

BEVEL GEAR BASED SPREADING MACHINE

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ABSTRACT

The continuous increase in the cost of fuel and the effect of various harmful gases from burnt fuel on the environment, necessarily stated the use of machines using non-renewable sources of energy is not very feasible. Bevel gear-based spreading machines operate on the general principle of moving. The defined bevel gear-based spreading machines have a bevel gear set up to connect the moving axle and the rotating disc. Moving is achieved by physical work done by an operator, which leads to rotational motion of the axle, which is transferred to the disc rod with the help of the bevel gear setup. The bevel gear-based spreading machine is operated by the user to use the disc's rotation or the centrifugal force to spread the desired material around in a balanced quantity.

Keywords: *Bevel gear, axle, centrifugal force, rotational motion*

1. INTRODUCTION

Physical linear motion is used to provide rotational motion to the bevel gear setup and further use the same rotational motion on a different axis to spread and scatter particles of desired materials. The setup of gears changes the axis of motion with the help of the inclined and intersecting tooth setup of the gears.

The bevel gear-based spreading machine will help to resolve the issues of using spreaders generating high amounts of air pollution and effective cost for limited usage on small scale needs.

A bevel gear setup, axle and rotating disc has been set-up to transmit motion from horizontal to vertical axis on using force to generate linear motion of the spreader, which leads to centrifugal force on the disc to spread the desired material.

2. OBJECTIVE

The main objective of making this project is to provide a better alternative of spreading machines for small-scale use, which would not require any source of power. The main aims behind this project are to overcome the need of fuel, reduce human resources and efforts, operating, maintenance and development cost. One of the best parts of the bevel gear based spreader machine is that they are environmentally friendly.

2.1 The major objectives of the project can be summarized as:

- To replace the traditional methods and provide more effective spreading machines.
- To reduce cost and maintenance charges of the fuel based spreaders.
- To make an efficient machine on simple mechanisms which can be operated by unskilled man force

- too.
- To make such a device which should be eco friendly.

3.METHODOLOGY

A rectangle shaped framing section handle, metal sheet, tyres, axle, connecting rod, bearings and a set of bevel gears to convert the axis of motion from horizontal to vertical axis to rotate the disc which would help to spread the material. When force is applied to move the machine in linear direction, the rotational motion of wheels is transmitted to the connecting rod to generate centrifugal force for the material on the disc.

4.LITERATURE SURVEY

S. Ramachandra

In this paper they studied that a large share of the population in India depends on traditional methods of farming, and the main objective of fertilizer broadcasters at sowing time is to uniformly distribute the fertilizer over the entire field[1].

Arun Abraham

He researched and found out that in small-scale farming the farmers have to carry heavy bags throughout the spreading process and found the necessity to develop a fertilizer spreader for small-scale use [2].

Joao P.A.R. Cunha

He studied that the quality of the fertilizer distribution process is important to the success of agriculture. This research aimed to study the distribution uniformity of fertilizers with spreaders capable of performing variable rates. Evaluations were carried out on different farms, in the Southwest region of the State of Goias, Brazil [5].

5. PROBLEM DEFINITION

There is a critical need to automate the horticultural activities (use machines to complete fundamental agrarian practices like water system, weeding, treating, and so on) as it builds the creation and diminishes the wastage of the workforce. Present hardware accessible is exorbitant and not helpful for limited scope ranchers.

By and large in the physical spreading of the manures in the homestead, a portion of the issues are happening like the lopsided spreading of the composts (wrong stuff and wrong sum) which might bring about crop harm.

For the most part in the manual spreading of the manures in the homestead, a portion of the issues that happen like the lopsided spreading of the composts (wrong stuff and wrong sum) might bring about the harvest harm. Regular spreading of manures by hand on a ranch is a tedious strategy and requires more human exertion. So the Bevel gear based spreader machine is reasonably more for horticulture fill-in as it will further develop crop creation effectively and with the least effort.

6.WORKING PRINCIPLE

The model features an all metal skeleton, which is prepared using square shaped hollow steel pipes to provide strength to the system. The lower part of the skeleton has a set of tires connected by a rotating axle. A set of bevel gear, with maximum number of teeth part on the rotating axle and the other one with less number of teeth on the connecting rod is fixed to transmit the rotational motion by the movement of wheels to the connecting rod using the bevel gear system to change the axis of motion.

A container or hopper is installed on the upper part of the system to act as a feeding and storage system while the system is in operation. It feeds the material on the disc to allow spreading all around the desired area with the centrifugal force which is observed by the rotation of the connecting rod.

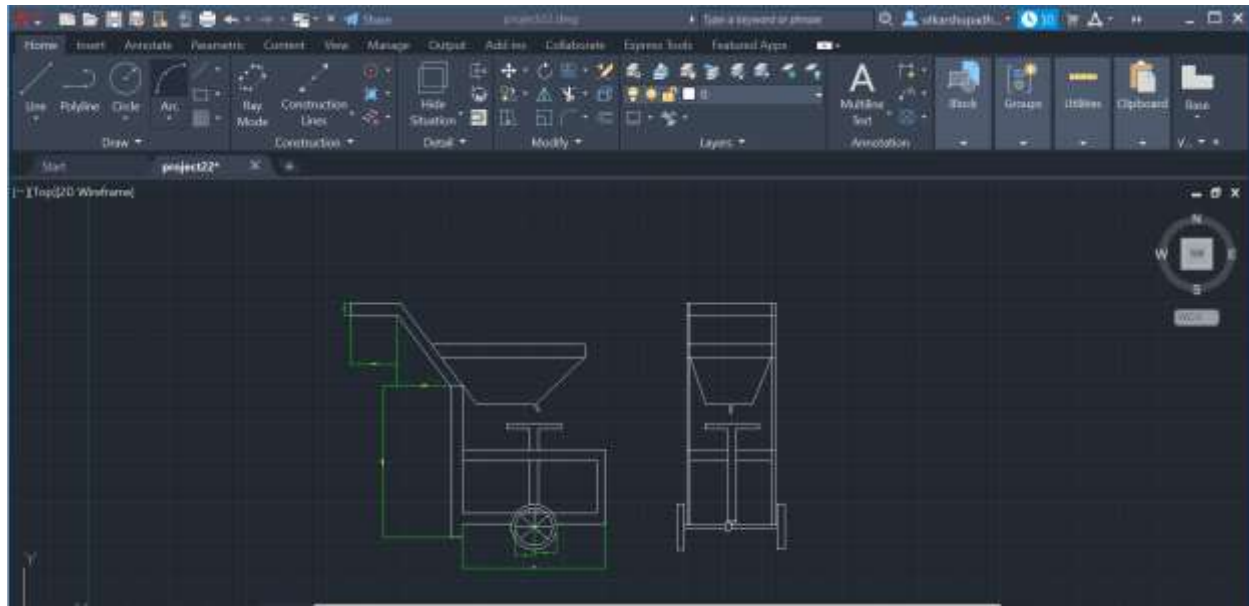


Fig:-2D CAD Model of Bevel gear-based spreading machine.

7. COMPONENTS USED

S.No.	Part Name	Material	Quantity
1	Square steel Rod	Mild Steel	20 feet
2	Bevel gear	Mild steel	1 set
3	Aluminum sheet	Aluminium	1
4	Wheel	Steel	2
5	Mild steel rod	Mild steel	2
6	Ball Bearings	-	2

8. RESULT AND CONCLUSION

The principle objective of our task was to fulfill the need of a spreading machine with least energy consumption, work cost efficient and accessibility as it could be used by a solitary individual. The issues or drawbacks in previous models are decreased in this model. It has tackled the issue of the customary preparation and is eco-amicable to environment.

9. FUTURE SCOPE

1. The device is completely Eco-friendly.
2. Better control of discharge can be achieved using flow control valves.
3. The device is operated manually for now but can be automated using solar energy.
4. It can operate without using any non-renewable energy source.
5. The device can be used by unskilled human forces.

10. REFERENCES

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