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(19) **United States**(12) **Patent Application Publication**
Simon et al.(10) **Pub. No.: US 2015/0165226 A1**(43) **Pub. Date: Jun. 18, 2015**(54) **MAGNETIC STIMULATION DEVICES AND METHODS OF THERAPY**(71) Applicant: **Electrocore, LLC**, Basking Ridge, NJ (US)(72) Inventors: **Bruce J. Simon**, Mountain Lakes, NJ (US); **Joseph P. Errico**, Warren, NJ (US); **Jonn T. Raffle**, Austin, TX (US)(21) Appl. No.: **14/636,498**(22) Filed: **Mar. 3, 2015****Related U.S. Application Data**

(60) Division of application No. 13/938,931, filed on Jul. 10, 2013, now Pat. No. 8,972,004, which is a division of application No. 12/964,050, filed on Dec. 9, 2010, said application No. 13/938,931 is a continuation-in-part of application No. 12/859,568, filed on Aug. 19, 2010, which is a continuation-in-part of application No. 12/408,131, filed on Mar. 20, 2009, now Pat. No. 8,812,112, which is a continuation-in-part of application No. 11/591,340, filed on Nov. 1, 2006, now Pat. No. 7,747,324.

(60) Provisional application No. 61/415,469, filed on Nov. 19, 2010, provisional application No. 60/814,313, filed on Jun. 16, 2006, provisional application No. 60/786,564, filed on Mar. 28, 2006, provisional application No. 60/772,361, filed on Feb. 10, 2006, provi-

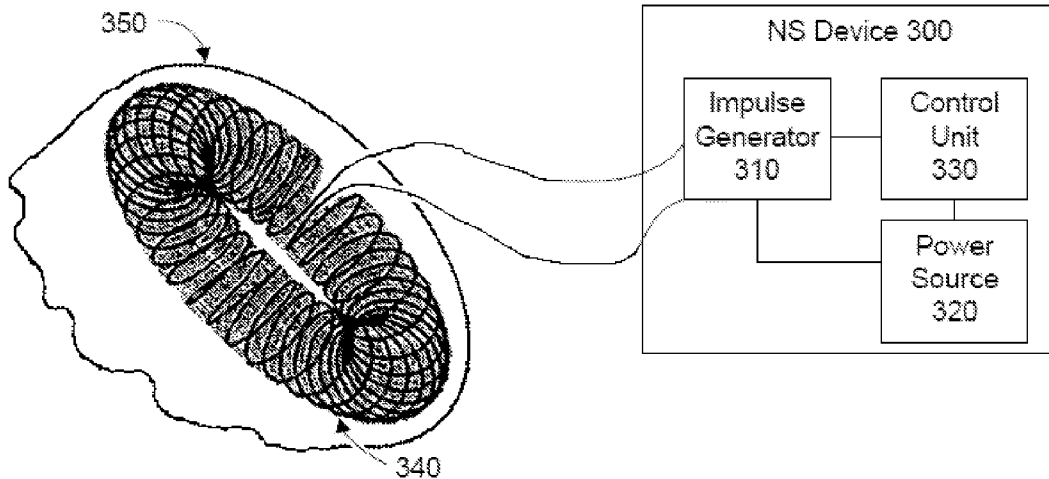
sional application No. 60/736,002, filed on Nov. 10, 2005, provisional application No. 60/736,001, filed on Nov. 10, 2005.

Publication Classification(51) **Int. Cl.***A61N 2/02* (2006.01)*A61N 2/00* (2006.01)(52) **U.S. Cl.**CPC . *A61N 2/02* (2013.01); *A61N 2/006* (2013.01)

(57)

ABSTRACT

Devices and systems are disclosed for the non-invasive treatment of medical conditions through delivery of energy to target tissue, comprising a source of electrical power, a magnetically permeable toroidal core, and a coil that is wound around the core. The coil and core are embedded in a continuous electrically conducting medium, which is adapted to have a shape that conforms to the contour of an arbitrarily oriented target body surface of a patient. The conducting medium is applied to that surface by any of several disclosed methods, and the source of power supplies a pulse of electric charge to the coil, such that the coil induces an electric current and/or an electric field within the patient, thereby stimulating tissue and/or one or more nerve fibers within the patient. The invention shapes an elongated electric field of effect that can be oriented parallel to a long nerve. In one embodiment, the device comprises two toroidal cores that lie adjacent to one another.



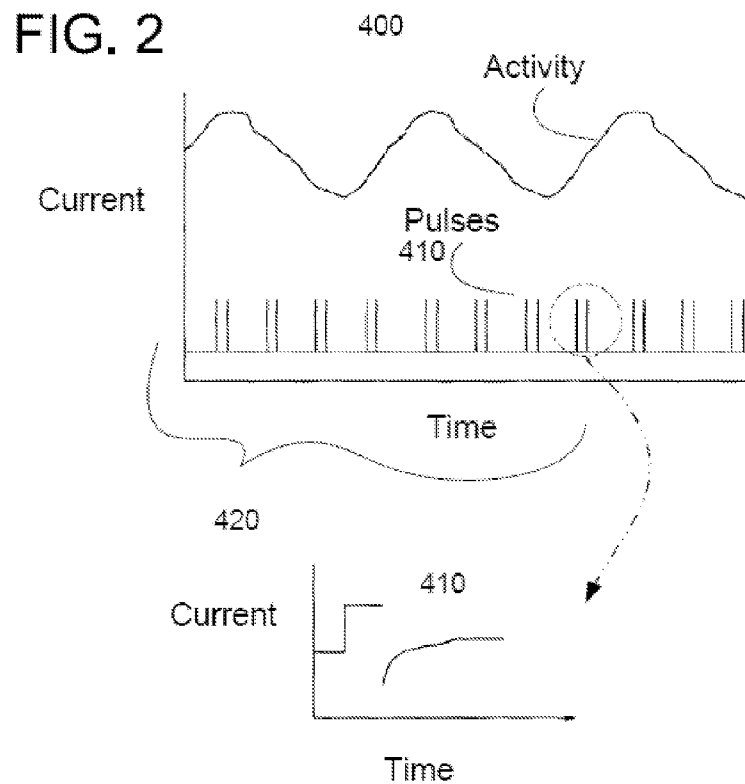
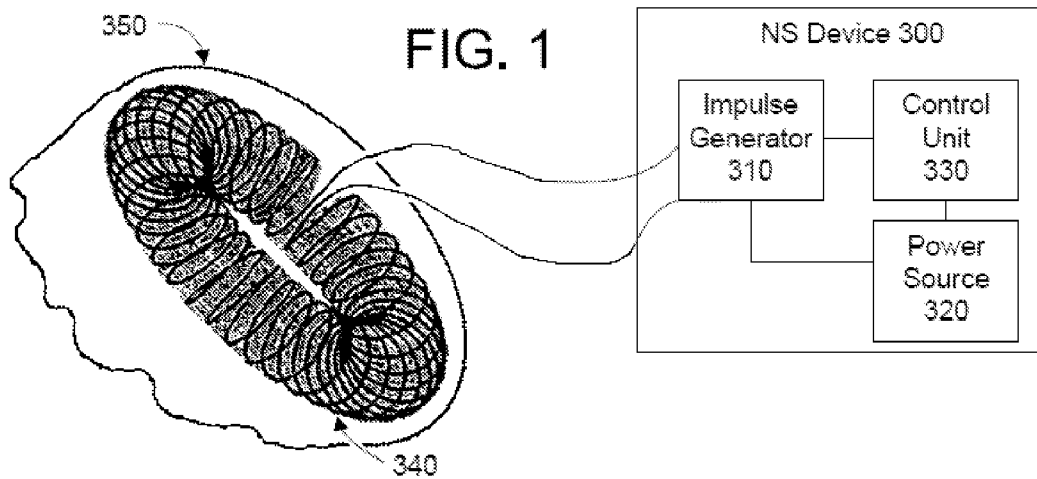


FIG. 3A

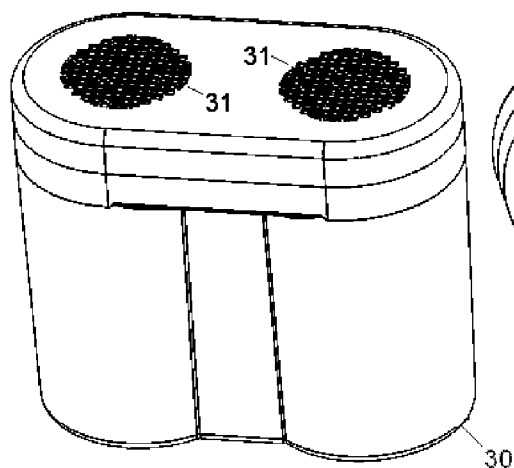


FIG. 3B

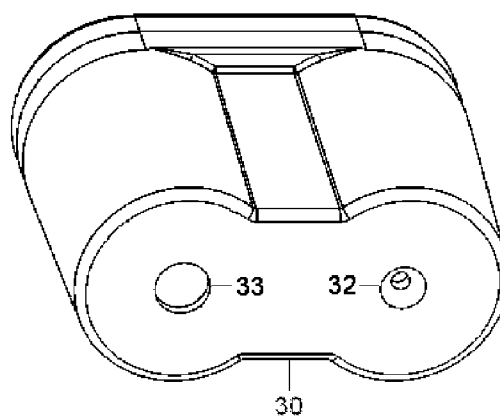


FIG. 3C

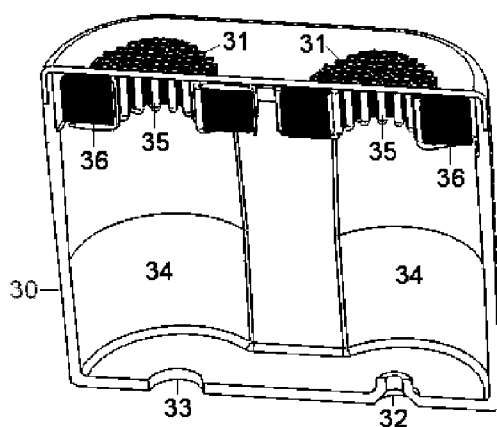
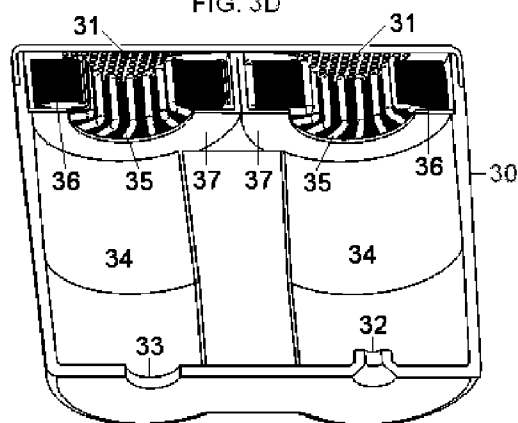


FIG. 3D



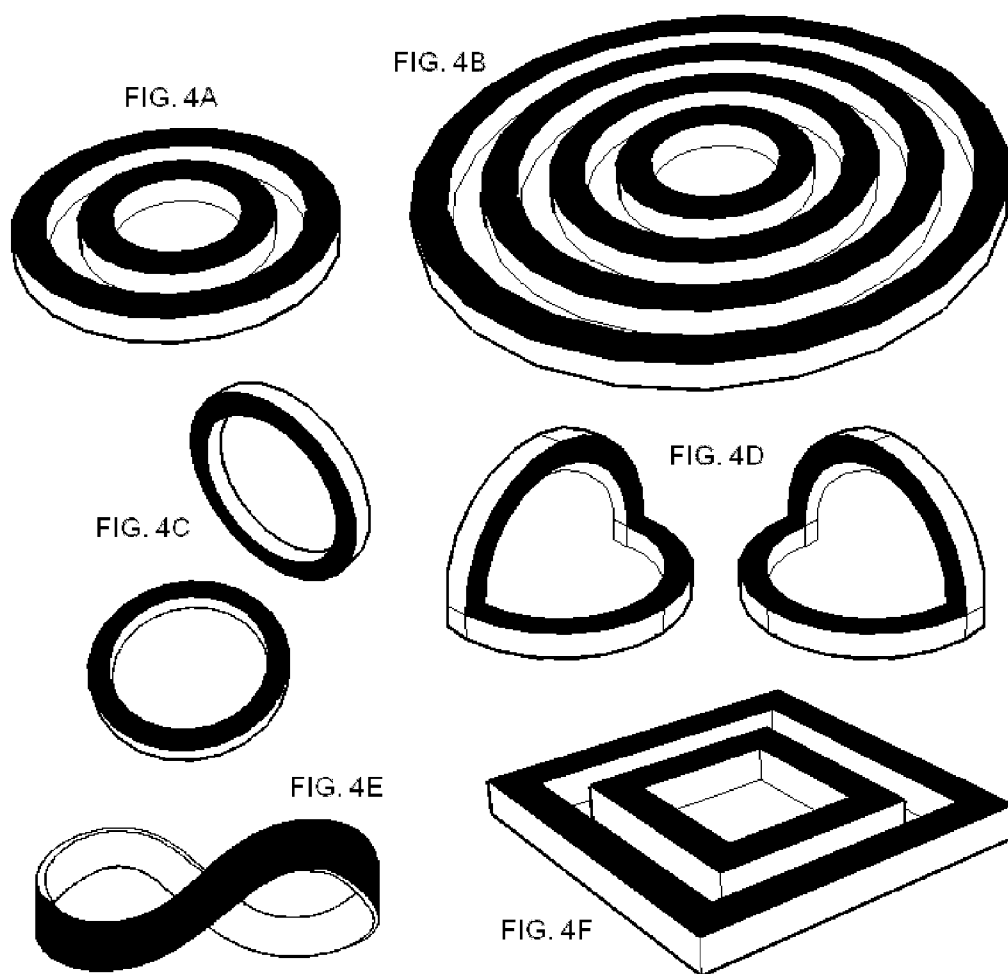
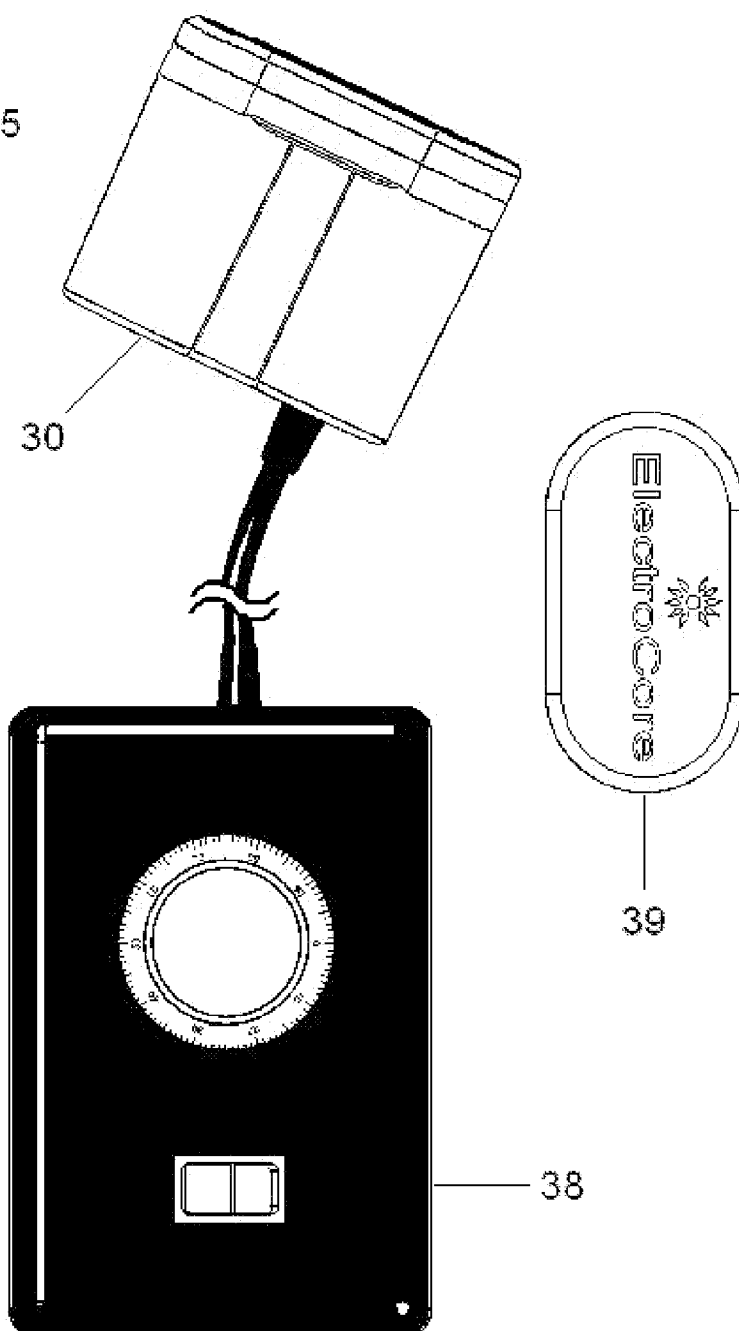


FIG. 5



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