



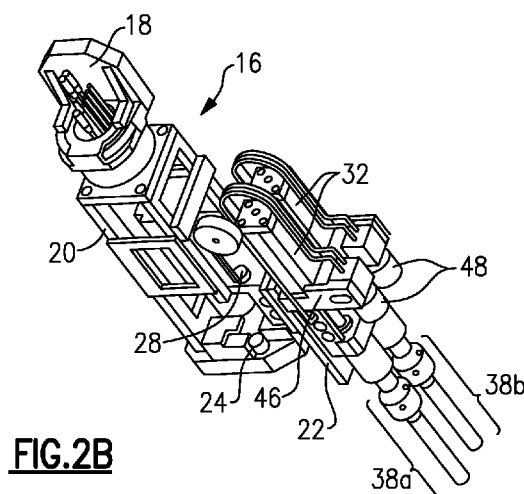
- (51) **International Patent Classification:**
B25J 9/16 (2006.01)
- (21) **International Application Number:**
PCT/US2019/052573
- (22) **International Filing Date:**
24 September 2019 (24.09.2019)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
62/735,551 24 September 2018 (24.09.2018) US
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- (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, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, 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, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, 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, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

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

- (54) Title:** ROTARY TOOL ADJUSTER FOR ROBOT WITH END OF ARM TOOL HAVING MULTIPLE TOOLS



- (57) Abstract:** A method of adjusting multiple tools on a common mount includes the interrogating first and second actual target positions on at least one workpiece. A variance is determined between the first and second actual target position and first and second theoretical target positions. At least one of the first and second tools is moved relative to the other of the first and second tools from the first and second theoretical target positions to a desired spacing respectively aligned with the first and second actual target positions.

(88) Date of publication of the international search report:
11 June 2020 (11.06.2020)

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2019/052573

A. CLASSIFICATION OF SUBJECT MATTER
INV. B25J9/16
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)
B25J

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2018/169870 A1 (NAKAYAMA KAZUTAKA [JP]) 21 June 2018 (2018-06-21) paragraph [0073] - paragraph [0080]; figures 10-13 -----	1-14
X	US 2011/017710 A1 (YASUNAGA NORIO [JP] ET AL) 27 January 2011 (2011-01-27) paragraphs [0010], [0015], [0044] - [0048], [0053] - [0062]; figures 5, 7-10 -----	1-14
A		15-20
X	US 2015/119214 A1 (SASAKI MASAOKI [JP]) 30 April 2015 (2015-04-30) paragraph [0031] - paragraph [0060]; figures 1,2 -----	15-20
A	JP 2013 188783 A (KYOHU MACHINE WORKS LTD) 26 September 2013 (2013-09-26) Figures 5, 6 and corresponding text -----	15-20
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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

30 April 2020

Date of mailing of the international search report

12/05/2020

Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2019/052573

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.:

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: 1-14

A method of adjusting the spacing between and the position of a first and second tool on a common mount such that they are aligned with a first and second target position respectively.

2. claims: 15-20

An end of arm tool assembly comprising first and second arms, respective first and second tools and respective first and second cameras mounted on the arms, whereby a spacing between a first and second target position on a workpiece is determined and the first and second arms are controllably moved resulting in a corresponding desired spacing between the first and second tools.

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2019/052573

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 107 738 029 A (WUHAN JIEZHONG AUTO PARTS CO LTD) 27 February 2018 (2018-02-27) Figure 1 and corresponding text -----	15-20
A	JP 2007 122705 A (NACHI FUJIKOSHI CORP) 17 May 2007 (2007-05-17) the whole document -----	15-20
A	JP H03 251379 A (MATSUSHITA ELECTRIC IND CO LTD) 8 November 1991 (1991-11-08) See Fig. 8 and corresponding text -----	15-20

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2019/052573

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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