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**D E C I S I O N**  
of 25 April 2002

**Case Number:** T 0693/98 - 3.2.1

**Application Number:** 91110797.7

**Publication Number:** 0471951

**IPC:** B60T 8/88

**Language of the proceedings:** EN

**Title of invention:**  
Antilock brake control system

**Patentee:**  
AISIN SEIKI KABUSHIKI KAISHA

**Opponent:**  
Robert Bosch GmbH

**Headword:**  
-

**Relevant legal provisions:**  
EPC Art. 56, 100(c), 102(3), 123(2)  
EPC R. 55(c)

**Keyword:**  
"Fresh ground for opposition (not admitted)"  
"Inventive step (yes)"

**Decisions cited:**  
G 0009/91, G 0010/91, T 0301/87

**Headnote:**  
The fact that amendments have been made to a claim in the course of the opposition proceedings does not allow an opponent to raise an admissible objection under Article 123(2) EPC at the appeal stage in the absence of the patentee's agreement, if such objection results from an amendment made before grant and has not been originally raised as a ground for opposition under Article 100(c) EPC pursuant to Rule 55(c) EPC (cf Point 2 of the reasons).



Case Number: T 0693/98 - 3.2.1

**D E C I S I O N**  
of the Technical Board of Appeal 3.2.1  
of 25 April 2002

**Appellant:**  
(Opponent)

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

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**Decision under appeal:**

Interlocutory decision of the Opposition Division  
of the European Patent Office posted 12 May 1998  
concerning maintenance of European patent  
No. 0 471 951 in amended form.

**Composition of the Board:**

**Chairman:** F. Gumbel  
**Members:** M. Ceyte  
G. Weiss

## Summary of Facts and Submissions

- I. The respondent is proprietor of European patent No. 0 471 951 (application No. 91 110 797.7).
- II. The patent was opposed by the appellant on the ground of lack of inventive step.

By its interlocutory decision posted on 12 May 1998 the opposition division took the view that the subject-matter of amended claim 1 was patentable over the prior art, in particular having regard to the following prior art documents

D7: DE-A-34 47 449

D8: DE-A-32 25 455.

- III. On 13 July 1998 the appellant (opponent) lodged an appeal against that decision, with the appeal fee being paid at the same time.

In the statement of grounds of appeal filed on 21 September 1998 the following document was cited for the first time

D9: Bosch technische Berichte Band 7 (1980) Heft 2,  
"Antiblockiersystem (ABS) für Personenwagen",  
Heinz Leiber, Armin Czinczel und Jürgen Anlauf

- IV. In response to a communication pursuant to Article 11(2) of the Rules of Procedure of the Boards of Appeal, the appellant raised the objection that an amendment to claim 1 made before grant did not comply with Article 123(2) EPC.

V. Oral proceedings before the Board were held on 25 April 2002.

The appellant requested that the decision under appeal be set aside and the European patent be revoked.

The respondent (patentee) requested that the appeal be dismissed and the patent be maintained on the basis of new claims 1 and 2 submitted during the oral proceedings, for the rest documents as granted.

Claim 1 reads as follows:

1. An anti-lock brake control system comprising:

a reservoir (19R, 19L) for storing therein an amount of fluid,

a master cylinder (12),

a plurality of wheel cylinders (WC1, WC2, WC3, WC4) provided for a plurality of corresponding wheels,

a plurality of control valves (15R, 15L, 17R, 17L) each of which is designed for establishing fluid communication of a respective wheel cylinder (WC1, WC2, WC3, WC4) to a selected one of the master cylinder (12) and the reservoir (19R, 19L),

a plurality of solenoids (Sol) each of which is connected to a battery and each control valve,

a first switch (S1) for turning on the solenoids (Sol) concurrently to activate the corresponding control valves (15R, 15L, 17R, 17L),

motor means 14, S2) including a motor (14), a second switch (S2) interposed between the motor (14) and the battery, and a pump driven by the motor (14) upon closure of the second switch (S2) for returning the fluid from the reservoir (19R, 19L) to the master cylinder (12), and

control means (ECU) for controlling the solenoids (Sol) and the motor means (14, S2) based on the rotational speed of any one of the wheels, being

characterized by

output judging means (22) arranged to output a load signal to the first and second switches (S1, S2) and to the solenoids (Sol), a pumping signal ( $\alpha$ ) which shows a normal condition on a normal state of the load output signal and shows an abnormal condition on an abnormal state of the load output signal and which shows the abnormal condition set by said output judging means (22) for checking purposes, wherein

inhibiting means (24) is arranged to receive the pumping signal ( $\alpha$ ) and to determine the condition thereof in order to interrupt the output of the load output signal to the first and second switches (S1, S2) and the solenoids (Sol) when it is determined that the pumping signal shows the abnormal condition, and said inhibiting means (24) is arranged to receive said pumping signal ( $\alpha$ ) set by said output judging means (22) and to interrupt the output of the load output signal so as to open the first and second switches (S1, S2) in response thereto when said abnormal state is determined, and wherein

said control means (ECU) is arranged to check the functional state of said inhibiting means (24) by determining whether or not the inhibiting means (24)

interrupts the output of the load output signal when said pumping signal ( $\alpha$ ) indicative of the abnormal state set by said output judging means (22) is applied from said output judging means (22) to said inhibiting means (24) and to inhibit the output of the load output signal in case it is determined that the inhibiting means (24) does not interrupt the output of the load output signal, in response thereto."

VI. In support of its request the appellant submitted in essence the following:

Having regard to its objection under Article 123(2) EPC it took the view that the feature "so as to open the first and second switches (S1, S2) when said abnormal state is determined" was not originally disclosed and that the patent must be revoked for this reason. Concerning patentability it may be true that the claimed anti-lock brake system formally differs from that disclosed in document D7 by virtue of:

- (i) output judging means used to output not only control signals for controlling the fluid pressure but also an error-signal (pumping signal).
- (ii) inhibiting means for interrupting the control signals when the pumping signal indicates an abnormal condition.
- (iii) an electronic control unit (ECU) being arranged to check the correct functioning of the inhibiting means, by delivering an intentionally created abnormal pumping signal, to determine whether or not the inhibiting means interrupt the control signals.

D7 relates however to an anti-skid braking system which in fact functionally corresponds to the above characterising features (i) and (ii) of claim 1: as shown in Figures 3 and 4, the micro-computer which is also a part of the electronic control unit (ECU) outputs an error signal to a failsafe and automatic reset block whose function is substantially the same as the claimed inhibiting means; in response to this error signal, the failsafe and automatic reset block also interrupts the control signals. As to the remaining characterising feature (iii) this citation teaches a self test circuitry in which the microcomputer checks the peripheral circuits for correct operation. In case of a failure the microcomputer stops the control signals.

D8 teaches that one of two parallelly operating computer units can be disabled with the aid of a disconnecting switch unit (18, 19), in the event that a comparator detects that such computer unit does not function correctly. Thus the disclosed disconnecting switch unit functions like the claimed inhibiting means, since each computer unit can be shut down by an independent disconnecting switch unit. Furthermore, the computer units check the correct functioning of the disconnecting switch units by issuing an intentionally abnormal signal, which enables the disconnecting switch units to be activated and to shut down the computer units. This means that D8 discloses the characterising feature (iii) cited above.

It follows that the skilled person would inevitably have arrived at the claimed solution by merely applying the teaching given in D8 to the electronic control unit disclosed in D7.

The newly introduced document D9 clearly shows that the features enumerated in the first part of claim 1 were well known before the priority date of the European patent in anti-lock brake control systems. The consideration of this prior art document instead of D7 would therefore also lead to the conclusion that the solution defined in claim 1 lacks an inventive step.

VII. The respondent (patent proprietor) rejected the arguments brought forward by the appellant.

It submitted in great detail for which reasons the subject-matter of claim 1 was clearly inventive over the opposed prior art.

It did not give its agreement for pursuing the appellant's objection under Article 123(2) EPC.

#### **Reasons for the Decision**

1. The appeal is admissible.
2. *Procedural matters:*

The ground of opposition as mentioned in Article 100(c) EPC has not originally been raised by the appellant (opponent) pursuant to Rule 55(c) EPC.

The objection that an amendment made to claim 1 before grant did not comply with Article 123(2) EPC, raised for the first time at the appeal stage of the proceedings thus constitutes a fresh ground for opposition.



In view of the respondent's refusal to agree to the introduction of this fresh ground for opposition and following the principles for appeal review laid down by the Enlarged Board of appeal in its decision G 9/91 "Power to examine/ROHM AND HAAS", OJ EPO 1993, 408 and in its opinion G 10/91, OJ EPO 1993, 420 (see point 18 of the reasons for both cases and point 3 of the opinion G 10/91) this fresh ground may not be considered in the appeal proceedings.

It is true that the respondent (patentee) proposed various amendments to the text of claim 1 in the course of the opposition proceedings and that the appellant (opponent) submitted that some of them did not comply with Article 123(2) EPC. Article 102(3) EPC which is applicable both in proceedings before the Opposition Division and in the appeal stage of the opposition proceedings requires that when amendments are made to a patent during opposition proceedings, the Opposition Division or the Board of Appeal must consider, taking into consideration the amendments made, whether "the patent and the invention to which it relates meet the requirements of this Convention", thus including Article 123(2) EPC.

The question therefore arises as to whether on the proper interpretation of Article 102(3) EPC the fact that any amendment to the claims has been made in opposition proceedings opens the possibility for an opponent to raise an objection under Article 123(2) EPC to all the amendments to the claims including those made before the patent was granted, even if such objection was not originally raised and substantiated as ground for opposition.

Obviously to admit such possibility would be contrary to both the letter and spirit of the above opinion G 10/91 of the Enlarged Board of Appeal which states the following (point 19 of the reasons):

"In order to avoid any misunderstanding it should be finally confirmed that in case of amendments of the claims or other parts of a patent in the course of the opposition or appeal proceedings, such amendments are to be fully examined as to their compatibility with the requirements of the EPC (e.g. with regard to the provisions of Article 123(2) and (3) EPC" (emphasis added).

This clearly means that only the amendments made during opposition or appeal proceedings, not those made before grant, must be examined in accordance with Article 102(3) EPC for compliance with the requirements of the EPC, including Article 123(2) EPC.

It should additionally be noted that the principles for appeal review laid down in decision G 9/91 and opinion G 10/91 of the Enlarged Board are in agreement with the previous case law of the Boards of appeal, where it is also well established that only the amendments made in the course of the opposition and appeal proceedings should be considered in accordance with Article 102(3) EPC as to their compatibility with the requirements of the EPC, see decision T 301/87 (OJ EPO 1990, 335).

In accordance with the above principles the Board concludes that the amendments made to claim 1 in the course of the opposition proceedings, which in fact, comply with the requirements of the Convention including Article 123(2) EPC, do not allow the appellant (opponent) to raise an admissible objection under Article 123(2) EPC at the appeal stage in the

absence of the respondent's agreement, if such objection results from an amendment made before grant and has not been originally submitted as ground for opposition under Article 100(c) EPC pursuant to Rule 55(c) EPC.

Accordingly the objection of the Appellant based upon Article 123(2) EPC is rejected as inadmissible.

3. *Article 123 EPC*

There are no formal objections under Article 123(2) EPC to the amendments to claim 1 made during the opposition and appeal proceedings, since they are adequately supported by the original disclosure.

Claim 1 as at present amended contains all the features of granted claim 1 and thus meets also the requirements of Article 123(3) EPC.

4. *Novelty*

The Board is satisfied that the subject-matter of claim 1 is novel over the opposed prior art documents.

Since this was never disputed during the opposition and appeal proceedings there is no need for further detailed substantiation of this matter.

5. *Inventive step*

- 5.1 The claimed invention relates to an anti-lock brake control system of the kind comprising a reservoir, a master cylinder, a plurality of wheel cylinders, a plurality of control valves, a plurality of solenoids, a first switch for turning on the solenoids concurrently to activate the control valves, motor means including a motor, a second switch interposed

between the motor and the battery, a return pump driven by the motor upon closure of the second switch and an electronic control unit (ECU) for controlling the solenoids and the motor means based on the rotational speed of the wheels.

A brake control system of this kind is in essence disclosed in document D7.

The object to be achieved by the present invention is to provide an anti-clock control system in which a safety braking operation can be assured in spite of (1) malfunction of the microprocessor and (2) failure of a monitoring circuit for monitoring the microprocessor (see column 2, lines 21 to 26 of the European patent).

5.2 This object is in essence achieved by the features stated in the characterising part of claim 1, that is as already stated in point VII above,

- (i) output judging means used to output not only control signals for controlling the fluid pressure but also an error signal (pumping signal),
- (ii) inhibiting means for determining whether the received pumping signal indicates a normal or abnormal condition and for stopping the control signals when the pumping signal indicates an abnormal condition, and
- (iii) electronic control unit (ECU) used to check the correct functioning of the inhibiting means, by delivering an intentionally created abnormal pumping signal to determine whether or not the inhibiting means interrupt the control signals (load output signals).

Hence the claimed arrangement renders it possible (1) to check the correct operation of the inhibiting means by the ECU (feature (iii)) above and (2) to additionally check the correct operation of a part of the ECU (the output judging means) by the inhibiting means.

- 5.3 Document D7 relates to an anti-skid braking system including (Figure 4) a failsafe and automatic reset block ("Fehlersicherheits- und automatische Rücksetzschaltung") connected to a microcomputer. This block is permanently disposed to blow a fuse and remove power from the drive circuits block ("Ansteuerschaltungen") so ensuring that the valve solenoids cannot be operated, so that the vehicle retains normal braking (page 13, line 9 to 14).

During normal operation, the failsafe and automatic reset block is continually disabled by the microcomputer. If the microcomputer detects any fault, it stops disabling the failsafe and automatic reset block. After a short delay, the automatic reset function reactivates the system. The microcomputer then enters a self test sequence in which it checks itself and the peripheral circuits. If a problem still exists, the microprocessor does not reactivate the fail safe disable signal. The failsafe block waits for an appropriate period of time and if it is not disabled implements the failsafe function, i.e. blows the fuse (see paragraph bridging pages 13 and 14 of D7).

There is thus no disclosure or suggestion of any checking of the correct functioning of the fail safe block by issuing of an intentionally created abnormal signal (feature (iii) above), i.e. the fail safe disable signal would not be deliberately stopped and the output of the failsafe block monitored to see if the fuse interrupts the power supply.

There is also no verification of the correct functioning of the microcomputer by the failsafe block: In the claimed invention, the so-called pumping signal delivered by the microcomputer (output judging means) is evaluated by the inhibiting means. When it is determined that the pumping signal shows a normal condition the load output signal is not blocked. However when the inhibiting means judges that the pumping signal is abnormal, then the transmission of the load output signal is blocked. Thus, if the fail safe block corresponds to the claimed inhibiting means, the function of this fail safe block is not to evaluate the control or pumping signal generated by of the associated microcomputer or output judging means as required by the characterising feature (ii) above.

- 5.4 Document D8 teaches that in order to improve the failsafe capabilities of a computer based control system in general, the computer unit should be duplicated. A monitoring system is connected to and located between these two computer units. Upon comparing the data provided by both computer units a comparator circuit determines whether the data signals from the computer units coincide with each other. If the data signals of both computer units do not coincide, an error signal is delivered to an independent disconnecting switch unit which disconnects the computer unit from which the error originates. This citation further describes, how the comparator circuit is checked by artificially generated errors in the signals generated by the computer units.

The appellant alleges that the skilled person seeking to improve the failsafe capabilities of an anti-lock brake control system of the kind disclosed in D7 would have considered the teaching of D8 and thus would have replaced the failsafe block of D7 by the separate disconnecting switch unit of D8. To do so however would

not enable the skilled person to arrive at the claimed teaching: The disconnecting switch unit disclosed in D8 is not designed to evaluate an error or pumping signal generated by the associated computer unit.

Therefore there is no suggestion or teaching in these two citations of the claimed inhibiting means which is used to evaluate the control signal supplied by the output judging means so as to detect either a normal or an abnormal condition in this signal, and to shut down the control signals when the control signal (pumping signal) indicates an abnormal condition.

5.5 Document D9 played no significant role during the oral proceedings before the Board. This citation clearly discloses the features of the preamble part of claim 1 but neither the feature (iii) nor the feature (ii) and thus would not lead the skilled person to the claimed invention.

5.6 Therefore, in the Board's judgment, the subject-matter of claim 1 cannot be derived in an obvious manner from the available prior art and consequently involves an inventive step (Article 56 EPC) Accordingly the patent is to be maintained on the basis of this main claim

6. Dependent claims 2 and 3 concern particular embodiments of the invention claimed in claim 1 and are likewise allowable.

The opposition ground thus does not prejudice the maintenance of the patent in amended form.

**Order**

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

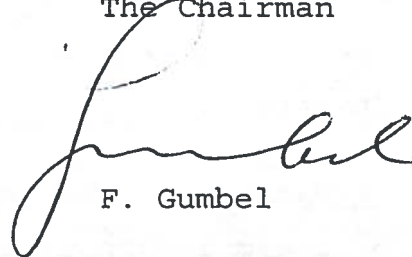
1. The decision under appeal is set aside.
2. The case is remitted to the first instance with the order to maintain the patent with the following documents:
  - claims 1 and 2 presented at the oral proceedings of 25 April 2002;
  - claim 3, description and drawings of the patent specification.

The Registrar:



S. Fabiani

The Chairman



F. Gumbel