

(51) International Patent Classification:
B25J 15/02 (2006.01) *G01N 3/04* (2006.01)(21) International Application Number:
PCT/US2009/040442(22) International Filing Date:
14 April 2009 (14.04.2009)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
200803071-0 22 April 2008 (22.04.2008) SG(71) Applicant (for all designated States except US): **ILLINOIS TOOL WORKS INC.** [US/US]; 3600 West Lake Avenue, Glenview, IL 60026 (US).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **TSAI, Kuo, Tsing** [MY/SG]; Blk 27 Lim Liak Street, #02-38, Singapore 160027 (SG).(74) Agent: **HAUPTMAN, Benjamin, J.**; Lowe Hauptman Ham & Berner, LLP, 1700 Diagonal Road, Suite 300, Alexandria, VA 22314 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, 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, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, 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, 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, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

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

[Continued on next page]

(54) Title: POWERED GRIP CLAMPING FORCE

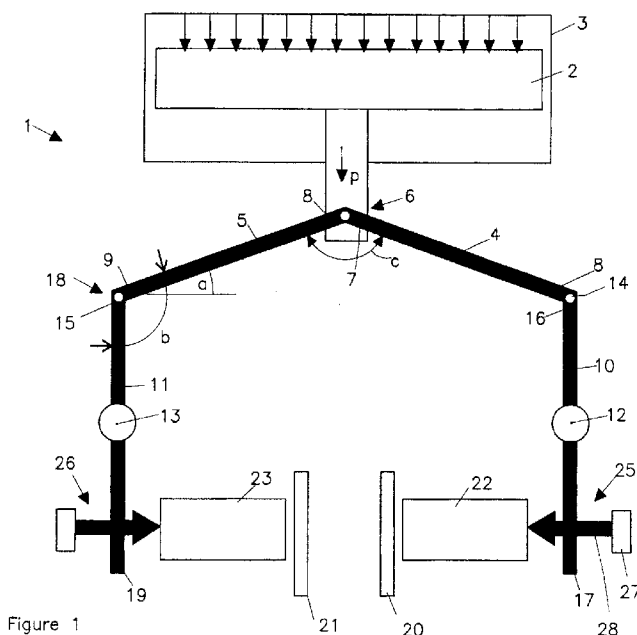


Figure 1

(57) Abstract: A powered grip that can engage and hold an item. The grip comprising a primary body member (3), an actuator (2) dependent from the primary body member. A pair of spaced apart clamp jaws (20, 21) to move towards and away from each other are also provided. These are configured to clamp onto an item to be tested. A force transmission mechanism (4, 5, 10, 11) is operatively located intermediate of the actuator and each of the clamp jaws of the pair of clamp jaws to displace the clamp jaws relative the primary body and that, through mechanical advantage, establishes a multiplication of the force of the actuator force at the clamp jaws. A force transmission mechanism geometry adjuster (27, 28) can adjust the geometry of the force transmission mechanism in order to vary the spacing between the clamp jaws to thereby, for any given operating force applied by the actuator to the force transmission mechanism, allow the pre-testing setting of the spacing between the jaws such that the range of force applied by the clamping jaws to the item to be tested is within a desired range.



— *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))*

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

11 March 2010

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2009/040442

A. CLASSIFICATION OF SUBJECT MATTER
 INV. B25J15/02 G01N3/04

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)

B25J G01N

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 practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 1 077 090 A (INSTRON LTD) 26 July 1967 (1967-07-26) page 2, line 71 - line 74	1-5, 8-11, 17-23, 25, 29, 34-37
X	US 3 069 761 A (FRANK SOMMER) 25 December 1962 (1962-12-25) column 4, line 25 - line 32	1, 21, 34, 35, 37
X	SU 1 399 115 A1 (GOMELSK KT EXI TEKH PEREVO [SU]) 30 May 1988 (1988-05-30) the whole document	1, 21, 24, 34, 35, 37
X	US 4 696 503 A (COLLODEL ZURINO P [US]) 29 September 1987 (1987-09-29) figure 1	1, 21, 34, 35, 37
	-/--	

☒ 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 document 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

24 September 2009

Date of mailing of the international search report

22/01/2010

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
 NL - 2280 HV Rijswijk
 Tel. (+31-70) 340-2040,
 Fax: (+31-70) 340-3016

Authorized officer

Meyer, Thomas

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2009/040442

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3 085 813 A (SAMPSON MERRITT B) 16 April 1963 (1963-04-16) column 3, line 30 - line 44 -----	1,21,34, 35,37
A	US 2 775 461 A (EHRlich WALTER A ET AL) 25 December 1956 (1956-12-25) column 1, line 57 - line 60 -----	21,34, 35,37
A	US 3 204 451 A (CAVANAUGH RONALD C ET AL) 7 September 1965 (1965-09-07) the whole document -----	1,21,34, 35,37
A	US 2 850 926 A (JOBE WILLIAM H) 9 September 1958 (1958-09-09) the whole document -----	1,21,34, 35,37
A	WO 96/01724 A (SARCOS INC [US]) 25 January 1996 (1996-01-25) the whole document -----	6,7,24

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2009/040442

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.:

see additional sheet(s)

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: 1-5, 8-11, 17-23, 25, 29, 34-37

directed substantially to a power grip comprising a force transmission mechanism geometry adjuster, and basic elements like an articulated lever.

2. claims: 6, 7, 12, 24

a power grip comprising a force transmission mechanism geometry adjuster comprising a further lever i.e. a link beam

3. claims: 13-16, 26, 27

a power grip comprising a force transmission mechanism geometry adjuster, further comprising an adjustable jaw mount, i.e. by a threaded elements.

4. claims: 28, 30-33

a power grip comprising a force transmission mechanism geometry adjuster, further comprising a particular system of several linked levers

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2009/040442

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
GB 1077090	A	26-07-1967	DE 1924637 U US 3388592 A	30-09-1965 18-06-1968
US 3069761	A	25-12-1962	NONE	
SU 1399115	A1	30-05-1988	NONE	
US 4696503	A	29-09-1987	NONE	
US 3085813	A	16-04-1963	NONE	
US 2775461	A	25-12-1956	NONE	
US 3204451	A	07-09-1965	NONE	
US 2850926	A	09-09-1958	NONE	
WO 9601724	A	25-01-1996	AU 3004095 A	09-02-1996