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DESIGN & FABRICATION OF 6-WAY DRILLING MACHINE

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ABSTRACT

The paper presents the detailed information about 'design and fabrication of 6-way drilling machine. We have design this machine by making modification in radial drillingmachine for the drilling of different sizes straight & angular cylindrical holes as per requirements for industry.

Keywords: Drilling Machine, Lead Screw, Supporting Frame, Guide Ways, Electric Gear Motor, Spur Gear, Drill Vice

I. INTRODUCTION

In the 19th century, industrial revolution takes place. After that industries are developed on the large scale. Products are required to produce by the mass production techniques to reduce the cost. For that purpose different techniques are developed. As many processes have to take place simultaneously, there is need for the help in working. For doing different work we need help. Special purpose machines are developed for thisIn the field

Technology, every day a new technique is ruled. It has his own characteristic due to which we have to adopt it. Today is the World of "New Technology" which we have to take in practice. Machineries is. one of the areas in the development. Machines are widely used in the Mechanical field. In the mechanical Industries, machines are widely used for the art of wing assembly, material handling, coating facility, manufacturing processes (cutting, drilling, welding etc.).s.

So we are going to make a machine for **6-WAYS DRILLING MACHINE TABLE**&make it multipurpose & should be used as drilling machine is simple to maintain easy to operate. Hence we tried our hands on **"6-WAYS DRILLING MACHINE TABLE"** to drill straight as well as angular direction in plywood, thin metal plates etc.

II. PROBLEM DEFINITION

The conventional drill machine has two main parts first drill head & another is drill table. Assembly normally involves tedious work while adjustment of drill table during job holding also there is problem in inclined hole drilling. To overcome this problem we can do the project on design & fabrication of 6-ways drilling machine table with auto feed drill machine which is capable of drilling straight as well as inclined hole

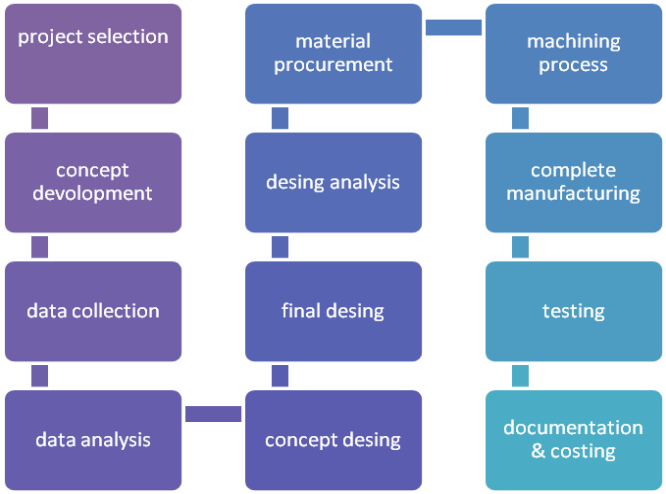
2.1 Objectives

- To reduce the man power & efforts in drilling operations.
- To maintain the accuracy in drilling process.
- To develop automation unit for the drill so that m/c can easily be adopted in today's
- Automated plants
- To performed the most rigid operation with high speed drilling in any types of drill profile.

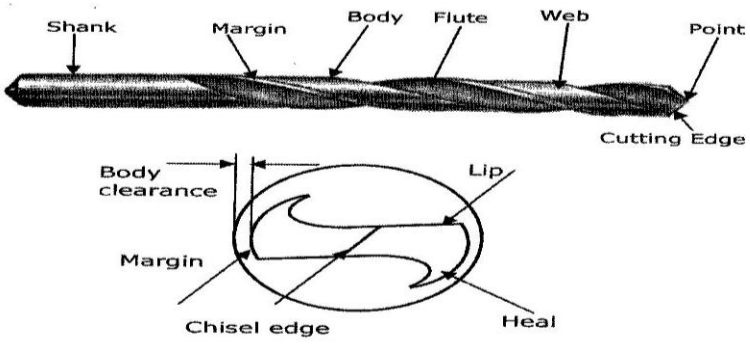
III. FIGURES & TABLES

3.1 Process flow chart & work methodology to solve the problem:

- The below flow chart shows the sequential operation/steps that will be performed during the project process.



3.2 Nomenclature of drill tool.



3.3 Process sheet

3.3.1 PART NAME: Mounting table frame.

Part weight – 5 kg

Part material – M.S.

Part quantity – 1

Part size –(500X380) MM

Sr. No.	Operation	Machine	Tool	Time
1	Cutting the material as per our required size.	Power Hacksaw	Hacksaw Blade	30 min
2	Welding the frame as per required size.	Welding Machine	Arc Welding tool	45 min
3	Grinding the frame	Grinding machine	Grinding machine	20 min

3.3.2 PART NAME: Slider power screw.

Part weight – 0.5 kg

Part material – M.S.

Part quantity – 03

Part size – dia: 50mm, length:370 mm

Sr.no.	Operation	Machine	Tool	Time
1	Cutting the material as per our required size.	Power Hacksaw	Hacksaw Blade	90 min
2	Welding the frame as per required size.	Welding Machine	Arc Welding tool	75 min
3	Grinding the frame	Grinding machine	Grinding machine	45 min

3.3.3 PART NAME: Circular base plate

Part weight – 0.5 kg

Part material – M.S.

Part quantity – 01

Part size – dia: 210mm

Sr. No.	Operation	Machine	Tool	Time
1	Cutting the plate as per our required size.	Gas weld	Gas gun	20 min
2	Welding the screw to plate.	Welding machine	Arc Welding tool	10 min
3	Grinding the power screw with blade.	Grinding machine	Grinding machine	05 min

3.3.4 PART NAME: Jaw holding base plate.

Part weight – 0.4 kg

Part material – M.S.

Part quantity – 01

Sr. No.	Operation	Machine	Tool	Time
1	Cutting the plate as per our required size.	Cutting machine	Cutting machine	20 min
2	Welding the hinge to plate.	Welding machine	Arc Welding tool	10 min
3	Grinding the plate with blade.	Grinding machine	Grinding machine	05 min
4	Drilling the holes for fixing the jaw.	Drill machine	Drill machine	10 min

3.4 Working

Our 6-ways drilling machine table with auto feed drill machine has two main parts first drill head & another is drill table. Job holding table assembly normally involves six ways work piece moving adjustments, while adjustment of drill table during job holding also in inclined hole drilling. In this project job moves in 6-ways as shown in fig.3.1. Having co-ordinates of moving drilling machine table with auto feed drill machine which is capable of drilling straight as well as inclined hole which is requirements for industry. The motion of drill table as given below,

1) Linear +X & -X.
2) Linear +Y & -Y.
3) Linear +Z & -Z.
4) Clockwise +Z & Anticlockwise –Z.
5) Angular Inclination about X-axis.
6) Angular Inclination about Y-axis.

In additional it provided auto feed drill machine at upper side of the drill table which can give drill machine feed by using motor & linear Guide ways Up & Down.

3.5 Detail model

Fig: working model of 6-way drilling machine

Fig: inclination of fixture

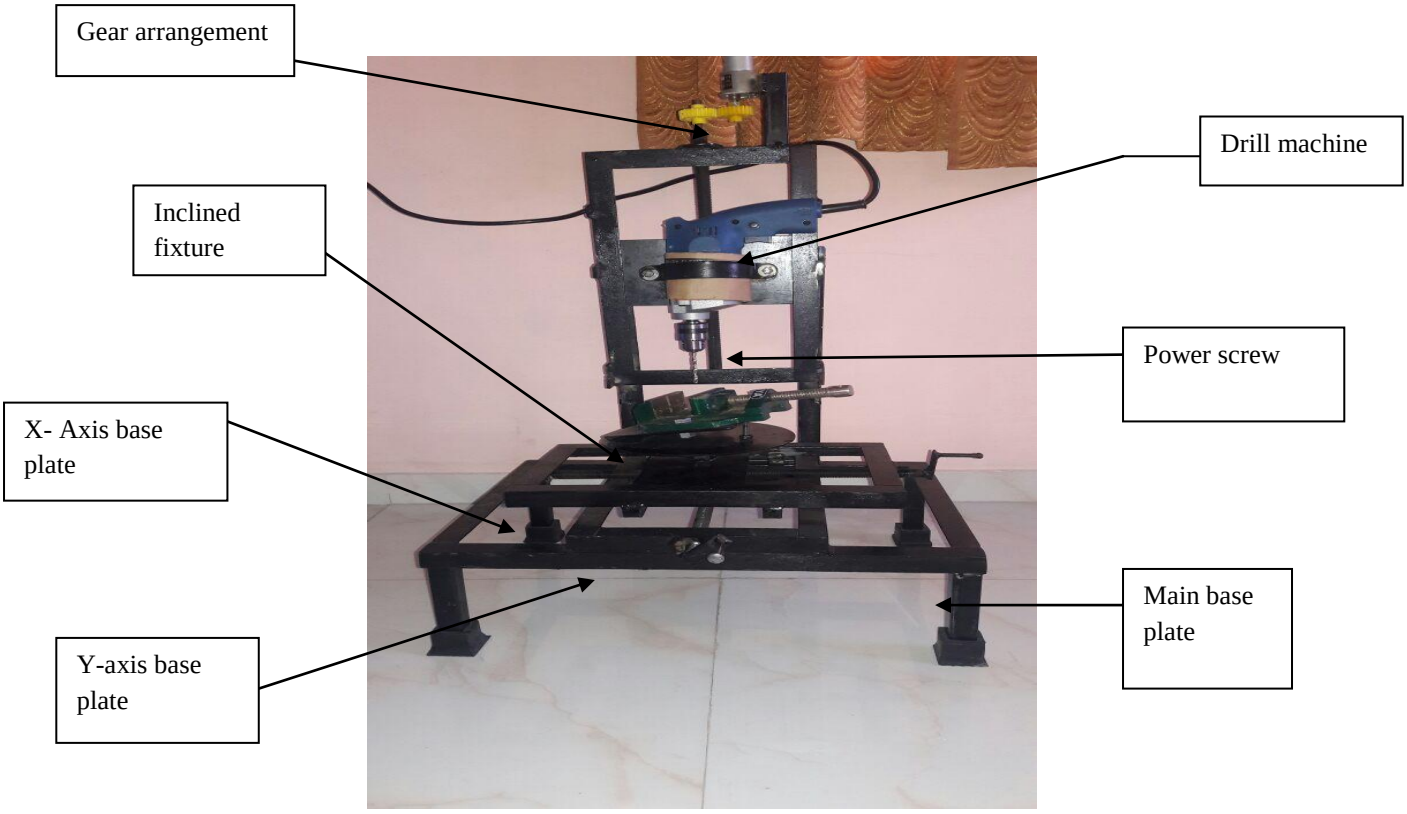


Fig: detail model of 6- way drilling machine

V. CONCLUSION

ADVANTAGES & APPLICATIONS

5.1 Advantages:

1) It provides multiple drilling sizes & types of the holes.
2) The operation of the new drill machine is well controlled.
3) Complex shapes can be drill as per requirement easily.
4) Well balanced system.
5) It approximately having higher efficiency that of old machine in low cost application machine.
6) It minimizes misalignment & less floor space is required.
7) Only simple support structures are required Design & fabrication is easy.
8) It is a faster process of drill.
9) Wide variety of materials can be drill easily.
10) Highly accurate profiles drilling can be easily obtained.
11) More accurate and economical in mass production.
12) A finished work pieces are made within less time.

5.2 Applications:

1) It is used for Drilling of all types of plywood, wooden mater
2) It is used reaming, counter boring for higher finishing for drilling metal

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