

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
18 December 2003 (18.12.2003)

PCT

(10) International Publication Number
WO 03/104873 A1

(51) International Patent Classification⁷: **G02B 6/44**

(21) International Application Number: PCT/SE03/00814

(22) International Filing Date: 21 May 2003 (21.05.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
0201743-2 5 June 2002 (05.06.2002) SE

(71) Applicant (for all designated States except US): **TELEFONAKTIEBOLAGET LM ERICSSON (publ)**
[SE/SE]; S-126 25 Stockholm (SE).

(81) Designated States (*national*): AE, AG, AL, AM, AT (utility model), AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ (utility model), CZ, DE (utility model), DE, DK (utility model), DK, DM, DZ, EC, EE (utility model), EE, ES, FI (utility model), FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **LIDÉN, Lennart**
[SE/SE]; Poppovägen 1, S-825 30 Iggesund (SE).

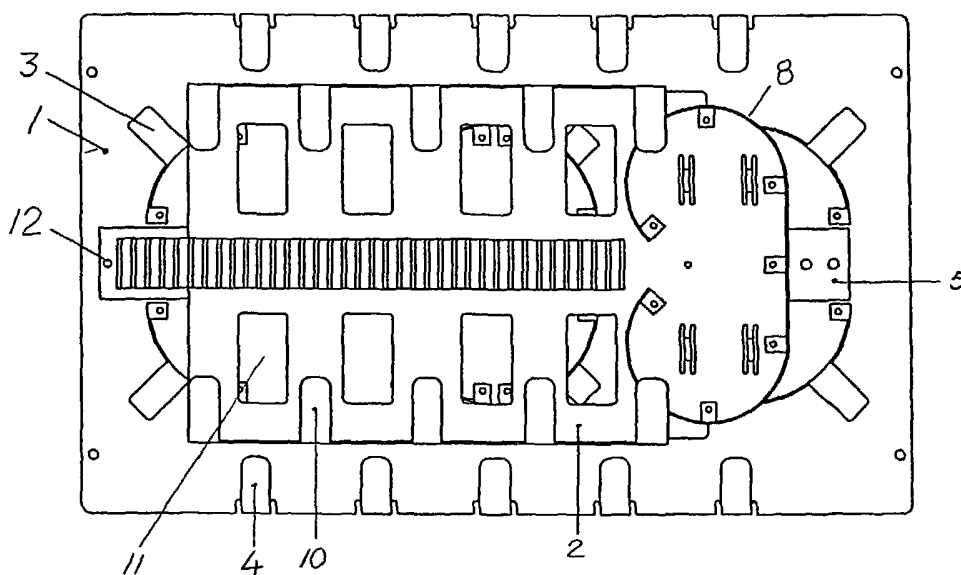
Published:

— with international search report

(74) Agent: **AROS PATENT AB**; P.O. Box 1544, S-751 45 Uppsala (SE).

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: OPTICAL FIBER SPLICE PLATE



(57) Abstract: A splice plate for jointing optical fibers/optical fiber ribbons from different optical fiber cables has two planes (1, 2) that connect directly onto each other and that are pivotally connected to each other. Thereby, several optical fibers/optical fiber ribbons from different optical fiber systems may be handled for jointing, without any need for the individual optical fibers/optical fiber ribbons to cross each other. The optical fibers/optical fiber ribbons may be inserted onto the splice plate without being wound or being roughly cut to the correct length. Optical fiber ends may then be fused together without removing the optical fibers/optical fiber ribbons from the splice plate.



WO 03/104873 A1

TITLE: OPTICAL FIBER SPLICE PLATE**TECHNICAL FIELD**

The present invention relates to a splice plate for optical fibers. On said splice plate single
5 optical fibers from a first optical fiber system may spliced/jointed to single optical fibers from
a second optical fiber system with the shortest possible optical fiber length in the jointing area
and with access to a space for storing associated optical fibers.

BACKGROUND

10 It may be difficult to splice or join single optical fibers and optical fiber ribbons in optical
fiber systems when connecting optical fiber cables having in excess of 200 optical fibers. Up
to the present, multiple splicing cassettes have been used where the respective excessive
optical fiber is wound in loops into the splicing cassette and is cut to the correct length. By the
continued handling of the optical fibers, individual optical fibers or fiber ribbons are lifted out
15 from the splicing cassette and are brought to an adjacent optical fiber fusion machine. When the
optical fibers/optical fiber ribbons have been fused together and a protective sleeve has been
shrunk-on the optical fibers/optical fiber ribbons are wound back into the splicing cassettes.
Since the trend is towards an increasing number of optical fibers per optical fiber ribbon and
towards an increasing number of optical fiber ribbons per optical fiber cable, there will be a
20 great demand for appropriate equipment and suitable methods of handling the optical fibers in
a structured manner.

SUMMARY OF THE INVENTION

By providing a splice plate having two planes connecting directly on to each other, several optical
25 fibers/optical fiber ribbons from different optical fiber systems may be handled for splicing or
jointing, without any need for the individual optical fibers/optical fiber ribbons to cross each
other. With the splice plate according to the invention, optical fibers/optical fiber ribbons may be
inserted onto the splice plate without being looped or roughly cut to the correct length. Optical
fiber ends may then be fused together without removing the optical fibers/optical fiber ribbons
30 from the splice plate. This is made possible by the excess length that is already provided and
that enables extension of the optical fiber ends directly out to a fusion machine to be fused
together and jointed. Finally, protective sleeves for the optical fiber ends may be secured to the

splice plate, on its sleeve holders. Using the splice plate designed in accordance with the invention, optical multiple fiber ribbons may be handled rationally by the fusion splicing and termination thereof.

- 5 The invention will now be described more closely by means of a preferred embodiment and with reference to the enclosed drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

- 10 Fig. 1 is a side view illustrating a splice plate in accordance with the invention; and.

Fig. 2 is a top view of the splice plate in accordance with the invention.

DESCRIPTION OF PREFERRED EMBODIMENT

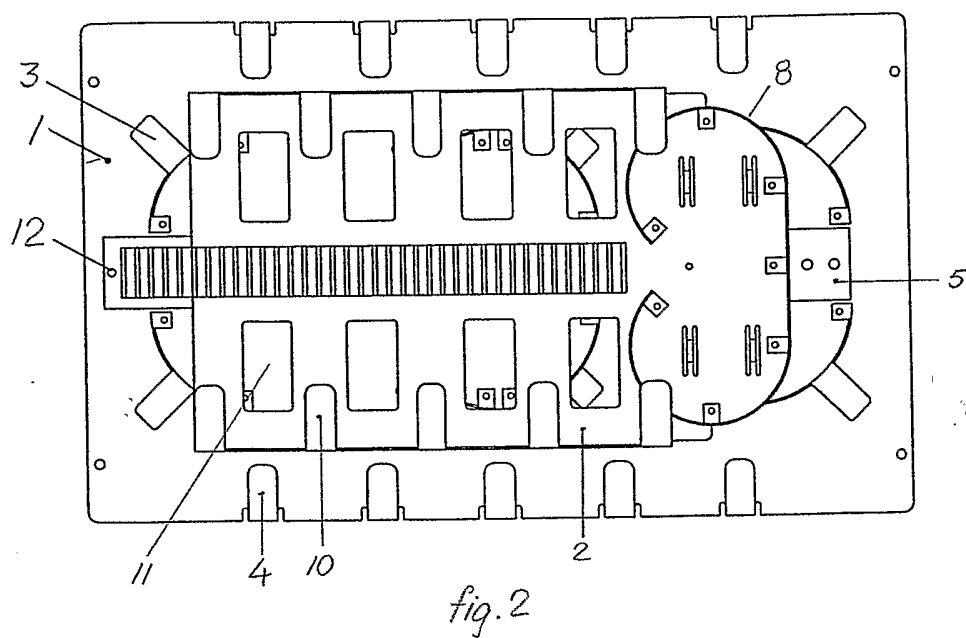
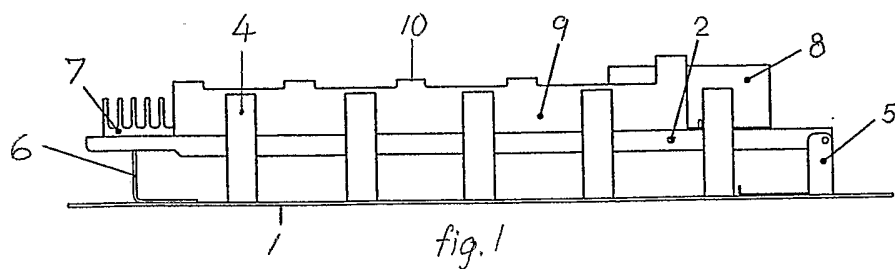
- 15 Figs. 1 and 2 are side and top views, respectively, of a splice plate arranged in accordance with the invention. Here, the splice plate consists of a lower rectangular bottom plate 1 and an upper tray 2 that is pivotally connected to the bottom plate. The bottom plate has fixed inner radius limiters 3 and outer holders 4 for optical fibers/optical fiber ribbons. A pivot mechanism 5 for the tray is provided at one end of the bottom plate and a support 6 for the tray is provided at the other end. The tray may be angled out from the bottom plate by means of the pivot mechanism, so that in the angled-out position it permits access to existing optical fibers/optical fiber ribbons that have been placed there. The tray may be fixed at the correct distance from the bottom plate by means of the support on the bottom plate. On the tray there is a centrally positioned rod-shaped sleeve holder 7, attached to the tray, for positioning the sleeves with the joints of the optical fibers/optical fiber ribbons, radius limiters 8 and several outer support brackets 10 arranged by the side walls 9. In order to provide access to the lower bottom plate the tray is provided with several inspection openings 11. At the end thereof that is opposite to that of the pivot the tray is provided with a lock 12 for connecting the tray to the support 6 of the bottom plate.
- 20
- 25
- 30 When the tray is in a raised position, single optical fibers/optical fiber ribbons from a first optical fiber cable connected to the splice plate may be placed on the bottom plate 1 between the outer brackets 4 and the radius limiters 3. Then, the respective optical fiber ends and/or

optical fiber ribbon ends may be brought up on the tray. In the same manner, single optical fibers/optical fiber ribbons from another optical fiber cable that is connected to splice plate, may be placed on the bottom plate and the respective optical fiber ends and/or optical fiber ribbon ends may be brought up on the tray. After fusing together, splicing and jointing the
5 respective optical fiber ends and/or optical fiber ribbon ends, the optical fiber splices or joints and/or optical fiber ribbon splices have been provided with protective sleeves and the sleeves with the splices have been positioned in the rod-like sleeve holder on the tray that is then lowered.

- 10 Naturally, the invention is not restricted to the embodiment that has been described above and that is illustrated on the drawing, but may be modified within the scope of the attached patent claims.

PATENT CLAIMS

1. A splice plate for arranging joints of optical fibers and/or optical fiber ribbons from different optical fiber systems, **characterized in** that the splice plate consists of a bottom plate
5 (1) and a tray (2) where the bottom plate has means (3, 4) for guiding the optical fibers and/or optical fiber ribbons, in that the tray is pivotally connected to the bottom plate in order to be able to provide access to the space between the tray and the bottom plate by the handling of the optical fibers and/or optical fiber ribbons, in that the tray has means (8, 10) for guiding the optical fibers and/or optical fiber ribbons and a sleeve holder (7) for arranging sleeves with
10 optical fiber joints and/or optical fiber ribbon joints.
2. A splice plate according to claim 1, **characterized in** that the means for guiding the optical fibers and/or optical fiber ribbons on the bottom plate (1) are provided as outer holders (4) and inner radius limiters (3).
15
3. A splice plate according to claim 1, **characterized in** that means for guiding the optical fibers and/or optical fiber ribbons on the tray (2) are provided as support brackets (10) and radius limiters (8).
- 20 4. A splice plate according to claim 1, **characterized in** that the tray (2) is pivotally connected to the bottom plate (1) by means of a pivot mechanism (5).
- 5 A splice plate according to claim 1, **characterized in** that the bottom plate (1) has a support (6) for the tray (2) in its lowered position.
25
6. A splice plate according to claim 1, **characterized in** that the tray has a lock (12) for connecting the tray with the support (6) of the bottom plate.



INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 03/00814

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: G02B 6/44

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: G02B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 0585809 A1 (RELCHLE + DE-MASSARI AG), 26 August 1993 (26.08.93), column 2, line 35 - column 3, line 1; column 3, line 33 - line 42 --	1-6
Y	US 5402515 A (KENNETH J. VIDACOVICH ET AL), 28 March 1995 (28.03.95), column 4, line 61 - column 5, line 1, figure 3 --	1-6
A	DE 4230418 A1 (SIEMENS AG), 17 March 1994 (17.03.94), abstract --	1-6

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

22 August 2003

Date of mailing of the international search report

26-08-2003

Name and mailing address of the ISA/
Swedish Patent Office
Box 5055, S-102 42 STOCKHOLM
Facsimile No. +46 8 666 02 86

Authorized officer

Irma Bornhede/MN
Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 03/00814

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 19956067 A1 (RXS-KABELGARNITUREN GMBH & CO. KG), 23 May 2001 (23.05.01), abstract --	1-6
A	US 5668910 A (JAIME RAY ARNETT), 16 Sept 1997 (16.09.97), abstract -- -----	1-6

INTERNATIONAL SEARCH REPORT

Information on patent family members

26/07/03

International application No.

PCT/SE 03/00814

Patent document cited in search report			Publication date	Patent family member(s)		Publication date
EP	0585809	A1	26/08/93	CH	684218 A	29/07/94
US	5402515	A	28/03/95	AU	689233 B	26/03/98
				AU	1910795 A	18/09/95
				CA	2184595 A	08/09/95
				DE	69521305 D,T	25/04/02
				EP	0748462 A,B	18/12/96
				ES	2157324 T	16/08/01
				JP	9509753 T	30/09/97
				WO	9523991 A	08/09/95
DE	4230418	A1	17/03/94	NONE		
DE	19956067	A1	23/05/01	CA	2384252 A	31/05/01
				EP	1234203 A	28/08/02
				WO	0138917 A	31/05/01
US	5668910	A	16/09/97	AU	4566496 A	05/09/96
				CA	2169975 A	29/08/96
				EP	0730178 A	04/09/96
				JP	8248241 A	27/09/96
				US	5559922 A	24/09/96
				US	5761368 A	02/06/98