BESCHWERDEKAMMERN DES EUROPÄISCHEN PATENTAMTS

BOARDS OF APPEAL OF THE EUROPEAN PATENT OFFICE

CHAMBRES DE RECOURS DE L'OFFICE EUROPEEN DES BREVETS

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File Number: T 492/88 - 3.3.3

Application No.: 79 104 652.7

Publication No.: 0 011 830

Title of invention: Highly filled thermoplastic compositions based on ethylene interpolymers and processing oils and their use as carpet backside coating

Classification: C08L 23/08

D E C I S I O N
of 27 June 1991

Proprietor of the patent: E.I. DU PONT DE NEMOURS AND COMPANY

Opponent: Teroson GmbH

Headword:

EPC Article 56

Keyword: "Inventive step - yes"

Headnote

Case Number : T 492/88 - 3.3.3

D E C I S I O N
of the Technical Board of Appeal 3.3.3
of 27 June 1991

Appellant : (Proprietor of the patent)
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Decision under appeal :
Decision of Opposition Division of the European Patent Office dated 03.08.88 revoking European patent No. 0 011 830 pursuant to Article 102(1) EPC.

Composition of the Board :

Chairman : F. Antony
Members : R.A. Lunzer
J.A. Stephens-Ofner

Summary of Facts and Submissions

I. European patent No. 0 011 830 was granted on 5 October 1983 on the basis of application No. 79 104 652.7 filed on 22 November 1979, with priority dates of 22 November 1978, and 27 June 1979, derived from US Applications Nos. 963111 and 52927. Claim 1 as granted read as follows:

"A thermoplastic composition consisting essentially of (a) from 5 to 50% by weight of at least one copolymer of ethylene with at least one comonomer selected from the group consisting of vinyl esters of saturated carboxylic acids wherein the acid moiety has up to 4 carbon atoms, esters of unsaturated monocarboxylic acids of 3 to 5 carbon atoms, and diesters of unsaturated dicarboxylic acids of 3 to 5 carbon atoms wherein the alcohol moiety has 1 to 8 carbon atoms, the ethylene content of said copolymer being at least 60% by weight, the comonomer content of said copolymer being from an amount sufficient to provide the desired oil compatibility and blend elongation to 40% by weight, and the melt index of said copolymer being from 0.1 to 150, provided that when said copolymer of ethylene is an ethylene/vinyl ester copolymer said copolymer can contain up to 15% by weight of carbon monoxide or sulfur dioxide; (b) from 5 to 15% by weight of processing oil; and (c) from 48 to 90% by weight of filler."

II. On 22 June 1984 an opposition was lodged by the Respondent on the grounds of Article 100(a), (b) and (c). The following documents were cited within the opposition period:

(1) EP-A-0 004 142 (published 19 September 1979)
(2) US-A-3 010 899
(3) US-A-3 203 921.

After the conclusion of the oral proceedings before the Opposition Division, the Respondent cited the following further documents:

(4) DE-A-2 319 431
(5) DE-A-1 940 838,

while the Appellant introduced by way of rebuttal:

(6) US-A-3 911 185.

The Opposition Division regarded documents (4), (5), and (6) as being relevant, and therefore admissible for the purposes of Article 114(1) EPC. The further cited documents were dealt with by the parties in written submissions, and a decision revoking the patent was issued on 3 August 1988.

III. Claim 1 as considered by the Opposition Division was in the following form:

"A thermoplastic composition obtainable by intensive mixing at a temperature of between 160 and 190°C of (a) at least 5% by weight of a copolymer of ethylene with at least one comonomer selected from the group consisting of vinyl esters of saturated carboxylic acids wherein the acid moiety has up to 4 carbon atoms, esters of unsaturated monocarboxylic acids of 3 to 5 carbon atoms, and diesters of unsaturated dicarboxylic acids of 3 to 5 carbon atoms wherein the alcohol moiety has 1 to 8 carbon atoms or a mixture of such copolymers, the ethylene content of said copolymer or the average ethylene content of said mixture of copolymers being at least 60% by weight, the comonomer content of said copolymer being from an amount sufficient to provide the desired oil compatibility and blend

elongation to 40% by weight, and the melt index of said copolymer being from 0.1 to 150, provided that when said copolymer of ethylene is an ethylene/vinyl ester copolymer said copolymer can contain up to 15% by weight of carbon monoxide or sulfur dioxide; (b) from 5 to 15% by weight of processing oil; and (c) 50 to 90% by weight of filler."

IV. In its decision, the Opposition Division held that the amendments to the Claims introduced by the Appellant in the course of the opposition were allowable for the purposes of Article 123 EPC. Lack of novelty with respect to document (1) was not established because the citation taught that it was advantageous to mix without heat, whereas Claim 1 in issue had been amended so as to specify intensive mixing at elevated temperatures. Nevertheless, the alleged invention lacked any inventive step, because, starting from document (5) as the closest prior art, it was obvious to use plasticizers (thus also mineral oils) in polymer compositions containing a large proportion of mineral filler, and also to perform the mixing at the elevated temperatures specified in the claims in issue. The decision under appeal rejected the Appellant's contention that there was an existing prejudice in the art, against the use of mineral oils as plasticizers for ethylene/vinyl acetate polymers (EVA), on the ground that the Appellant had failed to prove the existence of any such prejudice, the burden of proof being on the Appellant.

V. An appeal against that decision was lodged on 5 October 1988, the appeal fee was paid on the same day, and the Grounds of Appeal were filed on 9 December 1988.

VI. Together with its Statement of Grounds of Appeal, the Appellant maintained its request for Claim 1 in the form set out above, and by its first Auxiliary Request it sought a further amended Claim 1 in which the word "processing"

before the word "oil" in integer (b) was replaced by the words "naphthenic or aromatic". At the start of the oral proceedings the Appellant indicated that it did not wish to proceed with its Main Request, and at their conclusion indicated that its said first Auxiliary Request should be regarded as its sole Request.

VII. The Appellant contended that the alleged invention had achieved considerable commercial success, and that it overcame a prejudice in the industry against the inclusion of mineral oils as plasticizers for EVA polymers when loaded with substantial proportions of mineral fillers. As previously shown, there was an appreciable improvement of the tensile strength and elongation of a product made in accordance with the invention, i.e. embodying intensive mixing at elevated temperatures, when compared with a product of the same composition which had been mixed at room temperature. By means of further experimental evidence filed with its grounds of appeal, the Appellant demonstrated that the elongation of an oil containing polymer composition was improved significantly over one containing an equivalent proportion of conventional phthalate plasticizer.

VIII. The Respondent argued in its counterstatement, filed on 26 June 1989, and during oral proceedings on 27 June 1991, that the objection of lack of novelty in the light of document (1) ought to be upheld, because a claim expressed in the form "obtainable by" was not limited to products which had been so obtained. Furthermore, it argued that the sole difference relied on by the Appellant, viz. the fact that the products of the alleged invention were intensively mixed at a temperature of 160 to 190°C, whereas document (1) disclosed initial mixing at room temperature, was not an effective differentiation, because in carrying out the proposal found at page 11 line 1 of document (1), of

extruding the mixed composition there disclosed, it was inevitable that in a normal screw extruder there would be both intensive mixing and a temperature rise (due to friction) into the claimed temperature range.

As to lack of inventive step, the Respondent relied on document (5) as being the closest prior art. It contended that the two features of Claim 1, which were lacking from the disclosure of that citation, viz. the use of mineral oils as plasticizers, and intensive mixing at elevated temperatures, were exactly the expedients which would occur at once to a skilled worker, starting from the relatively stiff and board-like products described in document (5), and seeking to produce instead a softer, more flexible product, such as would be suitable as a sound absorbent underlay or carpet backing for use in motor vehicles. Further it was argued that the Appellant's experiments demonstrated nothing more than an improvement in % elongation, which was not a particularly relevant property in relation to a substance which was intended to be used as a carpet underlay.

IX. The Appellant (patentee) requested that the decision under appeal be set aside, and that the patent be maintained on the basis of the claims as submitted on 9 December 1988 and designated "New Claims (1. auxiliary plea)". The Respondent (opponent) requested that the appeal be dismissed.

Reasons for the Decision

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

2. Admissibility of proposed amendments

The amendments to be considered are the following:

(i) The change of the claim from a product claim to a claim to a product obtainable by a process. In the view of the Board, this amendment does not extend the protection conferred, and therefore does not offend against Article 123(3) EPC. The words "obtainable by intensive mixing at a temperature of between 160 and 190°C" constitute a further limitation on the scope of the claim. They are based on the disclosure of this feature which is to be found in the specification of the patent as granted at page 7, lines 11 to 16, read in conjunction with page 10, line 1, and page 20, line 8, there being exactly corresponding passages to be found in the application as originally filed (page 15 lines 22 to 32, page 25, line 2, and page 50, line 12). Consequently, the introduction of this feature is admissible.

(ii) Claim 1 as granted had an upper limit for the copolymer (a) of 50%, which was arithmetically inconsistent with the lower limits given for (b) at 5%, and (c) at 48%. The claim was therefore uncertain in its scope, contrary to Article 84 EPC. The avoidance of this confusion by the removal of the inconsistent upper limit of (a) is generally permissible (see T 2/80 OJ, EPC 81, 431), and complies also with Article 123(3) EPC, there being in fact a narrower upper limit of (a) which is fixed at 45% by the combined effect of the lower limits of (b) and (c) of 5%, and 50% respectively.

(iii) The lower limit of (c) has been raised from the 48% of Claim 1 as granted, to the 50% level disclosed in Claim 1 of the application as originally filed. Such an amendment limits the scope of the claim, and is

clearly based on the application as originally filed (see, e.g., original Claim 1).

(iv) The deletion of the words, "at least one", describing the copolymer of ethylene, and following the words, "(a) at least 5% by weight of", in the opening part of the claim is not really essential for the purposes of meeting the present opposition, but it is allowable in the context of making other amendments which are essential. Likewise, the addition after the words, "1 to 8 carbon atoms" of the further words, "or a mixture of such copolymers", and "or the average ethylene content of said mixture of copolymers", after "the ethylene content of said copolymer", do no more than make for consistency in dealing with the optional situation when more than one comonomer is used.

(v) The restriction of the oil referred to in (b) to "naphthenic or aromatic" oil is allowable, these oils being identified as the preferred oils in accordance with the description at page 4, line 27 of the specification of the patent as granted, corresponding to page 8, line 3 of the specification as filed.

Accordingly, all the above amendments meet the requirements of Article 123(2) EPC, and as they do not extend the protection of the claims, they do not offend against Article 123(3) EPC.

3. Novelty

3.1 Novelty of the alleged invention is attacked solely on the basis of document (1). This discloses a combination of a mineral oil in an EVA polymer which contains a considerable amount of filler. The amount of oil specified is 40 to 220

parts per 100 parts of the ethylene copolymer (page 4, line 36), and the filler can be in the range of 100 to 600 parts per 100 of the copolymer (Claim 2). Although the Examples show more than 15% of oil in the total composition, and are therefore beyond the upper limit of Claim 1 in suit, smaller proportions are covered by the claims.

3.2 The alleged invention is distinguishable from this disclosure on the basis of the intensive mixing at high temperature, which is claimed in the amended Claim 1, but not disclosed in document (1). In contrast thereto, document (1) teaches throughout, and notably at page 4, lines 25 to 31, that a valuable and surprising discovery is that mixing can be carried out without heat, and that the final step of fusion to form a backing can be carried out at the moderate temperature of 120°C (see Examples 1 to 4, page 17, line 12; page 18, line 14; page 19, lines 2 and 16). The Appellant's argument that the extrusion referred to at page 11, line 1 of document (1) would have the inevitable effects not only of intensive mixing, but also of heating to 160 to 190°C owing to friction, cannot be accepted, this being an unsubstantiated assertion. Accordingly, the allegation of lack of novelty having regard to document (1) is rejected.

4. The closest prior art

4.1 In considering inventive step, starting with the evaluation of which document is the closest prior art, document (1) has to be excluded altogether in view of its late publication date, having regard to the provisions of Article 56 EPC second sentence.

4.2 The Board considers that document (5) is the closest prior art, since, in contrast with the other citations, it

discloses a very heavy loading of mineral particles, in sound insulation boards made of EVA polymers. These boards are relatively rigid, but capable of being shaped by heating to temperatures in excess of 110°C (page 4, line 11). They may contain an EVA polymer in the range of 10 to 40% (page 3, line 3) and an inorganic filler in the range of 60 to 90% (page 3, line 6). Furthermore, at page 3, lines 15 to 17 it teaches that up to 10% of a conventional plasticizer may be included, and mentions dioctyl phthalate as an example of such a plasticizer.

5. Problem

Given document (5) as a starting document, the Board considers that the objective problem with which the patent in suit is concerned is to find a material comparable to that of (5) in both performance as a sound absorbent material and cost, but at the same time affording the advantage of being sufficiently flexible to make it suited for use as a carpet backing layer in the automotive industry.

6. The solution

6.1 The solution proposed by the patent in issue involves two essential features: the inclusion in the compositions of the invention of certain oils, instead of the conventional phthalate plasticizers, and intensive mixing of the composition at temperatures between 160 and 190°C. As is shown by the extensive data given in the patent in suit, notably in Table V at page 13, the presence of modest proportions of naphthenic processing oil enables a product to be made which has a satisfactory % elongation, despite the presence of a considerable proportion of filler to resin. Tables VI to XX in the patent in suit deal with

further aspects of the desirable properties of compositions made in accordance with the alleged invention.

6.2 These data have been supplemented by further experimental data introduced by the Appellant before the Opposition Division on 30 May 1986, demonstrating that intensive mixing at elevated temperature brings about a marked improvement in % elongation. In addition, a further experimental report filed during the appeal on 9 December 1988 shows that the improvement which is brought about by the inclusion of 6.5% of naphthenic oil produces a much better effect than the use of an equivalent amount of dioctyl phthalate. Thus, the Board is satisfied that the invention credibly provides the automotive industry with a product which is easy to install, and is effective as a sound absorbent. The property of better % elongation is relevant in the present context, because a combined carpet and underlay may need to be flexed significantly on insertion through the door space of a car, before it is laid. Hence the Board is satisfied that a credible solution to the above stated problem has been found.

7. Inventiveness

7.1 The issue of inventiveness turns on whether a skilled person, having as his starting point the disclosure of document (5), and confronted with the problem of finding a product which, instead of being in the form of a relatively rigid board which is disclosed in document (5), had the flexibility desired of a carpet backing or underlay, would have tried to reach this objective by using the two steps of, (a) including an oil of the defined class in place of the phthalate plasticizer of document (5), and (b) mixing intensively at elevated temperature.

7.2 As for (a), whether a skilled worker confronted with the problem of the present invention would use oil in place of a phthalate plasticizer depends on what was known as to their relative merits. It is not disputed that oils are commonly used as plasticizers for a wide range of plastics. However, there is nothing before the Board to show that the skilled worker in the art would have replaced the phthalate plasticizer suggested by (5) with the oils in accordance with the alleged invention, in the expectation that its properties, notably its flexibility, would be any better. That such a marked improvement exists is demonstrated by the experimental work referred to in 6.2 above.

7.3 Accordingly, in the Board's view although the skilled worker in this art would know that he could use oil as a substitute for a phthalate plasticizer, he would not do so in the expectation of attaining notably better properties, and accordingly it concludes that document (5) on its own does not make the alleged invention obvious.

7.4 Turning to other cited documents, document (2) relates to compositions consisting of lubricating oils and EVA copolymers in such proportions that the product is is either rubbery or grease-like, depending on the respective proportions of the main constituents (col. 1, lines 10 to 17). As fillers, carbon black or finely divided clays are proposed (col. 1, lines 61 to 62). No limits are given as to the maximum proportion of filler to be included, but the highest level disclosed is 20% of carbon black in Example II. In the view of the Board, this document is directed to a significantly different product, with a much lower proportion of filler, than the product in accordance with the invention. Its teaching, whether on its own or in combination with any other document, does not point towards the present invention.

7.5 Document (3) is concerned with mineral filled polyolefine polymers such as polyethylene and polypropylene. It was found that the problem of brittleness brought about by the inclusion of such fillers could be overcome by the inclusion of 2 to 7% of mineral oil (col. 1, line 46). However, the proportion of filler under consideration is in the range of only 10 to 20% (col. 1, line 45). As is clear from the introduction at col. 1, lines 11 to 58, what was aimed at in this citation was a modification of the properties of the polymer, such as to improve its feel and appearance, and to avoid excessive glossiness. There is no evidence before the Board suggesting that the skilled worker in this art would extrapolate its teaching to the different area, i.e. that of heavily filled plastics containing 50% or more of mineral filler used for sound insulation, nor is there any information in the document as to the method of mixing proposed. Consequently, the Board considers that the teaching of this document is not a pointer in the direction of the invention.

7.6 Document (4) is concerned with a sound damping material suitable for use in the automobile industry, consisting of a composite of at least two layers which together are capable of being vacuum formed. One of those two layers bears some resemblance to the sound absorbing materials of the present invention, being a mineral loaded polymer, the other being a soft material, such as a felt, or a low density foam. The polymer of the mineral loaded layer may be selected from a terpolymer of ethylene, polypropylene, and an unconjugated diene (EPDM), or polyvinyl chloride (PVC), or an ethylene vinyl acetate co-polymer (EVA), or styrene-butadiene rubber (SBR), or mixtures of these materials with thermoplastic materials such as polystyrene or a polyolefine (page 3, lines 14 to 20). It is to be noted that EVA is included as one amongst a number of possibilities. Two examples of the mineral loaded polymer

layer are given at page 5. In the first Example, the polymer is EPDM, there is 81% of filler and 9.5% of mineral oil. This oil is merely indicated as being a "Mineraloelstrecker" (mineral oil extender). Whether it is in fact a naphthenic or aromatic oil as required by the present Claim 1 is not disclosed.

In the second Example, the polymer is PVC, there is 79% of filler and 6.3% of a substance which is identified by a trade mark Poly-X E 280. The exact nature of this substance is not identified, but as the mineral oil in Example 1 has a resembling, but not identical trade mark, it may reasonably be assumed that this is another mineral oil, the exact nature of which is not disclosed. This document contains no specific teaching of any combination of EVA polymers, mineral oils of the type here in issue, and a large proportion of mineral filler. Neither on its own, nor in combination with the teaching of document (5), can it be regarded as a pointer in the direction of the invention.

7.7 Consequently the Board reaches the conclusion that it would not have been obvious to the skilled worker to replace the phthalate plasticizer of document (5) with the oils now claimed, and that the compositions claimed in Claim 1 are therefore not lacking in inventive step.

7.8.1 As already indicated in 7.1 above, two distinguishing features were in issue in the course of the appeal, identified as (a) the choice of a particular group of oils instead of a phthalate plasticizer, and (b) the use of intensive mixing at elevated temperatures. Having already reached a conclusion on the issue of inventiveness, it is not essential for the Board to deal with this further issue.

7.8.2 However, in deference to the arguments of the parties, and as the Board has reached a different conclusion from that reached by the Opposition Division, this issue will be considered briefly below. The experimental results filed by the Appellant in the opposition on 30 May 1986 showed not only that intensive mixing achieved greater uniformity, as a skilled worker might reasonably have expected, but that it resulted in a dramatic improvement in % elongation, from the results of 15 and 45% in the case of the comparative examples, mixed without heating in a standard blade mixer, to 300% in the case of the same composition which had been subjected to intensive mixing in a Banbury mixer at 177°C.

7.8.3 The importance of this experimental work by the Appellant was given still greater credibility by the conduct of the Respondent. At the oral proceedings before the Opposition Division it sought and obtained an adjournment (which with an extension of time limit totalled 6 months) on the ground that it needed time to answer these experiments. Bearing in mind that the Respondent had already had from the date when it received a copy of these experiments in June, until the oral proceedings in October 1986, to file any report of experiments in answer, this tardy request for an opportunity for further time in which to reply on the part of the Respondent, and its grant on the part of the Opposition Division, are interpreted by the Board as meaning that both the Respondent and the Opposition Division, rightly regarded these experiments as being of considerable significance.

7.8.4 Then, instead of answering the experiments, the Respondent did not do so, but chose to file further argument directed to other prior art. In these circumstances, the Board feels bound to attach due weight to these experimental results. The Respondent might nevertheless have succeeded on this issue, if it had adduced some credible evidence showing

that it is commonplace in this industry to mix polymers of this class intensively at elevated temperatures. There is no such evidence before the Board. Instead of adducing evidence, the Respondent contended that the reason why document (5), its own patent, makes no mention of the method of mixing, is because it is the normal practice in the industry to carry out mixing in a Banbury mixer, or an equivalent machine, at the claimed temperatures. If that were true, it could have been substantiated by a very brief written statement by a person having the necessary knowledge. In the absence of such essential evidence as to fact, the Board cannot make any assumption that the assertion is true.

7.8.5 As to information which is capable of being derived from the cited prior art, document (2) discloses intensive mixing in a Banbury mixer at elevated temperatures (93 to 177°C) (col. 1, lines 50 to 51). However, as already indicated in 7.4 above, the products there disclosed bear little resemblance to those here under consideration. Document (4) mentions in both of its examples that mixing is carried out in a Banbury mixer. While the Board is aware that mixing in a Banbury mixer is inherently intensive, and generates heat, there is no material before the Board to indicate that the minimum temperature claimed of 160°C would be attained. Consequently, the Board is not satisfied that the Appellant has shown that mixing as specified in Claim 1 in suit would have been obvious to the skilled worker, and this step may therefore be regarded as a further contribution to inventiveness.

8. Conclusion

The subject matter of Claim 1 of the patent in issue thus involves an inventive step as required by Article 56 EPC, and the Claim is therefore patentable. The same applies to

the dependent Claims 2 to 8, which relate to variants of the composition, all falling within the scope of Claim 1.

Order

For these reasons, it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the Opposition Division with the order to maintain the patent on the basis of the documents (claims and description) as submitted as "(1. auxiliary plea)" on 9 December 1988.

The Registrar: The Chairman:

E. Goergmaier F. Antony