

Solar Powered Seed Sowing Machine by Using Remote Control

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Abstract- Now a day's marching toward the rapid growth of all sectors including the agricultural sector. To get 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. The main motive of this project is to design and develop a solar operated seed sowing machine. The seed sowing machine is a key component of agricultural field. The different techniques used in India for seed sowing and fertilizer placement are manual, ox and tractor operator etc. The old techniques are time consuming and productivity is low. Tractor is operates on fossil fuel which emits carbon dioxide and other pollution every second. This coherent has led to widespread air, water and noise pollution and most importantly has led to a realistic energy crisis in the near future, in order to make the development of our farmer as well as nation sustainable and cause less harm to environment. Now the approach of this project is to develop the seed sowing machine which is to minimize the efforts as well as operate on clean energy. In this machine solar panel is used to absorbed solar energy and then it is converted into electrical energy which in turn is used to charge 12V battery, which then gives the necessary power to a DC geared motor. This power is then transmitted to the DC geared motor to drive the wheels. And to further reduction of labor dependency, RF sensors are used to maneuver remote in the field. Here 4 limit switch are used to define the direction, steering control, controlling of seed feeder mechanism, etc. Seed sowing machine can be completely operate on remote.

Keywords: Seed Sowing, Solar Panel, RF Sensor, DC Geared Motor.

1. INTRODUCTION

At present many countries have shortage of skilled labor in agriculture sector, which affects the growth rate of the developing countries including India which hugely depends on agriculture sector. As the population of India is rising, demand of food is also escalating which leads to higher crop production per hectare. So, to fix these problems farmers should use latest technological advancements for the various agricultural practices like digging, sowing, irrigation etc., which are more efficient. In this project we design a solar power seed sowing machine with remote control. The main work of sowing operation is to sow seeds at required depth with specific spacing between the two rows of sowed seeds. This can be achieved with the help of seed sowing machine which will dig the furrow and sow the seeds. After the seeds being placed in the furrow land, it will cover the sowed seeds with soil. Seed sowing machine saves labour requirement, thus saving a lot of money along with the assurance of proper seed broadcasting. From past few years, it has been thought that atomic energy would be a solution for the growing energy problem, but now a days solar energy has proved to be an efficient, more secure and safe way of providing energy. Solar panel is used to capture solar energy and then it is converted into electrical energy. This energy is used to charge 12V battery which is utilized to provide the power to DC geared motors. Remote is used to control all the operation of machine. The type of remote is transmitter and receiver type. By using this innovative project of solar power seed sowing machine with remote control we can save fuel required for sowing machine and it also reduces laborers cost. Also this project is pollution

free. This machine controls the seed depth and proper utilization of seeds to reduce the wastage of seeds.

2. BACKGROUND

The following are the three different types of seed sowing which are used in past few years.

2.1. Broadcasting

A field is initially prepared with a cultivate to a series of linear cuts known as furrows. The field is then seeded by throwing the seeds over the field, a method known as manual broadcasting. The result was a field planted roughly in rows, but having a large number of plants. When the seeds are sparse randomly with the help of hand on the soil, the method is called broadcasting.

2.2. Dribbling

Drill sowing and dribbling are better method of sowing the seeds. Once the seeds are put in the holes, they are then covered with the soil. This saves time and labor and prevents the damage of seeds by birds.

2.3. Traditional

In traditional methods includes broadcasting manually opening furrows by a cultivator and dropping seeds by hand and dropping seeds in the furrow through a bamboo funnel attached to a cultivator. For sowing in small areas dibbling i.e. making holes or slits by a stick or tool and dropping seeds by hand, is practiced. number of row traditional seeding device with manual metering of seeds are quite popular with experienced farmers.

3. LISTS OF COMPONENTS

The machine consists of the following components:

- Frame
- Seed Hopper

- Chassis
- DC geared motor
- Wheel
- Cultivator
- Lead acid battery
- Solar controller
- Shaft
- Remote (Transmitter-Receiver)
- Cultivator
- Crown and pinion
- Mud guard

4. CONSTRUCTION

4.1. Frame

Frame is made up of cast iron material to reduce the vibrations of machine and to bear the weight of the component mounted on it. The specifications of frame are dimension of frame: 45”×19”×35.5”

4.2. Chassis

Chassis is used in machine to mount the internal component of machine. The specification of chassis is dimension of chassis: 27”×5”.

4.3. Crown and Pinion

The crown and pinion gear format is also known as the rack and pinion gear, and it converts the mechanically



Figure 6.1:- Working Module

motion and rotational motion into linear motion.

Dimension of crown and pinion No. of teeth of crown = 88, No. of teeth of pinion = 20 Therefore geared ratio is, No. of teeth of crown/ no. of teeth of pinion = 88/20 Therefore, Geared ratio = 5/1 i.e., no. of teeth of crown = 5*no. of teeth of pinion So, Geared ratio is 1:5 Therefore from the above we know that, one revolution of crown is equals to the five times revolution of pinion.

4.4. DC Geared Motor

A gear motor is a type of electrical motor that is designed to produce high torque while maintaining a low horsepower. The gear assembly helps in increase the torque and reducing the speed. By using the correct combination of gears in a gear motor, its speed can be reduced to any desirable figure.

4.5. Lead Acid Battery

It consists electrochemical cells which convert stored chemical energy into electrical energy. This batteries feed supply to the DC geared motors. In this project two batteries are used. Specifications- Rated Voltage- 12V each, Capacity- 8 Ahr.

4.6. Solar Panel

Solar panel absorbs sunlight and converts this solar energy into electrical energy. Specifications- Rated Power- 40W, Dimension- 19”× 27”.

4.7. Remote

Remote is having the transmitter and receiver. HT12D and HT12E Ic’s are used.

4.8. Solar controller

The specifications of solar controller are Voltage of controller: 12/24 volt, Current: - 10 amp.

5. BLOCK DIAGRAM

Below figure shows the complete block diagram of solar powered seed sowing machine.

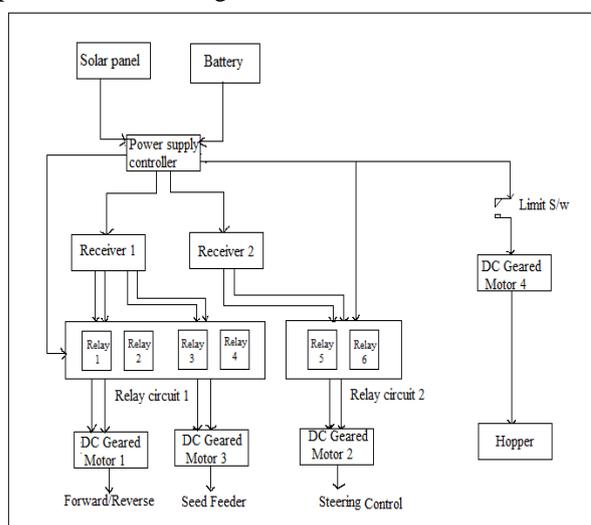


Figure 5.1. Block Diagram of Solar Powered Seed Sowing Machine by Using Remote Control.

It consists of solar panel which absorbed the solar energy and convert it into electrical energy. This solar energy is used to charge the battery. Input to solar controller is comes from solar panel. The main purpose of solar controller is to protect the reverse power flow. Two receiver circuits are used to receive the signal from transmitter. The output of receiver circuit is connected to relay circuit. The relay circuit is connected to DC geared motors. These motors are connected to mechanical parts for operation.

6. WORKING

In this machine a solar panel is used to capture solar energy and then it is converted into electrical energy which in turn is used to charge 12V battery, which then gives the necessary power to a DC geared motor.

In this project four DC geared motors are used. First motor is connected to the seed feeder mechanism which provides power to seed feeder mechanism. When this motor rotates, the seed in hopper fall on the soil. When machine change the direction, the rod of seed feeder is moving upward and

motor stop to rotate. Due to this reason a rod comes in between seed feeder and seed stop to fall. When this contact of seed mechanism touches the soil then and only then seed falls on the soil. Otherwise seed falling will stop. Power is then transmitted to the back wheel through crown and pinion. For the reverse and forward mechanism and one motor is used for the function of steering arrangement. i.e. front wheel operation. One small motor is used on hopper to rotate the small wheel on hopper for seed falling in the whole of seed hopper. Consequently, in this project an attempt is made to make the electric and mechanical systems share their powers in an efficient way. Remote is used to automatically control the machine. This is having four key buttons. Each button is having their own function. First button is used to move the machine forward, second button is used to move backward, third button is used to left and fourth button is used to move right direction. Any two buttons are used to start and stop the machine operation by matching the frequency of RF sensor.

7. CONCLUSION

Our machine which operates on solar power when compared to different traditional seed sowing methods, it can be concluded that: No pollution is caused, Economical, Variety of seeds can be sowed Hence after comparing the different method of seed sowing and limitations of the existing machine, it is concluded that the solar powered seed sowing machine by using remote control can: Proper utilization of seeds can be done with less loss, Saves labor requirement, labor cost, labor time, total cost of saving and can be affordable for the farmers.

Acknowledgment

The authors would like to express sincere gratitude to Pankaj Laddhad Institute of Technology and Management Studies Buldana , India for their help and support.

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