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HYBRID THERMOELECTRIC SOLAR SYSTEM

ROMÂNIA

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BREVET DE INVENȚIE

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Titular: UNIVERSITATEA POLITEHNICA DIN TIMIŞOARA, TIMIŞOARA, TM, RO

Titlul invenţiei: SISTEM SOLAR TERMOELECTRIC HIBRID

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Descrierea invenţiei, revendicările şi desenele la care se face referinţă în acestea, fac parte integrantă din prezentul brevet de invenţie.
Durata brevetului de invenţie este de 20 ani, cu începere de la data de 15/11/2013, cu condiţia plăţii taxelor anuale de menţinere în vigoare a brevetului.

Confirm cele de mai sus prin semnarea şi aplicarea sigiliului
Director General

București, Data eliberării 28/06/2019

The invention relates to a solar thermal system - electric, hybrid, which produces domestic hot water and electricity using thermoelectric modules.

The solar thermo-electric hybrid (figure 1) is composed of a concentrator, 1, with paraboloid cavity covered with reflecting mirrors, 2 (figure 3), arranged in a mosaic, over the interior surface, to ensure the capture and reflecting the sun light in a concentrated way towards the upper end of a collector 3, containing the TEGs, which provides the conversion of solar energy collected into electrical energy by means of a support 4, placed on a frame 5, shaped "L", which supports both the concentrator, 1 and the collector, 3 in various positions.
To ensure the maximum efficiency the solar tracking is possible using a tilt mechanism, 6, and pan mechanism, 7, 8. The baseplate, 9 has enough sturdiness to permit the attachment of the system and offer stability against wind.
The parabolic collector/concentrator 1, contains even shaped hexagonal mirrors, 10 and PV cells, 2 (figure 2). The electrical efficiency of the system and the hot water produced can be optimized by modifying the amount of photovoltaic cells used on the surface of collector. The energy of sunlight which enters the mirrors parallel to their plane is focused along the focal point, where the TEG 3, is placed.

Figure 1 represents the proposal for the solar collector, 3, built around the TEGs to produce the hot water and electricity. The TEG is placed in a cylindrical glass-like shaped duralumin with a lateral connection 12, connected to a vacuum pump. In the opposite side there is a hole filled with a rubber stopper 13, which ensure a good isolation and where wires attached to 4 connected serially TEGs, 14, exit from the module. The connection is made using low thermal conductivity fiber screws, 15. A black body metal plate, 16, ensure a good light absorption and a good thermal connection between the TEGs and the rest of the module. In the upper side of the module, a circular window is covered with a convex heat-resistant glass, 17, with good optical properties. The glass window is glued with a sealant ring, 18, to ensure a hermetic tightness. To obtain a good thermal isolation between the hot and cold junction of the TEG, the air is removed from the cylindrical cavity using a vacuum pump obtaining a low pressure of ~10-2 mbar. The bottom of the cylindrical shape, 11, is fixed with screws, 19, to a metal plate, 20, which contains high thermal conductivity aluminum silver anodized tubes, 21. The inside of the tubes are filled with an adequate liquid to ensure the heat transfer from the TEG module to the storage boiler. The module is connected to the "L" shaped bar, 4 and the support, 5 of the solar thermo-electric system with two isolation rings which ensure good thermal isolation from the system chassis.