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

Case Number: T 0293/99 - 3.2.5

Application Number: 92311014.2

Publication Number: 0545693

IPC: B29C 45/17

Language of the proceedings: EN

Title of invention:

Injection-molded article having high-quality appearance

Patentee:

mitsubishi gas chemical company, inc.

Opponent:

Battenfeld GmbH

Headword:

-

Relevant legal provisions:

EPC Art. 56

Keyword:

"Inventive step (yes)"

Decisions cited:

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Catchword:

-



Case Number: T 0293/99 - 3.2.5

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

Appellant: Battenfeld GmbH
(Opponent) Scherl 10
D-58540 Meinerzhagen (DE)

Representative: Gosdin, Michael, Dr.
Battenfeld Service GmbH
Scherl 10
D-58540 Meinerzhagen (DE)

Respondent: MITSUBISHI GAS CHEMICAL COMPANY, INC.
(Proprietor of the patent) 5-2, Marunouchi 2-chome
Chiyoda-Ku
Tokyo 100 (JP)

Representative: Senior, Alan Murray
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Decision under appeal: Intertocutory decision of the Opposition Division
of the European Patent Office posted 25 January
1999 concerning maintenance of the European
patent No. 0 545 693 in amended form.

Composition of the Board:

Chairman: A. Burkhart
Members: P. E. Michel
M. J. Vogel

Summary of Facts and Submissions

- I. The appellant (opponent) lodged an appeal against the decision of the opposition division maintaining patent No. 0 545 693 in amended form.

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

The following document was relied upon in the decision:

E1: Fachtagung 18. und 19. Sept. 1990 Festung Marienberg, Würzburg, Mehrkomponenten- und Gasinnendruck-Spritzgießverfahren- Tendenzen neuer Verfahrenstechniken,
M. Renger:
Das Gasinnendruckverfahren - eine Spritzgießvariante mit besonderen Möglichkeiten.

- II. Oral Proceedings were held before the Board of Appeal on 15 February 2001.

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

(ii) The respondent (patentee) requested that the appeal be dismissed.

The claims include a single independent claim reading as follows:

"1. An injection-molded article comprising a base body (10) defining what, in use, will be an exterior visible shape of the injection-molded article, a

thick-wall portion (20) extending from the base body, and a foot portion (40) formed at the juncture between the base body (10) and the thick-wall portion (20),
said foot portion (40) rising from the base portion (10), the thickness of the foot portion (40) increasing in the direction of the width of the foot portion (40) towards the thick-wall portion (20), and at least the thick-wall portion having a hollow portion; characterised in that the ratio of the maximum thickness of the foot portion (40) above the base body (10) to the width of the foot portion (40), which is from the thick-wall portion to an outer end of the foot portion, is in the range of $1/40$ to $1/2$, wherein the width (W_{20}) of the foot portion (40) is between $1.5t$ and $50t$, where t is the thickness of the base body portion (10)."

III. The appellant argued essentially as follows:

The closest prior art is represented by document E1 and in particular the left hand figure of Figure 26. The subject-matter of claim 1 is distinguished over the disclosure of this document by the two features specified in the characterising clause of claim 1.

From measurements carried out on an enlargement of the rib geometry as shown in the left hand figure of Figure 26, it can be seen that the ratio of the maximum thickness of the foot portion above the base body to the width of the foot portion is approximately 1:1.7. It is a matter of routine extrapolation not requiring inventive ingenuity to increase this ratio to 1:2 or more.

The second distinguishing feature of claim 1, according to which the width of the foot portion is between $1.5t$ and $50t$, where t is the thickness of the base body portion, represents a wide range which can be arrived at by the person skilled in the art without the exercise of inventive ingenuity.

Therefore, the subject-matter of claim 1 does not involve an inventive step.

IV. The respondent argued essentially as follows:

It is agreed that the closest prior art is represented by document E1. It is, however, not possible to take accurate measurements from Figure 26. The teaching of E1 is to provide a radius at the junction of the rib and the base body. This implies that the ratio of the maximum thickness of the foot portion above the base body to the width of the foot portion is approximately 1:1. It is also noted that the radius is small compared with the thickness of the base body portion. Such a radius is used to assist de-molding, to relieve stress concentration in the finished article and to facilitate mold manufacture.

The problem facing the present inventors starting from E1 is to enable the manufacture of injection molded articles which are free of strain and without irregular colour on the exterior visible surface of the article.

According to the invention, this problem is solved by the provision of a foot portion having dimensions as specified in claim 1, which reduces turbulent flow in the melt during introduction of gas. The problem is not addressed by E1.

Therefore, the teaching of E1 does not render obvious the subject-matter of claim 1.

Reasons for the Decision

1. *Novelty*

The novelty of the subject-matter of the claims as maintained by the opposition division was not questioned by the appellant and, indeed, the prior art does not disclose a foot portion having the dimensions specified in claim 1.

2. *Inventive step*

- 2.1 The closest prior art is represented by E1. This document discloses, with particular reference to the left hand figure of Figure 26, an injection-molded article comprising a base body defining what, in use, will be an exterior visible shape of the injection-molded article, a thick-wall portion extending from the base body, and a foot portion formed at the juncture between the base body and the thick-wall portion, said foot portion rising from the base portion, the thickness of the foot portion increasing in the direction of the width of the foot portion towards the thick-wall portion, and at least the thick-wall portion having a hollow portion. The foot portion is in the form of a radius tangential to the underside of the base portion and to the thick-wall portion. The ratio of the maximum thickness of the foot portion above the base body to the width of the foot portion is thus approximately 1:1.

2.2 A problem associated with the article disclosed in E1 is that, whilst the use of gas injection molding in the manufacture of the article enables the production of good quality articles free from sink marks, for some purposes, including components for car bodywork, a further improvement in surface quality is required. It is accordingly the object of the invention to provide articles having extremely high quality visible surfaces which are free of strain and without irregular colour.

According to the invention, this problem is solved by the provision of a foot portion having the dimensions specified in claim 1. Such a foot portion reduces turbulent flow in the melt during introduction of gas.

E1 neither in any way addresses the above problem, nor suggests the solution found by the inventors of the patent in suit. The person skilled in the art attempting to solve the above problem has a number of approaches available, including adjusting the timing of the introduction of the gas and adjusting the rate of cooling of the melt in the mold. The prior art does not indicate that experimenting with foot portions of different proportions could solve problems of unsatisfactory surface finish on the surface opposed to the thick-wall portion.

The appellant has presented an enlargement of the left hand figure of Figure 26 of E1, from which measurements were taken which are alleged to show a foot portion having a ratio of maximum thickness to width of approximately 1:1.7. Regardless of the arguments concerning the accuracy of the sketch and the measurements made thereon, the fact remains that E1 does not suggest to the skilled reader that the

dimensions of the foot portion should be varied. The person skilled in the art has no incentive to provide a wider, flatter foot portion than that shown in Figure 26. Similarly, contrary to the suggestions of the appellant, it is not possible to refer to the invention as being merely an extrapolation of an existing trend or a compromise between conflicting requirements. There is nothing in the prior art which suggests a trend which could be extrapolated or factors which should be taken into account when designing a foot portion. The present case is thus distinguished from those considered in T 410/87 and T 409/90.

The subject-matter of claim 1 thus involves an inventive step. Claims 2 to 9 are appendant to claim 1 and relate to preferred features of the article. The subject-matter of claims 2 to 9 thus also involves an inventive step.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

M. Dainese

A. Burkhart