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File Number: T 519/91 - 3.2.1
Application No.: 86 106 603.3
Publication No.: 0 203 469
Title of invention: Improved polyester fiberfill and process

Classification: B68G 1/00, D04H 1/00

D E C I S I O N
of 19 June 1992

Applicant: E.I. Du Pont de Nemours and Company

Headword:

EPC Article 84, Rule 29(6)

Keyword: "Clarity of claims (yes) - allowability of reference in claim to description (yes, special case)"

Headnote



Case Number : T 519/91 - 3.2.1

D E C I S I O N
of the Technical Board of Appeal 3.2.1
of 19 June 1992

Appellant : E.I. Du Pont de Nemours and Company
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Decision under appeal : Decision of Examining Division 2.3.08.088 of the
European Patent Office dated 1 March 1991
refusing European patent application
No. 86 106 603.3 pursuant to Article 97(1) EPC.

Composition of the Board :

Chairman : F. Gumbel
Members : S. Crane
W.M. Schar

Summary of Facts and Submissions

- I. European patent application No. 86 106 603.3, filed on 15 May 1986, was refused by a decision of the Examining Division dated 1 March 1991.

The reasons given in the decision were that independent Claims 1 and 12 according to the main request of the Appellants (Applicants) were not clear (Article 84 EPC). Independent Claim 1 according to the subsidiary request was also not clear and in addition its subject-matter lacked inventive step.

- II. The Appellants lodged an appeal against this decision on 17 April 1991 and paid the appeal fee on the same day. The Statement of Grounds of Appeal was filed on 2 July 1991.

- III. In response to a communication of the Board dated 7 October 1991 pursuant to Article 110(2) EPC the Appellants filed on 10 April 1992 a new set of Claims 1 to 13 and amended pages 3, 3a, 4, 4a and 7 of the description on the basis of which, together with the remaining pages of the description and the drawings as originally filed, the grant of a patent was requested. Minor amendments to these documents were agreed by the Appellants in a telephone conversation with the Rapporteur of the Board on 15 June 1992.

Independent Claim 1 as amended is worded as follows:

"Refluffable fiberballs consisting essentially of entangled polyester fiberfill characterized in that the fiberfill is spirally crimped, and coated with a slickener and has a cut length of about 10 to about

60 mm, and is entangled randomly within the fiberballs, which have an average dimension of 1 to 15 mm with at least 50% by weight of the balls having a cross-section such that its maximum dimension is not more than twice its minimum dimension, the fiberballs having a cohesion measurement, as defined in the description under the corresponding heading, of less than 6 Newtons (N)".

Claims 2 to 4 relate to blends of the fiberballs according to Claim 1 with other materials, Claims 5 and 6 to fiberballs according to Claim 1 packed into bags or compressed into packages respectively, and Claim 13 to a pillow filled with fiberballs according to Claim 1.

Independent Claim 7 as amended is worded as follows:

"Process for shaping polyester fiberfill into fiberballs that are suitable for transportation by air-blowing, involving separating the fiberfill into plurality of discrete tufts that are tumbled on the interior cylindrical wall of a stationary cylindrical vessel with blades that rotate about an axial bladed shaft that is mounted horizontally, characterized in that the polyester fiberfill has a spiral crimp, has a cut length of about 10 to about 60 mm and has been slickened, and that the tufts are tumbled by air, that is stirred by the blades, whereby the tufts are repeatedly turned and impacted by the air against the interior cylindrical wall so as to entangle the fibers and so as to condense and re-shape the tufts into fiberballs of randomly entangled fibers having an average dimension of 1 to 15 mm, at least 50% by weight of the balls having a cross-section such that its maximum dimension is not more than twice its minimum dimension, and the fiberballs having a cohesion measurement as defined in the description under the corresponding heading, of less than 6 Newtons (N)".

Claims 8 to 12 relate to preferred features of the process according to Claim 1.

Reasons for the Decision

1. The appeal meets the requirements of Articles 106 to 108 and Rule 64 EPC. It is therefore admissible.

2. Allowability of the amendments

Present independent Claim 1 combines in essence the features of original Claims 1 and 3 with the feature that the fiberfill is coated with slickener as found in the original description at page 7, line 26 and original Claim 4.

Present independent Claim 7 is based essentially on a combination of the features of original Claims 12 and 13, the more precise definitions of the starting material and end product to be found in original Claims 1 and 3, and the statement that the fiberfill has been slickened, see above.

Present Claims 2 to 6 and 8 to 12 correspond to original Claims 7 to 11 and 14 to 18 respectively. Present Claim 13 is based on numerous indications in the original disclosure of the particular suitability of the fiberballs of the invention as a filling for pillows.

The amendments made to the description are restricted to those necessary to adapt this to the new set of claims and to refer to the most relevant state of the art.

There are therefore no objections to the amendments under Article 123(2) EPC.

3. Form and clarity of the claims

3.1 In the course of the examination proceedings objection was made under Rule 29(6) EPC to the reference in original Claim 1 to a "cohesion measurement as defined of less than 6 Newtons (N)" and in original Claim 12 to a "cohesion value as defined of less than 6 Newtons (N)". In response to this and other objections the Appellants filed amended independent product and process claims. In the product claim the substance of the statement as to how the cohesion measurement was to be performed was incorporated from the description, so that the relevant part of the claim read as follows:

"... and having a cohesion measurement of less than 6 Newtons (N) measured by the force needed to pull a vertical rectangle of metal rods up through the fiberfill which is retained by 6 stationary metal rods closely spaced in pairs on either side of the plane of the rectangle, all the metal rods being of 4 mm diameter, and of stainless steel, said rectangle being made of rods of length 430 mm (vertical) and 160 mm (horizontal) and attached to an Instron and the lowest rod of the rectangle being suspended about 3 mm above the bottom of a plastic transparent cylinder of diameter 180 mm (the stationary rods will later be introduced through holes in the wall of the cylinder and positioned 20 mm apart in pairs on either side of the rectangle), 50 g of the fiberfill being placed in the cylinder before inserting the said rods, and the zero line of the Instron being adjusted to compensate for the weight of the rectangle and of the fiberfill, the fiberfill then being compressed under a weight of 402 g for 2 minutes, the 6 (stationary) rods introduced horizontally in pairs, as mentioned,

3 rods on either side of the rectangle one pair above the other, at vertical separations of 20 mm and the weight then removed, finally, the rectangle is pulled up through the fiberfill between the three pairs of stationary rods, as the Instron measures the build-up of the force in Newtons, ..."

In the process claim the reference to the "cohesion value as defined of less than 6N" was replaced by a reference to the fiberballs having a minimum of hairs.

The Examining Division then objected that these claims lacked clarity in various respects, these objections eventually leading to refusal of the application. The specific objections raised, insofar as these are still relevant to the presently valid claims, can be summarised as follows:

Firstly, the method of measuring cohesion described in the claim was unclear as the distance between the bottom of the cylinder and the lowermost stationary rods in the apparatus used was not specified. Furthermore, the speed of pulling of the rectangle was not stated. Both of these factors would influence the force needed to pull the rectangle thus rendering the claim unclear in scope. Secondly, the expression "50% by weight" of the balls was unclear in the context since no maximum and minimum dimensions of the balls were specified.

Since the Examining Division raised their original objection under Rule 29(6) EPC the relevant part of the Guidelines on this point (CIII 4.10) has been amended to indicate that one special case which would justify an exception to Rule 29(6) EPC is where the invention is characterised by parameters, and the length or complexity of the definition in terms of parameters renders it

impracticable to include the whole of that definition in the claim.

The Board supports the view expressed in the Guidelines and is of the opinion that the present case falls squarely within the type of situation envisaged there, this being apparent from a reading of the relevant passage quoted above of the version of Claim 1 on which the contested decision was based. Clearly, a complex description of apparatus and methodology is unsuitable for being subjected to the linguistic constraints imposed by the traditional conventions of claim drafting. Furthermore, since there was no standard measure of cohesion available to the Appellants which they could adopt they had little option but to develop suitable apparatus and methodology to determine a limiting value for this important characteristic in order to distinguish their invention from the prior art, see also point 4 below.

There is therefore no objection under Rule 29(6) EPC to the presently valid versions of Claims 1 and 7.

- 3.2 The questions raised by the Examination Division with respect to the statement as to how the cohesion measurement is performed still of course have to be addressed since if the terms of this statement were not such as to allow the skilled man reliably to perform the measurement and thereby determine whether any particular sample of fiberballs had the level of cohesion set out in the claims, then these claims would not meet the requirement of Article 84 EPC that they clearly define the matter for which protection is sought.

In order to try to meet the objections of the Examining Division the Appellants contracted an independent research institute to perform cohesion measurements on a number of

fiberball samples provided by them, the institute being given no other information than was contained in the patent application. The institute duly built a test rig and performed the measurements, the results of which correlate, within the experimental error to be expected in the circumstances, with the results obtained by the Appellants. After it had produced its results the institute was then asked to comment on the specific objection raised by the Examining Division. With respect to the spacing of the lowermost pair of rods from the bottom of the cylinder it was indicated that this was more or less determined by a combination of the other factors given, in particular the length of the pulling rectangle, the vertical spacing between pairs of rods and the length of the column of fiberballs once this has been compressed. With respect to the speed of pulling of the rectangle it was indicated that Instron tensile testers used in textile testing laboratories are generally set to operate at a particular pulling speed. In any case experience had shown that pulling speed had little effect on the measurement of fibre friction coefficients.

The Board finds the evidence presented by the Appellants convincing and therefore comes to the conclusion that the feature "a cohesion measurement as defined of less than 6 Newtons" is clear and capable of defining the matter for which protection is sought. It is not apparent from the contested decision why the Examining Division rejected this evidence.

- 3.3 The second objection of the Examining Division is not fully understood by the Board but appears to be based on the following considerations:

The requirement that the fiberballs "have an average dimension of 1 to 15 mm" would still be met where the

sample of fiberballs included a small number thereof which were much larger than the upper limit. This small number of larger fiberballs could however alone constitute the 50% by weight of the fiberballs required to have a maximum dimension not more than twice the minimum dimension. Accordingly, the claims do not adequately define the composition of a sample of fiberballs. The first of the above premises is however, in the opinion of the Board, incorrect. When read in the context of the application as a whole, and particularly having regard to the disclosed process of shaping the fiberballs which would not allow large divergences in the sizes of individual fiberballs, the term "average dimension of 1 to 15 mm" must be seen as being directed each fiberball per se, the dimensions of which have to be averaged as the fiberballs are not necessarily spherical.

Present independent Claims 1 and 7 therefore meet the requirements of Article 84 EPC. There have been no objections raised in this respect against the remaining claims and the Board finds no fault with them.

4. Novelty and inventive step

The invention is concerned in general terms with the provision of a washable down-like substitute for filling pillows and the like that particularly in terms of "refluffability", i.e. its ability to be returned quickly to its original soft fluffy condition simply by shaking and patting, is comparable to down.

In view of the commercial significance of providing such a product considerable research has been made in this field, numerous developments being mentioned and evaluated in the introductory part of the description of the application.

According to the proposal of JP-A-57 000 048 (D1) small groups of for example polyester fibers are mechanically drawn from a large block thereof and subjected to a mechanical "rumpling" operation to entangle them into balls having a diameter of 10 to 50 mm. The rumpling is preferable performed between a spiked rotating drum and the closely spaced wall of a surrounding casing or between conveyor belts moving in opposite directions to each other. After the balls are formed they are preferable set with a fixing resin. The balls thus formed are stated to have a down-like feel and to exhibit refluffability.

US-A-4 144 294 (D2) relates to a method and apparatus for separating sheets of resin bonded polyester fibers into small pieces and forming the pieces into balls. The apparatus comprises a partly cylindrical vessel in which a shaft is mounted for rotation about a horizontal axis. The shaft has radially projecting arms which carry a set of blades extending parallel to the shaft. Along the length of each blade is a set of spaced fingers the ends of which are in close proximity to the cylindrical part of the vessel wall. This part of the vessel wall is provided with radially inwardly directed fingers which interdigitate with the fingers on the blades. The balls formed are stated to have the look and feel of natural down.

The documents D1 and D2 are the most relevant prior art publications present in the proceedings.

Also mentioned in the application is a commercially available product designated as "38K" which comprises flattened discs mixed with longer cylindrical shapes of entangled spirally crimped polyester fibers. Such a product is stated in the application to have better refluffability than loose fiberfill but not to compare well with down due to clumping or prolonged use. The

product "38K" was considered by the Examining Division as constituting the most relevant state of the art, and is the only state of the art referred to specifically in the contested decision. However, the finding of lack of inventive step made in that decision was directed to the subject-matter of a product claim then on file that did not include a reference to the cohesion measurement. Furthermore, the Examining Division had disregarded the features of the claim concerning the average dimensions of the fiberballs and their predominant shape since it considered them as unclear, see point 3.3 above.

In the opinion of the Board the most relevant state of the art with respect to the product defined in present Claim 1 is to be found in document D1, the fiberballs disclosed there being predominately spherical in shape, with a range of diameters that overlaps that specified in the claim, and being stated to be refluffable. It is evident from the arguments presented by the Appellants that an important distinction of the fiberballs claimed over this prior art is to be seen in the low cohesion between the fiberballs, as defined in the claim by reference to the cohesion measurement, see points 3.1 and 3.2 above. It is the low level of cohesion between the fiberballs that is the main contributing factor to their good refluffability, which approaches that of natural down. The low cohesion is in turn dependent on a number of factors, in particular that the fiberfill is coated with a slickener, that the fiberballs are predominately of a similar shape, and most importantly that the "hairiness" of the fiberballs has been minimized by using fiberfill of a particular cut length and forming the fiberballs therefrom in a particular way. There is no suggestion in the prior art publications present in the proceedings that the cohesion aspect of fiberballs had previously received any attention, so that there was nothing to encourage the

skilled man to consider ways of meeting the requirement of Claim 1 in this respect. Furthermore, the fiberballs according to Claim 1 differ from those disclosed in document D1 in that the fiberfill is spirally crimped which leads to the fiberballs having high bulk (volume/unit weight) and good shape retention in use, particularly on washing, thus ensuring that the low level of cohesion is retained. Spirally crimped fiberfill had indeed already been used in the product "38k" but it was there not randomly entangled into predominately generally spherical balls as in the product claimed.

With regard to the process of independent Claim 7 the closest state of the art is to be found in document D2. In contrast to the process disclosed there the fiberballs are according to Claim 7 formed by being tumbled against the cylindrical vessel wall by air stirred up by the blades. This leads to compaction of the fiberballs and a reduction of their "hairiness" so that after a suitable length of time their cohesion measurement falls below the limiting value of 6 Newtons specified in the claim. No similar suggestion can be found in any of the available prior art documents.

As a consequence of the above the Board comes to the conclusion that the subject-matter of independent Claims 1 and 7 involves an inventive step (Articles 52(1) and 56 EPC). These claims together with Claims 2 to 6 and 13, which refer back to Claim 1, and Claims 8 to 12, which are dependent on Claim 7, therefore comprise a suitable basis for the grant of a patent.

Order

For these reasons, it is decided that:

1. The decision under appeal is set aside.
2. The case is referred back to the Examining Division with the order to grant a patent on the basis of the following documents:

Claims: Claims 1 to 13 filed on 10 April 1992, with the amendments to Claims 1 and 7 agreed by telephone on 15 June 1992;

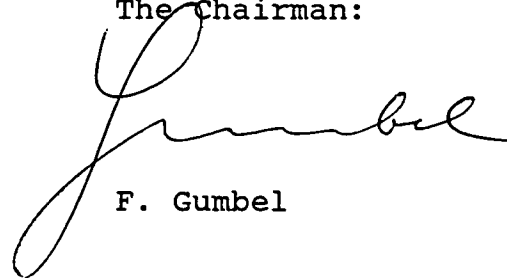
Description: Pages 3, 3a, 4, 4a and 7 filed on 10 April 1992 with the amendments to page 4 agreed by telephone on 15 June 1992; pages 1, 2, 5, 6 and 8 to 22 as originally filed;

Drawings: Sheets 1 to 6 as originally filed.

The Registrar:

S. Fabiani

The Chairman:



F. Gumbel

gr.
M. Lh.