

# Design and Fabrication of Volumetric Weighing and Packing Machine

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**Abstract:-** The packaging enterprise had superior leaps and limits over the few years. Pouch packing machines, also known as Form Fill and Seal Machines (FFS Machines), are available in a wide range of capacities. A low fee automatic packing device may be utilized by small corporations which might assist lessen their fee of the plant. This low-fee automatic device makes use of easy pneumatic, mechanical and electric powered systems. In this supplied one such low fee pouch filling device. An extra weighing and pouring mechanism have been delivered to grow the accuracy of the machine. The system float has been defined in detail. Various techniques concerned with inside the pouch packaging are well aligned and nicely timed to get the top-rated manufacturing rate. A Round tubular heater is used to seal the pockets.

This paper affords the improvement of a gadget that mechanically weighs and packs the product without any outside help. The major motive of this gadget could be lowering time and efforts with the aid of using human beings to weigh and pack the goods mechanically.

**Keywords:-** Packing based on the Volumetric filling.

## I. INTRODUCTION

In today's world, automation can be found in almost every industry to determine how heavy something is, usually through the use of scales in industries all around the world. The concept of this is an automatic volumetric packing machine that performs different operations like Volumetric weighing, packing, and sealing. The machine is operated using a controller, It can be used for packing cereals and powder.

It is used to weigh and pack grains, rice, dry fruits, sugar, and tea, among other items. Industries. It can weigh and pack product from 10 grams to 30 grams Currently there are fewer profit margins in their field. Industries must consider how to automate themselves and supply at a price that customers are willing to pay. Control switches and motors are used to carry out the entire process of volumetric weighing, packaging, and sealing. The control switch is in charge of the entire machine.

The following are the processes that the machine would carry out:

- Packing the product in the bag
- Packaging the bag filled with product
- Sealing the bag

## II. OVERVIEW

The entire weighing and packaging process consists of four steps. In the first step, the packing material is loaded into the hopper. The machine starts, and the round plate below the hopper, which is made up of cups of the desired volume, begins to rotate, after which the cups in the plate are filled with the material. The materials in the cups are then flowed down through the suite. The material is then dropped into the Aluminium Foil. After that, the pockets are sealed vertically using the rotating jaw heater, and then the pockets are sealed at the top and bottom using the heating device.

## III. SCOPE

This method can be used for a some of things, some of which are listed below but are not limited to them.

- Supermarkets and small-scale food processing businesses.
- Manufacturers of automated weighing and packing machines
- Farmers in India can utilize it to immediately package their agricultural products.
- Pharmaceutical companies.

## IV. LITERATURE REVIEW

Previously, when there were no plastic bags or anything else, humans would pack their products in metals, leaves, shells, and so on. Currently, these methods are being replaced by various packaging materials such as plastic bags and other materials. In rural areas, the packaging is still done with candles, which is reminiscent of the old days.

Tawanda Mushiri, Charles Mbohwa, International Conference on Operations Excellence and Service Engineering Orlando, Florida, USA, September 10-11, 2015[2]. Their project is concerned with the filling of packages with the less amount of cereal in each package.

The project's goal was to create a rigid plastic container through which the product could be poured and then packed. The film is affixed just below the hard plastic container, and it is essentially controlled by rotating the weight meter. The revolving weight meter is used to calculate the weight. Below the weighing meter, there are two roller pairs, one that generates longitudinal sealing and the other that completely splits. After then, the parcel slides out of the opening. 'Smart Packaging: Opportunities and Challenges,' by Dirk Schaefer and Wai M. Cheung[3]. According to them, the global market for smart packaging would grow, reaching \$26.7 billion by 2024. The employment of embedded technology in the packaging of food,

pharmaceuticals, tea, coffee, and other things is referred to as "smart packaging". Smart packaging is primarily used to extend shelf life, improve product quality, and ensure customer safety. Smart packaging will open up new economic prospects as a result of digitization, and so falls into the sphere of Industry 4.0. Methods of product analysis are required for selecting the best product as well as designing and optimizing production processes. Indeed, the majority of existing approaches are designed to examine a product or a product family on a physical level. However, different product families may have significant differences in terminology.

**V. METHODOLOGY**

*A. Project Overview*

The machine is categorized into four fundamental techniques-(fig 5.1).

Initially, the packing fabric is loaded into the hopper. The device starts, and the spherical plate underneath the hopper, it is made from cups. The cup within the plate begins to rotate at the desired volume, and the materials are then packed into the cups within the plate. The substances within the cups are then flowed down through the suite. The fabric is then dropped into the Aluminum Foil. The wallet is next sealed vertically with the help of the rotating jaw heater, followed by the pinnacle and backside of the wallet with the help of the heating device.

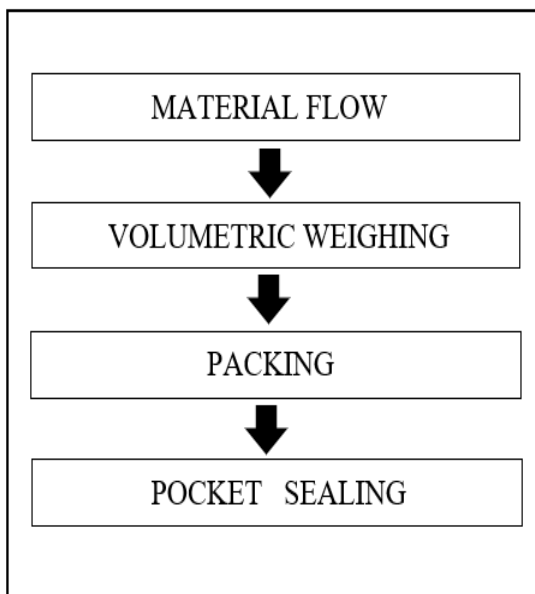


Fig. 1: Process flow chat



Fig. 2

**VI. WORKING PRINCIPLE**

- Round Plate  
The plate located underneath the hopper is used to rotate at the primary of the motor, The contents from the hopper are packed into the cups that are positioned within the plates. The cups are made up of an SS304 spherical rods. Which are machined on the desired dimensions.
- Suite  
The Suite is composed of STRAINLESS steel with a 180mm radius. Which enables the flow of material from the hopper to the Aluminium foil. It additionally courses the float of wrapper from the roller
- Motor  
To control the speed and power transfer, the motor is linked with a gearbox. Power is transfered to the difference gears setup like plate rotation sealing heater both vertical and horizontally.
- Heater  
The heater is used to sealing the wallet. In this, there have been pair of heating gadgets which might be used for sealing the wallet vertically and horizontally. Sealing is completed with the aid of using the assist of the heater. The temperature of the heater can be altered on the primary of the room temperature and warmth required to warm the aluminum foil.

**VII. OUTPUT SPECIFICATION**

These are the Output of the Machine that are listed below

NO OF PACKS	TIME TAKEN	PULLEY SIZE
30	1 Min	2-3.5(inch)
40	1 Min	3-3 (inch)

Table 1: Output details table

### VIII. RESULTS AND CONCLUSION

Several experiments may be performed to reach an end to the machine's purposeful implementation. The overall performance of the tool parameters could be assessed, and adjustments could be made primarily based totally on the results of the tests. The first section of trying out includes making sure the right operation of every tool separately. Since this unit may be used for measuring and packing the goods.

### IX. FUTURE SCOPE

The gadget may have vast implementations in various industries. The gadget might be supplying weighing, packaging, sealing, and printing rate at a minimum rate, and in addition studies will cause extra development of the device. The device might be broadly utilized in industries and shops consisting of the meals industry, beverage industry, grocery stores, et

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