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D E C I S I O N
of 3 March 2005

Case Number: T 1016/02 - 3.2.6

Application Number: 95120673.9

Publication Number: 0719530

IPC: A61F 13/15

Language of the proceedings: EN

Title of invention:
Absorbent sheet and process for producing the same

Patentee:
Kao Corporation

Opponent:
Kimberly-Clark Worldwide, Inc.

Headword:
-

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

Keyword:
"Novelty (yes)"
"Inventive step (yes)"

Decisions cited:
-

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 1016/02 - 3.2.6

D E C I S I O N
of the Technical Board of Appeal 3.2.6
of 3 March 2005

Appellant: (Proprietor of the patent)
Kao Corporation
14-10, Nihonbashi Kayabacho 1-chome
Chuo-Ku
Tokyo 103 (JP)

Representative:
VOSSIUS & PARTNER
Siebertstrasse 4
D-81675 München (DE)

Respondent: (Opponent)
Kimberly-Clark Worldwide, Inc.
401 North Lake Street
Neenah, Wisconsin 54956 (US)

Representative:
Davies, Christopher Robert
Frank B. Dehn & Co.
European Patent Attorneys
179 Queen Victoria Street
London EC4V 4EL (GB)

Decision under appeal:
Decision of the Opposition Division of the European Patent Office posted 15 July 2002 rejecting the opposition filed against European patent No. 0719530 pursuant to Article 102(2) EPC.

Composition of the Board:

Chairman: P. Alting van Geusau
Members: G. Pricolo
E. Dufrasne

Summary of Facts and Submissions

I. The appeal is from the interlocutory decision of the Opposition Division posted on 15 July 2002 concerning the maintenance in amended form of European patent No. 0 719 530, granted in respect of European patent application No. 95120673.9.

In coming to its decision the Opposition Division considered that the subject-matter of the claims of the patent as amended in accordance with the second auxiliary request filed during the oral proceedings of 2 July 2002 was novel and also involved an inventive step over the relevant prior art represented by documents:

D1: US-A-5 061 259;

D2: GB-A-2 269 109;

D3: EP-A-0 528 248.

II. The appellant (patentee) lodged an appeal, received at the EPO on 24 September 2002, against this decision and paid the appeal fee that same day. With the statement setting out the grounds of appeal, received at the EPO on 25 November 2002, the appellant requested that the patent be maintained in the amended form according to the main request or one of the first and second auxiliary requests filed therewith.

III. In an annex to the summons to oral proceedings pursuant to Article 11(1) Rules of Procedure of the Boards of Appeal the Board expressed its preliminary opinion that

it would appear doubtful whether the patent in suit included sufficient information enabling the skilled person to reliably determine the ratio of the diffusion area referred to in claim 1 of the main request. As a consequence it appeared that the requirements of Article 83 EPC were not met.

IV. Oral proceedings took place on 3 March 2005.

The appellant filed amended claims 1 to 10 and a revised description and requested that the decision under appeal be set aside and the patent maintained on the basis of these claims and description together with the figures of the patent as granted.

The respondent (opponent) requested that the appeal be dismissed.

V. Claims 1, 7 and 9 of the appellant's request read as follows:

"1. An absorbent sheet (11) containing bulky cellulose fibers (12) and hydrophilic fine fibers (13) or hydrophilic fine particles (13), wherein the proportion of the hydrophilic fine fibers (13) or the hydrophilic fine particles (13) is higher in one side of the absorbent sheet than in the other side; the bulky cellulose fibers (12) have an average fiber length of 1 to 20 mm and a degree of fiber roughness of 0.3 mg/m or more; the hydrophilic fine fibers (13) are selected from cellulose fibers and inorganic fibers and have an average fiber length of 0.02 to 0.5mm; the hydrophilic fine particles (13) are selected from cellulose particles and inorganic particles and have an average particle diameter of 0.02 to 0.5mm, wherein the

absorbent sheet (11) comprises 50 to 97 parts by weight of the bulky cellulose fibers (12), and 3 to 50 parts by weight of the hydrophilic fine fibers (13) or the hydrophilic fine particles (13), based on 100 parts by weight of the absorbent sheet."

"7. A process for producing an absorbent sheet (11) comprising the steps of: forming a slurry (14) by dispersing bulky cellulose fibers (12) having an average fiber length of 1 to 20 mm and a degree of fiber roughness of 0.3 mg/m or more and hydrophilic fine fibers (13) selected from cellulose fibers and inorganic fibers having an average fiber length of 0.02 to 0.5mm or hydrophilic fine particles (13) selected from cellulose particles and inorganic particles having an average particle diameter of 0.02 to 0.5mm in water; spreading the slurry (14) on a paper forming wire (15) to form a paper layer (16) on the paper forming wire (15); and dehydrating, wherein the rate of dehydration is 2 ml/(cm^2·sec) or more and drying the paper layer (16), whereby in the formed absorbent sheet (11) the proportion of the hydrophilic fine fibers (13) or the hydrophilic fine particles (13) is higher in one side of the absorbent sheet than in the other side and wherein the absorbent sheet (11) comprises 50 to 97 parts by weight of the bulky cellulose fibers (12), and 3 to 50 parts by weight of the hydrophilic fine fibers (13) or the hydrophilic fine particles (13), based on 100 parts by weight of the absorbent sheet."

"9. An absorbent article comprising a liquid permeable topsheet (21), a liquid impermeable backsheet (23) and a liquid retentive absorbent member (22) interposed between the topsheet (21) and the backsheet (23),

wherein the absorbent member (22) contains an absorbent sheet (11) and a superabsorbent polymer; the absorbent sheet (11) contains bulky cellulose fibers (12) and hydrophilic fine fibers (13) or hydrophilic fine particles (13); the proportion of the hydrophilic fine fibers (13) or the hydrophilic fine particles (13) is higher in one side of the absorbent sheet than in the other side; the bulky cellulose fibers (12) have an average fiber length of 1 to 20 mm and a degree of fiber roughness of 0.3 mg/m or more; the hydrophilic fine fibers (13) are selected from cellulose fibers and inorganic fibers and have an average fiber length of 0.02 to 0.5mm; and the hydrophilic fine particles (13) are selected from cellulose particles and inorganic particles and have an average particle diameter of 0.02 to 0.5mm, wherein the absorbent sheet (11) comprises 50 to 97 parts by weight of the bulky cellulose fibers (12), and 3 to 50 parts by weight of the hydrophilic fine fibers (13) or the hydrophilic fine particles (13), based on 100 parts by weight of the absorbent sheet."

VI. The submissions of the appellant can be summarised as follows:

D1 and D3 disclosed an absorbent sheet containing bulky cellulose fibers and hydrophilic fine fibers or particles. However, these were not selected from cellulose and inorganic fibers or particles, but from materials, particularly superabsorbents, capable of absorbing a high amount of liquid by forming a hydrogel in a liquid medium. It was true that D3 disclosed hydroxypropylcellulose and carboxymethylcellulose as suitable materials, but these materials had different

chemical structures than, and were therefore different from, cellulose. Accordingly, the claimed subject-matter was novel over the available prior art. It also involved an inventive step because the problem it solved was completely different from that underlying D1 and D3. By using hydrophilic fine fibers and particles made of cellulose or inorganic materials, the patent in suit provided an absorbent sheet which advantageously exhibited a high liquid absorption at its surface, a high liquid permeation, and high liquid diffusing properties at its inside. In contrast thereto, in D1 and D3 the gelling hydrophilic fine fibers or particles were used for improving the absorption properties and did not contribute to improve, but in fact impaired, the diffusion properties.

VII. In support of its request the respondent refuted the appellant's submission that the feature of claim 1 of the patent in suit according to which the hydrophilic fine fibers or particles were made of cellulose was not known from D3. This document disclosed that the absorbent material could be formed of hydroxypropylcellulose and carboxymethylcellulose which were cellulosic materials.

Reasons for the Decision

1. The appeal is admissible.

2. *Amendments*

2.1 Basis for the definition of independent claims 1, 7 and 9 is found in claims 1, 2, 7, 9, 10, 12 and in the

description (see page 8, lines 51 to 54 of the published application; see in particular the reference to "inorganic fibers or particles") of the application as filed.

Dependent claims 2 to 6, 8 and 10 correspond respectively to claims 3 to 7, 11 and 13 of the application as filed.

The description is amended to be into conformity with the wording of the claims as amended.

Hence, the amendments made to the patent in suit do not give rise to objections under Article 123(2) EPC.

2.2 Since the independent claims 1, 7 and 9 are amended by way of insertion of further restrictions in the definition of the corresponding independent claims 1, 9 and 12 as granted, the amendments made result in a restriction of the protection conferred by the patent in suit and therefore do not give rise to objections under Article 123(3) EPC.

3. *Novelty*

3.1 D3 undisputedly discloses an absorbent sheet (see Fig. 6) containing bulky cellulose fibers (12; see col. 4, lines 11 to 13 and example 1, in particular col. 14, lines 34 to 37) and hydrophilic fine fibers or hydrophilic fine particles (14; see col. 5, lines 12,13 and example 1, in particular col. 14, lines 41 to 46), the proportion of the hydrophilic fine fibers or the hydrophilic fine particles being higher in one side of the absorbent sheet than in the other side (col. 9,

lines 34-41). According to D3, the absorbent sheet comprises 5 to 95 parts by weight of the bulky cellulose fibers and 5 to 95 parts by weight of the hydrophilic fine fibers or particles based on 100 parts by weight of the absorbent sheet (see column 6, lines 37 to 50) and has therefore amounts of bulky cellulose fibers and hydrophilic fine fibers or particles falling within the respective ranges of 50 to 97 and 3 to 50 defined in claim 1 of the patent in suit. These fine fibers or particles are made of a water-swellable, generally water-insoluble material capable of absorbing at least 5 times or more its weight in water (see col. 4, lines 39 to 44). This absorbent material may be formed from organic material as well as synthetic materials (see col. 4, lines 44 ff.). There is however no disclosure in D3 of the hydrophilic fine fibers or particles being selected from, respectively, cellulose fibers or particles and inorganic fibers or particles.

The respondent referred to the materials hydroxypropylcellulose and carboxymethylcellulose which are disclosed in D3 (col. 4, lines 49 and 52, 53) as possible absorbent materials. These synthetic hydrogel polymers are, however, derivatives of cellulose and have therefore a different molecular structure. Accordingly, they are clearly distinguished from cellulose.

Furthermore, D3 discloses that the bulky cellulose fibers have an average fiber length preferably of 1 to 6 mm (see col. 4, lines 31, 32), i.e. within the range of 1 to 20 mm referred to in claim 1 of the patent in suit. However, contrary to the opinion of the

Opposition Division (page 5, penultimate paragraph of the decision under appeal), there is no basis in D3 to assume that the degree of fiber roughness of the bulky cellulose fibers must necessarily be of 0.3 mg/m or more. In fact, the patent in suit discloses that there are cellulose fibers having a roughness below 0.3 mg/m (see Table 1 on page 12, examples E - softwood kraft pulp - and G - crosslinked hardwood kraft pulp), i.e. outside the claimed range.

3.2 D1 discloses an absorbent sheet (see Fig. 2) containing cellulose fibers (see col. 3, line 68) and hydrophilic fine particles (see col. 4, lines 65 to 68), wherein the proportion of the hydrophilic fine particles is higher in one side of the absorbent sheet than in the other side (col. 10, lines 45 to 49). Analogously to D3, the fine particles are made of a water-swellable, generally water-insoluble material capable of absorbing water (it swells when forming hydrogels, see column 4, last line to column 5, line 17). There is no disclosure in D3 of the hydrophilic fine particles being selected from, respectively, cellulose fibers and particles or inorganic fibers and particles.

3.3 D2 discloses an absorbent sheet comprising bulky cellulose fibers and hydrophilic fine cellulose fibers (see claim 1 and page 13, last line). It does not disclose different proportions of hydrophilic fine fibers in the sides of the absorbent sheet.

3.4 Therefore, the subject-matter of claim 1 is novel over the prior art represented by D1, D2 and D3 (Article 54(2) EPC).

4. *Inventive step*

4.1 In the Board's view, the problem underlying the patent in suit is to provide an absorbent sheet which gives the wearer of an article containing this layer a good feel of dryness (see page 4, lines 31, 32). This general problem forms the basis for the more specific problem acknowledged in the patent in suit (see page 3, lines 24 to 26) of providing an absorbent sheet which has a large liquid absorbing space, exhibits high liquid absorption and permeation properties and high liquid diffusing properties.

Starting from the closest prior art which is undisputedly represented by the absorbent sheet of D3, this problem is effectively solved by the combination of features of claim 1, and in particular by providing the features that the hydrophilic fine fibers are selected from cellulose fibers and inorganic fibers having an average fiber length of 0.02 to 0.5 mm and that the hydrophilic fine particles are selected from cellulose particles and inorganic particles and have an average particle diameter of 0.02 to 0.5 mm. By means of these features, the side of the absorbent sheet having a higher proportion of the hydrophilic fine fibers or particles exhibits excellent liquid diffusing properties because of the high surface area of the fine fibers or particles. Therefore, the liquid having passed through the - wearer's - side with a lower proportion of the hydrophilic fine fibers or particles, which because of this exhibits a high rate of liquid absorption and excellent liquid permeation properties, quickly diffuses over the other side thereby giving the

wearer a good feel of dryness (see par. [0023] Of the patent in suit).

4.2 D3 and D1 disclose the use of hydrophilic fine fibers or particles that absorb liquid and swell upon absorption. By means of this absorption mechanism the liquid is retained by the fibers or particles and is not diffused. In fact, according to D3 and D1 the side of the absorbent sheet having a higher proportion of hydrophilic fine fibers or particles is not intended for having good diffusion properties but for having enhanced absorption properties (see D3, col. 1, lines 13 to 16; see D1, col. 5, lines 3 to 8). Since there is no suggestion in D1 or D3 that hydrophilic fine fibers or particles made of cellulose or inorganic materials would provide such enhanced absorption properties, there is no reason for the skilled person to consider to use these instead of the absorbent hydrophilic fine fibers or particles disclosed by D1 and D3. D2 discloses the provision of hydrophilic cellulose fine fibers in order to improve the diffusing properties of the absorbent sheet as a whole. For this purpose the bulky cellulose fibers are mixed with the fine cellulose fibers (see page 14, second paragraph). D2 therefore only suggests a uniform distribution of the fine cellulose fibers within the absorbent sheet but does not contain any indications leading the skilled person to provide fine cellulose fibers in different proportions from one side to the other in the absorbent sheet of D3.

4.3 The respondent's argument in respect of an alleged lack of inventive step only related to the obviousness to use lower capacity superabsorbent particles in the

structures disclosed in D1 in order to reduce the problem associated with gel blocking (see letter dated 9 June 2003). Since the present claims are clearly restricted to exclude the possibility of the hydrophilic fine fibers being superabsorbent particles, this argumentation no longer applies.

4.4 Therefore, the proposed solution to the above mentioned problem is not rendered obvious by the available prior art. It follows that the subject-matter of claim 1 is found to involve an inventive step over the available prior art (Article 56 EPC).

5. Since independent claim 7 relates to a process which directly results in the production an absorbent sheet having all the features of claim 1, and the absorbent article of claim 9 includes an absorbent sheet having all the features of claim 1, the subject-matter of claims 7 and 9 is also found to be novel and inventive.

The subject-matter of the dependent claims 2 to 6, 8 and 10 is for preferred embodiments of, respectively, the absorbent sheet of claim 1, the process of claim 7 and the absorbent article of claim 9, and thus also involves inventive step.

6. Therefore, the amended patent documents consisting of the claims and description filed during the oral proceedings and the figures of the patent as granted form a suitable basis for the maintenance of the patent in amended form.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the first instance with the order to maintain the patent on the basis of the following documents:

claims: 1 to 10 filed during the oral proceedings of 3 March 2005;

description: pages 2 to 19 filed during the oral proceedings of 3 March 2005;

drawings: figures 1 to 12 as granted.

The Registrar: The Chairman:

M. Patin P. Alting van Geusau