

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
9 January 2003 (09.01.2003)

PCT

(10) International Publication Number
WO 03/001987 A3

(51) International Patent Classification⁷: **A61B 17/00**

(21) International Application Number: PCT/US02/20921

(22) International Filing Date: 28 June 2002 (28.06.2002)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/301,967 29 June 2001 (29.06.2001) US
60/327,702 5 October 2001 (05.10.2001) US

(71) Applicant (for all designated States except US): **INTUITIVE SURGICAL, INC.** [US/US]; 950 Kifer Road, Sunnyvale, CA 94086 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **WALLACE, Daniel, T.** [US/US]; 621 Glenloch Way, Redwood City, CA 94062

(US). **ANDERSON, S., Christopher** [US/US]; 371 Prospect Street, Northampton, MA 01060 (US). **MANZO, Scott** [US/US]; 272 East Village Road, Shelton, CT 06484 (US).

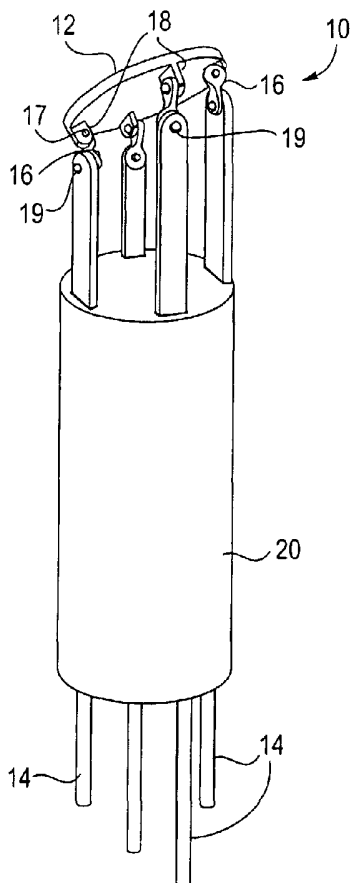
(74) Agents: **THOMPSON, Lynn, M.** et al.; Townsend and Townsend and Crew LLP, Two Embarcadero Road, 8th Floor, San Francisco, CA 94111-3834 (US).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),

[Continued on next page]

(54) Title: PLATFORM LINK WRIST MECHANISM



(57) Abstract: The present invention provides a robotic surgical tool (50) for use in a robotic surgical system. The robotic surgical tool (50) includes a wrist mechanism (10) disposed near the distal end of a shaft (52) that connects with an end effector (66). The wrist mechanism (10) includes a distal member (12) configured to support the end effector (66), and a plurality of rods (14) extending generally along an axial direction within the shaft (52) and moveable generally along this axial direction to adjust the orientation of the distal member (12) with respect to the shaft (52). The distal member (12) has a base to which the rods are rotatably connected by orthogonal linkage assemblies (16). This configuration allows for movement of the end effector (66) in pitch, yaw, and roll directions.



Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR,
GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent
(BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR,
NE, SN, TD, TG).

Declaration under Rule 4.17:

— *of inventorship (Rule 4.17(iv)) for US only*

Published:

— *with international search report*

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

20 November 2003

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US02/20921

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : A61B 17/00

US CL : 901/29; 606/1

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. : 901/29; 606/1, 130; 600/141, 102

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)

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 5,792,135 A (MADHANI et al) 11 August 1998 (11.08.1998), entire document.	1, 5, 8-10, 14-21, 27-36 ----- 2-4, 6
X --- Y	US 5,715,729 A (TOYAMA et al) 10 February 1998 (10.02.1998), entire document.	1, 5, 7, 10, 14 ----- 2-4, 6



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	"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
"E"	earlier application or patent published on or after the international filing date	"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
"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)	"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
"O"	document referring to an oral disclosure, use, exhibition or other means	"&"	document member of the same patent family
"P"	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search

16 April 2003 (16.04.2003)

Date of mailing of the international search report

17 JUN 2003

Name and mailing address of the ISA/US

Commissioner of Patents and Trademarks
Box PCT
Washington, D.C. 20231

Facsimile No. (703)305-3230

Authorized officer

Linda C Dvorak

Telephone No. (703) 308-0858