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DECISION
of 3 December 1993

Case Number: T 0526/90 - 3.2.5

Application Number: 86304911.0

Publication Number: 0209995

IPC: B23K 1/08

Language of the proceedings: EN

Title of invention:
Soldering method

Applicant:
Evenoak Limited

Opponent:
-

Headword:
-

Relevant legal norms:
EPC Art. 52, 56

Keyword:
"Inventive step (yes)"

Decisions cited:
-

Catchword:
-

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Case Number: T 0526/90 - 3.2.5

DECISION
of the Technical Board of Appeal 3.2.5
of 3 December 1993

Appellant:	Evenoak Limited Hunsdon Works Perry Road Industrial Estate East Witham Essex CM8 3BH (GB)
Representative:	Holliday, Frank Marks & Clerk 57-60 Lincoln's Inn Field London WC2A 3LS (GB)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office dated 18 January 1990 refusing European patent application No. 86 304 911.0 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: C.V. Payraudeau
Members: H.P. Ostertag
A. Burkhart

Summary of Facts and Submissions

I. The Appellant lodged an appeal against the decision of the Examination Division to refuse the application No. 86 304 911.2 (publication No. 0 209 995).

The reason for the decision was that the subject-matter of Claim 1 was not new, having regard to DE-A-3 022 351 (henceforth referred to as D1).

II . The Appellant requested that the decision under appeal be set aside and a patent granted on the basis of the following documents:

Description:	pages 1, 2, 5, 7 received on 8 October 1993 with letter dated 5 October 1993; Pages 3, 3a received on 9 September 1993 with letter dated 8 September 1993; Pages 4, 6 received on 10 April 1989 with letter dated 4 April 1989;
Claims:	1 to 4, 6 received on 21 May 1991 with letter of 18 May 1991; 5 received on 8 October 1993 with letter dated 5 October 1993:
Drawings:	Sheets 1 to 2 as originally filed; Sheet 3 received on 8 October 1993 with letter dated 5 October 1993.

III. Independent Claims 1 and 5 read as follows:

"1. Apparatus for applying solder to an end of a wire or a connecting lead of an electrical or electronic component, comprising a bath (3) for containing molten solder, a pump (9), a nozzle (16), a conduit (15) connecting the pump (9) and the nozzle (16), the pump (9) being arranged to pump solder from the bath (3) to the nozzle (16) via the conduit (15), the nozzle (16) having a downwardly directed exit (31) at an end thereof such that the solder is pumped out of the nozzle (16) to form a downwardly flowing stream of solder into which the end of the wire or lead is to be passed substantially sideways, characterized in that guide means (38, 39, 40) is provided at the end of the nozzle (16) for contacting and bending downwards the end of the wire or lead as it is passed into the stream of solder.

5. A method of tinning an end of a wire or a connecting lead of an electrical or electronic component, the method comprising the steps of providing a bath (3) of molten solder and pumping the solder (6) through a downwardly directed nozzle exit (31) to form a downwardly flowing stream of solder (45), and passing the end (42) of the wire or the connecting lead (41) sideways in to the stream of solder (45), characterized that as the wire or lead (41) is passed sideways in to the stream of solder (45) the end (42) of the lead is bent downwardly and the lead (41) is then withdrawn substantially axially from the stream of solder (45), the end of the lead (41) unbending as the stream of solder (45) is cleared."

Reasons for the Decision

1. *Amendments*

The amended claims are admissible in respect of Article 123(2) EPC, since their subject-matter does not extend beyond the content of the application as filed.

Claim 1 is based on Claims 7 and 10 as filed, Figures 1 and 8 and page 2, lines 25 to 27; Claim 2 is based on Claim 9 as filed and page 3, lines 11 to 12; Claim 3 is based on Figures 1 to 3 and page 6, lines 29 to 32; Claim 4 corresponds to Claim 8 as filed; Claim 5 is based on Claims 1 to 4 as filed and page 2, lines 25 to 31 and Claim 6 is based on Figure 8.

2. *Novelty*

2.1 DE-A-3 022 351 (D1), which represents the closest state of the art, discloses an apparatus for applying solder to a wire, whereby a wire is passed laterally in a downwardly flowing stream of solder that is pumped through a nozzle with an opening in the form of a narrow slit. Due to the narrow slit-like opening of the nozzle, the solder flow takes the form of a curtain, which exercises only a small force on the wire, thus **preventing** that the wire ends are bent downwardly. The nozzle can be rotated about a vertical axis not coinciding with the nozzle axis, and it can be shifted horizontally in order to adjust the position of the curtain with respect to the path of the wires to be tinned.

Neither D1 nor any other of the cited documents in the Search Report discloses an apparatus for applying solder comprising guide means for bending downwards the end of the wire or lead, in combination with the other features of Claim 1.

The subject-matter of Claim 1 is therefore novel with respect to the cited prior art.

2.2 The subject-matter of Claim 5 is also novel, since in none of the cited documents a method of tinning an end of a wire or lead is disclosed comprising the step of bending the end of the wire or lead downwardly as it is passed into the stream of solder, the end of the wire or lead unbending as the stream of solder is cleared.

3. *Inventive Step*

3.1 The problem the present invention seeks to solve is to provide an apparatus and a method of applying solder to the end of a wire or a connecting lead of an electrical or electronic component according to which the formation of a substantial curtain or tear of solder on the tinned wire or lead is reduced or avoided.

The present invention solves this problem by providing guide means at the end of the nozzle for contacting and bending downwards the end of the wire or lead as it is passed into the stream of solder, the end of the wire or lead unbending as it is released from the guide means.

3.2 No suggestion of the above-mentioned features is to be found in the teachings of the cited prior art documents. In particular, as pointed out above, D1 teaches the use of a curtain of downwardly flowing solder, the thickness of which is chosen such as to avoid any substantial bending down of the (unguided) wire ends, see page 7, last four lines. A thick stream of solder would result in bending down the unguided wire ends in an irregular way, resulting in an irregular tinning result, see page 5, lines 4 to 12. D1 not only fails to disclose guide means, which bends the tip of the wire downwardly, but instead teaches that bending the wire ends must be **avoided**. In is thus seen that D1 points away from the present invention.

Consequently, the subject-matter of Claims 1 and 5 shows an inventive step with respect to the cited prior art.

3.3 The dependent Claims 2 to 4 and 6 define further embodiments of the invention and likewise meet the requirements of Articles 52 to 57 EPC.

Order

For these reasons, it is decided that:

1. The decision under appeal is set aside.

2. The matter is referred back to the first instance with the order to grant a European patent on the basis of the documents mentioned in point II above with the additional correction of a clerical error: on page 7, line 6 from the bottom, "nozzle 29" must be replaced by "nozzle 28".

The Registrar: The Chairman:

A. Townend C. Payraudeau