Design and Fabrication of Automated Seed Sowing Machine and Grass Cutter

Dr. K. Senthilkumar[1], Alex George Paul[2], Amudhan. A[3], Chanthu. V[4], Ibrahim Sheriff [5]
[1] Associate Professor,
[2,3,4,5] UG Students.
Department of Mechanical Engineering.
SNS College of Engineering, Coimbatore-107, Tamil Nadu, India.

Abstract: Sowing machine should be suitable to all farms, all types of corps, robust construction, also is should be reliable, this is basic requirement of sowing machine. Thus we are designing sowing machine which is operated manually but reduces the efforts of farmers thus increasing the efficiency of planting also reduces the problem encountered in manual planting. For this machine we can plant different types of seeds also . This also increases the planting efficiency and accuracy. We are designing it with easily available materials thus it will be cheap and very usable for small scale farmers. For effective handling of the machine by any farmer or by any untrained worker we simplified its design. Also its adjusting and maintenance method also simplified . It also enables grass cutting in a uniform ratio and ,it can also tillage the land for sowing seeds.

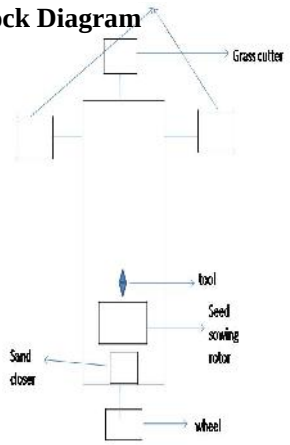
I. Introduction

Cropping is important and tedious activity for any farmer, and for large scale this activity is so lengthy also it needs more workers. Thus agriculture machines were developed to simplify the human efforts. In manual method of seed planting, we get results such as low seed placement, less spacing efficiencies and serious back ache for the farmer. This also limited the size of field that can be planted. Hence for achieving best performance from a seed planter, the above limits should be optimized. Thus we need to make proper design of the agriculture machine and also selection of the components is also required on the machine to suit the needs of crops The agriculture is the backbone of India. And for sustainable growth of India development of agriculture plays vital role. The India has huge population and day by day it is growing thus demand of food is also increasing. In agriculture we saw various machines. Also there traditional methods are there. Since long ago in India traditional method is used. Also India has huge man power. This manual planting is popular in villages of India. But for large scale this method is very troublesome. The farmer has to spend his more time in planting. But time available is less for him. Thus it requires more man power to complete the task within stipulated time which is costlier. Also more wastage happens during manual planting.

II. Proposed System

This machine has very less cost. This planter is very simple to use hence, unskilled farmer is also able to handle this machine. We simplified the design also made it cheaper and affordable to every rural farmer. We made various adjustments and simplified it from controlling and maintaining point of view. In this design we connected drive shaft to metering mechanism which eliminates the attachments such as pulleys and belts system. DC motor drives the shaft of motor which is coupled with battery bank. As motor starts it moves this robot as well as operates the metering mechanism. Seed storage tank is connected at the top of the robot near rear wheels. The sensor is fitted to it which senses the level of seed in it and gives the alarm when the tank is empty. Front sensor serves the function of guiding the robot. As any obstacle comes in front of robot it gives the signal to the robot and diverts the path of robot. For every rotation of the wheel according to the adjustment it allows the definite seed to fall into the hoper so that there is no wastage of the seeds also the sowing process does smoothly. When the robot reaches at other end and when it completes task it creates an alarm so that we can provide required facility

III. Block Diagram



IV.3d Proposed And Product Image

fig 4.1

Fig 4.2

V. Major Components

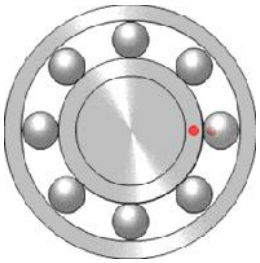
Dc Motor

The specific type of motor we are addressing is the permanent magnet brushed DC motor (PMDC). These motors have two terminals. Applying a voltage across the terminals results in a proportional speed of the output shaft in a steady state. There are two pieces to the motor: 1. stator and 2. rotor. The stator includes the housing, permanent magnets, and brushes. The rotor consists of the output shaft, windings and commentator.

Bearings

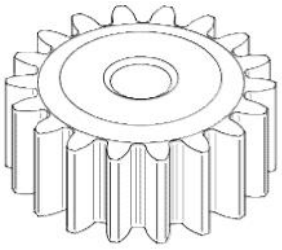
A bearing is a machine element that constrains relative motion and reduces friction between moving parts to only the desired motion. The design of the

bearing may, for example, provide for free linear movement of the moving part or for free rotation around a fixed axis; or, it may prevent a motion by controlling the vectors of normal forces that bear on the moving parts. Many bearings also facilitate the desired motion as much as possible, such as by minimizing friction. Bearings are classified broadly according to the type of operation, the motions allowed, or to the directions of the loads (forces) applied to the parts. The term "bearing" is derived from the verb "to bear"; a bearing being a machine element that allows one part to bear (i.e., to support) another. The simplest bearings are bearing surfaces, cut or formed into a part, with varying degrees of control over the form, size, roughness and location of the surface. Other bearings are separate devices installed into a machine or machine part. The most sophisticated bearings for the most demanding applications are very precise devices; their manufacture requires some of the highest standards of current technology.



Gears

A gear or cogwheel is a rotating machine part having cut teeth, or cogs, which mesh with another toothed part in order to transmit torque, in most cases with teeth on the one gear being of identical shape, and often also with that shape on the other gear. Two or more gears working in tandem are called a transmission and can produce a mechanical advantage through a gear ratio and thus may be considered a simple machine. Geared devices can change the speed, torque, and direction of a power source. The most common situation is for a gear to mesh with another gear; however, a gear can also mesh with a non-rotating toothed part, called a rack, thereby producing translation instead of rotation. The gears in a transmission are analogous to the wheels in a crossed belt pulley system. An advantage of gears is that the teeth of a gear prevent slippage. When two gears mesh, and one gear is bigger than the other (even though the size of the teeth must match), a mechanical advantage is produced, with the rotational speeds and the torques of the two gears differing in an inverse relationship. In transmissions which offer multiple gear ratios, such as bicycles, motorcycles, and cars, the term gear, as in first gear, refers to a gear ratio rather than an actual physical gear. The term is used to describe similar devices even when the gear ratio is continuous rather than discrete, or when the device does not actually contain any gears, as in a continuously variable transmission.



Seed Sowing Disc And Seed Bucket

Disc which is attached at the bottom of the tank allows one seed during one rotation of wheel. In the above fig seed sowing disc is also included. The buckets are screwed on the disc. These buckets are very similar to half shape of peloton buckets. As these are screwed to disc its size is varied

according to diameter of the seed and required distance between the seeds

Fig 5.1

VI. LITERATURE REVIEW

Mahesh R. Pundkar and A. K. Mahalle is presented review provides brief information about the various types of innovations done in seed sowing machine available for plantation. The seed sowing machine is a key component of agriculture field. The performance of seed sowing device has a remarkable influence on the cost and yield of agriculture products. Presently there are many approaches to detect the performance of seed-sowing device.

Laukik P. Raut and et. al., studied to meet the food requirements of the growing population and rapid industrialization, modernization of agriculture is inescapable. Mechanization enables the conservation of inputs through precision in metering ensuring better distribution, reducing quantity needed for better response and prevention of losses or wastage of inputs applied. Mechanization reduces the unit cost of production through higher productivity and input conservation.

D. Ramesh and H. P. Girish Kumar presented review provide brief information about the various types of innovations done inseed sowing equipment. The basic objective of sowing operation is to put the seed and seed in rows at desired depth and seed toseed spacing, cover the seeds with soil and provide proper compaction over the seed. The recommended row to row spacing, seedrate, seed to seed spacing and depth of seed placement vary from crop to crop and for different agro-climatic conditions to achieve optimum yields. Seed sowing devices play a wide role in the agriculture field.

Pranil V. Sawalakhe and et. al., are investigated the today's era is marching towards the rapid growth of all sectors including the agricultural sector. To meet the future food demands, the farmers have to implement the new techniques which will not affect the soil texture but will increase the overall crop production. This Paper deals with the various sowing methods used in India for seed sowing and seed placement.

VII. CONCLUSION

This seed plantation machine has great potential for increasing the productivity of the planting. Till now tractor was the main traction unit for nourishment in farming. With the adaptation of this seed planting machine its purpose will be done.Hence there is need to promote this technology and made available to even small scale farmers with affordable prices. This machine can be made by raw materials also which saves the cost of whole project and is easily manufactured in available workshops. The only cost is of metering device and sensors. Hence by using this machine we can achieve flexibility of distance and control depth variation for different seeds. Hence usable to all seeds.

VIII. ADVANTAGES

- Improved efficiency in planting
- Increased yielding and reliability in crop
- Increased cropping frequency
- Increased speed of seed planting
- Seed planting accuracy
- Less maintenance cost
- Uniform placement of seed in row

IX. REFERENCE

[1] PrasannaRaut, PradipShirwale, AbhijeetShitole " A Survey On Smart Famer Friendly Robot Using Zigbee", International Journal of Emerging technology and Computer Science , Volume: 01, Issue: 01, February 2016.

[2] Calvin Hung, Juan Nieto, Zachary Taylor, James Underwood and Salah Sukkarieh, "Orchard Fruit Segmentation using Multi-spectral Feature Learning" ,IEE/RSJ International Conference on Intelligent Robot System Tokyo,Japan,3-7,November 2013.

[3] Shrinivas R. Zanwar, R. D. Kokate, "Advanced Agriculture System", International Journal of Robotics and Automation (IJRA), Vol. 1, No. 2, pp. 107~112 ,ISSN: 2089-4856, June 2012

[4] Swetha S.1 and Shreeharsha G.H.2, "Solar Operated Automatic Seed Sowing Machine", Cloud Publications International Journal of Advanced Agricultural Sciences and Technology 2015, Volume 4, Issue 1, pp. 67-71, Article ID Sci-223, ISSN: 2320 – 026X, 26 February 2015.

[5] Kyada, A. R1*, Patel, D. B.2, "Design and Development of Manually Operated Seed Planter Machine", 5th International & 26th All India Manufacturing Technology, Design and Research Conference (AIMTDR 2014), IIT Guwahati, Assam, India, December 12th–14th, 2014.

[6] V.M. Martin Vimal1, A. Madesh1, S.Karthick1, A.Kannan2, "Design and Fabrication of Multipurpose Sowing Machine", International Journal of Scientific Engineering and Applied Science (IJSEAS), ISSN: 2395-3470, Volume-1, Issue-5, August 2015.

[7] M.Priyadarshini, Mrs.L.Sheela "Command Based Self Guided Digging and Seed Sowing Rover" International Conference on Engineering Trends and Science & Humanities, ISSN: 2348 – 8379, ICETSH-2015