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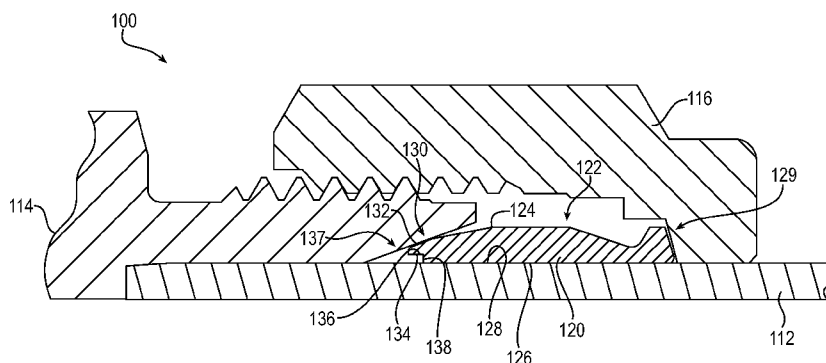


FIG. 2

(57) Abstract: A ferrule (120) for coupling a tube (112) to a fitting body (114) includes an outer cam surface (124) for bearing against the fitting body or another ferrule; an inner surface (126) defining a central bore (128) extending through a length of a body of the ferrule along a longitudinal direction from a bite edge (138) to a nut end (129); a recess surface (134) defining a counter bore extending from a bite end (137) to the bite edge (138), the bite edge (138) thereby recessed from the bite end (137).

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2014/043230

A. CLASSIFICATION OF SUBJECT MATTER
INV. F16L19/06 F16L19/10
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)
F16L

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)

EP0-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	DE 92 12 228 U1 (DIPL ING DR ERNST VOGELSANG GMBH & CO KG) 5 November 1992 (1992-11-05)	1,2,5,6, 8-14,16, 17,19
Y	page 5 - page 8	15,18
A	figures 1-4	37-48

X	EP 0 307 531 A1 (MASTROMATTEO CIRO) 22 March 1989 (1989-03-22)	1,2,5-11
Y	column 3, line 16 - column 4, line 31	12-19
A	figures 1-4	37-48

X	WO 2007/002576 A2 (SWAGelok CO [US]; WILLIAMS PETER C [US]; CARLSON GEORGE A [US]; MARSHA) 4 January 2007 (2007-01-04)	1-11, 37-48
Y	paragraphs [0085] - [0088], [0090], [0093], [0094]	12-19
	figures 3A,3B,4,7,8A, 8B	

	-/--	



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

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"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

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Y	paragraphs [0067], [0068], [0080],	12-19
A	[0098] - [0123] figures 3A,3B,5A,5B,8,9,10,11,12A,12B,13A,13B, -----	1-3,5-7
X	GB 534 291 A (PATEX SA) 4 March 1941 (1941-03-04)	1-3,5-11
Y	page 2, line 7 - page 3, line 25	12-19,
A	figures 4,5,6,7 -----	45,46 37,38,47
X	US 4 799 717 A (KINGSFORD KENJI A [US]) 24 January 1989 (1989-01-24)	1-19
A	figures 1,2,3,4 column 3, line 12 - column 6, line 30 -----	37-44,47
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Y	figures 1,2,3 column 2, line 41 - column 6, line 6 -----	12-19, 45,46

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2014/043230

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.:
1-19, 37-48
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.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-19

A ferrule for coupling a tube to a fitting body, the ferrule comprising: an outer cam surface; an inner surface defining a central bore; a recess surface defining a counter bore extending from a bite end to a bite edge, the bite edge thereby recessed from the bite end; wherein a radial distance, A, from the recess surface to the outer cam surface at an axial location of the bite edge is 50% or greater than a radial distance, H, from the inner surface to the recess surface.

2. claims: 20-36

A ferrule for coupling a tube to a fitting body, the ferrule comprising: an outer cam surface; an inner surface defining a central bore; a recess surface defining a counter bore extending from a bite end to a bite edge, the bite edge thereby recessed from the bite end; wherein the outer cam surface forms a continuous outer surface free of an inflection point from at least an outermost axial extent of the bite end to the bite edge.

3. claims: 37-48

A fitting assembly for coupling a first tube to a fitting body, the fitting assembly comprising: a ferrule including a reduced thickness portion near a nut end of the ferrule, the reduced thickness portion being thinner than adjacent portions of the ferrule and configured to flex when the fitting assembly is made up; and a nut having a bearing surface for bearing against a bearing surface of the ferrule.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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