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D E C I S I O N
of 25 January 2005

Case Number: T 0579/02 - 3.2.7

Application Number: 96916073.8

Publication Number: 0825966

IPC: C03B 37/05

Language of the proceedings: EN

Title of invention:
Processes and apparatus for producing man-made vitreous fibre products

Patentee:
Rockwool International A/S

Opponent:
Paroc AB

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step (yes)"
"Late filed documents (admitted)"

Decisions cited:
-

Catchword:
-

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Case Number: T 0579/02 - 3.2.7

D E C I S I O N
of the Technical Board of Appeal 3.2.7
of 25 January 2005

Appellant: (Opponent)
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Decision under appeal:
Decision of the Opposition Division of the European Patent Office posted 8 April 2002 rejecting the opposition filed against European patent No. 0825966 pursuant to Article 102(2) EPC.

Composition of the Board:

Chairman: K. Poalas
Members: P. A. O'Reilly
C. Holtz

Summary of Facts and Submissions

I. Opposition was filed against European Patent No. 0 825 966 as a whole, based on Article 100(a) EPC (lack of inventive step) and Article 100(b) EPC (insufficiency).

II. The Opposition Division rejected the opposition. The Opposition Division held that the ground under Article 100(b) EPC had not been sufficiently substantiated as required by Rule 55(c) and did not admit the ground. The Opposition Division further held that the subject-matter of claims 1, 28 and 33 of the patent as granted was novel and involved an inventive step.

III. The appellant (opponent) filed an appeal against the decision of the Opposition Division.

IV. The most relevant prior art documents for the present decision are:

D1: US-A-3 045 279
D2: WO-A-93/13 025
D3: SE-A-452 150
D3a: Translation into English of D3, the translation having been used by the parties in the proceedings and in this decision.
D4: WO-A-92/10 436
D5: WO-A-88/06 146
E1: US-A-5 116 397
E2: WO-A-88/10 242
E3: US-A-5 356 450
E4: US-A-5 131 935

V. The appellant requested that the decision under appeal be set aside and the patent be revoked.

The respondent requested that the appeal be dismissed. Alternatively, the respondent requested that the decision under appeal be set aside and the patent be maintained in amended form in accordance with one of the auxiliary requests filed with his letter of 16 December 2004.

VI. The independent claims of the patent as granted read as follows:

"1. Apparatus for making MMVF products comprising

a centrifugal spinner (1) having a front end, a first rotatable rotor (43) or a set of rotatable rotors consisting of a first rotor (43) and one or more subsequent rotors (44, 45, and 46) wherein the or each rotor is mounted for rotation about a substantially horizontal axis in front of the front end whereby melt poured onto the first rotor is thrown off as fibres or, in a set of rotors, is thrown onto the or each subsequent rotor in sequence and is thrown off the or each subsequent rotor and optionally off the first rotor as fibres, and primary air supply means (53, 54, 55 and 56) at least in the outer peripheral regions of the spinner associated with the first (43) or, in the set of rotors, with each subsequent rotor (44, 45 and 46) and optionally with the first rotor (43) for blasting primary air substantially axially forwards across the surface of the or each rotor with which the

primary air supply means are associated, and motor means (50) for rotating the or each rotor,
and a chamber (2) which comprises a collecting portion (3) which has a spinner end (4) adjacent the centrifugal spinner (1) and which extends forwards from the spinner end (4), and which comprises side and top walls (12, 14) and an upwardy inclined base defined by a collector (16) mounted to receive fibres blown from the spinner (1) and to carry the fibres as a web out of the chamber (2), and suction means (19) for applying suction through the collector (16),

characterised in that

the chamber also comprises a spinner portion (5) which has a rear end (6) which is substantially open to the atmosphere and a front end (7) which opens into and merges with the collecting portion (3), and a substantially tubular duct (8) which extends between the front end (7) and the rear end (6),
the collecting portion (3) of the chamber is substantially closed to the ingress of air except for air forced through the spinner (1) and air which is sucked through the tubular duct (8) and, optionally, a lesser, non-interfering, amount of air sucked or forced through supplementary air passages in the spinner end (13) of the collection portion (3),
the front end of the spinner (1) and the front end (7) of the spinner (5) together define a substantially open annular collar between them,
at least 50% of the cross-section area of the front end (7) of the spinner portion is open to the flow of air sucked through the spinner portion by the suction means (19), and the spinner (1) and the tubular duct (5) are

constructed to provide substantially steady air flow conditions through the collar."

"33. A cascade spinner (1) comprising

a first rotor and one or more subsequent rotors (43, 44, 45, 46) each mounted for rotation in front of the front face (42) about a substantially horizontal axis and arranged such that melt poured onto the first rotor (43) is thrown onto each subsequent rotor in turn and is thrown off the subsequent rotors (and optionally off the first rotor) as fibres, and
primary air supply means (53, 54, 55, 56) associated with the or each subsequent rotor (and optionally the first rotor) for blasting primary air axially forward across the surface of the or each rotor in the outwardly facing region of the or each rotor,

characterised in that the spinner includes

a housing (40) which is substantially closed to the free axial flow of air through the housing and which has a front face (42), a rear end (41) and a substantially tubular wall (40) which extends between the front face and the rear end and which is substantially streamlined to air flowing axially along the outside of the housing, and motor means (50) for driving the rotors and located within the housing or substantially within the area defined by the periphery of the rear end of the housing, and in which the total cross-sectional area of the first and subsequent rotors (43, 44, 45, 46) is at least 40% of the maximum cross-sectional area defined by the tubular wall of the housing (40)."

VII. The appellant argued in written and oral submissions essentially as follows:

(i) All the features of claim 1 are known from the apparatus of D3a except the feature of a primary air supply means for blasting primary air across the surface of the rotors. The problem to be solved by this feature is to improve the productivity of the process or the quality of the product or both, cf. the description of the patent column 4, lines 55 to 58.

The skilled person would find the solution to this problem in D5. The skilled person would take the spinner known from D5 and use it to replace the spinner used in the apparatus disclosed in D3a. In doing this the skilled person would merely have to remove the binder spraying nozzles provided in the apparatus of D3a.

The subject-matter of claim 1 is also obvious based on general considerations. The claim does not limit how large the front end of the spinner portion should be since only a relative size is defined. Moreover, the spinner portion is not defined. Therefore, if a conventional spinner having primary and secondary air streams were placed in a large collecting chamber it would comply with the claim.

(ii) The subject-matter of claim 33 is obvious starting from E1. This document discloses all the features of claim 33 apart from the feature that the total

cross-sectional area of the first and subsequent rotors is at least 40% of the maximum cross-sectional area defined by the tubular wall of the housing. This feature however is obvious for the skilled person since he knows from E4 that the rotors should be close together which results that they occupy a larger proportion of the front face. No significance has been shown for the value of at least 40%.

The subject-matter of claim 33 is also obvious in view of the combination of D3a and D5 which leads to all the features of claim 33 apart from the value of at least 40%. This value has no significance and can moreover be derived from nearly all the documents on file, e.g. D1 or D2.

(iii) E1 to E4 should be admitted into the appeal proceedings since they do not introduce any new grounds.

VIII. The respondent argued in written and oral submissions essentially as follows:

(i) D3a is not the nearest prior art as it is concerned with applying binder to the fibres. Even starting from D3a the subject-matter of claim 1 is not obvious. D3a does not disclose an open rear end to the spinner portion since the secondary air is not induced but blown in through channel 8. Channel 8 is closed at its rear end which is visible in figure 2. The collecting portion of the apparatus disclosed in D3a is not disclosed as sealed to the ingress of air. There is no reason

for the skilled person to combine this document with D5. The spinner disclosed in D5 has a streamlined form whose purpose would be lost if it were incorporated into the apparatus of D3a. Even if the device were incorporated in the apparatus of D3a the feature of claim 1 of at least 50% of the cross-section area of the front end of the spinner portion being open to the flow of air sucked through the spinner portion by the suction means would not be achieved in the combination.

There is no indication that the skilled person would provide a conventional spinner with a large collecting chamber in the manner suggested by the appellant. There is no indication that the feature of the cross-section area ratio or the feature of providing sealing against the ingress of air would be provided.

(ii) In accordance with the jurisprudence of the Boards of Appeal it is not permissible to derive numerical values from the figures of patent documents which are not indicated as being to scale. Therefore the feature of claim 33 that the maximum total cross-sectional area of the first and subsequent rotors is at least 40% of the maximum cross-sectional area defined by the tubular wall of the housing is not disclosed in any cited document. This feature has the effect that the gap between the primary air blast, which is across the surfaces of the rotors, and the secondary air flow around the housing of the spinner is reduced. The secondary air has a large volume flow rate at low speed whereas the primary

air has a small volume flow rate at high speed. By bringing the primary air flow closer to the secondary airflow the tendency of the secondary air flow to flow around the front face of the spinner is reduced. Since this flow around the front face causes turbulence its reduction also results in a reduction of turbulence. The effect starts immediately that the relative size of the rotors to front face cross-section area is increased and is clearly present if this relative size is at least 40%. There is nothing in the prior art to suggest providing this feature because the prior art does not consider reducing the effects of turbulence.

D3a is not relevant to claim 33 because the claim is directed to a cascade spinner whereas D3a concerns a spinner with a single rotor.

(iii) There is no objection to the introduction of documents E1 to E4 into the appeal proceedings since they in fact support the case of the respondent.

Reasons for the Decision

1. *Documents filed with the appeal*

Documents E1 to E4 were filed with the appeal grounds. The respondent indicated that there was no objection to these documents being admitted into the proceedings. The Board therefore admitted the documents into the appeal proceedings.

2. *Inventive step*

2.1 *Claim 1*

The principal arguments of the appellant are based on a combination of D3a and D5. It is therefore necessary to consider whether the skilled person would combine the teaching of these documents and, if so, how they would be combined by the skilled person.

D3a is concerned with the problem of attaching together the fibres by the binder. The document proposes spraying the binder into the flow of a fan driven air source in advance of where the gas flow meets the fibres (cf. page 5, lines 29 to 30 and page 7, lines 13 to 15). The document discloses an annular channel 8 arranged concentrically with the spinner with the gas issuing from this channel parallel to the axis of the spinner. Spray nozzles 22 for the binder are provided on the inside of the channel and directed into the flow path of the gas issuing from the binder. There is no information regarding the rear of the spinner.

D5 concerns a spinner with a single centrifuge wheel. The teaching of this document is to provide each centrifuge wheel with its own streamlined unit which comprises all the means required for defibration (cf. page 2, lines 22 to 27). In the prior art which D5 addressed there was a spinner comprising multiple centrifuge wheels with an external blower (cf. page 1, lines 13 to 30). D5 provides an internal air channel which blows air across the surface of the centrifuge wheel. The binder is added by a spraying apparatus 17 which is arranged axially and in front of the

centrifuge wheel. The binder is thus spraying into the air stream at a position at which the air stream has already entrained the fibres.

The appellant provided in the oral proceedings a drawing which showed how the device known from D5 would be incorporated into the apparatus of D3a. The drawing shows the device of D5 directly replacing the spinner device of D3a and being arranged radially inwardly of the annular channel. This arrangement requires that the binder spray nozzles of D3a are removed and replaced by the binder spray device of D5, i.e. spraying into the air stream already including the fibres. The exterior of the spinner is close to the axially interior wall of the annular chamber of the apparatus of D3a so that the centrifuge wheel is close to the outlet of the chamber.

The Board notes that in order to make this combination the skilled person starting from D3a must abandon the feature which is the subject of the invention of D3a, i.e. he must adopt a different arrangement for the binder spray. He must also use the spinner of D5 in such a way that a principal advantage in D5 of this device - streamlined exterior - is lost. The Board considers that the skilled person would only abandon these features if he had compelling reasons to do so. The appellant has not demonstrated the existence of such compelling reasons so that the combination of the documents is not straightforward. Moreover, even the combination of D3a and D5 as suggested by the appellant does not fall within the scope of claim 1 since the claim requires that at least 50% of the cross-section area of the front end of the spinner portion is open to the flow of air sucked through the spinner portion by

the suction means. The Board does not consider that the combination of D3a and D5 suggested by the appellant would produce this feature. There is no indication that in such a combination of D3a and D5 air is sucked through the spinner portion by the suction means. On the contrary the spinner portion of D3a includes a fan so that the air passing therethrough would not be sucked through by the suction means. Furthermore there is no indication that the value of at least 50% for the open cross section area of the front end of the spinner section would be reached.

The argument of the appellant that placing a conventional spinner in a large collecting chamber would result in an apparatus in accordance with the claim cannot be followed by the Board. There is nothing to suggest that the skilled person would do this and ensure that there was an area open to the flow of air that is at least 50% of the front end of the spinner portion. As pointed out by the respondent there is also nothing to suggest that the feature of providing sealing against the ingress of air would be foreseen by the skilled person.

The subject-matter of claim 1 is therefore not obvious to the person skilled in the art.

2.2 *Claim 28*

Claim 28 is directed to a method using the apparatus of claim 1 and thus its subject-matter involves an inventive step since the subject-matter of claim 1 involves an inventive step.

2.3 *Claim 33*

The appellant considered E1 to be the closest prior art and that this document disclosed all the features of claim 33 apart from the housing being tubular and the last feature of the claim that the total cross-sectional area of the first and subsequent rotors is at least 40% of the maximum cross-sectional area defined by the tubular wall of the housing. The appellant in written proceedings attempted to extract a value for this parameter from the drawings of E1 and arrived at the value of 48%.

The Board however follows the constant jurisprudence of the Boards of Appeal and considers that there is no basis in the present case for extracting a numerical value from the drawings of E1 (cf. Case Law of the Boards of Appeal of the European Patent Office, 4th Edition 2001, I.C.2.6).

With regard to the shape of the housing the respondent acknowledged that a circular tubular cross-section was not intended. The respondent did not defend the claim on the basis of this feature so that it is not necessary to consider the feature further.

The appellant referred to E4, which in column 4, lines 63 to 65 discloses that the peripheral surfaces of the centrifuge wheels are close to one another. According to the appellant this closeness would imply that most of the space at the front end of the spinner would be occupied by the wheels, i.e. more than 40%. Moreover, the question was discussed as to whether this value had any significance.

E4 does explain that the surfaces of the centrifugal wheels should be close together. However, it is for instance only necessary that the second wheel is close to the first wheel so as to receive the melt therefrom and that the third wheel is close to the second wheel also to receive the melt therefrom. It is not disclosed or necessary that the third wheel in addition to being close to the second wheel is also close to the first wheel. There is also no indication regarding the surface area of the wheels relative to the total cross-section. The Board concludes therefore that this document does not disclose or hint towards any particular value for the ratio of the maximum surface area of the wheels relative to the total cross-section. The appellant in written observations also cited D1 and D2 as disclosing this feature. However, in these documents it would also be necessary to derive the feature on the basis of measurements taken from the drawings. Also in these cases the Board follows the jurisprudence of the Boards of Appeal in not deriving dimensions from patent drawings which are not indicated as being to scale.

Even if the value of at least 40% for the ratio of the maximum surface area of the wheels relative to the total cross-section is not specifically disclosed in the prior art the question still arises as to whether this feature would have been obvious for the person skilled in the art. The respondent suggests that a typical value for a conventional spinner would be 30% or less and there is no evidence against this view.

The problem to be solved in the patent in suit is to reduce turbulence in front of the spinner, cf. the description of the patent column 3, lines 26 to 50. This turbulence arises because the secondary air, which has a large volume flow rate but low speed, meets a step at the front of the spinner. The primary air, which has a small volume flow rate but high speed surrounds the rotors of the spinner and does not mix immediately with the secondary air due to the distance of the rotors from the secondary air.

By increasing the cross-sectional area occupied by the rotors relative to the total cross-sectional surface area the primary air sources, which blow onto the circumferential surfaces of the rotors, are positioned nearer to the edge of the spinner and hence nearer to the secondary air flow, cf. patent specification, column 7, lines 50 to 53. This closer relative positioning in turn reduces the velocity gradient of the air adjacent the edge of the front face of the spinner. The feature therefore solves this problem. The situation is improved immediately when the ratio becomes larger than what is conventional and the improvement is present at 40% or above. There is no counter evidence that this effect is not present at the value of 40% or above. The Board concludes therefore that this feature solves the above mentioned problem.

None of the prior art documents addresses the objective problem. There is also nothing to indicate to the skilled person how this turbulence problem should be solved. Hence, there is nothing to lead the skilled person to provide this feature in a cascade spinner.

The argument of the appellant with respect to D1, D2 and D3a that there is no indication of the significance in the value of the total cross-sectional area of the rotors being at least 40% of the maximum cross-sectional area defined by the tubular wall of the housing and that it can be derived from these documents cannot be followed by the Board. As already explained above, the drawings of the documents cannot be used to derive specific values of the total cross-sectional area of the rotors and the maximum cross-sectional area defined by the wall of the housing. Moreover, as indicated by the respondent D3a is not relevant to claim 33 because the claim is directed to a cascade spinner whereas D3a concerns a spinner with a single rotor.

The subject-matter of claim 33 is therefore not obvious to the person skilled in the art.

2.4 Therefore, the subject-matter of claims 1, 28 and 33 of the patent as granted involves an inventive step in the sense of Article 56 EPC.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

U. Bultmann K. Poalas