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D E C I S I O N
of 16 July 1999

Case Number: T 1122/97 - 3.2.1

Application Number: 91202558.2

Publication Number: 0467490

IPC: B60C 3/04

Language of the proceedings: EN

Title of invention:
Heavy duty radial tire

Applicant:
Bridgestone Corporation

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 83, 84

Keyword:
"Sufficiency of disclosure (yes)"
"Clarity of claim (yes)"

Decisions cited:
-

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 1122/97 - 3.2.1

D E C I S I O N
of the Technical Board of Appeal 3.2.1
of 16 July 1999

Appellant: Bridgestone Corporation
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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 10 June 1997 refusing European patent application No. 91 202 558.2 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: F. Gumbel
Members: S. Crane
V. Di Cerbo

Summary of Facts and Submissions

I. European patent application No. 91 202 558.2 was refused by a decision of the Examining Division posted 10 June 1997. The reasons given for the decision were that the independent claims 1 and 2 then on file were unclear (Article 84 EPC) and that the claimed invention, insofar as it could be understood, was insufficiently disclosed (Article 83 EPC).

II. A notice of appeal against this decision was filed on 7 August 1997 and the fee for appeal was paid one day later.

The statement of grounds of appeal was filed on 8 October 1997.

III. Following a communication from the Board dated 5 November 1998 the appellants (applicants) submitted with letter dated 9 March 1999 a completely revised set of application documents comprising pages 1 to 33 of description, Figures 1 to 10 and claims 1 to 9.

Thereafter, in response to a telephone conversation with the rapporteur of the Board, the appellants submitted with letter dated 22 June 1999 a new set of claims 1 to 9 and a new page 4 of the description to replace those filed with their previous letter.

Claim 1 of this new set of claims reads as follows:

"1. A heavy duty radial tire including at least one radial carcass extending from one bead portion to the other bead portion and comprising inextensible cords

and a belt arranged outwardly of the radial carcass for reinforcing the tread of the tire, wherein said tire has an outer profile in radial cross-section, which when the tire is mounted on an approved rim whose width is not wider than that of a design rim and under no load condition, and the tire is being filled from 5% to 100% of a normal inner pressure, comprises a first profile portion (5) which expands radially outwardly in a tread zone from one end (4) of said tread through a crown center (3) to the other end of said tread, a second profile portion (7) which depresses axially inwardly of the tire at least in a part of a radially outer zone of a sidewall from said one end (4) of said tread to a tire maximum width position (6) when filled with the normal inner pressure, and a third profile portion (9) which expands axially outwardly of the tire in a radially inner zone of said sidewall from said tire maximum width position (6) when filled with the normal inner pressure to a starting point (8) of the sidewall from said rim, said rim having a bead seat engaging said bead portions of the tire, said bead seat being inclined at an angle of 5° relative to a rotational axis of the tire, and wherein the tire has a carcass profile in the radial cross-section of the tire which when the tire is mounted on the rim and filled with an inner pressure of 5% of the normal inner pressure and under no load condition is a composite curve smoothly passing through points F, A and G, where the point A is a point of contact of a carcass line C of the carcass profile with a tangent mm' in a radial direction to the carcass line C at the carcass line maximum width position (6) and the points F and G are intersections of the carcass line C and a perpendicular ll' to a bead base line RL which is defined with a

specific rim diameter, said perpendicular ll' being spaced apart axially outwardly from an equatorial plane M of the tire by a distance of 0.5 times a rim width (W) corresponding to a distance between flanges of the rim, characterized in that

i) $0 < 240/H \times v < 3.5$

ii) $4.0 < 240/H \times w < 9.5$

iii) $15 < 240/H \times x < 35$

where v is a maximum distance by which the carcass line C is spaced outwardly of a segment of a line FI connecting points F and I in the radial inner zone of the sidewall, where the point I is an intersection of the tangent mm' and a straight line jj' which is parallel with the rotational axis of the tire and spaced from the bead base line RL by a distance LH of 0.55 times H, where H is the maximum height of the carcass line C from the bead base line RL; where w is a maximum distance by which the carcass line C is spaced outwardly of an arc GI passing through the point G and contacting the tangent mm' at the point I in the radial outer zone of the sidewall; and where x is a distance by which the point I is located from the point A in a direction radially inwards of point A."

Independent claim 2 corresponds in general to claim 1 with the exception that the tire is designed to be mounted on a rim with a bead seat inclined at an angle of 15° relative to the rotational axis of the tire and that the relationships between the dimensions H, v, w and x are defined as:

(i) 0 < 210/H times v < 5.0

(ii) 2.0 < 210/H times w < 8.0

(iii) 6.0 < 210/H times x < 30.0

Dependent claims 3 to 9 relate to preferred embodiments of the tires according to claims 1 or 2.

Reasons for the Decision

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

2. The claimed invention is concerned with heavy duty radial tires which are designed in such a way that the outer profile of the tire undergoes a specific change in shape when the tire is mounted on an approved rim and inflated from 5% up to 100% of the normal design pressure. During this inflation the tread zone expands radially outwardly; a second profile portion located in the sidewall between the end of the tread and the tire maximum width position contracts ("depresses" in the language of the claims) axially inwardly; and a third profile portion located in the sidewall between the maximum width position and a parting point of the sidewall and the rim expands axially outwardly.

This basis configuration of tire as set out in the first part of the respective preamble of the independent claims 1 and 2 is indicated in the introductory description of the application as being

known in principle from US-A-4 155 392. The aim of the invention is to improve the performance, in particular the durability, of the known tire by optimising the change in shape of the tire as it is inflated.

To this end the carcass line of the tire, when mounted on the rim and inflated to 5% of normal pressure is designed to meet certain geometrical criteria which are specified in claim 1 with respect to a tire mounted on a rim with a 5° bead seat and in claim 2 with respect to a tire mounted on a 15° bead seat. In particular each of the claims specifies respective ranges of values for the dimensions "v", "w" and "x" in terms of "H", whereby each of those dimensions is defined in the manner also set out in the claims.

In the opinion of the Board each of those definitions for determining the values of "v", "w", "x" and "H" is clear in itself and in relation to any given form of carcass line there would be no difficulty in establishing whether the criteria stated in the independent claims were met or not. In particular, the lines mm', ll' are both defined by the overall geometry of the tire so that there should be no difficulty in determining the location of the points "G", "A" and "F" on the carcass line.

Within the context of the wording of the present claims the only objection to lack of clarity raised by the Examining Division which requires detailed consideration concerns the nature of the arc GT. The Examining Division argued that there was no indication that the arc was circular and that the meaning of "contacting" in "contacting the tangent mm' at the

point I" was unclear. However, in the opinion of the Board it can generally be assumed, where nothing in the application speaks against it, that the reference to an "arc" is intended to refer to a circular arc. Furthermore there can be no genuine doubt, particularly when reference is made to relevant parts of the description and Figures 9 and 10, that the term "contacting" in the phrase objected to by the Examining Division means that the arc GI is tangential to the tangent mm' at the point I.

Having regard to the above the Board comes to the conclusion that present independent claims 1 and 2 meet the clarity requirement of Article 84 EPC.

3. The Board can see no reason to doubt that it would be possible for the person skilled in the art, on the basis of what is taught in the application and his general knowledge of tire building techniques, to make tires which meet all the respective requirements of claims 1 and 2. As far as the Board understands it the objection of the Examining Division under Article 83 EPC was founded on its conclusion that the definitions contained within the independent claims were inherently defective. This conclusion cannot be accepted by the Board, for the reasons explained above.

4. Furthermore, the Board sees no reason to disagree with the assessment of the Examining Division in its communication dated 19 July 1994 that the claimed subject-matter is new and 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 grant a patent on the basis of the following documents:

Claims: 1 to 9 filed on 22 June 1999;

Description: pages 1 to 3 and 5 to 33 filed on 10 March 1999,
page 4 filed on 22 June 1999;

Drawings: Figures 1 to 10 filed on 10 March 1999.

The Registrar: The Chairman:

S. Fabiani F. Gumbel