



US009510827B2

(12) **United States Patent**  
**Kostrzewski**

(10) **Patent No.:** **US 9,510,827 B2**  
(45) **Date of Patent:** **Dec. 6, 2016**

(54) **MICRO SURGICAL INSTRUMENT AND  
LOADING UNIT FOR USE THEREWITH**

(71) Applicant: **Covidien LP**, Mansfield, MA (US)

(72) Inventor: **Stanislaw Kostrzewski**, Newtown, CT (US)

(73) Assignee: **Covidien LP**, Mansfield, MA (US)

(\* ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 786 days.

3,499,591 A	3/1970	Green
3,777,538 A	12/1973	Weatherly et al.
3,882,854 A	5/1975	Hulka et al.
4,027,510 A	6/1977	Hiltebrandt
4,086,926 A	5/1978	Green et al.
4,244,372 A	1/1981	Kapitanov et al.
4,429,695 A	2/1984	Green
4,505,414 A	3/1985	Filipi
4,520,817 A	6/1985	Green
4,589,413 A	5/1986	Malyshev et al.
4,596,351 A	6/1986	Fedotov et al.
4,602,634 A	7/1986	Barkley
4,605,001 A	8/1986	Rothfuss et al.

(Continued)

(21) Appl. No.: **13/849,590**

(22) Filed: **Mar. 25, 2013**

(65) **Prior Publication Data**

US 2014/0284372 A1 Sep. 25, 2014

(51) **Int. Cl.**  
**A61B 17/068** (2006.01)  
**A61B 17/072** (2006.01)  
**A61B 17/00** (2006.01)

(52) **U.S. Cl.**  
 CPC ..... **A61B 17/068** (2013.01); **A61B 17/07207** (2013.01); **A61B 2017/00398** (2013.01); **A61B 2017/00473** (2013.01); **A61B 2017/07228** (2013.01); **A61B 2017/07271** (2013.01); **A61B 2017/07278** (2013.01)

(58) **Field of Classification Search**  
 CPC ..... A61B 17/068; A61B 2017/07271; A61B 2017/07278  
 USPC ..... 227/177.1  
 See application file for complete search history.

(56) **References Cited**  
 U.S. PATENT DOCUMENTS

3,079,606 A	3/1963	Bobrov et al.
3,490,675 A	1/1970	Green et al.

FOREIGN PATENT DOCUMENTS

AU	198654765	9/1986
CA	2 773 414	11/2012

(Continued)

OTHER PUBLICATIONS

International Search Report 14161222.6 dated Oct. 10, 2014.

*Primary Examiner* — Thanh Truong

*Assistant Examiner* — Patrick Fry

(57) **ABSTRACT**

A loading unit configured for engagement with a surgical instrument is disclosed. The loading unit comprises a proximal body portion and a tool assembly. The proximal body portion defines a longitudinal axis. The tool assembly is disposed in mechanical cooperation with the proximal body portion and includes a cartridge assembly and an anvil assembly. At least one of the cartridge assembly and the anvil assembly is movable with respect to the other between an open position and an approximated position to engage tissue therebetween. The cartridge assembly is configured to house a plurality of fasteners therein. The diameter of the tool assembly is less than or equal to about 8 mm.

**28 Claims, 13 Drawing Sheets**

