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Methods and Systems for Controlling Magnetic Fields and Magnetic Field Induced Current

Key Investigator
- Elliott Hong
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Field
- Neurological disorder treatments
- Psychiatric disorder treatments
- Rehabilitation medicine

Technology
- Deep brain stimulation (DBS)
- Transcranial magnetic stimulation (TMS)
- Non-invasive medical treatments
- Magnetic field control
- Neurological therapy

Advantages
- Non-invasive treatment method
- High precision and control in targeting specific brain regions

Status
Available for licensing

Patent Status
US 10,773,096 B2

UMB Docket Reference
Docket here

External Reference
Grand View Research: Deep Brain Stimulation Devices Market : Online

Summary
The patent US 10,773,096 B2 introduces a novel approach to non-invasive medical treatments, leveraging controlled magnetic fields and currents for deep brain stimulation (DBS). This technology promises enhanced precision in targeting neurological disorders, offering a significant improvement over conventional method. The global DBS devices market, valued at USD 1.2 billion in 2022, is expected to grow significantly through 2030. This growth is driven by technological advancements, regulatory support, and the increasing prevalence of neurological disorders, despite facing challenges in precision, customization, and integration with other technologies.

Market
The DBS devices market, valued at USD 1.18 billion in 2022, is expected to witness a growth rate of 9.9% CAGR through 2030, supported by technological advancements, regulatory support, and a rising prevalence of neurological disorders. US Patent 10,773,096 B2 directly addresses these market dynamics by introducing a non-invasive method for controlling magnetic fields and currents. This innovation aligns with healthcare trends toward less invasive procedures, offering a solution that enhances the precision of DBS beyond current capabilities. The need for precise stimulation, customization to individual patient requirements, and seamless integration with existing medical technologies represents key market challenges. This patented technology offers focused magnetic fields and induced currents with controlled precision, potentially enhancing treatment efficacy for neurological conditions. Its commercial appeal is broad, with potential applications across various neurological and psychiatric conditions.

Technology
US Patent 10,773,096 B2 describes a method for non-invasive medical treatments, utilizing precise control over magnetic fields and magnetically induced currents. This technology is engineered to refine the accuracy and efficacy of deep brain stimulation (DBS) therapies, targeting the alleviation of symptoms associated with neurological disorders. The inventions novelty lies in its ability to produce concentrated magnetic fields and induce currents within specific bodily regions, such as the brain, with exceptional precision and control.

A key aspect of the innovation described in the patent is a sophisticated array of magnetic coils, designed to generate both direct current (DC) and transient magnetic fields. These fields interact within designated body areas to induce therapeutic currents. A key feature of this invention is its ability to narrowly focus stimulation on discrete volumes or regions of the target area, significantly reducing unintended effects on adjacent tissues. This precision is achieved through strategic placement of the magnetic coils in relation to a secondary magnetic source, capable of creating either an intensified magnetic field or a "magnetic hole" – a zone of diminished magnetic field strength – at specific body depths.

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Its precision in targeting distinct brain regions creates new possibilities for addressing neurological conditions that conventional transcranial magnetic stimulation (TMS) methods have struggled to treat effectively. Additionally, the system's adaptability enables its application across various brain and body parts, significantly expanding its therapeutic utility.

The primary utilization of this technology lies in the medical treatment for brain disorders, where its ability to accurately modulate the shape and intensity of magnetic fields at targeted bodily locations presents a promising approach for conditions such as depression, Parkinson's disease, among other neurological disorders. This innovation represents a novel strategy to overcome the constraints of existing TMS techniques, providing focused stimulation effects that substantially enhance treatment outcomes.

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