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D E C I S I O N
of 22 September 1999

Case Number: T 0860/96 - 3.2.5

Application Number: 84302454.8

Publication Number: 0125787

IPC: B29C 45/16

Language of the proceedings: EN

Title of invention:
Injection molding methods, injection molding apparatus and injection nozzle devices for use in molding multiple-layer articles, and multiple-layer injection molded articles

Patentee:
American National Can Company

Opponent:
Battenfeld GmbH

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step (yes)"

Decisions cited:
-

Catchword:
-

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Case Number: T 0860/96 - 3.2.5

D E C I S I O N
of the Technical Board of Appeal 3.2.5
of 22 September 1999

Appellant: (Opponent)
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Decision under appeal: **Interlocutory decision of the Opposition Division of the European Patent Office posted 22 July 1996 concerning maintenance of European patent No. 0 125 787 in amended form.**

Composition of the Board:

Chairman: H. P. Ostertag
Members: P. E. Michel
J. C. M. De Preter

Summary of Facts and Submissions

I. The appellant (opponent) lodged an appeal against the interlocutory decision of the Opposition Division maintaining the patent No. 0 125 787 in amended form.

Opposition was filed against the patent as a whole based on Article 100(a) EPC (lack of inventive step).

The Opposition Division held that the grounds of opposition based *inter alia* on D1 (DE-A-3036064) and D2 (DE-B-2401168) did not prejudice the maintenance of the patent as amended.

In the appeal procedure, the appellant introduced two new documents:

D4: DE-B-2 445 786

D5: FR-B-1 290 262

II. Oral Proceedings were held before the Board of Appeal on 22 September 1999.

(i) The appellant (opponent) requested that the decision under appeal be set aside and the patent be revoked.

(ii) The respondent (patentee) no longer contested the admissibility of the appeal, requesting that the appeal be dismissed and the patent be maintained in the amended form as maintained by the opposition division.

(iii) The sole request of the patentee includes two independent claims, claims 1 and 13, which read as follows:

"1. A method of forming multi-layer plastics articles wherein said method involves use of a multi-cavity injection molding machine, in which a combined material stream is injected from each of a plurality of co-injection nozzle means (296) of said machine into an associated injection cavity (102) to form each article, and said method including:
- providing polymeric materials to form layers of the articles, and moving streams thereof separately to each of the nozzle means (296),
- forming in the plural nozzle means (296) combined streams which are substantially identical, from the separate material streams, and
- injecting the combined streams to form the multi-layer plastics articles."

"13. Apparatus for forming a plurality of multi-layer plastics articles, comprising a plurality of injection nozzle means (296), each for injecting materials into an associated one of a plurality of cavities (102) to form the articles, means (208 to 212) for providing streams of materials for injection to form layers of the articles, means (288,294) associated with the nozzle means to channel the material streams separately from one another to each of the nozzle means (296), means (232,234,252,260,262) for moving the material streams along their

respective channels to the respective nozzle means (296), and means (540, 462, 482, 502, 522) for combining in each nozzle means the streams moved thereto, to form combined streams, which are substantially identical in the said nozzle means (296), for injection into their associated injection cavities (102) to form said articles."

III. At the oral proceedings, the appellant (opponent) indicated that he no longer relied on documents D4 and D5 and argued essentially as follows:

The disclosure in D1 of a multicoloured article is equivalent to the multi-layer article of the patent in suit. The teaching of D2 to use a plurality of cavities makes it obvious to apply the method of D1 to a plurality of cavities. Whilst there may well be an invention in arranging the apparatus so as to produce substantially identical streams, the independent claims 1 and 13 do not contain any of the features which are necessary to achieve this end.

Starting from D1, the person skilled in the art faces the problem of making the process more economical. The solution to this problem, that is, forming a plurality of articles simultaneously is known from D2.

IV. At the oral proceedings, the respondent (patentee) argued essentially as follows:

The closest state of the art is represented by WO-A-81/00231 (D6) as cited in the patent in suit. This document discloses a method of forming a multi-layer plastics article. Previously, multi-layer plastics

articles were generally produced from multi-layer films by thermoforming. D6 teaches a method of blow moulding a multi-layer plastics container. Starting from this state of the art, the person skilled in the art is faced with the problems of controlling layer thickness and applying the method to a multiple cavity mould.

This problem is solved by means of four features:-

(i) providing separate streams of the materials for each layer;

(ii) combining the streams at the nozzles;

(iii) ensuring that the combined streams are substantially identical; and

(iv) injecting a combined stream into each cavity.

D1, relating to a method of making coloured spectacle frames with two nozzles, is not relevant to the present invention. D2 suggests sensing temperature and pressure in the mould cavities. It is not clear how these two disclosures should be combined.

Reasons for the Decision

1. *Admissibility*

Although in the statement of grounds the appellant relied essentially on the new cited documents D4 and D5, he also referred to his argumentation in the opposition procedure and to the citation in that

procedure of D1 and D2. It is thus clear that the appellant maintains the objections of lack of inventive step as raised in the opposition procedure. The appeal is thus admissible.

2. *Amendments*

The Board concurs with the Opposition Division in that claims 1 and 13 comply with the requirements of Article 123(2) and (3) EPC. This was not contested by the appellant.

3. *Prior Art*

None of the documents cited by the opponent are concerned with forming multi-layer plastics articles. D1 is concerned with forming multi-coloured articles, such as spectacle frames having a different colour in the region of the hinges as compared with the remainder of the frame. D2 is concerned with the measurement of pressure in moulding cavities. D4 relates to the production of articles having a core of, for example, a plastics foam, surrounded by a skin. The core is not in the form of a layer. D5 discloses a valve enabling the simultaneous injection of two materials into a mould as referred to in D4. D6, referred to by the patentee, relates to a single cavity moulding machine.

4. *Inventive step*

4.1 Closest prior art

It was submitted on behalf of the opponent that D1 represents the closest prior art. This cannot be

accepted. This document is concerned with forming multi-coloured articles, such as spectacle frames having a different colour in the region of the hinges as compared with the remainder of the frame. The object of the invention of D1 is to enable the accurate and reproducible placing of the colours. The person skilled in the art would not start from such a document when concerned with a method and apparatus for forming multi-layer plastics articles. As stated in paragraph 3 above, neither are the remaining documents cited by the opponent concerned with forming multi-layer plastics articles.

The closest prior art is thus represented by document D6, which discloses a method of forming a single multi-layer plastics article in which a combined material stream is injected from a co-injection nozzle into an associated injection cavity to form the article, the method including:

- providing polymeric materials to form the layers of the article, and moving streams thereof separately to the nozzle,

- forming in the nozzle a combined stream from the separate material streams, and

- injecting the combined stream to form the multi-layer plastics articles.

4.2 Problem underlying the invention

A problem associated with the method of D6 is that the production of single articles is not economical. Whilst

the person skilled in the art will readily consider using a multiple cavity mould, there is no suggestion in the cited art as to how to ensure the desired layer thickness is obtained when producing multi-layer plastics articles in such a multiple cavity mould. The problem can thus be more narrowly stated as being to control layer thickness in a multiple cavity moulding apparatus and method for forming multi-layer plastics articles.

4.3 Solution

According to claim 1, the above problem is solved in that separate streams of the materials for each layer are fed to a plurality of nozzles, the streams are combined in the nozzles and injected into each cavity, whilst ensuring that the combined streams are substantially identical. In accordance with the description of the patent in suit at page 7, lines 17 to 29, the term "substantially identical" is construed as requiring that the material streams have undergone essentially the same flow experience in their paths to the nozzle, so that the combined streams have the same character.

This solution is not suggested by the cited prior art, none of which is concerned with the above problem.

D1 proposes injecting the material streams either simultaneously or sequentially. Mixing of the streams may take place either in the nozzle or in the mould cavity. In any case, the teaching of this document is not concerned with the problems associated with the moulding of multi-layer articles.

D2 relates to a moulding machine having a plurality of cavities. It is, however, only concerned with the injection of a single material stream.

D4 teaches the injection of a skin material followed by the injection of a core material. It is not, however, concerned with the moulding of multi-layer articles. The reference at the end of the description to the simultaneous injection of two or more materials through the same nozzle is not understood as referring to the materials of the skin and core, but rather meaning that either the skin or core could comprise two or more materials which may be simultaneously injected. An example of this is a bi-coloured skin material.

D5 discloses a valve which is suitable for use in the apparatus of D4, capable of injecting two streams of material either simultaneously or sequentially. The only suggested use of the valve is at column 1, line 6, where it is suggested that the valve would be applicable to the moulding of bicoloured articles.

4.4 The subject-matter of claims 1 and 13 thus involves an inventive step. The remaining claims are directly or indirectly appendant to either claim 1 or claim 13 and similarly involve an inventive step.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

A. Townend H. Ostertag