

A thermal mechanical positioning apparatus for increasing solar energy collection efficiency in solar panels

Keywords:

Passive positioning, thermal actuator, radiation absorber, solar tracking, solar panel, radiation tracking, photovoltaic panel

Applications:

A primary use of this technology is to make solar panels adjust their orientation in response to the sun's position in the sky.

Problems:

- Sub-optimal solar energy collection by solar panels having a fixed orientation
- Cost and reliability of active trackers

Technology:

This invention describes a thermal mechanical positioning apparatus for orienting an object in response to the angle of incidence of radiation striking the object. The apparatus is constructed from materials that are deliberately selected to exhibit a change in shape or applied force in response to changes in temperature and/or intensity of illumination, directly resulting in re-orientation of the structure, without external forces. The positioning apparatus makes use of the thermal gradients that vary across the apparatus due to: 1) varying angle of incidence of radiation striking the apparatus and object being re-oriented; and 2) shadowing of certain portions of the mechanical positioning apparatus, due to absorption, reflection, or scattering of radiation by the object being re-oriented or by other portions of the mechanical positioning apparatus.

Advantages:

Increases solar energy collection efficiency without using any mechanical motors, sensors or active electronic control.

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Intellectual Property:

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