PORTABLE SOLAR THERMOELECTRIC REFRIGERATOR CUM AIR COOLER

ABSTRACT:-

This paper is a comprehensive review on existing technologies based on solar thermoelectric cooling applications. The primary objective of this portable solar thermoelectric refrigerator cum cooler is to provide a comparatively low cost alternative to existing cooling systems. Refrigerators in the confines of our homes are too traditional, besides a portable refrigerator with a cooler which runs on solar energy as an alternative is a better choice. As a developing civilization, we have been consuming large amounts of energy for our survival and the non-renewable sources of energy are depleting. This explains the focus of the research, ie. To harness renewable sources of energy, solar in this case; keeping in mind the world energy crisis. Solar energy is widely available as compared to other renewable energy sources. The system will utilize solar energy, where supply of conventional electricity is not dependable. Comparison has been made based of existing systems and feasibility. The system works on Peltier effect and See beck effect. Thermoelectric Modules are incorporated for space cooling application. The cold side of the thermoelectric modules is utilized for space cooling, and the heat generated in the thermoelectric modules is removed using heat sinks and an arrangement of fans. The coefficient of performance of the system is a criterion for evaluating the performance of the cooling system. An effort has been made to enhance the COP using a combination of solar cells and thermoelectric modules. The system is compact, which makes it portable and it can be customized and fabricated to meet different user's requirements. The problem with traditional refrigerators have been, high consumption of electricity, negative impacts on the environment, all these problems have been addressed by the thermoelectric cooler. It does not make use of refrigerants thus ensuring a green and eco- friendly technology for space cooling applications. The absence of Compressor leads to noiseless operation and lowered maintenance cost. It is an energy efficient initiative, consuming less power. For

generations rural India does not have a dependable supply of electricity. Being highly reliable alternative it is intended for use in these places.

Block diagram :-

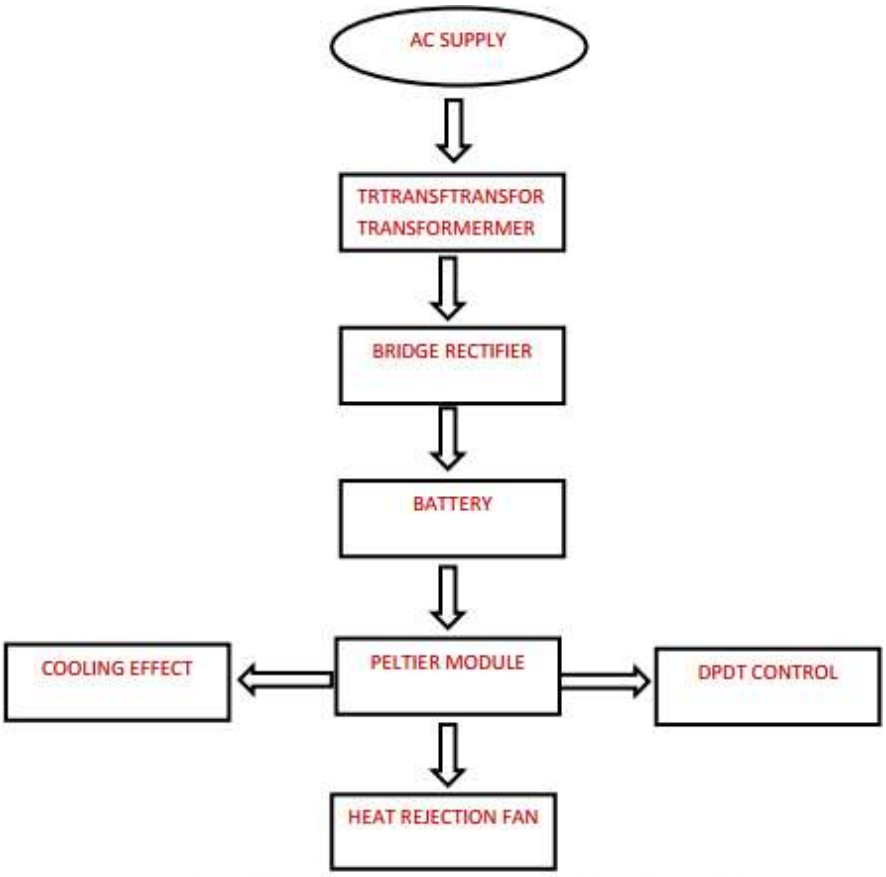

Fig 1: The arrangement of a thermoelectric cooling system