
Photo Voltaic Cooling Can

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Abstract--- *It operates using a solar power which drives a compressor. The compressor circulates coolant throughout the heated object, by circulating these coolant over a heated object it gets the heat from the object. Due to the constant circulation of the coolant total cooling is obtained. This is based on the refrigeration principle. There is a heat-exchanger which transfer the heat obtained from the heated object to the environment. This enables cooling to be quick and easy. There is a throttling device which reduces the pressure and temperature of the coolant. The coolant which is reduced in temperature is given inside the can and hence cooling is obtained. The design is automated using the thermostat. With help of the thermostat we can set the temperature and we can maintain temperature.*

Keywords--- *Compressor, Cooling, Mini Refrigerator, Throttling Device.*

I. INTRODUCTION

The purpose of this equipment is to produce cooling inside a can. This uses the renewable energy to power the compressor. Environmental problems due to extensive use of fossive fuel for electrically production and combustion energy have become increasingly serious on a world scale in recent year, to solve there problems, renewable energy source have been considered as new source of clean energy. Solar energy is one of the most important source among the renewable energy. Generally solar energy conversion systems can be classified into two categories. Thermal systems which convert solar energy into heat and photo voltaic system which convert solar energy to electricity. In the design we use photo voltaic system which converts solar energy to electricity. Intensive efforts are being made to reduce the cost of photo voltaic cell production and improve efficiency and narrow the gap between photo voltaic and conventional power generator method such as steam

Gas turbine power generator. In order to decrease the cost of PV array production, improve the efficiency of the system and collecting more energy for unit surface area different efforts have been made. There cooling system is very small as the cooling content is small. It is portable. It runs by the solar power which is renewable. So the main aim of the design is to consider the combination of a PV system with the portable system.

II. HARDWARE DESCRIPTION

Here the compressor circulates the coolant inside can ,the coolant carry the heat and goes to the pre cooler before sending it to the compressor .The pre cooler cool downs the heated coolant partially and it is given to the copper tube which is reduced in diameter .

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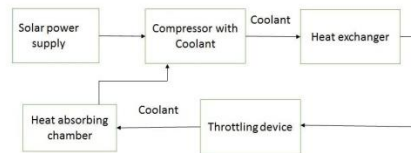


Fig. 1: Overall Block Diagram

It reduces the pressure and increases the flow of the coolant. Finally the coolant reaches the compressor .By doing the process continuously cooling is obtained. Finally the coolant reaches the compressor .By doing the process continuously cooling is obtained. This is based on refrigeration principle instructions fit in one program memory location.

III. PROPOSED SYSTEM

Each home in the country mostly have refrigerator at home as we use it to keep food cold, pressure them and keeping them away from bacterial growth to keep them safe until we eat them without these applicants it is very difficult. There are actually disadvantages out from owning one. One of the biggest disadvantages that this appliance can give you is the cost of keeping it on. It takes of about one-sixth of the electricity of the house hold usage. Now, refrigerators use only 60 per cent less power than what they use to back then. Refrigerator come in two different price tags and that the loss of the appliance as well as how much it will cost to run it each year. One of the main disadvantages is that they are environmentally unfriendly and dangerous if not disposed of properly. The refrigerator also contains refrigerant that can be damaging to the environment because of chlorofluoro carbon(CFC) content. This material should be recycled; otherwise the CFC can escape into the air. This material is suspected to be the cause of depletion of the earth ozone layer. Heat is added to the kitchen area from the motor of the compressor and the heat of the compression of the refrigerant. Their problems are eliminated in the proposed design as the system is very small as portable. The cost of running the fridge will increase power consumption which increases the electricity bill. Their problems are eliminated as the system uses the renewable resource like solar energy. The solar energy powers the compressor, which drives the cooling unit, by combining the solar unit and compact cooling unit. It is possible to produce cooling at any time and any area irrespective of the power source. The only disadvantage of the proposed design is that the heat produced by the compressor is not utilized. And heat on the surface of the solar panel should be handled with care as it may cause some burns on the human skin.

A. Thermostat

The W1209 is an incredibly low cost yet highly functional thermostat controller. With this module you can intelligently control power to most types of electrical device based on the temperature sensed by the included high accuracy NTC temperature sensor. Although this module has an embedded microcontroller no programming knowledge is required. 3 tactile switches allow for configuring various parameters including on & off trigger temperatures. The on board relay can switch up to a maximum of 240V AC at 5A or 14V DC at 10A. The current

temperature is displayed in degrees Centigrade via its 3 digit seven segment display and the current relay state by an on board LED.



Fig. 2: Thermostat

B. Compressor

The function of a compressor is to increase the pressure, and corresponding saturation temperature (boiling point) of the refrigerant vapor to high enough level so there refrigerant can condense by rejecting its heat through the condenser.

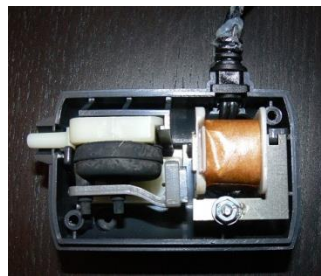


Fig. 3: Compressor

C. Capillary Tube

Throttling device is another vital part of all the refrigeration systems and air conditioning systems apart from the compressor, condenser and the evaporator. The refrigerant leaves the compressor at high pressure and temperature and enters the condenser. After leaving the condenser the refrigerant is at medium temperature and high pressure and then it enters the throttling valve. In the throttling valve the pressure and the temperature of the refrigerant is reduced drastically.

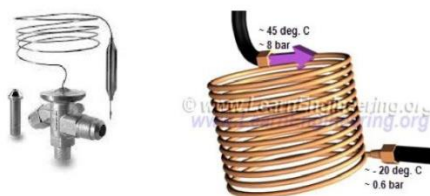


Fig. 4: Capillary Tube

D. Heat Exchanger

A heat exchanger is a device used to transfer heat between coolant and the atmosphere. The fluids may be separated by a solid wall to prevent mixing or they may be in direct contact. They are widely used in space heating, refrigeration, air conditioning, power stations, chemical plants, petrochemical plants, petroleum refineries, natural-gas processing.

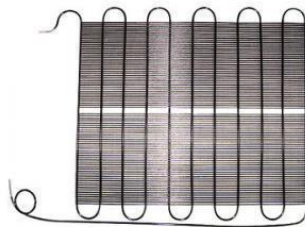


Fig. 5: Heat Exchanger

E. Solar Panel

The solar panel receives the light from the sun. It converts it into electrical energy. The electrical energy is given to the compressor of the unit.



Fig. 6: Solar Panel

F. 12V Gear Motor

Center Shaft Geared motors specifically designed for robotic applications offer a wide variety of options. Key features – easy to use and mount, standard size for all RPM's, a huge variety of RPM's available, long durability and very affordable considering the features. These motors open a wide choice for you in terms of Wheels and chasis.



Fig. 7: 12V Gear Motor

12V Battery

The rechargeable batteries are lead-lead dioxide systems. The dilute sulfuric acid electrolyte is absorbed by separators and plates and thus immobilized. Should the battery be accidentally overcharged producing hydrogen and oxygen, special one-way valves allow the gases to escape thus avoiding excessive pressure build-up. Otherwise, the battery is completely sealed and is, therefore, maintenance-free, leak proof and usable in any position.

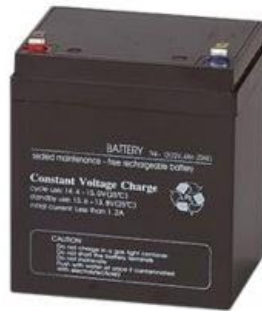


Fig. 8: 12V Battery

IV. CONCLUSION

Thus the whole system is to produce cooling on a given object, at any time and any place. The system consumes power from the sun and converts the solar energy into the electrical energy. The electrical energy drives the compressor. The compressor circulates the coolant gas around the capillary tube and the throttling device to produce cooling on the object.

V. FUTURE SCOPE

The design is to produce portable of the refrigeration at a reduced size in which storage product such as biological, chemical and food products may get stored and may be transported irrespective of the power source. This is one of the most advantages in the future.

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