

# An Innovative Design and Fabrication of Indian Flatbread Making Machine

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## ABSTRACT

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About 60 million Metric Tons (MMT) of wheat is processed to obtain Atta annually in India. It is consumed mainly in the form of Indian flatbread. Dough is prepared by mixing wheat flour with water, followed by sheeting the dough to form circular shape with small thickness. The flat circular sheet of dough is subjected to thermal treatment to get delicious and diet food as Indian Flatbread which is consumed by majority Indian peoples daily. Nowadays, flatbread making process is dying in Indian families because of busy life style and increased disposable income to fulfill the need of city life culture. It is evident that the Atta processing industry is showing the growth of more than 30% annually. But, there is an ever ending demand for ready-to-eat as well as easy-to-carry food as Indian flatbread which leads to the way for mechanizing flatbread making process with the aid of machineries. Hence, it is decided to make a detailed plan to fabricate low-cost Indian flatbread making machine that can yield high quality and traditional Indian flatbread. The machine designed consists of AC motor unit, plastic roller with handle which rotates smoothly by bearing and other maker parts. Design of Indian flatbread making machine was done by CATIA V5 R18 3D Modeling software. Fabrications of all the parts have been done with the assist of suitable machines. In this project work all the challenging parts are fabricated as per an innovative design followed by rigid fabrication as per need and the parts were assembled to perform indented function as flatbread sheet making process.

**Keywords :** Indian Flatbread Making Machine, AC Motor, Roller and Traditional Flatbread

## I. INTRODUCTION

Flatbread is the hygienic diet food of major population of the people in India, Pakistan and its nearby countries. Generally, the Indian Flatbread is circular in

shape having dimensions of approximately 15 cm to 20 cm in diameter and 0.15 to 0.20 in thickness. Flatbread is prepared by mixing fine uniform grain wheat flour with water to form dough and followed by flattening the dough and then are cooked in thermal

environment which is consumed fresh. Making the flatbread is based on the quantity which is required in different sectors like home, hotels, hostel, canteen and so many. Modernization from village to city life culture and industrialisation, the flatbread making process was done with the help of machinery. However, the traditional quality of obtaining flatbread is difficult. Change in life style, potential demand for ready-to-eat and easy-to-carry food as flatbread has a very high demand for making flatbread. Moreover, very few machinery are available for making flatbread. The prominent features of flatbread making machine finds wide application in the modern days which include mainly restaurants, hotels, hostel, mansions, home, picnic places, small roadside motel and farms in major countries fruitfully.

**Patil et al** has reviewed the recent advancement in the technology of making Indian flatbread. This staple food has been deeply investigated for different aspects such as processing, mechanism, quality improvement, shelf life extension and also the mechanization of flatbread processing [1]. In flatbread making process the flatbread get stucked to the rolling pin and rolling board. By adding the excess flour texture of dough is not good. Hence, the tool is designed by ergonomic aspects to do the task in an efficient way or in elegance manner [2]. **Sridhar et al** developed flow modelling of continuous Indian unleavened flat bread former by considering the flow rate and torque requirement [3].

Chandrasekar et al developed automatic chapati making machine using pneumatic power. It is declared that the chapathi making machine can highly be useful for restaurant to reduce the cost and time involved in the chapati making process as well as improved the quality (smoothness and taste) [4]. Khairulnizam Othman et al had made semi automatic chapati making machine at smaller industrial or home based. They have used the components as follows; cover, chassis, electric motor, plate and shaft, pressure roller mechanism, roller and spring [5].

Ankit Maurya et al developed the concept of making automatic flatbread machine for Indian households by considering cost, usability, easy handling and hygiene. It is learned that the machine has many features which are as follows portable machine in domestic segment, very compact requires no skills to operate, uniformly baked final product, eco-friendly, hygiene production and fully automatic [6].

## II. PARTS OF FLATBREAD MAKING MACHINE

The different materials/parts were utilized in the rigid fabrications of flatbread making machine. It consist of mainly consist of electrical motor (12V DC), battery(DC), bearings(629z), roller, shaft, base plate, switch and wires, frame, handle, base.

### A. Electrical Motor

An electric motor used in flat bread making machine is illustrated in Figure 1. A 12V, direct current (DC), uni-directional electrical motor is selected for flat bread making machines. It comes under the category of high torque and low speed electric motor.



Figure 1: Electric motor

### B. Battery

A battery which is used in the flat bread making machine is illustrated in the Figure 2. This battery has a capacity of 34w which runs at 15mins per rate.



Figure 2: CS3 1234W F2 Battery

### C. Bearings

The ball bearing is employed which is inside the rollers to reduce the rotational friction and support radial load of base plate and axial load of handle. The bearing is shown in Figure 3.



Figure 3: 629-Z BALL BEARING

### D. Other parts

The other parts namely base plate, wooden frame (body) and switch with wires are illustrated. On the top of the base plate a layer of food grade flat sheet is kept for loading the dough (Figure 4). The entire body is constructed with the help of plywood (Figure 5).



Figure 4: Base plate



Figure 5: Body

## III. ASSEMBLY AND WORKING OF FLATBREAD MAKING MACHINE

Assembly and working of the flatbread making machine is highlighted in this section.

### A. Assembly of flatbread making machine

The assembly of flatbread making machine is displayed in Figure 6.



Figure 6: Assembly of flatbread making machine

### B. Working stages of flatbread making machine

Working of flatbread making machine is consists of five stages. It is explained appropriately with a suitable diagram as below.

1) Stage-1 Initial position: The initial position of the flatbread making machine is schematically shown in Figure 7. It has dimensions of 36 x 25.5 x 30.5 mm. The roller attached to the present flatbread making can able rotate 180° freely from the base plate. The base

plate is connected to the rotary motor output shaft which is rigidly clamed on the base of the machine.

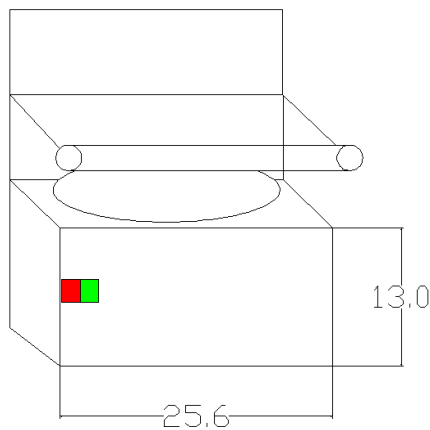


Figure 7: Initial position

2) Stage-2 Lifting the handle: In this position, the handle is lifted up manually for inserting the dough into the base plate of the machine to make flattened dough sheet to cook flatbread. The lifting up of the handle in flatbread making is evinced in Figure 8.

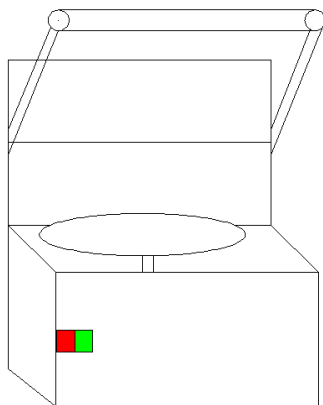


Figure 8: Lifting the handle

3) Stage-3 Dough insert and lowering the handle: Before switching on the motor, the dough is kept in the base plate. Also the handle is lowered. The dough insert and lowering the handle at the right position which is maintained at the gap distance of 1.5 mm as in Figure 9.

4) Stage-4 Rotating the base plate: Base plate was turned on at the end of the preceding position. The base plate rotates at a speed of 30 rpm once the switch is on.

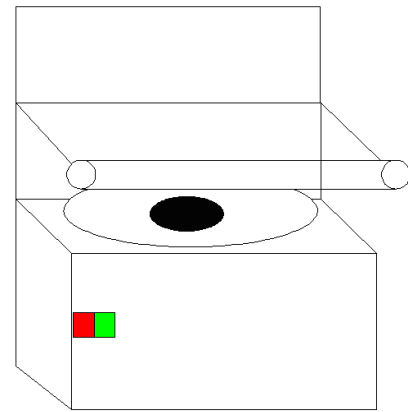


Figure 9: Dough insert and lowering the handle

5) Stage-5 Final position (Making Flatbread): Final flat bread is obtained within 50 seconds. After that, the handle is lifted up for the removal flattened dough as well as inserting the new globe dough. Then the step involved in the stages 1 – 5 is repeated.

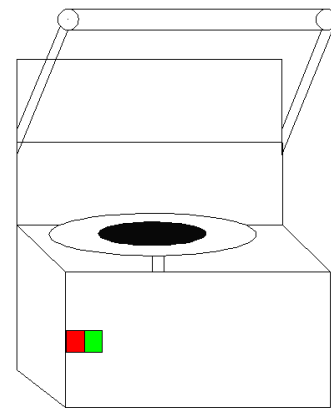


Figure 10: Obtain the flatbread

#### IV. CONCLUSION

Indian flatbread making machine parts are rigidly fabricated as per the design. The fabricated parts are assembled and tested. The following points concluded are

- Using AUTOCAD and CATIA software design of flatbread making machine was completed
- All the parts of the flatbread making machine was rigidly fabricated and assembled.
- It can be concluded that the machine designed is having a capacity to produce nearly 2 to 3 flatbreads per minute, which means within an hour this

machine will produce or make nearly 60 to 90 flatbreads.

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