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D E C I S I O N
of 17 January 2002

Case Number: T 0626/99 - 3.5.2

Application Number: 90313978.0

Publication Number: 0435569

IPC: H02G 15/184

Language of the proceedings: EN

Title of invention:

Radially shrinkable sleeve for enclosing a connection or a terminal of an electrical cable

Patentee:

MINNESOTA MINING AND MANUFACTURING COMPANY

Opponent:

Felten & Guilleaume AG VRP Patent- und Lizenzabteilung

Headword:

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Relevant legal provisions:

EPC Art. 56, 101(2), 108, 114(2)
EPC R. 58(4), 67

Keyword:

-

Decisions cited:

G 0001/88, G 0009/91, J 0007/82

Catchword:

-



Case Number: T 0626/99 - 3.5.2

D E C I S I O N
of the Technical Board of Appeal 3.5.2
of 17 January 2002

Appellant: Felten & Guilleaume AG
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Decision under appeal: Interlocutory decision of the Opposition Division
of the European Patent Office posted 6 April 1999
concerning maintenance of European patent
No. 0 435 569 in amended form.

Composition of the Board:

Chairman: W. J. L. Wheeler
Members: F. Edlinger
P. H. Muehlens

Summary of Facts and Submissions

I. The opponent filed this appeal against the interlocutory decision of the opposition division concerning maintenance of European patent No. 435 569 in amended form.

II. The two independent claims 1 and 11 have the following wording:

"1. A radially shrinkable cylindrical sleeve for enclosing a connection or terminal, respectively, of an electrical cable including a conductor (40), an insulation (42) surrounding said conductor, and a field restraining shielding layer (38) surrounding said insulation (42), said sleeve comprising a first inner layer adapted to engage said field restraining layer (38), a middle layer of an electrical insulative material, and an outer layer of an electrically semi-conductive material to form an integral sleeve (10), said sleeve being elastic and permanently flexible, and elastically stretched and placed in a radially expanded state on a removable support means (20), characterized in that said inner layer (18) includes a cylindrical portion of conductive or semi-conductive material located between the ends of said sleeve and adapted to engage said conductor (40) or a sleeve-shaped connector element (44) and the adjacent insulation (42) and at least one cylindrical end portion (14, 16) made of dielectric material and engaging said field restraining layer (38) of said cable to provide a field control, said support means is a coil (20), and said layers are cylindrical portions (14, 16, 12, 11) and are formed of silicone such that said sleeve will recover toward its relaxed position."

"11. An elongate cylindrical sleeve (10) for a connection or termination of an insulated cable having a screen (38), comprising a peripherally outer layer (11) of semi-conductive material, a peripherally inner layer (14, 16, 18) having a first portion (14, 16) of stress controlling dielectrical material adjacent to at least one end of the sleeve in the elongate direction for engaging the screen (38) of the cable and a second portion (18) of semi-conductive or conductive material remote from the end for engaging the conductor (40) of said cable or a sleeve-shaped connector element (44) and the adjacent insulation (42), and the sleeve further comprising a layer of electrically insulative material (12) between the inner and outer layers, the layers of the sleeve being bonded together by successive injection molding whereby the sleeve is integral, and the materials of each layer consisting of soft elastic and permanent flexible material, whereby the sleeve may be elastically and radially stretched from a relaxed state to a stretched state to fit onto a removable support means (20) and the sleeve subsequently recovers towards the relaxed state."

Claims 2 to 10 and 12 to 15 are dependent on claims 1 and 11, respectively.

III. The decision under appeal *inter alia* referred to the following documents:

D1: DE-A-3 001 158

D2: GB-A-2 042 818 and

F1: DE-A-3 027 097.

The opposition division regarded the closest prior art for the subject-matter of claim 1 as being D1. This shrinkable sleeve could withstand an elastic deformation of the order of 100% and was placed in a radially expanded state on a removable support means. The sleeve specified by claim 1 of the opposed patent was distinguished from this prior art in that it was placed on a coil as a support means, its layers were formed of silicone and comprised an inner layer including at least one cylindrical end portion made of dielectrical material and engaging the field restraining layer of the cable to provide a field control. The inner layer (between the separate end portions) could alternatively be conductive while it was of semiconductive material in the sleeve of D1. Although F1 recommended the use of silicone rubber for all the components of a cold-shrink sleeve, a sleeve as specified in claim 1 of the opposed patent was not obvious from a combination of D1 and F1 because the inner end portions of the sleeve of F1 provided geometric field control and D1 did not suggest providing an inner layer with separate end portions for refractive field control. However, the refractive field control provided by at least one cylindrical end portion constituted the underlying principle of a sleeve according to the opposed patent.

For similar reasons, neither F1 nor D1 could form a basis for an attack on inventive step of claim 11. D2 disclosed an elongate cylindrical sleeve consisting of an inner article and an outer article which could be heat-shrinkable or cold-shrinkable. The inner article had an inner layer comprising stress controlling dielectrical material adjacent to the end portions and a second portion of conductive material remote from the

end for engaging a connector element. D2 could therefore be considered as representing the closest prior art for claim 11. However, it was not obvious to provide an integral sleeve, as specified in claim 11 of the opposed patent, comprising a peripherally outer layer of semiconductive material, a peripherally inner layer and a layer of electrically insulative material between these layers which were bonded together by successive injection moulding.

IV. In the statement of grounds of appeal, the appellant essentially argued as follows:

The opposition division had taken the decision under appeal without inviting the opponent, in accordance with Article 101(2) EPC, to file observations on the amended claim 1 which was filed by the proprietor with letter dated 29 May 1998. Contrary to the requirement of Rule 58(4) EPC, the parties were not informed of the extent in which the opposition division intended to maintain the patent. Therefore, the decision under appeal was based on grounds on which the opponent had had no opportunity to present comments. For these reasons, the appeal fee should be reimbursed.

The following new documents should be introduced into the appeal proceedings:

F5: DE-A-3 521 946 and

F6: DE-U-8 617 005.

These documents disclosed highly relevant prior art and were found only when a new search was carried out after the proprietor had filed an amended claim 1. F5

(claim 1, Figure 1) disclosed a sleeve comprising a conductive outer layer, an insulative layer and an inner layer including cylindrical end portions which provided refractive field control as specified in claim 1 of the opposed patent. The authors of F5 did not consider it worthwhile mentioning for which of the two types of sleeve, elastically stretched (and mounted on a support means) or the push-on type, the sleeve could be used. F5 (page 3, lines 6 and 7) referring to the high costs of silicone suggested the use of EPDM as a main material. However, in the meantime the price of silicone had significantly fallen and silicone, because of its known advantageous elastic properties, had found widespread use. Therefore, it was obvious to use silicone rubber for a sleeve which was placed on a support means. The subject-matter of claim 1 of the opposed patent thus was not inventive.

F6 also disclosed a sleeve comprising cylindrical end portions which provided refractive field control as specified in claim 1 of the opposed patent. The sleeve of F6 constituted an integral part and was of the push-on type. It could be made of silicone and was thus also elastic and radially shrinkable. Instead of a semiconductive outer layer, the sleeve of F6 had a mesh as a conductive outer layer. It could not be considered as inventive to adapt such a sleeve for placing it on a coil support means which constituted a generally known measure (see eg F1). The subject-matter of claim 1 of the opposed patent thus did not involve an inventive step.

The technology available at the priority date of the opposed patent in the field of radially shrinkable sleeves thus clearly rendered the subject-matter of

claim 1 obvious. Radially shrinkable sleeves which used silicone and provided refractive field control were known (F5 and F6). Outer conductive layers (F1 or F5) and coils as support means (F1) were likewise known. Starting from an elastic sleeve on a support coil, it was obvious to replace the geometric field control layers of a sleeve as disclosed in F1 by refractive field control layers as disclosed in F5 or F6, and thereby to arrive at the subject-matter of claim 1 of the opposed patent.

- V. In a communication accompanying the summons to the oral proceedings, the Board expressed the provisional opinion that the opposition division had complied with Article 101(2) EPC and had given the parties an opportunity to present their comments.

Concerning the choice of the materials and the geometrical characteristics of a sleeve as claimed in the opposed patent, the Board considered that it was important whether the sleeve was mounted on a coil as a support means, or whether it was pushed on a cable by applying mechanical force. F5 and F6 therefore seemed less relevant than the documents dealt with in the decision under appeal, the analysis of which appeared not to be contested in the statement setting out the grounds of appeal. Since the purpose of the appeal procedure inter partes was mainly to give the losing party the possibility of challenging the decision of the opposition division on its merits (cf G 9/91, OJ EPO 1993, 408, point 18), it would not appear appropriate to admit new facts or evidence which would not promote convergence of the debate. However, if F5 and F6 were disregarded as late filed documents under Article 114(2) EPC, as requested by the respondent, the

appeal grounds would appear deprived of their evidential basis, since all the objections as to lack of inventive step seemed based on combinations of these documents, or on a combination of one of F5 or F6 with the disclosure of F1.

VI. Oral proceedings were held before the Board on 17 January 2002. The appellant elaborated his arguments concerning the reimbursement of the appeal fee. In his view, Claim 6 (in combination with claim 1) as granted, on which the opponent had commented, was much more specific than amended claim 1, which had introduced only some of the features of granted dependent claim 6. According to the Notice from the European Patent Office dated 14 July 1989 (OJ EPO 1989, 393) concerning the application of Rule 58(4) EPC in opposition proceedings (point 2.1), the opponent should have been given an opportunity to comment on that text. The opponent was therefore taken by surprise. In accordance with the jurisprudence of the boards of appeal, as set out for example in J 7/82, the appeal fee should be reimbursed in such circumstances.

Concerning inventive step of claim 1, the appellant argued that the features which had been introduced by the amendment had very little limiting effect such that the subject-matter of claim 1 of the opposed patent was obvious in view of the prior art on which the opposition was based. The opposition division, in their communication dated 21 January 1998, had expressed the view that the subject-matter of claim 1 was not inventive. The added features merely meant that a field control effect was achieved by any means which were not of a geometric capacitive configuration (cf patent specification, column 7, lines 41 to 45). The fact that

the end portions were made cylindrical was self-evident. Therefore, these additional features did not render the sleeve specified in claim 1 inventive in view of F1, D1 and D2. Concerning the documents introduced with the statement of grounds of appeal, the appellant repeated that sleeves of the push-on type could not be considered as essentially different because they were likewise elastic.

VII. The proprietor argued essentially as follows:

The opposition division had set out in point 17 of their communication that the provision of refractive field control was the underlying principle of the sleeve according to the opposed patent and that the introduction of these features even without considering other features of claim 6 as granted could render the subject-matter of claim 1 inventive. The features introduced into claim 1 were present in claim 11 as granted and the opposition division's communication commented on them also in this context. The opponent did not deny that he had received a copy of claim 1 with the proprietor's letter of 29 May 1998. He thus had almost one year in which to present comments if he had so wished. Therefore, the opposition division did not commit a procedural violation.

The Board should disregard F5 and F6 in accordance with Article 114(2) EPC because these documents were not submitted in due time and did not disclose relevant prior art. F5 and F6 did not disclose elastic and permanently flexible sleeves comprising only cylindrical layers formed of silicone and placed on coil support means. Both F5 and F6 referred to sleeves which had no semiconductive outer layer and were of the

push-on type, as was explicitly mentioned in F6 and implicitly derivable from F5 (eg page 2, lines 32 to 34) because F5 suggested the use of EPDM polymer (known for its relatively high shore hardness) as the main insulating layer while the inner layer was made of silicone (which was used for its good sliding properties). The structure of, and the materials used for, push-on type sleeves were significantly different from those of the cold-shrink type sleeves of the opposed patent. The former had to be accurately dimensioned for one particular diameter and had to be of sufficient strength with good sliding properties, to be pushed on a cable connection by mechanical force. The latter were elastically stretched, held in an expanded state and could be shrunk-fit to different cable diameters without applying mechanical force in an axial direction. Soft elastic material and thin walls were thus required. Starting from one of these push-on type sleeves the person skilled in the art would not arrive, in an obvious manner, at a radially shrinkable sleeve as specified in claim 1 of the opposed patent. Nor would he have any motivation to combine a radially shrinkable sleeve with geometric field control, as disclosed in F1, with a push-on type sleeve with refractive field control, as disclosed in F5 or F6.

Concerning D1, it had to be taken into account that in addition to the features which the decision under appeal considered as inventively distinguishing the subject-matter of claim 1, all layers of the sleeve of the opposed patent were cylindrical portions. The sleeves disclosed in D1 and F1 were fundamentally different and could not be obviously combined. D2 disclosed a sleeve which consisted of two articles and did not disclose that all the layers were made of

silicone.

The sleeve according to claim 1 of the opposed patent combined several advantageous features and proved to be very successful. It could be easily manufactured and made with thin walls because silicone was used for the conductive, semiconductive and refractive field control layers. This led to a compact and easily mounted sleeve which could be elastically stretched such that one sleeve diameter could be used for largely varying cable diameters. Since the appellant had only impugned the decision under appeal with respect to the features that were introduced in claim 1 in response to the communication issued by the opposition division, it was difficult to provide further arguments concerning the relevance of the documents considered in the decision under appeal.

VIII. The appellant opponent requested that the decision under appeal be set aside and that the patent be revoked. He also requested reimbursement of the appeal fee.

IX. The respondent proprietor requested that the appeal be dismissed.

Reasons for the Decision

1. The appeal is admissible.
2. Documents *considered in the decision under appeal*
 - 2.1 The decision under appeal has set out the reasons why the sleeve specified in claim 1 of the opposed patent

which provided refractive field control was not obvious in view of radially shrinkable sleeves as disclosed in D1, which had a semiconductive inner layer throughout the cable connection (cf D1, Figure 1; page 11, second paragraph), or as disclosed in F1, which made use of geometric field control (cf F1, Figure 1; page 5, lines 15 to 20; page 7, lines 1 to 9).

2.2 The appellant has not substantially challenged this reasoning but argued that it was obvious to replace geometric field control layers of a radially shrinkable sleeve by cylindrical field control layers made of dielectric material. However, the question to be decided is whether the subject-matter of claim 1 as a whole including such features is obvious in view of the prior art.

2.3 It is known *per se* that refractive field control may be obtained by stress controlling dielectric material (see eg patent specification, column 6, lines 18 to 27). Claim 1 of the opposed patent specifies "at least one cylindrical end portion (14, 16) made of dielectric material and engaging said field restraining layer (38) of said cable to provide a field control". Such stress controlling cylindrical end portions are also known for sleeves which may be cold-shrinkable and formed of silicone and different materials and physical principles for stress grading inner layers may be envisaged (see D2, page 2, lines 29 to 32 and 58 to 62; page 3, lines 55 to 60; page 7, lines 1 to 5; Figures 2 and 4).

2.4 The decision under appeal has taken account of this prior art and held that sleeves comprising a combination of layers as specified in claim 1 was not

obvious. Since radially shrinkable sleeves as specified in claim 1 of the opposed patent are elastically stretched (the inner diameter is for example stretched from 17.7 mm to 55 mm; cf column 7, lines 1 to 4, of the patent specification) before they are cold-shrunk on cables of different diameters, for tightly enclosing a connection or terminal of a cable, the elasticity of the materials of all the layers, the manner of forming semiconductive and conductive portions of the sleeves and the thickness of its walls, among other parameters, determine the mechanical behaviour of the sleeves. The materials and the formation of the layers are also influential on the electromagnetical effect of a refractive field control layer since the electromagnetic field essentially depends on the dimensional and physical characteristics of the layers in the finished state. Since the appellant has not given detailed arguments that the decision under appeal was incorrect in this respect, and since the Board sees no reason to come to a different conclusion, the subject-matter of claim 1 of the opposed patent, as well as that of claim 11, which was not commented on by the appellant, shall be considered as involving an inventive step, having regard to this prior art.

3. *Documents F5 and F6*

3.1 The filing of F5 and F6 cannot be considered as responsive to the grounds set out in the decision under appeal since the feature of providing a stress controlling end portion of dielectrical material for engaging the screen of a cable was already present in claim 11 as granted and particularly emphasized by the opposition division in their communication. Both F6 (page 3, second paragraph) and F5 (page 5, last

paragraph) are less relevant in this respect than D2 because D2 discloses sleeves which may be cold-shrinkable and formed of silicone (see point 2.3 above).

3.2 F6 (see eg claim 1: "Aufschiebemuffe") relates to a push-on type sleeve. The Board has no reason to doubt the respondent's assertion that this is also the case for F5 in view of the cited passage (F5, page 2, last paragraph). This passage of F5 also draws attention to some of the different requirements for push-on type sleeves (relatively stiff sleeve, smooth surface of the cable). Admitting these documents thus would not promote convergence of the debate, but rather divert it from the essential elements on which the opposition proceedings was based, contrary to the purpose of the appeal procedure inter partes which is mainly to give the losing party the possibility of challenging the decision of the Opposition Division on its merits (cf G 9/91, point 18).

3.3 The Board therefore judges it appropriate, pursuant to Article 114(2) EPC, to disregard F5 and F6 as late filed documents.

4. The Board thus comes to the same conclusion as the opposition division in the decision under appeal that, taking into consideration the amendments made by the proprietor, the patent and the invention to which it relates meet the requirements of the Convention (Article 102(3) EPC).

5. *Alleged procedural violation*

According to Rule 67 the reimbursement shall be ordered

"where the Board of Appeal deems an appeal to be allowable". Since this is not the case, the request cannot be granted. Nevertheless, the Board wishes to make the following comments. According to the principles set up by the decision of the Enlarged Board G 1/88 (OJ EPO 1989, 189, point 6), Rule 58(4) EPC does not need to be applied when the opponent has had sufficient opportunity of commenting on the new text. He "can" be given this opportunity through the application of Rule 58(4) EPC. The Notice from the European Patent Office dated 14 July 1989 concerning the application of Rule 58(4) EPC in opposition proceedings (OJ EPO 1989, 393) has been issued following decision G 1/88 and explains the new procedure derived from these principles. J 7/82 (see points VIII and 6) ordered reimbursement of the appeal fee in completely different circumstances. In the present case, the Board notes that the opposition division, as rightly argued by the proprietor (see point VII above), had informed the parties about the main reasons for which they considered the subject-matter of the opposed patent as inventive and the appellant had received a copy of the new text sufficiently long before the decision was taken. The opponent thus had an opportunity to comment on the text submitted.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

M. Hörnell

W. J. L. Wheeler