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**Datasheet for the decision
of 29 April 2008**

Case Number: T 0997/05 - 3.2.03
Application Number: 99908779.4
Publication Number: 1064437
IPC: E04B 1/78, E04C 2/16, D04H 1/70
Language of the proceedings: EN

Title of invention:

Process and apparatus for preparation of a mineral fibre product

Patentee:

Rockwool International A/S

Opponent:

Paroc Oy Ab

Headword:

-

Relevant legal provisions:

EPC Art. 56

Keyword:

"Inventive step - problem and solution"

Decisions cited:

-

Catchword:

-



Case Number: T 0997/05 - 3.2.03

D E C I S I O N
of the Technical Board of Appeal 3.2.03
of 29 April 2008

Appellant: Paroc Oy Ab
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Decision under appeal: Interlocutory decision of the Opposition
Division of the European Patent Office posted
9 June 2005 concerning maintenance of European
patent No. 1064437 in amended form.

Composition of the Board:

Chairman: K. Garnett
Members: G. Ashley
E. Frank

Summary of Facts and Submissions

- I. European patent EP 1 064 437 was granted to the Respondent in this case, and is directed to a process and apparatus for making a mineral fibre web having a dense, compacted surface layer. Grant of the patent was opposed by the present Appellant on the grounds that the subject-matter of the patent is neither new nor involves an inventive step (Articles 100(a), 54 and 56 EPC).

- II. The Opposition Division concluded that the claims submitted during the opposition proceedings as the first auxiliary request met the requirements of the EPC. Its interlocutory decision was posted on 09 June 2005; the Appellant filed notice of appeal on 03 August 2005, paying the appeal fee at the same time; a statement containing the grounds of appeal was received on 04 October 2005.

- III. In accordance with Article 15(1) of the Rules of Procedure of the Boards of Appeal, the Board issued a preliminary opinion setting out its view on inventive step, together with a summons to attend oral proceedings. The Appellant responded to the summons by filing further written arguments, but informed the Board that it would not be attending the oral proceedings. The oral proceedings were held in the presence of the Respondent on 29 April 2008.

IV. Claims

Claim 1, subject of the contested decision, together with the reference letters allocate by the Appellant, reads as follows:

"1. A process for the preparation of a mineral fibre product comprising the steps of:

- (a) providing a primary mineral fibre web (7) comprising a binding agent,
- (b) compressing the primary web (7) in a longitudinally extending zone along one or both edges of the primary web (7) so as to induce a sustained density increase in said zone(s),
- (c) bringing the primary web (7) to overlap itself by laying it out substantially transversal to the longitudinal direction of the primary web (13) to form a secondary web comprising a number of layers,
- (d) conveying the secondary mineral fibre web (3) in the longitudinal direction,

characterized in

- (e) decelerating the longitudinal movement of the secondary web (13) to obtain a longitudinally compressed tertiary web,
- (f) cure or harden the binding agent in said tertiary web,
- (g) cutting the cured or hardened tertiary web,
- (h) wherein the compressing step of the primary web (7) in said longitudinally extending zone along one or both edges of the primary web (7) is such that a web presenting different zones with different densities is

obtained, so that the layers of the secondary web (3) therefore also have different densities."

It should be noted that the reference sign (13) in feature (c) referring to the primary web and reference sign (3) referring to the secondary web in features (d) and (h) should read (7) and (13) respectively. These are obvious errors and are to be read as corrected.

Independent claim 8 is directed to an apparatus, and reads as follows:

"8. An apparatus for the preparation of a mineral fibre product comprising:

- means for providing a primary mineral fibre web (7) comprising a binding agent,
- means (8) for compressing the primary web (7) in a longitudinally extending zone exclusively along one edge not compressing the remaining primary web or in longitudinally extending zones exclusively along both edges of the primary web (7) not compressing a zone between said edges so as to induce a sustained density increase in said zone(s),
- means (10,11) for bringing the primary web (7) to overlap itself by laying it out substantially transversal to the longitudinal direction of the primary web (7) to form a secondary web (13) comprising a number of layers,
- means (12) for conveying the secondary mineral fibre web in the longitudinal direction,

characterized in

- means for decelerating the longitudinal movement of the secondary web to obtain a longitudinally compressed tertiary web,
- means for curing or hardening the binding agent in said tertiary web,
- means for cutting the cured or hardened tertiary web, wherein the means for compressing the primary web (7) in a longitudinally extending zone along one or both edges of the primary web (7) are such that they induce a sustained density increase in said zone."

Dependent claims 2 to 7 and dependent claims 9 to 11 concern preferred embodiments of the process of claim 1 and the apparatus of claim 8 respectively.

V. Prior Art

The following documents, amongst others, were cited in the contested decision:

D2: WO-A-97 01006

D3: WO-A-88 00265

VI. Submissions of the Parties

Inventive Step (Article 56 EPC)

(a) Document D3 as the Closest Prior Art

D3 describes the preparation of a mineral fibre web having zones of differing densities. The primary web is compressed along part of its width and is then folded transversely to overlap itself. It was not disputed by the parties that D3 discloses the features of the

preamble of claim 1, and that the claimed process differs by the step of decelerating the longitudinal movement of the secondary web in order to obtain a longitudinally compressed web. However, the parties had different views of the objective problem to be solved starting from D3, and consequently of its solution.

The Respondent stated that D3 represents the actual starting point for the present invention, and defined the problem as being how to improve the resistance of the web to delamination without recourse to large amounts of binder. The solution, which is to compress the web in the longitudinal direction, cannot be derived from D2, as this document is not concerned with delamination problems. The deceleration step shown in Figure 11 of D2 is for the purpose of making undulations in the web and has nothing to do with delamination.

The Appellant, referring to paragraphs [0005] and [0008] of the disputed patent, argued that delamination problems exist when a web comprising superimposed layers is longitudinally compressed. However, the web of D3 is produced differently by compressing the edge portions and overlapping the primary web on itself, ie in the manner as defined in claim 1 and which is said in the disputed patent to solve the problem of delamination. Hence, it is necessary to reformulate the objective problem. At the end of paragraph [0005] it is said that it is possible to shape the different layers, and the Appellant argued that technical effect of applying longitudinal compression is to form an undulated web. The objective technical problem is

therefore how to process the layered secondary web of D3 in order to shape it appropriately.

Document D2 also concerns mineral fibre products, and hence would be consulted by the skilled person. In particular, D2 concerns the processing of a secondary web having layers of different densities by longitudinally decelerating it to form undulations for making annular-shaped insulation. A person wishing to shape the web of D3 would turn to D2 and learn the solution of decelerating the longitudinal movement of the web. Consequently, the method of claim 1 does not involve an inventive step when the teachings of D2 and D3 are taken into account.

At the oral proceedings the Respondent submitted that, although the web of D3 shows improved resistance against delamination when compared with a web made of superimposed layers of different densities, such as disclosed in D2, the problem of delamination still exists to a certain extent. This is because of the tendency of the flaps in the top layer to separate. The objective problem is therefore to improve delamination resistance yet further. The effect of longitudinal compression is to force the flaps closer together, resulting in a greater intermingling of fibres, both in the compressed surface zone and in the main body of the web, with the effect that the tendency to delaminate is reduced yet further.

(b) Document D2 as Closest Prior Art

The contested patent states that the invention is particularly advantageous for making insulation in the

form of pipe sections (paragraphs [0053] and [0054]). Hence the Appellant sees D2 as an appropriate starting point for assessing inventive step, as it also discloses the preparation of annular fibre insulation products, and is explicitly referred to in the introduction to the disputed patent at paragraph [0006]).

The Appellant went on to argue that, since D2 discloses that the basic web can be compressed in height (Figure 3, page 20, lines 1 to 9), it follows that it may be compressed in a longitudinally extending zone. Thus D2 discloses all the features of steps (a) and (b) of claim 1. Undulations are formed in the web of D2 by decelerating it (Figure 8), and since the disputed patent also describes performing length compression by corrugating the secondary web (paragraph [0051]), the folding step of D2 in Figure 8 corresponds to the length compression of claim 1.

The claimed process differs from that of D2 in that the secondary web with zones of different densities is obtained by compression of the primary web in a longitudinally extending zone along one or both edges.

The objective problem is thus how to eliminate the risk of delamination during a longitudinal compression of the layered web.

The solution is to be found in D3, which teaches that a sharp delimitation between separate web layers of varying specific weight is not advantageous, and it is recommended that a web of layers having different densities is made by compressing a part of the web

instead of laminating individual webs together. D3 also provides the solution to the secondary problem mentioned in the contested patent, namely that of improving the control of the size of the zones with different densities (paragraph [0009]), as the width of the compressed part of the primary web of D3 can be selected as desired (D3, page 5, lines 33 to 37).

Consequently claim 1 lacks an inventive step in view of D2 in combination with D3.

The Respondent does not consider that D2 represents a reasonable starting point for an assessment of inventive step, as it is not concerned with the same type of product as the contested patent, ie a laminated fibre product comprising zones of different densities, and is not concerned with the delamination problem that underlies the contested patent.

Although D2 describes the manufacture of a mineral fibre web having a variation in density through the thickness, this is achieved by using complex machinery that strips off and then reapplies a surface layer of the web. In addition, height compression takes place either after the transverse folding step (Figure 2), or the primary web is compressed without any transverse folding; there is no disclosure of overlapping a primary web that has been compressed along one or both edges. Consequently, the undulated product of Figure 11 has a completely different structure to that of the invention, even though it may have regions of different densities.

Even if D2 were considered to be a starting point for the invention, D3 does not provide a solution to delamination problems of the web of D2. D3 discloses the manufacture of a web having density variations through its thickness by compressing it in a length-wise zone and then folding it. Any delamination problem in relation to the web of D2 would not be solved by compressing the edge of the primary web before folding in the step shown in Figure 2 of D2, since D2 instructs the reader to strip off and reapply the surface layer in order to produce variation in density. Accordingly, claim 1 involves an inventive step.

VII. Requests

The Appellant requested that the decision under appeal be set aside and the patent be revoked in its entirety.

The Respondent requested that the appeal be dismissed.

Reasons for the Decision

1. The Appeal is admissible.

Inventive Step (Article 56 EPC)

2. Document D3 as Closest Prior Art
 - 2.1 D3 discloses a process for making mineral fibre webs that have zones (22) of different densities. The primary mineral fibre web is compressed along one edge, so as to increase the density of the fibres along part of the width of the web. The web is then folded to

overlap itself and form a secondary web (D3, page 5, lines 27 to 33 and Figures 2 and 3).

The process of D3 thus corresponds to the preamble of claim 1, and indeed was said by the Respondent to be the actual starting point for the present invention, although it is not mentioned in the introduction to the patent. Document D3 thus provides an appropriate starting point for the assessment of inventive step.

2.2 D3 does not describe the deceleration of the secondary web to obtain a longitudinally compressed tertiary web, after which the tertiary web is cured and cut (features (e), (f) and (g) of claim 1).

2.3 Starting from D3, the objective problem to be solved is seen differently by the Appellant and the Respondent respectively. Indeed, in this case, the formulation of the objective problem is of paramount importance for determining the presence or lack of an inventive step.

The Respondent sees the problem as being how to reduce the tendency of webs comprising layers of different densities to delaminate. The Appellant, however, maintains that this problem is already solved by the process of D3.

The problem, as stated in paragraphs [0005] and [0008] of the disputed patent, is that a web made up of superimposed layers bonded together has a tendency to delaminate when subjected to longitudinal compression. A previous approach to this problem was to increase the amount of binder used to stick the layers together. However, according to both D3 and the disputed patent,

the primary web is folded transversally to overlap itself, and it is clear that this step will indeed reduce the tendency of the compressed layer to separate from the less dense layer. Nevertheless, as explained by the Respondent, there still remains a tendency for the layers of the secondary web (as shown in Figure 3 of D3) to delaminate.

The objective problem to be solved is therefore how to further improve the resistance of the secondary web to delamination.

2.4 The proposed solution is to subject the secondary web to longitudinal compression. This has the effect of forcing the upper dense layers closer together and of compressing the fibres in the less dense layers of the bulk of the web; the increased interaction between the surfaces of the layers results in improved delamination resistance.

2.5 D2 is concerned with producing annular mineral fibre coverings, for example for insulating pipes (page 1, paragraph 1). According to the process of D2, the primary web is folded over itself in the transverse direction to form a secondary web (Figure 2). The secondary web is then subjected to longitudinal compression by rollers 48 to 53 (Figure 3) and, in the embodiment shown in Figure 4, the surface layer is separated and compressed for forming a dense surface layer. A multi-layered web, made either in accordance with Figure 4 or one comprising a web resulting from the compression step shown in Figure 3 and sandwiched between different fibre webs (see page 31, lines 26 to

36), is formed into undulations as shown in Figures 11 to 13.

Any longitudinal compression of the web in the process of D2 thus occurs after formation of the secondary web or as a result of creating undulations. The secondary web does not have layers of different densities, and longitudinal compression is applied in D2 in order to homogenise the mineral fibre web (see page 21, lines 15 to 19). The purpose of forming an undulated web is to enable annular shaped insulation materials to be produced (see Figures 15 and 16 and page 5, lines 10 to 18). There is no mention in D2 of the problem of delamination or that longitudinal compression could have a beneficial effect in preventing layers of different density from separating.

It is not reasonable to expect the skilled person to consult D2 in the hope of finding a solution to the objective problem of delamination.

2.6 The process of claim 1 therefore involves an inventive step in light of the combination of documents D3 and D2.

3. Document D2 as Closest Prior Art

3.1 The Respondent argues that it is inappropriate to start from D2, as it discloses a different type of laminated fibre product, in which a variation in density is achieved by using complex machinery that strips off and reapplies a compressed surface layer of the web. D2 does not address the problem of delamination. The Appellant sees D2 as an appropriate starting point, as it discloses the preparation of a basic web that

corresponds to the compressed primary web of claim 1 of the opposed patent (features (a) and (b)).

The Board agrees with the reasoning put forward by the Respondent that, particularly in light of the disclosure of D3, document D2 cannot be considered as being the closest prior art. But even if D2 were to be considered as a suitable starting point, it would not lead to the process of claim 1.

3.2 According to D2, a mineral fibre web having zones of different density is formed by stripping off the top layer, compressing it and then reapplying it (Figures 4 and 11, and page 31, lines 27 to 33).

3.3 The process of claim 1 differs in that the zone of different densities is obtained by compressing zones along the edges of the primary web prior to overlapping (feature (b) of claim 1); contrary to the submission of the Appellant, there is no clear indication that this takes place in the process shown in Figure 2 of D2.

3.4 Starting from D2, the problem to be solved is seen by the Appellant as being how to eliminate risk of delamination during a longitudinal compression of a layered web, and the solution is to be found in D3.

D3 is directed to improving the resistance of mineral fibre sheets to concentrated loads (page 2, line 35 to page 3, line 7). There is no specific mention of the problem of delamination, although, as indicated by the Appellant, at page 2, lines 19 to 22 of D3, it is said that a sharp delimitation between separate web layers having varying densities is not advantageous. This,

however, is in the context of putting together cured and uncured layers, and is addressed in D3 by curing all the layers of different densities together (page 3, lines 13 to 19). D3 does disclose the compression of edge zones of the primary web in order to form a layer of different density in the embodiment shown in Figures 2 and 3 of D3; the purpose is to form a surface layer having greater specific weight and rigidity than the underlying material (page 5, line 37 to page 6, line 3 and page 6, lines 20 to 24).

There is no indication in D3 of the problems of delamination, and in particular, there is no suggestion that the multi-layered webs of D3 are subjected to further processing that might involve longitudinal compression where delamination problems might arise.

3.5 There is thus no hint of a solution to the problem as formulated by the Appellant, and consequently its solution cannot be derived from D3.

4. Apparatus Claim 8

None of the cited documents describes an apparatus comprising all the means defined in claim 8. The subject-matter of claim 8 is therefore novel and inventive for the same reasons as given above in respect of claim 1.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

A. Counillon

K. Garnett