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Design and Fabrication of Multipurpose Grating Machine: A Review

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Abstract: Grating variety of vegetables and a coconut is a basic need of this era. Grating process involves a numerous problems of a time consuming and manual fatigue. It is very important process for restaurants, canteens as well as for domestic purpose. The ultimate objective here is to design a machine that can perform multipurpose grating operations in a quick and safe manner. This paper shows the development of a mechanical grating machine. The machine is small-sized, lightweight and is convenient to carry and store.

Keywords: grating, mechanized, cylindrical drum.

I. INTRODUCTION

Grating of coconuts and vegetables is one of the most frequent operations at hotels, restaurants, canteens and even in household purpose. Coconut is probably the most popular food and widely consumed items in Indian diet. But grating coconuts has turned out to be hectic task for people. There has no change in the way coconut is grated, for several decades. Grating vegetables does not require much manual force but, coconut requires more manual force. This machine is designed in such a way that is consuming very less power for grating the coconuts. The invention of this multipurpose grating machine is to accomplish the job in just few minutes with improved safety and convenience.

A. Method, materials and process

- 1) *Design theory and principle:* The machine is design to grate the vegetables and coconut. The grating operation is done with the help of the rotary blades. The drum having grating holes are mounted on shaft and this is continuously rotating and blade are fixed inside the cylinder so the material is grated

II. DESIGN AND CONSTRUCTION

The multipurpose grating machine consists of cylindrical drum, blade, v belts, motor, and steel frame.

A. Cylindrical Drum

Drum is major part where the grating operation is done .inside surface of cylindrical body is made up of grating groove. There is opening from upper side from which the material is inserted.



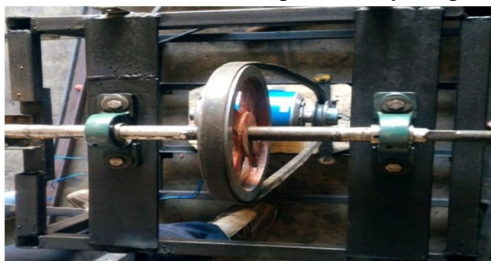
B. Drive for rotating shaft and drum

A motor is the device which is used to convert the electrical signal into mechanical signals. Three phase induction motor 0.25 HP, 50 Hz, and 1440 rpm is used here



C. Pulley and v belts

A pulley is wheel on shaft that is design to support a movement and change of direction of belts along its circumference. The material is used for pulley are cast iron. Various tension forces are experience by the pulley from v belts.



D. Hopper and collecting pans

The hopper is the opening from which the material is inserted. Collecting pan is assembly where the finished product is collected.

E. Bearing

Ball bearing is used to reduce the friction as well as it will smoothly do the rotating operation of the shaft.

III. SIGNIFICANCE AND MOTIVATION OF RESEARCH

Grating various types of vegetables is very tedious job. The time required for grating various type of vegetable are more. Grating of coconut is very hectic. the restaurant and canteen the requirement of grating material is so large so involvement of labor is so large consumption of time encouraged us to mechanization of grating machine. Traditionally we use the box type grater flat grater but the problem arises in these type of grater are they are not user- friendly , they required more afford to grate the material , also they have a problem of contentious holding. In our machine above problems are eliminated. We insert rotating drum which are rotated with the help of motor so the holding problem is eliminated. As the grater is rotating with the help of the motor so safety is automatically maintained. As well as machine is concern the effort required is less. Force require for grating is also less. The uncommon thing about the machine is it will able to grate the coconut. Usually the coconut grating is such a hectic work but in day to day life the use of grated coconuts is too large, especially, at the time of festival the most of the food contains coconut. To reduce the work as well as the fatigue our machine is so helpful. Minimum 3 to 4 types of vegetables are grated in our machine. For example: potato, carrot , radish , sweet potato and coconut . The machine has the changeable grater plate it will be grate the vegetable as well as the can able to slice them. The grating of the various vegetable in easiest way is the main motive of the machine. The machine is able to grate as well as slice the vegetable .the machine is very useful for restaurant and canteens as well as house hold purpose also. The cost is too small.

IV. PRESENT SCENARIO: LITERATURE REVIEW

Increasing advancement and innovation in technology tends to change the existing products by improved one .there is need to developed the machine which can perform the grating operation quickly and safely. The machine should incorporate with slicer as well as can perform grating.

Literature review is arranged on the basis of technique used according to latest work. Chung yee lok, M. K. Siti mazalina realised that there is need of integrated grating and slicing machine. Traditionally, the grating and slicing is done in two separate unit, but there is a need to develop such type of machine which is incorporated with both slicing as well as grating. Sajtil raj anshadh said the problem in olden method of coconut grating is that someone should hold the coconut near the blade all the time .also the grating coconut is time consuming process. They design the innovative design of coconut grating machine to solve this problem. Abinshaji, basil chandy proposed the machine a coconut braker, extractor ,grater which can de-husked as well as decicate the coconut. There is no contact between the hand and the tool.

V. CONCLUSION

The design of the multipurpose grating machine is really time saving, less power consuming, safe and cost effective. It can grate coconuts and vegetables in very less time. Also, it is portable and simple. The machine was tested and found capable to grate the vegetables and coconut simultaneously.

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