Design And Fabrication of Pneumatic Areca Cup Making Machine

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Abstract- *The fabrication and assembly of a pneumatically controlled areca cup and dish producing machine is the focus of this project. Plastics make up the majority of tea cups. According to research, drinking hot beverages from plastic cups may be hazardous to one's health. Plastic cups react slowly to bacterial decomposition in the soil, making the soil infertile. They also generate harmful fumes when burned, causing respiratory difficulties and posing a serious environmental concern. Areca cups can be manufactured from any type of areca leaf using this pneumatically powered equipment.*

After researching how current areca cup producing machines work, we came up with a low-cost, high-quality solution for areca cup and dish production. This areca cup production machine is small enough to fit in any space and is also highly cost effective.

Keywords- pneumatic, areca cup

I. INTRODUCTION

Agriculture accounts for 13.7 percent of India's GDP and employs half of the country's workers. In Indian communities, leaf cups and plates are typically created by hand. These are widely used to serve food during weddings, religious services, and social gatherings. To create these containers in exquisite shapes and sizes, the painstaking art can now be turned into a machine operation. With the ban on the use of plastics, the manufacture of areca cups has skyrocketed. To accommodate this need, tiny businesses have sprang up, creating cups in areas where raw materials are plentiful. The primary goal of this project is to address the stages involved in preparing areca leaves, such as soaking, cleaning, washing, and segregation, before cutting them into the desired form and size. All of the aforementioned operations must be carried out on a continual basis in order to increase production rates. These operations necessitate a significant amount of manpower, energy, and time. The primary goal of this project is to increase productivity while reducing personnel in the production of areca leaf cups. This suggested project does not presently exist. All of these tasks are completed by hand.This project is being developed with the help of a double acting cylinder that is controlled by a solenoid valve and a flow regulated valve. The cup is punching the basic dye with the help of compressed air from the pneumatic cylinder. Our project incorporates the Areca leaf cup-making mechanism in this manner.

II. REVIEW OF LITERATURE

Anand Kumar Singh IJTRE volume 4, issue 11, (July 2017), Design and Development of Pneumatic Punching Machine on etc., all had used compressed air or inert gas which are generally used for punching the material.

P. Goyal volume 2, issue 2, (2015), Review on Pneumatic Punching Machine and Modification in Punch Tool to Reduce punching force requirement deals with the design of pneumatically controlled small scale punching machine to carry out piercing operation on thin materials like sheet metals of different materials.

P. Rajendra Babu (2017),The components of cups making machine was designed by using CATIA software. The fabrication was done by using different joining methods. The real time testing was done at different temperatures of dies and soaking time. In testing observed properties of cups at optimal temperature.

N.Kiran (March 2022), The foot-operated areca-nut leaf plate manufacturing machine is designed, fabricated and tested. This machine requires electricity only for the heating purpose, leaving that the machine is foot operated. This machine doesn’t require much skill and economically feasible too. This will help to utilize the millions of areca-nut leaf sheath being wasted annually in the eastern terai region of Nepal and reduce heavy reliance on plastic and paper plates. Thus, this machine will consequently help to improve the economic condition of people of the areca-nut growing regions of country.

Punya S Gouda (2018), Research suggest that eating hot meals on plastic plates could actually be harmful to health. Plastic plate responds very slowly to bacterial decomposition in the soil, thus making the soil infertile and also releases

poisonous gases on burning, which can cause respiratory problems thus causing a big threat to environment. With the ban in plastic, has led to increase in the production of decomposable raw material industry such as ARECA leaf plate industry.

Apurva Garg (2017), Areca nut is an addictive substance consumed in many parts of the world by people of all the age groups. Apart from being carcinogenic to the oral cavity, pharynx, esophagus, liver and uterus, it has many diverse effects on the human body affecting almost all the organs. The systemic effects of areca nut are mainly due to the principle alkaloid arecoline. Areca nut causes euphoria, increase in heart rate, increased blood pressure, GABA inhibition and damage to neurons, but has no effect on concentration and memory.

R.B .Ashok (May - August 2018), Naturally available filaments have recently become attractive to researchers, engineers, and scientists because of suitability as an alternative reinforcement for fiber reinforced polymer composites. In this article survey on bio softening, adhesion, the effect of fiber length, the effect of chemical treatments of long areca fibers, Influence of mercerization on the tensile strength of long & short areca fibers, areca husk have been discussed.

Palanirajan.T (January 2021) Journal of Natural Fibers ,In this review, a comprehensive analysis of the areca nut fibers from different parts like leaves and husk was discussed. The two different fibers – coarse and fine were studied on the basis of its characteristics, the well-planned extraction methods and production application were analyzed. This organized review will generate sense of the uses of the areca fibers in fiber composites and nonwoven fabric productions.

III. PROBLEM IDENTIFICATION

By using the natural Areca Leaf Plates/cups the human will not affect with any infections. Usage of plastic or any synthetic material plates/cups for drinking or eating, it may leads to severe diseases like cancer, food poisoning, etc.,
For the production of Areca Leaf Plates, pneumatic process machine is affordable and efficient when compares to hydraulic mechanism.

Advantages:

- Cost effective
- Low maintenance Cost
- By using, pneumatic machines we can earn more income and productivity also high.

Methodology

Pneumatic systems rely on compressed air, which must be available in sufficient quantity and at a pressure that matches the system's capability. When employing the pneumatic system for the first time, however, it will be necessary to address the issue of compressed air supply, and the key component of any compressed air supply facility is a reciprocating compressor. A compressor is a device that takes in air or gas at a specific pressure and then delivers it at a higher pressure. The pneumatic cylinder, solenoid valve, flow control valve, air compressor, connectors, and hoses make up this Areca cup making machine fabrication.

Components And Description;

S.No.	PARTNAME
01.	PneumaticDoubleActingCylinder
03.	FlowControlValve
04.	Punch(Model)
05.	BottombasePlate
07.	FrameStand
08.	HoseCollarandHoseConnector
09.	PUtube

DOUBLE ACTING CYLINDER

A double acting cylinder is employed in a control system with a full pneumatic cushioning and it is essential when the cylinders itself is required heavy masses. The normal escape of air is out by “cushioning piston”.

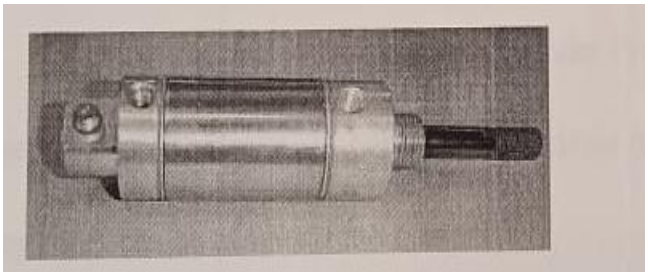


Fig.Pneumatic Double Acting Cylinder

FLOW CONTROL VALVES

Directional control valves control the way the air passes and used for controlling the commencement, termination and direction of air flow. Depending on the number of paths the air is allowed to take, directional valves are termed as two way, three way, and four way or multi way valves.

The different number of ways by means the number of controlled connections of the valve, inlet connections to the compressed air supply.

PUNCH AND DIE

Die and punch are known as 'press tools'.Die is the lower part of press tool. It is clamped on the bolster plate of the press. It remains stationary during the operation. The die has a cavity to receive the punch. The cavity may be with clearance or without clearance.

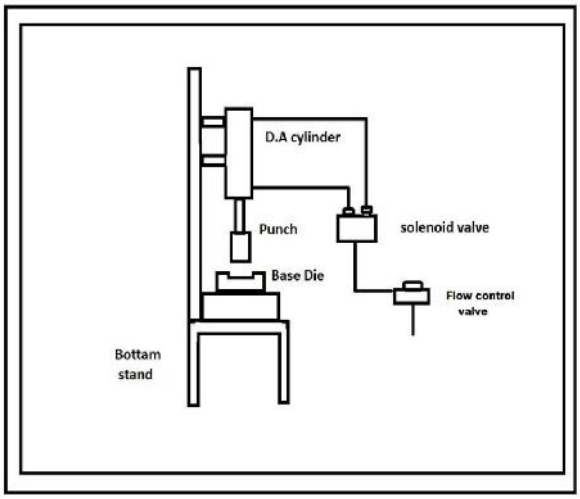
Punch is the upper part of the press tool. It is attached to the lower end of the ram of the press. It sheds with the ram during the operation and is forced into the die cavity. Die and punch must be in prefect alignment for proper operation.

Working principle

This fabrication of Areca cup making machine consists of the pneumatic cylinder, Solenoid valve, flow control valve, Air compressor, connectors and hoses.

- Compressor supplies high pressure air to the cylinder, whose flow is controlled by a flow control valve.
- The air passes through a Solenoid valve.
- This is used to actuate the piston and to specify its direction of movement.
- The piston and punch are the moving parts in this machine.
- The die is fixed on the base of the machine.
- The punch, punches the Areca leaf placed over the die.
- The Areca leaf placed will be wet.
- The cup can be taken out and the next Areca leaf can be placed over the die for the next cycle.

Design:-



Model

Application

The main application of this machine is to improveproduction rate and high uses of waste product and themaintain waste management system. We can use in Hotels, Restaurants, Bars, Functions and Homes etc…

Advantages

- The pneumatic is more efficient in the technical field.
- Quick response is achieved.Simple in construction.
- Easy to maintain and repair.
- Cost of the unit is less when compared to other machine.
- No fire hazard problem due to over loading.
- Comparatively the operation cost is less.
- Continuous operation is possible without stopping.

IV. CONCLUSION

All of the basic requirements for the Areca cup producing machine have been met. In most cases, the cups and plates are constructed of plastic. Plastics are damaging to society and have numerous drawbacks. Areca leaves are readily accessible and can be used to build cups. It is relatively inexpensive and has no negative side effects.

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