

# SNIPS (Straight & Bent)

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

- state the uses of straight and bent snips
- state the features and use of lever shears
- state the uses of circle cutting machines.

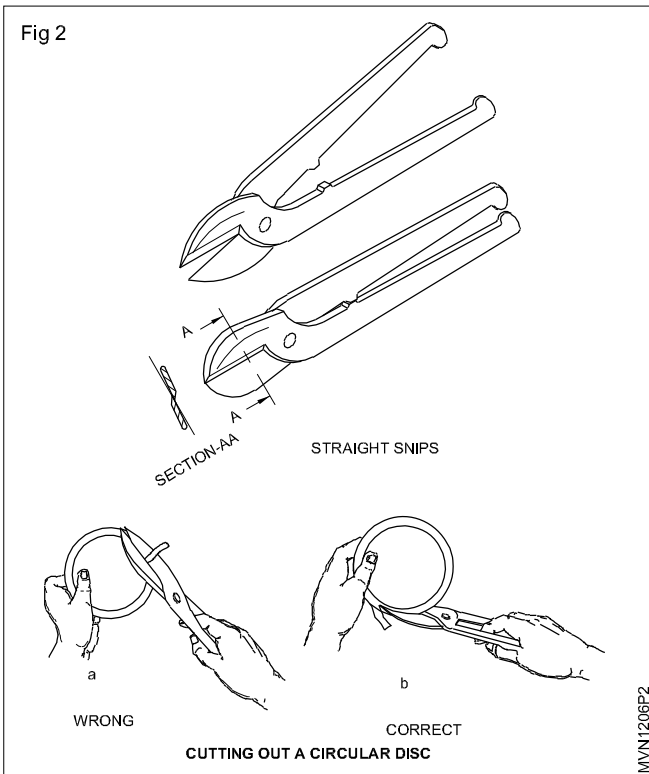
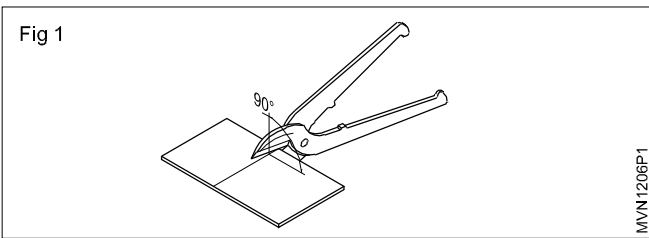
A snip, also called a hand shear and it is used like a pair of scissors to cut thin, soft metal sheets. Snips are used to cut sheet metal upto 1.2mm thickness.

## Types of snips (shears)

There are several types of snips available for making straight or circular cuts, the most common being straight snips and curved snips.

The choice of shears (snips) depends on the shape and type of the cut required.

## Straight snips (Figs 1 & 2)



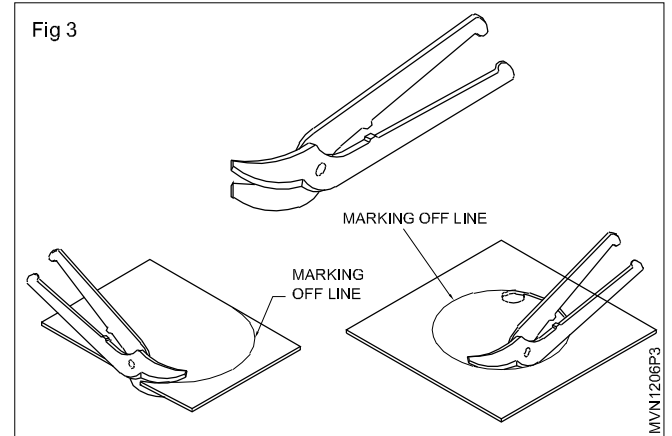
These are used for making straight cuts and large external curves.

Straight snips have thin blades which are only strong on a vertical planes. They are, therefore, only suitable for straight cuts and external curves when surplus waste has to be removed.

While cutting, the blade of the snips should not cover the marking.

## Bent snips (Fig. 3)

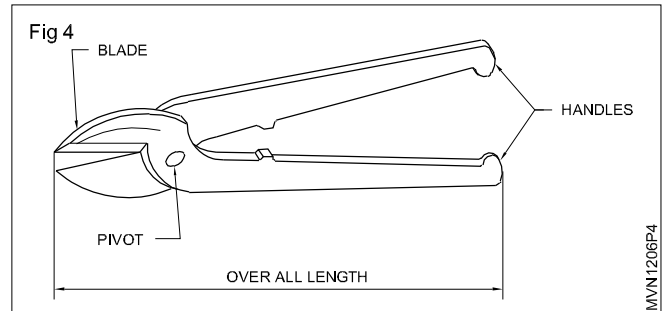
These snips have curved blades for making circular cuts. They are also used for trimming cylindrical or conical work in sheet metal.



Snips are specified by the overall length and the shape of the blade.

## Example

200mm straight snip (Fig.4)



**Screw Extractor** is a tool for removing broken or seized screws. There are two types one is spiral flute another is straight flute structure. It is made of hard, brittle steel, while applying twisting torque with screw extractor upon the broken screw, enter and bring out.

**Nipper** is a tool to 'nip' or remove small amount of hard material such as pieces of tiles which need to be fitted around an odd or irregular shape. Nipper is used to in railway line.

## Air impact wrench, air ratchet

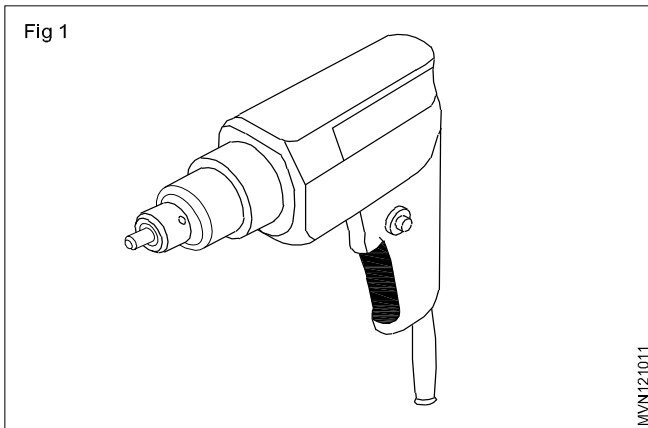
**Objectives:** At the end of this lesson you shall be able to

- explain the use of air impact wrench
- explain the working principle of air impact wrench.

### Air impact wrench (Fig.1)

Air Impact Wrench (also known as an impact or, Air Rattle Gun windy gun), Air wrench is a socket wrench power tool, which is used to deliver high torque. It works by storing energy in rotating mass and suddenly delivering it to output shaft.

Compressed Air is commonly used as the power source. Electric power can also be used as the source of power. cordless Electric devices are also used, and are very popular due to ease of working.



The Air impact wrench is to be used along with a specially hardened impact socket extension and joints to withstand sudden force.

Generally a special 6 inch pin socket is used with air impact wrench. (Fig. 2)

### Air Ratchet (Fig.3)

An Air Ratchet is a quite identical to General ratchet wrench.

It is also having square drive at different sizes.

The socket drive is turned by a Air Motor. When we pull the trigger, Air motor gets activated it turns the socket drive.

The direction of socket drive can be changed to clockwise (or) anti clockwise as per the user requirement.

Air Ratchet operates with more speed unless torque. In case where more torque is required we should use Air impact wrench.

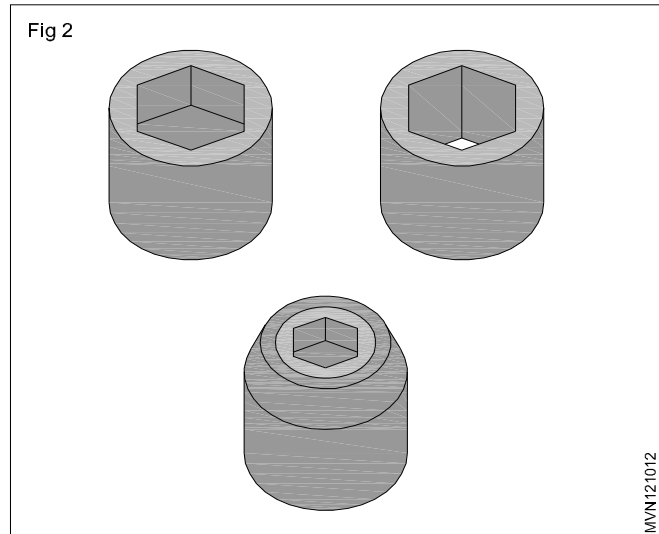
## Wrenches

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

- name the different wrenches used
- state the features of each type of wrenches.

### Types of wrenches

- Stillson pipe wrench
- Footprint pipe wrench
- Tension wrench
- Hexagon socket wrench

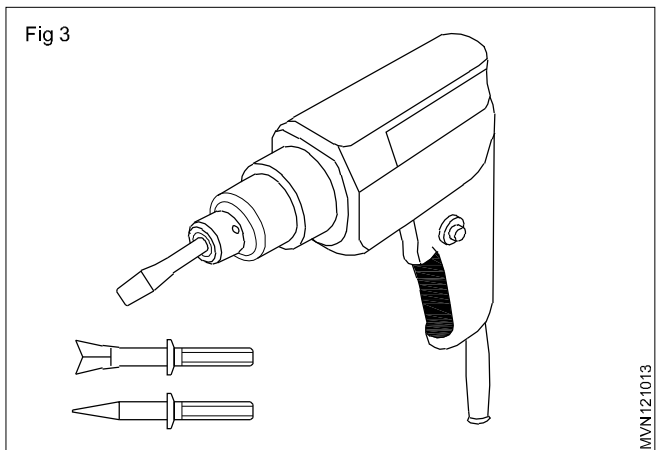


### Air Chisel

Air chisel is used for cutting the bolts to nuts of vehicle body sheet.

**The compressed Air provides more force and much efficient than a hand chisel and Hammer.**

Air chisel can be used with different types of chisel kit, depending upon the job.

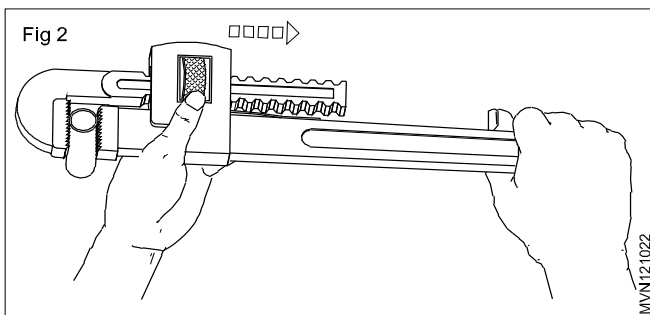
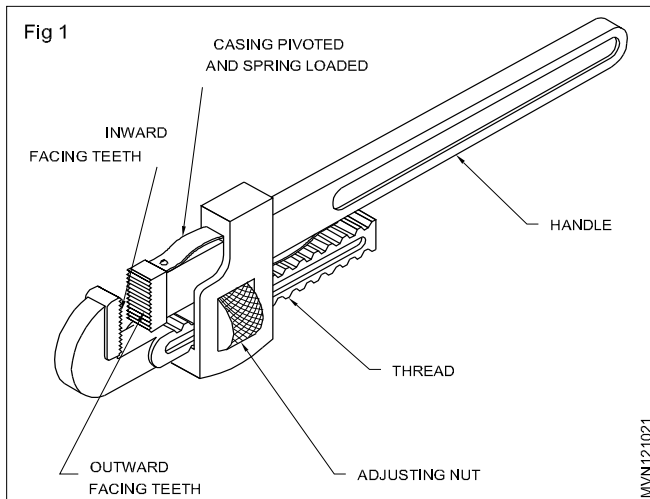


### Stillson pipe wrenches (Fig 1 & 2)

These are used for gripping and turning pipes of a wide range of diameters.

The parts and their names are shown in the

A jaw is fixed to the handle with outward facing teeth.



Attached to the handle by a pivot pin is a spring-loaded casing that carries a knurled adjusting nut. This engages with a thread on the adjustable arm of a jaw with inward facing teeth.

Once the jaws are adjusted, the spring loading keeps them in contact with the work, and the toggle action causes the hardened serrations to bite into the work.

The jaws will mark the work. File off any burrs. Never use them on polished or plated surfaces. Never grip hardened materials with this type of wrench as this will damage the serrations.

### Torque wrench (Fig.3)

A torque wrench is necessary to tighten bolts, nuts etc. To the exact torque as specified by the manufacturers. Excessive tightening may lead to breakage of the fastener/parts and loose tightening will lead to leakage/breakage during operation. Torque wrenches are available in special shapes and sizes. Selecting the torque wrench of the appropriate size and range is very important. Torque wrenches are available in pound feet (lb-ft), pound inch (lb-in), kilogram metre (Kg-m) kilogram - centimetre (Kg-cm) and Newton metre (N-m). Newton metre is the preferred metric unit, although others are still used by the manufacturers.

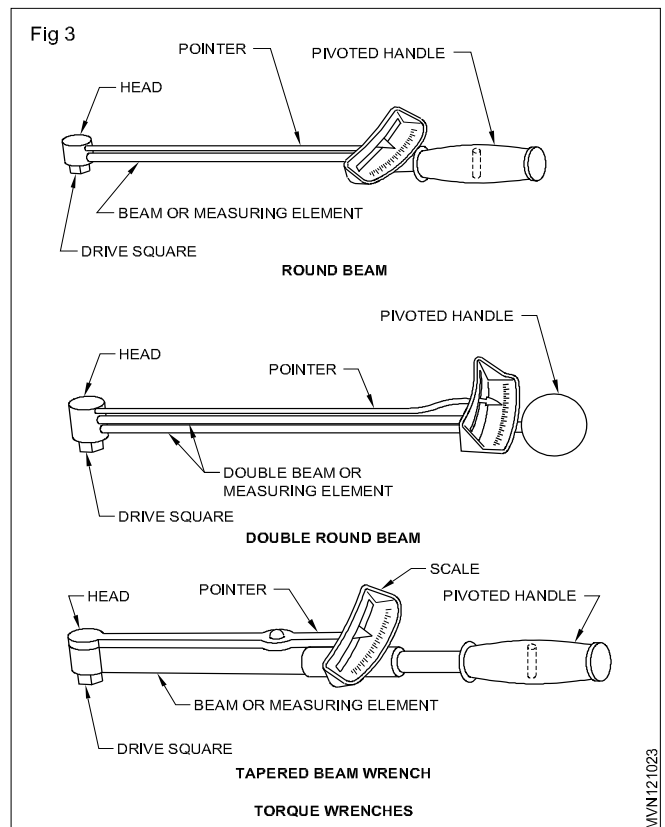
To convert pound feet to kilogram-metres by 0.138 and to convert to Newton-metres multiply the pound feet by 1.35.

### Dial type

It has a scale and the torque can be read directly.

### Brake over (Micrometer)

It contains a micrometer scale (1) on the handle and a ratchet head (2). In this the torque can be set on the micrometer scale (Ref.job sequence). (Both pound-feet



and metric scales are marked on the graduated barrel). The wrench makes a metallic 'click' that is heard and felt on the handle when fasteners are tightened at the correct.

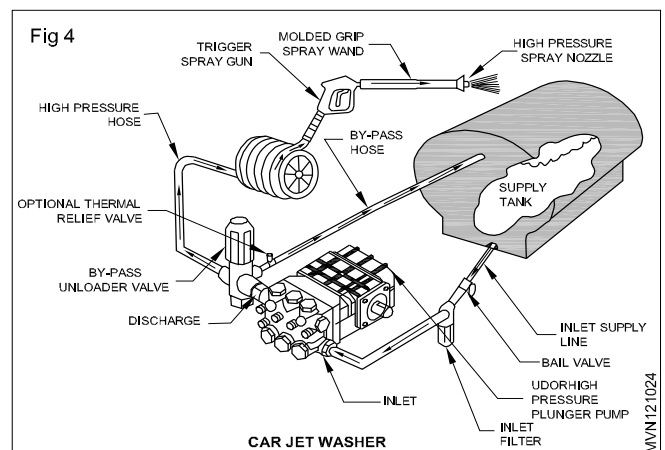
### Torsion bar torque wrench

Its gauge is a simple pointer (3) that moves across a graduated scale (4) which shows the amount of torque being applied.

Digital read out torque wrenches are also available.

### Car jet washer (Fig.4)

- Car jet washer is used to clean the interior and exterior of motor vehicle different type of car washer are available in the market
- It is also used for pressure wash the auto mobile employments in workshop
- Car jet washer is used for cleaning the dirty floor and wall of floor mates
- It is also used is ear service station for commercial purpose



# Flaring, flare fittings and testing the joints

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

- illustrate necessity, types of flaring methods
- list the types and applications of flare fittings
- pressures the joint system and test for leaks.

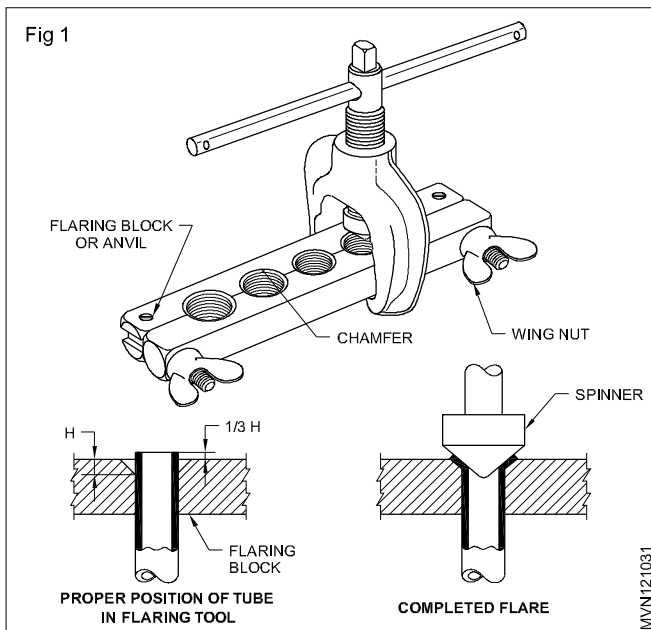
**Flaring necessity:** When connecting tubing to fittings, it is common practice to flare the end of the tube and to use fittings designed to grip the flare for a vapour tight seal. Special tools are used for making flares.

**Types of flaring :** There are two types of flaring

Single thickness flare

Double thickness flare

**Single thickness flare :** It can be made on smaller size copper tubing (Fig.1)



**Double thickness flare:** Double thickness flares are recommended for only the larger size tubing 5/16 inch

## Puller

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

- state the function of puller
- state the types of puller.

### Puller

The puller is a General Workshop tool which is used to remove Gears, bearings pulleys, flanges, bushes.

The puller is made out of steel material, generally with two or three legs and they are adjusted to hold the outside of the gears or bearing sleeves while the central threaded shaft is screwed forward exerting force on the gear/bearing. This enables to remove the bearing without damaging the shaft.

Pullers are classified according to the application and the number of leg.

Another classification is based on the power utilized i.e. Mechanical puller and Hydraulic puller.

(9mm) OD and over. Such flares are not easily formed on smaller tubing. The double flare makes a stronger joint than a single flare.

**Pressurising the joint on tubing :** A flared joint or brazed joint needs to be tested for its firm. If it leaks while working it will put the whole system into problem. Before putting the joint into a system after it is made pressure test must be done.

Air pressure from

Air compressor - 150 PSI

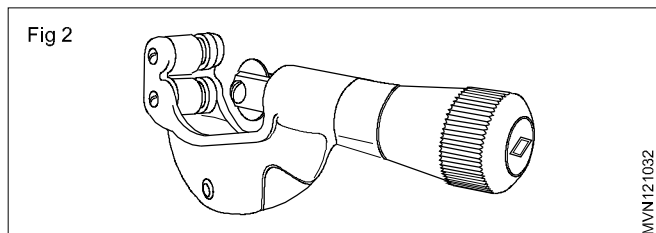
or - 10Kg/cm<sup>2</sup>

The gas which is employed can be used for testing.

Leak can be detected with the use of soap solution. There are also other methods for leak detection.

Pressure tests are usually made on the joints above the working pressure.

**A pipe cutter** is more convenient and better than a saw when cutting pipes and metal tubing. (Fig. 2)



The sharpened wheel does the cutting as the tool turns around the pipe, the screw increases the pressure, driving the wheel deeper and deeper through the pipe until it finally cuts right through.

make sure that items are pulled is well and adequately supported

do not apply heat to a puller

before every use lubricate the centre bolt threads, with graphite - based lubricant

use puller only with recommended attachment

do not over load a pulley which may cause to break

**Important: Always keep the guide parts of the lifting plate greased.**

Hydraulic pullers are designed to help you extend bearing life in your applications through proper installation, removal and service.

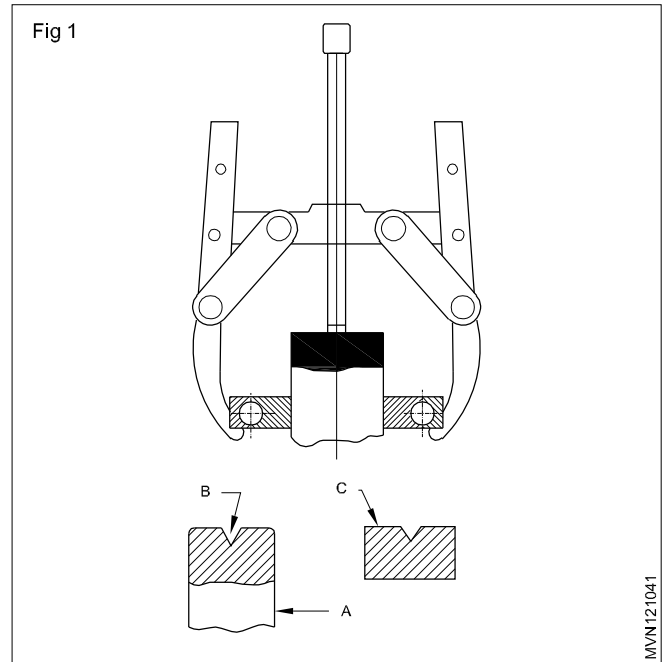
Hydraulic pulling systems are available with capacity ranging from 4 tons to 30 tons, and are ideal for removing all kinds of shaft filled parts.

Hydraulic pulling system comprises of integrated pump, cylinder, hose, puller with safety-release valve. The pullers have self-contained hydraulic pump and are compact, handy. There are ideal for pulling variety of press-fit parts including bearing, wheels bushings, gears, pulleys.

In Automobiles Hydraulic Puller especially used for marine engine liner from the cylinder block during engine Reconditioning Work.

**Mechanical Puller Operation (Fig.1)**

- 1 Ensure that the spindle is clean and applied grease before use.
- 2 The Shaft (A) must have a center hole (B) as shown in the figure. If it does not, use a shaft protector (C) as shown in (Fig.1)
- 3 Tighten strap bolts to hold jaws lightly in place
- 4 Position the puller that the spindle as shown in fig 2.
- 5 Tighten the spindle slightly by turning the spindle nut with proper wrench
- 6 Check that the jaws are fully contacting the part to be pulled.
- 7 Tighten the strap bolts.
- 8 Apply pulling force by turning the spindle.



**Post lock puller operation (Manual pullers) (Fig.2)**

- 1 Make sure that all items being pulled are supported by a means other than the puller. NO LOOSE PIECES!!!
- 2 Before each use, lubricate the center bolt of the puller with a graphite-based lubricant.
- 3 To operated the puller, grasp the puller with one hand and turn the T-handle counter-clockwise with the other hand until the jaw opening is big enough to fit over the component to be pulled.
- 4 Turn the T-Handle clockwise with the other hand until the jaw firmly onto the component. (Fig.2A)
- 5 Make sure that the center of the puller is aligned with the center of the component to be pulled. Using hand tools only, tighten the center bolt to pull the component off of its shaft. Never exceed the maximum torque ratings of the puller's drive bolt. (Fig.2B)
- 6 Turn the T-handle counter-clockwise to remove the puller from the component. (Fig.2C)

