Cardiac Energy Harvesting Device And Methods Of Use

Tech ID: 32325 / UC Case 2020-322-0

BRIEF DESCRIPTION

This technology involves a medical device implanted in the heart's ventricle that recharges leadless pacemakers. This device contains magnets and inductive coils whose motion is coupled to the contractions of the ventricles in order to create electricity.

SUGGESTED USES

• For charging a pacemaker.

FEATURES/BENEFITS

• Cost effective due to simple materials and components.

• High recharge rate due to design that utilizes full length of the pacemaker to generate energy.

• Easy implementation for manufacturers since device can be deployed at the same time as leadless pacemaker.

TECHNOLOGY DESCRIPTION

Researchers at the University of California, Irvine developed a medical device that is implanted in heart's ventricle and uses its contractions in order to recharge pacemakers. Currently pacemakers have to be replaced due their finite battery life and the chance of post implant complications increase with a patient's age. Previous attempts to harvest energy using electromagnetic induction have complications related to size, biocompatibility, patient comfort and incompatibility with leadless technology, while the use of piezo-electric materials has been met with limitations in its energy harvesting capability, design, and fabrication.

Researcher therefore developed a device that utilizes the pressure induced forces in the ventricular cavity of the heart to harvest energy for recharging pacemakers. This device cylindrically encloses pacemakers for a space saving design and contains magnets and coils that are enclosed in a mesh, where the mesh translates the torqueing mechanical movement of the heart to linear movements of the magnets. This device contains a double ring magnet design where the outer magnet can attract the inner into oscillatory movements, which generates power and allows for maximum voltage per heartbeat.

STATE OF DEVELOPMENT

This technology is in the final design stages of the prototype. A working prototype will be built once the design is complete and animal trials will be sought.

PATENT STATUS

Country	Type	Number	Dated	Case

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OTHER INFORMATION

CATEGORIZED AS

- **Energy**
  - Storage/Battery
- **Medical**
  - Diagnostics
  - Disease: Cardiovascular and Circulatory System
- **Nanotechnology**

United States Of America	Issued Patent	11,771,910	10/03/2023	2020-322	» Electronics

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