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**Datasheet for the decision
of 18 December 2018**

Case Number: T 0278/16 - 3.2.01

Application Number: 09178458.7

Publication Number: 2199104

IPC: B60C9/20

Language of the proceedings: EN

Title of invention:

Truck tire

Patent Proprietor:

The Goodyear Tire & Rubber Company

Opponent:

MICHELIN Recherche et Technique S.A.

Headword:

Relevant legal provisions:

EPC Art. 100(c), 100(b), 100(a), 54(1), 56

Keyword:

Amendments - extension beyond the content of the application
as filed (no)

Sufficiency of disclosure - (yes)

Novelty - main request (yes)

Inventive step - main request (yes)

Decisions cited:

G 0002/10

Catchword:



Beschwerdekammern

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Case Number: T 0278/16 - 3.2.01

D E C I S I O N
of Technical Board of Appeal 3.2.01
of 18 December 2018

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Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted on 11 December
2015 rejecting the opposition filed against
European patent No. 2199104 pursuant to Article
101(2) EPC.**

Composition of the Board:

Chairman G. Pricolo
Members: W. Marx
 S. Fernández de Córdoba

Summary of Facts and Submissions

- I. The appeal is directed against the decision rejecting the opposition against European patent No. 2 199 104.
- II. With regard to claim 1 as granted, the appellant relied on the following evidence filed during the opposition procedure:
- E1: EP 2 199 105 A1;
 - E2: EP 0 501 782 B1;
 - E3: US 4,688,615;
 - E4: WO 2005/113258 A1;
 - E5: GB 1 567 614;
 - E6: US 7,404,425 B2;
 - E7: WO 2005/016666 A1;
 - D1: US 6,065,518.
- III. At oral proceedings held on 18 December 2018 the appellant (opponent) requested that the decision under appeal be set aside and that the European patent be revoked. The respondent (patent proprietor) requested that the appeal be dismissed or, in the alternative, that the patent be maintained according to one of the first to seventh auxiliary requests filed by letter of 12 August 2016.
- IV. Claim 1 as granted reads as follows (amendments with respect to claim 1 as filed are marked by strike-through for deletions and underlining for additions):
- "A pneumatic tire for use on trucks, the tire comprising a tread (12) and a belt structure (50) located radially inward of the tread (12), the belt structure (50) including a pair of working belts (52, 54), wherein the working belts (52, 54) are reinforced plies each comprising parallel reinforcement elements,

wherein the angle of the reinforcement elements in the respective working belts (52, 54) ranges from 16 degrees to 30 degrees from the circumferential direction, ~~characterized in that the working belts (52, 54)~~ wherein the reinforcement elements are extensible having an elongation at 10% of the breaking load greater than 0.2% when measured at the reinforcement elements extracted from a cured tire, and wherein the extensible reinforcement elements are wires comprising steel or hybrid cords, characterized in that the belt structure (50) comprises a belt (58) positioned between the working belts (54, 56) comprising parallel reinforcement elements angled at less than 5 degrees from the circumferential direction."

Reasons for the Decision

1. The appeal is admissible.
2. *Extension beyond the content of the application as filed (Article 100(c) EPC)*
 - 2.1 The subject-matter of the European patent does not extend beyond the content of the application as filed.
 - 2.2 The appellant raised the following objections under Article 100(c) EPC:
 - omission of the allegedly essential feature (a) that "*the angle of the working belts (52, 54) ranges from 16 degrees to 30 degrees from the circumferential direction*" (see claim 1 as filed), which was replaced by a feature taken from claim 3 as filed

- omission of the allegedly essential feature (b) that "*the working belts (52, 54) are extensible*" (see claim 1 as filed), which was replaced by a feature taken from claim 3 as filed
- neither the description nor dependent claim 4 as filed provided a support for the feature (c) that "*the reinforcement elements are extensible having an elongation at 10% of the breaking load greater than 0.2% when measured at the reinforcement elements extracted from a cured tire*"

2.3 The board wishes to point out that according to the established case law of the Boards of Appeal the concept of essential features relates primarily to Article 84 EPC, i.e. the clarity of the claimed invention and its support in the description. However, a ground for opposition cannot be invoked under Article 84 EPC against the patent as granted.

Admittedly, deletion of features which are presented as essential features in the application as filed might be objected to under Article 123(2) EPC. However, the mere fact that a feature present in claim 1 as filed is omitted and replaced by a feature disclosed in dependent claim 3 as filed does not necessarily mean that the feature deleted was an essential feature, unless it was consistently presented as an essential feature. The criterion to be applied when assessing amendments is that an amendment is only allowable if it does not result in the skilled person being presented with technical information which he would not derive directly and unambiguously, using common general knowledge, from the application as filed (see G 2/10, point 4.5.1). Moreover, omission of a feature from an

originally disclosed combination of features results in an unallowable intermediate generalisation only in case the features were inextricably linked to each other.

Note: In the following, it will be referred to the respective passages in the A-publication when reference is made to the application as filed.

2.4 The appellant argues that the application as filed (see paragraphs [0005] and [0025]) described the original features (a) and (b) to be essential features, which could not be deleted. Moreover, the preferred embodiment of the invention defined in claim 3 as originally filed disclosed these features in combination with the features of original claim 1.

First of all, the board notes that none of these features is presented in the application as filed as an essential feature. Therefore, they might only be a vague and broad formulation of what is further specified in claim 3 as originally filed. This is why the opposition division found that unclear features as originally disclosed were only replaced by clear expressions.

The board also finds that the originally disclosed features (a) and (b) defining the angle of the working belt formed with the circumferential direction and their extensible character are vague and general. They leave open whether the specified angle range and the extensibility of the working belt are provided by the working belt as such, i.e. by the layer defined by its outer edges, its thickness and composition of cords and coating material, or by elements of the working belt such as the reinforcement elements.

2.4.1 As regards omission of feature (a):

Referring to documents E1 and E2 and the zigzag belts disclosed therein, the appellant argues that the "angle of the working belt" might also relate to the angle formed by the belt's outer edge (which indicated the belt's orientation) in relation to the tire's circumferential direction, which could be different from the angle formed by the reinforcement elements with the circumferential direction, as specified in claim 1 as granted. Accordingly, the subject-matter as defined in granted claim 1 included working belts orientated at an angle of e.g. 0° in relation to the circumferential direction (i.e. different from $16-30^\circ$), thereby encompassing embodiments which, contrary to the requirements of Article 123(2) EPC, were not disclosed by the combination of claims 1 and 3 as filed.

However, the board finds that the application as filed, in particular paragraph [0005] (reciting the wording of dependent claim 3) in combination with paragraph [0025] even suggests the embodiment which the appellant considers to be undisclosed. As stated in paragraph [0025], the width of e.g. the working belt 54 is about equal to the tread arc width. This already makes clear that the working belt as such cannot be inclined at an angle in a range of 16 to 30 degrees with respect to the circumferential direction of the tire. Moreover, according to the definitions in the application as filed (in particular paragraph [0010]), the term "(reinforcing) belts" defines "annular layers", which also indicates a circumferential orientation of the working belts. Therefore, the wording of claim 1 as originally filed cannot mean that the side edges of the working belts as such form an angle greater than 16° with the circumferential direction, so it has to be

construed accordingly. A different interpretation of the wording of claim 1 as originally filed cannot be based on further documents, as alleged by the appellant by referring to E1 and E2. However, even considering these documents, E2 clearly shows (see Fig. 2) a belt 6 forming an angle of 0° with the circumferential direction, and only the cords are lying zigzag between the edges of the belt and are thus inclined with respect to the circumferential direction. Similarly, E1 shows a zigzag belt structure 39 having a strip or cord 41 inclined with respect to the circumferential direction and a width of the belt layer structure 39 (see Fig. 2) that is - as in the figures of the patent specification - not much less than the tread arc width.

Therefore, the board follows the opposition division that there is no reason to retain the unclear feature that "*the angle of the working belts ranges from 16 degrees to 30 degrees from the circumferential direction*" when combining claims 1 and 3 as filed, since the claimed angle range - in view of the disclosure of the application as filed - can only relate to the angle of the reinforcement elements in the respective working belts. Moreover, retaining this feature would result in an unallowable amendment, as there is no clear and unambiguous disclosure in the application as filed of an embodiment which shows at the same time outer edges of the working belt and reinforcement elements forming an angle with the circumferential direction of the tire in the range from 16 to 30 degrees. As a consequence, both features cannot be considered as being inextricably linked so that omission of feature (a) would result in an unallowable intermediate generalisation.

2.4.2 As regards omission of feature (b):

The appellant also argues that a working belt having extensible reinforcement elements as specified in claim 1 as granted might be extensible or even inextensible, whereas only extensible working belts were originally disclosed. It was clear that a definition of the property "extensible" for a reinforcement element could not clarify the extensible characteristic of the working belts.

Basically, the appellant argues again that claim 1 as granted now comprises embodiments which were not originally disclosed, i.e. inextensible working belts. Allegedly, characteristics of the working belt (such as its extensibility) were dependent on several parameters (properties of the cords, their angle with the circumferential direction, material composition of the belt; as admitted by the respondent in its letter of reply on page 4) and the measurement of this characteristics (direction of measurement, threshold which qualifies a belt as extensible). It was also necessary to define how a value measured for cords was translated into a value for a belt. Moreover, the inextensible reinforcements of the first example in paragraph [0032] of the patent specification still fell under the wording of original claim 1 ("extensible working belt"), but not under claim 1 as granted, i.e. the extensible character of the working belt was not relying solely on the extensible character of the reinforcement elements.

However, according to the definitions given in the application as filed (see paragraphs [0010] to [0016]), the term "(reinforcing) belts" denotes annular layers of plies of parallel cords, "ply" meaning a cord-

reinforced layer of elastomer-coated cords, and the term "extensible" is then explicitly specified only as a characteristics of a cable, cord, wire or reinforcement. This makes perfectly clear that the extensible character of the working belt (constituted by elastomer-coated cords) is provided by the extensible character of the reinforcement elements. The patent specification might show an example in the description (in fact never characterised as an example or embodiment of the invention) which does not fall under the wording of claim 1 as granted, as argued by the appellant. This, however, cannot prove that the invention as finally specified in granted claim 1 has to be construed in such a broad way that inextensible working belts were included. Such embodiments are even excluded on a true understanding of the definitions given in the patent specification (identical to those in the application as filed), as argued further above. The board cannot see any clear teaching which would indicate that the ply (or belt) might be inextensible when providing extensible cords or reinforcement elements, since the plies are a composition of cords and elastomer.

Therefore, the board takes the view that omission of feature (b) that the working belt is extensible is justified when introducing the feature of extensible reinforcement elements, since it would only contain redundant (and not any new) information in view of the definitions given in the patent specification.

Note: Even assuming that the scope of protection provided by claim 1 as granted might be shifted or enlarged by including also working belts which are inextensible, as possibly alleged by the appellant, this would only be an issue under Article 123(3) EPC which cannot be invoked against the patent as granted.

2.4.3 As regards feature (c):

The appellant argues that an elongation at 10% of the breaking load greater than 0.2% for the reinforcement elements was not originally disclosed. The application as filed only showed a value of 0.4% in this context (see claim 4 and paragraphs [0006] and [0025]). It was not clear that the definition of the term "extensible" in paragraph [0014] had to be interpreted in this sense and supported the amendment according to feature (c).

The board follows the respondent that the skilled reader will note that paragraph [0014] of the application as filed (defining the term "extensible" as "a relative elongation at break of greater than 0.2% at 10% of the breaking load") contains a typographical error and is obviously erroneous, since it specifies an elongation for two contradictory testing conditions. Taking into account the further values given in the application as filed (e.g. in paragraph [0006]: "a % elongation at 10% of breaking load greater than 0.4%" according to a preferred aspect of the invention; see also paragraph [0025], or claim 4), it is clear to the skilled reader that a value of 0.2% at break for an extensible cord would not allow a cord to reach an elongation of 0.4% (at 10% of the breaking load) at all, although this value measured at 10% of the breaking load should represent a preferred aspect of the invention. Moreover, document E4 filed in the name of the appellant itself confirms (see page 3, 3rd paragraph: "*Des câbles sont dits inextensibles lorsque lesdits câbles présentent sous une force de traction égale à 10% de la force de rupture un allongement relatif au plus égal à 0,2%*") that it is well accepted in the related technical field that the threshold value

for classifying a cable or cord as "inextensible" respectively "extensible" is an elongation of 0.2% at 10% of the breaking load. The appellant referred in this context to the definition of the term "elastic" given in E4 (page 4, 4th paragraph: specifying a relative elongation at break of at least 4%). However, the board cannot see that this would provide a proof to the contrary.

The appellant's argument that paragraph [0014] related to the definitions recited in the application as filed, which could give a term a meaning different from the common meaning of this term, could not convince the board. As elaborated above, it is clear to the skilled reader that paragraph [0014] contains an erroneous definition, and that in particular the same elongation value cannot be defined "at break" and "at 10% of the breaking load" to define a threshold elongation for the characteristic "extensible". Even assuming that it was not immediately evident which definition out of the possible two definitions was the right one, as would be required when correcting an obvious error under Rule 139 EPC, the board cannot see that the skilled person was confronted with new technical information when choosing the threshold definition which complies with the values specified for the preferred embodiments of the invention, as shown above.

2.5 Therefore, the board comes to the conclusion that the ground for opposition according to Article 100(c) EPC does not prejudice the maintenance of the European patent as granted.

3. *Sufficiency of disclosure (Article 100(b) EPC)*

3.1 The ground for opposition under Article 100(b) EPC does not prejudice the maintenance of the patent as granted.

3.2 The appellant argues the contested patent neither indicated a clear meaning of the term "angle of the working belt" to the skilled person, nor provided any definition on how to measure that "the working belt is extensible", alleging again that these feature were essential features of the invention (as discussed above under 2.4.1 and 2.4.2). The application as filed allegedly did not disclose all the features necessary to realise the working belt. The working belt's orientation was defined by its outer edges, and its extensibility was dependent on how this characteristic was measured (direction and conditions of measurement), which was not further defined in the application as filed. The working belt allegedly could have an orientation corresponding to that of the reinforcement elements (see E1, E2), which was not present in claim 1 as granted any more, but other interpretations were also possible. A clear and complete meaning of the extensibility of a working belt required a definition of the direction of measurement. Apart from that, the term "extensible" was not defined in the context of measurements on the working belt. The skilled person had a large number of possibilities without any indication which to choose. Moreover, the first example stated in paragraph [0029] was in contradiction to the claimed invention. Therefore, it was not possible to realise a tire as claimed and reproduce the invention.

3.3 The board has already difficulties in understanding why the ground for opposition under Article 100(b) EPC should apply, since the invention as defined in claim 1

as granted does not contain the terms or features objected to by the appellant, which have been replaced by a clearer wording on the basis of the more specific definition given in claim 3 as originally filed. The board follows the respondent in that the skilled person knows how to make a truck tire according to claim 1 as granted, comprising a pair of crossed working belts having inclined reinforcement elements (as admitted by the appellant during oral proceedings when discussing novelty, explaining that the "triangulation" of the reinforcement elements of the working belts was known), and an additional 0° belt between the working belts. Moreover, the specification itself defines the meaning of the term "extensible".

As argued already above (see 2.4.1), in view of the disclosure of the application as filed, it is clear to the skilled person that the side edges of the working belts do not form an angle with the circumferential direction in the range from 16 to 30 degrees, but are to be considered as annular layers. Also the documents cited by the appellant (e.g. E2) clearly distinguish between the belt and inclined reinforcement elements (cord segments) forming the belt, and they specify angles of the reinforcement elements (not of the working belt) with regard to the circumferential direction. Moreover, a measuring method with regard to the term "extensible" when describing its elongation at 10% of the breaking load is defined in the application as filed (see paragraph [0014]: "*when measured from a cord extracted from a cured tire*"). Since this characteristic is specified for the reinforcement elements, it is clear in view of the examples given in the description (reinforcement elements formed by wires or cables) that the direction of measurement is along these elongated elements.

There might still be a variety of measures to realise the subject-matter of claim 1 as granted. However, this is considered to be an indication of the broadness of the claimed subject-matter, which does not prevent the skilled person from reproducing the invention. The mere fact that paragraph [0029] of the application as filed, which corresponds to paragraph [0032] of the patent specification, mentions an example with inextensible reinforcements (curve 75 in Figure 3) does not prevent the claimed invention from being sufficiently disclosed and reproducible. It is clear for a skilled person that this example is not according to the invention as claimed, as already found by the opposition division.

- 3.4 The appellant's objection with regard to the ambiguous definition of the term "extensible" in the description as filed is no issue under Article 100(b) EPC but at best a clarity issue, which is solved in claim 1 as granted (see above point 2.4.3, feature (c)).
- 3.5 The appellant has raised further objections under Article 100(b) EPC in the grounds of appeal with respect to the terms "circumferential", "wire", "tread arc width" (claims 4, 6 and 9) and the examples according to Figure 3. As regards the term "wire", the appellant itself has stated that it was clear for the skilled person that a cable consisted of wires (the opposition division held that the term "wires" was a generic term encompassing cables). The board agrees with this view, so no issue under Article 100(b) EPC can be seen. As regards the other terms and the objection with regard to Figure 3, the board follows the conclusion in the contested decision (point 3.4) that a skilled person is not prevented from carrying out the invention as defined in claim 1 and also in

claims 4, 6 and 9. In particular, as argued already above, the first example shown in Figure 3 (curve 75) which relates to working belts made of inextensible reinforcements does not fall under the wording of claim 1 as granted.

4. *Novelty (Articles 54(1) and 100(a) EPC)*

4.1 The subject-matter of claim 1 as granted is new and not anticipated by the disclosure of documents E3 or E4, as required by Article 54(1) EPC.

4.2 E3 discloses (Figure 1; column 4, lines 11-20; column 9, lines 22-25) a truck tire comprising a three-ply reinforcing structure, in particular an outer and an inner working belt showing angles of the cords in the range of 5° to 60° from the circumferential direction, preferably 23° or 45°, and a belt positioned between the working belts showing cords angled at about 0° from the circumferential direction. The middle belt or ply comprises a high extension wire made of a suitable metal allowing a 7% elongation (column 9, lines 22-25). As admitted by the appellant, E3 does not explicitly disclose an elongation at 10% of the breaking load greater than 0.2% for the reinforcement elements in the respective working belts as claimed.

4.2.1 The appellant's novelty objection with regard to E3 relies on a combination of a specific disclosure, according to which the 0° belt comprises wires having an elongation at break of 7% (column 9, lines 22-25), with the more generic passage stating that "*the middle ply may have the same tensile strength as the outer and inner plies*" (column 3, lines 53-56). Allegedly, E3 established a clear link between the tensile strength of the wires and the tensile strength of the belt.

However, the appellant's approach to combine these passages in E3, thus trying to fill gaps in its novelty objection, cannot be accepted. There is no clear and unmistakable teaching in E3 that the general statement in column 3 would imply or suggest that high extension wires as mentioned in column 9 for the 0° middle ply can also be used in the working belts. On the contrary, the board arrives at a different conclusion when taking into account the entire disclosure of the relevant passage on page 3 of E3, which reads as follows:

"However, in the reinforcing structure of the present invention, the 0° middle ply does not take the majority of the load. While the middle ply may have the same tensile strength as the outer and inner plies, it preferably has a lower tensile strength, i.e. is more extensible than and not as stiff as, the outer and inner plies" (column 3, lines 51-56). The "invention" referred to in this passage is described further above (column 3, lines 29-32), reciting that *"cords of the third belt are made from a material having a lower tensile strength than the material from which the cords of the first and second belt members are made"*. Taking these passages together, the board finds that the skilled person at best can derive from E3 an embodiment of three plies or belts having the same tensile strength and which are stiff. The term "stiff" is not further defined in E3, but there is no indication at all that high extension wires as described in column 9 for the middle ply might also be proposed for the working belts. Therefore, even assuming that the tensile strength of the plies in E3 directly correlates with the tensile strength or elongation of the cords (which was denied by the respondent), the appellant's line of argument could not be followed.

4.2.2 In the oral proceedings the appellant also brought forward that the invention as described in E3 started from a prior art in which the 0° middle ply was known as the "armor" layer and the inner and outer plies were made of thinner cords of material which had a lower tensile strength (column 3, lines 36-50). The intention in E3 was to provide stiffer working belts and (see column 9) an extensible middle ply. The general remark in column 3 suggested that also the working belts might be extensible. The simplest solution was to provide wires for the working belts as described in the embodiment of column 9, explicitly characterised as high extension wires having a 7% elongation, which did not fall under the definition for "inextensible" (i.e. "*0.2% elongation at 10% of the breaking load*"), so they were to be considered as extensible within the meaning of claim 1.

In fact, prior art tires referred to in E3 might have a "0° ply or tension resistance armor" which has the task of "withstanding expansion of the carcass" (column 3, lines 46-47), but the invention in E3 wants to provide a reinforcing structure in which the 0° middle ply does not take the majority of the load (as stated in column 3, lines 52-53). When providing high extension wires for the two working belts and the 0° middle ply, as argued by the appellant, there would be hardly any tension resistance as required for a tire's "reinforcing structure". Moreover, as stated in E3 in respect of the working belts of the prior art (see column 3, lines 49-50: "provide only transverse rigidity to the tire tread") and also explained by the appellant during oral proceedings, the working belts should limit tire deformation during steering by providing transverse rigidity. This function of the working belts would be lost when incorporating high

extension wires in the working belts. Therefore, the board was not convinced that E3 clearly suggests extensible working belts in combination with an extensible middle ply, as argued by the appellant, since such a construction would be against the entire teaching of E3.

- 4.2.3 In view of the foregoing, the board concludes that E3 is lacking a clear link between the general remarks in column 3 and the specific embodiment of column 9 describing a middle ply comprising high extension wires, which would be required for supporting the appellant's novelty attack.

Therefore, irrespective of whether E3 shows further features which were contested by the respondent, novelty of the subject-matter of claim 1 as granted over E3 has to be acknowledged.

- 4.3 Document E4 is not considered novelty-destroying for the subject-matter of claim 1 as granted for the following reasons:

The wording of claim 1 requires (as found by the opposition division) a pair of working belts, meaning two separate working belts, each comprising extensible reinforcement elements. E4 shows two working plies 41 and 43, but the second working ply 43 is formed by inextensible reinforcement elements (page 10, last paragraph) and therefore does not represent an extensible working belt within the meaning of claim 1. Moreover, the working ply 41 of E4 which comprises folded-back end portions is not to be regarded as a pair of working plies or working belts as claimed, although it might comprise extensible reinforcement elements (as argued by the appellant by referring to

claims 1 and 3 in E4), which might also be present in the folded portions (see page 9, paragraph 5).

The board does not follow the appellant's argument in this respect that the folded-back portions of the working belt 41 in E4, allegedly providing the function of a working belt, could therefore be considered as an additional working belt as required by the wording of claim 1 as granted. In the board's view, the respective feature specifying a "*belt structure including a pair of working belts*" requires (due to the term "pair") two working belts as separate structural elements of the tire, both of which comprising extensible reinforcement elements, which is not known from E4.

The appellant also argues (referring to E1 and E2) that the notion of working belts separated from each other had no basis in the patent specification. However, as clearly can be seen e.g. in Figure 1 of the contested patent, the two working belts 54, 56 (which according to definitions given in the patent are to be considered as annular layers or plies) are separated radially by an intermediate belt 58. E1 and E2 might show two layers lying in zigzag which are formed successively by continuously winding a ribbon. However, these documents cannot be used to ascribe a different meaning to the wording of claim 1 of the patent as granted.

Therefore, irrespective of whether the extensible reinforcement elements in E4 satisfy the requirement specified in claim 1 ("*elongation at 10% of the breaking load greater than 0.2% measured at the reinforcement elements extracted from a cured tire*"), novelty over E4 has to be acknowledged.

5. *Inventive step (Articles 56 and 100(a) EPC)*

5.1 The subject-matter of claim 1 as granted involves an inventive step (Article 56 EPC), irrespective of whether E3, E4, D1 or E5 is considered as representing the closest prior art.

5.2 As admitted by the appellant, the specific embodiment described in E3 (see column 9) having a 0° middle ply comprising a high extension wire with 7% elongation does not show details on the working belts. A value of 7% elongation of the wire most probably indicates that the respective middle belt is extensible within the definition given in the patent specification. However, as already argued above in respect of novelty, the board cannot see that the skilled person, even taking into account the general remark in E3 that the middle ply may have the same tensile strength as the inner and outer plies (see column 3), is prompted to provide the reinforcing structure of E3 with two working belts and a middle ply, all of which comprising high extension wires and thus being extensible (assuming that the belt's rigidity is determined mainly by the nature of the reinforcement elements).

As convincingly argued by the respondent, at least some structure in the tire, in particular in case of truck tires, must provide a certain rigidity and load bearing characteristics, which according to the general teaching of E3 is provided by stiff inner and outer belts. Therefore, the general remark in E3 can at best provide an indication to the skilled person to provide a middle ply which is as stiff as the inner and outer plies, but not to provide high extension wires allowing a 7% elongation for the working belts, as proposed for the middle ply in the specific embodiment later in E3.

In the absence of any hint in E3 on working belt reinforcement wires which are extensible according to the definition given in claim 1, the board cannot see that the skilled person starting from E3 would arrive in an obvious manner at the subject-matter of claim 1.

- 5.3 Starting from E4 as the closest prior art, E4 shows only a single "extensible" working belt 41, whereas the second working belt 43 is explicitly described as being inextensible (page 10, last paragraph). As argued already above with regard to novelty, E4 does not show a pair of extensible working belts.

The problem to be solved by this distinguishing feature may be regarded as how to increase further the tire's durability. The board follows the reasoning in the contested decision (point 5.3) that there is no motivation for the skilled person to either modify the second working ply 43 by using extensible reinforcement elements, or even to cut the working ply 41 at the shoulder regions to form a second, axially interrupted ply. In particular, there is no pointer in E4 to modify the inextensible working belt 43, and when cutting the working ply 41 at its shoulder, protection at the belt edges would be lost.

The appellant's argument in this respect was again that the folded-back portions of working ply 41 increased the tire's durability and provided some relieve for working ply 41, so they had the same function and represented a second working belt as claimed. In particular, it was allegedly not required that a working belt had free ends (see E1). Moreover, E4 showed elastic and therefore extensible cables.

However, as argued already above in respect of novelty, claim 1 requires a second extensible working belt as a separate structural element, and the appellant has not convincingly shown how the skilled person would arrive in an obvious manner starting from E4 at a reinforcing structure of a tire as claimed.

5.4 As regards the objection of lack of inventive step over D1, the appellant argues that the opposition division has confused inextensible cables with low-elongation cables.

5.4.1 The low-elongation steel cords as disclosed in D1 for breaker plies (9A, 9B) in the embodiment of Figure 2 might represent extensible reinforcement elements within the meaning of the contested patent ("*having an elongation at 10% of the breaking load greater than 0.2%*"; see also the threshold for inextensible cables defined in E7, page 4, 2nd paragraph). However, as admitted by the appellant, Figure 2 in D1 shows a 0° belt (11A) radially outside of the two working belts (9A, 9B). D1 therefore does not show the characterising feature of granted claim 1, which requires a belt comprising parallel reinforcement elements angled at less than 5 degrees from the circumferential direction (in the following referred to as 0° belt) which is positioned between the two working belts. The problem to be solved may be regarded as how to increase the durability of the tire.

Positioning a 0° belt between two working belts might be suggested by E7 (see page 13) in order to decrease compression of the carcass plies in comparison with a 0° belt positioned radially outside of the working belts. However, the cables in the working belts in E7 are said to be inextensible (see example on page 16),

with E7 showing at least the same numerical threshold values (page 4, second paragraph) distinguishing inextensible from extensible cables as specified in claim 1. There is no indication that a 0° belt positioned between the working belts would also be provided in case of extensible working belt reinforcements, as required by the preamble of granted claim 1, i.e. the skilled person would have to ignore part of the combined teaching in E7 to arrive at the subject-matter of claim 1. The board was not convinced by the appellant's argument that the skilled person would learn from E7 the advantageous effect on the durability of the tire's carcass when providing a 0° middle layer and would follow this teaching, irrespective of whether the working belt reinforcements were extensible (as probably in D1) or not (as in E7).

- 5.4.2 A second line of argument of the appellant started from the second embodiment of D1 (see Figures 10 and 11), which showed two working belts (9B, 9C) composed of high elongation steel cords (elongation at break of 4 to 10%) forming an angle in a range of from 10 to 20 degrees to the tire equator (column 9, lines 20-28). As admitted by the appellant, this embodiment does not show an intermediate 0° belt positioned between the working belts. The appellant's argument regarding lack of inventive step relied on a passage in D1 (column 10, lines 17-20), reciting that for an elongation at break over 10% the tire strength was lowered. According to the appellant, the skilled person would understand that in such a case a circumferential reinforcement was needed again (such as the band 11A of the first embodiment according to Figure 2, which was omitted in the second embodiment, see column 7, lines 58-61). The skilled person would also understand that the tire's rigidity was lowered in case that the angle of the

reinforcement elements in the working belts formed with the circumferential direction exceeded 20° , i.e. also in this case a 0° belt or additional circumferential reinforcement was necessary. D1 did not specify the position of such a belt and might suggest to position it radially outside of the two working belts, but E7 allegedly suggested a 0° belt positioned between the two working belts.

The appellant's reasoning is rather speculative and could not convince the board. As argued already further above, E7 only teaches to provide a 0° belt between two working belts which comprise inextensible cables or reinforcements, so the skilled person would not ignore part of this combined teaching and only add a 0° middle belt when starting from D1 and consulting E7. Moreover, the second embodiment of D1 is explicitly characterised by omission of a further circumferential reinforcement when providing extensible working belts. Therefore, the board cannot see why the skilled person should consider again having a 0° belt contrary to the express teaching of D1. Moreover, it appears that the passage cited by the appellant even discourages the skilled person from seriously considering at all high elongation cords having an elongation at break over 10% (or increasing the angle of the reinforcement elements above 20°). D1 explicitly states that in this case the tire strength is lowered so that its shape cannot be retained.

- 5.4.3 Therefore, the board concludes that the combination of either the first embodiment (Figure 2) or the second embodiment (Figures 10 and 11) of D1 and the teaching of E7 does not lead in an obvious manner to the subject-matter of claim 1 as granted.

5.5 Document E5 shows - similar to the first embodiment of D1 - two working belts of metallic cords having an "ultimate elongation of 3%" (page 2, lines 37-40) and thus allegedly extensible cords (for further support, the appellant referred to E6, column 5, lines 33-37, showing that a cord of type 7x4x0.22, mentioned in E5 on page 3, lines 88-97, was a high elongation cord). In E5, a 0° layer having metallic cords is positioned radially outside of the two working belts (column 2, lines 49-51). The appellant argues that the skilled person, trying to increase the durability of the tire, would learn from E7 that positioning a circumferential reinforcement between the two working belts provided the above described benefits for the carcass plies.

However, for the same reasons as argued already above with regard to D1, the board comes to the conclusion that the combination of documents E5 and E7 does not lead in an obvious manner to the subject-matter of claim 1 as granted.

6. Since none of the grounds for opposition prejudices the maintenance of the European patent as granted, the opponent's appeal has to be dismissed.

Order

For these reasons it is decided that:

- The appeal is dismissed.

The Registrar:

The Chairman:



A. Vottner

G. Pricolo

Decision electronically authenticated