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D E C I S I O N
of 23 June 2005

Case Number: T 0606/04 - 3.2.3
Application Number: 94904594.2
Publication Number: 0678138
IPC: E04B 1/78, D04H 1/70, E04C 2/16
Language of the proceedings: EN

Title of invention:

A method of producing a mineral fiber-insulating web and a plant for producing a mineral fiber web

Patentee:

Rockwool International A/S

Opponent:

Paroc AB

Headword:

-

Relevant legal provisions:

EPC Art. 56

Keyword:

"Inventive step: no"

Decisions cited:

-

Catchword:

-



Case Number: T 0606/04 - 3.2.3

D E C I S I O N
of the Technical Board of Appeal 3.2.3
of 23 June 2005

Appellant: Paroc AB
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Decision under appeal: Interlocutory decision of the Opposition
Division of the European Patent Office posted
9 March 2004 concerning maintenance of European
patent No. 0678138 in amended form.

Composition of the Board:

Chairman: U. Krause
Members: Y. G. A. Jest
J. P. B. Seitz

Summary of Facts and Submissions

I. The appeal is directed against the decision posted on 9 March 2004 of an opposition division which maintained the European patent EP-B-0678138 in an amended form. In the decision under appeal, the opposition division held that the grounds of lack of inventive step raised by the opponent did not prejudice the maintenance of the patent as amended.

The opponent, hereinafter the appellant, lodged the appeal on 7 May 2004 and paid the appeal fee on the same day. In the statement of the grounds, which was received on 30 June 2004, lack of inventive step under Article 100a) EPC were again relied on.

The following relevant state of the art documents were already under discussion in the opposition procedure:

- D3: WO-A- 92/10602
- D7: US-A- 4950355
- D10: GB-A- 1403322 (patent family document corresponding to DE-C-2307577 (D10') referred to in D3)

II. On 23 June 2005 oral proceedings took place in the absence of the patentee, who notified with a letter dated 23 March 2005 the withdrawal of his request for oral proceedings and that he would not be attending.

During the oral proceedings, the discussion was based on the set of amended claims and the adapted pages of the description as submitted by the patentee with letter of 17 June 2005.

Independent method claim 1 is based on claim 1 as maintained by the first instance but including additional features corresponding to those of dependent claim 2 as maintained (hereinafter in *italic* in feature labelled "g").

(a) Independent claim 1 has the following wording:

"A method of producing a mineral fibre-insulating web comprising the following steps:

- a) producing a first non-woven mineral fibre web (50''') defining a first longitudinal direction parallel with said first mineral fibre web (50''') and a second transversal direction parallel with said first mineral fibre web (50'''), said first mineral fibre web (50''') containing mineral fibres arranged generally in said second transversal direction and including a first heat-curable bonding agent, said first non-woven mineral fibre web (50''') defining a first mineral fibre web(50''') height, and wherein the first web (50''') is produced by providing a basic non-woven mineral fibre web (40) in which the overall orientation of the mineral fibres is parallel with the longitudinal orientation of the basis web (40), and arranging the basic web (40) in layers which overlap generally in the said second transversal direction,
- b) moving said first mineral fibre web (50''') in said first longitudinal direction of said first mineral fibre web (50'''),
- c) cutting said first mineral fibre web (50''') parallel with said first longitudinal direction and perpendicular to said second transversal direction so as to produce a plurality of mutually parallel mineral

fibre strips (64) extending in said first longitudinal direction, said mutually parallel mineral fibre strips (64) being of identical width,

d) tilting each of said mutually parallel mineral fibre strips (64) so as to turn said mineral fibres of each of said mutually parallel mineral fibre strips (64) from the arrangement generally in said second transversal direction to the arrangement generally perpendicular to said first longitudinal direction and said second transversal direction,

e) adjoining said tilted mineral fibre strips (64) in abutting relationship so as to produce a second non-woven mineral fibre web (50''') defining a second mineral fibre web height identical to said width of each of said mutually parallel mineral fibre strips (64), said second mineral fibre web (50''') containing mineral fibres arranged generally perpendicular to said first longitudinal direction and said second transversal direction,

f) moving said second mineral fibre web (50''') in said first longitudinal direction,

g) producing a third non-woven mineral fibre web (24) defining a third direction parallel with said third mineral fibre web (24), said third mineral fibre web (24) containing mineral fibres arranged generally in said third direction and including a second heat-curable bonding agent, said third mineral fibre web (24) being a mineral fibre web of a higher compactness as compared to said second mineral fibre web (50''') *and being produced by separating a surface segment layer of said first mineral fibre web (50''') therefrom and by compacting said surface segment layer for producing said third mineral fiber web (24),*

h) adjoining said third mineral fibre web (64) to said second mineral fibre web (50''') in facial contact therewith for producing a fourth composite mineral fibre web (90), and
i) curing said first and second curable bonding agents so as to cause said mineral fibres of said fourth composite mineral fibre web (90) to bond to one another, thereby forming said mineral fibre-insulating web."

(b) The independent device claim 9 relates to a "plant for producing a mineral fiber-insulating web" which is defined by nine "means for" features, each being respectively followed by the wording of one of the nine method steps a) to i) of claim 1, without any further constructional details of said plant.

III. The appellant requested that the appealed decision be set aside and the patent be revoked for lack of inventive step of the claimed method and plant.

The appellant's arguments in this respect can be summarised as follows:

- Prior art document D3 discloses a method of producing a mineral fibre-insulating web comprising steps a) to f) of claim 1, bearing in mind that step d) is disclosed in D3 as an alternative method by direct reference to document D10'.

- The distinguishing steps g) to i) provide a surface layer to the insulating web in order to enhance the physical properties of the outer surface of the web.
- The same problem is solved by D7 which provides an identical solution in terms of features g) to i) of claim 1, i.e. the application of a compacted layer to a web for reinforcing the outer surface structure, which layer has originally been cut from the basic web.
- The person skilled in the art would thus in an obvious manner arrive at the claimed method, and, by analogy, at the claimed plant.

IV. The patentee (respondent) requested in writing that the impugned decision be set aside and that the patent be maintained on the basis of his main request (claims 1 to 16 and a description adapted thereto) filed with letter dated 17 June 2005.

He further requested that, if said claims were held to comply with the EPC requirements, but further amendments to the description were required, the appeal procedure be continued in writing or that the case be remitted to the first instance for adaptation of the specification.

The respondent presented his argument on inventive step as follows:

- According to the preferred embodiment of D3, as illustrated in its single drawing, the web is

cured prior to its cutting into strips, which requires a subsequent application of additional binder. This is in opposition to one object of the invention, which is to avoid the need of such additional binder.

- Although D3 mentions the possibility of applying the process of D10', i.e. the tilting "in-line" of the cut lamellae, this alternative is clearly presented in D3 as a less preferred solution.

- The problem to be solved is therefore to determine a process conducted "in-line" for forming lamellae boards with significantly improved surface properties and without needing to increase the amount of binder.

- Although D7 might provide a solution for improving the surface properties of webs or boards, the skilled person would not have combined D7 with D3, because D7 does not address the problem of reduction of the amount of binder linked to the lamellae structure of the webs and because D3 teaches mainly an "off-line" process.

Reasons for the Decision

1. The appeal is admissible.

2. *Amendments*

Independent claims 1 and 9, when compared to the claims as granted, comprise further limiting features which

are unambiguously supported by the originally filed application documents, e.g. substantially by dependent claims 2, 4 and 5, and, respectively, by dependent claims 13, 15 and 16.

The amendments made to the dependent claims and to the description consist in their adaptation to the amended definition of the invention according to the independent claims.

The requirements of Article 123 EPC are therefore obviously met.

3. *Novelty*

Novelty has never been an issue since no cited prior art shows, in combination, a lamellae web structure including an upper layer made of the same material as for the web but compacted in order to enhance its physical properties.

4. *Inventive step*

4.1 Preliminary remark

The independent device claim 9 relates to a "plant for producing a mineral fiber-insulating web" which is defined by nine "means for" features a) to i), each being respectively followed by the wording of one of the nine method steps a) to i) of claim 1, and without any further constructional details of said plant.

The following analysis and results based on the method claim may therefore be fully applied to the apparatus claim.

4.2 Closest prior art

In agreement with the opinion of the parties and of the opposition division, the board considers that D3 discloses the closest prior art.

The method directly derivable from D3 comprises, in combination, features a) to f) of claim 1 as can be seen from the following.

4.2.1 The invention according to D3 generally relates to a method and apparatus of manufacturing insulating boards comprising providing a mineral fibre web including binder, cutting said web in the longitudinal direction to form lamellae, turning said lamellae 90° about their longitudinal axis and bonding them together to form boards (see page 1, first paragraph). The fibre web 14, having fibres oriented generally perpendicularly to the longitudinal direction of the web, results from forming partially overlapping layers of a thin primary web 8 (see Figure 1 and page 7, lines 3 to 6).

4.2.2 It may be emphasized at this stage that prior art D3 contains additional technical information about the manufacturing process at two distinguishable levels:

- first, further details can be found in the single embodiment of the method as illustrated in the drawing, and
- second, the description of D3 refers directly to possible alterations based on either alternative or additional method steps as compared to the detailed method illustrated in the drawing.

- (a) From the detailed embodiment as illustrated by the single drawing, the lamellae 23, obtained by the longitudinal cut of the web (see cutters 22), are transversely cut into segments or board elements 25 (see cutter 24), these segments then being turned or tilted by 90° by transferring them to a second conveyor belt 26 ("off-line" tilting step). Finally, groups of adjacent segments are bound together so as to form the insulating boards by either applying a binder to the contact surfaces or joining the segments by means of strips, strings, vlies or paper (see page 7, lines 26 to 30 and 37 to 39).
- (b) As mentioned, the description of D3 offers several variations of said embodiment.

The tilting operation may be done, alternatively to the "off-line" step related to the lamellae segments as shown in Figure 1, in an "in-line" process as suggested by the direct reference (see page 5 of D3, lines 28 to 30) to a different method disclosed in D10 and D10'. According to this alternative, the "endless" tilting operation is performed on the lamellae, immediately after having been cut from the web by an "in-line" tilting device (see D10, Figure 1 and 3, page 3, lines 11 to 26).

Prior art D3 also offers a multiple choice with respect to the bonding operation of the lamellae. One of these options consists in using the heat curable binder already present in the primary web to adjoin the lamellae and subsequently to cure

them in one step through a curing furnace, see page 5, line 37 to page 6, line 11. It may be noted that this alternative is in line with the process known from D10, in which the tilted lamellae are bond together in a final step in a curing oven 33 by using the binder already present in the lamellae material so as to form the final web structure, see for instance claim 1 of D10.

4.2.3 In summary it becomes apparent from this discussion of prior art D3, bearing in mind all the offered alternatives suggested in the description of D3, that features a) to f) of the independent claim 1 are directly known in combination from D3.

4.3 The differences of the method of claim 1 and prior art D3 thus lie in the three features g), h) and i) and could be summarised as follows:

the claimed method provides, in addition to the lamellae-structured fibre web as derivable from D3, a compacted covering layer made of the same basic web material and which has previously been cut from the first web, said layer and web being cured and thus bonded together by the binders they already comprise.

4.4 Technical problem

The objective problem derivable from said differences could be defined as being to form boards with improved surface properties, having for instance regard to mechanical performance or properties, and wherein the overall process may still be conducted "in-line". This definition actually corresponds to the technical

problem, see page 1, lines 39 to 57, and supported by the expected advantages as presented in the description of the patent.

4.5 Solution - obviousness

Prior art D7 discloses a process and an apparatus in which a compacted web layer 8 is bonded to a non-woven mineral fibre-web 7 to provide continuously "in-line" a board with enhanced properties at its surface, see especially col. 1, lines 40 to 45, line 65 to col. 2, line 26, Figures 1 to 4 and 10. The compacted web 8 of D7 is produced by separating a surface layer of a primary mineral fibre web 2 therefrom and by compacting said separated surface layer to improve its physical properties compared with the original structure, see Figure 1 and col. 2, lines 8 to 26. In a further step, the compacted web 8 is bonded to the fibre-web 7 by using the binder present in both webs and by finally curing this layered structure in oven 5. When D7 teaches that the compacted web layer 8 may be partially pre-cured (see for instance column 8, lines 60 to 68), it does not alter the fact that the process requires the curing of the bonding agents present in the layers in a final and mandatory heating operation in curing oven 5 (see for instance column 9, lines 46 to 53).

Furthermore, it is implicit from the process as described in D7 (see for instance Figure 1 or 10), that the fibres of the compacted web 8 are generally oriented parallel with this web. In fact, the fibres in web 8 have the same orientation as in the primary web 2 before separation therefrom, whether the separation is effected by severing the top layer of a straight

primary web as in Figure 1 or of a folded web as in Figure 10.

Since D7 provides a technical solution to the above mentioned problem the person skilled in the art would contemplate the introduction of the method steps disclosed in D7 in a method and apparatus known from D3. By doing so the person skilled in the art would actually apply a continuous compacted fibrous web on the lamellae structure prior to a final curing operation for effecting a bond between the lamellae and between the compacted web layer and the lamellae structure. The resulting orientation of the fibres in the compacted surface layer would be parallel to said layer so that the requirements in the claims relating to the different orientation of the fibres in the different layers would be met. The result of this combination would straightforwardly lead to the claimed method and apparatus.

The method of claim 1, and, by analogy, the plant defined in claim 9 thus are obviously derivable from the prior art, i.e. from the combination of D3 with D7.

The subject-matter of independent claims 1 and 9 therefore lacks inventive step in the meaning of Article 56 EPC.

4.6 To the respondent's arguments

The arguments put forward by the respondent, substantially in line with the reasoning developed in the impugned decision, could not convince the board.

4.6.1 To the disclosure of D3

In the board's view, the person skilled in the art when reading prior art D3, in its full scope, would not consider the sequence of method steps, consisting of curing the web prior to its cutting into strips and thus requiring a subsequent application of additional binder, as being essential. As explained previously, D3 already contemplates an alternative sequence for the cutting and curing steps, using thereby the presence of binders for joining the lamellae. Thus the information contained in D3 offers unambiguously a solution for which no additional binder is needed for the curing stage. The board would also like to remark that the scope of protection sought by the invention as claimed does, by no feature, exclude the provision of an additional pre-curing step, which could in practice be foreseen for obvious advantages to be gained, especially what concerns the subsequent cutting operation of the web into lamellae.

Similar consideration is given to the choice indicated in D3 between an "in-line" or "off-line" tilting of the lamellae, even though one alternative may be presented as preferred.

4.6.2 To the combination D3 and D7

The board is convinced that the skilled person would have combined D3 and D7, because D7 provides a clear and straightforward teaching for improving the surface properties of webs or boards, which is applicable to boards produced according to the method of D3 without further modification. As set out above, the aspect of

the invention as claimed by the respondent and consisting in a reduction of the amount of binder, does not contribute to the definition of the objective technical problem since it is already solved or dealt with by the altered ("in-line" tilting) process disclosed in D3.

Furthermore, the board can not agree with the respondent's assertion, that if D7 was to be combined with D3, the person skilled in the art would not alter the sequence of the method steps disclosed in D3 but rather stick to the described order of a curing step before the cutting operation. As pointed out above, prior art D3 is not limited to said sequence of steps.

Rather, the person skilled in the art taking D7 into consideration would be aware that the alternative sequence described in page 6, lines 5 to 11, of D3 would be the appropriate choice because it offers the advantage that the bonds between the lamellae can be achieved at the same time as the bonding between the compacted web and the lamellae using the final curing step described for the process of D7.

Order

For these reasons it is decided that:

1. The impugned decision is set aside.
2. The European patent No. 0 678 138 is revoked.

The Registrar:

The Chairman:

A. Counillon

U. Krause