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D E C I S I O N
of 13 January 2005

Case Number: T 0368/03 - 3.2.1
Application Number: 94119126.4
Publication Number: 0658452
IPC: B60C 19/08, B60C 1/00
Language of the proceedings: EN

Title of invention:
Antistatic tyre having low-carbon black blends

Patentee:
PIRELLI PNEUMATICI Società per Azioni

Opponent:
DUNLOP TYRES Ltd

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step - no (main and auxiliary requests)"

Decisions cited:
-

Catchword:
-



Case Number: T 0368/03 - 3.2.1

D E C I S I O N
of the Technical Board of Appeal 3.2.1
of 13 January 2005

Appellant: PIRELLI PNEUMATICI Società per Azioni
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Respondent: DUNLOP TYRES Ltd
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 3 February 2003
revoking European patent No. 0658452 pursuant
to Article 102(1) EPC.

Composition of the Board:

Chairman: S. Crane
Members: J. Osborne
S. U. Hoffmann

Summary of Facts and Submissions

I. The appeal is directed against the decision posted 3 February 2003 revoking European patent No. 0 658 452.

II. In the decision the Opposition Division found that the subject-matter of claim 1 both as granted and in an amended form did not involve an inventive step.

III. The following prior art document was introduced by the respondent during the appeal procedure:

D4: JP-A-3-169711 together with a translation into English

Reference was also made to *inter alia* the following evidence from the opposition procedure:

D1: GB-A-544 757

IV. In a communication pursuant to Article 11(1) RPBA the Board indicated that the newly introduced evidence D4 appeared highly relevant. It further indicated that it seemed that the matter of inventive step would come down to whether it would be obvious for the skilled person to select an appropriate value of resistivity for the elastomer in which the respective cords according to D4 are embedded.

V. In oral proceedings held 13 January 2005 the appellant requested that the contested decision be set aside and that the patent be maintained in amended form on the basis of claims according to a main request or an

auxiliary request both filed on 10 December 2004. The respondent requested that the appeal be dismissed.

VI. Claim 1 according to the main request reads:

"A vehicle tyre for mounting on a rim, comprising:
at least one carcass ply (2) anchored, at respective opposite edges thereof, to a pair of bead cores (3) arranged in corresponding beads (4) defined along the inner circumferential edges of said tyre (1);
at least one belt layer (6) extending circumferentially about said carcass ply (2);
a tread band (9) disposed circumferentially about the belt layer (6) and externally exhibiting a rolling surface (9a) designed to come into contact with the ground;
means being provided for discharging to the ground the electrostatic charges stored on the vehicle through a conductive path formed into the tire structure;
said tread band (9) is made of a filler including blend whose resistivity is not such as to constitute a conductive path from said rolling surface (9a) to said at least one conductive belt layer (6);
said discharging means include at least one conductive insert (12) radially extending through the whole tread band (9) thickness, of a blend exhibiting an electric resistivity lower than that of the blend forming said band, to make a conductive path from said rolling surface (9a) to said at least one conductive belt layer (6);
said carcass ply (2) and belt layer (6) are conductive and in electric contact with each other;
characterized in that

said carcass ply (2) being made by employing an elastomeric material blend exhibiting an electric resistivity not exceeding 10^3 Kohm*m;
said belt layer (6) being made by employing an elastomeric material blend exhibiting an electric resistivity not exceeding 10^3 Kohm*m."

Claim 1 according to the auxiliary request differs from the above by the addition of the following feature in the preamble:

"said belt layer (6) and carcass ply (2) being made of cords being covered with elastomeric material".

VII. The respondent's arguments in respect of the newly filed evidence D4 may be summarised as follows:

Although D4 is silent as to whether the respective cords are embedded in elastomeric material, the skilled person knows that this is the case. Moreover, as acknowledged in the patent specification it has been known for a long time to provide a conductive path through elastomeric blends provided in a tyre in order to discharge static electricity created by the vehicle. The conductive path from the tread band through to the bead in the tyre according to D4 must be provided without interruption and the skilled person therefore is inevitably led to the provision of conductive elastomers. The range of resistivity already known from D1 falls within the presently claimed range.

VIII. The appellant countered essentially as follows:

The matter of inventive step of the claims 1 according to both requests essentially concerns the feature that the cords of both the breaker belt and the carcass are embedded in elastomeric material having a particular electrical resistivity. The claimed subject-matter is an amazingly simple solution to the problem of providing a conductive path in a low hysteresis tyre without the need for additional features. D4 proposes additional metal threads running along the cords in order to provide a conductive path from the tread band to the bead. If the elastomers in which the cords according to D4 are embedded would have had the presently claimed resistivity the metal threads would have been unnecessary. D4 therefore teaches away from the presently claimed solution. The respondent relies on hindsight when it assesses both D4 and the acknowledgement in the patent specification of prior art; there is no evidence which supports the idea of tyres in the prior art having the cords embedded in conductive elastomer. Moreover, the resistivity value proposed in D1 is much lower than that presently claimed.

Reasons for the Decision

1. Inventive step is the only matter to be considered in this case. As acknowledged by the appellant the additional feature in claim 1 according to the auxiliary request is of no significance as regards the matter of inventive step and both requests therefore can be considered together.

2. It is well known that vehicle tyres should be made electrically conductive in order to provide a route to discharge static electricity to the ground. Conventionally this has been achieved by the use of carbon black as a filler in the elastomeric blends used in various parts of the tyre. More recently there has been a move away from the use of carbon black in the tread band in favour of other fillers which reduce the tyre's rolling resistance. The tyre according to the present claims comprises an insert in the tread band which is more conductive than the material of the tread band itself and which forms together with the breaker belt, carcass and bead a conductive path through the tyre.

3. The Board shares the view of both parties that D4 discloses the features of the preamble of claim 1 according to both requests. D4 relates to tyres specifically intended for use on vehicles transporting explosives and combustible goods and therefore in which the avoidance of sparks resulting from the discharge of static electricity is of utmost importance. It begins from prior art in which the use of electrically conductive steel cords is unacceptable and in which the alternative carcass and breaker belt cords of organic fibre such as Nylon are electrically insulating, resulting in an excessively high resistance in the conductive path. The solution according to D4 is to provide metallic filaments along the length of the cords, thereby providing a conductive path and lowering the resistance to discharge through the tyre from the bead to an insert provided in the tread band.

3.1 D4 is silent regarding the manner in which the cords are incorporated into the carcass and the breaker belt. Nevertheless, as acknowledged by the appellant, it is wholly conventional that the cords are embedded in an elastomeric material and this feature is implicit in the disclosure of D4 for the skilled person. Indeed, the appellant acknowledges this by including the additional feature of the auxiliary request in the preamble of the claim when delimiting it against D4. Moreover, as stated in the patent specification, particularly paragraphs 009 and 0011, at the time of writing and for a long time previously the requisite electrical conductivity was provided in the elastomeric materials themselves. D4 has an application date only four years earlier than the priority date of the present patent and it is implicit that the conductive path in the tyre according to D4 when passing from the tread insert to the metal filaments in the carcass cords includes the elastomeric material in which the breaker belt and carcass cords are embedded.

3.2 It follows from the above that the subject-matter of the respective claims 1 according to both requests differ from the disclosure of D4 in that the respective elastomeric blends employed in making the carcass ply and belt layer exhibit an electrical resistivity not exceeding 10^3 Kohm*m.

3.3 The teaching of D4 is incomplete in as far as it does not specify the properties of the elastomer in which the respective cords will be embedded and when seeking to put the teaching of D4 into effect the skilled person would select appropriate values without the need to exercise inventive effort. D1 deals with the problem

of wishing to reduce the amount of carbon black in the elastomeric compositions used in the tread band and side walls of tyres and the resulting effect on the conductivity of the tyre as a whole. It proposes a solution involving the application of a rubber composition to surfaces of the tyre, the composition having a resistivity of 1 Kohm*m or less. This falls within the range "not exceeding 10^3 Kohm*m" presently claimed. Indeed, the appellant has not argued that the values of resistivity are in themselves anything other than conventional and the same value is specified in dependent claim 12 of both requests for the material forming the conductive insert in the tread band although this is of unspecified shape and size.

- 3.4 It is not stated in the wording of the present claims that the conductive path through the breaker belt and carcass is formed entirely by the embedding elastomer so it is not relevant that this is not the case in the teaching according to D4. Moreover, the Board cannot agree with the appellant's argument that D4 teaches away from the presently claimed subject-matter. The presently claimed resistivity of the elastomer in which the respective cords are embedded is not disclosed in D4 but nevertheless is a conventional value appropriate for putting its teaching into effect. Furthermore, it was the aim according to D4 to restore to a tyre having electrically insulating cords a total resistance from wheel rim to ground similar to that of a tyre having steel cords. The influence of the embedding elastomer on the total resistance would be low in comparison with that of the steel and so would not render the metallic threads unnecessary.

4. The Board concludes on the basis of the foregoing that the subject-matter of the claims 1 according to both requests does not involve an inventive step (Article 56 EPC).

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

A. Vottner

S. Crane