

BESCHWERDEKAMMERN
DES EUROPÄISCHEN
PATENTAMTS

BOARDS OF APPEAL OF
THE EUROPEAN PATENT
OFFICE

CHAMBRES DE RECOURS
DE L'OFFICE EUROPEEN
DES BREVETS

Internal distribution code:

- (A) Publication in OJ
(B) To Chairmen and Members
(C) To Chairmen

D E C I S I O N
of 16 October 1996

Case Number: T 0407/95 - 3.2.1

Application Number: 87112684.3

Publication Number: 0305558

IPC: B60C 9/26

Language of the proceedings: EN

Title of invention:

Pneumatic tire

Patentee:

Bridgestone Corporation

Opponent:

The Goodyear Tire & Rubber Company

Headword:

-

Relevant legal provisions:

EPC Art. 54(3), 56

Keyword:

"Novelty - (yes)"

"Inventive step - (no)"

Decisions cited:

T 0167/84

Catchword:

-



Europäisches
Patentamt

European
Patent Office

Office européen
des brevets

Beschwerdekammern

Boards of Appeal

Chambres de recours

Case Number: T 0407/95 - 3.2.1

D E C I S I O N
of the Technical Board of Appeal 3.2.1
of 16 October 1996

Appellant:
(Opponent) The Goodyear Tire & Rubber Company
1144, East Market Street
Akron
Ohio 44316-0001 (US)

Representative: Leitz, Paul
Goodyear Technical Center-Luxembourg
Patent-Department
L-7750 Colmar-Berg (LU)

Respondent:
(Proprietor of the patent) Bridgestone Corporation
10-1, Kyobashi 1-chome, Chuo-ku
Tokyo 104 (JP)

Representative: Whalley, Kevin
Marks & Clerk
57-60 Lincoln's Inn Fields
London WC2A 3LS (GB)

Decision under appeal: Interlocutory decision of the Opposition Division
of the European Patent Office posted 17 February
1995 concerning maintenance of European patent
No. 0 305 558 in amended form.

Composition of the Board:

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

Summary of Facts of Submissions

- I. European patent No. 0 305 558 was granted on 8 July 1992 on the basis of European patent application No. 87 112 684.3, which was filed on 31 August 1987 with no claim to priority.
- II. The granted patent was opposed by the appellants on the grounds that its subject-matter lacked novelty and/or inventive step with regard to the state of the art represented by the following documents:

(D1) LU-A-85 964

(D2) FR-A-2 285 255

(D3) GB-A-2 064 445

(D4) GB-A-1 581 571

(D5) DE-A-3 535 064

(D6) EP-A-0 258 822

- III. With its decision announced at oral proceedings on 11 January 1995, and issued in writing on 17 February 1995, the Opposition Division held that the patent was to be maintained in amended form. Claim 1 on which this decision was based reads as follows:

"A pneumatic tire comprising

a carcass (23) made up of layers of cords and extending from one bead to the other bead,

a tread portion (25) disposed radially outwardly of the carcass (23) and extending in a circumferential direction of said tire,

a belt (27) disposed between said carcass (23) and said tread portion (25), and a reinforcing layer (30, 40, 50, 60, 70, 80, 90, 100) disclosed between said tread portion (25) and said belt (27),

said reinforcing layer (30, 40, 50, 60, 70, 80, 90, 100) being formed by hooping a continuous strip (36, 46, 52, 62, 72, 82, 92, 102) spirally in the circumferential direction,

characterized in that the strip (36, 46, 52, 62, 72, 82, 92, 102) has a rectangular cross section and is composed of 2 to 12 cords (32) covered with rubber so that the lateral edges of the belt (27) are completely covered and the ends of the continuous ribbon-like strip do not overlap each other in the circumferential direction; that said continuous ribbon-like strip (36, 46, 52, 62, 72, 82, 92, 102) is hooped with a variable hooping density in the lateral direction of said tire; and

that said cord (32) of said continuous ribbon-like strip (36, 46, 52, 62, 72, 82, 92, 102) is made of nylon."

Dependent Claims 2 to 7 relate to preferred embodiments of the tire according to Claim 1.

III. An appeal against this decision was filed on 15 April 1995 and the fee for appeal paid at the same time.

The statement of grounds of appeal was filed on 6 June 1995.

The appellants requested that the decision under appeal be set aside and the patent revoked in its entirety. In their statement of grounds the appellants made various objections under Articles 84 and 123(2) EPC to the terms of the amended claims and pursued their objections that the subject-matter of the claims lacked novelty and/or inventive step.

- IV. In their counterstatement filed on 12 October 1995 the respondents (proprietors of the patent) requested that the appeal be dismissed and the patent maintained amended in the form upheld by the Opposition Division. In the alternative (first auxiliary request) they requested that the following words be added at the end of Claim 1.

"... and characterised in that the width of said continuous ribbon-like strip is between 4 mm and 11 mm."

With a letter filed on 13 February 1996 the respondents submitted a further set of Claims 1A to 7A which were directed to a method of manufacturing a tire and which, according to a second auxiliary request, were to be added to the existing product Claims 1 to 7.

- V. Oral proceedings before the Board were held on 16 October 1996.

At the oral proceedings the respondents maintained their main and first auxiliary requests and modified their second auxiliary request in the sense that the Claims 1A to 7A filed on 13 February 1996 were to replace the existing Claims 1 to 7.

VI. The essence of the appellants' arguments can be summarised as follows:

Although document D6, which belonged to the state of the art according to Article 54(3), did not specifically mention that the cords of the reinforcing layer were of nylon this was implicit for the person skilled in the art since this was the material of choice in the circumstances. In the absence of any indication in document D6 as to what the cords should be made of the person skilled in the art would therefore automatically assume that nylon was meant.

Document D4 disclosed a tire having all the features of the preamble of Claim 1 in which the nylon cord of the reinforcing layer was spirally wound with a variable hooping density. Thus the subject-matter of the claim differed from this state of the art solely in that a ribbon-like strip comprising 2 to 12 cords embedded in rubber was spirally wound instead of a single cord. The use of strips in this way was however a well-known measure in the tire building art, as could be seen from documents D1, D2 and D5, with well-known advantages. The person skilled in the art would therefore have every reason to apply this technique to the tire shown in document D4 in order to produce it more economically. The choice of a strip width of 4 mm to 11 mm, as stated in the first auxiliary request, followed from routine design considerations.

VII. In reply the respondents argued substantially as follows:

It was plainly evident that document D6 did not disclose that the cords of the reinforcing layer were of nylon. Other materials were possible and had been suggested in the art. What the appellants were effectively arguing was lack of inventive step rather

than lack of novelty, which was clearly inappropriate with respect to the state of the art according to Article 54(3) EPC.

The person skilled in the art seeking to improve the production of a tire according to document D4 had no reason to turn to the teachings of documents D1, D2 or D5. In particular, documents D2 and D5 did not relate to the formation of a reinforcing layer of the type envisaged and document D1 required specifically that the edges of the wound strip were in contact, i.e. that the cords were uniformly spaced and not, as presently claimed, arranged with a variable hooping density. As regards the first auxiliary request, the state of the art clearly did not teach using a strip of a width between 4 mm and 11 mm. In particular, document D1 proposed in this respect a width of 15 mm to 45 mm, preferably 20 mm to 30 mm.

Reasons for the Decision

1. The appeal complies with the formal requirements of Articles 106 to 108 and Rules 1(1) and 64 EPC. It is therefore admissible.
2. *State of the art*
 - 2.1 Document D1 relates to a radial pneumatic tire in which a reinforcing layer for the belt is made by spirally winding a strip comprising a number of parallel nylon cords embedded in rubber, which strip has a rectangular cross-section and is preferably of a width of 15 mm to 45 mm with a cord density of at least 750 ends per metre. The turns of the strip are arranged in edge to edge contact in a single or two superimposed layers.

- 2.2 In document D2 there is disclosed a pneumatic tire with a belt made by spirally winding a strip comprising a number of steel or polyamide cords embedded in rubber. The strip may have a rectangular cross-section of a width preferably between 5 mm and 50 mm.
- 2.3 The radial tire of document D3 comprises at each edge of its belt a reinforcing layer made up of cords extending in a substantially circumferential direction. The cords may be of metal, aromatic polyamide or other high modulus material. The edge reinforcing plies may be made by winding a band with at least two cords or spirally winding a single cord.
- 2.4 Document D4 relates to a radial tire with a reinforcing layer for the belt made by spirally winding a nylon cord around it. The distance between adjacent windings at the crown of the tire is greater than at its edges to provide additional reinforcement in those areas where it is most needed.
- 2.5 Document D5 discloses a radial motor cycle tire with a belt formed by spirally winding two segments of a strip comprising parallel cords embedded in rubber in opposite directions with respect to the central plane of the tire. The strip has a rectangular cross-section of a width corresponding to between 1% and 30% of the width of the belt and comprises 2 to 10 parallel cords. The cords are preferably of steel or an aromatic polyamide.
- 2.6 Document D6 was filed on 27 August 1987 with a claim to priority from 3 September 1986, and was published on 9 March 1988. It therefore belongs to the state of the art according to Article 54(3) EPC. It discloses a radial tire with a reinforcing layer for the belt made by spirally winding a strip comprising for example four to six parallel cords embedded in rubber and of a width

of preferably 8 mm to 20 mm. In the central portion of the tire the strip is wound in edge-to-edge contact or with a small spacing between turns. At the edges of the belt the turns of the strip overlap to give a higher density of cords in these areas. The material of the cords is not specified.

3. *Main request*

3.1 *Novelty*

The approach to novelty in the EPO is a strict one. This is of particular importance when considering a conflicting application which belongs to the state of the art according to Article 54(3) EPC (see T 167/84, OJ EPO 1987, 369).

The Board cannot accept the argument of the appellants that in the absence of an indication in document D6 of the material of the cords it disclosed nylon "by default" as this was the material generally used. There is no doubt a number of other polymeric materials of comparable properties which could also be used. Also, document D3 suggests the use of metal cords in this context.

The subject-matter of Claim 1 is therefore novel with respect to document D6.

At the oral proceedings it was also suggested that both document D1 and document D3 fully anticipated the subject-matter of Claim 1. With respect to document D1 it was argued that an inevitable effect of winding two superimposed layers from a single strip would be an increased winding density at the edges of the layers. The Board sees however no reason why that must be the case. As for document D3 the appellants relied on the reference to "winding" a strip with two or more cords

as meaning "spirally winding". The document itself however only refers to the spiral winding of a single cord, thus suggesting that a strip with a plurality of cords is merely to be "wound" in the way well-known in the art, i.e. circumferentially with overlapping ends. The arguments of the appellants in this respect are accordingly not convincing.

3.2 *Inventive step*

It is common ground that the most appropriate starting point for the evaluation of inventive step is document D4. The subject-matter of Claim 1 is distinguished from the tire known from this document in that, instead of spirally winding ("hooping") a single nylon cord around the belt, a strip having a rectangular cross-section and composed of 2 to 12 cords covered with rubber is so wound. The use of such a strip instead of a single cord has a number of advantages. In particular, less turns are required, thus speeding up production, the spacing between the cords is more easily controlled and the strip is easier to apply since the rubber of the strip will readily adhere to the underlying surface. All of these aspects concern the efficiency of production of the tire. There is no suggestion that the tire claimed in itself has superior technical properties to the tire disclosed in document D4. It is merely easier to produce.

In document D5 the benefits in productivity terms of forming a spirally wound layer of cords by using a strip containing a plurality of them rather than a single one is clearly expressed (page 4, paragraph 3). In document D2 this teaching is at least implicit. In document D1 the comparison with the state of the art is on the basis of the older technique of forming the reinforcing layer by wrapping a sheet containing parallel cords around the belt, the ends of the sheet

overlapping in the circumferential direction. It can however be seen immediately by the person skilled in the art that what is taught in document D5 is superior in productivity terms to winding a single cord.

On the basis of the state of the art known from documents D1, D2 and D5 it was obvious for the person skilled in the art that he could improve the production of the tire proposed in document D4 by winding a strip comprising a plurality of cords rather than a single cord. The optimum number of cords to be contained in the strip can be derived from routine considerations and/or experimentation. Clearly, two is the minimum number. The maximum is determined by factors such as the maximum desirable pitch angle and ease of handling. Thus nothing of independent significance can be seen in setting the maximum at twelve, as required by present Claim 1. In all of the documents D1, D2 and D5 the cords are embedded in rubber and the strip has rectangular cross-section, according to the terms of present Claim 1.

With respect to documents D2 and D5 the respondents argue that these are of no relevance to the claimed invention as they do not relate to the formation of a reinforcing layer for the belt but to the formation of the belt itself. In the opinion of the Board that view would impose a far too limited restriction on the power of abstraction of the person skilled in the art. As discussed above the claimed invention is not concerned with the technical characteristics of any particular component of the tire or with the way these components interact to affect overall performance. It is concerned solely with economical production. The person skilled in the art can readily recognise that the teachings of documents D2 and D5 are applicable to any layer of a tire in which cords are to be arranged substantially circumferentially, such as in the reinforcing layer

presently under consideration. Moreover, document D1 specifically relates to the formation of such a reinforcing layer by the same technique. With respect to this latter document, the respondents contend that it teaches away from, or is at least inconsistent with, the claimed invention since it requires that the edges of the turns of the strip are in contact, in other words that there is a constant winding ("hooping") density. The Board cannot accept that proposition in particular for the reason that the claimed invention does not exclude, and the patent specification specifically discloses, arrangements in which the turns of the strip are in edge-to-contact. In these cases the variable winding density is achieved by having a different number of layers of cords. This possibility is one that the person skilled in the art can recognise without any difficulty.

The Board therefore comes to the conclusion that the subject-matter of Claim 1 according to the main request lacks inventive step (Article 56 EPC).

4. *First auxiliary request*

Claim 1 according to the first auxiliary request includes the additional feature that the width of the strip is between 4 mm and 11 mm.

The factors affecting the choice of the width of the strip are related and similar to those discussed above with respect to the number of cords in the strip. In paragraph 1, column 6 of the patent specification it is stated that

"if the width is less than 4 mm, the cost of production is increased, and if the width is more than 11 mm, the ribbon-like strip of the reinforcing layer protrudes from the lateral end of the belt when it is hooped, so that cracks occur at the protruded portion."

There is nothing there that can be seen as going beyond the routine considerations of the person skilled in the art.

Thus the subject-matter of Claim 1 according to the first auxiliary request also lacks inventive step.

5. *Second auxiliary request*

The claims according to the second auxiliary request have the same substantive content as the claims according to the main request but have been drafted in terms of a method of manufacture. The claims were offered by the respondents in response to an objection by the appellants that the granted claims were in the wrong category and that the claimed invention concerned a method of manufacture rather than the tire itself. It is self-evident that the above analysis of inventive step applies with equal force to these method claims. They are therefore also unallowable.

Order

For these reasons it is decided that:

1. The appealed decision is set aside.
2. The patent is revoked.

The Registrar:



S. FABIANI

The Chairman:



F. PROLS

Handwritten notes:
2888.D
AD