

# AUTOMATIC PIPE CUTTING MACHINE

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## ABSTRACT

To reduce human effort for repetitive work of cutter pieces of pipes as well as providing a convenient fixture to support and hold the pipes/rods during cutting. The subject is undertaken as a part of B.E mechanical project. It can be termed as smart machine. There are many industrial applications where round bar or square bars are required to be operated on different machines to make machine components such as Shafts, Bolts, Screws, etc. This needs more and more number of pieces to be cut for mass production of those components. The bar feeding mechanism is a metal cutting machine tool designed to feed the metal. The machine is exclusively intended for the mass production and they represent faster and more efficient way to feed the metal. The clamping arrangement can be varied according to need of operations suitable. The overall system is compact in size, light weight, modular and flexible to be used in small works jobs who need batch production. The setup overall configuration can be adopted by a semi skilled worker easily and can vary the operations by making certain small changes. The system even has the potential to add up a PLC system to control its overall working with ease and with less effort provided. This system has the potential to adopt higher level of automation if desired in future. In this project we are designing and developing a bar feeding mechanism which will be useful to feed the bar to the cutter automatically and then cutting the same. It is able to cut metal bars of different materials and will be helpful in many industries due its compatibility, reliability and efficiency.

**Keywords:** Arduino Uno, PVC Pipe, Cutter, Lead Screw, etc.

## ARTICLE INFO

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## I. INTRODUCTION

Now This is an era of automation where it is broadly defined as replacement of manual effort by mechanical power in all degrees of automation. The operation remains an essential part of the system although with changing demands on physical input as the degree of mechanization is increased. Degrees of automation are of two types, viz.

- Full automation.
- Semi automation.

In semi automation a combination of manual effort and mechanical power is required whereas in full automation human participation is very negligible. Mechanical engineering without production and manufacturing is meaningless and inseparable. Production and manufacturing process deals with conversion of raw materials inputs to

finished products as per required dimensions specifications and efficiently using recent technology. The primary concern of this system is to carry out three operations Feeding, Clamping and cutting. The sequenced operations of the system must be precisely timed. The major work of this system is to slice out large number of jobs in rod or pipe form according to the batch production. The selection of cutter is based on the stress calculated considering the pipe or rod material. The material preferred in this system is a PVC (polyvinyl chloride) pipe for demonstration. But mild steel rods and pipes also be worked out by using different cutters specifications. The cutter to be used in the machine system has been considered by calculating the torque required for cutting PVC object by help of the design data available. With the help of this system the time required to

slice the objects like the pipe or rod will be less the accuracy of slicing or cutting of the material will also be improved. The system can be handled by semi skilled operators with ease. The layout of the machine is compact to be placed in a small workshops .

## II. METHOD AND MATERIAL

Automatic stock bar feed mechanism for automatic screw machines US 2300457 A by MARIOTTE This invention relates to stock bar feed mechanism for automatic machine tools or automatic screw machines, which mechanism embodies a plunger movable in a tube or cylinder to which a motive fluid, as air, is supplied to actuate the plunger to feed the stock bar against the stop of the machine tool or screw machine. It has for its object a means for cutting oil the supply of motive fluid, or air, to the cylinder when the plunger has traveled a predetermined distance, this distance being that traversed by the plunger when a new stock bar is being inserted in the tube.

Theoretical Analysis of Multi-Way Power Hacksaw Machine Prof. KshirsagarPrashant R. , RathodNayan J , RahatePrashant P , HalayePrashant P , Surve Sachin S. To achieve this goal the Multi-way power hacksaw machine is developed. This paper proposes the model of multi-way hacksaw machine which is able to cut four pieces simultaneously without any jerk and minimum vibrations. The model implies conversion of rotary motion into the reciprocating motion for proper working of hacksaw. This model overcomes the limitations of conventional hacksaw machines which can cut single piece at a time. It is able to cut metal bars of different materials at same time and will be helpful in many industries due its compatibility, reliability and efficiency.

## III. PROPOSED SYSTEM

This project consists of single phase vertical electric motor rigidly placed at the center of metallic foundation provided. The shaft of motor rotates at 90- 100 rpm with the power 2HP. The circular disc is mounted on the shaft of motor with the help of key and key slot arrangement. The eccentric point on the plane of disc is provided such that the desired cutting stroke is achieved (around 4-5 inches).

One end of each connecting rod is pivoted at this eccentric point by the use of suitable bearing. Another end of each rod is connected to the hacksaw blade fame with the help of universal joint to get vertical and horizontal Degree of Freedom of rotation for the proper cutting operation. The hacksaw frame slides on the guide ways provided. When motor is ON and disc starts rotating, due to the reciprocating motion of hacksaw frame the metal rod is cut which is firmly fixed in vise. The automatic feeding of coolant is provided to reduce heat generated due to friction which also avoids the jerk.

### A. Flow Diagram

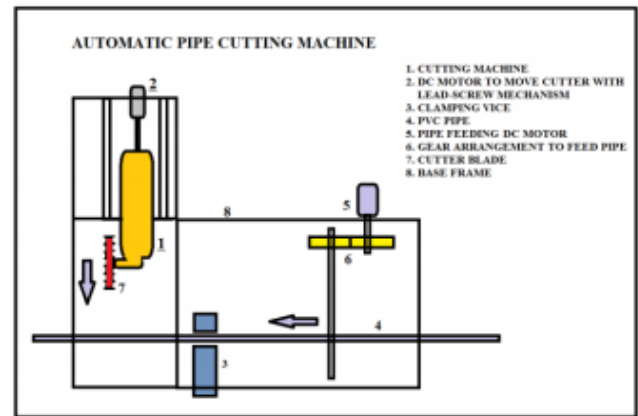


Fig. working of project.

### BLOCK DIAGRAM

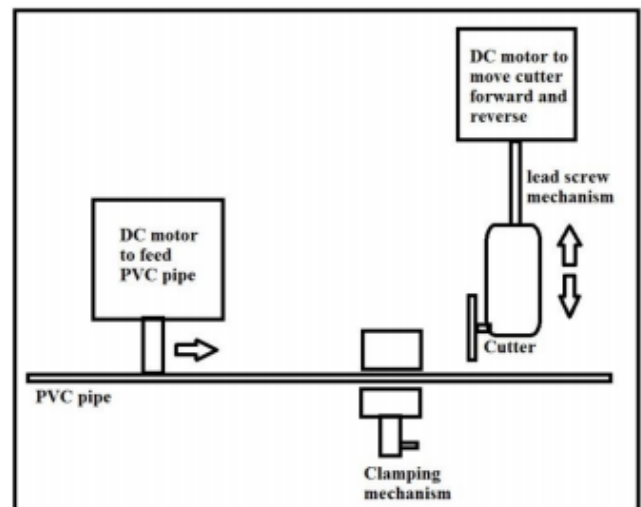


Fig. Block Diagram.

## B. HARDWARE REQUIREMENT

- ARDUINO UNO
- CUTTING MACHINE
- DC MOTOR FOR CUTTER
- DC MOTOR FOR PIPE
- DC MOTOR FOR VICE
- VICE CLAMP
- PVC PIPE
- CUTTER BLADE
- GEAR ARRANGEMENT TO MOVE PIPE

## IV. CONCLUSION

Thus, this work provides an alternative to the existing automatic PVC pipe cutting machine, in terms of automating the pipe entry into the cutting apparatus, eliminates power fluctuation and lesser initial investment. Time consumption is less when compared to manual cutting. This work provides the desired output.

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