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D E C I S I O N
of 11 November 2003

Case Number: T 0921/01 - 3.2.5

Application Number: 93912511.8

Publication Number: 0648158

IPC: B29C 47/12

Language of the proceedings: EN

Title of invention:

Multi-cavity travelling mold tunnel for molding profiled pipe
and mold block tunnels

Patentee:

LUPKE, Manfred Arno Alfred

Opponent:

Unicor Rohrsysteme GmbH

Headword:

-

Relevant legal provisions:

EPC Art. 54, 56, 123(2)

Keyword:

"Extension beyond the content of the application as filed
(no)"

"Novelty (yes)"

"Inventive step, main request (no), first auxiliary request
(yes)"

Decisions cited:

-

Catchword:

-



Case Number: T 0921/01 - 3.2.5

D E C I S I O N
of the Technical Board of Appeal 3.2.5
of 11 November 2003

Appellant:
(Opponent)

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Representative:

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Respondent:
(Proprietor of the patent)

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Representative:

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Decision under appeal:

**Interlocutory decision of the Opposition
Division of the European Patent Office posted
18 June 2001 concerning maintenance of European
patent No. 0648158 in amended form.**

Composition of the Board:

Chairman:

W. Moser

Members:

W. Widmeier

W. R. Zellhuber

Summary of Facts and Submissions

- I. The appellant (opponent) lodged an appeal against the interlocutory decision of the Opposition Division maintaining the patent No. 0 648 158 in amended form.

The Opposition Division held that the grounds of opposition submitted by the appellant under Article 100(a) EPC (lack of novelty and lack of inventive step, Articles 54 and 56 EPC) did not prejudice the maintenance of the patent as amended.

The following documents were referred to in the appeal proceedings:

E1: DE-C-3 335 850

E2: EP-A-0 464 411

E3: DE-C-195 17 023

- II. Oral proceedings were held before the Board of Appeal on 11 November 2003.
- III. The appellant requested that the decision under appeal be set aside and that the European patent No. 0 648 158 be revoked in its entirety.

The respondent (patent proprietor) requested that the decision under appeal be set aside and that the patent be maintained on the basis of the following documents:

- (a) main request: claim 1, filed as main request on 8 October 2003, and claims 2 to 12 as granted; or

- (b) first auxiliary request: claims 1 to 4 submitted as first auxiliary request during oral proceedings; or
- (c) second auxiliary request: claims 1 to 3 submitted as second auxiliary request during oral proceedings; or
- (d) third auxiliary request: claims 1 to 3 submitted as third auxiliary request during oral proceedings.

IV. Claim 1 of the main request reads as follows:

"1. A travelling mold tunnel for vacuum forming of profiled tube from extruded parison of molten thermoplastics material, said tunnel including a plurality of parallel mold cavities (18), characterised by control means for controlling the vacuum independently for each of said mold cavities (18) so that the travelling mold tunnel enables to form parallel tubes simultaneously in each mold cavity and, if desired, to seal off the unused mold cavity or mold cavities (18) from the vacuum to form tubes not in all mold cavities."

Claim 1 of the first auxiliary request reads as follows:

"1. A travelling mold tunnel for vacuum forming of profiled tube from extruded parison of molten thermoplastics material, said tunnel including a plurality of parallel mold cavities (18), wherein each mold cavity (18) is formed by a plurality of mold blocks (12) each of which comprises opposing mold block

halves (14, 16), characterised by control means for controlling the vacuum independently for each of said mold cavities (18) so that the travelling mold tunnel enables to form parallel tubes simultaneously in each mold cavity and, if desired, to seal off the unused mold cavity or mold cavities (18) from the vacuum to form tubes not in all mold cavities, and a plurality of vacuum channels (34, 36), one to each of said mold cavities (18), and a separate vacuum manifold (32) provided for each of said vacuum channels (34, 36), whereby each of said mold block halves (14, 16) is provided with only one of said vacuum channels (34, 36) and the corresponding vacuum manifold (32)."

Independent claim 2 of the first auxiliary request reads as follows:

"2. A travelling mold tunnel for vacuum forming of profiled tube from extruded parison of molten thermoplastics material, said tunnel including a plurality of parallel mold cavities (18), wherein each mold cavity (18) is formed by a plurality of mold blocks (12) each of which comprises opposing mold block halves (14, 16), characterised by control means for controlling the vacuum independently for each of said mold cavities (18) so that the travelling mold tunnel enables to form parallel tubes simultaneously in each mold cavity and, if desired, to seal off the unused mold cavity or mold cavities (18) from the vacuum to form tubes not in all mold cavities, and a plurality of vacuum channels (33, 35, 37), one to each of said mold cavities (18), and a common vacuum manifold (32) for all of said vacuum channels (33, 35, 37), whereby the control means include valve means to control the vacuum

independently through each vacuum channel (33, 35, 37), and all of said vacuum channels (33, 35, 37) and the common vacuum manifold (32) are provided in only one of said mold block halves."

V. In the written and oral proceedings, the appellant argued essentially as follows:

(a) *Main request*

The control means of claim 1 for controlling the vacuum independently for each of the mould cavities are not disclosed in the application as filed. The claims of the application as filed refer to control means for controlling the channels rather than for controlling the cavities. For this reason claim 1 of the main request is not in accordance with Article 123(2) EPC.

Figures 1 and 2 of document E1, which represents the closest prior art, show a travelling mould tunnel, and claim 1 of this document shows the forming of a tube by means of a vacuum. Figure 2 of this document shows a plurality of parallel mould cavities which enable the simultaneous forming of parallel tubes. The features defined in claim 1 of document E1 imply control means for controlling the vacuum. Consequently, all features of claim 1 of the main request are disclosed, at least implicitly, in document E1 so that the subject-matter of claim 1 lacks novelty.

Even if the implicit disclosure of document E1 concerning the control means for controlling the vacuum were not to be accepted, it is clear that a person skilled in the art has to provide a vacuum for all the

mould cavities of the tunnel. The selector valve connecting one of the cavities to the vacuum while simultaneously sealing off the unused cavities so that it is not possible to form more than one tube at a time, considered by the respondent as the solution a skilled person would use for operating the vacuum in document E1, is a complicated and expensive part. A person skilled in the art would use simple individual valves for each of the cavities, open the valve of the cavity to be used and close the other ones. Such a valve configuration would also enable a simultaneous forming of more than one tube. Although claim 1 of document E1 designates the tube forming by pressure as the preferred method, the alternative to form the tubes by means of vacuum is mentioned in document E1 and will thus be considered by a person skilled in the art. If necessary, document E2 gives the instructions how to connect the cavities to the vacuum source. Document E3 expresses a late finding with respect to the use of vacuum. A person skilled in the art reading document E1 could trust that in accordance with the legal requirements the subject-matter of document E1 was examined with respect to its feasibility and that the use of vacuum is indeed one of two possible alternatives. Since the configuration with three individual valves is the easiest and most obvious one to control the vacuum in the cavities, the subject-matter of claim 1 cannot be considered to involve an inventive step.

(b) *First auxiliary request*

The additional features of claims 1 and 2 of the first auxiliary request are purely mechanical measures a person skilled in the art performs on the basis of his ordinary skill and with the help of the disclosure of document E2. Thus, also the subject-matter of claims 1 and 2 of the first auxiliary request lacks an inventive step.

VI. In the written and oral proceedings, the respondent argued essentially as follows:

(a) *Main request*

The application as filed discloses that the vacuum is controllable. As a logical consequence, there must be control means. The description of the application as filed (published version), in particular page 6, last full paragraph and page 7, first full paragraph, shows the function of the control means and shows that it is the same function to control the vacuum in the channels and in the cavities. Thus, claim 1 does not go beyond the content of the application as filed.

Document E1, which represents the closest prior art, discloses the features of the preamble of claim 1, however, it does not disclose control means as specified in the characterising portion of the claim. Consequently, the subject-matter of claim 1 is novel.

Claim 1 of document E1 shows that vacuum tube forming is not desired. Document E3 does not constitute prior art, however, it makes clear that a person skilled in

the art considers vacuum tube forming in combination with an arrangement as disclosed in document E1 unsuitable. Even if a person skilled in the art were nevertheless to use a vacuum for forming a tube in one of the cavities of the tunnel of document E1, he is aware of the fact that he has to avoid that air is sucked through the unused cavities. He would therefore not use control means as specified in claim 1. He would use control means which prevent a vacuum connection to more than one cavity. For this reason he would use a selector valve which connects the cavity to be used to the vacuum and would seal the unused cavities. With such a valve it is not possible to form more than one tube at a time. Furthermore, a person skilled in the art would use a symmetrical vacuum channel arrangement as shown in document E2. Anyway, the mould tunnel is clearly not intended for forming a plurality of tubes simultaneously as is best shown by the use of a table on which the mould tunnel is mounted. The height of this table is adjustable in order to move the cavity to be used in front of the extruder. It would require a couple of non-obvious steps, starting from document E1, to arrive at the solution of the patent in suit. For this reason the subject-matter of claim 1 involves an inventive step.

(b) *First auxiliary request*

The essential feature of claim 1 of the first auxiliary request is that each mould block half is provided with only one of the vacuum channels and a corresponding vacuum manifold. The essential feature of claim 2 is that all of the vacuum channels and the common manifold are provided in only one of the mould block halves. A

combination of documents E1 and E2 cannot result in these features. If a person skilled in the art combined these documents, the result would be a symmetrical arrangement of vacuum channels as shown in document E2, with two channels to each cavity. Thus, neither the solution according to claim 1 with only one channel in each half nor the solution according to claim 2 with all the vacuum channels in only one mould block half is rendered obvious.

Reasons for the Decision

1. *Main request*

1.1 Formal requirements

The application as filed (published version) specifies on page 6, last full paragraph, that shut-off valves are provided to control the vacuum in each of the channels. As described on page 6, first paragraph, and illustrated in Figures 1 and 2 of the application as filed (published version), the channels are connected with the respective mould cavities. Thus, the shut-off valves are control means for controlling the vacuum in the channels and, consequently, in the cavities. Together with the definition in claim 1 of the application as filed that the vacuum is independently controllable for each of the mould cavities, this constitutes the basis for the definition used in claim 1 of the main request that there are control means for controlling the vacuum independently for each of said mould cavities.

The Board is therefore satisfied that claim 1 of the main request meets the requirements of Article 123(2) EPC.

Claim 1 also meets the formal requirements of Articles 84 and 123(3) EPC and of Rule 57a EPC. No objections were raised by the appellant in this respect.

1.2 Novelty

Document E1 discloses the features of the preamble of claim 1. However, this document leaves it open how, in case a vacuum is used for forming tubes, this vacuum is controlled. Thus, this document does not disclose control means for controlling the vacuum independently for each of the mould cavities. Document E2 shows a mould tunnel with only one cavity. Document E3 does not constitute prior art according to Article 54(2) and (3) EPC and has to be disregarded. For this reason, the subject-matter of claim 1 is novel.

1.3 Inventive step

The Board concurs with the parties in considering document E1 to represent the closest prior art. Claim 1 of this document specifies, as one of two alternatives, that the necessary pressure difference for forming the tubes in the mould cavities may be achieved by a vacuum (cf. column 1, lines 27 to 32). Although this alternative is not the preferred one, a person skilled in the art will nevertheless think about a realization of the device with a vacuum as pressure source.

Document E3, which teaches that a vacuum in combination with a mould tunnel comprising a plurality of cavities is unsuitable, was published four years after the priority date of the patent in suit. Thus, at this priority date a person skilled in the art could not yet see an obstacle to use a vacuum for the device of document E1 and would simply have tried to find a way to connect the three cavities of the mould tunnel to a vacuum source.

Since only one of the cavities of the tunnel shown in document E1 is used at a time, the person skilled in the art will realize that the unused cavities must be sealed off so that sucking air through an unused cavity is inhibited. Thus, a system has to be provided which allows connecting the one cavity to be used for forming a tube to the vacuum source while sealing off the other two unused cavities. To realize this, the person skilled in the art has two straightforward possibilities. One is to provide an open/close valve in each vacuum channel which connect the cavities and the vacuum source, and to open only one valve while keeping the other two closed. The other possibility is a three-way valve which is designed such that it opens only one way while automatically closing the other two ways. The choice among these two possibilities is an easy design measure and depends on the circumstances. If the solution with the three single valves is chosen, then the system has control means for controlling the vacuum independently for each of the mould cavities, and enables therefore to form parallel tubes simultaneously in each mould cavity or mould cavities and to seal off the unused mould cavity or cavities from the vacuum. It

is to be noted that claim 1 specifies the ability of the device rather than the way how it is used.

Thus, starting from document E1, and with a simple choice among obvious possibilities, a person skilled in the art arrives at the subject-matter of claim 1, which cannot therefore be considered to involve an inventive step.

2. *First auxiliary request*

2.1 Formal requirements

The Board is satisfied that claims 1 and 2 of the first auxiliary request meet the requirements of Articles 84, 123(2) and (3) EPC and of Rule 57a EPC. Besides, the appellant did not raise any objections in this respect.

2.2 Novelty

Claims 1 and 2 have been supplemented with respect to claim 1 of the main request by further features. Thus, also the subject-matter of claims 1 and 2 of the auxiliary request is novel. The appellant did not raise any objections as to novelty.

2.3 Inventive step

Also the preambles of claims 1 and 2 of the first auxiliary request relate to the travelling mould tunnel known from document E1. The characterising portions of both claims have been supplemented by the feature that the mould tunnel comprises a plurality of vacuum channels, one to each of the mould cavities.

Claim 1 has further been supplemented by the features that a separate vacuum manifold is provided for each of the vacuum channels and that each of the mould block halves is provided with only one of the vacuum channels and the corresponding vacuum manifold.

Claim 2 has further been supplemented by the features that a common vacuum manifold is provided for all of the vacuum channels, that the control means include valve means to control the vacuum independently through each channel and that all of the vacuum channels and the common vacuum manifold are provided in only one mould block half.

Document E1 does not show any details of a possible vacuum arrangement. A person skilled in the art trying to realize such an arrangement can use document E2 in order to find the necessary details. This document relates to a travelling mould tunnel with only one mould cavity. This cavity is formed by mould block halves (2, 2'), wherein each half is equipped with a vacuum channel (28, 28') connected to a respective manifold (30, 30') so that the cavity (26) is connected to two channels and their corresponding manifolds (cf. Figure 2). When transferring the teaching of document E2 to document E1 a person skilled in the art will consequently provide for each of the three cavities the symmetric arrangement of two channels and two corresponding manifolds so that each cavity is connected via both mould block halves by two channels and two manifolds to the vacuum source. A solution with one channel for each cavity and only one in each half, as specified in claim 1 of the first auxiliary request,

or a solution with one channel for each cavity and all channels in one half with a common manifold, as specified in claim 2 of the first auxiliary request, does not result in an obvious manner from applying the teaching of document E2 to document E1.

Thus, the subject-matter of claim 1 and of claim 2 of the first auxiliary request involves an inventive step.

2.4 Claims 3 and 4 of the first auxiliary request depend on claim 1 or 2 and involve therefore the same inventive step as the respective reference claim.

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 4 submitted as first auxiliary request during oral proceedings; and
 - (b) description, pages 2 to 4 submitted during oral proceedings; and
 - (c) drawings, pages 6 to 8 as granted.

The Registrar:

The Chairman:

R. Schumacher

W. Moser