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15/430,844 13 February 2017 (13.02.2017) US
15/430,858 13 February 2017 (13.02.2017) US

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[Continued on next page]

(54) Title: TENSION FED FASTENER INSTALLATION TOOL AND RELATED METHODS OF USE

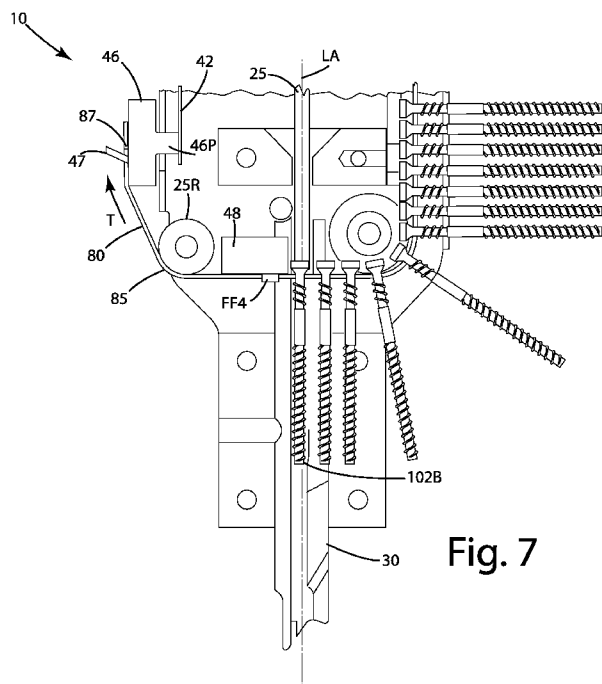


Fig. 7

(57) Abstract: An installation tool and related methods are provided. The tool can pull a strip of collated fasteners along a collated fastener path to a guide, where individual fasteners are sequentially separated from the strip and advanced into a workpiece. The tool can include a tension feeder located downstream of the guide. The tension feeder is configured to apply tension to the strip between the guide and a leading end of the strip. The tool can include a driveshaft configured to attach to a conventional drive tool chuck or a drive tool having hexagonal type drive components. The guide can be one piece and replaceable, with a guide body and a guide head. A strip slot can be defined in the same to align a fastener head with a backstop and facilitate entry of a fastener shank in a feed slot. Related methods of use are provided.



SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

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— *with international search report (Art. 21(3))*

(88) Date of publication of the international search report:

12 October 2017

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2017/018029

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.:
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.:
1-20, 41-60

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/US2017/018029

A. CLASSIFICATION OF SUBJECT MATTER

INV. B25B23/04 B25C1/00 F16B27/00
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)

B25B B25C F16B

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	DE 200 09 191 U1 (FABRICIUS FASTENER GMBH [DE]; LOEW KARL [DE]) 24 August 2000 (2000-08-24)	1-6,10, 17-20, 41, 45-47, 50,51, 55,56, 58-60
A	page 1, line 1 - line 7 page 4, line 4 - page 5, line 12 figures	7-9, 11-16
X	US 2015/321325 A1 (VANDENBERG ROGER A [US]) 12 November 2015 (2015-11-12) paragraph [0001] paragraph [0435] - paragraph [0497] figures ----- -/-	1-3,6,8, 10,17-20



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

20 June 2017

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Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2017/018029

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 749 808 A1 (HILTI AG [LI]) 27 December 1996 (1996-12-27) column 1, line 3 - line 11 column 3, line 1 - column 4, line 2 figures -----	1-6,10, 20
X A	US 4 775 089 A (MACDONALD DONALD K [US]) 4 October 1988 (1988-10-04) column 1, line 6 - line 10 column 3, line 14 - column 4, line 16 column 6, line 4 - column 15, line 46 figures -----	1,2,10, 17-19 41-60
X	WO 2008/104093 A1 (MOBILETRON ELECTRONICS CO LTD [CN]; HSU MING-HUNG [CN]; CHEN WEN-HSIUN) 4 September 2008 (2008-09-04) figures -----	41, 43-47, 49-60
X	DE 298 20 104 U1 (FABRICIUS FASTENER GMBH [DE]) 18 February 1999 (1999-02-18) page 1, line 1 - line 8 page 3, line 10 - line 14 page 4, line 13 - page 6, line 3 figures -----	41, 45-47, 50,51, 55,56, 58-60
A	DE 20 2012 003275 U1 (LIN CHAN WEI [TW]; LIN SHENG HUEI [TW]; RAY FU ENTERPRICE CO [TW]) 12 June 2012 (2012-06-12) figures -----	41-60
A	DE 10 2012 007639 A1 (ZAHN HARALD GMBH [DE]) 24 October 2013 (2013-10-24) figures -----	41-60

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2017/018029

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 20009191	U1	24-08-2000	NONE
US 2015321325	A1	12-11-2015	NONE
EP 0749808	A1	27-12-1996	CN 1145289 A 19-03-1997 DE 19522815 A1 02-01-1997 EP 0749808 A1 27-12-1996 JP H0911145 A 14-01-1997 KR 100371787 B1 08-04-2003 US 5826468 A 27-10-1998
US 4775089	A	04-10-1988	NONE
WO 2008104093	A1	04-09-2008	BR PI0621888 A2 07-08-2012 WO 2008104093 A1 04-09-2008
DE 29820104	U1	18-02-1999	NONE
DE 202012003275	U1	12-06-2012	DE 202012003275 U1 12-06-2012 JP 3176141 U 14-06-2012 TW M413037 U 01-10-2011 US 2012292212 A1 22-11-2012
DE 102012007639	A1	24-10-2013	NONE

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-20, 41-60

Installation tool and strip of collated fasteners

2. claims: 21-33

Connection of installation tool and drive tool

3. claims: 34-40

Installation tool guide
