

Literature Review on Automatic Seed Feeder

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Abstract—

In this modern era research in the agricultural field is going on. Plant nursery is important part of agriculture field and facing many problems. The problems are availability of labours, low productivity rate and more manual efforts required for seed feeding. In plant nursery more time is required for plantation which is due to seed feeding process. For reducing these problems of plant nursery research of automatic seed feeder mechanism is used. The mechanism consists of frame, hopper, belt drive, sewing motor, conveyor etc. Hopper consists of seeds (brown mustered seed) are fall down on belt. This customised belt transfer seeds from one end to other end. The customised belt contains conical shaped holes on sheet metal which mounted on cloth material. While movement of belt excess amount of seeds are minimised by stripper plate. Those seeds are passed through stripper plat and present in holes are fall down in the tray.

Keywords — Plant nursery, Hopper, Small seeds, Belt conveyor with customised belt, Sewing motor, Tray.

I. INTRODUCTION

Now a day's many industries are moving towards the automation in their working environment. This reduces the overall cycle time and cost of manufacturing of the product. Automation or automatic control is the use of various control systems for operating equipment such as machinery processes in the factories, and other applications with minimal or reduced human intervention. The biggest profit of automation is that it saves the labor, however it also save energy and materials and to improve the quality, accuracy and precision.

The aim of 'Automatic seed feeder' is to reduce seed plantation time and increase the productivity. In plant nursery more time is required for the plantation which is due to the seed feeding process as seed feeding is skilled job. In the nursery more human efforts are required for feeding the seed in the tray. Almost every seed has the capability of growing so we cannot feed two or more seed in one cup of tray; this causes the loss of plantations.

So this project helps to minimize the human efforts involved in plantation and save the time. This will give perfect plantation with less effort.

The mechanism consist of the hopper for seed feeding, a belt drive to move single seed towards the

tray and intermittent advancement of the tray. This all the mechanisms make the project cost efficient.

II. LITERATURE REVIEW

Kyada A et al.[1] :

This research paper presents design and development of manually operated seed planter machine. In this they present objective of seed planter machine design, factors affecting seed emergence, some mechanisms. The basic objective of sowing operation is to put the seed and fertilizer in rows at desired depth and seed to seed spacing, cover the seeds with soil and provide proper compaction over the seed. The recommended seed to seed spacing and depth of seed placement vary from crop to crop and for different agro-climate conditions to achieve optimum yields. From this we know that mechanical factors effects on seed germination like uniformity of depth of placement of seed, uniformity of distribution of seed along rows. In this power transmission mechanism, seed meter mechanisms, plunger mechanism etc. mechanisms" are used. The working as machine is pushed; power wheel is rotating which transmit power to plunger through chain and sprocket mechanism. Now cam is mounted on sprocket shaft which push plunger towards downward direction. Once plunger is penetrate in soil and during backward stroke flapper is opened so seed get separated from plunger and inserted in dig. From this we get idea that if we use the belt having small holes with defined thickness then it is beneficial for our project. As our automatic seed feeder is only for small seeds then using of conveyor belt with motor is useful.

Ramesh D et al. [2]:

This research paper present "Agriculture Seed Sowing Equipment: A Review". The present review provides brief information about the various types of innovations done in seed sowing equipment. The basic objective of sowing operation is to put the seed and fertilizer in rows at desired depth and seed to seed spacing, cover the seeds with soil and provide proper compaction over the seed. In this multi-purpose seeding machine equipment consists of cylindrical shape container in which the seeds can fill. The container is attached on the four wheeled carrier assembly. It consists of metering plate bevel gear mechanism and two holes at the bottom depending on seed size. The working as plate will rotate in container when the bottom holes of container and meter plate hole coincide seeds will

flow through pipe to soil. Here the metering plate gets rotating motion by bevel gear assembly and the bevel gears get the motion by rear wheels with the help chain and sprocket assembly.

Kannan A et al. [3]:

This research paper presents design modification in multipurpose sowing machine. In this they present that for sowing purpose we import the machinery which are bulk in size having more cost. To prevent this they design multipurpose sowing machine which consists of hopper, seed metering mechanism, ground wheel, power transmission system, seed distributor, and tiller. In this they design model on PRO-E software. Actually the working is very simple as the tiller rotates it directly transmit motion to ground wheel which directly connected through main shaft. A main shaft has a disc with scoops inside the hopper. When the ground wheel rotates the main shaft also rotates with the help of power transmission system. The scoops collect the seed from hopper and leave it inside the seed distributor. The tiller is having very good contact with ground.

Marode A et al. [4]:

This research paper represents “Design & Implementation of Multi Seed Sowing Machine”. In this paper gives types sowing machine. The following are the three different types of seed sowing are broadcasting: A field is initially prepared with a plough 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 scattered randomly with the help of hand on the soil, the method is called broadcasting. Dribbling: Drill sowing and dribbling (making small holes in the ground for seeds) 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 labour and prevents the damage of seeds by birds. Another method of sowing the seeds is with the help of a simple device consisting of bamboo tube with a funnel on it attached to a plough. As the plough moves over the field the tube attached to it leaves the seeds kept in the funnel at proper spacing and depth. The plough keeps making furrows in the soil in which the seeds are dropped by the seed drill.

Rohokale A et al.[5]:

Agriculture is demographically the broadest economic sector and plays a significant role in the overall economy of India. For the growth of Indian economy, mechanization is necessary. The main purpose of mechanization in the agriculture is to improve the overall productivity and production. Planning is conventionally done manually which involves humans and draught animals, this result in higher cost of cultivation and delay in planting. The

purpose of this paper is to compare conventional sowing methods and modern methods. The required row to row spacing ,seed rate ,seed to seed spacing can be achieved by proposed machine. The machine reduces the human efforts.

Shriprasad B et al.[6]:

This research paper presents information about modern globalization; many technologies are to update a new development based on automation which works very rigidly, high effectively and within short time period. The progressive invention in agricultural system is becoming an important task especial because of rising demand on quality of agriculture products and declining labours availability in rural farming areas. The designed system is seeding and fertilizing agriculture robot using micro controller. The aim of designed system is to seeding fertilizing and soil ph, temperature ,moisture ,humidity checking. The robot is controlled by remote. The designed system involves navigation of robot is controlled via remote. The robot and remote system are connected through internet system. DC motors are used for navigation of the robot. The speed of DC motor is controlled using controller. The solenoid is used to control seeding fertilizing. This paper gives idea about the automation and use of motor for movement of belt conveyor.

III.PRESENT SITUATION

The present situation of the plant nursery and their way of working are discussed as below.

A. Present Practices

Nursery is the part of agriculture. So as in farm the feeding of all parts of seeds are not feasible because in the farm proper environment will not present, the wastage of seeds are possible. Also the chances of falling of unnecessary seeds during sowing are possible. Hence in the nursery by maintaining proper environment required for growing of plants care is taken. After growing of plants those plants are taken and then they are used to plant in farm. For this the plants are produced by using a tray which has number of holes as per the requirements in those whole the coco-peat powder is used to fill half of the hole and is followed by the seeds in those holes. Again the powder is filled. As per requirements of customers the nursery produces different kinds of plants.

Now a days in Nursery seed feeding is done manually which affects on productivity of the Nursery. The seed feeding activity takes more time which results in less plantations of the seeds.

B. Methodology

The plantation of seeds is being done by manually with the help of labor in the Nursery. The sizes of

seeds are very small. What is exactly is being done in nursery to complete the plantation of seed is that first in the box which has number of holes near about 104.



Fig.1.Base Tray

The half of box is filled by coco peat powder thoroughly in all the holes, after completion of near about 9 to 10 then all these boxes are put one over another and pressed so that all holes are filled to half of size after that seed are put one by one in these holes by the labours. After putting seeds in the holes of the box again coco peat powder is put in the box and excess amount of powder which will remain in the box is removed.



Fig. Manual seed feeding process.

The time required for this process is 3 to 4 minutes for 9 to 10 boxes. Then after completing all the process the tray is kept in proper environment and water is being fed when required. The sufficient height of plants in the tray will grow then it is supplied to customers.



Fig. Completion of seed feeding process.

IV. AUTOMATIC SEED FEEDER

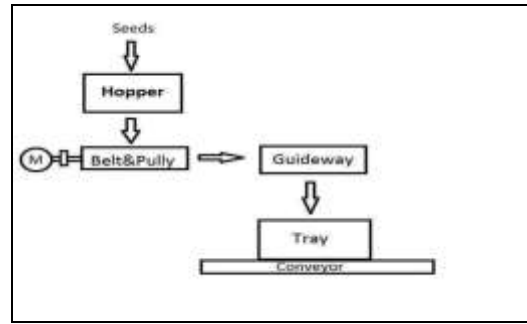


Fig.4. Block diagram of automatic seed feeder.

As whole assembly is mounted on the frame hence it should be rigid and having more strength to withstand forces. Frame consists of rectangular structure. The hopper is mounted on the frame. For that purpose four strips are welded on the frame. For roller and bearing assembly eight holes are provided on upper side of the frame. By using nut & bolt, saddle the roller and bearing assembly attached to the frame. Bearing and belt are mounted on roller before the frame. Lower part of frame consists of conveyor, tray and motor. On the conveyor tray is mounted. Through the pulleys motor & conveyor and motor & roller are connected. This is the simple construction of automatic seed feeder.

V. CONCLUSION

Automatic Seed Feeder is invention in the nursery (agricultural field), which is having several advantages like

1. To reduce seed plantation time,
2. To increase productivity,
3. To increase the efficiency of the plant and to reduce manual efforts,
4. The time required seed feeding is less as compared to manual seed feeding,
5. After manufacturing all the assembly we conclude that the cost is less as compared to manual seed feeding cost.
6. Space required for the automatic seed feeder is minimum.

This system is run by sewing motor. The mechanism used in automatic seed feeder is reduces manual efforts and also reduces the time required for seed feeding. This results in the increase rate of plantation. This system is partially working.

ACKNOWLEDGMENT

It gives us immense pleasure to present our IJETT research paper titled "Literature Review on Automatic Seed Feeder". We are highly thankful to our honourable guide **Prof. A. O. Hannure**, Department of Mechanical Engg. NKOCET, Solapur for his help and encouragement. We are highly

obliged to him for his invaluable guidance and contribution to the project.

REFERENCES

- [1] A. R. Kyada & D. B Patel, DEC 2014 “*Design And Development Of Manually Operated Seed Planter Machine*” of Lecture 5th International & 26th All India Manufacturing Technology, Design and Research Conference (AIMTDR 2014) , IIT Guwahati, Assam, India. Vol 2.
- [2] D. Ramesh , H.P. Girishkumar, JULY 2014 “*Agriculture Seed Sowing Equipments: A Review*” , ISSN NO.:2278-7798, Volume3.
- [3] A.Kannan , K. Esakkiraja , S. Thimmarayan, JAN 5014 “*Design And Modification Of Multipurpose Sowing Machine*” VOL:2 ,ISSN (ONLINE): 2321-3051.
- [4] Roshan V. Marode, P.Gajanan, and K.Swapnil ,OCT 2013 “*Design & Implementation of Multiseed Sowing Machine*”, Vol : 2, No. 4, ISSN No.: 2278-0149, patented.
- [5] A. Rohokale , 2004 “*International journal of advanced agriculture system with proper seed spacing*”.
- [6] B.Shivprasad, M. Ravishankara, B.Shoba., 2010 “*Design And Implementation Of Seeding And Fertilizing Agriculture Robot*” , Volume 1(3)190-213.
- [7] P. Bhargavi, Dr.S.Jyothi., 2011 “*Soil Classification Using Data Mining Techniques : A Comparative Study*”, Vol:2, ISSN:2231-5381(IJETT).
- [8] Prof.C.H.Chavan, Mr.P.V.Karande., “*Wireless Monitoring of Soil Moisture, Temperature & Humidity Using Zigbee in Agriculture*”, Vol:11, ISSN:2231:5381(IJETT).