# Design and Fabrication of Groundnut Harvester and Thresher

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**ABSTRACT:** In India, most of land use for the agricultural purpose which produces semi-finished product or goods. Around 65% of people depend on agriculture as the main occupation. Groundnut is also one of the agricultural semi-finished goods. Among the many fast-growing cash crops, small farmers have always looked after groundnut as the main crop to cultivate, but the major problem in growing the groundnut crop is harvesting and threshing .Digging or pulling of groundnuts from the soul is a labourers and time consuming process . One of the solutions for increasing the profit and productivity is to mechanize both harvesting and threshing operations in groundnut cultivation. For mechanizing these operations, tractor operated groundnut harvesters, and ground threshers have been developed. Hence a machine similar to the rice/wheat combine is the present need of the farmers through which harvesting and threshing of groundnut crop could be taken up simultaneously. Sensing the success of a combine harvester and thresher for rice/wheat, we have decided to develop and fabricate a combine harvester and thresher machine for the cultivation of groundnut.

**Index Term :** Automated, folding, stitching, box making, bags.

## I. INTRODUCTION :

Harvesting and threshing of groundnut are the most important and labour intensive operations in groundnut cultivation. Present practice of manual harvesting and threshing consumes huge amount of labour to the magnitude of 84 man-h ha-. During peak seasons, due to non-availability of labour in time, delay in harvesting and threshing resulted in heavy loss to the farmer. In addition, the migration of agricultural labour force from the rural areas aggravated the problems to the farmers. One of the solution for increasing the profit and productivity is to mechanize both harvesting and threshing operations in groundnut cultivation. For mechanizing these operations, power operated groundnut harvesters, and ground threshers have been developed. Even though the harvesters and threshers have been. Developed, their adoption level is very low due to varying power requirements and individual operation leads to the requirement of separate machine. Hence a machine similar to the rice/wheat combine is the present need of the farmers through which harvesting and threshing of groundnut crop could be taken up simultaneously. Sensing the success of rice/wheat combine, the development of a tractor operated groundnut combine was contemplated.

Harvesting and threshing of groundnut are the most important operations in groundnut cultivation. During peak seasons, due to the non-availability of labour in time, delay in harvesting and threshing results in heavy loss to the farmer. For alleviating the labour problems during peak seasons and for accomplishing the timeliness of operation an attempt was made to develop a groundnut combine harvester. As the combine harvester has to perform the dual operations *viz.*, harvesting and threshing, the groundnut harvesting mechanism, conveyors and threshing mechanism have to be mounted integrally to carry out harvesting and threshing simultaneously.

**Problem Formulation :**

Present practice of manual harvesting and threshing consumes huge amount of labour.

During peak seasons, due to non-availability of labour in time, delay in harvesting and threshing resulted in heavy loss to the farmer .Even though the power operated harvesters and threshers have been developed, their adoption level is very low due to varying power requirements and individual operation results in heavy loss to farmers .Lack of groundnut processing machines at affordable cost, is a major problem of groundnut production.

## II. THE CONSTRUCTION DETAILS OF DESIGN AND FABRICATION OF GROUND HARVESTER AND THRESHER ARE AS FOLLOWS :

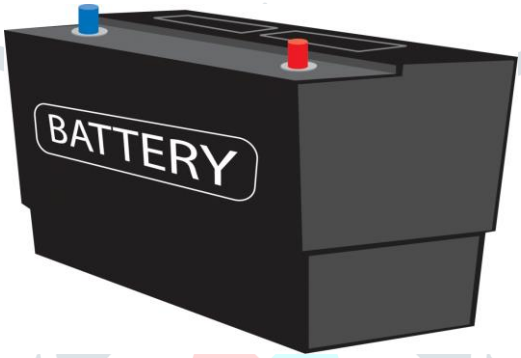
- Motor
- Battery
- Pulley belt Mechanism
- Convery Belt

- DC Motor

A DC motor is any of a class of electrical machines that converts direct current electrical power into mechanical power. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodically change the direction of current flow in part of the motor. Most types produce rotary motion; a linear motor directly produces force and motion in a straight line.

- Battery

An electric battery is a device consisting of one or more electrochemical cells with external connections provided to power electrical devices such as flashlights, smart phones, and electric cars.[1] When a battery is supplying electric power, its positive terminal is the cathode and its negative terminal is the anode. The terminal marked negative is the source of electrons that when connected to an external circuit will flow and deliver energy to an external device. When a battery is connected to an external circuit, electrolytes are able to move as ions within, allowing the chemical reactions to be completed at the separate terminals and so deliver energy to the external circuit. It is the movement of those ions within the battery which allows current to flow out of the battery to perform work. Historically the term "battery" specifically referred to a device composed of multiple cells, however the usage has evolved additionally to include devices composed of a single cell.



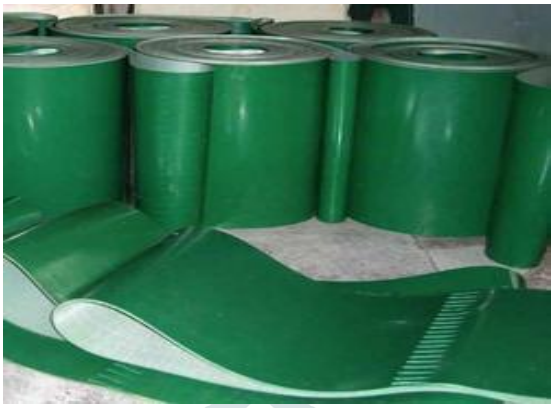

- Pulley cover Mechanism

A pulley is a wheel on an axle or shaft that is designed to support movement and change of direction of a taut cable, supporting shell is referred to as a "block." A pulley may also be called a sheave or drum and may have a groove or grooves between two flanges around its circumference. The drive element of a pulley system can be a rope, cable, belt, or chain that runs over the pulley inside the groove or grooves.

Pulleys are also assembled as part of belt and chain drives in order to transmit power from one rotating shaft to another.

- Conveyor Belt

The conveyor belt of size 3 meter with 100 mm width and 3 mm thickness is used to carry fabric material over a central distance of 1412 mm. The motor is equipped with motor driver and microcontroller is used to give power to the conveyor. Here the flat belt is used which has the gripping material on one side to have grip over the inclined pulley.



## III. WORKING :

The groundnut combine with the following components should perform the desired functions. The harvester for penetrating into the soil to the required depth and digging out the groundnut crop with pods. Picker conveyor pick up units of sufficient width to allow for picking and conveying the dug outcrops with pods from the soil surface. Collection chamber for collecting the crops with pods conveyed by the picker conveyor. Belt conveyor to convey the collected crop from one end of the harvester to other end. Elevator for elevating and feeding the conveyed crop with pods from the belt conveyor into the feeding chute of threshing unit. Feeding chute to regulate the flow of crops conveyed by the elevator into threshing cylinder. Thresher cylinder for separating the pods from the vines of groundnut crops. Blower for blowing out the chaff and dust particles after the threshing operation.

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