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D E C I S I O N
of 16 October 2001

Case Number: T 1068/99 - 3.2.1

Application Number: 94309130.6

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Title of invention:
Apparatus for alarming tyre deflation

Patentee:
SUMITOMO RUBBER INDUSTRIES LIMITED, et al

Opponent:
Mannesmann VDO AG

Headword:
-

Relevant legal provisions:
EPC Art. 54(2), 56, 100(b)

Keyword:
"Sufficiency of disclosure (yes)"
"Novelty (granted claim 2, no)"
"Inventive step (yes)"

Decisions cited:
-

Catchword:
-



Case Number: T 1068/99 - 3.2.1

D E C I S I O N
of the Technical Board of Appeal 3.2.1
of 16 October 2001

Appellant:
(Opponent)

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Respondent:
(Proprietor of the patent)

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Decision under appeal:

**Decision of the Opposition Division of the
European Patent Office posted 20 October 1999
rejecting the opposition filed against European
patent No. 0 657 314 pursuant to Article 102(2)
EPC.**

Composition of the Board:

Chairman: F. Gumbel
Members: S. Crane
J. Van Moer

Summary of Facts and Submissions

- I. European patent No. 0 657 314 was granted on 6 August 1997 on the basis of European patent application No. 94 309 130.6.

The granted patent has two claims, which read as follows:

- "1 An apparatus for alarming tyre deflation comprising a deflation detection mechanism for detecting tyre deflation, characterised by a vehicle speed measuring device and an alarm mechanism for deciding an alarm level depending on levels of tyre deflation detected by the deflation detection mechanism and on levels of vehicle speed."
- "2. A method for alarming tyre deflation on a vehicle comprising determining and monitoring a deflation level characterised in that the method further comprises determining and monitoring a speed level of the vehicle, and alarming depending on levels of deflation levels and levels of vehicle speed."

- II: The granted patent was opposed in its entirety by the present appellants on the grounds that its subject-matter lacked novelty and/or inventive step (Article 100(a) EPC) and that the claimed invention was insufficiently disclosed (Article 100(b) EPC). Of the prior art documents relied upon only the following have played any role on appeal:

(D1) EP-A- 0 239 545

(D2) WO-A- 86/07 316

(D3) DE-A- 3 916 176

(D7) EP-A- 0 036 755

III. The Opposition Division rejected the opposition with its decision posted on 20 October 1999.

IV. A notice of appeal against this decision was filed on 25 November 1999 and the fee for appeal paid at the same time. The statement of grounds of appeal was filed on 23 February 2000.

V. Oral proceedings before the Board were held on 16 October 2001.

The appellants requested that the decision under appeal be set aside and the patent revoked in its entirety.

The main request of the respondents (proprietors of the patent) was that the appeal be dismissed and the patent maintained as granted. In the alternative they requested maintenance of the patent in amended form on the basis of the documents according to first and second auxiliary requests filed on 13 September 2001.

Claim 1 of the first auxiliary request corresponds to claim 1 as granted, claim 2 reads as follows:

"A method for alarming tyre deflation on a vehicle comprising determining and monitoring a deflation level, characterised in that the method further

comprises determining and monitoring a speed level of the vehicle, and alarming , wherein the alarm level is decided depending on levels of deflation levels and levels of vehicle speed."

VI. In support of their request the appellants argued substantially as follows:

It was unclear how a alarm mechanism could make decisions, as stated in granted claim 1, and the patent specification was wholly silent as to any concrete means for determining the level of the alarm to be given in particular circumstances. There was therefore a fundamental insufficiency of disclosure which alone should lead to revocation of the patent (Article 100(b) EPC).

In any case, the subject-matter of granted claims 1 and 2 lacked novelty with respect to both documents D2 and D3. The means described in document D2 for generating an alarm noise from a tyre with low pressure would automatically result in an alarm level which was dependent on the deflation level and the vehicle speed, in correspondence with the claimed subject-matter. The importance of making the alarm dependent on both deflation level and vehicle speed was also clearly stressed in document D3. All of the technical means specified in claim 1 and their method of operation as set out in claim 2 were to be found in this document.

If there were any residual doubts as to the full anticipation of the claimed subject-matter by documents D2 and D3 then reference to document D1 and D7 would fill the gaps. These documents clearly indicated the benefit of associating different alarm levels to

different levels of endangerment to normal operation and included within their ambit tyre deflation monitoring.

VII. The reply of respondents can be summarised as follows:

The essence of the invention lay in the generation of an alarm at a level which was commensurate with both the level of tyre deflation and the vehicle speed, thus avoiding problems associating with tyre deflation alarm systems of the prior art. The design of suitable means, eg an electronic circuit, for performing the necessary determinations, would be a trivial matter for the person skilled in the art and the absence of detail in this respect did not make the patent specification insufficient.

It was very questionable whether the rather primitive proposal of document D2 would be effective to produce any form of alarm on tyre deflation, but in any case there was certainly no suggestion that the level of alarm would be dependent on the level of deflation and on vehicle speed.

Document D3 was effectively concerned with a method of determining tyre deflation and two distinct applications of the determined values. The first was to give an alarm to the driver if certain thresholds were exceeded, the second to instigate tyre pressure regulation. In the second application vehicle speed was taken into account in the regulation system, but this has nothing to do with deciding on an appropriate alarm level.

In addition, neither of the documents D1 or D7 gave any

hint as to the basic idea underlying the invention.

Reasons for the Decision

1. The appeal complies with the formal requirements of Articles 106 to 108 and Rules 1(1) and 64 EPC. It is therefore admissible.

2. As explained in the introductory description of the patent specification various kinds of systems for detecting the deflation of a tyre and warning the driver accordingly have been proposed. Problems however arise with determining how far deflation should be allowed to proceed before an alarm is given, since the degree of danger depends on vehicle speed. If the system is set to give an alarm on slight deflation in order to give maximum security this can lead to false alarms which can cause uneasiness in the driver and, eventually, to him ignoring the alarm completely. On the other hand, if the alarm is not given until there is significant deflation the reliability of the system is improved at the risk of the alarm coming too late in the case of high speed driving.

In general terms what the claimed invention therefore proposes is to have a range of alarm levels, eg in terms of loudness of an audial alarm or frequency of a flashing visual alarm, the level of the alarm being determined in dependence on the level of tyre deflation and the vehicle speed.

The patent specification goes into considerable detail as to how the alarm level should be related to the two variables of tyre deflation and vehicle speed, resulting in the graphical representation to be found

in Figure 1. As shown an alarm is only given once the minimum meaningful deflation of -15% has been detected and at this level there is no alarm until a minimum speed of 40 Km/h is reached. Thereafter, at a constant deflation level of -15% the level of the alarm increases with speed until the maximum alarm level is reached. At the other end of the scale, the alarm is always given at the maximum level if the deflation is over -80%, irrespective of vehicle speed. The patent specification is however silent with regard to the technical means necessary for determining, or in the terms of granted claim 1 "deciding", the alarm level in dependence on the level of tyre deflation and vehicle speed. It is the absence of any information in this respect that forms the basis for the objection of the appellants to insufficiency of disclosure under Article 100(b) EPC.

In numerous decisions the Boards of Appeal have established that the disclosure of a patent specification is aimed at the person skilled in the art who may use his common general knowledge to supplement the information contained in it (see section II. A. 2 of the compendium "Case law of the Boards of Appeal of the EPO"). In the present case the Board of Appeal has no doubt that it would be a routine matter for the person skilled in the art to design suitable means for determining, according to a pre-ordained schedule, which alarm level should be associated with any particular combination of tyre deflation level and vehicle speed. Such means might typically comprise analogue or digital control circuitry. Insofar as the appellants object that granted claim 1 could be interpreted as meaning that the "alarm mechanism" takes a fresh independent "decision" as to what alarm level to

use, which the person skilled in the art would not be able to put into practical effect, the Board is of the opinion that this interpretation is not one which is realistic in view of the description.

The objection under Article 100(b) EPC therefore fails.

3. Document D2 is directed towards the provision of simple and reliable means for warning the driver that there has been a loss of pressure in a tyre. For safety reasons the level of the warning should increase with increasing vehicle speed. What the document proposes is to equip the inside of the tyre with an elastic element biased so as to form a localised depression in the tread. Normal tyre pressure overcomes the biasing force but if the pressure drops below a threshold value then the depression will lead to the creation of a noise each time it passes through the contact zone with the road surface. Thus the level of the warning given will automatically rise with the vehicle speed.

Beside any other considerations concerning the functionality of the proposal of document D2 it is apparent that the arrangement disclosed there does not comprise an alarm mechanism for deciding an alarm level within the meaning of granted claim 1. Thus the novelty of the subject-matter of this claim is given.

The situation with regard to the method defined in granted claim 2 requires more detailed consideration since the terms of this claim are in some respects considerable broader in ambit than those of claim 1. In particular, the method claim makes no reference to an alarm level being decided depending on the level of tyre deflation and vehicle speed. In the opinion of the

Board the relevant feature of claim 2 thus extends to a method in which the question of whether to give an alarm is determined in dependence on these variables. The respondents argue that the references to "levels" of tyre deflation and vehicle speed in the plural implies that there are also levels of alarm. The Board can however see no clear basis for that contention and takes the view, particularly having regard to the description of the preferred embodiment, that no distinction of a technical nature is imposed by the reference to "levels" rather than "level" of tyre deflation and vehicle speed.

As a consequence of the above considerations the Board is satisfied that the prior art according to document D2 discloses a "method for alarming tyre deflation on a vehicle" wherein there is "alarming depending on levels of deflation levels and levels of vehicle speed" as set out in granted claim 2. On the other hand, given the automatic nature of how the alarm is given the known method cannot be fairly said to comprise the steps of "determining and monitoring" a deflation level and "determining and monitoring" a speed level of the vehicle, unless at the limit the act of "monitoring" could be equated to the driver hearing the noise generated by the partially deflated tyre. However, even on that assumption, document D2 does not indicate that the arrangements it discloses would be capable of determining different levels of tyre deflation, referring instead only to a single threshold, above which the depression in the tyre will start to create noise, so the subject-matter of the granted claim 2 would still remain novel with respect to document D2. (The respondents argue indeed that the arrangements of this prior art would be completely ineffective at

distinguishing a fully inflated state of the tyre from a partially deflated one, but in view of the above finding it is no longer necessary to go into these arguments here.)

4. Document D3 is principally directed to a method and apparatus for monitoring tyre inflation levels, the detail of which are not of significance to the present case. The monitoring apparatus may be combined with means for giving an appropriate indication to the driver that the tyre pressure requires alteration and with means for controlling the tyre pressure. As indicated in column 1, lines 47 to 51, and column 3, lines 40 to 52, it is particularly advantageous in such a tyre pressure control system if the vehicle speed is included as a variable in determining whether the tyre pressure is correct. The respondents argue that the proposals of document D3 concerning the indication to the driver of the state of the tyre pressure and the use of the tyre pressure control system are mutually exclusive. Particularly having regard to what is said in column 3, lines 18 to 31, the Board cannot agree with that assessment and in its view document D3 accordingly discloses, at the least by implication, an apparatus in which the reference tyre pressure level with which the actual tyre pressure is compared, in order to determine whether an indication should be given to the driver that the tyre requires inflation (equivalent to a tyre deflation alarm), is dependent on vehicle speed.

Nevertheless, there is no disclosure in document D3 of the level of the alarm to be given being decided in dependence on the level of the tyre deflation and the vehicle speed. Thus the subject-matter of granted

claim 1 is novel with respect to document D3. As explained above, however, the situation as regard to the method of granted claim 2 is different. The claim extends to a method wherein the alarm is only of one level, but its triggering is dependent on the level of tyre deflation and vehicle speed. For the reasons given in the preceding paragraph the Board is of the opinion that such a method is disclosed in document D3. That this prior art method involves the step of determining and monitoring the level of tyre deflation and the vehicle speed is self-evident and has not been in dispute. Accordingly, the subject-matter of granted claim 2 lacks novelty with respect to document D3. The main request of the respondents must therefore be refused.

5. In the claims according to the first auxiliary request claim 1 has been maintained unamended and claim 2 has been amended so as to align it more closely with claim 1, in particular by now stating that the "alarm level is decided depending on levels of deflation levels and levels of vehicle speed". There are no objections to this amendment under Article 123(2) and (3) EPC.

Since the method defined in claim 2 of the auxiliary request is in essence a statement of how the apparatus defined in claim 1 functions, it is apparent that the above findings with respect to the novelty of the subject-matter of claim 1 apply equally to the subject-matter of claim 2.

It is therefore necessary to consider the inventive step of the claimed subject-matter and more particularly to investigate whether there is any

teaching in the state of the art which would encourage the skilled person to modify the system of document D3 in such a manner that the level of the alarm given is determined in dependence on the level of tyre deflation and vehicle speed.

In this respect the appellants rely on documents D1 and D7 but neither of these contains anything which can be seen as going in the above direction.

Document D1 concerns a system for monitoring and indicating acoustically a plurality of operating conditions of a motor vehicle. The system comprises a plurality of sensors, including tyre pressure sensors, and an acoustic signal generator capable of generating a sound which is preferable characteristic of the condition being monitored. Thus the signal associated with insufficient air pressure in the tyres could reproduce the hissing typically heard when a tyre deflates (see page 4, second paragraph). Furthermore, the system can attach different levels of importance to each of the conditions being monitored, for example an information level, an alert level and an alarm level (see page 5, fourth paragraph). The user therefore receives a signal which first informs him of the importance of the operating condition and then informs him about the precise nature of the operating condition (see page 6, second paragraph). Applying these concepts to the tyre pressure sensor there can be seen therefore no teaching even of giving alarms at different levels depending on the levels of tyre deflation, let alone depending on both the level of tyre deflation and vehicle speed.

The basic concept underlying the abnormal vehicle

condition monitoring system of document D7 is that according to the seriousness of the abnormality the driver is alerted either when the vehicle is in operation or only after it has been stopped. In the context of tyre pressure monitoring (see page 24) this means that on detecting a first low level of deflation a warning is given upon stoppage of the vehicle whereas if the deflation reaches a second higher level the warning is given immediately. Thus, although it may be said in general terms that the nature (if not the level) of the alarm is dependent on the level of tyre deflation, there is certainly no dependence on vehicle speed.

The Board therefore comes to the conclusion that the subject-matter of claims 1 and 2 of the first auxiliary request involves an inventive step.

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 (first auxiliary request);
 - description as granted with column 2, lines 8 to 14, replaced according to the first auxiliary request;

- drawing as granted.

The Registrar:

The Chairman:

S. Fabian

F. Gumbel