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D E C I S I O N
of 19 October 2005

Case Number: T 0443/03 - 3.5.02

Application Number: 95103406.5

Publication Number: 0671754

IPC: H01H 33/76

Language of the proceedings: EN

Title of invention:

Switch and arc extinguishing material for use therein

Patentee:

Mitsubishi Denki Kabushiki Kaisha

Opponent:

Moeller GmbH
Alstom Holdings

Headword:

-

Relevant legal provisions:

EPC Art. 54, 56, 123(2)

Keyword:

"Late submissions of a prior use (not admissible)"
"Inventive step of main and first auxiliary requests - (no)"
"Second auxiliary request - (inadmissible amendment)"
"Inventive step - third auxiliary request - (yes)"

Decisions cited:

-

Catchword:

-



Case Number: T 0443/03 - 3.5.02

D E C I S I O N
of the Technical Board of Appeal 3.5.02
of 19 October 2005

Appellant: Moeller GmbH
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Decision under appeal: Interlocutory decision of the Opposition
Division of the European Patent Office posted
14 February 2003 concerning maintenance of
European patent No. 0671754 in amended form.

Composition of the Board:

Chairman: W. J. L. Wheeler
Members: J.-M. Cannard
P. Mühlens

Summary of Facts and Submissions

I. Opponent 01 and opponent 02 appealed against the decision of the opposition division concerning the maintenance of European patent No. 0 671 754 in amended form in accordance with the proprietor's second auxiliary request filed on 15 April 2002 during the oral proceedings before the opposition division.

II. Opponent 01 cited, for the first time, prior art documents:

F12: DE-A-43 07 682,

F12a: EP-A-0 614 933 (corresponding to F12),

F13: US-A-3 294 936,

F14: Hans Vogel, *Flammenfestmachen von Kunststoffen*, Hüthig Verlag, Heidelberg, 1966, pages 44 to 47, 62 to 65 and 163, and

D15: EP-A-0 335 165,

with its statement of grounds of appeal,

F16: EP-A-0 571 241,

with the letter dated 13 June 2003, and

D3c: Affidavit dated 29 August 2005 and a new page 38 of document D3 (Nomenklaturliste 3/94) already cited in the opposition proceedings,

D3d: Telecopy BASF dated 10 November 1992 relating to a product KR4455,

D3e: Produkt-Vorstellung KR4455, BASF 01/93, and

D3f: Benutzungsnachweis der Firma Felten & Guilleaume Austria AG, 3943 Schrems, AT, dated 17 February 1993,

with the letter dated 9 September 2005.

III. Opponent 02 cited for the first time with its statement of grounds of appeal prior art documents:

D24: EP-A-0-571 241 (identical to F16),

D25: DE-A-26 49 262,

D26: US-A-2 328 825, and

D27: FR-A-2 346 823.

IV. Prior art documents:

D2: Dissertation H. Hochhaus (Uni Braunschweig, presented 10/1985),

D2a: Bescheinigung des Herstellers BASF relating to documents D2 and D3,

D6: DD 155 218,

D7: Römpf, Chemie-Lexicon, Franckh'sche
Verlagshandlung, Stuttgart (DE), page 1486
(published 1981) and page 1584 (published 1990),

D8: Amft et al.: "Über die Isolierstoffbeanspruchung
in Schaltkammern von Lichtbogenschaltern",
Elektrie 37, 1983, 12, pages 656 to 660, and

D22: US-A-3 761 660,

considered during the proceedings before the opposition
division, remain relevant to the present appeal.

V. Claims 1 to 5 and 7 to 18 as maintained by the
opposition division together with independent claim 6
filed with the letter dated 9 December 2004 form the
claims of the main request. Claim 1 of this request
reads as follows:

"An arc-extinguishing material comprising an arc-
extinguishing insulator composition (1, 2) containing a
matrix resin and an inorganic filler,

characterized in that

said composition comprises:

10 to 55% by weight of at least one filler selected
from the group consisting of a glass fiber containing
not more than 1% by weight of compounds of group 1A
metals of the periodic table in total, an inorganic
mineral containing not more than 1% by weight of
compounds of group 1A metals of the periodic table in
total, and a ceramic fiber containing not more than 1%

by weight of compounds of group 1A metals of the periodic table in total;

a matrix resin containing as a principal component at least one member selected from the group consisting of a polyolefin, an olefin copolymer, a polyamide, a polyamide polymer blend, a polyacetal and a polyacetal polymer blend; and

a substance capable of generating H_2O , O_2 and/or O (atomic oxygen) by thermal decomposition selected from the group consisting of magnesium hydroxide, antimony tetroxide and antimony pentoxide."

Claim 1 of a first auxiliary request filed with the letter dated 13 September 2005 differs from claim 1 according to the main request in that the components "polyamide" and "polyamide polymer blend" are respectively replaced by the components "crystalline polyamide" and "crystalline polyamide polymer blend".

Claim 7 of a set of claims 1 to 8 according to a second auxiliary request which was filed during the oral proceedings held on 19 October 2005 reads as follows:

"A switch comprising a contact section including contacts (4, 5) from which an arc is generated, and an arc-extinguishing device comprising an insulator (1) covering the contact section excepting contact surfaces of the contacts, and an insulator (2) disposed on both sides with respect to a plane including the locus of an opening or closing movement of the contacts or around the contact section, said insulator (1) being formed of an arc-extinguishing material comprising an arc-

extinguishing insulator composition containing a matrix resin and an inorganic filler,

wherein said composition comprises:

10 to 55% by weight of at least one filler selected from the group consisting of a glass fiber containing not more than 1% by weight of compounds of group 1A metals of the periodic table in total, an inorganic mineral containing not more than 1% by weight of compounds of group 1A metals of the periodic table in total, and a ceramic fiber containing not more than 1% by weight of compounds of group 1A metals of the periodic table in total;

a matrix resin containing as a principal component at least one member selected from the group consisting of a polyolefin, an olefin copolymer, a polyamide, a polyamide polymer blend, a polyacetal and a polyacetal polymer blend, and

a substance capable of generating H_2O , O_2 and/or O (atomic oxygen) by thermal decomposition selected from the group consisting of magnesium hydroxide, antimony tetroxide and antimony pentoxide, and said insulator (2) being formed of an arc-extinguishing material according to one of claims 1 to 3."

A set of claims according to a third auxiliary request comprises claim 1 and dependent claims 2 to 6 according to the second auxiliary request. Claim 1 of this request reads as follows:

"An arc-extinguishing material comprising an arc-extinguishing insulator molded product having a double-layered structure, said product comprising:

an arc-receiving layer made of a reinforced arc-extinguishing insulator composition comprising 5 to 20% by weight of at least one filler selected from the group consisting of a glass fiber containing not more than 1% by weight of compounds of group 1A metals of the periodic table in total, an inorganic mineral containing not more than 1% by weight of compounds of group 1A metals of the periodic table in total and a ceramic fiber containing not more than 1% by weight of compounds of group 1A metals of the periodic table in total, and a matrix resin containing as a principal component at least one member selected from the group consisting of a polyolefin, an olefin copolymer, a polyamide, a polyamide polymer blend, a polyacetal and a polyacetal polymer blend; and

a base layer underlying said arc-receiving layer and made of an arc-extinguishing insulator composition comprising 20 to 65% by weight of at least one filler selected from the group consisting of a glass fiber, an inorganic mineral and a ceramic fiber, and a matrix resin containing, as a principal component thereof, a thermoplastic resin or a thermosetting resin."

VI. The arguments of the appellant opponent 01 can be summarized as follows:

The arc-extinguishing material according to claim 1 of the main request was not novel in view of the public

prior use of a material "Ultramid" KR4455, as this appeared from the documents D3c to D3f.

Document D24 disclosed a flame retardant material for use in an arc chamber which comprised a polyamide and a glass fiber and differed from the material according to claim 1 only by the content in compounds of group 1A metals of the periodic table. The skilled man would have considered the use of a special glass fiber containing less than 1% by weight of compounds of group 1A metals in the material of D24. This appeared from document D8, according to which a glass fiber used in arc-extinguishing materials should not contain alkaline metals, or from document D7, which specified that a special glass fiber (E-Glas) provided a good electrical insulation and was suitable for reinforcing resins.

The subject-matter of claim 6 of the main request (wording same as that of claim 1 of the third auxiliary request) lacked an inventive step in view of the combination of documents D2 and D6. D2, which disclosed an arc-extinguishing product made of a material comprising a polyamide reinforced with a glass fiber having a low content in compounds of group 1A metals, formed the starting point of the claimed invention. It was obvious to mould, using this material, a product having a double-layered structure. An arc-extinguishing product comprising a base layer underlying an arc-receiving layer, which both included a polyamide and a filler, was disclosed for instance in document D6. The same considerations applied to claim 6 of the first auxiliary request and to claim 1 of the second and third auxiliary requests, which were all identical to claim 6 of the main request.

VII. The arguments of the appellant opponent 02 can be summarized as follows:

The material according to claim 1 of the main request was not novel in view of D24 which disclosed a flame retardant material suitable for a use in an arc chamber. The material according to example 2 of D24 comprised a polyamide, 35% by weight of a glass fiber and magnesium hydroxide. It was implicit to the skilled reader that the glass fiber contained less than 1% by weight of compounds of group 1A metals in an arc-extinguishing material. At least, the subject-matter of claim 1 lacked an inventive step in view of the combination of documents D24 and D25. According to D25, the properties of arc-extinguishing materials were improved when they comprised compounds which had a low content in group 1A metals.

The double-layered product specified in claim 6 of the main request could be formed of a first and a second layer made of the same arc-extinguishing material comprising 20% by weight of a filler. The subject-matter of claim 6 would then be identical to that of claim 1 of the main request and lack novelty, or an inventive step. Documents D22 and D26 disclosed an arc-extinguishing material which had a double-layered structure consisting of a base layer underlying an arc-receiving layer. The subject-matter of claim 6, even if the base layer and the arc-receiving layer had a different composition, would be obvious in view of the teaching of D24 taken in combination with that of D22, or D26.

The matrix resin comprised in the material of D24 was, for instance, a PA 6,6 (or a PA 4,6) polyamide, which was a crystalline polyamide. Claim 1 according to the first auxiliary request was not allowable for the same reasons as claim 1 of the main request.

Claim 7 in the set of claims according to the second auxiliary request concerned a switch comprising a first insulator (1) which was not disclosed in the originally filed application. Claim 7 contravened Article 123(2) EPC.

Claim 1 of the third auxiliary request was identical to claim 6 of the main request and its subject-matter lacked novelty, or an inventive step for the same reasons.

VIII. The arguments of the respondent proprietor can be summarized as follows:

None of the new documents cited by the opponents with the statements of grounds of appeal were *prima facie* highly relevant or responsive to the reasons given in the contested decision. The new documents D3c to D3f were cited only one month before the oral proceedings to complement an alleged public prior use which had not been substantiated during the nine-month period for opposition. All these late-filed documents should not be admitted in the proceedings.

D24 did not destroy the novelty of claim 1 of the main request because it related to a material which neither had arc-extinguishing properties nor contained not more than 1% by weight of compounds of group 1A metals. The

arc-extinguishing properties resulted from the low content in compounds of group 1A metals and should be seen as a functional distinguishing feature of the claimed material. The skilled person looking for an arc-extinguishing material had no good reason to start from D24, which was a flame retardant material. The cited prior art did not suggest the use of a glass fiber containing not more than 1% by weight of compounds of group 1A metals: D25 related to a special arc chamber containing an insulating gas, D2 specified on page 12 that polyamide was not appropriate for an arc-extinguishing material, and D8 was mainly concerned with the mechanical properties of materials for arc chambers.

The subject-matter of claim 6 of the main request, which related to an arc-extinguishing material having two different layers, was novel. A double-layered structure was not disclosed in D24. Nor was a material comprising two layers and a filler clearly disclosed in D6. D22 and D26 disclosed an arc-extinguishing material having two different layers, but the arc-receiving layer thereof did not comprise a filler which contained not more than 1% by weight of compounds of group 1A metals. There was no good reason for the skilled person to combine D22, or D26, with D24 and D7.

- IX. The appellants (opponents) requested that the decision under appeal be set aside and that the European patent No. 0 671 754 be revoked.

- X. The respondent (patentee) requested that the patent be maintained in amended form on the basis of claims 1 to 5 and 7 to 18 as maintained by the Opposition Division

and claim 6 filed with letter dated 9 December 2004 (main request), or on the basis of claims 1 to 18 of the first auxiliary request filed with letter dated 13 September 2005, or on the basis of claims 1 to 8 of the set of claims filed in the oral proceedings (second auxiliary request), or, as a third auxiliary request, on the basis of claims 1 to 6 of the said set of claims filed in the oral proceedings.

Reasons for the Decision

1. The appeal is admissible.

Admissibility of new submissions made during the appeal proceedings

2. Considering that document D24 cited with the opponent 02's statement of grounds of appeal is *prima facie* highly relevant and responsive to reasons given in the contested decision, the Board admitted it into the proceedings.
3. The set of documents D3c to D3f was filed by opponent 01 with the letter of 9 September 2005, that is to say one month before the oral proceedings, as additional support for an alleged public prior use of a material "Ultramid KR4455". Regarding the date of availability to the public of this material, the only information provided within the nine-month period for opposition is to be found in document D2a which specifies that "Except "Ultramid" KR4455 and..., all products were sold before 1994". The evidence and facts presented within the nine-month period for opposition

thus did not prove that the material "Ultramid KR4455" was made available to the public before the claimed priority dates of the patent in suit. The alleged public prior use of this material was not adequately substantiated during the opposition period mentioned in Article 99(1) EPC. Following the case law of the Boards of appeal (see Case Law of the Boards of Appeal of the European Patent Office, 4th edition, page 473 ff and page 330 ff), the late-filed evidence formed by D3c to D3f was not admitted in the proceedings.

Claim 1 of the main request - lack of inventive step

4. Although it discloses all the other features required by claim 1 of the main request, document D24 does not say that the filler in the thermoplastic materials disclosed there contains not more than 1% by weight of compounds of group 1A metals of the periodic table.
5. Document D8 is an article in a scientific journal and could be considered as indicating some of the common general knowledge of the skilled person in the field of arc-extinguishing materials. The subject-matter of claim 1 according to the main request is not to be considered as involving an inventive step within the meaning of Article 56 EPC in view of document D8 taken in combination with documents D24 and D7.
 - 5.1 D8 discloses an arc-extinguishing material suitable for use in an arc chamber, which material comprises a polyamide resin reinforced by a glass fiber having a low content of alkaline metals, and includes additional extinguishing substances (see page 656, section 1, first paragraph and table 1; section 3, page 658, left

column, second paragraph; section 4.3, paragraph bridging pages 659 and 660, and page 660, right column). The Board judges that such a material forms a realistic starting point for assessing the inventiveness of the subject-matter of claim 1 of the main request.

5.2 However, D8 does not disclose any specific glass fiber content of said arc-extinguishing material, or indicate what is considered to be a low content of alkaline metals. Therefore, the skilled person wishing to implement the teaching of D8 would have to fill these gaps in the teaching and would face two problems:

- looking for a reinforced polyamide material which meets the requirements which according to D8 have to be fulfilled by an arc-extinguishing material, namely being flame retardant, electrically insulating, easy to manufacture with good mechanical properties and able to generate by thermal decomposition extinguishing gases (see table 1 and page 657, section 2; pages 659 and 660, bridging paragraph); and

- looking for a glass fiber with a sufficiently low content of alkaline metals.

5.3 D24 discloses a flame retardant material which would be considered by the skilled man for solving the first problem because it is suitable for use in an arc chamber (page 3, lines 24 and 25) and meets most of the requirements established in D8. More specifically, the material described in D24 comprises 25% by weight of an inorganic filler consisting of a glass fiber, a matrix resin containing as principal component a polyamide, and magnesium hydroxide, which is one of the substances

capable of generating H₂O, O₂ and/or O (atomic oxygen) by thermal decomposition specified in claim 1 of the main request (see D24, page 2, lines 20 to 32; page 4, table, example 2). The glass fiber content given in D24 falls within the range of 10 to 55% specified in claim 1. But D24 does not disclose that the glass fiber filler contains not more than 1% by weight of compounds of group 1A metals. The claimed material differs from the material described in D24 only in this respect.

- 5.4 Document D7 is an excerpt of a chemistry dictionary which can be considered as part of the common general knowledge of the skilled person. According to D7, an alkali-free glass fiber called E-Glas (see D7, page 1486, right column, lines 31 to 38 and page 1584, left column, lines 43 to 47) is specially suitable for electrical applications and provides a good electrical insulation. The skilled person would therefore consider using this special glass fiber as the filler. Since E-Glas contains not more than 1% by weight of compounds of group 1A metals of the periodic table in total, the material resulting from the obvious combination of the common general knowledge of the skilled person (D7 and D8) with the teaching of D24 would contain all the features of claim 1 of the main request.

Claim 1 of the first auxiliary request - Lack of inventive step

6. One example of polyamide resin material disclosed in D24 is PA-6,6 polyamide (page 2, line 46), which is a crystalline polyamide (see for instance, D2, page 32, point 3 and lines 18 to 33). Therefore, the incorporation of a crystalline polyamide in claim 1 of

the first auxiliary request does not introduce any new distinguishable feature over the disclosure of D24. The subject-matter of claim 1 of the first auxiliary request is considered to be obvious in the light of the reasoning given above for claim 1 of the main request.

Claim 7 of the second auxiliary request - Inadmissibility of the amendment

7. The switch according to claim 7 of the second auxiliary request comprises a first insulator (1) formed of a single layer of an arc-extinguishing material, which comprises *inter alia* a polyamide, 10 to 55% by weight of a filler and a substance such as magnesium hydroxide, and a second insulator (2) having a double-layered structure. No basis for such a switch can be found in the application as originally filed: the insulator (1) set out in the originally filed claims has a content in filler from 10 to 55% by weight only for the case when the polyamide consists of nylon 6T, nylon 46 and nylon 66 (see claims 2 and 5) and does not comprise a substance such as magnesium hydroxide. The proprietor has not proved that the originally filed description provides a support for the switch recited in claim 7. Therefore, claim 7 of the second auxiliary request defines an intermediate generalisation which contravenes Article 123(2) CBE and the second auxiliary request is not admissible.

Third auxiliary request - Inventive step

8. Claim 1 of the third auxiliary request is based on claim 6 as granted with the added restriction to a material having a **double-layered structure**, comprising

an arc-receiving layer according to the reinforced arc-extinguishing insulator composition comprising 5 to 20% by weight of at least one filler recited in said claim 6. The Board is satisfied that the claims according to this request comply with the requirement of Article 84 EPC and do not contravene Article 123(2) or (3) EPC.

9. Claim 1 of the third auxiliary request relates to an arc-extinguishing material comprising, *inter alia*, an arc-receiving layer comprising 5 to 20% by weight of a filler and a base layer underlying said arc-receiving layer comprising 20 to 65% by weight of a filler. Although the upper limit of the content in filler for the arc-receiving layer and the lower limit of the content in filler for the base layer are the same, the Board considers that the "double-layered structure" should be understood as meaning there are two distinguishable layers, each adapted for its particular purpose. On the basis of the description of the patent, it can be seen that although the specified ranges touch at 20%, the arc-receiving layer would generally contain less filler than the base layer, so that these layers would in fact at least differ from one another by their contents in filler.

10. The arc-extinguishing material according to claim 1 of the third auxiliary request is distinguished over a material derivable from the combination of documents D8, D24 and D7 in that it further comprises an arc-receiving layer made of a reinforced arc-extinguishing insulator composition comprising 5 to 20% of a glass fiber and a base layer underlying the arc-receiving layer, and comprising 20 to 65% by weight of a glass

fiber, which is a range higher than the range given for the arc-receiving layer. Such double layers are neither disclosed, nor suggested, in the cited prior art. This consideration applies in particular to the document D6, which does not disclose a material containing a glass fiber filler, and documents D22 and D26, which do not describe an arc-receiving layer and a base layer, both containing a glass fiber filler.

11. In the Board's judgement, taking into account the amendments made by the proprietor, the claims according to the third auxiliary request satisfy the requirements of the Convention. Given the complexity of the description which discloses a plurality of examples of realisation of materials having one layer or a double-layered structure, the Board did not require the proprietor to file during the oral proceedings an amended description brought into conformity with the amended claims; rather the Board decided to make use of the possibility offered by Article 111(1) EPC to remit the case to the first instance to give the proprietor a reasonable time to file the necessary amendments, and the opponents time to consider them.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the first instance with the order to maintain the patent in amended form with claims 1 to 6 filed in the oral proceedings and a description to be adapted.

The Registrar:

The Chairman:

U. Bultmann

W. J. L. Wheeler