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Datasheet for the decision of 7 September 2006

Case Number: T 0410/05 - 3.2.07

Application Number: 97101806.4

Publication Number: 0789004

IPC: C03B 9/193

Language of the proceedings: EN

Title of invention:
Servo plunger mechanism

Patentee:
OWENS-BROCKWAY GLASS CONTAINER INC.

Opponent:
GPS Glasproduktions-Service GmbH

Headword:
-

Relevant legal provisions:
EPC Art. 56, 123(2)

Keyword:
"Inventive step (yes)"

Decisions cited:
-

Catchword:
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Case Number: T 0410/05 **-** 3.2.07

D E C I S I O N
of the Technical Board of Appeal 3.2.07
of 7 September 2006

Appellant: (Patent Proprietor)
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Decision under appeal:
Interlocutory decision of the Opposition Division of the European Patent Office posted 17 January 2005 concerning maintenance of the European patent No. 0789004 in amended form.

Composition of the Board:

Chairman: C. Holtz
Members: H. Felgenhauer
H. Hahn

Summary of Facts and Submissions

I. The appellant (proprietor) filed an appeal against the interlocutory decision of the opposition division maintaining the European patent No. 0 789 004 in amended form.

II. Opposition was filed against the patent as a whole based on the grounds of opposition according to Article 100(a) EPC (lack of novelty and of inventive step).

III. The Opposition Division was of the opinion that claims 1 and 6 of the then auxiliary request 2, comprising the additional feature according to which means for controlling the weight of the gob of molten glass are provided, involve an inventive step.

IV. The Board expressed its preliminary opinion in view of the claims of the then pending requests in a communication dated 28 April 2006.

Oral proceedings before the Board were held on 7 September 2006.

In the course of the oral proceedings the appellant replaced all requests by a sole request, claims 1 and 10 having been amended to further define structural elements of the apparatus and their mutual arrangement.

V. The appellant requested the decision under appeal to be set aside and the patent be maintained on the basis of the following documents:
claims: 1 to 22 as filed during the oral proceedings,

description: pages 3, 4, 4a and 5 and columns 1 to 7 as filed during the oral proceedings
drawings: figures 1 and 2 of the patent specification.

The respondent (opponent) requested that the appeal be dismissed.

VI. Claim 1 of the sole request reads as follows:

"An apparatus for forming a gob of molten glass into a hollow article, comprising:

a plunger (175) having a glass gob contact end for contacting a gob of molten glass to shape it into a hollow article;

an electro servo-driven leadscrew (210, 211) connected to said plunger (175) for translating said plunger (175) along a rectilinear stroke toward and away from the glass gob to bring said glass gob contact end of said plunger (175) into and out of contact with said glass gob; and

control means (220, 240, 241) for controlling the operation of said electro servo-driven leadscrew (210, 211) to control the rectilinear stroke toward and away from the glass gob,

wherein said control means comprises a plunger position sensing resolver (220) for sensing the position of said plunger (175) at all locations along said stroke,

wherein said plunger position sensing resolver (220) provides both commutation information about the motor

as well as precise plunger position information by being coupled to said leadscrew (210, 211) and

wherein said leadscrew is an inside-out leadscrew and

wherein the electro servo-drive of said leadscrew (210, 211) includes a motor (200) which is wrapped around the inside-out leadscrew (210, 211)".

VII. The present decision refers to the following document

D1 DE-U-92 12 648.

VIII. The facts, evidence and arguments relied upon by the appellant may be summarised as follows:

(i) Claim 1 clearly defines the elements of the apparatus for forming a gob of molten glass into a hollow article, namely the plunger, electro servo-driven leadscrew and the control means, the structure of these elements as well as their mutual arrangement within the apparatus.

(ii) The apparatus according to claim 1 solves the problem underlying the patent in suit, namely to avoid any inherent problems related to the use of hydraulics and/or air pressure to control the movement of the plunger and to increase at the same time the accuracy of the plunger displacement measurement for providing more control over the plunger movement.

(iii) Simultaneously the apparatus according to claim 1 can, due to the structure of its elements and their mutual arrangement, be made sufficiently small to fit into the space allotted for a standard plunger cylinder.

(iv) Document D1 discloses an apparatus for forming a gob of molten glass into a hollow article, the elements of which having a different structure and mutual arrangement as the ones according to claim 1 of the patent in suit. The parallel arrangement and the coupling of the motor and the leadscrew via a belt drive prevents that a unit of the known apparatus, comprising an electro-servo drive and a leadscrew, is made sufficiently small such that it can be fit in the space allotted for the standard plunger cylinder. Since furthermore no indication is given concerning modification of such a unit which would allow this unit to be made sufficiently small to fit into the space allotted for a standard plunger cylinder, D1 cannot be considered as giving an indication leading to the apparatus according to claim 1.

IX. The facts, evidence and arguments relied upon by the respondent may be summarised as follows:

(i) The apparatus according to claim 1 is obvious in view of the apparatus disclosed in D1. Contrary to the prior art referred to

in the patent in suit in the apparatus according to D1 the plunger is not driven by a piston activated by air or hydraulic pressure but, as it is the case according to claim 1, by an electro servo-driven leadscrew.

(ii) The features which essentially distinguish the apparatus according to claim 1 from the one according to D1 relate to the structure of the electro servo-drive, the structure of the leadscrew and the manner in which these two elements are mutually arranged.

(iii) Thus the problem underlying the patent in suit, namely to avoid any inherent problems related to the use of hydraulic and/or air pressure to control the movement of the plunger and to increase at the same time the accuracy of plunger displacement measurement for providing more control over plunger movement, is already solved by the apparatus according to claim 1.

(iv) In case a servo-drive and leadscrew unit of the kind concerned should be made sufficiently small to fit into the space allotted for the standard plunger cylinder, it would be obvious to appropriately modify the structure of the electro servo-drive and of the leadscrew as well as the manner of mutual arrangement of these elements.

Reasons for the decision

1. *Amended claim 1*

Claim 1 has been amended during the oral proceedings in direct response to objections made against auxiliary requests 1 and 2 submitted with letter dated 22 May 2006.

1.1 With respect to claim 1 as granted the amendment consists essentially in the addition of the following features

"wherein said plunger position sensing resolver (220) provides both commutation information about the motor as well as precise plunger position information by being coupled to said leadscrew (210, 211) and

wherein said leadscrew is an inside-out leadscrew and

wherein the electro servo-drive of said leadscrew (210, 211) includes a motor (200) which is wrapped around the inside-out leadscrew (210, 211)".

1.2 No objection has been raised from a formal viewpoint with respect to this amendment of claim 1 and the corresponding amendment of claim 10.

The Board is convinced that the amendment of claim 1 complies with the requirements of Article 123(2) and (3) EPC. The added features are based on the description of the application as originally filed (cf. page 5 and the paragraph bridging pages 5, 6) and do not extend the

protection conferred. This applies correspondingly with respect to claim 10.

1.3 Claim 1 defines the structure of the leadscrew by referring to the leadscrew as an inside-out leadscrew (cf. patent in suit, column 5, lines 38 - 48).

It further defines the structure of the electro serve-drive and its mutual arrangement and cooperation with the leadscrew defining that the electro servo-drive includes a motor, which is wrapped around the inside-out leadscrew.

Due to this arrangement of the motor and the leadscrew both elements form a unit in which they are arranged coaxially and in alignment.

Such a unit can be made sufficiently small such that it is possible to position it within an existing plunger cylinder (cf. patent in suit, column 3, lines 9 - 29).

2. *Inventive step*

2.1 Since document D1 is the only document in the proceedings which discloses an apparatus for forming a gob of molten glass into a hollow article, within which the plunger is translated via a leadscrew driven by an electric servo-drive, it is considered as constituting the closest prior art.

Document D1 discloses an apparatus for forming a gob of molten glass into a hollow article which, corresponding to features of claim 1, comprises

a plunger having a glass gob contact end for contacting a gob of molten glass to shape it into a hollow article;

an electro servo-driven leadscrew connected to said plunger for translating said plunger along a rectilinear stroke toward and away from the glass gob to bring said glass gob contact end of said plunger into and out of contact with said glass gob; and

control means for controlling the operation of said electro servo-driven leadscrew to control the rectilinear stroke toward and away from the glass gob.

The servo-drive driving the leadscrew 11 is in the form of an electro-servogeardrive 17. This drive is connected to the leadscrew via transfer elements connected in between, such as a beltdrive 13 (page 2, paragraph 2; page 10, first two full paragraphs; figure 1). For the embodiment shown in figure 1 the electro servo-geardrive and the leadscrew are essentially arranged in parallel and in side by side alignment.

Concerning control means of the apparatus besides a reference to operational characteristics of the servo-gearmotor (cf. page 3, last paragraph; page 6, last full paragraph; page 10, second full paragraph) no further indication is given.

2.2 The apparatus according to claim 1 thus essentially differs from the one according to document D1 in that

a) the control means comprise a plunger position sensing resolver for sensing the position of said plunger at all locations along said stroke,

b) wherein said plunger position sensing resolver provides both commutation information about the motor as well as precise plunger position information by being coupled to said leadscrew and

c) wherein said leadscrew is an inside-out leadscrew and

d) wherein the electro servo-drive of said leadscrew includes a motor which is wrapped around the inside-out leadscrew.

The distinguishing features thus concern the manner in which control means are provided (features a) and b)) and the structure and the mutual arrangement of the electro servo-drive and the leadscrew (features c) and d)).

Both groups of features are interrelated since the information provided by the plunger position sensing resolver is obtainable by one sensor due to the arrangement of the motor and the leadscrew according to features c) and d). Features c) and d) further lead to a coaxial and aligned arrangement of the servo-drive and the leadscrew.

2.3 *Problem*

Based on the distinguishing features c) and d) referred to above, the objective technical problem underlying

the patent in suit can be seen in the provision of a unit comprising a servo-drive and a leadscrew, such that plunger movement is made possible by a servo-driven leadscrew which can be positioned inside an existing plunger cylinder (column 3, lines 18 - 29), which requires that the unit can be made sufficiently small (column 3, lines 21 - 24).

Since this problem can be considered as underlying the patent in suit and since the solution to this problem according to claim 1 is considered as involving an inventive step as indicated in the following, a further possible problem underlying the patent in suit based on distinguishing features a) and b) and concerning the accuracy of plunger displacement (cf. column 3, lines 9 - 15) need not be further considered. In this respect it remained undisputed in the oral proceedings that features a) and b) lead to an accurate control of the plunger position while D1 remains silent with respect to the provision and arrangement of sensing means.

In the oral proceedings the respondent submitted an extract from "Meyers Lexikon der Technik und der exakten Naturwissenschaften", Dritter Band O-Z, Bibliographisches Institut, 1970, as evidence for the common technical knowledge concerning control means ("Regelung"). According to the respondent this common technical knowledge needs to be considered in combination with D1. This argument was made with respect to claim 1 as granted (i.e. the claim 1 according to the then valid main request). In view of the further definition of the control means according to features a) and b) of (amended) claim 1 this argument has no longer been upheld and the extract has

no longer been considered, since the common technical knowledge does not extend to the particular sensor and its particular arrangement as defined by features a) and b).

2.4 *Solution*

The Board is convinced that the problem referred to above is solved by the apparatus of claim 1. Due to the arrangement of the motor of the servo-drive and the leadscrew according to features c) and d) the prerequisite for the provision of a unit comprising an electric servo-drive and a leadscrew, which can be made sufficiently small enough to fit into the space allotted for the standard plunger cylinder (column 3, lines 21 - 29), is fulfilled.

2.5 *Obviousness*

The Board is of the opinion that it is questionable whether the person skilled in the art, attempting to solve the problem underlying the patent in suit (cf. paragraph 2.3 above), would have considered document D1 at all. Due to the connection of the servo-geardrive and the leadscrew via transfer means, a beltdrive being referred to as the sole example for such means, the unit comprising the servo-geardrive and the leadscrew is apparently not one having a structure which, by making modifications coming within regular design practice and by selecting appropriate dimensions to make it sufficiently small, can be considered as forming the basis for a unit which can be positioned inside an existing plunger cylinder. Furthermore no indication can be derived for D1 leading in the

direction of decreasing the size of the unit and even less decreasing the size to an extent such that the unit can be fit in the space allotted for a standard plunger cylinder. Indeed D1 by referring to the possibility to actuate more plungers by a single unit comprising a servo-geardrive and a leadscrew (cf. page 9, paragraphs 2, 3; figure 1) leads in a different direction.

Even if the person skilled in the art would have considered document D1, the structure of the servo-geardrive, of the leadscrew and the coupling and mutual arrangement of these elements as disclosed in this document do not give an indication towards the apparatus according to claim 1, within which the servo-drive and the lead leadscrew have a structure and are mutually arranged in a fundamentally different manner as defined by features c) and d).

According to the respondent claim 1 is obvious with respect to document D1 for the following reason. Firstly the apparatus according to D1 comprises elements like a servo-drive and a leadscrew, both being coupled to transform the rotatory motion of the servo-drive into a linear one of the leadscrew and ultimately the plunger, these elements thus having the same function as the corresponding elements of the apparatus according to claim 1. Secondly, in case it would be required to form a sufficiently small apparatus, it would be obvious to replace these elements, while maintaining their function by others having a different structure. Thus a unit can be arrived at without requiring inventive skill, in which the mutual arrangement of the servo-drive and the leadscrew is

modified, making the unit suited for being made sufficiently small enough to fit in the space allotted for the standard cylinder.

The Board is not convinced by this argument, since the electro servo-drive and the leadscrew according to features c) and d) are mutually arranged in a fundamentally different way as compared to D1. Document D1 does not give any indication which could lead to such an arrangement. It likewise does not give any indication with respect to the fundamentally different structure of the servo-drive and the leadscrew which would be required in order to arrange the servo-drive and the leadscrew as defined by features c) and d).

Starting from D1 such a mutual arrangement cannot be obtained within regular design practice by rearranging the servo-geardrive and the leadscrew as disclosed in this document. Moreover such a mutual arrangement cannot be arrived at by a modification of the servo-drive and the leadscrew according to D1 coming within regular design practice.

In other words changing the mutual arrangement of the servo-drive and the leadscrew as disclosed in D1 to arrive at the one defined by features c) and d) requires a fundamentally different structure of the servo-geardrive and the leadscrew. Document D1 neither gives an indication concerning the structure of the servo-drive and the leadscrew as defined by features c) and d) nor the mutual arrangement of these elements resulting from this structure.

2.6 The apparatus according to claim 1 thus involves an inventive step (Article 56 EPC).

This applies for corresponding reasons with respect to the method according to claim 10 and the further apparatus according to claim 16. The latter, which has not been objected to during the oral proceedings, comprises features corresponding to features c) and d).

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 with the following documents:

claims: 1 to 22 as filed during the oral proceedings,
description: pages 3, 4, 4a and 5 and columns 1 to 7 as filed during the oral proceedings
drawings: figures 1 and 2 of the patent specification.

The Registrar: The Chairman:

G. Nachtigall C. Holtz