

Automatic Solar Water Sprinkler

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doi: <https://doi.org/10.21467/proceedings.118.31>

ABSTRACT

India is a vast country where water is insufficient availability in some regions. Conservation of water is very much important in agriculture due to the various climatic phenomenon's. The various alternative modes of irrigation should be adopted to tackle this problem. The developed countries are using several methods to conserve and reuse the water. If we check the fact of water availability on earth, two- third of earth is filled by water but only less than one percent of water can be used for the normal use. This is the point where the preserving of water's importance is arriving. This type of irrigation reduces water wastage to a large extent. In our project we are accepting the sprinkler mechanism for irrigation. The sprinkler is working by using the double acting pneumatic cylinder, in which on the forward and backward stroke of the cylinder pushes air to the water tank. This air from the cylinder passes the water out of the tank, through the sprinkler. This way make sure proper watering of the crop.

Keywords: Solar panel, Solar power, Sprinkler, Battery, Irrigation, DC motor, Control circuit

1 Introduction

The sun supply sustainable amount of the energy used for various purposes on earth for atmospheric system. Every minute the sun emits about 5.68×10^{26} calories of energy and the earth intercepts only 2.55×10^{18} calories (NRF, 2010). This represents only 2000 millionth of the total sun energy sent into the space. The total sun energy is estimated to be 30,000 times greater than the total annual energy of the world. If we able to convert a very few percent of this much sun energy into the benefit of common man, it will directly ensure the sustainability of our future generation. Sun energy is a time dependent and intermittent energy source. There is need for the storage of sun energy for later use when there is no further supply of the sun energy. An optimally designed solar cell system will collect and convert when the isolation is available during the day. Photovoltaic is the direct convert of light into electricity at atomic level. When free electrons are catch, an electric current is produced and can be used as electricity. The series and parallel electrical grouping to produce any required voltage. Photovoltaic cell modules and arrays produce direct-current (DC) electricity and current combination. The chain drive used in the mechanism able to run the vehicle as well as the sprinkler to sprinkle the water to plants. This combined mechanism can deliver functionally better result in irrigation and give mobility to the mechanism to reach places where a permanent sprinkler system is too costly.

2 Method

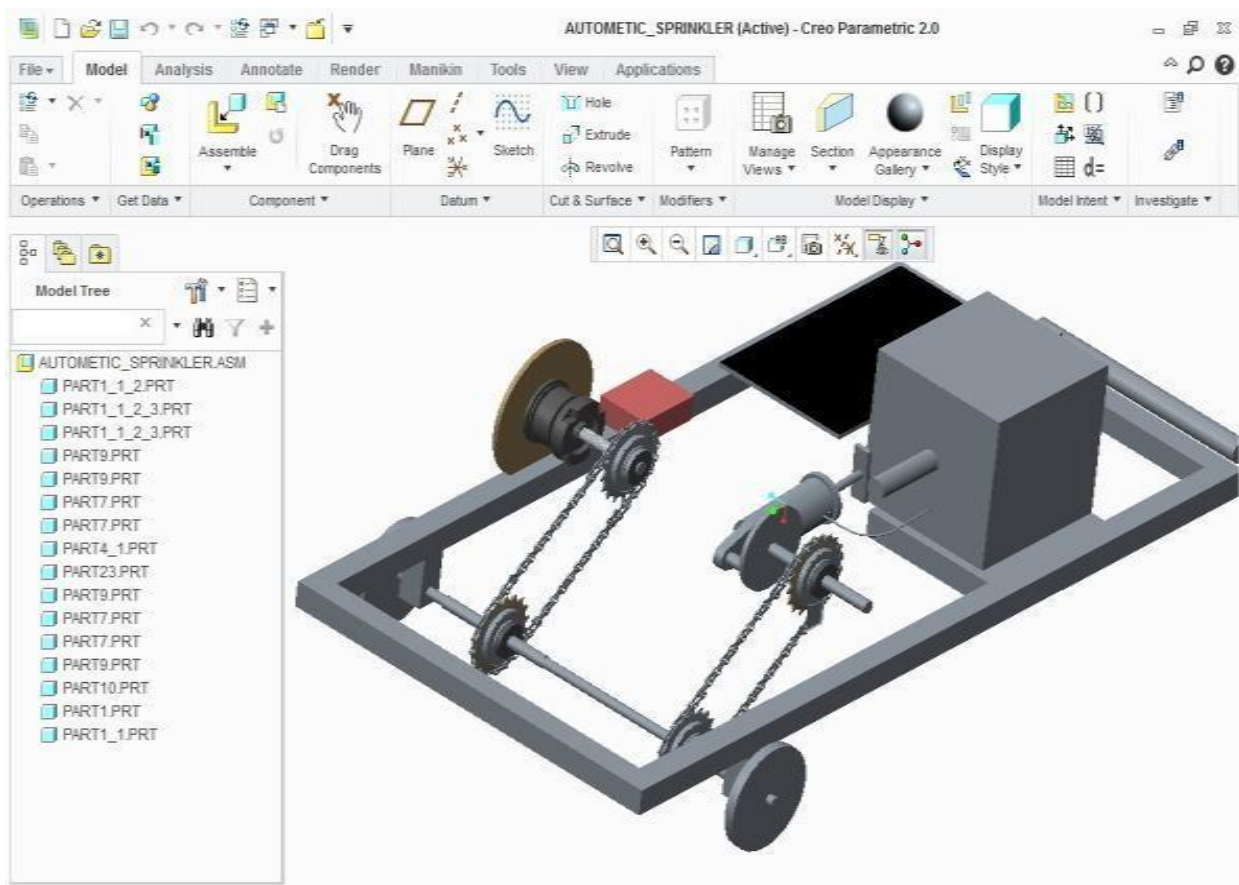
Water is hardly available in some months of the year; water conservation is very much essential for the sustainability. The fixed installation of sprinkler and piping is too costly and it will result in few lakh rupees. The permanent sprinkler system needs lot of primary investment so there is a need of practical solution in between the higher cost and conservation of the water. Solar energy giving alternative to the existing fossil fuel power production. According to world energy report, we get around 80% of our



energy from conventional fossil fuels like oil (36%), natural gas (21%) and coal (23%). It is well known that the time is not so far when all these sources will be completely worn out. So, alternative sources should be used to avoid energy/power crisis in the nearby future. So introduce sun energy for the machine process to work.

3 Working Principle

Automatic traveling water sprinkler is powered by sun solar energy. The sun energy is absorbed by the solar panel and the energy is stored as electricity in the battery. This battery gives power to the DC motor. The DC motor is connected with the chain sprocket mechanism. The chain and sprocket is connected with the rear shaft which helps the machine to move forward. At the rear shaft another set of chain, sprocket is also there. The fourth sprocket of second chain is connected with the crank plate via shaft. The crank plate is assembled to the piston rod of the cylinder, where the rotary motion of crank plate is converted to the reciprocation motion in the pneumatic cylinder. The double acting cylinder is connected with the water tank by a non-return valve. The air goes into the water tank pushes water out of the tank. This pushed out water / chemical is sprayed through the sprinkler to the plants.



4 Discussion

4.1 Types of Irrigation techniques Surface Irrigation

In surface irrigation techniques, water moves all over and across the land by gravity flow in order to wet and infiltrate the soil. Surface irrigation technique is divided into furrow, border strip or basin irrigation. It is also known as flood irrigation when it results in flooding or near flood of the arable land.

4.2 Sprinkler Irrigation

Sprinkler irrigation technique is another popular method, which pipes a set amount of water to the fields, and then sprays this directly over the crops with high pressure sprinklers. The amount of water can be controlled, which is a great benefit.

4.3 Drip Irrigation

Drip irrigation is also known as trickle irrigation, functions as its name suggests. Water is provided or near the root zone of plants(farm), drop by drop. This method can be the most water systematic method of irrigation, if managed properly, since evaporation and runoff are minimized. In modern agriculture/farming, a drip irrigation is never combined with plastic, further to bring down evaporation, and is also a means of passing of fertilizer. The process is known as fertilization.



5 Conclusion

Solar/ Sun energy is easily available in India. In rural area electricity is not available easily but solar/sun energy is easily and freely available for the irrigation purpose to sprinkle the water. So, by using Automatic solar water sprinkler we will be able to conserve the water and also electricity and hence reduce the human work and money.

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