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**Yates et al.**

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(54) **CONDUCTOR ARRANGEMENTS FOR ELECTRICALLY POWERED SURGICAL INSTRUMENTS WITH ROTATABLE END EFFECTORS**

(58) **Field of Classification Search**

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See application file for complete search history.

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(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)

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(Continued)

International Search Report for PCT/US2014/051633, dated Dec. 11, 2014 (4 pages).

(Continued)

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(57) **ABSTRACT**

A surgical instrument that includes a housing that has an elongated shaft assembly attached thereto that is configured to be rotated relative to the housing. The surgical instrument further includes a conductor arrangement that facilitates transfer of electrical power or current from a power source which may be located in the housing or external to the housing to a distal portion of the elongated shaft assembly or to a surgical end effector coupled thereto. The surgical instrument may further include a travel limiting arrangement for limiting the amount of rotary travel of the elongated shaft assembly relative to the housing to a predetermined range of rotary travel.

**23 Claims, 130 Drawing Sheets**

