



Groundnut Pod Removing and Separating Machine

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Abstract

In India, most of land used for agricultural purpose which produces semi-finished product or goods. Groundnut is one of the agricultural semi-finished goods. Groundnut is grown on small scale farmers in developing countries like India. The average kernel price is approximately twice the price of pod. Lack of groundnut pod removing machines, especially groundnut pod, is a major problem of groundnut production, especially in our country India. In the recent condition the pod were separated from groundnut by the workers. They simply decoct the groundnut by their hands and separate the pod from its roots. The output got from this method, was very low and it does not fulfil the market demand because it was very time consuming process. A research-work for design, fabricate, and performance evaluation of a groundnut pod removing machine consisting of belt conveyer with a flow rate control device, separating unit and power system. The performance of the machine was evaluated in terms of throughput capacity, separating efficiency, material efficiency and mechanical damage. The regression models that could be used to express the relationship existing between the pod separating performance, pod moisture content and feed rate were establish. Overall, this project involves processes like design, fabrication and assembling of different components etc. By keeping the point in our mind, we think that we should make such a machine, whose production capacity is more & machine gets operated on electric motor instead of manual work. The new and small former or business man can start their business by investing less capital. So working on the above points, we design and fabricate a new medium production capacity machine and today we proudly present this machine called groundnut pod separating machine.

Index Terms: design and fabrication, groundnut pod, separating machine, locally sourced materials.

1. INTRODUCTION

India is an agricultural based country. Since last 50 year's lot of changes has been occurred in agriculture sector. Many new agricultural based industries have been started new varieties and species of plant have been discovered. In our country most of the people are dependent on the agriculture sector/field. The Groundnut is one of the major product in the some regions. The product in the farms in abundant quantity. There is lot of time waste in old method of groundnut pod separating.

In some region people collect the groundnut from the groundnut plant directly for pod separating purpose. The groundnuts are spreads on the ground and the pod of groundnut plant can be separated manually. Because of this method lot of time waste takes place as well as due to striking process some ground nut can be brakes of damage.

But by using the groundnut pod separating machine we separate the pod from groundnut plant efficiently and large quantity in very less time. So we increase the work capacity and saving the time efficiently & effectively. So our machine is very useful to separating the pod from groundnut plant.

2. LITERATURE REVIEW

Mr. Mohanasundaram, a small groundnut farmer from Nasiyanur village, Erode district has developed a portable groundnut pod stripper. The machine is powered with a help of a 0.25 HP electrical motor.

"The cylindrical type machine is closed on all the sides except for three openings, one on the top and the other two at the bottom. The uprooted plant with the pods is fed through the opening at the top where a spiked cylinder is fitted and through the opening at the bottom the broken pods are collected. The fine dust and other particles are thrown out through the third outlet. It is designed in such a way that two men can simultaneously work on it and is gender friendly," says Dr. p. Alagesan, Programme Coordinator, Mysore Resettlement and Development Agency (Myrada), KVK, Erode district.[1]

3. PROBLEM STATEMENT

Aim of proposed work is to reduce the time for separating groundnut pod from the plant and to reduce the human efforts.

4. OBJECTIVE

The main aim of this project is to overcome the traditional method.

- 1) To minimize the time for separating the groundnut pod from plant body.
- 2) To minimize manpower.
- 3) To improve efficiency of operation of separation of groundnut pods from plant body.

5. EXISTING SYSTEM

The existing system is used for shelling of pod with manual removing of groundnut plant from the land.

6. PROPOSED SYSTEM

Automatic removing of groundnut plant from the land with pod separating mechanism i.e. "Groundnut pod removing and separating machine".

7. WORKING PRINCIPLE

- a) It consists of A.C. motor and shaft arrangement by which motion transmits from motor to spoke wheel.
- b) When we move the machine over the plant field then the plants are grabs between the belt conveyers by giving rotation to the belt conveyer.
- c) So that plant get shifted from bottom to the upper part of the belt conveyer when it comes in the spoke wheel the plant and pod get separated.
- d) Due to gravity the pod get collect in the tray and remaining leaves are shifted in the other tray which is located at the last of the belt conveyer.

8. CONSTRUCTION AND WORKING



Fig No 1: Experimental setup of groundnut pod separating and removing machine

The machine consists of the following parts:-

1) Feeding conveyor belt:-

These two feeding conveyor is used to collect crop from ground level and feeding conveyor material is rubber. Flat belt on these belt teeth is require for gripping the crop. [2]



Fig no.2: Timing belt

2) Main Pulley:-

The main pulley is V- belt pulley mounted on the input shaft by means of an alien head grub screw. This pulley is a reduction pulley that is time reduces the motor speed 5 times so also torque available at machine input shaft is amplified. [2]



Fig no.3: Pulley

3) Motor:-

The motor is a single phase AC commutator motor, 0.5 hp power meaning that the speed is infinitely 1440 rpm. The motor is mounted on the base plate and is connected to the input shaft by means of a v belt.

4) Input shaft:-

The input shaft is held in ball bearing supported in the central bearing block. The input shaft carries reduction pulley at one end whereas the input crank at the other end. The input crank is fixed on the input shaft and carries the fork at the other end.

5) Fork:-

The fork is connected to the input crank at one end where as it is connected to the output shaft at the other end by means of fork pin. [2]

6) Output shaft:-

The output shaft is a vertical member which is supported in two bush bearing an either ends that are held in suitable bearing blocks. The arrangement converts clockwise rotation of output shaft. When input shaft turns form 0 to 180 degrees, but during this operation or motion conversion the output also moves in the axial direction, Which needs to be constrained, hence an spring is incorporated in the setup.[2]

7) Almond coupling:-

Coupling that can converts rotary motion into oscillating motion. [2]

8) Spoke wheel:-

The spoke wheel with the inclined shaft at its upper end located just below the upper end of conveyer.[2]

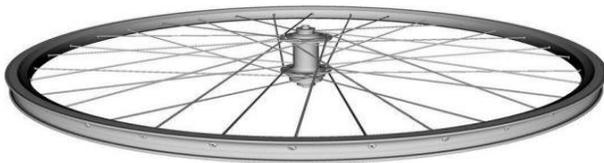


Fig no.4: Spoke wheel

9) Base plate with Bearing housing:-

The base plate is the base member that supports the bearing housings. [2]



Fig no.5: Base plate with bearing housing

9. TRANSMISSION SYSTEM

The mechanical power produced by prime mover is used to drive various machines in the workshop and factories. A transmission system is the mechanism, which deals with transmission of the power and motion from prime mover to shaft or from one shaft to the other. The machine tool drive is an aggregate of mechanism that transmits motion from an external source. To the operative elements of the machine tool. The external source of energy is generally a single phase A.C. motor, which has a rotary motion at its output shaft.

The rotary motion of the motor is transmitted to the operative element to provide an operative working or auxiliary motion. When the required motion is rotary; the transmission takes place through mechanisms that transfer Rotary motion from one shaft to another.

Transmission of the motion from the external source to the operative element can take place through Mechanical elements such as belts Gears, chains etc.

Mechanical Transmission and its elements: -

- a) Belt Transmission
- b) Gear Transmission
- c) Chain Transmission

a) Belt Transmission: -

Belt drive is one of the most common effective devices transmitting motion and power from one shaft to the other by means of thin inextensible belt over running over to pulleys. This largely used for general purpose on mills and factories especially when the distance between the Shafts is not very great.

When the centre distance between the two shafts is large than the tight side of the belt should be the lower one the pulley called driver is mounted on the driving shaft while the shaft while the other, which is mounted on the shaft to which power is to be transmitted is called the driven pulley or follower.

When the belt moves over the pulleys there is always the possibility of slipping between the belt and pulley and hence

the character of the motion transmitted is not positive when positive action is required. Gears and chain must be used. [1]

b) Gear Transmission: -

Efficiency of power transmission in belt and rope drives is less. The power may be transmitted from one shaft another by means of mating gears with high transmission Efficiency and a gear drive is also provide when the between driver and follower is very small.[3]

10. FUTURE SCOPE

The agriculture is the basic profession of vast of population world-wide .Some modifications can be done in this machine And it will be used over long scale. This machine provides better help to farmers so that they can get proper income of Their crop. The scope in agricultural field is tremendous. It will definitely be a vast sector to work on to minimize man Power and improve efficiency of operation, decrease cost of operation, decrease efforts. The world is growing so fast and all want healthy food for healthy life. This food comes from agriculture. So the crop handling techniques should be efficient to keep it healthy. The new innovations in agriculture field will not only help farmer but also beneficial to fulfil demand by not causing price-hike.

11. CONCLUSION

1. Atomize machine is better option for farmer to use instead of manually operated.
2. The demands of atomize Groundnut Pod Separating Machine” for farmer & other customers will be also considered. Since this machine is made for small businessman or for farmers, therefore the work carried out by this machine is less.
3. The capital required for purchasing the bigger size groundnut decorticator is very high or the cost required for decorticating the groundnut on the job work is also more. In comparison these “Groundnut Pod Separating Machine” is very cheap.
4. In the process of completion of the project work our ideas and thought are development towards the mechanisms and technologies of the equipment. We also visualized that this “Groundnut Pod Separating Machine” is the most critical equipment for the future growth and development of cottage sector projects.

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