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DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

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Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

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- with international search report (Art. 21(3))
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[Continued on next page]

(54) Title: ADAPTIVE TISSUE COMPRESSION TECHNIQUES TO ADJUST CLOSURE RATES FOR MULTIPLE TISSUE TYPES

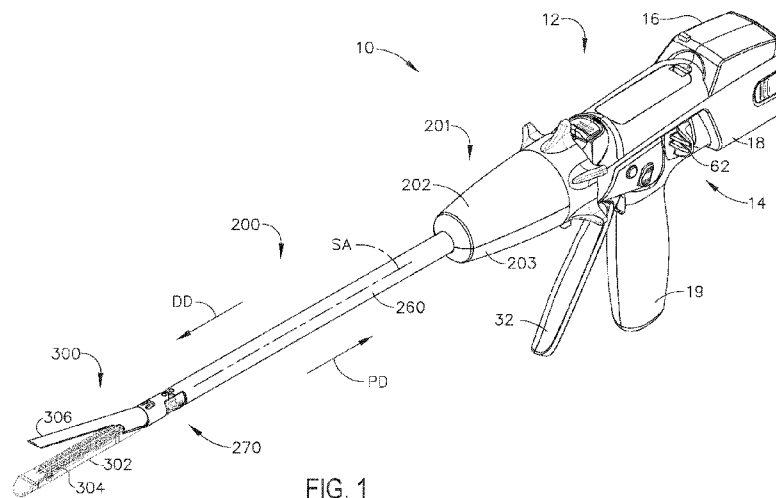
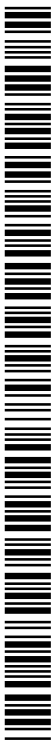


FIG. 1

(57) Abstract: A mechanism is disclosed for adapting operations of a surgical instrument based on data from actual, expected or predicted properties of tissue, data from measuring operation of the surgical instrument itself, and data based on clinician conduct. The adaptive measures can be based on predetermined control measures such as algorithms stored in operative communication with the surgical instrument, based on dynamically generated control measures, or a combination of both. Utilizing such mechanisms can help to adjust closure and firing algorithms based on tissue properties, improve battery usage, and learn from user operations, enhancing functioning of the instrument within an operational envelope.



**(88) Date of publication of the international search report:**  
10 November 2016

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US2016/020641

## 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:

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 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.:

### 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.

INTERNATIONAL SEARCH REPORT

International application No  
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A. CLASSIFICATION OF SUBJECT MATTER  
INV. A61B17/072 A61B90/00 A61B90/90  
ADD. A61B17/00

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)  
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 practicable, search terms used)  
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Further documents are listed in the continuation of Box C.

See patent family annex.

\* Special categories of cited documents :

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- "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
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| Date of the actual completion of the international search<br><br>22 September 2016   | Date of mailing of the international search report<br><br>05/10/2016 |
| Name and mailing address of the ISA/<br>European Patent Office, P.B. 5818 Patentlaan 2<br>NL - 2280 HV Rijswijk<br>Tel. (+31-70) 340-2040,<br>Fax: (+31-70) 340-3016 | Authorized officer<br><br>Mathis, Martin                             |

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**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, 2, 10, 11

A surgical cutting and stapling instrument, wherein a control measure is configured to determine the deviation of an instrument parameter from an acceptable value, the control measure being furthermore associated with a property of a cartridge,  
so that the risk of cartridge damage can be reduced.

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2. claims: 3, 4

The surgical cutting and stapling instrument, wherein the control measure is associated with an expected value for a property of a tissue,  
so that the risk of tissue damage can be reduced.

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3. claims: 5, 6

The surgical cutting and stapling instrument, wherein the control measure is associated with electrical parameters related to at least one motor of the instrument,  
so that the risk of motor overload can be reduced.

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4. claim: 7

The surgical cutting and stapling instrument, wherein the control measure is associated with a usage metric related to at least one battery of the instrument,  
so that battery lifetime can be prolonged.

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5. claim: 8

The surgical cutting and stapling instrument, wherein the control measure is associated with a distance between the jaws of the instrument,  
so that the risk of jaw damage can be reduced.

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6. claim: 9

The surgical cutting and stapling instrument, wherein the control measure is associated with a measured behavior of a clinician,  
so that maloperation of the instrument can be reduced.

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7. claim: 12

**FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210**

The surgical cutting and stapling instrument, wherein a clinician is alerted during the course of a surgical procedure, so that critical situations can be resolved by the clinician.

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8. claims: 13-20

A surgical cutting and stapling instrument, wherein a control measure is configured to predict the deviation of an instrument parameter from an acceptable value, so that corrective measures can be undertaken at an early stage.

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