

EXPERIMENTAL STUDY OF GRAPHICAL DRILLING MACHINE

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Abstract - A This drill machine can drill graphically in all directions, it can rotate radially on X-axis and Z-axis. In this way we can drill in any direction 360 degrees. We can drill approximately in any material like wood, metal, etc.

As it is a compact machine, we can carry it anywhere and can use it. We can do all the required job with this machine as it is done with any other conventional drilling machine.

Key Words: Drilling Machine, Material, Direction, Job, tool, wood

1. INTRODUCTION

Around 35,000 BCE, Homo sapiens discovered the benefits of the application of rotary tools. This would have rudimentarily consisted of a pointed rock being spun between the hands to bore a hole through another material. This led to the hand drill, a smooth stick that was sometimes attached to flint point, and was rubbed between the palms.

This was used by many ancient civilizations around the world including the Mayans. Bow drill (strap-drills) are the first machine drills, as they convert a back-and-forth motion to a rotary motion, and they can be traced back to around 10,000 years ago.

It was discovered that tying a cord around a stick, and then attaching the ends of the string to the ends of a stick (a bow), allowed a user to drill quicker and more efficiently. Mainly used to create fire, bow-drills were also used in ancient woodwork, stonework and dentistry.

Archeologist discovered a Neolithic graveyard in Mehrgarh, Pakistan dating from the time of the Harappans, around 7,500-9,000 years ago. The earliest evidence of these tools being used in Egypt dates back to around 2500 BCE.

The usage of bow-drills was widely spread through Europe, Africa, Asia and North America, during ancient times and is still used today.

Over the years many slight variations of bow and strap drills have developed for the various uses of either boring through materials or lighting fires. The core drill was developed in ancient Egypt by 3000 BC. The pump drill was invented during Roman times, it consists of a vertical spindle aligned by a piece of horizontal wood and a flywheel to maintain accuracy and momentum.

1.1 PROJECT OBJECTIVE

- Drilling machine can be used for drilling in all direction (x, y, z and radial).
- These drilling machine can be used for drilling different materials like wood, metal, etc
- Main purpose is to reduce time and vibration in drilling operation.
- Drilling machine is compact and flexible.
- It can be used in small and large scale Industries for increasing production rates.

2. WORKING OF GRAPHICAL DRILLING MACHINE

This drilling machine possesses a radial arm which along with the drilling head can swing and move vertically up and down as can be seen in Fig. The radial, vertical and horizontal arm movement of the drilling head enables locating the drill spindle at any point within a very large space required by large and odd shaped jobs.

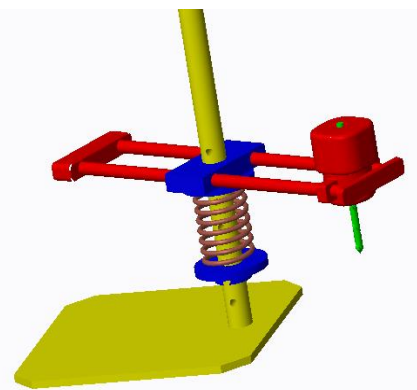


Fig. 1: Diagram of Graphical Drilling Machine

The tubular column on that the radial arm which moves up and down manually or it can powered movement then the drilling head here this is called drilling head which holds the drill spindle here in which the drill is mounted and is subjected to rotation. The entire head is mounted on the radial arm and this can move inward and outward from the drill axis. Also the horizontal arm can slide linearly on vertical arm. Not only that, as this along with this radial arm the drilling head moves upward and downward to have large gap between the drill and job or there is a stroke length. Not

only that further this radial arm can be rotated about the column rotated about the column, say about 360 degree. After locating the hole positions, the work piece is mounted on the worktable using suitable fixtures. Suitable drill and coolant are selected. The drill is fitted into the spindle. The tool head is brought over the work piece by swinging and moving the arm in the necessary up, down, left, or right directions. The necessary feed and speed are given. The machine is started and drilling may then be performed as usual.

The main movements in the machine are:

- 360 degrees rotation of arm joint.
- Up & down movement of the horizontal arm on vertical arm. Linear slide movement of horizontal arm.

3. FEATURES

- a. The Radial Drilling Machine have a thick base plate and vertical column to which is mounted a horizontal arm.
- b. The horizontal arm moves up and down on the column and can be rotated/locked at any position
- c. The drilling head move along the radial arm towards or away from the column and can be locked at any position.
- d. The drill is housed in the drilling head, it rotates and also moves up and down.

4. ADVANTAGES OF GRAPHICAL DRILLING MACHINE

- Price comparative to other available in market will be much cheaper the presently available smallest radial drilling machine will cost approximately 1.5 lakhs well this machine costs only 40000 rupees.
- The radial, vertical and horizontal movement of the drilling head enables locating the drill spindle at any point within a very large space required by large and odd shaped jobs.
- High accuracy while drilling complex drills can be achieved.
- It is a multifunctional portable machine.
- The sixth degree of freedom is an added advantage of using the machine.
- The machine design on further up gradation is a new step towards evolution of drilling machine would outnumber the presently available model.
- Helping the needy small scale industries had been our motto and we have succeeded in giving a simpler solution which has a huge scope to be improvised in the near future.
- Head may swivel so holes can be drilled on angle

- The flexibility of machining is also one of the main feature of our machine.
- The table allows a vise or clamp to be used to position and restrain the work, making the operation much more secure

5. FUTURE SCOPE OF BASE

- Complete automation can be achieved
- Easy locking technique can be derived.
- 180° rotation of the upper base plate can be modified further more to achieve 360° rotation
- Mobility of machine can be increased.
- Portability can be improvised.
- Base bottom plate can be magnetized for an environment where no clamping is possible.
- Locking in the base can be further accurate by the use of gears or any stepper motor.

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