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D E C I S I O N
of 2 June 2004

Case Number: T 0847/02 - 3.2.3

Application Number: 93309283.5

Publication Number: 0600652

IPC: E04B 1/94

Language of the proceedings: EN

Title of invention:
Reinforcement system for mastic intumescent fire protection coatings

Patentee:
Akzo Nobel N.V.

Opponent:
Thermal Science, Inc.

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step (no)"

Decisions cited:
-

Catchword:
-

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Case Number: T 0847/02 - 3.2.3

D E C I S I O N
of the Technical Board of Appeal 3.2.3
of 2 June 2004

Appellant: (Proprietor of the patent)
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Decision under appeal:
Decision of the Opposition Division of the European Patent Office posted 14 June 2002 revoking European patent No. 0600652 pursuant to Article 102(1) EPC.

Composition of the Board:

Chairman: C. T. Wilson
Members: J. du Pouget de Nadaillac
J. P. B. Seitz

Summary of Facts and Submissions

I. The appeal is directed against the decision posted on 14 June 2002 of an opposition division of the European Patent Office which revoked the European patent EP-B-0 600 652 for lack of inventive step of the subject-matter of claim 1, as granted, of said patent, having regard to the following prior art documents:

D1: EP-A-0 505 940 and

DX: Brochure "Fire Resistance Directory", pages 548 and 1136, from Underwriters Laboratories Inc. (US).

The patent proprietor, hereinafter the appellant, filed the appeal on 8 August 2002 and paid the appeal fee on the same day. The statement of grounds was received on 18 October 2002.

II. Claim 1 reads as follows:

"A fire protection for a substrate, comprising:

a first layer of intumescent mastic coating applied to the substrate;

a layer of carbon mesh applied over the first mastic coating layer without being mechanically coupled to the substrate, the mesh having a weight less than 550 gm/m² (1 lb/yd²), a mesh opening with a yarn to yarn spacing in the range 1.5 mm to 25 mm (1/16" to 1"), and capable of maintaining its integral integrity at a temperature in excess of 480°C (900°F), and

a second layer of the intumescent mastic coating applied over the mesh to embed the mesh in the mastic coating."

III. Oral proceedings took place on 2 June 2004.

IV. The arguments of the parties can be summarized as follows:

(A) From the appellant:

Document DX, which according to the impugned decision is taken as the closest prior art for the present invention, discloses as reinforcement means for the intumescent mastic coating a layer of glass mesh with a mesh opening of 1.8 mm, and nothing more. This document was combined with document D1, which also relates to a fire protection coating system that can be reinforced with an embedded mesh made of glass fibre, carbon fibre, etc... However, similarly to the teaching of the patent in suit, it is indicated on page 14 of this document that the glass fabric reinforcement provides no benefit when exposed to high temperatures since it rapidly reaches its melting point. Thus, D1 addresses the same technical problem as the present invention, namely to improve the fire-resistant properties of an intumescent fire-resistant coating. Indeed, as set out in the patent in suit, the problem underlying the present invention is to provide a reinforced intumescent fire protective coating system with good fire protection, resistance to temperature cycling and low installation costs.

However, not only the solution according to D1 differs from that claimed in the patent in suit, but D1 even mentions clear disadvantages in relation to the use of carbon fiber fabric as reinforcement means. On page 14 of D1, several fire tests conducted with fabrics made of different materials, among others glass fibres and carbon fibres, are shown as being unsuccessful, and finally the solution disclosed in D1 is to use glass fibre chopped strands combined with the intumescent mastic coating and, eventually, with a glass fibre fabric. Glass fibres are clearly preferred for the reasons given on page 14, lines 15 to 23. Thus, the person skilled in the art and faced with the above mentioned problem, is directed to the use of glass fibre chopped strands. Nothing in D1 suggests that carbon fibres are preferred. The arguments of the respondent that D1 points to the use of the carbon material or that the fire tests mentioned on page 14 of D1 solely relate to the use of a carbon reinforcing material on large surfaces, are based on an *a posteriori* view. Therefore, even if the present invention seems to be very simple, it is not obvious.

(B) From the respondent (opponent):

The only difference between the disclosure of DX and the present invention is the use of a carbon mesh reinforcement instead of a glass mesh reinforcement. In claim 1 as granted, the carbon mesh is defined by parameters which are trivial: the weight and temperature parameters follow automatically from the mere use of the carbon material with the yarn to yarn spacing parameter known from the disclosure of DX. Thus, starting from the product known from DX, the

problem underlying the present invention is to find a product which provides better fire protection. The priority document of the patent in suit shows that, for the person skilled in the art, the use of carbon mesh to reinforce mastic coatings was well-known. Similarly, D1 explicitly shows that for this purpose a woven carbon fabric is an alternative to a woven glass fabric. Since the person skilled in the art is well aware of the fact that carbon mesh has a higher resistance to heat than glass mesh, it was at least obvious for him to select this material, or at least to try to use it. The disadvantages mentioned in D1 for this material are merely linked to its use for coating a wooden door, that is to say for coating a large surface; this corresponding to what is disclosed by the patent in suit itself, so that it cannot be said that D1 discourages the person skilled in the art from using carbon. The claimed substitution is therefore obvious.

V. The appellant requested that the decision under appeal be aside and that the patent be maintained as granted.

The respondent requested that the appeal be dismissed.

Reasons for the Decision

1. The appeal is admissible.

2. The novelty of the subject-matter of claim 1 was not contested by the respondent. A fire protection according to this claim is not disclosed either by D1 or DX (Article 54 EPC).

3. In the grounds of appeal, the appellant had contested the choice of DX as prior art closest to the present invention, D1 being in its view more appropriate since it explicitly addresses the technical problem solved by the present invention, i.e. finding an intumescent coating fire protection system with better fire protection properties than the known products (D1, page 3, lines 19 and 20). Simultaneously he had recognised that the fire protection system disclosed by DX and that defined by claim 1 of the patent in suit have the most relevant technical features in common. The problem, as set out above by the appellant, is so broad, that it can be considered as underlying all new fire protection systems put on the market, for example that of DX, even if there is no explicit mention of this problem in document DX itself. Therefore, the criterion "technical problem to be solved" is not relevant in the present case for identifying the closest prior art. The other criterion, i.e. that considering the most relevant technical features in common, then leads to consider DX as representing the nearest prior art. During the oral proceedings, the appellant has no more disputed this choice.

4. With the design N601 on page 548 of the prior art document DX, a fire protection system for steel beams is described, comprising a multifilament glass mesh with approximately 14 threads per inch (i.e. a yarn to yarn spacing of about 1.8 mm) placed between two coats of intumescent mastic coating.

5. The subject-matter of claim 1 essentially differs from this known system in that, instead of a glass fibre mesh, a carbon fibre mesh is used. It has been proved

by the respondent that, besides the yarn to yarn spacing parameter known from DX, the two other parameters, namely the limit parameters "weight" and "temperature" as given in claim 1, are inherent to the carbon material itself. This fact was not contested by the appellant.

6. In the description of the patent in suit, it is explained that the main problem with glass is that it melts at temperatures to which the coating might be exposed and that, once melted, it provides no benefits. Thus, starting from the system of DX, which uses a glass mesh and consequently suffers from the same disadvantage, the problem to be solved is to find a similar system which above all provides a better fire protection, that is to say a better resistance to high temperatures.

This problem is more simple than that mentioned in the patent in suit, which refers to additional aims, namely a good resistance to temperature cycling and low installation cost. These additional aims are, at least partly, already solved by the system according to DX, since in this known system a mesh is already embedded in the mastic coating, so that, on the one hand, it reduces the risk of "debonding" of the system when "it is exposed to harsh environmental conditions including large temperatures swings of as much of 50°C" as indicated in the patent in suit, column 1, lines 45 to 52, and, on the other hand, no mechanical fixing means are necessary for attaching the mesh to the substrate, so that the costs for the installation of the system are reduced.

In the grounds of appeal, the appellant has also mentioned the poor flexibility of the glass, which makes a glass fabric difficult to handle and to apply on a coated substrate, thus playing also a role for the installation of the system. This drawback was not mentioned in the patent in suit as originally filed and cannot therefore be taken into account. Moreover, there is no requirement in claim 1 that the system and in particular the mesh should be flexible. In the patent in suit, a flexible system requiring flexible yarns for the mesh, a flexibilised mastic coating, the thickness of which is reduced, is only disclosed as a particular embodiment of the present invention.

7. Document D1 concerns the same technical field and describes an intumescent fire-resistant mastic coating with optionally embedded in it at least one layer of incombustible woven fabric as reinforcement means. It is explicitly indicated on page 11 that said fabric can be "made of glass fibre, carbon fibre, etc.".

Thus, the person skilled in the art, faced with the problem of improving the fire protection of the system according to DX, receives from this document the mere information that carbon fibres can be used for the woven mesh in the same way as glass fibres. The skilled person, who is well aware of the high melting point of carbon, has his attention drawn to this information of D1, since he knows that the source of the above mentioned problem was the bad fire resistance properties of glass fibres, in particular the low melting temperature. Hence he realizes that carbon could be a solution for this problem, so that he has a good reason for at least trying this material for the

mesh layer of the system according to DX, reaching thereby the solution of the present invention as claimed.

8. It is true that D1 does not provide a preference towards the carbon material, but as seen above there is no need for that because of the known advantage of carbon vis-à-vis glass having regard to the problem to be solved. On the other hand, the argument of the appellant that D1 discourages the use of the carbon material for the mesh layer and teaches another solution which should be considered by the skilled person, cannot be followed having regard to the passages of page 14 of D1, which were quoted by the appellant. All these passages and the disclosed solution are directed to a different problem, namely how to eliminate the disadvantages (breaks on the fabric surface, deformation of the substrate or falling of the fabric with coating parts) of a fire protection system applied on test panels of real size, that is to say on large surfaces. The patent in suit also refers to this particular problem, however in the second part of the description, see the last paragraph of column 4, mentioning the same disadvantages and proposing technical features for solving this particular problem, which are additional to those mentioned in claim 1. Compared to the solution according to DX, the solution of D1 is rather complex, implying the use of embedded glass fiber chopped strands. In view of this particular problem and of the more complicated solution, the person skilled in the art is rather inclined without hindsight to first consider the information provided on page 11 of D1, namely to use carbon fibres as

alternative means to glass fibres, this solution being more simple.

9. Therefore the subject-matter of claim 1 as granted lacks an inventive step within the meaning of Article 56 EPC.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

A. Counillon C. T. Wilson