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D E C I S I O N
of 25 May 2001

Case Number: T 0283/98 - 3.2.5

Application Number: 91904363.8

Publication Number: 0524181

IPC: B29C 45/17

Language of the proceedings: EN

Title of invention:
Method and apparatus for injection molding plastic article with gas-assistance

Patentee:
Melea Limited

Opponent:
(01) Battenfeld GmbH
(02) Cinpres Limited
(03) WAVIN B.V.

Headword:
-

Relevant legal provisions:
EPC Art. 21(4)(b), 123(2), 123(3)

Keyword:
"Enlargement of the Board (no)"
"Addition of subject-matter (main and first auxiliary request, (yes)"
"Extension of protection (second auxiliary request (yes))"

Decisions cited:
G 0001/93

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0283/98 - 3.2.5

D E C I S I O N
of the Technical Board of Appeal 3.2.5
of 25 May 2001

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Decision under appeal: **Decision of the Opposition Division of the European Patent Office posted 22 January 1998 revoking European patent No. 0 524 181 pursuant to Article 102(1) EPC.**

Composition of the Board:

Chairman: W. Moser
Members: P. E. Michel
A. Burkhart

Summary of Facts and Submissions

I. The appellant (patentee) lodged an appeal against the decision of the Opposition Division revoking patent No. 0 524 181.

Opposition had been filed against the patent as a whole based on Article 100(a) EPC (lack of novelty and inventive step). During the opposition proceedings the ground for opposition according to Article 100(c) EPC (inadmissible amendment) had also been raised.

The Opposition Division held that the subject-matter of claim 1 of each of the requests of the appellant either extended beyond the disclosure of the application as filed, and thus offended against the provision of Article 123(2) EPC, or involved an extension of protection as compared with the patent as granted and thus offended against the provision of Article 123(3) EPC.

II. The appellant requested that

(i) the Board decide in an enlarged composition, comprising two legally qualified members and three technically qualified members.

(ii) the decision under appeal be set aside and it be decided that the claims of the main, first and second auxiliary requests as considered by the Opposition Division are admissible and do not offend against the provisions of Article 123(2) and (3) EPC and that the case be remitted to the first instance for further prosecution.

(iii) the question of whether the revocation of a European patent for purely formal reasons constitutes an offence against constitutional property rights should be referred to the Enlarged Board of Appeal.

An auxiliary request for oral proceedings was subsequently withdrawn.

The respondents I, II and III (Opponents OI, OII and OIII) requested that the appeal be dismissed and, in the case of respondents I and II, as an auxiliary request, that oral proceedings be held.

III. The main request of the appellant is for maintenance of the patent in suit as granted, claim 1 of the patent in suit as granted reading as follows:

"A method of injection molding a plastic article with gas-assistance comprising the steps of:
injecting a pressurized charge of molten plastic through a flow path and into an article-defining cavity of a mold;
depressurizing the molten plastic in the flow path by a controlled amount after the injection step;
introducing a charge of gas pressurized at a predetermined level into the molten plastic for assistance in molding the article in conformity with the article-defining cavity;
maintaining the gas under pressure while the plastic solidifies in the article-defining cavity;
and removing the article from the mold
characterized in that
the pressurized charge of molten plastic is injected by advancing a reciprocable, rotating screw to knead and

melt plastic granules into a molten mass, said screw functioning as a ram,
that depressurizing the molten plastic is carried out by controlled retraction of the reciprocable, rotating screw and/or by controlled retraction of a pin with a tip bounding a portion of the flow path,
and that the pressurized gas is vented prior to removing the article from the mold."

In claim 1 of the first auxiliary request of the appellant, the words "by controlled retraction of the reciprocable, rotating screw and/or" appearing in claim 1 of the main request of the appellant are deleted.

In claim 1 of the second auxiliary request of the appellant, the characterizing portion of claim 1 of the main request of the appellant is amended to read as follows:

"characterized in that the pressurized charge of molten plastic is injected through the flow path defined as the head of a cylindrical opening in a barrel containing a reciprocable rotating screw to knead and melt plastic granules into a molten mass, a passageway in a valve interposed between the cylindrical opening and a nozzle, a passageway in the nozzle, an opening in a sprue, a runner system and a gate by advancing said screw functioning as a ram,
that depressurizing the molten plastic is carried out by controlled retraction of a pin with only its tip bounding a lateral portion of the flow path,
introducing the charge of pressurized gas at a selected point into the flowpath downstream of the valve while said valve is in its closed position,

and that the pressurized gas is vented prior to removing the article from the mold."

IV. The appellant argues essentially as follows:

As the main argument, it is submitted that, during injection, the screw may either continue to rotate or be advanced without rotation. Reference is made to the catalogue E12 (Spritzgießtechnik 1990), pages 24 and 28. Whilst the word "rotating" in claim 1 of the main request and of both auxiliary requests is semantically related to the steps of injecting and depressurising, the technical meaning of the term is not specifically related to these steps. The extent of protection of claim 1 of the main request covers both the possibility of the screw rotating or not rotating as it functions as a ram, rotation only being necessary during kneading and melting of the plastics granules. The subject-matter of claim 1 of the main request does not extend beyond the content of the application as filed and thus complies with the requirement of Article 123(2) EPC.

As a secondary argument, in the event that claim 1 of the main request is construed as requiring rotation of the screw during the steps of injecting and depressurising, it is submitted that rotation of the screw during injection and retraction is implicitly disclosed in the application as filed. Claim 1 of the main request thus also complies in this case with the requirement of Article 123(2) EPC.

As a tertiary argument, it is submitted that the term "rotating" does not provide a technical contribution and merely serves to limit the protection conferred by the patent in suit. According to the decision G 1/93 of

the Enlarged Board of Appeal (OJ EPO 1994, 541), the introduction of such a limitation is permissible.

Moreover, by replacing the term "rotational" by "rotating", the appellant has not obtained an undue advantage, the term "rotating" not being decisive with reference to the questions of novelty and inventive step, and an adverse effect on the interests of third parties has not been created, neither has their legal security been damaged. Hence, the inescapable trap mentioned in decision G 1/93 and its sanction, namely the revocation of the patent in suit without consideration for the intellectual and industrial property rights contained in the invention as disclosed in the application as filed is contrary to the constitutional principle relating to the protection of individual property rights because it is too harsh and inequitable in view of the rather minor deviation from the provisions of the EPC.

V. The respondents argue essentially as follows:

The term "rotating" is not synonymous with the term "rotational". Rotating means that the screw is actually rotating, whereas rotational means that the screw is capable of rotating. There is no disclosure in the application as filed of the screw rotating during injection or depressurisation. The amendments made to claim 1 of all the requests submitted by the appellant thus include process steps which were not disclosed in the application as filed and thus extend the scope of protection beyond the content of the application as filed contrary to Article 123(2) EPC.

The term "rotating" cannot be deleted without extending

the scope of claim 1 of all the requests submitted by the appellant beyond the method claimed in claim 1 of the patent in suit as granted, since this would be contrary to Article 123(3) EPC.

Reasons for the Decision

Composition of the Board of Appeal

1. According to Article 21(4)(b) EPC, the Board may *inter alia* be enlarged so as to consist of three technically qualified members and two legally qualified members when the Board of Appeal considers that the nature of the appeal so requires. In the present case, the Board does not consider that there are any legal or technical issues which would require such an enlargement of the Board.

Main request and first auxiliary request of the appellant

2.1 The application as filed discloses a method of injection molding a plastic article with gas-assistance and an apparatus for carrying out the method. The description of the application as filed opens with a discussion of the background art, in particular the problems associated with containment of the gas within the injected plastic. The description then continues with the disclosure of the invention, which utilises a depressurisation step in order to reduce the resistance presented by the plastic to entry of the gas. Neither the discussion of the background art nor the disclosure of the invention makes any reference to the question of

whether or not the screw is rotating during injection and depressurisation. The description is completed by a description with reference to the drawings of a preferred method and apparatus according to the invention.

2.2 The description with reference to the drawings commences at page 6 of the published PCT international application. The method is first explained with reference to Figure 1, which is a flow chart of a method of injection molding a plastic article with gas-assistance having six steps, numbered from 1 to 6. Of interest to the question of whether or not the application as filed discloses a method wherein the screw is rotating during injection and depressurisation are steps 1 and 2.

Step 1 is, in fact, divided into two sub-steps, in the first of which plastic granules within a barrel are melted by rotation of the screw and by heater bands. This is conventional, heat being generated in the plastic by virtue of the shearing action of the screw. In the second sub-step, the molten plastic mass is injected into the article-defining cavity of the mould by advancing the screw as an injection ram. An indication that injection takes place after melting of the granules is given by the use of the word "then" in line 18. The paragraph at page 6, lines 8 to 24, does not, however, explicitly state whether or not the screw is rotated during advancement.

In step 2, the volume of the flow path is increased, thus depressurising the molten plastic. This can be achieved either by retracting the injection ram or another reciprocable member. The paragraph at page 6,

line 25 to page 7, line 2 does not explicitly state whether or not the screw is rotated during retraction of the screw.

The description continues from page 8, line 5 with a description of the apparatus for practising the method of the invention. At page 8, lines 13 to 16, it is stated that the screw "is rotational to knead, melt and advance plastic materials into a molten mass", that is, the functions of the first sub-step of step 1 referred to above. At page 8, line 18, it is stated that the screw "is also reciprocable to inject the molten plastic mass". There is thus again no explicit disclosure of whether or not the screw is to be rotated during advancement. However, the fact that the paragraph at page 6, lines 8 to 24 appears to suggest that the functions disclosed as being achieved by rotating the screw, that is to form a molten mass from the granules, are completed before injection of the molten mass, would appear to indicate that the screw should not, in fact, be rotated during injection. In a method involving rotation of the screw during injection, melting of the granules continues during injection.

At page 10, line 30, to page 11, line 6, the advancement of the screw is discussed with reference to Figure 3. Retraction of the screw is discussed at page 11, lines 20 to 24. These passages again merely refer to the screw functioning "as a ram" during injection and being retracted and do not make any reference to rotation.

Finally, the claims make no reference whatsoever to rotation of the screw.

The application as filed thus does not contain any explicit teaching of rotation of the screw during either injection or retraction. The person skilled in the art wishing to carry out the teaching of the application would further not find any incentive in the application as filed to rotate the screw during either injection or retraction. The application as filed thus also does not contain any implicit teaching of rotation of the screw during either injection or retraction.

2.3 It is known in the prior art, as illustrated by the catalogue E12 (see pages 24 and 28), that injection can be carried out with the screw either rotating or not rotating. It is more usual not to rotate the screw, thus enabling the volume of plastic to be accurately determined. On the other hand, it is known in the art that the screw may be rotated during injection so that further plastic is melted during the injection step. In this way, in the case of large articles, the size of the screw does not have to be increased proportionally to the increase in size of the articles to be moulded.

It thus cannot be accepted that to construe the word "rotating" as requiring that rotation takes place is a mere narrow, semantic interpretation, far removed from the practical approach of the person skilled in the art. On the contrary, the person skilled in the art is aware of the fact that, under some circumstances, it may well be desirable to rotate the screw during injection and will read claim 1 of the main and first auxiliary requests as being restricted to a method in which the screw is rotated during injection.

2.4 The argument of the appellant to the effect that the extent of protection conferred by claim 1 of the main

and first auxiliary requests comprises a screw which is rotating or not rotating during injection cannot be accepted. The semantic interpretation of the term "the pressurized charge of molten plastic is injected by advancing a reciprocable, rotating screw to knead and melt plastic granules into a molten mass, said screw functioning as a ram" as meaning that the screw is rotated during injection is on all fours with the practical or technical understanding of the term, since the person skilled in the art is aware that the option of rotating the screw during injection is available and thus, upon reading the claim, will understand that this option should be adopted.

2.5 It similarly cannot be accepted that rotation of the screw during injection is implicitly disclosed in the application as filed. At page 6, lines 13 to 17 of the application as published, the reader is told that "plastic granules are melted into a plastic mass by a screw within a barrel. The rotation of the screw and the heater bands heat and melt the plastic and advances it toward a chamber at the nozzle end of the machine". This is conventional in the art and results in molten mass of plastic being available for injection. The description then continues "the injection of the molten plastic mass then occurs by ... advancing the screw as an injection ram". Insofar as there is any implicit teaching in this passage (see point 2.2 above), it is that the screw should not be rotated when acting as a ram during injection.

2.6 When the screw is not rotated, the volume of plastic injected into the mould can be accurately determined. When the screw is rotated, further plastic is melted during the injection step, thus shortening the cycle

time and allowing larger articles to be moulded without a corresponding increase in the size of the barrel and screw. The fact that different technical effects are achieved by the rotation or non-rotation of the screw implies that the feature provides a technical contribution.

2.7 Thus, claim 1 of the main request offends against the provision of Article 123(2) insofar as it is specified that "the pressurized charge of molten plastic is injected by advancing a reciprocable, rotating screw" and that "depressurizing the molten plastic is carried out by controlled retraction of the reciprocable, rotating screw", in view of the fact that a method of injection moulding including such steps is not disclosed in the application as filed.

Similarly, claim 1 of the first auxiliary request offends against the provision of Article 123(2) EPC insofar as it is specified that "the pressurized charge of molten plastic is injected by advancing a reciprocable, rotating screw", in view of the fact that a method of injection moulding including such a step is not disclosed in the application as filed.

Second auxiliary request

3.1 Claim 1 of the main request, that is, of the patent in suit as granted, specifies that "the pressurized charge of molten plastic is injected by advancing a reciprocable, rotating screw".

3.2 Claim 1 of the second auxiliary request merely specifies that injection occurs "by advancing said screw functioning as a ram". The claim thus includes

within its scope both the case in which the screw is rotated during injection and the case in which the screw is not rotated during injection. The amendment of the claim during the opposition proceedings thus has the effect of extending the protection conferred. Claim 1 of the second auxiliary request thus offends against the provision of Article 123(3).

3.3 A limiting amendment was made to claim 1 before grant of the patent in suit, consisting of the introduction into that claim of the undisclosed feature that the screw is rotated during injection (cf. point 2.7 above). Thus, the case in which the screw is not rotated during injection is excluded from claim 1 of the patent in suit as granted. This feature makes a technical contribution to the subject-matter of the claimed invention, since rotation of the screw during injection enables further plastic to be melted during the injection step, thus shortening the cycle time and allowing larger articles to be moulded without a corresponding increase in the size of the barrel and screw. Thus, in accordance with decision G 1/93, the possibility of maintaining the patent in suit through the addition of this undisclosed feature is excluded in the present case.

Constitutional property rights

4. In decision G 1/93, point 13 of the reasons, it is held that "it must be admitted that Article 123(2) in combination with Article 123(3) EPC can operate rather harshly against an applicant, who runs the risk of being caught in an inescapable trap ... however, this hardship is not *per se* a sufficient justification for not applying Article 123(2) EPC as it stands in order

to duly protect the interests of the public". It follows that the points of law which apply in the present case were fully considered by the Enlarged Board of Appeal in G 1/93; accordingly, there is no question requiring referral to the Enlarged Board of Appeal.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

M. Dainese W. Moser