

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
28 February 2008 (28.02.2008)

PCT

(10) International Publication Number
WO 2008/024803 A3

(51) International Patent Classification:
B25C 7/00 (2006.01) **B23P 11/00** (2006.01)

(21) International Application Number:
PCT/US2007/076459

(22) International Filing Date: 22 August 2007 (22.08.2007)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
11/466,231 22 August 2006 (22.08.2006) US

(63) Related by continuation (CON) or continuation-in-part (CIP) to earlier application:
US 11/466,321 (CON)
Filed on 22 August 2006 (22.08.2006)

(71) Applicant (for all designated States except US): **FLEXIBLE STEEL LACING COMPANY** [US/US]; 2525 Wisconsin Drive, Downers Grove, IL 60515 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **ATKINS, Mark R.**

[US/US]; 41 W. 674 Privet Court, St. Charles, Illinois 60175 (US). **WAWCZAK, William R.** [US/US]; 320 Lorraine Street, Glen Ellyn, Illinois 60137 (US).

(74) Agent: **KRATZ, Rudy I.**; Fitch, Even, Tabin & Flannery, 120 South LaSalle Street Suite 1600, Chicago, Illinois 60603 (US).

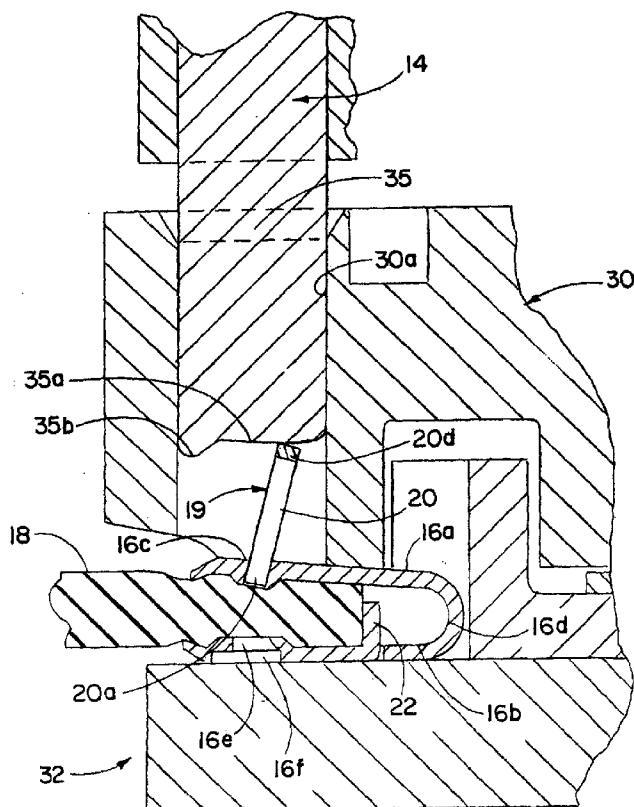
(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,

[Continued on next page]

(54) Title: A POWER TOOL AND METHOD FOR CONNECTING FASTENERS TO BELTS

FIG. 9



(57) Abstract: A power operated belt splicing system is provided. Staples (20) are driven through a belt (18) and clinched in a final set using a power driven tool (10) and a force applying member (14) having multiple drive punches (35). A lower force applying end on a punch (35) has a first portion (35a) to drive the staple (20) and a second portion (35b) to drive a leading edge of the belt fastener (16) against the belt (18) thereby distributing the drive force over both the staple and the belt fastener. A pair of adjacent punches (35) can substantially simultaneously drive two pairs of preset staples (20) with each pair of preset staples (20) being associated with one of a pair of adjacent hinged belt fasteners (16) thereby attaching a pair of belt fasteners (16) to a belt (18) in a single operation.



ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,
FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL,
PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM,
GA, GN, GQ, GW, 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*

Published:

— *with international search report*

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

11 December 2008

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US07/76459

A. CLASSIFICATION OF SUBJECT MATTER

IPC: B25C 7/00(2006.01);B23P 11/00(2006.01)

USPC: 227/147;29/243.51

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)

U.S. : 227/147; 29/243.51, 243.53, 798; 227/51, 53, 61, 62, 110, 111, 148, 155, 156

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)
EAST

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 5,544,801 A (SCHICK) 13 August 1996 (13.08.1996), see the whole document.	1, 2, 4-6 ----- 8-11, 13-16
X --- Y	US 5,644,836 A (SCHICK) 08 July 1997 (08.07.1997), see the whole document.	1, 2, 4-6 ----- 8-11 and 13-16
Y	US 5,524,808 A (VOGRIG) 11 June 1996 (11.06.1996), see the whole document.	1, 2, 4-6, 8-11, 13-16
Y	US 6,739,038 B2 (HEROLD) 25 May 2004 (25.05.2004), see the whole document.	1, 2, 4-6, 8-11, 13-16
Y	US 4,620,657 A (GLADDING et al.) 04 November 1986 (04.11.1986), see the whole document.	5, 6, 8, 13, 14, 16



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 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

30 August 2008 (30.08.2008)

Date of mailing of the international search report

30 SEP 2008

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Facsimile No. (571) 273-3201

Authorized officer

Essama Omgba

Telephone No. (571) 272-3700

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US07/76459

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:
Please See Continuation 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 additional fees, this Authority did not invite payment of any 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.: 1-16
- 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/US07/76459

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 4,688,711 A (GLADDING et al.) 25 August 1987 (25.08.1987), see the whole document.	5, 6, 8, 13, 14, 16
A	US 3,913,180 A (PRAY) 21 October 1975 (21.10.1975)	
A	US 4,440,336 A (KIFOR) 03 April 1984 (03.04.1984)	
A	US 5,095,590 A (SCHICK) 17 March 1992 (17.03.1992)	
A	US 5,368,214 A (SCHICK) 29 November 1994 (29.11.1994)	
A	US 5,906,038 A (HEROLD) 25 May 1999 (25.05.1999)	
A	US 6,081,995 A (HEROLD) 04 July 2000 (04.07.2000)	
A	US 6,311,393 B1 (GARNER) 06 November 2001 (06.11.2001)	
A	US 6,488,144 B2 (WINKELMAN et al.) 03 December 2002 (03.12.2002)	

BOX III. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claim(s) 1-16, drawn to a power driven apparatus.

Group II, claim(s) 17-24, drawn to a belt splicing, force applying member.

Group III, claim(s) 25-36, drawn to a method of applying a splice to a conveyor belt.

Group IV, claim(s) 37-42, drawn to a fluid motor drive device.

Group V, claim(s) 43, drawn to a method of using a power tool.

The inventions listed as Groups I, II, III, IV and V do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: the technical feature of a motor in Group I is not present in Groups II, IV and V; the technical feature of a force applying member in Group I is not present in Group III; the technical feature of a main body with a plurality of punches extending from its lower end in Group II is not present in any of the other Groups; the technical feature of a guide block in Group III is not present in any of the other Groups; the technical feature of a drive rod in Group IV is not present in any of the other Groups; and the technical feature of a power tool with a safety mechanism and a trigger mechanism in Group V is not present in any of the other Groups.