

innovations

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TITLE: THERMOELECTRIC DEVICE HAVING AN ENERGY STORAGE DEVICE LOCATED BETWEEN ITS HOT AND COLD SIDES

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DESCRIPTION: This invention uses parallel plate capacitors as thermal insulators between the hot and cold sides of a thermoelectric device. These parallel capacitors serve a dual purpose of increasing the thermal efficiency by reducing losses due to thermal conduction and serving as energy storage devices. Presently available solid state thermoelectric (TE) devices operate at a fraction of potential efficiency due to the poor conduction of heat from the hot to cold side. This invention seeks to significantly increase TE device efficiencies by eliminating heat transfer through thermoelements. This is accomplished by placing parallel plate capacitors in series with each thermoelement. The gap between the plates of each capacitor will prevent heat conduction through the thermoelements. This device can be designed for refrigeration and then run "in reverse" for power generation. The device is essentially the same, and therefore can be charging and discharging the capacitors to improve performance for TE refrigeration and power generation.

ADVANTAGES: There are two other types of technologies that attempt to insulate against thermal conduction. The first uses thermionic emission using semiconductor diodes, which are difficult and expensive to manufacture. The second uses thermotunneling of electrons through a thin (nanometer scale) barrier. The method of using capacitors is much simpler and can be fabricated with readily available, off the shelf components. The implementation of this method can be used to improve the performance of TE refrigeration and power generation.

PATENT STATUS: Provisional Patent

LICENSING STATUS: World wide rights available

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