Europäisches Patentamt
Beschwerdekammern

European Patent Office
Boards of Appeal

Office européen des brevets
Chambres de recours

Case Number: T 78 / 82

T162 -

DECISION

of the Technical Board of Appeal 3.5.1

of 24 May 1984

Appellant: Dorman Smith Switchgear Ltd.
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Representative: Derek Daunton
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Decision under appeal: Decision of Examining Division 051 of the European Patent Office dated 12 January 1982 refusing European patent application No 79300747.7 pursuant to Article 97(1) EPC

Composition of the Board:

Chairman: G. Korsakoff

Member: J. van Voorthuizen

Member: L. Gotti Porcinari

Summary of facts and submissions

I European Patent application No. 79 300 747.7 filed on 1.5.79 (Publication No. 0 018 454), was refused by a Decision of the Examining Division 051 of the European Patent Office of 12.1.82. That Decision was based on claims 1-8 as submitted on 2.10.81.

II The reason given for the refusal was that the subject-matter of the claims did not involve any inventive step having regard to US-A-4 056 798 and CH-A-549 976.

III. The applicant lodged an appeal against this Decision on 24.2.82. The Statement of Grounds was filed on 23.4.82. The appeal fee was paid on 23.2.82.

IV In the Statement of Grounds of Appeal the applicant argued essentially that the person skilled in the art would not be led to the circuit-breaker according to Claim 1 as filed on 2.10.81 by the disclosure in US-A-4 056 798, all of its teaching being directed to the provision, as individual entities, of the arc-quenching plate array and the slot motor. Certain passages in the description of this US patent which seem to indicate that the laminations can be made to function at the same time both as arc-extinguishing means and as slot-motor plates, are speculative and are lacking in practical basis.

The applicant stressed the importance of the key-hole form of the slots and the effects obtained by making the movable contact move within the enlarged portion of the slots.

.../...

V In the course of the procedure before the Board, the applicant submitted an amended set of Claims 1-6 in which Claim 1 was limited by the introduction of the features of the former Claims 2 and 3. Furthermore, corresponding amendments to the description were submitted. The applicant requested that a European patent be granted on the basis of these claims, which read as follows:

1. An electric circuit breaker of the kind comprising for the or each pole thereof, a fixed contact (14), a movable contact arm (11) carrying a movable contact (12) and pivotable between an "on" position in which the movable contact (12) engages with the fixed contact (14), and an "off" position in which the movable contact (12) is separated from the fixed contact (14), the circuit breaker further including a tripping mechanism which serves, upon passage through the circuit breaker of current in excess of the rated current of the breaker, to cause the movable contact arm or arms (11) to swing into the off position, and in which the or each movable contact arm (11) is spring-loaded towards its associated fixed contact (14) so as to be capable of limited movement against the action of the spring and away from the fixed contact (14) independently of the tripping mechanism under the influence of the electro-magnetic forces generated by a short circuit current, and further comprising, for the or each movable contact arm (11), an array of arc-quenching plates (22) of magnetic material, each of which is generally of U-shaped configuration providing an air gap between the limbs of the U for the respective

movable contact arm (11)to move therethrough, characterised in that the gap is shaped to have an enlarged inner end (26) wider than the mouth (28)of the gap where the latter meets the edge of the plate (22), the gap being substantially key-hole shaped, having a relatively narrow neck portion (25) which connects with the said edge of the plate and a relatively enlarged inner circular portion (26), the centres of the inner circular portions (36) of the arc-quenching plates (22) of the or each array lying on an axis passing through the point of contact between the movable contact (12) and the fixed contact (14) and the inner circular portion (26) of each plate (22) having a radius which is not less than the distance between said point and the pivot axis (15) of the movable contact arm (11), or the width of this arm, whichever is the greater, and in that each said arc-quenching plate (22) has its limbs so dimensioned as to extend past the respective movable contact (12) carried at the free end of the respective movable contact arm (11) to a respective termination the position of which is spaced away from the movable contact (12) by a distance which is not less than 30% of the spacing between the pivot axis (15) of the movable contact arm (11) and the movable contact (12), and is not greater than 70% of said spacing.

2. A circuit breaker as claimed in Claim 1, wherein the ends of the limbs of the arc-quenching plates (22) project slightly past halfway between the movable contact (12) and the pivot axis (15).

3. A circuit breaker as claimed in Claim 1 or 2 wherein the air gap is shaped complementarily to the profile of the movable contact arm (11) and the movable contact (12) carried thereby, to leave a clearance small relative to the width of the gap for the movable contact arm (11) to pass therethrough.

4. A circuit breaker as claimed in any preceding claim wherein the arc-quenching plates (22) of the or each said array connected together as a unit.

5. A circuit breaker as claimed in Claim 4, wherein the said plates (22) extend between and are connected to side locators (20,21) which form the or each array into its unit.

6. A circuit breaker as claimed in Claim 4 or 5 wherein the or each said unit has a top plate (23) which is similar in external shape to the arc-quenching plates (22), but has no gap therein.

Reasons for the Decision

1. The appeal complies with Articles 106 to 108 and Rule 64 EPC and is, therefore, admissible.

2. Although the Examining Division properly rejected the claims before it on the ground of lack of inventive step, the present Claims filed on 23.1.84 (Claim 1) and 28.6.83 (Claims 2-6) are not open to that objection.

Claim 1 is now limited by the inclusion of characteristics found in previous dependent Claims 2 and 3 and the applicant has shown that by the use of key hole slotted plates (known in themselves from CH-594 796) in a circuit breaker according to US-A-4 056 798 not only is the amount of metal vapour present during an interruption reduced, as was to be expected, but that this shape, together with the fact that the movable contact is moving within the wider part of the slots, effects an improvement in the draw back force. The circuit breaker according to Claim 1, therefore, involves an inventive step and this claim is allowable.

3. The dependent claims 2-6 describe further embodiments of the invention, they are not open to objections.

4. The amendments to the description submitted on 23.1.84 and 20.2.84 duly take account of the prior art and of the new wording of the claims, in conformity with Rule 27(c) and (d) EPC respectively, in conjunction with Rule 36(1) EPC. They are, therefore, not open to objection.

For these reasons

it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the Examining Division with the order to grant a European patent on the basis of the following documents:

   (a) claim 1 as filed on 23.1.84 and Claims 2-6 as filed on 28.6.83;

(b) original description with amendments filed on 23.1.84 and 20.02.84;

(c) drawings as originally filed.