

12/3/2012

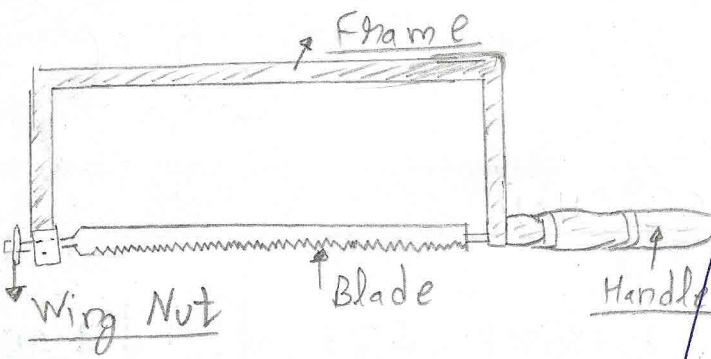
## 2- DRILLING SHOP

★ Object:- To drill out different size of holes on a given workpiece (mild steel plate) according to given drawing specifications on a drilling machine.

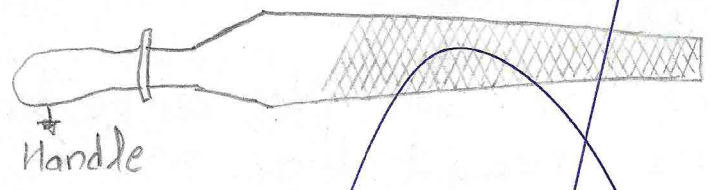
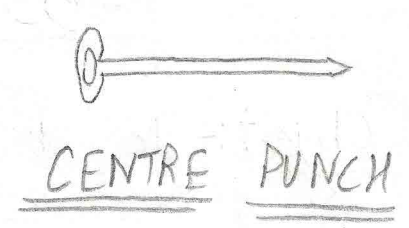
★ Apparatus Required:- Hand-hack saw, files, centre punch, try square, hammer, bench vice, drilling machine.

★ Introduction:-

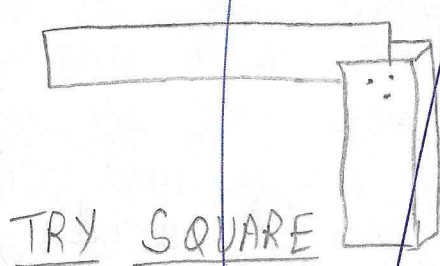
Drilling is an operation of making a circular hole by removing a volume of metal from the job by cutting tool called drill. A drill is a rotary end-cutting tool with one or more cutting lips and usually one or more flutes for the passage of chips and the admission of cutting fluid. A drilling machine is a machine tool designed for drilling holes in metals. It is one of the most important and versatile machine tools in a workshop. Besides drilling round holes, many other operations can also be performed on the drilling machine such as counter-boring, countersinking, honing, reaming, lapping, sanding, etc.



HAND HACK SAW

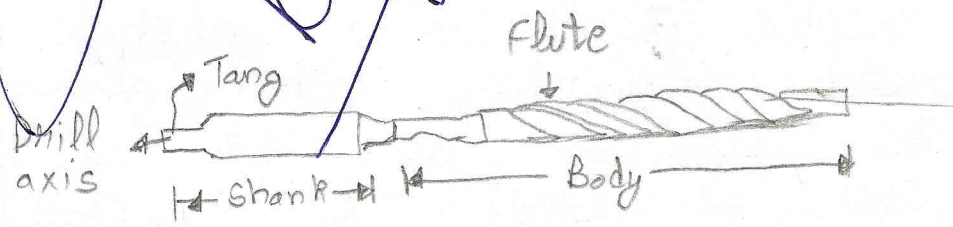


FLAT FILE



TRY SQUARE

*rough work*

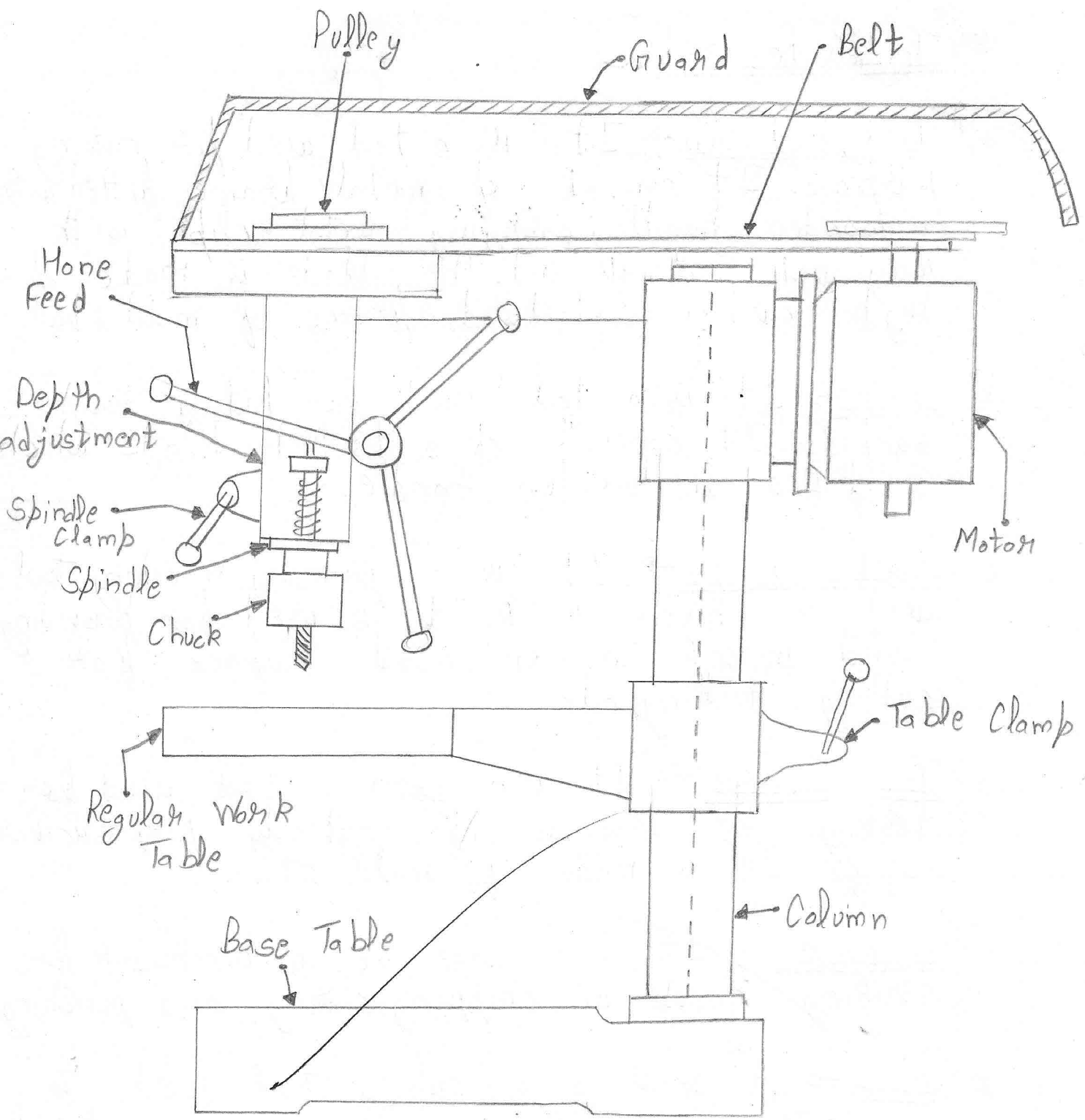


TWIST DRILL



## ★ Tools Required:

- a) Hand hack saw → It is a tool used for cutting purpose. It consists of metal frame fitted with a wooden handle, carrying metal clips with wing nut at its end. The blade is made of high carbon steel and frame of mild steel.
- b) Files → It is a tool used for filing rough surfaces. It consists of a toothed blade which is fitted in wooden handle.
- c) Centre Punch → It is a primary marking tool used in bench work. It is used for providing round indentation on metal surface for cutting, drilling, etc.
- d) Try Square → It is a common tool used for testing the trueness of mutually perpendicular surface. It is made of mild steel.
- e) Hammer → It has wide use in benchwork for striking chisels in chipping, cutting and punching.
- f) Drill → A drill is a cutting tool used to originate or enlarge a hole in solid materials.



DRILLING MACHINE



## ★ Sensitive Drilling Machine

It is a small machine used for drilling small holes in light jobs. In this drilling machine, the workpiece is mounted on the table and drill is fed into the work by purely hand control. High rotating speed of the drill and hand feed are the major features of sensitive drilling machine. As the operator senses the drilling action in the workpiece, at any instant, it is called sensitive drilling machine. The machine consists of a horizontal table, a vertical column, a head supporting the motor and driving mechanism, and a vertical spindle.

Drills of diameter 1.5 to 15.5 mm can be rotated in the spindle of sensitive drilling machine. Depending on the mounting of base of the machine, it may be classified into following types:

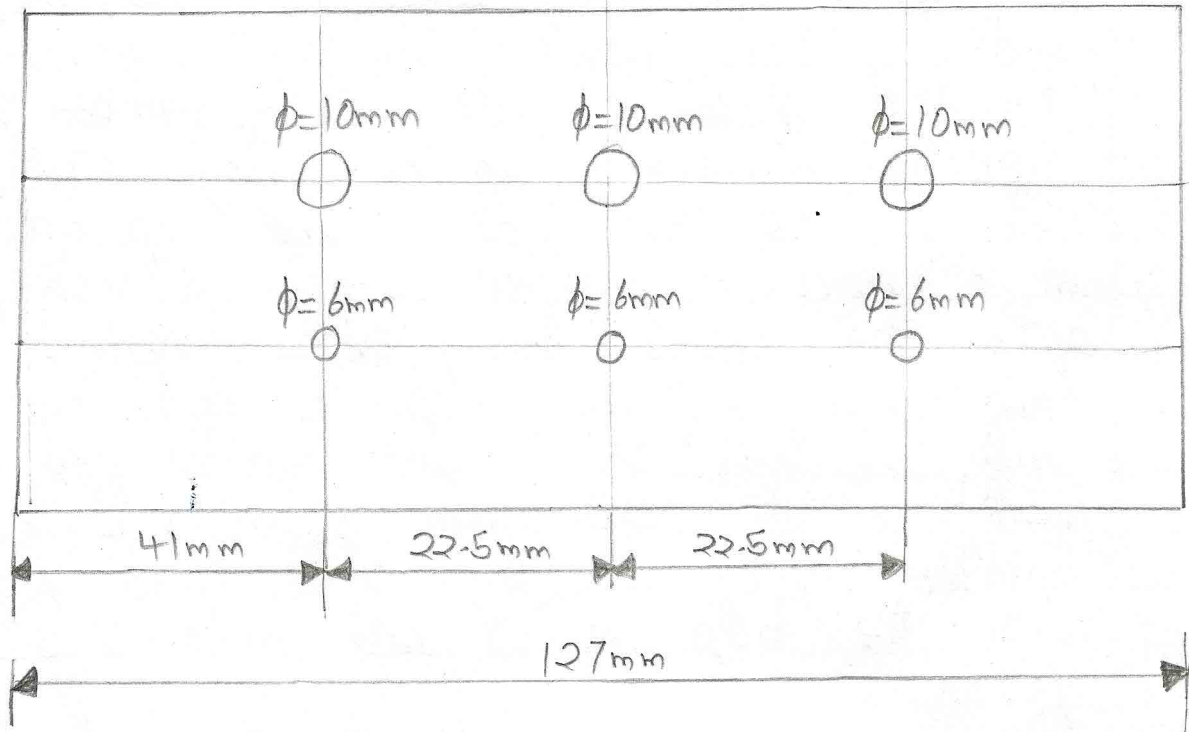
- 1- Bench mounted drilling machine, and
- 2- Floor mounted drilling machine.



## \* Construction of Drilling Machine :->

Different parts of a drilling machine is shown in fig.

- (i) The head containing electric motor, V-pulleys and V-belt which transmit rotary motion to the drill spindle at a number of speeds.
- (ii) Spindle is made up of alloy steel. It rotates as well as moves up and down in a sleeve. A pinion engages a rack fixed onto the sleeve to provide vertical up and down motion of the spindle and hence the drill so that the same can be fed into the workpiece or withdrawn from it while drilling. Spindle speed or the drill speed is changed with the help of V-belt and V-step pulleys.
- (iii) Drill chuck is held at the end of the drill spindle and in turn it holds the ~~drill~~ bit.
- (iv) Adjustable work piece table is supported on the column of the drilling machine.
- (v) The base supports the column, which in turn, supports the table, head, etc.
- (vi) Column is a vertical round or box section which rests on the base and supports the table, head, etc.



Dimensions of work piece



## ★ Drill Types →

A drill is a multi point cutting tool used to produce or enlarge a hole in the workpiece. Broadly, there are 3 types of drills:-

- 1- Flat drill,
- 2- Straight-fluted drill, and
- 3- Twist drill

## ★ Procedure →

- Firstly cut a pinch piece of mild steel by fixing it on a bench vice and using a hand hack-saw to cut it.
- Using a flat file, file the rough surfaces.
- With the help of scale and blade, draw parallel & perpendicular lines on the metal according to specifications.
- At the intersection of these lines, make indentation marks using a centre punch.
- Make holes as per required specifications by drilling machine.
- File all the sides of the workpiece.



★ PRECAUTIONS: →

- Apply pressure in forward stroke while using a hand-back-saw to cut the metal.
- Hold the metal piece in bench vice, keeping the cutting end very near to it, to avoid vibration.
- Apply ~~pressure~~ slowly and constantly on workpiece while drilling with drilling machine.