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Datasheet for the decision of 19 February 2013

Case Number: T 0411/09 - 3.5.02

Application Number: 97940953.9

Publication Number: 929905

IPC: H01H 33/66

Language of the proceedings: EN

Title of invention:
Encapsulated vacuum interrupter and method of making same

Patent Proprietor:
Cooper Industries, Inc.

Opponent:
ABB Patent GmbH

Headword:
-

Relevant legal provisions:
EPC Art. 56, 123(2)

Keyword:
"Inventive step (yes)"
"Amendments - added subject-matter (no)"

Decisions cited:
-

Catchword:

Europäisches Patentamt | European Patent Office | Office européen des brevets

Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0411/09 - 3.5.02

D E C I S I O N
of the Technical Board of Appeal 3.5.02
of 19 February 2013

Appellant: (Opponent)
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Decision under appeal:
Decision of the Opposition Division of the European Patent Office posted on 17 December 2008 rejecting the opposition filed against European patent No. 929905 pursuant to Article 101(2) EPC.

Composition of the Board:

Chairman: M. Ruggiu
Members: G. Flyng
P. Mühlens

Summary of Facts and Submissions

I. The opponent has appealed against the decision of the opposition division rejecting the opposition.

In the decision the opposition division found that the grounds for opposition mentioned in Article 100(a) and (c) EPC did not prejudice maintenance of the patent.

In particular, the opposition division held that the amendment of the term "expanded" to "stretched" in claim 1 was supported by page 5, line 28 of the description as filed (see WO 98/11582), where stretching and expanding were presented as synonyms in the context of the invention.

Of the documents that were mentioned in the contested decision, only the following have been referred to in any detail in the present appeal:

D1: DE Offenlegungsschrift 2240106
D2: US Patent 3812314
D8: Japanese Patent Publication Nr. 55-102128, published August 5th, 1980 (original text and English translation).

The opposition division held that the subject-matter of claim 1 was novel over D1 (and its family member D2), as well as novel over D8 and D9 (Japanese patent publication 59-103237, published June 14, 1984, original text and English translation).

Furthermore, the opposition division set out why it considered the subject-matter of claim 1 to involve an

inventive step over a combination of D1 (as closest prior art) and general knowledge, as well as over a combination of D1 with D3 (GB 1030798), D8 or D9.

II. The Board summoned the parties to oral proceedings, setting out its preliminary observations on the appeal in an annex to the summons.

III. With a letter dated 15 February 2013 the respondent (proprietor) submitted four sets of amended claims according to auxiliary requests 1 to 4.

IV. Oral proceedings were held as scheduled on 19 February 2013.

The appellant (opponent) requested that the decision under appeal be set aside and that the patent be revoked.

The respondent (patent proprietor) requested that the appeal be dismissed (main request), or that the patent be maintained in amended form on the basis of one of the auxiliary requests 1 to 4 filed with letter dated 15 February 2013.

V. Independent claim 1 of the patent reads as follows:

"1. An interrupter, comprising:
a vacuum assembly (18);
switching contacts enclosed within the vacuum assembly (18);
a layer of rigid material surrounding the vacuum assembly and characterised by

a layer (16) of stretched compliant material around the vacuum assembly (18) and within the layer of rigid material."

Independent claim 15 of the patent reads as follows:

"15. A method of encapsulating a vacuum interrupter, comprising the steps of:
stretching a sleeve (16) of compliant material;
inserting the vacuum interrupter within the stretched sleeve (16);
collapsing the stretched sleeve (16) onto the interrupter; and
encapsulating the interrupter and sleeve (16) within a rigid material."

The remaining claims of the patent, claims 2 to 14 and claims 16 to 20, are dependent on claim 1 and claim 15, respectively.

In view of the Board's findings on the proprietor's main request it is not necessary to set out the claims of the auxiliary requests.

VI. The submissions of the appellant (opponent) may be summarised as follows:

There was a functional difference between "expanded" and "stretched". An expanded material did not necessarily return to its original form again when released, whereas a stretched material did. Hence, according to the opponent, the change from the originally used term "expanded" to "stretched" in claim 1 added fresh subject-matter.

The opponent also argued that the subject-matter of claim 1 and of claim 15 was did not involve an inventive step over documents D2 (or D1) and D8.

According to the opponent, document D2 disclosed the features of the preamble of claim 1 and furthermore disclosed in column 5, from line 53 that there was a coating of elastic material between the vacuum chamber and the epoxy encapsulation. The statement that the coating was "elastic" made it clear to the skilled reader that the material could be stretched.

Furthermore, according to the opponent, document D8 disclosed (see translation, page 5, lines 18 to 26) to fit a rubber ring around a vacuum chamber. The rubber ring was stretched and extended in the circumferential direction because its internal diameter was smaller than the diameter of the vacuum chamber. Thus, it was known from D8 to stretch a rubber ring that was to be used as a compensation layer. Starting from D2 (or D1) and seeking to solve the problem of improving the dielectric and mechanical properties of the encapsulation the skilled person would take from D8 the idea that a layer of compliant material can be fitted by stretching it around the vacuum assembly, within the layer of rigid material.

Regarding method claim 15 the opponent argued that if one wanted to place a stretched sleeve onto an interrupter it had to contract onto the interrupter, so the reasoning given for claim 1 applied equally to the method claim.

VII. The submissions of the respondent (proprietor) may be summarised as follows:

The proprietor argued that there was no evidence of any functional difference between the terms "expanded" and "stretched" and no support for the opponent's suggestion that "stretched" meant "reversibly extended" whereas "expanded" meant "non reversibly extended". The proprietor agreed with the opposition division's finding that in the context of the application these expressions were meant to be synonymous. Furthermore, the opponent argued that even if there were some difference in the meaning of the term stretched, it did not add fresh subject-matter to use this term in the claim because a "stretched silicon sleeve" was already disclosed in the application as filed (see WO 98/11582, page 5, lines 28 to 31).

Regarding inventive step, the proprietor argued that D2 (or D1) did not disclose that the "thin layer of resilient material 13" was in a stretched condition. The layer 13 was applied to the vacuum switch 4 as a coating and was used to take up any difference in thermal expansion between the vacuum switch and the hard epoxy housing 1a. For this purpose the layer 13 had to adhere to the switch and the housing (column 5, lines 53 to 59). There was no reason to assume that it was in a stretched condition.

Regarding document D8, the proprietor argued that the rubber ring 8 could not be considered as a layer of stretched compliant material which surrounded the vacuum assembly as set out in claim 1 of the patent. The rubber ring 8 merely provided a place in which an

insulating ring 9 could be formed (cf. translation, page 4, line 25 to page 5, line 5). Furthermore, the rubber ring 8 could not be said to be "within" the insulating ring 9 in the sense of claim 1.

According to the proprietor, document D8 mentioned known techniques in which, like in D2, epoxy resin was moulded into the outer wall of the insulating vacuum chamber of a vacuum circuit breaker by injection moulding (see translation, page 3, lines 9 to 18), but characterised these encapsulation techniques as disadvantageous and sought to avoid encapsulation (see translation, page 4, lines 13 to 24). Thus, D8 taught an alternative solution to the encapsulation technique disclosed in D2, so it would not be obvious for the skilled person to seek to combine the teachings of D2 and D8.

Reasons for the Decision

1. The appeal is admissible.

Main request

2. **Amendments, Article 100(c) EPC**

The Board shares the opposition division's view that the amendment of the term "expanded" to "stretched" in granted claim 1 does not offend Article 123(2) EPC.

The Board considers that the sentence "The stretching or expanding of the silicone sleeve during installation ... " on page 5, lines 28 to 31 of the description as

filed (see WO 98/11582) makes it clear to the skilled reader that the terms "stretched" and "expanded" are used in the application to mean the same thing. The Board can find no support for the opponent's contention that "stretched" means "reversibly extended" whereas "expanded" means "non reversibly extended".

Furthermore, the application as filed explicitly refers to a "stretched silicone sleeve" (page 3, lines 18 to 25), and it is clear that this stretched silicone sleeve is an embodiment of the layer of expanded compliant material referred to in claim 1 as filed. Hence, the Board considers that it is directly and unambiguously derivable from the application as filed that the layer of compliant material is stretched.

3. ***Novelty and inventive step, Article 100(a) EPC***

3.1 Document D2 discloses a vacuum switch 4 which is mounted within a housing 1a during a suitable moulding operation (see column 3, lines 36 to 40 and figure 1).

In column 4, lines 49 to 66 it is stated that:

> *in order to assure the electrical integrity of the seal between the wall member 5 of switch 4 and the moulded epoxy resin of housing 1a, it is necessary to form a void-free seal between these components.*

Furthermore, it is explained that in one alternative way of achieving this:

> *a "hard" epoxy resin may be used to form the housing 1a around switch 4, if a thin layer of resilient material 13 is mounted between the wall*

member 5 and housing 1a when the housing 1a is moulded.

Furthermore, D2 states that (emphasis added):

to form such a layer of resilient material 13, the wall member 5 may be coated with either a cured or uncured layer of bonding material ... prior to molding the epoxy resin housing 1a around the vacuum switch 4.

The Board concludes from the above that document D2 discloses not only the features of the preamble of granted claim 1, but also a layer of compliant material (i.e. the resilient material 13) around the vacuum assembly and within the layer of rigid material (i.e. the hard epoxy resin housing 1a).

The Board can see no suggestion in document D2 that the layer of compliant material is stretched. Indeed, it seems to the Board that when a layer is coated onto a body as in D2, it would not be usual for that layer to then be in a stretched condition, unless special measures were taken to achieve that effect. Hence, the Board finds that the subject-matter of claim 1 is novel over the disclosure of document D2.

3.2 Document D1 takes it's priority from document D2. The disclosures of D1 and D2 seem to be broadly the same, so the above findings apply equally to document D1.

3.3 In document D8 a silicone rubber ring 8 is provided around a vacuum chamber for the purpose of mounting an insulating material (member) 9 that is for reinforcing

the external creepage insulation of the vacuum chamber (cf. translation, page 6, second paragraph).

D8 discloses that the silicone rubber ring 8 is stretched when it is fitted around the outer wall 4a of the insulator tube 4 that forms the vacuum chamber 1 of the circuit breaker (cf. translation, page 5, from line 22). The insulating member 9 is fitted into a square-shaped groove 8a on the rubber ring 8 and is pressed and fixed thereto by the stress in the rubber ring (page 6, lines 2 to 12). The internal surface of the rubber ring 8 is appressed to the outer wall 4a of the insulator tube (page 6, lines 13 to 22). In this way the insulating member 9 and vacuum chamber 1 are fixed integrally, thereby reinforcing the external creepage insulation.

In the Board's judgement, whilst the insulating member 9 of D8 does seem to form a ring around the vacuum assembly, it cannot be considered as a layer of rigid material surrounding the vacuum assembly in the sense of claim 1 of the patent. Here, the Board understands the term "surrounding" in the sense of "encapsulating" the vacuum assembly, rather than just as forming a ring around it. Furthermore, the Board does not consider that the silicone rubber ring 8 of D8 is within the insulating member 9 in the sense of claim 1. For these reasons, the Board finds that the subject-matter of claim 1 is novel over the disclosure of document D8.

3.4 Considering inventive step, the Board considers that the subject-matter of claim 1 is not obvious in view of a combination of the teachings of D2 and D8 for the following reasons.

Document D2 concerns a vacuum circuit breaker in which the insulating vacuum chamber is encapsulated in an epoxy resin housing. Document D8 characterises such an arrangement as disadvantageous and suggests an alternative arrangement that avoids such encapsulation (see translation, page 4, lines 13 to 24). Hence, it seems to the Board that if the skilled person starting from document D2 were to consider following the teachings of D8, this would lead to removing the epoxy encapsulation of D2 and replacing it with a rubber ring 8 and insulating member 9 as suggested in D8. This would take away the layer of rigid material surrounding the vacuum assembly and thus would move away from the subject-matter of claim 1.

For these reasons, the Board concludes that the subject-matter of claim 1 involves an inventive step, Article 56 EPC.

3.5 The independent method claim 15 refers to stretching a sleeve of compliant material, inserting the vacuum interrupter within the stretched sleeve, collapsing the stretched sleeve onto the interrupter and encapsulating the interrupter and sleeve within a rigid material. As set out above, the Board has found that document D2 does not disclose that the layer of resilient material 13 is stretched, that document D8 does not disclose to encapsulate an interrupter and a stretched sleeve, and that a combination of D2 and D8 would not lead to an arrangement that is encapsulated. For the same reasons, the Board finds that the subject-matter of claim 15 is novel and involves an inventive step.

4. In view of the above, the Board concludes that the appeal has to be dismissed. It is thus not necessary to consider the proprietor's auxiliary requests.

Order

For the above reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

U. Bultmann M. Ruggiu