

SOLAR OPERATED SOLID FERTILIZER DISPENSING MACHINE

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ABSTRACT

In the recent days it has been found that farmers are unable to gain more crop production by use of conventional agricultural methods. So there is big need for the development of engineering system for compensating these drawbacks. It is well known that by using farm equipment's, farmer's yields more crop productions which ultimately have impact on national economy. Itself it gives prior need of agro equipment's in the field of agriculture. As we can see today, the major problem faced by the farmers is shortage of labor's and also the time required for Fertilization is more. So in order to have solution to it, it was proposed to manufacture a Fertilizer Spreader/Dispenser machine. So, the farmers can work more easy and functional. The proposed machine can be used to dispense solid fertilizers across the field. The proposed concept is driven by solar energy, thus making it eco-friendly and completely green as well as cost free to operate.

Keywords: Solid, energy, dispenser, Solar, Eco-Friendly etc.

I.INTRODUCTION

India is agriculture based country. Near about 70% people of our country are farmers. Our economy also depends on agricultural products. Farming process includes many stages, out of which fertilization is one of the important stages and which is not exploded up to the mark up till now. What we need is an alternative to the traditional as well as tractor operated fertilizer spreading machine which will fulfill all the requirements.

The Present invention relates to a device for spreading granular materials, particularly fertilizers mainly for the solid fertilizer..

Solid chemical fertilizers are one of important sources for plant nutrition, due to its low price compared to liquid chemical fertilizers, they provide the plant with important nutrients needed for growth during the periods of its growing life, and also it works to improve the properties of soil (soil structure and the acidity degree). In fact, there are many types of distribution machines of solid chemical fertilizers, but the most famous one is the centrifugal distribution machine, and this was due to its advantages, low cost, low power necessary, simplicity of mechanical design, ease of maintenance, its high performance, and its wide operation width, but the most important drawback with this machine is the lack of distribution accuracy of fertilizers at the rate desired.

Generally in the manually spreading of the fertilizers in the farm, some of the problems are occurring like uneven spreading of the fertilizers (wrong stuff and wrong amount) which may result in the crop damage.

Moreover the conventional spreading of fertilizer by hand in a farm is more time consuming method and require more human effort.

This project deals with the concept of solar powered fertilizer dispensing machine which uses solar energy to dispense fertilizers across the field using the mechanisms completely driven by solar energy.



Fig:Traditional way .

II.LITERATURE REVIEW

Parish and Chaney (1986) showed that the increase of the plate speed had small effect on the distribution pattern, but they expected that low speeds may adversely affect and substantially changes the pattern. They explained that by the fact that the friction and air resistance decrease the particle speed.

Parish (1987) indicated that the pattern quality deteriorates when the speed varies substantially from the speed at which the spreader is designed to operate. He also added that the pattern changes do not differ statistically significant unless the speed is varied approximately 25 percent.

Olieslargers et al. (1996b) showed that the spreading width of transverse distribution pattern increases with increasing angular velocity of the disc because the particles have a higher initial outlet velocity. As the relative amount of particles is higher for a lower angular velocity because the same amount is spread on smaller area

Abd El-Mageed et al. (2006) developed a locally broadcasting machine by linking an electronic circuit that capable to control automatically the flow rates of the fertilizer metering mechanism with respect to forward speed of the machine. The developed spreader was tested and evaluated under controlled and field 8 conditions. The results indicated that the 30 cm spinner diameter gave good distribution pattern for all investigated feed rates, blade angels and fertilizer types.

III.PROBLEM DEFINATION

Generally in the manually spreading of the fertilizer in the farm there are some of the problems is occurring like uneven spreading of the fertilizer which may result in the crop damage, it is very time consuming method etc. here is listed some of the most common and major problem of the manually spreading of the fertilizers and try to eliminate by this invention.

IV.OBJECTIVES

The main objectives of the project are to develop a portable low cost machine which can be

- Used by farmers to dispense solid fertilizers evenly in the field easily
- To make the machine Solar Powered which makes it portable as well as eco-friendly to operate.
- To make it economical
- To ensure fertilizer gets spread evenly
- To make the machine easier for farmers to operate.
- **WORKING PRINCIPLE**
- . The proposed concept deals with the development of solar powered fertilizer dispensing machine. As shown in the conceptual diagram, the machine consists of solar panel which generates electrical energy. The generated electrical energy is stored in battery using the charge controller. The machine consists of a mechanism and a hopper to store solid fertilizers. The hopper can be opened and closed using hand operated clutch. When the machine is started, the drive train uses solar energy to drive the motor which runs centrifugal dispensing mechanisms. The fertilizers are dropped onto the mechanism from the hopper which are dispensed in the field.

V.DEVOLPING PROCESS OF MACHINE

1) Selection of frame material:

Since the frame or chassis forms the integral part of the project on which all the other components can be mounted, care has to be taken while choosing th material for the frame of the project.

2) Choosing the optimum drive system:

A proper drive system is needed for transmitting the power from motors to the spinning disc. Thus it is necessary to select the drive systme in such a way that it is most efficient to with minimum maintenance.Also the slected drive system for spinning the disc should have a proper transfer of energy and have least maintenance.

3) Hopper Fabrication:

The hopper is ued for storing the fertilizers for spreading. The hopper is proposed to be made using 1.6 mm sheet metal using welding and cutting.

4) Chassis Fabrication:

With the selected frame the next step is fabrication of the chassis. The chassis should be so fabricated that is is light weight , withstaand all the forces and should have sufficient space for mounting all the components.

5) Solar panel and Power system:

In this phase the solar power system is incorporated. This involves adding the solar panel , the charge control systems and battery unit to the project.

6) Testing:

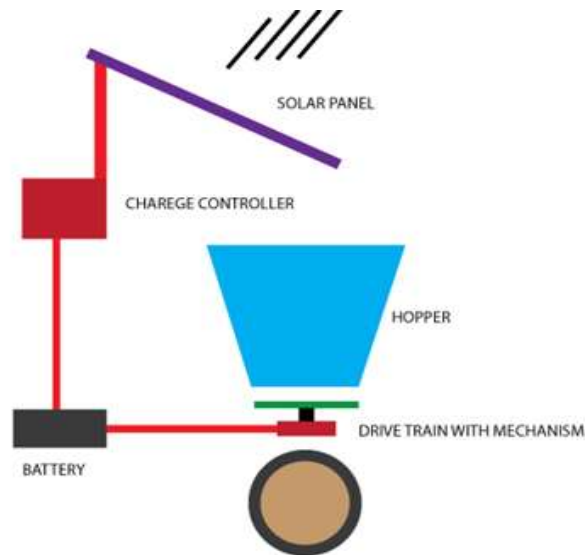
After everything is fabricated the final step is assembly of the required components. The assembly stage is followed by testing and ruther optimization if required.

VI. DESIGN OF MACHINE

The machine contains various components which are mainly used for dispensing of solid fertilizers. The components are,

1. Frame
2. Solar panel
3. Charge controller
4. Battery
5. Drive train
6. Hopper

These components are essential in working process of the solar powered solid fertilizer dispensing machine



VII. ADVANTAGES

- Time savings.
- Less fatigue to labor.
- High speed Fertilization.
- Applicable for small and medium farms.
- No electric power required.
- Easy to operate, as no skilled operator required.
- Easy to assemble.
- It is pollution free.
- Maintenance cost is low.

VIII. LIMITATIONS

- Battery Maintenance may be required.

IX.APPLICATIONS

Farmers :

Agriculture forms the backbone of our country economy. About 50-60% of citizens are depending on agriculture. For developing our country means providing our farmers with more advanced technology or tools, which would reduce overall time and cost required for work. This would make work more easy and comfortable.

X.CONCLUSION

- With this machine we can.
- Reduce human effort.
- Increase continuous work capacity.
- Increase efficiency than conventional system.
- Less harmful to user.

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