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Design and fabrication of automatic plantation device for cotton seeds

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ABSTRACT

In our project, we select automatic plantation or sowing device for cotton seeds. It sowing and plantation of cotton seeds in the soil of the farm. For that, we use our device assemblies like a cylinder, cone teeth, holder, ball bearings, cultivator, nut and screw. This all assembly will complete our sowing device final construction. This each component have the specific functions work the brief function of each component is as like below.

Keywords— Ball bearing, Cone teeth, Cylinder, Holder, Solid rod, Hub

1. INTRODUCTION

Our project on the plantation or sowing of cotton seeds. We select the “Design and fabrication of automatic plantation device for cotton seeds.” In this device, we use the tractor cultivate mount design. This design is the assembly of the cylinder, cone teeth, holder, ball bearings, cultivator, nut and screw.

Our project aim is to reduce manpower for plantation. Apply an automatic system so the time of plantation will reduce. So the overall cost of the plantation will reduce. We design the device which is easy to understand. No any skilled person will require to operate it. Easy to use of our device. No any mechanisms required for rotation of the cylinder, it is most beneficial to the farmer to its use.

We apply the arrangement in the device so some function of the plantation will gain like, the proper distance between two plants will maintain. Proper depth of seeds in the soil where it sowed will maintain. Also, take uniform plantation on the whole farm. So overall plantation time will reduce. The worker cost (for plantation require working labour) will reduce due to the device usage. Also, the maintenance of the device will easy so the maintenance costs will decrease. Also, we make a proper hole size of cone teeth. So by the cone teeth, proper seeds distribution will maintain.

In our device will one homogenous material mostly use for fabrication of the device. So the no changes required for welding and metal joining process. Also, the ball bearing is used for rotation will easily available in the market. Also, the holder design is easy so whenever the replace of the holder is required then it's easily replaced that's form. Also, no complicated metal joining processes are required for the device assembly.

In short, we design and fabricated automatic plantation device for cotton seeds plantation is easy in construction. It will easy to use for plantation of cotton seeds. The accuracy of the plantation will more importance that cover our project working system arrangement. Also for plantation uniformity will gain by the whole arrangement. Mainly the device is made of simple assembly structure and not a complicated structure so it is more robust.

1.1 Advantage

- By using this device decrease the manpower.
- So due to decreasing manpower reduce the sowing cost.
- The Plantation/Sowing time is Decrease.
- Fully Automatic System Provide.
- Achieve the proper distance between two plants during the plantation.

- Achieve the proper distribution of seeds in the plantation.
- Achieve the proper depth in the soil in the plantation.
- Reduce maintenance cost.
- Electricity is not required.
- Proper germination of seeds.
- Weight machine is less
- Seed rate can be controlled.
- The damage of seeds is to be controlled.

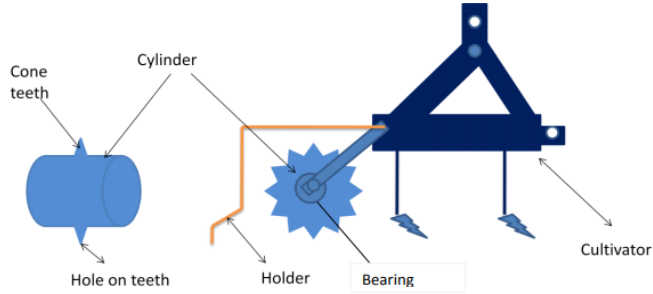


Fig. 1: Diagram of design and fabrication of automatic plantation device

1.2 Disadvantage

- Loss of seeds during the plantation

1.3 Application

- It is useful for cotton seeds plantation.
- Useful at Agriculture Product Market Corporation.
- Useful at seeds Production Company for plantation.
- Useful for Farmer for Plantation.
- Useful to develop other crop plantation device.

2. DESIGN

2.1 Cylinder

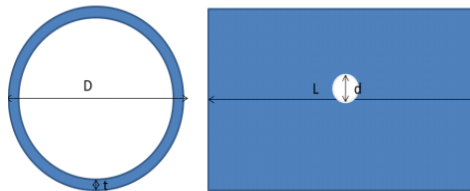


Fig. 2: Cylinder

a) Design data

Cylinder radius calculation

- $L = 2\pi R$ (perimeter of circle)
 L= Distance between two plants
 R= Radius of the cylinder
1. L= 60.96 cm (2feets), R=?
 $60.96 = 2 * \pi * R$
 $R = 9.70 \text{ cm} = 10 \text{ cm approx.}$
 2. L= 76.20 cm (2.5 feet's), R=?
 $76.20 = 2 * \pi * R$
 $R = 12.13 \text{ cm} = 12 \text{ cm approx.}$
 3. L= 91.44 cm (3 feet's), R=?
 $91.44 = 2 * \pi * R$
 $R = 14.56 \text{ cm} = 15 \text{ cm approx.}$

2.2 Cone teeth

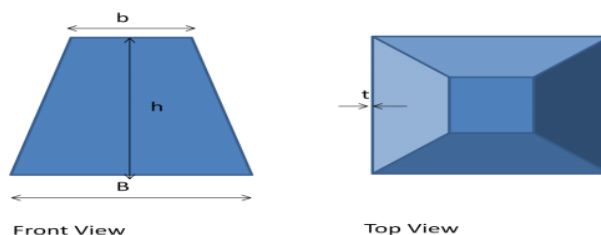


Fig. 3: Cone teeth

a) Design data

- Bottom Base of the cone (B): 3
- Top base of cone (b) : 1
- Height of cone (h) : 5
- The thickness of cone sheet (t): 0.1625
- The material of cone: Galvanized Iron

2.3 Ball bearings

- Bearing Type: Ball Bearing
- IS: 6004 both side Rubber seal



Fig. 4: Ball bearings

2.4 Support section

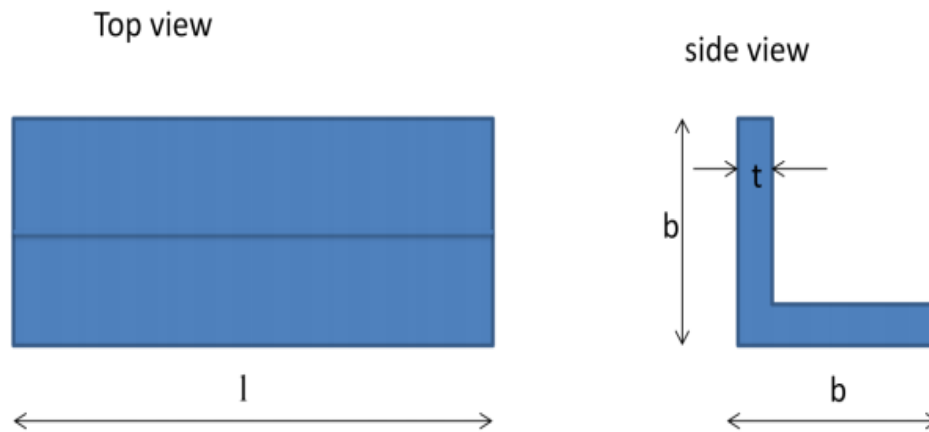


Fig. 5: Support section

a) Design data

- Length of support (l) : 70
- Base of support (b) : 5
- Thickness of support (t) : 0.5 All dimension are in cm 3.4

b) Technical data calculation

$$L = 2\pi R \text{ (perimeter of circle)}$$
$$L = 45 \text{ cm (1.5feet),}$$
$$R = ? \quad 45 = 2 * \pi * R \quad R = 7.16 \text{ cm} = 7 \text{ cm approx.}$$

Where, L= Distance between two plants,
R= Radius of cylinder XXXI

- Weight of device: 12 kg
- Bearing: Two ball bearing (IS: 6004 2 sides RS)
- The material of device: Cast iron

3. ACKNOWLEDGEMENT

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4. CONCLUSION

- By using the cylinder and other components we make a model of cotton seeds plantation device for the farmer which is efficiently and effectively works as compare to the manual seeds plantation.
- From all the work we have concluded that the PDWM is cost-effective, Eco-Friendly, low maintenance during and after plantation. It can work uniformly in inter and intra row distance. It can be flexible as per our requirements.

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