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**D E C I S I O N**  
**of 17 May 2001**

**Case Number:** T 0313/98 - 3.2.5

**Application Number:** 90914009.7

**Publication Number:** 0493447

**IPC:** B29C 45/17

**Language of the proceedings:** EN

**Title of invention:**

Method for the use of gas assistance in the molding of plastic articles

**Patentee:**

Melea Limited

**Opponent:**

Battenfeld GmbH  
Cinpres Limited

**Headword:**

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**Relevant legal provisions:**

EPC Art. 84, 56  
EPC R. 57a

**Keyword:**

"Allowability of amendments (main request, no)"  
"Sufficiency of disclosure (yes)"  
"Inventive step (yes)"

**Decisions cited:**

T 0295/87, T 0829/93, T 0794/94, T 0610/95, T 0223/97

**Catchword:**

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Case Number: T 0313/98 - 3.2.5

**D E C I S I O N**  
**of the Technical Board of Appeal 3.2.5**  
**of 17 May 2001**

**Appellant:** Melea Limited  
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**Respondent I:** Battenfeld GmbH  
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**Respondent II:** Cinpres Limited  
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**Decision under appeal:** Decision of the Opposition Division of the  
European Patent Office posted 28 January 1998  
revoking European patent No. 0 493 447 pursuant  
to Article 102(1) EPC.

**Composition of the Board:**

**Chairman:** W. Moser  
**Members:** P. E. Michel



## Summary of Facts and Submissions

- I. The appellant (patentee) lodged an appeal against the decision of the opposition division revoking patent No. 0 493 447.

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

The Opposition Division held that the subject-matter of claim 1 of a main and first auxiliary request in each case lacks novelty and that claim 1 of a second auxiliary request lacks an inventive step. The only document relied upon was US-A-3 044 118 (D6).

- II. Oral proceedings before the Board of Appeal took place on 17 May 2001.

- III. The appellant requests that the decision under appeal be set aside and that the patent be maintained on the basis of the following requests submitted during the oral proceedings:

(a) main request: claims 1 to 5; or

(b) auxiliary request: claim 1 in accordance with the main request as single claim.

The respondents I and II (opponents O1 and O2) request that the appeal be dismissed.

IV. Independent claims 1 to 4 of the main request read as follows:

"1. A method for the use of gas-assistance in an injection molding system including a mold having an injection aperture, in the molding of an article in the form of a headlamp lens cover (22) having a substantially planar panel (30) which has a perimeter frame (32) of thicker cross section, a pair of mounting flanges (34a) and (34b) attached integrally to opposite lateral ends of the panel (30) by respective webs (36a) and (36b), center portions of the mounting flanges (34a) and (34b) including notches (38a) and (38b) configured to couple with actuator arms on a servo mechanism which would pivot the headlamp lens cover (22) between its open and closed positions, the method comprising the steps of:

injecting an amount of molten plastic resin sufficient for the preparation of the plastic article (22) through the injection aperture and along a resin flow path which extends from the injection aperture to an article-defining cavity in the mold;

injecting a charge of pressurized gas through said resin flow path into the mold, maintaining the gas charge under pressure within the mold while the plastic resin solidifies within the article-defining cavity; and

relieving the gas pressure within said flow path; wherein said resin flow path includes a runner portion (26) which is substantially contiguous to a portion of the article-defining cavity corresponding to the substantially planar panel portion (30) and which extends substantially along the width of said substantially planar panel portion (30), said runner portion (26) having a bulbous section and a section

narrower than the contiguous portion of the article-defining cavity corresponding to the substantially planar panel portion (30) to facilitate the entry of the gas into said runner portion (26), to accommodate a substantial quantity of pressurized gas to assist in the molding process and to facilitate containment from the article-defining cavity,

the molten plastic resin is injected at a pressure sufficient to nominally fill out the article-defining cavity without introducing microscopic stresses within the plastic,

a charge of pressurized gas is injected into the mold, said gas charge being of pressure and quantity sufficient to enter into the contiguous runner portion (26) of the resin flow path contiguous to the portion of the article-defining cavity corresponding to the substantially planar panel portion (30), and not into the article-defining cavity to assist in the fillout of the cavity with molten resin."

"2. A method for the use of gas-assistance in the molding of a plastic article (22) in an injection molding system including a mold having an injection aperture, the method comprising the steps of:

injecting an amount of molten plastic resin sufficient for the preparation of the plastic article (22) through the injection aperture and along a resin flow path (24, 26) which extends from the injection aperture to an article-defining cavity in the mold;

injecting a charge of pressurized gas through said resin flow path (24, 26) into the mold, maintaining the gas charge under pressure within the mold while the plastic resin solidifies within the article defining cavity; and

relieving the gas pressure within said flow path;

characterized in that said method comprises the step of

injecting said charge of pressurized gas into the mold at a pressure and quantity sufficient to enter the resin flow path but not into the article-defining cavity;

injecting a second charge of pressurized gas into the mold at a location (23; 40) remote from the resin flow path (24, 26), said second charge of gas being of a pressure and quantity sufficient to enter the article defining cavity but not into the resin flow path (24, 26);

maintaining the first and second gas charges under pressure within the mold while the plastic resin solidifies within the article-defining cavity thereby completing the formation of the plastic article, and

relieving the gas pressure within the resin flow path (24, 26) and within the article-defining cavity."

"3. A method for the use of gas-assistance in the molding of a plastic article (22) in an injection molding system including a mold having an injection aperture, an article defining cavity and a resin reservoir (40) in communication with the cavity, the method comprising the steps of:

injecting an amount of molten plastic resin sufficient for the preparation of the plastic article through the injection aperture and along a first resin flow path (24, 26) which extends from the injection aperture to the article-defining cavity and along a second resin flow path which extends from the article-defining cavity to the resin reservoir (40);

injecting a first charge of pressurized gas into the mold, said first charge being of pressure and quantity sufficient to enter into the first resin flow



path (24, 26), but not into the article-defining cavity;

injecting a second charge of pressurized gas into the resin reservoir (40), said second charge of gas being of pressure and quantity sufficient to enter the second resin flow path and thence into the article-defining cavity but not into the first resin flow path (24, 26);

maintaining the first and second gas charges under pressure in the mold during the solidification of the plastic resin within the article-defining cavity, thereby completing the formation of the plastic article; and

relieving the gas pressure within the first resin flow path (24, 26), and within the article-defining cavity preparatory to removing the plastic article (22) from the mold."

"4. A method for the use of gas-assistance in the molding of plastic article (22) in an injection molding system including a mold having an injection aperture, an article-defining cavity and a resin reservoir (40) in communication with the cavity, the method comprising the steps of:

injecting an amount of molten plastic resin sufficient for the preparation of the plastic article through the injection aperture and along a first resin flow path (24, 26) which extends from the injection aperture to the article-defining cavity and along a second resin flow path which extends from the article-defining cavity to the resin reservoir (40);

injecting a first charge of pressurized gas into the mold, said first charge being of pressure and quantity sufficient to enter into the first resin flow path (24, 26), but not into the article-defining

cavity;

injecting a second charge of pressurized gas into the resin reservoir (40) said second charge of gas being of pressure and quantity sufficient to enter the second resin flow path but not into the article defining cavity;

maintaining the first and second gas charges under pressure in the mold during the solidification of the plastic resin within the article-defining cavity, thereby completing the formation of the plastic article; and

relieving the gas pressure within the first and second resin flow path preparatory to removing the plastic article (22) from the mold."

V. The appellant argued substantially as follows:

It is appropriate to retain claims 3 to 5 as granted as independent claims 2 to 4 in the main request. Claims 3 to 5 as granted are directed to features of the embodiment of Figures 4 to 10, and the amended claim 1 is directed to a feature disclosed in the context of the embodiment of Figures 2 and 3. Since it is not possible to render claims based on claims 3 to 5 as granted appendant to claim 1, the claims should be allowable as independent claims.

The amended claim 1 is clearly based on the disclosure of the application as filed. The interpretation of the word "through" relied upon by the respondents I and II is a purely semantic interpretation and not a technical interpretation of the word. The term "contiguous" as used in claim 1 includes within its scope the illustrated arrangement in which a frame portion is present between the runner and the planar portion.

The person skilled in the art is well aware of the meaning of the term "without introducing microscopic stresses within the plastic" and is capable of injecting the plastics material at a pressure sufficient to nominally fill out the article-defining cavity but not so high as to introduce microscopic stresses into the plastics material. The patent in suit thus complies with the requirement of Article 100(b) EPC.

The subject-matter of the amended claim 1 is novel and involves an inventive step having regard to the disclosure of document D6.

VI. The respondents I and II argued substantially as follows:

The amendments forming the basis of the main request should not be allowed. In view of the fact that the amendments were only filed at the oral proceedings, they are not allowable in view of Rule 71a EPC. In addition, the fact that the claims are directed to new combinations and include three new independent claims, they are not allowable in view of Rule 57a EPC. The amendments are made merely in order to enable the appellant to obtain additional protection, not to meet a ground of opposition.

Claim 1 does not satisfy the requirements of Article 123(2) EPC. Firstly, the application as filed does not disclose a method comprising "injecting a charge of pressurized gas through said resin flow path into the mold". The term "through" means completely through and therefore means that the gas passes from the runner portion into the article-defining cavity.

Secondly, in the method of forming a headlamp lens cover as disclosed in the application as filed, the runner feeds into the rim, and not into the planar portion of the article-defining cavity. The article-defining cavity as disclosed in the application as filed thus does not possess "a runner portion (26) which is substantially contiguous to a portion of the article-defining cavity corresponding to the substantially planar panel portion (30)".

Whilst claim 1 specifies that the molten plastic resin is injected at a pressure sufficient to nominally fill out the article-defining cavity without introducing microscopic stresses within the plastic, there is no teaching how the specified pressure is determined. The patent in suit thus does not comply with the requirement of Article 100(b) EPC.

The closest state of the art is disclosed in document D6. This document discloses a method of injection moulding in which a charge of pressurized gas is injected into a reservoir adjacent the article-defining cavity, but not into the article-defining cavity itself. In order to apply the teaching of this document to an article having a substantially planar panel portion, it does not involve an inventive step to provide a runner portion having a form as defined in claim 1, that is, a runner which extends substantially along the width of the substantially planar panel portion and has a bulbous section and a section narrower than the contiguous portion of the article-defining cavity corresponding to the substantially planar panel portion. The subject-matter of claim 1 thus does not involve an inventive step.

## Reasons for the Decision

### 1. *Main Request*

#### 1.1 Allowability of the amendments

According to the established jurisprudence of the boards of appeal, the admissibility of amendments to the text of a granted patent during opposition and subsequent appeal proceedings is a matter that is for the instance in question to decide in its discretion under Rules 57a and 58(2) EPC. To be admissible, proposed amendments should be appropriate and necessary having regard to the nature of the grounds for opposition and the issues raised thereby (see decisions T 295/87 (OJ EPO 1990, 470), T 829/93 of 24 May 1996, T 794/94 of 17 September 1998, T 610/95 of 21 July 1999 and T 223/97 of 3 November 1998).

On the basis of criteria laid down in T 295/87, amendments to the text of a granted patent should only be considered appropriate and necessary within the meaning of Rules 57a and 58(2) EPC and therefore admissible, if they can be fairly said to be occasioned by grounds for opposition laid down in Article 100 EPC.

In the present case, the appellant amended the claims in an attempt to overcome the finding of the Opposition Division that claim 1 as granted and as amended according to a first auxiliary request was not new having regard to the disclosure of document D6, and that claim 1 according to a second auxiliary request lacks an inventive step having regard to the disclosure of document D6. The amendments involve the replacement of the claims as granted, which include a single

independent claim and thirteen dependent claims, with a set of claims consisting of four independent claims (claims 1 to 4) and a single dependent claim (claim 5).

Claim 1 is amended so as to include features drawn solely from the description, not corresponding to any of the claims as granted, restricting the claim to the moulding of a headlamp lens cover, wherein the runner has a bulbous section.

Claim 2 is directed to a combination of claims 1 and 3 as granted, claim 3 is directed to a combination of claims 1 and 4 as granted, claim 4 is directed to a combination of claims 1 and 5 as granted.

In order to overcome the objections of lack of novelty and inventive step, it is sufficient for the appellant to amend the sole independent claim as granted (claim 1) either by combining the claim with features drawn from the dependent claims as granted, and thus arriving at three independent claims, or by introducing features from the description into the sole independent claim as granted. It is not, however, necessary to establish a new set of claims comprising both the three independent claims arising from a combination of the claims as granted and an additional independent claim not having any counterpart in the granted version of the claims.

Such an addition of a new claim, not having any counterpart in the granted version of the claims, cannot be regarded as an attempt to respond to an objection under Article 100 EPC (see T 295/87, end of point 3).

The amendments forming the subject of the main request of the appellant are thus considered to be neither necessary nor appropriate, so that the amendments are not allowable in view of Rule 57a EPC.

2. *Auxiliary request*

2.1 Allowability of the amendments

The respondents I and II argue that the application as filed does not disclose a method comprising "injecting a charge of pressurized gas through said resin flow path into the mold". It is suggested that the term "through" means completely through and, therefore, means that the gas passes from the runner portion into the article-defining cavity. This cannot be accepted. The expression must be interpreted to mean that the gas is injected through the resin flow path into the mould, as opposed to being injecting into the mould from another location. The interpretation of the term as pleaded for by the respondents I and II would be in flat contradiction to the remainder of the claim, which states that "a charge of pressurized gas is injected into the mold, said gas charge being of pressure and quantity sufficient to enter into the contiguous runner portion (26) of the resin flow path contiguous to the portion of the article-defining cavity corresponding to the substantially planar panel portion (30), and not into the article-defining cavity to assist in the fillout of the cavity with molten resin". The interpretation of the term as pleaded for by the respondents I and II is also in contradiction to the description of the patent in suit, which makes it clear that the gas does not pass beyond the runner and enter the article-defining cavity.

The respondents I and II further argue that, in the method of forming a headlamp lens cover as disclosed in the application as filed, the runner feeds into the rim and not into the planar portion of the article-defining cavity. The article-defining cavity as originally disclosed thus does not possess "a runner portion (26) which is substantially contiguous to a portion of the article-defining cavity corresponding to the substantially planar panel portion (30)". The term "contiguous" must, however, be construed in the light of the description and drawings and, in particular, Figures 2 and 3, which make it clear that the term includes within its scope an arrangement in which the runner is not actually adjacent to the planar portion, but is close to it and extends over the greater part of the length of the planar portion.

The claim thus does not specify any feature which is absent from the application as filed, and the amendments to claim 1 satisfy the requirements of Article 123(2) EPC. In addition, the amendments to the sole claim involve a limitation of the protection conferred as compared with claim 1 as granted and thus also satisfy the requirements of Article 123(3) EPC.

## 2.2 Sufficiency of disclosure

According to the description of the patent in suit, "the charge of plastic resin is injected at a pressure sufficient to nominally fill out the article-defining cavity without any gas entry into the cavity but not so great as to introduce microscopic stresses within the plastic which will cause warpage upon removal of the article from the mold cavity or during subsequent thermal cycling of the article" (column 6, lines 25 to



32). It is further stated that the "presence of pressurized gas in the volume indicated at 28 [i.e. within the runner (26)] assists in the fill out of the article-defining cavity with molten resin to avoid the need for relatively high plastic injection pressure" (column 7, lines 2 to 5). Thus, the use of pressurized gas enables fill out of the article-defining cavity at a lower plastics injection pressure, which avoids the problems of internal stresses in the moulded article caused by high injection pressures. The person skilled in the art is able to arrive at a pressure "sufficient to nominally fill out the article-defining cavity without any gas entry into the cavity but not so great as to introduce microscopic stresses within the plastic" by a limited amount of trial and error based on experience of gas assisted injection moulding of plastics articles having a high quality surface finish.

The patent in suit thus discloses the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art.

### 2.3 Inventive step

The closest prior art is the method of manufacturing the headlamp lens cover having the form defined in the single claim by die casting metal, as discussed in the patent in suit at column 2, lines 28 to 41.

The problem facing the person skilled in the art is to reduce the weight of the part so as to enable a lower rated motor to be used to pivot the headlamp lens cover between its open and closed positions.

Document D6 is concerned with forming large,

irregularly shaped articles by injection moulding of plastics. It suggests that problems of shrinkage during cooling and solidification may be overcome by injecting a charge of pressurized gas into a reservoir adjacent the article-defining cavity, but not into the article-defining cavity itself. Gas pressure is thereby exerted upon the plastics material in the article-defining cavity, without the formation of a hollow article. During cooling and solidification, plastics material is forced from the reservoir into the mould cavity, thus compensating for shrinkage.

It may be assumed that the person skilled in the art might well consider that the headlamp lens cover should be manufactured by moulding of plastics in order to save weight as compared with the die cast metal component. The disclosure of document D6 may further encourage the skilled person to inject a charge of pressurized gas into a reservoir adjacent the article-defining cavity, but not into the article-defining cavity itself, in order to alleviate problems of shrinkage during cooling and solidification of the headlamp lens cover, in view of its irregular shape.

There is, however, no suggestion in the cited prior art that, in order to mould a headlamp lens cover having the form defined in claim 1, the resin flow path should include a runner portion which is substantially contiguous to a portion of the article-defining cavity corresponding to the substantially planar panel portion of the headlamp lens cover and which extends substantially along the width of the substantially planar panel portion, the runner portion having a bulbous section and a section narrower than the contiguous portion of the article-defining cavity

corresponding to the substantially planar panel portion. By virtue of the runner portion having such a form, the entry of the gas into said runner portion is facilitated and a substantial quantity of pressurized gas is accommodated in the runner portion to assist in the molding process and, at the same time, the gas is contained in the runner portion and prevented from entering the article-defining cavity.

The subject-matter of the sole claim of the auxiliary request thus involves an inventive step.

## Order

### For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the first instance with the order to maintain the patent on the basis of the following documents submitted during the oral proceedings:

**Claims:** 1 of the main request as single claim

**Description:** pages 2 to 5

**Figures:** 1 to 3 of the drawings as granted.

The Registrar:

The Chairman:

M. Dainese

W. Moser