

DESIGN AND FABRICATION OF MACHINE PERFORMING MULTIPLE WOOD WORKING OPERATIONS USING SINGLE DRIVE

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Abstract: This paper discuss about the design and fabrication of multi-operational mechanical wood working machine. Wood working is anything that performing any operation on wood in any way for some useful work. The multi-operational mechanical wood working machine (MoMM) has ability to perform four operations such as drilling, hack-saw cutting, grinding, saw blade cutting. On a single machine all the four tools driven by single motor. The belt drives can be engaged and disengaged whenever necessary. In this competitive work people are passionate for their home interior design. Traditionally carpenter uses separate machine for separate operation which creates a serious problem of material handling as well as maintenance. In order to minimise this problem the idea of installing all the machines in single setup comes up. Which will not only minimise the working space but also it will enhance the ease of operation for operator.

Keywords: - Multi-operational mechanical machine, drilling, hack-saw cutting, grinding, saw blade cutting.

VIII. INTRODUCTION

Industries are basically meant for production of useful goods and services at low production cost, machinery cost, low inventory cost. Today in this world every task have been made quicker and fast due to technology advancement, but this advancement also demands huge investment and expenditure, every industry desires to make high productivity rate maintaining the quality and standard of the product at low average cost, so here we have proposed machine which can perform operations like drilling, sawing (hack-saw, circular saw), grinding which implies that industrialist have not to pay for the machine performing above task individually but simultaneously.

IX. EXISTING SYSTEM

Generally the operations which can be performed on multi-operational mechanical wood working machine is done on separate, huge and bulky machines which costs high and also difficult to maintain periodically. Also it requires high initial investment which is generally not possible for small and medium scale enterprise. This gives rise to the innovative machine which will lessen the efforts of human being and yield more productivity by arranging all the above mentioned four operations that is drilling, saw blade cutting, hack-saw cutting and grinding in one single setup.

X. PROPOSED SYSTEM

The system consists of simple setup and at most utilization of space and considering all the ergonomic considerations for the operator which will ease the machine.

A] Layout Diagram

The proposed layout of Multi-operational Mechanical wood working machine is shown in fig [1].

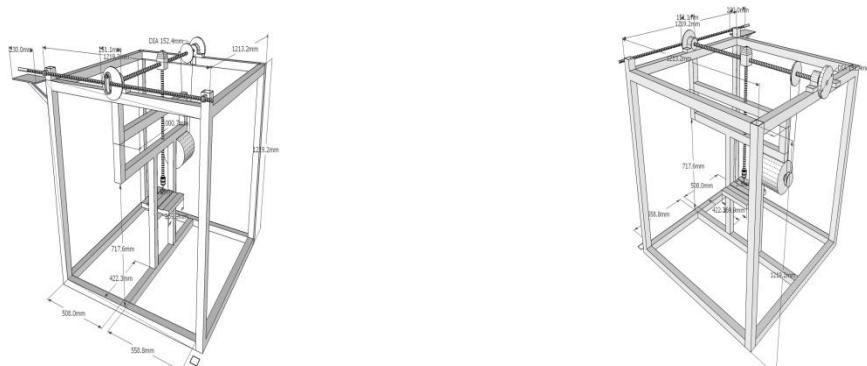


Fig 1: Block Diagram of Multi-operational wood working machine

This system contains of the all four operations done on the same platform. The frame constructed contains the position of the motor, belt, pulley, shaft, drilling, grinding, saw cutting and gears as shown in the figure.

B] System Architecture

The motor is attached above the center and power is transmitted from motor to main shaft. Main shaft then connects to grinding and at center it is connected to drilling shaft by bevel gear. And for saw cutting scotch yoke mechanism from main shaft.

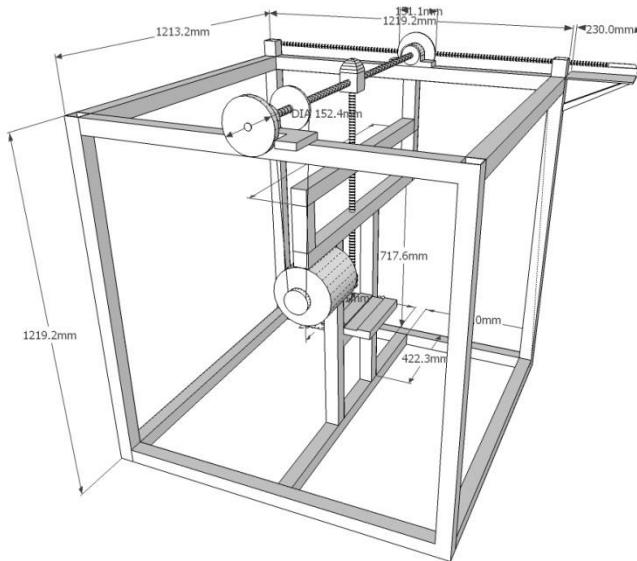


Fig 2. All the mechanisms of MoMM is detailed viewed

Detailed description of MoMM:

This project basically holds four main operations as follows:

1. Drilling machine operation

In MoMM drilling head assembly is used. It is capable of drilling upto 25mm diameter. It works on basic principle of bevel gear arrangement which is fitted in the drilling head portion of machine. The arm is connected for the reciprocating movement of the drilling tool. Work piece is placed on the work table which is attached below drilling assembly and which can be adjusted according to the dimension of the job.

2. Hack-saw cutting operation:

It is horizontal cutting machine which is basically used widely in the wood working applications. It has wide area of scope in the same. It works on mechanism known as scotch yoke mechanism in which two semi circles are fabricated with certain distance. It consists of groove in which a circular plate is attached to where the drive from motor is given. As soon as motor is on the drive from the motor is given to circular plate through pulley and belt arrangement thus scotch yoke mechanism starts working in function.

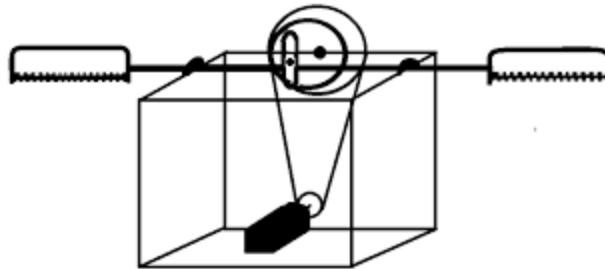


Fig.3 Scotch yoke mechanism for hack-saw cutting operation

3. Circular saw blade cutting:

| | |
|-----------------|---------------|
| Diameter | 6"-10" |
| Max. RPM | 6,000 |
| Plate Thickness | 0.071 |
| Teeth | 24.0 |
| Tool | Table / miter |



Fig.4

4. Grinding operation:

Grinding operation is generally a finishing process. The uneven cut surfaces of wood or any other material are smoothen, polished, grinded in this grinding operation. Particular speaking about wood in grinding operation improves aesthetic look of the wood surface.



Fig.5

CONCLUSION

We seen various design aspects of important components of multi operational mechanical machine. We also studied the various mechanisms which can be used in this machine. During designing we came across various criteria for designing which helps in actual manufacturing process.

Thus this machine will prove boon to the small as well as medium scale enterprises.

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