

ANMELDUNG | SCHUTZ | VERWERTUNG



Focus Sectors

- Power Electronics
- Compensation of Thermal-Energy-Peaks e.g. electrical components
- Energy Storage

Key Words

- Latent Heat Accumulator
- Cooling System
- Heat Conductivity
- Additive Manufacturing
- Laser

Development Status

- Prototype available

Patent Procedure Status

- DE Patent filed
- EP Patent filed

Chances for Cooperation

- Licensing
- Patent Sale
- R&D Cooperation

TU131/12.10.2015

Thermal Energy Storage with a Phase Change Material and Method for its Manufacture

Innovation and Customer Benefit

Latent heat accumulators collect thermal energy and save them by phase transition of suitable material. Because of the low thermal conductivity of storage media latent heat accumulators, especially smaller sizes of a few centimeters, were so far not suitable for the rapid absorption of heat energy. Typical thermal conductivities of used storage media were less than 1 W / mK.

The present invention allows a faster removal of excess thermal energy by using a so-called "metallic-lattice-structure" of high thermal conductivity, which is filled with the storage medium.

The main advantages of the system are:

- Uniform and thus faster distribution of heat energy to the entire volume of the storage medium
- Flexible space lattice arrangements

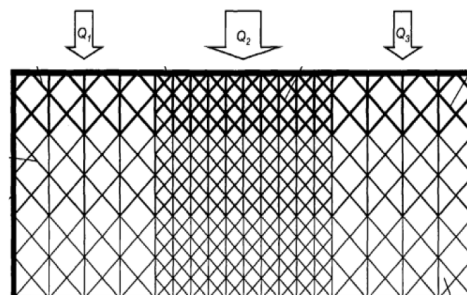


Fig. 1: Schematic flexible set-up with the heat flows $Q_1 = Q_3 < Q_2$

Possible Applications

Temporary cooling can be employed for emergency cooling or damping of heat peaks so that for example in cooling failure of power electronics these do not overheat and operate until the switching off is safe.

Technical Description

The invention relates to a heat storage device comprising a housing, in which a phase change material and a heat conducting structure surrounded by the phase change material are arranged. The heat conducting structure exhibits a space grid made of bars of same material extending to the junction of the space grid.

An independent claim is also included for producing a heat storage device comprising:

- Supplying a powdery active material to be produced on the heat conducting structure;
- Fusing defined regions of the powdery active material by thermal effect of an energetic beam;
- Repeating the steps (i) and (ii) until the fused regions of a spatial grid-a made of bars of same material extending to the junction of the space grid-a is formed;
- Removing the non-fused powdery active material;
- Injecting the phase change material, so it surrounds the heat conducting structure.