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D E C I S I O N
of 15 May 2001

Case Number: T 1032/98 - 3.2.5

Application Number: 93116318.2

Publication Number: 0591983

IPC: B29C 45/76

Language of the proceedings: EN

Title of invention:
Injection molding machine, and method for controlling ejection therein

Applicant:
SUMITOMO HEAVY INDUSTRIES, LTD

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 123(2)
EPC R. 29(1)(a)

Keyword:
"Admissibility of amendments (yes)"

Decisions cited:
-

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 1032/98 - 3.2.5

D E C I S I O N
of the Technical Board of Appeal 3.2.5
of 15 May 2001

Appellant: SUMITOMO HEAVY INDUSTRIES, LTD
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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 29 May 1998 refusing European patent application No. 93 116 318.2 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: W. Moser
Members: C. G. F. Biggio
P. E. Michel

Summary of Facts and Submissions

I. The appellant (applicant) lodged an appeal against the decision of the Examining Division dated 29 May 1998, refusing the European patent application No. 93 116 318.2, comprising independent claims 1 and 2 as filed during oral proceedings before the Examining Division on 14 May 1998.

The Examining Division held that the subject-matter of the above-mentioned independent claims 1 and 2 did not meet the requirements of Article 123(2) EPC.

II. On 2 October 2000, the Board summoned the appellant to attend oral proceedings and joined to the summons a communication indicating that the objection under Article 123(2) EPC, as raised by the Examining Division in respect of independent claims 1 and 2 underlying the decision under appeal, appeared to be well grounded.

III. Oral proceedings were held before the Board on 15 May 2001.

The appellant requested that the decision under appeal be set aside and a European patent be granted on the basis of claims 1 to 9 submitted during oral proceedings.

IV. The claims read as follows:

"1. A method of controlling movement of at least one ejector pin (17) in an injection molding machine during the ejection step in which a minute vibration is imparted to said ejector pin to assist loosening of the molded product from the ejector pin, characterized in

that said ejector pin (17) is at first advanced at a controlled speed under speed control and/or load control for a distance or time where the molded product will have started release from the corresponding die (2) and that said vibration is imparted to the ejector pin only thereafter.

2. The method of claim 1, wherein said distance or, respectively, time can be adjusted.

3. The method of claim 1, wherein said distance or time is determined by sensing reduction of the load effective on said ejector pin (17).

4. The method of any one of the preceding claims, wherein, after termination of the advancement at a controlled speed, either before or after said vibration, the ejector pin (17) is further advanced at an increased speed to complete release of the molded product from the corresponding die (2).

5. The method of any one of the preceding claims, wherein, during retreat of said ejector pin (17), the movement thereof is attenuated by counteraction of a resisting force.

6. An injection molding machine comprising
- a stationary die (1),
- a movable die (2) opposed to said stationary die (1) to define a mold cavity (23) therebetween and movable into and out of contact with said stationary die,
- at least one ejector pin (17) slidably supported within one (2) of said dies (1, 2), a tip end of said ejector pin facing that mold cavity (23),

- a driving device (54; 30 - 51) for driving said ejector pin (17) and
- a control unit (55) for controlling said driving device (54; 30 - 51),

characterized in that said control unit (55) is designed for control according to the method of any one of the preceding claims.

7. The injection molding machine of claim 6, wherein said vibration is generated by said driving device (54; 30 - 51).

8. The injection molding machine of claim 6 or 7, wherein the retreat of said ejector pin (17) is performed by spring force.

9. The injection molding machine of claim 8, designed for performing the method of claim 5, wherein said driving device (54; 30 - 51) is hydraulically operated and said resisting force is obtained by at least one restriction (41, 42, 50) in the path of the respective hydraulic liquid."

V. The appellant argued essentially as follows.

The subject-matter of independent claim 1 (method claim) and independent claim 6 (apparatus claim) is substantially identical to that of independent claim 2 (method claim) and independent claim 1 (apparatus claim) of the application as filed, respectively. Any discrepancies which exist between the wording of the independent claims of the application as filed and the wording of the present independent claims are supported by the disclosure of the application as filed as a whole. The disclosure of the application as filed

further provides a clear, unambiguous interpretation of the meaning of such discrepancies.

The amendments to the subject-matter claimed in the application as filed are necessary:

(a) in order to better distinguish the claimed subject-matter with respect to the closest prior art on file, i.e. document D2: JP-A-62-19422 (abstract thereof), which discloses a method of controlling the movement of at least one ejector pin in an injection molding machine during the ejection step in which a minute vibration is imparted to said ejector pin to assist loosening of the molded product from the ejector pin; and

(b) in order to cover, by way of clear claims, both the embodiments of the invention as described with reference to Figures 4 and 7 of the application as filed.

Reasons for the Decision

1. *Independent claim 1 (method claim)*

The Board notes that independent claim 2 (method claim) of the application as filed claimed a method of controlling the ejection in an ejection molding machine, which was defined as "comprising the steps of

(i) conducting an ejection according to at least one of a speed control and a pressure control, until a load is reduced from the start of the ejection, and

(ii) conducting an ejection attended by a very small vibration, after the load has been reduced."

The Board further notes that, since a method of controlling movement of at least one ejector pin in an injection molding machine during the ejection step, in which a minute vibration is imparted to said ejector pin to assist loosening of the molded product from the ejector pin, is disclosed by document D2, this portion of the subject-matter of independent claim 2 (method claim) of the application as filed has correctly been mentioned in the pre-characterising portion of the present independent claim 1 (method claim), pursuant to Rule 29(1)(a) EPC.

The Board is, moreover, of the opinion that the meaning of the method features, now mentioned in the characterising portion of the present independent claim 1 (method claim), may unambiguously be derived from the application as filed, with particular reference to Figures 4 and 7 and the passages of the description associated therewith (cf. page 13, paragraphs 1 to 4; and page 18, last paragraph to page 19, 1st paragraph).

The Board is accordingly of the opinion that the subject-matter of the present independent claim 1 (method claim) meets the requirements of Article 123(2) EPC.

2. *Independent claim 6 (apparatus claim)*

The Board notes that independent claim 1 (apparatus claim) of the application as filed defined the claimed injection molding machine as follows:

"An injection molding machine, comprising
a stationary die,
a movable die disposed in an opposed relation for movement into and
out of contact with said stationary die to define a cavity between both the dies,
an ejector pin disposed with its tip end facing said cavity, a driving device for advancing said ejector pin, and
a control unit for controlling said driving device,
said control unit performs

(i) an ejection according to at least one of a speed control and a pressure control, until a load is reduced from the start of the ejection, and

(ii) an ejection attended by a very small vibration, after the load has been reduced."

The Board notes that the wording of the present independent claim 6 (apparatus claim) differs from the above in that

(a) the cavity between the dies is defined to be a "mold cavity",

(b) the ejector pin is defined as being "slidably supported within one (2) of said dies (1, 2)", and

(c) the control unit is defined as being "designed for control according to the method of any one of the preceding claims", i.e. present claims 1 to 5, defining the claimed method.

As to (a) above:

From the application as filed, the person skilled in the art receives the unambiguous teaching that the cavity between the dies is indeed a cavity intended for molding, i.e. a mold cavity (cf., for example, Figure 2 and the passage of the description on page 8, lines 12 to 17 associated therewith).

As to (b) above:

From Figures 2 and 6 and the passages of the description on page 7, lines 21 and 22, page 8, lines 18 to 20 and page 16, lines 6 to 11 of the application as filed it may be inferred that the ejector pin 17 is there disclosed as being slidably supported within one (die 2) of said dies (1, 2).

Since, moreover, present independent claim 1 (method claim), whose subject-matter meets the requirements of Article 123(2) EPC (cf. point 1 above), recites in its characterising portion both the following method features:

"...said ejector pin (17) is at first advanced at a controlled speed under speed control and/or load control for a distance or time where the molded product will have started release from the corresponding die (2)" and "...said vibration is imparted to the ejector pin only thereafter", the Board is of the opinion that, notwithstanding the language differences indicated under items (a), (b) and (c) above, the features of the injection molding machine according to present independent claim 6 (apparatus claim) were disclosed in the application as filed.

The Board is, accordingly, of the opinion that the

present independent claim 6 (apparatus claim) meets the requirements of Article 123(2) EPC.

Claim 2 relates to the alternative modes of operation discussed at page 10, lines 15 to 18 of the application as filed. Claim 3 relates to the mode of operation discussed at page 10, lines 19 to 23 of the application as filed. Claim 4 refers to the two alternatives illustrated in Figures 4 and 7 of the application as filed. The subject-matter of claim 5 is disclosed at page 17, line 20 to page 18, line 7 of the application as filed. The apparatus features of claims 7 to 9 are disclosed in the preferred embodiments of the invention depicted in Figures 2 and 6 of the application as filed.

Dependent claims 2 to 5 and 7 to 9 thus also satisfy the requirements of Article 123(2) EPC.

3. In summary, the Board is of the opinion that present claims 1 to 9 meet the requirements of Article 123(2) EPC.

4. Since the application in suit was refused by the Examining Division merely on the grounds that the subject-matter of the claims then on file did not meet the requirements of Article 123(2) EPC, the Board, in application of the discretionary power conferred to it under Article 111(1) EPC, shall refrain from considering whether or not the subject-matter of the present claims is also novel and involves an inventive step and remit the case to the Examining Division for further prosecution.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the Examining Division for further prosecution on the basis of claims 1 to 9 submitted during oral proceedings.

The Registrar: The Chairman:

M. Dainese W. Moser