

The opinion in support of the decision being entered today was **not** written for publication and is **not** binding precedent of the Board.

Paper No. 16

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte YASUTSUGU TSUTSUMI

Appeal No. 1998-0316
Application No. 08/355,646

ON BRIEF

Before CALVERT, FRANKFORT, and NASE, Administrative Patent Judges.

CALVERT, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal from the final rejection of claims 11 to 22 and 25 to 27, all the claims remaining in the application.

Claim 11 is representative of the subject matter in

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issue, and reads:

A molding method comprising:

joining first and second molds to define a mold cavity;

injecting a plastic into the mold cavity; and

projecting the [sic: an] eject pin into the mold cavity with the molds joined together, thereby applying pressure to the plastic in the mold cavity.

The claims on appeal are reproduced in Appendix 1 of appellant's brief.¹

The references applied in the final rejection are:

Osada 1988	4,723,899	Feb. 9,
Ohasi et al. (Ohasi) 1991	5,053,181	Oct. 1,

The appealed claims stand finally rejected on the following grounds:

(1) Claims 11 to 15, 17 and 18, unpatentable over Ohasi, under 35 U.S.C. § 103;

and

(2) Claims 16, 19 to 22 and 25 to 27, unpatentable over Ohasi

¹ In reviewing the application, we note that on page 8, lines 12 and 14, "upper" and "lower" should be reversed. Also, we do not find numeral "69" (Fig. 7) in the specification.

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in view of Osada, under 35 U.S.C. § 103.

Rejection (1)

First considering this rejection with regard to claim 1, we find that Ohasi discloses a molding method in which first and second molds 6, 7 are joined to define a mold cavity, plastic is injected into the mold cavity, and then, prior to solidification of the plastic, a plunger 8, which may also function as an eject pin (col. 3, lines 27 to 30), is lowered to a position in which its lower surface is flush with the inner surface of mold 6, applying pressure to the plastic (col. 3, lines 11 to 24). Appellant argues that Ohasi does not meet all the limitations of claim 11 because it does not disclose projecting the pin 8 "into the mold cavity with the molds joined together," as claimed. On pages 3 and 4 of the reply brief, appellant further contends that since Ohasi designates the space below plunger 8 (i.e., projection 5) as being outside the mold cavity, the examiner's assertion that portion 5 forms a part of the mold cavity is incorrect.

We do not agree with appellant. The fact that Ohasi does not define portion 5 as being part of the mold cavity is not conclusive, since terms in a claim are to be given their

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broadest reasonable meaning as they would be understood by one of ordinary skill in the art, "taking into account whatever enlightenment by way of definitions or otherwise that may be afforded by the written description contained in the applicant's specification." In re Morris, 127 F.3d 1048, 1054, 44 USPQ2d 1023, 1037 (Fed. Cir. 1997). In appellant's disclosed apparatus, the mold cavity is formed by cavity 1a in upper block 1, and cavity 51a in lower block 51. This cavity does not completely define the final shape of the molded product, however, because eject pin 54 projects into the cavity before the plastic solidifies. Thus, as shown in Fig. 7, the cavity in which the molded product solidifies is defined not by cavities 1a and 51a alone, but by cavity 1a, cavity 51a, and the projecting portion B of eject pin 54. Consequently, reading claim 11 in light of appellant's disclosure, the claim term "mold cavity" must be construed as including not only the cavity in which the molded product solidifies, but also the additional portion of the cavity which will be occupied by the eject pin after it has been projected into the cavity prior to solidification.

As so construed, we conclude that claim 11 is readable on

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Ohasi, in that Ohasi's "mold cavity" includes not only the cavity between mold halves 6 and 7 in which the molded product (rotor) solidifies, but also the portion 5 which will be occupied by plunger 8 after it has been projected downwardly prior to solidification of the product. Ohasi's eject pin (plunger) 8 is therefore projected "into the mold cavity with the molds joined together" as claim 11 requires. Appellant's argument on page 4 of the reply brief, first full paragraph, is not well taken, because the mold cavity of Ohasi does not "extend[] to wherever the tip of plunger 8 is located."²

Accordingly, the rejection of claim 11, as well as of claims 12, 15, 17 and 18 which appellant has grouped therewith (brief, page 4), will be sustained.

Claim 13 recites:

The method according to claim 11 including projecting the eject pin into the mold cavity two to five seconds after injecting the plastic into the mold cavity.

² While our conclusion is tantamount to a holding that claim 11 is anticipated by Ohasi under 35 U.S.C. § 102(b), the § 103 rejection of that claim will be sustained, since "[t]he complete disclosure of an invention in the prior art is the ultimate or epitome of obviousness." In re Avery, 518 F.2d 1228, 1234, 186 USPQ 161, 166 (CCPA 1975).

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The examiner takes the position that the claimed time range would have been obvious as such ranges "comply with further injection of the resin prior to complete solidification" (answer, page 4), while appellant contends that such time is not suggested by the prior art or recognized as a result-effective variable, such that it would have been obvious to optimize it, citing In re Antonie, 559 F.2d 618, 621, 195 USPQ 6, 9 (CCPA 1977) (reply brief, pages 4 to 6).

In the process disclosed by Ohasi, the plunger (pin) must be projected into the cavity after the cavity and space below the plunger are completely filled with plastic (resin), but before the plastic is cooled, so that the formation of voids is prevented (col. 3, lines 11 to 24 and 31 to 35). It therefore would have been evident to one of ordinary skill that the time at which the plunger of Ohasi is projected after the plastic has been injected into the mold is crucial, so that any voids will be filled before the plastic solidifies, i.e., that the elapsed time between plastic injection and projection of the plunger is a result-effective variable. That being the case, it would have been obvious to experiment to obtain the optimum range for such time. Cf. In re Huang,

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100 F.3d 135, 139, 40 USPQ2d 1685,
1688-89 (Fed. Cir. 1996).

The rejection of claim 13 will therefore be sustained.

Claim 14 reads:

The method according to claim 11 including projecting the eject pin into the mold cavity a distance corresponding to shrinkage of the plastic during molding.

We will not sustain the rejection of this claim, since we find no teaching or suggestion thereof in Ohasi. The plunger 8 of Ohasi is disclosed as being projected into the cavity in order to insure complete filling of the mold by the plastic, rather than to compensate for shrinkage, and the distance of projection is defined not by potential shrinkage but by the plunger reaching a position flush with the inner surface of mold 6.

Rejection (2)

Turning first to claim 16, the examiner takes the position that, in effect, it would have been obvious to use the method of Ohasi to mold an article containing a lead frame supporting a semiconductor device, the molding of such articles being disclosed by Osada. Appellant contends to the

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contrary, stating that since distributors such as molded by Ohasi operate at high voltages while semiconductor devices do not, the problem addressed by Ohasi, i.e., avoidance of voids to prevent dielectric breakdown, would be inapplicable to semiconductor devices, and therefore it would not have been obvious to use the Ohasi method to mold (encapsulate) such devices.

We consider the rejection to be well taken. Like Ohasi, Osada is also concerned with the problem of avoiding voids in the molded product; see col. 3, lines 6 to 9, and col. 7, lines 9 to 11. Therefore, it would have been obvious, in view of Osada, to apply the Ohasi method to the encapsulation of semiconductor devices, such being suggested by Ohasi's provision of a method for preventing voids, and Osada's disclosure of the encapsulation of such devices in resin and the desirability of preventing voids when doing so.

On page 4 of the brief, appellant states that claim 25 stands or falls with claims 19 and 22, but claim 25 is dependent on claim 16, and is considered to be unpatentable for the same reasons as claim 16.

Claims 26 and 27 are also considered unpatentable for the

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same reasons as claim 16.

The rejection of claim 19, and of claims 20 to 22 dependent thereon, will not be sustained. With regard to claim 19, the examiner states (answer, page 9):

The applied Osada reference teaches as conventional the provision of mold plates which support the cavity block and are further compressed during injection molding of thermoplastic by spacer blocks. See col. 1 [sic: col.3?], ln. 61 to col. 2 [sic: col. 4?], ln. 21.

Claim 19 requires, inter alia, "supporting a cavity block of a first mold on an elastic post" and "axially compressing the elastic post . . . and thereby projecting the eject pin into the mold cavity with the molds joined together." It is not apparent from the examiner's statements how the disclosure of Osada would have taught or suggested to one of ordinary skill the use in the Ohasi apparatus of an elastic post which supports a cavity block and would be axially compressed to thereby project the plunger 8 of Ohasi into the mold cavity. Absent any such teaching or suggestion in the applied prior art, there is no basis for sustaining the rejection of claims 19 to 22.

Conclusion

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The examiner's decision to reject claims 11 to 22 and 25 to 27 is affirmed as to claims 11 to 13, 15 to 18 and 25 to 27, and reversed as to claims 14 and 19 to 22.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED-IN-PART

IAN A. CALVERT)	
Administrative Patent Judge)	
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)	BOARD OF PATENT
CHARLES E. FRANKFORT)	
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