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DESIGN AND DEVELOPMENT OF AN SEED SOWING MACHINE USING IOT

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ABSTRACT

Agriculture requires technologies that are easier for farmers to understand, implement, and use. It is a device that costs less money and requires less human effort and time. Implementation is very necessary for the success of the agricultural industry. That's why we developed an IoT controlled seeding system that helps farmers plant seeds in the right place and save time and money. A machine used in small-scale farming to perform tasks such as plowing, seeding, and picking. Sowing seeds is one of the main processes in agricultural activities. This requires a lot of human effort and time investment. These are the main requirements of growers. Therefore, we have created an automatic operated seeder when the farmer has to do less work, increasing seeding efficiency and reducing the problems associated with automatic seeding.

KEYWORDS: Sowing Machine, IOT, Seed and Automatic.

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 Million hectares. 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 fulfil these requirements. In addition, saving in cost of operation time, labour 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 performing different agricultural operations with the help of single vehicle setup which can perform simultaneous operations.

2. LITERATURE REVIEW

DEVELOPMENT OF A VERTICAL DISC PUSH-TYPE DOUBLE-ROW CARROT SEEDER FOR SMALL-SCALE FARMERS MARVIN T. VALENTIN, PUBLISHED ONLINE 31 DECEMBER 2016

- This study was conducted to develop a push-type double-row carrot seeder. Specifically, the study investigated the performance of the carrot seeder at different operating speeds in terms of field efficiency, field capacity, germination, and uniformity of seed discharge. In addition, the study aimed to establish optimum operating speeds and compare the use of orthotic and manual sowing of carrot seeds. The device consists of a hopper, seed metering disc, soil opener, and seed coverer, grip handle, ground wheel, and power transmission; all attached to the frame. The metering disc is synchronized with the ground wheel as a source of power during operation. The design of the carrot seeder was prepared using AutoCAD software. It was fabricated using locally available materials. Three operating speeds (0.75, 1.0, and 1.25 m/s) were used during the evaluation. An area of 225 sq. m was used. It was divided into 9 plots with dimension of 50 cm by 500 cm.

INTERNATIONAL JOURNAL OF CURRENT MICROBIOLOGY AND APPLIED SCIENCES ISSN: 2319-7706 VOLUME 7 NUMBER 09 (2018) -DESIGN AND EVALUATION OF TRACTOR OPERATED RAISED BED MECHANICAL CARROT PLANTER SHIDDANAGOUDA YADACHI¹* AND INDRA MANI².

- Is a major vegetable crop which is a good source for human diet. Carrot planting, conventionally done by manual dibbling, is a labour intensive and thus, costly operation. The mechanization of carrot planting aims to reduce the operational costs, minimizing human drudgery and enhance the production. The appropriate crop machine and operational parameters were identified. Tractor operated prototype mechanical carrot planter was designed and evaluated for its field performance using treatments viz. uncoated carrot seeds (S1), biogas slurry coated seeds (S2) and Thirame coated seeds (S3).

AUTOMATIC SEED SOWING ROBOT VIDYA YEDAVE¹, PUNAM BHOSALE², JYOTI SHINDE³, PROF. JAGDISH HALLUR⁴ APR (2019)

- In the field of agriculture, an idea was developed to see if several small autonomous machines could be more effective than traditional giant tractors and human forces. This article attempts to design and build a machine to automate critical activities such as slogging, sowing, and soil covering in order to reduce human effort (sowing process - Fatigue due to continuous bending) and speed up the process. Numerous drive systems, including wheeled hybrid and reconfigurable mechanisms, have been extensively researched. The propulsion mechanism for wheeled locomotives is typically bio-inspired and offers several advantages. The main aim of this paper is to design an efficient and low-cost machine that can perform multi-tasks like plowing, seed sowing, and covering of the soil using technologies. The paper focuses on the synthesis and analysis of a mechanism capable of moving across any terrain with the least amount of difficulty and effort. Mechanisms for soil covering, seeding, and slogging on a variety of terrains have been developed in this work.

RATNESH KUMAR, AADHAR GOVIL, PARTH DAGA, SHUBH GOEL, SAURABH DEWANGAN MATERIALS TODAY

- Earth's population is projected to cross 10 billion by 2050, and the amount of food required to feed that population double of what we produce today. There is an immediate need to increase the efficiency of our agricultural practices. This is ever more relevant in India, where an estimated 70% of population finds employment in the agricultural sector, compared to 2% in a developed country like the United States of America. During this study, analysis of seed sowing practices adopted by low-income farmers in the country has been done. This paper utilizes the concepts of mechatronics and allied fields to develop a low-cost machine that can automate the process to some extent. This machine will enable the farmers to engage in alternative activities that generate income. By this paper farmers will have an option that without their direct involvement, their land is being ploughed and seeds being sown.

SA BOBADE, NIKHIL YAVALKAR, ABHISHEK BANKAR, PRANIL TIWASKAR, SHUBHAM BHORGADE EPRA INTERNATIONAL JOURNAL OF AGRICULTURE AND RURAL ECONOMIC RESEARCH. - Agriculture is the backbone of Indian economy. Agro-Technology is the process of applying the technology innovation occurring in daily life and applying that to the agriculture sector which improves the efficiency of the crop produced and also to develop a better Mechanical machine to help the agriculture field which reduces the amount and time of work spent on one crop. Hence in this work of project we decided to design a better mechanical machine which is available to the farmers at a cheaper rate and also which can sow and seed the crop at the same time. This project consists of the better design of the machine which can be used specifically for sowing of soybean, maize, pigeon pea, Bengal gram, groundnut etc. For various agricultural implements and non-availability of sufficient farm labor, various models of seed sowing implements becoming popular in dry land regions of India.

3. WORKING PRINCIPLE

When the power supply from the battery is allowed to enter into the DC motor it causes the vehicle to move on the field. Initially the ploughing rods get contacted with the ground surface according to the ploughing depth, soil ploughing operation is performed. The rotation of DC motor also makes the metering plate to rotate about its fixed axis and causes the seeds loaded inside the hopper to discharge on the fields. The water spraying operation is performed by the activation of DC which sucks the water from the reservoir and discharge with high pressure on to the field. At last with the help of levelling lever ploughed land gets levelled which also helps in covering the dipped seeds by the sand for proper growth maintenance.

4. MAJOR COMPONENTS

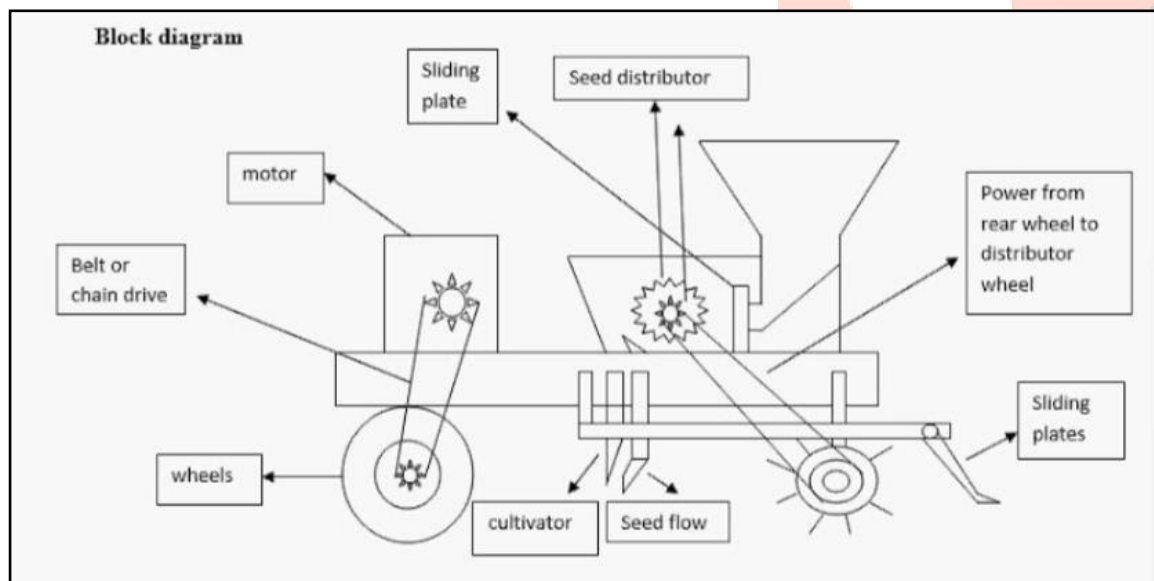
- Wheel
- Plouger
- Chain Sprocket
- Seed Metering Mechanism
- Dc Motor
- Battery
- Dc Pump
- Spray Nozzle
- Shaft
- Sheet Metal
- Ball Bearing
- Metal Frame



5. MATERIAL USED

S.No	DESCIRPTION	QTY	MATERIAL
1	DC MOTOR	1	ELECTRICAL
2	BATTERY	1	ELECTRICAL
3	CHAIN DRIVE	1	STAINLESS STEEL
4	FRAME,SHAFT,	AS PER REQUIRMENT	MILD STEEL
5	METAL STRIP	AS PER REQUIRMENT	MILD STEEL
6	WHEEL,D C PUMP,NOZZLE	1	PLASTIC
7	PLOUNGER	1	MILD STEEL
8	SHEET METAL	1	GALVANZED IRON SHEET
9	BEARING	8	STAINLESS STEEL
10	SEED SOWER	1	MILD STEEL

6. LAYOUTS OF MODEL



7. 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 this machine 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 machine 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 autonomously. This machine 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 machine is designed with chain roller instead of normal wheel. Hence, it is applicable to the real time agricultural field.

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