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AN ERGONOMIC APPROACH TO DEVELOP MACHINE FOR EXTRACTING THE RESIDUAL COTTON PLANT STEMS

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Abstract

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In the remaining stalk and root system usually left behind by shredders and mowers, the cotton residues puller removes each residue entire root system, effectively breaking up the life cycles of insects. This single machine has two systems and the effectiveness of this Cotton residues Puller lies in those two-part system that is incorporated into a single machine. While its operation, the tandem, shaft-mounted, heavy-duty turf tires rotate against one another to grip the stalks, while the forward motion of the tractor pulls the stalks and root systems out of the ground and then releases them. The objective of this thesis is to design a residues removal machine which can remove maximum residues from the field with an adjustable arrangement in machine for every distance between the plants in a row or column. The construction of machine should be simpler in design and easily fabricated in small workshop so as to minimize the cost of machine so that maximum possible farmer can afford to buy or construct such machine in small workshop at lower cost.

INTRODUCTION

In Current scenario of India, the Stalk removal from the agriculture field is still not fully mechanization and the cost of machines available is so high which cannot be bear by most of the farmer, Because in most of state stalk removal machinery manufacturer is not available which is very different case as compare with Punjab Having varieties of option of different agriculture machineries at lower cost. After the food grains pick from the field the stalk will remain on the field which has extract from the field, removal of such unwanted dried plants from the field is very difficult task as it is time consuming but still in most of state it is done manually because of high cost of machinery. And the available machine also can not remove the 100% stalk from the field which further needs to remove manually. To remove 100% stalk from the field the plantation should be done on same distance for every row and column. So in a field where the plantation is not in same order stalk removal machinery is not efficient to remove maximum stalk from the field. So our objective is to design a stalk removal machine which can remove maximum stalk from the field and there should be an adjustable arrangement is

machine which is can suitable for every distances between the plants in a row or column. And the construction of machine should be simple in design and easily manufacture in small workshop as well to minimize the cost of machine so that maximum possible farmer can buy or construct such machine in small workshop at lower cost.

Utilization of Plant Stalk

Plant utilization has a greater prospective in this century, as we know Cotton Stalk and Sugarcane Stalk is widely used for various purpose like. Soft Board, Hard board, Particle Board, Domestic fuel and mushroom growing which drastically reduces the use trees wood to make furniture's. And other food grains stalk is used as food for different animals.

Problem Identification

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After the food grains pick from the field the residues will remain on the field which has extract from the field, removal of such unwanted dried plants from the field is very difficult task as it is time consuming but still in most of state it is done manually because of high cost of machinery. And the available machine also can not remove the 100% residues from the field which further needs to remove manually. To remove 100% residues from the field the plantation should be done on same distance for every row and column. So in a field where the plantation is not in same order residues removal machinery is not efficient to remove maximum residues from the field.

Summary of Invention

The Present invention provides a method and apparatus for processing of crop stubble, in particular, cotton stalks, simultaneous with the process of harvesting. Thus, the present invention saves time, labor, fuel and decreases harm to the environment by reducing carbon emissions. The cotton picker stalk eliminator kit is designed to be attached to the rear of the cotton picker harvesting

head on a cotton harvester. The kit provides housing in alignment with channel that the cotton plants exit the picker head. The kit is driven by the cotton picker head in relationship to the head speed so the speed of the kit is always in proper relation to the picker head speed and thereby in relation to ground speed. As the cotton stalk exists the harvesting spindle area, and the cotton has been removed by the picker head, the stalk moves through the exit of the picker head and into the housing of the stalk eliminator apparatus, The cotton plant stalk will then come in contact with the blade, preferably once or more peripheral blades with four cutting edges on each. The blades lift the cotton stalks from the root and damage the stalks significantly. Some short stubble that does not affect future planting preparation may be left in the ground.

The upper part of the cotton plant is loosened and contacts a directing device that moves the upper portion of the plant stalk downward toward the blade area. The directing device includes a selection of a fixed angled member, a rotating walker, or tapered angled auger. In one embodiment, a rotating walker includes arms that engage the stalk as the walker turns to move the stalks downward and releases the stalks as

the arms rotate through them, In another embodiment, an auger angles downward toward the rear of the harvester and upward toward the picking heads. The auger may protrude in to the picking head where it will first contact the cotton plant. The auger causes the upper portion of the cotton plant stalk to move downward as it moves to the rear of the eliminator housing where the stalk is fed into the blade or blades. As the upper portions of the stalks fall into the blade with the assistance of the directional device above, the blade further damages or breaks up the stalk. The combination of the directional device and blade ejects the stalk rearward of the eliminator housing.

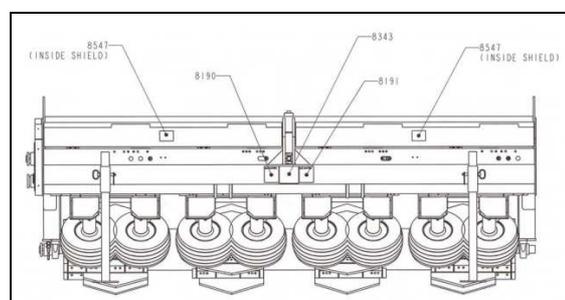
Present Invention

Amadas (2007) "Hi-Speed Cotton Stalk Puller/Chopper SPC-4/SPC-6" This new system provides you with a significant advantage over conventional mowing and disking. The Cotton Stalk Puller/Chopper removes each stalk's entire root system, effectively breaking up the life cycle of insects and diseases that overwinter in the remaining stalk and root usually left behind by shredders and mowers. The effectiveness of the Cotton Stalk Puller/Chopper lies in the two-part system

that is incorporated into a single machine. The tandem, shaft-mounted, heavy-duty turf tires rotate against one another to grip the stalks, while the forward motion of the tractor pulls the stalks and root systems out of the ground and then releases them. The rotary blade cutting system at the rear of the machine then chops the stalks and roots into small pieces. The AMADAS Cotton Stalk Puller/Chopper is designed to operate at high speeds and handle the toughest stalks. The SPC-4 is adjustable for 36", 38", or 40" row widths; the SPC-6 is adjustable for 36" or 38" rows



Figure-1 Hi-Speed Cotton Stalk Puller/Chopper



**Figure-2 Hi-Speed Cotton Stalk
Puller/Chopper (Sketch)**

Plant Residual Removal Machine

Based on all the above review paper's the available machine can not remove the 100% stalk from the field which further needs to remove manually. To remove 100% stalk from the field the plantation should be done on same distance for every row and column. So in a field where the plantation is not in same order stalk removal machinery is not efficient to remove maximum stalk from the field and in most of state it is done manually because of high cost of machinery. So the aim of this machine is to remove Maximum Plant Stalk from the field, flexible for any field and should be fabricate in small work shop at lower Cost.

Working Principle:

First the rotation is taken from the output shaft [6] from the tractor, whose rpm is ranging from 500 to 700 and engine rpm is

ranging from 1100 to 2000. The rotation from the tractor shaft is then transfer to the chain drive [10]. Which rotates one tyre [1] of each pair having total three pair, other tyre of each pair is mesh with rotating tyre so that they will rotates in opposite direction.

So when Plant Stalk comes in contact between two tyre it allow to pass through between two tyre by spring arrangement in other tyre and it gets pulls between two tyre. Two C channel [3] attached together with slotted holes to carry 3 pair of tyres which can be adjusted in a slotted arrangement as per requirements on the field and the tyres shaft are allow to rotate in bearing housing [2]. This C channel can be placed on the two outer plates where the height of Channels can also be adjusted as per requirement in the field. And the complete arrangement can be run on the field by using outer two tyres connected to outer plate[4] Concept Drawing of this Machine is shown in figure(8).

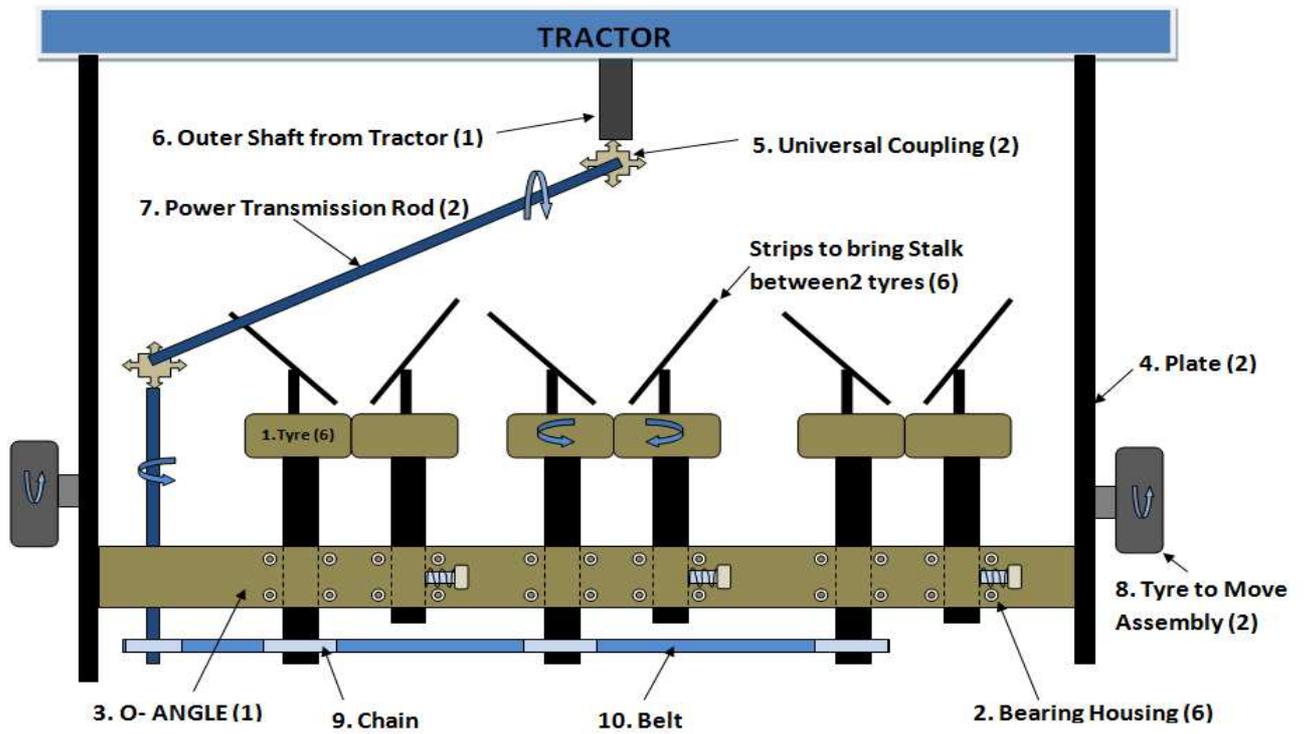


Figure-3 Concept Drawing of Plant Residual Removal Machine

Description Of Individual Parts

1. Pair of tyres: Tyre will mount on the tyre shaft which rotates in the bearing housing and complete 3 pairs will mount on a Slotted assembly of C channel. (Dimension will decide based on research paper)
2. Bearing Housing: To hold and rotate the pair of tyre (Standard bearing housing will Select)
3. C- Channel: It is used to hold pair of tyre and bearing housing in slotted arrangement (Standard C-Channel will Select then slotted arrangement will do as per requirement).
4. Outer Plate: It is used to carry C-Channel at various desire height. (After finalizing 1.2 & 3. It will make using sheet metal cutting and drilling)
5. Universal Coupling: To transmit power from tractor shaft to chain drive. (Standard bearing housing will select).
6. Remaining Parts (Shafts, Outer tyre and Plate): Shaft, Outer tyre and Plate will select as standard available Parts in the market after Finalizing 1 to 5 Parts.

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