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D E C I S I O N
of 1 December 1998

Case Number: T 0040/97 - 3.2.1

Application Number: 88630191.0

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Title of invention:
Radial pneumatic tire with reverse curvature carcass ply

Patentee:
The Goodyear Tire & Rubber Company

Opponent:
Bridgestone Corporation

Headword:
-

Relevant legal provisions:
EPC Art. 100(c), 123(2), (3)

Keyword:
"Addition of subject-matter (yes)"

Decisions cited:
-

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Case Number: T 0040/97 - 3.2.1

D E C I S I O N
of the Technical Board of Appeal 3.2.1
of 1 December 1998

Appellant: (Proprietor of the patent)
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Decision under appeal: **Interlocutory decision of the Opposition Division of the European Patent Office posted 20 November 1996 concerning maintenance of European patent No. 0 317 487 in amended form.**

Composition of the Board:

Chairman: F. Gumbel
Members: S. Crane
J.-C. Saisset

Summary of Facts and Submissions

I. European patent No. 0 317 487 was granted on 22 June 1994 on the basis of European patent application No. 88 630 191.0.

Claim 1 of the granted patent reads as follows:

"A radial ply pneumatic tire (200, 300, 500) for use on paved surfaces, the tire comprising a carcass having at least one radial ply (220, 320, 520), a belt structure (230, 330, 530) radially outward of and circumferentially surrounding the carcass to provide circumferential restriction of the carcass shape beneath the belt structure, and a tire tread (240, 340, 540) having a width in the range from 65 to 80% of the tire's section width, the tire having a reverse curvature either to the radial carcass ply or to both the belt structure and the carcass plies when the tire is mounted on its design rim and normally inflated, the reverse curvature being in a region between two points (221, 521) in the tire profile centred about and on opposite sides of the equatorial plane, the respective points being located at maximum radial dimensions of the carcass ply on the respective sides of the equatorial plane (EP), said points of maximum radial dimension being respectively located axially inwardly of both the lateral edges of the belt structure and the centers of the annular tensile members (251, 351, 551) in the beads (250, 350, 550) of the tire, dimensions between the carcass and the belt structure continually decreasing as a function of axial distance from the equatorial plane in the region between the two points, the reverse curvature being imparted to the carcass ply by an elastomeric wedge (260, 360, 560) positioned either between the carcass and the belt structure or between the tread and the belt structure, having a

thickness (H) at the equatorial plane less than or equal to 5% of its width in the axial direction, the radially innermost ply of the belt structure having a cord angle in the range from 17° to 27° and being in contact with the radially outer surface of the wedge, and the tire having an aspect ratio less than or equal to 75%, characterized in that the wedge (260, 360, 560) is dimensioned so that the tire when mounted on its design rim and undeflected undergoes uniform growth of its tread surface in the radial dimension, as measured from the tire's axis of rotation, when its inflation pressure is increased from atmospheric pressure to normal pressure, the radial displacement laterally across the tread surface being uniform within plus or minus 25% of the radial displacement of thread surface at the equatorial plane."

II. The granted patent was opposed by the present respondents on the ground, in particular, that it extended beyond the content of the application as filed (Article 100(c) EPC). They also challenged the sufficiency of the disclosure in the patent specification on the basis that the embodiment of Figure 4 was inconsistent with the terms of granted claim 1. In the notice of opposition they stated that they reserved the right to argue lack of patentability with respect to the state of the art documents referred to in the file history. No arguments were however presented in this respect in the course of the opposition or appeal proceedings.

III. With its decision posted on 20 November 1996 the Opposition Division found that there was no disclosure in the original application of a tire having a wedge arranged above the belt structure wherein the cords of the plies of the belt structure had a cord angle of greater than 25°, there was only one radial ply and the wedge had a thickness of no more than 5% of its axial

width. The Opposition Division therefore held that the patent could only be maintained on the basis of an amended set of claims 1 to 9 and an adapted description according to the second auxiliary request from which documents the alternative in which the wedge was arranged above the belt structure had been eliminated.

IV. The proprietor of the patent filed an appeal against this decision on 11 January 1997 and paid the fee for appeal at the same time.

The statement of grounds of appeal was filed on 20 March 1997.

V. Oral proceedings before the Board were held on 1 December 1998.

At the oral proceedings the appellants requested maintenance of the patent on the basis of sets of claims 1 to 10 according to main, first auxiliary and second auxiliary requests. Claims 1 to 9, which corresponded to the claims approved by the Opposition Division in the contested decision, were common to all three requests.

Claim 10 of the main request reads as follows:

"A radial-ply pneumatic tire (500) for use on paved surfaces, the tire comprising a carcass having at least one radial ply (520) a belt structure (530) radially outward of and circumferentially surrounding the carcass to provide circumferential restriction of the carcass shape beneath the belt structure, and a tire tread (540) having a width in the range from 65 to 80% of the tire's section width, the tire having a reverse curvature to both the belt structure and the carcass plies when the tire is mounted on its design rim and normally inflated, the reverse curvature being in a

region between two points (521) in the tire profile centred about and on opposite sides of the equatorial plane, the respective points being located at maximum radial dimensions of the carcass ply on the respective sides of the equatorial plane (EP), said points of maximum radial dimension being respectively located axially inwardly of both the lateral edges of the belt structure and the centers of the annular tensile members (551) in the beads (550) of the tire, dimensions between the tread surface and the carcass ply continually decreasing as a function of axial distance from the equatorial plane in the region between the two points, the reverse curvature being imparted to the carcass ply by an elastomeric wedge (560) positioned between the tread and the belt structure, having a thickness (H) at the equatorial plane less than or equal to 5% of its width in the axial direction, the plies of the belt structure having a cord angle in the range from 17° to 27° and the tire having an aspect ratio less than or equal to 75%, characterized in that the wedge (560) is dimensioned so that the tire when mounted on its design rim and undeflected undergoes uniform growth of its tread surface in the radial dimension, as measured from the tire's axis of rotation, when its inflation pressure is increased from atmospheric pressure to normal pressure, the radial displacement laterally across the tread surface being uniform within plus or minus 25% of the radial displacement of the tread surface at the equatorial plane."

Claim 10 of the first auxiliary request differs from that of the main request solely in that the upper limit of the cord angle in the plies of the belt structure has been reduced from 27° to 25°.

Claim 10 of the second auxiliary request reads as follows:

"A radial-ply pneumatic tire (500) for use on paved surfaces, the tire comprising a carcass having at least two radial plies (520), a belt structure (530) radially outward of and circumferentially surrounding the carcass to provide circumferential restriction of the carcass shape beneath the belt structure, and a tire tread (540) having a width in the range from 65 to 80% of the tire's section width, the tire having a reverse curvature to both the belt structure and the carcass plies when the tire is mounted on its design rim and normally inflated, the reverse curvature being in a region between two points (521) in the tire profile centered about and on opposite sides of the equatorial plane, the respective points being located at maximum radial dimensions of the carcass ply on the respective sides of the equatorial plane (EP), said points of maximum radial dimension being respectively located axially inwardly of both the lateral edges of the belt structure and the centers of the annular tensile members (551) in the beads (550) of the tire, dimensions between the tread surface and the carcass ply continually decreasing as a function of axial distance from the equatorial plane in the region between the two points, the reverse curvature being imparted to the carcass ply by an elastomeric wedge (560) positioned between the tread and the belt structure, having a thickness (H) at the equatorial plane less than or equal to 5% of its width in the axial direction, the plies of the belt structure having a cord angle in the range from 17° to 25° and the tire having an aspect ratio less than or equal to 75%, wherein the wedge (560) is dimensioned so that the tire when mounted on its design rim and undeflected undergoes uniform growth of its tread surface in the radial dimension, as measured from the tire's axis of rotation, when its inflation pressure is increased from atmospheric pressure to normal pressure, the radial displacement laterally across the tread surface being

uniform within plus or minus 25% of the radial displacement of the tread surface at the equatorial plane, the radial cords of two carcass plies having cord angles respectively right and left in the range from 65° to 80°."

The set of claims 1 to 10 according to the second auxiliary request was associated with a revised description submitted at the oral proceedings and the drawings as granted.

The respondents requested that the appeal be dismissed.

VI. The arguments of the appellants in support of their requests can be summarised as follows:

The basic design concept underlying the invention as it was portrayed in the original application was the provision of a radial-ply tire having a carcass ply with a reverse, ie inwardly convex, curvature in the region under the tire tread. More particularly, that reverse curvature should correspond to the reverse curvature natural shape of a belt structure having cord angles in the range of 17° to 27°. This concept was applicable to tires having a single carcass ply or a plurality thereof. The reverse curvature could be obtained by positioning an appropriate wedge between the carcass ply or plies and the belt structure or alternatively positioning the wedge above the belt structure, in which case the belt structure as well as the carcass ply or plies would take up the required reverse curvature. The general applicability of the design concept involved was apparent from the detailed explanation of the theoretical background of the concept as well as from the original independent claim 19, which was of correspondingly broad ambit.

The other two original independent claims, claims 1 and 10, were directed to two specific preferred ways of putting the inventive design concept into effect. According to claim 1 the wedge was positioned between the carcass ply or plies and the belt structure. According to claim 10 on the other hand the wedge was positioned above the belt structure. Claim 10 indeed required that there be at least two carcass plies having cord angles respectively right and left in the range from 65° to 80° and that the plies of the belt structure have cord angles of less than 25°, but these were merely preferred features of this mode of realisation and the person skilled in the art would not understand this claim or anything else in the original application as meaning that the wedge could only be placed above the belt structure if these conditions were met. In fact, it was apparent from the particular description of the relevant embodiment of Figure 12 that two carcass plies were provided to give the additional lateral stiffness required to compensate for the use of aromatic polyamide cord in the belt structure rather than being in some way technical associated with the position of the wedge above the belt structure.

As for the form of the wedge, it was clear, in particular from page 6, lines 15 to 26, of the original description that its required shape was independent of whether it was to be placed below or above the belt structure and accordingly that the requirement of its maximum height being no more than 5% of its width, specifically disclosed with respect to the embodiments where the wedge is below the belt structure, also applied to the embodiment where it was above the belt structure.

It followed therefore that claims 1 and 10 of the main request, in which the two different originally disclosed modes of realisation, one with the wedge below the belt structure and the other with the wedge above it, were - for reasons of improved clarity in comparison with granted claim 1 - claimed separately, conformed with Articles 123(2) and (3) EPC.

Lastly, the amendment proposed to the description of the embodiment of Figure 4 was merely intended to eliminate an inconsistency between this and claim 1. Since it merely involved the deletion of an inaccurate statement, it could clearly not constitute any addition of subject-matter.

VII. In reply the respondents argued substantially as follows:

The only disclosure in the original application of the requirement that the thickness of the wedge be no more than 5% of its width was in relation to the embodiments where the wedge was positioned below the belt structure. To bring this requirement into combination with the embodiment where the wedge was positioned above the belt structure therefore constituted an addition of subject-matter. For that reason alone claim 10 according to each of the main, first and second auxiliary requests was unallowable.

Furthermore, the only interpretation of the original application which was properly consistent with the totality of its disclosure was that the positioning of the wedge above the belt structure was limited to the case where there were at least two carcass plies having cord angles respectively right and left in the range from 65° to 80° and the plies of the belt structure had a cord angle of less than 25°. That limitation had been removed when the granted claim 1 was drafted to cover

both modes of realisation with the wedge below or above the belt and it was this which had given rise to the original objection under Article 100(c) EPC. The separation of the two modes of realisation into present claims 1 and 10 of the main request eliminated the inconsistencies to be found in granted claim 1 but did nothing to resolve the problem of added subject-matter.

The proposed amendment of the description of the embodiment of Figure 4 should not be allowed. Its effect was to bring something that was outside the scope of the claims within those claims. Since it changed the character of the relevant disclosure it was tantamount to an addition of subject-matter.

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. It is readily apparent from a study of granted claim 1, especially when read in the light of the description, that this is intended to cover two distinct arrangements. In the first the radial carcass ply, in the region underlying the tire tread, has a reverse curvature which is imparted by an elastomeric wedge positioned between the carcass ply and the belt structure. In the second both the radial carcass ply and the belt structure have a reverse curvature, the wedge being positioned between the belt structure and the tread.

It is however also apparent that granted claim 1 is internally inconsistent in that it attributes features to both the first and second arrangement which from the technical point of view are exclusive to the first arrangement. In particular the claim requires that the "dimensions between the carcass and the belt structure continually decrease as a function of distance from the equatorial plane" and that "radially innermost ply of the belt structure...is in contact with the radially outer surface of the wedge."

The wording of granted claim 1 came into being as the result of the appellants following a suggestion made by the Examining Division to combine the previously independent claims 1 and 10 into a single main claim. In doing so the previous requirements of claim 10 concerning the specific arrangement of two carcass plies having cord angles respectively right and left in the range from 65° to 80° and the belt structure having plies with cord angles of less than 25° were removed. Furthermore, the requirement that the thickness of the wedge did not exceed 5% of its width, which was present in the previous claim 1 but not in claim 10, became associated with the arrangement where the wedge was located above the belt structure.

By redividing granted claim 1 into two independent claims the appellants have eliminated the internal inconsistencies in that granted claim. Present claim 1, which is the same in each of the main, first and second auxiliary requests and corresponds to claim 1 approved by the Opposition Division in the contested decision, is now directed exclusively to the arrangement where the wedge is located between the carcass ply and the belt structure.

The respective independent claims 10 of the main, first and second auxiliary requests are directed to the arrangement where the wedge is located above the belt structure. In these respective claims 10 the requirement of granted claim 1 concerning the dimensions between the carcass ply and the belt structure, which of course would be inconsistent with the wedge being located above the belt structure, has been replaced by a corresponding requirement concerning the dimensions between the carcass ply and the tread surface. In the particular circumstances of the present case the Board can see no objection to that amendment under Article 123(3) EPC and none has been raised by the respondents.

Although the reversion to two separate independent claims 1 and 10 has removed the inconsistencies present in granted claim 1 it is apparent that claim 10 of the main request is still open to the same objections of added subject-matter that were raised against granted claim 1. As a first step in the investigation of these objections it is necessary to consider in detail was the originally filed application taught the person skilled in the art. In the following analysis the page and line references are to the published A-document.

2.1 The description of the original application starts with the broad statement that the invention relates to a radial-ply pneumatic tire having a carcass ply that has a "reverse", i.e. inwardly convex, curvature. The reverse curvature occurs between two inflection points in the carcass ply or plies equally spaced from the equatorial plane of the tire. It is then explained that this arrangement reduces stresses in the belt-edge

areas of the tire and gives greater uniformity of growth in the radial dimensions of the tire when this is inflated. As a consequence of the latter there is an improvement in the footprint characteristic of the tire.

There then follows an evaluation of various examples of prior art, some of which are concerned with the problem of improving the footprint characteristic of a radial-ply tire by different means and others disclose the provision of a reverse curvature carcass ply for different purposes.

At page 3, lines 4 to 8, it is then stated that

"In accordance with the invention, which applies only to tires having an aspect ratio less than or equal to 75% and a tread width in the range from 65% to 80% of the tire´s section width, a radial tire for use on paved road surfaces has elastomeric means for imparting a reverse curvature to the tire´s radial carcass (and also to its belt structure where the tire has at least two radial plies with right and left cord angles in the range from 65% to 80%)."

There follows a paragraph setting out in more detail the location and form of the region of reverse curvature of the carcass ply or plies and immediately thereafter another statement of invention, which since the appellants particularly rely on it, is repeated here in full:

"In accordance with another aspect of the invention, the radial-ply pneumatic tire is configured with one or two "radial" plies as its carcass; these plies have cord angles respectively directed left and right at angles in the range from 65° to 80°. This construction is particularly suitable for passenger and light-truck

vehicles and is used with a belt structure having two or more plies. A wedge of elastomeric material is used to impart a reverse curvature to the carcass, the reverse curvature making the carcass profile concave outwardly in a region centered about the equatorial plane. The elastomeric means for causing the reverse curvature can be an integral part of the tread or undertread material or can be suitable member positioned between the belt structure and the carcass plies. If an elastomeric wedge is positioned above the belt structure, the belt structure also will have a reverse curvature centered about the equatorial plane."

After the brief description of the Figures there comes a list of definitions which are said to be "applicable both to the specification and to the appended claims". Amongst them is the definition of belt structure in the following terms: "Belt structure means at least two layers or plies of parallel cords, woven or unwoven, underlying the tread, unanchored to the bead, and having both left and right cord angles in the range from 17° to 27° with respect to the equatorial plane of the tire."

The particular description discloses three preferred embodiments with respect to Figures 4, 10 and 12 together with extensive theoretical considerations concerning the underlying design concept involved, explained with reference to Figures 13 to 17.

In the tires of Figures 4 and 10 an elastomeric wedge is positioned between the single carcass ply and the belt structure to give to the carcass ply the required reverse curvature. The form of the wedge used in the tire of Figure 4 is described in more detail with

reference to Figure 5. In particular it is stated at page 6, lines 23 to 25, that the height at the equatorial plane of the wedge is less than or equal to 5% of the width thereof and is preferably only about 2% thereof in the illustrated tire.

With reference to Figure 12, where the wedge is positioned above the belt structure, it is stated at page 7, lines 42 to 45, that "this tire also represents a further aspect of the invention in that both its carcass plies and its belt plies have a reverse curvature, that is, they have respective portions centered about the equatorial plane that are outwardly concave and this is combined with carcass plies having "radial" cord angles in the range from 65° to 80°."

Subsequently, at lines 48 to 51, the belt structure of the tire of Figure 12 is stated to be "formed by two belt plies having cord angles, also right and left respectively, in the preferred range from 18° to 21° and, in any case, less that or equal to a "critical angle" of 25° described in greater detail hereinafter."

The underlying design theory for the tires extends from page 8, line 33 to page 11, line 11, which is the end of the description. This theoretical passage includes the following statement at page 9, lines 20 to 35, again quoted extensively as it is particularly relied upon by the appellants:

"From the preceding descriptions of the tires illustrated in Figures 4, 10 and 12, it may become evident that the tire constructed according to one aspect of the invention incorporates a carcass contour in its sidewall regions that is of natural shape for the "radial" carcass, whereas the area of such carcass beneath the tread and belt structure approximates the reverse-curvature Purdy-equation natural shape for the

cord angle or angles of the belt structure in the range from 17° to 25° or 27° (25° is preferred). Where both carcass and belt structure have reverse curvatures, such as in the tires illustrated in Figures 12 and 17, the cord angles of the working plies of the belt structure are less than 25° and are allowed to take the natural shape for cords at such angles. In the tires illustrated in Figures 4 and 10, the belt structure has plies that retain their outwardly convex shape, but the radial carcass portion beneath the belt structure is allowed to take a reverse curvature which, rather than being characteristic of a radial ply, is instead characteristic of a ply having the cord angle or angles of the plies in the belt structure. This has quite unexpectedly been found to provide the uniform dimensional growth and reduced-stress benefits previously described.

When the outwardly convex bead structures are used in conjunction with a reverse-curvature carcass ply, as illustrated in the tire structures of Figures 4 and 10, it is as yet unclear as to whether or not the cord angles in the belt plies must be less than the critical angle of about 25°. In other words, the cord angle may be up to about the 27° used in radial tires while still providing at least some of the benefits described herein."

The detailed design considerations involved with a tire having a wedge positioned above the belt structure are set out with reference to the schematic representation of Figure 17. In this context it is said at page 10, lines 29 to 31, that "it should be noted that the carcass in the aspect of the invention illustrated in Figure 17 has "radial" cord angles in its two plies that are in the range for the reasons described in connection with Figure 12."

Turning now to the claims, original claim 1 was directed to a tire having a carcass comprising at least one radial ply and an elastomer wedge positioned between the carcass and the belt structure for imparting a reverse curvature to the carcass ply. The radially innermost ply of the belt structure has a cord angle of 17° to 27° and is in contact with the radially outer surface of the wedge.

In dependent claim 3 it is stated that the wedge has a thickness at the equatorial plane less than or equal to 5% of its width in the axial direction.

The radial tire of original independent claim 10 has a carcass comprising at least two plies and comprises elastomeric means for imparting a reverse curvature to both the carcass plies and the belt structure. The plies of the belt structure have cord angles less than 25° and the radial cords of the two carcass plies have cord angles respectively right and left in the range from 65° to 80°.

According to dependent claim 11 there are only two carcass plies, both with polyester cords, and the belt structure has plies of steel or aromatic polyamide cord with cord angles in the range from 17° to 25°.

According to dependent claim 12 the elastomer means is comprised by a wedge.

In a third independent claim, claim 19, a tire with a carcass having at least one radial ply is defined in very general terms as having a carcass shape which in its sidewall regions conforms to the natural shape for

sidewalls having the radial cord angles of the radial plies therein and which, in its region underlying the belt structure, conforms to the reverse curvature natural shape for those belt structure plies having cord angles in the range from 17° to 25°.

2.2 Having completed this summary of the contents of the original application, it is convenient to turn first of all to the objection concerning the ratio of the maximum thickness and the axial width of the wedge when considered in the context of the mode of realisation covered by claim 10, where the wedge is positioned above the belt structure. The reason for starting with this objection is that the relevant feature appears in each of the respective claims 10 of the main, first and second auxiliary requests, so that if the objection of added subject-matter is found to hold good then all of the requests would have to be refused and the appeal dismissed.

In strict terms it is certainly true that there is no explicit disclosure in the original application that the elastomeric wedge used in the embodiment of Figure 12 to impart a reverse curvature to the carcass plies and the belt structure has a thickness in the equatorial plane which is less than or equal to 5% of its axial width. The only description of the wedge in these terms is with respect to the embodiment of Figure 4, where the wedge is positioned between the carcass ply and the belt structure. Furthermore, the dependent claims relating to this feature of the wedge, claims 3 and 4, are directly or indirectly appended to claim 1, which is restricted to the wedge arrangement as shown in Figures 4 and 10. Nevertheless, the Board takes the view that in a case such as the present, where a number of generally similar embodiments are discussed in equivalent terms, the person skilled in the art will in normal circumstances and when nothing

points to the contrary, notionally associate the characteristics of an element of one embodiment, described in some detail, with the comparable element of another embodiment described in lesser detail. In the present case there is nothing which could indicate to the person skilled in the art that the wedge used in the embodiment of Figure 12 should, as regards the permitted ratio of its thickness to axial width be any different to the wedge used in the embodiment of Figure 4. This view is reinforced by the fact that in the detailed description of the shape of the wedge shown in Figure 5 at page 6, lines 19 to 26, reference is made to the shape being preferably determined using the procedure described in connection with Figures 16 and 17. Now, Figure 17 relates specifically to the arrangement where the wedge is positioned above the belt structure. Thus this presents a clear indication for the person skilled in the art that the wedges used respectively below or above the belt structure should have an essentially equivalent shape. Accordingly the Board comes to the conclusion that the requirement of claim 10 (of all requests) that the thickness of the wedge at the equatorial plane be less than or equal to 5% of its axial width does not constitute an addition of subject-matter.

Although, as just explained, the original application is to be understood as teaching an implicit equivalence between the wedges used either below or above the belt structure, it draws a clear distinction between various other aspects of those two arrangements.

Firstly, it can be seen from the passage on page 9, quoted above, that when the wedge is positioned above the belt structure then the plies should have a cord angle of less than 25°, whereas when the wedge is positioned below the belt structure, a cord angle of up to 27° can be tolerated. Again, in the description of

the embodiment of Figure 12 at page 7, lines 49 to 51, it is stated that the cord angle in the plies of the belt structure must be less than or equal to a "critical angle" of 25°. In the opinion of the Board it can be seen from these statements and the terms of the relevant original independent claim 10 that the limitation to a maximum value of 25° for the cord angle of the belt structure plies in the arrangement where the wedge is positioned above those plies was fully intentional and technically meaningful. (There is merely a slight discrepancy as to whether the actual value of 25° itself should be included or not. In view of this inconsistency the appellants are entitled to include the value in claims 10 of the auxiliary requests.) The appellants have sought to refer to the general definition of "belt structure" found on page 4, lines 23 to 25, as providing a basis for the range of belt structure ply cord angles of 17° to 27° found in claim 10 of the main request. The Board does not find that argument in any way convincing, since the original application also contains other examples of preferred cord angle ranges for the plies of the belt structure, such as 18° to 21°, and those belt structures are clearly intended to be consistent with the definition given. It cannot be justified, on the basis of the definition alone to replace at will references to a more restrictive cord angle range by a reference to 17° to 27°.

Secondly, in the statement of invention at page 3, lines 4 to 8, the particular description of the embodiment of Figure 12, the theoretical explanations with respect to Figure 17 and independent claim 10 together with its dependent claim 12, the original application establishes a clear and exclusive association between the positioning of the wedge above the belt structure and the fact that the carcass comprises at least two radial plies with cord angles

respectively right and left in the range from 65° to 80°. Here the appellants see the justification for removing this requirement in the second statement of invention at page 3, lines 19 to 27, and the original independent claim 19. Both of these are however in very general terms and neither contains an explicit or implicit disclosure of the use of wedge positioned above the belt structure to impart reverse curvature to this and to a single carcass ply. The passage at page 3, lines 19 to 27, is somewhat unclear in its terms, especially as it purports to set out "another" aspect of the invention which is in no way clearly distinguishable from the one set out before. Insofar as it is possible to assemble notionally from the various possibilities mentioned a tire having only one carcass ply and a wedge positioned above the belt structure that can only be done with hindsight and in direct contradiction to what has been set out a few lines previously as being the invention and to the subsequent particular description of the embodiments. As for original claim 19, this does not even mention a wedge, so that it is difficult how support can be found here for a specific arrangement of that wedge in combination with a single carcass ply.

Having regard to the above the Board therefore takes the view that the original application only disclosed the use of a wedge positioned above the belt structure to impart the required reverse curvature to both the carcass plies and the belt structure in the context of a tire which has two carcass plies having cord angles respectively right and left in the range from 65° to 80° and belt plies having cord angles of 17° to 25°. As a consequence neither the main request, nor the first auxiliary request can be allowed.

Both of the appropriate limitations appear together first in claim 10 of the second auxiliary request. This claim, together with claims 1 to 9 as agreed by the Opposition Division accordingly form a suitable basis for maintenance of the patent in amended form.

3. The appellants have submitted a revised description to accompany the amended claims which, apart from routine editorial adaptations to the terms of the claims, includes one amendment which has been vigorously contested by the respondents. This amendment concerns the description of the embodiment of Figure 4 where it was said originally at page 6, lines 9 to 11, that the belt structure comprised four plies having cord angle ranges "respectively of 55° to 65° right, 18° to 21° right, 18° to 21° left, and 18° to 21° right". That statement seems manifestly inconsistent both with the terms of the definition of "belt structure" discussed above and the terms of original claim 1, which required that the radially innermost ply of the belt structure had a cord angle in the range from 17° to 27°.

The amendment made by the appellants to remove this inconsistency is to delete the passage setting out the respective cord angle ranges. The respondents object to this amendment since in their view it converts something which originally was clearly not an embodiment of the invention claimed into such an embodiment, which gives an unfair advantage to the appellants. The Board cannot accept that this is the case. For the person skilled in the art reading the original application there can be no doubt in the circumstances that the tire of Figure 4 is intended to illustrate an embodiment of the invention and that the stated cord angle range of 55° to 65° for the radially innermost belt ply must therefore be a mistake, since this is required to be in the range of 17° to 27°. The deletion of the stated cord angle ranges removes this

inconsistency without in any way adding subject-matter to the content of the application and the Board knows of no provision of the EPO which should be applied to turn the proposed amendment down.

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 on the basis of the set of claims 1 to 10 according to the second auxiliary request and the corresponding adapted description submitted at the oral proceedings, together with the drawings as granted.

The Registrar: The Chairman:

S. Fabiani F. Gumbel