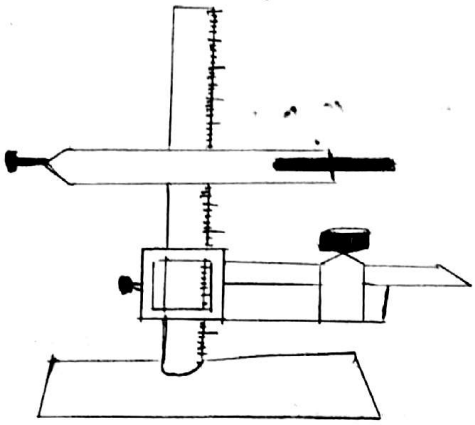
INTRODUCTION

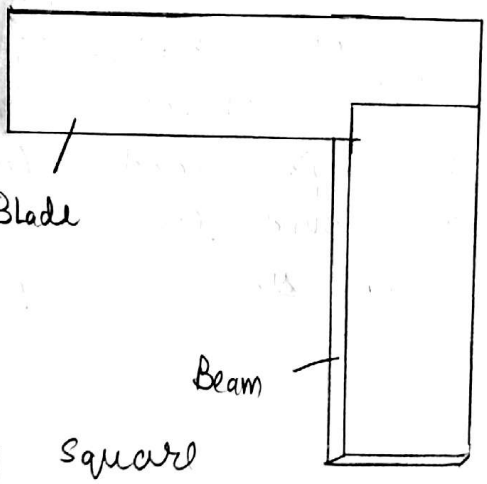
The term fitting is related to assembly of parts after bringing the dimension or shape to the required size or form, in order to secure the necessary fit. The operations required for the same are usually carried out on a work bench, hence the term work bench is also added with the name fitting. The bench work and fitting plays an important role in engineering. Although in today's industries most of the work is done by automatic machines which produces the job with accuracy but still it requires some hand operations. Sheet metal work has its own significance in the engineering work. Many products, which fulfill the household needs, decoration work and various engineering articles are produced from sheet metals. Common examples are of hoopers canisters, guards, pipes, hoods, funnels, bends, boxes, etc. such asticles are found less expensive, lighter in weight and in some cases ~~shot~~ metal products replace the use of castings or forgings.

Marking Tools



Height Gauge

Scribers



Try square

TOOLS REQUIRED

Tools used in bench and fitting shop are classified as under :-

1) Marking tools
2) Measuring devices
3) Holding tools
4) Striking tools
5) cutting tools
6) Drilling tools

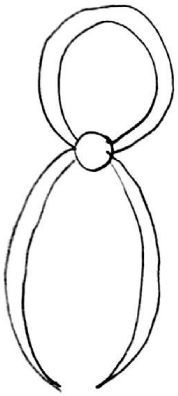
MARKING TOOLS

a) Surface Plate :- It is used for testing the flatness, trueness of the surfaces. It is made up of cast iron or graphite. Its upper face is planned to form a very smooth surface.

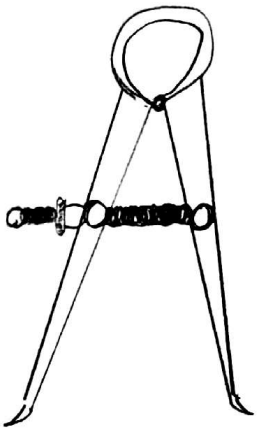
b) Height Gauge :- A vernier height gauge consist of a heavy base, a gradrated beam, a sliding head with vernier sliding jaaks holding a scriber and a fine adjustment clamp.

Measuring Tools

Steel rule

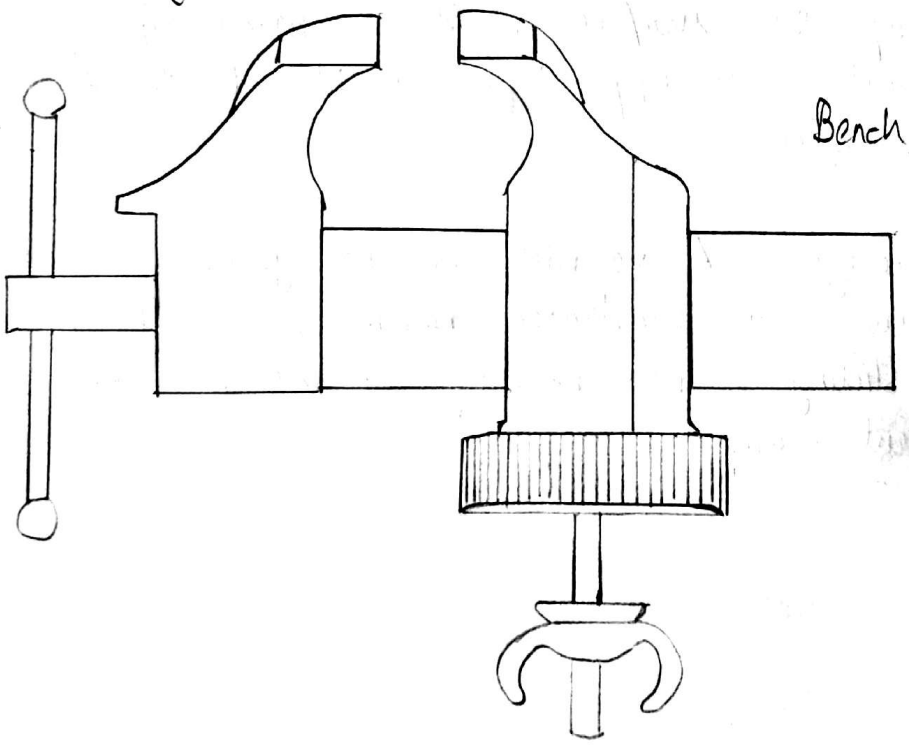


Outside Spring Calipers



Inside spring Calipers

Holding Tools



Bench Vice

c) Trysquare - It is used for checking the squareness of two surfaces. It consists of a blade of steel which is attached to a loose at 90°

d) Scriber - It is used to scribe or mark line on a metal surface for a variety of purposes.

MEASURING DEVICES

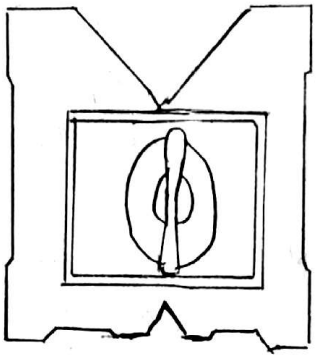
a) Steel Rule :- These are made up of stainless steel and are available in many (styles) sizes. These are marked in inches or milimeters

b) Vernier Callipers - It is used for measuring the outer dimensions of round, flat, square components and also the inner size of the holes and base.

c) Micrometer :- micrometers are commonly employed for measuring small dimensions with extreme accuracy.

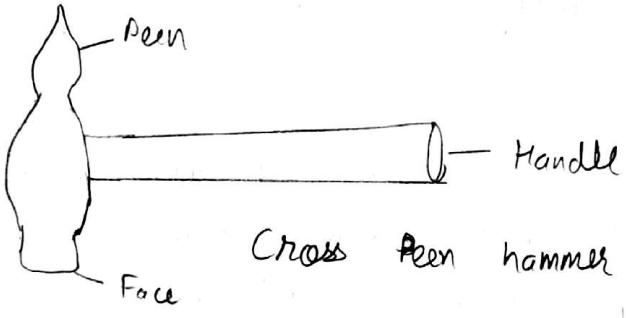
HOLDING TOOLS

a) Work bench :- This is a table of particular size and raised construction made of hard wood. The size ranges from 50-80 cm in length about 90 cm in width.

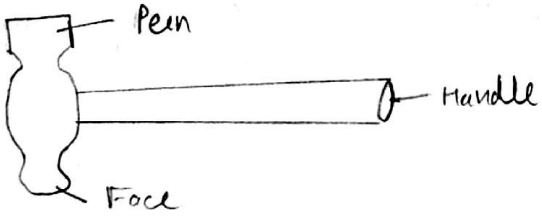


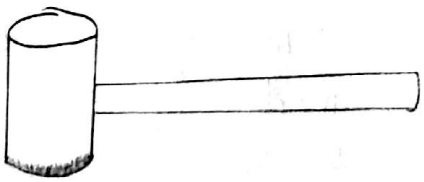
V - block

Striking Tools



Cross Peen hammer





Mallet

b) Bench vice :- It is firmly fixed to the bench with the help of nuts and bolts. It consists of a cast iron body and cast iron jaws.

c) V- Block :- V grooves are provided To hold the round objects

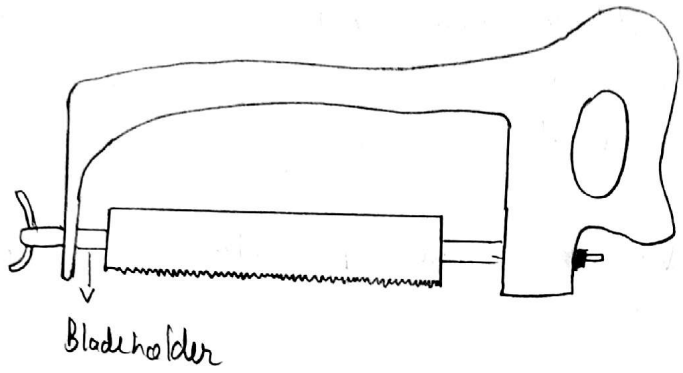
d) pliers :- Pliers are mainly ordinary nedle nose and special type. These are commonly used by fitter and electricians for holding jobs.

STRIKING TOOLS

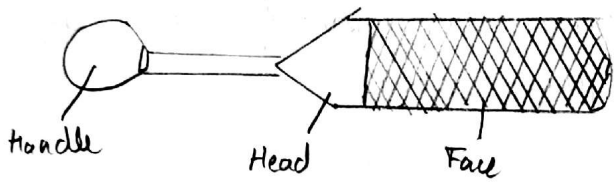
a) Hammers :- hammers are used for striking the naids, assembling joints, and setting wooden plane blades.

b) Mallet :- A mallet is a short handled wooden hammer with a large head. It is used to strike a chisel for heavy cutting waste wood from joints such as mortises and halving joints and also for removing unwanted wood.

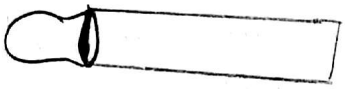
Cutting Tools



Hacksaw

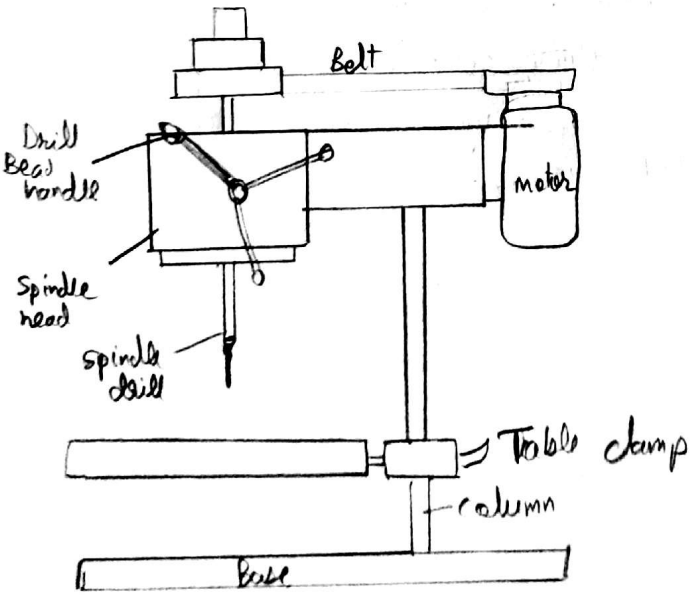


File



Chisel

Drilling Machine



CUTTING TOOLS

a) Chisel :- Chisels are used for cutting metals and for marking prior to breaking. They may be hot or cold depending on whether the metal to be cut is hot or cold.

b) Hacksaw :- hacksaw is used for cutting of rods, bars pipes plats etc. It consists of a frame, which is made from mild steel.

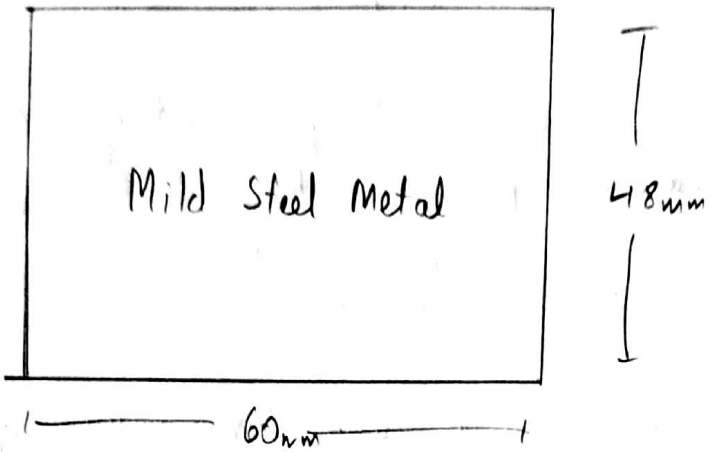
c) Snips :- A snip is a hand shear used to cut thin sheets of gauge size. It works like an ordinary scissors.

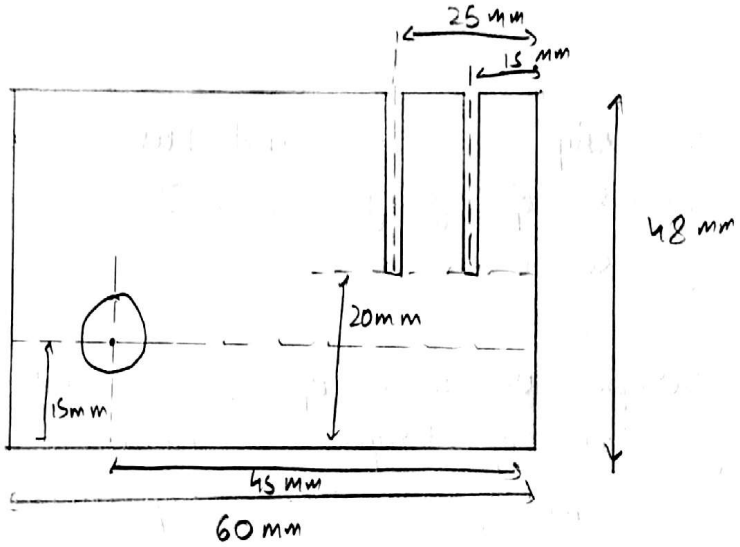
d) Scraper :- Scraper are made up of old files and the cutting edge of scraper is hardened and tempered. They are mainly used to scrap metal surfaces by rubbing the work surface

e) Files :- It is hardened piece of high grade steel with slanting rows of teeth. It is used to cut, smooth or fit metal parts.

DRILLING - Drill is generally held in check of bench drilling machine. It usually of two cutting edges set at an angle with the axis. Hand drill is used to the make relatively large size holes.

Aim: To practice hacksawing, fitting, marking and drilling





JOB-1

Aim :- To practice hacksawing, fitting, marking and drilling.

Material Required :- Mild steel flat piece

Tools and equipment Required :- Trysquare, scriber, hacksaw, rough file, smooth file, steel rule, height gauge, drill, work bench, bench vice.

Procedure :-

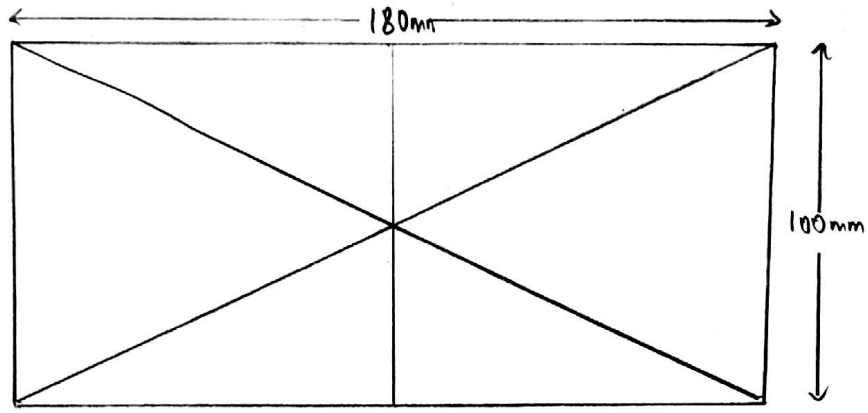
1) A mild steel flat piece is cut by using hacksaw
2) Both of the edges are filled to straightness with rough and smooth file and checked try square
3) Chalk is applied on one side of piece
4) Lines are marked by vernier height gauge
5) Dot punch are made (marked by vernier height gauge).
6) Finally make a hole by drilling machine and use creamers for finishing.

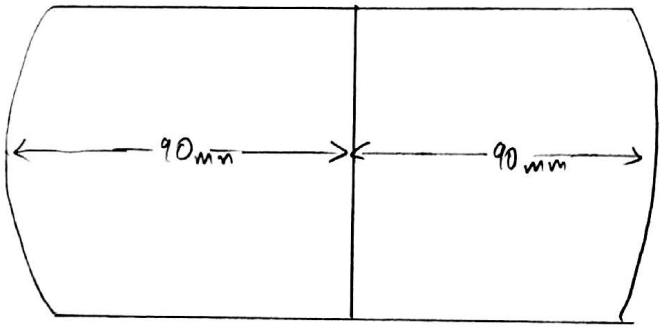
Safety Precautions :-

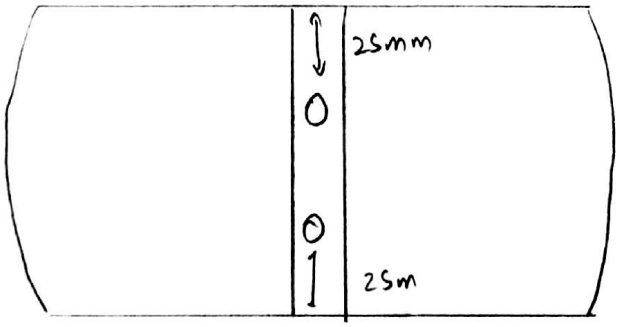
1) One should always use a file card to ~~file~~ clean the file
2) Never use your hands on job, the clips may penetrate in hand and cause a painfull infection
3) One should not use a file without a handle.

4) One should not test the sharpness of the blade by running hand accross its teeth.
5) Handle and use the drill very carefully.
6) Care should be taken while cutting with spin

Aim : To make a Riveted Joint







JOB-2

Aim :- To make a riveted joint

Material Required :- Galvanised iron sheet

Tools :- Scale, verniers, scissors, marking tools, Rivet, hammer

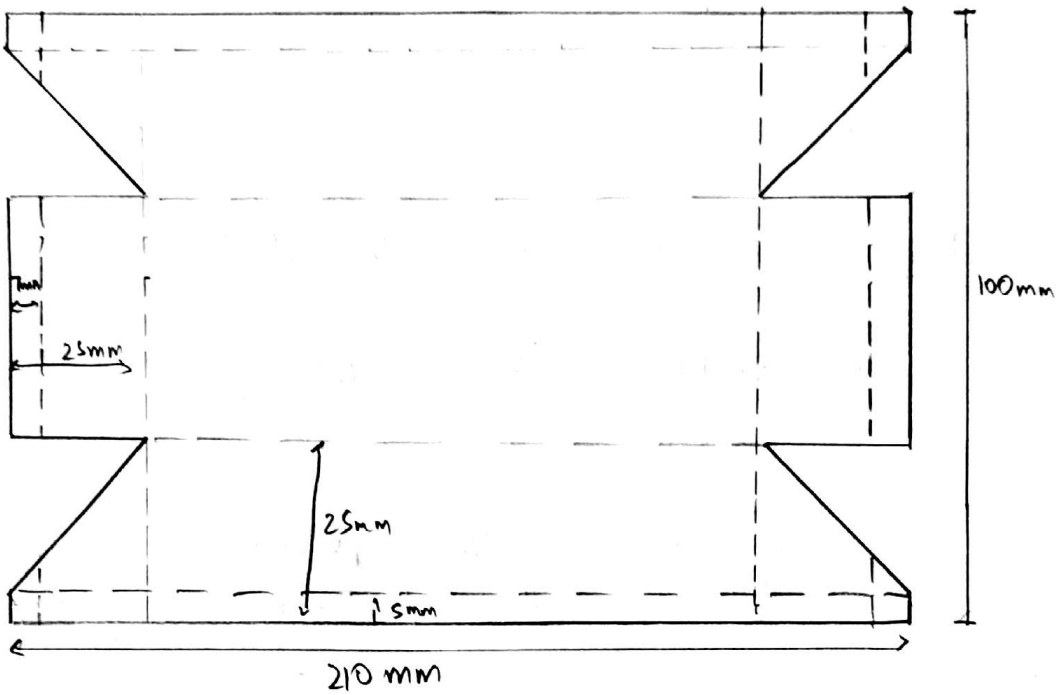
Procedure :-

1) Cut a sheet of galvanised iron (180×100)mm using scissor
2) Measure edges at the radius of 90 mm using verniers
3) Cut along arc.
4) Cut through the mid sheet and mark a line along width at a distance of 8 mm from cut
5) Fold along line and make rivet joint.
6) Mark two points at a distance of 2.5 mm rivet joint.

Safety Precautions :-

1) one should always use a file card to clean the file
2) Care should be taken while cutting with snip.
3) Care should be taken while bending.
4) One should not test the sharpness of teeth by running the finger accross the teeth.

Aim : To make a box from thin metal sheet



JOB-3

Aim :- To make a box from a thin metal sheet of dimensions 120 × 210 mm

Material Used :- A thin metal sheet, metal cutting scissors, scales, scriber.

Procedure :-

1) Cut a thin metal sheet of dimensions 210 × 120 mm
2) On this mark 25 mm from each side
3) Then mark 7mm from width side and 5mm from length side
4) Then cut the metal sheet along as shown in figure.
5) After this bend the length wise and then along 7mm line to obtain L-shape
6) Then bend along the 25 mm lines to obtain the loose shape
7) Then bend width wise 7mm line completely.

Precautions :-

1) Handle the sheet with care after cutting at the sharp edges can hurt.
2) Cutting accordingly to dimensions is always done along length.