

Design and Fabrication of Engine Powered Mulching Machine

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ABSTRACT

To meet the growing needs of the farmers who wish continuously to improve the profitability of their farming they use more efficient materials and machineries. One of the methods to achieve this is to use mulching paper technique mulching paper laying machine, lay mulching paper and Making Holes on the paper to provide plantation of Plant. Also it will cover the paper with the soil on its either sided edges to avoid the deflection of paper from its positions because of various areas on such as disturbance from wind. In ancient ways of laying mulching paper is done with help of labours but due to this the paper is damage and it is a time consuming process. This machine will avoid the wages of labours used for laying mulching paper as compared to conventional method which is not that much accurate and easy. This paper looks at working and design parameters of mulching paper laying machine for minimizing the human efforts and increasing productivity of crops. In this project, we have tried to develop a new mechanism for Laying of Mulching paper For the Plantation of Plants such as chilies, tomatoes, brinjal etc. here we have used the concept to manufacture the proposed mechanism.

Keywords: Lay Mulching Paper, Making Holes Etc.

INTRODUCTION

Machine will avoid the wages of labours used for laying mulching paper and making hole on it as compared to conventional method which is not that mulch accurate and easy. In this project, working and design efforts and increasing productivity of crops is considered as main objective equation. The main objective of this development of mulching machine for spreading of mulch paper for covering of soil in order to provide a barrier to soil pathogens, to limit the water losses and conserve moisture, to maintain a water temperature even during night time which enables seeds to germinate quickly and for young plant to rapidly establish a strong root growth system with the aim to assess and determine minimum justified annual utilization of mulching machines of various manufacturers from the economy point of view. The Name of our project is automatic mulching paper laying machine. It spreads mulching paper and makes holes on it in one pass for plantation for tree.

LITERATURE REVIEW

Mr. Sumant Balli In recent decade the demand for plastic mulch laying machine has been drastically increased throughout the world. The plastic laying mulch machine will benefit the farmers in controlling weed, moistening of soil, increasing of soil nutrients, reduction of insect's pests and high crop yield. In this paper, seek to design the plastic mulch laying machine that includes a sliding fit mechanism to adjust the variable size of bund making, press wheel and hoeing blade. The plastic mulch laying machine is a combination of main frame, bund making frame, drip pipe roller, mulch roller, hoeing blades, punching wheel and belt drive mechanism. This machine will perform operations like bund making, drip pipe laying, mulch laying, soil covering and punching mulch sheet in one pass. The plastic mulch laying machine will resolve the problems like laying the mulch, punching mulch sheet at explicit positions and laying the drip pipe.

Mr. Akshay Patil This paper will flash on the history of mulching, current methods and operations with the individual costing compared to conventional methods. Reducing the input cost and increasing the output is the main motto of agriculture now a days. But due to rainfall problem and draught in some areas, it is essential to conserve the water and make optimum use of it .Hence, the best way of optimization of water is the Mulching and Dripping method Mulching is the effective method to reduce the rise of weeds around the plants and make optimum use of water by conservation moisture. The initial cost of mulching and dripping by manually is very high and it should reduced. For that purpose we are designing and fabricating such a machine that it will perform several operations like- bed formation, drip pipe laying on bed, mulch paper laying, covering the mulch paper and finally making holes on the mulch paper simultaneously in one pass of the machine.

Mr. Leslie .E. Bailey First working model of mulch laying machine was developed by Leslie.E.Bailey in October22, 1921. The mechanism was horse pulled and had a rotary drum arrangement to lay the paper. In mid 1930s the mulching paper laying machine was used while being powered and pulled by horses. Prior to the invention of the mechanism. The mulching paper was laid by simply unrolling the winded paper roll through manual labor. This technique was both time consuming as well as tedious and not efficient. The use of horses was verymuch effective than the manual process and hence preferred on large scale.

Mr. Jagvir Dixit First working Abstract: A tractor drawn mulch laying machine was developed in order to integrate the operations and fix the anomalies in terms of labour associated with conventional mulch laying operations. The prototype integrates the operations of bed making, drip line laying, mulch laying, mulch covering and punching hole on mulch in one pass. The developed prototype was evaluated at three-levels of forward speed (3.0, 5.0, 7.0 kmh⁻¹), two- levels of bed width (76.2, 91.4 cm) and two- levels of dibbling hole spacing (15.2, 20.3 cm). The results of evaluation experiment for the developed machine showed that the draft requirement decreased with the increase in forward speed (3.0 to 7.0 kmh⁻¹), bed width (76.2 to 91.4 cm) and dibbling hole spacing (15.2 to 20.3 cm). Field efficiency increased. With increase in forward speed, bed width and spacing of dibbling holes.

Although at low speed (3.0 kmh⁻¹), the actual field capacity and field efficiency decreased about 57% and 5.0%, respectively while draft increased about 36 %, compared to the speed of 7.0 kmh⁻¹. However, at a speed of 3.0 kmh⁻¹, the mulch damage, un-covered mulch percentage and missing of dibbling hole decreased about 65%, 64% and 7.0 %, respectively. Zhcharias steinmetz et al. proposed comprehensive research with aim of gaining an extensive understanding of the process governing the in act of mulching on soil quality it needed in order to assess the contribution of plastic mulching future research should focus on more detailed soil characterization technique.

C.Subramanian et al. (2011) have investigated the design and evaluate the performance of double bolted end joint for thermoplastic composite leaf spring. Injection molded 20% glass fiber reinforced polypropylene leaf springs were considered for the joint strength evaluation. Servo hydraulic test facility is utilized to evaluate the static and fatigue performance of the bolted joint. Various bolt sizes were utilized for the joint and its performances were evaluated under static loading condition to understand the effect of fit between bolt and its hole of the joints. Influence of clearance between the fastener and composite plate hole on bearing strength of the joint under static loading condition is found to be significant. Increase in joint strength is exhibited with the decrease in clearance. However for the investigated range of clearance, failure morphology is found to be same.

List of Construction Material Following are the main components used in project—

1. Pedestal Bearing
2. Ball bearing
3. Petrol Engine

1. Pedestal Bearing

This bearing is fitted in solid structure by nut-bolt joint. These four bearing is used in model in two axle end. A pillow block refers to any mounted bearing where in the mounted shaft is in a parallel plane to the mounting surface, and perpendicular to the center line of the mounting holes, as contrasted with various types of flange blocks or flange units. A pillow block may contain a bearing with one of several types of rolling elements, including ball, cylindrical roller, spherical roller, tapered roller, or metallic or synthetic bushing. The type of rolling element defines the type of pillow block. These differ from "plummer blocks" which are bearing housings supplied without any bearings and are usually meant for higher load rating sand a separately installed bearing. The fundamental application of both types is the same, which is to mount a bearing safely enabling its outer ring to be stationary while allowing rotation of the inner ring. The housing is bolted to a foundation through the holes in the base. Bearing housings may be either split type or solid type. Split type housings are usually two piece housings where the cap and base may be detached, while others may be single-piece housings. Various sealing arrangements may be provided to prevent dust and other contaminants from entering the housing. Thus the housing provides a clean environment for the environmentally sensitive bearing to rotate free from contaminants while also retaining lubrication, either oil or grease, hence increasing its performance and duty cycle.

2. Ball bearing

These ball bearing is for rolling the mulch paper bundle. This two bearing is used in front of model by horizontal placed shaft. A ball bearing is a type of rolling-element bearing that uses balls to maintain the separation between the bearing races. The purpose of a ball bearing is to reduce rotational friction and support radial and axial loads. It achieves this by using at least two races to contain the balls and transmit the loads through the balls. In most applications, one race is stationary and the other is attached to the rotating assembly (e.g., a hub or shaft). As one of the bearing races rotates it causes. The balls to rotate as well. Because the balls are rolling they have a much lower coefficient of friction than if two flat surfaces were sliding again teach other. Ball bearings tend to have lower load capacity for their size than other kinds of rolling- element bearings due to the smaller contact area between the balls and races. However, they can tolerate some misalignment of the inner and outer races.

3. Petrol Engine

Petrol engine (British English) or gasoline engine (American English) is an internal combustion engine with spark-ignition, designed to run on petrol (gasoline) and similar volatile fuels. In most petrol engines, the fuel and air are usually pre-mixed before compression (although some modern petrol engines now use cylinder direct petrol injection). The pre-mixing was formerly done in a carburetor, but now it is done by electronically controlled fuel injection, except in small engines where the cost/complication of electronics does not justify the added engine efficiency. The process differs from a diesel engine in the method of mixing the fuel and air, and in using spark plugs to initiate the combustion process. In a diesel engine, only air is compressed (and therefore heated), and the fuel is injected into very hot air at the end of the compression stroke, and self-ignites. A petrol engine, also known as a gasoline engine, is an internal combustion engine that runs on petrol. Petrol engines can also be adapted to run on other fuels, such as liquefied petroleum gas and ethanol blends. Petrol engines work on the Otto cycle, which involves two isochoric processes and two isentropic processes.

In a petrol engine, air and petrol are mixed in a carburetor before being introduced to the cylinder. Once the air and petrol are compressed, the fuel is ignited by an electric spark.

CONCLUSION

This process leads to preparation of raised seed bed, spread mulch film and anchoring of edges of film. If this process done manually then it requires number of persons for laying the plastic over the soil bed and also for shovel the soil onto the edges of the mulch and then these overall manual process tends to be very time consuming, labour intensive, tedious and costly. So working through this machine is more efficient to do. Above discussed parameters will definitely provide the basic ideas associated with mulching laying machine.

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