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(54) Title: GUIDE WIRE OR WORKING CATHETER WITH MODIFIED DRIVE SURFACE

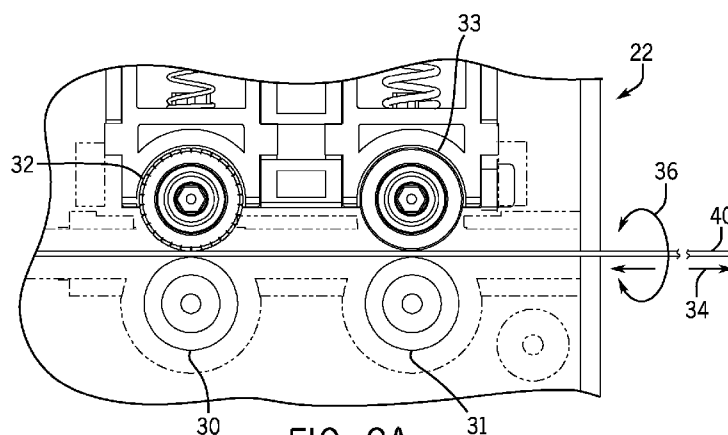


FIG. 2A

(57) Abstract: An elongated medical device with a modified drive surface for use with the driving mechanism of a robotic system. The elongated medical device has a distal portion configured to navigate the lumen of a human body channel and a proximate portion with a surface different from that of the distal portion and adapted to better interact with the driving mechanism than the surface of the distal portion.

**Box No. 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 No. 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:

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

Group I: Claims 1-17 are directed toward an elongated medical device with a modified drive surface for use with a drive mechanism of a robotic system.

Group II: Claims 18-24 are directed toward a method of modifying a guide wire or working catheter, with a distal portion configured to navigate the lumen of a human body channel, to enhance its interaction with the driving mechanism of a robotic system.

-\*\*\*- Continued Within the Next Extra 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 additional fees, this Authority did not invite payment of additional fees.
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.:  
1-17

**Remark on Protest**

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - A61M 25/082 (2014.01)

USPC - 604/159, 164.07, 528

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(8): A61M 25/08, 25/082 (2014.01)

USPC: 604/156, 159, 164.07, 164.12, 528; 606/108; CPC: A61F 2/95; A61M 25/0111, 25/0606

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 practicable, search terms used)

MicroPatent (US-G, US-A, EP-A, EP-B, WO, JP-bib, DE-C,B, DE-A, DE-T, DE-U, GB-A, FR-A); Google Scholar; ProQuest Dialog; Medline/PubMed: advanc\*, catheter, coat\*, cof, conduit, distal\*, driv\*, elongate, engag\*3, exterior\*, forc\*3, friction\*, guidewire, handle, interact\*, introduc\*, lumen, outside, proxim\*, push\*3, shaft, sheath, surface, turn\*, vessel, wire

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category*     | Citation of document, with indication, where appropriate, of the relevant passages                                   | Relevant to claim No.        |
|---------------|----------------------------------------------------------------------------------------------------------------------|------------------------------|
| X<br>---<br>Y | US 6514261 B1 (RANDALL, SL, et al. ) February 4, 2003; figure 2; column 3, lines 20-26; column 4, lines 13-16, 58-62 | 1, 10<br>-----<br>2-9, 12-17 |
| Y             | US 2010/0222669 A1 (FLICKINGER, W, et al) September 2, 2010; figure 1; paragraphs [0024], [0026], [0031]             | 2, 3, 17                     |
| Y             | US 2010/0069833 A1 (WENDEROW, T, et al.) March 18, 2010; figures 5, 13; paragraphs [0071], [0079], [0080], [0082]    | 4, 5, 12, 15-17              |
| Y             | US 2011/0015484 A1 (ALVAREZ, JB, et al.) January 20, 2011; figure 7B; paragraph [0039]                               | 6-9                          |
| Y             | US 2009/0054875 A1 (STRAUSS, BH, et al.) February 26, 2009; paragraph [0095]                                         | 7, 8                         |
| Y             | US 5379779 A (ROWLAND, CA, et al.) January 10, 1995; figures 1, 2; column 4, lines 3-7                               | 9                            |
| Y             | US 6027460 A (SHTURMAN, L) February 22, 2000; column 9, lines 9-12; column 12, lines 48-51                           | 13-14                        |
| Y             | US 2010/0049169 A1 (NORIEGA, GV, et al.) February 25, 2010; paragraph [0056]                                         | 14                           |
| A             | US 4769983 A (STAHLECKER, F, et al.) September 13, 1988; column 7, lines 36-40                                       | 11                           |
| A             | US 2010/0305394 A1 (ROSENBLATT, PL) December 2, 2010; paragraph [0032]                                               | 11                           |

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


## \* 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 application or patent 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

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\*\*\*- Continued from Box III - Observations where unity of invention is lacking -\*\*\*

The inventions listed as Groups I-II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: the special technical features of Group I include an elongate body having a distal portion configured to navigate the lumen of a human body channel, and a proximate portion; a length sufficient to extend from the drive mechanism to beyond the end of the guide catheter which is distal from the drive mechanism, which are not present in Group II; the special technical features of Group II include causing the sleeve to shrink in the radial direction such that it firmly engages the guide wire or working catheter, which are not present in Group I.

The common technical features of Groups I and II are a guide wire or working catheter; with a surface different from that of the distal portion and adapted to better interact with the driving mechanism than the surface of the distal portion over the proximate portion of the guide wire or working catheter such that it does not enclose the distal portion

These common technical features are disclosed by US 6,514,261 B1 to Randall, et al. (hereinafter 'Randall'). Randall discloses a guide wire or working catheter system (distal end of a catheter 11 having a stent 16 carried within it for implantation into the body of a patient; sheath 10 is secured to a pawl/sheath hub 32; a spring pawl 34 attached to the hub 32 engages a ratchet 36 which is integrated into the housing shell 30 (ratchet 36 is a modified drive surface); figure 2; column 3, lines 20-21; column 4, lines 58-62); with a surface different from that of the distal portion and adapted to better interact with the driving mechanism than the surface of the distal portion over the proximate portion of the guide wire or working catheter such that it does not enclose the distal portion (a spring pawl 34 attached to the hub 32 engages a ratchet 36 which is integrated into the housing shell 30 (ratchet 36, proximate portion, interacts with spring pawl and better interacts with pawl than the smooth sheath, i.e. distal portion); figure 2; column 3, lines 20-21; column 4, lines 58-62).

Since the common technical features are previously disclosed by the Randall reference, the common features are not special and so Groups I and II lack unity.