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Datasheet for the decision of 15 October 2008

Case Number: T 0613/05 - 3.4.02

Application Number: 95936181.7

Publication Number: 0788611

IPC: G02B 6/255

Language of the proceedings: EN

Title of invention:
Splicing an optical fiber having twin cores and a fiber having a single core

Applicant:
TELEFONAKTIEBOLAGET LM ERICSSON (publ)

Opponent:
-

Headword:
-

Relevant legal provisions:
-

Relevant legal provisions (EPC 1973):
EPC Art. 84, 56

Keyword:
"Independent claims - clear and involve an inventive step - yes (after amendment)"

Decisions cited:
-

Catchword:
-

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Case Number: T 0613/05 - 3.4.02

D E C I S I O N
of the Technical Board of Appeal 3.4.02
of 15 October 2008

Appellant: TELEFONAKTIEBOLAGET LM ERICSSON (publ)
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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 23 February 2005 refusing European application No. 95936181.7 pursuant to Article 97(1) EPC 1973.**

Composition of the Board:

Chairman: A. Klein
Members: M. Rayner
M. J. Vogel

Summary of Facts and Submissions

I. The present appeal is against the decision of the examining division refusing European patent application number 95 936 181.7 (International Publication No. WO-A-96/12980). The patent application is concerned with determining the distance between symmetrically placed cores in an optical fibre.

II. In the decision under appeal, the examining division made reference to the following documents:

D3 US-A-4 948 412
D4 EP-A-0 280 562
D6 US-A-5 013 345

Method Claim

According to the examining division, the independent method claim presented to it did not meet the requirements of Article 84 EPC for lack of clarity. Only when imaged in a heated state can fibre cores be resolved, yet this feature is not in claim 1, which does not therefore contain all the technical features essential to the invention. Moreover, in the absence of a reference to a heated state, i.e. if, for example, high resolution imaging were used, there would be no need for a splicing process as recited in claim 1, in other words the claim would be rendered obscure. The examining division noted that it had informed the applicant that a claim containing features of claim 1 and 2 would be allowable, but that the claim had not been so amended.

Device Claim

The subject matter of the independent device claim is not novel having regard to any one of documents D3, D4 or D6. In all cases the device disclosed is suitable for determining the difference between symmetrically located cores in an optical fibre having twin cores. In the case of document D3 various calculations of distance are performed by the device, therefore it can be assumed it can carry out an operation as simple as a multiplication by two. Similarly, it can be assumed the microprocessor disclosed document D4 or control unit 88 in document D6 can multiply by two.

III. The appellant requests that the decision under appeal be set aside and the patent application be further processed. During the appeal proceedings, amended claims were filed. The appellant considers method claim 1 to be sufficiently clear. In relation to device claim 4, the term "means for" should be interpreted in the conventional way as "means arranged specially for" and not as interpreted by the examining division. The subject matter of the claim is new and involves an inventive step as the cited documents do not show determining the distance between two cores of a twin core fibre.

IV. Independent claims 1 and 4 are worded as follows:

"1. A method of determining the distance between symmetrically placed cores (3') in an optical fiber (1') having twin cores, characterized by the steps of
- providing an optical fiber (1) having a single, centrally located core (3),

- positioning an end of the optical fiber (1’) having twin cores (3') to allow images to be captured of the end in a direction substantially perpendicular to a longitudinal axis of the end and perpendicular to a plane through longitudinal axes of the twin cores within said end,
- splicing one end of the optical fiber (1’) having twin cores to an end of the optical fiber (1) having a single core, with a symmetrical or concentric positioning of the outer sides or surfaces of the fiber ends in relation to each other and with these outer sides or surfaces in parallel with each other, the splicing of the fiber ends performed by heating and welding the ends to each other,
- capturing an image of the fiber ends in the heated state and therefrom determining a value of the offset, as seen in a transverse direction of the fiber ends, of one of the cores (3’) in the fiber (1’) having twin cores in relation to the core (3) in the fiber (1) having a single core, and
- determining the distance between the cores (3’) in the fiber (1’) having twin cores to be twice the value of the determined offset.

4. A device for determining the distance between symmetrically located cores in an optical fiber (1’) having twin cores (3’), characterized by
- means (27, 29, 31; 17, 41, 43, 33) for retaining and positioning an end of the optical fiber and an end of an optical fiber having a single, centrally located core opposite to each other with the outer surfaces of the fiber ends in parallel to each other and symmetrically or concentrically placed in relation to each other,

- means (25, 37) for welding the fiber ends to each other in this position, said means being designed to provide heat to the fiber ends and thereby obtain a fusion-welding of the fiber ends to each other,
- means (17) for capturing, in a direction substantially perpendicular to the longitudinal axes of the fiber ends, images of the fiber ends in their heated state during the welding process, the cores (3', 3) of the fibers (1', 1) then being visible in the images,
- said means (27, 29, 31; 17, 41, 43, 33) for retaining and positioning arranged to rotate (27) the end of the optical fiber having twin cores to an angular position to allow the means for capturing images to capture an image of the fiber ends in a direction also perpendicular to a plane through the longitudinal axes of the twin cores within said end of the optical fiber having twin cores,
- means, comprising or connected to the means for capturing an image, for determining from an image of the fiber ends, captured in the state of the fiber ends where they are welded to each other and said end of the optical fiber having twin cores is in said angular position, a value of the transverse offset, in relation to the longitudinal direction of the fiber ends, between a core in the end of the fiber having twin cores and the core in the end of the fiber having a single core, and
- means for multiplying the determined value by two."

Reasons for the Decision

1. The appeal is admissible.

2. *Method claim 1*

2.1 Claim 1 now includes the features "the splicing of the fiber ends performed by heating and welding the ends to each other, capturing an image of the fiber ends in the heated state", which are the features seen by the examining division as essential in the context of Article 84 EPC 1973.

2.2 Therefore, the reason for refusal of the claim no longer exists. The board concurs with the examining division that the claimed subject matter is allowable.

3. *Device Claim 4*

3.1 This claim contains at least device features corresponding to method claim 1. In principle, this means that it must also be allowable following the logic of the examining division in relation to claim 1. In the present case, the board does not share the difficulty experienced by the examining division in relation to the claims being cast using the common "means for..." format. None of the documents cited by the examination division relate to determining the distance between symmetrically placed cores in an optical fibre having twin cores, but concern single core fibres. The apparatus therein is not therefore designed to perform, without further modifications not suggested by the prior art, the functions defined by the "means for" features now recited in the amended

claims in relation to twin core fibres. Moreover, such apparatus cannot be considered to render the claimed features obvious because problems related to determining distance between symmetrically placed cores in a fibre having twin cores are not addressed at all in the documents relied on by the examining division. Accordingly the board is satisfied as to inventive step of the subject matter concerned.

4. The board saw no other reason preventing grant of a patent.

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 documents:

Description

pages 4-9 as published

pages 1-3, 10-11 filed with the letter dated 17.12.2007

Claims

claims 1-6 filed with the letter dated 21.04.2008

Drawings

Sheets 1/6-6/6 as published

The Registrar The Chairman

M. Kiehl A. G. Klein