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Case Number: T 2161/22 - 3.2.07

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Language of the proceedings: EN

Title of invention:
PROCESSES FOR FORMING MAN MADE VITREOUS FIBRES

Patent Proprietor:
ROCKWOOL A/S

Opponents:
Saint-Gobain Isover
Paroc Group Oy

Headword:

Relevant legal provisions:
EPC Art. 56

Keyword:
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Catchword:

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Case Number: T 2161/22 - 3.2.07

D E C I S I O N
of Technical Board of Appeal 3.2.07
of 3 September 2024

Respondent: (Patent Proprietor)	ROCKWOOL A/S Hovedgaden 584 2640 Hedehusene (DK)
Representative:	Gill Jennings & Every LLP The Broadgate Tower 20 Primrose Street London EC2A 2ES (GB)
Appellant: (Opponent 1)	Saint-Gobain Isover Tour Saint-Gobain 12, Place de l'Iris 92400 Courbevoie (FR)
Representative:	Saint-Gobain Recherche Département Propriété Industrielle 39 Quai Lucien Lefranc 93300 Aubervilliers (FR)
Appellant: (Opponent 2)	Paroc Group Oy Energiakuja 3 00180 Helsinki (FI)
Representative:	Berggren Oy P.O. Box 16 Eteläinen Rautatiekatu 10A 00101 Helsinki (FI)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 21 July 2022 concerning maintenance of the European Patent No. 2697178 in amended form.**

Composition of the Board:

Chairman	G. Patton
Members:	S. Watson
	S. Ruhwinkel

Summary of Facts and Submissions

I. Appeals were filed by the patent proprietor and both opponents 1 and 2 against the decision of the opposition division maintaining European patent No. 2 697 178 in amended form on the basis of auxiliary request 7.

The opposition division found that the subject-matter of claims 1 and 13 of the main request as well as claim 1 of auxiliary requests 1 to 6 was not novel (Articles 54 and 100(a) EPC).

II. In preparation for oral proceedings, the board gave its preliminary opinion in a communication pursuant to Article 15(1) RPBA, dated 21 June 2024. Neither party responded substantively to the communication.

III. Oral proceedings before the board took place on 3 September 2024.

The patent proprietor withdrew its appeal at the oral proceedings.

At the conclusion of the proceedings the decision was announced. Further details of the oral proceedings can be found in the minutes.

IV. The final requests of the parties are as follows:

Opponents 1 and 2 (appellants 1 and 2) request that the decision under appeal be set aside, and that the patent be revoked.

V. The patent proprietor (respondent) requests that the appeals be dismissed or if the decision under appeal is set aside that the patent be maintained according to one of the sets of claims of auxiliary requests 8 to 13 filed with its reply to the opponents' appeals.

VI. The following documents are referred to in this decision:

D1: "Integrated Pollution Prevention and Control (IPPC) Reference document on best available techniques in the glass manufacturing industry" European Commission December 2001, pp. 57-60.

D8: WO 95/01941 A1

D18: WO 99/28252 A1

D19: WO 99/28253 A1

D21: WO 97/31870 A1.

VII. Claim 1 of auxiliary request 7 as maintained by the opposition division reads as follows:

"A method of manufacture of man made vitreous fibres (MMVF) comprising:
heating and melting a charge in an electric furnace using graphite electrodes to form a melt;
fiberising the melt by means of a spinning cup to form fibres; and
collecting the formed fibres,
wherein the charge comprises iron oxide; and
wherein the proportion of Fe(2+) based on total Fe in the melt prior to the fiberisation step is greater than 80%."

VIII. Claim 1 of auxiliary requests 8 and 12 reads as follows:

"A method of manufacture of man made vitreous fibres (MMVF) comprising:

heating and melting a charge in an electric furnace using graphite electrodes to form a melt;
fiberising the melt by means of a spinning cup to form fibres; and
collecting the formed fibres,
wherein the charge comprises iron oxide; and
wherein the proportion of Fe(2+) based on total Fe in the melt prior to the fiberisation step is greater than 80%; and
wherein the graphite electrodes are in contact with the charge and become at least partially submerged in the melt."

IX. Claim 1 of auxiliary request 9 reads as follows:

"A method of manufacture of man made vitreous fibres (MMVF) comprising:
heating and melting a charge in an electric furnace using graphite electrodes to form a melt;
fiberising the melt by means of a spinning cup to form fibres; and
collecting the formed fibres,
wherein the charge comprises iron oxide
and wherein the melt comprises the following, quoted as weight percent oxides:
SiO_2 35 - 50, preferably 38-48
Al_2O_3 12-30, preferably 15-28
TiO_2 up to 2
Fe_2O_3 2-12
CaO 5-30, preferably 5-18
MgO up to 15, preferably 1-8
Na_2O up to 15
K_2O up to 15
P_2O_5 up to 3
MnO up to 3
B_2O_3 up to 3."

X. Claim 1 of auxiliary requests 10, 11 and 13 reads as follows:

"A method of manufacture of man made vitreous fibres (MMVF) comprising:
heating and melting a charge in an electric furnace using graphite electrodes to form a melt;
fiberising the melt by means of a spinning cup to form fibres; and
collecting the formed fibres,
wherein the charge comprises iron oxide
and wherein the melt comprises the following, quoted as weight percent oxides:
SiO_2 38-48
Al_2O_3 15-28
TiO_2 up to 2
Fe_2O_3 2-12
CaO 5-18
MgO 1-8
Na_2O up to 15
K_2O up to 15
P_2O_5 up to 3
MnO up to 3
B_2O_3 up to 3
and comprising:
at least 85% Fe(2+) based on total Fe;
no detectable Fe(0);
wherein the T_{liq} is less than 1220°C, preferably 1100-1180°C."

XI. The arguments of the parties relevant for the decision are dealt with in detail in the reasons for the decision.

Reasons for the Decision

1. *Auxiliary request 7 - claim 1 - inventive step (Article 56 EPC) - document D8 with common general knowledge, exemplified by D1*

1.1 In the decision under appeal, the opposition division found that there were two distinguishing features of claim 1 of auxiliary request 7 with respect to document D8, namely that the heating and melting a charge step was carried out "in an electric furnace" and "using graphite electrodes".

1.2 The board however agrees with appellant 1 that the use of graphite electrodes presupposes a choice of an electric furnace. Therefore there is only a single distinguishing feature that the charge is heated and melted "in an electric furnace using graphite electrodes".

1.3 The respondent argued that in the present case there was an unexpected synergy when using graphite electrodes in a specific melt with a spinning cup fiberising process, because blockage of the spinning cup was prevented. The objective technical problem should therefore be regarded as to provide a more efficient method for forming MMVF with high thermal stability, whilst simultaneously reducing blockage of the spinning cup. None of the available prior art discussed aperture blockage when using a spinning cup fiberisation method, so that the subject-matter of the claim was only obvious with hindsight.

1.4 However, as argued by appellant 1, the contested patent has not shown that this problem has been solved with respect to a cupola furnace (as in D8), but has only

compared MMVF samples according to the claimed invention with fibres produced using a gas/electric fired furnace with molybdenum electrodes, i.e. not in a reducing environment (contested patent, paragraph [0074]).

The objective technical problem is therefore regarded as being to provide an alternative method of heating and melting the charge.

1.5 Document D1 is a reference document describing what are regarded as being the best available techniques in glass manufacture including mineral wool production.

The final two paragraphs of page 60 of this document set out that melting charges by immersed electric arc furnace with graphite electrodes requires less frequent iron tapping than for a cupola furnaces, providing a more efficient method.

1.6 The skilled person therefore would combine the teaching of document D8 with the common general knowledge exemplified in document D1 and use an electric furnace with graphite electrodes in the method of document D8.

There is generally no requirement for a specific pointer when the objective technical problem to be solved is regarded as being to provide an alternative (see Case Law of the Boards of Appeal, 10th edition 2022 ("CLB"), I.D.5., last paragraph and I.D.9.21.9 b)).

In any case, document D1 indicates that a more efficient method is obtained by using an electric furnace with graphite electrodes rather than a cupola

furnace, so that the skilled person would be motivated to combine the teachings.

1.7 Even if the respondent's arguments were followed, that the use of graphite electrodes in an electric furnace for melting a charge had the previously unknown effect of preventing blockage of apertures of a spinning cup, as the subject-matter was already obvious for the reasons given above, this effect could not make the subject-matter of the claim inventive as it would be considered as a bonus effect resulting inevitably from the obvious combination discussed above (see CLB, I.D. 10.8).

1.8 The respondent also argued that none of the cited documents taught or suggested that the use of graphite electrodes results in the claimed proportion of Fe(2+) in the melt.

However, there is no indication in the contested patent of any further features required, apart from merely the use of graphite electrodes, to achieve the claimed proportion of Fe(2+), so that it is inherent that when the graphite electrodes of D1 are used in the method of document D8 that the claimed proportion of Fe(2+) is present.

1.9 The respondent's further argument that document D1 shows a cascade spinner rather than a spinning cup is also not convincing as there is no disclosure in document D1 that the information contained in that document is only related to fiberisation with a cascade spinner. The skilled person understands D1 to be referring to the production of stone wool in general.

1.10 The above reasoning leads to the board's finding, contrary to the decision under appeal, that claim 1 of auxiliary request 7 is obvious over the combination of D8 and common general knowledge as shown in D1.

The decision under appeal therefore has to be set aside.

2. *Auxiliary request 8 - claim 1 - inventive step (Article 56 EPC)*

2.1 Appellant 1 argued that claim 1 of auxiliary request 8 is not inventive in view of the combination of the teachings of document D8 and common general knowledge as shown in document D1 as D1 disclosed submerged arc furnaces.

2.2 The respondent argued in writing that claim 1 of auxiliary request 8 was inventive for the same reasons as claim 1 of auxiliary request 7, and that the newly introduced feature was a further distinguishing feature over document D8. At the oral proceedings before the board the respondent made no further comments on this point.

2.3 The board finds the arguments of the appellants convincing as the electric furnace described in document D1 is an immersed electric arc surface (page 60, final paragraph).

2.4 The subject-matter of claim 1 of auxiliary request 8 is therefore still considered to lack inventive step in view of document D8 together with the common general knowledge exemplified in D1.

3. *Auxiliary request 9 - claim 1 - inventive step (Article 56 EPC)*

3.1 Claim 1 of auxiliary request 9 differs from claim 1 of auxiliary request 7 in that it includes melt composition features, quoted as weight percent of oxides.

3.2 Appellant 1 argued that claim 1 of auxiliary request 9 was obvious, using a partial problems approach, with respect to document D8 with common general knowledge, represented by D1 and with D18, D19 or D21.

3.3 According to appellant 1, the effect of the further distinguishing feature over D8 (35 to 50 weight percent of SiO_2) was related to its effect on the viscosity of the melt, as set out in paragraph [0053] of the contested patent. This effect was independent from the technical effect caused by the use of graphite electrodes in an electric furnace so that a partial problem approach must be used.

Appellant 1 regards the partial problem to be solved by this feature as to provide a composition with adequate viscosity for fiberisation. According to appellant 1, documents D18, D19 and D21 all show examples corresponding to the claimed composition which are said to be adapted for fiberisation (D18, examples 2 and 3, and page 12, line 4; D19, examples 2 to 4 and 6, page 11, line 24; and D21, examples 1 to 9 and page 9, lines 31 to 35).

3.4 The respondent argued in its written submissions, in relation to claim 18 of the then main request, that to obtain a melt composition falling within the scope of that claim from the disclosure of document D21 required

the selection of end points for numerous ranges, including the amounts of SiO_2, TiO_2 and MgO.

3.5 The board however follows the argument of appellant 2 that at least examples 1, 2, 5, 8 and 9 of document D21 (see table on page 14) have compositions which fall within the claimed ranges of claim 1 of auxiliary request 9. There is therefore no need for any selection from ranges.

3.6 The board also agrees with appellant 1 that the effects of the distinguishing features are independent and at least D21 explicitly discloses the suitability of the composition specifically for the spinning cup process (D21, page 9, line 31 to page 10, line 8), in particular in view of its viscosity.

3.7 The respondent's further written arguments relating to the disclosure of documents D18, D19 and D21 (see respondent's statement of grounds of appeal, page 4, fifth paragraph to page 6, first paragraph) do not concern the melt compositions as such but rather refer to the ratio of Fe(2+) to Fe(3+) and the quantity of Fe(0).

These features are however not present in claim 1 of auxiliary request 9.

3.8 Therefore the subject-matter of claim 1 of auxiliary request 9 is not inventive, taking into account that the the use of graphite electrodes in an electric furnace cannot justify an inventive step for the reasons already given above with respect to auxiliary request 7 (see point 1. above).

4. *Auxiliary request 10 - claim 1 - inventive step (Article 56 EPC)*

4.1 Appellant 1 raised an objection of lack of inventive step against the subject-matter of claim 1 of auxiliary request 10 and argued that the examples of D21 fall within the claimed T_{liq} temperature range and that the absence of Fe(0) is inherent when using graphite electrodes.

4.2 The respondent argued in its written submissions that the T_{liq} temperature in document D21 had to be selected from a range (as well as the various components of the melt composition as set out above in point 3.4 of this decision).

The board however agrees with the appellants that examples 1, 2, 5, 8 and 9 all have specific T_{liq} temperatures which are less than 1220°C and therefore fall within the range claimed in claim 1 of auxiliary request 10.

4.3 The respondent also argued in its written submissions, regarding claims 15 to 17 of its then main request, and at the oral proceedings before the board, that document D8 did not disclose that there was no detectable Fe(0) in the melt.

The board however follows the arguments of the appellants that in the absence of any indication in the contested patent of any further features required to achieve undetectable levels of Fe(0), apart from merely the use of graphite electrodes, this feature is inherent when graphite electrodes are used.

4.4 At the oral proceedings before the board, the respondent also argued that there was no motivation for the skilled person, starting from document D8 to turn to D21 in order to solve the objective technical problem of providing a composition suitable for use with graphite electrodes and that prevented blocking the apertures of a spinning cup and which forms suitable MMVF with good biosolubility.

4.5 The board however agrees with appellant 1 that a partial problem approach is again to be used as the respondent has not shown what effects are caused by the distinguishing features with respect to D8 (rather than a gas/electric fired furnace with molybdenum electrodes) or that they act synergistically.

Instead, the features of using graphite electrodes in an electric furnace together with the resulting features relating to the iron content, give rise to the objective technical problem of providing an alternative method of heating and melting the charge (see point 1.4 above). The features relating to the melt composition give rise to the objective technical problem of providing a composition with adequate viscosity for fiberisation (see point 3.3 above).

Therefore, as the combination of the teaching of document D8 with common general knowledge as shown in document D1 and document D21 (as considered above for auxiliary request 9) leads to the claimed method, the subject-matter of claim 1 of auxiliary request 10 is obvious.

5. *Auxiliary request 11*

Claim 1 of auxiliary request 11 is identical to claim 1 of auxiliary request 10 so that this request is not allowable for the same reasons as set out in point 4. above.

6. *Auxiliary request 12*

Claim 1 of auxiliary request 12 is identical to claim 1 of auxiliary request 8 so that this request is not allowable for the same reasons as set out in point 2. above.

7. *Auxiliary request 13*

Claim 1 of auxiliary request 13 is identical to claim 1 of auxiliary request 10 so that this request is not allowable for the same reasons as set out in point 4. above.

8. *Conclusion*

In the absence of any allowable request, the patent must be revoked.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is revoked.

The Registrar: The Chairman:

G. Nachtigall G. Patton

Decision electronically authenticated