requests under consideration read as follows.

Main request

"1. An automotive abnormality forecasting and warning method comprising:

detecting the condition of an inspection item of an automobile and generating a detection signal (T_w) in accordance with said condition;

giving an alarm (23) when the value of said detection signal exceeds a first predetermined value;

calculating the rate of increase with time (dT) in the value of said detection signal (T_w); and giving an alarm when the value of said detection signal (T_w) exceeds a second predetermined value lower than said first predetermined value and at the same time the rate of increase in the value of said detection signal exceeds a given rate;

characterised in that said given rate changes such that the smaller is said calculated rate (dT) and the greater is said detection signal (T_w), then the larger is the said given rate."

First alternative request

"1. An automotive abnormality forecasting and warning method comprising:

detecting the condition of an inspection item of an automobile and generating a detection signal (T_w) in accordance with said condition;

giving an alarm (23) when the value of said detection signal exceeds a first predetermined value;

calculating the rate of increase with time (dT) in the value of said detection signal (T_w); and giving an alarm when the value of said detection signal (T_w) exceeds a second predetermined value lower than said first predetermined value and at the same time the rate of increase in the value of said detection signal exceeds a given rate;

characterised in that:

said second predetermined value is predetermined to increase sequentially with decrease in the calculated rate of increase (dT) in the value of said detection signal when said calculated rate decreases from said given rate, and in that the alarm is actuated even when the value of said detection signal (T_w) exceeds said second predetermined value when said calculated rate (dT) is not higher than said given rate."

Second alternative request

"1. An automotive abnormality forecasting and warning method comprising:

detecting the condition of an inspection item of an automobile and generating a detection signal (T_w) in accordance with said condition;

giving an alarm (23) when the value of said detection signal exceeds a first predetermined value;

calculating at intervals the rate of increase with time (dT) in the value of said detection signal (T_w); and giving an alarm when the value of said detection signal (T_w) exceeds a second predetermined value lower than said first predetermined value and at the same time the rate of increase in the value of said detection signal exceeds a given rate;

characterised by the fact that the time period (N) between successive intervals is determined in such a manner that the higher the value of the detection signal (T_w) or the higher the rate of increase (dT) thereof, the shorter is the said period between successive intervals; and by giving an alarm when two conditions are satisfied namely (i) the value of said detection signal (T_w) and (ii) the rate of increase (dT) in the value of said detection signal both fall within a predetermined region in a representation (Fig. 5) of the relationship between these two variables stored in a memory of a microcomputer (3)."

Third alternative request

"1. An automotive abnormality forecasting and warning apparatus comprising:

temperature detecting means for generating a detection signal (T_w) in accordance with a temperature, means for displaying an alarm (22,23) when the value of said detection signal exceeds a first predetermined value;

calculating means calculating the rate of increase with time (dT) in the value of said detection signal (T_w);

and alarm means giving an alarm when the value of said detection signal (T_w) exceeds a second predetermined value lower than said first predetermined value and at the same time the rate of increase in the value of said detection signal exceeds a given rate;

characterised by the combination of;

water temperature judging means (3,4) including means for fetching a water temperature indication signal periodically and means for calculating the water temperature change in variable calculation cycle periods, said calculating means including means (103) for calculating the rate of water-temperature change (dT) in a given variable cycle period (N) in accordance with the difference in the detected water temperature (T_w) between the beginning and the end of said cycle period (N);

first memory means for storing the relation between water temperature (T_w), water-temperature change rate (dT) and calculation cycle period (N) in such a manner that the higher the water temperature and the water-temperature change rate, the smaller the calculation cycle period (N) (Fig. 4);

second memory means for storing the relation between water temperature (T_w) and water-temperature change rate (dT) in a predetermined water overheated region (Fig. 5);

means (104) for determining the calculation cycle period (N) corresponding to the calculated water-temperature change rate (dT) and the detected water temperature indication signal on the basis of the signal from said first memory means; overheating trend detection means (105) for comparing the detected water temperature (T_w) and the calculated change rate (dT) with those in said

predetermined water overheat region and issuing an overheating trend alarm signal when said detected water temperature (T_w) and said calculated change rate (dT) are included in said region, said overheating trend detection means issuing a cancellation signal when said detected water temperature and said calculated change rate are not included in said region;

visual alarm means (106 to 108) for issuing an alarm on an overheating trend in accordance with the overheating trend alarm signals generated in a number (M) of said comparisons less than a predetermined number (M_o);

voice indicator means (106,107,111) for issuing a voice alarm on an overheating trend in response to the generation of the overheating trend alarm signals in a number (M) equal or exceeding said predetermined number (M_o)."

Reasons for the Decision

1. The appeal is admissible.
2. Formal aspects of the claims.
 - 2.1 All independent claims of the request now relate in their precharacterising part to US-A-3 775 745 (D1).

These precharacterising features are disclosed in the initial Claim 1 of the patent application up to "and giving an alarm..." and for the rest in the forecasting calculation routine 100 described in column 6, lines 11 to 21 in relation to Fig. 5 in particular as regards "a second predetermined temperature" of for example 100°C in

Fig. 5 and "a given rate" which obviously refers to points in the hatched region of Fig. 5 for which an "alarm" is given.

- 2.2 Considering the characterising features of Claim 1 of the main request, according to the explanations given by the Respondent these features represent a definition of the sloping part of the borderline between the hatched and blank areas in Fig. 5 of the patent. The Respondent argued that Fig. 5 being part of the disclosure, features may be taken from the drawing to define the subject-matter protection is sought for.

In this respect the Board draws attention to the fact that although in principle features contained in the drawings may be included in the claims, in accordance with a former decision of this Board (T 169/83 OJ EPO 1985, 193) the condition must be satisfied that the features are clearly shown in the drawings originally filed and are clearly, unmistakable and fully derivable from the drawings in terms of structure and function by a person skilled in the art to enable him to recognise these features as forming part of the invention when considering the content of the description as a whole.

In the Board's judgment the latter condition is not satisfied in the present case.

Figure 5 of the patent represents a schematic diagram of a hatched region in a presentation of the water temperature against the calculated water temperature increase with time. Although it can be recognised that the borderline between these two regions contains a straight and sloping part, the exact nature of the sloping part such as the slope angle or "end" points of this part are neither clearly derivable from the Figure nor from the

description. Moreover, the description refers to "the hatched region" of Fig. 5 as an overheating condition only and does not contain any reference to the form of the borderline or relevance of the sloping part for the invention.

Therefore, while it can be accepted that the hatched region of Fig. 5 represents different "given rates" (see also §2.1 above) no clear disclosure that the given rate changes in the manner as defined in the characterising part of the main request can be found in the patent.

For these reasons Claim 1 of the main request is not acceptable on grounds of Article 123(2) EPC (added subject-matter).

- 2.3 Considering independent Claim 5 of the main request the Board notes that in addition to the objections of lack of support and added subject-matter as put forward against Claim 1, which objections apply also to Claim 5, the subject-matter of Claim 5 is additionally unacceptably extended with respect to Claim 5 in the form as originally submitted and published in the patent by leaving out the feature that voice alarm generator means are provided. Therefore this claim is also not acceptable for reasons of Article 123(3) EPC.

Since, as established above, Claim 1 is not acceptable, the argument advanced by the Respondent in respect of Claim 5, namely that it is drafted in dependent form based on a Claim 1 which satisfies Article 123 EPC, has no basis; Claim 5 is therefore not acceptable. Moreover the Board cannot accept the principle upon which this submission is based for the reason that Claim 5 relates to an apparatus for carrying out the method of Claim 1 and is therefore of a different independent category; it is only

related to Claim 1 in as much as the apparatus defined in Claim 5 is suitable for carrying out the method of Claim 1.

2.4 The characterising features of Claim 1 of the first alternative request also relate, according to explanations given by the Respondent, to a definition of the sloping part of the borderline in Fig. 5 of the patent. As set out above the Board considers that the application as filed does not contain a sufficient disclosure that would justify the interpretation now given in this Claim 1 and therefore also Claim 1 of the first alternative request is, in the Board's judgment, not acceptable for reasons of Article 123(2) EPC. As a consequence also the first alternative request must be rejected as a whole.

2.5 The characterising features of Claim 1 of the second alternative request are disclosed in column 5, from line 40 to column 6, line 21 in combination with Fig. 4 and 5 of the patent in accordance with the original disclosure.

The characterising features of Claim 1 of the third alternative request are contained in the Claim 8 of the patent and of the original application.

These claims are therefore formally acceptable.

3. Patentability, second alternative request

3.1 The nearest prior art is considered to be disclosed in D1. In accordance with the precharacterising features of Claim 1 of this request (see §2.1 above) D1 discloses that an alarm is given when two conditions are satisfied namely (i) the value of the detection (temperature) signal and (ii) the rate of increase in the value of said detection

(temperature) signal both fall within a predetermined region in a representation of the relationship between these two variables: these features are the result of the control circuit in Fig. 4 of D1 in particular when considering the function of AND gate 30.

In this respect the Board drew attention during the oral proceedings to the fact that the formulation in Claim 1 of this request does not demonstrate the difference of the known predetermined region when compared to the predetermined region as presented by the hatched region in Fig. 5 of the patent.

3.2 The subject-matter of Claim 1 of the second subsidiary request differs from the known abnormality forecasting and warning method according to D1 in that

- (a) the time period (N) between successive intervals is determined in such a manner that the higher the value of the detection signal (T_w) or the higher the rate of increase (dT) thereof, the shorter is the said period between successive intervals; and
- (b) the predetermined region is stored in a memory of a microcomputer.

The subject-matter of Claim 1 of this request is therefore novel. Novelty of the subject-matter of this claim was not disputed by the Appellants during the oral proceedings in particular in view of the fact that D1 does not contain feature (b) above.

3.3 The features (a) and (b) above are not related in a manner that a combinatory effect is achieved and should therefore be considered separately rather than in their combination.

3.4 Considering feature (b) the Board notes that in D1 the "predetermined region" is defined in the hardware constituted by start of heating detector A₃ and rate trigger A₂(b) (see Fig. 4 of D1) thereby specifying an area in a temperature-temperature increase rate diagram for which an alarm is given.

However other possibilities are available to the skilled control engineer for specifying such an area in a representation of two variables of which possibilities, in view of the easy access and programming, it is in the Board's opinion, obvious to store the above relationship in a memory of a microcomputer. Therefore in the Board's judgment feature (b) merely represents an obvious alternative of the known area defining elements and is without any inventive significance.

3.5 Considering feature (a) the Board recognises that these features result in a more accurate forecasting of an abnormality in particular near the "first predetermined value".

The object of the subject-matter of Claim 1 of the second subsidiary request thus essentially relates to an improvement of the known forecasting method of D1 to achieve a more accurate forecasting, in particular at higher values of the detection signal.

The Board notes that the Appellant I pointed out in the oral proceedings that D1 in column 1, lines 24 and 25 discloses that the permissible time interval shortens as the temperature rises and that therefore feature (a) is implicitly disclosed in D1.

However, as put forward by the Respondent, which interpretation is supported by the Board, considering the whole paragraph in column 1, starting from line 20 it is clear that the "time interval" referred to is not a time interval for measuring a temperature rise in the sense as used in Claim 1 under consideration but merely a time period during which higher temperatures may be allowed in a gas-turbine without creating an overheated condition. Therefore the above paragraph in column 1 of D1 cannot be construed to represent an implicit disclosure of feature (a).

Nevertheless, considering the determination of the rate of increase, in the Board's opinion, the skilled control engineer would immediately realise that during the calculating interval of the temperature rate the upper limit should not be exceeded and that therefore adaptation of the interval becomes necessary in order to be able to still make a forecast near the highest acceptable temperature. In this respect the Board is of the opinion that it is part of the general knowledge of the control engineer that measuring frequencies should be selected higher, thus leading to shorter measuring intervals, when the measured parameter indicates the approach of a critical situation.

Therefore feature (a) is considered to relate to an obvious further development of the known abnormality forecasting and warning method disclosed in D1 rather than that inventive ingenuity was necessary for adapting the known method to include feature (a).

- 3.6 Since, as referred to above, features (a) and (b) do not result in any surprising or combinatory effect and the features (a) and (b) by themselves are not inventive, their combination cannot be considered to add anything

inventive to the known method according to the precharacterising part of Claim 1 under consideration.

As a consequence Claim 1 of the second alternative request cannot be allowed for reasons of lack of inventive step. Therefore this request as a whole is not acceptable.

4. Patentability, third alternative request

4.1 This claim is also related in its precharacterising part to the nearest prior art disclosed in D1 and contains in its characterising part those features which are clearly novel with regard to the apparatus disclosed in D1. Therefore the subject-matter of Claim 1 of the third subsidiary request is novel. Since this was not disputed by the Appellants no further substantiation of this matter is necessary.

4.2 The features of the characterising part apparently lead to a more accurate forecasting when compared with the known forecasting disclosed in D1 and provide improved warning. The object of the invention is therefore related to an improvement of the known apparatus in this sense as this is set out on page 1, lines 22 to 24 of the adapted description filed in the oral proceedings.

4.3 The Board notes that the forecasting and warning apparatus according to Claim 1 of this request is very detailed and includes to a great extent the features of the embodiment described in columns 3 to 7, up to line 15 and as such provide a practicable arrangement of an abnormality forecasting and warning apparatus for judging the water temperature in an automobile.

4.4 Although, as set out above in §3.5 the skilled man would consider variable calculation cycles for determining the

temperature change rate no lead can be derived from the cited documents, considering in particular D1, to the detail of the water temperature judging means defined in the first part of the characterising portion of Claim 1 under consideration with respect to Fig. 4 of the patent.

Further, the second memory means for storing the relation between water temperature and water temperature change rate and overheating trend detection means are linked to both visual and voice indicator alarm means in such a manner that account is taken of short and long-term overheating indications each with their own alarm means to which idea and detail also no lead can be derived from any of the cited documents.

Appellant II drew attention to D2, page 13, last paragraph which discloses that in addition to visual also acoustic signals may be given. He however failed to provide any arguments or evidence showing that these two alarm means may be operated in the manner as defined in Claim 1. Also the Appellants' argument that since the method steps of the known forecasting and warning disclosed in D1 do not differ in substance from these steps in the patent, the means for carrying out the method steps must be essentially the same, cannot be considered convincing.

Given the fact that method steps can be substantiated in many different ways, and considering that there was no proof that the features of Claim 1 can be derived in an obvious way from the prior art, the above contention must be regarded, in the Board's judgment, as mere speculation and hence not suited for detracting from patentability of the claimed subject-matter.

Summarising the Board comes to the conclusion that despite the fact that D1 discloses the idea of forecasting an

abnormality on the basis of an unacceptable temperature increase rate over a particular temperature, there cannot be any probability that a skilled person being confronted with the object of the invention as set out above would arrive at the detailed apparatus defined in Claim 1 without the exercise of any inventive activity.

Consequently the subject-matter of Claim 1 of the third alternative request is considered to be based on an inventive step. Claim 1 is therefore acceptable.

- 4.5 Dependent Claims 2 and 3 concerning particular embodiments of the invention in accordance with Rule 29(3) EPC are likewise acceptable.

The description and drawings take account of the requirements of the EPC and are suitable for maintenance of the patent in amended form.

Order

For these reasons, it is decided that:

1. The impugned decision is set aside.
2. The main request, the first and second alternative requests are rejected.

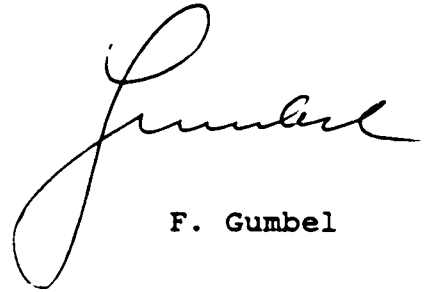
3. The case is remitted to the first instance with the order to maintain the patent on the basis of the documents in accordance with the third alternative request submitted during the oral proceedings.

The Registrar:

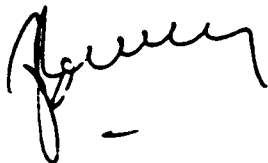


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The Chairman:



F. Gumbel



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