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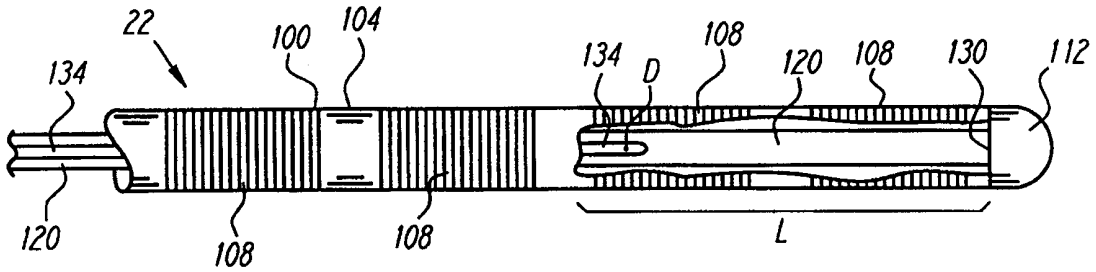
14 May 1999 (14.05.99)

(54) Title: IMPROVED CATHETER DISTAL END ASSEMBLIES



(57) Abstract

The present invention includes improved assemblies for transferring torque from a catheter main body tube (104) to the steering center support member (120) through the buff bond joint assembly. Such improvements include the utilization of a crimp sleeve (290) that is disposed within the butt bond sleeve (274), such that an enhanced mechanical interference is created within the adhesive that is utilized to fill the but bond sleeve. Various crimp sleeve shapes are disclosed. Alternatively, a stiffener member may be fixedly engaged to the steering mechanism, where the stiffener member includes an arm portion that projects into the butt bond sleeve area. The projecting arm portion is bonded into the adhesive that fills the butt bond sleeve. Additional torque enhancing features include radially inwardly project ribs that are formed in the butt bond sleeve, and laterally extending portions of the steering center support member which create enhanced mechanical interference with the adhesive disposed within the butt bond sleeve. The improved steering and control features of the present invention are obtained by locating the attachment point of the steering wires with the center support member a suitable distance proximate to the distal end of the center support member. Additionally, improvements to the shape of the center support member provide enhanced control characteristics. In a preferred embodiment, the steering wire attachment point is located approximately one inch proximal to the distal tip of the device.

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INTERNATIONAL SEARCH REPORT

International Application No
PC1/US 98/15163

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 A61M25/01 A61B17/36

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 6 A61M A61B

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)

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 5 643 255 A (ORGAN) 1 July 1997 see column 3, line 54 - column 6, line 17; figures ---	17 1-3
X A	US 5 582 609 A (SWANSON) 10 December 1996 see column 5, line 39 - line 47; figures ---	17 1-3
A	US 5 190 050 A (NITZSCHE) 2 March 1993 see column 6, line 12 - column 7, line 52; figures ---	1,17
A	US 5 273 535 A (EDWARTS) 28 December 1993 cited in the application see claim 1; figures ---	1,17
P,A	WO 97 42996 A (EP TECHNOLOGIES) 20 November 1997 see the whole document -----	1,17

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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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

"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	Date of mailing of the international search report
10 December 1998	30. 03. 1999

Name and mailing address of the ISA	Authorized officer
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	KOUSOURETAS, I

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 98/15163

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.:

1-21

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/US 98/15163

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

1. Claims: 1-21

A catheter comprising a handle, a steering support member and at least one steering wire.

2. Claims: 22-27

A system for ablating body tissue comprising a catheter body carrying at least two electrodes, at least two electrodes supported by the distal assembly capable of creating generally elliptical lesions at least 2 cm long and 7 mm deep, whereby transmission of radiofrequency energy simultaneously by the at least two electrodes forms a lesion that extends without interruption across the body tissue area between the at least two electrodes.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/US 98/15163

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5643255 A	01-07-1997	NONE	
US 5582609 A	10-12-1996	CA 2174131 A	20-04-1995
		EP 0723469 A	31-07-1996
		JP 10507373 T	21-07-1998
		WO 9510327 A	20-04-1995
		CA 2174129 A	20-04-1995
		EP 0754075 A	22-01-1997
		JP 9509069 T	16-09-1997
		WO 9510318 A	20-04-1995
		WO 9510236 A	20-04-1995
		WO 9510321 A	20-04-1995
		WO 9510319 A	20-04-1995
		US 5545193 A	13-08-1996
		US 5871523 A	16-02-1999
		WO 9510225 A	20-04-1995
		US 5637090 A	10-06-1997
		WO 9510226 A	20-04-1995
		US 5860920 A	19-01-1999
US 5190050 A	02-03-1993	WO 9415524 A	21-07-1994
US 5273535 A	28-12-1993	AU 3066092 A	07-06-1993
		CA 2105774 A,C	09-05-1993
		EP 0566724 A	27-10-1993
		JP 7500755 T	26-01-1995
		US 5358478 A	25-10-1994
		WO 9308869 A	13-05-1993
WO 9742996 A	20-11-1997	US 5820591 A	13-10-1998