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D E C I S I O N
of 24 August 2005

Case Number: T 0676/02 - 3.3.9

Application Number: 93907517.2

Publication Number: 0686089

IPC: B32B 3/24

Language of the proceedings: EN

Title of invention:
Packing Material

Patentee:
Liberopax LLC

Opponent:
Jiffy Packaging Company Limited

Headword:
-

Relevant legal provisions:
EPC Art. 83, 123(2) (3), 54, 56

Keyword:
"Sufficiency of disclosure (yes)"
"Main request: inventive step (no)"
"Auxiliary request: inventive step (yes); non-obvious solution"

Decisions cited:
-

Catchword:
-

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Case Number: T 0676/02 - 3.3.9

D E C I S I O N
of the Technical Board of Appeal 3.3.9
of 24 August 2005

Appellant: (Proprietor of the patent)
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Decision under appeal: **Decision of the Opposition Division of the European Patent Office posted 17 April 2002 revoking European patent No. 0686089 pursuant to Article 102(1) EPC.**

Composition of the Board:

Chairman: P. Kitzmantel
Members: A.-T. Liu
K. Garnett

Summary of Facts and Submissions

I. European patent No. 686 089, granted on 9 December 1998, was opposed on 10 September 1999 on the ground of Article 100(a) EPC. In a subsequent letter dated 22 August 2001, the Opponent relied on Article 100(b) EPC as an additional ground of opposition.

II. The opposition was supported inter alia by the following documents:

D1: EP-A-0 377 397
D4: US-A-2 383 400
D14: "Paper and Board Packaging - Why Package", Paper, naturally, pages 1 to 4 (1991).
D16: A Textbook on MG, Kraft and Sack Paper, AssiDomän, Kraft Products (1998).
RWT: Statutory Declaration of R.W. Townsend, dated 22 January 2002.

III. Claim 1 as granted read as follows:

"A flat expandable recycled paper sheet material (10) comprising:

at least one sheet of a slit paper (12);
each of said at least one sheet of paper having, in its unexpanded form, a slit pattern of a plurality of parallel spaced rows of consecutive slits (14,16) and unslit gaps, extending transversely to the grain of the paper and from one edge (18,17) of said sheet of paper to the opposing edge (17,18) of said sheet of paper, each of said rows having its slits (14,16)

positioned adjacent unslit gaps of the adjacent parallel row of slits forming land areas (20);

each said sheet being expanded by extending the sheet in a direction (A) transverse to said rows of slits, said unslit gaps and said space between rows of slits having dimensions whereby the slits form an array of hexagonal openings (26), wherein, the material being for use in expanded form as cushioning material for protecting an object, the dimensions of the slits (14,16), the lands (20) and the spacing (38) between rows, are such that said land areas (20) form an angle with the plane of the unexpanded sheet, of between 45 degrees and less than 90 degrees."

IV. At the conclusion of the oral proceedings on 28 February 2002, the Opposition Division decided to revoke the patent. Essentially, the Opposition Division held that the subject-matter of Claim 1 as granted and that of Claim 1, as filed as an auxiliary request, did not involve an inventive step with regard to the teaching of D1 or D4, in combination with general common knowledge.

Having admitted the ground for opposition under Article 100(b) into the proceedings, the Opposition Division decided that the requirements of Article 83 EPC were met.

V. Notice of appeal by the Patentee was received on 27 June 2002. With the Statement of the grounds of appeal dated 23 August 2002, the Appellant submitted a new set of 6 claims. This was later replaced by a set of Claims 1 to 6, presented at the oral proceedings of

24 August 2005 as the basis for the Appellant's only auxiliary request.

VI. Claim 1 of the Auxiliary request was worded as follows:

"A method of protecting an object by wrapping that object using a flat expandable recycled paper sheet material (10) comprising:

at least one sheet of a slit paper (12);

each of said at least one sheet of paper having, in its unexpanded form, a slit pattern of a plurality of parallel spaced rows of consecutive slits (14,16) and unslit gaps, extending transversely to the grain of the paper and from one edge (18,17) of said sheet of paper to the opposing edge (17,18) of said sheet of paper, each of said rows having its slits (14,16) positioned adjacent unslit gaps of the adjacent parallel row of slits forming land areas (20);

the method comprising expanding the material (10) by extending the sheet in a direction (A) transverse to said rows of slits, said unslit gaps and said space between rows of slits having dimensions whereby the slits form an array of hexagonal openings (26), the dimensions of the slits (14,16), the lands (20) and the spacing (38) between rows, are such that said land areas (20) form an angle with the plane of the unexpanded sheet, of between 45 degrees and less than 90 degrees;

the method further comprising wrapping the expanded material around the object to overlie itself, with the lands (20) of one layer of wrapping interlocking with those of an adjacent layer such that contraction of the expanded sheet is restricted."

VII. The Respondent, who had been duly summoned, was not represented at the oral proceedings.

VIII. The Appellant's arguments were as follows:

- With respect to the closest prior art D1, the technical problem to be solved consisted of the provision of an improved packaging material.
- The solution proposed in Claim 1 of the main request was a paper sheet material characterised in that it was made from recycled paper, and in the configuration of the slits.
- The use of recycled material would allow for lower "orientation memory" and for softer land edges, thereby reducing abrasion. It also had the advantage of being cheaper.
- In view of D14 and D16 the skilled person would be deterred from using recycled paper when applying the teaching of D1.
- D1 did not teach using rolls of paper for making the packaging materials, let alone orienting the slits in the transverse direction to the paper grain.
- D1 did not indicate the dimension of the slits for paper. Since paper behaved differently from metal foil, the teaching in D1 concerning the latter could not be applied to the former in the same way.
- D4 did not teach that the slits were transverse to the grain of paper.
- D4 was also silent about the land angles. However, it was the norm for land angles in expanded sheets of this type to be less than 45 °.

IX. The Respondent's arguments, submitted in writing, were essentially as follows:

- At the filing date, there was a strong sense of ecological responsibility; it was therefore obvious to favour recycled paper over virgin paper in the field of packaging.
- The technical advantage based on the use of recycled material was unsubstantiated. In particular, it was unfounded that the land angle should have any effect on the abrasion.
- It was self-evident that the paper grain in D1 would be aligned in the direction of travel of the paper making machine and that, in accordance with the method of D1, the slits would therefore lie transverse to the paper grain.
- The slitting process of D1 would inevitably lead to paper expandable such as to have land angles of more than 45°.
- D4 showed the same general type of slitted paper material as claimed. When expanded, it would inevitably give rise to a 3-dimensional sheet with a land angle of between 45 and 90°.
- D4 also made it clear that the expanded sheet material was inherently susceptible to "self-securing", which would necessarily restrict its contraction.

X. The Appellant requested that the decision under appeal be set aside and the patent be maintained as granted or alternatively on the basis of the Auxiliary Request submitted during the oral proceedings.

The Respondent requested that the appeal be dismissed.

Reasons for the Decision

1. *Sufficiency of disclosure*

As indicated in the decision under appeal, the Opposition Division held that requirements of Article 83 EPC were met. The Respondent did not challenge this view and the Board does not see any reason to deviate from this conclusion.

Main request

2. *Inventive step*

2.1 Claim 1 of the main request is directed to a flat expandable recycled paper sheet material for use in expanded form as cushioning material for protecting an object (see paragraph III above).

2.2 It is common ground for all the parties concerned and consistent with the decision under appeal that D1 should be considered to comprise the closest prior art (see decision under appeal page 4, item 6).

D1 is primarily directed to a form of expandable slit metal foil which may be stretched into a three-dimensional metal net useful in extinguishing surface fires (column 2, lines 23 to 30). In addition, D1 also discloses that, by substituting other materials for the metal foil in producing an expandable product, it is possible to use such a product in a number of applications, such as in the packaging. For example, if

cardboard or strong kraft paper is used, an improved packing or insulation material can be made for use in place of materials such as corrugated cardboard or air bubble insulation (column 22, line 57 to column 23, line 12).

2.3 With respect to D1, the Appellant has submitted that the technical problem to be solved consists in the provision of an improved material for use in packaging.

2.4 The solution to the indicated technical problem, as proposed in Claim 1, is a paper sheet material which is distinguished from a piece of slitted cardboard or kraft paper according to D1 by the following features:

(a) the paper is made from recycled material

(b) the spaced rows of consecutive slits and unslit gaps extend transversely to the grain of the paper, and

(c) the dimensions of the slits, the lands and the spacing between rows are such that the land areas form an angle of between 45 degrees and less than 90 degrees with the plane of the unexpanded sheet.

2.5 The Appellant has argued that the claimed subject-matter is improved over the closest prior art according to D1 in the following respects.

2.5.1 The Appellant at first contended that the use of recycled paper would allow for softer land area edges and thus would abrade the surface of the protected objects to a lesser extent than virgin paper. Since the

Appellant has not provided any evidence to demonstrate the asserted effect, which was strongly contested by the Respondent, the Board cannot take this argument into consideration for the assessment of inventive step.

2.5.2 Furthermore, the Appellant has argued that recycled paper has a lower "orientation memory", and thus a reduced tendency to return to the unexpanded configuration than with virgin paper. This effect was attributed to the lengths of the fibres, which were said to be usually shorter in the recycled paper than in virgin paper. As was not refuted by the Appellant, however, one cannot make the general statement that recycled paper is always made up of shorter fibres than are found in any kind of virgin paper. In particular, the Appellant has not submitted any convincing argument, let alone proof, that recycled paper will always have shorter fibres than in cardboard or in kraft paper as referred to in D1. On the other hand, Claim 1 neither defines a particular kind of recycled paper, nor does it specify the length of the fibres in the recycled paper. Under these circumstances, the Board is not convinced that, as a matter of principle, the effect with respect to "orientation memory" attributed to the relative size of the fibres is generally present.

2.5.3 The Board does not have any difficulty in accepting that the use of recycled paper has the advantage of being cheaper. The Appellant has also contended that the alignment of the slits transverse to the paper grain results in a higher resistance to tearing and that the land angles are essential for obtaining the desired cushioning effect. Since D1 is silent on the orientation of the slits relative to the paper grain

and does not explicitly indicate the range of land angles obtainable with slitted kraft paper, a direct comparison between the claimed expandable paper material and the packing material according to D1 cannot be made. However, for the sake of further discussion, the Board will assume in favour of the Appellant that the claimed material is improved over the prior art in the sense that, in addition to being cheaper, it also has high tear resistance and provides, in expanded form, a high cushioning effect, and that these advantages correspond to the objectives underlying the problem to be solved.

2.6 It remains to be decided whether the achievement of these advantages by the features of Claim 1 is obvious in view of the available prior art.

2.6.1 Re: feature (a)
Recycled paper

The Board concurs with the Opposition Division in that, for ecological reasons, it was obvious for the skilled person at the relevant time to use recycled paper, particularly in the field of packing material. Furthermore, it was also known that recycled paper was not only environment-friendly but also offered economic advantages. Thus, at the priority date of the patent in suit, the skilled person would undoubtedly have considered the use of recycled paper in view of these apparent advantages.

The Appellant has argued that, by disclosing the use of kraft paper for packaging materials, D1 would teach away from the use of recycled paper because the fibres

would become shorter with the recycling, which makes them unsuitable for the production of kraft paper.

As already observed above, the fibre length is not a feature of Claim 1. As was not refuted by the Appellant, there is no difference in principle between virgin and recycled material in respect of the fibre length, this depending on the kind of virgin fibres concerned and on the degradation the fibres experience during possibly repeated recycling. The Board is also not convinced that D14 and D16 teach that recycled fibres are unsuitable for the production of kraft paper. Whilst D14 indicates that "some packaging papers and board are made exclusively from virgin paper", this only concerns the case where "strength and purity are requisites" (page 4, last paragraph). This statement cannot be construed as a teaching that ordinary kraft paper should never include recycled material. In D16, it is indicated that "the paper used to make AssiDomän kraft paper contains exclusively fibres which come directly from the forest. 100% virgin fibre." (page 23, first full paragraph). Since this document was issued by AssiDomän Kraft Products AB and expressly concerns the quality of kraft paper produced by that particular company, it is not justifiable to conclude from this statement that recycled material is not to be used for kraft paper for generally applicable **technical** reasons.

Furthermore, D1 not only suggests using kraft paper as material for packaging but also cardboard (column 23, line 6). As can be derived from D14, it is common in the art to use recycled paper for cardboard (see page 3: "General Packaging Board"). Moreover, D14 even emphasises that "the packaging sector is a major user

of waste paper" (page 4: "Raw materials", first paragraph).

Consequently, the Board cannot accept the Appellant's argument that D1 teaches away from using recycled paper for packaging material.

2.6.2 Re: feature (b)
Slits extending transversely to the grain of the paper

D1 discloses in Figures 7 to 16 a machine for producing slits in expandable metal foil. Mounted at the input end is a feed roller and at the take-up end of the machine is a take-up roller. The operation of the machine leads to production of metal foil with transverse lines of discontinuous slits (column 14, line 9 to column 15, line 56).

It is common ground that the metal foil according to D1 does not have a grain structure. However, it is also commonly known that, in the production of (a roll of) paper, the fibres tend to be generally aligned in the longitudinal direction, conventionally referred to as "the machine direction". Thus, if the metal foil roll described in D1 were replaced by a paper roll, then the slits would extend transversely to the paper grain (or to "the machine direction"). This is not disputed by the Appellant.

The Appellant, however, argued that D1 did not suggest using rolls of paper but rather the use of cardboard for making the packaging materials. By reference to RWT (Statutory Declaration of R.W. Townsend), the Appellant asserted that, if individual pieces of cardboard

cuttings were put to the slitting machine according to the process of D1, there would be no compelling reason for orienting the slits in the transverse direction to the paper grain (see RWT, page 5, paragraph 14). The Board would remark, however, that in the same document, in the preceding paragraph to the one cited by the Appellant, it is stated that "It is self-evident to me that ... when tension is applied to the slit sheet to open the slits, the stress which is applied to the paper may well cause the paper to tear in the direction of the slits. It is very well known in the paper industry that the resistance to tearing in the cross direction is significantly higher than resistance to tearing in the machine direction [i.e. the grain direction - remark added by the Board]... Thus, if I had been asked to put D1 into practice with strong Kraft paper, and I had not already been directed to orient the slits in the transverse direction, I would have automatically have (sic) done this, because I would have known that it would have produced a paper which was less likely to tear" (see RWT, page 4, paragraph 13).

Since the Appellant itself has relied on this expert declaration RWT for defending his case, the Board has no reason to query these statements. Consequently, the Board concludes that the configuration of the slits transverse to the paper grain is either an inevitable result of putting D1 into practice using a paper roll or an obvious choice for the skilled person, who is well aware that the resistance to tearing in the cross direction of the paper grain is higher since it involves tearing across the fibres.

2.6.3 Re: feature (c)
Land angles

As discussed during the oral proceedings, Claim 1 is directed to a flat expandable paper sheet and not to an expanded sheet of paper. The technical features pertaining to the array of hexagonal openings and to the land angle of between 45 degrees and less than 90 degrees therefore do not characterise the flat paper sheet as such. In fact, these features can only be construed in the sense that the slits are dimensioned and positioned in a suitable way such that, when the paper sheet is expanded, they form an array of hexagonal openings, with the land areas at an angle to the plane of the expanded sheet as specified.

D1 states that, if cardboard or strong kraft paper is used as the material, "an improved packing or insulation material can be made for use in place of materials such as corrugated cardboard or air bubble insulation". D1 then goes on to teach that the slitted cardboard "can be stretched into final net or honeycomb form for use in producing boxes, spacers and other insulating items similar to the corrugated cardboard presently used." (column 23, lines 9 to 12 and lines 16 to 25). Although D1 does not describe in detail the structure of the expanded paper sheets, the Board finds it plausible that, if desired, the slitted paper sheet of D1 could be expanded to an inclination of the land areas of at least 45 degrees, because otherwise it would be unsuitable for, or at least less suitable for, the intended use as a cushioning material to replace air bubbles, since with too low a land angle the expanded sheet would readily collapse.

The Appellant has argued that paper does not expand in the same way as metal foil, and therefore the skilled person would not expect paper to behave in the same way during expansion as does metal. The Board, however, remarks that D1 gives an illustration of the honeycomb-structure obtained with metal foil in Figures 3A through 3E. As clearly shown in these drawings, the openings ("eyes") of the honeycomb structure have an hexagonal form. It also states that the horizontal surfaces of the foil are raised to a vertical position when the foil is expanded to this extent (see column 9, lines 1 to 7). There is nothing in D1 to suggest that the paper sheets could not be expanded to a similar extent. On the contrary, D1 describes the expanded material, be it metal foil or paper sheet, in practically identical words, namely, in the case of metal foil, in terms of an "expanded prismatic net" and "honeycomb-like structure" versus, in the case of paper sheet, "net form" and "final net or honeycomb form" (compare column 9, lines 1 and 4 and column 23, lines 19 to 20 and 22). Thus, even if the materials may behave somewhat differently, the teaching of D1, when interpreted by a skilled reader, is that the final expanded structure would be similar for both kinds of materials concerned.

The Appellant has also observed that D1 suggests adjusting the placement of the knives on the slitting machine for wider spaces between lines of slits when cardboard or strong kraft paper is used instead of metal foil, without indicating the exact spacing (column 23, lines 6 to 12). Since this has an influence on the surface area of the land areas and thus on the manner of expansion of the slitted sheet, no inferences

whatsoever about the angle of the land areas in an expanded slitted paper sheet can be deduced, in the Appellant's view, from D1. To the Board, this argument is ill-founded, since it is clear that the slit pattern must be such as to allow the expanded paper to attain the desired honeycomb-like structure.

Under these circumstances, the Board finds that the disclosure of D1 is inherently directed to slitted paper expandable to the similar extent as metal foil, namely to form land angles of more than 45 degrees.

2.6.4 Combination of features in Claim 1

By way of summary of the above, the Board holds that the distinguishing feature (a) is common in the art. Furthermore, the characterising features (b) and (c) are either inherent to or obvious with respect to the closest prior art teaching according to D1. The Appellant has not submitted any arguments showing an unexpected interaction of these features either among themselves or between any of those and the remaining technical features of the claim. Consequently, the combination of features of Claim 1 does not imply an inventive step (Article 56 EPC).

Auxiliary request

3. *Procedural matters*

It is to be noted that Claim 1 of the Auxiliary request was amended during the oral proceedings, in the absence of the Respondent. This claim, however, corresponds in substance to Claim 1 submitted with the Statement of the Grounds of Appeal dated 23 August 2002, with the

only difference that the claim, being directed to a method, has been reworded to be clearly defined by process features. The Respondent has taken the opportunity to comment on the claim submitted by letter of 23 August 2002 in its reply dated 7 July 2003 (page 8, item 8). The Board therefore holds that the Respondent's right to be heard on the patentability of the present Claim 1 has been duly respected (Article 113(1) EPC).

4. *Amendments*

Claim 1 of this request is essentially based on Claims 1 and 6 as granted. The basis for these claims in the documents as originally filed is not in dispute. Present Claim 1 further includes the feature that interlocking is such "that contraction of the expanded set is restricted". The basis for this amendment is on page 2, lines 32 to 33, of the International Application published under the PCT. In addition, the added feature restricts the scope of this claim with respect to the granted method Claim 6.

The dependent Claims 2 to 6 are based on Claims 3 to 5 and 8 as granted. As a consequence, the Board holds that the requirements of Article 123(2) and (3) are met.

5. *Novelty*

The novelty of the method of Claim 1 has never been queried. The reason for this will be clearly apparent from the following discussion of inventive step.

6. *Inventive step*

6.1 Claim 1 is now directed to a method of protecting an object, essentially by expanding a paper sheet material and wrapping the expanded paper sheet around the object to overlie itself, with the lands of one layer of the wrapping material interlocking with those of an adjacent layer such that contraction of the expanded sheet is restricted.

6.2 The closest prior art D1 discloses that, for use as cushioning materials, the slitted paper materials are "stretched into final net or honeycomb form for use in producing boxes, spacers or other insulating items similar to the corrugated cardboard presently used" (column 23, lines 16 to 25).

6.3 The Board accepts that, with respect to D1, the technical problem to be solved is the use of the slitted paper sheet material to protect an object without having recourse to separate fixing means, e.g. adhesives.

6.4 The technical problem stated above is solved in Claim 1 by (i) expanding the slitted paper sheet to form a land angle of between 45 degrees and less than 90 degrees, (ii) wrapping an object with the expanded paper sheet and (iii) interlocking the wrapping layers such that contraction of the expanded sheet is restricted. Although the cardboard in D1 will be expanded to the same extent for use, D1 neither discloses nor suggests wrapping the expanded material around an object, let alone in a manner to secure the wrapping by

interlocking, without having recourse to the use of adhesives.

6.5 The Board finds it plausible that the use of adhesives for securing the wrapping can be avoided when the contraction of the expanded sheet is restricted by interlocking the adjacent layers of the expanded material. The technical problem is therefore considered to be solved by the claimed method. This has not been questioned by the Respondent. The only question is whether the proposed solution is obvious in view of the available prior art documents.

6.6 D4 is directed to a paper wrapper which can be readily applied to and removed from wound packages. It indicates that the expandable paper disclosed therein conforms to the shape of the fibre bobbin cake and has the advantage of stabilising the inside fibre windings of the cake (page 1, left hand column, lines 9 to 16 and page 2, right hand column, lines 66 to 75). There is no mention of the extent to which the slitted paper is expanded for the required use. Since the wrapper is not intended for providing a cushioning effect, the Board has no reason to assume, and the Respondent has not submitted any convincing argument, that the expansion must be such as to form land angles in the range as stipulated in Claim 1.

The Board concurs with the Respondent in so far as the expanded sheet material according to D4 is inherently susceptible to self-securing. It is also uncontested that D4 mentions interlocking in the description, in particular with respect to the preferred embodiment illustrated in Figure 5. In this example, the paper

sheet has an intermediate unslitted portion 8 provided with a cut-out portion and slitted end portions 10 and 11. In use, the unslitted portion of the wrapper is first disposed internally, then the shorter slitted end 10 wrapped over and around the smaller end of the cake and the longer slitted end 11 wrapped around the outside of the cake and around the end 10 of the wrapping into the inside of the cake. It is then remarked that, "where the slitted portions 10 and 11 engage each other, they tend to interlock, thereby assisting the maintenance of the wrapping throughout processing of the wrapped package." (page 2, left hand column, lines 21 to 35, in particular lines 31 to 35). This is the only interlock taught by D4. As explained by the Appellant and not refuted by the Respondent, it is evident, in particular in the light of Figures 3 and 5, that when the expanded sheet of paper is wrapped around the cake as described, the slits are overlaid with one another such that the opposite ends of each row of slits overlap. It is undisputed that this kind of interlock described in D4 would not restrict the contraction of the expanded sheet. Thus, contrary to the Respondent's submission, interlocking with restriction of contraction is not the only way that wrapping would or could be done in practice (see Respondent's letter dated 9 July 2003, page 9, second full paragraph and Appellant's letter of reply dated 25 July 2005, paragraph bridging pages 4 and 5).

The Respondent has not argued and the Board cannot see that the solution to the present technical problem, as proposed in Claim 1, is described or suggested in any other document. In conclusion, the claimed method comprising the step of wrapping the expanded sheet

about an object in a manner whereby contraction is restricted cannot be derived from the available prior art in an obvious way.

6.7 The dependent Claims 2 to 6 are directed to preferred embodiments of the method according to Claim 1; the methods concerned therefore also involve an inventive step.

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 Claims 1 to 6 of the Auxiliary Request submitted during the oral proceedings, with drawings as granted, and after any necessary consequential amendments of the description.

The Registrar The Chairman

G. Röhn P. Kitzmantel