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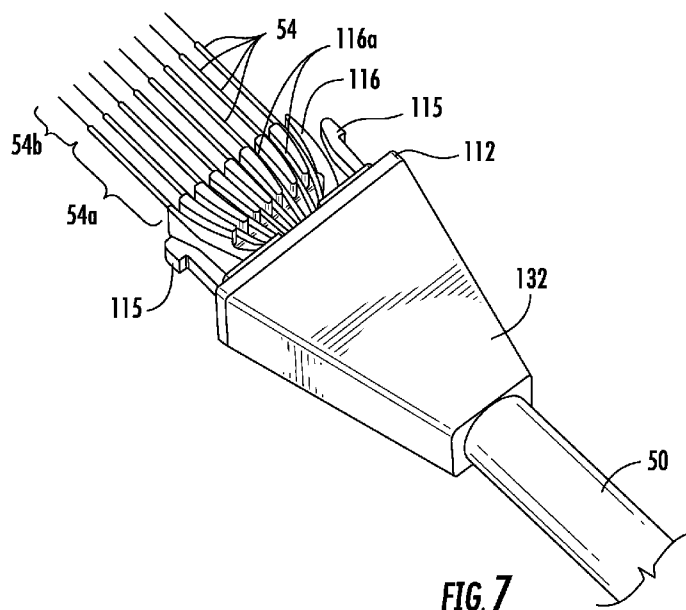
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[Continued on next page]

- (54) Title: SIMPLIFIED FIBER OPTIC CONNECTORS HAVING LENSES AND METHOD FOR MAKING THE SAME



- (57) Abstract: Disclosed are optical connectors having lenses along with methods for making the same. In one embodiment, the op-
tical connector includes a fiber body having a front portion with a plurality of fiber guides, and a connector body having a plurality
of connector body fiber guides that lead to a plurality of lenses at a front portion of the connector body. The fiber body attaches to
the connector body and may align a plurality of optical fibers to the lenses at the front portion of the connector body. One embodi-
ment has the fiber body configured as a crimp body with a barrel at a rear portion for attaching a fiber optic cable.



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INTERNATIONAL SEARCH REPORT

International application No

PCT/US2013/029499

A. CLASSIFICATION OF SUBJECT MATTER
 INV. G02B6/38
 ADD.

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)
 G02B

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

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

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2011/299816 A1 (YEN YU-HUNG [TW] ET AL) 8 December 2011 (2011-12-08)	1,6-8, 11-13, 16,17, 24-30, 33-35
Y	figures 2-7 paragraph [0026] - paragraph [0037] -----	2-5,19
X	US 2010/284651 A1 (KRAEHENBUEHL ROGER [CH] ET AL) 11 November 2010 (2010-11-11)	1,8, 16-18, 20,21, 24-26,30
Y	figures 10-13 paragraph [0040] - paragraph [0048] -----	19,23
Y	US 2011/081119 A1 (TOGAMI CHRIS K [US] ET AL) 7 April 2011 (2011-04-07) figures 2A-7 -----	2-5,23
	-/-	



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

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2013/029499

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3. ☒ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
1-9, 11-13, 16-31, 33-35
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☒ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2013/029499

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6 421 493 B1 (BUREK DENIS E [US] ET AL) 16 July 2002 (2002-07-16) figures 1a-9b column 2, line 30 - line 38 -----	1,8,9, 18,22, 24,30,31
Y	US 2008/144999 A1 (TAKEDA HOMARE [JP] ET AL) 19 June 2008 (2008-06-19) figures 1-13 paragraphs [0058], [0061], [0072] -----	1,8,9, 18,22, 24,30,31
X	US 2009/154884 A1 (CHEN WENZONG [US] ET AL) 18 June 2009 (2009-06-18)	24,30
Y	paragraph [0024]; figures 1-5 -----	31

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2013/029499

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2011299816 A1	08-12-2011	TW 201145721 A	16-12-2011
		US 2011299816 A1	08-12-2011
US 2010284651 A1	11-11-2010	CN 101828137 A	08-09-2010
		EP 2183627 A1	12-05-2010
		US 2010284651 A1	11-11-2010
		WO 2009030360 A1	12-03-2009
US 2011081119 A1	07-04-2011	NONE	
US 6421493 B1	16-07-2002	EP 1139127 A2	04-10-2001
		JP 2001281497 A	10-10-2001
		US 6421493 B1	16-07-2002
US 2008144999 A1	19-06-2008	CN 101206283 A	25-06-2008
		JP 2008151843 A	03-07-2008
		KR 20080055618 A	19-06-2008
		US 2008144999 A1	19-06-2008
US 2009154884 A1	18-06-2009	CA 2603338 A1	12-10-2006
		CN 101228466 A	23-07-2008
		EP 1866687 A1	19-12-2007
		JP 2008535037 A	28-08-2008
		US 2006245694 A1	02-11-2006
		US 2009154884 A1	18-06-2009
		WO 2006108024 A1	12-10-2006

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-8, 11-13, 16-21, 23-30, 33-35

An optical connector comprising a plurality of fibres and associated lenses with a body configured as a crimp body and a method of assembling said connector.

2. claims: 9, 22, 31

An optical connector comprising a plurality of fibres and associated lenses comprising a cover which is transmissive to UV light.

3. claims: 10, 32

An optical connector comprising a plurality of fibres and associated lenses and a cover with grooves.

4. claims: 14, 36

An optical connector comprising a plurality of fibres and associated lenses and a latch including a latch guard.

5. claims: 15, 37

An optical connector comprising a plurality of fibres and associated lenses and cantilevered arms.
