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D E C I S I O N
of 14 October 2003

Case Number: T 0197/01 - 3.5.2

Application Number: 94117372.6

Publication Number: 0652605

IPC: H01R 13/11

Language of the proceedings: EN

Title of invention:
Female terminal fitting for connector

Applicant:
SUMITOMO WIRING SYSTEMS, LTD.

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 54, 56

Keyword:
"Novelty, inventive step (yes)"

Decisions cited:
-

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0197/01 - 3.5.2

D E C I S I O N
of the Technical Board of Appeal 3.5.2
of 14 October 2003

Appellant: SUMITOMO WIRING SYSTEMS, LTD.
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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 24 July 2000 refusing European application No. 94117372.6 pursuant to Article 97(1) EPC.**

Composition of the Board:

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

Summary of Facts and Submissions

I. The appellant contests the decision of the examining division to refuse European patent application No. 94 117 372.6. The reason given for the refusal was that none of the requests met the requirements of novelty and inventive step according to Articles 52(1), 54 and 56 EPC.

II. With the letter dated 13 August 2003 the appellant filed an amended claim 1 and an amended page 17 of the description. Amended pages 1 to 7, 11, 12 and 16 of the description and new drawing sheets 1/4 to 4/4 were filed with the letter dated 17 June 2003.

III. The sole claim (claim 1) according to the main request now reads:

"A connector comprising a male and a female terminal fitting, said female terminal fitting comprising:
a cylindrical insertion portion (2) whose front end is open; and
a resilient contact piece (10) disposed within said cylindrical insertion portion (2), said resilient contact piece including:
a first fold (11) being formed by extending an extending end portion from a wall portion of said cylindrical insertion portion (2) and folding the extending end portion back into a hollow of the cylindrical insertion portion, said first fold (11) being given resiliency,
a second fold (14) being formed by further folding the extending end portion inward, said second fold being given resiliency, and

a contact projection (13),
wherein said male terminal fitting (C) is retained in pressure contact with said resilient contact piece (10) upon correct and complete insertion of said male terminal fitting (C) into said cylindrical insertion portion (2),

characterized by

a stopper (16) regulating any excessive biasing force to an amount of flexion of said resilient contact piece (10) within the limit of resiliency allowed by the first fold, said stopper being formed by bending the extending end portion of said second fold (14) so as to confront a back surface of said resilient contact piece (10) between said first fold and said second fold, wherein
said contact projection (13) is provided between the portion confronting the stopper (16) and the second fold (14), and wherein
said stopper (16) and said male terminal fitting (C) being dimensioned such that, upon correct insertion of the male terminal fitting, resiliency is applied by both folds, facilitating the male terminal fitting to be inserted at a small insertion pressure, and ensuring highly reliable contact with high contact pressure once the male terminal fitting has been inserted."

IV. The following documents:

D1: GB-A-1 584 571,

D2: FR-A-2 415 890, and

D3: JP-U-2-117 672,

considered in the first instance proceedings, remain relevant to the present appeal.

V. The arguments of the appellant can be summarized as follows:

The subject-matter of claim 1 according to the main request was novel because a female terminal fitting comprising a stopper as defined by the characterizing portion of claim 1 was not disclosed in any of the cited prior art documents. Moreover, the examples of prior art connectors mentioned in the preamble of the description or shown in the present figures 3 to 8 of the application, particularly figure 6 (originally filed figure 22), were conceptual and did not form part of the public prior art. There was no hint in any of the cited publicly available prior art documents to form a stopper at the end part of the resilient contact piece of a connector in the manner claimed. The subject-matter of claim 1 thus was novel and involved an inventive step.

VI. The appellant requested that the decision under appeal be set aside and, as main request, that a patent be granted on the basis of:

claim 1 (main request) filed with letter dated 13 August 2003,

the description, page 17 filed with letter dated 13 August 2003, pages 1 to 7, 11, 12 and 16 filed with letter dated 17 June 2003, pages 8 and 9 filed with letter dated 6 July 1998, pages 10, 13 to 15 filed with letter dated 6 June 1997,

sheets 1/4 to 4/4 of the drawings filed with letter dated 17 June 2003.

Reasons for the Decision

1. The appeal is admissible.

2. *Amendments*

2.1 Claim 1 according to the main request relates to a connector comprising in combination a male terminal fitting and a female terminal fitting which comprises all the features recited in claim 1 of the application as filed and the following additional features:

- the stopper has the function of "regulating any excessive biasing force to an amount of flexion of said resilient contact piece (10) within the limit of resiliency allowed by the first fold";

- a contact projection (13) "provided between the portion confronting the stopper (16) and the second fold (14)"; and

– the stopper and the male terminal fitting are "dimensioned such that, upon correct insertion of the male terminal fitting, resiliency is applied by both folds, facilitating the male terminal fitting to be inserted at a small insertion pressure, and ensuring highly reliable contact with high contact pressure once the male terminal fitting has been inserted".

2.2 An embodiment of a female terminal fitting which comprises all the features recited in claim 1 of the application as filed is disclosed in the application as filed (see published application, column 9, line 54, to column 12, line 2, and figures 1 and 2). According to this embodiment, the female terminal fitting and a male terminal fitting (C) together form a connector. The female terminal fitting comprises a contact projection (13) provided between the portion confronting the stopper and the second fold. Moreover, according to the mode of operation described in column 11, the stopper regulates any excessive biasing force within the limit of resiliency allowed by the first fold (column 11, lines 30 to 35). This implies that the stopper and the male terminal fitting are dimensioned so that, upon correct insertion of the male terminal fitting (C), resiliency is applied by both folds, facilitating the male terminal fitting to be inserted at a small insertion pressure, and ensuring highly reliable contact with high contact pressure once the male terminal fitting has been inserted (column 11, lines 5 to 23). Accordingly, the amendments made to claim 1 do not contravene Article 123(2) EPC.

3. *Novelty*

3.1 It appears that in the first instance proceedings, there was some confusion as to what may be regarded as a stopper in the sense of the word as used in claim 1. According to the first paragraph of the characterizing part of claim 1, the stopper (16) is formed by bending an end portion of the resilient contact piece extending from the second fold (14) in such a manner that it regulates any excessive biasing force to an amount of flexion of the resilient contact piece within the limit of resiliency allowed by the first fold (11).

3.2 Document D3 (figure 6) discloses a connector comprising a male and female terminal fitting. The female terminal fitting comprises a cylindrical insertion portion and a resilient contact piece (6) including first and second folds having resiliency and provided with a contact projection between said first and second folds. An end portion of the contact piece extending from the second fold is bent inwardly a small amount towards the back portion of the resilient contact piece (6) between the first and second folds. However, it does not appear that this bent portion may act as a stopper as recited in the characterizing part of claim 1 of the present application.

3.3 Document D1 (figure 6; page 2, lines 47 to 65) discloses a connector comprising a male and female terminal fitting. The female terminal fitting comprises a cylindrical insertion portion and a resilient contact piece (24) including first and second folds having resiliency which has been formed by extending and folding an extending portion from a wall portion (25)

of the cylindrical insertion portion. An end portion (24a) extending from the second fold is bent inwardly a small amount towards the back portion of the resilient contact piece (6) between the first and second folds. However, it does not appear that this bent portion may act as a stopper as recited in the characterizing part of claim 1 of the present application.

3.4 The prior art cited in the application with reference to figure 6 (originally filed figure 22) does not refer to a published prior art document. Moreover, the resilient contact piece (53) of this connector does not comprise a stopper as recited in claim 1. The other prior art documents cited in the search report and in the application itself are not concerned with a connector whose female terminal fitting comprises a resilient contact having a first and a second fold. Therefore the subject-matter of claim 1 according to the main request is considered to be new (Article 54(1) EPC).

4. *Inventive step*

4.1 Starting from D3, which is the closest prior art, the objective problem addressed by the present invention can be seen as providing a connector having a female terminal fitting which can ensure reliable connection to a male terminal fitting by preventing a resilient contact piece from losing the proper spring character thereof or preventing deformation of the resilient contact piece. This corresponds to one of the objects of the invention identified in the application as filed (see published application, column 5, lines 43 to 48).

4.2 The solution to this problem is to provide the resilient contact piece with a stopper according the characterizing part of claim 1.

4.3 As already mentioned in paragraphs 3.2 to 3.4 above, no suggestion of such a solution can be founded in any of the cited prior art documents. Nor can it be derived from any combination of them.

5. For the foregoing reasons, in the Board's judgement, the subject-matter of claim 1 according to the present main request is considered to be new and involve an inventive step within the meaning of Articles 54 and 56 EPC and the application as amended meets the requirements of the EPC.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the department of first instance with the order to grant a patent in the following version:

Claims:
claim 1 (main request) filed with letter dated 13 August 2003,

Description:
page 17 filed with letter dated 13 August 2003,
pages 1 to 7, 11, 12 and 16 filed with letter dated 17 June 2003,
pages 8 and 9 filed with letter dated 6 July 1998,
pages 10, 13 to 15 filed with letter dated 6 June 1997,

Drawings:
sheets 1/4 to 4/4 filed with letter dated 17 June 2003.

The Registrar: The Chairman:

R. Schumacher W. J. L. Wheeler