Fabrication of Dough Rolling Machine

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Abstract- *Dough's are made from a wide variety of flours, commonly wheat but also flours made from maize, rice, rye, legumes, almonds, and other cereals and crops used around the world. In this new era everyone want the product at best quality with low manufacturing cost so from the point of view of hotel industry, it is very important that customer should get immediate service. So this is a major requirement that we are going to serve. So rolled dough machine would be the best option to complete that requirement which would increase the cooking productivity with good quality. In commercial hotels, restaurants, hostels, local messes and catering enterprises have to produce large quantity of rolled dough, which is a traditional food with large demand. Enormous difficulties are faced during the production of rolled dough at large scale, dough rolling process is a time consuming process. Thus, the machine has been design and fabricated in a semi-automatic way for dough rolling which can save time and can be used for mass production of rolled dough's for high consumption. The developed setup for making rolled dough at minimum cost and less effort has been proven.*

Keywords- Dough, rolling, design, machine.

I. INTRODUCTION

Dough is a thick, malleable, sometimes elastic, paste made out of any grains, leguminous or chestnut crops. Dough is typically made by mixing flour with a small amount of water and/or other liquid, and sometimes includes yeast or other leavening agents as well as other ingredients such as various fats or flavorings. The process of making and shaping dough is a precursor to making a wide variety of foodstuffs, particularly breads and bread-based items, but also including biscuits, cakes, cookies, dumplings, flatbreads, noodles, pasta, pastry, pizza, piecrusts, and similar items. Dough's are made from a wide variety of flours, commonly wheat but also flours made from maize, rice, rye, legumes, almonds, and other cereals and crops used around the world.

Types of Dough's

Dough's vary widely depending on ingredients, the kind of product being produced, the type of leavening agent (particularly whether the dough is based on yeast or not), how the dough is mixed (whether quickly mixed or kneaded and left to rise), and cooking or baking technique. There is no formal definition of what makes dough, though most dough's have viscoelastic properties.Leavened or fermented dough's (generally made from grain cereals or legumes that are ground to produce flour, mixed with water and yeast) are used all over the world to make various breads. Salt, oils or fats, sugars or honey and sometimes milk or eggs are also common ingredients in bread dough.

Commercial bread doughs may also include dough conditioners, a class of ingredients that aid in dough consistency and final product.Flatbreads such as pita, lafa, lavash, matzah or matzo, naan, roti, sangak, tortilla, and yufka are eaten around the world and are also made from dough. Some flatbreads, such as naan, use leavening agents; others, such as matzo, do not.

Dough Making Process

Wheat is the basic raw material for the preparation of dough. Dough is a baked product prepared from the whole wheat flour. It is the staple food for a majority of the population in many regions of the Indian sub-continent. It is prepared by mixing whole wheat flour and water, followed by rolling the dough to about 1.5 mm thickness and cutting it into 150 mm diameter discs. The discs are baked on a hot plate at 200–210°C for 1–2 min and puffed over a live flame or coal fire for few seconds. Dough are generally prepared manually and served hot. Increasing demand for ready to eat and easy to carry foods vested in mechanizing rolled dough for marketing in unit packs.

The present work deals with a design and fabrication of a machine which can roll dough's both manually and semi-automatic way to reduce the time, effort and cost which can be used for mass production and high consumptions in hotels, restaurants, hostels, local messes and catering enterprises.

II. OBJECTIVES OF THE PROJECT

- To design &develop dough rolling machine.
- The machine reduces the time & effort required in dough rolling process.

- To design the machine for mass producing rolled dough's.
- The rolled dough will have proper shape and thickness.
- Main objective is to build a dough rolling machine which will satisfy the requirements of in hotels, restaurants, hostels, local messes and catering enterprises.

III. MACHINE DESIGN

Dough Rolling Machine

Machine drawings are used as a means of communicating information on how to construct, gather, solve , refurbish, and operate a piece of machine or a system. In order to come up with drafting/solid of machine, CATIA software was used as shown in figure 1.

Components

1. Body
2. Top plate
3. Motor
4. Bevel Gears (2 Nos)
5. Base plate
6. Roller
7. Hinges (2 Nos)
8. Shaft
9. Bearing
10. Handle

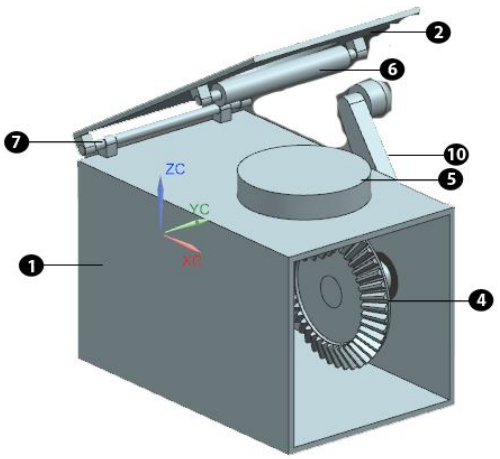

Fig.1. Solid Mode of Dough Rolling Machine.

IV. MANUFACTURING PROCESS

Introduction to Manufacturing Process

The knowledge of manufacturing processes is of great importance for a design engineer. The following are the various manufacturing processes used in Mechanical Engineering.

1. Primary shaping processes: The processes used for the meant for shaping of the component.

2. Machining Processes: The process is used to machine the unwanted material to obtained specific dimension.

3. Surface Finishing Processes: These process are used for final finishing of the component.

4. Joining Processes: The processes used for joining of parts or other sub assembly.

5. Processes Effecting Change in Properties: These processes are used to change property in direct heating or cooling.
Following fabrication processes were followed to manufacture machine.

1. Machining
2. Welding

V. WORKING OF MULTI-PURPOSE DOUGH ROLLING MACHINE

The figure 1, shows the dough rolling machine, the working will start as hand lever is cranked to impart the motion to the bevel gear arrangement. The bevel gear arrangement tends to rotate the base plate which remains supported by a roller ball bearing. The hinged top plate is lowered during the operation and lifted above when the operation attains its completion. The dough ball which remains spherical in shape is placed in between the top plate and the base plate. The spherical ball tends to change its shape under the influence of pressure imparted from rolling pin. Soon after the operation the roti is removed out from the arrangement and a new dough ball is placed and the whole process is repeated to produce the required number of dough's are rolled. The hand lever used for cranking can be replaced by electrical DC motor to reduce the human effort needed.

VI. CONCLUSION

Developed dough rolling machine is to replace the existing method of preparing the dough's by manually methods which requires enough skill, time and effort. The machine developed can become commercial product for regular or mass producing of rolling dough's for regular consumption in hotels, restaurants, fast food vendors, hostels,

and home. The following benefits were achieved by developed dough rolling machine.

- Economical and efficient dough rolling alternative owing to savings on manpower.
- Convenient dough thickness and size adjustment feature according to custom requirements.
- Machine which completely works on simple mechanism for user friendly.
- Machine compactness ensuring ease maintenance.

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