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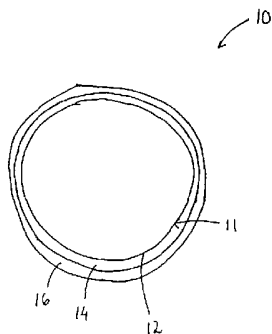
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- (72) Inventor: **SAHAGIAN, Richard**; Burlington, MA (US).
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- (74) Agents: **PHAM, Chinh, H.** et al.; Foley, Hoag & Eliot LLP, One Post Office Square, Boston, MA 02109-2170 (US).
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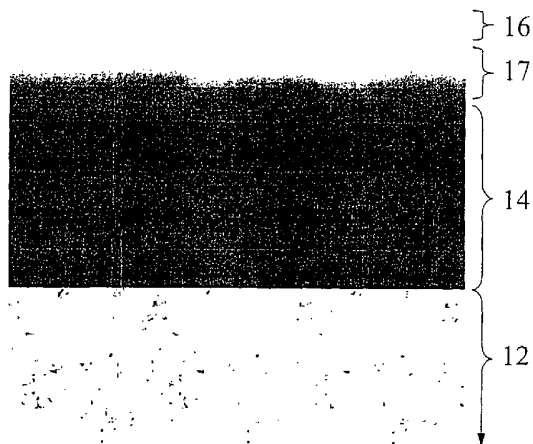
[Continued on next page]

(54) Title: MULTI-LAYERED RADIOPAQUE COATING ON INTRAVASCULAR DEVICES



(57) Abstract: Intravascular devices having a radiopaque layer thereon for visualization are provided. The devices further include a capping layer on the radiopaque layer to prevent exposure of the radiopaque material to surrounding tissues. A method of coating the device is also provided. The method includes using an unbalanced magnetic field magnetron to generate, from a source, metal atoms for coating and bombarding ions for compression deposited metal atoms to the surface of the device.

Microfused Radiopaque Coating With Overcoat



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GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent
(BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR,
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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

International Application No
PCT/US 01/43223

A. 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)

EP0-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 5 858 556 A (ECKERT JOHN K ET AL) 12 January 1999 (1999-01-12) column 3, line 35 -column 4, line 63	1-9,12, 13,16, 19-24, 26,27, 29,30
X	EP 0 916 317 A (MEDINOL LTD) 19 May 1999 (1999-05-19) paragraph [0012] - paragraph [0015] paragraph [0018] - paragraph [0020]	1-11
A	--- -/--	12-31

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.
- "&" document member of the same patent family

Date of the actual completion of the international search

25 June 2002

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Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Mary, C

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 6 099 561 A (ALT ECKHARD) 8 August 2000 (2000-08-08) column 7, line 44 - line 58 column 9, line 1 - line 44 column 9, line 66 -column 10, line 13	1-8,11
A	---	19-31
E	US 6 387 123 B1 (JACOBS JAMES M ET AL) 14 May 2002 (2002-05-14) column 4, line 8 -column 5, line 53 column 6, line 40 - line 54	1-9, 11-13, 16, 19-24, 26,27,30
X	US 5 679 470 A (MAYER DAVID W) 21 October 1997 (1997-10-21) column 10, line 7 - line 34	1
A	WO 00 54704 A (ADVANCED CARDIOVASCULAR SYSTEM) 21 September 2000 (2000-09-21) page 6, line 17 -page 7, line 30 -----	1-31

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 01/43223

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.:

1-31

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: 1-31

An intravascular device comprising a substrate surface; a layer of radiopaque material; a capping layer positioned on the layer of radiopaque material to prevent exposure of the layer of radiopaque material to surrounding tissue.

1.1. Claims: 1-18

An intravascular device comprising a substrate surface; a layer of radiopaque material; a capping layer positioned on the layer of radiopaque material to prevent exposure of the layer of radiopaque material to surrounding tissue.

1.2. Claims: 19-25

An intravascular stent comprising a flexible expandable body having a surface; a layer of radiopaque material on the surface; a capping layer positioned on the layer of radiopaque material to prevent exposure of the layer of radiopaque material to surrounding tissue and a transition layer between the capping layer and the layer of radiopaque material.

1.3. Claims: 26-31

An intravascular stent comprising a flexible expandable body having a surface; a layer of radiopaque material on the surface; an adhesion layer between the layer of radiopaque material and the surface to enhance bonding between the layer of radiopaque material and the surface, a capping layer positioned on the layer of radiopaque material to prevent exposure of the layer of radiopaque material to surrounding tissue.

2. Claims: 32-37

A method for coating an intravascular device, the method comprising: providing an intravascular device having a substrate surface; generating a flux of atoms of a radiopaque material and a flux of bombarding ions in a co-linear fashion toward the substrate surface; and permitting the bombarding ions to impact the atoms to the substrate surface, so as to provide a substantially uniform layer of radiopaque material.

Please note that all inventions mentioned under item 1, although not

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

necessarily linked by a common inventive concept, could be searched without effort justifying an additional fee.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 01/43223

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