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D E C I S I O N
of 10 September 2002

Case Number: T 0624/99 - 3.2.5

Application Number: 93918841.3

Publication Number: 0659113

IPC: B29C 44/00

Language of the proceedings: EN

Title of invention:
Vented mold and use thereof

Patentee:
WOODBRIDGE FOAM CORPORATION

Opponent:
Hennecke GmbH

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Late-filed submissions(not admitted)"
"Inventive step (no)"

Decisions cited:
-

Catchword:
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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0624/99 - 3.2.5

D E C I S I O N
of the Technical Board of Appeal 3.2.5
of 10 September 2002

Appellant: (Opponent)
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Representative:
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Respondent: (Proprietor of the patent)
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Decision under appeal: **Decision of the Opposition Division of the European Patent Office posted 9 April 1999 rejecting the opposition filed against European patent No. 0 659 113 pursuant to Article 102(2) EPC.**

Composition of the Board:

Chairman: W. Moser
Members: W. R. Zellhuber
P. E. Michel

Summary of Facts and Submissions

I. The appellant (opponent) lodged an appeal against the decision of the Opposition Division rejecting the opposition against the European patent No. 0 659 113.

II. In the decision under appeal, it was held that the grounds of opposition submitted by the appellant under Article 100(a) EPC (lack of novelty, Article 54 EPC, and lack of inventive step, Article 56 EPC) did not prejudice the maintenance of the patent.

III. In a communication accompanying the summons to attend oral proceedings, the Board of Appeal informed the parties that the subject-matter of independent claims 1 and 8 of the patent in suit as granted did not seem to be novel and that any written submission should be filed well in advance, i.e. at least one month before the date of oral proceedings. The Board further noted that amendments which are not submitted in good time prior to oral proceedings may be disregarded, and it referred to the "guidance for parties to appeal proceedings and their representatives" (OJ EPO 1996, 342), point 3.3, second paragraph.

On 12 August 2002, the respondent (patent proprietor) filed a set of amended claims 1 to 16 as an auxiliary request.

IV. Oral proceedings were held before the Board of Appeal on 10 September 2002.

At the beginning of the oral proceedings, the respondent submitted a new main request, a new auxiliary request, an auxiliary request #2 and an

auxiliary request #3.

The Board disregarded these late-filed requests.

V. The appellant requested that the decision under appeal be set aside and that the patent be revoked.

The respondent requested that the decision under appeal be set aside and that the patent be maintained on the basis of the following document submitted during oral proceedings:

claims 1 to 13 as sole request.

VI. Claim 1 of the sole request reads as follows:

"1. A method of producing an article (420) in a mold (200, 400) comprising an upper mold (204, 408) and a lower mold (404) which can be closed to define a mold cavity (202, 412), the mold (200, 400) further comprising a vent selected from one or both of: (i) a first vent (416) located at the part-line between said upper mold (204, 408) and said lower mold (406), and having a thickness (116, 418) of from about 0.050 mm (0.002 inches) to about 0.765 mm (0.030 inches); and (ii) a second vent (98) located in said upper mold (204, 408), and having a thickness of from about 0.050 mm (0.002 inches) to about 0.380 mm (0.015 inches), the process comprising the steps of:

dispensing a liquid foamable polymeric composition in the mold cavity (202,412);

allowing the liquid foamable polymeric composition to expand to substantially fill the mold cavity

(202, 412);

venting gases in the mold cavity (202, 412) through the vent (98, 416) in the mold (200, 400) such that the gases exit the mold (200, 400);

flowing liquid foamable polymeric composition into the vent (98, 416);

restricting movement of the liquid foamable polymeric composition in the vent (98, 416) to substantially prevent exit thereof from the vent (98, 416); and

the liquid foamable polymeric composition undergoes curing in the vent (98, 416) prior to exit of the liquid foamable polymer composition from the vent (98, 416)."

VII. In the course of the appeal procedure, the following documents have, *inter alia*, been referred to:

D2: DE-A 2 246 948 and
D4: US-A 2,976,571.

VIII. As regards the sole request filed during oral proceedings, the appellant argued essentially as follows:

(i) The subject-matter of claim 1 of the sole request was not clear, because the term "a vent selected from ... both of ..." was unclear, and, due to the prefix "about", the numerical indication of the thicknesses of the vents was vague.

Furthermore, the feature of claim 1 of the liquid foamable polymeric composition undergoing curing in the vent prior to exit of the liquid foamable polymeric composition from the vent was not disclosed in the application as filed. According to the latter, the liquid foamable polymeric composition would have cured before it had flowed a significant distance into the vent, thus, well before it had reached the exit of the vent.

The requirements of Articles 84 EPC and 123(2) EPC were thus not met.

(ii) Moreover, the subject-matter of claim 1 did not involve an inventive step.

Document D2, which represented the closest prior art, disclosed a method of producing articles in a mould comprising vent holes. In order to reduce material wastage and to provide a smooth surface structure of the moulded article, a mould comprising vent holes was suggested which allowed air to escape from the mould cavity, but which, however, were sufficiently small to prevent exit of foam material from the vents. Document D2 made mention of thicknesses of the vent holes of from 0.8 to 1.2 mm.

The subject-matter of claim 1 of the sole request differed from the method disclosed in document D2 only in that the vents, provided that they were located in the upper mould, had a thickness of from about 0.050 mm to about 0.380 mm.

Since it was known from document D2 that the vents

had to be made smaller in order to prevent the polymeric foam material from penetrating the vent holes, a person skilled in the art would also consider providing vent holes having a thickness of less than 0.8 mm, and thus, also vent holes having a thickness within the range indicated in claim 1 of the sole request. Moreover, document D4 referred to vent holes in a mould venting structure having a thickness of 0.02 mm.

IX. As regards the sole request filed during oral proceedings, the respondent argued essentially as follows:

The subject-matter of claim 1 of the sole request involved an inventive step.

Admittedly, document D2 disclosed a method of producing an article in a mould which was similar to that of the patent in suit. However, the method disclosed in document D2 represented a more costly, a more labour-intensive and, as regards the products thus produced, a worse solution. After moulding, the vents had to be removed and replaced by new ones. Removing of the plastic tabs formed within the vent holes damaged the surface of the moulded article due to their large size of 0.8 mm and more.

The invention of the patent in suit consisted in that the vents had a thickness below that indicated in document D2. Vents having thicknesses within the range indicated in claim 1 of the sole request made further finishing steps superfluous and led to moulded articles having a smooth surface.

Reasons for the Decision

1. Main request, new auxiliary request, auxiliary request #2 and auxiliary request #3 submitted by the respondent during oral proceedings.

1.1 These requests were submitted one month after the final date set by the Board for filing written submissions. They were thus not filed in good time.

1.2 Furthermore, claim 1 of each of these requests comprises the feature of producing extruded foam material attached to the article which does not need to be removed prior to application of a finish cover to the article. This feature, in that general form, was the subject neither of the claims of patent in suit as granted nor of the claims filed as auxiliary request on 12 August 2002.

The amendments were thus not foreseeable, neither by the Board nor by the appellant.

In the Board's judgement, admitting such an unpredictable amendment at that very late stage of the proceedings would not be fair to the appellant and would give rise to an unbalanced treatment of the parties.

This applies independently of the question of whether or not the subject-matter of the requests and the amendments as such are clear and easily comprehensible.

1.3 In addition, in the Board's judgement, the amendments give rise to objections at least with regard to the requirements of Article 84 EPC. In particular, the

above-mentioned feature seems to be unclear, because the requirements for an extruded foam material not having to be removed are vague and indefinite.

Therefore, in the Board's judgement, these requests are also *prima facie* not allowable.

1.4 The Board, therefore, decided to disregard the submissions of the respondent filed as main request, new auxiliary request, auxiliary request #2 and auxiliary request #3 during oral proceedings.

2. *Sole request, claim 1*

2.1 The sole request was submitted during oral proceedings and, thus, also after the final date set by the Board for filing written submissions.

However, the Board used its discretion and admitted this request for the following reasons. The subject-matter of claims 1 to 13 according to the sole request is, in substance, based on claims 1 to 16 submitted as auxiliary request on 12 August 2002. That request was submitted in due time. Amendments to these claims were necessary in order to overcome objections under Articles 84 and 123 EPC raised for the first time during oral proceedings. Furthermore, these amendments have been made without essentially departing from the conceptual structure defined by claims 1 to 16 filed as auxiliary request on 12 August 2002.

2.2 Clarity, extension (Articles 84 and 123 EPC)

2.2.1 The expression "comprising a vent" indicates that the mould may comprise more than one vent. The vents may

therefore be selected from either or both of a first and a second type of vent.

In claim 1, the lower limit of the thickness of the vents is defined by "about 0.050 mm", which thus includes also values below the indicated value of 0.050 mm. However, in general, expressions such as "about" or "substantially" do not render the subject-matter of a claim unclear. They merely indicate that deviations, in particular due to work tolerances, should be considered as falling within the scope of the claim.

In the Board's judgement, the subject-matter of claim 1 is thus sufficiently clear (Article 84 EPC).

2.2.2 Furthermore, the feature of the liquid foamable polymeric composition undergoing curing in the vent prior to exit from the vent is disclosed in the published version of the application as filed on page 10, lines 8 to 10 and page 13, lines 26 to 29. According to these passages, the polymeric composition stops moving and undergoes curing before it reaches the end of the vents, i.e. prior to exit from the vent.

2.2.3 Moreover, the scope of protection conferred by independent claim 1 is more limited than that of the corresponding independent claim 1 of the patent in suit as granted.

2.2.4 Claim 1 thus also meets the requirements of Article 123(2) and (3) EPC.

2.3 Novelty

2.3.1 Claim 1 concerns a method of producing an article in a mould comprising an upper mould and a lower mould which can be closed to define a mould cavity. Liquid foamable polymeric composition is dispensed in the mould cavity and allowed to expand to substantially fill the mould cavity. The mould further comprises a vent. As regards the vent, two different types of vents may be used:

(a) a first vent located at the part-line between the upper mould and the lower mould. Such a first vent has a thickness of from about 0.050 mm to about 0.765 mm, and

(b) a second vent located in the upper mould. Such a second vent has a thickness of from about 0.050 mm to about 0.380 mm.

2.3.2 None of the cited documents discloses a method of producing an article in a mould comprising a vent selected from one of these first and second vents.

Document D2 concerns a method of producing an article in a mould comprising a vent located in the upper mould, i.e. a vent according to the above-mentioned alternative b). The vent holes have a thickness of from 0.8 to 1.2 mm (cf. page 6, lines 2 to 4).

Document D4 concerns a method of producing an article in a mould comprising a vent located at the part-line between an upper mould and a lower mould, i.e. a vent corresponding to a vent according to the above-mentioned alternative a). It has a thickness of from 0.02 mm (0.00075 inches) to 0.038 mm (0.0015 inches), cf. column 3, lines 31 to 39.

Moreover, document D4 does not concern a method comprising the steps of dispensing a liquid foamable polymeric composition in a mould cavity and allowing it to expand.

The subject-matter of claim 1 is therefore novel within the meaning of Article 54 EPC.

2.4 Inventive step

As regards the question of whether or not the subject-matter of claim 1 involves an inventive step, the Board focuses on the above-mentioned alternative b) of claim 1.

2.4.1 Document D2, which is considered to represent the closest prior art, discloses a method of producing an article in a mould, wherein a foamable polymeric composition is dispensed in the mould cavity and allowed to expand to substantially fill the mould cavity, cf. page 1.

The method comprises the step of venting gases in the mould cavity through vents located in the upper part of the mould. The vents include a plurality of vent holes, cf. page 4, lines 1 to 8 and the drawing.

The size of the vent holes is selected such that gases may exit the mould, whilst foam material is prevented from passing through the vent holes ("durchdringen") and exiting from the vents ("austreten"), cf. page 2, lines 1 to 11 and page 4, lines 1 to 11. The thickness of the vents has to be selected in accordance with the process parameters, in particular, with the pressure produced by the foam ("Schaumdruck"), cf. page 4,

line 22 to page 5, line 1 and page 6, lines 12 to 18. Vents having thicknesses of from 0.8 mm to 1.2 mm are disclosed on page 6, first paragraph, and in claim 6.

The use of vent holes of a smaller size, in comparison to those used in moulds known up to that time, prevents the formation of so-called mushrooms by polymeric material exiting the vents, cf. page 4, lines 16 to 19, reduces wastage of material and allows manufacturing of articles having a smooth surface, cf. page 3, lines 10 to 21.

2.4.2 Document D2 further teaches that, after the moulding step, the vents are removed and replaced by new ones, cf. page 4, lines 13 to 16 and page 7, lines 1 to 3. It is directly and unambiguously derivable from the disclosure of document D2 that the reason for that replacement consists in that liquid foamable polymeric material flows into the vent holes and undergoes hardening therein. Movement of the foamable polymeric material in the vent is thus restricted to substantially prevent exit thereof from the vent.

2.4.3 Document D2 thus already suggests a solution to the problems of reducing material wastage and providing moulded articles having a smooth surface structure.

Therefore, the objective problem to be solved by the method according to claim 1 of the sole request can be seen in further improving the known method.

2.4.4 A solution suggested in claim 1 of the sole request consists in that the article is produced in a mould comprising vent holes in the upper mould, which have a thickness of from about to 0.050 mm to about 0.380 mm,

whilst document D2 suggests a thickness of the vent holes of from 0.8 to 1.2 mm.

2.4.5 To a person skilled in the art, it is clear that, in order to prevent the foam material from exiting from the vents, the size of the vents has to be selected in accordance with a plurality of parameters including foaming pressure, viscosity of the polymer material, temperature of the mould and the foaming material, and so on.

In the Board's judgement, a person skilled in the art therefore does not feel bound to the thicknesses indicated, in the form of figures, in document D2. He would, as a matter of routine, also consider using vent holes having a thickness outside the range indicated in document D2 and, thus, also a thickness within the range indicated in claim 1 of the sole request. He would particularly consider using vents of smaller sizes, if exiting of polymeric material from the vents cannot be stopped by using vent holes having a thickness as indicated in document D2.

Moreover, document D4 suggests that, in an injection moulding machine, venting openings having a thickness of from 0.02 to 0.038 mm permit rapid gas exhaust, but prevent material from flowing through the openings, cf. column 3, lines 31 to 39. Thus, there was no prejudice against the use of vent holes having small sizes.

2.4.6 The Board further notes that, according to claim 1, the liquid foamable polymeric composition undergoes curing in the vent. In general, curing has to be construed as meaning that the composition undergoes hardening by a chemical process such as vulcanisation, polymerisation,

and the like.

Document D2 does not specify the hardening process. However, there is no indication in the patent in suit or in the written and oral submissions of the respondent that the specific process of hardening by curing the polymeric composition would be of any particular relevance with regard to the object to be achieved.

Furthermore, the Board is of the opinion that curing is a generally known form of hardening, and, accordingly, the implementation of the feature of the polymeric composition undergoing curing in the vents does not result in subject-matter involving an inventive step.

2.4.7 Consequently, at least as far as the above-mentioned alternative b) is concerned, the subject-matter of claim 1 of the sole request does not involve an inventive step within the meaning of Article 56 EPC.

3. Since a decision can only be taken on a request as a whole, the question of whether or not the subject-matter of claim 1 according to the above-mentioned alternative a), and the subject-matter of claims 2 to 13 involve an inventive step need not be considered.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is revoked.

The Registrar: The Chairman:

M. Dainese W. Moser