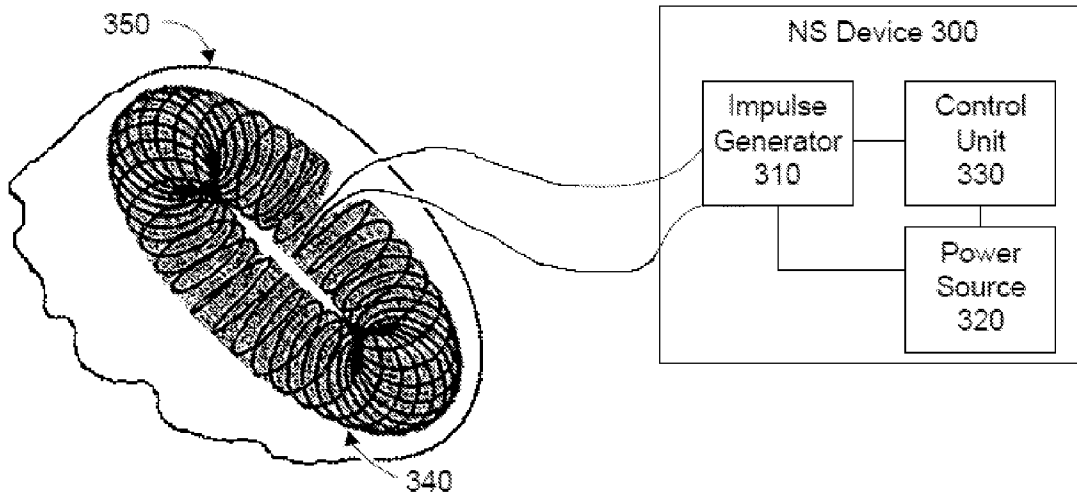




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Simon et al.(10) **Pub. No.: US 2011/0152967 A1**(43) **Pub. Date: Jun. 23, 2011**(54) **NON-INVASIVE TREATMENT OF
NEURODEGENERATIVE DISEASES**(75) Inventors: **Bruce Simon**, Mountain Lakes, NJ
(US); **Joseph P. Errico**, Warren, NJ
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NJ (US)(21) Appl. No.: **13/005,005**(22) Filed: **Jan. 12, 2011****Related U.S. Application Data**(63) Continuation-in-part of application No. 12/964,050,
filed on Dec. 9, 2010, which is a continuation-in-part
of application No. 12/859,568, filed on Aug. 19, 2010,
said application No. 12/859,568 is a continuation-in-
part of application No. 12/408,131, filed on Mar. 20,
2009.(60) Provisional application No. 61/415,469, filed on Nov.
19, 2010.**Publication Classification**(51) **Int. Cl.**
A61N 1/36 (2006.01)(52) **U.S. Cl.** **607/45**(57) **ABSTRACT**

Methods and devices are disclosed for the non-invasive treatment of neurodegenerative diseases through delivery of energy to target nervous tissue, particularly the vagus nerve. The devices include a magnetic stimulator having coils with toroidal windings, which are in contact with an electrically conducting medium that is adapted to conform to the contour of a target body surface of a patient. The coils induce an electric current and/or an electric field within the patient, thereby stimulating nerve fibers within the patient. The stimulation brings about reduction of neuroinflammation in patients suffering from conditions comprising Alzheimer's Disease, Parkinson's Disease, Multiple Sclerosis, postoperative cognitive dysfunction and postoperative delirium. Reduction in inflammation is effected by enhancing the anti-inflammatory competence of cytokines such as TGF-beta, wherein a retinoid or components of the retinoic acid signaling system provide an anti-inflammatory bias, by enhancing anti-inflammatory activity of a neurotrophic factor such as NGF, GDNF, BDNF, or MANF, and/or by inhibiting the activity of pro-inflammatory cytokines such as TNF-alpha.



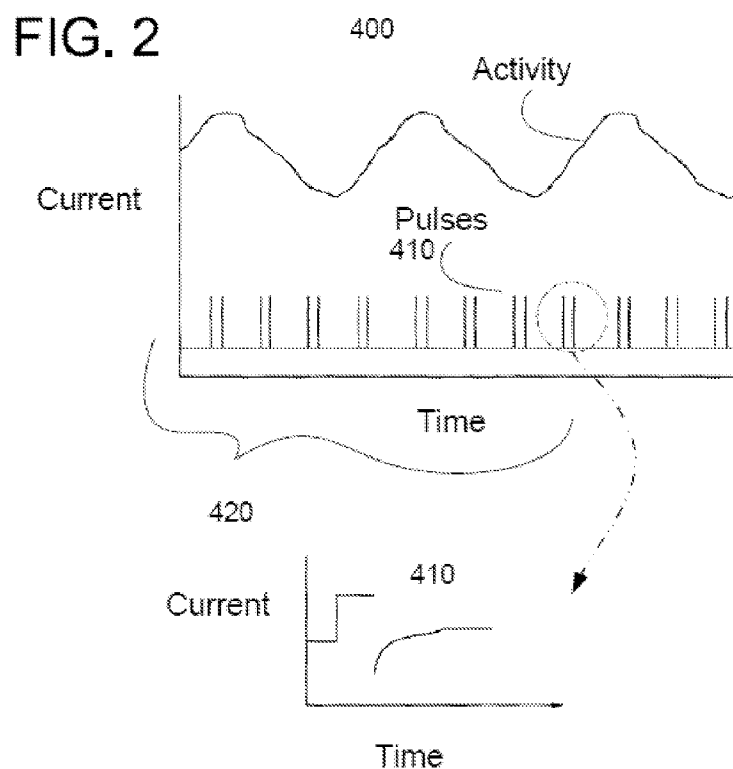
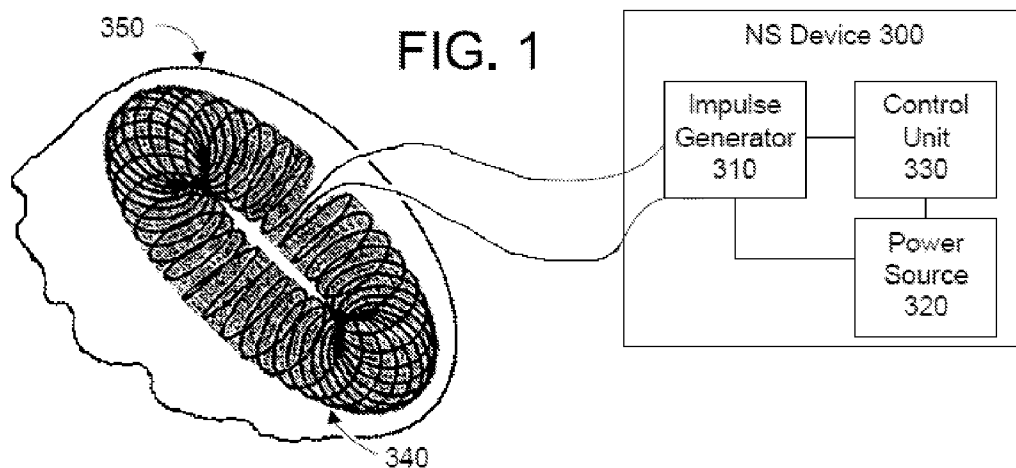


FIG. 3A

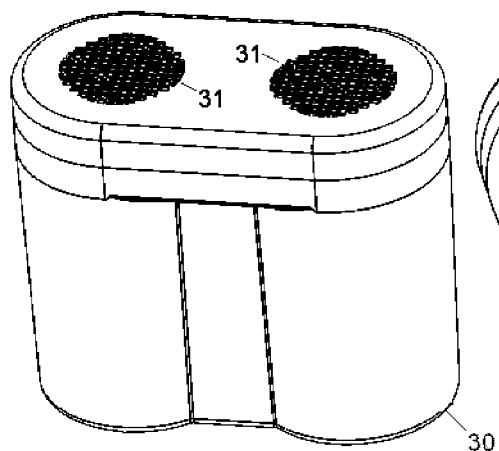


FIG. 3B

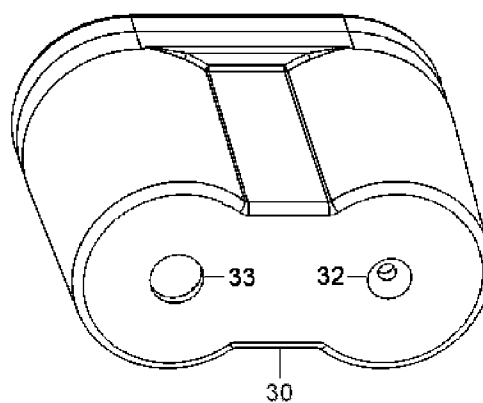


FIG. 3C

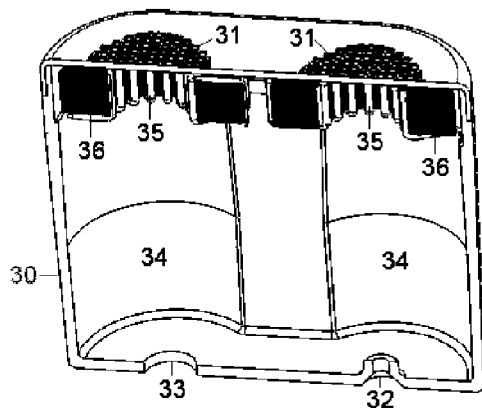
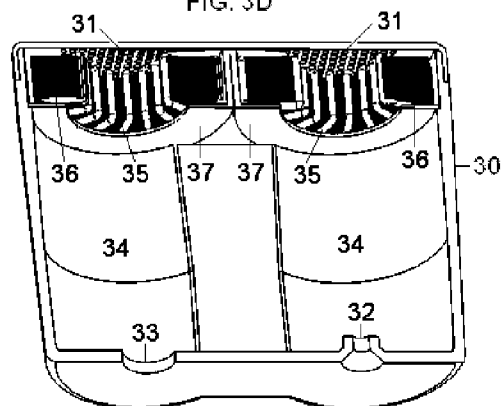


FIG. 3D



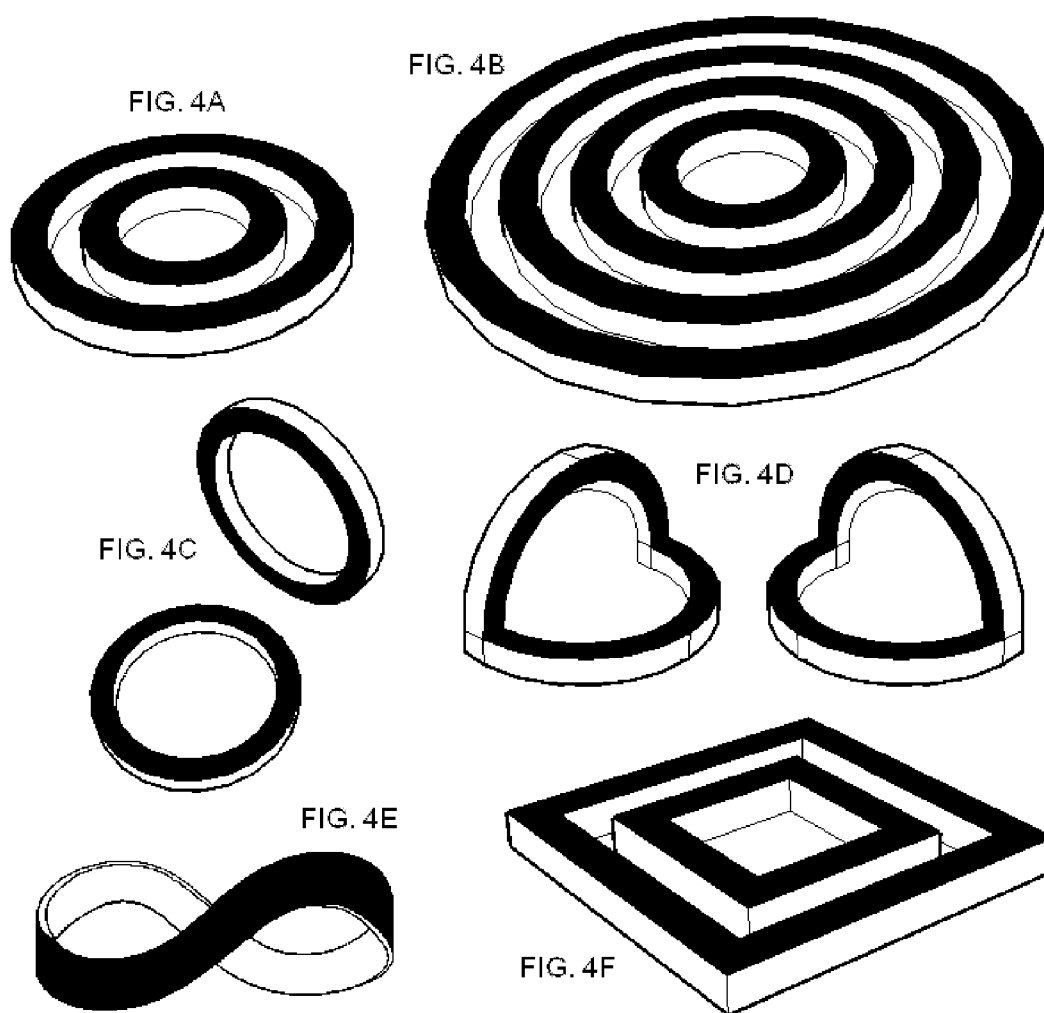
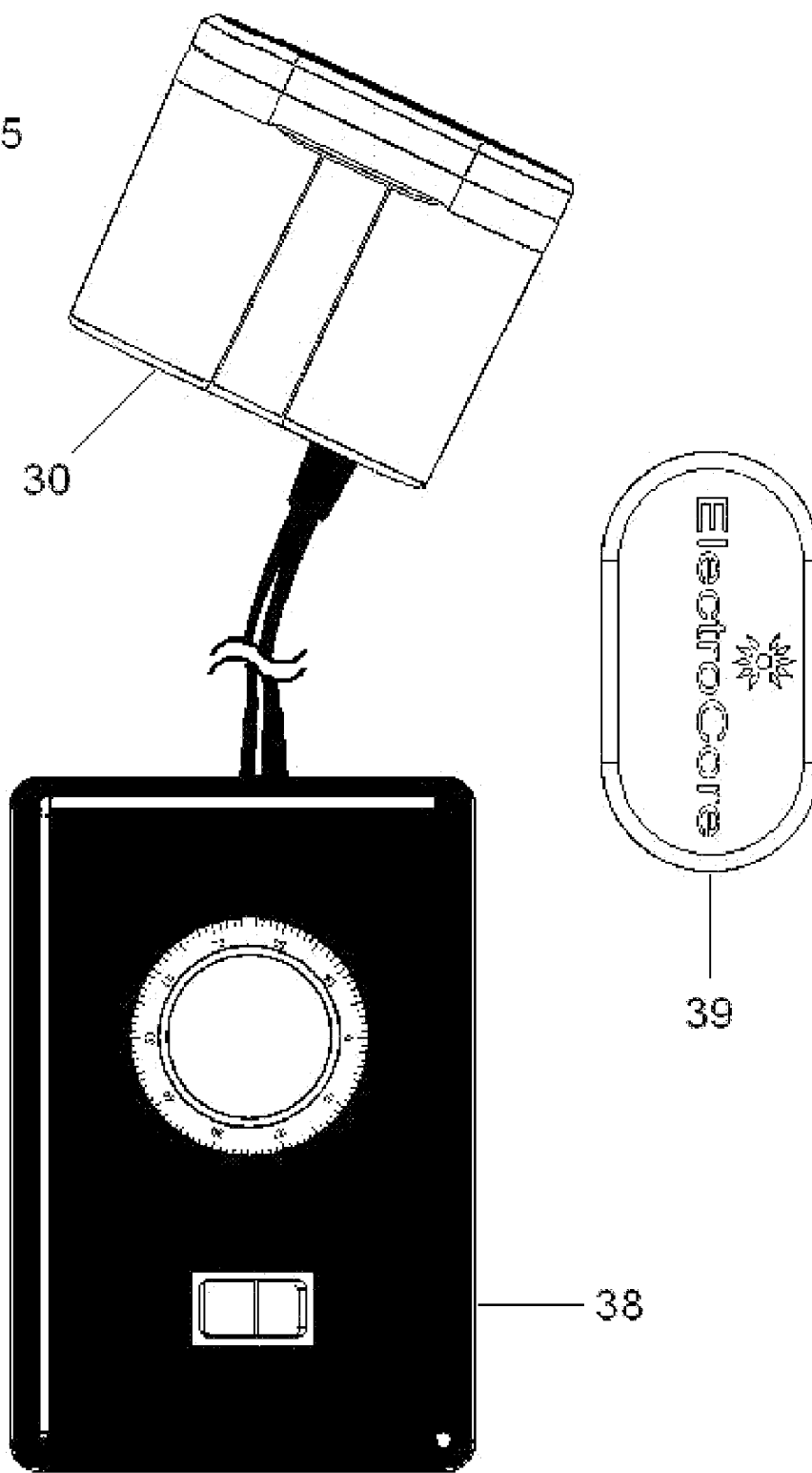


FIG. 5



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