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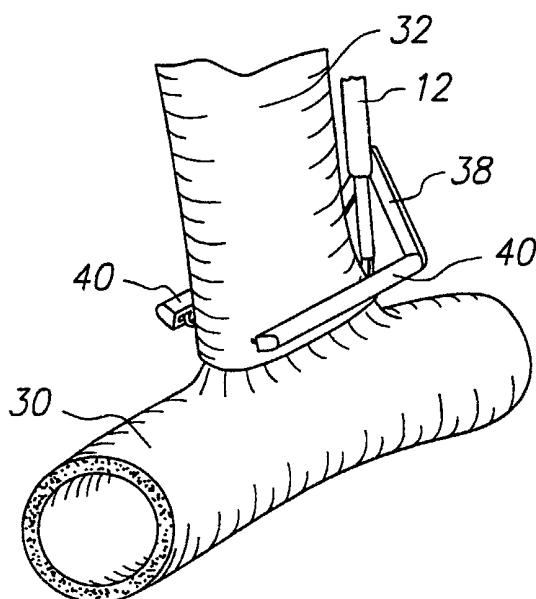
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(54) Title: ANASTOMOSIS SYSTEM AND METHOD OF USE



(57) Abstract: An anastomosis system and method uses an anvil to control and support a tissue site during an anastomosis procedure. The anvil is particularly useful for supporting a wall of a coronary artery during attachment of a graft vessel to the coronary artery because the wall of the coronary artery is very thin, difficult to grasp, and susceptible to tearing. In one method, the anvil is inserted into a pressurized or unpressurized target vessel (30) and is pulled against an inner wall of the target vessel (30) causing tenting of the thin tissue of the vessel wall. A graft vessel (32) is then advanced to the anastomosis site and an end of the graft vessel is positioned adjacent and exterior of the target vessel (30). Staples (22) are inserted through the tissue of the graft vessel (32) and the target vessel (30) by pivoting the arms (40) of a staple holder (38) towards the anvil (14). When the ends of the staples (22) engage staple bending features (16) on the anvil (14), the ends of the staples bend over securing the graft vessel (32) and target vessel (30) together. After stapling is complete, an incision is formed in the wall of the target vessel (30) to allow blood flow between the target vessel (30) and the graft vessel (32).



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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

Inter. nal Application No

PCT/US 00/20418

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A61B17/11 A61B17/115 A61B17/064

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 A61F

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, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 99 11178 A (MGF GROUP, INC.) 11 March 1999 (1999-03-11) abstract; figures	37,48,49
Y		1-3,6-8, 11-19
A		20,53
X	US 5 395 030 A (KURAMOTO ET AL.) 7 March 1995 (1995-03-07) abstract; figures	37,46, 48,49
Y		1-3,6-8, 11-19
A		20,53
X	WO 99 21491 A (SUYKER ET AL.) 6 May 1999 (1999-05-06) abstract; figures	20,37, 39,40
A		54,56
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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)

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.

Z document member of the same patent family

Date of the actual completion of the international search

9 March 2001

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Inter. nal Application No

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 197 32 234 A (QUATCHADZE) 28 January 1999 (1999-01-28) abstract; figures	54,56
A	---	1,20,37, 39,44
X	FR 2 316 910 A (VSESOJUZNY NAUCHNO ISSLEDOVATELSKY I ISPYTATELNY INSTITUT M. T.) 4 February 1977 (1977-02-04) the whole document	37,38, 43,46-49
A	---	1,20,53
X	US 4 773 420 A (GREEN) 27 September 1988 (1988-09-27) abstract; figures	37,38, 43,46, 48,49
A	---	1,9,10, 20,53
X	US 4 930 674 A (BARAK) 5 June 1990 (1990-06-05) abstract; figures	37,38, 43,48,49
A	---	1,9,10, 20,53
A	WO 98 19625 A (HOUSER ET AL.) 14 May 1998 (1998-05-14) abstract; figures page 11, line 6-20 page 10, line 4-13	1
P,X	EP 0 938 870 A (ETHICON ENDO-SURGERY, INC.) 1 September 1999 (1999-09-01) the whole document	1,11-13, 18,19

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 00/20418

Box I Observations where certain claims were found unsearchable (Continuation of item 1 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.: 24-36, 50-52 and 57
because they relate to subject matter not required to be searched by this Authority, namely:
Rule 39.1(iv) PCT - Method for treatment of the human or animal body by surgery
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 II Observations where unity of invention is lacking (Continuation of item 2 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.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ 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: 1-19

Anastomosis system comprising an anvil having a tissue penetrating tip

2. Claims: 20-23 and 54-56

Stapling system comprising a backbone supporting a plurality of staples

3. Claims: 37-49 and 53

Anastomosis system comprising an anvil having substantially parallel staple bending features, and anvil therefor

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 00/20418

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