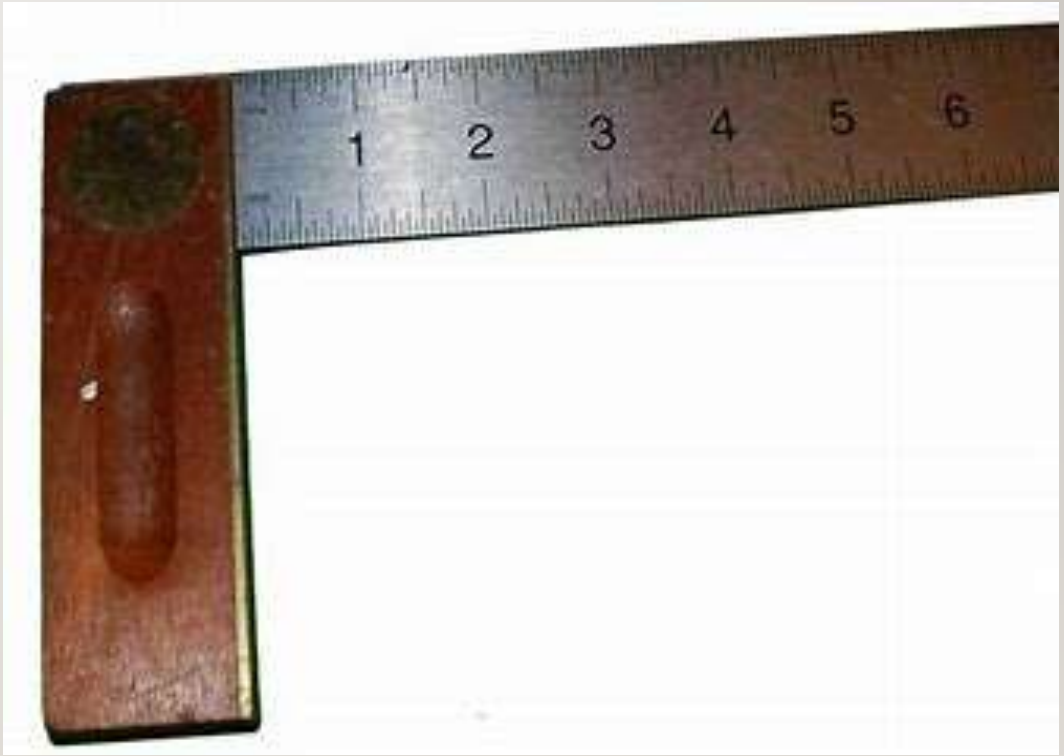
WOOD WORKING TOOLS

- Wood working tools are of 4 types. They are,

1. Measuring tools
2. Cutting tools
3. Planning tools
4. Miscellaneous tools

I. Measuring tools

1. **Try square/ Carpenter's square** :- Try squares are used for marking and testing right angles. It consist of a steel blade diverted at angles. The try square may be made of steel or wood. Try square is a measuring tool as well as a squaring tool.



2. **Gauge**

a. **Marking gauge**:- This is simply a straight bar, with a sharpened point projecting out on one side near its end, and having an adjustable sliding head. Gauge is used for marking lines parallel to the edges of a piece of wood. Or it is used for making lines at uniform distance from the edge of a board.

b. **Mortise Gauge**

- Similar to marking gauge. It has two marking points one is fixed and other is adjustable.
- Marking two parallel lines for marking mortise and tenon joints.

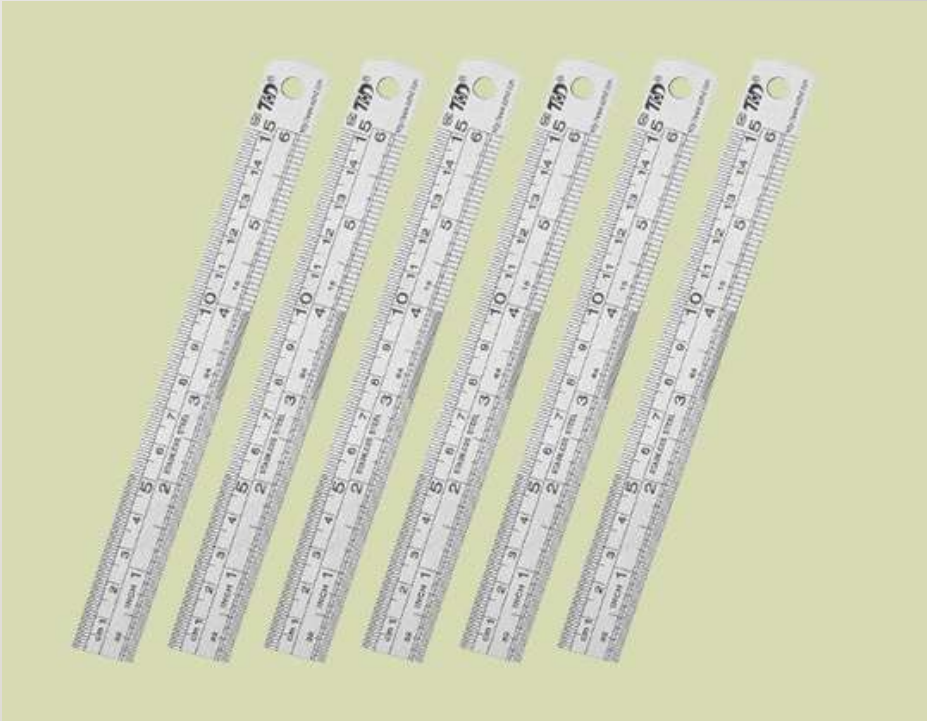
3. **Rule/ Ruler**

- An important item in wood working shop is a good quality straight edge rule.
- A rule is generally the first tool used by the wood worker. Rules are made in different lengths and of different materials. Those used by the wood worker are usually of the folding type.

Types of rulers

a. Straight Ruler/Steel ruler

These rulers are typically marked with both inches and centimeters, and are particularly useful for measuring lengths and drawing straight lines.



b. Hook Ruler

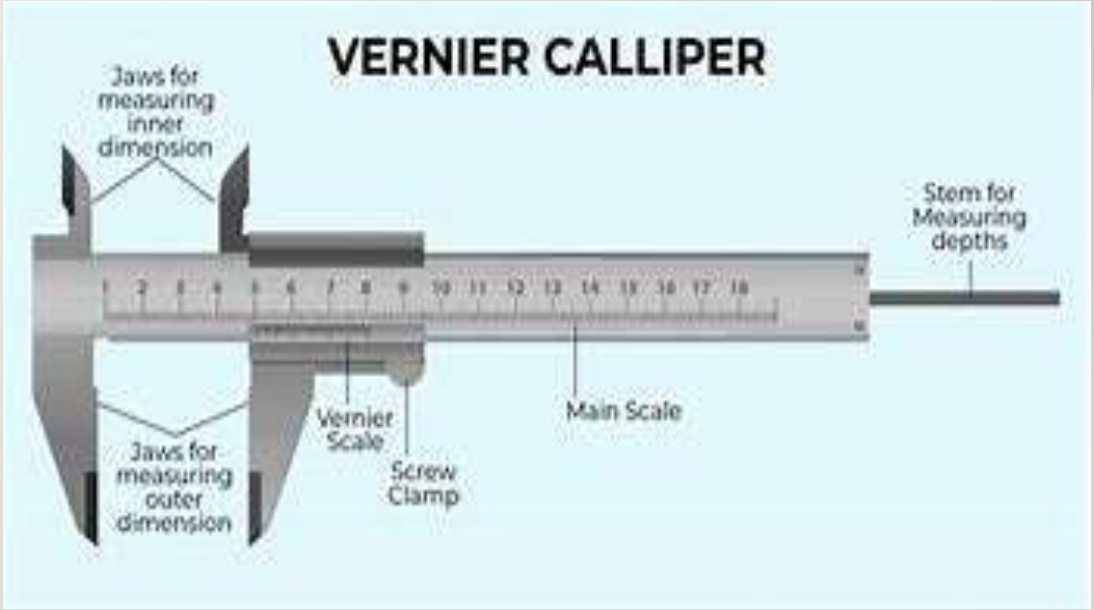
A hook ruler also known as a hook scale. It has hooked or "L"-shaped end for accurate measurements of the depth of holes, grooves, or recesses.

C. Tape rule

- The tape rule is an extendable steel strip coiled into a container.
- The tape is spring loaded. So that as soon as it is released it will automatically return to the case.

4. Vernier calliper

- A vernier calliper is a measuring device that is used for the measurement of linear dimensions.
- The main use of the vernier calliper over the main scale is to get an accurate and precise measurement.

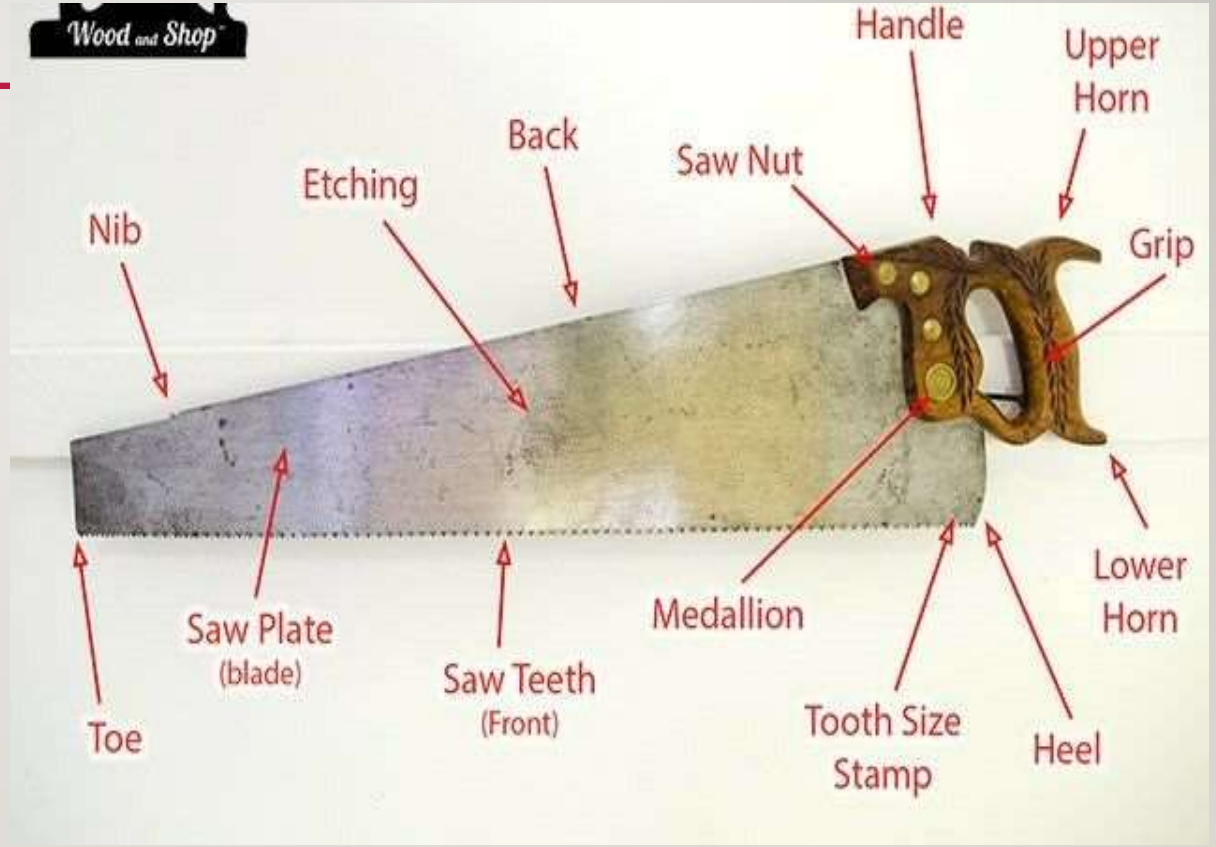


II. Cutting tool

Cutting tools can be classified into 2 categories.
Saw and chisel.

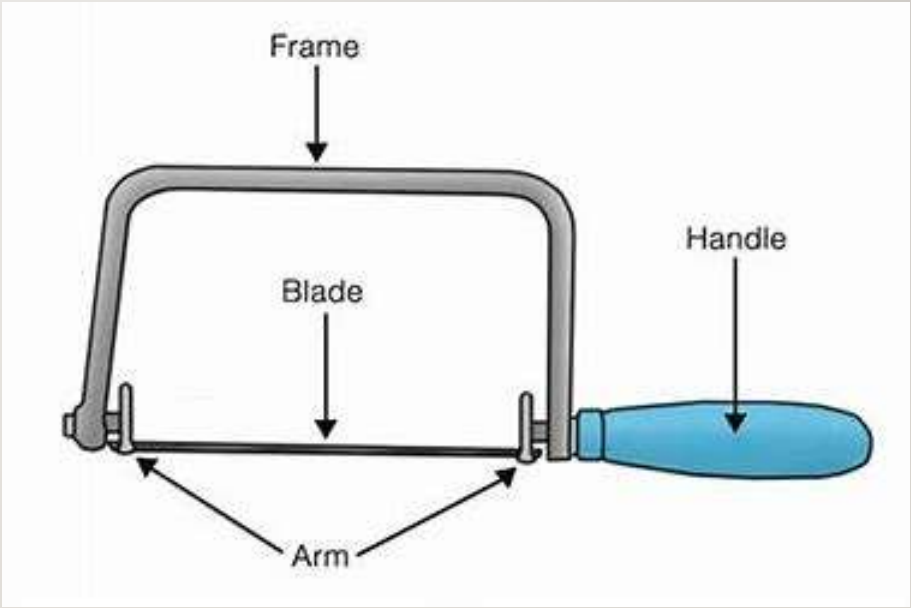
1. Saw

a) Rip saw :- A rip saw is used for cutting a wood along its grains. The blade of rip saw is either straight or skew backed. Rip saws are made in different sizes, their teeth varying in coarseness for either fine or rough cutting.




Maintain eyeline with the workpiece
Keep shoulder in line with your hand
FRONT VIEW
Hold workpiece securely

b) **Coping saw :-** coping saw consists of a very thin blade held rigidly in a metal frame with the help of screws provided in the handle. It is used for cutting curves, roundlings and special shapes.



c). **Compass saw**

The blade of compass saw is 10 to 14 inch. It is used for cutting large curves and circles. The pointed blade of these saws make it possible to start the saw in a small hole and cut sharp curves.

2. Chisel

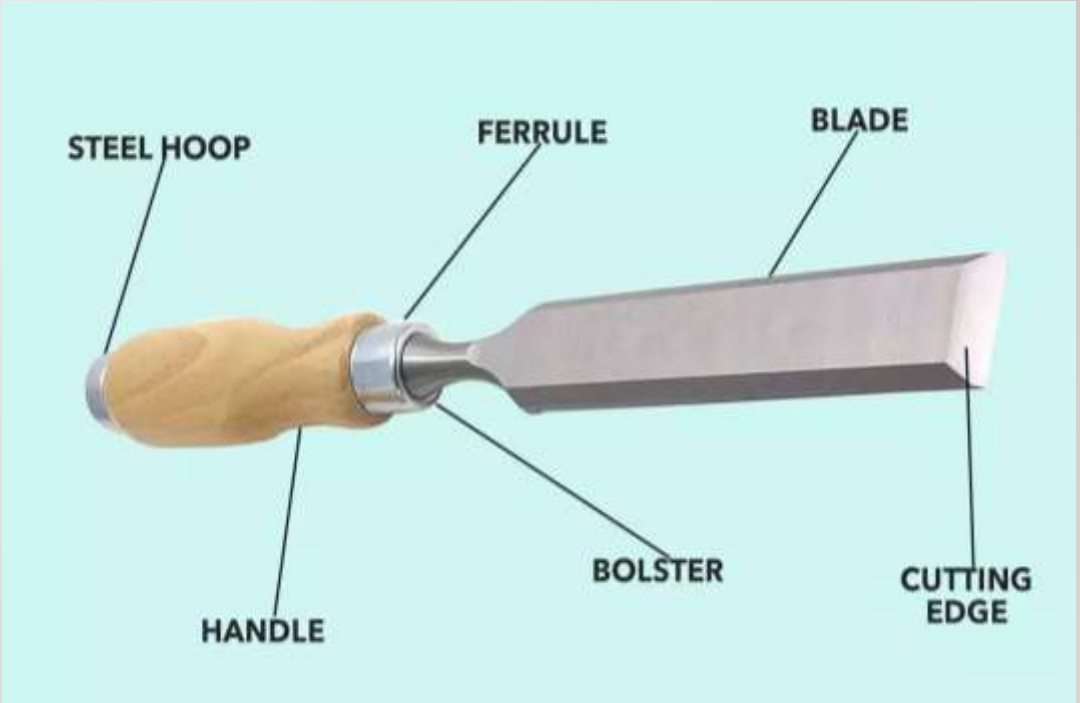
- A wedge like tool with a cutting edge at the end of the blade, often made of steel. Used for cutting or shaping of wood.
- Chisel blades are sharpened on one side only. The slope that forms on the sharpened edge is normally at an angle of 30 degrees to the flat surface. If maintained well and sharpened regularly, chisels can help you execute complex cutting tasks fairly easily.
- Chisels used for wood working are made in various blade widths, ranging from 3 to 50 mm.
- Common types of wood chisels are, firmer chisel and mortise chisel.

- A chisel can cut with, across, or along the grain,

CHOPPING VERTICALLY

CHOPPING HORIZONTALLY

a. **Firmer chisel** :- These chisels are typically had flat square edges and a wooden handle. The blade is usually 5-25mm width and 125mm length.



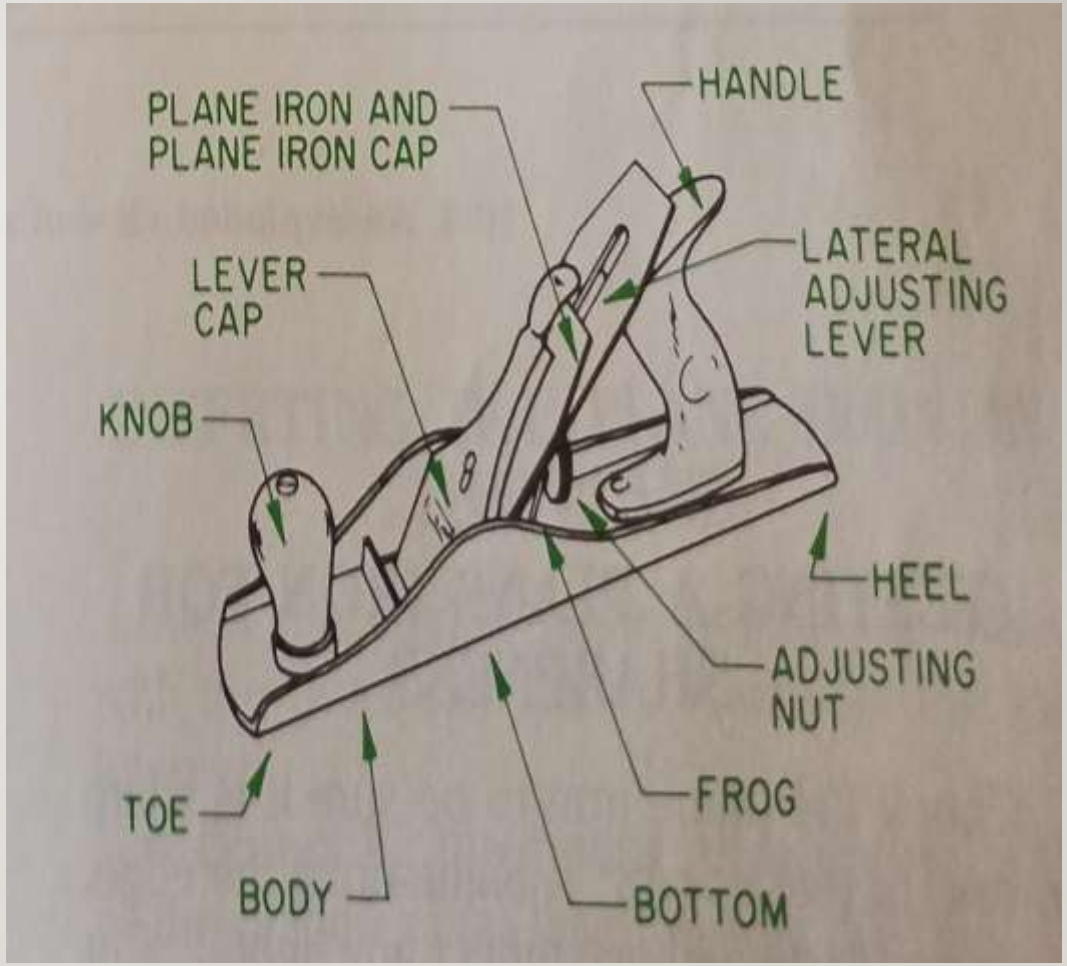
Types of firmer chisel

b) **Mortise chisel** :- As it's name indicates they are chiefly used to cut mortise joints. Mortise chisel is thicker than firmer chisel

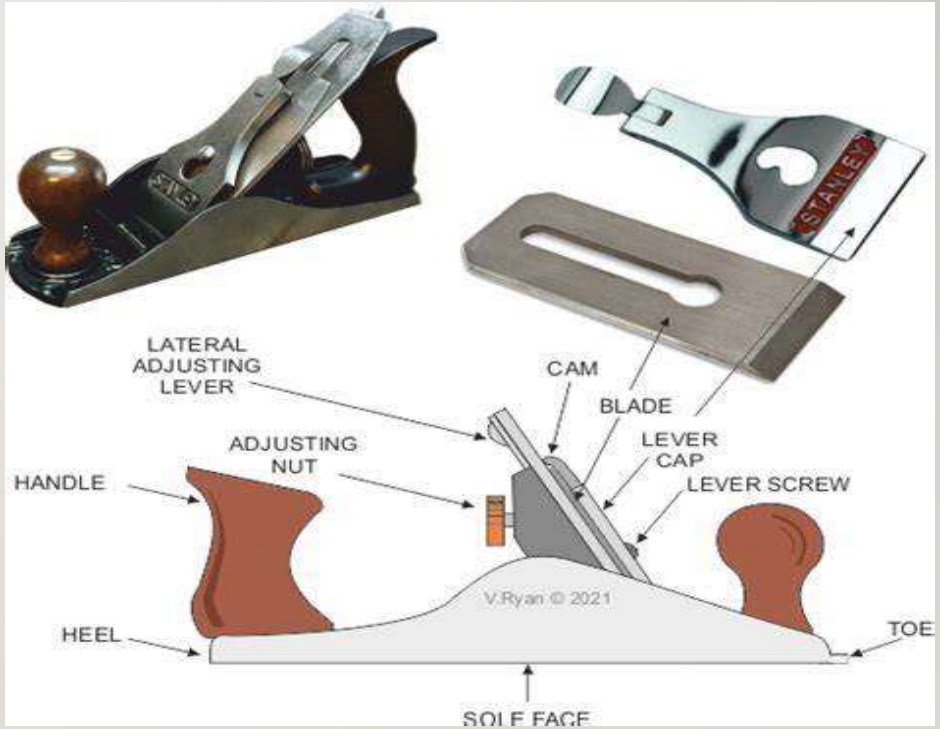
Types of mortise chisel

III. Planning tool

- Planning is the process of removal of wood from the surface or smoothing the surface of wood with the help of a planer.
- Many types of hand planes are available. They are **jack plane, block plane, jointer plane and router plane.**



a) **Jack plane** :- 14 - 18 inch plane. Probably the most commonly used plane for straightening and smoothing the surface. There are 2 types of jack planes are used in the carpentry shops. They are wooden jack plane and metal jack plane.



b) **Block plane** :- A small plane with a single cutter. 3 to 7 inches in length. Block planes are used for minor cutting, shaping, and cleaning tasks such as chamfering, leveling corners, or removing glue.

c) **Jointer plane** :- 22 0r 24 inch plane for planning very long stock such as the edges of doors.

d) **Router plane:-** A plane used to smoothen the bottom of grooves or other recesses. The blade of a router plane is Suspended below the body.

IV. Miscellaneous tools

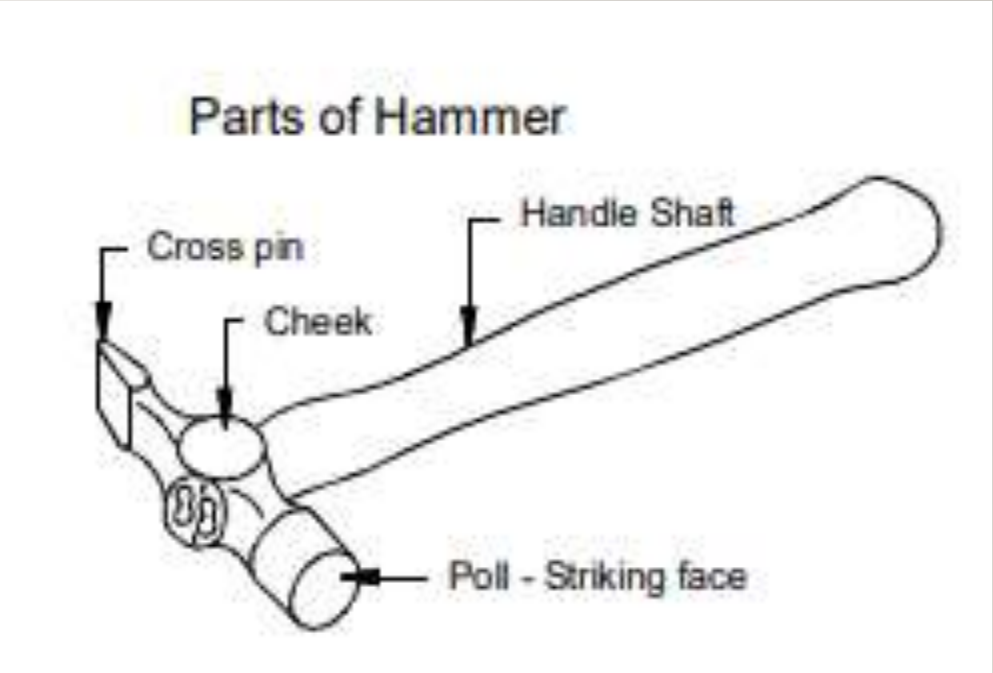
1. **Hammer** :- Hammer is a striking tool. There are different types of hammers used by carpenters for different works. Commonly the hammers used by carpenters are:

a. Wooden mallet

b. Claw hammer

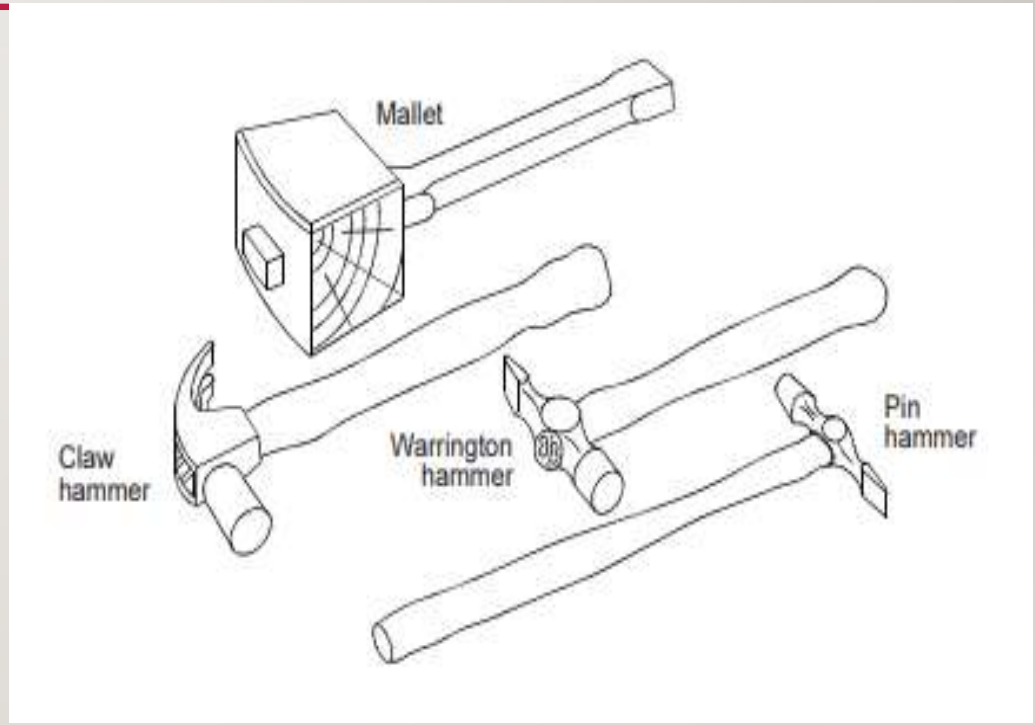
c. Warrington hammer

d. Pin hammer



a. **Wooden mallet** :- it is mainly used to strike the chisel for working.

b. **Claw hammer** :- it is the main hammer of the carpenter. It weights about 500 gm. It has poll on one side and claw on the other. The claw is used to pull out nails from the wood work.



c. Warrington hammer :- Used for medium heavy work of driving nails. It weights about 250 gm.

d. Pin hammer :- The weight of pin hammer is about 110 gm and is used to drive small nails or pins

2.Bench vise

- It is usually fixed on the side of a working bench. Its one jaw is fixed and other is movable by screw and handle.
- Used for holding workpiece, for carrying out various wood working operations.

3. G Clamp

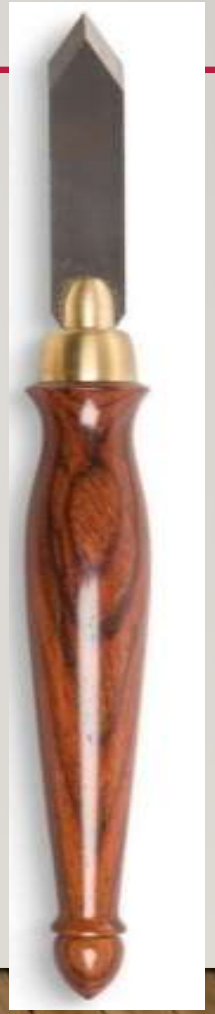
- Consists of malleable iron frame, bent in the shape of letter G and steel screw.
- G Clamp hold everything in place for cutting, shaving, nailing together, or even for keeping it straight.

4. Sandpaper

- Sandpaper is used to create a smooth surface.
- Sandpaper is just a paper with abrasives attached to it with an adhesive. It is available in different grit sizes which are shown by a number on the back.
- Low numbers like 40 means it is very coarse and higher numbers like 300 means it is very fine which will give a smoother finish.
- The numbers on the back of sandpaper simply means how many abrasive particles there are per inch of sandpaper

5. Marking knife

- The blade of marking knife is extremely hard and sharp, which means that it marks wood precisely and is ideal for woodworking.



WOOD WORKING OPERATIONS

wood working is the process of making items from wood. A large number of operations are carried out in wood workshop to get a finished end product from wood.They are,

1. Planning and thicknessing
2. Mortising and tenoning
3. Rebating
4. Grooving and Tonguing
5. Moulding
6. Drilling and boring
7. Turning
8. Carving
9. Sanding

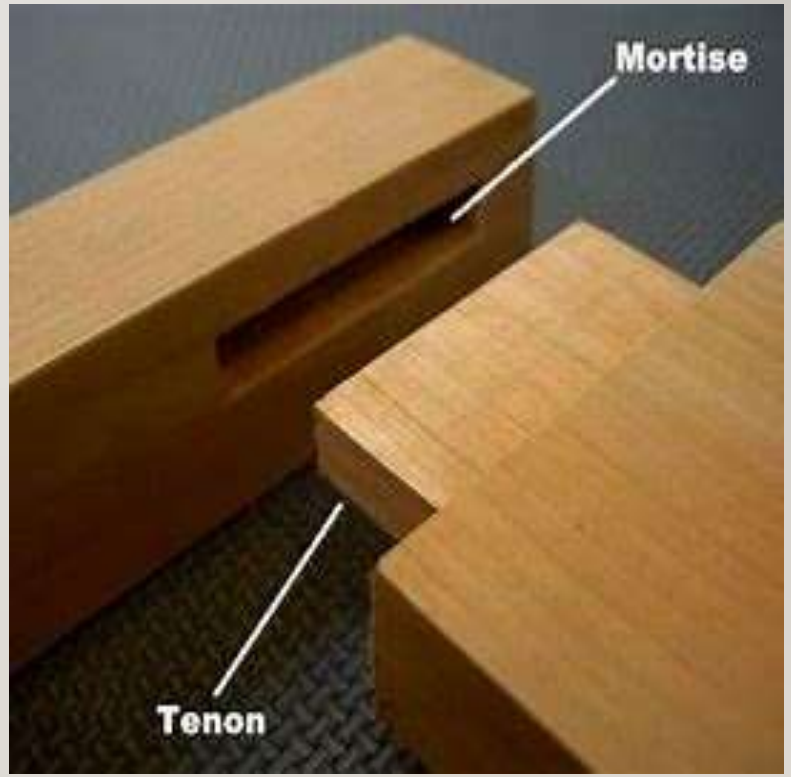
1.Planning and thicknessing

- Planning is the process of smoothen the surface of a rough cut lumber.A hand plane tool or planer is used for it.
- Thicknessing is done to give a uniform thickness to the wood by using thickness planers to get wood pieces of required dimensions.
- This operation is also known as “facing and edging”.

- Planer-thicknesser machines can be used for both surface and thickness planing
- A perfectly planed surface should be perfectly straight and parallel in width and thickness and all edges square to the face
- Before carrying out planning operation, the direction of wood grains should be checked and planning must be done only along the grains

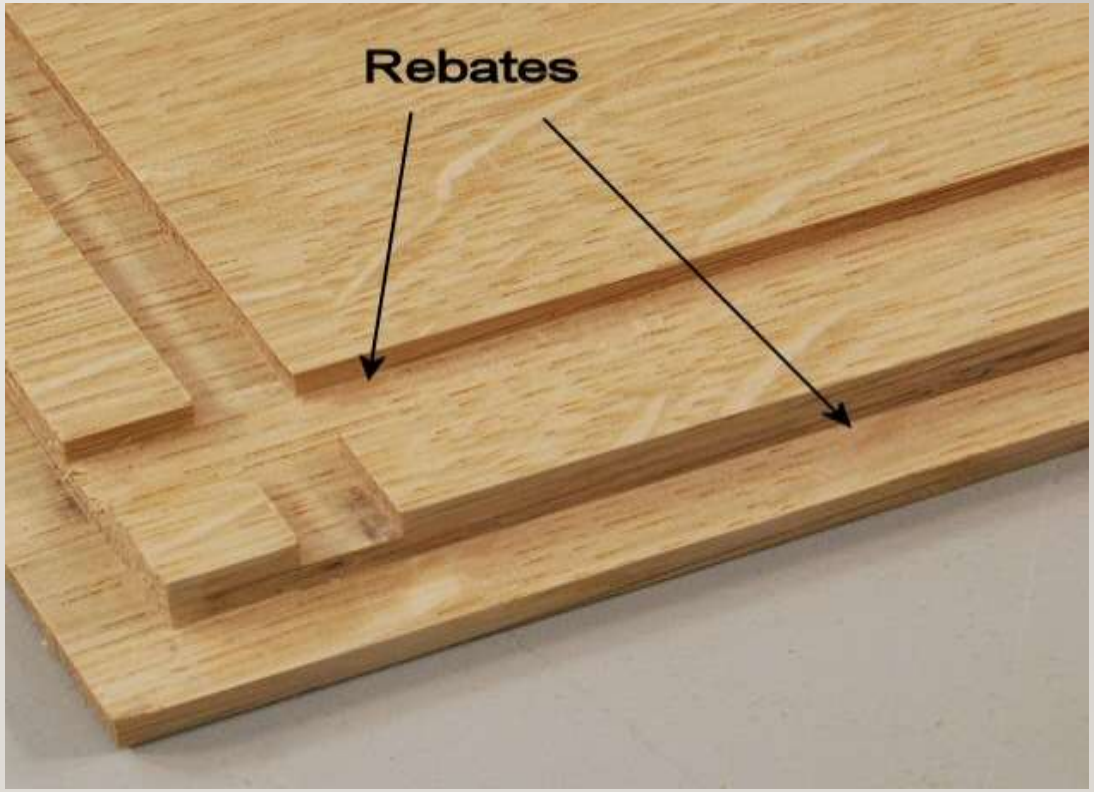
2. MORTISING AND TENONING

- Mortising is an operation of producing rectangular or square holes and recesses in wooden pieces.
- In the beginning the portion where the mortising operation is to be carried out is marked accurately with a pencil. Then the mortising operation is performed with a mortise chisel and mallet.



3.Rebating / Rabetting

- It is the process of making recess (also called rebate) taken out of the edge of a piece of wood.
- A rebate is made by a rebating plane and may be horizontal or cross.
- Part of a door in which the door fits, or a recess in a window in which glass is fitted are examples of rebate.



4. MOLDING

- It is the process of cutting convex, concave and circular surfaces on a piece of wood.
- Molding is done with a molding plane having a cutter blade of required shape.
- Molded wood pieces are used in photo frames and for decorative purposes.

5.GROOVING AND TONGUING

- Grooving is the process of making grooves and tonguing is the process of producing corresponding projections of wood to fit in to grooves or channels.
- Practical application of grooving and tonguing can be seen in drawing boards, floor boards and partitions.

- Grooving is done with a plough plane and tonguing is done with a molding plane

5.DRILLING AND BORING

- Drilling is the process of removing material to perforate a hole or widening an existing hole. These are the process of producing holes in wood.
- Small holes are produced with a bradawl or gimlet while large size holes are produced by braces, bits or drills.

- Boring is performed to enlarge an existing hole in a work piece.
- Boring can be done straight or inclined to suit the type of work. To carry out a boring operation, the center of the hole is marked on the workpiece and the workpiece is firmly secured in a holding tool.

- During boring the boring tool should be turned constantly in one direction and withdrawn at intervals, to remove the waste core, by turning in the opposite direction and exercising an upward pull.

DRILL BITS


Special coating aids durability
HIGH-SPEED STEEL BIT
Spur
LIP-AND-SPUR BIT
Sharp edges prevent chipping
FORSTNER BIT
Bit enlarges hole's opening so screw can sit flush with the wood
COUNTERSINK BIT
Bit cuts the wood plug used to fill a counterbore hole
PLUG CUTTER BIT
COMBINATION COUNTERBORE BIT

- The higher the density of the wood, the greater the power required for processing.
- The processing power shows its maximum value in wood moisture 10–13% and then gradually decreases to the fiber saturation point (30%).

6.TURNING

- Turning: Wood turning is the process of using tools to cut and mould shapes on to wood while it turns on an axis of rotation.
- It usually uses a tool called a wood lathe which performs operations such as sanding, cutting drilling and deformation. Wood turning helps to make items such as candlesticks, lamps, chess pieces or any wooden piece molded in to a form.

7.CARVING

- Wood carving is the process of creating elaborate designs in wood using carving tools Wood carving may vary from floral, traditional, motifs to geometric or abstract patterns.
- Depending on the purpose, the method of carving varies like Deep carving, shallow carving, lattice work and semi-carving

8.SANDING

- Sanding is a very common wood working operation to produce smooth surfaces or to adjust a given thickness.
- The most important operational parameters of sanding are the cutting speed, surface pressure, grit size, and feed speed. Sanding is usually done prior to coating and painting.

ADVANCED WOOD WORKING MACHINES

- A wood working machine is a machine that is intended to process wood.

Machines can be divided into

1. Hand held power tools : the tool is moved over the material
2. Stationary machines : the material is moved over the machine

1.CNC ROUTER

- CNC stands for computer numerical control, that creates objects from wood.
- CNC works on the Cartesian coordinate systems(X,Y,Z) for 3D motion control.
- The parts of project can be design in the computer with CAD or CAM program.
- Then cut automatically using a router to produce a finished parts.
- They are used for designing doors, cabinets & tables quickly and perfectly in a short time.
- The wood router typically spins faster with a range of 13000 to 24000 RPM.

Features

Separate heads: *Some* wood routers have multiple separate heads that can come down simultaneously or not.

Dust collection: *The wood router typically has 6-10 air ducts to suck up the wood chips or dust created.*

2.SANDING MACHINE

- A sander is a power tool used to smooth surface by abrassion with sand paper
- It simplifies the sanding operation.
- There are many different types of sander for different purposes. They are

a) Drum sander

b) Disc sander

DRUM SANDER

- A large sander that uses a rotary sanding drum. It is good for finishing large surfaces.

E.g.: oscillating 3 drum sander

- In addition to the linear sanding operation, the oscillating drum sander oscillates from left to right & lowers heat build up on the sanding belt to reduce loading & burning.

DISC SANDER

- It consists of a disc of abrasive attached to a face plate.
- Disc sander is used for the shaping and smoothing of small pieces of work.

3.DOWEL MAKING MACHINE

- A dowel is a cylindrical rod usually made from wood, plastic or metal.
- Dowel making machine is ideally suited to make dowels for joining work in desk, chair and furniture assembly.
- It cut square wood into dowels, with working range from 6-18mm in diameter.

4.COPYING LATHE

- A machine used for the production of plane and curved surface from a master on products made of various materials.
- It rotates the work piece about an axis of rotation to perform various operations such as cutting, sanding, drilling, turning etc. with tools that applied to the work piece to create an object with symmetry about that axis.Speeds of 340 to 3200 rpm are usually used.

5.DRILLING MACHINE

- Power drills are used to create holes
- Bit are held in a tool called a drill which rotate them and provide torque and axial force to create the hole.
- They are faster and more accurate with variable speed controls.

- Most drills have a very tough plastic outer case for affordability and to resist breaking from drops.
- Drills work with drill bits which are inserted into the end of the drill and there are two types where one is for drilling holes and the other is for inserting or removing screws.

TOOLS FOR BORING AND DRILLING HOLES

6.PLANER

- Planers are wood working machinery that are used to perform similar functions.
- A jointer is used for performing cuts along the edge of the board so as to form a 90° angle with the top of the board.
- One can make very small cuts to form a straight surface.

- Planers are mostly used to flatten the upper and lower surface of wood by removing some thickness of the wood.
- This provide a smooth finish or levelling the surface of the wood.

CIRCULAR SAWS

- The blade of a circular saw is connected to the rotor of an electric motor.
- The pistol grip should be held in the right of the cut is reduced because hand. Always keep the left hand on the other of the angle of the blade.
- The circular saw is a much quicker alternative to a hand saw and it is more portable than a table saw.
- It has a hard plastic or rubber casing and it also has a transparent plastic guard to prevent injuries. The blade is also large and it can be easily changed when it is blunt or damaged


Electrical Cord
Trigger Switch
Front Handle
Depth Adjustment
Motor Housing
Lever for Retracting Lower Blade Guard
Base Plate
Bevel Cutting Angle Adjustment Knob
Retracting Blade Guard
makita

JIG SAWS

- Jigsaws are best suited for cutting boards and button thin sections of wood. Due to the narrow sizes of the blades.
- Jigsaws can be used to cut curves as well as to make straight cuts.

- A narrow blade with small teeth (top) allows the saw to turn quickly, which enables you to cut curves with small radii.
- A blade with downward-pointing teeth (middle) is useful for cutting countertops, as it cuts wood on the down stroke and does not cause break out on the top surface.
- A blade with coarse a teeth (bottom) enables fast cutting.

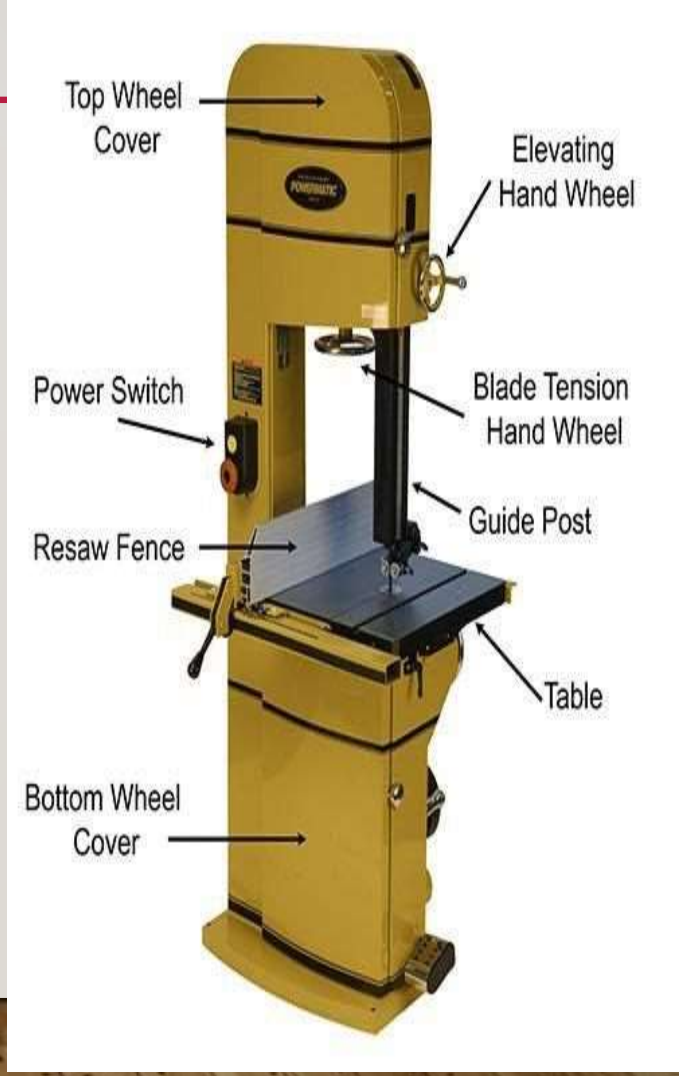
- There are a wide range of jigsaw blades available, with a blade to suit any given situation.
- Some blades are designed for fast cutting, while others are best suited for curved work.
- Jigsaw blades are disposable and need frequen replacement because the relatively short length of blade quickly becomes dull.

NAIL GUNS

- Used for tasks that involve the insertion of a large number of nails or pins.
- Nail guns can be gas-, compressed air, AC, battery, or hand-powered.
- Be very careful when working with thin materials, as there is a danger that the nail will pass straight through the work piece.
- While nail guns can be used with a range of nail sizes.

BAND SAW

- Although the band saw is designed primarily for making curved cuts, it can also be used for straight cutting.
- The band saw has two large wheels on which a continuous narrow saw blade, or band, turns, just as a belt is turned on pulleys.
- The lower wheel, located below the working table, is connected to the motor directly or by means of pulleys or gears and serves as the driver pulley. The upper wheel is the driven pulley.



- The saw blade is guided and kept in line by two sets of blade guides, one fixed set below the table and one set above with a vertical sliding adjustment.
- The alignment of the blade is adjusted by a mechanism on the backside of the upper wheel.
- Tensioning of the blade—tightening and loosening is provided by another adjustment located just back of the upper wheel.