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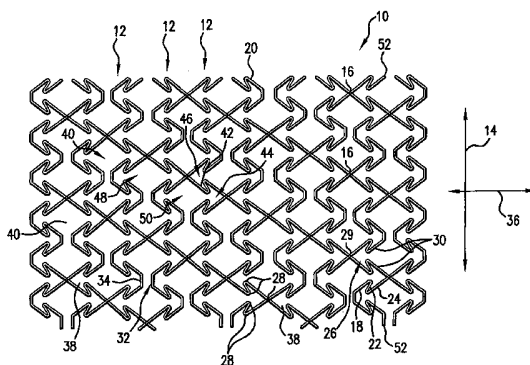
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- (21) International Application Number: PCT/US2003/014247 (74) Agents: **WARK, Allan, W.** et al.; D-377 AP6A-1, 100 Abbott Park Road, Abbott Park, IL 60064-6008 (US).
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- Published: — with international search report

[Continued on next page]

(54) Title: ENDOPROSTHESIS FOR CONTROLLED CONTRACTION AND EXPANSION



(57) Abstract: An endoprosthesis that has a plurality of annular elements (12), each connected to an adjacent annular element at at least one connection location (16). Each annular element includes an interconnected series of struts (20), selected strut members of which are each connected to adjacent strut members at a longitudinal apex (29). The selected strut members extend to a strut end portion at a location on the longitudinally opposite site of the annular element from the apex. At least one of the strut members includes a first end portion (18) at a first end of the strut member, which is located at the strut end portion, an intermediate portion (22) hingedly connected to the first end portion, and a second end portion (24) hingedly connected to the intermediate portion and extending to the apex. The endoprosthesis has a delivery diameter when in a delivery condition and a deployed diameter when in a deployed condition. Some of the strut members (187) can have a nesting feature that is configured for nestingly receiving another strut member when the endoprosthesis is in the delivery condition. A scaffolding body of the endoprosthesis can have an inner and outer component, each having a set of interconnected strut members (216). The interconnected strut members of one component overlap those of the other to define a cooperating cell pattern. Also, the body of the endoprosthesis can be configured to naturally tend to contract when the body is smaller than a predetermined diameter and naturally tend to expand when the body is larger than a predetermined diameter.



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

8 April 2004

*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/US 03/14247A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 A61F2/06

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 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

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	US 2001/047200 A1 (WHITE GEOFFREY HAMILTON ET AL) 29 November 2001 (2001-11-29)  paragraph '0035! - paragraph '0039! paragraph '0042! figures 2A,2B  ---	1, 4-10, 12-14, 16, 17 2, 11
X A	US 2001/000043 A1 (ISRAEL HENRY MARSHALL ET AL) 15 March 2001 (2001-03-15)  paragraph '0031! figure 4  ---	18-27  28, 29, 31
X	US 2001/027339 A1 (BRUMMETT KIMBERLY D ET AL) 4 October 2001 (2001-10-04) paragraph '0076! figure 3  ---  -/-	18-23, 26, 29

☒ 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
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- \*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

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- \*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

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17 December 2003

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## INTERNATIONAL SEARCH REPORT

International 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	US 6 245 100 B1 (DAVILA LUIS A ET AL) 12 June 2001 (2001-06-12) column 5, line 10 - line 23 figures 3,5-7	34-37
X	US 5 591 223 A (PERRY STANTON ET AL) 7 January 1997 (1997-01-07) column 2, line 59 -column 3, line 12 figures 1-3	38
X	WO 95 31945 A (BURMEISTER PAUL H ;EUTENEUER CHARLES L (US); SCIMED LIFE SYSTEMS I) 30 November 1995 (1995-11-30) page 7, line 7 -page 8, line 28 figures 3-4B,9A,9B	38,50-52
X	US 2001/000188 A1 (COX BRIAN J ET AL) 5 April 2001 (2001-04-05)	38
A	paragraph '0016! - paragraph '0018! paragraph '0059! paragraph '0060! figures 5A-5E	39
X	US 6 350 277 B1 (KOCUR GORDON J) 26 February 2002 (2002-02-26) column 1, line 65 -column 2, line 9	51
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\* (continuation of second sheet) (July 1992)

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 03/14247

## 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.:  
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 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: 1-10,12-14,16,17

Endoprosthesis capable of expanding from a first to a second diameter comprising a plurality of annular elements, each of them connected to the adjacent annular element at at least a connection location defining a plurality of cells; each annular element includes interconnected series of strut members where, at least, one strut member is divided in three sections hinged together. The strut members of the annular elements present a repeating pattern defining cells, such that each cell includes at least two arrowhead portions extending longitudinally and directed in opposite directions and at least one portion forms a contoured arrowhead shape.

2. Claim : 11

Endoprosthesis capable of expanding from a first to a second diameter comprising a plurality of annular elements each including an interconnected series of strut elements; each strut member includes, hinged together, a first end, an intermediate end and a second end portions where the first and second portions extend in a first circumferential direction and the intermediate portion extends in an opposite circumferential direction

3. Claims: 15,31-33

Tubular endoprosthesis capable of expanding from a first to a second diameter formed of a plurality of annular elements including interconnected strut members such that some of these strut members have nesting characteristics

4. Claims: 18-30

Endoprosthesis capable of expanding from a first to a second diameter defined by a cell structure including first and second set strut members, where the second set members define an upper cell section having a trapezoidal shape when in the second diameter.

5. Claims: 34-37

## FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Endoprosthesis comprising a generally tubular scaffolding body having first and second diameters. The endoprosthesis further having an outer component including a first set of interconnected strut members and an inner component including a second set of interconnected strut members overlapping with the first set to define a cooperating cell pattern.

## 6. Claims: 38-50

Endoprosthesis comprising a scaffolding body configured to have a compressed diameter and an expanded diameter; the body having a first bias when in a first range of diameter between the compressed and the expanded diameters and a second bias when in a second range of diameter between the first range and the expanded diameter; the second bias is expansive and has a greater expansive magnitude than the first bias.

## 7. Claims: 51-53

Method of manufacturing an endoprosthesis

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Information on patent family members

International Application No  
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