

DESIGN AND FABRICATION OF SOLAR POWERED FRESH VEGETABLE VENDING CART

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ABSTRACT

Now-a-days the biggest concern for human is human health. Health comes from good food and good food comes from good vegetables. But when we go to buy them, they are hard to find because vegetables tends to get stale very quickly as they get cut. So to overcome this difficulty we can implement a solar operated cold storage system to the vendor's cart which will work similar to refrigerator. This arrangement will help to keep vegetables fresh for 2 to 3 days. Kart Corporation which is mandated for the manufacture supply and promotion of innovative and unique AC Mobile Vegetable Vending Cart. It has revolutionized the era of vegetable vending in India. This innovative cart has increased the profit of the vegetable vendors by 25-30% and reduced wastage as it has a chamber which keeps the vegetable very fresh for longer duration. Kart Corporation has been into institutional sale and retailing of the AC mobile Vegetable vending cart from its inception. We are happy to present our 4th model which is much lighter, durable, more strength than the previous carts and customize to the maximum comfort level of the vendors. Solar power is the energy released by the sun. Solar power is gaining sympathy as a safe and popular alternative source of energy. It may successfully replace our fossil fuel reserves because they are decreasing and they have a negative environmental impact when burned down to produce energy, another reason is the higher and higher price at energy. The energy generated by the sunlight (solar power) is free and harmless to the environment.

Keywords: *Evaporative cooling, fruits and vegetables, solar-powered cart, storage*

INTRODUCTION

solar-powered vending cart will be designed and developed for storage of fruits and vegetables. It will be tested for its performance during summer season. The minimum and maximum drop in temperature would be in range between 8.1 degree Celsius and 11.2 degree Celsius, and the increase in relative humidity would be up to 15% and 25% inside the vending cart chamber (it will vary according to weather conditions). The requirement of water would be in range between 16.5 and 20.0 liter/day. There will be considerable effect on physiological loss in weight of different vegetables kept either inside or outside the mobile chamber. The freshness and shelf-life of vegetables will increase substantially after storage in the cart. Evaporatively cooled storage has proved to be useful for short-term storage of fruits and vegetables in hot and dry regions¹. It has been extensively used for enhancing the shelf-life of horticultural produce, which is essential for maintaining the freshness of the commodities¹—Evaporative cooling is an environmental friendly air-conditioning system that operates using induced processes of heat and mass transfer, where water and air are the working fluids. It provides an inexpensive, energy-efficient, environmentally benign (not requiring ozone damaging gas as in active systems) and attractive cooling system.

LITERATURE SURVEY

1. **Dr. R.S. Bharj (2015)**

Study on Solar Hybrid System for Cold Storage:-

According to this paper solar energy is use to cool the storage of vender cart. The Solar panel can be effectively used in summer to produce refrigeration effect using solar hybrid refrigeration cycle.

2. **Dr. V. K. Samuel****Solar-powered evaporatively cooled vegetable vending cart:-**

According to this paper the coefficient of performance of the hybrid system is high. Solar hybrid refrigeration systems are more applicable in remote areas or islands where conventional cooling is difficult and solar energy is always available.

3. **Surender Kumar (2015)****Design for Solar Hybrid Mobile Multipurpose Cold Storage system:-**

According to this paper the hybrid cold storage was specially designing to reduce both wastage and deterioration of perishable food items during transportation and storage in ruler areas.

SMART VENDING CART

Fig(a). Smart vending cart

COMPONENT DETAILS

- **SOLAR PANNEL =10 WATT+10WATT**

These Solar Panels generally used for small off grid systems like Solar Lantrens, Solar Mobile Charger, small Solar Battery Banks, Solar Garden Lights, Solar Street Lights Etc. Here is complete Detail, Size, Watt, Volt, Working, Technical Specification and Cost of the 10w 20w 40w 50w DC and AC solar panel

- **CHARGE CONTROLLER=6 AMP**

A 12 volt solar charger is surprisingly easy to build and will help you save money, reduce pollution and reduce dependence on foreign oil. This article will talk about the different kinds of solar battery chargers, which type is best and even how to build your own 12 volt solar charger. The simplest battery charger is just a power supply that sends electricity of the correct voltage to a battery. You can connect battery to the power supply until the battery is fully charged and then disconnect it. For a 12 volt battery, you can plug it into a 15-18 volt power supply and then when it is fully charged, disconnect it. Unfortunately, though, there is nothing to prevent you from overcharging the battery using such a simple system. charger controller to make sure that you don't overheat..

- **DRY BATTERY=12 VOLT ,7.3 AMP**

A dry cell is a type of battery, commonly used for portable electrical devices. It was developed in 1886 by the German scientist Carl Gassner, after development of wet zinc-carbon batteries by Georges Leclanché in 1866. A dry cell uses a paste electrolyte, with only enough moisture to allow current to flow. Unlike a wet cell, a dry cell can operate in any orientation without spilling, as it contains no free liquid, making it suitable for portable equipment

- **HEAT EXCHANGER COIL**

A heat exchanger is a device used to transfer heat between a solid object and a fluid, or between two or more fluids. The fluids may be separated by a solid wall to prevent mixing or they may be in direct contact. [1] They are widely used in space heating, refrigeration, air conditioning, power stations, chemical plants, petrochemical plants, petroleum refineries, natural-gas processing, and sewage treatment. The classic example of a heat exchanger is found in an internal combustion engine in which a circulating fluid known as engine coolant flows through radiator coils and air flows past the coils, which cools the coolant and heats the incoming air. Another example is the heat sink, which is a passive heat exchanger that transfers the heat generated by an electronic or a mechanical liquid coolant.

- **TANK =5 LIT**

Tank reservoirs store liquids or gases in storage tanks that may be elevated, at grade level, or buried. Tank reservoirs for water are also called cisterns.

SCOPE

Evaporatively cooled storage has proved to be useful for short-term storage of fruits and vegetables in hot and dry regions. It has been extensively used for enhancing the shelf-life of horticultural produce, which is essential for maintaining the freshness of the commodities. Evaporative cooling is an environmental friendly air-conditioning system that operates using induced processes of heat and mass transfer, where water and air are the working fluids. It provides an inexpensive, energy efficient, environmentally benign (not requiring ozone damaging gas as in active systems) and potentially attractive cooling system.

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