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D E C I S I O N
of 28 January 1997

Case Number: T 0582/95 - 3.2.1
Application Number: 89630046.4
Publication Number: 0333628
IPC: B60C 9/22, B60C 9/20

Language of the proceedings: EN

Title of invention:
Pneumatic tire

Patentee:
THE GOODYEAR TIRE & RUBBER COMPANY

Opponent:
Continental AG
SP Reifenwerke GmbH

Headword:
-

Relevant legal provisions:
EPC Art. 56
EPC R. 67

Keyword:
"Inventive step - no"
"Reimbursement of appeal fee - no"

Decisions cited:
T 0275/89, T 0669/90

Catchword:
-



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Boards of Appeal

Chambres de recours

Case Number: T 0582/95 - 3.2.1

D E C I S I O N
of the Technical Board of Appeal 3.2.1
of 28 January 1997

Appellant:
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 26 April 1995
revoking European patent No. 0 333 628 pursuant
to Article 102(1) EPC.

Composition of the Board:

Chairman: F. Gumbel
Members: S. Crane
G. Davies

Summary of Facts and Submissions

I. European patent No. 0 333 628 was granted on 21 April 1993 on the basis of European patent application No. 89 630 046.4.

II. Claim 1 of the granted patent reads as follows:

"A pneumatic tire (1) comprising a radial carcass (2), a tread portion (7) and a belt reinforcing structure (8) having belt layers (8') with reinforcing cords (8"), which is radially interposed between the carcass (2) and the tread portion (7), a textile reinforced overlay structure (9) being located radially outwardly of the belt reinforcing structure (8), the overlay structure (9) comprising a series of helical convolutions of a ribbon (11) which comprises an elastomeric material reinforced by cords (10) arranged side by side and extending longitudinally of the ribbon (11), the cords making an angle of between 0° and 5° with the mid-circumferential plane of the tire and the adjacent turns of the ribbon (11) being in an overlapping relationship characterized in that the cords (10) of the overlay structure (9) are oriented in a direction opposite to the direction of the cords (8") of the radially outermost belt layer (8') of the belt reinforcing structure (8) with respect to the mid-circumferential plane of the tire."

Dependent claims 2 to 10 relate to preferred embodiments of the tire according to claim 1. Claim 11 relates to a method of manufacturing a tire as claimed in any one of claims 1 to 10 and claims 12 to 14 relate to preferred embodiments of the method according to claim 11.

III. The granted patent was opposed by the present respondents (opponents 01 and 02) on the grounds that its subject-matter lacked novelty and/or inventive step with respect to the state of the art (Article 100(a) EPC).

Among the pre-published documents relied upon by the respondents were the following:

D1: EP-A-0 258 822,
D3: LU-A-85964,
D7: JP-A-61-15604,
D11: SAE Paper No. 760731: "Ply steer in Radial Tires",
Marion G. Pottinger, 1976.

Extracts from two chapters of the book "Mechanics of Pneumatic Tires", printed by USGPO, 1981, namely Chapter 3 "Cord Reinforced Rubber", J. D. Walter, pages 123 and 171 to 174 (D16), and Chapter 8 "Measurement of Tire Properties", H. van Eldik Thieme et al, pages 541 and 617 to 621 (D17).

IV. With its decision dated 26 April 1995 the Opposition Division revoked the patent.

V. An appeal against this decision was filed on 1 July 1995 and the fee for appeal paid at the same time. The statement of grounds of appeal was filed on 24 August 1995.

The appellants (proprietors of the patent) requested that the contested decision be set aside and the patent maintained unamended (main request). They also requested reimbursement of the appeal fee.

VI. Oral proceedings were held on 28 January 1997.

At the oral proceedings the appellants submitted respective claims 1 according to a first and second auxiliary request for maintenance of the patent in amended form.

In comparison with granted claim 1 these claims include the following additional features in the respective characterising clause.

Claim 1 according to first auxiliary request:

"and in that adjacent turns of the ribbon (11) overlap in such a way that the axial width (0) of the overlap between adjacent turns of the ribbon (11) is uniform across the axial width (C) of the belt reinforcing structure (8)"

Claim 1 according to the second auxiliary request:

"and in that the overlay structure (9) is divided into a center portion and a pair of axially outer portions wherein the width of the overlap is greater in the axially outer portions (0_s) than in the center portion (0_c) of the overlay structure"

VII. The arguments presented by the appellants in support of their request can be summarized as follows:

When evaluating the inventive step of the subject-matter of granted claim 1 account should be taken of all the features specified in the claim. In particular, the claim required that the turns of the ribbon comprising the overlay structure were in overlapping relationship and that the cords in the overlay structure were oriented in a direction opposite to the direction of the cords in the outermost

reinforcing belt layer. Contrary to the assertions of the respondents there was however no clear disclosure in document D7 that the turns of the ribbon disclosed there were in overlapping relationship. As for document D1, this specifically disclosed and claimed an arrangement in which the turns of the ribbon only overlapped in the edge regions of the reinforcing belt. The only mention in document D1 of a tire corresponding to the preamble of claim 1, and which had been taken as the basis for the delimitation of the claim during the pre-grant proceedings, was in a reference to otherwise unidentified prior art. Furthermore there was no suggestion anywhere in the numerous cited prior art documents that the orientation of the cords in the overlay structure could have any effect on the amount of ply steer which the tire exhibited. The documents D11, D16 and D17 relied upon by the respondents in this respect were concerned only with reinforcing belt plies and nothing said there could be transferred to an overlay structure. The appellants had been the first to recognise that an appropriate arrangement of the cords in the overlay structure would reduce the ply steer of the tire. The effect was small but nevertheless significant.

The respective claim 1 according to the first and second auxiliary requests contained features which more clearly distinguished the claimed invention from document D1. The arrangement specified in claim 1 of the second auxiliary request, which had a higher cord density in the edge regions of the reinforcing belt enabled a certain "fine tuning" of the amount of ply steer.

The Opposition Division had committed a serious procedural violation in taking its decision before the appellants had an opportunity to comment on the documents D11, D16 and D17, which had been belatedly

introduced into the proceedings by the respondents. According to the Guidelines E VIII 1.2 a time limit of four months for reply should have been set at the time that the relevant submissions of the respondents were communicated to the appellants. In fact, no time at all was set, which went against what had been said in Decision T 669/90 (OJ EPO 1992, 739). The reimbursement of the fee for appeal was therefore justified.

VIII. The respondents requested that the appeal be dismissed. In support of this they argued substantially as follows:

There could be no doubt from a consideration of Figure 1 of document D7 and the corresponding description that in the tire shown there the wound turns of the ribbon making up the overlay structure overlapped each other. Document D7 therefore clearly represented the closest state of the art. It was only possible to wind the ribbon in two ways, right to left or left to right. In one of these two configurations the cords in the ribbon would inevitably be oriented in a direction opposite to that of the cords in the outermost reinforcing belt layer. On the basis of the information contained in documents D11, D16 and D17 it was obvious to the person skilled in the art that the choice of this configuration would result in a lower ply steer than the alternative configuration in which the cords in the ribbon were oriented in the same direction as the cords in the outermost reinforcing belt layer.

Reasons for the Decision

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

2. *Main Request*

In a radial pneumatic tire of conventional construction, having a belt reinforcing structure comprising a number of belt layers with reinforcing cords disposed at an angle to the circumferential direction of the tire, it was well-known to provide an overlay structure with circumferentially extending cords between the belt reinforcing structure and the tread portion of the tire. Traditionally this overlay structure had been formed by circumferentially wrapping an appropriate piece of tire cord material around the tire and overlapping its ends. This overlap led however to a lack of uniformity in the tire.

Accordingly, proposals were made for example in documents D1 and D7 to form the overlay structure by helically winding a narrow ribbon around the tire, the ribbon containing a small number of ends of reinforcing cord, thus avoiding the circumferential overlap associated with the traditional technique. Document D3 teaches that the edges of the wound turns of the ribbon, which has a width of 15mm to 45mm, should abut each other. The result of helically winding the ribbon around the tire is that the reinforcing cords make a small angle, less than 5°, with the circumferential direction of the tire. In document D7 it is stated with respect to the embodiment of Figures 1 and 2 that the ribbon ("strip ply") is wound from one edge of the belt layer to the others "while successively forming a plurality of mutually superposed portions" (page 5,

lines 6 and 7). In the cross-section of the tire shown in Figure 1 the turns of the ribbon are portrayed schematically in a manner resembling roof shingles. In the opinion of the Board there can therefore, having regard to the text and Figure 1 of document D7, be no doubt the adjacent turns of the ribbon disclosed there are in an overlapping relationship. According to document D7 the ribbon has a width of 10mm to 50mm.

Document D1 can be seen as representing a further development of the teachings of documents D3 and D7 in that it proposes winding the ribbon in such a way that the edges of adjacent turns abut in the central portion of the tire and overlap in the shoulder portions of the tire.

Having regard to the above the Board shares the view of the respondents that document D7 represents the closest state of the art. It is true that document D7 does not specifically disclose the angle which the cords in the wound ribbon make with the circumferential direction of the tire (neither for that matter does document D1, on which the preamble of granted claim 1 is stated to be based) but as the appellants conceded at the oral proceedings an angle of 5° or less is wholly conventional and would follow automatically from the width of the ribbon disclosed in document D7.

Since document D7 contains no teaching as to how the orientation of the cords in the overlay structure is disposed with respect to the orientation of the cords of the outermost belt layer of the belt reinforcing structure, the subject-matter of granted claim 1 is novel.

According to the patent specification the choice of the particular orientation of the cords in the overlay structure specified in the characterising clause of

claim 1, that is in a direction opposite to the direction of the cords in the outermost belt layer, helps towards reducing the tendency of the tire to steer in a particular direction, this tendency being commonly known in the art as "ply steer" (see column 4, last paragraph). The issue of inventive step therefore resolves to the question as to whether it was obvious for the person skilled in the art when fabricating the tire according to document D7 to choose the claimed orientation of the cords in the overlay structure, from the two possibilities open to him, in order to reduce the ply steer of the tire.

In this respect documents D11, D16 and D17 are of particular relevance. Document D11 provides a detailed theoretical and mathematical analysis of the phenomenon of ply steer. In the right-hand column of page 6 it is stated that ply steer can be reduced in a radial carcass tire essentially to zero by belt design alone. Figure 21 shows a belt with no ply steer and comprises three belt layers with the direction of the cords in the innermost and outermost layers being the same and opposed to that of the cords in the central layer. In document D16 it is indicated that for a four layer belt structure the lowest ply steer is given when the cords in the innermost and outermost layers have the same direction, opposed to the direction of the cords in the two layers lying therebetween. The highest ply steer is given when the two lower layers have cords oriented in the same direction, opposed to the direction of the cords in the two upper layers. Document D17 teaches that low ply steer is achieved by a symmetrical arrangement of the belt layers, that is with a three layer belt when the arrangement corresponds with that discussed above with respect to Figure 21 of document D11. A two layer reinforcing belt structure, being asymmetrical about its mid-plane, will have high ply steer.

Notwithstanding the fact that the cords in the overlay structure are disposed at a lower angle to the circumference of the tire than the cords of the reinforcing belt layers and generally have a lower stiffness than these, the Board is convinced that the person skilled in the art would recognise that the cords of the overlay structure will nevertheless have an influence on the ply steer of the tire. Furthermore, on the basis of what is disclosed in documents D11, D16 and D17 it is obvious for him that the configuration in which the cords of the overlay structure are oriented in a direction opposite to that of the cords of outermost belt layer will tend to have a lower ply steer than the alternative configuration in which the cords of the overlay structure are oriented in the same direction as the cords of the outermost belt layer. Taking for example a two layer reinforcing belt structure as illustrated in the present patent it is apparent that the former of the two configurations discussed above will lead to a more symmetrical overall arrangement of the reinforcing cords in the belt structure and overlay structure taken together than in the latter of those two configurations.

The Board therefore comes to the conclusion that the subject-matter of granted claim 1 lacks inventive step (Article 56 EPC).

3. *First and Second auxiliary requests*

The feature added to claim 1 of the first auxiliary request that the overlap between adjacent turns of the ribbon is uniform across the axial width of the belt reinforcing structure is already known from the closest state of the art, document D7. It is therefore apparent that this feature cannot contribute anything of inventive significance to the claim.

According to claim 1 of the second auxiliary request the overlap between adjacent turns of the ribbon is greater in the axially outer portions of the overlay structure than in its central portion. It had however already been proposed in document D1 to provide greater reinforcement in the shoulder portions of the tire, where it is most needed, by having no overlap of the ribbon of the overlay structure in its central portion and overlap in its axially outer portions. To achieve in the tire according to document D7 the effect of having greater reinforcement in the shoulder portions of the tire by increasing the degree of overlap in the axially outer portions of the overlay structure in comparison with the degree of overlap in the central portion of the overlay structure cannot be seen as a measure going beyond the routine competence of the person skilled in the art.

At the oral proceedings the appellants suggested that the higher cord density in the shoulder portions of the tire provided by the additional feature of claim 1 of the second auxiliary request enabled a "fine tuning" of the ply steer of the tire. There is however no mention of this in the patent specification and on the evidence available to it the Board can see no *prima facie* technical reason which would support the assertion of the appellants. The only reason given in the patent specification for increasing the cord density in the shoulder portions of the tire is to confer greater strength to these areas (column 3, line 51 to 56) which thus fully coincides with the reason given in document D1.

4. *Reimbursement of the fee for appeal*

Since in the present case the appeal is to be dismissed, the appellants' request for reimbursement of the fee for appeal must be rejected (Rule 67 EPC).

Nevertheless, for completeness, the Board makes the following observations on the arguments submitted by the appellants in support of this request.

The opposition procedure was somewhat complicated by the fact that the patent specification contains a clerical error with the statement of problem reading that the object of the invention was to provide a tire with reduced "polyester", rather than "ply steer" as it should have done. It was only after the appellants' reply of 20 July 1994 to the notices of opposition that this issue was clarified. Thereafter the respondents submitted with respective letters dated 14 December 1994 and 20 January 1995 further arguments and evidence (the documents D11, D16 and D17) relating to the ply steer issue. These letters were communicated to the appellants with EPO forms 2911 dated respectively 29 December 1994 and 27 January 1995. These communications, signed by the formalities officer, and inviting the appellants to "take note" of the submissions of the opponents do not constitute communications of the Opposition Division within the terms of Article 101(2) EPC for which a time limit for reply (normally four months, cf. Guidelines E VIII 1.2) is required. Nevertheless, the relevance of these submissions and the new prior art documents to which they refer to the arguments of the appellants contained in their letter of 20 July 1994 are self-evident. The time that elapsed between the communications mentioned above and the issue of the contested decision, which is based on reasoning corresponding in essence to those submissions of the respondents, gave the appellants sufficient opportunity, particularly given the relative simplicity of the subject-matter involved, to comment on the new cited prior art documents if they so wished (Article 113(1) EPC), see T 275/89 (OJ EPO 92, 126).

Decision T 669/90 (OJ EPO 1992, 739), on which the appellants rely, relates to the use and terms of a previous EPO form 2937.2 (now superseded by the form 2911) which it was held (obiter) could lead the recipient into believing that no reply was thought necessary by the Opposition Division, since this form enabled the formalities officer to choose between crossing one of two boxes, the first inviting that the recipient "take note" and the second that he reply within a given time limit. As the present form 2911 does not offer these choices and only invites the recipient to "take note" the possibly misleading nature of the earlier form no longer arises. It is at the discretion of the recipient to reply to this communication if he finds it necessary, having reviewed the significance of the material sent to him. If he intends to reply but for any reason is prevented from doing so within a reasonable period of time, then the appropriate action is to inform the Opposition Division of his difficulties.

The Board is therefore of the opinion that the procedure before the Opposition Division did not involve a substantial procedural violation as alleged by appellants.

Order

For these reasons it is decided that:

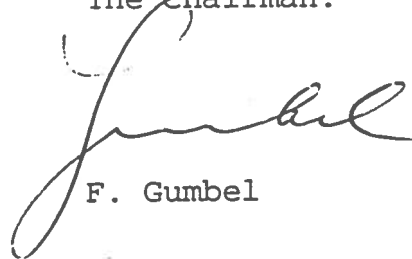
1. The appeal is dismissed.
2. The request for reimbursement of the fee for appeal is rejected.

The Registrar:



S. Fabiani

The Chairman:



F. Gumbel

Chiani

