BESCHWERDEKAMMERN DES EUROPÄISCHEN PATENTAMTS | BOARDS OF APPEAL OF THE EUROPEAN PATENT OFFICE | CHAMBRES DE RECOURS DE L'OFFICE EUROPEEN DES BREVETS

Internal distribution code:
(A) [ ] Publication in OJ
(B) [ ] To Chairmen and Members
(C) [X] To Chairmen

D E C I S I O N
of 26 June 1997

Case Number: T 0414/96 - 3.2.1

Application Number: 89312392.7

Publication Number: 0371773

IPC: B60J 1/02, B29C 67/18

Language of the proceedings: EN

Title of invention:
Windows for automobiles or the like, and method of manufacturing the same

Patentee:
Hashimoto Forming Industry Co. Ltd.

Opponent:
GAIN Technologies

Headword:
-

Relevant legal provisions:
EPC Art. 56, 100(b)

Keyword:
"Inventive step (yes)"
"Sufficiency of disclosure (yes)"

Decisions cited:
-

Catchword:
-

Europäisches Patentamt | European Patent Office | Office européen des brevets

Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0414/96 - 3.2.1

D E C I S I O N
of the Technical Board of Appeal 3.2.1
of 26 June 1997

Appellant: (Opponent)
GAIN Technologies
6400 Sterling Drive North
Sterling Heights
Michigan 48312 (US)

Representative:
Rehders, Jochen, Dipl.-Ing.
Stresemannstrasse 28
40210 Düsseldorf (DE)

Respondent: (Proprietor of the patent)
Hashimoto Forming Industry Co. Ltd
320 Aza-Fujii
Kamiyabe-cho
Totsuka-ku
Yokohama City
Kanagawa Pref. (JP)

Representative:
Senior, Alan Murray
J. A. Kemp & Co.
14 South Square
Gray's Inn
London WC1R 5LX (GB)

Decision under appeal: Decision of the Opposition Division of the European Patent Office posted 16 February 1996 rejecting the opposition filed against European patent No. 0 371 773 pursuant to Article 102(2) EPC.

Composition of the Board:

Chairman: F. Gumbel
Members: S. Crane
J.-C. Saisset

Summary of Facts and Submissions

I. European patent No. 0 371 773 was granted on 26 January 1994 on the basis of European patent application No. 89 312 392.7.

II. Independent claims 1 and 8 of the granted patent read as follows:

1. "A window for an automobile or the like, comprising a window plate (1) and a frame member (2), which frame member (2) comprises a thermoplastic synthetic resin material formed into an integral structure with the window plate (1) by molding along at least one edge thereof, wherein said frame member (2) includes a substantially U-shaped cross-sectional portion comprising lip and web sections (2b, 2d) which are spaced from and opposed to each other on outer and rear surfaces of the window plate (1), respectively, and a bridge section (2c) connecting the lip and web sections (2b, 2d) with each other, characterized in that said frame member (2) has a longitudinally continuous hollow inner space (3)."

8. "A method of manufacturing a window for an automobile or the like, the window being in accordance with any one of claims 1 and 7, wherein said method comprises the steps of:

preparing a mold (10, 11) having surfaces defining a cavity (12) of a predetermined volume therein, said cavity (12) being of a configuration which corresponds to said frame member (2);

placing at least one edge of the window plate (1) in the mold cavity (12);

injecting into the mold cavity (12) a predetermined amount of thermoplastic synthetic resin material in its molten state, and placing said synthetic resin material under cooling and solidification in said mold cavity (12), thereby to form the frame member (2) which is integral with said window plate (1) characterized in that said predetermined amount of thermoplastic synthetic resin material is smaller than said volume of the cavity (12);

and by the step before solidification of the thermoplastic synthetic resin material of injecting compressed gas into the thermoplastic synthetic resin material in said cavity (12) to urge said synthetic resin material against said surfaces of the mold (10,11) defining the cavity (12) whereby

the frame member (2) has a longitudinally continuous hollow inner space (3).

Dependent claims 2 to 7 and 9 to 13 relate to preferred embodiments of the window or the method according to claims 1 or 8 respectively.

III. The granted patent was opposed by present appellants on the ground that its subject-matter lacked novelty and/or inventive step (Article 100(a) EPC). As state of the art the appellants relied on the following documents:

(D4) EP-A-0 173 907,

(D5) FR-A-2 553 083,

(D6) GB-A-2 158 002,

(D6a) EP-A-0 127 961,

(D7) EP-A-0 289 230, and

(D8) US-A-4 234 642.

At the oral proceedings before the Opposition Division the appellants also raised an objection of insufficiency of disclosure against the invention claimed in claim 1.

IV. With its decision posted on 16 February 1996 the Opposition Division rejected the opposition.

V. An appeal against that decision was filed on 18 April 1996, the fee for appeal having been paid one day earlier. The statement of grounds of appeal was filed on 18 June 1996.

The appellants requested that the decision under appeal be set aside and the patent revoked in its entirety. In support of this request they argued substantially as follows:

Since the advantages of the gas assisted injection moulding technique were well known from documents D6 to D8 at the relevant date, it was obvious to use it to form a frame member around an automobile window to solve the various problems with conventional moulding techniques identified in the patent specification. The Opposition Division had erred in relying on documents D4 and D5 as showing that there was a general technical prejudice in the art against the use injection moulding for this purpose. All these documents said was that conventional injection moulding techniques produced unsatisfactory results, they did not refer to gas assisted injection moulding at all.

VI. In a counterstatement filed on 30 October 1996 the respondents (proprietors of the patent) argued that documents D4 and D5, together with further documents they referred to, clearly showed that the persons skilled in the art had opted for the reaction injection moulding technique to solve the known problems associated with the conventional injection moulding technique for forming the frame of an automobile window. Since gas assisted injection moulding was known at the time the proposals for reaction injection moulding were being made, it was apparent that the latter was not seen as presenting a viable alternative. There was nothing in documents D6 to D8 to suggest that gas assisted injection moulding could solve the very specific problems identified in the patent specification.

VII. In a communication dated 22 November 1996 the Board pointed out that the statement of grounds of appeal was directed in essence solely to the subject-matter of independent claim 8 and clarified that in its view a positive finding with respect to the inventive step of the subject-matter of claim 8 would not automatically lead to a corresponding conclusion with respect to the subject-matter of claim 1, the latter not being limited to the hollow space in the frame member being formed by a particular injection moulding method. It therefore invited the parties to comment on the subject-matter of claim 1.

VIII. The reply of the appellants to this communication was received on 13 January 1997. In it they argued that although it was possible to produce the window of claim 1 by a method other than that defined in claim 8 it would make no technical sense to do so and the problems to which the claimed invention was addressed would not be solved thereby. Thus the window as defined broadly in claim 1 did not exhibit any technical effect

which could distinguish it from the state of the art. In any case, considered as the product of the method of claim 8, the subject-matter of claim 1 lacked inventive step. In this respect reference was made to a further document which dealt with the advantages of the gas assisted injection moulding technique, namely

(D13) "Structural Web Moulding - A new development in low pressure smooth surface technology", D. Anderson and E. Hunerberg, published by the Society of the Plastics Industry in 1982.

IX. With a reply received on 23 January 1997 the respondents argued that the window plate of a window according to claim 1 was subject to less residual stress caused by cooling of the frame member after moulding and was therefore less liable to breakage. To substantiate this reference was made to two declarations originally made by one of the inventors, Mr Ohtake, in the course of prosecuting the equivalent US patent application. They also submitted sets of claims according to first to fourth auxiliary requests.

Reasons for the Decision

1. The appeal complies with the formal requirements according to Articles 106 to 108 and Rules 1(1) and 64 EPC. It is therefore admissible.

2. *Background to the claimed invention; cited state of the art*

As explained in the introductory description of the patent specification with reference by way of example to US-A-4 139 234 (published in 1979), it had been proposed to make the frame member by which an

automobile window is mounted in the bodywork by positioning the edge of the window plate in an injection mould and injecting a molten thermoplastic synthetic resin material into the mould space. However, this known technique was associated with a number of technical difficulties and disadvantages which are explained at length in the patent specification. In particular, the high injection pressures required meant that high mould closing forces are needed. Given that the edge of the window plate defined part of the mould cavity it had to be clamped between the mould halves necessarily imposing large stresses on the window plate which could lead to it fracturing. These high pressures also led to the formation of burrs or flashes along the parting surfaces of the mould halves. Another difficulty lay in the fact that the frame member had sections of markedly different thickness and thus cooling rate, leading to sink marks on the thicker sections. Furthermore, the dimensions of the window plate could vary significantly so that the distance the edge of the window plate projected into the mould and hence the volume of the mould cavity would vary correspondingly. This made it difficult to control the moulding operation properly. Lastly, cooling of the frame member after forming imposed substantial compressive stresses on the window plate which could lead to fracture, especially if the window plate was curved.

Accordingly, see column 2, line 55 to column 3, line 11 of the patent specification, it is the stated object of the invention to provide a window comprising a window plate and an integrally moulded frame member which can be manufactured without these drawbacks and a method for manufacturing such a window.

The problems associated with the high injection pressures required by conventional injection moulding techniques for forming a frame member around a window plate had already been addressed in the state of the art. Both documents D4 and D5, which have priority dates of 1984 and 1983 respectively, propose overcoming these problems by the use of a technique known as reaction injection moulding in which relatively low viscosity components are injected into the mould cavity at low pressures where they react and set.

Documents D6 to D8 and D13, the earliest of which, document D8, was published in 1980, all relate to the technique known as gas assisted injection moulding or "structural web moulding" (cf. document D13). The basic principle involved with this technique is that a relatively small core volume of molten thermoplastic material is first injected into the mould cavity and then high pressure inert gas is injected into the thermoplastic material to drive this against the walls of the mould. By careful selection of the gas pressure and injection rate it is possible to ensure that there is no breakthrough at the interface between the gas and thermoplastic material and thus to mould complex tubular shapes. Document D13, in particular, contains a long exposition of the advantages of "structural web moulding", which include an improved surface finish without sink marks and reduced cycle time. Among the various articles for which the techniques is suitable document D13 mentions "window and door frames" (see page 55, right-hand column).

3. *Novelty and inventive step*

The novelty of the subject-matter of claims 1 and 8 is not in dispute.

In view of the way the appellants have developed their case and in view in particular of their comments with regard to the subject-matter of claim 1, see section VIII above, it is convenient to consider first the subject-matter of claim 8 when evaluating inventive step.

A central aspect of the decision under appeal is that the Opposition Division held, on the basis of what is said in document D4, that there was a technical prejudice in the art against the formation of a frame member for a window from thermoplastic synthetic resin material because of the high injection pressures required and that this prejudice would in effect extend to the gas assisted injection moulding technique. The appellants object strongly to that finding, in the Board's view not without reason. However, the Board is nevertheless of the opinion that the teachings of documents D4 and D5 certainly have to be taken into account when assessing whether, at the priority date of the present patent (1988), the replacement of the known conventional injection moulding of the frame member by gas assisted injection moulding was obvious for the person skilled in the art. The reason for this is the fact that although gas assisted injection moulding must, in the light of the documents mentioned above, be considered as having been generally known in 1983 or 1984, the authors of documents D4 and D5 had not recognised its potential benefit in avoiding breakage of the window plate when forming a frame around it and had instead opted for the reaction injection moulding technique. This is for the Board a very strong indication that the choice of gas assisted injection

moulding was not obvious for the person skilled in the art. In this respect it has to be noted that nowhere in documents D6 to D8 or D13 is any mention made of the lower injection pressures associated with gas assisted injection moulding being beneficial in relation to a moulding operation in any way analogous to that being claimed, i.e. where a frame member or the like is to be directly moulded onto another article which is liable to suffer breakage. The general references in document D13 to "window and door frames" cannot be understood as being directed to such frames moulded around a glass panel.

Accordingly, the Board comes to the conclusion that the subject-matter of claim 8 involves an inventive step (Article 56 EPC).

In view of the fact that claim 1 contains no limitation to the effect that the frame member has been formed by the method of claim 8 it is necessary to evaluate the inventive step of its subject-matter independently. In the opinion of the Board the critical question here is whether there is anything in the state of the art which could have encouraged the person skilled in the art to have provided a continuos hollow space in the known injection moulded frame members. The answer to this is in the negative and the appellants have not in fact attempted to show otherwise. Instead, they rely much more on their argument that the hollow space in itself had no technical effect and therefore cannot properly distinguish what is claimed from the state of the art. That argument overlooks however that the reduced section of the hollow frame member in comparison with a solid frame member will reduce the level of the forces applied to the window plate as the frame member cools after having been formed.

Having regard to the above the Board is therefore also of the opinion that the subject-matter of claim 1 according to the main request cannot be derived in an obvious manner from the state of the art and thus involves an inventive step (Article 56 EPC).

4. *Sufficiency of disclosure (Article 100(b) EPC)*

This ground of opposition was first raised by the appellants at the oral proceedings before the Opposition Division, which dealt with the objection and held it be unfounded, see point 2 of the reasons of the contested decision. In essence, the argument advanced by the appellants at that time was that the only method of making a window according to claim 1 was by the method of claim 8 so that there was insufficiency of disclosure with respect to the subject-matter of claim 1 in its broadest terms. However, when a claim is directed to an article of manufacture it is not normally necessary to disclose more than one method of making it - if that is not in any case clear from common general knowledge - to satisfy the requirement of sufficiency of disclosure. Furthermore, the appellants have explained in their submissions received on 13 January 1997 how the window of claim 1 can indeed be made otherwise than by the method of claim 8, see for example page 5, last paragraph.

The objection under Article 100(b) EPC does not therefore hold good.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

S. Fabiani F. Gumbel