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Case Number: T 0684/05 - 3.2.03

Application Number: 98955508.1

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IPC: F24J 2/00, F24J 2/40, E04B 1/76

Language of the proceedings: EN

Title of invention:
Facade system with a translucent porous insulating material

Patentee:
SAINT-GOBAIN ISOVER

Opponent:
ROCKWOOL INTERNATIONAL A/S

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step"

Decisions cited:
-

Catchword:
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Case Number: T 0684/05 **-** 3.2.03

D E C I S I O N
of the Technical Board of Appeal 3.2.03
of 5 July 2007

Appellant: (Opponent)
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Decision under appeal:
Decision of the Opposition Division of the European Patent Office posted 30 March 2005 rejecting the opposition filed against European patent No. 0950160 pursuant to Article 102(2) EPC.

Composition of the Board:

Chairman: U. Krause
Members: C. Donnelly
K. Garnett

Summary of Facts and Submissions

I. This appeal lies from the decision of the opposition division, posted on 30 March 2005, rejecting the opposition against European Patent No. EP-B-0950160.

II. The appellant (opponent) filed a notice of appeal on 27 May 2005 and paid the corresponding fee the same day. In the grounds of appeal, filed on 20 July 2005, the appellant requested that the impugned decision be set aside and the patent be revoked in its entirety under Article 100(a), Article 56 and Article 100(b).

III. The appellant cited the following documents as state of the art for the first time with the grounds of appeal:

Z1: DE 2608263

Z2: EP 250 691

Z3: EP 243 912

Z4: EP 725 918

Z5: CH 678 203

Z6: McGraw-Hill Concise Encyclopedia of science and technology, 3rd edition 1994, p 1428.

Z7: Int. J. Solar Energy, 1992, vol. 11, pp. 117 to 134.

The appellant also cited the following documents from the opposition proceedings:

E1: WO 88/08906

E2: US 5 185 197

E3: DE 195 22 645

E7: US 4 706 435

E12: CH 597 453

IV. In letter of 6 February 2006 the respondent (patentee) requested that the appeal be dismissed and the patent be maintained as granted or, failing this, maintained in amended form on the basis of one of the auxiliary requests 1 to 4 filed with letter of 6 February 2006.

The respondent cited the following documents:

E14: RWE Energie Bau-Handbuch 11, Ausgabe 1/94, pp. 17/1,17/3 and 17/4;

E15: Fachartikel "Farbige Dämstoffe und Solarenergie im System", Sonderdruck aus Fassadentechnik, Heft 3/98

E16: Untersuchungsbericht, "Untersuchung lichttechnischer und strahlungsphysikalischer Kenngrössen nach DIN 67 507" des Fraunhofer-Instituts für Bauphysik vom 28. April 1998;

E17: Forschungsbericht "Bewertung des solaren Energiegewinns von transparent verglasten und farbig kaschierten Mineralwollesystemen" des

Fraunhofer-Instituts für Energiesysteme vom 22 Januar 2001.

V. In a communication pursuant to Article 11(1) RPBA annexed to the summons to oral proceedings, the Board informed the parties of its provisional opinion and in particular indicated that the objection under Article 100(b) EPC did not seem sustainable.

VI. At the beginning of the oral proceedings held on 5 July 2007, the appellant withdrew the objection under Article 100(b) EPC. Following a preliminary debate on inventive step, the respondent withdrew the main request and auxiliary requests 1 to 3, thereby leaving maintenance of the patent in amended form on the basis of auxiliary request 4 dated 6 February 2006 as the sole request.

VII. Claim 1 according to auxiliary request 4 reads:

"Façade system with a translucent porous insulating material of mineral or organic fibres (1) for passive solar energy utilization with a transparent protection against weather influences in the form of a cover provided on its outer side, wherein the transparent protection is a glass panel, and wherein a temperature profile is achieved, when there is usable solar irradiation , with a maximum value within the insulating layer (1),
characterised in that
- between said glass panel and said porous insulating material a separate coloured layer (2;2')is arranged for controlling light transmittance τ,

- the coloured layer (2;2')is of a colour-fast design with respect to UV irradiation,
- the insulating layer (1) with the coloured layer (2;2')is designed with a light transmittance τ of less than 10% between its outer and inner bounding surfaces,
- the insulating layer with the coloured layer (2;2') is designed as a façade insulating board (1;1'),
-said insulating material (1) has bonded to the outside said separate coloured layer (2;2'),
and wherein said colored layer (2;2') being formed by a coloured glass-fiber felt which is laminated on the insulating layer (1)."

VIII. The arguments of the parties may be summarised as follows:

IX. *Appellant*

The subject-matter of claim 1 according to auxiliary request 4 is not inventive in view of E1 in combination with either E3 or Z2.

According to the claim it is the insulating material that is translucent and not the insulating layer as a whole. Further, the feature: "is arranged for controlling light transmittance τ", does not reflect any technical limitation since any coloured layer applied to the insulating panel for whatever reason fulfils this requirement and any difference lies merely in the mind of the designer. Therefore this functionality must be disregarded when assessing novelty and inventive step.

E1 describes two embodiments:

(i) embodiment II (see figure 1) which has an opaque insulating layer made up from translucent insulating material; and

(ii) embodiment III(see figure 2) which employs a translucent insulating material to make a translucent layer.

In particular, embodiment II is a façade system with:

a translucent porous insulating material of mineral or organic fibres ((5) - see page 7, lines 25 to 32) for passive solar energy utilization with a transparent protection against weather influences in the form of a cover provided on its outer side, wherein the transparent protection is a glass panel ((3) - see page 6, lines 28 to 31), and wherein a temperature profile is achieved, when there is usable solar irradiation , with a maximum value within the insulating layer ((1) - see claim 1), and wherein
- between said glass panel (3) and said porous insulating material (5) a separate coloured layer is arranged (see page 8, lines 1 to 2) for controlling light transmittance τ,
- said insulating material has bonded to the outside said separate coloured layer (2;2')
- the insulating layer (5) with the coloured layer is designed with a light transmittance τ of less than 10% between its outer and inner bounding surfaces (see claim 2),
- the insulating layer with the coloured layer is designed as a façade insulating board (see claim 1).

The arrangement of claim 1 differs therefrom in that:

(a) the coloured layer is of a colour-fast design with respect to UV irradiation,

(b) said coloured layer is formed by a coloured glass-fibre felt which is laminated on the insulating layer.

The use of a colour-fast design with respect to UV irradiation is merely a conventional measure that any skilled person would take when designing a coloured layer for exposure to sunlight.

Feature (b) facilitates the manufacture of the façade panel, hence, the objective problem can be seen to be that of reducing manufacturing costs as stated at paragraph 7 of the contested patent. Faced with this problem the skilled person would have consulted documents Z2 and E3 which both make reference to the use of a coloured glass-fibre felt. In Z2 the coloured layer (4) may be of an opaque material, but the claim does not rule out this possibility. In E3 the glass-fibre felt is used a carrier for a thermotropic mixture of polymers which change their degree of cloudiness, depending on the outside temperature, in order to control the light transmittance (see column 2, lines 3 to 9). However, the claim also encompasses such arrangement since by becoming cloudy the glass-fibre felt will display a kind of milky grey aspect which is a colour - in fact grey is one of the colours specifically cited at paragraph 24 of the contested patent.

Hence, both E3 and Z2 give the skilled person a direct teaching as to how a coloured layer can be economically applied to an insulating material to solve the above objective problem.

Consequently, the subject-matter of claim 1 does not involve an inventive step.

Embodiment III of E1 (see figure 2) is a façade system with:

a translucent porous insulating material (see page 7, lines 3 to 4) of mineral or organic fibres (5') for passive solar energy utilization with a transparent protection against weather influences in the form of a cover provided on its outer side((3) - see page 7, lines 2 to 3), and wherein a temperature profile is achieved, when there is usable solar irradiation , with a maximum value within the insulating layer (5') (see claim 1), and wherein

- the insulating layer (5') is designed with a light transmittance τ of less than 10% between its outer and inner bounding surfaces (see claim 2),

- the insulating layer is designed as a façade insulating board, and

- wherein the transparent protection is a glass panel (implicit).

The subject-matter of claim 1 differs therefrom in that

- between said transparent protection and said porous insulating material a separate coloured layer is arranged for controlling light transmittance τ

- the coloured layer is of a colour-fast design with respect to UV irradiation,

- said insulating material has bonded to the outside said separate coloured layer,
and wherein said colored layer is formed by a coloured glass-fibre felt which is laminated on the insulating layer.

These distinguishing features effectively boil down to:

- a separate layer for controlling light transmittance, formed by a coloured glass-fibre felt of a UV irradiation colour fast design, is laminated to the outside of the insulating layer such that it is between said transparent protection and said porous insulating material.

The objective technical problem to be solved is that of providing a coloured façade panel in a simple economic manner.

As already described above, E3 and Z2 also give the skilled person taking embodiment III of E1 as the nearest prior art a direct teaching as to how to solve this problem.

X. *Respondent*

The claim specifies that the insulating layer as a whole is translucent, any other interpretation would be technical nonsense since it would only mean that the individual fibres are translucent.

The feature: "is arranged for controlling light transmittance τ", has a technical limitation since it implies certain properties of the coloured layer, in particular, it excludes an opaque coloured layer which cannot be said to control light transmittance, but rather to prevent it.

E1 is the most relevant prior art. This document deals with various combinations of transparent or translucent outer covers with translucent or opaque insulating layers. Embodiment II of E1 differs from the subject-matter of claim 1 in that:

(i) the insulating material is translucent

(ii) between said glass panel and said porous insulating material a separate coloured layer is arranged for controlling light transmittance τ,

(iii) the coloured layer is of a colour-fast design with respect to UV irradiation,

(iv) the insulating layer with the coloured layer is designed with a light transmittance τ of less than 10% between its outer and inner bounding surfaces,

(v) the insulating layer with the coloured layer is designed as a façade insulating board

(vi) said insulating material (1) has bonded to the outside said separate coloured layer

(vii) said colored layer is formed by a coloured glass-fibre felt which is laminated on the insulating layer.

Since the insulating layer of embodiment II of E1 is opaque the skilled person would not even contemplate the idea of adding a separate coloured layer for controlling the light transmission since this would serve no purpose.

The subject-matter of claim 1 differs from that of Embodiment III of E1 by the features of the characterising portion i.e. in that:

– between said glass panel and said porous insulating material a separate coloured layer is arranged for controlling light transmittance τ,

– the coloured layer is of a colour-fast design with respect to UV irradiation,

– the insulating layer with the coloured layer is designed with a light transmittance τ of less than 10% between its outer and inner bounding surfaces,

– the insulating layer with the coloured layer is designed as a façade insulating board,

– said insulating material has bonded to the outside said separate coloured layer,
and wherein said colored layer being formed by a coloured glass-fibre felt which is laminated on the insulating layer.

The objective technical problem to be solved is one of how to improve the performance of a building façade system for passive solar energy utilization in an economic and aesthetic manner.

Neither E3 nor Z2 gives the skilled person a hint to incorporate these features into the arrangement of embodiment III of E1 in order to solve this problem. E3 relates to a system with a thermotropic layer that changes the amount of light transmitted by turning from clear to opaque as the temperature rises. This thermotropic layer cannot be equated with a coloured layer of a colour-fast design with respect to UV irradiation, since besides not having a recognised colour it is certainly not colour-fast.

In fact this arrangement acts in a similar manner to a blind being rolled down over the façade in that all the light transmittance is cut off beyond a certain outside temperature. This cannot be compared with the predetermined setting of a certain level of light transmittance by the selection of a separate layer of a fixed colour. Consequently, the skilled person would not take E3 into consideration.

The coloured layer 4 of Z2 is opaque ("matière opacifiante" - see column 2, line 11) and thus cannot be said to control the light transmittance since it

just prevents any transmittance from occurring. Further, the insulating material 2 itself is opaque since the main example given i.e. rigid panels of extruded polystyrene (see column 2, lines 29 to 42) are opaque and it is to be expected that any other material that might be chosen would have similar properties. Also, the glass panel 1 of the arrangement is tinted and reflective, as opposed to being transparent (see claim 1 - "une glace réfléchissant teintée (1)"). Thus, the skilled person would understand that the arrangement of Z2 is intended to prevent any light from getting into the insulating layer.

Thus, Z2 does not provide the skilled person with any teaching as to how obtain the subject-matter of claim 1.

Reasons for the Decision

1. *Interpretation of claim 1*

It is first necessary for the Board to decide between the different interpretations of claim 1 made by the parties.

The Board cannot accept the view that the feature "a translucent porous insulating material of mineral or organic fibres" means that only the material is translucent but not the insulating layer composed of this material.

When reading the claim as a whole the Board is of the opinion that the terms "insulating material" and

"insulating layer" are synonymous and have been used indiscriminately in the claim. In the characterising portion, for example, the separate coloured layer is specified as being "between said glass panel and said porous insulating material" which would imply that the insulating material is also a layer since it is providing a boundary to the separate coloured layer. In the same vein, the claim further specifies that "said insulating material has bonded to the outside said separate coloured layer" which also implies that the insulating material must be in the form of a layer in order to allow the bond with the separate coloured layer to be made.

The Board also feels that the type of insulating material under consideration probably does not exist as individual fibres except in the research laboratory, but rather is manufactured and supplied in layers or sheets of various fibre types, orientation and density which make up the material parameters of practical use to the skilled person designing an insulation system.

Whether a layer is translucent depends not only on these material parameters, but also on the thickness of the layer, as indicated for example at page 9, lines 15 to 20 of E1, where the notion of an "opaque layer thickness" ("Opazitätsschichtdicke") is mentioned. It could also be expected that the intensity of the light source would have an influence, but the Board considers that this will be standardised for outside lighting conditions and that the skilled person would know how to apply this in order to establish the "opaque layer thickness".

The Board is also of the opinion that the feature "is arranged for controlling light transmittance τ", does reflect a technical limitation. In particular, when taken in combination with the requirement for a translucent insulating layer, such a qualification implies that the coloured layer must be translucent or transparent, but not opaque, since there must be some degree of transmittance of light if there is to be control. Further, it would not appear to make technical sense to apply an opaque layer to an insulating layer specifically designed to be translucent.

It should be noted that "controlling light transmittance" as used in the claim is understood to mean setting a certain predetermined level of light transmittance since, once the colour has been selected, it cannot be readily changed as a function of changing environmental conditions. This is also made clear in claim 1 of auxiliary request 4 since the insulating layer with the coloured layer is specified as being "designed with a light transmittance τ of less than 10% between its outer and inner bounding surfaces".

2. *Inventive step (Article 56 EPC)*

The Board agrees with the parties that the most relevant prior art is described in E1. In view of the above comments on the interpretation of claim 1, embodiment III comprising the translucent insulating material is considered to be the most pertinent example.

The Board concurs with the respondent that claim 1 according to auxiliary request 4 differs therefrom in that:

(i) between said glass panel and said porous insulating material a separate coloured layer is arranged for controlling light transmittance τ,

(ii) the coloured layer is of a colour-fast design with respect to UV irradiation,

(iii) the insulating layer with the coloured layer is designed with a light transmittance τ of less than 10% between its outer and inner bounding surfaces,

(iv) the insulating layer with the coloured layer is designed as a façade insulating board,

(v) said insulating material has bonded to the outside said separate coloured layer, and

(vi) wherein said colored layer being formed by a coloured glass-fibre felt which is laminated on the insulating layer.

The appellant considers that embodiment III of E1 also comprises features (iii) and (iv). However, since embodiment III of E1 does not actually have a separate coloured layer, it would be inconsistent then to state that it comprises characteristics incorporating this feature.

The Board agrees with the appellant that the above distinguishing features could have been more succinctly expressed, for example as:

(a) a separate layer for controlling light transmittance τ, formed by a coloured glass-fibre felt of a UV irradiation colour fast design, is laminated to the outside of the insulating layer such that it is between said transparent protection and said porous insulating material; and wherein

(b) the insulating layer with the coloured layer is designed as façade insulating board with a light transmittance τ of less than 10% between its outer and inner bounding surface

The objective technical problem to be solved is that of providing, in a simple economic manner, an insulated building façade with an improved utilisation of solar energy which at the same time blends into the environment.

Feature (a) in particular, as well as simplifying manufacture, can be seen to improve the predictability of the light transmittance and allow different rates of transmittance to be selected for different parts of the building according to their exposure.

By forming the coloured layer from a separate glass-fibre felt which is then laminated to the outside of the insulating material, it can be appreciated that, compared e.g. with applying paint, plaster or other methods that will invariably throw up variations in

thickness, texture etc, it is possible to obtain a more uniform layer. Consequently, it will not only be easier to ensure that the light transmittance characteristics of the façade are uniform over a particular area, but also that it will be possible to predict precise design values by varying the characteristics of the coloured layer (e.g. thickness, colour, surface texture) in order to suit different types of exposure (e.g. south or north facing, sloping, vertical) and insulating material type. When applying colour to façades for aesthetic purposes alone these considerations would not be of importance.

Neither E3 nor Z2 gives the skilled person a suggestion as to how to solve this problem.

E3 relates to a system with a thermotropic layer comprising two polymers borne by a glass-fibre felt which, by turning cloudy as the temperature rises, control the amount of light transmitted to the insulating layer. Although this layer can be said to have a colour, it does not meet the requirement for being a colour-fast design with respect to UV irradiation and for providing, together with the insulating layer, a predetermined design value of the light transmittance, since its degree of cloudiness (and hence colour) does change with temperature and by implication with UV radiation. Thus, the arrangement according to E3 differs fundamentally from that of claim 1 in that it acts in a similar manner to blinds or louvres placed over the façade which are then adjusted to limit the amount of light transmittance. In the arrangement of the contested patent, a certain level of light transmittance is preset by the selection

of a separate layer of a fixed colour. Further, the arrangement of E3 does not solve the problem of blending into the environment in that it presents a changing appearance and is not necessarily an economic option in view of the requirement to employ interacting polymers.

Consequently, E3 teaches an entirely different solution and would not lead the skilled person to the subject-matter of claim 1.

The Board concurs essentially with the respondent's analysis of Z2. The coloured layer 4 is opaque ("matière opacifiante" - see column 2, line 11), which is excluded from the scope of the claim by the requirement to control the light transmittance rather than just preventing it from occurring. The main example given for the insulating layer i.e. rigid panels of extruded high density polystyrene (see column 2, lines 29 to 39 of the published application) is normally opaque and it is to be expected that the skilled person faced with the task of selecting another material (see column 2, lines 39 to 42 of the published application) would select one with similar properties. Further, if the insulating layer is covered by an opaque coloured layer there would appear to be no point in then selecting a translucent insulating layer since there would be no light available.

Also, the glass panel 1 of the arrangement is tinted and reflective (see claim 1 - "une glace réfléchissant teintée (1)") which would reduce the amount of light arriving at the opaque coloured layer but still conserve its aesthetic purpose. Thus, the skilled

person would understand that the arrangement of Z2 is intended to prevent any light radiation from getting into the insulating layer under a wide range of conditions. Hence, the temperature profile which is achieved in the system of Z2, when there is usable solar irradiation, would not present a maximum value within the insulating layer, but rather one similar to curve (a) ("referenz") in figure 3 of E1 which represents that of an opaque outside sheet (Aluminium) and an opaque insulating layer.

Thus, Z2 does not provide the skilled person with any teaching as to how obtain the subject-matter of claim 1. Further, none of the other documents considered during the appeal proceedings provides any such suggestion.

In conclusion, the subject-matter of claim 1 according to the fourth auxiliary request involves an inventive step and meets the requirements of Article 56 EPC.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the opposition division with the order to maintain the patent in amended form on the basis of:

   (1) Claims 1 to 10 according to the fourth auxiliary request filed on 6 February 2006;

   (2) The amended description filed during the oral proceedings consisting of pages 2 to 4;

   (3) Figures 1 to 4 as granted.

The Registrar: The Chairman:

A. Counillon U. Krause