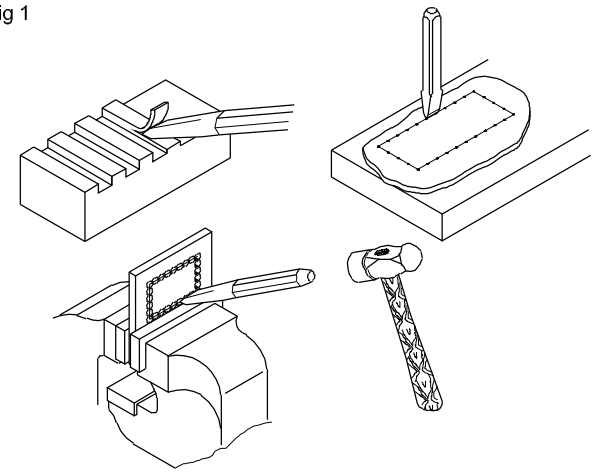
Chisel

Objectives: At the end of this lesson you shall be able to
- **list the uses of a cold chisel**
- **name the parts of a cold chisel**
- **state the different types of chisels.**

The cold chisel is a hand cutting tool used by fitters for chipping and cutting off operations. (Fig.1)

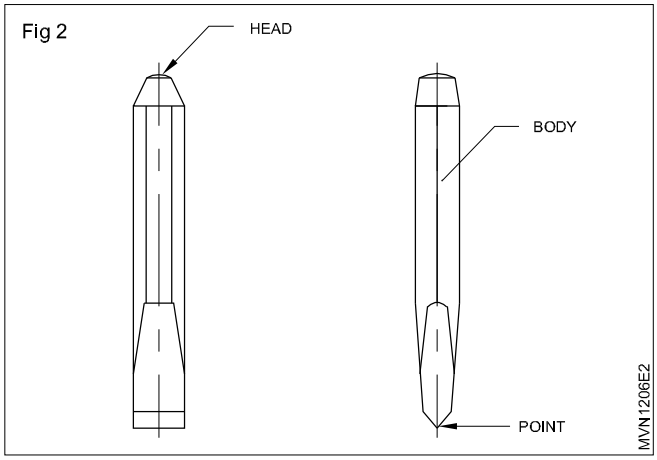
Chipping is an operation of removing excess metal with the help of a chisel and hammer. Chipped surfaces being rough, they should be finished by filing.

Fig 1



Parts of a chisel (Fig.2)
A chisel has the following parts.
Head
Body
Point or cutting edge

Fig 2



Chisels are made from high carbon steel or chrome vanadium steel. The cross-section of chisels is usually hexagonal or octagonal. The cutting edge is hardened and tempered.

Common types of chisels

There are four common types of chisels

- Flat chisel (1)
- Cross-cut chisel (2)
- Hall round nose chisel
- Diamond point chisel

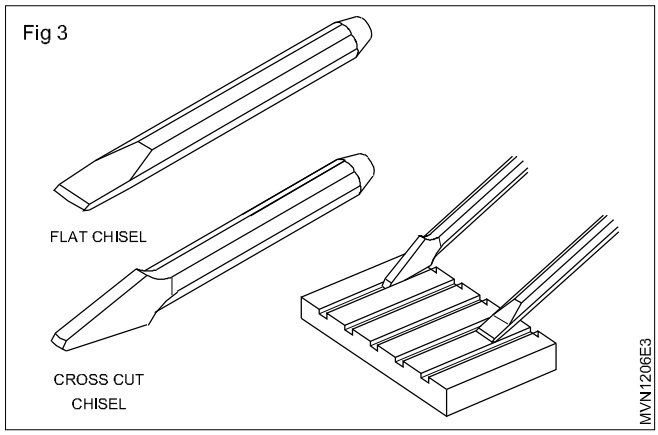
Flat chisels (Fig.3)

They are used to remove metal from large flat surfaces and chip excess metal of weld joints and castings.

Cross-cut or cape chisels (Fig.3)

These are used for cutting keyways, grooves and slots.

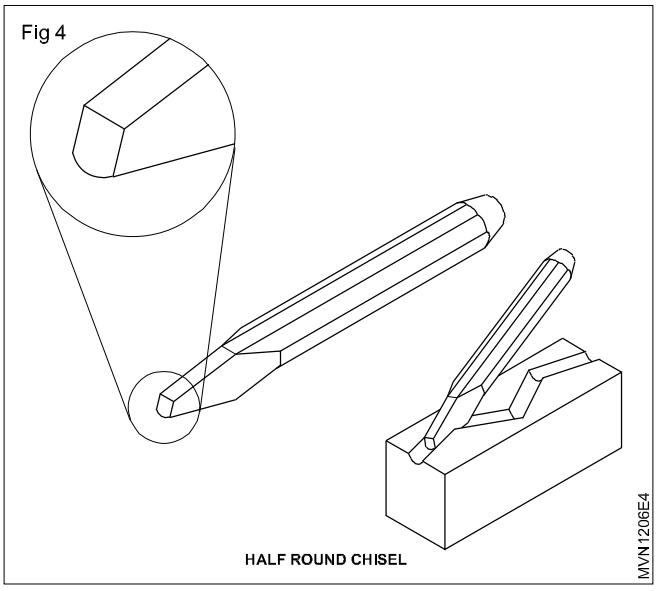
Fig 3



Half round nose chisels (Fig. 4)

They are used for cutting curved grooves (oil grooves)

Fig 4



Diamond point chisels (Fig.5)

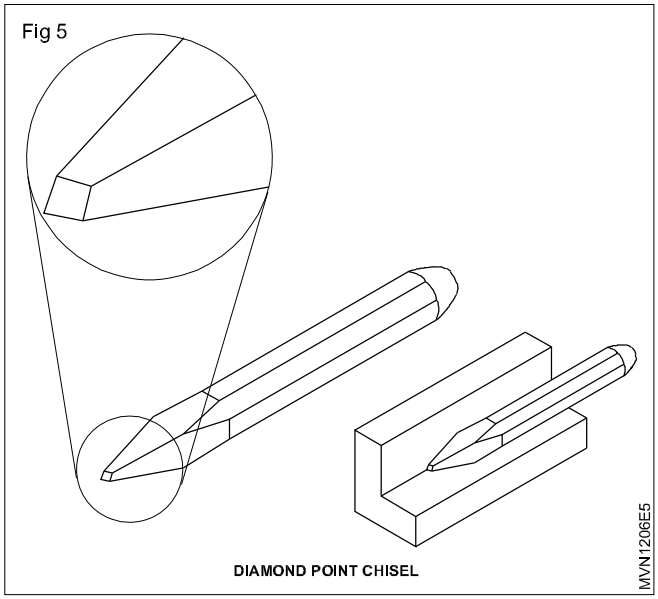
These are used for squaring materials at the corners.

Web chisels/punching chisels (Fig.6)

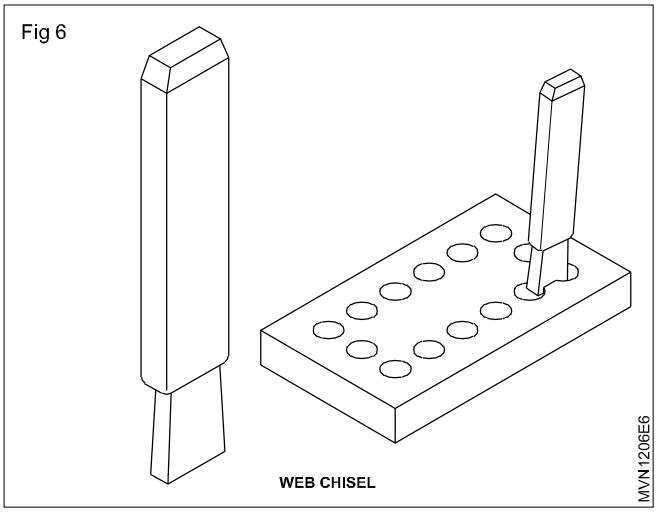
These chisels are used for separating metals after chain drilling.

Chisels are specified according to their

- length
- width of cutting edge
- type
- cross-section of body



The length of the chisels ranges from 150mm to 400mm. The width of the cutting edge varies according to the type of chisels.



Angles of chisels

Objectives: At the end of this lesson you shall be able to
- **select the point angles of chisels for different materials**
- **state the different cutting angles of a chisel**
- **state the effect of rake and clearance angles.**

Point angles and materials (Fig 1)

Correct point/cutting angles of the chisel depends on the materials to be chipped. Sharp angles are given for soft materials, and wide angles for hard materials.

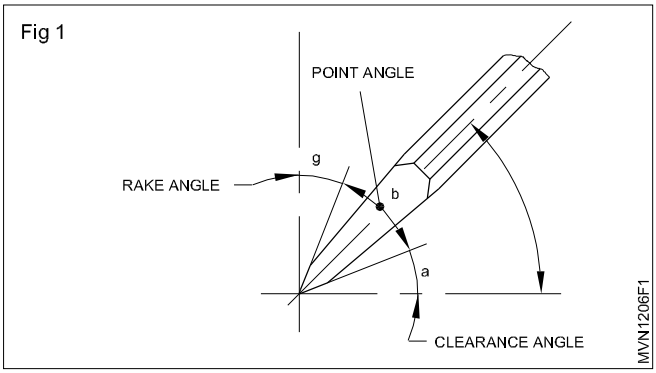
The correct point angle and angle of inclination generate the correct rake and clearance angles.

Rake angle (Fig. 1)

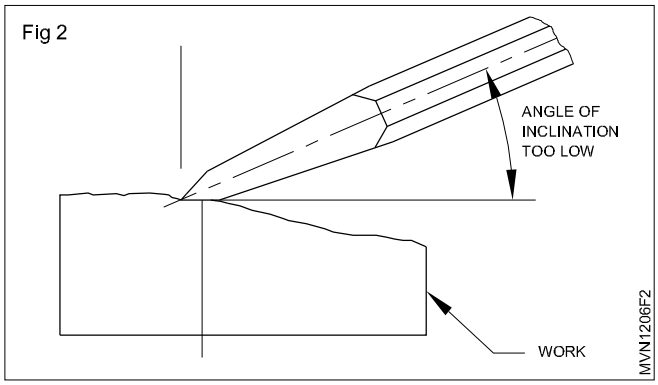
Rake angle `γ' is the angle between the top face of the cutting point, and normal to the work surface at the cutting edge.

Clearance angle (Fig. 1)

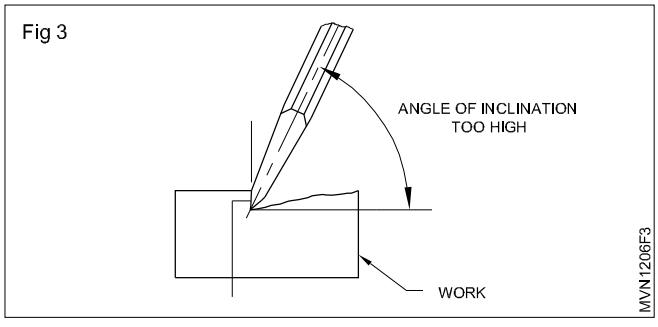
Clearance angle `α' is the angle between the bottom face of the point and tangent to the work-surface originating at the cutting edge.



If the clearance angle is too low or zero (Fig. 2), the rake angle increases. The cutting edge cannot penetrate into the work. The chisel will slip.



If the clearance angle is too great (Fig. 3), the rake angle reduces. The cutting edge digs in, and the cut progressively increases.

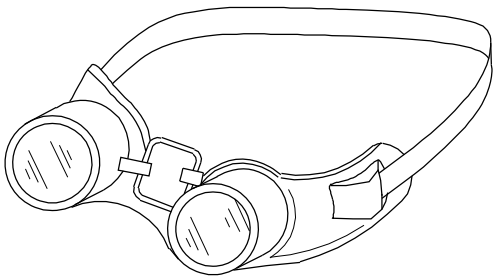


Chipping goggles (Fig.4): It is used to protect the eyes while chipping the slag or grinding the job.

It is made of Bakelite frame fitted with clear glasses and an elastic band to hold it securely on the operator's head.

It is designed for comfortable fit, proper ventilation and full protection from all sides.

Fig 4



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Material to be cut	Point angle	Angle Inclination
High carbon		
steel	65°	39.5°
cast iron	60°	37°
Mild steel	55°	34.5°
Brass	50°	32°
Copper	45°	29.5°
Aluminium	30°	22°

Hammers

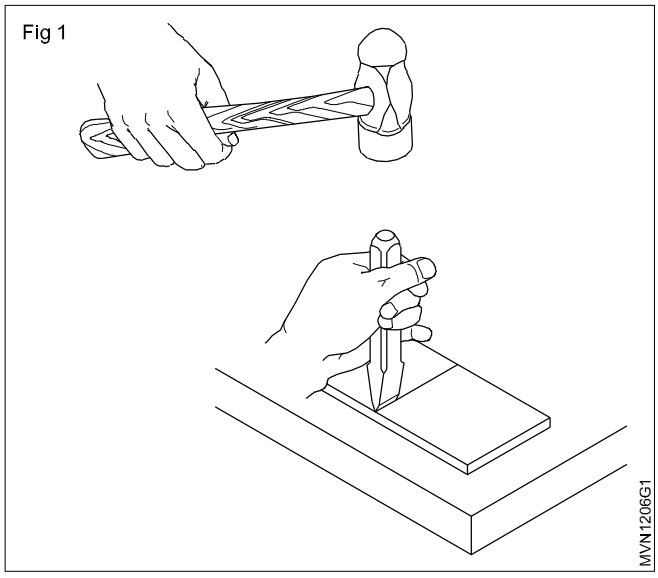
Objectives: At the end of this lesson you shall be able to

- **state the uses of an engineer's hammer**
- **list the parts of an engineer's hammer and state their functions**
- **name the types of engineer's hammers**
- **specify the engineer's hammer.**

An engineer's hammer (Fig.1) is a hand tool used for striking purposes while

- punching
- bending
- straightening
- chipping
- forging
- riveting

Fig 1



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Major parts of a hammer (Fig.2)

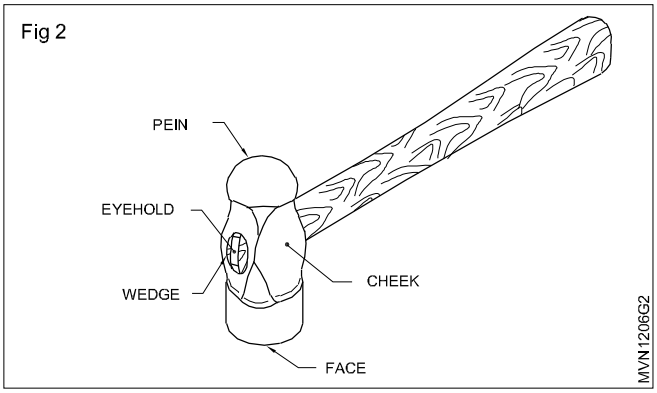
The major parts of a hammer are a head and a handle.

The head is made of drop-forged carbon steel, while the wooden handle must be capable of absorbing shock.

The parts of a hammer head are the

- face (1)
- pein (2)
- cheek (3)
- eyehole (4)
- wedge (5)

Fig 2



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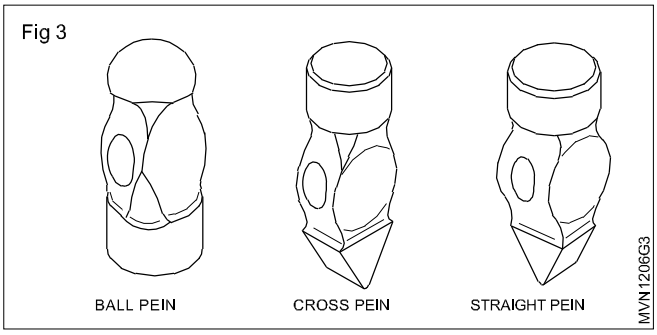
The face is the striking portion. Slight convexity is given to it avoid digging of the edge.

The pein is the other end of the head. It is used for shaping and forming work like riveting and bending. The pein is of different shapes like the (Fig. 3)

Fig 3



MVN1206G3

- ball pein
- crosspein
- straight pein

The face and the pein are hardened.

The cheek is the middle portion of the hammer-head. The weight of the hammer is stamped here.

This portion of the hammer-head is left soft.

An eyehole is meant for fixing the handle. It is shaped to fit the handle rigidly. The wedges fix the handle in the eye hole. (Fig 4,5)

Fig 4

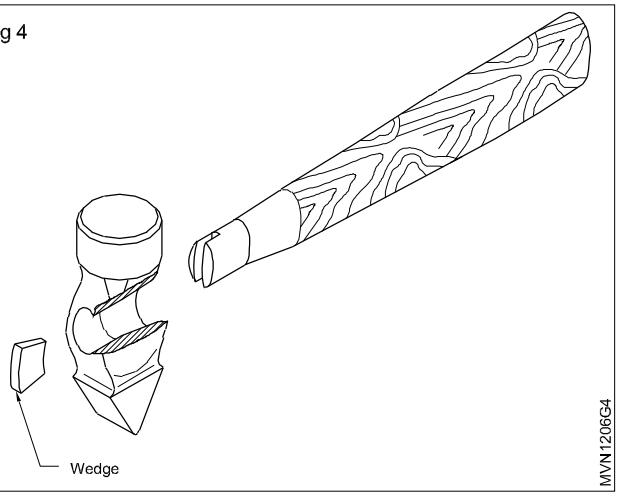
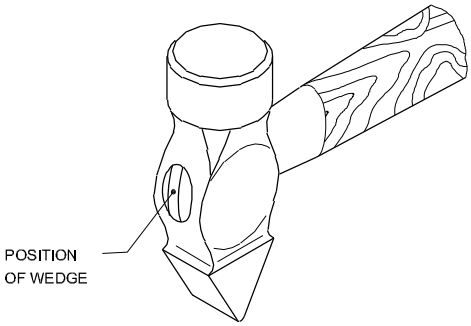


Fig 5



Specification

An engineer's hammers are specified by their weight and the shape of the pein. Their weight varies from 125 gms to 1.5 kg.

The ball pein hammers are used for general work in a machine/fitting shop.

Before using a hammer

make sure the handle is properly fitted

select a hammer with the correct weight suitable for the job

check the head and handle for any cracks

ensure the face of the hammer is free from oil or grease.

The figure shows the different parts of a hammer (Fig. 6). The handle is fitted in the eye-hole of the hammer.

The face of the hammer is used for general work, such as striking chisels and punches and levelling and working over joints. (Fig.7)

Ball pein hammer (Fig. 8)

A ball pein head is used to spread metal in all directions.

This hammer has a semi-spherical pein suitable for riveting. (Fig. 9)

Fig 6

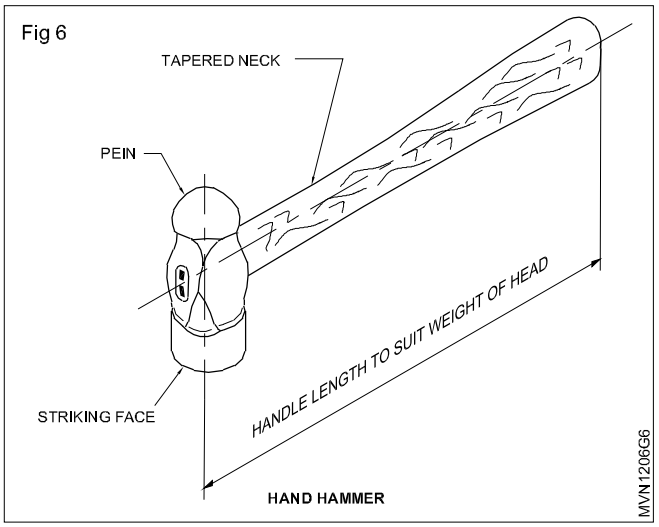


Fig 7

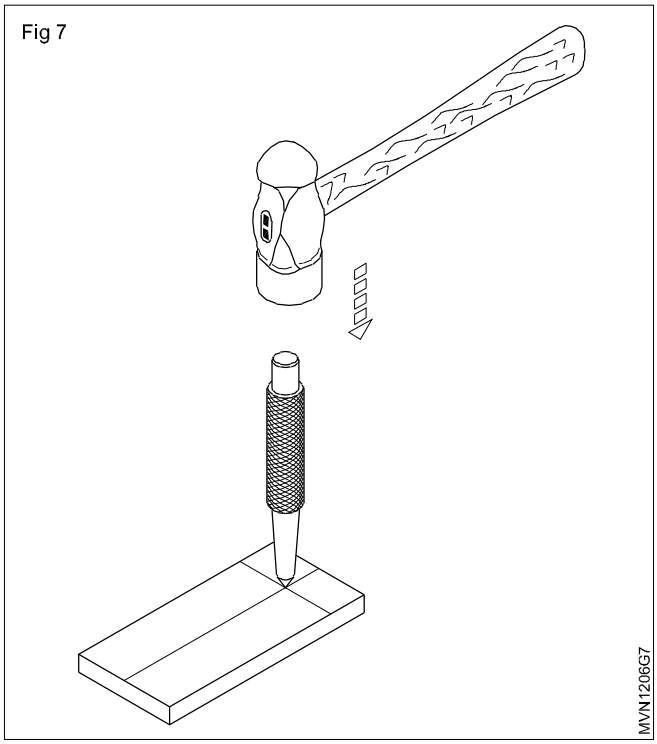
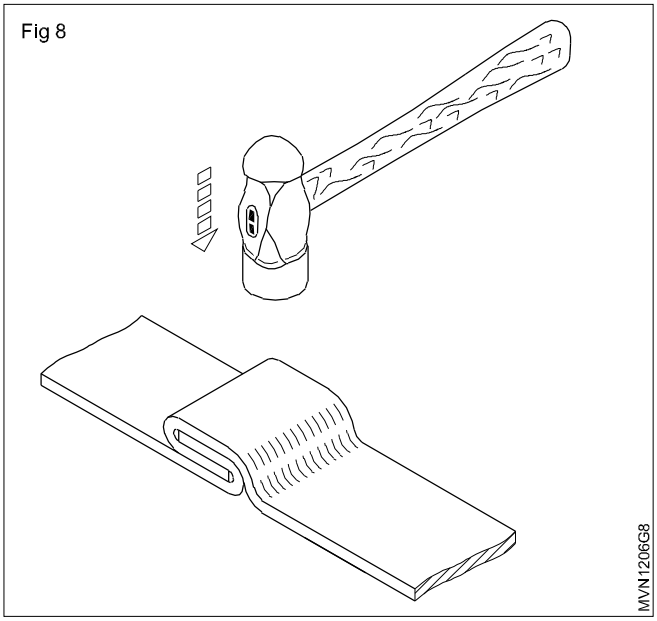
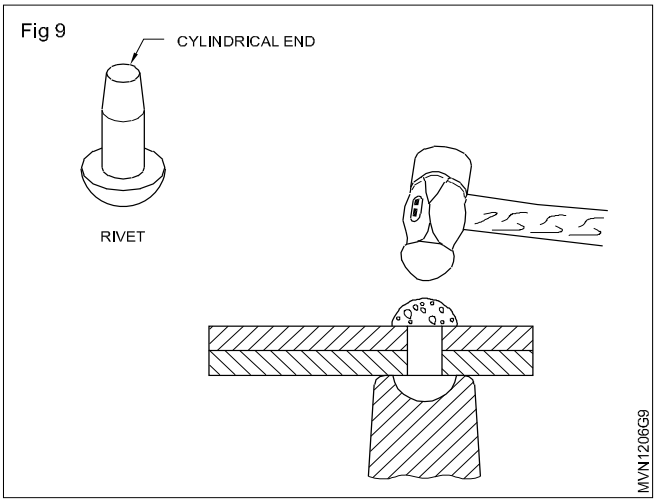


Fig 8



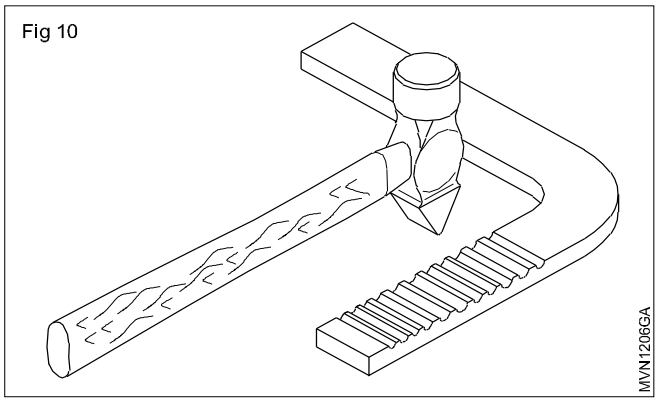


It is used for shaping the cylindrical end of a metal rivet to form a rivet head.

Cross pein hammer (Fig. 10)

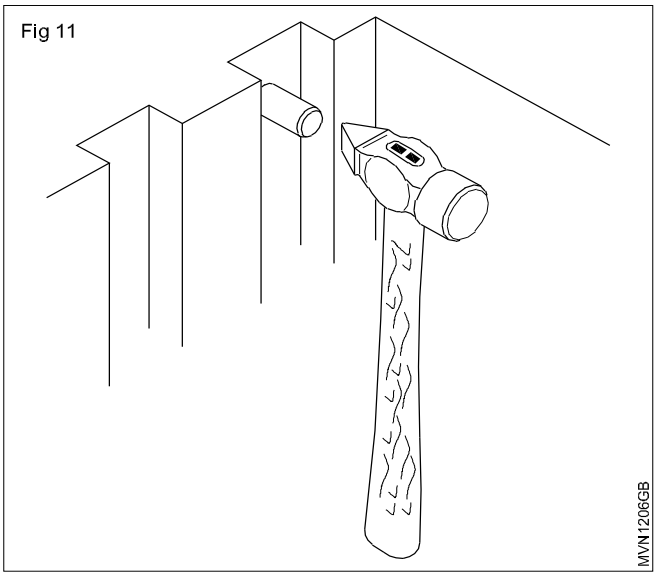
A cross pein head is used to spread metal in one direction in the line of striking.

This has a blunt wedge-shaped pein at right angles to the axis of the handle.



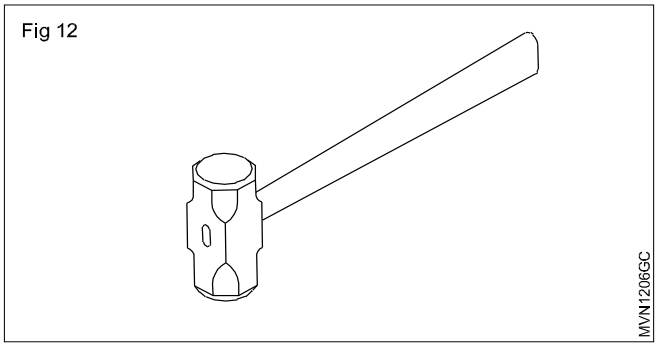
Straight pein hammer

A straight pein hammer is used to spread metal in one direction at right angles to the line of striking (Fig. 11)



This hammer has a blunt wedge-shaped pein in line with the axis of the handle.

A lump hammer or club hammer is a small sledgehammer (Fig.12) whose relatively light weight and short handle allow single-handed use. It is useful for light demolition work, driving masonry nails, and for use with a steel chisel when cutting stone or metal. In this last application, its weight drives the chisel more deeply into the material being cut than lighter hammers.



Wooden Mallet

Objectives: At the end of this lesson you shall be able to
- **name the different types of mallets**
- **state the uses of each type of mallets.**

Mallets

Mallets are soft hammers and are made of raw hide, hard rubber copper, brace, lead or wood, and are used to strike a soft and light blow on the metal.

Types and uses

Standard wooden mallets (Fig.1) are used for general purpose work like flattening, bending etc.

Bossing mallets (Fig.2) are used for hollowing panel beatings etc.

An end-faked mallet (Fig.3) is used for stretching, hammering etc.

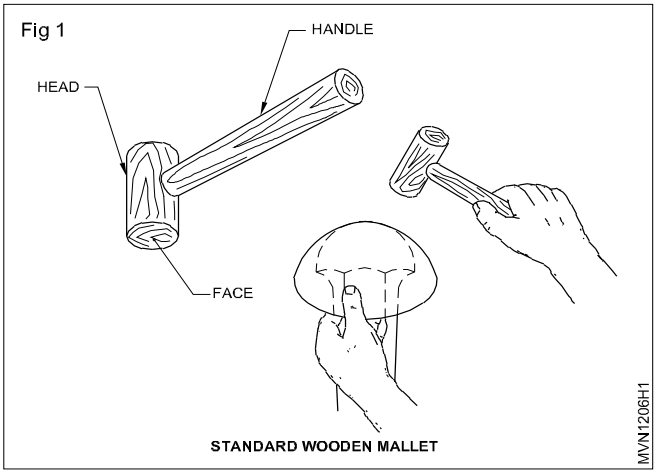
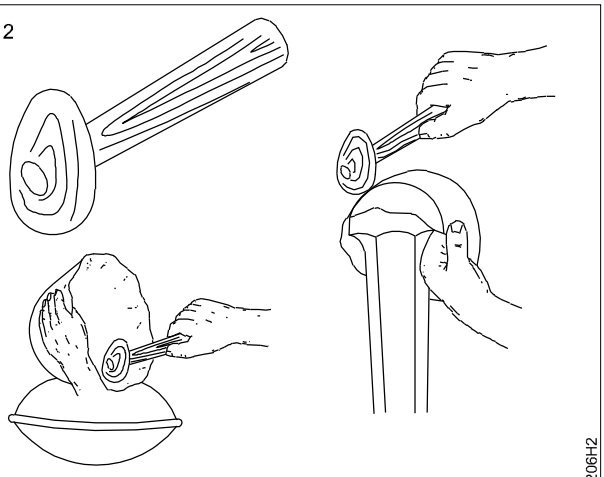


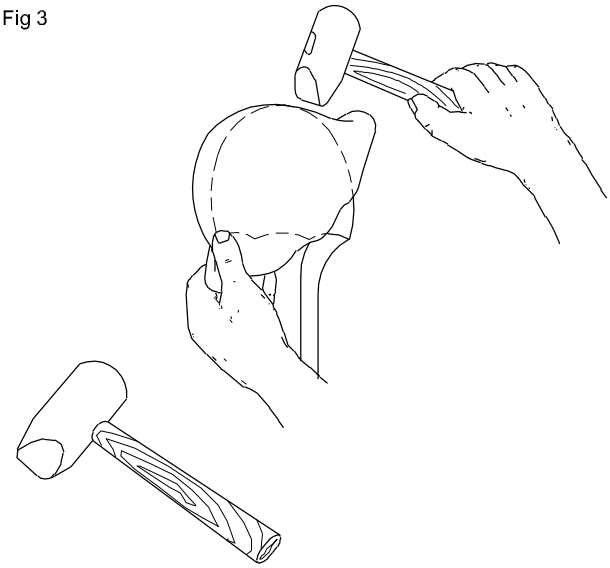
Fig 2



SHAPING THE HEMISPHERICAL BOWL BY RAISING BOSSING MALLET

MVN1206H2

Fig 3



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Screwdrivers

Objectives: At the end of this lesson you shall be able to

- **classify the hand-held screwdrivers and state the features of standard screwdrivers**
- **list out the different types of special screwdrivers and their specific uses**
- **specify standard screwdrivers.**

Screwdrivers are used to tighten or loosen screws which are fixed in the machine element.

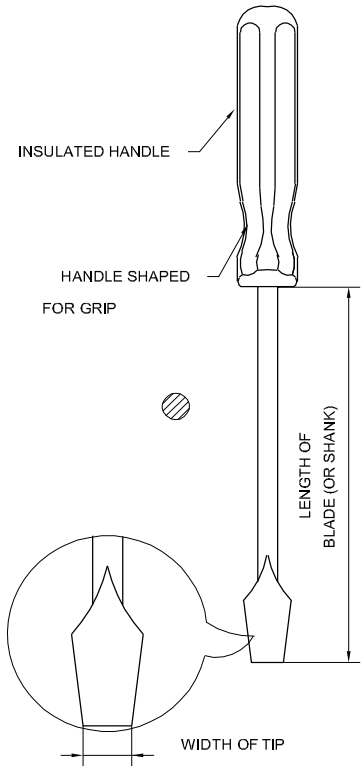
Classification

- Standard type with tips to suit recessed head screw slots.
- Special type with tips to suit recessed head screws

Features of Standard screwdrivers (Fig.1)

Screwdrivers must have:

Fig 1



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- tips (1) of turn screws with slotted heads
- handles of metals, wood or moulded insulating material(2), shaped to give a good grip for turning (3).
- blades of hardened and tempered carbon steel or alloy steel
- round or square blade with length (4) ranging from 40mm to more than 350mm.
- flared tips which vary in length and thickness with the length of the blade.

Standard Screwdrivers

Standard screwdrivers are classified as:

- heavy duty screwdrivers
- light duty screwdrivers
- stumpy screwdrivers

Heavy duty screwdrivers (Fig 2 & 3)

This screwdriver has a square blade for applying extra twisting force with the end of the spanner. Heavy duty screwdrivers of London pattern have a flat blade and are mostly used by carpenters.

Fig 2

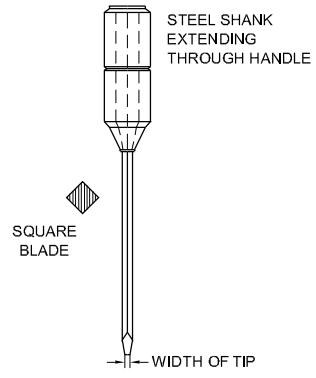

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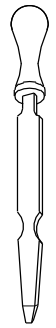
Fig 3



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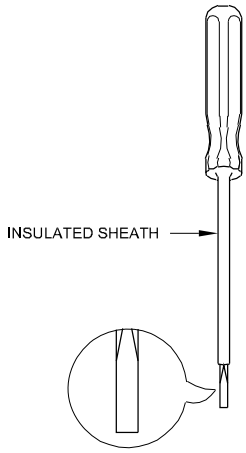
Light duty screwdrivers (Fig.4)

This screwdriver has a round blade with parallel tips. This screwdriver is used by electricians. The blades are sheathed in insulation to avoid short circuiting live parts.

Fig 4



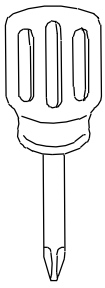
LIGHT DUTY SCREW DRIVER

MVN12064

Stumpy screwdrivers (Fig.5)

These are small sturdy screwdrivers. They are used when other types of screwdrivers cannot be used due to the space limitations.

Fig 5



STUMPY SCREW DRIVER

MVN12065

Special screwdrivers and their uses

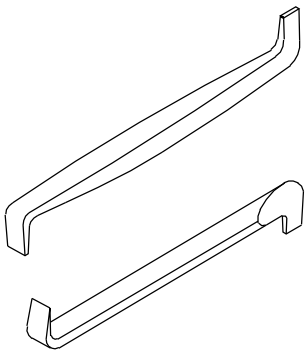
Offset screwdriver (Fig.6)

Offset screwdrivers are used on screws which are placed in blind spaces.

They are made with short blades and with the tips at right angle.

Greater turning force can be applied on screws by these screwdrivers because of their leverage.

Fig 6



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Ratchet screwdriver (Fig.7)

The following are the features of ratchet screwdrivers.

These screwdrivers are made with a three-position ratchet control for screwing, unscrewing of a screw and also providing a neutral position.

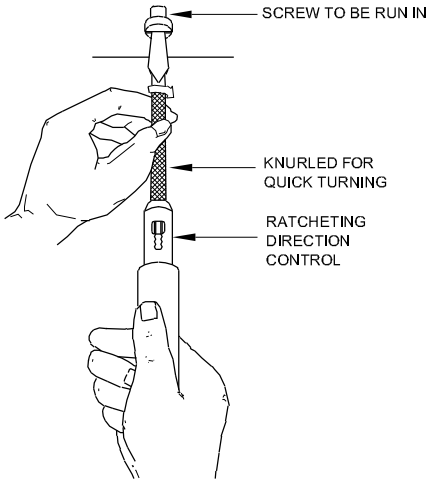
They are used for tuning screws in confined spaces.

They can be operated without changing the hand grip.

They are used for slackening or tightening with a medium force.

They are used in mass production.

Fig 7



RATCHET SCREWDRIVER

MVN12067

Phillips (cross-recess) screwdrivers (Fig.8)

Phillips screwdrivers have cruciform or cross-shaped tips that are unlikely to slip from the cruciform slots in Phillips recessed head screws.

The end of the four flats is tapered to an angle of 53^{o}

The extreme end is ground to 110°.

Four different sizes to cover the full range of screws are available. These are specified by point sizes 1,2,3 & 4 which correspond to the size of the Phillips screw heads.

For quicker application ratchet offset screwdrivers are also available with renewable tips. (Fig.9)

Specification

Screwdrivers are specified (Fig.10) according to the

- length of the blade (a)
- width of the tip (b).

Fig 8

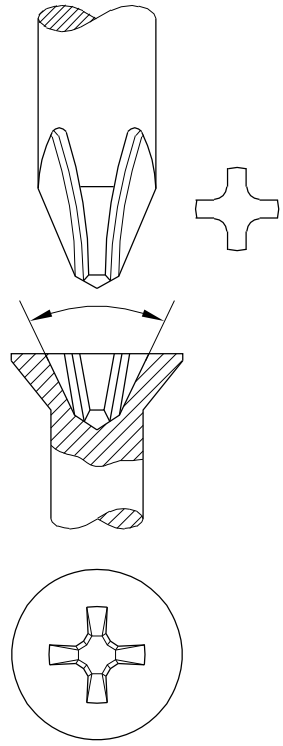


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Fig 9

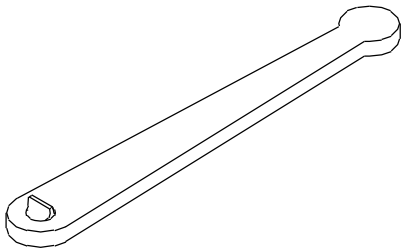

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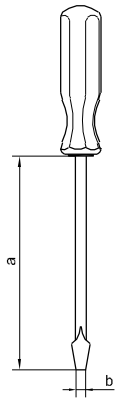
Fig 10



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Normal blade length : 45 to 300mm. Width of blade : 3 to 10mm.

The blades of screwdrivers are made of carbon steel or alloy steel, hardened and tempered.

Screwdrivers for special uses

Small sturdy screwdrivers (Fig.11) are available for use where there is limited space.

Screwdrivers with blades sheathed in insulation are available for the use of electricians (Fig.12)

Fig 11

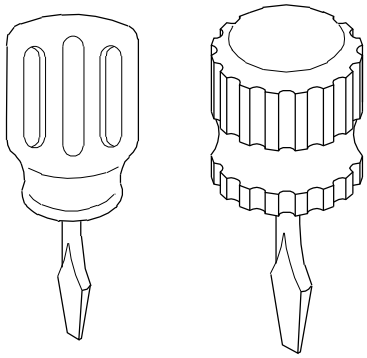

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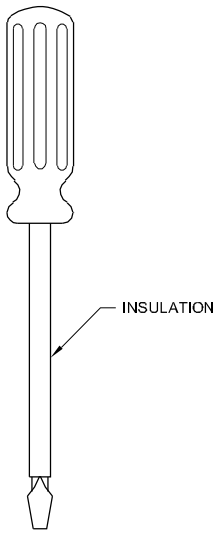
Fig 12



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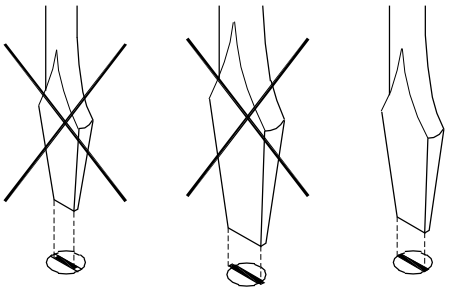
Precautions

Use screwdrivers with tips correctly fitting into the screw slot. (Fig.13)

Fig 13



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Make sure your hand and the handle are dry.

Hold the screwdrivers axis in line with the axis of the screw.

While using a Philips screwdriver apply more downward pressure.

Keep your hand away to avoid injury due to slipping of the screwdriver. (Fig.14)

Do not use screwdrivers with split or defective handles. (Fig.15)

In the case of damaged screwdrivers, the blades can be ground (the faces will be parallel with the sides of the screw slot) and used. While grinding ensure the end of the tips is as thick as the slot of the screw.

Fig 14

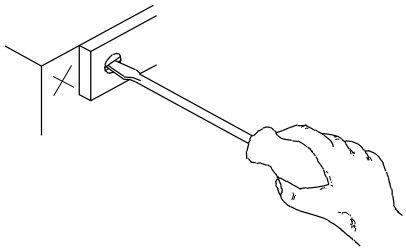

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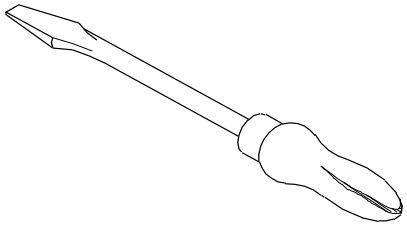
Fig 15



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While using screwdrivers on small jobs, brace the job on the bench or hold them in a vice.

Specification of a screwdriver

Screwdrivers are specified according to the

- length of the blade
- width of the tip

The normal blade length varies from 45mm to 300mm and the width of the blade varies from 3mm to 10mm.

Screw driver (Fig.16): There are several different size of screw drivers of the standard, reed & prince & phillips types.

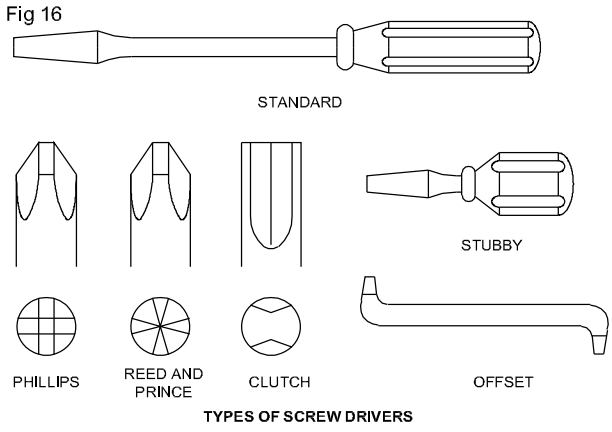
The offset screw driver is useful in tight quarters where even a “Stubby” cannot be used.

Safety

1 Always use correct type and size screw drivers.

2 Don’t do repair work by holding the job on the hand with the help of screw driver, if may slips it pierce the hand.

Fig 16



TYPES OF SCREW DRIVERS

MVN1206IG

Allen keys

Objectives: At the end of this lesson you shall be able to
- **state the features and uses of hexagon socket screw keys**
- **specify hexagon socket screw keys**.

Hexagon socket screw keys/Allen keys are made from hexagonal section bars of chrom vanadium steel.

These are hardened and tempered. These are bent to `L' shape. The size of an Allen key is identified by the size across the flat of the hexagon.

Uses

They are used to tighten or loosen screws having internal hexagon sockets. (Fig.1)

Allen keys, available in different sets in plastic wallets, surprise of a set of 8 (2 to 10mm)

2,3,4,5,6,7,8 and 10mm

Sizes of Allen keys (Fig.1)

Individual pieces are available as follows 1, 1.5, 2, 2.5, 3, 4, 5, 6, 8, 10, 12, 14, 17, 19, 22, 24, 27, 32 and 36.

Designation of Allen keys (Fig.2)

A hexagonal socket screw key of width across flat 8 mm shall be designated as Key 8 IS:3082.

Fig 1

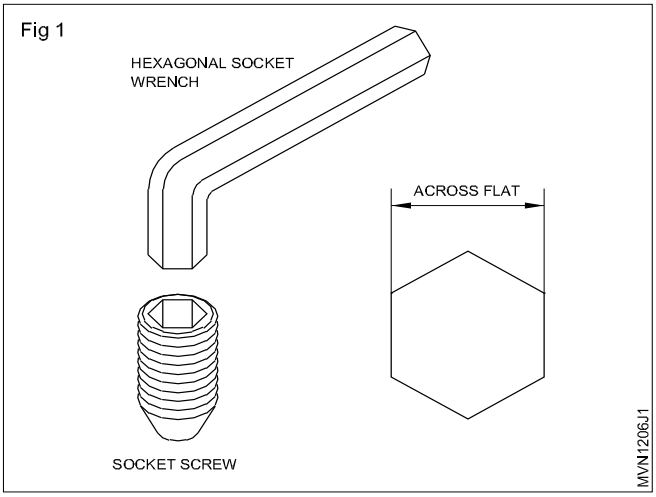


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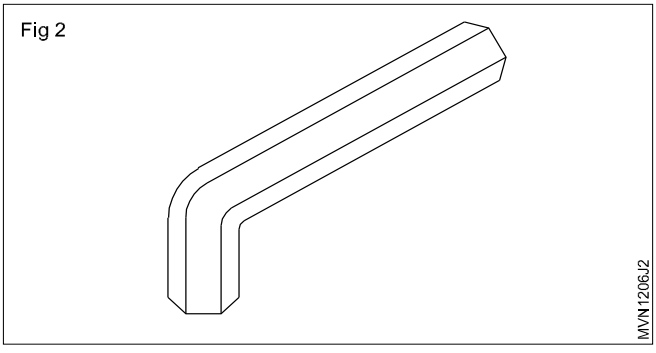
Fig 2



MVN1206J2

Bench vice

Objectives: At the end of this lesson you shall be able to
- **name the parts and uses of a bench vice**
- **specify the size of a bench vice**
- **state the uses of vice clamps.**

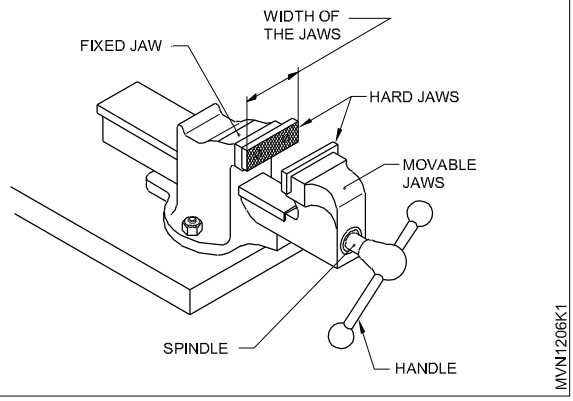
Vices are used for holding workpieces. They are available in different types. The vice used for bench work is called as bench vice or (Engineer's vice)

A bench vice is made of cast iron or cast steel and it is used to hold work for filling, sawing, threading and other hand operations.

The size of the vice is stated by the width of the jaws.

Parts of a bench vice (Fig.1)

Fig 1



The following are the parts of the vice

The Vice is generally bolted and secured in a wooden work table, and is useful for operations like filing, chipping, hacksawing, bending sheet metal etc.

Fixed jaw, movable jaw, hard jaws, spindle, handle, box-nut and spring are the parts of vice.

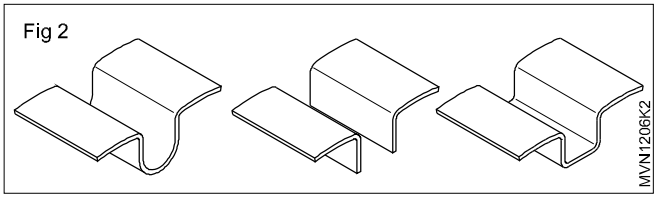
The box-nut and the spring are the internal parts.

Vice clamps or soft jaws (Fig.2)

The hold a finished work use soft jaws (vice clamps) made of aluminium over the regular jaws. This will protect the work surface from damage.

Do not over-tighten the vice as, the spindle may get damaged.

Fig 2



Types of vices

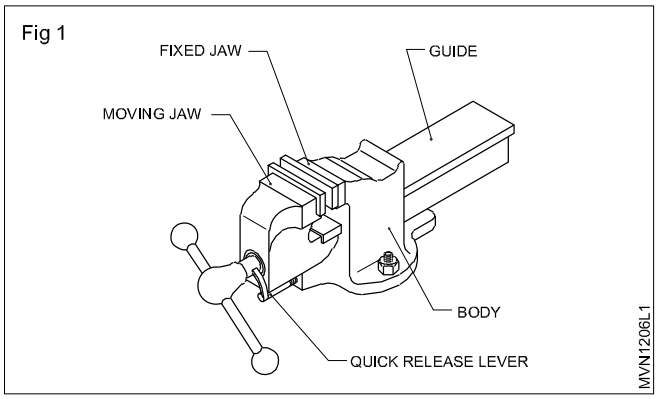
Objectives: At the end of this lesson you shall be able to
- **state the construction and advantages of a quick releasing vice**
- **state the uses of pipe vice, toolmakers vice, hand vice and pin vice.**

There are different types of vices used for holding workpieces. They are quick releasing vice, pipe vice, hand vice pin vice and toolmaker's vice.

Quick releasing vice (Fig.1)

A quick releasing vice is similar to an ordinary bench vice but the opening of the movable jaw is done by using a trigger (lever). If the trigger at the front of the movable jaw is pressed, the nut disengages the screw and the movable jaw can be set in any desired place quickly.

Fig 1

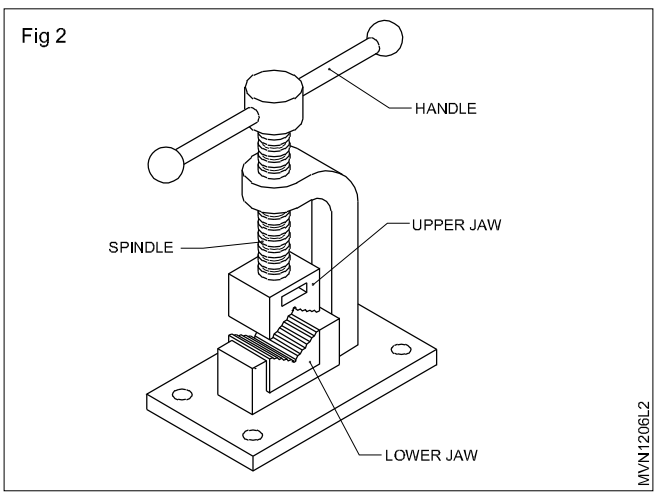


Pipe vice (Fig.2)

A Pipe vice is used for holding round sections of metal, and pipes. In this vice, the screw is vertical and movable. The jaw works vertically.

The pipe vice grips the work at four points on its surface. The parts of a pipe vice are shown in Fig. 2.

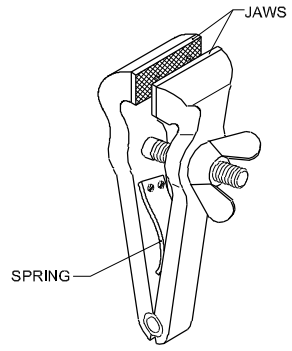
Fig 2



Hand vice (Fig.3)

Hand vices are used for gripping screws, rivets, keys, small drills and other similar objects which are too small to be conveniently held in the bench vice. A hand vice is made in various shapes and sizes. The length varies from 125 to 150 mm and the jaw width from 40 to 44 mm. The jaws can be opened and closed using the wing nut on the screw that is fastened to one leg, and passes through the other.

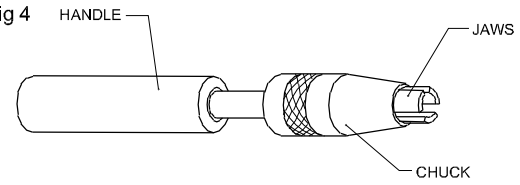
Fig 3



Pin vice (Fig.4)

The pin vice is used for holding small diameter jobs. It consists of a handle and a small collect chuck at one end. The chuck carries a set of jaws which are operated by turning the handle.

Fig 4

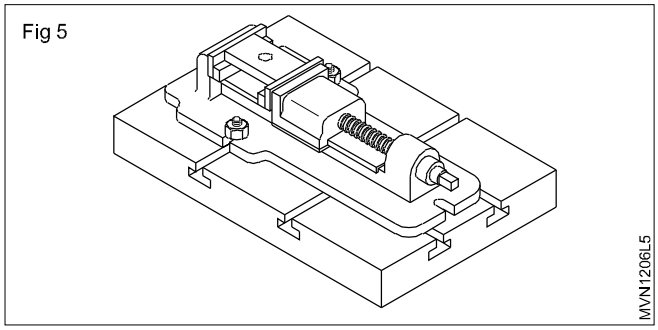


Toolmaker's vice (Fig 5)

The toolmaker's vice is used for holding small work which required filing or drilling and for marking of small jobs on the surface plate. This vice is made of mild steel.

Toolmaker's vice is accurately machined.

Fig 5



C - Clamps and toolmaker's clamps

Objectives: At the end of this lesson you shall be able to
- **state the purpose of using clamps**
- **specify the requirements of the clamping devices**
- **state the features and uses of 'C' clamps**
- **state the features of Toolmaker's clamps.**

Purpose of using clamps

Clamps are used for preventing the movement of work, and for holding the job tight.

Requirements of clamping devices

Should be able to manipulate for easy loading.

Should provide the required clamping force.

Should be capable of locking with minimum movement.

Should accommodate a range of sizes of jobs.

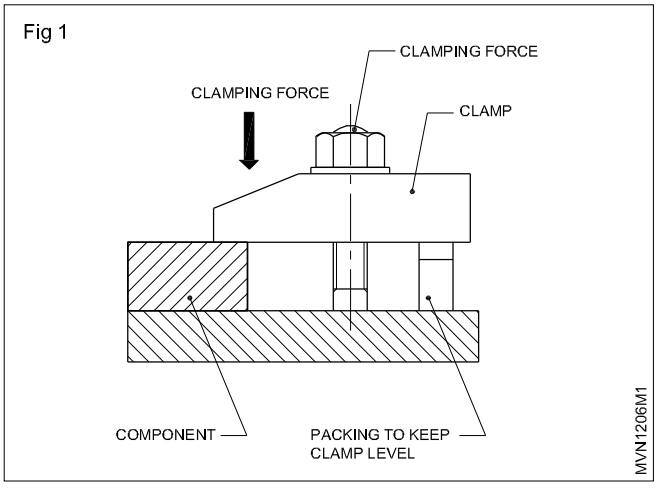
(Fig.1) shows a typical clamping device, employing a screw and nut to provide the clamping force.

'C' Clamps

These clamps are in the shape of a 'C'. The 'C' clamp has its body forged or cast. One end of the clamp is machined flat. The other end is drilled and threaded to accommodate a screw-rod which is operated by a handle. The screw-rod carries a swivel pad which is free to revolve. The clamp is hardened and the face is serrated. (Fig 2)

These clamps are used to hold work, on an angle plate or a drill press table, and also, for holding two or more workpieces together.

Fig 1

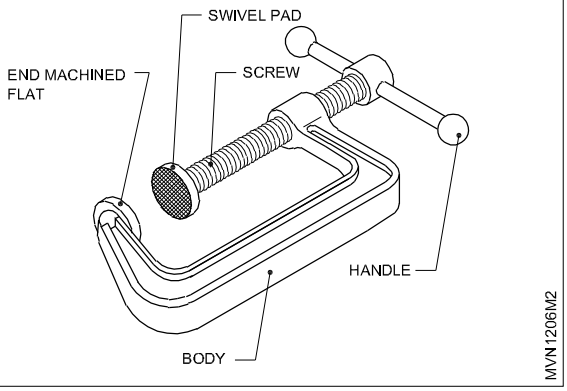


The swivel pad on the end of the clamping screw helps in clamping surfaces which are not parallel. 'C' clamps are available for light and heavy duty work.

Toolmaker's clamps

This is the type most commonly used by toolmakers for holding small, machined, flat pieces for further operations. They have two rectangular pieces of steel perfectly machined. The inner faces which come in contact with the workpiece are perfectly parallel. They are assembled

Fig 2

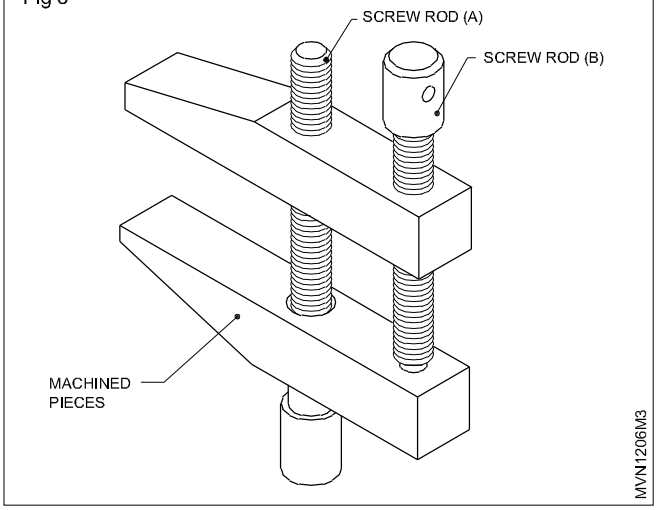


by means of two threaded rods. The screw-rod (A) is rotated in one direction to adjust the gap between the two holding faces. The other screw (B) when tightened maintains the required pressure. (Fig 3)

The head of the screw-rod (B) is provided with a hole through which a cylindrical pin may be passed for tightening purposes. The toolmaker's clamps are for holding a previously machined work which is flat and parallel.

The toolmaker's clamp is not suitable for doing any heavy operations on the workpiece since the contacting and holding area of the clamp is limited. It is meant for holding light jobs. It is also called as parallel clamp.

Fig 3



'U' Clamps

These are clamps used along with 'V' Blocks as an accessory. These clamps serve the purpose of holding the round work securely in the 'V' groove for layout operations as well as for machining operations.

Spanners and their uses

Objectives: At the end of this lesson you shall be able to
- **state the necessity of spanners**
- **identify the different types of spanners**
- **specify the spanners**
- **list out the parts of adjustable spanners**
- **state the features of 'C' spanners and their uses.**

Spanners are used for operating threaded fasteners, bolts and nuts. They are made with jaws or opening that fit square on hexagonal nuts and bolts and screw heads. They are made of high tensile or alloy steel. They are drop-forged and heat-treated for strength. Finally they are given a smooth surface finish for ease of gripping.

Spanners are considerably in shape to provide ease of operation under different conditions.

The basic types of spanners are (Fig. 1)

- Open end spanners (1)
- tube or tubular box spanners (2)
- Socket spanners (3)
- Ring spanners (4)

The correct spanner fits exactly and allows room for use. They should also permit the job to be done in a shorter time.

The following are the points to be noted for using spanners in a safe way. (Fig.2)

Use open end and ring spanners by pulling on the shank. It is safest to pull as there is less chance of hitting your knuckles if the spanner or nut slips suddenly. If you are forced to push the spanner, use the base of your hand and keep your hand open.

Use both hands for large spanners.

Keep yourself balanced and firm to avoid slipping yourself, if the spanner slips suddenly, Hold on to some support, if there is any chance of falling.

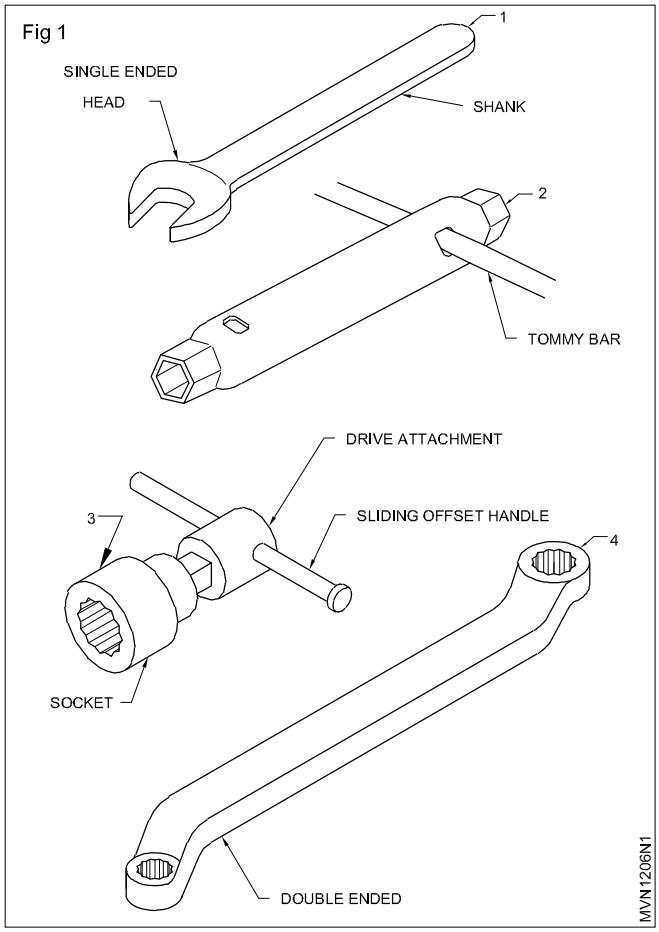
Use both hands as shown in the figure, when using tubular box spanners. (Fig. 2)

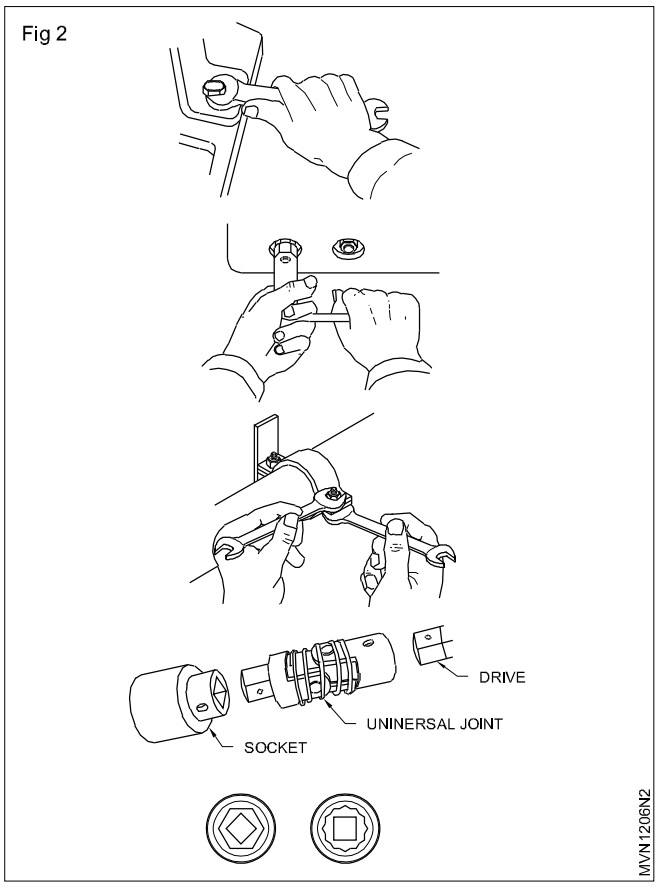
Use two spanners as shown in the figure to stop the head of the bolt rotating as the nut is operated. (Fig. 2)

Socket spanners may be turned by accessories which have square driving ends. (Fig. 2)

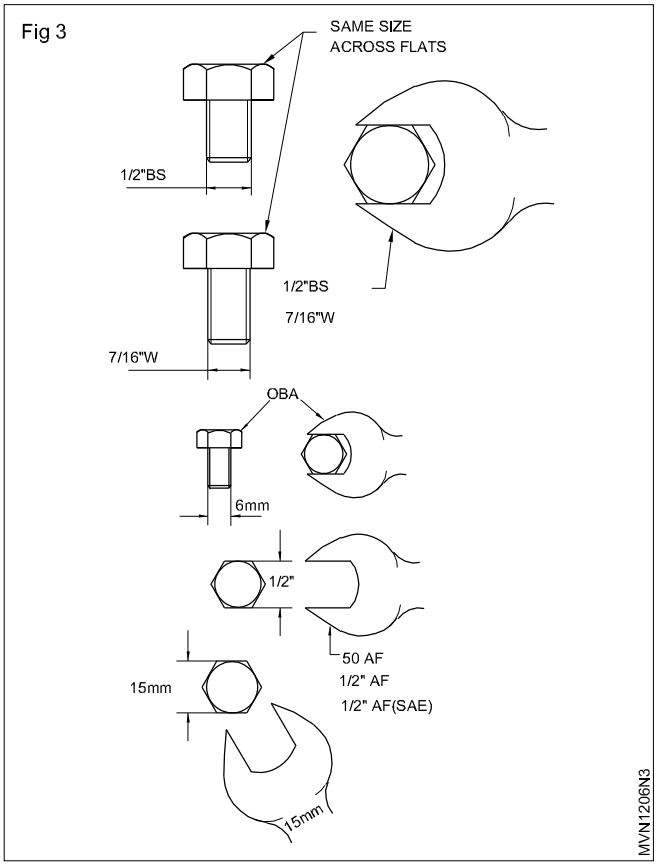
Size and identification of spanners

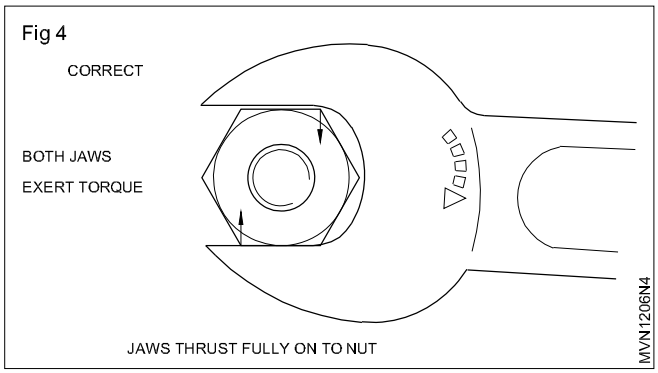
The size of a spanner is determined by the nut or bolt it fits. The distance across the flats of a nut or bolt varies both with the size and the thread system. (Fig 4)





In the British system the nominal size of the bolt is used to identify the spanner. (Fig. 3)





In the unified standard system (Fig.3), the spanners are marked with a number based on the gas requirement decimal equivalent of the nominal fractional size across the flats of the hexagon, following the sign A/F or with the fractional size across the flats following the sign A/F. In the metric system, spanners are marked with the size across the jaw opening followed by the abbreviation ‘mm’.

To fit exactly, a spanner must be:

- of the correct size
- placed correctly on the nut
- in good condition.

Spanners have their jaws slightly wider than the width of the nut so that they can be placed into position easily. Any excess more than a few hundredths of a millimeter clearance could cause the spanner to slip under pressure.

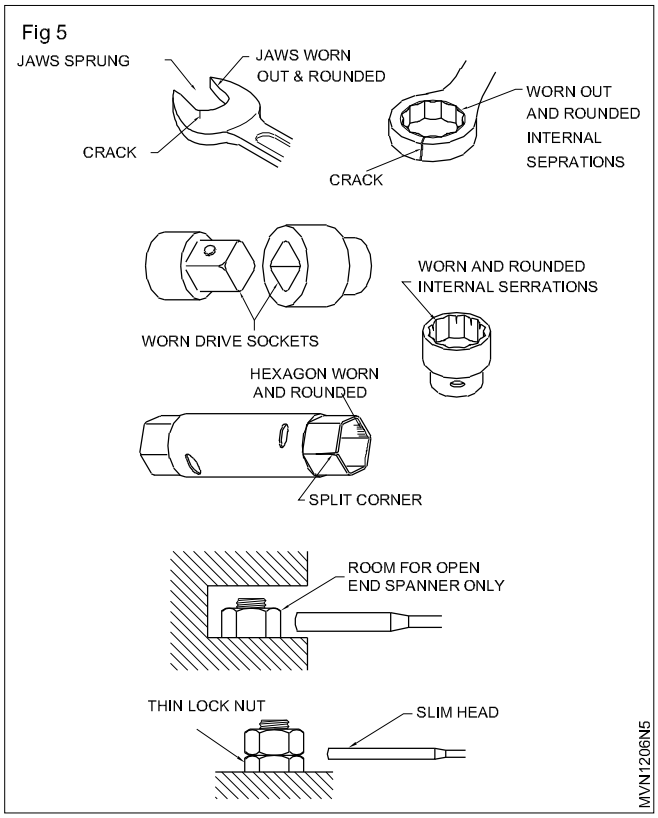
Place the spanner so that its jaws bearfully on the flats of the nut.

Incorrect use damages the spanners & the nuts too.

Discard any defective spanners. The spanners illustrated here are dangerous for use.

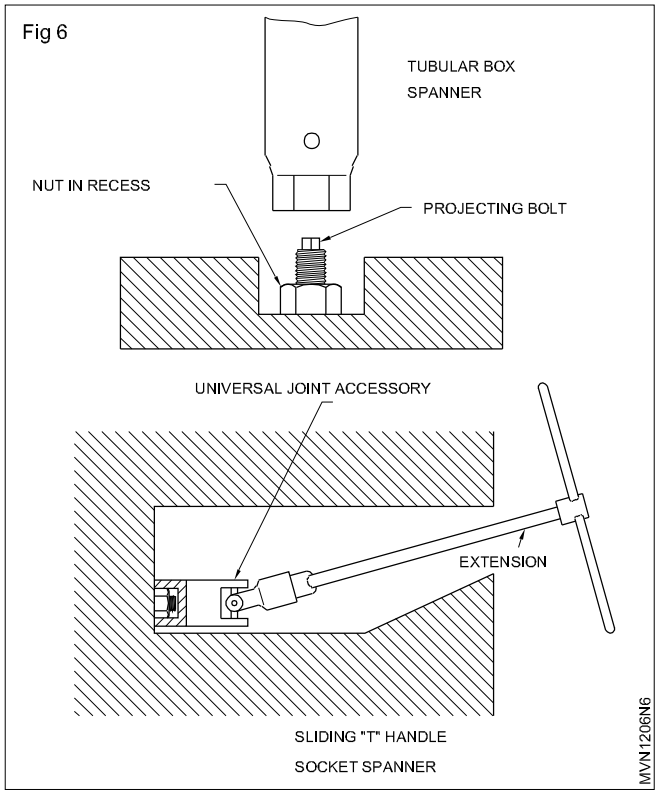
Choose spanners that allow room for use.

Nuts in inaccessible positions may be reached with socket spanners, with special drawing accessories. (FIg 5)



Length of spanners (Fig. 6)

Normally spanners have a length that is about ten times the width of the jaw opening.

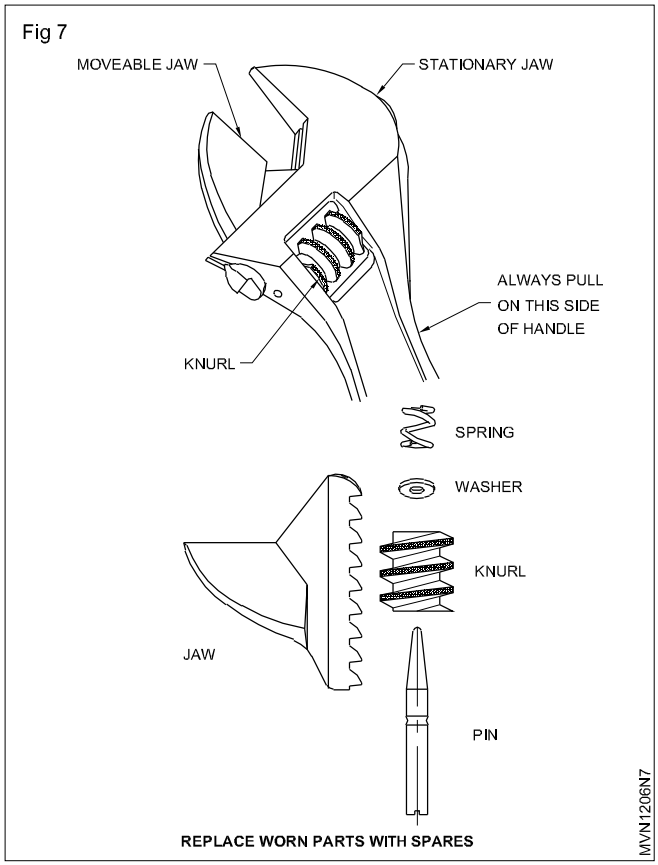


Never exert excessive pull on a spanner, particularly by using a pipe to extend the length of a spanner.

Excess turning effect of the spanner could result in:

- striping the thread
- shearing the bolt
- straining the jaws of the spanner
- making the spanner slip and cause an accident.

Adjustable spanners (Figs 7 & 8)



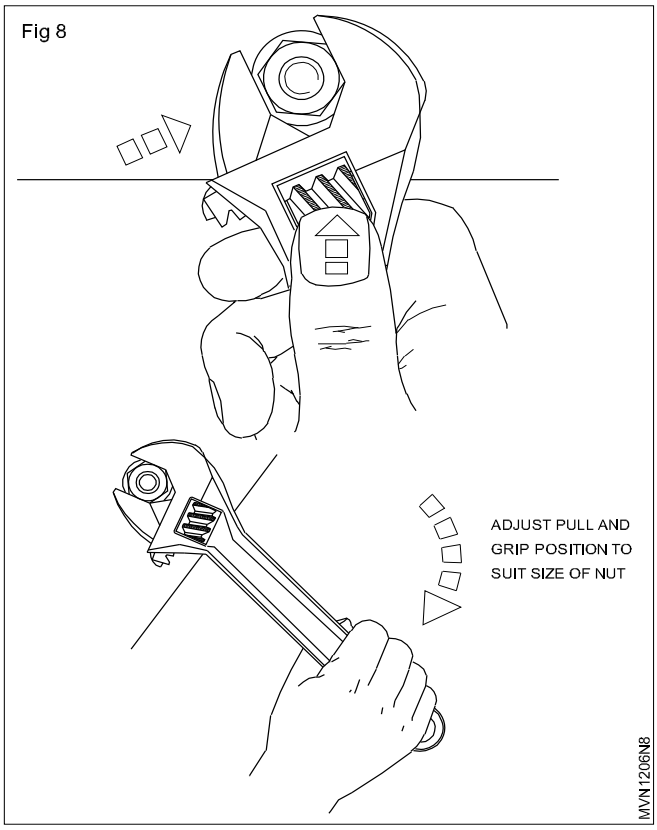
Most common types of adjustable spanners are similar to open and spanners, but they have one movable jaw. The opening between the jaws of a typical 250 mm spanner can be adjusted from zero to 28.5 mm. Adjustable spanners may range in length from 100 mm to 760 mm. the type illustrated has its jaws set an angle of 22 1/2^0 to the handle. Adjustable spanners are convenient for use where a full kit of spanners cannot be carried about. They are not intended to replace fixed spanners which are more suitable for heavy service. If the movable jaw or knurled screw is cracked or worn out, replace them with spare ones.

When using the adjustable spanner follow the steps given below.

Place it on the nut so that the jaw opening points in the same general direction the handle is to be pulled. In this position the spanners are less liable to slip and the required turning force can be exerted without damage to the moving jaw and knurl.

Push the jaws into full contact with the nut.

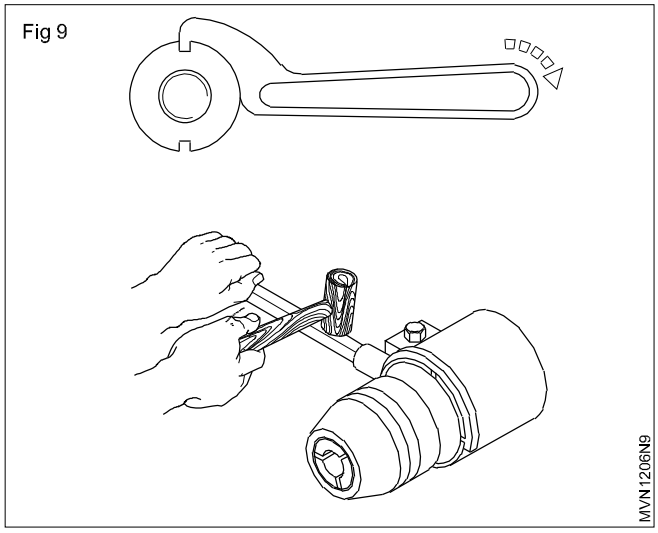
Use the thumb to tighten the adjusting knurl so that the jaws fit the nut strongly.



Pull continuously. The length of the handle is designed to suit the maximum opening of the jaws. With small nuts, a very small pull on the handle will produce the required torque.

'C' spanners (Hook spanners) (Fig.9)

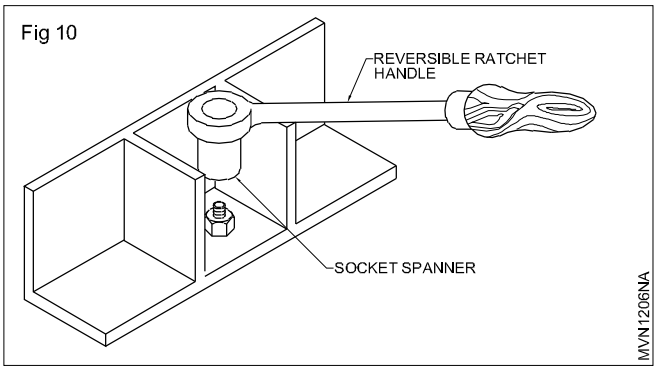
It has a lug that fits in a notch, cut in the outer edge of a round nut. The 'C' section is placed around the nut in the direction in which it is to be turned. In adjustable hook wrenches, part of the 'C' section pivots to fit nuts with a range of diameters. A set of three spanners is needed to cover diameters from 19 mm to 120 mm.



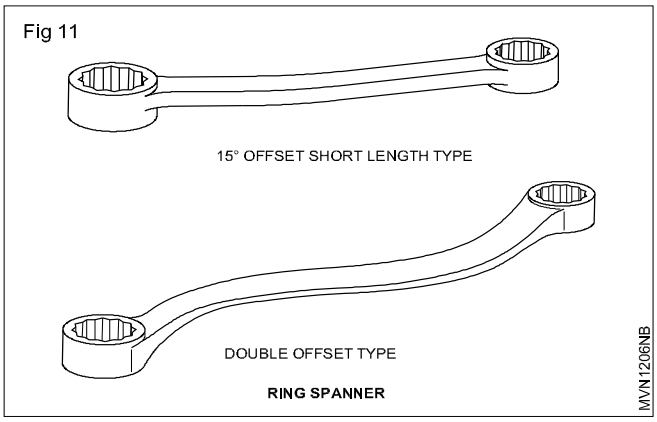
The applications of 'C' spanners are shown in the figure.

C' Spanners are also used for zero - setting of micrometer.

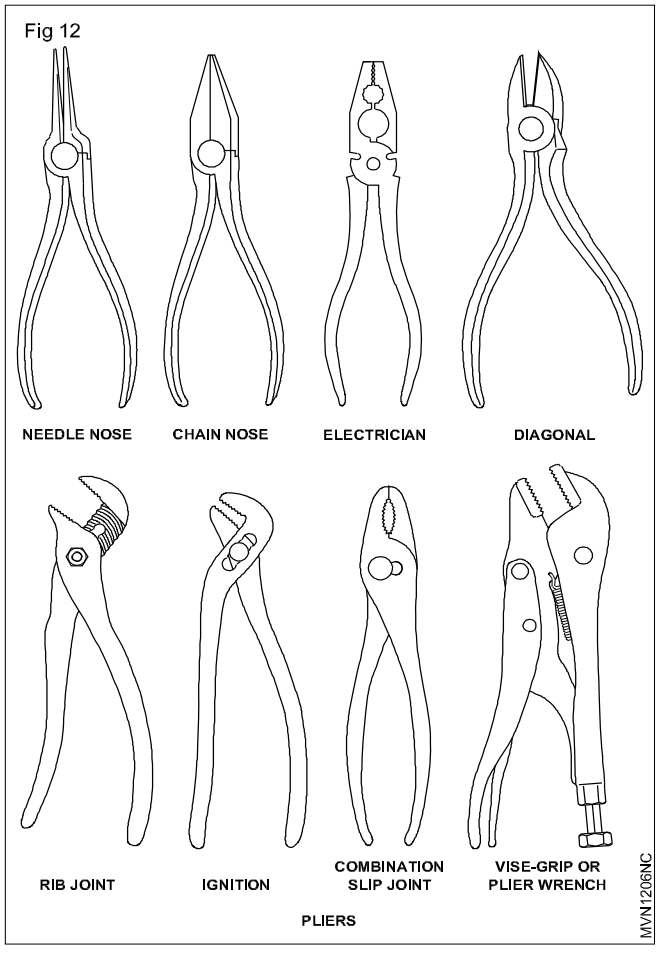
With socket spanners (Fig. 10), use the reversible ratchet handle for doing fast work, where turning space is restricted.



Ring or box spanner (Fig.11)**:** For critical tightening and loosening of nuts. For multi contact on bolts and nuts.



Pliers (Fig.12)**:** Pliers are commonly used for cutting wires, holding parts, crimping electrical connections and bending cotter pins.



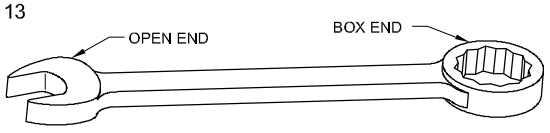
Safety

1 Avoid cutting hardened objects.

2 Never use pliers to turn nuts, bolts or tubing fitting.

Combination of ring and open end spanner (Fig 13)**:** This tool has a box end on one end and an open end on the other. Both ends are of the same size.

Fig 13

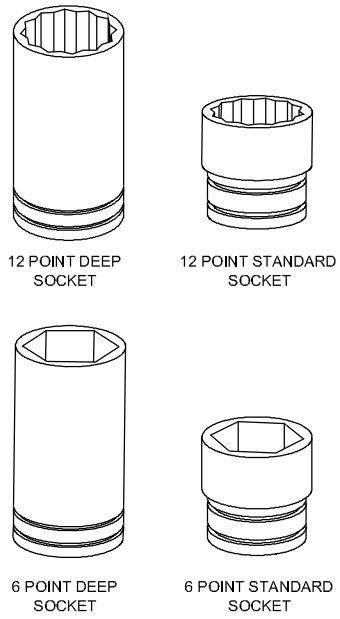


COMBINATION OF RING AND OPEN END SPANNER

MVN1206ND

Socket spanners (Fig 14)**:** The socket is one of the fastest and most convenient of all the spanners. Sockets come in two sizes; standard and deep.

Fig 14



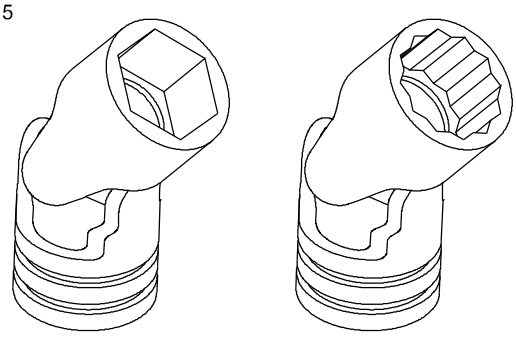
SOCKET SPANNER

MVN1206NE

Standard sockets will handle the most of the works, while the extra reach of the deep socket is occasionally needed.

Swivel socket (Fig 15)**:** The swivel socket allows the user to turn fasteners at an angle.

Fig 15

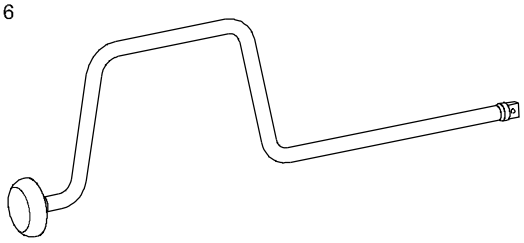


SWIVEL SOCKETS

MVN1206NF

Socket handles: Several different drive handles are used. The speed handle (Fig 16 & 17) is used whenever possible as it can be turned rapidly.

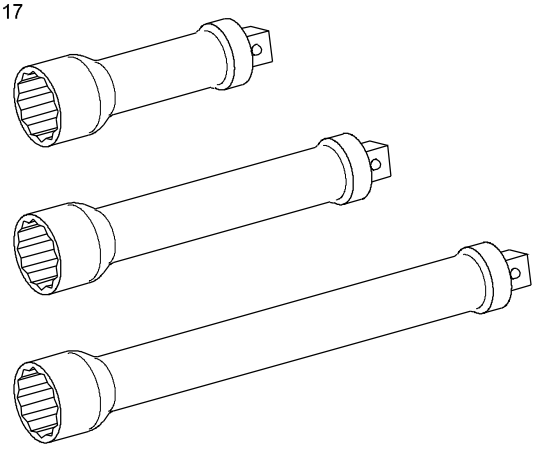
Fig 16



SOCKET SPEED HANDLE

MVN1206NG

Fig 17



SOCKET EXTENSION BARS

MVN1206NH

Pliers

Objectives: At the end of this lesson you shall be able to
- **state the features of pliers**
- **state the uses of pliers.**

Features

Pliers have a pair of legs joined by a pivot, hinge or fulcrum pin. Each leg consists of a long handle and a short jaw.

Elements of pliers with two joint cutters (Fig. 1) **(Combination pliers)**

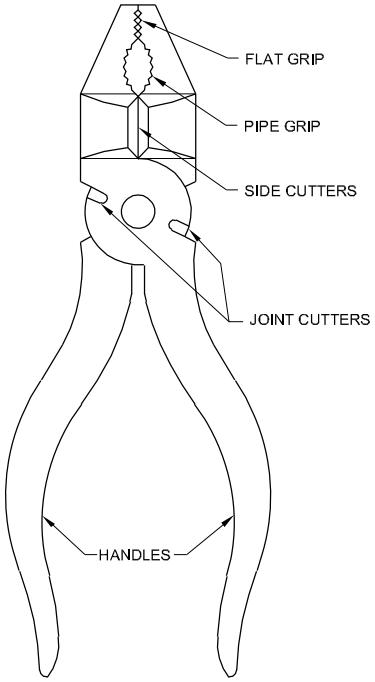
- Flat jaw
- Pipe grip
- Side Cutters
- Joint cutters
- Handles

Features

Flat jaw tips are serrated for general gripping.

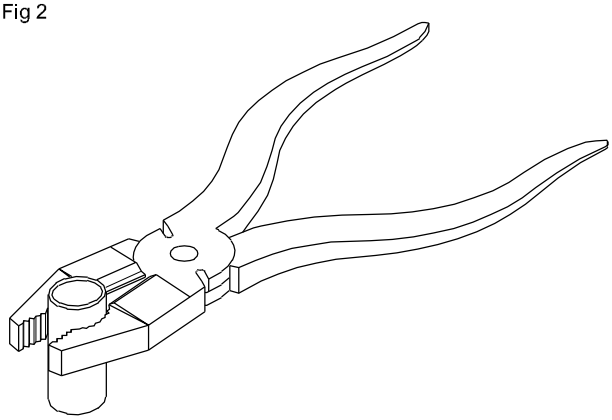
Pipe grip is serrated for gripping cylindrical objects. (Fig 2)

Fig 1



MVN1206O1

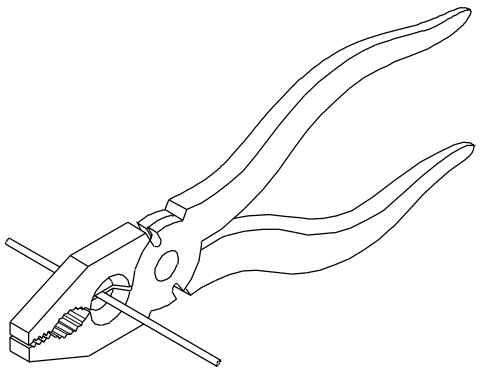
Fig 2



MVN1206O2

Cutters are provided for cutting off soft wires. (Fig 3)

Fig 3



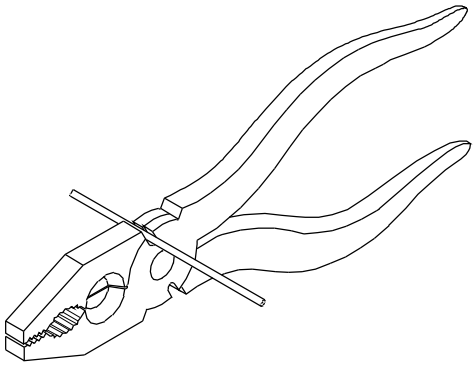
MVN1206O3

Two joint cutters are provided for cutting or shearing off steel wires (Fig 4)

Handles are used for applying pressure by hand.

Pliers are available in sizes from 150 mm to 230 mm. (Size = Overall length)

Fig 4



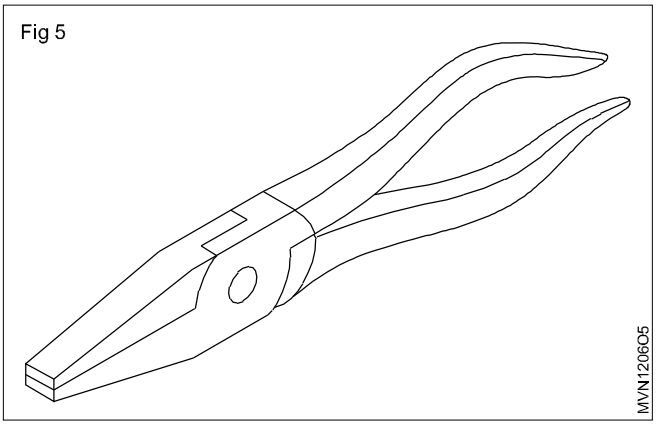
MVN1206O4

Other types of pliers

Flat nose pliers

It has tapered wedge jaws with flat gripping surfaces which may be either smooth or serrated. (Fig 5)

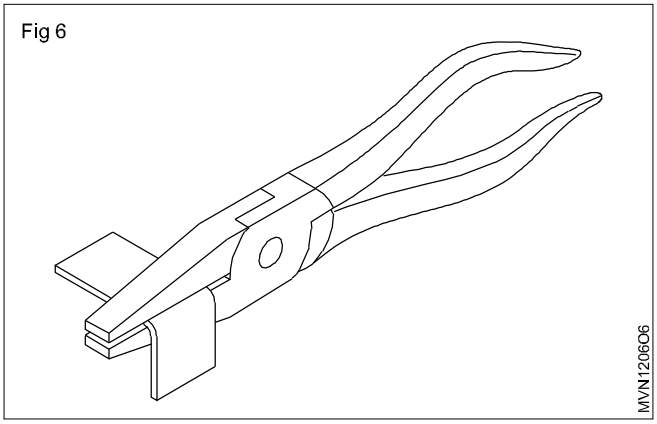
Fig 5



MVN1206O5

It is used for bending and folding narrow strips of thin (Fig.6)

Fig 6

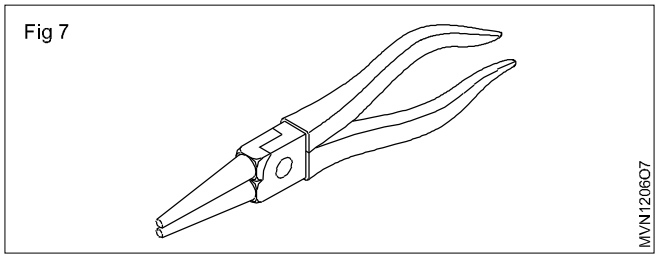


MVN1206O6

Roundnose Pliers

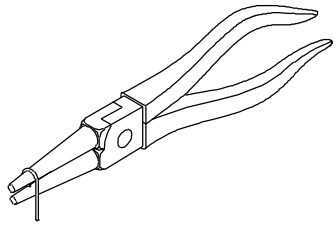
This type of pliers is made with tapered round shaped (Fig.7) They are used to shape loops in wires and the form curves in light metal strips (Fig.8)

Fig 7



MVN1206O7

Fig 8



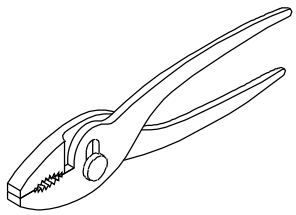
MVN1206O8

Slip-joint pliers

These pliers are available in various ranges of positions with different shapes of pivot pins so that they have various ranges of jaw opening.

Mainly used for gripping. (Fig 9)

Fig 9

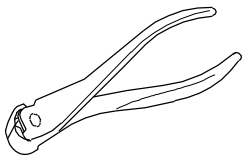


MVN1206O9

End cutting pliers

These pliers have the same uses as the side cutting pliers. (Fig 10)

Fig 10



MVN1206OA

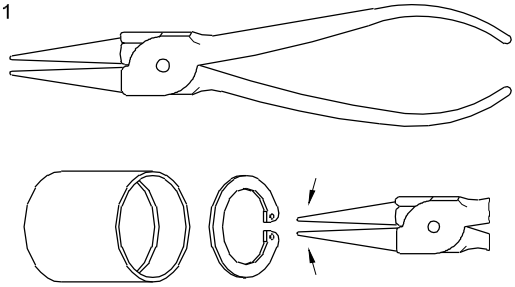
Circlip pliers

Circlip pliers are used for fitting and removing circlips in assembly works.

Internal circlip plier

It is used to fit and remove the internal circlip in the groove of the bore. (Fig 11)

Fig 11



MVN1206OB

Slip-joint, multi-grip pliers

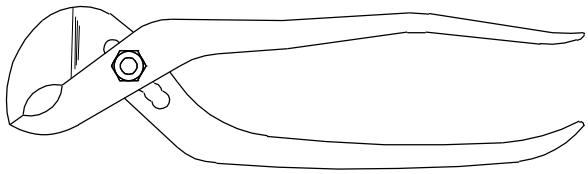
It is similar to the grip pliers but has more openings in the legs. It gives a range of jaw openings. It allows parallel gripping by the jaws in a number of positions. (Fig 12)

The shape and length of the leg are different from those of the slip-joint pliers. (Fig.13)

Side cutting pliers

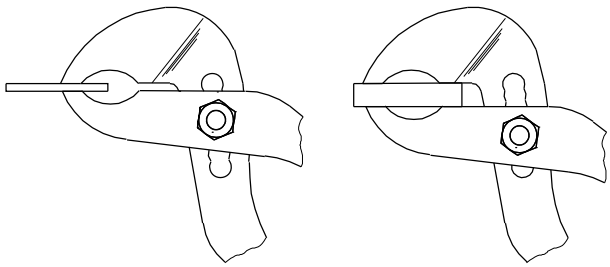
It is made with jaws set at an angle. (Fig.14)

Fig 12



MVN1206OC

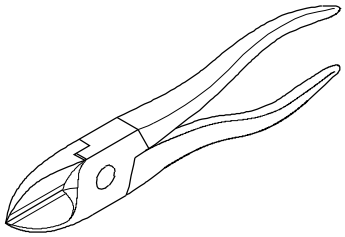
Fig 13



MVN1206OD

They are used for shearing off wires in confined spaces and cutting off wires close to the surface level. (Fig.15)

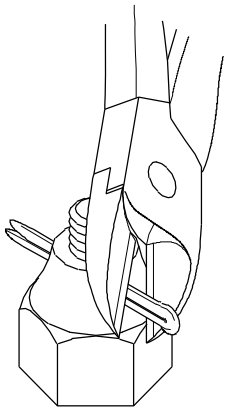
Fig 14



MVN1206OE

They are also used for spreading the cotter pin. (Fig 16)

Fig 15



MVN1206OF

External circlip pliers.

External circlip pliers are used to fit and remove the external circlip in the grooves of the shafts.

Locking pliers

The locking lever of the locking pliers is attached with a movable handle which clamps the jaws on to an object of any shape.

It has high gripping power.

The screw in the handle enables adjustment of the lever action to the work size.