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Water Sprinkling Robot for Agriculture

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Abstract
Water plays a significant role among other existing natural resources. The daily demand for water supplies is increasingly on the rise as the population grows.To minimize the consumption of water in agricultural industry, several proposals were suggested. So, a robot-based irrigation system has been proposed to improve the performance of the system. To minimize the water usage for cropsin agricultural industry, an water sprinkler robot has been developed which can be used in this industry. There will be a vehicle type structure by which sprinkling work will be done. There will be four wheels in the base for motion. A nozzle will be fitted tosprinkle water with a jet by the centrifugal pump. DC supply will be required for whole operations. Whole Power will be harvested as Solar Energy by SolarPanel fitted with this project. Solar Panel will charge batteries in day time by which water sprinkling will be done using pump.

Key Words:
Water Sprinkling, Agriculture, Robot

Introduction:

Sprinkler robots are playing an important function inside the agriculture area asit does now not require extra people to perform and might shop lots of charges and time for watering vegetation each day. Hence, this mission is all approximately developing a sprinkler robot which is supplied with solar electricity. The boundaries of water sources and global population growth hasled states and governments global to boom agricultural merchandise consistent with unit and optimize soil and water sources productiveness with the use of new irrigation methods. India is agrarian economies and most of rural populations rely on agriculture to earn their livelihood. The farming methods at present are guide or semi-automated with excessive involvement of employees. In the latest years, the number of hard work availability is decreasing constantly along with growth of their wages. There is a requirement of higher productiveness. Hence the tool is to be designed which allows farmers to overcome the said problem. This robotic can offer us the answer. The essential application of robots in the business zone has been concerned with the substitution of manual human hard work via robots or mechanized systems to make the work more time green, accurate, uniform and much less costly. The farmer's benefits are found in greater green preservation of the plants and both less work for themselves or a reduced need for the employment of others.challenge presents the design and creation of an self-sustaining robot that seeks to address some of the human health worries associated with farms. This robotis designed as a base for growing systems to enable the automation of farming techniques such as the spraying of water, cattle watering, irrigation and metropolis water deliver.

Power supply is the circuit from which we get a desired dc voltage to run the other circuits. The voltage we get from the main line is 230V AC but the other components of our circuit require 5V DC. Hence a step-down transformer is used to get 12V AC which is later converted to 12V DC using a rectifier. The output of rectifier still contains some ripples even though it is a DC signal due to which it is called as Pulsating DC. To remove the ripples and obtain smoothed DC power filter circuits are used. Here a capacitor is used. The 12V DC is rated down to 5V using a positive voltage regulator chip 7805. Thus a fixed DC voltage of 5V is obtained.

This includes 78xx voltage regulators. The most commonly used ones are 7805 and 7812. 7805 gives fixed 5V DC voltage if input voltage is in (7.5V-20). You may sometimes have questions like, what happens if input voltage is <7.5 V or some 3V, the answer is that regulation won't be proper. Suppose if input is 6V then output may be 5V or 4.8V, but there are some parameters for the voltage regulators

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like maximum output current capability, line regulation etc. won't be proper. Remember that electronics components should be used in the proper voltage and current ratings as specified in datasheet. You can work without following it, but you won't be able to get some

Parameters of the component.
Negative voltage regulators
Mostly available negative voltage regulators are of 79xx family. The mainly available 79xx IC's are 7905,7912 1.5A output current, short circuit protection, ripple rejection are the other features of 79xx IC's.
Crystalline silicon modules Most solar modules are currently produced from silicon photovoltaic cells. These are typically categorized as mon ocrystalline or polycrystalline modules. Rigidthin-filmmodules

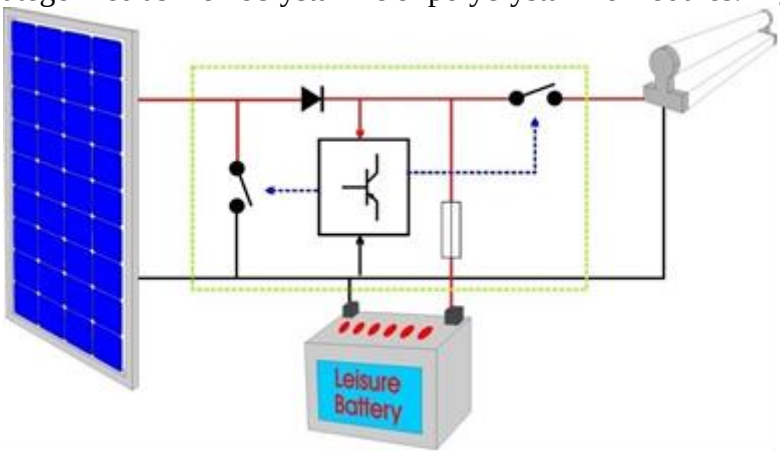

Figure no-1 Charge Controller

The principle behind a solar charge controller is simple. There is a circuit to measure the battery voltage, which operates a switch to divert power away from the battery when it is fully charged.Because solar cells are not damged by being short or open-circuits, either of these methods can be used to stop power reaching the battery Optionally there may also be a switch which automatically disconnects the power from the appliances or loads when the battery voltage falls dangerously low. This is known as a low-voltage disconnect function.

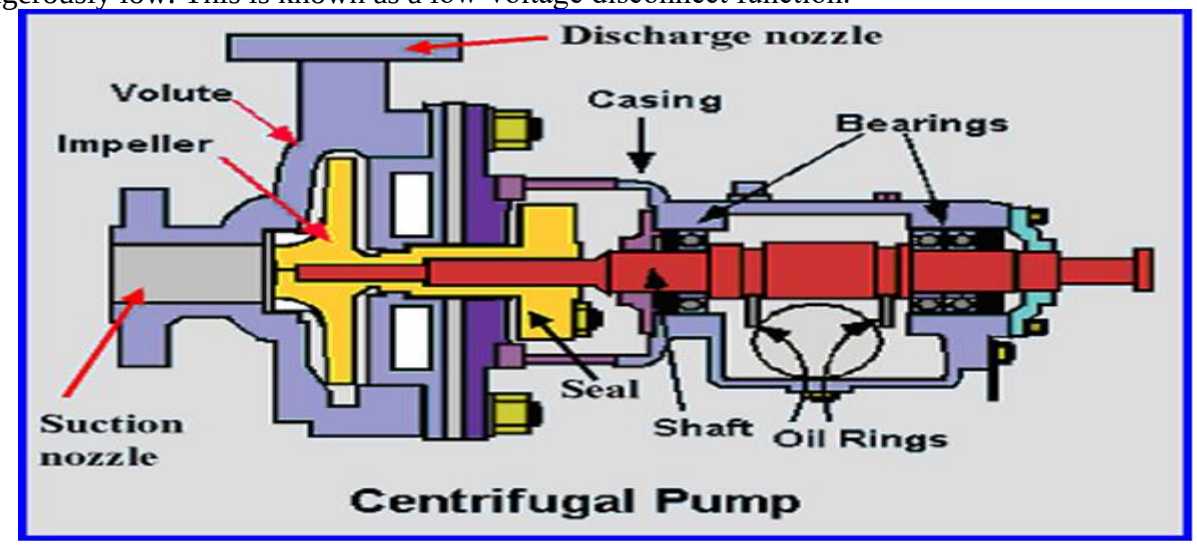

Fig-2: Centrifugal Pump

Centrifugal pumps are used to induce flow or raise pressure of a liquid. Its working is simple. At the heart of the system lies impeller. It has a series ofcurved vanes fitted inside the shroud plates. The impeller is always immersed in the water. When the impeller is made to rotate, it makes the fluid surrounding it also rotate. This imparts centrifugal force to the water particles, and water moves radially out.

Since the rotational mechanical energy is transferred to the fluid, at the discharge side of the impeller, both the pressure and kinetic energy of the water will rise. At the suction side, water is getting displaced, so a negative pressure will be induced at the eye. Such a low pressure helps to suck fresh water stream into the system again, and this process continues.
The negative pressure at the eye of the impeller helps to maintain the flow in th system. If no water is present initially, the negative pressure developed by the rotating air, at the eye will be negligibly small to suck fresh stream of water. As a result the impeller will rotate without sucking and discharging any water content.

Conclusion:
Solar power is pollution free and causes no greenhouse gases to be emittedafter installation, Reduced dependence on foreign oil and fossil fuels.Renewable clean power that is available every day of the year, even cloudydays produce some power.Return on investment unlike paying for utility bills.Virtually no maintenance as solar panels last over 30 years. Creates jobs by employing solar panel manufacturers, solar installers, etc. andin turn helps the economy.Ability to live grid free if all power generated provides enough for the home /building.

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