

Internal distribution code:

- (A) Publication in OJ
(B) To Chairmen and Members
(C) To Chairmen
(D) No distribution

**Datasheet for the decision
of 9 October 2009**

Case Number: T 0211/07 - 3.2.05

Application Number: 99956335.6

Publication Number: 1230080

IPC: B29D 30/16

Language of the proceedings: EN

Title of invention:

A method for manufacturing elastomeric material components of a tyre for vehicle wheels

Patentee:

PIRELLI TYRE S.p.A.

Opponent:

Continental AG

Headword:

-

Relevant legal provisions:

EPC Art. 54, 56

Relevant legal provisions (EPC 1973):

-

Keyword:

"Novelty - yes"

"Inventive step - yes"

Decisions cited:

-

Catchword:

-



Case Number: T 0211/07 - 3.2.05

D E C I S I O N
of the Technical Board of Appeal 3.2.05
of 9 October 2009

Appellant: Continental AG
(Opponent) Vahrenwalder Str. 9
D-30165 Hannover (DE)

Representative: -

Respondent: PIRELLI TYRE S.p.A.
(Patent Proprietor) Viale Sarca, 222
I-20126 Milano (IT)

Representative: HOFFMANN EITLÉ
Patent- und Rechtsanwälte
Arabellastrasse 4
D-81925 München (DE)

Decision under appeal: Interlocutory decision of the Opposition
Division of the European Patent Office posted
8 December 2006 concerning maintenance of
European patent No. 1230080 in amended form.

Composition of the Board:

Chairman: W. Zellhuber
Members: H. Schram
M. J. Vogel

Summary of Facts and Submissions

- I. The appellant (opponent) lodged an appeal against the decision of the Opposition Division posted on 8 December 2006 maintaining the European patent No. 1 230 080 in amended form on the basis of the main request of the respondent (patent proprietor) filed on 14 November 2006.

The Opposition Division held that the grounds of opposition under Article 100(a) EPC (lack of novelty, Article 54 EPC, and lack of inventive step, Article 56 EPC) did not prejudice the maintenance of the patent in amended form.

- II. Oral proceedings were held before the Board of Appeal on 9 October 2009.

- III. The appellant requested that the decision under appeal be set aside and that the patent in suit be revoked.

The respondent (patent proprietor) requested that the appeal be dismissed, or, as an auxiliary measure, that the decision under appeal be set aside and that the patent be maintained on the basis of one of the first to fifth auxiliary requests filed on 30 September 2009.

- IV. Claim 1 as maintained by the Opposition Division reads as follows:

"1. Method for manufacturing elastomeric material components of a tyre for vehicle wheels, comprising the following phases:

feeding a continuous elongated element (20) from a dispensing organ (19) positioned adjacently to a toroidal

support (18) to apply said elongated element (20) onto the toroidal support itself;

imparting to the toroidal support (18) a rotatory circumferential distribution motion about its own geometric axis of rotation (X), so that the elongated element (20) is circumferentially distributed on the toroidal support (18);

effecting controlled relative displacements for transverse distribution between the toroidal support (18) and the dispensing organ (19) to form with said elongated element (20) a component (9, 12, 13, 14, 15, 16, 17) of a tyre (3) defined by a plurality of turns (20a) laid in mutual approach and superposition according to a laying arrangement pre-set as a function of a pre-determined cross section profile to be conferred to said component (9, 12, 13, 14, 15, 16, 17),

controlling the rotatory circumferential distribution motion according to the distance between a point of application of the elongated element (20) onto the toroidal support (18) and said geometric axis of rotation (X), to confer to the toroidal support itself, in correspondence with the point of application, a peripheral speed of application whose nominal value exceeds, and is directly proportional to, a theoretical feeding rate of the elongated element (20) by said dispensing organ (19), characterised in that

a step of modifying the peripheral speed of application relative to said nominal value is achieved during the application of the elongated element (20) onto the toroidal support (18), to perform a programmed modification of the cross section of the elongated element (20)."

V. The following documents were *inter alia* referred to in the appeal proceedings:

D1 US-A 4,240,863

D3 EP-A 0 873 852

VI. The arguments of the appellant, in writing and during the oral proceedings, can be summarized as follows:

Objection of lack of novelty, Article 54 EPC

Document D1 disclosed undisputedly a method for manufacturing elastomeric material components of a tyre for vehicle wheels comprising all the features of the preamble of claim 1 of the main request. However, the characterizing feature of that claim was also known from document D1. This followed from the following: at the end of winding the ribbon 12 (elongated element) around the tyre, as a result of braking the applicator roll 20, the rotatory motion of the tyre was not reduced whereas the theoretical feeding rate of the ribbon 12 was reduced, so that the peripheral speed of application relative to the (theoretical) feeding rate was increased, or modified. The effect of the braking action was a controlled modification of the cross section of the ribbon 12. The subject-matter of claim 1 of the main request lacked therefore novelty with respect to document D1.

Document D3 disclosed also a method comprising all the features of the preamble of claim 1 of the main request. Figure 6a was a semi-sectional view showing the step of forming a cap thread of a tyre having a curved outer profile on the building drum 3B. The next turns of the

rubber strip were applied on said curved outer profile of the tyre intermediate body X that had already been shaped on the building drum, ie they were formed on a surface having the shape of a toroidal support, as explained in paragraph [0073] of the patent in suit. Document D3 further disclosed that the actual cross-section of the rubber strip extruded from the extruder was measured and, if the cross-section differed from the required target cross-section, that the peripheral speed of application was modified so as to perform a programmed modification of the cross-section such that the target cross-section was attained. The subject-matter of claim 1 of the main request lacked therefore novelty with respect to document D3 as well.

Objection of lack of inventive step, Article 56 EPC

The closest prior art document was document D1. The subject-matter of claim 1 of the main request differed from the method for manufacturing elastomeric material components of a tyre known from document D1 in that a programmed modification of the cross-section of the elongated element was performed. Document D1 taught already how to perform a programmed modification of the cross-section of the elongated element by modifying the peripheral speed of application during the application of the elongated element. It was thus obvious to the person skilled in the art, starting from the method known from document D1, and seeking to solve the problem of providing a method which allows adapting the cross-section of the elongated element with a view to form components with a more complex configuration, to apply the teaching of document D3, and hence to arrive at the subject-matter of claim 1 of the main request.

VII. The respondent's arguments, in writing and during the oral proceedings, can be summarized as follows:

Objection of lack of novelty, Article 54 EPC

In column 4, lines 10 to 21, of document D1 it was described that when the desired build-up of rubber had been achieved, the ribbon 12 was automatically severed by braking the applicator roll 20 and thereafter continuing rotation of the tyre 14 for a short amount to stretch the ribbon between the stitcher rolls 22 and the applicator roll 20 to the point of breakage. This allowed a short length of the ribbon 12 to extend past the applicator roll 20 and enabled easy start-up of the next application cycle. This had nothing to do with the object of the invention, viz. to achieve a programmed modification of the cross-section of the elongated element for turns with increased or decreased cross-section. If the ribbon, which was made of green elastomeric material, was stretched up to the point of breakage, it would break in a random fashion and the modification of its cross-section was random as well. The goal of document D1 was to apply a ribbon with a cross-section that was constant in the axial direction, see column 2, lines 53 to 60, of document D1. The article drive 18 shown in Figure 1 was not connected to the computer 32, it was driven at a controlled rate, see column 4, lines 6 to 10, of document D1. The subject-matter of claim 1 of the main request was therefore new with respect to document D1.

The toroidal support 18 reiterated in claim 1 of the main request had an outer surface 18a which "*was substantially shaped according to the internal configuration of the*

tyre itself", see paragraph [0037] of the patent in suit. In document D3 the building drum formed a cylindrical support, not a toroidal support. Document D3 disclosed a method for building a tyre, whereby -as in document D1- a rubber strip with a constant cross-section was applied. For these two reasons the subject-matter of claim 1 of the main request was novel with respect to document D3.

Objection of lack of inventive step, Article 56 EPC

Document D1 represented the closest prior art. The person skilled in the art seeking to form tyre components with a more complex configuration would not deviate from the teaching of document D1 that the elongated element had to have a constant cross-section. The solution as claimed in claim 1 of the main request could not be found in document D3, since that document also taught that the elongated element had to have a constant cross-section. In the method known from document D3 the elongated element extruded from the extruder (rubber strip) was not, as in document D1, directly formed on the support, the rubber strip was wound on an adjusting drum, and rewound therefrom on the building drum. The person skilled in the art would therefore not combine documents D1 and D3. Moreover, the formulas for the ratio of the rotating speeds of the building drum to that of the adjusting drum presented on page 6 of document D3 could not be transferred to the applicator 16 of document D1. Consequently, the subject-matter of claim 1 of the main request involved an inventive step.

Reasons for the Decision

MAIN REQUEST

1. *Objection of lack of novelty, Article 54 EPC*

1.1 Interpretation of claim 1 of the main request

The "peripheral speed of application" in the characterizing feature of claim 1 of the main request is defined in the last feature of the preamble of claim 1 of the main request. It is the (absolute) peripheral speed of the elongated element 20 at the point of application onto the article (on the toroidal support 18), ie the peripheral speed of the laying surface (cf. paragraph [0073] of the patent in suit) at the point of application.

The expression "modifying the peripheral speed of application relative to said nominal value" in the characterizing feature of claim 1 of the main request has the meaning "modifying the peripheral speed of (the laying surface at the point of) application with respect to the nominal value of the peripheral speed of (the laying surface at the point) of application" (henceforth referred to as the nominal peripheral speed). The nominal peripheral speed is simply the peripheral speed of application before the characterizing step of claim 1 of the main request is carried out, ie it is the unmodified peripheral speed. "Modifying the peripheral speed" means in the context of the patent in suit increasing or decreasing the speed with a view to obtain a programmed modification, eg a thinning or bulging of the cross-section of the elongated element, cf. paragraph [0084] of the patent in suit.

The characterizing step of claim 1 of the main request thus requires increasing or decreasing the (nominal) peripheral speed of the laying surface during the application of the elongated element (20) onto the toroidal support (18) in a programmed manner.

- 1.2 Document D1, which is cited in paragraph [0015] of the patent in suit, discloses a method for manufacturing elastomeric material components of a tyre for vehicle wheels, comprising all the steps of the preamble of claim 1 of the main request.

In operation, when the applicator roll 20 has brought the ribbon 12 of elastomeric material into contact with the tyre 14, the tyre 14 and the applicator 16 are driven at a controlled rate, see column 4, lines 6 to 10, and Figure 1 of document D1. The general idea behind the control system proposed in document D1 is that the speed of the moving means for moving the article (tyre 14) is adjusted to match a desired proportion between the rate of the extrusion and the rate of application of the ribbon to the article, see column 2, lines 35 to 52 of document D1.

Document D1 further discloses that when the desired build-up of rubber has been achieved, the ribbon 12 may be automatically severed by braking the applicator roll 20 and thereafter continuing rotation of the tyre 14 for a short amount to stretch the ribbon between the stitcher rolls 22 and the applicator roll 20 to the point of breakage to enable an easy start-up of the next application cycle. Document D1 does not disclose that the peripheral speed of the laying surface of the tyre 14

during the application of the ribbon 12 is modified in a programmed manner with a view to obtain a programmed modification of the cross-section of the ribbon, neither during normal operation (no modification of the cross-section) nor during braking the applicator roll and severing the ribbon (no modification of the peripheral speed of the article).

Document D1 does therefore not disclose the characterizing feature of claim 1 of the main request.

The subject-matter of claim 1 of the main request is hence new vis-à-vis document D1.

- 1.3 Document D3 discloses (see page 2, lines 35 to 39) a method of forming a green tyre which comprises (temporarily) winding on an adjusting drum 2 a rubber strip S made of unvulcanized rubber extruded from an extruder in a length corresponding to the rubber quantity of a tyre constituent portion and forming the tyre constituent portion by continuously winding a plurality of times the rubber strip S on the outer circumference of a rotary support member (building drum 3 driven by motor M3) while rewinding the rubber strip from the adjusting drum 2 driven by motor M2, with a view to shape a tyre constituent portion with high dimensional accuracy (see page 2, lines 33 and 34). The idea of document D3 is that fluctuations in the extrusion quantity wound on the adjusting drum, or an increase in the peripheral speed of the rotary support member due to the growth of the outer diameter of the tyre, can be compensated for by measuring the thickness and the width of the rubber strip S extruded from the extruder and controlling the forming speeds of the motors M2 and M3 for winding said rubber

strip on the outer circumference of the rotary support member on the basis of that dimensional information (see page 2, lines 40 to 50, page 6, lines 1 to 21, and claims 4 to 6).

Document D3 does not disclose that the rotary support member (cylindrical building drum 3) is a toroidal support 18 as claimed in method claim 1 of the main request (cf. the first phase or step of that method: "*feeding a continuous elongated element (20) from a dispensing organ (19) positioned adjacently to a toroidal support (18) ...*"). That the laying surface of the tyre intermediate body X shaped on the building drum 3 in document D3 may have a toroidal shape cannot give rise to a different conclusion.

Although during the manufacturing of a tyre component according to claim 1 of the main request the laying surface is represented by previously laid turns on the outer surface of the toroidal support 18, and no longer by the outer surface of the toroidal support 18 itself as for the first layer applied to the toroidal support 18, this is not to say that the feature pertaining to a toroidal support 18 can be ignored.

The subject-matter of claim 1 of the main request therefore is new vis-à-vis document D3.

It may be noticed that the last subject-matter of claim 1 of the main request, ie performing "*a programmed modification of the cross section of the elongated element (20)*", allows to form structural elements with complex configurations, having different thickness variations, always using a same elongated element as

starting material, cf. paragraph [0086] of the patent in suit. In document D3 it is the other around: the elongated element wound on the adjusting drum 2 may show a variation in sectional area with respect to a target sectional area (ie different elongated elements), which difference is made zero, so that the tyre constituent portions can be formed with higher accuracy having no thickness variations. Whether controlling the sectional area of the rubber strip to a target sectional area of the rubber strip in document D3 can be called performing "*a programmed modification of the cross section of the elongated element*" in the sense of the invention does no longer need to be answered for assessing novelty.

- 1.4 Since no other document cited by the appellant discloses all the features of claim 1 of the main request, the subject-matter of said claim 1 is therefore new within the meaning of Article 54 EPC.

2. *Objection of lack of inventive step, Article 56 EPC*

Document D1 represents the closest prior art.

The subject-matter of claim 1 of the main request differs from the method for manufacturing elastomeric material components of a tyre for vehicle wheels known from document D1 (see point 1.2 above) in its characterizing feature, namely in "*a step of modifying the peripheral speed of application relative to said nominal value is achieved during the application of the elongated element (20) onto the toroidal support (18), to perform a programmed modification of the cross section of the elongated element (20)*".

It may be noticed that a variation of the peripheral speed of the laying surface at the point of application results in a corresponding variation of the cross-section of the elongated element if the feeding rate of the elongated element by the dispensing organ is kept constant. Claim 1 of the main request however does not require that the feeding rate of the elongated element is constant.

The distinguishing feature solves the problem stated in the passage from column 2, line 57, to column 3, line 7, of the patent in suit and offers the advantages stated in paragraphs [0084] to [0086] of the patent in suit. In particular, by suitably varying the cross-section of the elongated element components of a tyre for vehicle wheels having a complex configuration can be accurately formed.

The distinguishing feature is not known from, nor suggested by the prior art cited by the appellant. Although in both documents D1 and D3 it is recognized that the cross-section of the elongated element can be controlled by controlling the peripheral speed of the laying surface at the point of application and/or the feeding rate of the elongated element by the dispensing organ, this information is not used to solve the problem addressed by the present invention. Both documents D1 and D3 teach that the cross-section of the elongated element must be accurately controlled so that the elongated elements at the point of application all have the same cross-section. In contrast, in the present invention cross-section of the elongated element at the point of application is deliberately varied in a programmed manner.

The subject-matter of claim 1 of the main request is therefore not obvious to the person skilled in the art, and hence involves an inventive step, Article 56 EPC.

AUXILIARY REQUESTS

3. Since the claims of the main request are allowable, there is no need to consider the first to fifth auxiliary requests of the respondent.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

D. Meyfarth

W. Zellhuber