SOLAR OPERATED AGRICULURAL THREE IN ONE MACHINE (WATER SRAYER,WEEDER,SEED SOWIER)

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ABSTRACT:

Agricultural applications suitable for photovoltaic (PV) solutions are numerous.These applications are a mix of individual installations and systems installed by utility companies when they have found that a PV solution is the best solution for remote agricultural need such as water pumping for crops or livestock. A solar powered water pumping system is made up of two basic components. These are PV panels and pumps. The smallest element of a PV panel is the solar cell. Each solar cell has two or more specially prepared layers of semiconductor material that produce direct current (DC) electricity when exposed to light. This DC current is collected by the wiring in the panel. It is then supplied either to a DC pump, which in turn pumps water whenever the sun shines ,or stored in batteries for later use by the pump.

Today's era is marching towards the rapid growth of all sectors including the agricultural sector. To meet the future food demands, the farmers have to implement the new techniques which will not affect the soil texture but will increase the overall crop production. This paper deals with utilization of solar energy and it is converted into the chemical energy, which is used to drive the different units of the system. In this paper we had tried to explain how the different agriculture equipments are combined and work together efficiently with reducing the manufacturing cost which will be in affordable beget.

Keywords— Hopper,Spraying machine,Solarcell,DCMotor,weeder ,12v Battery,Seed Sower,DC Pump

I. INTRODUCTION:

Agriculture has been the backbone of the Indian economy and it will continue to remain so for a long time. It has to support almost 17 percent of world population from 2.3 percent of world *geographical area and 4.2 percent of* world's water resources. The present cropping intensity of 137

percent has registered an increase of only 26 percent since 1950-51. The net sown area is 142 Mha.It is common to use diesel fuel to power generatorsin agricultural operations. Which causes a pollution to the environment by fumes and noise. While thesesystems can provide power where needed seperately like sprayer,weeder and seed sower

The basic objective of sowing operation is to put the seed and fertilizer in rows at desired depth and spacing, cover the seeds with soil and provide proper compaction Over the seed. The recommended row to row spacing, seed rate, seed to seed spacing and depth of seed placement vary from crop to crop and for different agricultural and climatic conditions to achieve optimum yields and an efficient sowing machine should attempt to fulfill these requirements. In addition, saving in cost of operation time, labor and energy are other advantages to be derived from use of improved machinery for such operations. A traditional method of seed sowing

II. LITERATURE SURVEY:

1.Solar Sprayer - An Agriculture Implement

In these journel studied briefly about sprayer working princples and phasing difficults in the normal diesel sprayer machine.

2.Solar Operated Automatic Seed Sowing Machine

In these journel studied briefly about automatic seed sowing machine by operated various types especially by using a solar power to operate machine.

3.Three-In-One Agricultural Vehicle System

In these journel studied briefly to known about information clearly by various operations combine in one machine a basic idea to evaluate reduce the cost of individual machine operation in single machine.

4. SOLAR POWERED WATER PUMPING SYSTEMS

In these journel studied briefly about water sprayer facing problems by cost and causes of using fuel diesel to polluting environment by pumping chemical for spraying.

5.SOLAR POWERED SEED SOWING MACHINE

In these journel studied briefly about seed sowing operation plant wastage of crop seeds on heavy vechicles with wastage of time in farmers mostly by seed sowing opeartion with proper spacing for growth plants.

III. COMPONENTS :

1. Battery
2. Electric dc Motor
3. Electric dc pump
4. Solar panel
5. Weeder blades
6. Seed sowier
7. Ball bearings
8. Chassis or Metal frame

1) BATTERY:

In isolated systems away from the grid, batteries are used for storage of excess solar energy converted into electrical energy. The only exceptions are isolated sunshine load such as irrigation pumps or drinking water supplies for storage. In fact for small units with output less than one kilowatt. Batteries seem to be the only technically and economically available storage means. Since both the photo-voltaic system and batteries are high in capital costs. It is necessary that the overall system be optimized with respect to available energy and local demand pattern.We use lead acid battery for storing the electrical energy from the solar panel for lighting the street and so about the lead acid cells are explained below.

FIG NO : 1

Battery Specifications:

Capacity : 12V and 7.3 Amps
Rechargeable battery one : yes
Charging time : 3 hour.
O/p Power : 84 watt
Operating voltage : 12 V
Current : 7.3 amps.
Weight of battery : 2 kg
Type of battery : LEAD-ACID WET CELL

2) ELECTRICAL D.C MOTOR:

The electrical motor is an instrument, which converts electrical energy into mechanical energy. According to faraday's law of Electromagnetic induction, when a current carrying conductor is placed in a magnetic field, it experiences a mechanical

force whose direction is given by Fleming's left hand rule.

Constructional a dc generator and a dc motor are identical. The same dc machine can be used as a generator or as a motor. When a generator is in operation, it is driven mechanically and develops a voltage. The voltage is capable of sending current through the load resistance. While motor action a torque is developed.

Specifications of dc motor :

Volt– 12 V

Ampere – 2.1 amps

3) ELECTRICAL D.C MOTOR PUMP:A pump is a device used to raise, compress, or transfer fluids. The motors that power most pumps can be the focus of many best practices. It is common to model the operation of pumps via pump . Pump curves offer the horsepower, head, and flow rate figures for a specific pump at a constant rpm. System curves describe the capacity and head required by a pump system.

Specifications of dc pump :

Volt – 12 V

Ampere – 2.1 amps

4) SOLAR PANNEL:

Solar panel refers either to a photovoltaic module, a solar hot water panel, or to a set of solar photovoltaic (PV) modules electrically connected and mounted on a supporting structure. A PV module is a packaged, connected assembly of solar cells. Solar panels can be used as a component of a larger photovoltaic system to generate and supply electricity in commercial and residential applications. Each module is rated by its DC output power under standard test conditions (STC), and typically ranges from 100 to 320 watts. The efficiency of a module determines the area of a module given the same rated output – an 8% efficient 230 watt module

Specifications of a Solar panel:

Power– 10 watt
Size – 2*2.5
Weight of panel – 1.6 kg
Volt - 6v

5) WEEDER BLADES :

Weeder blades are the parts which are directly having an interaction with the soil and are having high impact on the weeding operation. The weeder blades are made up of mild steel. Generally weeder blades are connected to a shaft by means of permanent welding. But

in this rotary type solar powered weeder, blades are attached to a flange mounted on a rotating shaft usually with bolts and nuts. The blades of two units of rotary cutting blades are used for weeding operation. Each unit consists of inclined angular shaped blades connected in orthogonally opposite direction on a rotary flange which is attached to shaft.

6) SEED SOWIER :

The basic objective of sowing operation is to put the seed and fertilizer in rows at desired depth and seed to seed spacing, cover the seeds with soil and provide proper compaction over the seed.

7) ROLLER BEARING :

The bearings are pressed smoothly to fit into the shafts because if hammered the bearing may develop cracks. Bearing is made upon steel material and bearing cap is mild steel.Ball and roller bearings are used widely in instruments and machines in order to minimizefriction and power loss.

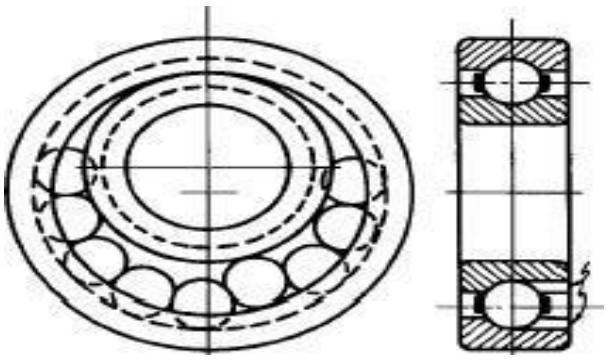
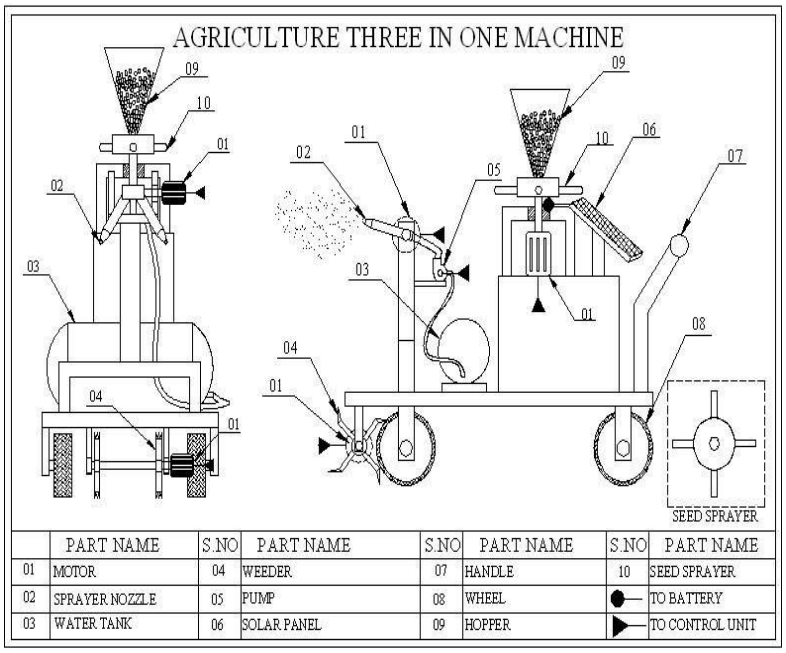


FIG NO: 2

8) METAL FRAME:

The metal frame is generally made of **mild steel** bars for machining, suitable for lightly stressed components including studs, bolts, gears and shafts. It can be case-hardened to improve wear resistance.The frame is the most important part of this machine shown in Fig. 4. The top part of the frame holds handle and at the bottom end the chasis is arranged to fix the Dc motor,Dc pump, weeder setup, seed sowier setup, water tank, solar pannels, and battery on the fame. Arrangements are made on the handle to fix the solar panel and to hold the speed controller. The chain sprocket mechanism is fixed below the chasis of the fame with the support of two pedestal bearings at both the ends of the chasis for seed sowier setup. Four wheels are connected to the frame for moving .

SYSTEMATIC DIAGRAM:



	PART NAME	S.NO	PART NAME	S.NO	PART NAME	S.NO	PART NAME
01	MOTOR	04	WEEDER	07	HANDLE	10	SEED SPRAYER
02	SPRAYER NOZZLE	05	PUMP	08	WHEEL		TO BATTERY
03	WATER TANK	06	SOLAR PANEL	09	HOPPER		TO CONTROL UNIT

IV. CONSTRUCTION AND WORKING :

Construction of spraying machine:

It consists of solar plate, battery, on off switch, centrifugal pump fluid caring pipe or tube, nozzle, fluid containing tank, one 12 volt dc motor, power transmitting wire.

Working of spraying machine:

In our project all the components are placed on the base frame. There are four wheels to move this machine. The spraying nozzle is coupled with the motor to spray for moving the nozzle. Then the water is pumped from the water tank to the sprayer nozzle.

Construction of Weeder machine:

It consists of dc motor, cutting blades, switch, solar plate, battery, adjusting stand for weeder setup.

Working of Weeder machine:

The solar energy trapped in the solar plate is stored in the battery. This energy is given to the motor due this the motor start running. The weeder is fixed in front of the machine and it is rotating with the help of the motor.

Construction of seed sowier machine: It consists of rotary seed separate setup, solar plate,roller bearings,shaft, battery, dc motor, seed hopper, switch, adjusting rod.

Working of Seed Sowing machine:

The hopper and the motor setup is used for sowing the seeds. Seed sprayer set up consists of six pipes around the main in right angle to each other. The seed sprayer is used for spraying the seeds over the land.Seed sowing machine is a device which helps in thesowing of seeds in a

desired position.All motors are taken the energy from the storage battery. The battery is charged by the sun light by using the solar panel which is attached in this vehicle. After all the motors are switched ON, then the vehicle can be moved manually over the agricultural field. When the vehicle is started to move, at first the weeder will plough the field and the water is sprayed over it. Then seed is sprayed after that to the plowed field. This process will be continuously done. Then vehicle can be moved wherever we want to move in the agricultural field.

V. ADVANTAGES :

1. Low cost
2. Easy to operate
3. Usage of solar energy
4. Low power consumption
5. Reduced man power

VI. APPLICATIONS :

It can be used by all farmers such that they avoid diesel sprayers and without any maintenance cost, they can use it.

VII. CONCLUSION :

This project is made with pre planning, that it provides flexibility in operation.This innovation has made the more Desirable and Economical. This project "SOLAR OPERATED AGRICULUTURAL THREE IN ONE MACHINE" is designed with the hope that it is very much economical and help This project helped us to know the periodic steps in completing a project work. Thus we have completed the project successfully.

VIII. PHOTOGRAPHY :

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6. DEVELOPMENT OF SOLAR POWERED SEED SOWING AND FERTILIZER SPRAYING MACHINE

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