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Aktenzeichen / Case Number / N<sup>o</sup> du recours : T 299/87 - 3.5.1

Anmeldenummer / Filing No / N<sup>o</sup> de la demande : 83 303 763.3

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Bezeichnung der Erfindung: Method of producing a contact device for a switch  
Title of invention:  
Titre de l'invention :

Klassifikation / Classification / Classement : H 01 H 11 /04

### ENTSCHEIDUNG / DECISION

vom / of / du 16 October 1989

Anmelder / Applicant / Demandeur : Mitsubishi Denki Kabushiki Kaisha

Patentinhaber / Proprietor of the patent /  
Titulaire du brevet :

Einsprechender / Opponent / Opposant :

Stichwort / Headword / Référence :

EPÜ / EPC / CBE Article 56 EPC

Schlagwort / Keyword / Mot clé : "Inventive step (yes) - unobvious modification"

Leitsatz / Headnote / Sommaire

Europäisches  
Patentamt

Beschwerdekammern

European Patent  
Office

Boards of Appeal

Office européen  
des brevets

Chambres de recours



Case Number : T 299/87 - 3.5.1

DECISION  
of the Technical Board of Appeal 3.5.1  
of 16 October 1989

Appellant : Mitsubishi Denki Kabushiki Kaisha  
2-3 Marunouchi 2-chome  
Chiyodaku  
Tokyo (JP)

Representative : Lawson, David Glynne  
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Decision under appeal : Decision of Examining Division 050  
of the European Patent Office  
dated 10 February 1987 refusing  
European patent application  
No. 83 303 763.3 pursuant to Article  
97(1) EPC

Composition of the Board :

Chairman : W.B. Oettinger  
Members : W.J.L. Wheeler  
F. Benussi

## Summary of Facts and Submissions

- I. European patent application No. 83 303 763.3, filed on 29 June 1983 claiming priority of 29 June and 1 December 1982, and published under No. 99 671, was refused by a decision of Examining Division 2.2.07.050 dated 10 February 1987. That decision was based on Claims 1 to 6 filed on 12 June 1986, which are identical with the originally filed claims.

The reason given for the refusal was that the subject-matter of Claims 1 to 5 lacked an inventive step, having regard to prior art documents

D1: US-A-3 828 428

D2: US-A-2 888 742 and

D3: CH-A-226 564,

and Claim 6 was not clear.

- II. On 8 April 1987 the Applicant lodged an appeal against that decision in its entirety by telex confirmed on 13 April 1987. The appeal fee was paid on 9 April 1987.

On 11 June 1987, the Appellant filed a Statement of Grounds of Appeal accompanied by amended claims and two auxiliary requests.

- III. In response to communications from the Board expressing, inter alia, the provisional view that none of the claims on file was allowable but further amendments could lead to an allowable independent claim, the Appellant filed amended claims.

The independent claim reads as follows:

"1. A method of producing a contact device for a vacuum switch comprising the steps of:

pressing a powdered contact material mixture (10) consisting solely of powdered alloy contact metals, or solely of a mixture of powdered alloy contact metals and a powdered contact metal oxide, placed on a main surface of a substantially flat conductive metal substrate (9) forming a contact carrier with cylindrical lateral sides, to become a unitarily moulded product;

sintering said moulded product at a temperature which is lower than the melting point of the main constituent metal of the powdered contact material mixture and lower than the melting point of the conductive metal substrate, whereby the said contact metal mixture is solidified and bonded to the said substrate by the said sintering step;

wherein the method is characterised by:

in the step of pressing the powdered contact material mixture, pressing a portion of the contact material mixture (10), which is placed on the lateral sides of the substrate (9), so that the contact material mixture has a cylindrical flange (11) in intimate contact with the lateral sides of the substrate;

sintering, in the sintering step, said moulded product in a hydrogen atmosphere;

after the sintering step, contracting the contact material mixture uniformly on the substrate (9), the coefficients of contraction of the substrate and the contact material mixture being different from one another, wherein the main surface of the substrate is irregular for augmenting the bonding thereof with the contact material mixture;

machining the sintered product, after the contracting step, to a desired shape; and

brazing an electrode bar (5) to said substrate thereby forming an integral composite contact."

Claims 2 to 5 are dependent upon Claim 1, Claims 2 to 4 relating to particular forms for the substrate and Claim 5 to a particular sintering temperature range.

IV. From the Appellant's submissions it follows that he requests that the decision under appeal be set aside and a patent granted on the basis of the following application documents on file:

- description: pages 1, 2, 4, 5 and 7 to 11 as published, pages 3 and 3c filed on 31 May 1989, pages 3a and 3b filed on 2 October 1989, page 6 filed on 19 September 1989;
- Claims 1 to 5 filed on 19 September 1989;
- drawing: one sheet filed on 19 September 1989.

#### Reasons for the Decision

1. The appeal is admissible.
2. The amendments are admissible.

More particularly, the combination of the features recited in Claim 1 is derivable from the original Claims 1 to 5 and pages 1, 4, 5 and 6 of the original description.

The features recited in Claims 2 to 4 are mentioned in original Claims 2 to 4 respectively. The temperature specified in Claim 5 is mentioned on page 7 of the original description and all examples described fall within the range specified in Claim 5.

The description has been amended to refer to D2 as prior art and to be consistent with Claim 1.

3. The method claimed in Claim 1 is not only new but involves an inventive step.

The claims are therefore allowable.

This conclusion is based, in essence, on the following considerations:

- 3.1 The description correctly states that the method steps defined in the pre-characterising portion of Claim 1 are known from D2 but not the characterising features.

There is no suggestion in D2 to leave the principle that, in the step of pressing the portion of the contact material mixture 7, the projections or protrusions 6 are distorted and bent outwardly and backwardly so as to grip the compacted metal powder (Fig. 6). There is therefore no suggestion leading to a cylindrical flange and to consequential features in Claim 1.

- 3.2 Essentially the same applies to D3.

- 3.3 The claimed cylindrical flange corresponds, in effect, to the cylindrical portion of the insert (30) or in the matrix material (31) of D1, and the skilled person would, from his general knowledge, know that a shrink fit would be a suitable measure for attaching cylindrical members firmly to each other.

3.4 The claimed method goes, however, beyond this measure by applying an irregular surface to the substrate for augmenting the bonding thereof with the contact material mixture, it being clear that with "irregular surface" a certain roughness is meant and not projections or protrusions like those used according to D2(6) or D3(1b).

3.5 Such an irregular surface combined with a shrink fit in order to achieve both a firm mechanical grip and an enhanced electrical connection, which allow the sintered product to be machined to a desired shape, is not suggested in any of the prior art documents on file.

It is therefore regarded as unobvious to modify the method known from D2 by the claimed features, even if D1 and D3 are also taken into account, whereby it is not necessary to consider whether the feature of doing the sintering in a hydrogen atmosphere contributes to the inventiveness of the method.

3.6 This finding would apparently not be affected if the remaining document cited in the Search Report (US-A-2361089), but not by the Examining Division, were considered.

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 grant a patent on the basis of the following application documents:
  - description: pages 1, 2, 4, 5 and 7 to 11 as published, pages 3 and 3c filed on 31 May 1989, pages 3a and 3b filed on 2 October 1989, page 6 filed on 19 September 1989;
  - Claims 1 to 5 filed on 19 September 1989;
  - drawing: one sheet filed on 19 September 1989.

The Registrar:



S. Fabiani

The Chairman:



W.B. Oettinger

*by fax 16.10.89  
Fabiani*