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Design of Automatic Barrier Detection and Blockage Removing System in Sowing Machine

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Abstract: ***This paper presents the idea of the automatic system which detects and removes the blockages automatically in the pipes of seeder machine or sowing machine. This automatic system is very useful for many farmers. As increase in the technology, all the sector needs automation in every system. In current generation most of countries do not have sufficient manpower specially in agriculture sector. So there is need to develop equipment which will reduce the efforts of farmers. This system introduces a control mechanism which aims to detect blockages in the pipes of sowing machine and automatic removal of it by developing mechanism. Objective of this system is to develop a totally automated system for seed sowing process. Hence by replacing a manual system, develop a secure, reliable and efficient system.***

Keywords: (seeder machine, voltage controller, LDR sensor, blockage detection circuit, blockage removal circuit)

I. INTRODUCTION

In the current generation most of countries do not have sufficient skilled manpower specifically in agriculture sector and it affects the growth of developing countries. Our India is one of the developing countries in world. Which is on the way to become an advanced country. So development in all fields is needed. In India, near about 70% people are dependent on agriculture. Our whole economy is based on agriculture. Agriculture field involves the effective production of food/feed/fiber and other goods for human and animals. From ancient day human power is used for different work of farming. It depends on huge amount for man power for it as well as it is more time consuming because all the process or works of farming has to done by human on its own.

Traditional sowing methods having following limitations:

1) In manual seeding, it is not possible to achieve uniformity in distribution of seeds.
2) A farmer may sow at desired seed rate but inter-row and intra-row distribution of seeds is likely to be uneven resulting in bunching and gas in field.
3) Poor control over depth of seed placement.
4) Labour requirement is high because two persons are required for dropping seed and fertilizer.
5) Traditional sowing machines are so heavy in weight.
6) Also it required high skill operator.

But nowadays we are using many machines to do many works of farming. Like we are having seeder machine for sowing seeds. The present methods of seed sowing are problematic. The equipment used for seed sowing are very difficult and inconvenient to handle. So there is a need to develop equipment which will reduce the efforts of farmers. Now a day this sowing machine is used for the sowing purpose but there are some problems related to this machine-like blockage. So we are going to overcome that problems.
This system introduces a control mechanism which aims to detect blockages in the pipes of seeder machine. And automatic removal of it by developing blockage removing mechanism. The drawbacks of the existing seeder machine will be overcome.

II. LITERATURE SURVEY

[Thorat Swapnil, Madhu L. (*IRJET)*] et.al In the current condition most of farmers do not have sufficient skilled manpower and workers in agriculture sector and it affects the growth of farmers. From ancient days human power is used for different work of farming. It depends on huge amount for man power for it as well as it is more time consuming because all the process or works of farming has to done by human on its own.[1]

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[Sanjay P. Patil and Asmita Patil (*IRJET)*] et.al The present methods of seed sowing are problematic. The equipment used for seed sowing are very difficult and inconvenient to handle. So, there is a need to develop equipment which will reduce the efforts of farmers. Now a day this sowing machine is used for the sowing purpose but there are some problems related to this machine-like blockage. So we are going to overcome that problems. This system introduces a control mechanism which aims to detect blockages in the pipes of seeder machine. And automatic removal of it by developing devices. The drawbacks of the existing seeder machine will be overcome.[2]

[Swetha S.I, and Harsha G.H (*IRJET)*] et.al In this machine 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 shunt wound DC motor. This power is then transmitted to the DC motor to drive the wheels. And to further reduction of labor dependency, IR sensors are used to maneuver robot in the field. Here 4 post sensors are used to define the territory and robot senses the track length and pitch for movement from line to line.[3]

[Department of Agriculture Maharashtra (2008)] et.al The India is an agricultural country. In India, near about 70% people are dependent on agriculture. Our whole economy is based on agriculture. In Maharashtra more than 10 lakh hectares of area cultivated by sowing machines. This year the crop did not germinate at farm and Farmers suffered a lot this year.[4]

[Kunal A. Dhande. (*IRJET)*] et.al In this work we replace complicated gear system by hall effect sensor for easier and costlier seed sowing and also reduce a need of labour. The Hall Effect sensor convert rotation into distance for which seed sowing at particular distance. Also, there is adjustable system for sowing at different distance. By using this machine, the sowing can be done row by row and distance will maintain.[5]

[Trupti A. Shinde. (*IRJET*)] et.al In seed sowing machine system, they are used battery powered wheels and dc motor inbuilt in these wheels. When the seeds are empty it detects the level of storage seed and indicates the alarm. When any obstacle comes in the in-front of machine or divert path the seed sowing machine can detect this obstacle very easily. In each complete rotation of rotating wheel there is seeds falls from this seed drum and the seed plantation process can take place smoothly as well as without wastage of seeds. The end of system machine reached and it create alarm.[6]

III. PROPOSED WORK

To overcome the disadvantage of present methods of seed sowing mechanism. We are going to develop equipment which will detect the blockages and automatic removal of blockages in the pipes of seed sowing machine.

For detection of blockages we are going to use the LDR (Light Dependent Resister) will placed inside a tube or pipe through which seed flow occurs. Also we are using BC-547 Transistor for detection circuit. We are developing an advanced sensor system for detection of blockages. When blockages are detected farmer LED indicator Light will start blowing and clogs inside the pipe also removed by blockage removing mechanism like slider crank mechanism inside the pipe.

IV. SYSTEM DEVELOPMENT

System development will consist of four parts:

A. Voltage regulating circuit

In this circuit we are using IC 7805 as voltage regulating IC. and also, we are using variable resistance device for drop down the voltage.

In voltage regulating system we are using step-down transforming circuit to decrease the voltage.

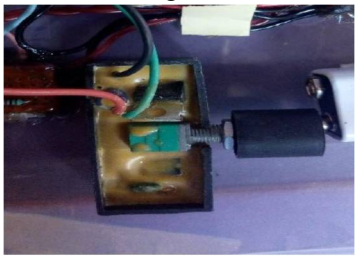

Fig-1 Voltage Regulating Circuit

This system converts 12V/ 24V DC voltage to the 5V and 9V DC voltage output.

It provides required input voltage power supply for our system.

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B. Barrier Detection System

A light dependent resistor (LDR) is also called a photo resistor or a photoconductor. It is basically a photocell that works on the principle of photoconductivity. The passive component is basically a resistor whose resistance value decreases when the intensity of light decreases. This optoelectronics device is mostly used in light varying sensor circuit, and light and dark activated switching circuits.

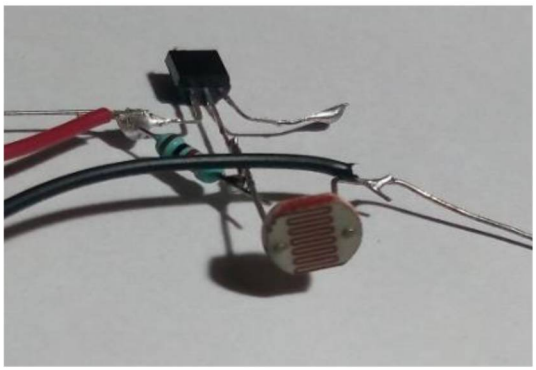

Fig-2 LDR (Light Dependent Resistor)

Here we are use BC 547 Transistor for switching and detecting blockage purpose.

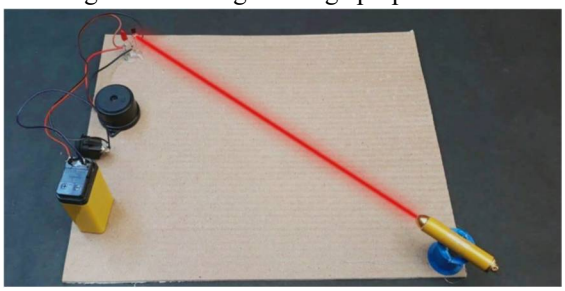

Fig-3 Barrier Detection System

In our project when current is starts flowing through the circuit laser light will activate and the laser beam falls on LDR sensor. at that time any type of barrier comes between the LDR sensor and Laser beam then the circuit will provide signal to the controller and the indicator will show you which pipe has been blocked.

C. Blockage removing system

We are using Slider crank mechanism. It is used for removing blockage by using DC gear motor.
This gear motor operates on 12V power supply
Speed of this gear motor is 100 Revolution per minute

Fig-4. Blockage removing system

When the control unit provides a signal to the blockage removing system, the DC motor will start and move at a reciprocal speed and the obstruction will be removed

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D. Indicator and Control Unit

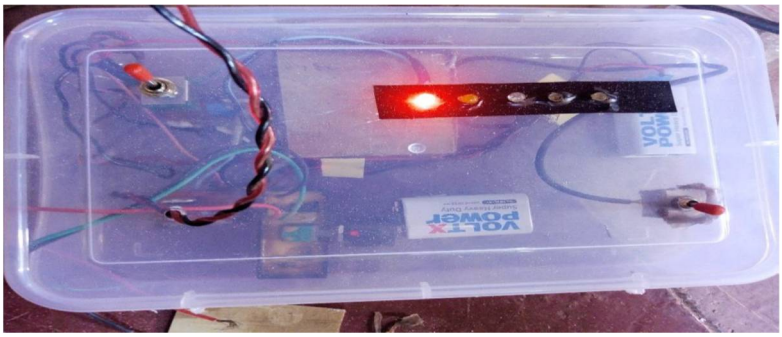
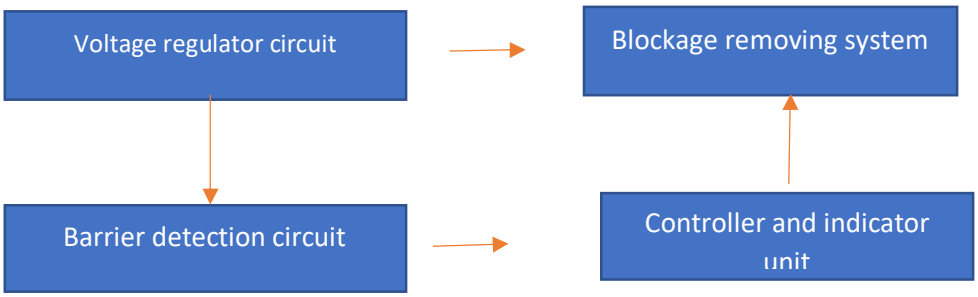


Fig-5.-Indicator & control unit

This device is used for fixing circuits and all control units.
The indicator will show you which pipe has been blocked Then we can remove blockage automatically or manually by using this controller

V. SYSTEM BLOCK DIAGRAM



When the blockages present in the pipes of seeder machine are detected by the Barrier detection circuit then the result of detection circuit is given to the controller and indicator unit. Controller and indicator unit transmits the signal to the blockage removing system. When the signal is received by the blockage removing system then user will get the message in form of indication or buzzer. After getting the message user will know about the blockages present in the pipes of seeder machine. At that time, we can remove blockage manually or automatically
Analog inputs number of LED I1, I2, I3, I4, indicator used for number of furrow opener. Indicator and control mechanism are used to give indication to the user about the status of pipes of seed sowing machine.

VI. CONCLUSION

This system introduces a control mechanism which aims to detect blockages in the pipes of sowing machine. And automatic removal of it by developing mechanism. The drawbacks of the existing sowing machine will be overcome.
By implementing this project, we can able to find out the blockages in pipes during the process of seeding.
It prevents uneven growth of crops due to blockages. And manual efforts are reduced by this system.
This paper is made for study of design of barrier detection and blockage removing system idea about the process and fabrication of the equipment. Though from this study we found to apply our theoretical knowledge of previous coerces like machine design, product design, electronics and sensors.

VII. ACKNOWLEDGMENT

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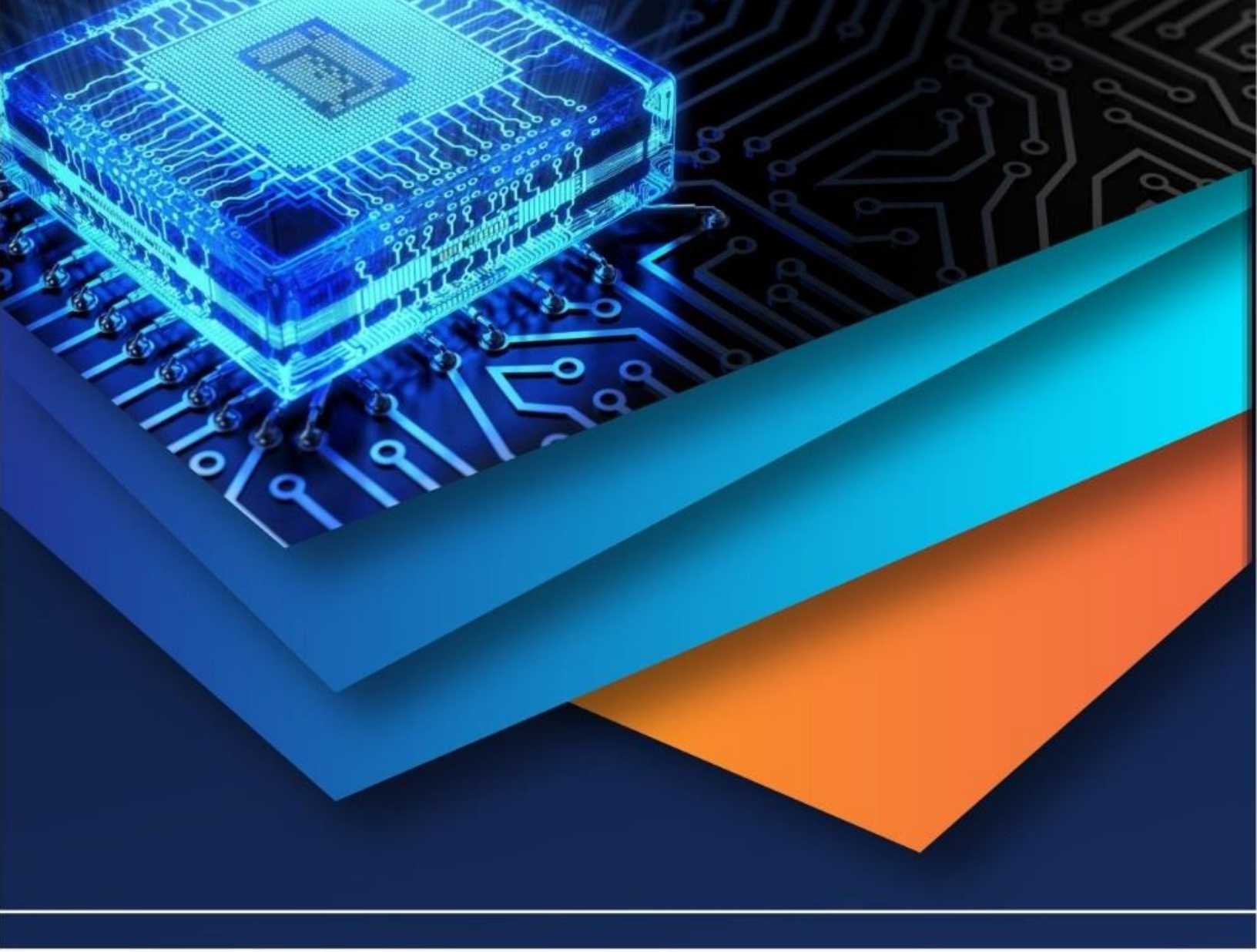

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