



Hand Tools

1. Marking Out Tools

Steel Rule

- Used for measuring
- ***"Measure twice, cut once"***, golden rule of woodwork
- Rule should begin from the edge of the metal
- Millimetres are used, nothing else will do
- 10mm = 1cm
- 1000mm = 1m

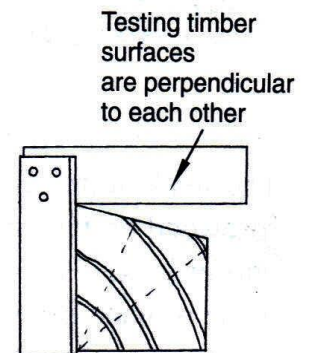
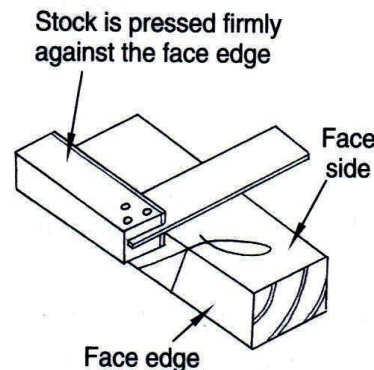
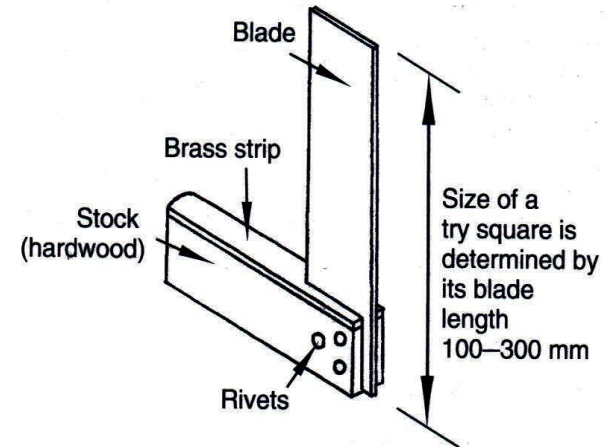


Graduations are in millimetres and centimetres



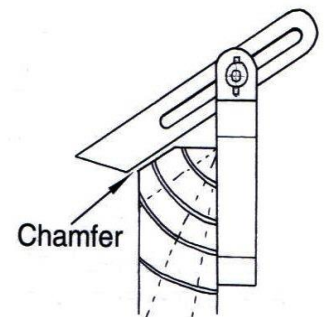
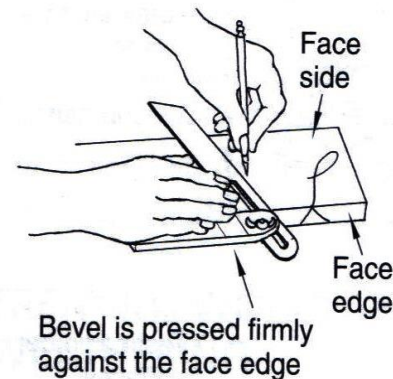
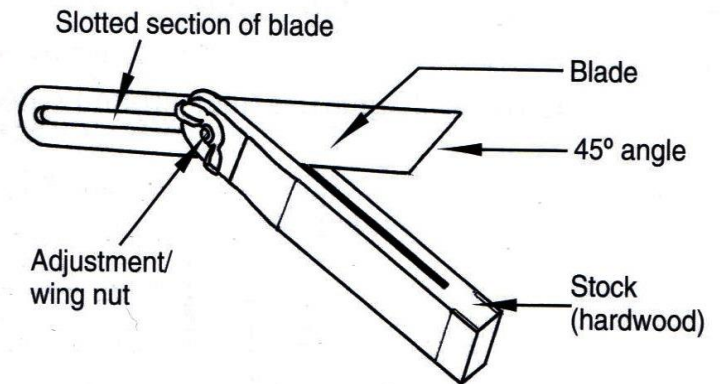
Try Square

- Used to mark lines at right angles to a true edge or side of the piece
 - Also tests square- ness
- Two parts: **Stock** made from rosewood or mahogany; the **blade** made from steel which are held together with **rivets**
- Stock is protected from wearing by the brass strip
- Must always be held firm and tight against the timber while marking or testing is done
- Should not be dropped to avoid being knocked out of square



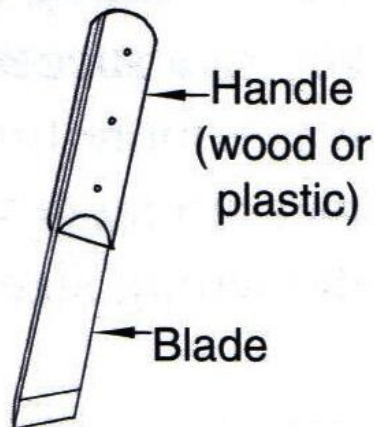
Sliding Bevel

- Like the try square it has a stock and blade but any angle can be set between the two. Not just right angles
- Instead of rivets we have a **half swing nut** to tighten the blade to the stock.
- The blade can slide into the stock when not in use



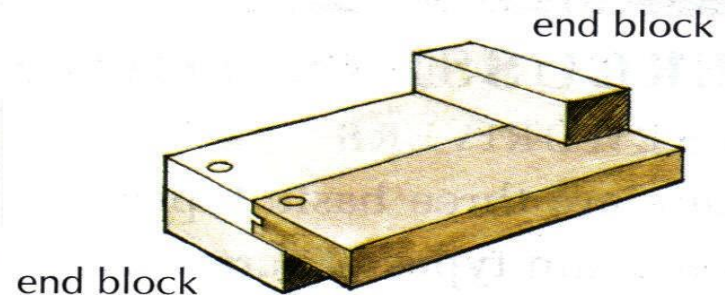
Marking knife

- Used to score lines that are to be sawn.
- Cuts outer fibres of the timber to give a cleaner cut.
- Only lines to be sawn should be marked



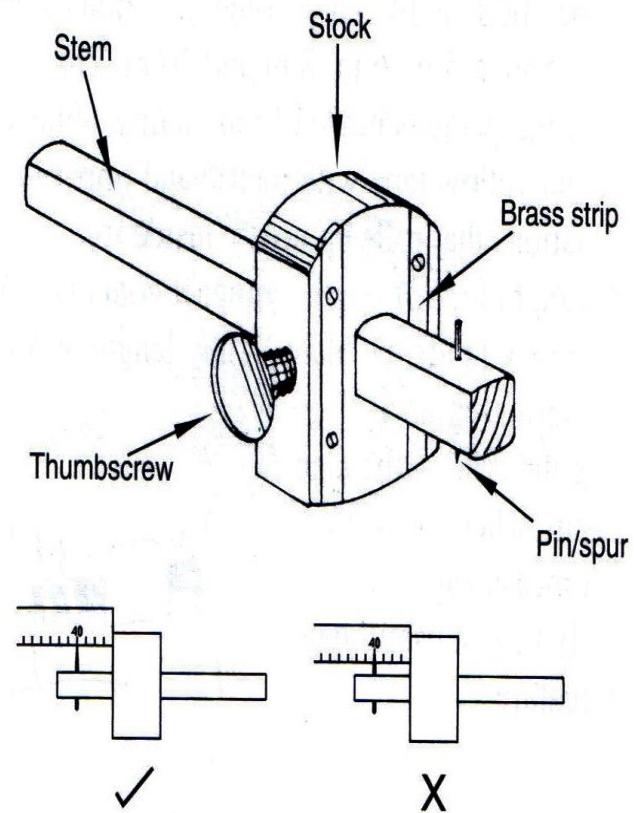
Bench Hook

- Made of beech
- Two end blocks are joined at right angles to the base block.
- bottom block is hooked over the edge and placed into the vice.
- the top block is used to hold the piece firmly.
- Prevents the bench from sawing damage



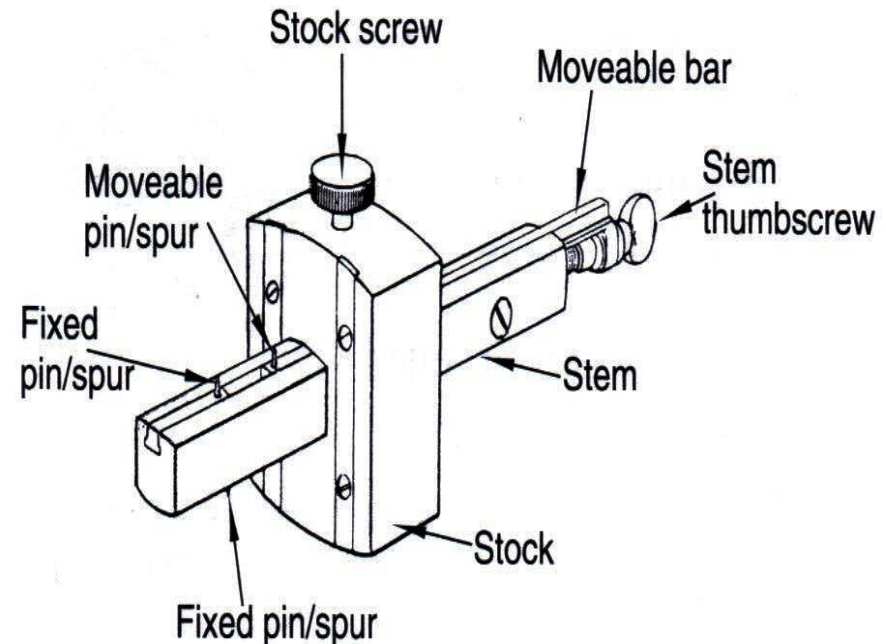
Marking Gauge

- Made from beech
- Used for marking lines parallel to a true face edge or face side
- Consists of a **stock**, **stem**, **spur** and **thumbscrew**
- To set the gauge, release thumbscrew and set rule against the stock to the pin and tighten.
- Stock must be firmly held against the work piece
- Gauge pushed away from the operator



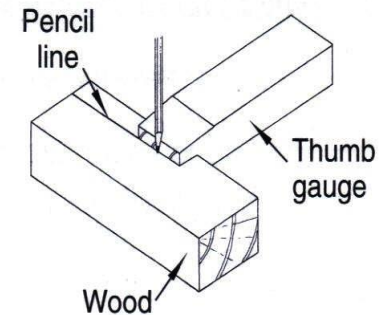
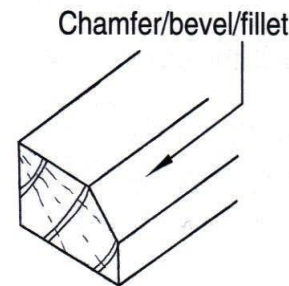
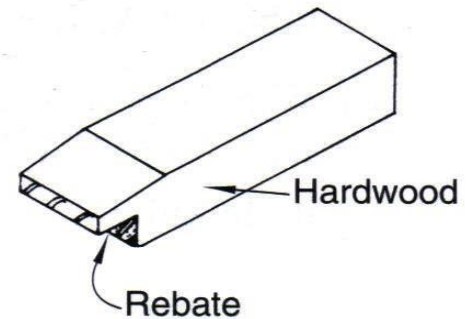
Mortise Gauge

- Made from mahogany or rosewood
- Mainly used from marking mortise and tenon joints hence the name.
- Like the marking gauge except it has **two** pins.
- One is fixed and the other can be adjusted with the thumbscrew.
- Otherwise it is used the same way as the marking gauge



Thumb gauge

- **Used for marking out chamfer/bevels or fillets on wood.**
- **Temporary gauge made for any small marking out or where all markings must be of the same size.**
- **i.e. if u leave the marking gauge for a long period and someone resets it.**



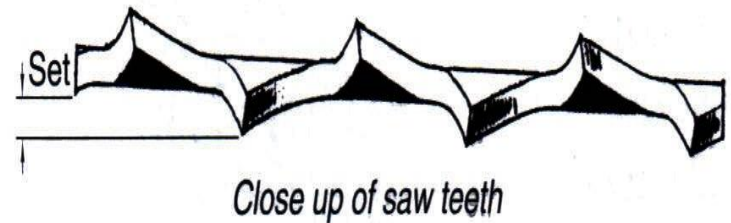
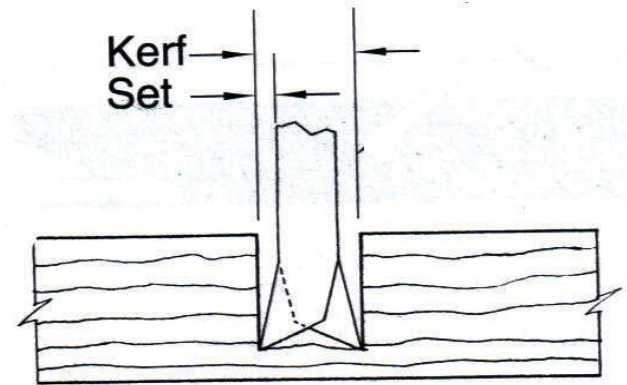


Saws

- **Saws are placed into two categories.**
 1. **Straight cutting saws**
 2. **Curved saws**
- **Teeth design depends on the type of timber to be cut.**
-
- **When cutting across the grain “cross cut” type teeth are used**
- **Cutting with the grain “rip-saw” type teeth are used.**
- **Cross cut teeth are sharpened to a point whereas rip-saw teeth work like chisels.**
- **Teeth are usually measured in teeth per inch TPI**

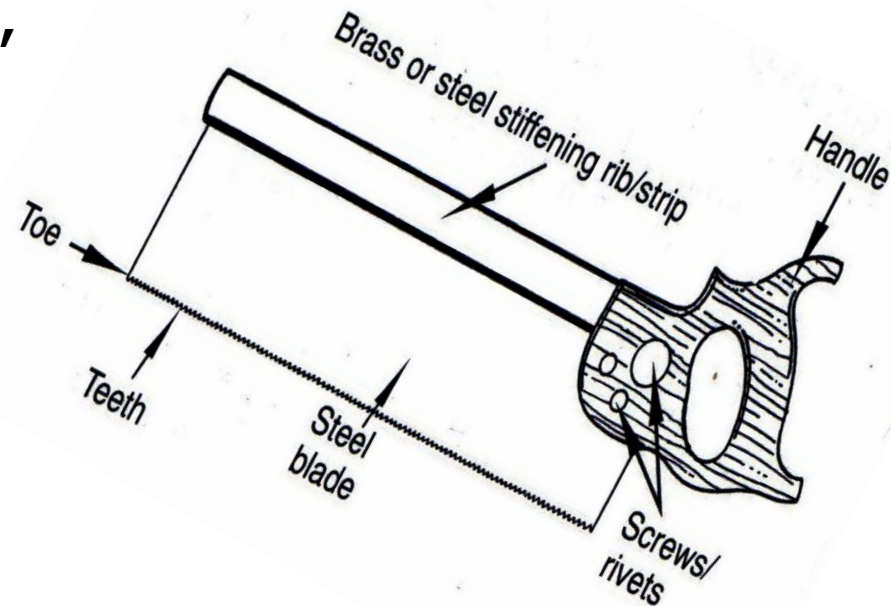
Saws

- Large teeth with deep gullets are best suited for softwoods.
- Important feature of saws is the **set**
- Saw cut must be thicker than the blade, if not the saw will become stuck.
- Alternate teeth are bent slightly to the left and right prevent this from happening.
- The **kerf** that is produced allows the saw to pass freely through the wood.



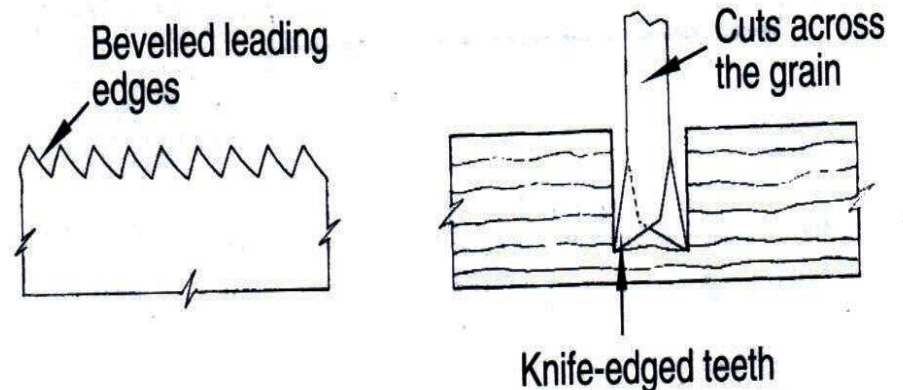
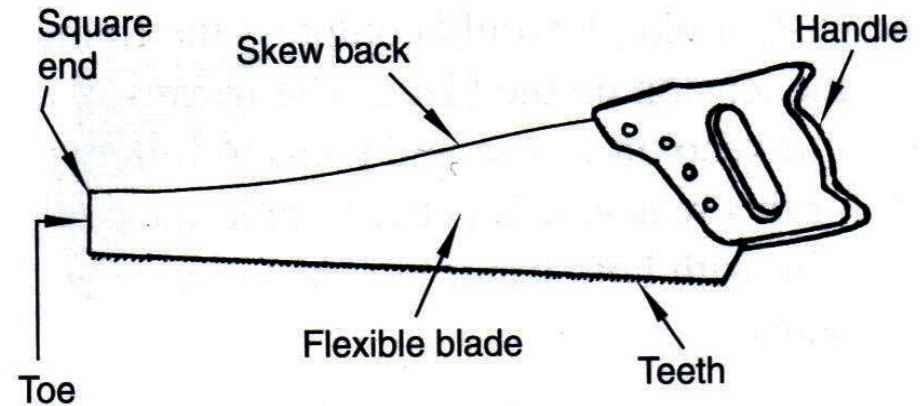
Tenon saw

- Used for light bench work and most suited to cutting tenons.
- Consists of the **handle**, **blade**, **teeth**, **rib** and **screws**.
- Stiffening rib runs along the length of the saw to prevent the blade from bending and to keep the blade straight.
- Size of saw teeth is usually 12-14 TPI
- Care must be taken with the saws teeth as they are damaged easily



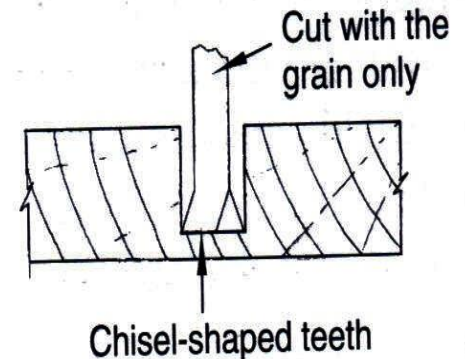
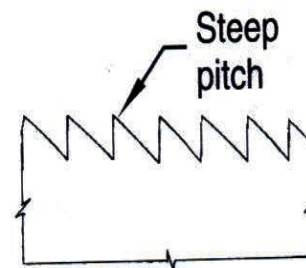
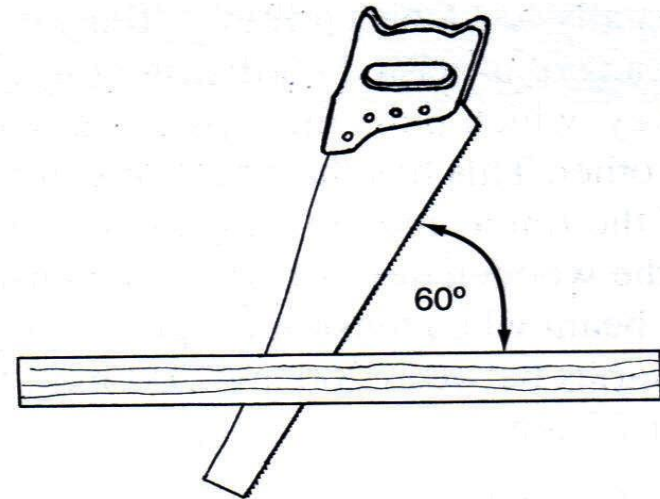
Cross-cut saw

- Used for cutting across the grain
- Teeth have a bevelled edge that slice with a knife action
- TPI equals around 6,7,or 8.
- Saw is held at a 45 degree angle when being used
- As with the tenon saw, the index finger should point along the saw in the "James Bond" fashion!



Rip-saw

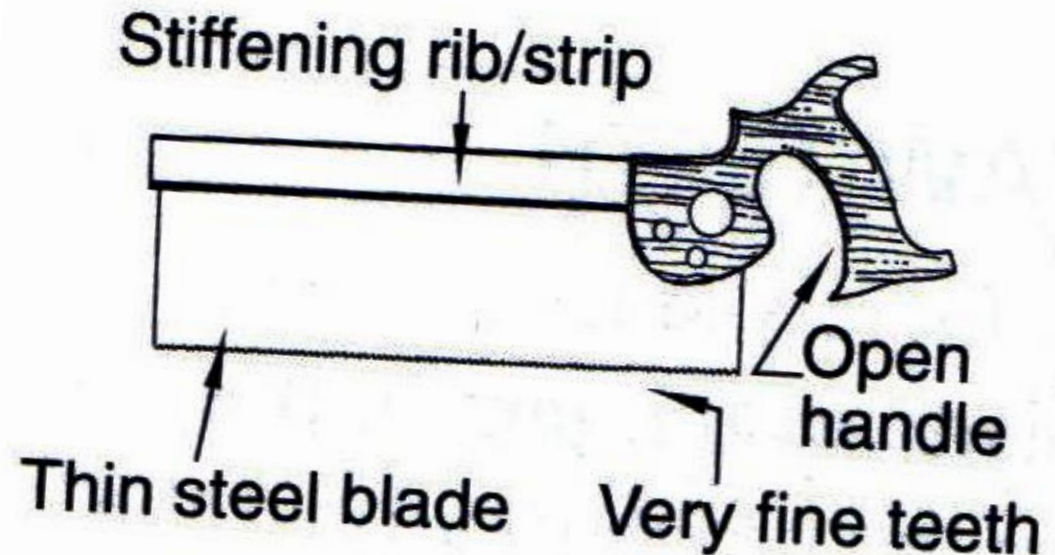
- Used for cutting along the grain
- TPI equals around 3-6
- A cut is started the same way as for the tenon saw resting the blade against the thumb and pulling back three times
- The saw is usually held at an angle of 60 degrees.
- The full length of the saw should be used for greater accuracy



Dovetail

Dovetail Saw

- Used for very fine light work and dovetail joints, hence the name.
- Smaller version of the tenon saw.
- Traditional made with an open handle



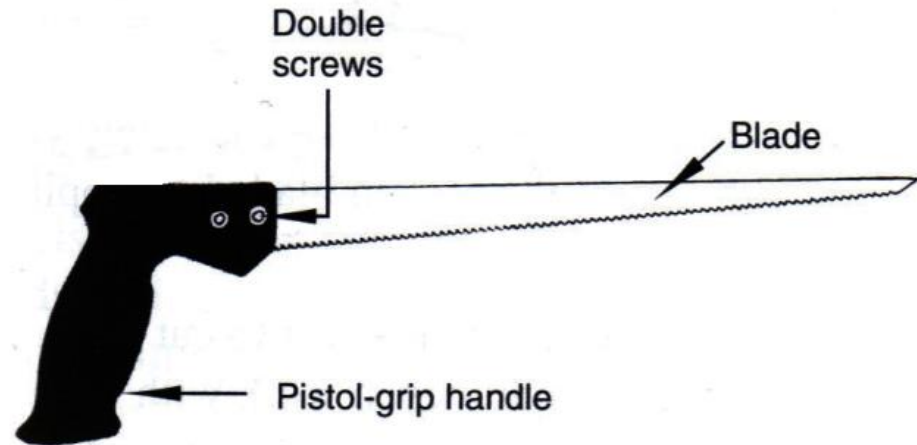
Curved saws

Compass Saw

Cuts internal shapes and curves quickly.

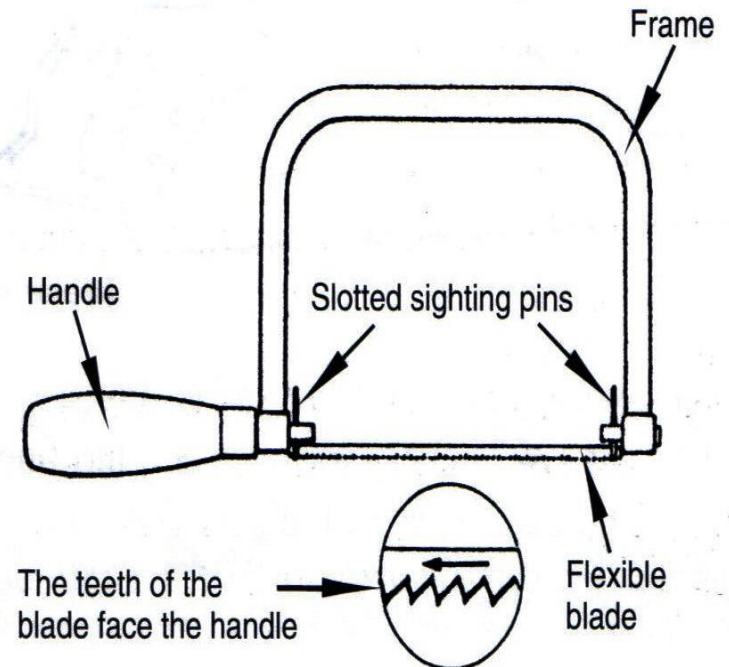
No frame only a pistol grip

TPI = 8 - 10



Coping Saw

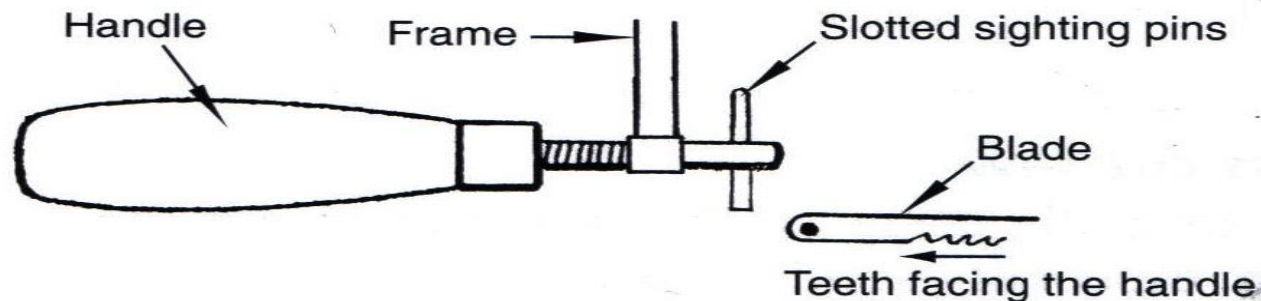
- Used to cut small curves and intricate shapes and removing waste between joints such as the finger or dovetail joint
- Blade is held in tension and can be turned by loosening the handle
- It is the most unusual saw in the woodwork room as the teeth face toward the user and **cuts on the pull stroke**
- Saw is held with both hands and is ideal for thin timber
- TPI = 14 - 17





Replacing a broken blade in a coping saw

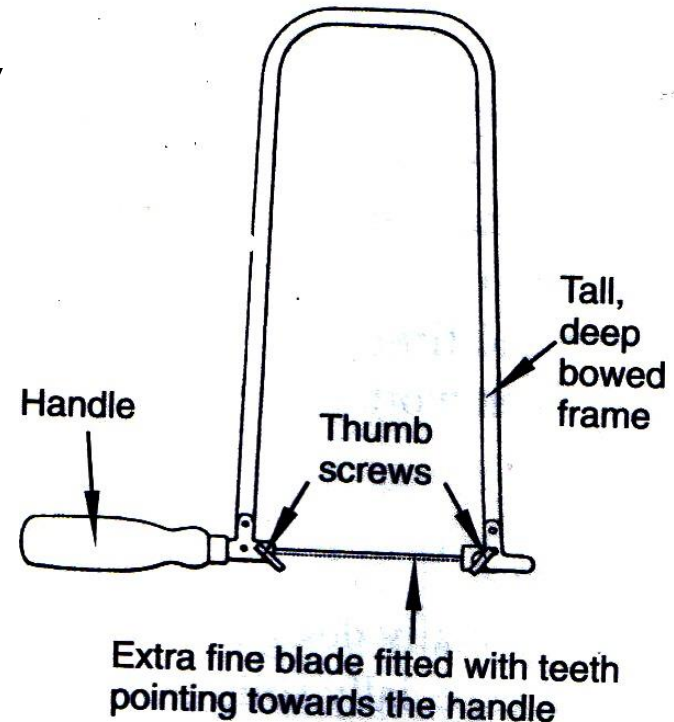
1. Remove the old blade.
2. Turn the handle anticlockwise to reduce the gap between the sighting pins.
3. Place the blade in slots with the teeth facing the handle.



4. Tighten the handle to give tension to the blade.
5. Align the sighting pins by eye so that the blade is straight.

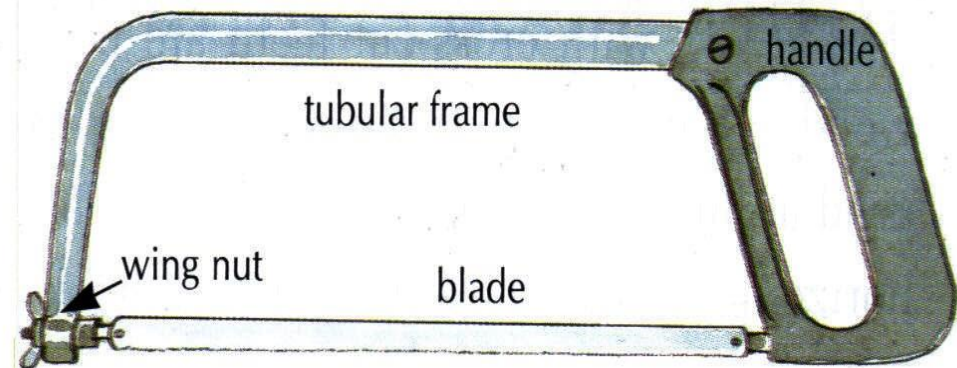
Fret Saw

- Designed to cut extremely tight, intricate curved cuts in timber
- Consists of a steel frame and a wooden handle
- The tall **deep throat** allows for **long reach** in from the edge of the material
- The blade used is extra fine
- There are up to 32 teeth per inch (TPI).



Hacksaw

- Used to cut both metals and plastics
- Frame is adjustable to take different blade lengths.
- Two hands are used on the saw, one on the handle and one on the frame.



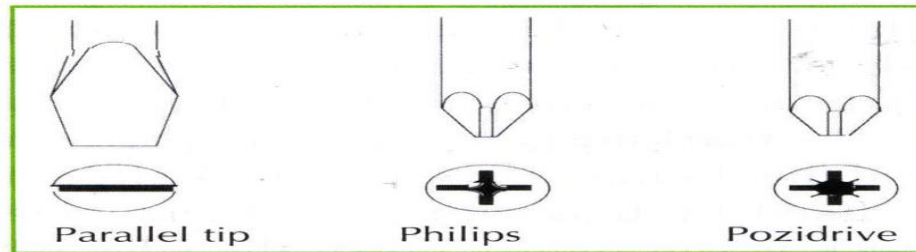


Hand Tools

2. Percussion tools

Screwdrivers

- There are three main types of screwdrivers
- The slotted/fluted head = parallel tip screwdriver
- The Philips head = Philips screwdriver
- The pozidrive head = pozidrive screwdriver



- Lengths vary from 50mm- 300mm
- Care must be taken to choose the correct screwdriver. A badly fitted screwdriver will damage the screw head. The tip must fit the screws in both width and thickness

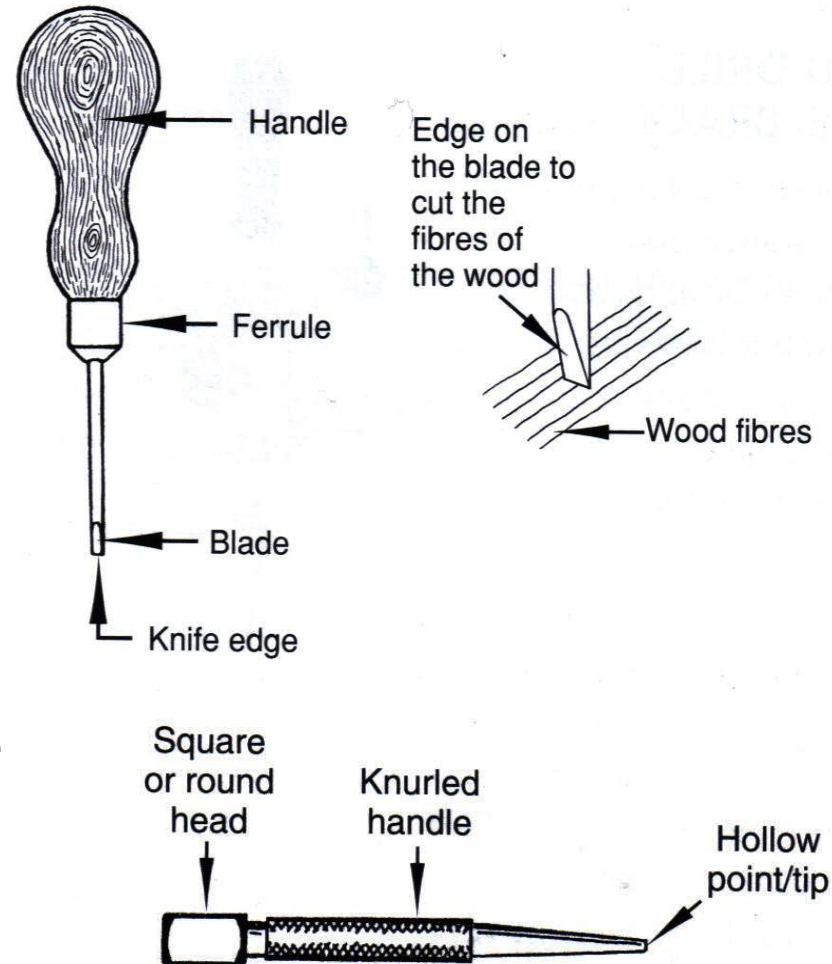


■ Bradawl

- **Used to make small holes in wood mainly to mark a centre hole for small screws.**
- **Downward pressure with a short clockwise and anti-clockwise twists will bore the hole.**
- **Never to be used as a small screwdriver**

■ Nail Punch

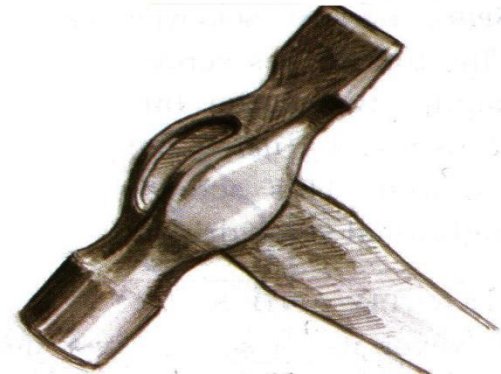
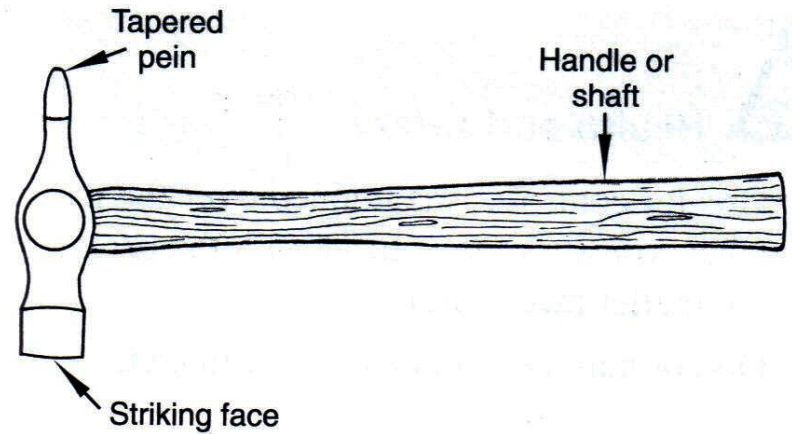
- **Used to punch the nails below the surface of the timber so it can be sanded and cleaned effectively.**



Hammers

Warrington

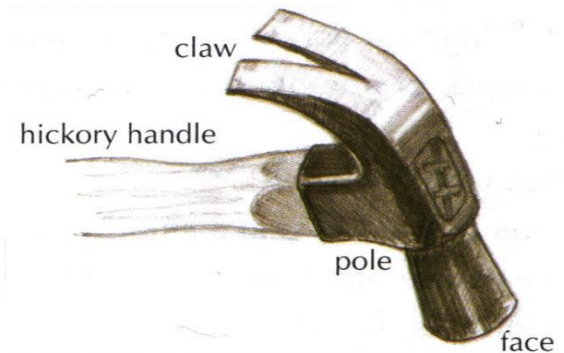
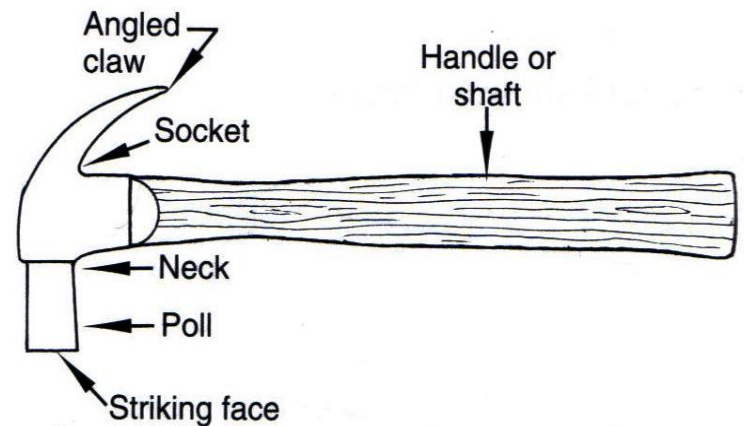
- Generally used for light work.
- One side has a flat circular face which is used for hammering most nails.
- The second face is bevelled to allow the user to hammer nails or panel pins which are small in length. Prevents the user from hammering their thumb or fingers causing injury.



Hammers

Claw hammer

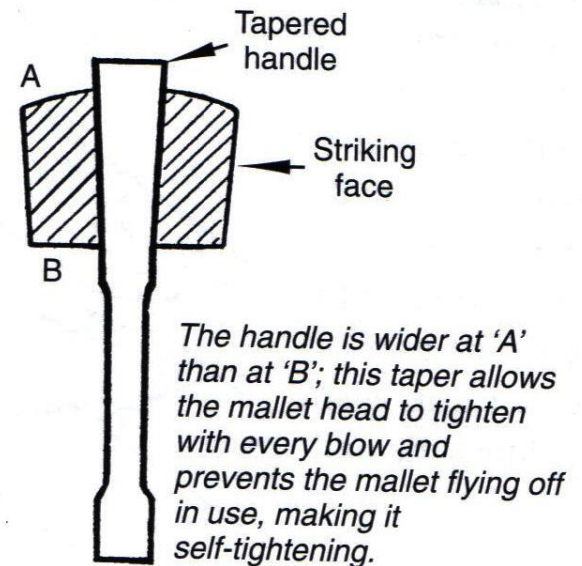
- Heavier than the Warrington.
- The claw is used to pull nails
- To withstand the force of pulling the head of the hammer is usually fixed to the handle using two or more steel wedges and a wooden wedge.
- Note . a hammer should never be used to strike a chisel head.





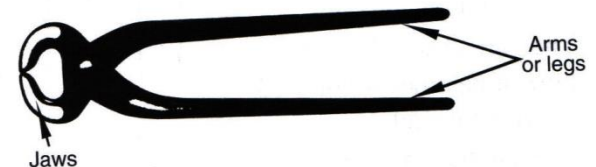
Mallet.

- Used to strike the handle of a chisel.
- Usually made from beech as it is hard and dense enough to withstand the stresses involved
- Handle is tapered therefore the head tightens when the mallet is used.



Pinchers.

- Used to remove nails from timber or for cutting the heads off small nails or tacks.

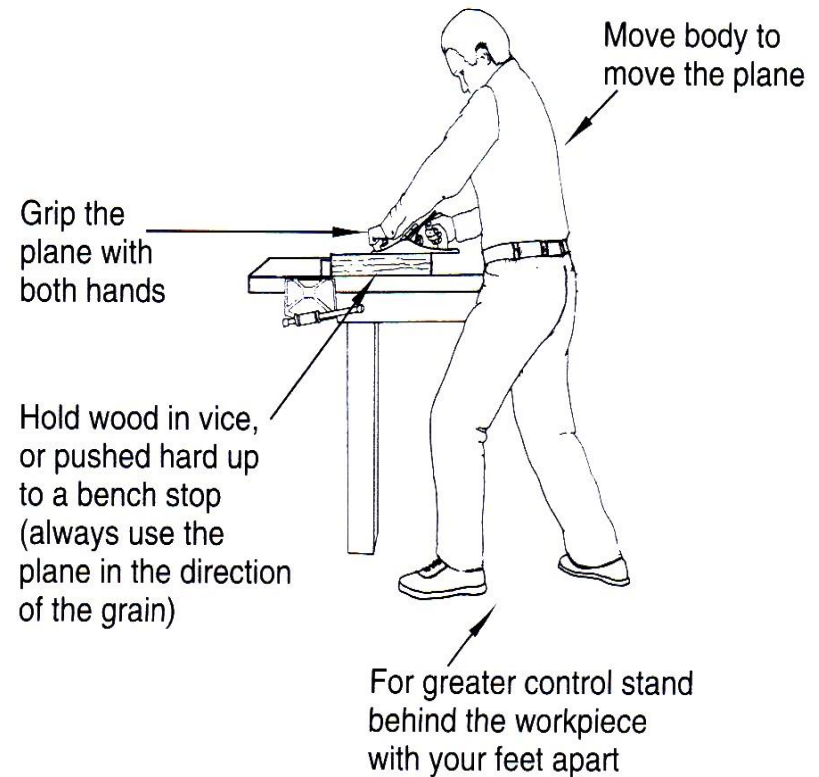




Paring Tools

Using Planes

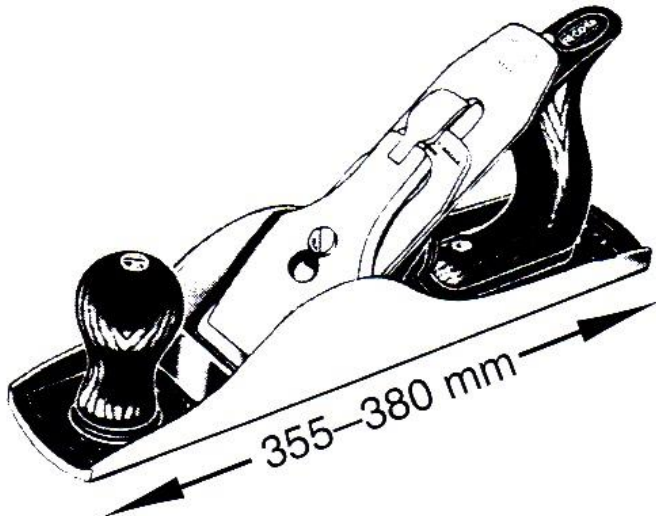
- Planing is a way of removing waste wood or smoothing a surface before a finish is applied.



Types of planes

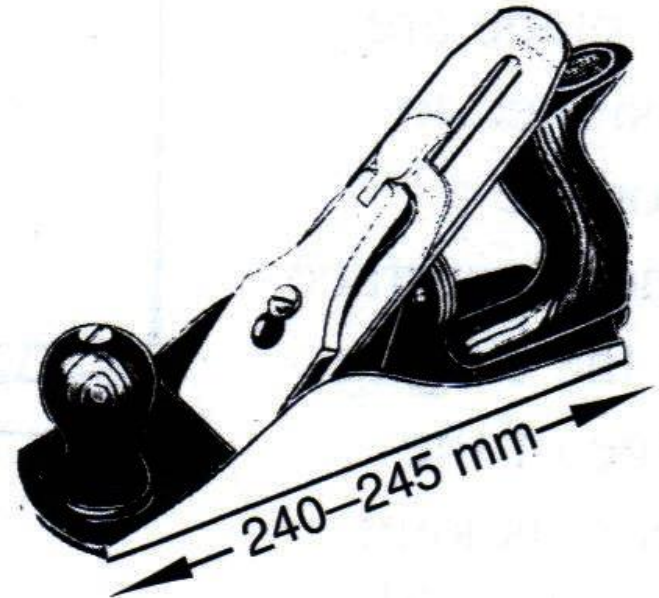
Jack Plane

- Light to work with for long periods of time.
- Squares up rough timber



Smoothing Plane

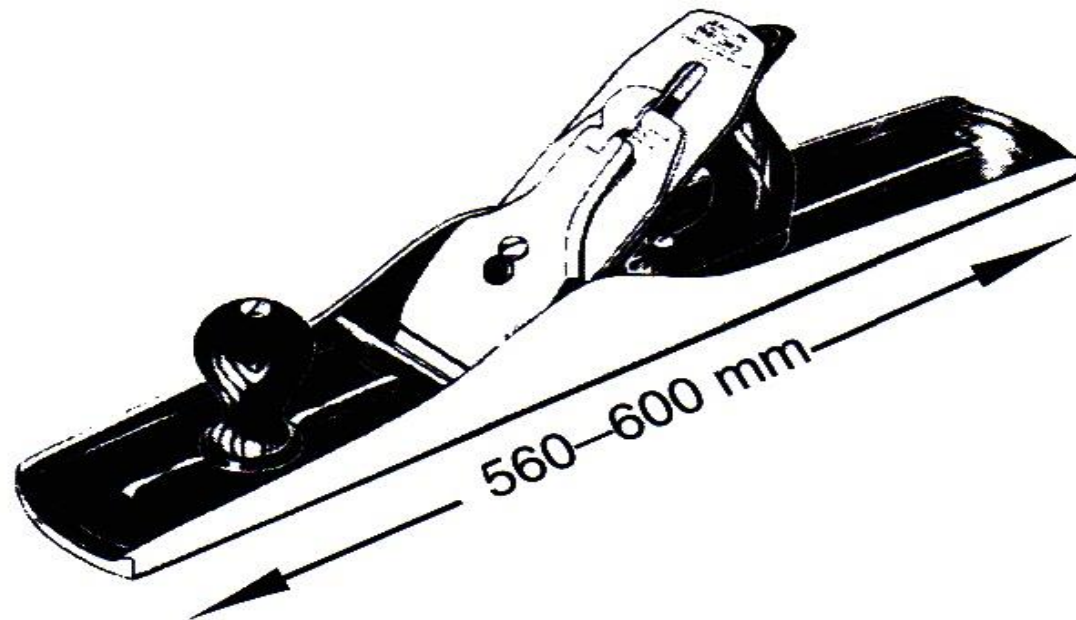
- Puts a final smooth surface on the wood



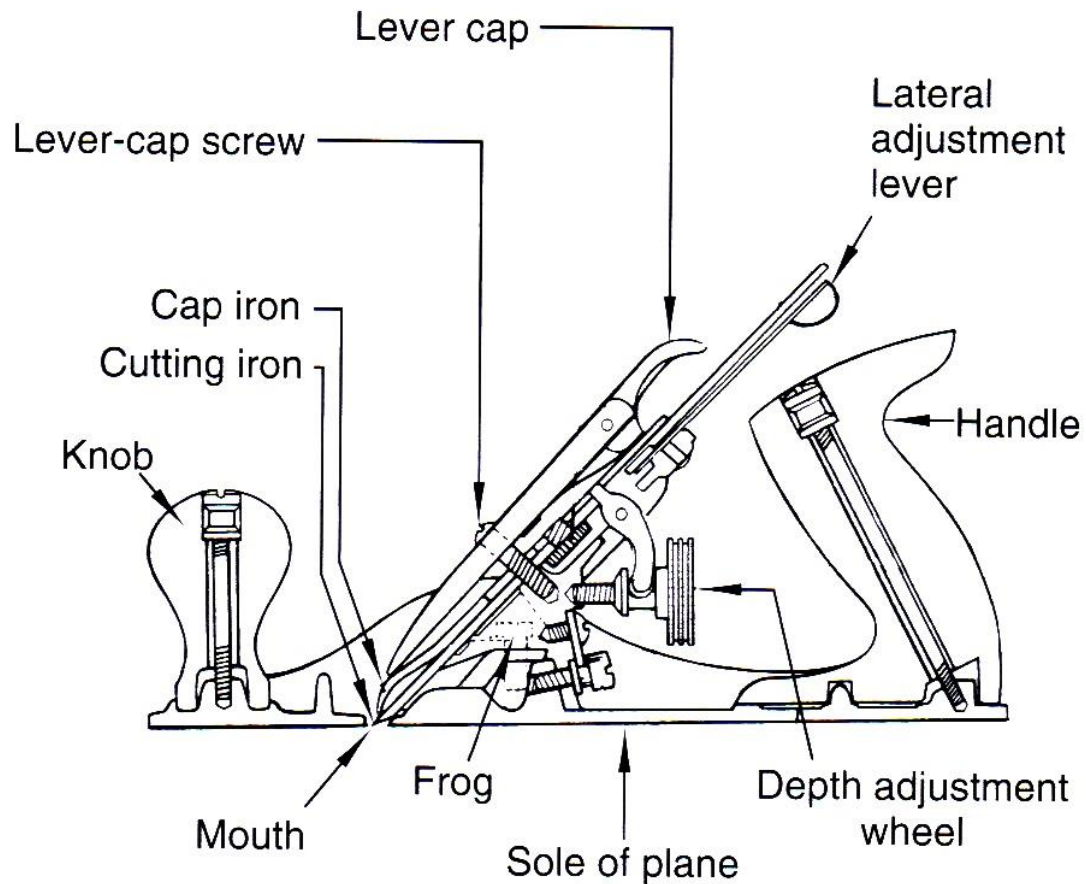
Types of planes

Try plane

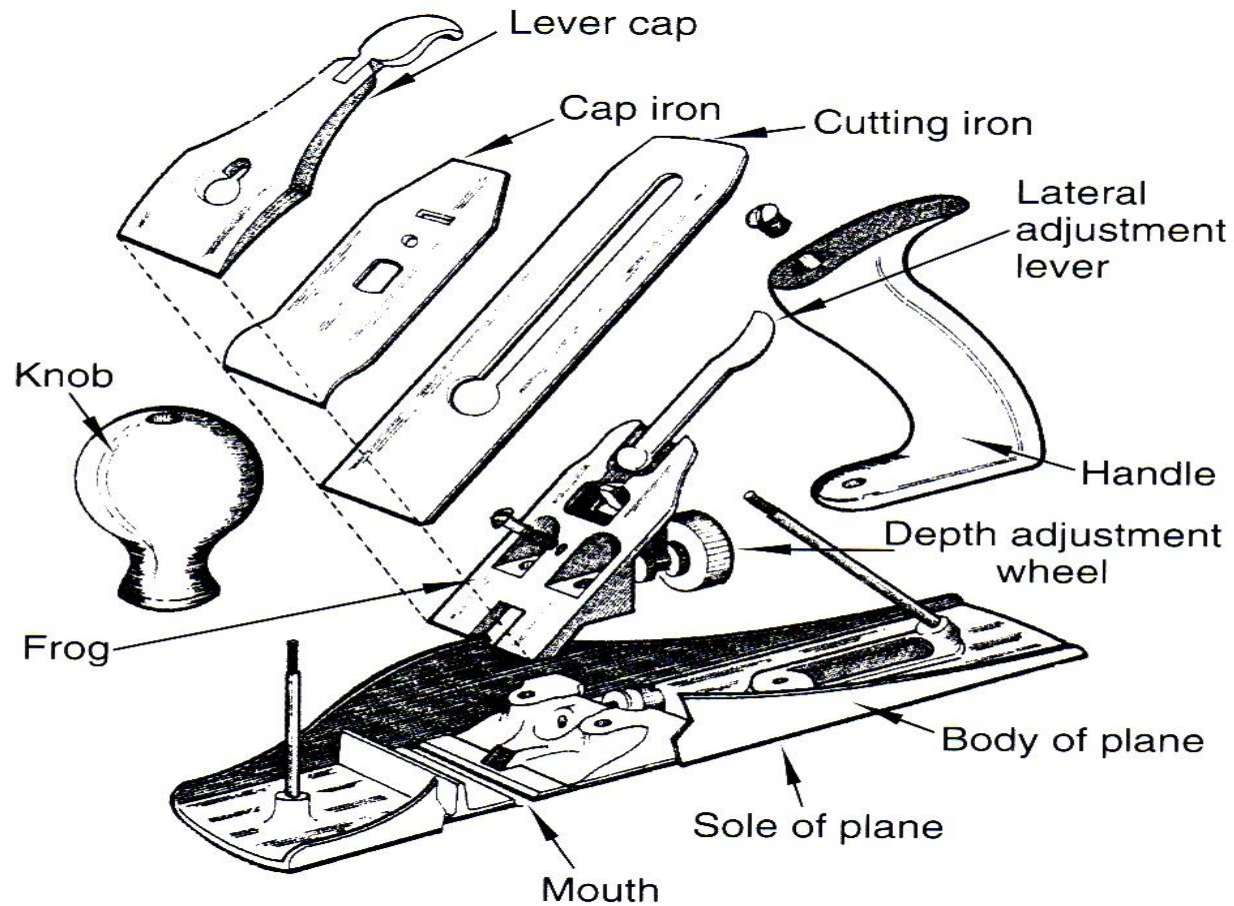
- Planes extra long surfaces and edges to a smooth finish



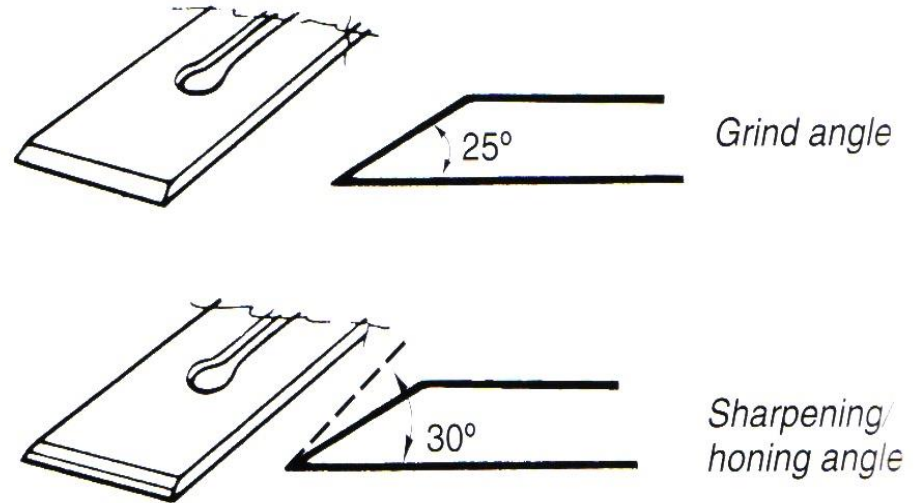
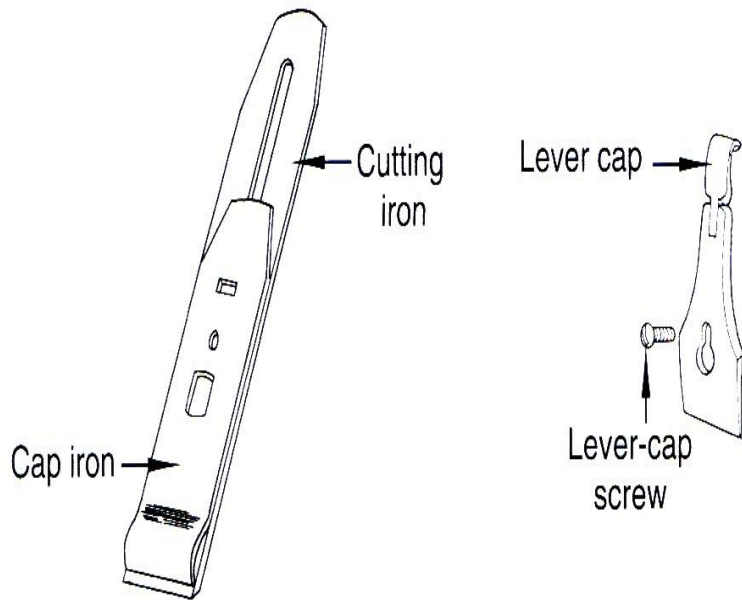
Parts of a Plane



Parts of a Plane



Cutting Assembly for a plane

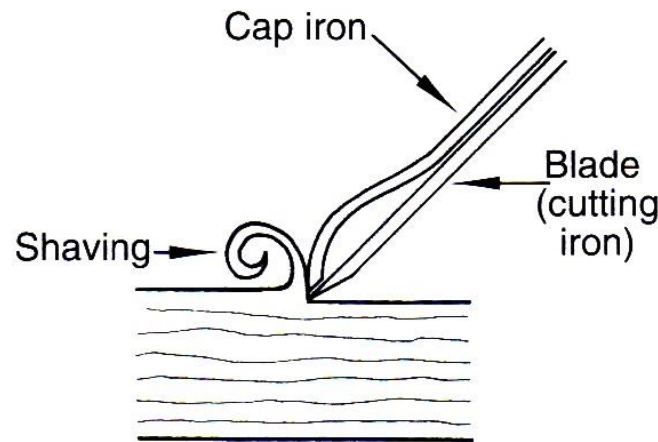


How a plane works

CAP IRON

The three main functions of the cap iron are:

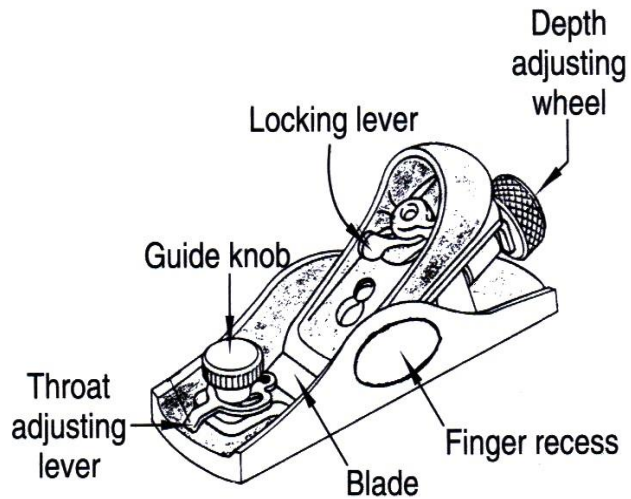
1. To give extra strength and rigidity to the cutting iron.
2. To curl/bead shavings when cut and to guide them out of the plane.
3. To prevent tearing of the wood to give a better planed surface finish.



Other Types of Planes

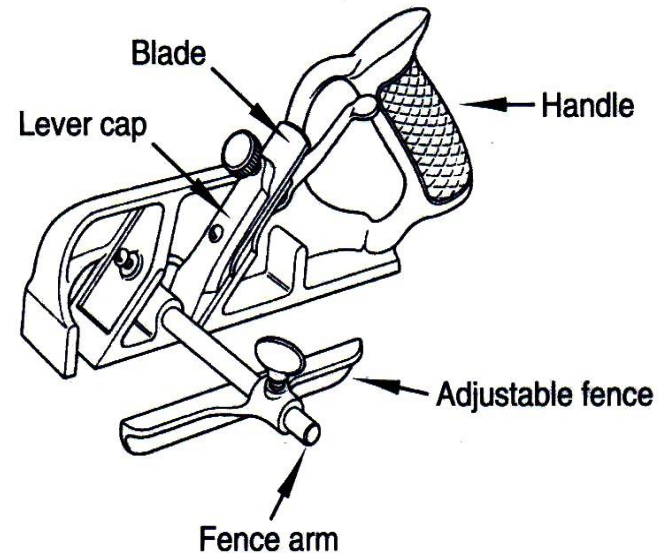
Block plane

Use: for chamfering end grain work and other small jobs. The low pitch of the blade also allows work on plastic laminates.



Rebate plane

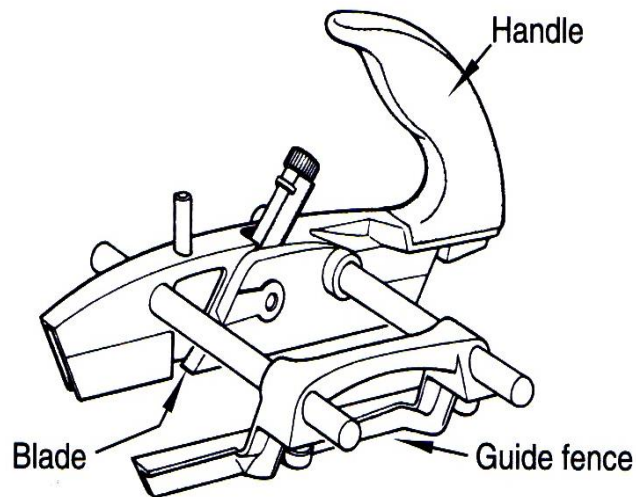
Use: for working out a step at the edge or end of wood.



Other Types of Planes

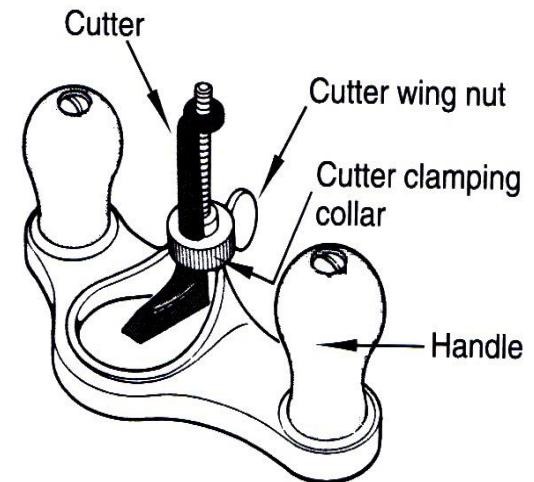
Plough plane

Use: cuts a groove (slot) along the grain in a piece of timber, as in tongued and grooved flooring boards or for the insertion of a panel into a frame.



Router plane

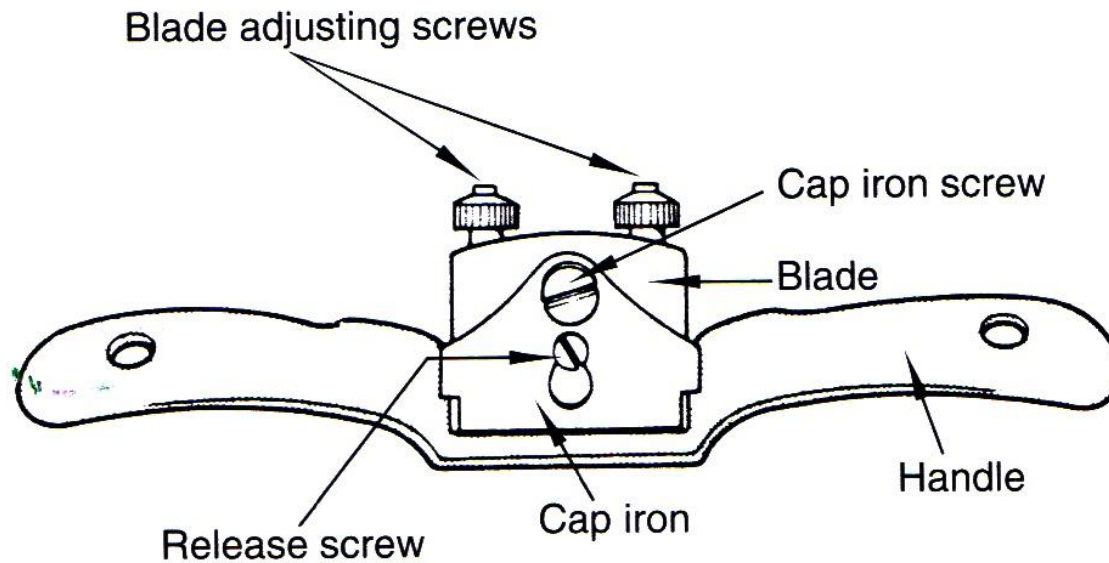
Use: levels the bottoms of grooves or trenches to a precise depth.



Other Types of Planes

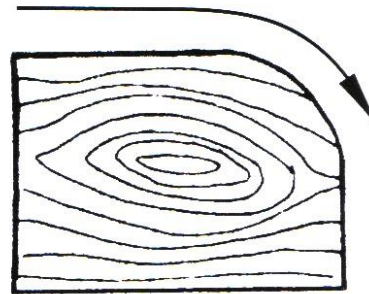
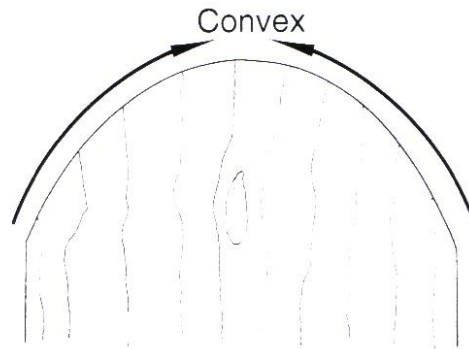
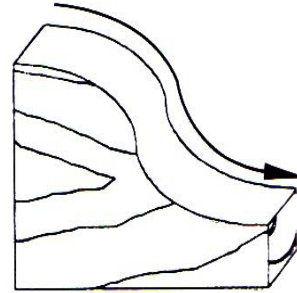
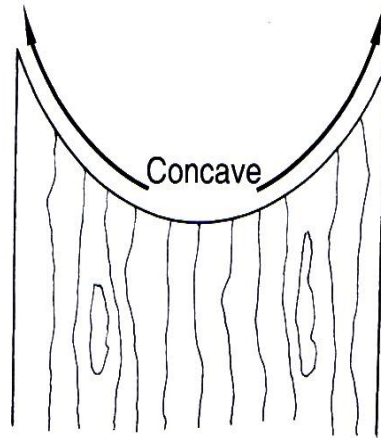
Spokeshave

Use: smooths and shapes a curved edge or surface.



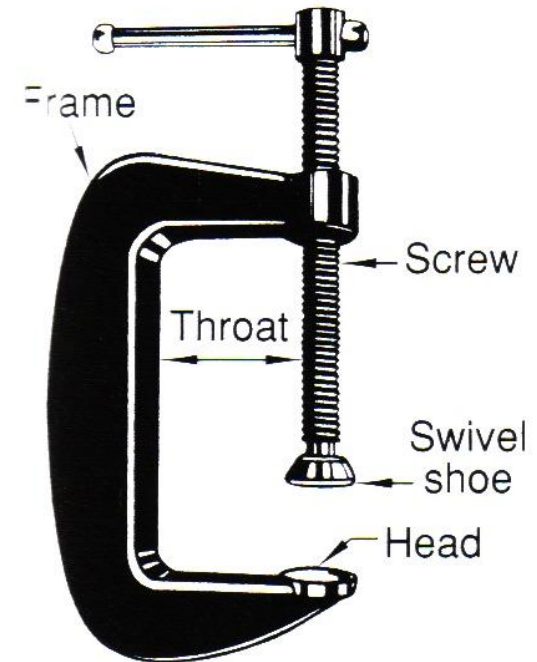
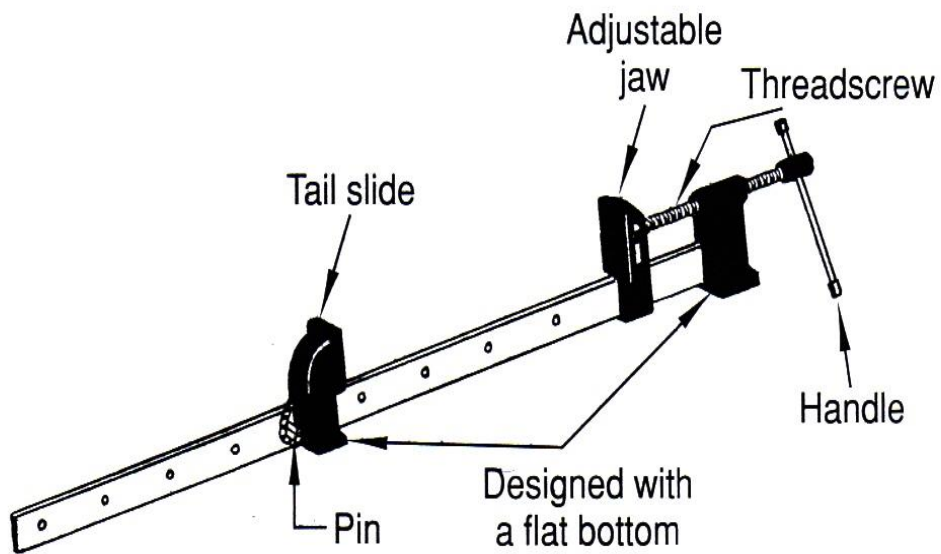


Spokeshave is used for curved work



Cramps

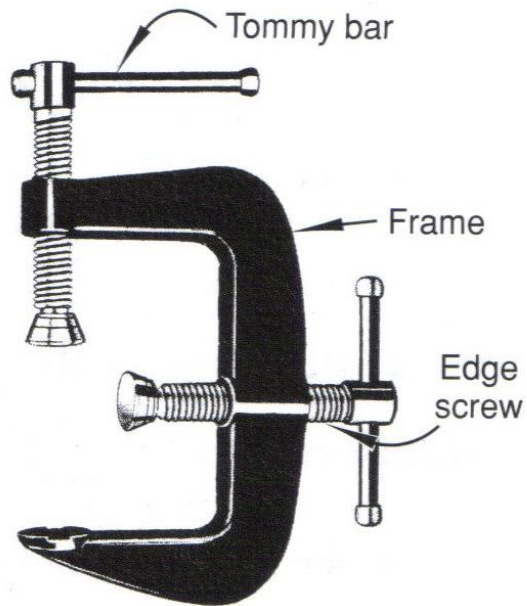
Sash Cramp



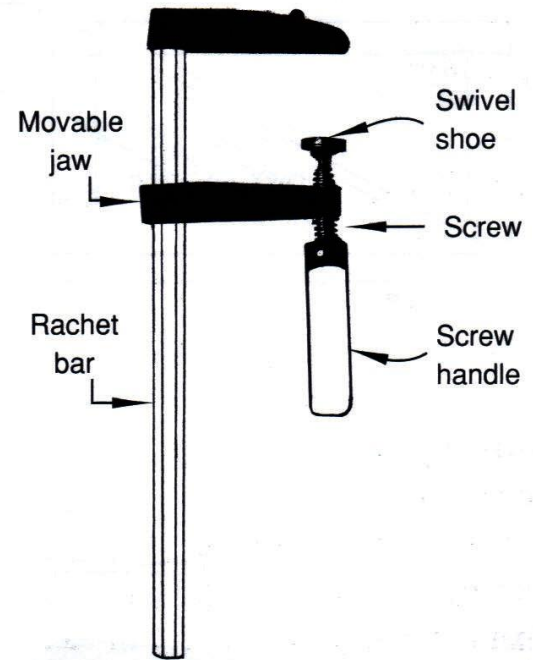
G- cramp

Cramps

Edge Cramp

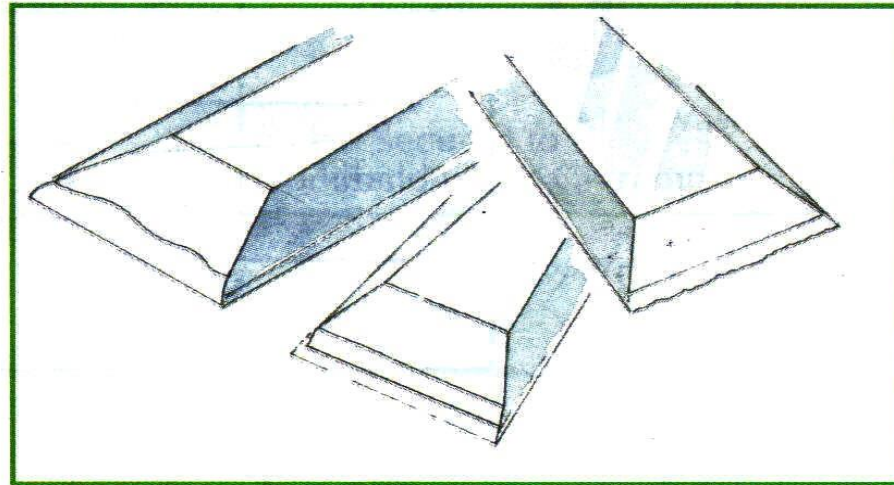


Adjustable Cramp

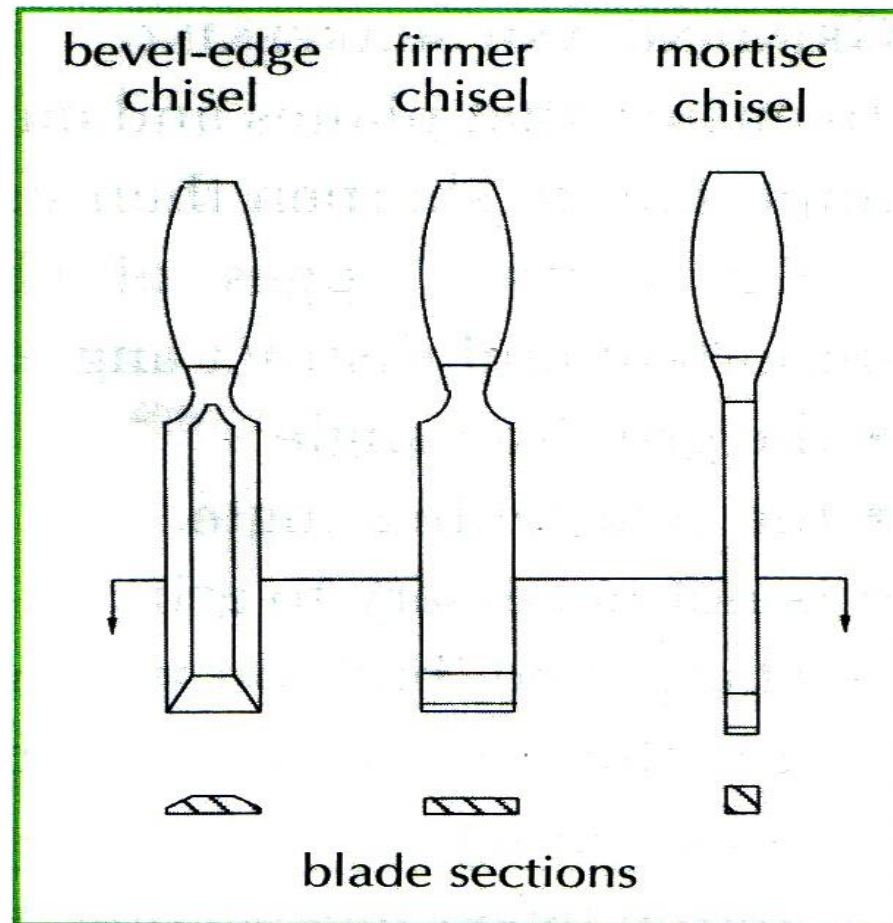


Grinding and sharpening tools

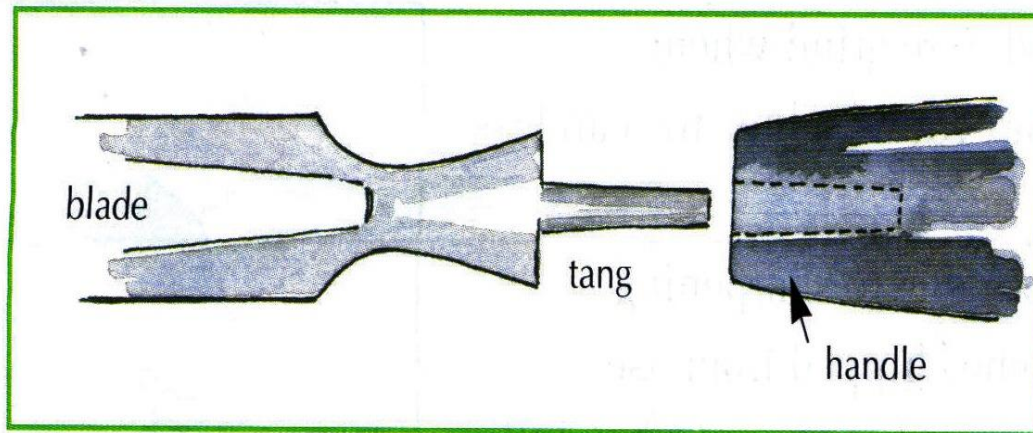
- Not necessary to regrind every time you sharpen but only if the bevel has become
 - round,
 - chipped or
 - damages or worn.



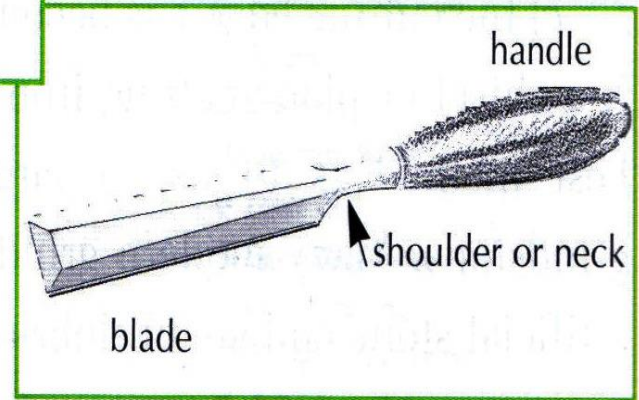
Chisels



Chisels

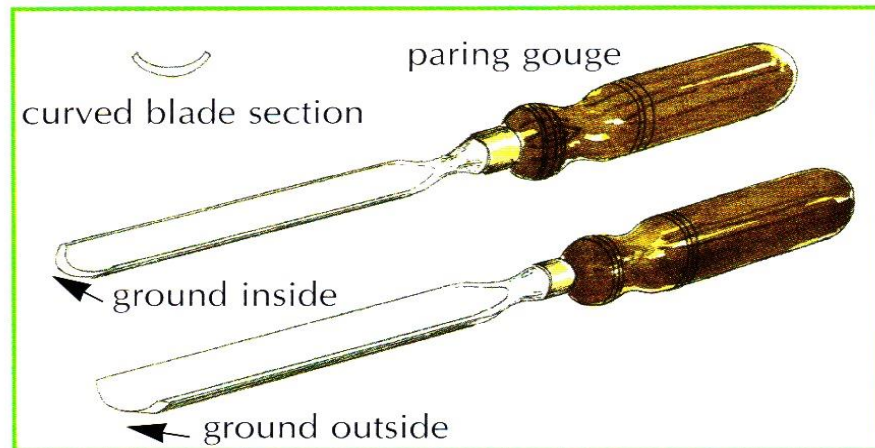


Stanley bolster construction



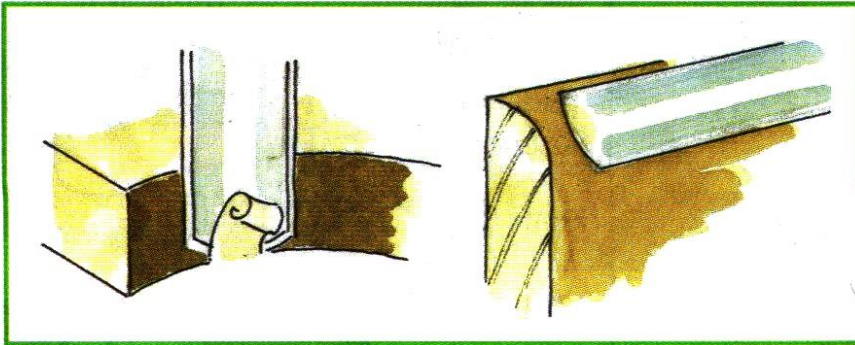
Gouges

- Similar to a chisel but with a curved blade
 - Two types
- 1. Firmer Gouge - ground on the outside – well suited for paring and curved grooves
- 2. Paring Gouge – ground on the inside – well suited to working with concave curves

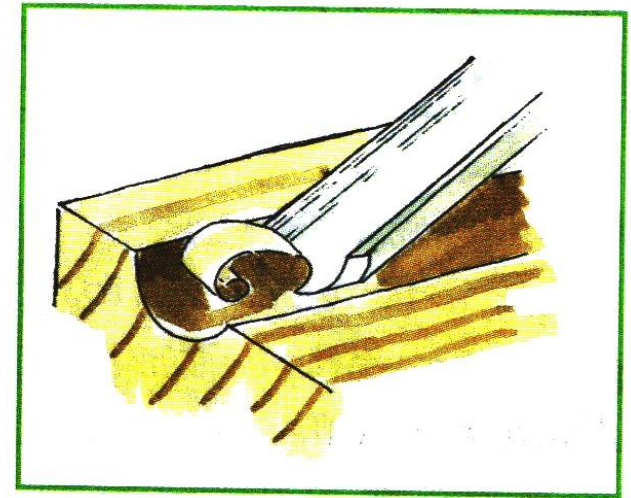


Gouges

- Paring Gouge



- Firmer Gouge





Sharpening Tools

- Three Stages involved in sharpening a badly damaged blade of a chisel or plane
 - **1. Grinding**
 - **2. Honing:**
 - **3. Removal of wire edge/burr**

Step 1: Sharpening

- **Grinding:** grind the blade on an oil or water cool grinder at an angle of 25°

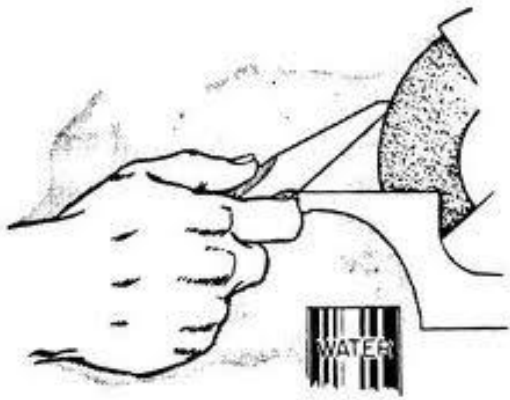


Figure 5-16.—Sharpening a chisel with a grinder.



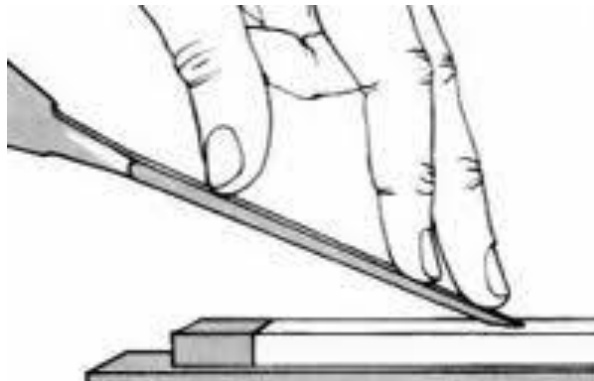
Step 2: Sharpening

- **Honing:** Apply a few drops of oil to an oilstone and move in a figure-of-eight at 30°

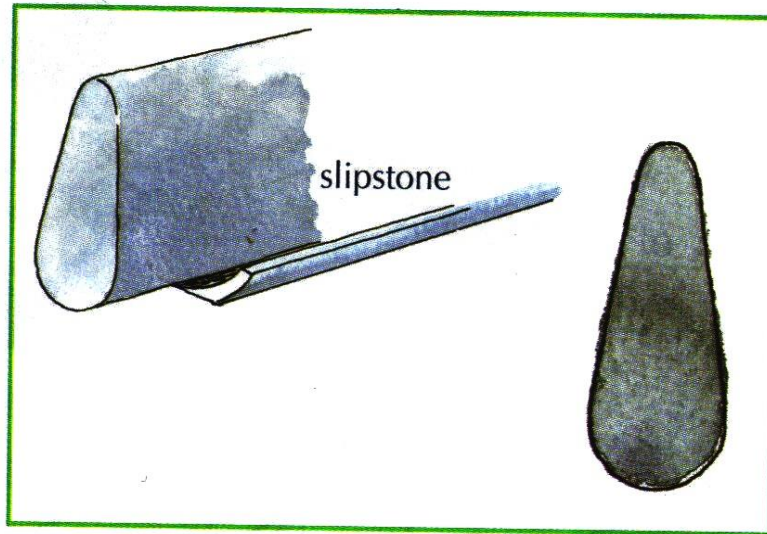


Step 3: Sharpening

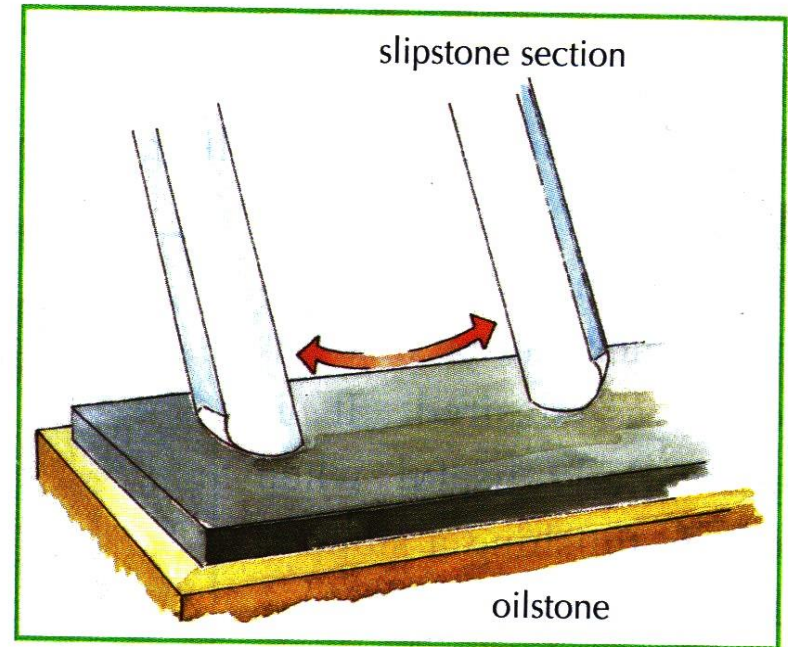
- **Removal of wire edge/burr:** To remove steel that was sharpened or grinded off place the chisel on its back flat on the oilstone. We then hone backwards and alternate the chisel in both directions.
- You can also use a leather strop to remove the wire.



Sharpening Gouges



Sharpening paring gouge



Sharpening a gouge