BESCHWERDEKAMMERN DES EUROPÄISCHEN PATENTAMTS | BOARDS OF APPEAL OF THE EUROPEAN PATENT OFFICE | CHAMBRES DE RECOURS DE L'OFFICE EUROPEEN DES BREVETS

Internal distribution code:
(A) [ ] Publication in OJ
(B) [ ] To Chairmen and Members
(C) [X] To Chairmen

D E C I S I O N
of 13 October 1994

Case Number: T 0142/92 - 3.2.5

Application Number: 84300060.5

Publication Number: 0117026

IPC: B29C 67/12, B29C 61/06

Language of the proceedings: EN

Title of invention:
Method of enclosing cables and pipes

Patentee:
RAYCHEM LIMITED

Opponent:
kabelmetal electro GmbH
Siemens AG

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step - denied"

Decisions cited:
-

Catchword:
-

Case Number: T 0142/92 - 3.2.5

D E C I S I O N
of the Technical Board of Appeal 3.2.5
of 13 October 1994

Appellant: (Opponent)
kabelmetal electro GmbH
Kabelkamp 20
Postfach 2 60
D-30002 Hannover (DE)

Representative: -

Appellant: (Opponent)
Siemens AG
Postfach 22 16 34
D-80506 München (DE)

Representative: -

Respondent: (Proprietor of the patent)
RAYCHEM LIMITED
Rolls House
7, Rolls Buildings
Fetter Lane
London EC4 1NL (GB)

Representative:
Benson, John Everett
Raychem Limited
Intellectual Property Law Department
Faraday Road
Dorcan
Swindon, Wiltshire SN3 5HN (GB)

Decision under appeal: **Decision of the Opposition Division of the European Patent Office, delivered on 8 October 1991 and posted on 18. December 1991 rejecting the opposition filed against European patent No. 0 117 026 pursuant to Article 102(2) EPC.**

Composition of the Board:

Chairman: C. V. Payraudeau
Members: W. D. Weiß
A. Burkhart

Summary of Facts and Submissions

I. The two Appellants (Opponents) filed oppositions against the European patent No. 0 117 026 on the ground that its subject-matter did not involve an inventive step in view of the prior art documents they cited.

II. The Opposition Division having rejected the oppositions, the Appellants appealed from this decision, maintaining in the grounds of appeal the objection of lack of inventive step inter alia in view of the documents:

E1 Brochure Raychem "Universal wraparound telephone cable splice closure system Xaga 800 series"
E6 US-A-3 455 337
E8 Montageanleitung VASM, Stand 8/78, Rose Fernmeldetechnik
E16 US-A-3 058 863 and
E17 Kunststoff-Taschenbuch, 21th edition, 1979, p. 479.

III. During the oral proceedings before the Board which were held on 13 October 1994, the Appellants requested that the decision under appeal be set aside and the patent be revoked.

The Respondent requested that the appeal be dismissed and that the patent be maintained as granted (main request), or be maintained on the basis of a first subsidiary submission, filed on 20 November 1992, with the proviso that Claims 17 to 20 be deleted, or be maintained on the basis of a second subsidiary submission, filed on 20 November 1992.

IV. The independent Claims 1 and 18 as granted (main request) read as follows:

"1. A method of environmentally protecting at least a part of a substrate comprising a pipe or a cable or a join or splice therein, by surrounding the part with a dimensionally heat-recoverable article and heating the article to cause it to recover into engagement with the part, characterized in that:

(a) the article comprises a fabric having fibres which will recover when heated and which have a tensile strength of at least 0.1 MPa at their recovery temperature, the fabric having an external surface that is coated with a layer of polymeric material of at least 0.03 mm thickness, the polymeric material being softenable without flowing when heated to accommodate recovery of the article;

(b) the layer of polymeric material is bonded to the fibres; and

(c) the article is heated with a torch flame directed against the coated surface.

18. A method of environmentally protecting at least part of a substrate comprising a pipe or a cable or a join or splice therein, by surrounding the part with a dimensionally heat-recoverable article and heating the article to cause it to recover into engagement with the part, characterized in that:

(a) the article comprises a composite structure which comprises a polymeric matrix material and heat-recoverable fibres by virtue of which the composite structure is recoverable, a layer at an outwardly facing surface of the matrix material being cross-linked to a greater extent than the remainder of the matrix material;

(b) the recoverable fibres are bonded to the polymeric matrix material; and

(c) the article is heated with a torch flame directed against the outwardly facing surface."

The only independent Claim 1 according to the first subsidiary submission is identical to the granted version of Claim 1 with the addition at the end of the paragraph (a) of the phrase "and being substantially unstressed".

The only independent claim according to the second subsidiary submission is identical to the granted Claim 18.

V. The Appellants argued essentially as follows:

Either the document E1 or the document E8 can be considered as representing the closest prior art, as they both disclose the use of a torch flame to heat the external surface of recoverable article in combination with all the features contained in the precharacterising portions of the independent claims.

A serious drawback of this known method of enclosing cables and splices resides in that the known recoverable articles are sensitive to the presence of small scratches which are the starting points of quickly propagating cracks during the heat-recovery of the article. It is just this problem of the tendency to rupture which is claimed to have been solved by the method disclosed in document E16. In particular, the fact that, according to the teaching of this document, polypropylene is preferably used for the fibres together with polyethylene for the matrix material implies that all the requirements indicated in the paragraphs (a) and (b) of the characterising portion of Claim 1 as granted are met.

Since the method according to the patent in suit suggests extrusion lamination as the preferred coating method without requiring particular precautions to be

taken, the feature "substantially unstressed" contained in Claim 1 according to the first subsidiary submission has to be interpreted as relating to the "as extruded" condition of a film without the application of any additional stretching. However, this is also the condition which results from the examples 2 to 6 of document E16.

The feature of Claim 18 of the main request (and of Claim 1 of the second subsidiary submission of the Respondent) according to which the surface of the matrix material is cross-linked to a greater extent than the remainder of the matrix material is disclosed in document E6 and readily available to the practitioner when he wants to reduce the vulnerability of the heat-recoverable articles disclosed in document E1 or document E8 to the flame of a torch directed against its surface.

Consequently, the subject-matters of the independent claims according to the three requests of the Respondent do not involve an inventive step.

VI. The Respondent argued essentially as follows:

E1 or E8, respectively, is the closest prior art from which the subject-matter of Claim 1 as granted differs by the features (a) and (b) of its characterising portion.

No skilled person would consider using the heat-recoverable material discribed in document E16 to solve the problem of the invention, because this document discloses a material which is neither intended nor apt to be heated by a torch flame directly applied to its external surface and to be used as a means to

permanently and reliably enclose cable splices and joints under rugged environmental conditions.

Moreover, the matrix film used in the heat-recoverable material described in the document E16 is not substantially unstressed even if it is laminated to the fabric as extruded and without any additional stretching (E16, column 4, lines 50 to 58). On the contrary according to the invention as claimed in Claim 1 of the first subsidiary submission, particular care has to be taken to extrude the film in a manner that it is substantially unstressed and, hence, displays virtually no heat-recoverability.

Reasons for the Decision

1. *Novelty*

None of the cited documents discloses, in combination, all the features of the independent claims according to the main request.

Consequently, the Claims 1 and 18 cannot be objected on the basis of lack of novelty.

2. *Closest state of the art*

The documents E1 and E8 both disclose a method of enclosing cables and splices which comprises all the features mentioned in the preambles of the independent Claims 1 and 18 as granted and further comprises the characterising feature that the article is heated with a torch flame directed against its outwardly facing surface.

3. *Technical problem*

The patent in suit states (col 6, lines 25 to 29) that a significant disadvantage of the conventional heat-recoverable wraparounds (i.e. as disclosed in the closest state of the art) resides in that they are largely sensitive to the presence of small scratches that may be caused by poor handling of the article before installation and which result in the failure of the material by tearing during heat-recovery.

The avoidance of this drawback of the closest state of the art is a technical problem which the patent in suit aims to solve.

4. *Solution*

4.1. Claim 1 of the main request

Starting from the closest prior art, this problem is solved according to Claim 1 as granted in that:

(a) the article comprises a fabric having fibres which recover when heated and which have a tensile strength of at least 0.1 MPa at their recovery temperature, the fabric having an external surface that is coated with a layer of polymeric material of at least 0.03 mm thickness, the polymeric material being softenable without flowing when heated to accommodate recovery of the article; and

(b) the layer of polymeric material is bonded to the fibres.

According to the description of the patent in suit (page 4, lines 24 to 38) the condition "softenable without flowing" is met, whenever the inequality there

cited is valid. This inequality in its broadest definition, however, does not express but the trivial requirement that, at the recovery temperature, the recovery stress exerted by the fabric must exceed the resisting stress originating from the matrix material.

4.2. Claim 18 of the main request and Claim 1 of the second subsidiary submission.

According to these claims, the said problem is solved in that:

(a) the article comprises a composite structure which comprises a polymeric matrix material and heat-recoverable fibres by virtue of which the composite structure is recoverable, a layer at an outwardly facing surface of the matrix material being cross-linked to a greater extent than the remainder of the matrix material; and

(c) the recoverable fibres are bonded to the polymeric matrix material.

5. *Inventive step*

5.1. The tendency to easy tear propagation is a disadvantage of the usual heat-recoverable films which was well known long before the priority date of the patent in suit (see document E16, column 1, lines 17 to 27).

As a solution to this problem, document E16 suggests to use for heavy duty protection a composite laminate of a polyethylene film and a polyalkylene fibre fabric (column 1, lines 44 to 57, and Figures 2 and 3). The polyalkylene fibres in the fabric can be either polyethylene fibres or polypropylene fibres (column 2, lines 24 and 25). The film may have a thickness from

about 0.025 mm to 0.51 mm or may be even thicker where substantially rigid structures are desired (column 2, lines 41 to 60). The recovery temperature is about 120°C (see document E16, claim 1). Polyethylene as well as polypropylene have a tensile strength which is far above 0.1 MPa at their recovery temperature (see document E17). At least in the case where polypropylene fibres are combined with a polyethylene film, the polymeric material of the film meets necessarily the requirement of being "softenable without flowing when heated to accomodate recovery of the article" in the sense that the above mentioned inequality is valid. But even in cases of material combinations which do not automatically imply that the above mentioned inequality is met, it can only be considered as a trivial measure to choose the second member of a pair of materials such that it does not inhibit the desired effect (i.e. the heat-recoverability) of the other member.

Consequently, document E16 immediately guides the skilled person, who strives at solving the problem mentioned under point 3 above, to use the features mentioned under point 4.1. above for this purpose and thus to arrive at the subject-matter of Claim 1 as granted.

The Respondent's argument that the laminate disclosed in document E16 would not be apt to be used in a method according to the patent in suit because it would not be heatable with a torch and cannot be taken into consideration since the subject-matter of Claim 1 as granted does not contain any other feature as those mentioned above and resulting from the combination of the teachings of documents E1 or E8 and E16.

The subject-matter of Claim 1 as granted, therefore, does not involve an inventive step.

5.2. The independent Claim 18 as granted, in contrast to Claim 1, does not mention particular numerical minimum requirements as regards the tensile strength at the recovery temperature and the thickness of the polymeric (matrix) material, but requires that a layer at an outwardly facing surface of the (polymeric) matrix material is crosslinked to a greater extent than the remainder of the (polymeric) matrix material.

The Respondent, at the oral proceedings, acknowledged that the step of differentially crosslinking the walls of such articles was a well-known (i.e. from document E6) measure which a person skilled in the art had used at its discretion for a long time to exclusively render an outwardly facing layer of such protective articles (e.g. those disclosed in documents E1 or E8) infusible and, therefore, less vulnerable when exposed to the flame of a torch.

Consequently, the subject-matter of Claim 18 as granted, and hence of Claim 1 according to the second subsidiary submission, does not involve an inventive step either.

5.3. Claim 1 according to the first subsidiary submission, in addition to the features of Claim 1 as granted, requires that the polymeric material is "substantially unstressed".

The scope and interpretation of this feature being unclear, the description of the patent in suit has to be consulted for elucidation. EP-B-0 1177026 states in this respect (page 6, lines 22 to 25): "Because the heat recovery of the article used in a method according to the invention is due to the recoverability of the fibres making up the fabric, the article as a whole need not be stretched during manufacture and so the layer of polymeric material may be substantially unstressed, that

is to say it exhibits little or no tendency to recover of its own accord when heated." Extrusion lamination is the preferred coating technique (page 6, lines 42 and 43) which is described before (page 6, lines 33 to 34) as a technique "in which a hot polymeric material is pressed onto the fabric and immediately quenched to prevent the fabric recovering". These passages can only be interpreted that the polymeric material meets the requirement of being "substantially unstressed", when a conventional extrusion lamination technique is used; only stretching of the article as a whole (laminate) should be avoided.

The documents of the patent application as originally filed do not provide a basis for the submission of the Respondent that the extrusion of the film should be particularly controlled as to avoid also the residual heat-recoverability of a film which results from a conventional extrusion technique. Such an interpretation would go beyond the disclosure of the documents as filed and therefore go against the requirements of Article 123(2) EPC.

Since, according to document E16, column 2, lines 54 to 56, the film may be laminated as extruded without an additional stretch being applied, the feature "substantially unstressed" does not represent an inventive contribution step to Claim 1 as granted.

Consequently, Claim 1 according to the first subsidiary submission also fails to involve an inventive step.

6. Since none of the requests of the Respondent is allowable, the patent has to 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:

A. Townend C. Payraudeau