

# ‘Multi Operation carpentry machine’

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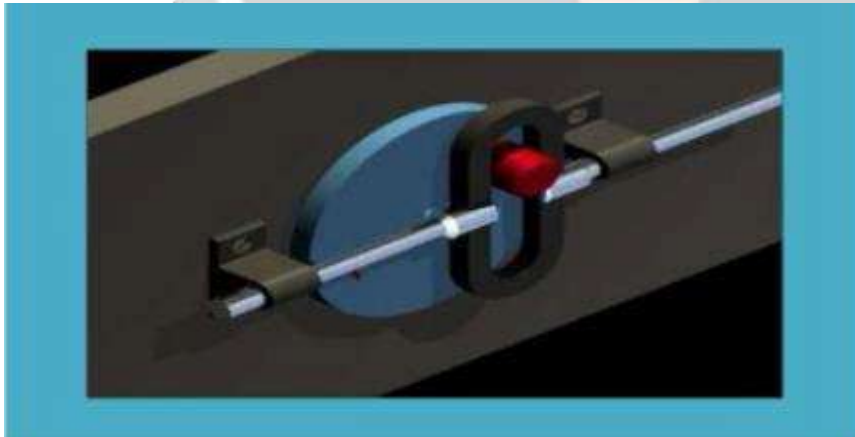
## ABSTRACT

There are many ways to cut metals, but all these ways take more time our aim is to reduce the cutting time by “DESIGN AND FABRICATION OF A MULTI PURPOSE SCOTCH YOKE MECHANISM” and increasing the number of productivity. By this method five operations can be performing. There are four cutting. One drilling and one grinding at the same time by using the bevel gear attachment. The time required to cut four works by power hacksaw multi metal cutter is the time taken by other methods to cut a two work. This method reduces human effort and saves the metal cutting time. Apart from other methods this method can be used in places were to cut more work at low cost. If we want to drilling or surface finishing work it is also possible. The sewing machine is faster and easier than hand sawing and is used principally to produce an accurate square or mitered cut on the work piece.

**Keyword:** - Multipurpose, Five operation, solid work design, Scotch yoke mechanism

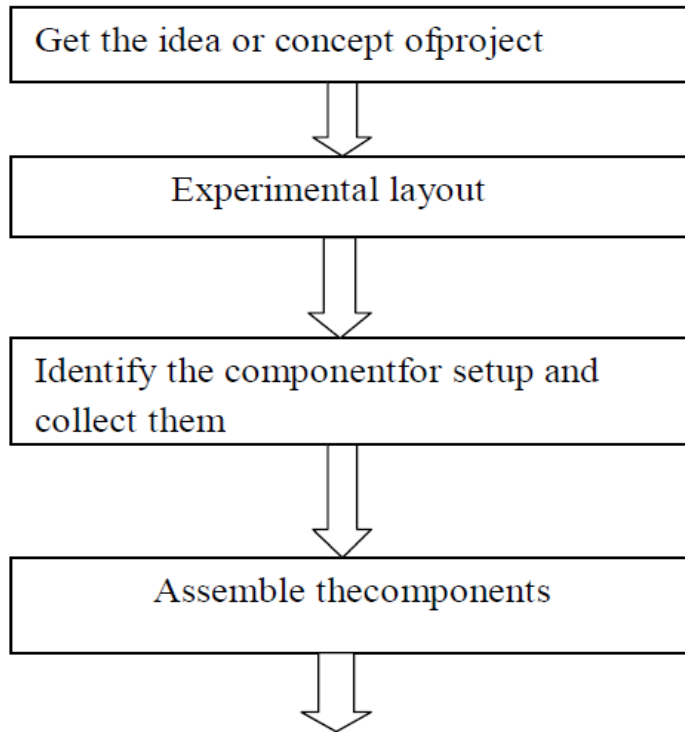
## 1. INTRODUCTION

The multi-purpose machine is used to do the multi operations like Drilling, Shaping, Cutting and Grinding at a time and which is used to save the time and space requirement of an industry. The main concept of machine is to do the operations like cutting, shaping, drilling and grinding by using scotch yoke mechanism.



The **scotch yoke** mechanism is reciprocating motion mechanism, converting the liner motion of a slider into rotational motion, or vice versa. The piston or other reciprocating part is directly coupled to a sliding yoke with a slot that engages a pin on the rotating part. In many engine, reciprocating motion is converted into rotational motion by means of a crankshaft, a piston and a rod that connects them. The scotch yoke is considered to be a ,more efficient means of producing the rotational motion as it spends more time at the high point of its rotation than a piston and it has fewer parts.

### 1.1 METHODOLOGY



### 1.2 Working Principle :

There are only two major principle on which our proposed machine (conceptual model) generally works:

1. Scotch-Yoke mechanism
2. Power transmission through gears.
  - a. Bevel gears

#### 1. Scotch Yoke Mechanism

The Scotch yoke is a mechanism for converting the reciprocating of a slider into rotational motion or vice-versa. The piston or other reciprocating part is directly linked to a sliding yoke with a slot that engages a pin on the rotating part. The motion of the piston is a oscillating over time given a constant rotational speed. We can use two tool on both sides.

#### 2. Power Transmission Through Gears

Bevel gears are used to transfer power of vertical shaft to horizontal. Bevel gears are most often mounted on shafts that are 90 degrees apart, but can be designed to work at other angles as well. The pitch surface of a gear is the imaginary surface that you would have by averaging out the peaks and valleys of the individual teeth. The pitch surface of an ordinary gear is the shape of a cylinder. The pitch angle of a gear is the angle between the face of the pitch surface and the axis.

### 2. Working of the Model:

In the conceptual model of “Multi operational machine” we are giving supply to the main shaft. we move along the axis of shaft we have mounted a pair of bevel gears, through the pinion shaft we are giving drive to drill shaft through belt-pulley arrangement, we have installed the stepped pulley in the arrangement therefore we can made the speed variation. Now again as we move along the axis of main-shaft further we have again used the bevel gear arrangement to give the drive to grinding center.

As we can see that the scotch yoke mechanism is directly fabricated to the main shaft and has same angular velocity as that of main-shaft.

### 3. Advantages:

1. it requires very less labor.
2. reduce human efforts.
3. multiple operation can be performed.
4. cost of machine is minimum.

#### 3.1 Disadvantages

1. Difficult to control at higher depth.
2. Buckling of wire is problem.
3. Holding work piece is difficult.

#### 3.2 Application

1. It is used in saw mill.
2. It is used in carpentry workshop.
3. It is also used in wood working industry.

## 4. CONCLUSIONS

After completing the major project “MULTI OPERATIONAL CARPENTRY MACHINE “ we are much happy and would like to thank our professor, guides and the lectures of the concerned department who have guided us. While making this project we have been able to learn a lot and understand the various aspects of “MULTIPURPOSE MECHANICAL MACHINE “ we can use our knowledge, which we get during our knowledge, which we get during our study.

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