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 259/89 - 3.3.1

Application No.: 84 200 913.6

Publication No.: 0 136 727

Title of invention: Aromatic polyamide yarn impregnated with lubricating particles, a process for the manufacture of such a yarn, and packing material or rope containing this yarn

Classification: D06M 15/244

D E C I S I O N
of 2 May 1991

Proprietor of the patent: AKZO N.V.

Opponent: Hoechst Aktiengesellschaft, Frankfurt

Headword: Polyamide yarn/AKZO

EPC Article 56

Keyword: "Inventive step (confirmed)"

Headnote

Europäisches Patentamt | European Patent Office | Office européen des brevets

Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number : T 259/89 - 3.3.1

D E C I S I O N
of the Technical Board of Appeal 3.3.1
of 2 May 1991

Appellant : (Opponent)
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Decision under appeal :
Decision of Opposition Division of the European Patent Office dated 24 February 1989 rejecting the opposition filed against European patent No. 0 136 727 pursuant to Article 102(2) EPC.

Composition of the Board :

Chairman : K.J.A. Jahn
Members : J.M. Jonk
R.L.J. Schulte

Summary of Facts and Submissions

I. The grant of the European patent No. 136 727 in respect of European patent application 84 200 913.6 was announced on 12 August 1987 (cf. Bulletin 87/33). The patent was based on 24 claims, Claim 1 reading as follows:

"A yarn consisting of aromatic polyamide endless filaments which are impregnated with a dispersion containing solid lubricating particles of polyfluorocarbon resins, particularly PTFE, and/or graphite, wherein the yarn is a tangled yarn interlaced by a fluid-jet process."

II. A notice of opposition was filed on 11 May 1988 requesting the revocation of the patent on the ground that its subject-matter did not involve an inventive step. The opposition was supported by several documents including:

(1) DE-A-2 326 826
(2) US-A-3 110 151
(3) US-A-3 302 386 and
(5) US-A-4 371 180

which are relevant to the present decision.

III. By a decision delivered on 24 February 1989 the Opposition Division held that the subject-matter of Claim 1 was novel and involved an inventive step.

The Opposition Division considered that it was not obvious to a skilled person to leave out the PTFE (polytetrafluoroethylene) filaments from the yarn known from document (1) and to produce a tangled yarn having a bulky consistency by replacing the process of document (2) by the process of document (3).

IV. A notice of appeal was filed against this decision on 14 April 1989 and the appeal fee was paid on the same date.

A statement of grounds of appeal was submitted on 4 July 1989.

V. The Appellant disputed that the subject-matter of Claim 1 involved an inventive step. It was argued that the tangle obtained according to document (2) was essentially the same as that obtained according to document (3) if the overfeed was less than 10 percent. Moreover, the treatment of a yarn interlaced according to document (2) with a dispersion containing lubricant particles provided an impregnated yarn instead of a coated yarn, because the interstices between the filaments of the yarn were large enough to enable an impregnation by the lubricant particles to occur. Therefore, the claimed yarn differed from the yarn known from document (1) only in that it did not comprise PTFE filaments. It would, however, be obvious to a skilled person to leave out the PTFE filaments if a packing material having improved strength was desired.

VI. In his counter-statement the Respondent rebutted the Appellant's pleading. It was argued that the yarn according to the disputed patent not only differed from the yarn known from document (1) by the choice of the yarn material, but also in that the subject yarn was a tangled yarn that was bulky or textured and provided with internal and/or external loops, whereas the known yarn was a compact interlaced yarn. Consequently, the distribution of the lubricating particles was also different, the known yarn being coated only on the outside. The improved impregnation in combination with the use of only one type of filament material, i.e. aromatic polyamide, resulted surprisingly in a packing yarn and a packing material of

superior quality. The subject-matter of the claim, therefore, was not obvious to a skilled person.

VII. Oral proceedings took place before the Board on 2 May 1991 in the course of which new Claims 1-22 were filed to meet the Board's objection that arguments to support the inventive step were not reflected in Claim 1. Claim 1 differed from that as granted in that the passage "wherein ... process" was amended to read as follows:

"wherein the yarn is a tangled loopy yarn interlaced with an overfeed of at least 1% by a fluid-jet process".

Claim 10 was restricted by replacing "contains" by "consists of". Claims 22 and 24 were deleted and Claim 23 renumbered and its dependency amended.

The Appellant maintained his objections regarding inventive step. It was alleged that an interlacement using an overfeed of 1% according to the amended Claim 1 would not provide a loopy yarn, because document (3) required an overfeed of at least 10% for the fabrication of a loopy yarn. Moreover, it was submitted that document (2) also disclosed the fabrication of a loopy yarn and that the fluid used as interlacing agent may contain yarn lubricants. These disclosures supported the argument that the subject yarn only differed from the yarn known from document (1) in that it did not comprise PTFE filaments or, in other words, wholly consisted of aromatic polyamide filaments. Such a yarn was considered obvious because document (5), which disclosed a gasket material comprising aramid fibres and inorganic fibres, indicated that the inorganic fibres were used for the sake of cost reduction.

VIII. The Appellant requested that the decision under appeal be set aside and that the patent be revoked.

The Respondent requested that the patent be maintained on the basis of Claims 1 to 22 filed during oral proceedings.

IX. At the conclusion of the oral proceedings, the Board's decision to maintain the patent as requested was announced.

Reasons for the Decision

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

2. There are no formal objections to the present claims under Article 123 EPC. The restriction of Claim 1 to a tangled loopy yarn interlaced with an overfeed of at least 1% is based on the passage on page 7, lines 3-10, of the patent application as filed and on the corresponding passage in the patent (page 4, lines 47-52). Furthermore the restriction of Claim 10 to a packing material solely consisting of the subject yarn is based on page 2, lines 10-14 and page 3, lines 12-16, of the application as filed and on the patent specification, namely page 2, lines 33-37 and page 3, lines 13-15.

3. After examination of the cited documents, the Board has reached the conclusion that the claimed subject-matter is novel. Since novelty is not in dispute, it is not necessary to give detailed reasons for this finding.

4. The issue to be dealt with is whether the subject-matter of Claim 1 involves an inventive step.

4.1 The Board concurs with the opinion of the first instance that document (1) represents the closest state of the art.

This document discloses a blended yarn for use as a packing material consisting of 50-80% by weight of PTFE filaments and 50-20% by weight of aromatic polyamide filaments (cf. page 1, lines 1-4 and page 2, lines 6-9). Preferably the yarn is coated with fine PTFE particles (cf. page 2, lines 14-16). The filaments may be interlaced according to document (2) (cf. page 3, the last two lines). This document discloses a process for producing a compact interlaced yarn that is essentially free from ring-like or other filament loops (see the title; column 1, lines 11-31; and column 2, lines 38-46).

4.2 In the light of this closest state of the art the technical problem underlying the subject patent can be seen in providing a yarn that is particularly suitable for being formed into a packing material that ensures a more effective sealing over a long time in use under high dynamic loads, (cf. page 2, lines 41-43 and lines 49-53, and page 2, line 63 to page 3, line 10, particulary page 3, lines 2-5 of the printed patent specification).

4.3 According to Claim 1, this technical problem is solved by a yarn having a tangled loopy configuration consisting of aromatic polyamide filaments interlaced with an overfeed of at least 1% by a fluid-jet process and impregnated with a dispersion containing the indicated lubricant particles.

In view of the undisputed statements in the disputed patent (cf. the passages indicated in above paragraph 4.2) in which it is explained that the improved properties of

the claimed yarn and of the packing material containing this yarn are essentially based on a better distribution of the lubricant particles over the filaments due to the voluminous character of the yarn and on the more homogeneous composition of the subject yarn consisting only of aromatic polyamide filaments the Board is satisfied that the above technical problem is credibly solved.

In this connection it is observed that the Board does not concur with Appellant's objection that a tangled loopy yarn cannot be obtained if the yarn is interlaced with an overfeed of 1%, because document (3) discloses that a loopy yarn is obtained at a feed in excess of 10% (cf. column 3, lines 18-29). On the one hand the Appellant did not provide any evidence to support this allegation and on the other hand it would be clear to a skilled person that less overfeed can be compensated for by other parameters, such as the blowing pressure, the configuration and the dimensions of the apparatus, and the diameter of the yarn (see document (3), column 3, lines 30-57).

4.4 It remains to be examined whether, in view of the technical problem to be solved, the requirement of inventive step is met by the claimed yarn.

4.5 As already indicated in paragraph 4.1 above, document (1) discloses a blended yarn consisting of PTFE filaments and aromatic polyamide filaments, wherein the PTFE filaments form the main component and are present in an amount of at least 50% by weight, preferably 65-75% by weight (see page 2, lines 9-11).

The aromatic polyamide filaments are used to improve the sealing properties of PTFE packing materials (see the paragraph bridging pages 1 and 2, and example 2).

Therefore, this citation does not provide any indication that would lead a skilled person to the finding that yarns consisting solely of aromatic polyamide filaments, i.e. omitting the main component of the disclosed yarn, would provide suitable packing materials, let alone packing materials having the advantages which are necessary in order to solve the above-defined technical problem.

This document also discloses that the filaments of the blended yarn may be interlaced according to the process of document (2) (cf. page 3, last paragraph). This reference is concerned with a process for producing a compact interlaced yarn which is essentially free from ring-like or other filament loops (see the title, as well as column 1, lines 19-31, column 2, lines 38-46 and column 15, lines 13-25). Appellant's argumentation, based on the passage in column 15, lines 38-55, that the technical teaching in document (2) is not restricted to the production of compact non-loopy yarns cannot be followed. It is true that this particular passage indicates that a yarn having increased bulk and feel of a textured yarn can be produced by feeding the component yarns to the interlacer at different tensions or by slackly feeding one component yarn or by overfeeding that component, but this passage must be read in the context of the whole disclosure of document (2) teaching -as indicated above -that the formation of loops must be prevented. Therefore, in the Board's judgment, the combined disclosures of documents (1) and (2) would not provide the skilled person with any incentive to carry out the interlacement in such a way that a tangled loopy yarn in the sense of the disputed patent and document (3) is obtained (see the disputed patent, page 4, line 1 and lines 52-54; document (3), column 1, lines 50-67 and column 3, lines 26-29; and the above section 4.3, last paragraph).

Document (1) also discloses that the yarn can be coated with PTFE particles (see page 2, lines 14-16, and page 4, lines 6-17). It is true that PTFE particles are used in an amount of about 50 to 100% based on the weight of the yarns (cf. page 4, lines 11-14), but the Board cannot accept the Appellant's allegation that this would mean that the yarns are impregnated with the particles in the sense of the disputed patent i.e. so that a uniform distribution of the PTFE particles in the yarn takes place (cf. the paragraph bridging pages 2 and 3). According to Example 1, PTFE yarns and polyamide yarns are rolled together to form a combined yarn. Then this combined yarn is coated with 61,7% PTFE particles. Because of the compact structure of the combined yarn obtained by the rolling process it does not appear likely that a substantial impregnation would take place. Also a substantial impregnation does not appear to be likely in the case of a compact yarn interlaced according to document (2), even if the interstices between the filaments of the compact yarn were large enough to contain the particles. In any case, in the absence of any evidence to the contrary, in the Board's judgment, there would be a substantial difference between the impregnation rate of a compact yarn obtained according to document (2) and a bulky loopy yarn in the sense of present Claim 1, because the degree of impregnation depends on the voluminous character of the yarn. Therefore, document (1) also does not provide the skilled person with any incentive to impregnate the yarn with the PTFE particles in order to obtain a uniform distribution of the particles over the cross-sectional area of the yarn and, consequently, the desired advantages which are related to the solution of the above defined problem.

This analysis of the disclosure in document (1) shows that, in the Board's judgment, the claimed yarn was not obvious to a skilled person. Moreover, it shows that the claimed yarn not only differs from the known yarn in the choice of the yarn material but also in its bulky loopy consistency and in the specific distribution of the lubricant particles. Consequently, the Appellant's objection regarding inventive step, which was essentially based on the view that the claimed yarn differed from the known yarn only in that it did not contain PTFE filaments, cannot be accepted.

4.6 Document (5) discloses, as state of the art, that organic fibres such as polytetrafluoroethylene and aramid may be suitable as gasket materials (see column 1, lines 24-28). In order to improve the properties of such gasket materials the organic fibre is combined with a vitreous, i.e. inorganic fibre, the combination being impregnated with a PTFE suspension as sealant (see column 1, lines 35-43, as well as the objects and the advantages of the disclosed material indicated in column 1, line 67 to column 2, line 11, and column 4, lines 3-31). The opinion of the Appellant, based on the passage in column 4, lines 34-40, that the inorganic fibres are only used to reduce the cost of the gasket material cannot be shared by the Board. It is clearly indicated in this document (cf. column 4, lines 6-34), that the desired degree of reinforcement and the degree of conformability can only be obtained by combining organic and vitreous fibre. Therefore, this document does not provide the skilled person with any incentive to use as gasket materials a yarn only consisting of aromatic polyamide filaments, let alone a tangled loopy yarn uniformly impregnated with PTFE particles.

4.7 Consequently, in the Board's judgment, the proposed solution to the technical problem underlying the patent in suit is inventive. Thus, Claim 1 and independent Claims 10 and 14, which are concerned with a packing material and a process for the manufacture of the yarn according to Claim 1 respectively and which are based on the same inventive concept, therefore, are allowable.

Independent Claim 13, relating to a rope formed from the claimed yarn, is also allowable because - as in the case of packing materials - it is plausible that the reduced friction resulting from the uniform distribution of the lubricating particles in the bulky loopy yarn will have a positive effect on the length of time in use under high dynamic loads. This claim was also not contested by the Appellant.

Dependent Claims 2-9, 11, 12 and 15-22, which relate to preferred embodiments claimed in the independent claims, are also acceptable.

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 Claims 1-22 filed during oral proceedings.

The Registrar: The Chairman:

E. Görgmaier K.J.A. Jahn