



US009364233B2

(12) **United States Patent**
Alexander, III et al.

(10) **Patent No.:** **US 9,364,233 B2**
(45) **Date of Patent:** **Jun. 14, 2016**

(54) **TISSUE THICKNESS COMPENSATORS FOR CIRCULAR SURGICAL STAPLERS**

(75) Inventors: **Johnny H. Alexander, III**, West Chester, OH (US); **Cortney E. Henderson**, Loveland, OH (US); **Christopher C. Miller**, Loveland, OH (US); **John P. Measamer**, Cincinnati, OH (US); **Katherine J. Schmid**, Cincinnati, OH (US); **Frederick E. Shelton, IV**, Hillsboro, OH (US); **Stephanie A. Mutchler**, Loveland, OH (US); **Bret W. Smith**, Kings Mills, OH (US); **Michael S. Cropper**, Edgewood, KY (US)

(73) Assignee: **Ethicon Endo-Surgery, LLC**, C Los Frailes Industrial Park Guaynabo, PR (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 892 days.

(21) Appl. No.: **13/433,179**

(22) Filed: **Mar. 28, 2012**

(65) **Prior Publication Data**
US 2012/0241505 A1 Sep. 27, 2012

Related U.S. Application Data

(63) Continuation-in-part of application No. 13/097,891, filed on Apr. 29, 2011, now Pat. No. 8,864,009, which is a continuation-in-part of application No. 12/894,377, filed on Sep. 30, 2010, now Pat. No. 8,393,514.

(51) **Int. Cl.**
A61B 17/072 (2006.01)
A61B 17/00 (2006.01)

(Continued)

(52) **U.S. Cl.**
CPC **A61B 17/07292** (2013.01); **A61B 17/00491** (2013.01); **A61B 17/064** (2013.01); **A61B 17/0643** (2013.01); **A61B 17/072** (2013.01);
(Continued)

(58) **Field of Classification Search**
CPC A61B 17/08
USPC 227/175.1, 176.1, 180.1; 128/898; 606/153, 219
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

66,052 A 6/1867 Smith
662,587 A 11/1900 Blake
(Continued)

FOREIGN PATENT DOCUMENTS

AU 2008207624 A1 3/2009
AU 2010214687 A1 9/2010
(Continued)

OTHER PUBLICATIONS

International Search Report for PCT/US2013/046513, dated Nov. 6, 2013 (6 pages).
(Continued)

Primary Examiner — Nathaniel Chukwurah

(57) **ABSTRACT**

Tissue thickness compensators for use with circular surgical staplers. Various tissue thickness compensators are disclosed for deployment between a stapler head of a surgical circular stapler and an anvil attached thereto to accommodate variances in tissue thickness during stapling. Some tissue thickness compensator arrangements include means and configurations for deploying healing agents for enhancing the healing process.

14 Claims, 263 Drawing Sheets

