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D E C I S I O N
of 24 June 1997

Case Number: T 0975/95 - 3.2.1

Application Number: 89107254.8

Publication Number: 0339511

IPC: B60C 15/06, B60C 15/00

Language of the proceedings: EN

Title of invention:
Radial tyre for motor vehicles

Patentee:
BRIDGESTONE/FIRESTONE, INC.

Opponent:
Continental AG

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step (no)"

Decisions cited:
T 0142/84

Catchword:
-



Case Number: T 0975/95 - 3.2.1

D E C I S I O N
of the Technical Board of Appeal 3.2.1
of 24 June 1997

Appellant: Continental AG
(Opponent) Postfach 169
D-30001 Hannover (DE)

Representative: -

Respondent: BRIDGESTONE/FIRESTONE, INC.
(Proprietor of the patent) 1200 Firestone Parkway
Akron, Ohio 44317 (US)

Representative: Jorio, Paolo
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 5 October 1995
rejecting the opposition filed against European
patent No. 0 339 511 pursuant to Article 102(2)
EPC.

Composition of the Board:

Chairman: F. Gumbel
Members: M. Ceyte
G. Davies

Summary of Facts and Submissions

- I. The respondent is the proprietor of European patent No 0 339 511 (application No. 89 107 254.8).

Claim 1 of the patent reads as follows:

"1. A radial tyre (20) for motor vehicles, the tyre (20) comprising two metal beads (4); a body ply (6) comprising two lateral portions (8), each turned about a respective said bead (4) and joined, by an end portion (9), to the outer surface of the centre portion (7) of the body ply (6) over the respective said bead (4); an innerliner (10) and an outer abrasion strip (12) integral with each other, and turned about each said lateral portion (8) of the body ply (6); each said lateral portion (8) of the body ply (6) being turned substantially 360° about a respective said bead (4); the end portion (9) of each said lateral portion (8) of the body ply (6) joining with the centre portion (7) of the body ply (6) immediately over the respective bead (4); and each abrasion strip (12) comprising a second portion (22) extending outwards of the respective bead (4) and having a section varying in thickness, so as to compensate for the absence of a bead filler, characterized in that said second portion (22) of the abrasion strip (12) is arranged in direct contact with the respective lateral portion (8) of the body ply (6)."

- II. The patent was opposed by the appellant on the grounds of lack of novelty and inventive step.

The following state of the art was inter alia cited in the notice of opposition:

- D6: Fahrwerktechnik, Reimpell/Sponagel,
Vogel-Buchverlag, 1986, pages 65 and 67
- D7: Mechanics of Pneumatic Tires, Clark, US DoT,
Washington, 1981, pages 221 and 213
- D8: US-A-3 232 331
- D9: EP-A-0 111 118
- D10: US-A-4 258 775
- D11: EP-A-0 251 980

The Opposition Division rejected the opposition in a decision dated 5 October 1995.

- III. An appeal against that decision was filed on 8 December 1995, the appeal fee was paid on the same day and the statement of grounds of appeal was filed on 15 February 1996.
- IV. In a communication annexed to the summons for oral proceedings the Board called attention to the prior art according to document D8.
- V. Oral proceedings before the Board were held on 24 June 1997.
- VI. The appellant (opponent) requested that the decision under appeal be set aside and the patent be revoked in its entirety.

He took the view that the subject-matter of claim 1 was obvious in the light of the teachings of document D11. Furthermore he held that also document D8 clearly

teaches the skilled person to eliminate the tapering filler between the body ply and its turn-up. It was obvious to apply this teaching to the prior art tyre of Figure 1 of the patent and hence to arrive at the subject-matter claimed in claim 1.

VII. The respondent (patent proprietor) requested that the appeal be dismissed and the patent be maintained as granted. In support of this request, he essentially made the following submissions:

The claimed invention seeks to overcome the disadvantages resulting from the use of a bead filler in a conventional radial tyre.

This object is accomplished according to the invention by:

- (i) turning each lateral portion of the body ply substantially 360° about the respective bead, and joining the end portion of such turn-up to the main portion of the body ply itself;
- (ii) providing an abrasion strip including first and second portions of different thickness, the second portion extending along the outer side wall and being thicker than the first to compensate for the absence of a bead filler; and
- (iii) arranging the second portion of the abrasion strip in direct contact with the turn-up portion of the body ply.

The tyre shown in Figure 4 of document D8 can be considered as having the following features:

- the turn-up portion of the body ply is turned about 270° about the respective bead; since 270° is somewhat different from "substantially 360° " of the claimed invention, the aforementioned feature (i) is not anticipated;
- the loop about the bead is open, and the end portion of the turn-up is not connected to the main portion of the body ply as in the claimed feature (i);
- the bead area is shown very diagrammatically; however, since there is some material (empty spaces are not acceptable in a tyre) in the area above the bead between the main portion of the body ply and its turn-up, such material is, and cannot be other than, a short filler; therefore, Figure 4 of document D8 does not disclose a fillerless tyre;
- the tyre disclosed therein has in fact two fillers for each side wall since the resilient tapering strip (15) is a filler, which is imbedded in the structure of the wall and has a substantially triangular cross section to impart a variable rigidity to the side wall; clearly the fact that a portion of the resilient tapering strip acts as an abrasion strip is not essential;
- in any case, since an abrasion strip is, by definition, an external element, the portion of the resilient strip extending outwards of the

respective bead cannot be regarded as the second portion of an abrasion strip owing to its being completely covered by the sidewall layer; therefore, also the aforementioned feature (ii) is not anticipated;

- finally, feature (iii) is also not present since the resilient outer strip is in any case not in direct contact with the body ply;

It follows that document D8 does not teach or suggest the claimed solution.

The same applies to document D11 which in its Figure 3 does not disclose an abrasion strip within the meaning of present claim 1, whereas the embodiment of Figure 1 clearly shows a structure having a bead filler between the body ply and its turn-up portion.

Reasons for the Decision

1. The appeal is admissible.
2. The invention according to the patent in suit is concerned with radial tyres for motor vehicles. The prior art radial tyre to which the invention relates is shown in Figure 1 of the patent specification and referred to thereafter as the Figure 1 tyre.

The conventional Figure 1 tyre has a pair of metal beads each fitted along its outer periphery with a filler having a substantially triangular cross section. A body ply has a main portion extending between the metal beads and two turned up or return bend portions extending around each bead. Each turn-up has a first portion covering part of the respective bead and the

surface of the respective triangular filler and an end portion extending beyond the triangular filler and secured to the main portion of the body ply.

The carcass of the tyre comprises an inner liner covering the entire inner surface of the main portion of the body ply. Each lateral edge of the inner liner is connected via a splice to an abrasion strip of substantially constant thickness. The abrasion strip extends around the respective bead and is connected via a second splice to the side wall, also of substantially constant thickness.

The abrasion strip is divided into two portions, the upper of which is positioned outside the turn-up and in direct contact with it. On column 1 of the patent specification it is stated that the bead filler which had been considered as essential for insuring sufficient lateral rigidity, had proved to be unsatisfactory in that it firstly required the use of extremely wide body plies, whose turn-up portion should be long enough to cover the surface of the triangular bead filler and to be secured to the main portion of the body ply (column 1 lines 30 to 35).

Secondly, the presence in a radial tyre of a bead-bead filler assembly required the use of a preassembly line, parallel to the tyre assembly line for forming and pre-assembling the beads and the fillers (column 1 lines 46 to 53).

Thirdly, because of the composition of the bead filler which is different from that of the surrounding parts, a poorly homogeneous bead area was obtained, which inevitably led to curing difficulties (column 2 second paragraph of the specification).

In the light of the foregoing, the technical problem underlying the patent in suit was seen in providing an improved radial tyre which overcomes the above-listed disadvantages of the prior art Figure 1 tyre.

That is accomplished by a radial tyre according to claim 1 in which

- (i) the body ply is turned substantially 360° about the respective bead, the end portion of each turn-up of the body ply being joined to the main portion of the body ply immediately above the respective bead
- (ii) the abrasion strip has a section varying in thickness so as to compensate for the absence of a bead filler.

3. The Board is satisfied that the subject-matter of claim 1 is novel over the prior art tyre of Figure 1 or documents D8 and D11.

Since this has never been disputed during the appeal proceedings there is no need for further detailed substantiation of this matter.

4. The idea underlying the claimed teaching is to eliminate the bead filler between the main portion of the body ply and its turn-up. As claimed in Claim 1 there is provided an upper portion of the abrasion strip of varying thickness so as to compensate for the elimination of the filler strip. Furthermore, since there is no filler between the turn-ups and the main portion of the body ply, it is possible to wind the body or carcass ply substantially 360° about the respective bead. The feature as to the upper portion of

the abrasion strip bearing directly against the turn-ups of the body or carcass plies is known from the prior art Figure 1 tyre and thus does not originate in the elimination of the bead filler.

5. Since the elimination of deficiencies encountered in practice is a constant preoccupation of any technician, the object of the invention to be achieved or the technical problem to be solved, as set out in the patent in suit, cannot be regarded as contributing to the inventive merits of the solution.
6. Document D8 describes five embodiments of the invention disclosed therein with reference to five figures.

Figure 4 illustrates a radial tyre provided with an annular reinforcement disposed below the tread and with body or carcass plies.

The body plies are wound about the bead cores to form turn-ups. Outside the turn-ups there are resilient tapering strips each having an extension which extends towards the base of the bead. Such extension is not covered by the rubber forming the side walls and comes into direct contact with the rim flange.

7. The respondent contended that the resilient tapering strip of document D8 is in fact a resilient tapering filler which is not disposed between the turn-ups and the body plies but outside the turn-ups.

This cannot be accepted: according to the respondent itself a filler is to be defined as an annular element, generally of substantially triangular cross section, which is located at each bead area of a tyre. It is always an internal element, ie an element interposed between at least two external layers or elements.

An abrasion strip, on the contrary, is a relatively hard external element generally joining the inner liner to form the sidewall and designed, among others, to withstand wear.

Obviously, the resilient tapering strip according to Figure 4 of document D8 does not fall within the respondent's own definition of a filler since the resilient tapering strip is not an internal element; as stated above, it is provided with an external extension which comes into contact with the rim flange.

Furthermore, it is said in document D8 (column 3, lines 31 to 37) that the rubber constituting the resilient tapering strip is very hard, so that "it is possible to eliminate the chafers of fabric and the special rubber which would be otherwise necessary to protect the plies in the zone in which the beads come into contact with the rim flange". Thus the purpose of the external extension is to withstand wear and the disclosed resilient tapering strip is therefore to be regarded as an abrasion strip.

8. At column 3, lines 38 to 45 of document D8, it is stated:

"Moreover the forms of hard resilient strip shown in Figures 4 and 5 have an advantage over the forms of Figures 1, 2 and 3 in that they facilitate the construction of pneumatic tyres since they eliminate the need for a special resilient tapering strip between the plies and their turn-ups and this in turn permits the use of conventional building-up machines without the need of any modification".

Hence document D8 clearly teaches the skilled person to eliminate the bead filler ("the special resilient tapering strip") between the body plies and their turn-ups in order to facilitate the construction of pneumatic tyres. Therefore, the skilled person looking for ways of overcoming the disadvantages of the conventional Figure 1 tyre and in particular that stemming from the use of a preassembly line for fitting the bead core and the bead filler together, would be led by document D8 to eliminate the bead filler in the conventional Figure 1 tyre in order to achieve the advantages which this elimination is said to offer.

9. Once having taken the step of eliminating the bead filler a skilled person would have realised, that the end portion of the turn-up was to be joined to the main portion of the ply immediately over the respective bead instead at a certain distance above the respective bead. This requires the body ply to be turned substantially 360° about the respective bead.

In this respect it is noted that the carcass ply according to Figure 4 of document D8 is wrapped around the bead core to the same extent as in Figure 2 of the patent specification illustrating the claimed invention. Therefore the carcass ply in Figure 4 of document D8 can be considered as being also "turned substantially 360°" about the respective bead, as claimed in claim 1.

10. It is true that not all of the three partial problems or disadvantages which are overcome by the claimed teaching are clearly stated in prior art document D8, where it is only said that the elimination of the filler between the plies and their turn-ups has proved to be advantageous in that it simplifies the construction of pneumatic tyres. However, according to the established case law of the Boards of Appeal, it is

not necessary that the problem or all problems solved by the subject-matter of a prior art document should have been stated expressis verbis in that document in order to establish that the claimed subject-matter is obvious having regard to the disclosure of this document (see e.g. T 142/84 OJ 87, 112 point 8.2 of the reasons).

As set out under point 8 above, the skilled person would be led by this citation to eliminate the bead filler between the plies and their turn-ups. He would also realise that this elimination would have an effect on the length of the turn-ups and on the homogeneity of the bead area of the radial tyre. No doubt he would realise that without any bead filler superimposed on the bead core, the turn-ups of the plies could be shorter and the bead area more homogeneous. The Board is convinced that that would be obvious to him.

11. Accordingly the Board comes to the conclusion that the subject-matter of claim 1 lacks an inventive step as required by Article 56 EPC. Therefore the claim cannot be allowed to stand having regard to Article 52(1) EPC.

Claims 2 and 3 depending on claim 1 and having as subject-matter special embodiments of the radial tyre according to claim 1, are not allowable either, since their validity is contingent on that of claim 1 which has been denied.

In conclusion the Board is of the opinion that the ground for opposition mentioned in Article 100(a) EPC prejudices the maintenance of the European patent.

Order

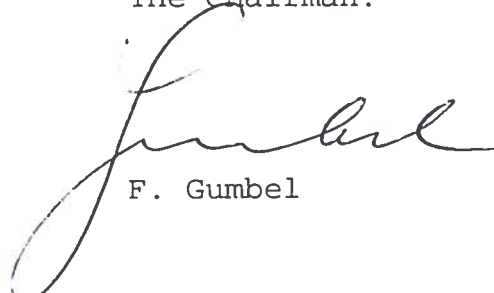
For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The European patent No. 0 339 511 is revoked.

The Registrar:


S. Fabiani

The Chairman:


F. Gumbel

WD
CM
M