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Datasheet for the decision of 6 December 2018

Case Number: T 0667/16 - 3.2.01

Application Number: 04102689.9

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IPC: B60C1/00, C08K5/01, C08L9/06

Language of the proceedings: EN

Title of invention:
Pneumatic tire having a component containing a process oil with low PCA content

Patent Proprietor:
The Goodyear Tire & Rubber Company

Opponents:
ZEON CORPORATION
ARLANXEO Deutschland GmbH

Headword:

Relevant legal provisions:
EPC Art. 56, 84

Keyword:
Inventive step (main request, third auxiliary request : no)
Clarity (first, second, fourth to seventh auxiliary request : no)

Decisions cited:

Catchword:

Europäisches Patentamt
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Beschwerdekammern

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Case Number: T 0667/16 - 3.2.01

D E C I S I O N
of Technical Board of Appeal 3.2.01
of 6 December 2018

Appellant: (Patent Proprietor)	The Goodyear Tire & Rubber Company 1144 East Market Street Akron, OH 44316-0001 (US)
Representative:	Kutsch, Bernd Goodyear S.A. Patent Department Avenue Gordon Smith 7750 Colmar-Berg (LU)
Respondent: (Opponent 1)	ZEON CORPORATION 6-2, Marunouchi 1-chome Chiyoda-ku Tokyo 100-8246 (JP)
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Representative:	Michalski Hüttermann & Partner Patentanwälte mbB Speditionstraße 21 40221 Düsseldorf (DE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 14 January 2016 revoking European patent No. 1493596 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chairman	G. Pricolo
Members:	C. Narcisi
	O. Loizou

Summary of Facts and Submissions

I. The European patent No. 1 493 596 was revoked by the decision of the Opposition Division posted on 14 January 2016. Against the decision an appeal was lodged by the Patentee on 18 March 2016 and the appeal fee was paid. The statement of grounds of appeal was filed on 20 May 2016.

II. Oral proceedings took place on 6 December 2018. The Appellant (Patentee) requested that the decision under appeal be set aside and that the patent be maintained as granted (main request) or, in the alternative, that the patent be maintained in amended form according to one of the auxiliary requests 1 to 7 (filed on 20 May 2016). The Respondents (Opponents 1 and 2) requested that the appeal be dismissed.

III. Granted claim 1 reads as follows:

"A pneumatic tire having a component comprising a rubber composition comprising, based on 100 parts by weight of elastomer (phr),
from 40 to 90 phr of a solution polymerized styrene-butadiene having a styrene content of greater than 38 percent by weight and a glass transition temperature of from -10°C to -25°C;
from 10 to 60 phr of at least one additional elastomer; and from 10 to 70 phr of a process oil having a glass transition temperature of from -80°C to -40°C and a polycyclic aromatic content of less than 3 percent by weight as determined by the IP346 method, wherein said process oil is selected from mild extraction solvates (MES), treated distillate aromatic extracts (TDAE), and heavy naphtenic oils, and wherein said composition is exclusive of glycerides and factices."

Claim 1 of the first auxiliary request differs from granted claim 1 in that the wording "exclusive of glycerides and factices" was replaced by "exclusive of glycerides and factices; and wherein the glass transition temperature of the resulting combination of elastomers in the rubber composition is in a range of from -20°C to -45°C".

Claim 1 of the second auxiliary request differs from claim 1 of the first auxiliary request in that the wording "having a component comprising" is replaced by "having a tire tread comprising".

Claim 1 of the third auxiliary request differs from granted claim 1 in that the wording "wherein said process oil is selected from mild extraction solvates (MES), treated distillate aromatic extracts (TDAE), and heavy naphtenic oils" is replaced by "wherein said process oil is a mild extraction solvate (MES) having a glass transition temperature in a range of from -57°C to -63°C".

Claim 1 of the fourth auxiliary request differs from claim 1 of the third auxiliary request in that the wording "exclusive of glycerides and factices" is replaced by "exclusive of glycerides and factices; and wherein the glass transition temperature of the resulting combination of elastomers in the rubber composition is in a range of from - 20°C to - 45°C".

Claim 1 of the fifth auxiliary request differs from claim 1 of the fourth auxiliary request in that the wording "having a component comprising" was replaced by "having a tire tread comprising".

Claim 1 of the sixth auxiliary request differs from claim 1 of the fourth auxiliary request in that the wording "exclusive of glycerides and factices; and" is replaced by "exclusive of glycerides and factices; wherein the rubber composition comprises a combination of additional elastomers; and".

Claim 1 of the seventh auxiliary request differs from claim 1 of the sixth auxiliary request in that the wording "having a component comprising" is replaced by "having a tire tread comprising".

IV. The Appellant's arguments may be summarized as follows:

The subject-matter of claim 1 (main request) is inventive over D2 (JP H07-292161 A)/D2a (English translation) in view of D4 (KGK Kautschuk Gummi Kunststoffe, 52. Jahrgang, Nr. 12/99, p.799-805, published December 1999).
First, the skilled person starting from D2/D2a would not consider the pneumatic tire tread according to example 20 (see Table 4) as being the closest prior art since its mechanical and physical properties correspond only to average values (see e.g. wet grip), other examples in Table 4 of D2/D2a showing better results in several respects.
Nonetheless, the skilled person even starting from example 20 of D2/D2a would anyway not arrive at the claimed invention. The pneumatic tire of claim 1 differs from the pneumatic tire of D2 (see in particular Table 4, example 20) in that it comprises "a process oil having a glass transition temperature of from -80°C to -40°C and a polycyclic aromatic content of less than 3 percent by weight as determined by the IP346 method, wherein said process oil is selected from

mild extraction solvates (MES), treated distillate aromatic extracts (TDAE), and heavy naphtenic oils" (hereinafter designated as feature (i)).
This leads to a definition of the objective technical problem as consisting in improving the overall tire performance, the positive aspect deriving from feature (i) (implying oils with reduced polycyclic aromatic compounds (PCA) or polyaromatic hydrocarbons (PAH)) and relating to the reduction of carcinogenic compounds constituting only a side effect (thereby addressing regulatory concerns).
The surprising result of the invention is that a low PCA oil (as claimed)) together with a high styrene content SBR (as claimed) allows to improve rolling resistance, wet braking and wet handling in a synergistic way.
The synergistic effect is derivable from Tables 1 to 3 of the patent specification (hereinafter designated as EP-B) in conjunction with paragraph [0044] as follows. First, a comparison of controls 1 (comprising a DAE oil) and 2 (comprising a MES oil) shows that replacing a conventional process oil (DAE, with high PAH content) with MES oil does not improve rolling resistance or wet braking medium, given controls 1, 2 having only low styrene content (26 weight %). Second, a comparison of controls 1, 2 on the one hand and 3 (comprising a DAE oil) on the other hand shows that increase of styrene content alone (from 26 % to 41 %) does not improve rolling resistance or wet braking, given control 3 comprising a conventional DAE oil. Finally, a comparison of control 3 (or 4) with sample 5 according to the invention demonstrates that increasing styrene content and using MES as process oil (instead of conventional DAE oil) unexpectedly and surprisingly is beneficial to rolling resistance and wet braking.

In view of the above defined objective technical problem there is in D2/D2a no hint that feature (i) may provide a solution to it, particularly since in D2/D2a (see paragraph 29) conventional DAE oils are used, having known glass transition temperatures differing from those indicated in claim 1. D4 likewise does not suggest using a polymerized styrene-butadiene rubber with high styrene content, for according to Table 4 (in D4) solution polymerized styrene-butadiene rubber (S-SBR) "Buna VSL 5025-0" is used, which has only 25% styrene content. Therefore D4 teaches away from the present invention. Moreover, the skilled person would not combine D2/D2a with D4, as the results presented in D4 (see figures 2, 3 and 4) show no clear trend in terms of influence of the oil on tire performance (e.g. rolling resistance or wet braking). Depending on the use of carbon black or a silica the rolling resistance may be slightly better or slightly worse than with aromatic processing oils, thus not leading to any significant effect according to D4.

The subject-matter of claim 1 according to the first, second, fourth, fifth, sixth and seventh auxiliary request is clear and is supported by the description. Specifically, the feature reading "wherein the glass transition temperature of the resulting combination of elastomers in the rubber composition is in a range of from - 20°C to - 45°C " (hereinafter designated as feature A) and the further feature reading "wherein the rubber composition comprises a combination of additional elastomers; and wherein the glass transition temperature of the resulting combination of elastomers in the rubber composition is in a range of from - 20°C to - 45°C" (hereinafter designated as feature A+D) (see sixth and seventh auxiliary requests) are clear and are supported by paragraph [0018] in EP-B. This paragraph

states that a glass transition temperature Tg in a range of from -20°C to -45°C may be achieved either by using SBR in conjunction with an additional elastomer or by using SBR is conjunction with a combination of additional elastomers.

The subject-matter of claim 1 of the third auxiliary request is inventive over D2/D2a for similar reasons as stated above, further indicating also a specific range for the glass transition temperature Tg of the MES extender oil, which is not explicitly disclosed in D4 (see Table 1).

V. The Respondents' arguments may be summarized as follows:

The subject-matter of granted claim 1 does not involve an inventive step in view of D2/D2a and D4. The skilled person would start from example 20 (see Table 4) in D2/D2a, as this represents the "closest prior art" according to the definition given by established case law of the Boards of Appeal and by the Guidelines for examination in the EPO. The objective technical problem starting from D2/D2a was correctly identified in the appealed decision (page 14, penultimate paragraph) as consisting in providing a tire which meets environmental regulations (low PCA) while maintaining the overall performance. The surprising synergistic effect alleged by the Appellant remains unproven and is not based on the factual evidence. Indeed, comparison of sample 3 (or 4) with sample 5 is not appropriate to demonstrate the alleged synergistic effect, as sample 4 contains emulsion polymerized SBR (E-SBR) and has about 41% by weight of styrene, whereas sample 5 contains solution polymerized SBR (S-SBR) and has about 45% by weight of styrene. A direct comparison between samples

having the same styrene content and differing only by the type of oil used is clearly missing in EP-B. Finally, the Appellant misrepresented the disclosure of D4, which actually teaches to replace conventional DAE oils with oils having low PCA (or low PAH) content, both on the basis of environmental regulatory concerns and on the basis of a performance which is illustrated and proven to be at least comparable to that of DAE oils. For these reasons the combination of D2/D2a and D4 would be obvious for the skilled person.

The subject-matter of claim 1 of the first, second and fourth to seventh auxiliary requests is unclear, paragraph [0018] of the patent specification (EP-B) being ambiguous and vague as to the specific nature of the embodiment disclosed therein.

The subject-matter of claim 1 of the third auxiliary request lacks an inventive step, essentially for the same reasons as stated hereinabove.

Reasons for the Decision

1. The appeal is admissible.

2. The subject-matter of claim 1 does not involve an inventive step (Article 56 EPC) over prior art D2/D2a in view of D4.

Regardless of whether or not example 20 in Table 4 of D2/D2a represents the closest prior art, which is denied by the Appellant, the skilled person would anyway consider example 20 as a promising starting point since it has excellent wet skid resistance (only three examples in Table 4 are slightly better), an excellent tensile strength (only one example is

slightly better), several other parameters (see e.g. hardness, heat build-up resistance) being above average as well. Thus the tire tread of example 4 has very good overall mechanical and physical properties and an overall balanced performance.

It is not disputed that the subject-matter of claim 1 differs from D2/D2a (see example 20 in Table 4) by the aforesaid feature (i).

The Board concurs with the Respondents' view (and the view taken in the appealed decision) in that the objective technical problem can be derived from feature (i) as consisting in providing a tire which meets environmental regulations (low PCA) while maintaining the overall performance of heretofore known prior art tires.

The skilled person would retrieve and retain D4 (which clearly addresses regulatory concerns aimed at reducing the environmental impact of process oils) stating that "the replacement of classified distillate aromatic extracts by non-carcinogenic MES, TDAE, or naphtenic process oils will reduce the PAH emissions from tires by more than 98%" (D4, page 799, left column). Furthermore, D4 also discloses that "rubber tests back-to-back with DAE with carbon black and silica filled vulcanisates show a slight shift in wet grip performance and an improvement in rolling resistance for all alternative oils", concluding that "MES type oils from different crude oils and refineries are fully interchangeable in rubber and compound formulations" (D4, page 799, left column). As a result of various rubber tests (illustrated in figures 2 to 4) D4 also notes that "NAP and TDAE performed slightly better in the damping test at low temperatures if compared to MES", nevertheless "the differences between TDAE and MES are only marginal in the reported rubber tests, and it can be expected that a small adaptation

of the tire formulations will allow the use of MES oils even in those applications where TDAE appears to be more favourable" (see D4, page 804, second column).
In conclusion, whilst not improving overall performance as compared to conventional oils (as also alleged by the Appellant), D4 explicitly advises the skilled person to replace DAE oils by MES or other oils (e.g. TDAE or naphtenic oils, cited in D4) having low PAH content and overall performances at least comparable to those of DAE oils, in order to reduce environmental impact. The skilled person would thus arrive in an obvious manner at the choice of the specific oils and values indicated in feature (i) (see D4, page 800; second column, last paragraph; third column, second paragraph; Table 1).

The Appellant's allegations that the improved pneumatic tire according to sample 5 involves a synergistic effect (due to the high styrene content and the implementation of feature (i)) are not confirmed by the available evidence.
Indeed, in order to demonstrate a synergistic effect related to changing two physical parameters, starting from a known prior art sample respective separate samples should be provided, with only one respective parameter having been modified, and at least one sample with both parameters having been modified. This has not been done here, since the effect arising from increasing only styrene content and changing only the process oil when starting from sample 3 (or sample 4) is not derivable from Tables 1 to 3 in EP-B. This is due to the fact that in sample 5 both styrene content (45%) has been increased and the process oil has been changed (with respect to samples 3 and 4), whilst in addition numerous other differences between sample 3 (or 4) and sample 5 are noted as well, such as relating

to the polymerization process of styrene-butadiene (i.e. E-SBR in samples 3,4 vs. S-SBR in sample 5) and to the content of sulfur, accelerators, waxes, coupling agents and silica. Therefore no evidence is provided in the description of the patent specification (EP-B) or additionally by the Appellant that a synergistic effect occurred.

3. The subject-matter of claim 1 of the first, second and fourth to seventh auxiliary requests does not comply with the requirements of Article 84 EPC. In effect, aforesaid feature A (or A+D) is ambiguous and misleading, given this feature being based on paragraph [0018] in EP-B, which states "in another embodiment", this "another embodiment" being not further specified in paragraph [0018] or in EP-B (e.g. also no examples are given). Therefore it is unclear in which way this embodiment is actually related to the embodiment of claim 1, specifically which differences are implied as compared to the embodiment of claim 1, this being of particular significance in view of the range indicated in paragraph [0018] for the glass transition temperature Tg, which considerably deviates from the corresponding range indicated in claim 1. These ambiguities lead to a substantial lack of clarity, as was noted in the appealed decision too (see page 15, 1. Auxiliary request).

4. The subject-matter of claim 1 of the third auxiliary request lacks an inventive step (Article 56 EPC) in view of D2/D2a and D4. This subject-matter differs from that of granted claim 1 only in that aforesaid feature (i) has been particularly limited to MES oils having a glass transition temperature in a range of from -57°C to -63°C. However, this limitation cannot justify an inventive step, as D4 (see Table 1) discloses a glass

transition temperature Tg of -64°C for a specific MES process oil and this value nearly overlaps with the above indicated temperature range, and as the resulting difference of 1°C does not involve any specific technical effect, which was also not alleged by the Appellant.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

A. Vottner G. Pricolo

Decision electronically authenticated