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## Declarations under Rule 4.17:

— of inventorship (Rule 4.17(iv))

## Published:

— with international search report (Art. 21(3))

— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

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

16 March 2017

(54) Title: THICKNESS -ADJUSTABLE HEMOSTATIC CLIPS, CLIP APPLIERS, AND APPLICATIONS THEREOF

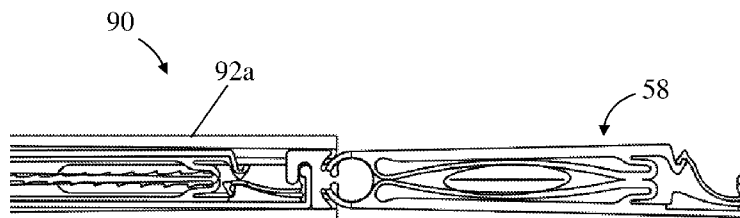


FIG. 11F

(57) Abstract: Hemostatic clips, clip applicators, and applications thereof, for ligating bodily organs or tissues in a subject. The clip and clip applicators are configured to structurally conform to various thicknesses of bodily organs or tissues. In exemplary embodiments, the hemostatic clip includes pivotally linked clip arm members, wherein at least one has an outer rigid clip arm member, and an inner clip arm member being resilient and elastic. The clip includes a locking mechanism for locking together the clip arms. The hemostatic clip shifts from a non-stressed fully opened configuration to a stressed locked configuration with compressive forces being applied to a bodily organ or tissue. Inner resilient clip arm member of the clip facilitates structural conformity to various thicknesses of bodily organs or tissues, and provides an efficient, long lasting, and safe tissue ligation.



# INTERNATIONAL SEARCH REPORT

International application No  
PCT/IB2016/054408

A. CLASSIFICATION OF SUBJECT MATTER  
INV. A61B17/122  
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

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 39Q 019 A (LEVEEN HARRY H [US] ET AL) 28 June 1983 (1983-06-28) the whole document -----	1,2,6-16
X	EP 2 074 954 A1 (TELEFLEX MEDICAL INC [US]) 1 July 2009 (2009-07-01) paragraph [0031] ; figure 1 -----	1-16
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Further documents are listed in the continuation of Box C.



See patent family 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 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

2 February 2017

Date of mailing of the international search report

09/02/2017

Name and mailing address of the ISA/

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# INTERNATIONAL SEARCH REPORT

International application No

PCT/IB2016/054408

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 5 846 255 A (CASEY DONN [GB] ) 8 December 1998 (1998-12-08) the whole document -----	1,2,6-16
X	wo 2004/066849 AI (UNIV LONDON [GB] ; BARKER STEPHEN GEORGE EDWARD [GB] ; HOLLINGSWORTH SIM) 12 August 2004 (2004-08-12) the whole document -----	1,2, 6-13, 16
A	US 2011/009853 AI (BERTOLERO ARTHUR A [US] ET AL) 13 January 2011 (2011-01-13) paragraphs [0035] , [0036] ; figures 1A-1B -----	1-16
X	US 2014/074131 AI (ARMENTEROS JESUS R [DO] ET AL) 13 March 2014 (2014-03-13) the whole document -----	17-27
A	US 5 725 542 A (Y00N INBAE [US] ) 10 March 1998 (1998-03-10) col umn 10, line 13 - col umn 11, line 14; figures 14, 15 col umn 12, line 6 - col umn 17, line 61; figures 18-27 -----	17-27

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2016/054408

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
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# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/IB2016/054408

## 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.: 28  
because they relate to subject matter not required to be searched by this Authority, namely:  
Rule 39.1(iv) PCT - Method for treatment of the human or animal body by surgery; Rule 39.1(iv) PCT - Method for treatment of the human or animal body by therapy.
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.

## FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

## 1. claims: 1-16

a thickness-adjustable hemostatic clip according to claim 3 and characterized by the features introduced by this claim i.e. in that "said outer rigid clip arm member joins said inner resilient elastic clip arm member at two separate joining portions, whereby said outer and inner clip arm members enclose a gap extending between said joining portions, said gap separates a roof surface of said outer rigid clip arm member away from a roof-contact surface of said inner resilient elastic clip arm member". The characterizing features relate to the technical problem of finding an alternative resilient elastic member.

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## 2. claims: 17-27

a clip applicator according to claim 17 or 18, characterized by "a trigger mechanism including an inner sleeve and configured for sliding and advancing said inner sleeve from a retracted position that uncovers said distal-most hemostatic clip, to a protruding position that covers said distal-most hemostatic clip; wherein, said inner sleeve, when advanced to said protruding position over said first and second clip arms of said distal-most hemostatic clip effects moving of said first and second clip arms to approach each other so as to self-lock said first and second clip arms by said locking mechanism of said distal-most hemostatic clip"; or "a clip pressing mechanism, including a sliding press, and configured for selectively moving said sliding press across said distal-most hemostatic clip between a fully retracted position proximal to said distal-most hemostatic clip, and a fully protruded position across said distal-most hemostatic clip, so as to limit said opened clip height of said distal-most hemostatic clip to a maximal opened clip height being equal to or less than said closed clip height; wherein, when the clip applicator is deployed, shifting said sliding press from a retracted position to said fully protruded position effects gradual closing of said hemostatic clip by decreasing distance between said first and second clip arm distal ends, at least until reaching said closed-clip height, so as to activate said locking mechanism to lock together said first and second clip arm distal ends at said closed clip height, for facilitating ligation of the bodily organ or tissue". The recited features relate to the technical problem of making closing of the hemostatic clip more convenient.

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