

# Design and Fabrication of Automatic Seed Transplanter

Mr. Kare A. A.<sup>1</sup> Mr. Shelar Y. S.<sup>2</sup> Mr. Pawar A. B.<sup>3</sup> Mr. Patil A. S.<sup>4</sup> Prof. Shelke S. V.<sup>5</sup>

<sup>1,2,3,4</sup>B.E. Student <sup>5</sup>Assistant Professor

<sup>1,2,3,4,5</sup>Department of Mechanical Engineering

<sup>1,2,3,4,5</sup>PREC, Loni, SPPU, Pune, India

**Abstract**— Indian modern agriculture development does not have sufficient skilled labour to trade off new technology. The problem focused here is direct seeding. The manually operated seed sowing technique associates exposure of seeds to rats, birds and snails. So, it is mandatory to automate this sector and a progressive innovation becomes necessity for raising the demand on agro product quality. To give an elucidation to these problems, a sensor guided rover for digging, precise seed positioning and sowing has been proposed to reduce the human effort and also to increase the yield. The rover's navigation is performed by remote guiding devices fortified with the positioning system.

**Keywords:** Agriculture, Seed Sowing, Automatic Seed Sowing, Seed Transplanter

## I. INTRODUCTION

As we know economy dependency of our country is on agriculture. As India is agricultural country about 65 percent of peoples are farmers. In recent scenario number of changes are occurring in agriculture methodology like seed sowing, pesticides and irrigation. For developing our economical condition it must necessary to increase our agricultural productivity and quality also. Out of them Seed plantation is one of the most important and day-to-day job of the farmers. The conventional method for seeding is manual one but it requires more time and more efforts.

Manually seed plantation method suffers from various problems. The tendency of manual work is going on reducing. The man power shortage is one of the biggest problems faced continuously to all farmers. Due to labour shortage the plantation cost should be increased. So it is not economically beneficial for all farmers.

Now a day's instrumentation and control system plays an important role. So we develop a system for "seed plantation robot" using microcontroller which is very economical and beneficial. Due to automation the work become easiest, errorless and it saves money also.

Our system is nothing but the four tyre vehicle which is driven by geared DC motor. According to remote control, after some distance instant the seed should be dropped through the nozzle, which is operated by slider crank mechanism. Nozzle size is depends on the diameter of the seed. Same operation is repeated after same soil also. distance. So there is no more labor work. It dig the seed in Soil also.

## II. OBJECTIVES:

- 1) To make the machine simple so that semiskilled operator can operate.
- 2) To develop a planter to plant onion seed without damage to the seed.

- 3) To develop more efficient manually operated seed sowing machine to fasten the conventional sowing process.
- 4) To reduce total cost thereby using manually operated machine.
- 5) To achieve improvement in planting efficiency.
- 6) To develop simple construction & mechanism in manual operated machine.
- 7) To achieve proper seed to seed spacing and proper depth.

## III. CONSTRUCTION AND WORKING

### A. Frame

The L angle frame is used in this project. It is made up of mild steel. It is the main structure of the project. All the parts are mounted in the frame. Box type frame is used as a handle. The frames are joined by means of ARC welding. Cross members are added to increases the strength of the structure.



Fig. 2.1: Frame

### B. Seed Box:

It is made up of steel sheet. It is used to carry the seed. It is in rectangle shape. It is fabricated by means of ARC welding. In the bottom of the box seed sowing mechanism is attached.



Fig. 2.2: Seed Box

### C. Wheel

It is a circular component, Which is fixed in the axle with bearing. It is made up of rubber. Used for transporting purpose. It is primary function to transfer the load.



Fig. 2.3: Wheel

**D. Double Pole Double Throw switches (DPDT)**

It is one of the electrical switch. It is used change the direction of rotation of motor. It is operated manually. It is used for operating the light, motor etc., It can be operated by means of pressure, temperature sensors. This switch has 2 input and 4 output.

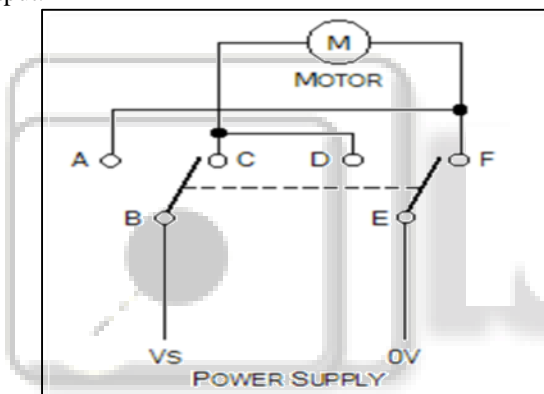


Fig. 2.4.1: DPDT circuit

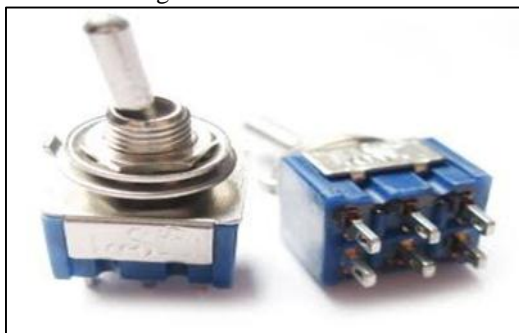


Fig. 2.4.2: DPDT Switch

**1) Specification**

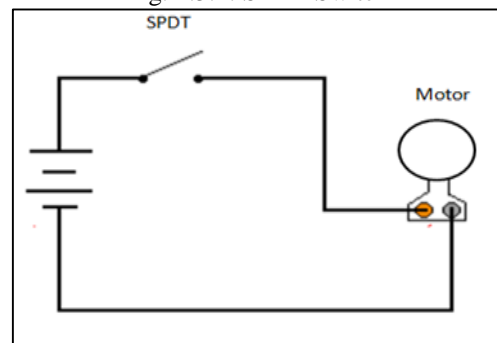
Pole and Throw: Double Pole Double Throw  
Actuator Type: Raised Handle  
Voltage: 12V  
Current Rating: 5A

**E. Single Pole Double Throw switches (SPDT)**

It is one of the electrical switch. It is used as a ON/OFF switches. Direction of current can't be controlled. It is operated manually. It is used for operating the light, motor etc., This switch has 1 input and 2 output.



Fig. 2.5.1: SPDT Switch



**1) Specification**

Pole and Throw: Single Pole Double Throw  
Actuator Type: Raised Handle  
Voltage: 12V  
Current Rating: 5A

**F. DC Motor with speed controller:**

A DC motor is any of a class of rotary electrical machines that converts direct current electrical energy into mechanical energy. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodically change the direction of current flow in part of the motor. DC motors were the first type widely used, since they could be powered from existing direct-current lighting power distribution systems. A DC motor's speed can be controlled over a wide range, using either a variable supply voltage or by changing the strength of current in its field windings. Small DC motors are used in tools, toys, and appliances.



Fig. 2.6: DC Motor

**G. Seed Meter Mechanism**

Seed metering devices are those devices that meter the seed from the seed box and deposit it into the delivery system (plunger) that conveys the seed for placement.

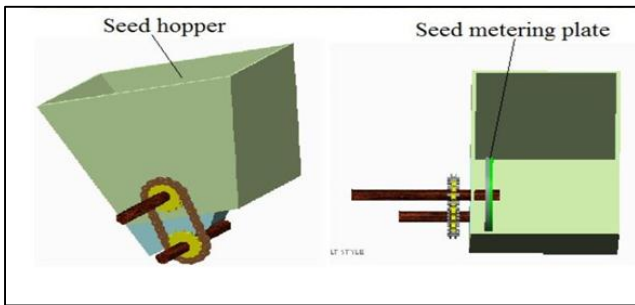
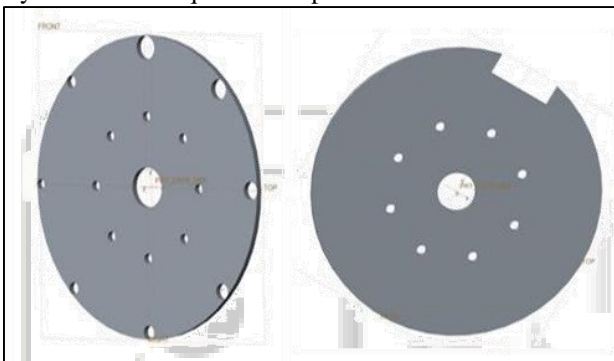


Fig. 2.7: Seed metering mechanism

Functional requirements of seed metering devices:

- 1) Meter the seed at a predetermined rate/output (e.g. kg/ha or seeds/meter of row length).
- 2) Meter the seed with the required accuracy (spacing) to meet the planting Pattern requirements.
- 3) Cause minimal damage to the seed during the metering process.

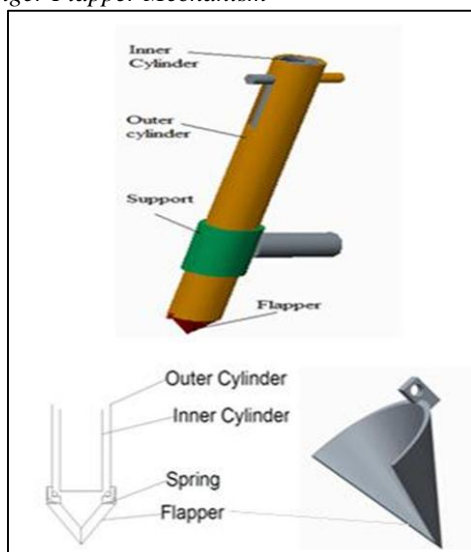
All function can be fulfilling by using one plate as shown in figure. Cover plate is used to cover remaining hole on seed metering plate because at a time for one revolution of shaft only one seed is required to deposit.



#### H. Plunger Mechanism

Plunger mechanism as shown in figure is used for digging and seeding. Plunger itself is used as digging tool and spring mechanism for predefined timing seeding. Plunger is pushed by the cam which is synchronized with lever fulcrum mechanism. Plunger has a flapper for opening into the cavity for seeding.

##### 1) Plunger Flapper Mechanism



#### IV. WORKING PRINCIPLE

It works on simple mechanism, a battery operated D.C. motor is used transmits the rotary motion to the shaft with the help of chain drive, and there is another connection of sprocket and chain to the seed meter for the rotary motion. When the farmer puts seeds into the hopper, seed drops into the seed meter which is control by the slider crank arrangement mounted on the assembly. As the seed meter rotates, seed drops in the seed pipe, which is connected to the flaper opener for the seeding; there is flaper closer for covering the seeds by soil.

#### V. ADVANTAGES

- 1) This machine can be operated by semi-skill
- 2) It is affordable to all type of farmers.
- 3) The placement and removal of seeds in the machine was made simple.
- 4) The time and money wasted in conventional processes we saved.
- 5) Controlled seed flow.
- 6) Minimum labors were required.
- 7) Easy to transport.
- 8) Easy to change direction of machine while working

#### VI. CONCLUSION

The main focus of this system is its Automatic way of sowing the seeds. The seeds are been sowed in a proper sequence which results in proper germination of seeds. This automatic way of sowing seeds using a robot reduces the labor requirement. Here the wastage of seeds is also been reduced to a greater extent. This system has been developed for the sowing of seeds in an automatic way. Here with the help of a robot the seeds are been dispensed in the soil in a proper sequence hereby reducing the wastage of seeds The planting process of the onion crop only has been implemented by using this Seed Sowing V robot autonomously. This robot will help the farmers to do the farming process efficiently. The project can be enhanced to any other kinds of crop such as fruits, paddy, sugarcane etc. The robot can be designed with chain roller instead of normal wheel. Hence, it can be applicable to the real time agricultural field.

#### REFERENCES

- [1] Green Growth Management by Using Arm Controller, B Yogesh Ramdas et al Int. Journal of Engineering Research and Applications ISSN : 2248-9622, Vol. 4, Issue 3( Version 1), March 2014, pp.360-363.
- [2] D.S.Suresh, Jyothi Prakash K V, Rajendra C J, "Automated Soil Testing Device", ITSI Transactions on Electrical and Electronics Engineering (ITSI-TEEE) ISSN (PRINT): 2320 – 8945, Volume - 1, Issue -5, 2013.
- [3] Soil Testing in India", Department of Agriculture & Co-operation, Ministry of Agriculture, Government of India, New Delhi, January, 2011.
- [4] Sneha J. Bansod, Shubhadha Thakre, "Near Infra-red Spectroscopy based Soil Nitrogen measure-ment", International Journal of Current Engineer-ing and Technology E-ISSN 2277 – 4106, P-ISSN 2347 – 5161.

- [5] K. Prema, N. Senthil Kumar, and K.A. Sunitha, (2009), Online Temperature Control Based On Virtual Instrumentation, IEEE, International Conference on Control, Automation, Communication and Energy Conservation, 2009, Perundurai, India, 4-6 June, 2009.
- [6] Weather head published a paper on “An autonomous tree climbing robot utilizing four bar linkage system” (CIGR-2002).

