

Agriculture Manure Spreader for Natural Farming

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Abstract— India is agricultural based country. Our economy is also depends on agricultural related product. In the recent days it has been found that farmers are unable to grain more crop production by use of conventional agricultural methods. This project is based on manually spreading the solid manure by using the manure spreader. A method is generated to spread the soiled manure over a fallow land by dropping the fertilizer over the spreader disc. It is a trolley based system of manure spreader.

Key words: Agriculture, Natural Farming

I. INTRODUCTION

India is agriculture based country. Near about 70% people of our country are farmers. Our economy also depends on agricultural products. Nowadays tremendous changes have occurred in conventional methods of agriculture like seed plantation, irrigation system, pesticides and spray used. For developing our Economic condition, it is necessary to increase our agricultural productivity and quality also. Farming process includes many stages, out of which Spreading of manure is one of the important stages and which is not exploded up to the mark up till now. Now-a-days, we are used to do spreading of manure in traditional way which is time consuming, costlier as well as not provide comfort to the labor. Also, some tractor operated machines for spreading of fertilizer are available. So, what we need is an alternative to the traditional as well as tractor operated fertilizer spreading machine which will fulfill all the requirements. So, we are going to design a manually operated machine for solid manure spreading by taking into consideration the user group and their needs which helps to them to work easy and functional.

II. PROBLEM STATEMENT

In the manually spreading of manures in the farm have some problems like uneven spreading which may result in crop damage. Moreover the conventional spreading of manure by hand in the farm is more time consuming method and require more human effort. In order to have a solution for it, it was proposed to manufacture a manure spreader machine. So the farmer work more easy and functional.

The manure spreader machine should satisfy the following objectives

- Less time to spread the manure.
- Portable
- Driven by manually
- Light weight
- Less cost
- User friendly
- Eco friendly
- Maximum land cover

III. WORKING AND CONSTRUCTION

The working of the manure spreader is described below in details. The drive gear is fastened at the center of the horizontal shaft between the wheels. The driven is connected at the one end of the vertical column. The spreader disk is placed at the other end of the vertical column. When we move the machine, the drive gear rotate along with the wheel so by that the driven gear also rotate. The spreader disk is also tends to rotate. We kept the manure in the hopper. When we open the adjustor, the manure will fall from the hopper to the spreader disk. Due to centrifugal action of the spreader disk, the manure will spread around the field. We can keep the manure in the hopper. By spreading one column in the field we can pre calculated how much manure is needed to the whole field. The adjuster can be adjusted according to our requirement. The spreader can be fixed at the correct level to get the proper spreading. The small push behind the trolley based manure spreader can be enough to the machine from one place to other the gears are fasted in between the wheel at the correct place. The power is transmitted from drive to driven gear in 900 to the vertical column. So by that the spreader disk rotate at the particular speed. Due to gravity the manure inside the hopper fall through the hole in the hopper to spreader disk. Due to centrifugal action the manures are spread around the field.

A. Wheel

A wheel is a part in which the entire load of the frame is acting. It is fastened to the horizontal shaft. Here one two wheels made by the plastic is used.

Diameter of the wheel = 30cm=0.3m



Fig. 1: Wheel

B. Bevel gear

The bevel gears are used for transmitting power at a constant velocity ratio between two shafts whose axes intersecting at a certain angle. Bevel gears are transmit the power from the

horizontal shaft to the vertical column. It is a main power transmitting device in these machine.



Fig. 2: Bevel Gear

C. Hopper

Hopper is used to keep the Manure. It also accommodates the flow metering mechanism. The bottom corner side of hopper contain hole and adjustor. The manure may come out from the hole and the adjustor is used to adjust the hole. The rate of flow of manure may controlled by the adjustor.



Fig. 3: Hopper

D. Spreader disk

Spreader disk is used to spread the manure around the field. It is also one of the main component in the machine. The impeller blade like structure will held to spread the manure.it is fastened at the top of the vertical column. When the manure strike it,de to its centrifugal action the manure will spread around the field.

Diameter of the spreader disk=25cm=0.25m



Fig. 4: Spreader Disk

E. Ball Bearing

The shaft must be machined in order to fix the bearing. The bearing material must have the ability to withstand the weight of the component. It must resist high wear and tear. The outer diameter of the bearing must be maintained to fix in the center bore of the component.

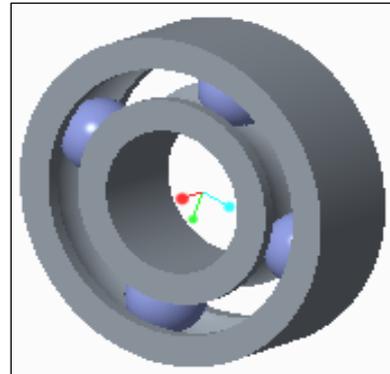


Fig. 5: Ball Bearing

Inner diameter of bearing=0.02m

Outer diameter of bearing=0.04m

F. Shaft

The shaft has to be made so as to carry the gears and other units. The shaft has to be stepped at three places. One is used to fix the gear and other two are used to fix the bearing. The shaft must have withstand the overall load.



Fig. 6: Shaft

Diameter of the shaft=0.02m

IV. DESIGN CALCULATION

A. Hopper

Volume of the hopper = $[(31 \times 31) - (10 \times 10)] \times 40 + [10 \times 10] \times 10 = 35440 \text{cm}^3$

Volume of the hopper = 0.03m^3

B. Wheels

Diameter of the wheel = $30 \text{cm} = 0.3 \text{m}$

Perimeter of the wheel = $\pi \times 0.3 = 0.94 \text{m}$

C. Shaft

Length of the shaft = $60 \text{cm} = 0.6 \text{m}$

Diameter of the shaft = $20 \text{cm} = 0.02 \text{m}$

D. Spreader Disk

Diameter of the spreader disk = $25 \text{cm} = 0.25 \text{m}$

Average spreader speed=300rpm

E. Drive Bevel Gear

No of teeth=60

F. Driven Bevel Gear

No of teeth=20

Gear speed ratio=1:3

Total weight of the machine=15kg

V. VIEWS OF MANURE SPREADER



Fig. : Front View



Fig. : Side View

VI. ADVANTAGES AND DISADVANTAGES

A. Advantages

- Increase in uniformity of manure spreading.
- Good crop yield.

- Reduction in time required to speed.
- Less waste of manure.

B. Disadvantage

- Not suited for all soils.
- Manual power can vary from persons to person.

VII. CONCLUSION

Our goal was to build a system which is efficient to perform a various applications with the help of Manually Operated Manure Spreader Machine. With the scope of improvement, the project is done to fulfill the demands of agricultural applications. The main objective of our project was to fulfill the need of farmers suffering from the problems of increasing cost of spreading manures, labor cost and availability as it is operated by single person.

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