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[Continued on next page]

(54) Title: EXPANDABLE TISSUE THICKNESS COMPENSATOR

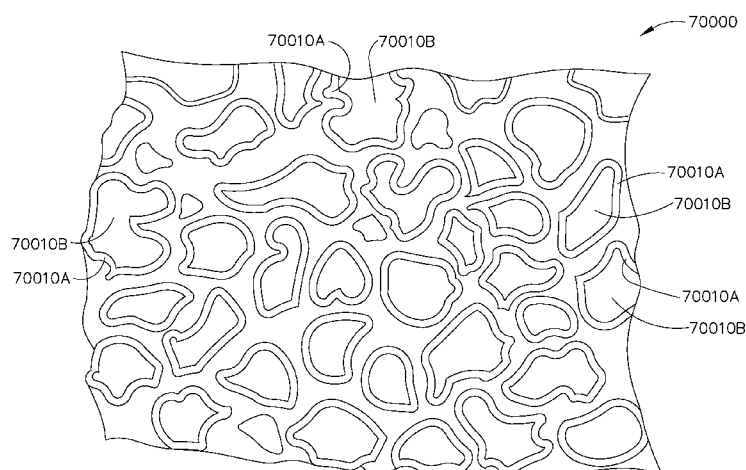


FIG. 518A

(57) **Abstract:** A tissue thickness compensator (70010, 70130, 70150, 70182) may generally comprise a biocompatible material, a first component (70010A), and a second component (70010B), wherein the first component and second component form a reaction product to expand the tissue thickness compensator. The first component may comprise a first hydrogel precursor, the second component may comprise a second hydrogel precursor, and the reaction product may comprise a hydrogel. The reaction product may be formed *in vivo* and/or *in situ* by contacting the first component and the second component. The first component and/or second component may be encapsulated and configured to release the components when ruptured. The reaction product may comprise a fluid-swellaable composition. Articles of manufacture comprising the tissue thickness compensator and methods of making and using the tissue thickness compensator are also described.

**Declarations under Rule 4.17:**

- *as to the identity of the inventor (Rule 4.17(i))*
- *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))*

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:

5 December 2013

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2013/033997

A. CLASSIFICATION OF SUBJECT MATTER

INV. A61B17/00 A61B17/072 A61L31/14
ADD.

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 A61L

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 2010/331880 A1 (STOPEK JOSHUA [US]) 30 December 2010 (2010-12-30) paragraph [0027] - paragraph [0043]; figures -----	1,2,4, 7-9,11, 14-16
X A	US 2011/045047 A1 (BENNETT STEVEN [US] ET AL) 24 February 2011 (2011-02-24) paragraph [0021] - paragraph [0079]; figures -----	1-11, 14-16 17-19
X A	EP 2 314 254 A2 (TYCO HEALTHCARE [US] COVIDIEN LP [US]) 27 April 2011 (2011-04-27) paragraph [0010] - paragraph [0055]; figures ----- -/-	1-11, 14-16 17-19



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

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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

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20/09/2013

Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No

PCT/US2013/033997

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 6 818 018 B1 (SAWHNEY AMARPREET S [US]) 16 November 2004 (2004-11-16) column 1, line 11 - line 18 column 4, line 48 - column 28, line 18 -----	1,7-11, 14-16

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2013/033997

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.: 20, 21
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:

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

Information on patent family members

International application No

PCT/US2013/033997

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2010331880	A1	30-12-2010	AU 2010202510 A1 20-01-2011 CA 2707885 A1 29-12-2010 CN 101933824 A 05-01-2011 EP 2292276 A2 09-03-2011 JP 2011005260 A 13-01-2011 US 2010331880 A1 30-12-2010
US 2011045047	A1	24-02-2011	AU 2011244877 A1 17-05-2012 CA 2755617 A1 03-05-2012 CN 102525603 A 04-07-2012 EP 2457600 A2 30-05-2012 JP 2012096038 A 24-05-2012 US 2011045047 A1 24-02-2011
EP 2314254	A2	27-04-2011	AU 2010226888 A1 21-04-2011 CA 2716247 A1 01-04-2011 EP 2314254 A2 27-04-2011 JP 2011072797 A 14-04-2011 US 2011081397 A1 07-04-2011
US 6818018	B1	16-11-2004	NONE