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DESIGN AND FABRICATION OF PURAN CRUSHER AND VEGETABLE CUTTER MACHINE

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Abstract

Vegetable cutting is necessary for preparation of food and it is everyday activity in all houses, hotels and restaurants. Large-scale hotels can use many types of advanced automatic machines but small-scale hotels cannot afford such high-class machinery. In hotels, more number of peoples are required for the vegetable cutting and it requires more time and also the Puran making machine is used to make paste of dal after which to make sweet bread for any occasion. This machine is seen at some religious place like temple where people make puranpoli in order to serve the god as well as people. This project aim is to design and fabrication of Puran Crusher and Vegetable Cutter Machine. It helps to reduce daily effort of vegetable cutting and puran making occasionally.

The machine consists of motor and different crushing and cutting mechanisms. When compare to manual cutting and puran making by using this machine has a capacity to cut the vegetables and making of puran in faster rate and economical. It has cutting blades which cut the vegetables in a shearing type of motion and also has crusher blades to crush the dal for puran making.

Index Terms: Shearing, Crushing, Cutting, High class machineries.

1. INTRODUCTION

Overview

In olden days, knives are used for vegetable cutting, it requires more time for the vegetable cutting. In addition, skill was required for cutting vegetables finely. There is chance of getting injuries while cutting the vegetables due to negligence or recklessness. Typically, it is very tough for physically disabled people. In present days, life styles of the people are changed. In most of the families, both of the couple is working in the companies. Therefore, they do not have time for cooking so they are depending on the hotels near the working area and living areas. It is one of the reasons for increase in the number of medium and small sized hotels in India. In the larger hotels, they can afford highly advanced latest equipment for cutting vegetables in short time. However, small and medium hotel owners cannot afford such advanced equipment for vegetable cutting. Therefore, they take more time for vegetable cutting. Vegetable cutting cost will be increases. At the time of more demand, they cannot prepare food for all people. At that time, there is a chance of losing profit. And there is a chance of getting injuries due to pressure of demand.



Cutting vegetables becomes difficult for handicapped, and they have to depend on.

Fig. 1.1.1 Conventional method of vegetable cutting

Puran making machine is used to make paste of dal after which to make sweet bread for any occasion. This machine is seen at some religious place like temple where people make puranpoli in order to serve the god as well as people. Puranpoli is a Marathi cuisine, considered as a nutritionally rich food and traditionally made only during auspicious occasions and during important Indian festival.



Fig.1.1.2 Domestic Puran Crusher

Puranpoli is the most popular dessert of Maharashtra state and it is made in each and every house during the festival. The domestic Puran crusher is usually limited for small scale and more time require making puran paste in large quantity. This machine will make in large quantity in less time. This machine will be automatically to run reducing working effort.

Problem Statement

In the present Scenario due to the gradual increase in population, there is too much of demands in the hotel sector for the cutting of vegetables and for puran crushing to avoid the problem of lack of labor and for the fast production of meal. Due to the scarcity of daily labors. The output from these labors is less productive due to manual or hand operations adopted by them. Since heavy machines cannot be introduced due to affordability and limited area in hotel sector or domestic use, it is very essential to bring in a machine which is cost effective, compact and easy to use for mini hotels and domestic use. So there is the need to make a machine which can perform the Easy cutting of vegetables and crushing of puran, less manual efforts, Low cost and less maintenance.

- Existing method of vegetable cutting and puran crushing required more time and more manpower.
- Today's labor shortages are big problem for the hoteliers invest more money on cook and there is less chances to complete work in within time.
- Machines are available for vegetable cutting and puran making but are used for some limited applications.
- . In addition, skill was required for cutting vegetables finely. There is chance of getting injuries while cutting the vegetables.
- A single person can cut vegetable and crush dal in a day but waste of time in this situation is more. Due to labor shortage and high wage of labor create headache to an hotelier.
- So design and fabricate of vegetable cutting and puran making machine to overcome this problem and reduce the time and effort.

Background of Development

The design is based on the requirement and demand for compact efficient and affordable machine for vegetable

cutting and puran making. The main purpose of this survey was to see and collect information about cutting methods and traditional method for puran making which are being used by them; the problems are being faced while using these conventional methods.

The following questions were taken from the market survey:

- Which machines are available for vegetable cutting & puran making?
- What are the machines cost?
- Are these machines feasible for domestic and hotel purpose both?
- Which traditional techniques used for both of the processes?

From these questions, we got the basic idea about the current situation. We also found that there is essential to have reduced this effort and make it simpler for the safety during cutting of vegetables and crushing of dal and also helps to small scale hotels for their profit.

2. Work Done

Working

As we start the AC motor of 1440 RPM, 1 H.P. single phase 50 Hz, the power is transmitted to the 3 inch pulley of main shaft. Then the pulley rotates and then it transmits the power to the other 3 inch pulley of same shaft.

This shaft transmits power to the other two shafts on which two different machines is mounted. The one machine is 'Puran Crusher' and other one is 'Vegetable Cutter'. The lever mechanism is provided to both machines so that engagement or disengagement of any machine can be done. This lever connected to 3 inch pulleys for tension requirement to run the shafts of the machines.

To run the Puran Crusher machine, we engage the lever of crusher section. The power from motor shaft will drive the crusher shaft. The boiled soaked dal is fed from the hopper to lead screw on crusher shaft which will forward the dal towards crusher assembly. In crusher assembly, there are two crusher discs, one is fixed and other is movable. The dal is crushed into paste when it comes the middle of these two crusher discs. After paste formation, the paste will come out and stored in the vessels.

To run the Vegetable Cutter machine, we engage the lever of cutter section. The power transmits from 3 inch pulley to 12 inch pulley. The single slider mechanism is used in this machine. The crank shaft is rigidly connected to the 12 inch pulley shaft. When the crank shaft rotates, the connecting rod connected to the crank oscillates. This oscillation will help the slider to slide. There are two blades, one is fixed in vegetable hopper where vegetable is going to fed and the vegetable is pressed against the fixed blade with the help of wooden

pressure block assembly, and the other blade is movable which is rigidly connected to the slider. The movable blade will move and cut the vegetable in horizontal axis. When vegetable is fed into the hopper, the pressure block will press the vegetable against the fixed blade which will result in cutting of vegetable into cubes shape and the movable blade will cut the cube shape vegetable. This will result in obtained suitable cutting shaped of vegetable.

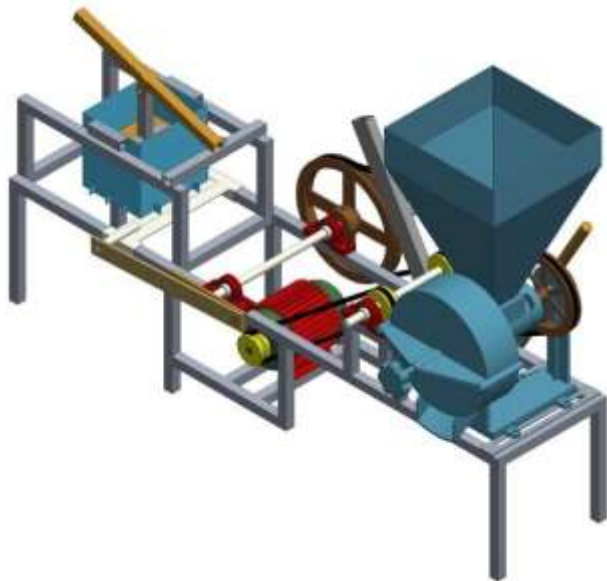


Fig.2.1 3-D Model of Puran Crusher and Vegetable Cutting Machine

RESULT AND DISCUSSION

From this work the following result were drawn for the cost of cutting and crushing of dal using this machine is considerably less as compare to manual operation. In the manual operation of vegetable cutting and crushing of dal it takes a lot of time and whereas in the “Vegetable Cutting and Puran Making Machine” the required time is considerably less. Therefore, time can also be saved by using the machine. It is concluded that the device is most economical.

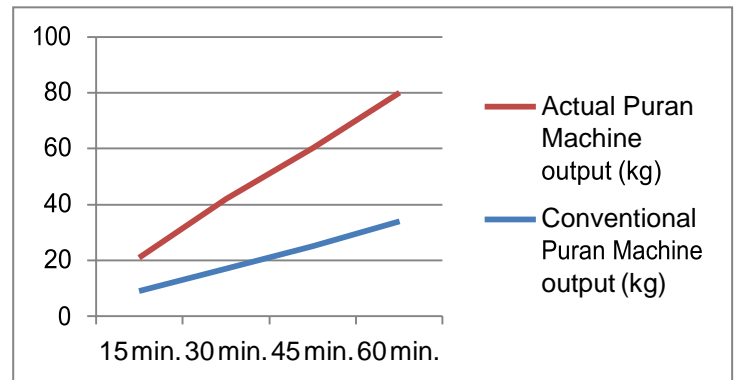


Fig.2.2 Graphical Representation between Conventional and Actual Puran Machine Output.

From above graph, the comparison is shown between the output quantities of conventional puran machine with actual fabricated puran machine. It is observed that the output of actual fabricated puran machine is comparatively more than the output of conventional puran machine. Hence, the design machine gives more output in less time.

3. CONCLUSION

It can be concluded that the machine is comparatively compact and easy to handle. The cost of cutting and crushing of dal using this machine is considerably less as compare to manual operation. The machines available in market are suitable for large production, so this can be the best machine for the hoteliers and domestic use. The machine can be run on single phase 0.5 H.P. motor and the machine operated by single labour. The machine will eliminate the labour problem in peak session for vegetable cutting period and occasional period for puran making. There are some changes that need to be done on the machine and a final product is to be taken out for sell.

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Dedication and perseverance when supported by inspiration

Table-1: SPECIFICATION OF PARTS

Part Name	Dimension	Material
Shaft Diameter	Ø 20mm x 457.2 mm	En8 Steel
Frame	60x14x21 inches	M.S
Pulley	3 inch, 8 inch, 12 inch	CI
V belt	59, 41 & 34 inches	Rubber
Bearing	Ø 20 mm	Chrome steel
Crusher Disc	Ø 6 inch	Stainless steel
Cutter blade	210mm x 160mm x 20mm	Stainless steel
Hopper	340mm x 340mm x 458mm	Stainless steel

and guidance leads to success. For us the inspiration and guidance was given by our **Prof. Dinesh B. Shinde** who was accessible for us to obviate the darkness of our problem with light office knowledge of the relevant subject enriched by his hands on experience in the field of technology. We truly sense it was privilege for ours, to have them as our guide. We feel highly honored working under them.

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