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Veröffentlichung im Amtsblatt	Ja/Nein
Publication in the Official Journal	Yes/No
Publication au Journal Officiel	Oui/Non

Aktenzeichen / Case Number / N° du recours : T 228/87 - 3.3.3

Anmeldenummer / Filing No / N° de la demande : 81 304 330.4

Veröffentlichungs-Nr. / Publication No / N° de la publication : 0 048 619

Bezeichnung der Erfindung: Rubber composition for tires
Title of invention:
Titre de l'invention :

Klassifikation / Classification / Classement : C08L 9/06

ENTSCHEIDUNG / DECISION

vom / of / du 12 April 1990

Anmelder / Applicant / Demandeur :

Patentinhaber / Proprietor of the patent /
Titulaire du brevet : Bridgestone Tire Company Limited

Einsprechender / Opponent / Opposant : Hüls Aktiengesellschaft

Stichwort / Headword / Référence : Rubber composition/BRIDGESTONE

EPÜ / EPC / CBE Art. 56, 84, 100, 114

Schlagwort / Keyword / Mot clé : "Inventive step (affirmed) - improvements not suggested by prior art" - "late-filed submissions disregarded"

Leitsatz / Headnote / Sommaire

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Case Number : T 228/87 - 3.3.3

D E C I S I O N
of the Technical Board of Appeal 3.3.3
of 12 April 1990

Appellant : (Opponent)
Hüls Aktiengesellschaft
Postfach 1320
D-4370 Marl 1

Representative :

Respondent : (Proprietor of the patent)
Bridgestone Tire Company Limited
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Tokyo (JP)

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Decision under appeal : **Decision of Opposition Division of the European Patent Office dated 27 April 1987 rejecting the opposition filed against European patent No. 0 048 619 pursuant to Article 102(2) EPC.**

Composition of the Board :

Chairman : F. Antony
Members : S. Schödel
J. Stephens-Ofner

Summary of Facts and Submissions

I. European patent No. 48619 was granted with four claims on 17 April 1985 in response to European patent application No. 81 304 330.4 filed on 21 September 1981. Claim 1 was worded as follows:

"A rubber composition for tires, characterized by comprising a rubber component containing at least 20 parts by weight, based on 100 parts by weight of the rubber component, of a high vinyl butadiene-styrene copolymer rubber obtained by randomly copolymerizing styrene and 1,3-butadiene, and containing 3-30% by weight of bonded styrene and 60-95% by weight of 1,2-bonds in the butadiene units, and further containing in its main chain bonds of at least one metal selected from silicon, germanium, tin and lead with butadienyl groups, in a weight fraction of at least 20% by weight."

II. Notice of Opposition was filed by the Appellants, who requested that the patent be revoked owing to lack of inventive step. Of the then cited documents only

(I) Kautschuk Gummi Kunststoffe, 33 (1980), 251-255

was relied on in this appeal.

III. By its decision dated 27 April 1987, the Opposition Division rejected the Opposition, holding that in (I) many possibilities were indicated to obtain rubbery products having differing molecular structures and hence different properties. A detailed consideration related to the preparation of styrene-butadiene copolymer rubber (SBR) using lithium alkyl catalysts. The prior art, however, did not suggest the preparation of the high-vinyl SBR of

Claim 1 and blends containing them for tyre compositions. The improvements achieved in rolling resistance, running stability, breakage strength and wear resistance were clearly demonstrated by the tables of results in the experiments. In conclusion, the Opposition Division held that the Appellant's arguments relied on an ex-post-facto analysis of the invention.

IV. Notice of Appeal was lodged by the Appellant on 19 June 1987, the appeal fee being paid on the same day. A Statement of Grounds was submitted on 26 August 1987.

Citing two new documents, viz.

(IV) DE-OS-2 843 794 and
(V) DE-OS-2 740 572

the Appellant argued essentially as follows:

(a) The skilled person would have learnt from (I) that rubber compositions suitable for the manufacture of tyres should comprise a coupled SBR having a low styrene content and a high vinyl content. From (IV) it was known that rubber compositions containing less than 40% of styrene and 50-80% of 1,2-positioned butadiene resulted in improved wet skid resistance, and reduced the rolling resistance of tyres. The basic structure of the claimed SBR corresponded to the joint teaching of these documents.

(b) Document (V) was even considered prejudicial as to novelty, since polymerisation of styrene and butadiene, when carried out in the presence of a randomizer and of polar solvents, gave statistical SBR with a styrene portion of at least 5% by weight and with "essentially vinyl unsaturation". The latter

implied that the portion of 1,2-butadiene units was markedly higher than 50% and lower than 100%. In addition, these copolymers contained bonds with elements such as Si, Sn, Pb or Ge. The resulting product was thus identical to a rubber composition of the patent in suit wherein the SBR content of the rubber composition amounted to 100% by weight.

(c) It was also obvious to combine the teachings of the above-mentioned prior art references.

Lastly, the Appellant objected to alleged lack of clarity of Claim 1 (Art. 84 EPC) and asserted insufficiency (Art. 100(b) EPC).

V. In his counter-statement, the Respondent contested all the the Appellant's arguments. He further objected to (IV) and (V) being cited at this late stage. He contended, in particular, that:

(a) (V) did not disclose an SBR containing 60 to 95% of 1,2-bonds in the butadiene portion and metal bonds with butadienyl units in a fraction of at least 20%. The presence of an alkyl potassium compound was effective for the production of an SBR having a minimum vinyl content. Thus, although (V) did describe a coupling reaction of SBR with a metal halide, it did not suggest the use of a high vinyl SBR in the tread of a tyre, so as to achieve both low fuel-consumption and high wet skid resistance;

(b) citation (IV) did not refer to the use in a tyre of a solution-polymerised SBR coupled with a metal;

(c) no good reason had been advanced for combining the teachings of (I), (IV) and (V).

Lastly, he maintained that Claim 1 was clear, but expressed his willingness to make a minor amendment.

He also objected to the insufficiency attack being brought at this stage, but at the same time defended sufficiency of the disclosure of the patent in suit.

VI. The Appellant requests that the decision under appeal be set aside and the patent in suit be revoked.

The Respondent requests that the appeal be dismissed.

Reasons for the Decision

1. The appeal complies with Arts. 106 to 108 and Rule 64 EPC and is, therefore, admissible.

2. Within the nine-month opposition term, the Appellant had attacked the patent in suit solely on the grounds of Art. 100(a) EPC, with particular regard to alleged lack of inventive step (Art. 56 EPC). An objection of insufficiency was first raised at the appeal stage, thus not in due time (Art. 114(2) EPC). The Board shares the opinion expressed by another Board in Decision T 182/89 of 14 December 1989 (to be published), viz. that an Opposition Division (or Board of Appeal) should decide all grounds of opposition which have been both alleged and supported in the notice of opposition; it should not, on the other hand, decide potential grounds of opposition which have not been alleged in the notice of opposition. The Board, while satisfied that the disclosure of the patent in suit is indeed sufficient, therefore, disregards the Appellant's arguments under Art. 100(b) EPC.

3. Lack of clarity of a claim (Art. 84 EPC), apart from being also submitted late, is not a ground of opposition under the EPC. Therefore, if no amendments to a claim were made in the course of opposition proceedings, it should not be objected to for lack of clarity (cf. T 23/86, OJ EPO 1987, 316). In the present case, while the clarity of Claim 1 as granted is indeed less than perfect, this is a matter which should have been dealt with at the examination stage, not during the opposition proceedings. The Board reads Claim 1 as if the words "comprising a" in its first line read "its" and as if the words "by weight" after "60-95%" in its fourth, and after "20%" in its last line, as well as "weight" before "fraction" in its last line were absent. The present decision is, therefore, based on the preceding interpretation.

4. As to (IV) and (V), the Appellant seeks to justify the introduction of these documents into the appeal proceedings on the ground that they constitute evidence of the common general knowledge of the notional skilled person at the relevant time.

4.1 A party to the proceedings may at any stage refer to such common general knowledge and may, as required, support such reference by appropriate evidence. However, according to the consistent jurisprudence of the Boards of Appeal, while standard textbooks, encyclopedias etc. will normally be accepted as evidence of common general knowledge, isolated pieces of patent literature, or scientific publications will - failing special circumstances so qualifying them - not generally be accepted to be such evidence.

4.2 In the present case, no arguments have been advanced, nor can the Board otherwise recognise any reasons why (IV) and (V) should be common general knowledge as opposed to just normal pieces of prior art. These documents are, therefore, considered to be late submissions, which the Board may disregard in accordance with Art. 114(2) EPC.

4.3 The Board, having checked the relevance of (IV) and (V), considers them not relevant to the outcome of this case and hence, in exercising the discretion conferred to it by Art. 114 EPC, will disregard these documents.

5. The patent in suit relates to rubber compositions based on SBR suitable for pneumatic tyres.

Rubber compositions of this type have been known already. In the introductory part of the present description, reference is made to JP-A-62248/79 as disclosing organolithium-initiated, solvent-polymerised, randomised SBR having a styrene content of 20 to 40% by weight, a 1,2-bond content in the bonded butadiene of 50 to 80%, and a glass transition temperature (T_g) higher than that of conventional SBR. This, in the Board's view, represents the closest prior art. No satisfactory results are said to have been obtained with a rubber composition, all the polymer of which consists of the said SBR. It is true that the running stability of the tyre on a wet road surface, which is important in view of safe running, was improved; however, the rolling resistance, which is important for low fuel consumption, is not sufficient. In order to reduce the rolling resistance, materials having a low T_g, such as cis-polybutadiene rubber, or having a low hysteresis loss, such as natural rubber, were generally used as the tread rubber of such tyres.

So far, rubber compositions simultaneously satisfying both the requirements of low rolling resistance and high running stability, while maintaining good breakage resistance and wear resistance had not yet been attained.

6. In the light of the above closest state of the art, the technical problem underlying the patent in suit can be seen in the provision of rubber compositions for tyres having improved overall performance with regard to each of the criteria mentioned in the preceding paragraph.

As a solution to this problem, the patent in suit provides a rubber composition as defined in Claim 1.

The results listed in Tables 3 to 5 of Examples 1-3, which were not rebutted by the Appellant, adequately demonstrate that the rubber compositions do indeed solve the afore-referred problem.

7. No piece of prior art in the proceedings discloses rubber compositions having all the features of the present Claim 1. Thus, the subject-matter of Claim 1 of the patent in suit is considered to be novel (Art. 54 EPC). It is not necessary to discuss this in more detail because novelty over the prior art is not in dispute.

8. Turning now to inventive step, the Board needs to decide whether the subject-matter of Claim 1 satisfies the requirements of Art. 56 EPC.

Starting from the statements in the introduction to the present description, the known rubber compositions have to be modified in the following respects in order to arrive at the terms of present Claim 1:

(a) The conventional solution polymerisation-type SBR of JP-A-62248/79 has to be replaced by the star-shaped

SBR obtained by coupling solution SBR with the claimed metal halides. These star-shaped polymers comprising butadienyl-metal bonds, unlike sulphur-crosslinked polymers formed by common vulcanisation, have regular crosslinked centres introduced by means of the coupling agents; thus the molecular chains are mutually bonded. The fraction of bonds with metal-butadienyl groups should be at least 20% of the copolymer. While the styrene content has to be reduced, the vinyl content of the SBR must be increased ("high vinyl" SBR).

(b) The high-vinyl SBR component has to be applied in specified amounts and to be blended preferably with natural rubber or synthetic diene rubbers, such as ordinary SBR, polyisoprene or ethylene-propylene-diene copolymers, depending on the object and use of the finished tyre.

There is, however, no incentive in the prior art cited for any of these modifications carried out and claimed by the Respondent. Thus, in the JP-specification star-shaped, SBR are not mentioned at all; Citation (I) is a review article on SB-copolymers, their variable molecular structures and characteristics being obtainable by polymerising of styrene and butadiene in lithium-organic systems.

In conclusion, in seeking to solve the problem referred to above, it could not have been expected that rubber compositions set out in the present Claim 1 would provide the combination of improvements and desirable qualities found in the overall performance characteristics of the resulting pneumatic tyres.

9. From the above it is clear that the subject-matter of Claim 1 of the patent in suit is not derivable in an obvious manner from the state of the art and, therefore, involves an inventive step as required by Art. 56 EPC. Claim 1 is therefore patentable. The same applies **mutatis mutandis** to dependent Claims 2-4, which relate to specific embodiments of the rubber compositions of Claim 1.

Order

For these reasons, it is decided that:

The appeal is dismissed.

The Registrar:

P. Martorana

The Chairman:

F. Antony