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D E C I S I O N
of 5 December 2002

Case Number: T 0619/99 - 3.2.5

Application Number: 93830051.4

Publication Number: 0623443

IPC: B29C 45/14

Language of the proceedings: EN

Title of invention:

A method and device for the production of lined panels by low pressure injection

Patentee:

Johnson Control S.p.A.

Opponent:

IBS Brocke GmbH & Co. KG

Headword:

-

Relevant legal provisions:

EPC Art. 54, 56, 100(b)

Keyword:

"Sufficiency of disclosure (yes)"

"Novelty, main request (no)"

"Novelty, inventive step, first auxiliary request (yes)"

Decisions cited:

T 0883/99

Catchword:

-



Case Number: T 0619/99 - 3.2.5

D E C I S I O N
of the Technical Board of Appeal 3.2.5
of 5 December 2002

Appellant: IBS Brocke GmbH & Co. KG
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Representative: Godemeyer, Thomas, Dr
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Respondent: Johnson Control S.p.A.
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Representative: Gislon, Gabriele
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 30 April 1999
rejecting the opposition filed against European
patent No. 0 623 443 pursuant to Article 102(2)
EPC.

Composition of the Board:

Chairman: W. Moser
Members: W. R. Zellhuber
P. E. Michel

Summary of Facts and Submissions

- I. The appellant (opponent) lodged an appeal against the decision of the Opposition Division rejecting the opposition against the European patent No. 0 623 443.
- II. The Opposition Division held that the grounds for opposition submitted by the appellant under Article 100(a) EPC (lack of novelty, Article 54 EPC, and lack of inventive step, Article 56 EPC) and Article 100(b) EPC did not prejudice the maintenance of the patent in suit as granted.
- III. Oral proceedings were held before the Board of Appeal on 5 December 2002.
 - (i) The appellant requested that the decision under appeal be set aside and that the European patent No. 0 623 443 be revoked.
 - (ii) The respondent (patentee) requested as a main request that the appeal be dismissed, or as auxiliary requests that the decision under appeal be set aside and that the patent be maintained on the basis of following documents:
 - (a) first auxiliary request: claims 1 to 6 as granted; or
 - (b) second auxiliary request: claims 1 to 5 submitted during oral proceedings.

IV. Independent claims 1, 3 and 7 of the patent in suit as granted (main request) read as follows:

"1. A method for the production of lined panels, of the type comprising the steps of positioning a lining (1) of shapeable material, in tape or sheet, between two half molds (2,3), injection molding a thermoplastic material (8) to form the support of said panel, and cutting the formed panel in correspondence to its border before its removal from said half molds, characterized in that it further comprises the steps of approaching said half molds (2,3) as far as a preset distance having a value within the range of 70 % to 80 % of the thickness of the lining material (1) and injecting said thermoplastic material (8) at a pressure below 50 bar in more points of the mold (3) by means of injectors (7) independently controlled in temperature and flow rate, the sealing between said half molds (2,3) being performed by said sheet or tape of lining material (1)."

"3. A device for the production of lined panels by means of injection of a thermoplastic material (8) on a lining material (1) in sheet or tape, of the type comprising a mold formed by two half molds (2,3) of matching shape, a dispensing unit (5) of said thermoplastic material (8) to said mold and a plurality of injectors (7) for the injection of said thermoplastic material, characterized in that it further comprises spacing means (4) adjustable to space said half molds (2,3) at a preset distance; in that said injectors (7) are located at different points of the mold and independently controlled in flow rate; and in that said dispensing unit (5) and said injectors (7) are independently controlled in temperature."

"7. A lined panel as obtainable by means of the method according to claims 1 or 2."

V. The following documents were referred to in the appeal procedure:

D1: EP-A 0 497 335;

D3: plast europe, March 1992, "Machine Technology and Process Control for In-mould Surface Decoration (ISD)", A. Jaeger and G. Fischbach, Schwaig, pages 43 to 45, Carl Hanser Verlag München;

D5: Patent Abstracts of Japan; Vol. 12, Number 296 (M-731) [3143]; August 12, 1988 & JP-A 63-74617;

D6: EP-A 0 491 682;

D7: DE-A 4 033 297;

V1: "Spritzgießversuche nach Vorgaben von Patent EP 0 623 443 B1", Firma IBS Brocke GmbH & Co. KG, Lichtenberg, 20 August 1999.

VI. In the written procedure and during oral proceedings, the appellant argued essentially as follows:

Main request, Article 100(b) EPC

The patent in suit did not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art.

There was no disclosure as to how the sealing between the two mould halves could be performed by the lining

material, whilst the latter was allowed to be drawn into the mould. The lining material represented an essential feature of the invention. In decision T 883/99, which also concerned such a method, the Board had revoked the respective patent, in particular, for lack of sufficient disclosure of that process step.

Furthermore, there was no indication in the patent in suit in which part of the mould the pressure had to be below 50 bar.

As far as the lining materials were concerned, neither any details nor any properties of the materials were disclosed, nor did the patent in suit disclose any example.

The tests produced by the appellant (cf. document V1) had shown that, although standard materials had been used, the invention could not be carried out as desired. The test apparatus included a single injection nozzle. However, similar results would have been achieved in an apparatus comprising a plurality of injection nozzles.

It went beyond the routine of a person skilled in the art and required an inventive step to select appropriate materials and, dependent therefrom, to determine all the parameters necessary for carrying out the invention, in particular, the position, temperature and flow rate of each of the nozzles as well as the pressure distribution within the mould.

Main request, novelty (Article 54 EPC)

The subject-matter of claim 3 was not novel with regard

to the prior art as disclosed in document D1. The blankholders disclosed in document D1 had the function of spacing means. Moreover, in any injection moulding apparatus, the distance between the two mould halves was controllable, and injection nozzles were controllable with regard to temperature and flow rate.

The product according to claim 7 did not differ from a product obtained by a method according to the prior art as disclosed in either of documents D1 and D3.

First auxiliary request, inventive step (Article 56 EPC)

Document D1, which represented the closest prior art, disclosed injection moulding of lined panels under high pressures. The object of the patent in suit was to avoid deformation of the lining material caused by the application of high pressures, cf. column 2, lines 5 and 6 of the patent in suit. In order to solve that problem the use of lower pressures in combination with the use of a plurality of injection nozzles was suggested.

However, that solution had been known from document D3. This document disclosed a method and a device for the production of lined panels, wherein plastic material was injected at low pressures below 50 bar into a mould cavity through a plurality of injection nozzles. The cascade injection moulding technique, disclosed on page 44, right-hand column, of document D3, required injection nozzles which were independently controllable with regard to temperature and flow rate.

The solution suggested in claim 1 was therefore obvious

to the person skilled in the art. It had further to be taken into consideration that claim 1 did not indicate the chronological sequence of the process steps. Thus, applying the two-step injection/stamping process of document D3 was not excluded by the wording of claim 1.

The remaining features of claim 1 (approaching the mould halves to a preset distance, sealing being performed by lining material) did not contribute to the solution of the above-mentioned problem.

Moreover, the patent in suit was not restricted to specific lining materials, and the preset distance of between 70 and 80% of the lining material was arbitrary. As regards the feature of sealing, document D5 disclosed injection moulding wherein sealing between the mould halves was performed by lining material.

Furthermore, the subject-matter of claims 1 and 3 also was obvious with regard to the prior art as disclosed in documents D6 and D7. Document D6, similarly to document D3, disclosed a method and an apparatus wherein a plurality of independently controllable injection nozzles were provided, and document D7 disclosed an injection moulding process wherein, as could be seen in the drawings, sealing of the mould halves was performed by the lining material.

Therefore, the subject-matter of independent claims 1 and 3 of the first auxiliary request, ie. claims 1 and 3 of the patent in suit as granted, did not involve an inventive step.

VII. In the written procedure and during oral proceedings, the respondent argued essentially as follows:

Main request, Article 100(b) EPC

The tests performed by the appellant (document V1) had not been carried out according to the instructions of the patent in suit and, therefore, were not relevant. In particular, a single injector had been used instead of a plurality of independently controllable injectors, the injection pressure had been above 50 bar, the duration of injection reported in the tests was surprisingly high, which gave rise to the assumption that a plastic material of high viscosity had been used, and the lining materials used in these tests were not properly selected so that the tests had to fail.

The patent disclosed the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art. It indicated the injection pressure, ie. the pressure in the area of the mould where the plastic material was injected. It defined the range of compression of the lining material and taught using a plurality of injectors which were independently controllable in temperature and flow rate. It fell within the customary practice of the person skilled in the art to select appropriate materials and to determine the respective process parameters. Test runs were a commonly known tool for determining these parameters.

The feature of the lining material being drawn into the mould was mentioned in the description rather than in the claims. It was not essential to the invention. The stretchability of the lining material allowed manufacturing of lined panels without deformation of the

lining material, and without the necessity of the lining material being drawing into the mould during injection.

The appeal case T 883/99 concerned a different invention wherein blank holders provided between the mould halves had the function of sealing. The findings in the decision in that case were thus not applicable to the present case.

Main request, novelty (Article 54 EPC)

The subject-matter of claims 3 and 7 was novel.

The apparatus disclosed in document D1 comprised neither spacing means nor injectors which were independently controllable with regard to temperature and flow rate.

The panels obtained by the method of document D3 were physically different from the panels obtained according to the method of the patent in suit. In the latter case the injection points left corresponding injection marks on the panel. Due to the "cascade" technique applied in the method of document D3, a lined panel obtained by that method did not comprise such injection points.

First auxiliary request, inventive step (Article 56 EPC)

None of the cited prior art documents disclosed an injection moulding process wherein plastic material was injected at a low pressure using a plurality of injectors which were controllable in temperature and flow rate. Furthermore none of the documents suggested the feature of sealing being performed by the lining material, thus avoiding the necessity of providing additional sealing means.

The process of document D1 required high injection pressures in order to form embossings in the lining material.

Documents D3 and D6 disclosed injectors which could be opened and closed. They were silent about controlling flow rate or temperature.

In the apparatus of document D5, elastic material was compressed between the mould halves without using any spacing means.

Document D7 disclosed an injection moulding process wherein a single injection nozzle was used. It was silent about sealing as well as about spacing means for adjusting the gap between the mould halves in accordance with the thickness of the lining material.

The subject-matter of claims 1 and 3 of the patent in suit as granted (first auxiliary request) was thus not obvious with regard to the cited prior art.

Reasons for the Decision

1. Sufficiency of disclosure (Articles 83 and 100(b) EPC)
 - 1.1 The patent in suit discloses the key features of the invention, which can be summarized as following:
 - (a) applying an injection pressure of below 50 bar, which "prevents the lining from deformation and allows to obtain sufficient sealing between the two half-molds thanks to the lining material alone", cf. column 3, lines 5 to 7 of the

description of the patent in suit.

The term "injecting said thermoplastic material (8) at a pressure below 50 bar" used in claim 1 and the description of the patent in suit has to be construed as meaning that the pressure in the area of the mould where the plastic material is injected is below 50 bar. The pressure in that area is different from the pressure within the mould cavity, and is definitely different from the pressure in the peripheral parts of the mould cavity which are distant from the injection holes.

(b) "The optimal distribution of the support material is obtained by injecting it at the plastic state in more points of the mold by means of injectors independently controlled as far as temperature and flow rate are concerned", cf. column 3, lines 8 to 11 of the description of the patent in suit.

(c) "Jointly using the low pressure injection and the temperature and flow rate control, the sealing between the half-molds 2 and 3 is ensured by the lining 1 since, in the vicinity of the internal edges of the shape, the thermoplastic material gets rapidly cool and has not a sufficient pressure to escape from the space comprised between the half-mold 3 and the lining 1", cf. column 4, lines 20 to 26 of the description of the patent in suit.

1.2 Bearing in mind that the disclosure of a patent is aimed at the skilled person and that a skilled person uses his common general knowledge and considers performing a reasonable amount of test runs, there is no indication

or evidence that the disclosure would not be not sufficient to enable a skilled person to carry out the invention as claimed in the patent in suit.

It falls within the customary practice of a skilled person to select a lining material which, after having been pressed to a value between 70% and 80% of its thickness, is suitable to perform the sealing and to withstand the pressure of the plastic material in the mould cavity. A skilled person would not consider using a soft material, which, for example, can be easily pressed to one half or a quarter of its thickness, for carrying out the invention, although such a soft material might be used as a standard material in the technical field concerned, ie. automobile manufacturing.

Furthermore, there is no evidence that, following the instructions in the patent in suit, a skilled person, in order to obtain an optimal distribution of the plastic material, was not enabled to determine the position, the temperature and the flow rate of each injector without performing an unreasonably high number of tests.

- 1.3 The tests the appellant referred to (cf. document V1) were performed using a single injection nozzle. They thus were not performed in accordance with the instructions indicated in the patent in suit.

The appellant argued that the use of a plurality of injection nozzles would have led to the same results. This cannot be accepted. When using a plurality of independently controllable injection nozzles, the volume within the cavity to be filled by each injection nozzle is smaller and, accordingly, lower injection pressures can be applied. Furthermore, due to the controllability

of the injectors with regard to temperature and flow rate, the distribution of the plastic material within the mould cavity can be controlled more accurately.

- 1.4 According to the description of the patent in suit, cf. column 3, lines 37 to 40 and column 4, lines 6 to 9, the lining material is allowed to be drawn into the mould during the injection of the plastic material. However, that feature is neither a feature of the invention as defined in claims 1 and 3 of the patent in suit, nor does the description of the patent in suit indicate that it is essential to the invention.

Nevertheless, there is no indication that the process as disclosed in the patent in the suit does not allow lining material to be drawn into the mould during injection, provided that the instructions given in the patent in suit are respected, ie. that low injection pressures are applied and that spacing means and a plurality of independently controllable injection nozzles are used.

- 1.5 Decision T 883/99 concerns an injection moulding process wherein sealing of the mould is performed by means of blankholders located between the mould halves, and wherein these blankholders further should be suitable to let coating material to be drawn into the mould during the injection of supporting material. In that case, the Board found that it had not been disclosed how these blankholders have to be constructed in order to perform these contrary functions.

The patent in suit does not refer to such blankholders. The findings in decision T 883/99 are therefore not applicable to the present case.

1.6 To sum up, although the patent in suit as granted does not describe in detail a specific way of carrying out the invention, there is no indication that the patent in suit does not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art.

Therefore, the ground for opposition raised under Article 100(b) EPC does not prejudice the maintenance of the patent in suit as granted.

2. *Main request, novelty (Article 54 EPC)*

Claim 7 of the patent in suit as granted concerns a "lined panel as obtainable by means of the method according to claims 1 or 2" of the patent in suit.

Document D3 also discloses a lined panel manufactured by using the so-called in-mould decoration process. The patent in suit, and, in particular, claim 7, is silent about any specific structural features of the lined panel manufactured according to the method of claim 1 or claim 2 of the patent in suit. Furthermore, there is no indication that a lined panel "obtainable by means of the method according to claims 1 or 2" will inevitably show any structural features which would distinguish it from a lined panel manufactured according to the method disclosed in document D3.

The respondent argued that the panels obtained by the method of document D3 were physically different from the panels obtained according to a method of the patent in suit, because, in the latter case, the injection points left corresponding injection marks on the panel. However, claim 1 is silent about any injection marks,

and document D3 is silent about the formation of injection marks. Moreover, document D3 discloses a process wherein, at the end of the injection cycle, all the nozzles can be opened again, cf. page 44, right-hand column, last sentence, which, for the same reasons as in the process according of the patent in suit, gives rise to the formation of injection marks.

Accordingly, document D3 discloses a lined panel which is obtainable by means of the method according to claim 1 or claim 2 of the patent in suit.

Therefore, the subject-matter of claim 7 of the patent in suit as granted is not novel within the meaning of Article 54 EPC. Consequently, the main request of the respondent is not allowable.

3. *First auxiliary request*

3.1 Formal requirements

The first auxiliary request only includes claims 1 to 6 of the patent in suit as granted. No formal objections have been raised against the patent in suit as amended. The deletion of claim 7 does not give rise to any objection with regard to requirements of Articles 84 and 123 EPC and Rule 57a EPC.

3.2 Novelty (Article 54 EPC)

The cited documents disclose neither a method nor an apparatus according to claim 1 and claim 3, respectively. In particular, none of the cited documents discloses the feature of providing a plurality of injectors which are independently controllable in

temperature and flow rate as further demonstrated in the following paragraph.

3.3 Inventive step (Article 56 EPC)

3.3.1 Document D1, which is considered to represent the closest prior art, concerns a method for the production of lined panels, wherein plastic material is injected at a plurality of points of the mould and at high pressure. Document D1 suggests a solution neither to the problem of sealing the mould halves during injection, nor to the problem of the lining material being deformed due to high injection pressures.

The object of the patent in suit is to provide a process and an apparatus for the production of lined panels with improved homogeneity of the support material and a perfect shaping of the lining material whilst reducing or eliminating deformations of the lining material, cf. column 2, lines 27 to 39 of the patent in suit.

3.3.2 The object is solved by a method according to claim 1 and an apparatus according to claim 3, respectively.

Particular aspects of the solution suggested in the patent in suit are:

- (a) the injection of thermoplastic material at different points of the mould by means of injectors which are independently controlled in temperature and flow rate, which allows the injection to be carried out at a low pressure (<50 bar) and
- (b) to provide means for approaching the mould halves

to a preset distance having a value within the range of 70% to 80% of the thickness of the lining material and performing sealing between the mould halves by means of the lining material.

3.3.3 The cited prior art suggests neither feature (a) nor (b).

Document D3 suggests the injection of thermoplastic material at a low pressure at different points of the mould by means of a plurality of injectors (hot-runner nozzles, cf. page 45, left-hand column, lines 1 to 4), which can be opened and closed independently from each other in order to fill the mould cavity section by section thus avoiding weld lines, cf. page 44, left-hand column, paragraph with the heading "cascade injection moulding".

Document D3, however, is silent about independently controlling the temperature of these hot-runner nozzles. There is also no indication that these nozzles have to be independently controllable in temperature for carrying out cascade injection moulding.

Furthermore, document D3 discloses independently opening and closing the nozzles. However, it is silent about individually controlling the flow rate, ie. the quantity of injected material per unit time as claimed in claims 1 and 3 of the patent in suit.

Finally, document D3 suggests providing "...vertical flash faces to prevent uncontrolled escape of the melt from the **open** mould during injection", cf. page 44, center column, third paragraph. It further follows from this passage that these "flash faces can be spring

mounted on one half of the mould ...". Document D3 does not disclose how sealing is performed in the subsequent stamping process, ie. when the mould is closed.

Document D6 also concerns cascade injection moulding using injection nozzles which are sequentially opened and closed thus avoiding the formation of weld lines, cf. column 5, lines 28 to 38. The lining material is attached to the peripheral edge of the mould cavity by needles mounted on sliding blocks, cf. column 4, lines 30 to 45. Document D6 is silent about independently controlling flow rate and temperature of the nozzles, and using the lining material for sealing.

Document D7 concerns an injection moulding process wherein a single injection nozzle 15 is used, cf. Figures 1 to 5. A gap is provided between the closed mould halves to receive the lining material without applying pressure on it ("ohne Klemmung"), cf. column 1, lines 47 to 50. Nothing is said about sealing.

Document D5 shows an apparatus comprising a sprue for injecting thermoplastic resin into a mould cavity. An elastic member is pressed between two moulding tool parts, however without providing any spacing means or similar means to keep the two parts at a predetermined distance, cf. abstract and Figure.

- 3.3.4 Thus, the cited prior art documents taken either alone or in any combination do not suggest the above-mentioned aspects of the patent in suit and, accordingly, do not render obvious the subject-matter of claims 1 and 3 of the patent in suit as granted.

Therefore, the subject-matter of claims 1 and 3 as

granted involves an inventive step. The subject-matter of claims 2 and 4 to 6, which are appendant to these claims, similarly do involve an inventive step.

- 3.4 The first auxiliary request of the respondent is therefore allowable. Consequently, the second auxiliary request of the respondent need not be considered.

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:
 - (a) claims 1 to 6 as granted; and
 - (b) description: pages 2,3 and page 4, column 5, lines 1 to 19 as granted; and
 - (c) drawings, Figures 1 to 5, as granted.

The Registrar:

The Chairman:

M. Dainese

W. Moser