

## Design, Fabrication & Experimentation of Automatic Bottle Filling Plant

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**ABSTRACT:** Automation is the most required for any developing and developed industry. Many companies are now becoming very adaptive to the automation as it gives large production rates, accuracy and fewer requirements of workers, and thereby decreasing the money required and increasing the overall profit. They also use laser machineries, sensors and other electronic components for automation. But small scale industries cannot afford this much of machineries and therefore they required machines with low cost and more effectiveness. Bottle Indexing & filling machines are widely used in the domestic purpose. The Bottle Indexing & Filling machines play very important role in the Medical, Bislerly, and Wine industry. By providing a Geneva mechanism & one limit switch time of the machine is minimized by providing this attachment the efficiency of the machine is improved up to 94% & also average skilled operator may be required for operate the machine due to this provision this machine is used for mass production also & it give facility to operate this machine easily.

**Keywords:** Bottle indexing, Geneva.

### 1. INTRODUCTION:

Richness of a country and its wealth status is always judges or know on compositions (steel) in proper conditions, etc. India has a very large population. But other countries like Japan, Germany and USA are pioneers in steel making. Earlier, India was flourishing in trade and commerce. But the entrance of East India Company changed the whole scenario. The British started exploiting the Indian resources. They made their market for finished goods in India. Then came the Industrial revolution and the industries started prospering again. Then in 1992, came the law that multi-nationals can come and set up their industries, the whole scenario changed, more stress on quality and accuracy was given than the quantity. Thus came to the need for the SPM as GPM could not live up to the expectations of the customers. In engineering, many

Processes are required and different parts require different processes.

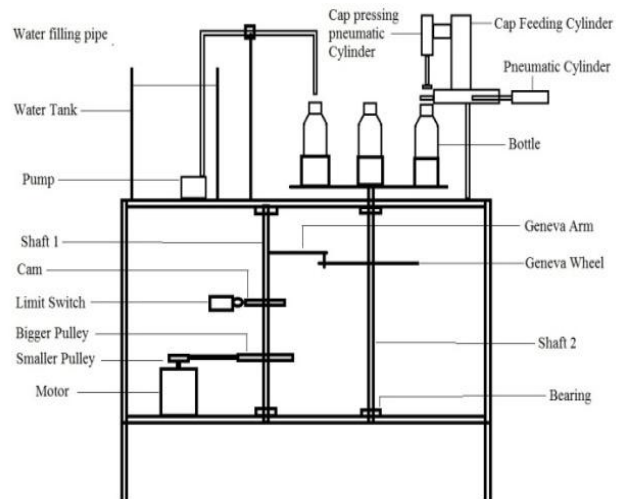


Fig. Schematic diagram of bottle filling plant which is to fabricate.

But the properties of materials and other things changes with the processes. This caused the invention of automated machines and mechanisms “design, fabrication & experimentation of automatic bottle filling plant”. It is a light duty special purpose machine used for INDEXING the liquid and slurry automatically as per the requirement of the container. The machine is driven by the 1/2H.P. motor, which has speeded around 1440 rpm and using speed reduction gear box unit. The v-belt and bevel gears are used for transmitting power from motor to the shaft.

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## 2. PROBLEM DEFINATION:

This project is for Plastic bottle filling as well as Glass bottle filling but we are working on plastic bottle filling operation in traditional bottle filling process there is many problems arise with traditional process. This problems are generally are as follows

1. Overflow of water.
2. Improper water filling.
3. More time required for filling water.
4. Extra human efforts required.
5. Wastage of water.
6. Chances of bottle damage throughout procedure of Geneva mechanism manufacture looks very simple. But it is very difficult to complete manufacturing stages of any project. The actual manufacturing is not that much simple while working various difficulties had been arrived. We completed our project by using various manufacturing techniques & equipment. But first trouble is, when we are working on the mechanical tools there is wastage of time say due to cut-off the power supply or limit of the instrument of the workshop. Much trouble over this is involved while assembling & fitting alignment of various parts for smooth running.

## 3. METHODOLOGY:

It works on the principle that, the reduced speed is energized to rotate the driving plate and when the rod mounted on the driving plate come in contact with the slot of the Geneva wheel, the wheel also rotate through a particular angle hour at a 275 bars pressure in hot press. Again the composite was kept in oven at 105°C for 30 minutes and cooled in cold press for 15 minutes.

## 4. OPERATING PROCEDURE:

When we start the motor rotational speed is fed to the cam plate or driving plate through the speed reducing devices. For reducing the speed, Speed reduction gear box, pulley and belt arrangement, bevel gears are used. When the Geneva plate rotates and the rod mounted on driving plate is come in contact with the slot of Geneva wheel, the wheel also rotate through a particular angle and then the back side of the driving plate is meshed with the dwell slot. At that time, Geneva wheel remains stationary. The time taken for this meshing is used to fill the liquid in the bottle. As the Geneva wheel rotates, the plate on which the bottles are kept also rotates and the

liquid starts to flow down from the tank. Then again the rod of the driving plate comes in contact with the slot of the Geneva plate wheel. The next empty bottle or glass comes underneath the top of the tank. This cycle will on till the motor is 'ON' Thus we get the intermittent motion by using this Geneva mechanism.

## 5. RESULT AND DISCUSSIONS:

In this project 'design, fabrication & experimentation of automatic bottle filling plant which we have practically completed by overcoming various difficulties. we concluded that there are many parameters on which the total project is dependent i.e. Total knowledge of project, its mechanism, design, its applications, the advantages, its drawback, etc. Though we are having knowledge of this, we should be successful in practical (assembly) work. We want to have the perfect decision about its design, material used for it & control on the cost of it.

## 6. CONCLUSIONS:

The bottle filling plant has been designed with conveyor belt system using Geneva mechanism and timing switch. It has been designed to move in the conveyor belt in horizontal direction one after one. The water filling in 250 ml bottle takes an average time of 10 seconds and then it moves further to get filled in the next bottle. The movement of the bottles via conveyor belt is independent on the submersible pump operating. If the pump stuck up to supply the water, then to the conveyor belt starts moving after of 10 seconds. By conducting actual experiment these observations are noted.

## 7. REFERENCES:

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