

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
25 November 2004 (25.11.2004)

PCT

(10) International Publication Number
WO 2004/100801 A3

(51) International Patent Classification⁷: **A61B 17/06**

(21) International Application Number:
PCT/US2004/014962

(22) International Filing Date: 13 May 2004 (13.05.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
10/437,144 13 May 2003 (13.05.2003) US

(63) Related by continuation (CON) or continuation-in-part
(CIP) to earlier application:
US 10/437,144 (CIP)
Filed on 13 May 2003 (13.05.2003)

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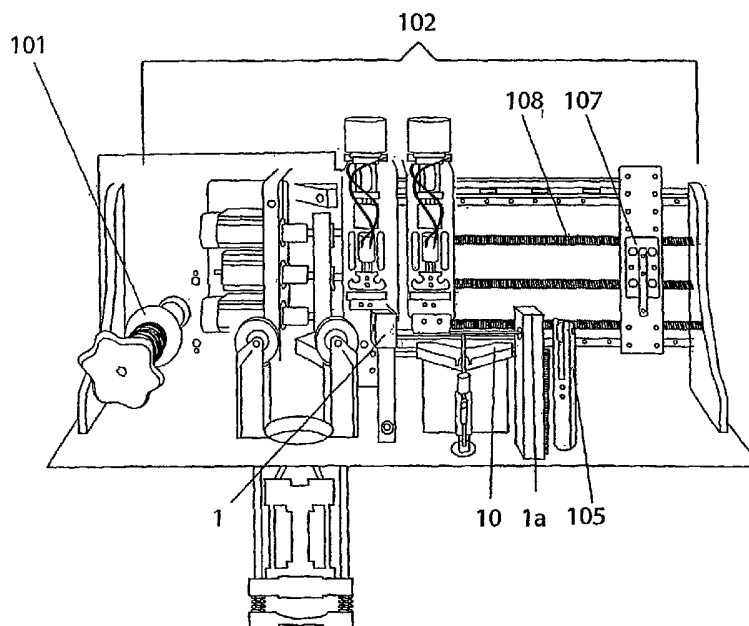
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(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GH, GM, HR, HU, 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, NA, NI, NO, NZ, OM, PG,
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,
TN, TR, TT, TZ, UA, UG, US (patent), UZ, VC, VN, YU,
ZA, ZM, ZW.

[Continued on next page]

(54) Title: APPARATUS FOR FORMING BARBS ON A SUTURE



(57) Abstract: An apparatus for cutting barbs into a suture having a filament supply (101). The apparatus also has an in-feed collet (1) for holding one end of a filament threaded therethrough. Further the apparatus has an out-feed collet (1a) for holding a second end of a filament threaded therethrough. Additionally, the apparatus has a holder (10) positioned between said in-feed and out-feed collets for holding a filament suspended between the in-feed and out-feed collets. The apparatus also has a cutting assembly (102) for cutting barbs in the filament tensioned between the in-feed and out-feed collets.

WO 2004/100801 A3



(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, HU, IE, IT, LU, MC, 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).

Published:

— with international search report

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

12 May 2005

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
US2004/014962

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A61B17/06

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)
IPC 7 A61B B65H

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	WO 03/017850 A (QUILL MEDICAL INC ; WILLIAMS III ROBERT C (US); GENOVA PERRY A (US); J) 6 March 2003 (2003-03-06) cited in the application figures 6-18B	1,4-7,26
Y	-----	2
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in 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)
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"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

12 November 2004

Date of mailing of the international search report

24.02.2005

Name and mailing address of the ISA

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INTERNATIONAL SEARCH REPORT

International Application No
US2004/014962

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 1 428 560 A (ETHICON INC) 17 March 1976 (1976-03-17) page 2, line 101 - line 110 -----	24
X	DE 198 33 703 A (CETEX CHEMNITZER TEXTILMASCHIN) 3 February 2000 (2000-02-03) column 3, line 22 - line 25 -----	24

INTERNATIONAL SEARCH REPORT

national application No.
PCT/US2004/014962

Box 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 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 fee, this Authority did not invite payment of any additional fee.
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 annex

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International Application No. PCT/ US2004/ 014962

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1,2,4-7,24,26

An apparatus for cutting barbs into a suture, further comprising a tensioner for tensioning the filament.

2. claims: 1,3,8,9

An apparatus for cutting barbs into a suture, further comprising a cut off tool for trimming the filament to a specified length.

3. claims: 10-12

An apparatus for cutting barbs into a suture comprising three directional feed motors for moving a first cutter, a second cutter, and a grasping tool.

4. claim: 13

A holder for securing a suture, comprising a bed, a channel, and a plurality of orifices arranged along the channel, each orifice comprising a first end exposed in the channel and a second end connected to a suction means.

5. claims: 14-19

A collet for holding a suture, comprising a chuck having a plurality of jaws, whereby movement of said jaws adjusts the aperture of said chuck.

6. claims: 20-22,28-30

An apparatus for cutting barbs into a suture, comprising a collet being rotatable to impart twist on a suture.
A method of forming a barbed suture using such a rotatable collet.

7. claim: 23

An apparatus for cutting barbs into a suture, comprising a collet and a biased tensioner, the biased tensioner allowing the collet to move in two directions.

8. claim: 25

INTERNATIONAL SEARCH REPORT

International Application No. PCT/ US2004/ 014962

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

A cutter comprising a sharply honed first edge, and a blunted and roughened second edge.

9. claim: 31

An apparatus for cutting barbs into a suture, comprising a blade, a tensioning vise, and a movable plate upon which the blade and the tensioning vise are mounted.

10. claims: 27,32,33

An apparatus for cutting barbs into a suture, comprising a linkage system for causing a blade to describe a circular path.

A three-axis robot comprising a cutting head, wherein the cutting head can be moved in x, y, and z directions.

11. claims: 34,36

A cutter comprising a plurality of cutting surfaces being formed in a spiral about a central shaft.

12. claim: 35

A cutter head comprising a blade slot formed in a base, wherein said blade slot is formed at an angle to a surface of the base.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

I US2004/014962

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