

SOLAR DRIP IRRIGATION: CONSTRUCTIONAL DESIGN

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ABSTRACT

Sun sends out energy in the form of electromagnetic radiation. The solar cells receive the solar energy. The solar cells operate on the photo-electric energy by using solar cells principle. The energy from the photo voltaic cells is used to charge D.C. battery. Energy from battery is used to drive motor. Movement of motor shaft causes reciprocating motion of piston which further result into suction of water from reservoir and discharge through pipe.

Keywords— *D.C. Battery, Electromagnetic radiation Piston motion, Solar Cell, Photovoltaic Cell*

I. INTRODUCTION

Solar drip irrigation system is a system which works on conversion of solar energy into electric energy which is used to drive mechanical linkages which results into water dripping for irrigation purpose .we want to focus on various aspects of project earlier for water lifting in rural area or in garden. Our project is provided so for above said problem at present no technology is available. So making our project is using spraying and irrigation of water in rural area and used to small field and using city area in garden.

II. PROBLEM STATEMENT

Many people do not believe in solar energy because it said to be too expensive, it needs more space, sophisticated skills, is difficult to store and so on. However there are reasons to believe that solar energy has a future. At the 2005 UN World Summit the condition of our planet was described as follow. There is not so much progress in the development in Indian villages. They don't get the facilities that are available to urban areas. We are here trying to focus on the needs of the rural people and of course will surely contribute to for solving environment problems too. In urban areas we make our meal on time because of availability of LPG at our house whether it will finish we will fix that problem but what about the villages in India? Also the prices of conventional fuels are increasing so they go to cut the trees to burn them and use it as fuel. It results into deforestation which is directly related to the environment and wild life. We are already in problem of Global warming and allowing them to act like this. One is given to understand that presently only 8% of the energy used on earth comes from renewable resources. The rest 92% is from fossil fuel and nuclear sources.

III. HIGHLIGHTED POINTS FROM LITERATURE REVIEW

Cost effective solar power can be the answer for all our energy needs. Solar powered smart irrigation systems are the answer to the Indian farmer. This system consists of solar powered water pump along with an automatic water flow control using a moisture sensor. It is the proposed solution for the present energy crisis for the Indian farmers. This system conserves electricity by reducing the usage of grid power and conserves water by reducing water losses.

Solar power is used as only the source of power to control the overall system. Sensors are placed on the paddy field and these sensors continuously sense the water content and give the message to the farmer. Without visiting the paddy fields, farmers can get the information about the Moisture content and farmer can control the pump set by sending a message from his cellular phone even from a remote place where network is available. However, if the Moisture level reaches to the low level the motor will automatically start without intimation to farmer and to ensure the proper water level in the site. At the end of this paper, a complete hardware implementation of this proposed automated irrigation system will be presented.

The purpose of this paper is to explain the design of an ATmega16 microcontroller based Automated Irrigation System that senses moisture requirements in a field and performs irrigation automatically. The system is programmed to handle multiple fields by diverting water to each field. The system is powered by a 12V battery that is charged by a solar panel. The battery charge levels are maintained at the optimum level by the microcontroller through relays to the solar panel and battery load which prevent over-charge or full-discharge. An inverter is also implemented in the system to utilize battery power for AC loads. A solar tracking system is designed to ensure maximum availability of sunlight as the day progresses. The user can adapt the system to multiple crops by simple alteration in the variable values.

This paper deals with the design of solar tracking system to harness maximum solar energy that is converted into electrical energy which in turn is used to power the irrigation system. The designed single axis solar tracker device, on the basis of LDR sensor values, orients the PV panel in accordance with the position of the sun. The irrigation pump can be controlled in two modes namely Automatic mode, GSM mode In Automatic mode the water pump is switched on and off automatically based on moisture sensor value. In GSM mode the farmer at his own discretion can send a message to ON and OFF the water pump without actually going to the field. Solar power is absolutely perfect for use with irrigation systems for gardens, allotments, greenhouses, and polytonal. When the sun is shining you need more water and so the solar power is there for the pump. By adding a suitable deep-cycle leisure/marine battery, power can be made available 24 hours per day enabling watering in the evening - the best time to water plants in the summer so that the water has a chance to soak into the ground.

IV. COMPONENTS FOR DESIGN

1. Solar Panel 2.Solar Charge Controller Unit 3.Dc Battery Motor 4. Double Acting Cylinder

SOLAR PANEL

Solar panel is one of the most important standard part of system. Solar energy is easily and readily available all over world. Main function of panel is all the solar radiations impinge on panel is absorbed and utilized by panel.



Solar panels absorb the sunlight as a source of energy to generate electricity or heat.



Fig.1.Solar Panel

SOLAR CHARGE CONTROLLER UNIT

Solar energy absorbed by solar panel is used to charge DC battery. This solar charge controller is a unit through which this charging can be done. Unit shows red light while charging is going on.



Fig.2. Solar Charge Unit

DC BATTERY

This rechargeable D C battery is used to drive motor. Battery is charged by means of solar panel through solar charge controller unit. Positive and negative electrode terminals may be fasten tab type, bolt fastening type, threaded post type, or lead wire type, depending on the type of the battery. Sealing of the terminal is achieved by a structure which secures long adhesive-embedded paths and by the adoption of strong epoxy adhesives.



Fig.3.D.C.Battery

MOTOR

Motor shaft is connected to double acting piston cylinder through some mechanical linkage. Motor is drive by means of battery. Specification of motor is shown above.



Fig.4.Motor

DOUBLE ACTING CYLINDER

There are two double acting cylinders used in this system. One piston is connected to motor shaft which drive with help of motor which results in to suction of water from reservoir and discharge of water through nozzle. Another piston is used for auto tracking system.



Fig.5. Double Acting Cylinder

V. WORKING PRINCIPLE

Solar energy is easily and readily available all over world. First of all solar energy is absorbed and utilized by flat plate collector. Then absorbed solar energy is stored in battery in the form of DC voltage through solar charge controller unit. The stored energy in the battery is used to motor. Movement of motor shaft used drive some mechanical linkages which results in to reciprocating motion piston. Reciprocating motion of piston causes suction of water from reservoir through suction pipe. This water is discharged through nozzle. In this way one can use this system for various purposes such as irrigation spraying pesticides and supply water to gardens. The energy can neither be created nor be destroyed it can be converted into one form to another its need to be used.

VI. CONCLUSION

By using this apparatus, we are totally avoiding the use of non-renewable sources. This paper can be taken as fundamental for so many Industrial and Automation related work. This paper can be helpful in the situation of energy crises.

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