

GROUNDNUTS SEPERATION MACHINE

Shelke Amar¹, Palve Akshay², Ghuge Sanket³, Korade Dipak⁴, Walhekar Sagar⁵

¹⁻⁴BE (Mechanical), SVIT, PRES Nasik, Maharashtra, India

⁵Professor, Dept. of Mechanical Engineering, SVIT College, Maharashtra, India

Abstract – Generally two types of methods are there present in India to separate the groundnuts from the plants. One is manually means by hand cut the single groundnut from the plant and another one is keep the plant in sunlight for the 15 to 20 days and then put in automatic machine in bulk. But there is some limitations and problems to handling with this two technique. From one, Fingers get wears and damage due to continue working and also work is not more efficient. One person can maximum cut the groundnuts 20-25 kg per day. This work is doing humans that means performance get reduced in next day. From this all we can conclude that first method is not reliable. Now let's talk about second method, First problem with this method is that machine is too bulky and costlier, so this is not reliable for smaller landholder/Farmers. Another problem is quality of groundnuts is not too good. From this all we can say till now we were not any reliable and quality mechanisms for separate the groundnuts from the plant. But Now Me and my partner innovated new mechanism for separate the groundnuts from the plant manually. Mechanism is manual machine, by using this mechanism we can cut groundnuts at time 3 plants. From the practical we get output of this machine is minimum 500 kg per day. Only two people is need to operate this machine. This most reliable cost for everyone. Main things is maintenance costs is about negligible. In this machine we used the spoked wheel, which can attached to handle with gear and chain mechanism. All things covered with proper metallic casing to insure the safety.

Key Words: Groundnuts, reliable, cutting machine, Gear and chains, metallic casing.

1. INTRODUCTION

Now it's time to focus on development in agricultural techniques. Because conventional techniques are not too good in performance as well as time required to complete that process is to large with needs more man power. So we are introducing new mechanism for agricultural development and that is groundnut separator machine. If we think about present, then some mechanical and electrical operated mechanism are there. But as per abstract there is so many problems with that all mechanism. So in this mechanism we tried to solve that kinds of problem. In this mechanism machine will operate manually with least power, only two human are needed to operate this machine and this machine will work of 10 to 15 human per day. Apart from two, one person have to rotate the handle and another one have to put that groundnuts plant in the machine. So this is the very simple way to separate groundnuts from its plant. Machine contains spoke type wheel as cutter and chain sprocket type assembly is connected to handle which have circular motion.

Now-a-days climatic condition also a reason for unavailability of workers in these fields. With the use of groundnut thresher, farmers can do their harvesting operations and do their work at right time which helps in prevention of damage of groundnuts due to late harvesting or unavailability of workers at needed time.

MODEL DIAGRAM:-

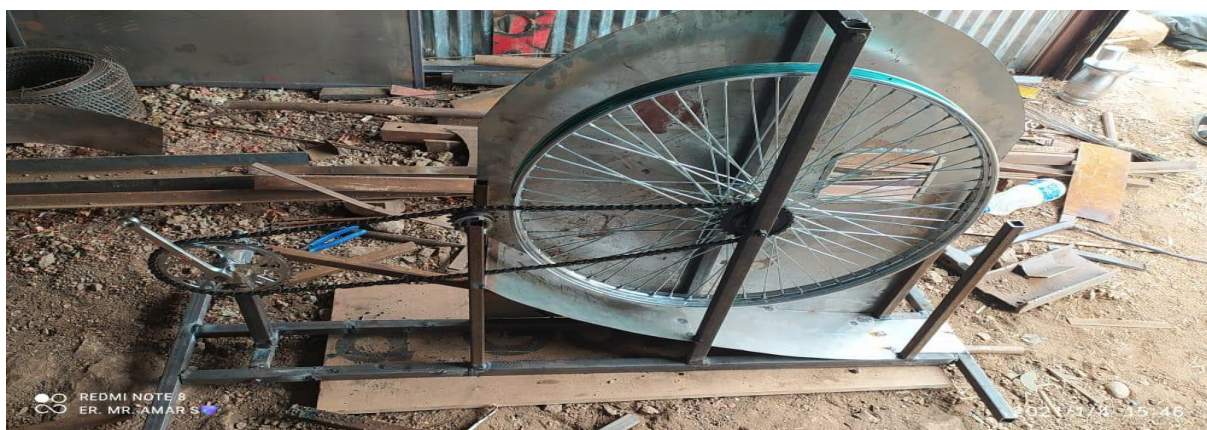


Fig (1) model diagram

PARTS OF MACHINE:-

a) Cutter:-

In this machine cutter is used as rim and spoke type assembly is used. This rim is mounted on axel. Diameter of rim is used as 75 cm and diameter of spokes are 8mm.

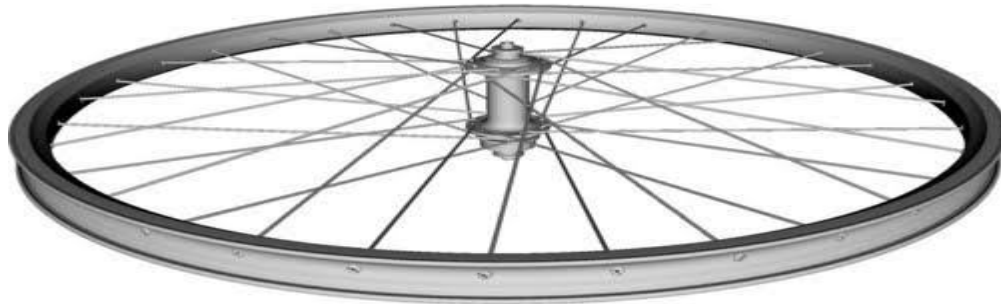


Fig (2) cutter

b) Chain and sprocket:-

There is two sprocket are there, one is connected to axel another one is connected to handle. This two sprocket is inter connected with help of chain. Same arrangement as bicycle.



Fig (3) chain and sprocket

c) Intermediate gear:-

There is one intermediate gear placed between two axel and front sprocket, purpose is that to avoiding slippage of chain.



Fig (4) Gear

d) Bearing :-

A bearing is a mechanical element that's constrains relative motion to desired motion as well as reduce friction between moving parts. In this we used two ball bearing at axel and intermediate gear respectively.



Fig (5) Bearing

e) Axel:-

An axel is a central shaft for rotating gear. It simply supports the rotating member. This member is non-movable. In this machine rear all assembly is mounted on this axel.



Fig (6) Axel

f) Square pipe:-

Simple steel square pipes are used in this machine for structural arrangement purpose. This arrangement supports whole mechanism.



Fig (7) Square pipe

g) Casing:-

In machine metallic casing is used. Simple steel sheet is used. Purpose is

- To avoid spreading groundnuts during operation.
- To protect inner parts from atmospheric debris and dust.
- Protection to injuries



Fig (8) Metal sheet

Layout diagram:-

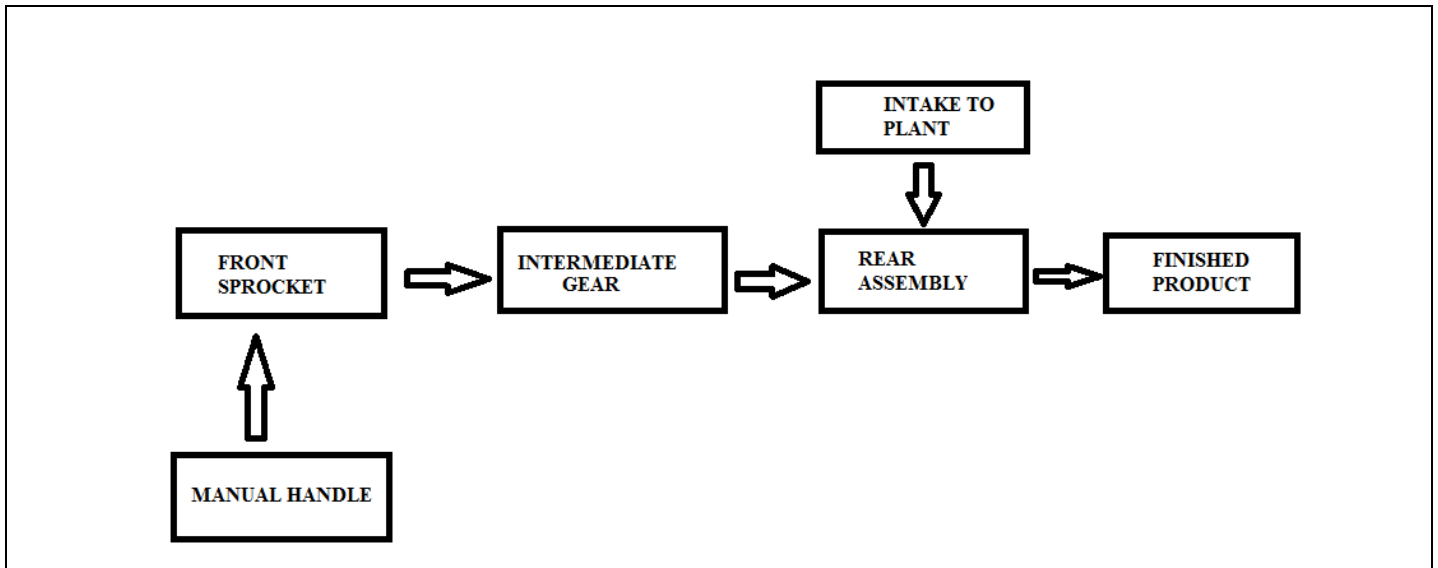


Fig (9) Layout

PROCEDURE:-

Step to follow for this machine is as follow,

- Take 4 to 6 plant in bunch
- Hold this bunch at intake position , and hold it till all groundnuts is not separated
- Then start moving handle at manual handle position
- This circular motion is get transferred to rear assembly through chain and sprocket mechanism
- Now motion is reached to cutter and groundnuts get separated and falls down on net
- Net is kept as tapered to separate groundnuts from mud and dusts
- Finally finished groundnut get at finished product position.

MATERIALS:-

Elements	Material
Cutter	Stainless Steel
Sprocket	Stainless Steel
Chain	Steel
Bearing	SAE52100
Axel	Steel
Net	MS
Square Pipe	MS
Casing Sheet	MS

ADVANTAGES:-

- Easy to operate
- Least maintenance
- Less injuries
- More life span
- Less cost
- More productive

DISADVANTAGES:-

- Oiling is necessary
- Two people is essential to operate this machine

CONCLUSION:-

So in this way we conclude that groundnuts can easily separate with the help of this mechanism. This is the simplest method. So in this mechanism we tried to solve that kinds of problem. In this mechanism machine will operate manually with least power.

REFERENCES

1. Faculty of Mechanical department 2014, 'PSG Design Data Book', Compiled by PSG College of Technology, Coimbatore-641004.
2. Ghatge, J.S, Bandgar, P.S & Mehetre, S.A 2014, 'Development and performance evaluation of pedal operated groundnut pod stripping machine', International Journal of Agricultural Engineering, vol 7, issue 1, pp.217- 220.
3. Ikechukwu Celestine Ugwuole, Olawale James Okegbile & Ibukun Blessing Ikechukwe 2014, 'Design and Fabrication of Groundnut Shelling and Separating Machine', International Journal of Engineering Science Invention ISSN: 2319-6734, vol 3, issue 4, pp.60-66.
4. Khurmi, R.S & Gupta, J.K 2009, 'A Textbook of Machine Design', Eurasia publishing house(pvt.) ltd., Ram nagar, New Delhi-110055.
5. Nautiyal, C 2002, 'Groundnut Post-Harvesting operation' edited by AGSI/FAO: Danila Mejia, Beverly Lewis, pp. 20- 24.
6. The Hindu newspaper 2014, 'A lightweight, efficient groundnut pod removing machine'.