Design and Fabrication of Hand Operated Groundnut Sheller Machine

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Abstract— Groundnut has more important in this world as on oilseed crop. Seeds contain abundant amounts of edible oil and protein for us and fodder for animals. Our country is facing problems in production of peanuts. Having a lack of groundnut processing machine is the major drawback for our country. In market, the no. of machines are available with larger size, high cost and mostly for non-domestic application and only suitable for mass production. Therefore, it is necessary to design and manufacture peanut shelling machine. All the forces, factors and engineering principle are taken into account while designing different parts of machine. Special design of this machine improves separation efficiency and reduces errors. It consists of hopper, crushing chamber, hand operated mechanism, bearings, nuts and bolts. The machine is small in size, easy to maintain and portable.

Keywords: Hand Powered, Design and fabrication, groundnut shelling etc.

I. INTRODUCTION

India is an agriculture based country and 70-80% of Indian population is engage in farming. Farmers used mostly traditional tools and methods for the cultivation of their crops. Because of these traditional tools and methods, farmers reduce their earning. Farmers cultivate different types of crops in their farm. Groundnut is one of them. Scientific name of groundnut is Archishypogal. It belongs to the family of fabasi. Dry climate conditions are favourable for the cultivation of this crop. This crop was found in peru due to its climate conditions. The normal height of the plant is around 30cm to 50cm. The main parts of the groundnut are shell, cotyledon, seed, radial and plume. Peanuts are a rich source of energy and protein. Peanut oil is used in food purposed such as peanut butter, peanut flour, boiled nuts, roasted peanuts, etc. They also having an industrial applications like lubricating oil, leather dressing, paints, furniture polish and vanish and emulsion for insect etc. Peanuts are used for the producing the oils and for cooking oil purposes. When oil is extracted from peanuts, the received waste is given to animals. Oilcakes serves as high protein livestock feed for animals.

In this project, a small machine is designed and developed to shell or crushed the groundnuts. so that farmers can reduce their labour cost and processing time and get high profit in return by selling the shelled nuts. The aim of the designed machine is to separate the nuts from the groundnut pods. This equipment is eco-friendly and also have lass maintenance cost. The hopper is used to store and guide the groundnuts by shearing action. Arc welding is used to weld the beater, from mild steel material. Hand operated mechanism is used to crush the groundnuts.

A. Objectives

- To limit the labour, time and human exertion to shell or squashed the ground nuts.
- To simplify the procedure and improve the shelling productivity by changing the beater structure.
- The expense of a machine should be moderate to the ranchers.
- Machine with less consumed space, less weight and ought to effectively moveable.

II. LITERATURE REVIEW

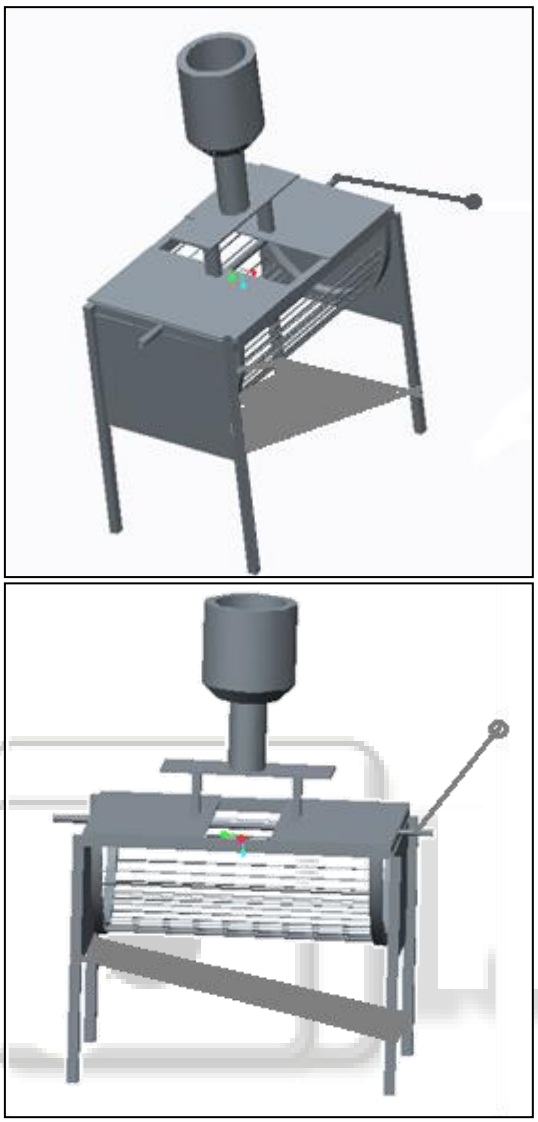
Santosh Mangave and Bhagyesh Deshmukh fabricated a groundnut shelling machine which can run easily. The parts of the machine are hopper, axle, main disc, front disc, handle etc. The hopper is made up of thin metal sheet and the main disc and front disc are made up of wood. The axle manufactured from the steel. Axle of the machine may be horizontal, vertical or inclined. The peanuts falls from the hopper into the crushing chamber between the front disc and main disc. As we rotate the machine handle by hand, the front disc is rotated and the peanuts gets shelled and falls down from the disc. The machine shells the dry groundnut and machine can be used for domestic application

Shubham Deshmukh et.al planned and created the machine with the yield shelling pace of 400kg/hr. It has 95.25% of shelling productivity and 91.67% of isolating proficiency. Engine, fundamental pulley, input shaft, yield shaft, fork, base plate, flywheel, almond couplings are the part of the machines. The materials utilized for the machine is cheap and easily accessible. The heaviness of the machine is also low and it comprise of the container, crushing chamber, partition chamber and the blower unit.

Khulbhushan M. Shejole design and fabricated the pedal operated groundnut shell removal machine. In the machine the groundnuts are separated manually. The groundnut decorticator machine works on quick return mechanism. Through the pedalling action the groundnuts get crushed. The pendulum is attached to the shaft. In order to decrease the mechanical damage of the groundnuts, the rubber pad is placed on the pendulum. With the help of the rubber pad the groundnuts get crushed. A greater output rate is obtained if we continuously operates the machine. Output rates obtained by pedal operated groundnut decorticator 49 kg/hour. The maintenance cost, production cost and energy consumption was less in these machine.

The pedal operated peanut crusher was designed and fabricated by Pratima G. Mungase. The pedalling action is used to rotate the screw conveyor which is placed on bicycle. In the bicycle shaft, the rear sprocket is placed on it. The rear sprocket which is rotated with the help of chain drive. The peanuts are inserted through the hopper in the screw conveyor. The distance between the flights and casing of the conveyor is enough to crush the peanuts. At the final output, the mixture of peanut and crushed shells are obtained.

III. CONCEPT DESIGN



IV. WORKING

The different parts utilized in the machine are: container, shaft, beater (roller), strainer, hand worked component, pivots, Plummer square, L edge, nut and screw. The dry groundnuts are poured in the container. From the container the groundnuts slide down into the devastating load. Smashing chamber comprise of turning mixer and the stationary sifter. The basic separation between the mixer and sifter is of 10mm. Groundnuts gets shelled when they are in contact of the blender and the sifter. The shelled groundnut blend falls in the isolating load, where the nuts and shells get isolated. Denser nuts, falls in that plate while the lighter shells are covered through an outlet. The plate is put underneath the confining chamber which falters by the smart bring framework back. The escaped from shells from the secluding chamber are removed when nuts are briefly taken care of in the faltering plate. The groundnuts are accumulated once the plate is full. Diverse pitch distance across hand worked system drive is utilized to run the blender, the devastating instrument by hand controlled.

V. ADVANTAGES

- It requires no power for its operation.
- Cost of the machine is less as compared with automatic machine.
- It requires no maintenance.
- No need of skilled labour.
- Efficient work is done by the machine.

VI. CONCLUSION

We concluded that hand operated groundnut sheller machine is better option to use instead of power operated groundnut sheller machine. The machine is hand operated so that there is no energy consumption which will helps to reduce cost of production. This machine also saves time and manpower. If we go on continuous work we got a higher output in very short time. The operating procedure of this machine is very simple, there is no skilled labour required to operate a machine.

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