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SOLAR POWERED SEED SOWING MACHINE

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Abstract

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 the various sowing methods used in India for seed sowing and fertilizer placement. The comparison between the traditional sowing method and the new proposed machine which can perform a number of simultaneous operations and has number of advantages. As day by day the labor availability becomes the great concern for the farmers and labor cost is more, this machine reduces the efforts and total cost of sowing the seeds and fertilizer placement.

Key words: Seed Sowing, Agricultural Sector, Solar Powered, Portable, Motor, Solar Panel, Battery, Microcontroller, Display, IC, Wheel, Hopper, Iron Plate, Springs.

1. 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. 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 has many disadvantages. This paper is about the different types of methods of seed sowing and fertilizer placement in the soil And developing a multifunctional seed sowing machine which can perform simultaneous operations.



2. LITERATURE SURVEY

Mahesh R. Pundkar [1] stated that the seed sowing machine is a key component of agriculture field. high precision pneumatic planters have been developed for many varieties of crops, for a wide range of seed sizes, resulting to uniform seeds distribution along the travel path , in seed spacing.

P.P. Shelke [3] concludes that bullock drawn planters are becoming necessity for sowing as the skilled workers for sowing are almost diminishing. Planting distance and plant population are crucial factors in maximizing the yields of crops.

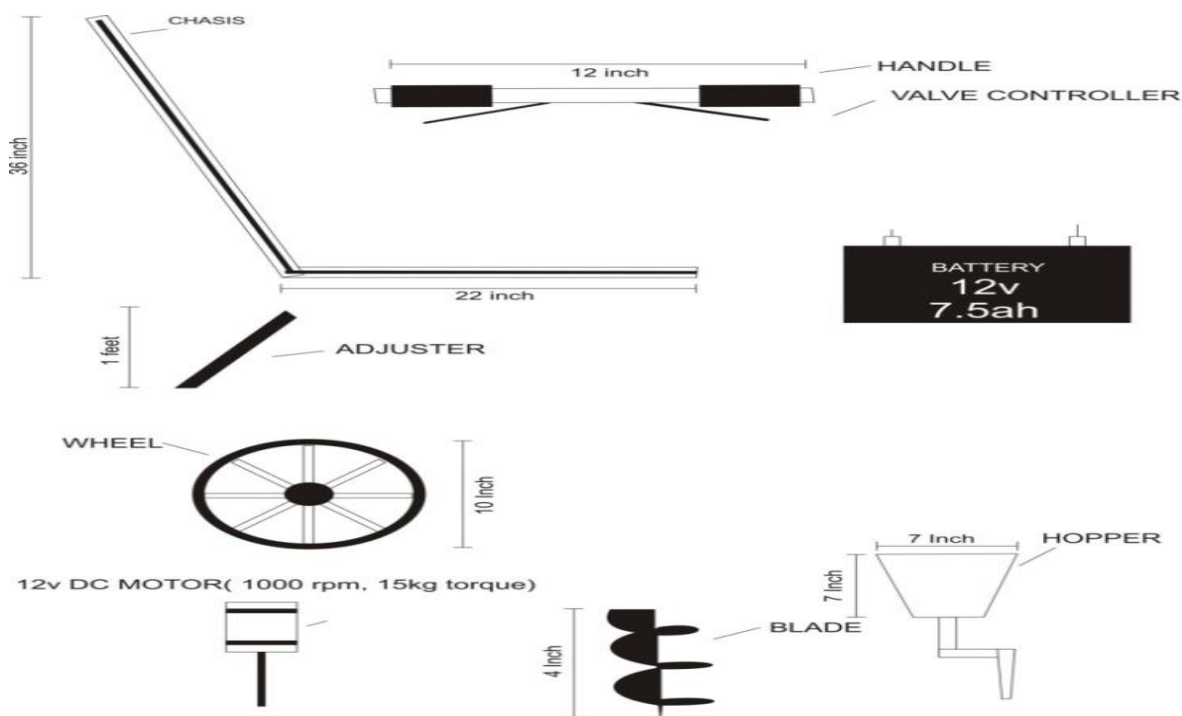
Singh (1971)[4] revealed that by using a seed drill for wheat crop there was an increase in yield by 13.025 percent when compared with the conventional method, it also revealed that by using a seed drill for wheat crop, a saving of 69.96 per cent in man-hours and 55.17 percent in huloock hours was achieved when compared, with the conventional method.

Umed Ali Soomro at al. [4] in Pakistan has evaluated three sowing methods and seed rate in a four replicated RCBD method and concluded that drilling method of sowing at seed rate 125 kg/ha is optimal for yield and quality of wheat grains, because the said sowing method and seed rate distribute seed uniformly and desired depth which provide appropriate depth for seed germination and crop establishment.

3. MODULES

The block diagram consists of four main parts. These are:

- Chassis
- PCB
- Drill
- Battery
- Electric Motor
- Solar panel



**Chassis:-**

A consists of an internal framework that supports a man-made object in its construction and use. It is analogous to an animal's skeleton. An example of a chassis is the under part of a motor vehicle, consisting of the frame (on which the body is mounted). If the running gear such as wheels is included then the assembly is described as a rolling chassis.

Material Used In Chassis - Iron

Size of Chassis – 22 inch x 8 inch x 36 inches

PCB:-

A printed circuit board (PCB) mechanically supports and electrically connects electronic components using conductive tracks, pads and other features etched from copper sheets laminated onto a non-conductive substrate. PCBs can be single sided (one copper layer), double sided (two copper layers) or multi-layer. Conductors on different layers are connected with plated-through holes called vias. Advanced PCBs may contain components - capacitors, resistors or active devices - embedded in the substrate. Printed circuit boards are used in all but the simplest electronic products.

Drill Bits:-

Drill bits are cutting tools used to create cylindrical holes, almost always of circular cross-section. Drill bits come in many sizes and have many uses. Bits are usually connected to a mechanism, often simply referred to as a drill, which rotates them and provides torque and axial force to create the hole.

The shank is the part of the drill bit grasped by the chuck of a drill. The cutting edges of the drill bit are at one end, and the shank is at the other.

18000 RPM base motor

6mm Dia shaft with M3 thread hole

Length 63 mm without shaft

Shaft length 30mm

12kgcm torque

Battery:-

An electric battery is a device consisting of one or more electrochemical cells that convert stored chemical energy into electrical energy. Each cell contains a positive terminal, or cathode, and a negative terminal, or anode. Electrolytes allow ions to move between the electrodes and terminals, which allows current to flow out of the battery to perform work.

Battery: 7.5 Amp Hour 12 Volts Sealed Lead Acid Battery

Electric Motor:-

An electric motor is a device used to convert electrical energy to mechanical energy. Electric motors are extremely important in modern-day life.

The basic principle on which motors operate is Ampere's law. This law states that a wire carrying an electric current produces a magnetic field around itself.

- Motor Diameter 28.5 mm
- 300 RPM base motor
- No-load current = 800 mA,
- Load current = up to 7.5 A(Max)

Solar panel:-

Solar panels are a great way of cutting your electricity

We all want to live self-sustainably, or at least reduce the carbon footprint of our home, and solar panels make that dream possible.

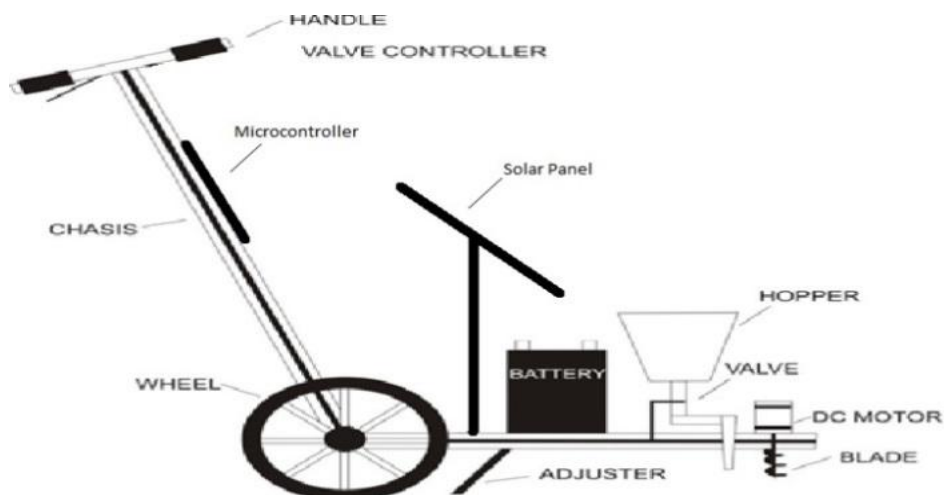
Solar panels are made of photovoltaic (PV) cells, which turn sunlight into electricity. This electricity can then be fed into your home's mains electricity supply.



The technology behind solar is relatively old, despite their futuristic appeal, but while the basics are the same the efficiency of solar panels has improved greatly in recent years.

Rated power 15W
 Frame Heavy duty aluminum
 Kind of connection waterproof junction box, can be customized
 Guarantee of power 90% within 10 years 80 within 25 years, Kind of glass and its thickness Low Iron,
 high transparency tempered glass of 3.2mm
 SLA Battery Voltage 12V
 12 inch x 18 inch

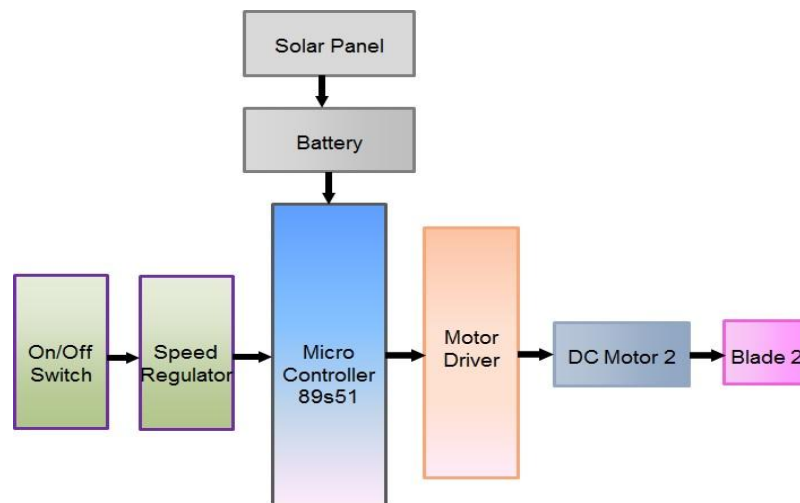
4. WORKING ARCHITECTURE



This solar powered seed sowing machine basically works on “**VERTICAL-DISCONTINUOUS WORK PRINCIPLE**” Which refers to the vertical movement which can be followed by an individual body in an agricultural field and implements its discontinuous action in relation to the horizontal line of work.

As per name indicate this machine is used for sowing seed.
 Which includes:-

- Drill the ground
- Sow seed inside the drilled hole.
- Cover that hole with the help of adjuster.



Firstly a hole is drilled with the help of a 4 inch land drill bit having shaft diameter of 7 mm and Diameter of edges - 25 mm
With a Depth of cut of - 76.2mm

This is run with the help of motor of 300 RPM and 12 kg-cm torque. This is connected to 12 V and 7 A DC battery. This is directly connected to the solar panel through which it gets charged. This motor is controlled by a 8 bit microcontroller .with help of which it can be start and stop .and we can also control the clockwise and anticlockwise motion of motor.

For dropping seed we are using a hopper which is mounted behind motor show in figure above and a lever arrangement is provided on handle when this lever is pressed seed will be dropped automatically from hopper travel into a pipe attached to it and dropped in hole. An adjustable Iron plate is fitted in rare side of machine which will collect soil and cover the land with is drilled.

In this way seed sowing is done with this machine.

5. FUTURE SCOPE

- Introduction of Cutter in place of drill can be used as grass cutter equipment.
- Using remote control machine can be made automatic.
- Addition of multi-hopper can be attached side by side for sowing of large farm.
- Water dripping unit could be included in seed sowing machine.

6. ADVANTAGES

- It maintains the proper row spacing.
- The seeds can be placed at proper depth.
- Seed rate can be controlled.
- Many seeds can be sown by this machine.
- Mixed cropping can be easily done.
- Due to small size machine is portable. And can also be used in small area.
- Cost efficient.
- Less Man Power will be used.
- Decrease the disturbance of the agricultural soil by 98%
- Improve agricultural soil carbon sequestration
- Save energy, money and time of a farmer.



7. CONCLUSION

Innovative Seed sowing equipment's has remarkable influence in agriculture. By using this innovative project of seed sowing equipment we can save more time required for sowing process and also it reduces lot of laborer cost. It is very helpful for small scale formers.

After comparing the different method of seed sowing and limitations of the existing machine, it is concluded that the this solar powered seed sowing machine can

- Maintain row spacing and controls seed rate.
- Control the seed depth and proper utilization of seeds can be done with less loss.
- Perform the various simultaneous operations and hence saves labour requirement so as labour cost, labour time and also save lots of energy.

Hence it is easily affordable by farmers.

So we feel that this project serves something good to this world and we would like to present it before this prosperous world.

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