Bharath

INSTITUTE OF HIGHER EDUCATION AND RESEARCH

(Declared as Deemed-to-be-university under Section 3 of UGC Act, 1956)

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Course.....B.TECH..... Branch.....ECE.....

Year.....1st..... Semester.....I.....

Register No. U19EC270

Certified to be the bonafide Record of work done by the above student in the .....WORK SHOP..... laboratory during the .....I.....Semester in the Academic year 2019 - 2020

Signature of the Lab-in-charge

Signature of the Head of Dept.

Submitted for the practical examination held on.....03/12/19.....

Internal Examiner

External Examiner

INSTRUCTIONS FOR MAINTAINING THE RECORD NOTE BOOK

1. The Record should be written neatly in ink on the pages of the right hand side and the diagrams /drawings to be drawn on the pages of the left hand side in pencil.

2. Every Experiment should begin on a new page.

3. The right hand side pages of the record should contain:

   i. SI. No. and date of performance of the Experiment in the margin at the top.

   ii. Experiment No. and the title of the Experiment on the first line followed by

   iii. Aim of the Experiment.

   iv. A list of apparatus required.

   v. Description of the apparatus.

   vi. Theory of the Experiment in brief.

   vii. Inference of the result.

4. The left hand side pages of the Record should contain :

   i. Neat sketches of apparatus used and full page graphs wherever possible.

   ii Diagrams of Electrical connections neatly drawn.

   iii. Observation (to be entered in a tabular form neatly, wherever possible)

   iv. A detailed account of manipulation.

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V. good

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Expt. No.
Date : 30/08/19

CARPENTRY SECTION

STUDY OF CARPENTRY TOOLS

INTRODUCTION :-

Carpentry is the process of working with wood for applications such as floor works, roofs and partitions in a building. Preparation of other wood works such as windows, stairs, cupboards etc is called as joinery.

WOOD SEASONING :-

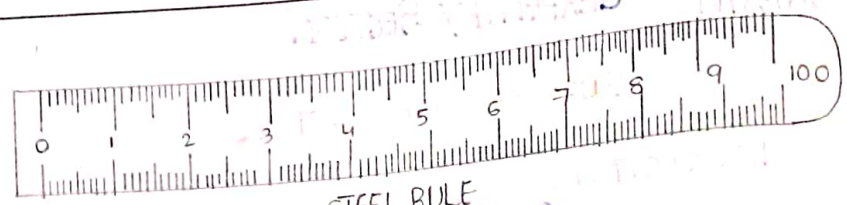
Seasoning is the process of removing the excess moisture present in the timber by evaporation. Seasoning makes the wood resilient and fighter seasoning ensures that the wood will not distort after it is made into an objects.

Types of WOOD :-

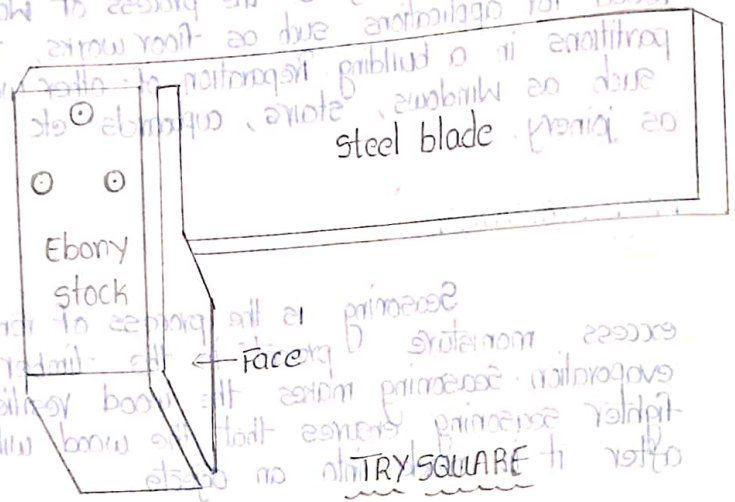
Wood has two types based on botanical factors soft wood and Hard wood.

Soft Wood :- It has straight fibers and is comparatively weaker.

Hard Wood :- It has proper bonds inside. so it very stronger.

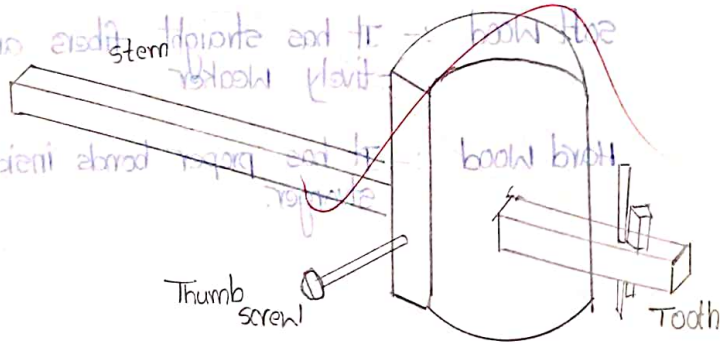


STEEL RULE



TRY SQUARE

MARKING GAUGE



Expt. No.

Date :

MARKING AND MEASURING TOOLS

Steel Rule :-

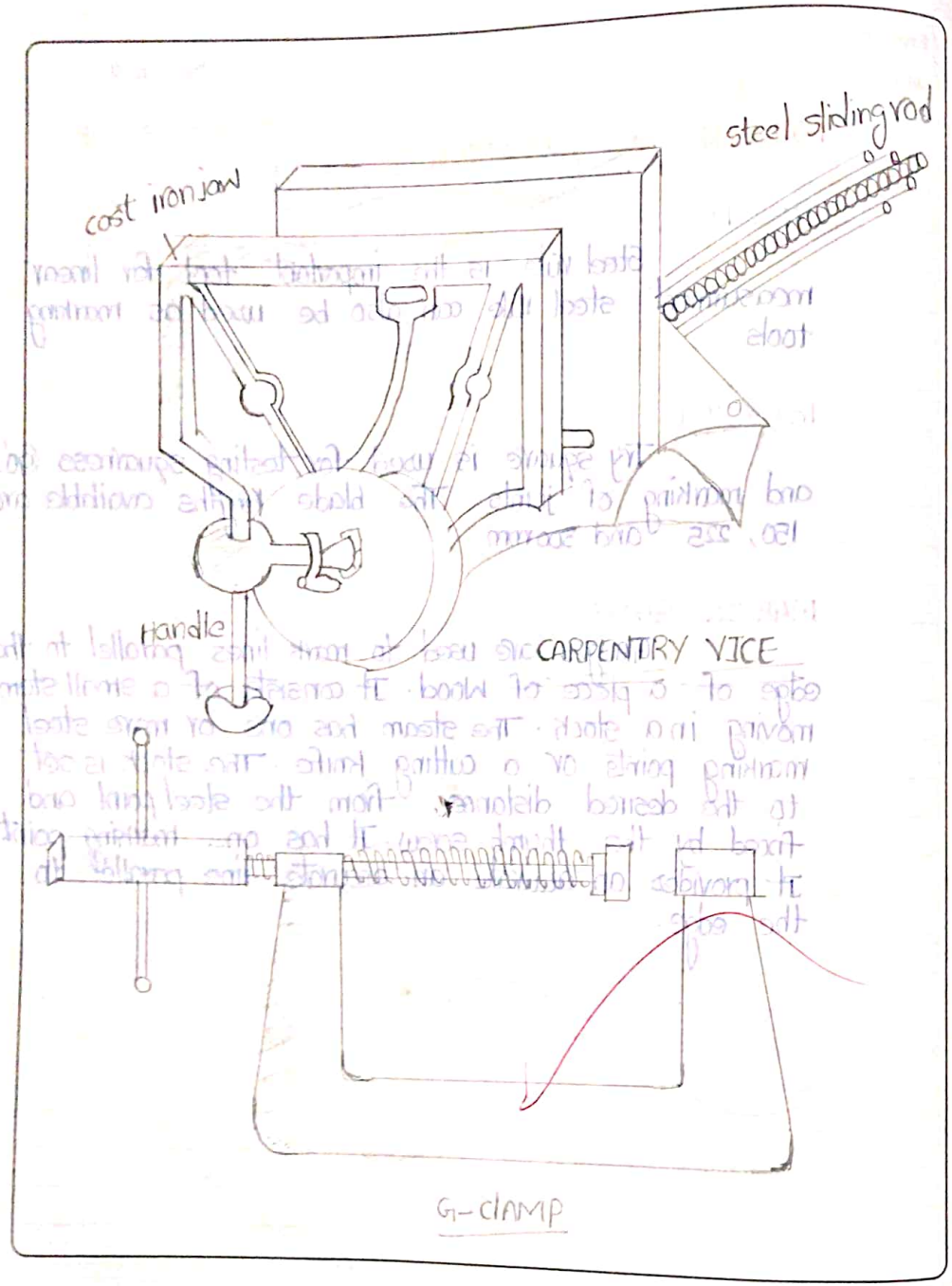
Steel rule is the important tool for linear measurment. steel rule can also be used as marking tools.

TRY SQUARE :-

Try square is used for testing squarness (90°) and marking of joints. The blade lengths available are 150, 225 and 300mm.

MARKING GAUGES :-

GAUGES are used to mark lines parallel to the edge of a piece of wood. It consists of a small stem moving in a stock. The steam has one or more steel marking points or a cutting knife. The stock is set to the desired distance from the steel point and fixed by the thumb screw. It has one marking point. It provides an accurate an accurate line parallel to the edge.



HOLDING TOOLS :-

During wood working, job is shaked. so maintaing accuracy is tough. To maintain accuracy the wood is to be held rigidly.

BENCH VICE [CARPENTRY VICE]

It is the most common work holding device. It consists of one fixed jaw and one movable jaw, the fixed jaw is fastened to the work bench and the movable jaw mounted over the screw rod and guide pins. The gaps between the jaws are adjusted by using the screw rod

G-CLAMP :-

It is made up malleable join. The opening capacity varies from 50 to 350 mm. It can be used for clamping small work. The swivel shoe allows to fix angled work.

PLANING TOOLS :-

Generally, planes are used to produce flat surfaces on wood. A plane is like a chisel fitted in a black of metal on wood. The cutting blade is fixed in a wood or metal with some inclination.

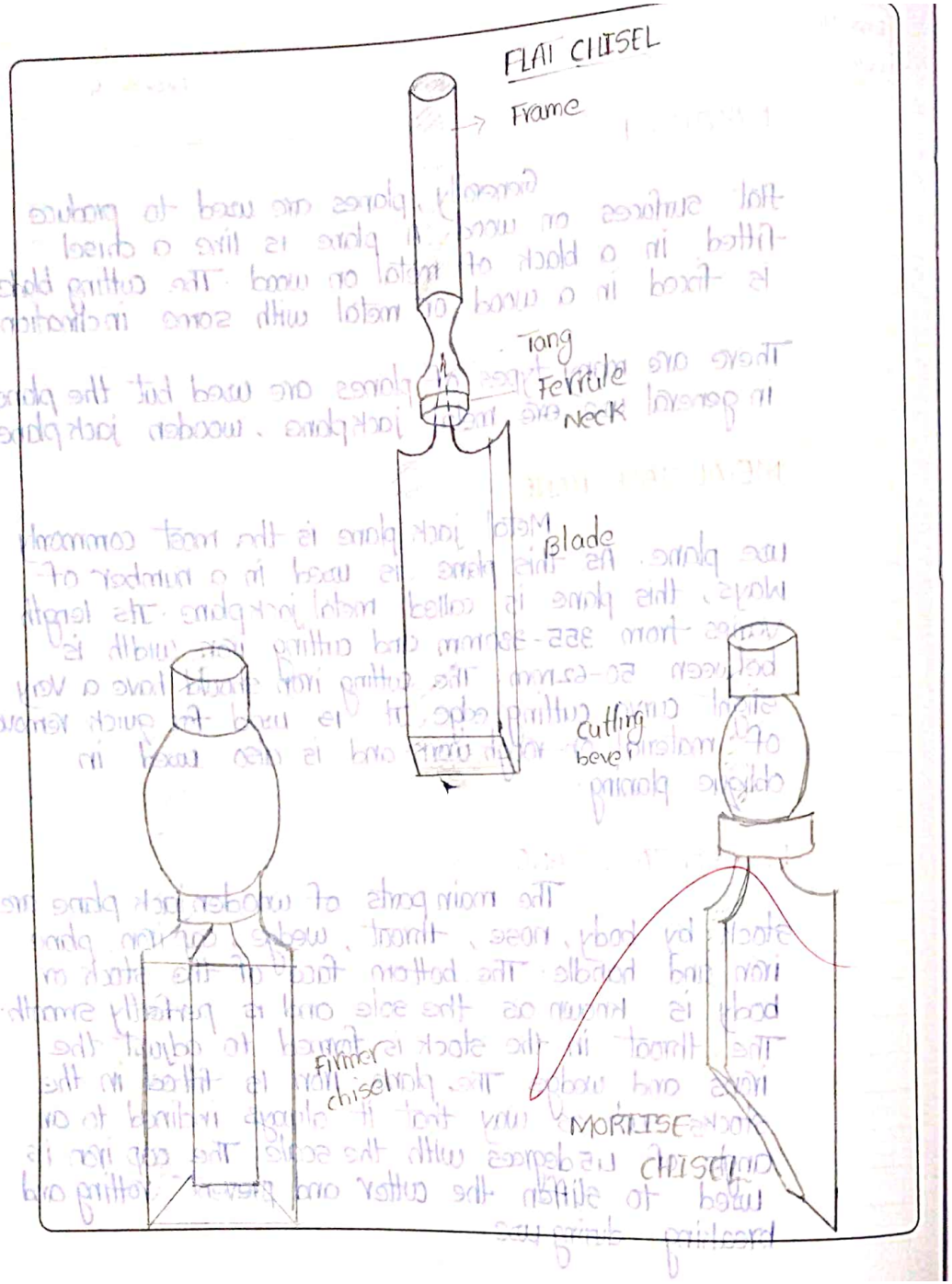
There are many types of planes are used but the planes in general use are metal jack plane, wooden jack plane.

METAL JACK PLANE :-

Metal jack plane is the most commonly use plane. As this plane is used in a number of ways, this plane is called metal jack plane. Its length varies from 355-380mm and cutting iron width is between 50-62mm. The cutting iron should have a very slight curve cutting edge. It is used for quick removal of material on rough work and is also used in oblique planing.

WOODEN JACK PLANE :-

The main parts of wooden jack plane are stock by body, nose, throat, wedge, cap iron, plane iron and handle. The bottom face of the stock or body is known as the sole and is perfectly smooth. The throat in the stock is formed to adjust the irons and wedge. The plane iron is fitted in the stocks such as way that it always inclined to an angle of 45 degrees with the scale. The cap iron is used to stiffen the cutter and prevent rotting and breaking during use.



Expt. No.

Date :

CHISELS

The chisels are cutting tools and are using for fitting shaping and surface decoration. It is a flat thick piece of tool steel edge and the other end 5 provided with a wooden handle

Flat chisels :-

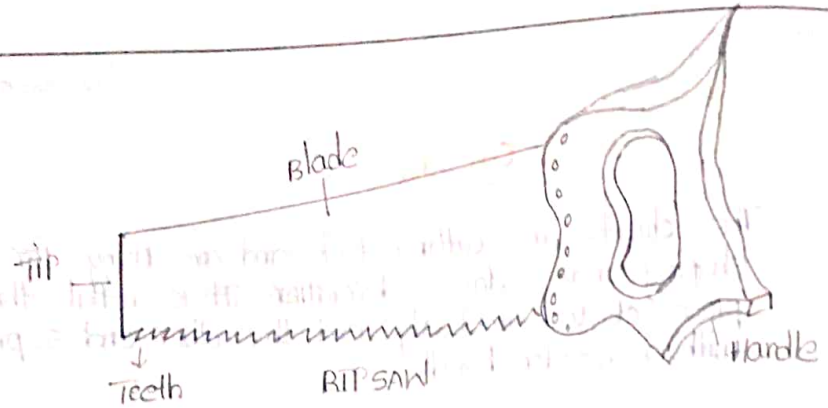
This is the most commonly used chisels this is an-all purpose tools used for light and heavy work.

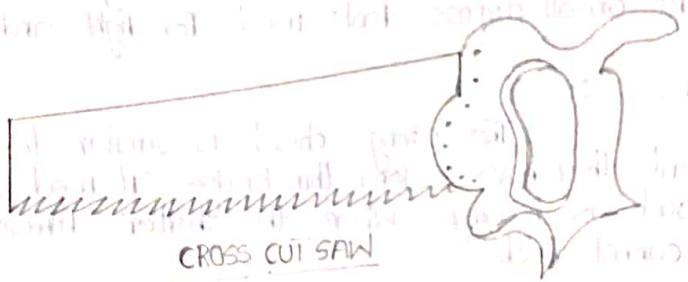
Paring chisel :-

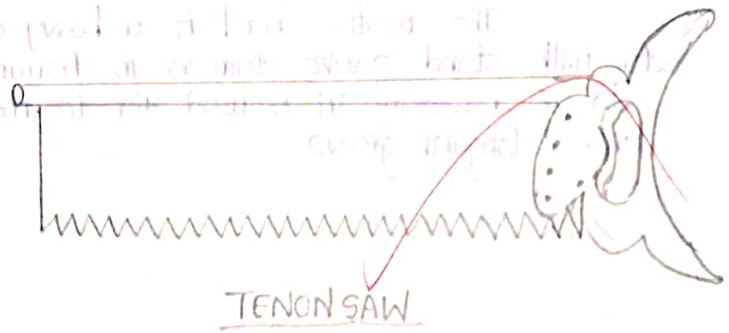
The paring chisel is similar to firmer chisels But they have a long thin bradge. It used for deep work such as housings, where the shorter firmer chisel cannot reach.

Mortise chisel :-

The mortise chisel is a heavy duty tool used to with stand severe stain as in framing where deep cuts are necessary. It is used for to make square and rectangular groove.







CUTTING TOOLS

Saws and chisels are the cutting tools used in carpentry. Saw is the mostly used carpentry cutting tool. It has two parts namely steel blade and wooden handle.

Types of saw :-

Rip saw :-

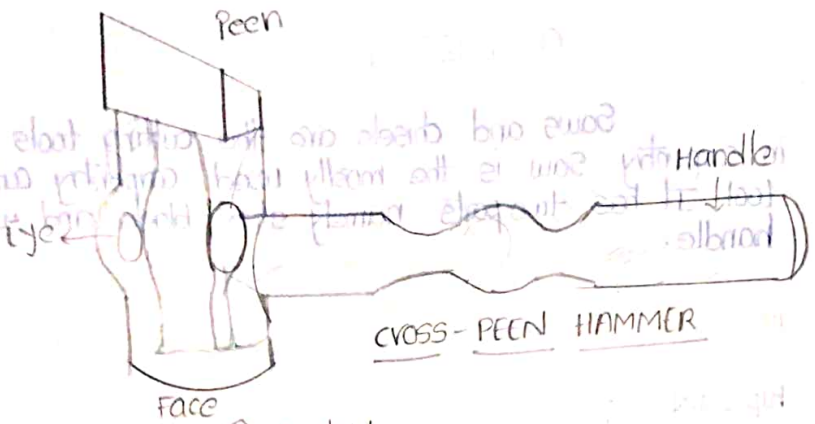
Rip saw is the largest and coarsest of all saws. The length of the blade is between 650 - 710 mm and number of teeth per 25mm is either 4 or 5. Teeth are sharpened such that it will form a square cutting effect. It is similar to that of large number of chisels passing through the surface of the wood and is suitable for sawing down the grain.

Cross cut saw or Hand saw :-

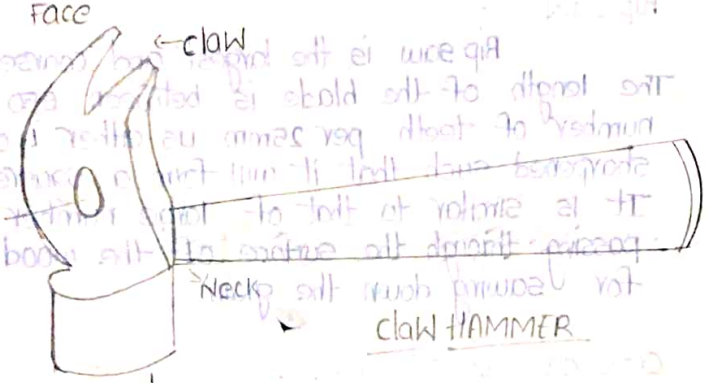
Cross cut saws are for cutting across the grain in thick wood. These are 600 to 650mm long and has 8 to 10 teeth per 25mm.

Tenon saw :-

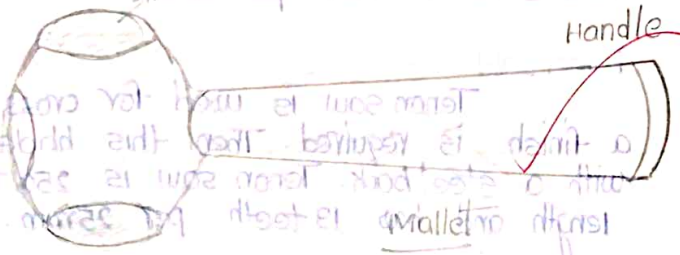
Tenon saw is used for cross cutting when a finish is required. Then this blade is reinforced with a steel back. Tenon saw is 250 to 400mm in length and has 13 teeth per 25mm.



CROSS - PEEN HAMMER



CLAW HAMMER



Mallet

Expt. No.

Date :

STRIKING TOOLS

Hammer :-

Hammer is one of the mostly used striking tools. It has many types.

Cross - peen Hammer :-

The cross peen hammer is mostly used for positioning small nails. The head is tightly held in the handle with the help of iron wedges.

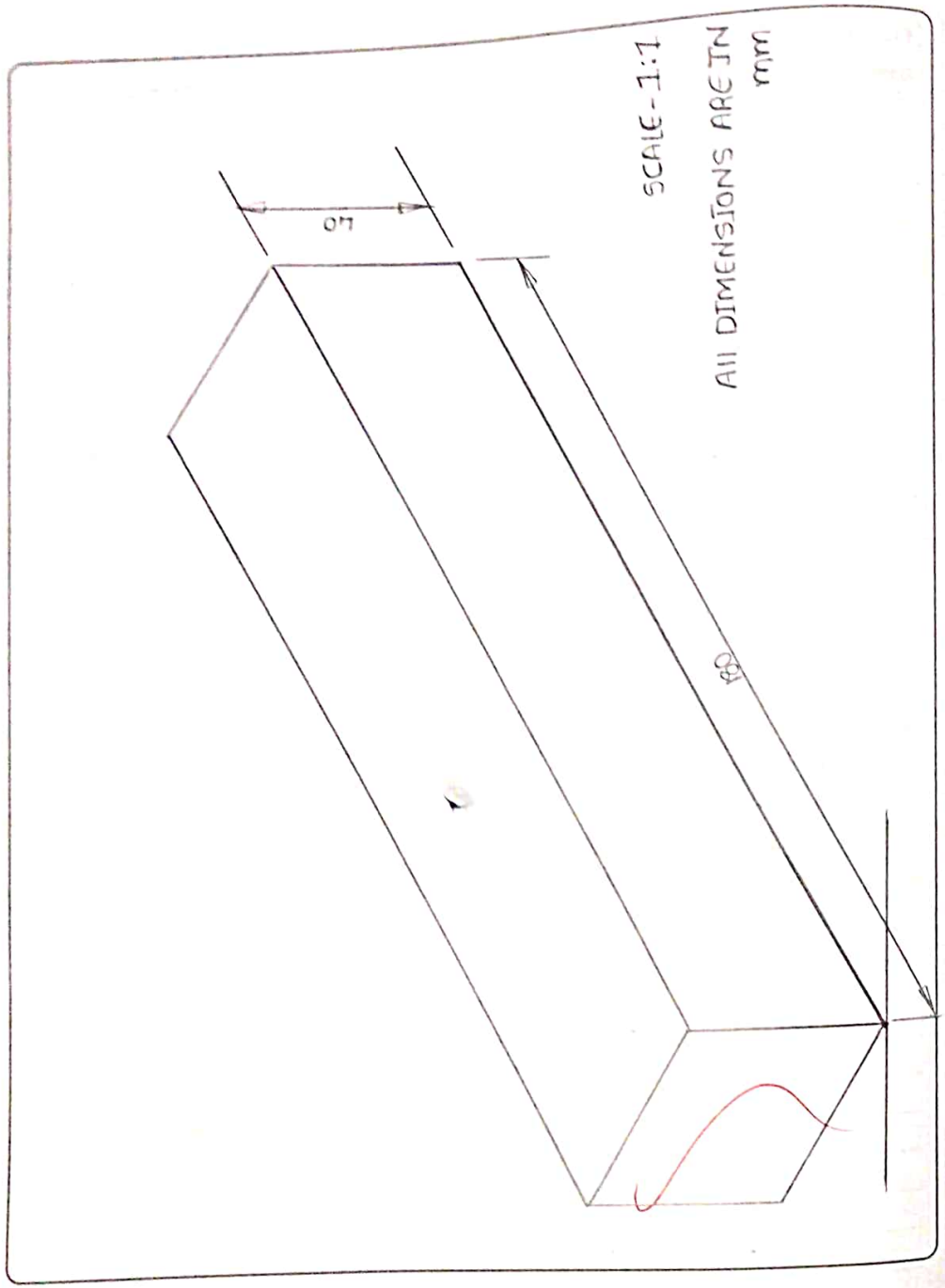
Claw- Hammer :-

The claw hammer is effective in removing very large nails and also for driving the nails using other end of the hammer.

Mallet :-

Mallet is used to give light blows. The head is made up of wood and round in section. The striking face is flat. It is made of beech wood and ash wood.

25/9



Expt. No. 01
Date : 20/09/19

RECTANGULAR PLANNING

Aim :- To Determain the Rectangular planning in given dimensions are 180x40x40 mm.

Tools Required :-

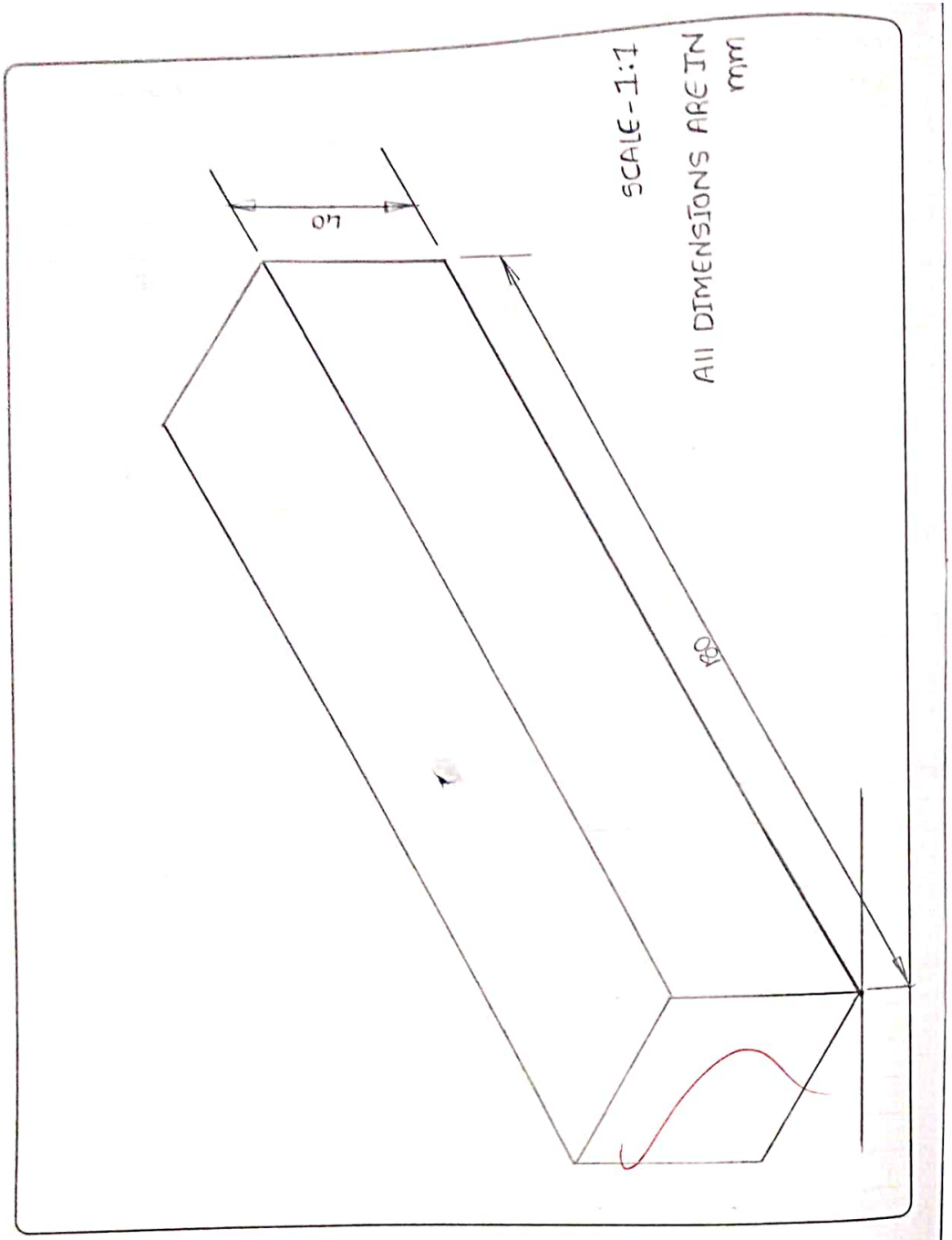
Steel Ruler, marking guage, Try square, metal jack plane, carpentry vice

Materials Required :-

A silver wooden block of dimensions in 180 X 45 X 45 mm.

Procedure :-

1. Take the raw material of wooden block. The dimensions are 180 X 45 X 45 mm
2. Take the tools which is required to make the rectangular plane in 180 X 40 X 40 mm
3. Fixed the wooden block in between the vice jaws
4. The wooden block is hard so we used to the metal jack plane to make smooth and two equal surfaces



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3. Fixed the wooden block in between the vice jaws
4. The wooden block is hard so we used to the metal jack plane to make smooth and two equal surfaces

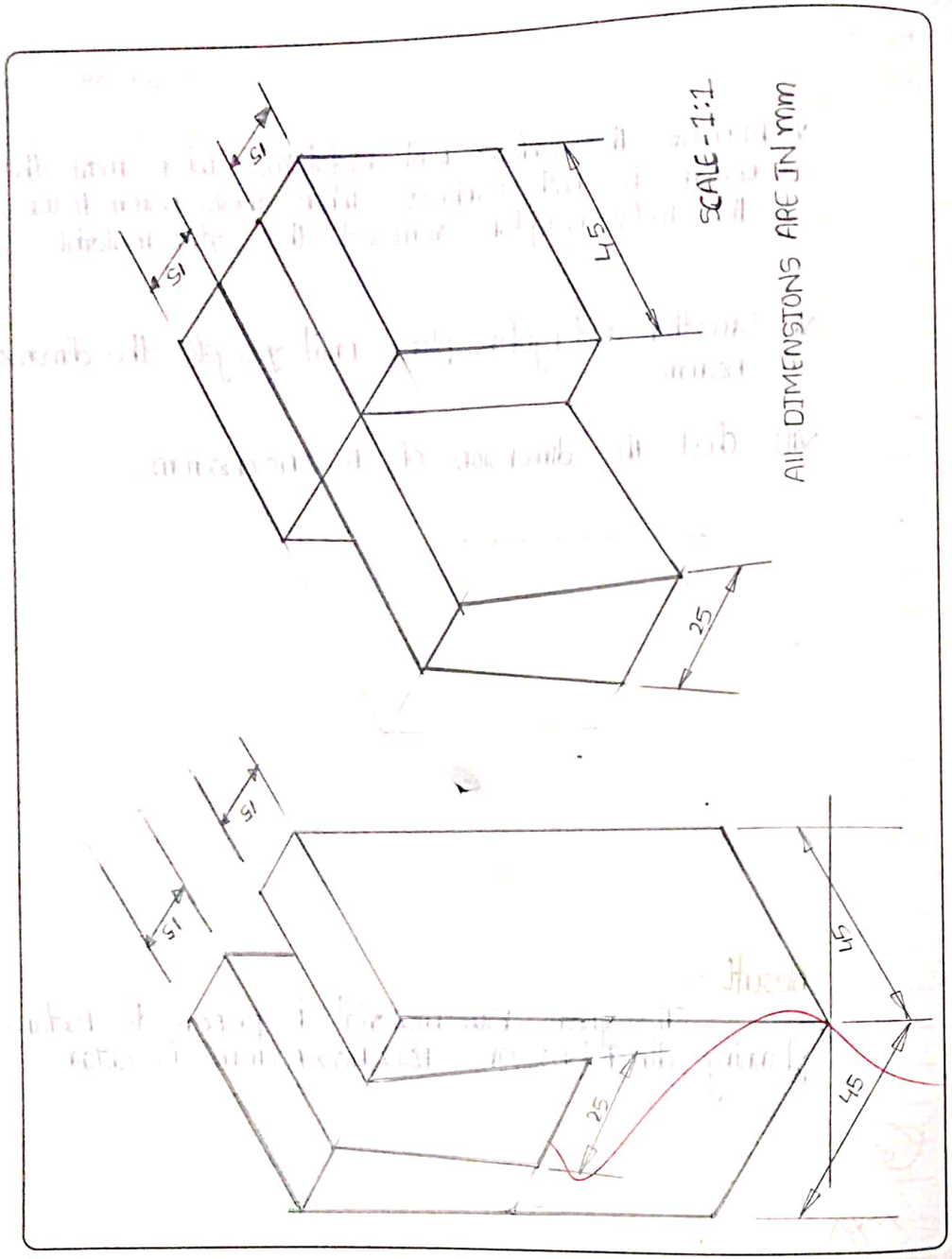
v. Measure the surface with metal rule when mark the 40mm is both surfaces when above 40mm to use the metal jackplane removed the extra material.

vi. Smoothen rectangular plane until you get the dimension 40 mm

vii) check the dimension of 180 X 40 X 40 mm.

Result :-

The given raw material is prepare to Rectangular planning dimensions are 180 X 40 X 40 mm is obtain.



Expt. No. 02.
Date : 13/09/19

SINGLE DOVE TAIL JOINT

Aim :- To prepare 'single Dove Tail Joint' as per given dimensions.

Tools Required :- steel ruler, marking instrument, Try square metal jack plane, carpentry vice, wooden hammer, hand saw, G clamp, mortise chiesel, plate chiesel.

Materials Required :- silver wood 180 x 45 x 45

Procedure :-

1. Take a raw material and cutting into two equal parts.
2. Take the marking instruements marks the dimesions as shown the figure.
3. Using the carpentry vice fit on the vice And using mortise chiesel and, hand saw removing the external material
4. In two parts are also removing external part.
5. Using mortise chiesel or plate chiesel remove external material.
6. When two pieces are joint or not once we check it, not joining to remove the extra part in wooden piece using rasp file.
7. As shown in figure

Result:- Thus the single dove tail joint is obtained as per given dimensions.

Study of fitting Tools.

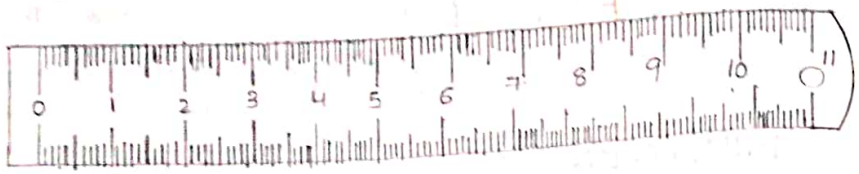
INTRODUCTION :-

In engineering particularly in heavy and medium engineering even to-day, with the use of automatic machines, bench work and fitting have important roles to play to complete and finish a job to the desired accuracy

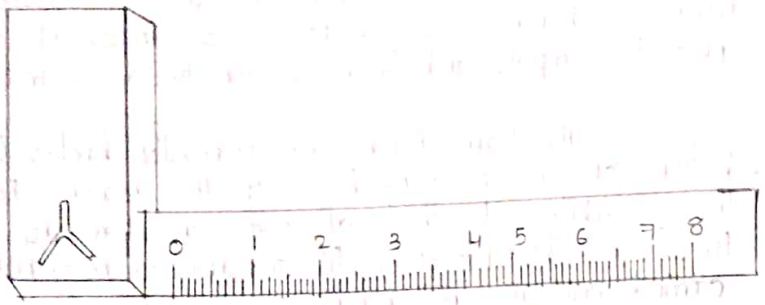
The term bench work generally denotes the production of an article by hand on the bench. Fitting is the assembling together of parts and removing metals to secure the necessary fit and may or may not be carried out at the bench.

Fitting :-

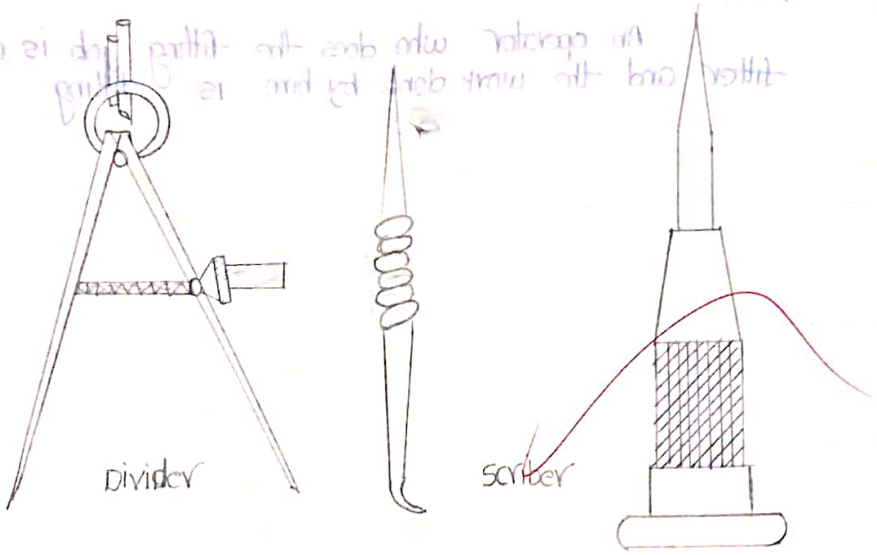
An operator who does the fitting job is called fitter and the work done by him is fitting



STEEL RULE



TRY SQUARE



Expt. No.

Date :

MEASURING AND MARKING TOOLS.

Measuring and marking tools have been developed in order that true and accurate work may be assured. The commonest of such tools are as follows.

STEEL RULE :-

The steel rule is one of the most useful tools in the fitting shop for taking linear measurement of article to an accuracy of from 0.1 to 0.5mm

TRY SQUARE :-

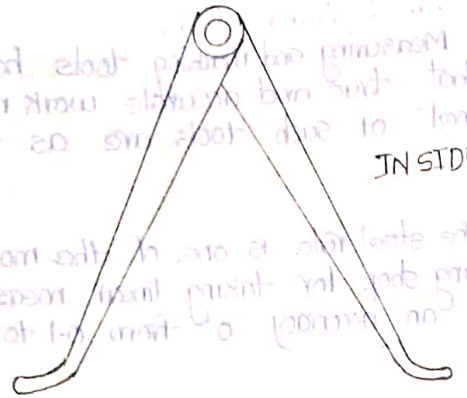
TRY square are used for marking and testing angles of 90. It consists of a steel blade, riveted in to a hard wood or incial stock sizes vary from 150 to 300mm, according to the length of the blade.

SCRIBER :-

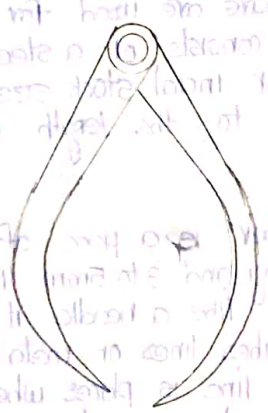
The scriber is a piece of hardned steel about 150 to 300mm long and 3 to 5mm in diameter pointed one to both ends like a needle it is held like a pencil to scratch or scribes lines on metal. The bend end is used to scratch line is places where the straight end cannot reach. The ends are sharpened on an oil stone when necessary. It is made of carbon tool steel.

PUNCH :-

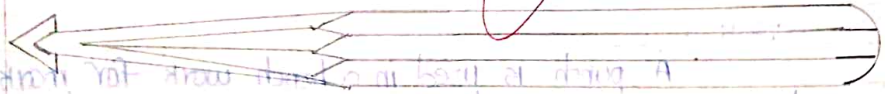
A punch is used in a bench work for marking out work, locating centers etc in a more permanent manner Two types of punches are used it is made of tool steel.



INSIDE CALIPER



OUTSIDE CALIPER



CENTER PUNCH

PRICK PUNCH :-

Centre punch :-

The centre punch is used only to make the prick - punch marks larger at the centers of holes that are to be drilled, hence the name centre punch. A strong blow of the hammer is needed to mark the point.

calipers :-

A caliper is used to transfer and compare a dimension from one object to another or from a part to a scale or micrometer where the measurement cannot be made directly. The two types of caliper are

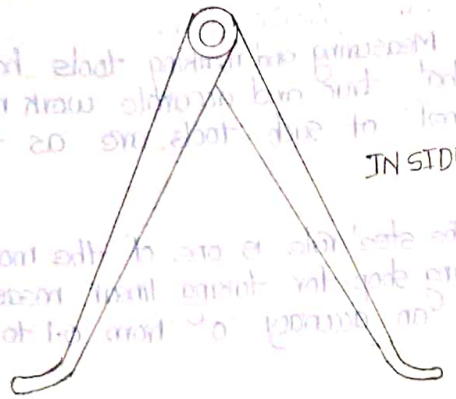
1. Inside caliper
2. outside caliper

INSIDE caliper :-

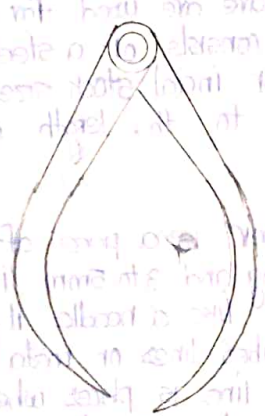
It is used for measuring diameters of hole and length of recesses.

OUTSIDE caliper :-

It is used for measuring diameters of rods and small lengths.



INSIDE CALIPER



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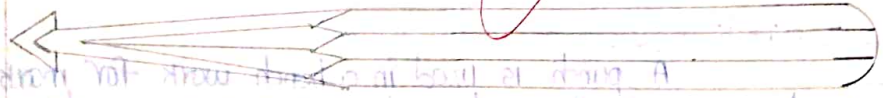

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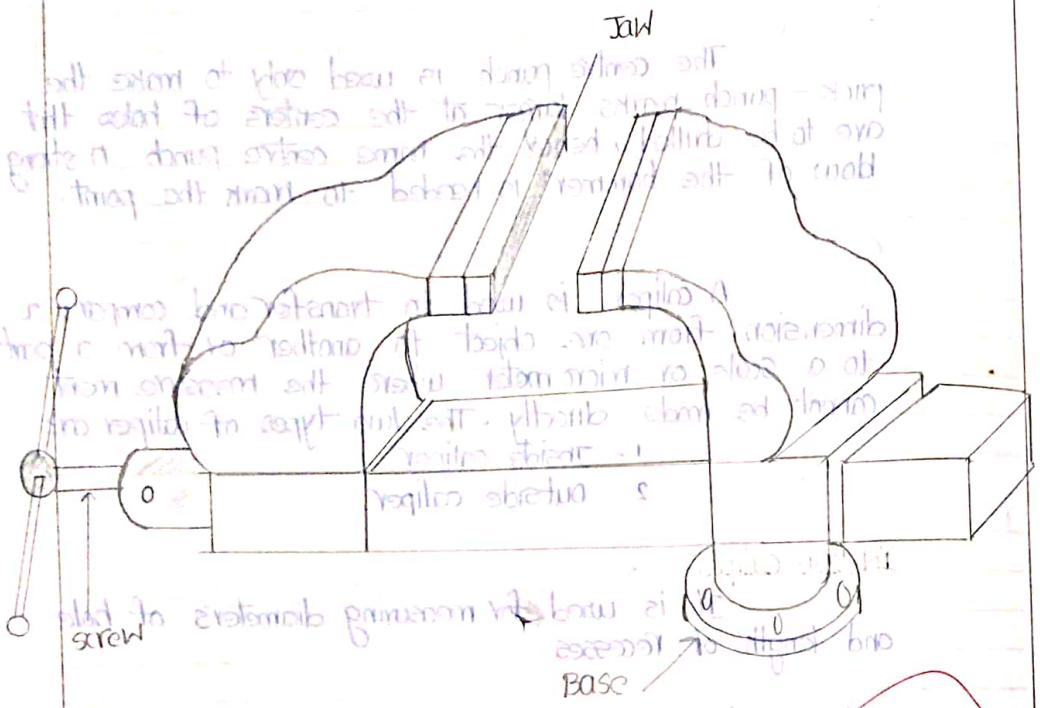


FITTING VICE

Expt. No.

Date :

HOLDING TOOLS

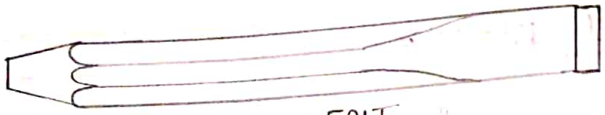
VICE (Fittervice)

The vice is the most common tool for holding work various types of vices are used my various purposes.

The vice essentially consists of a cast iron body, a fixed jaw, a movable jaw, both made of cast steel, a handle, a square threaded screw and nut all made of mild steel. separates cast steel plates known as a jaw plates are fixed to the jaws by means of set screws and they can be replaced when worn.

Types of vice

1. Bench vice
2. Leg vice
3. Hand vice.



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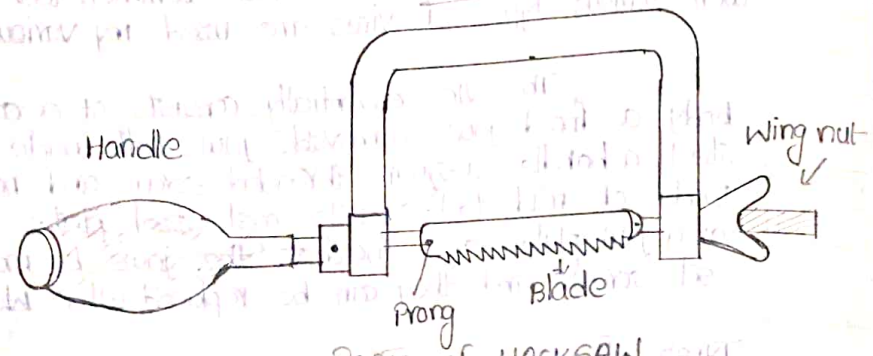
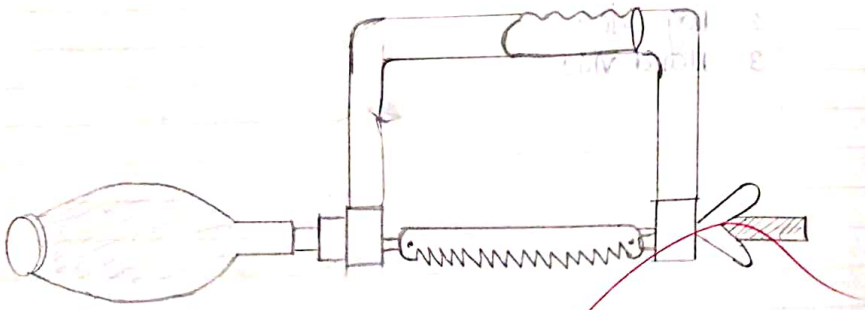


PARTS OF HACKSAW



HACK SAW WITH ADJUSTABLE FRAME

Expt. No.

Date :

CUTTING TOOLS

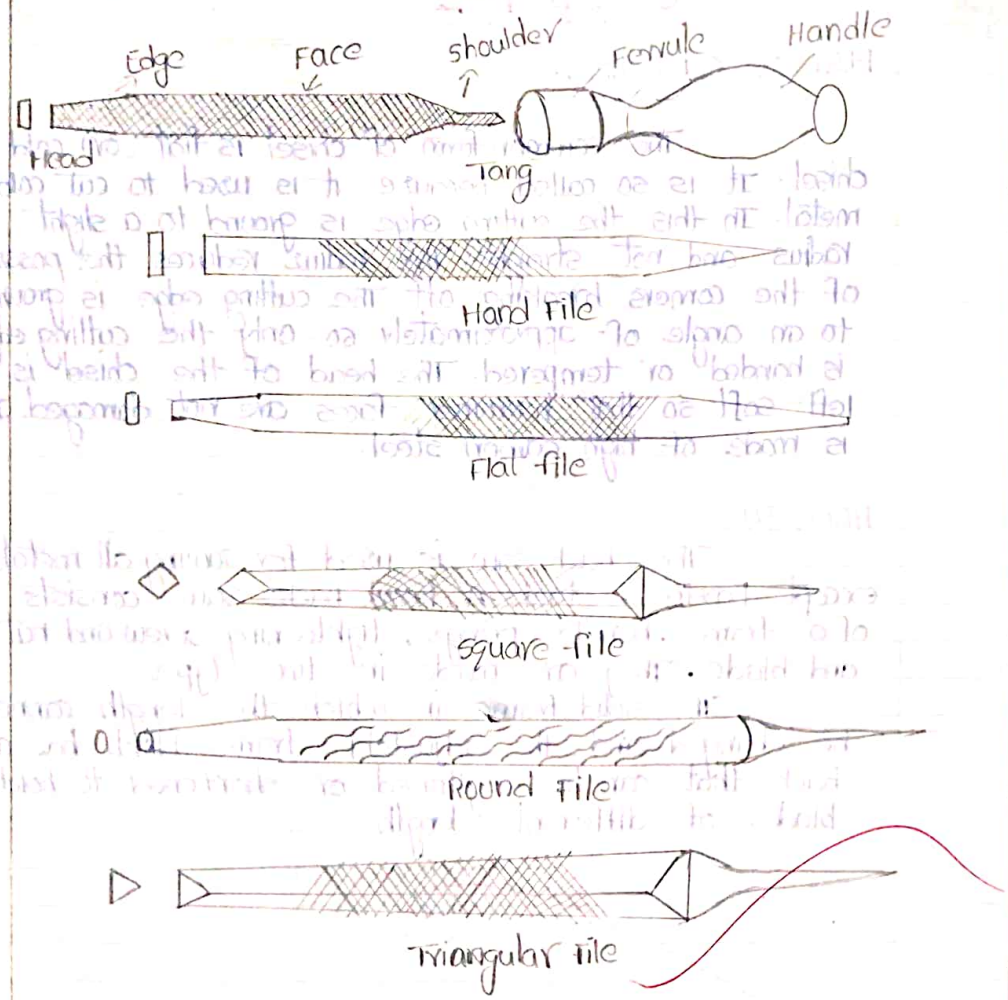
FLAT (or) cold chisel.

The common form of chisel is flat (or) cold chisel. It is so called because it is used to cut cold metal. In this the cutting edge is ground to a slight radius and not straight. The radius reduces the possibility of the corners breaking off. The cutting edge is ground to an angle of approximately 60. Only the cutting edge is hardened or tempered. The head of the chisel is left soft so that hammer faces are not damaged. It is made of high carbon steel.

HACK SAW :—

The hack saw is used for sawing all metals except hardness steel. A hand hacks saw consists of a frame, handle, prongs, tightening screw and nut and blade. They are made in two types.

The solid frame in which the length cannot be changed and the adjustable frame which has a back that can be lengthened or shortened to hold blades of different length.



Expt. No.
Date :

FINISHING TOOLS

Filings is the most important operation that a metal worker has to learn, filing is usually an after treatment and usually don and after chipping. It serves to remove the cuts and clean the face of the cuts and to finish the final shape of a work piece.

FILE :-

File is the harder piece of high grade steel with slanding rows of teeth it is used to cut and fit the metal part

Types of filings :-

Cross filings
straight filings
Draw filings.

Types of files :-

FLAT FILE :-

That is tapered in width and thickness, and one of the most commonly used files for general work. They are always double - cut on the faces and single cut on the edges.

HAND FILE :-

This is parallel in its width and tapered in thickness. A hand file is used for finishing flat surface. It has one sage edge and there fore is useful where the flat file cannot be used. They are always double cut.

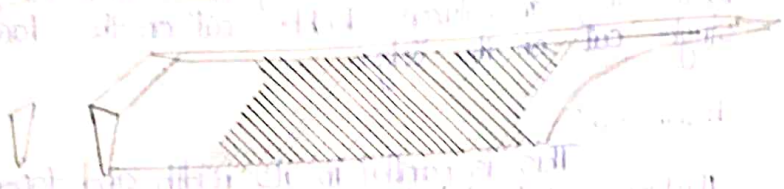
SQUARE FILE :-

This square in cross - section, double cut and tapered towards the point. This is used for filing square corners, enlarging square or rectangular openings as splines and keyways.

ROUND FILE :-

They are round in cross - section and usually tapered, when they are termed ratailied when parallel they are described as parallel round. Round files are used for filing curved surfaces and enlarging round holes and forming fillets.

Half Round file



Knife edge file

HALF ROUND FILE :-

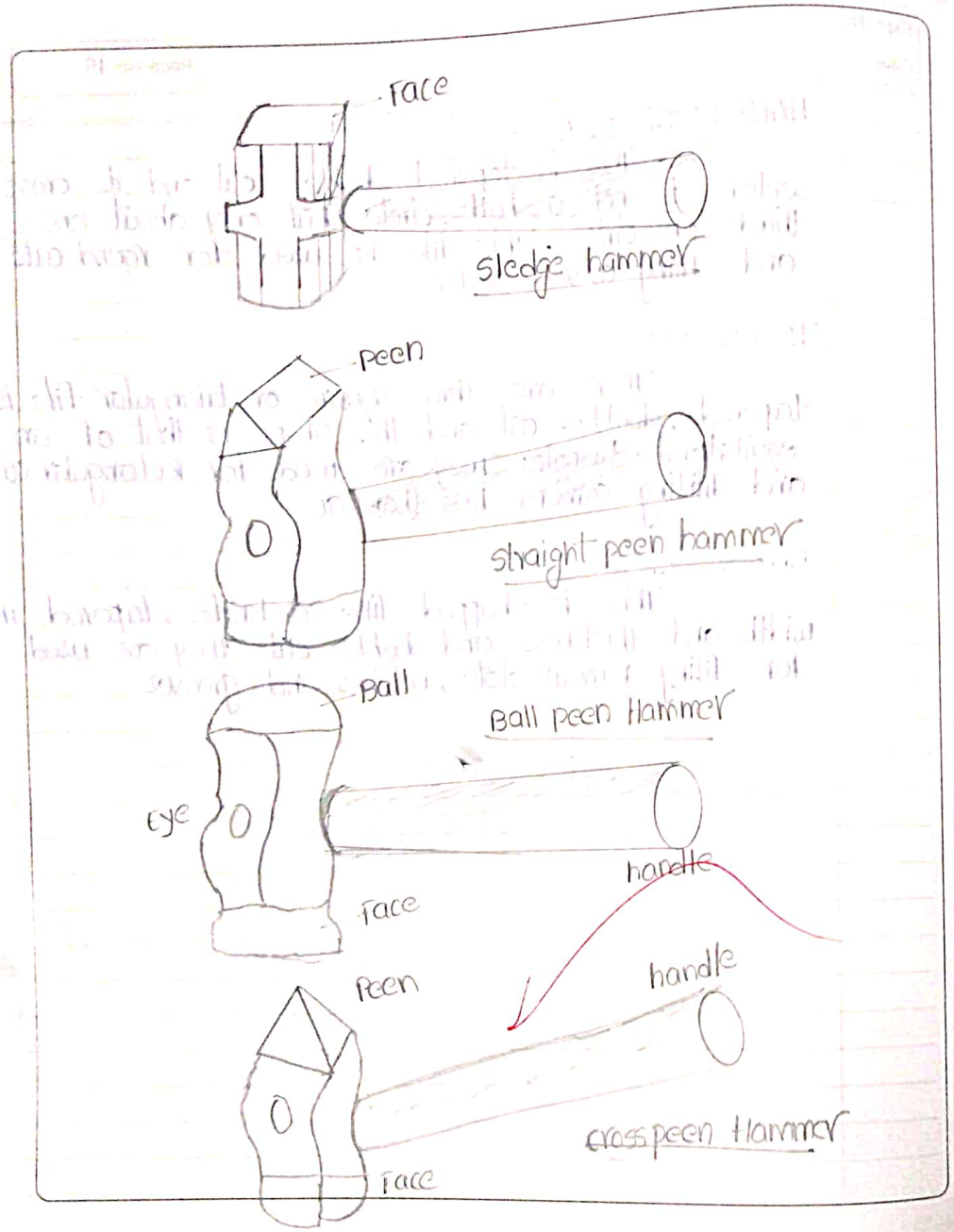
This is tapered double cut and its cross section is not a half circle but only about one-third of circle. This file is used for round cuts and filing curved surfaces.

TRIANGULAR FILE :-

There are three square or triangular file is tapered, double-cut and the shape is that of an equilateral triangle. They are used for rectangular cuts and filing corners less than 90°.

KNIFE EDGE FILE :-

This is shapped like a knife, tapered in width and thickness and double-cut. They are used for filing narrow slots, notches and grooves



Expt. No.
Date :

STRIKING TOOLS

Hammers are used as striking tools. Hammers are used to strike a job or tool. They are made of forged steels of various sizes and shapes to suit various purposes.

BALLPEEN HAMMER :-

The peen has a shape of a ball which is hardened and polished. This hammer is chiefly used for chipping and riveting.

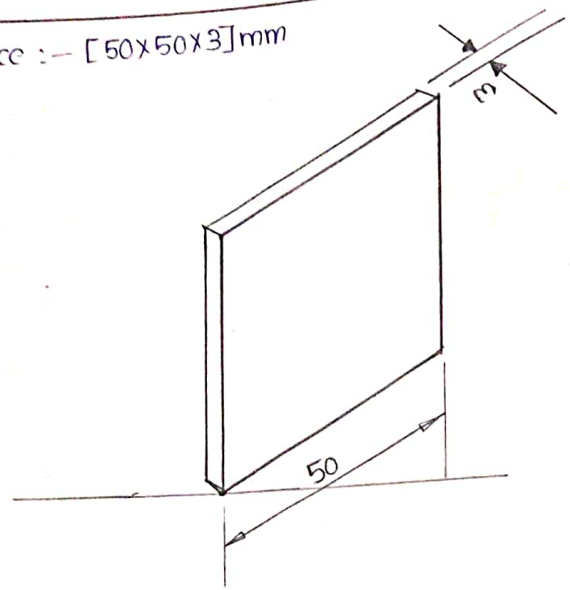
CROSS PEEN HAMMER :-

This is similar to ball peen hammer in shape and size except the peen which is across the shaft or eye. This is mainly used for bending stretching, hammering into shoulders.

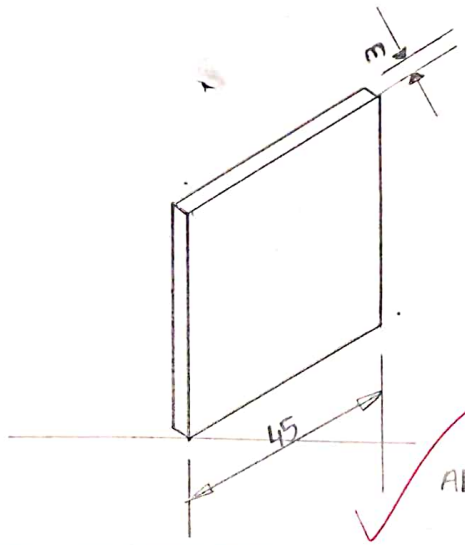
STRAIGHT PEEN HAMMER :-

This hammer has a peen straight with the shaft parallel to the axis of the shaft. This is used for stretching (or) peening the metal.

Given Work piece :- [50x50x3] mm



Machined work piece :- [45x45x3] mm



scale - 1:1
ALL DIMENSIONS ARE IN mm

Expt. No. 01
Date : 20-9-19

SQUARE FILING

Aim :- To prepare square filling as per given dimensions.

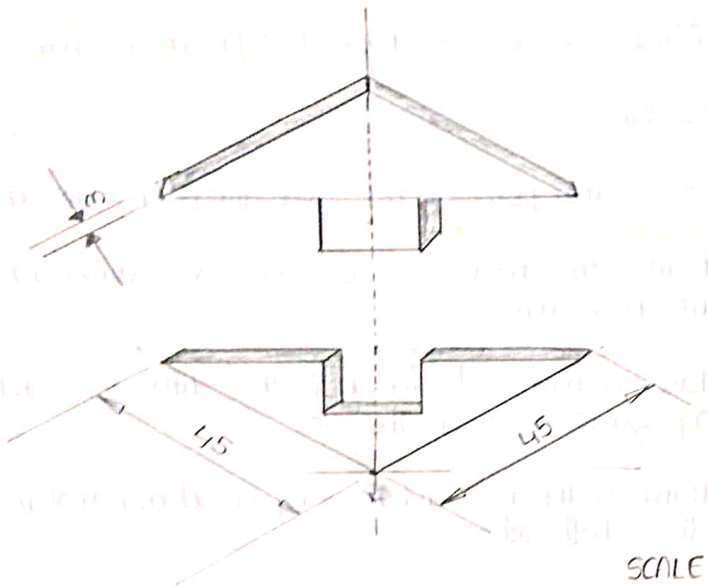
Tools Required :- Filling vice, try square, flat file, steel ruler, marking instruments.

Materials Required :- Mild steel [50x50x3] mm thick plate

Procedure :-

1. Take a mild piece as per given dimensions are 50x50x3 mm
2. Mark the mild piece as per given dimension is 45x45x3 mm
3. Take a mild steel fixed at the filling vice and using a try square to check the 90°
4. Using a flat file and removing a external material on the both sides
5. Using a steel rular to check the measuring in mild piece.
6. Finally to check the try square when the angle is 90° on four sides.
7. See the figure as per given dimension to make a 45x45x3 mm

Result :- Thus square filling is made as per given dimensions [45x45x3] mm



SCALE - 1:1

All DIMENSIONS ARE IN mm

Expt. No. 02
Date : 27/09/19

ARROW JOINT

Aim :- To prepare a 'Arrow Joint' as per given dimensions.

Tools Required :- Fitting vice, steel ruler, Try square, scriber, punch, Hammer, hacksaw, flat file, square file

Materials Required :- A mild steel pieces of dimensions in 50x50x3 mm.

Procedure :-

1. Take a mildsteel piece as per 45x45x3 mm
2. Mark the required dimensions to using a steel rular and scriber
3. Take mild piece to make a punch in a marked line using a punch and hammer on both pieces.
4. Take the mild steel piece fix it on fitting vice
5. Using the hacksaw remove the external part on both pieces.
6. After removeing the external part take it from fitting vice
7. Now joining the both mild steel pieces as shown in figure.

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Result :-

Thus the arrow joint is made as per given dimensions 45X45X3 mm

10

$\frac{34}{27}$

WELDING

STUDY OF WELDING

Introduction :—

Welding is the process of joining similar metals by the application of heat, with or with out application of pressure or filler metal in such a way that the joint is equivalent in composition and charestristics of the metals joined. In the begining welding was mainly used for repairing all kinds of worn or damaged parts Now it is extensively used in manufacturing industry, construction industry and maintenance work, replacing riveting and boiling to a greater extent.

The various welding processes are

i. Electric Arc Welding
ii. Gas Welding
iii. Thermil Welding
iv. Resistance Welding and
v. Friction Welding.

How ever, only electric arc and gas welding are discussed here. In either process the work pieces are melted along a common edge, to their melting point and then a filler metal is introduce to form the joint to solidfication. The materials to be welded in, must be free from rust, scale oil or other impurities so as to obtain a sound weld.

ARC Welding :-

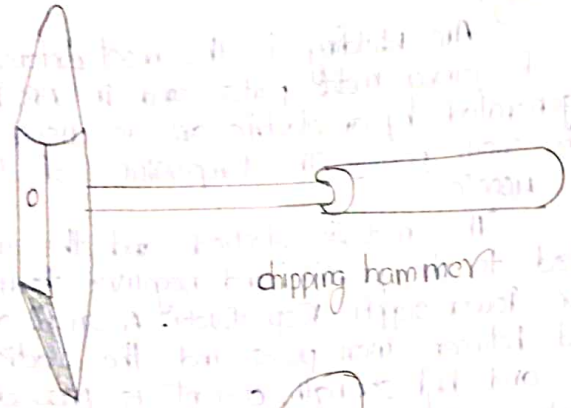
Arc Welding is the most extensively used method of joining metal parts and in Arc Welding the heat generated by an electric arc is used to melt and join the work pieces. The temperature of the arc is around 4000°c.

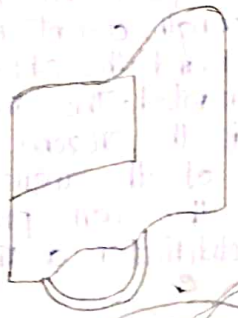
The metallic electrode and the work piece are connected to the positive and negative terminals of an AC or DC. Power supply respectively. A small gap should be mainted between work pices and the electrode. A low voltage and high strength current is passed through the electrode, work piece and the cable circuit. Thus an electric arc is generated. This raises the temperature to about 4000°c in the arc zone and melts the electrode tip and the junction of the work piece. The melt of the electrode and the work piece are minced in a molten pool on solidification a rigid welded joint is made.

Equipments used in ARC Welding and Their function.

1. AC Welding Machine :-

It consist of a welding transformer set. Its function is to stepdown the main supply voltage (4100/440V) to the voltage (60-100V) and current (40-320A) suitable for metal arc welding.





2. DC Welding Machine :-

It consist of an AC motor generator set a diesel engine-generator welding set or a transformer-rectifier welding set. Its function is to supply suitable voltage and current for metal arc welding.

3. Cable and cable connections :-

The main function of cables and cables connectors is to conduct electrical energy from the welding machine to the end of the electrode and to work.

4. Electrode :-

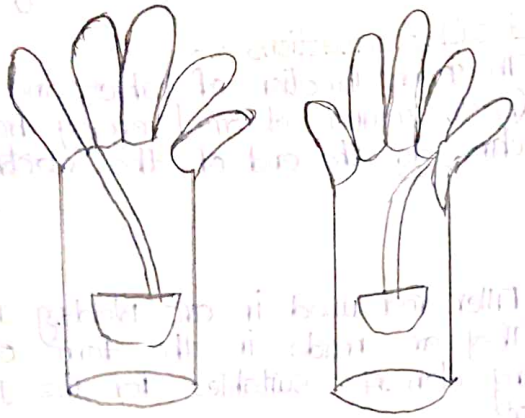
Filler rod used in arc welding is called electrode. They are made in the form of rod with alloying elements suitables for the job, coated with a flux.

5. Electrode Holder :-

To secure the electrode firmly, electrode holders are used. It should be light, strong and easy to handle. The jaws of the holder are insulated offering protection from electric shock.

6. Ground camp :-

It is used to complete the circuit between the electrode and the welding machine which i connected to the workpiece. It should be strong and durable and gives low resistance.



Hand gloves

7. Chipping hammer and wire Brush:-

Chipping Hammer is used to remove the slag after the weld metal has solidified wire brush is used for cleaning and preparing the work for welding

8. Face sheid or screen :-

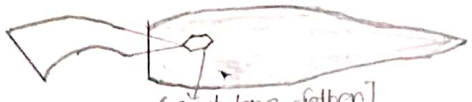
Face sheild is used to protect the eyes and face of the welder from the dangerous effect of ultra-violet and infra-red radiations of the arc. It is available either in hand type or helmet type

9. Protective sheild or clothing:-

Hand gloves are used to protects the hands of the welder from the effect of ultraviolet rays, infrared rays, heat and sparks

Natural flame

oxidizing flame



(acetylene feather)

carburisting flame

GAS WELDING :-

Gas welding is also widely used to join metal plates. The filler rod and parent metal plates are melted by the heat of the flame produced using oxygen and acetylene gas mixture.

The components used in gas welding are

1. oxygen and acetylene gas cylinders with pressure regulators and pressure gauges.
2. Welding torch where flame is obtained by mixing oxygen and acetylene.
3. Hoses in black (oxygen) and maroon (acetylene) colours to connect the gas cylinders and the welding torch.

Types of gas-flames :-

Depending on the ratio of oxygen and acetylene three types of flame are obtained. They are

1. Neutral Flame :-

It has equal quantity of oxygen and acetylene and is used for welding steel, stainless, cast iron, copper etc. This flame is also used for cutting metal plates.

2. Oxidizing Flame :-

It has more quantity of oxygen. The acetylene to oxygen ratio is 1:1.2 to 1.5. This flame is used for welding copper, brass and bronze.

3. Carburizing flame :-

It has more quantity of acetylene to oxygen. Flame is long. This flame is used for welding alloy steel and aluminium.

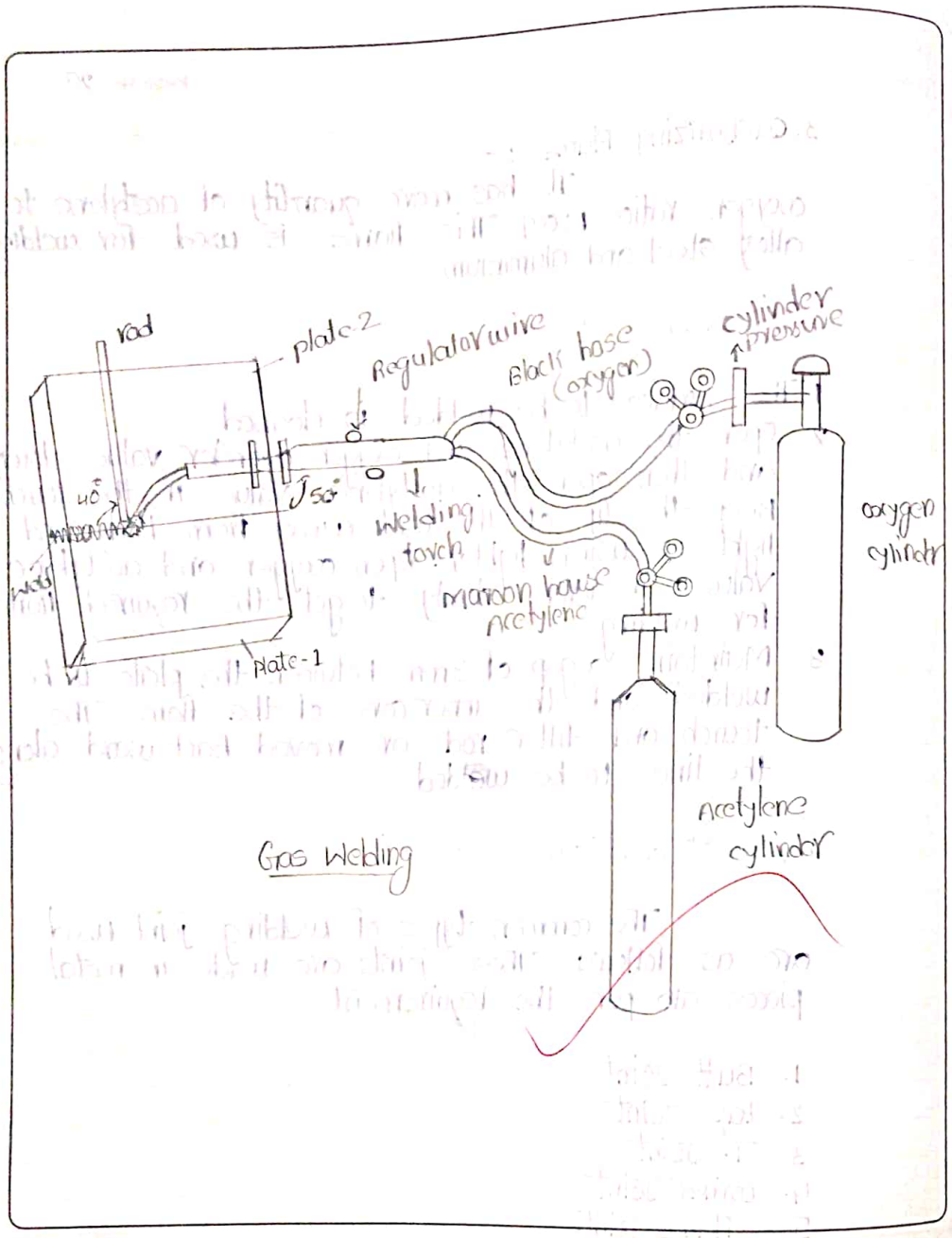
Gas Welding Procedure :-

1. The surface to be welded is cleaned.
2. Open the acetylene and oxygen cylinder valve slowly and then open the acetylene valve in the torch. Keep the tip of the torch away from body and light it using lighter. Open oxygen and acetylene valves in torch slowly to get the required flame for welding.
3. Maintain a gap of 3mm between the plate to be welded and the inner cone of the flame. The torch and filler rod are moved backward along the line to be welded.

Types of weld joints :-

The common types of welding joint used are as follows. These joints are made in metal pieces are per the requirement.

1. Butt Joint
2. Lap Joint
3. T Joint
4. Corner Joint
5. Flange Joint.



Gas Welding

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1. Butt Joint :-

The joint is used to join the ends or edges of two plates or surface. In this joint both the plates or surfaces are located in the same plane. Depending on the strength requirement the weld may be done in single side or both the sides of the plate

2. Lap joint :-

This is used to join two-overlapping plates. The edges of the one plate are welded to the surface of the other plate. Depending on the strength requirement the weld may be done in single or both the sides of the plates common types of lap joint and double lap joint.

3. T. Joint :-

This joint is obtained by placing man edge of one part on the surface of another part at right angles to the other. This types of joint is common is common in engineering structures. This joint is used for welding thicker plates.

4. Corner Joint :-

If plates are placed in corner positions they are known as corner joints.

It could be outside or inside corner. In this joint the plates are at 90° to each other corner joints are used in welding of boxes, tanks and frames.

5. Flange joint :-

This type of joint is used to join parallel plates as well as for plates at 90° to each other. The edges of the plates are bent to form a flange

Electrodes :-

The general electrodes are classified into five main groups, mild steel, high carbon steel, special alloy steel, cast iron and non-ferrous. The greatest range of arc welding is done with electrodes in the mild steel group.

SHEET METAL WORK

Introduction :-

Sheet metal work is working on the metal of 16 gauge to 30 gauge with hand tools and simple machines into different forms by cutting forming into shape and joining.

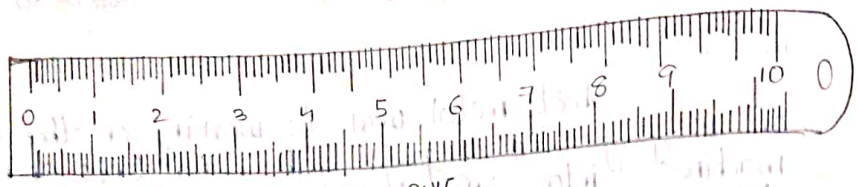
Sheet metal work is one of the major applications in engineering industry. It has it own significance as useful trade in engineering work.

Application of sheet Metal :-

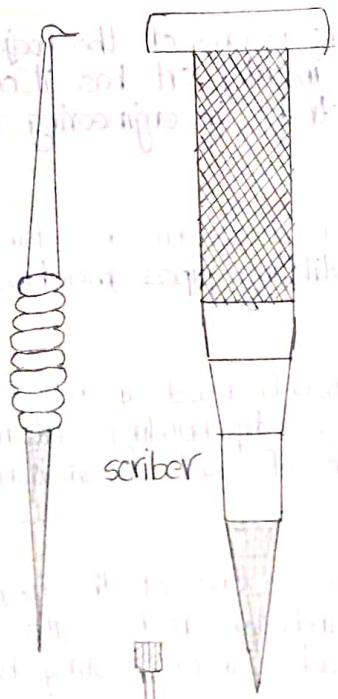
Sheet metal is used for making, funnels, various ducts, chimneys, ventilating pipes machine tool guards, boilers etc..

It is also extensively used in major industries like aircrafts manufacturing, ship building, automobile body building and fabrication of ducts in air conditioning equipments etc..

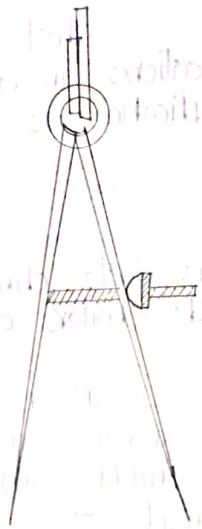
Sheet metal work is one of the major applications in engineering industry. It has its own significance as useful trade in engineering work



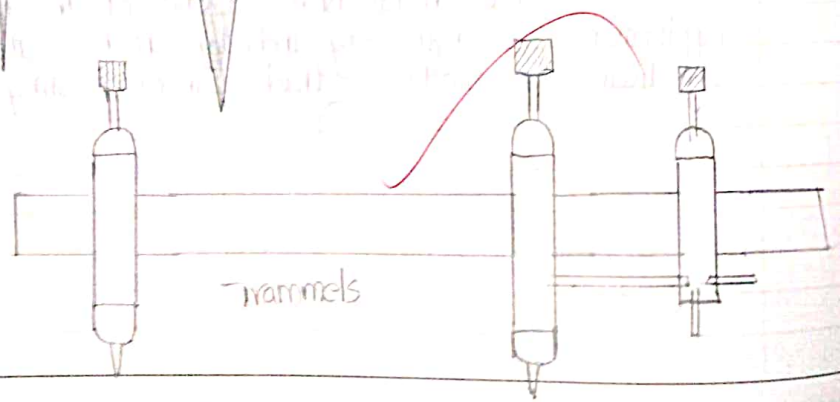
STEEL RULE



scriber



Divider



Trammels

Hand Tools :-

The common hand tools used in sheet metal works are, steel rule, usually of 60cm length, wire gugge, dot punch, trammel, scriber, ball peen hammer, straight peen hammer, cross-peen hammer, mallet, ships and soldering iron

Steel Rule :-

It is used for measuring and laying out small work It can measure with can be accuracy of upto 0.5mm

Scriber :-

It is a long wire of steel which its one end sharply pointed and hardend to scratch line on sheet metal for laying out patterns.

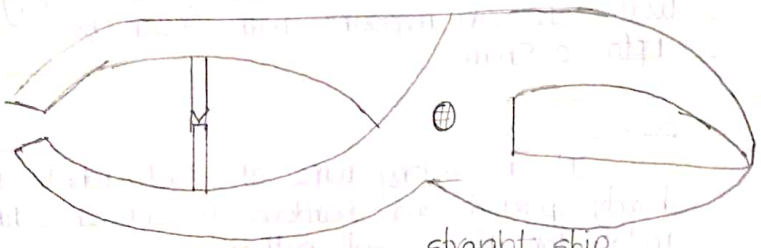
Dividers :-

Divider are used for drawing circles or arcs on sheet metal. They are used to mark a desired distance between two points and to divide lines into equal parts.

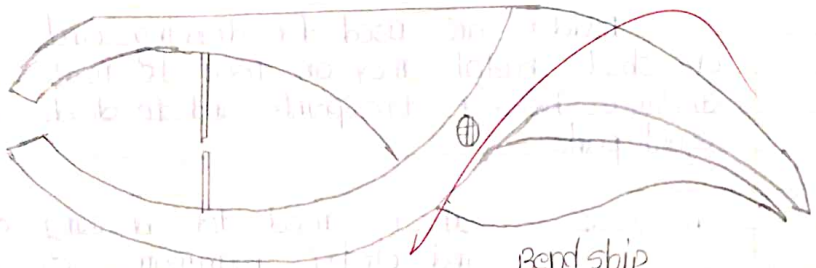
Trammels :- It is used for marking of arcs and circles. Maximum size of the arc that can be scribed depends on the length of the beam in scriber.

Flat chisel

Round Nose chisel



straight ship



Bend ship

Cutting Tools :-

1. chisels
2. snips
3. shears

chisels :-

Chisels are used in sheet metal works for cutting sheets, rivets, bolts and chipping operations. Through there are many types of chisels available round nose chisel and flat chisel are mostly used for sheet metal work.

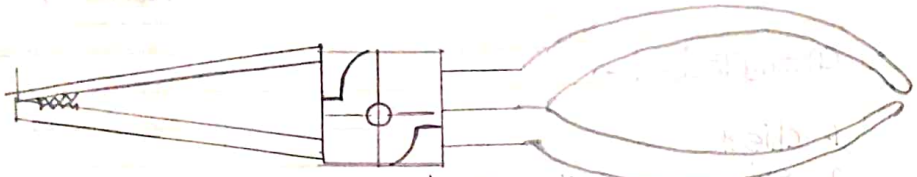
Snips (or) shears :-

Snips are hand shears, varying in length from 200mm to 600mm. 200mm and 250mm length is most commonly used. In sheet metal work, straight and curved snips are mostly used.

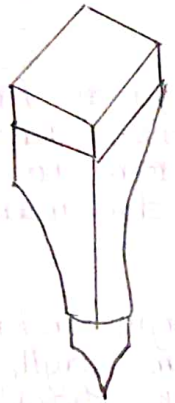
Straight snips :-

straight are used for cutting along outside curved and straight snips.

Curved snips or bent snips are used for trimming along inside curves.

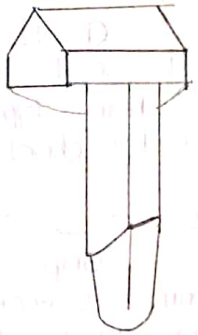


Round Nose pilers

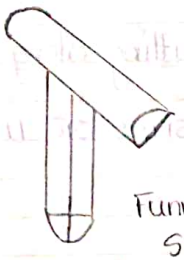


Tinmans Anvil

Round bottom stake



Hatchet stake

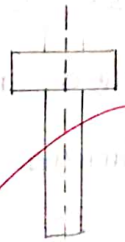


Funnel stake

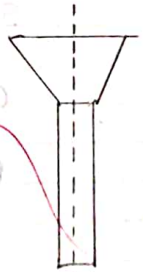
Funnel stake

Round Rivets

conical



flat



counter sunk

Expt. No.

Date :

Punches :-

In sheet metal work, punch is used for marking out work locating centres etc.

The following two types of punches are widely used
i) Dot punch
ii) centre punch

Supporting tools :-

stakes :- stakes are nothing but sheet metal workers anvils used for bending, hemming, seaming, forming etc, using hammers or mallet. The following fig shows different shapes and sizes of stakes

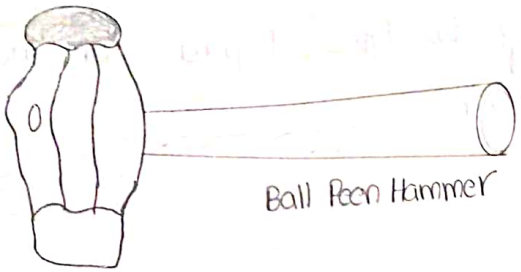
Striking tools :-

a) Hammers b) Punches

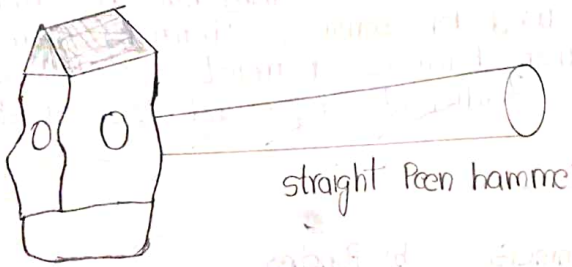
a) Hammers :-

Hammers is used in sheet metal work for hollowing stretching, levelling, riveting, strengthening of sheet metal joints etc. The following hammers are mostly used in sheet metal work.

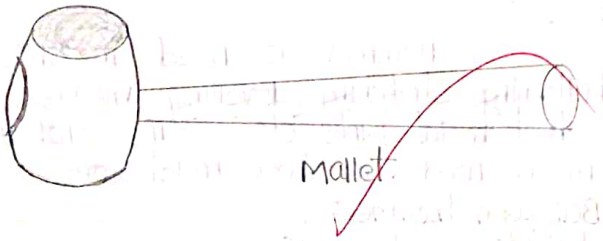
i) Ball peen hammer
ii) straight peen hammer
iii) Riveting hammer
iv) Mallet.



Ball Peen Hammer



straight Peen hammer



Mallet

i) Ball Peen Hammer :-

The ball-peen hammer has the peen of the shape of a ball. It is the most common type of the hammers and is mostly used for riveting for forming a shop head on the tail of a rivet.

ii) straight Peen Hammer :-

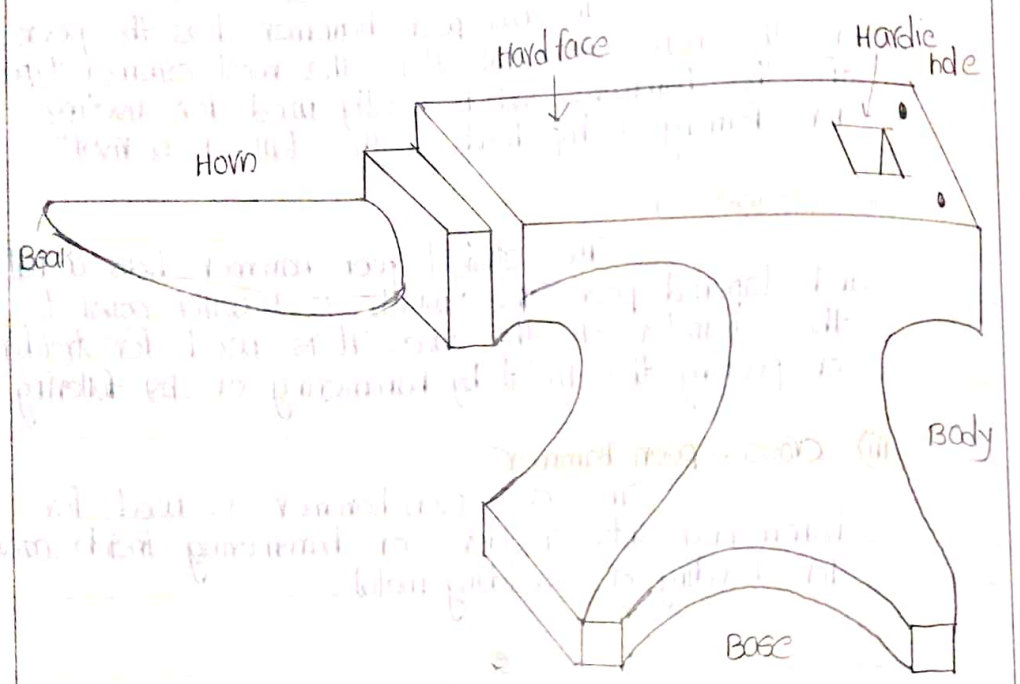
The straight peen hammer has a flat and tapered peen. The width is usually equal to the diameter of the face. It is used for stretching or peening the metal by hammering or by fullering.

iii) cross - peen Hammer

The cross-peen hammer is used for hammering into shoulders or hammering inside curves, for bending or stretching metal.

iv) Mallet :-

It is made of hardwood and may be round or rectangular in shape. These are used to strike the cutting tools, which have wooden handle such as chisels and gauges. The head has an eye for fixing the handle to hold it comfortably



ANVIL

Expt. No.

Date :

ANVIL :-

The anvil is an important smith's tool. It is used for supporting the work while it is struck with hammer. It is made is several shapes but two most common forms are the english and french types. The body of the anvil is made of mild steel to which a piece of high carbon steel to 2.5mm thick is welded on the top to given a hard top face. The beak is soft like the anvil body and its shape makes it useful for bending round section to different diameters.

MACHINE SHOP

Introduction :-

The main function of a lathe is to remove metal in the form of chips from a work piece to give it the required shapes and size. This is accomplished by holding the work securely and rigidly on the lathe and then rotating it against a cutting tool. The lathe is mainly used to machine cylindrical shapes. Generally, single point tool is used as the cutting tool. The tool material should be harder and stronger than the work piece material.

The main significance of a lathe lies in the fact that, besides its basic operations of turning, facing, boring, milling, gearcutting etc. Hence it is called a versatile machine tool.

Principal parts of a LATHE :-

Figure shows a centre lathe, indicating the main parts. The name is due to the fact that work pieces are held by the centre.

1. BED :- It is the base of the lathe. The head stock is mounted on the left end, the carriage in the middle and the tailstock at the right end of the end. The bed has flat or inverted 'V' guide ways. The carriage and the tailstock move along the guide ways over the bed.

2. Head stock :-

It carries a hollow spindle. A live centre can be fitted into the hollow spindle. The live centre rotates with the work piece and hence called live centre. The spindle nose is threaded. chuck or face plates can be attached to the spindle nose. The head stock has a gearbox. Power is transmitted from the head stock to the different parts of the lathe.

3. Tail stock :-

It is mounted on the bed at the right end. It is used for supporting the right end of the work piece by means of a dead centre.
The dead centre doesnot revolves with the work piece and hence called dead centre. How ever it can be moved axially by means of a hand wheel. Tail stock can be moved along the bed for supporting different lengths of work pieces and clamped at any position. The tail stocks is also used for holding drill and reamer for drilling and reaming operations.

4. carriage :-

It is supported on the lathe bed ways and can move in a direction parallel to the lathe axis. The carriage is used for giving various movements to the tool by hand and by power. It carries saddle cross slide, compound rest, tool post and the apron.

5. saddle :-

It carries the cross slide, compound rest and tool post. It is a H shape casting fitted over the bed. It moves alone to guide ways.

6. cross slide :-

It carries the compound rest and toolpost. It is mounted on the top of the saddle. It can be moved by hand or may be given power feed through apron mechansim.

7. Compound Rest :-

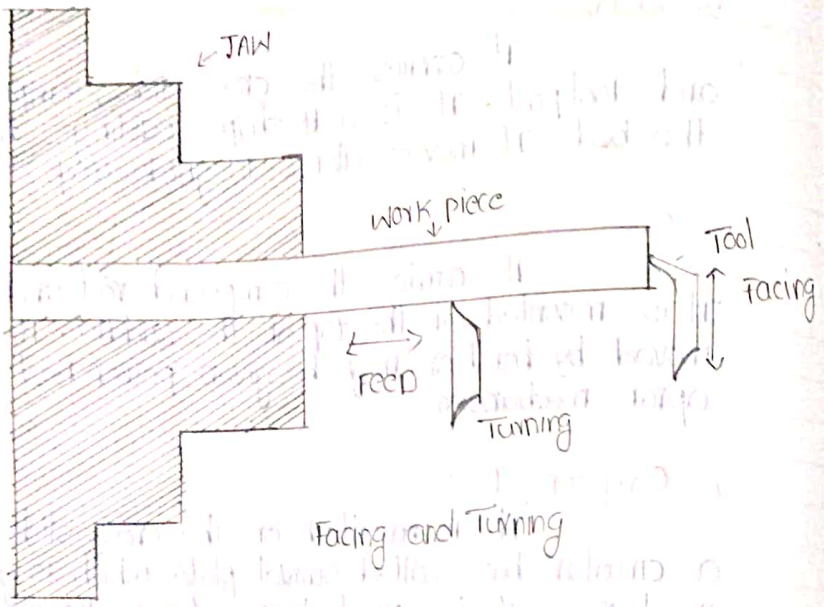
It is mounted on the cross slide it carries a circular base called swivel plate which is graduated in degrees. It is used during taper turning to set the tool for angular cuts. The upper part known as compound slide can be moved by means of a hand wheel.

8. Tool post :-

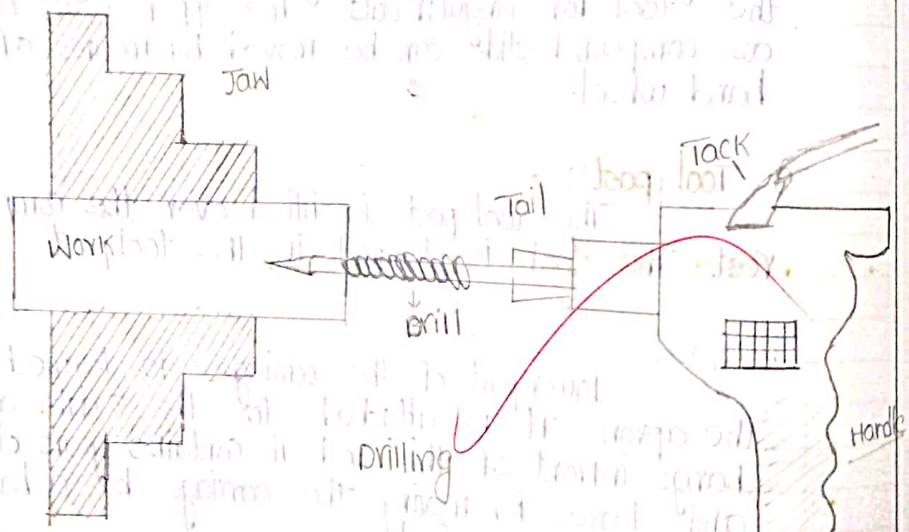
The tool post is fitted over the compound rest. The tool is clamped in the tool post.

9. Apron :-

lower part of the carriage is termed as the apron. It is attached to the saddle and hangs infront of the bed. it contains gears, clutches and leaves for moving the carriage by a hand wheel or power feed.



Facing and Turning



Drilling

Work Holding devices and supporting Devices

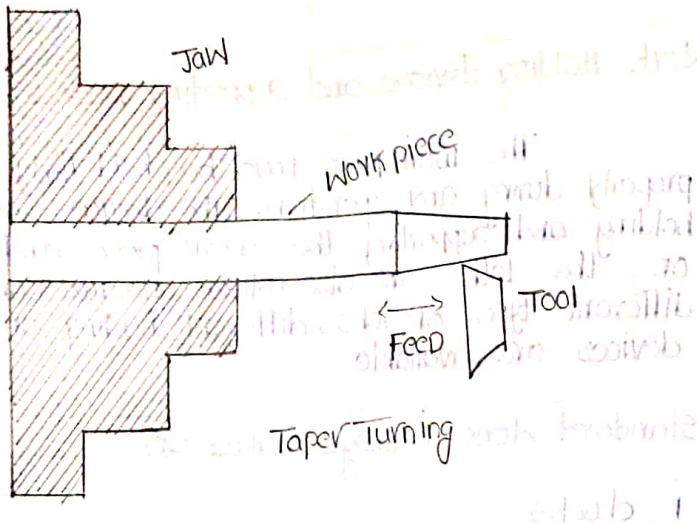
The work piece must be held firmly and supported properly during any operation. The devices employed for holding and supporting the work piece and the tool on the lathe are also called it accessories To suit different types of jobs, different holding and supporting devices are available.

Standard Work holding devices are

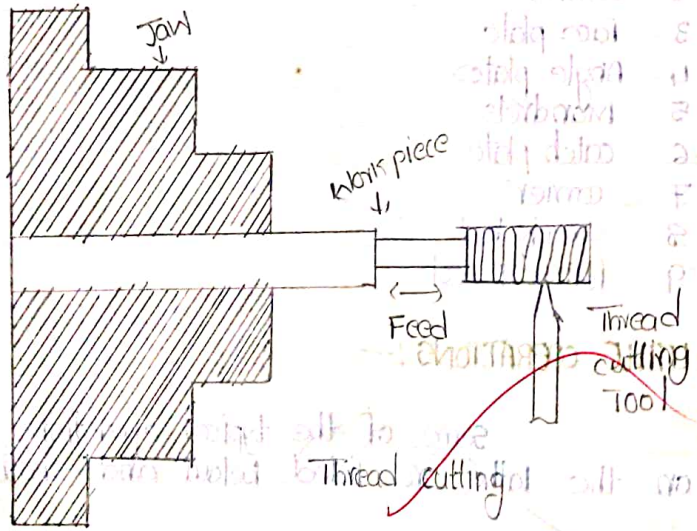
1. chucks
2. centres
3. face plate
4. Angle plates
5. Mandrels
6. catch plate
7. carrier
8. steady rest
9. follower rest

LATHE OPERATIONS :—

Some of the typical operations performed on the lathe are listed below and show in fig.



Taper Turning



Thread cutting

1. Facing :-

It is the machining of the end of the work piece to produce that surface. This operation may be per performed by using facing tool or ordinary turning tool. The food is fed perpendicular to lathe axis.

2. Turning :-

It is the process of removing excess material from a work piece to produce is cylindrical surface. Hand feed or automatic feed can be used for rough turning the rate of feed of tool is fast and the depth of cut is heavy.

For this rough turning is used and the depth of cut may be from 2 to 5mm for finish turning feed and depth of cut will be small for this a finish turning tool is used and the depth of cut may be from 0.5 to 1mm.