

SEMI-AUTOMATIC SPRAY MACHINE

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ABSTRACT

We made Semi-automatic spray machine has simple construction. This machine is used in agriculture sector, for spreading liquid fertilizers on the crops. The focusing of this project on to reduce the efforts of farmer. This machine is not physically hart the farmer as compare to normal spray pump. This machine is save the farmer from harmful fertilizer's which is come out at the time of spreading and others equipment's used as normal spray pump. This is the simple machine this machine can operate at standing position without moving.

Keywords: Brushless Dc Motor (BLDC), Relay(R), Microcontroller (MC), Battery (B).

I. INTRODUCTION

The Indian farmers are backbone for Indian economy, Approach from tech companies to small scale farmers is increasing day by day this is important aspect for those farmers cause of lack of skilled labors, water resource, crop monitoring and efficient fertilization devices. Existing technology are not suitable for small scale farmers and also it's not affordable from them. Then we made a simple semi-automatic spray machine which is used to spray fertilizers on different crops and used for different activities of farmers. And this machine has four wheels for running purpose, and four nozzles provided for spread fertilizers. A sprayer is a device used to spray a liquid, where sprayers are commonly used for projection of water, weed killers, crop performance liquids, and pesticide chemicals. In this machine we use two nozzle for spreading purpose and one extra nozzle for future expansion. Battery is an important part in our project. We can use lead acid battery. We can use 3 motors actually two motors which is installed at two back wheels for running purpose and one motor is installed at near the tank to spread the fertilizer through the nozzles. We can use two "BLDC" Motor at the two wheels. We give a tank to storage liquid fertilizer in the machine, and also two buzzers there are two buzzers. Using this machine Farmers efforts can less as compare to normal spray pump. It is suitable for spraying at minimum cost for the farmer so that they can afford it.

II. METHODOLOGY

The semi-automatic spray machine has simple construction. In this machine we use battery for providing power to the machine. And we use motors for running purpose and to spread the fertilizers from the nozzles. We use relays for switching purpose, and also we use buzzers for ringing purpose. When any distraction occurs in the path of machine then buzzer is ringing and also use microcontroller for sensing purpose. And we use tank to store the liquid fertilizers in the machine. When we on the battery switch. Then microcontroller gives the supply from battery and they closed the relays R1 and supply is start motor gives the supply and it start running and wheel is mechanically coupled with motor and wheel start rotating with his fixed speed. At the same time relay R2 gives supply from microcontroller when this relay is closed then controller gives supply which is used to control the speed of fertilizer's which is spread in the nozzles. Nozzles are T shaped and machine start spreading the fertilizers on the crops. And also they are run in the farm. Mostly in India we used the old method and equipment for the agriculture. For agriculture the pesticide and water is mostly required after the some interval of time to remove the insect from the agriculture land. In old equipment only one work has been performed at a time due to which the time as well as effort required is more. To remove the insect from the land we first put the pesticide and after that we give the water or another pesticide due to lack of technology.

In this machine we use wheels for running purpose .Due to this farmers efforts are less automatically. These wheels can run with the help of motor which is installed in the machine .and also we use battery for power. Also we use controller to cheek pesticides in the tank and other programming purpose. Such as when wheels are stop due to any reason then we installed buzzer start ringing. We installed two buzzers one is when wheel stop and other is when pesticides in the tank is less or empty. We can use nozzles which are "T" shaped .This nozzles spread fertilizers at a time 3or 4.

Battery

Battery is an important part in our project .we can use lead acid battery. This battery is used to provide power to the whole circuit which is operated in the battery. We can use two batteries to provided separate power to the machine and motor which is connected in tank and nozzles. This batteries are connected in parallel. This battery voltage is 12V. And 9 AH. These batteries charging method is used to constant voltage charging methods and this battery Initial current is less than 2A. And standby use is 13.6-13.8v. And cycle uses is 14.4-15.0v. The battery efficiency is 70 to 80%. This battery internal resistance is very low.

These batteries charge and discharge voltage is. -

- 1) 12.6 V the battery is 100% charge.
- 2) 12.4V the battery is 75% charge
- 3) 12.2V the battery is 50% charge.
- 4) 12.0V the battery is 25% charge.
- 5) 12.0V less voltage the battery is discharged.

Motors

Motors is an important part in our machine. We can use 3 motors actually two motors which is installed at two back wheels for running purpose and one motor is installed at near the tank to spread the fertilizer through the nozzles. We can use two "BLDC" Motor at the two wheels. In this BLDC motor Dc supply is used for motor start. In this motor starter is not required. This motor main two part starter and rotor. This motor does not have brushes. In this motor Maintenance very low. In this motor efficiency is more than 75%. This motors has long life. In this motor winding is mounted in starter. Motor used permanent magnet. Motor speed controlled by control the starter voltage. These motors can be operated by a remote to vary its Speed. And another motor is to connect to tank to suck the water in the tank and spread the liquid fertilizer

Nozzles

In this machine we use two nozzle for spreading purpose and one extra nozzle for future expansion. This nozzles is made up of cast steel. This nozzles are adjustable for future expansion. Basically nozzles are T shaped to spreading fertilizer on the crops and it helps to grow healthy crop in agriculture. At the time. When our vehicle/machine is running in the crops trench then by using a switch we start the motor which is connected to the nozzles by using of battery. Then nozzles start spreading. At that time when liquid fertilizer in the tank is low then we got a message in our mobile "The water is less ". And the buzzer was ringing. And the nozzles are adjustable at both side and also they are adjust upward and downward.

Tank

We give a tank to storage liquid fertilizer in the machine. This tank capacity is 20ltr this tank has cylinder in shape. In this tank we installed a water level indicator. When liquid fertilizer in the tank is low then buzzer starts ringing, and also at that time we give a message on our mobile "Water level is low ". And one motor is connected to the tank for spraying purpose. When we start the motor by using mobile then by using of nozzles. And one motor is connected to the tank to suck the water and spread the fertilizer through the nozzles.

Buzzers

We give two buzzers for ringing purpose. One buzzers is ringing when liquid fertilizers low and we give a message on mobile. This buzzer plays important role because Farmer operate it machine to stay at one position and suppose at mid-point the liquid in the tank is empty at that time buzzer start ringing. And another buzzer is for any distractions occurs in the path of machine then this buzzer can start ringing. We set this buzzer at the front of the machine.

Leaf sensor

This senator plays important role in our machine. The main work of this sensor is to sends the leaf and then spread it. If at any place the leaf/plant is not present then at that place the nozzles stop spreading and when machine is run forward then the nozzles start again. By using of this sensor farmer fertilizer can save. And this is the benefit in our machine. By using this machine farmer fertilizers don't waste. We installed this sensor at the side of machine.

III. MODELING AND ANALYSIS

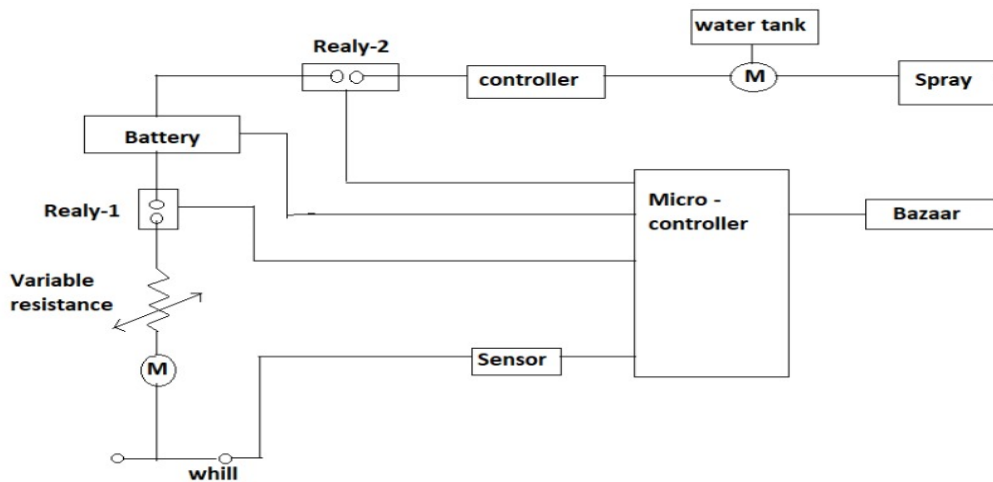


Figure 1: Block Diagram of machine.

IV. RESULTS AND DISCUSSION

This machine is simple in use for farmer's .the farmer can use this machine at standing only on position. One time Machine is start then automatically the motor which is connected to the tank is start and start spreading fertilizers through nozzles. There is two nozzle at both ends and this nozzles can adjusts as the line of crops and height is adjusted. And the machine can easily run in agriculture.



V. CONCLUSION

This is designed for small scale farmers and small gardens it is affordable for small scale farmers. It is reduce farmers efforts and it is easy to handle in dry and moist soil, ensure the proper fertilization the advantage of this spray machine is to utilize of resources and affordable management from manufacturers to customers this will also reduce human intervention.

VI. REFERENCES

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