

## Power hacksaw

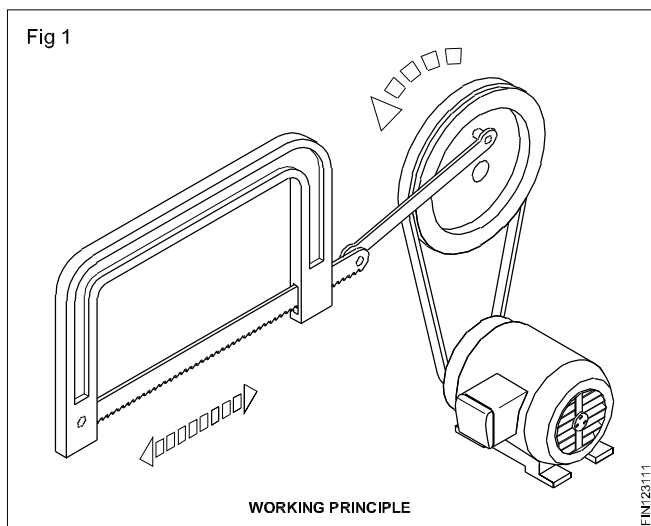
**Objectives:** At the end of the lesson you shall be able to

- state the features of a power hacksaw
- select the correct blade for different jobs
- state the features of a power hacksaw blade
- state the features of work-holding and supporting devices
- name the parts of a power hacksaw
- state the method of fixing power saw blades.

Cut off saws are used to cut metal stock roughly to the required length. The commonly used cut-off saw in small scale industries is a POWER SAW.

### Features

The power saw works like a hand hacksaw, and has an arrangement for cutting during the movement in one direction and releasing pressure on the non-cutting stroke. The rotary motion of the motor is converted into linear motion by a crank mechanism. (Fig 1)

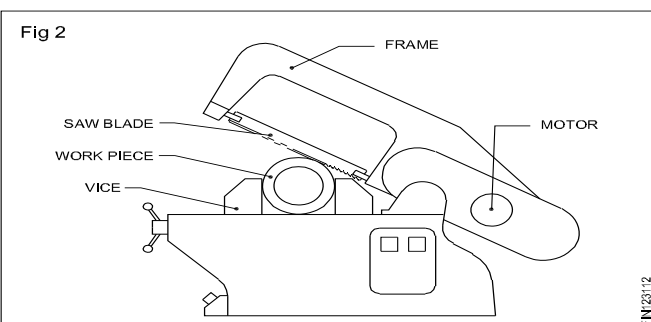


The required cutting pressure is obtained hydraulically or by an adjustable weight.

During the non-cutting motion the blade will be lifted away from the work.

A clamping device/vice holds the work firmly.

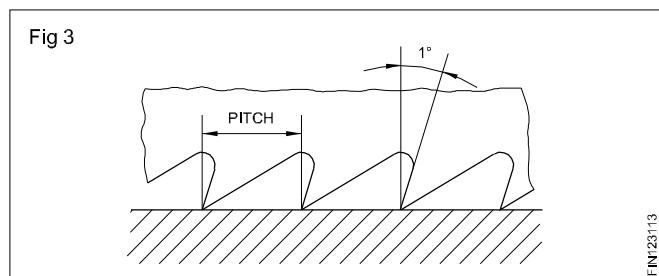
**Power saw:** This is most commonly used metal cutting saw. (Fig.2)



### Power hacksaw blades

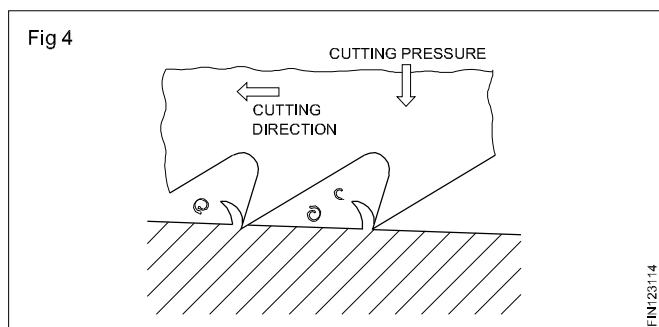
The saw blades are selected, depending on the machine and the type of work on hand. The blades are made of H.S Steel and are fully hardened.

For different materials, blades of different pitches are used (number of teeth per 25mm length). (Fig 3)



As a general rule, the softer the material, the lesser is the number of teeth, per length of 25 mm.

Teeth with a large pitch can accommodate large chips (Fig 4)



Blades are available with varying coarsenesses i.e between 4 to 14 teeth per inch length.

Coarse pitch blades are also used while cutting large sections of stock, as this will help in greater chip clearance and increased penetration.

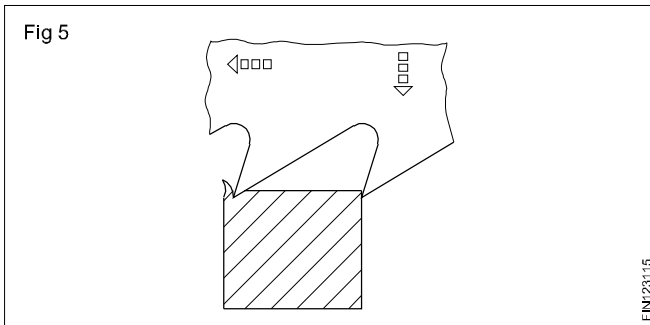
For cutting hard material (example - tool steel), and thin material, a 14 T.P.I blade is recommended.

For general purpose sawing, a 10 TPI blade will be useful.

**While selecting blades, make sure atleast two teeth of the blade will be in contact with the work at all times.**

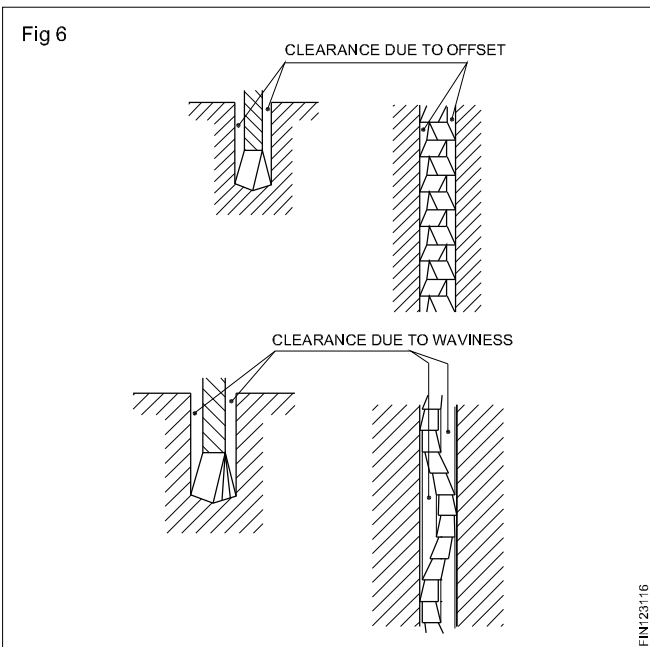
What will happen if less than two teeth are in contact with the work?

The work can be caught in the tooth gullet, and cause breakage to the blade. (Fig 5)

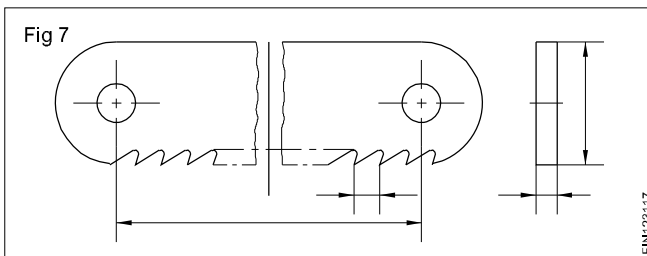


### Blade clearance (Fig 6)

In order to avoid jamming of the teeth and to provide for chip clearance, the teeth of the saw blades are offset or waved.



Specification of power hacksaw blades (Fig 7)

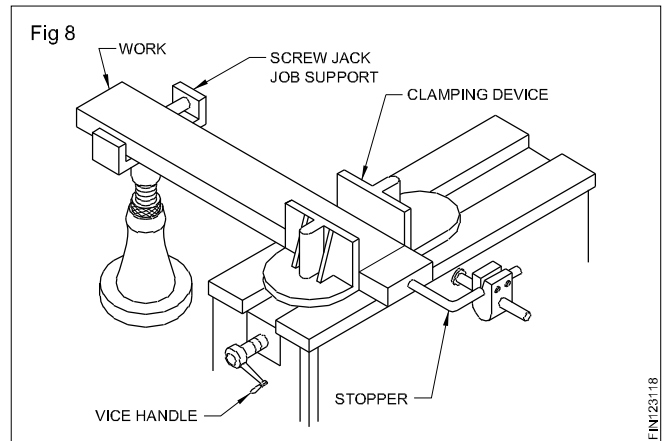


While specifying power hacksaw blades, it is necessary to state

- The length (the distance between centre of holes).
- The width
- The thickness and
- The teeth pitch.

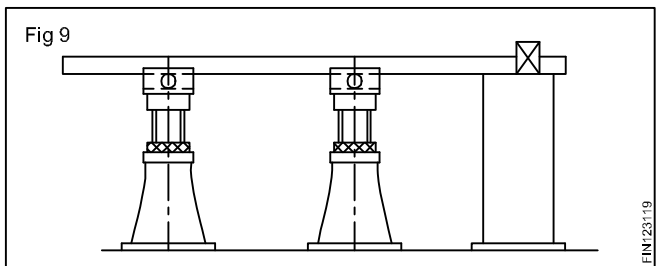
### Clamping arrangement (Fig 8)

Power saws are provided with clamping devices similar to those in machine vices, and the work can be gripped by using the crank handle.



When a number of pieces of the same size are to be cut an adjustable stop is used.

Long bars are supported, and the level maintained by the use of adjustable floor stands. (Fig 9)



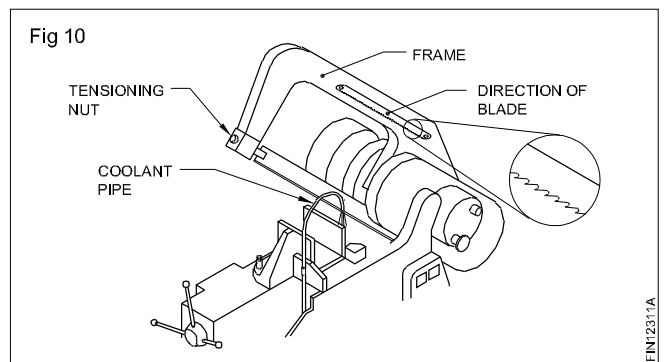
### Fixing blades (Fig 10)

The blades are mounted on frames using screws.

The teeth of the blade should point towards correct directions. (Depending on the type of machine the blade either cuts on the forward or on the return stroke).

It is necessary to follow the directions given by the manufacturer as indicated in the frame.

Tension the blade using the tensioning device.



## **Metal-cutting saws**

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

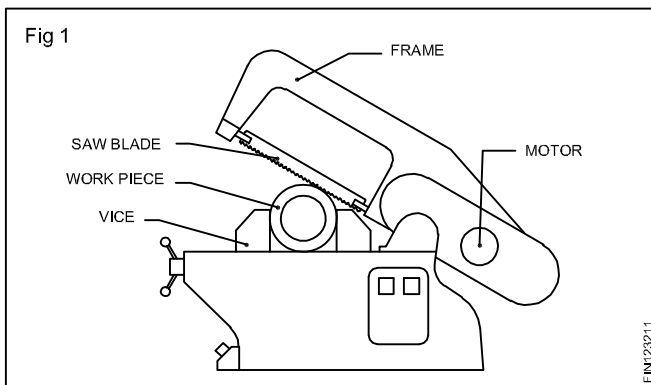
- name the common types of metal-cutting saws
- state the advantages of a horizontal band-saw
- state the features of different types of cutting saws
- state the specific use of a contour-saw.
- state the precautions to be observed while machine sawing.

Metal-cutting saws of different types are used in industries. The most commonly used are the:

- power saw
- horizontal band-saw
- circular saw
- contour band-saw.

### **Power saw (Fig 1)**

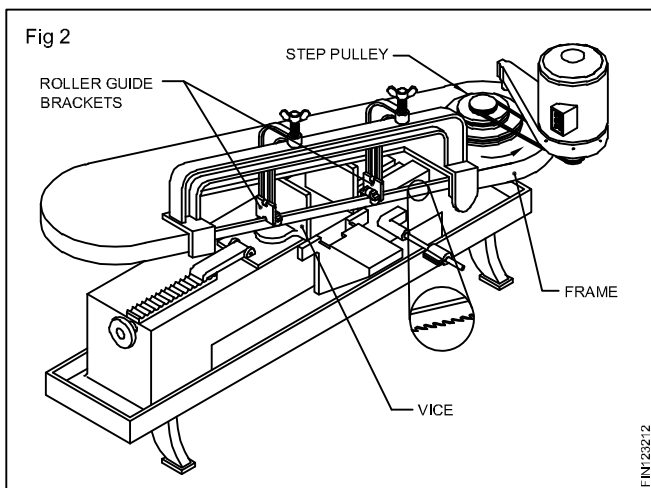
This is the most commonly used metal-cutting saw and discussed in related theory for Ex: 1.2.31.



### **Horizontal band-saw (Fig 2)**

This has a saw frame on which a motor is fitted.

There are two pulley wheels on which an endless bandsaw passes.



Speed variation is obtained through the stepped pulleys on the motor.

The roller-guide brackets provide the rigidity for the blade in the cutting area and also prevent wandering of the blade while cutting.

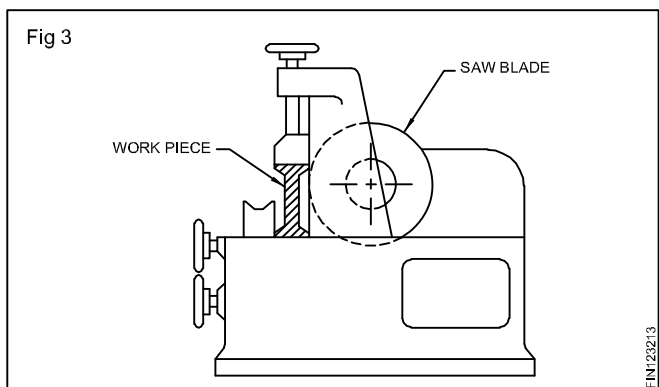
The blade tension is maintained by using the adjusting handle, provided for this purpose.

A vice is provided for holding the metal stocks. The vice is adjustable for angular cutting.

This machine has the advantage of continuous cutting ability, and is much faster than a power saw. It may be noted that a power saw cuts only in every alternate stroke.

### **Circular saw (Fig 3)**

This type of cutting machine is used when cutting materials have a large cross-section. The circular saw has a continuous cutting action and is economical in production work where heavy section metals are used.



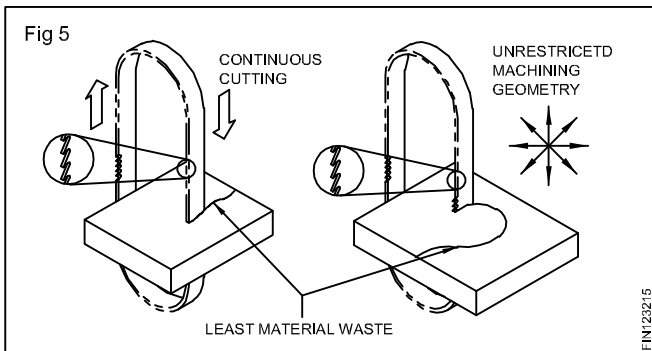
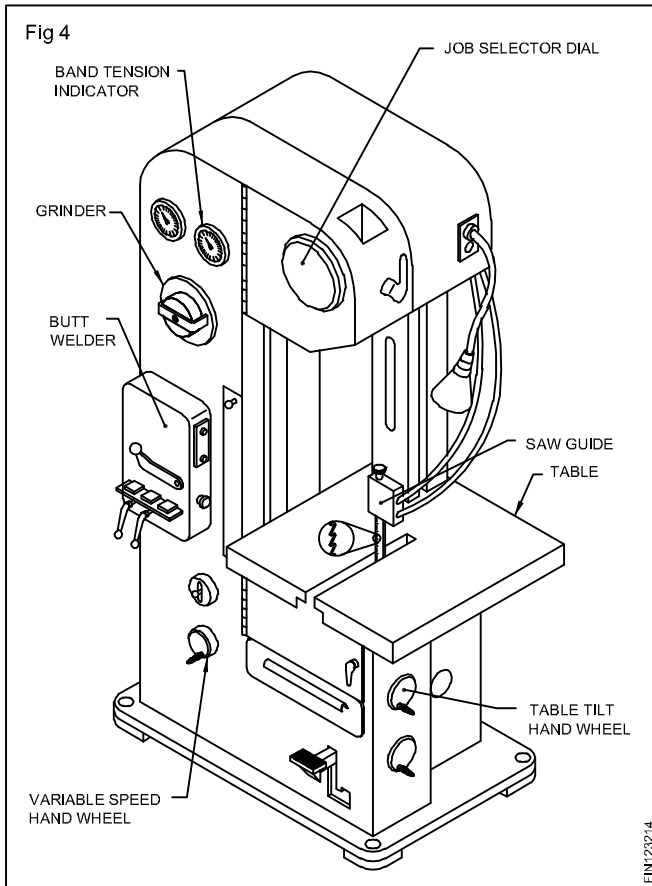
### **Contour saw (Fig 4)**

In this, a metal band saw blade is used, and the contour saw has a continuous cutting motion. (Fig 5)

These machines are very much used for cutting metals to different profiles. (Fig 6)

Different speeds can be obtained while cutting, with the help of variable speed pulleys.

For repairing broken contour saw blades, these machines are fitted with a shear for trimming the blade ends, a butt-welding machine for joining the ends and the small grinder to finish the welded joint.



The table can be tilted to any angle for angular cutting.

The blade passes through a guide which prevents the blades from wandering and keeps it rigidly.

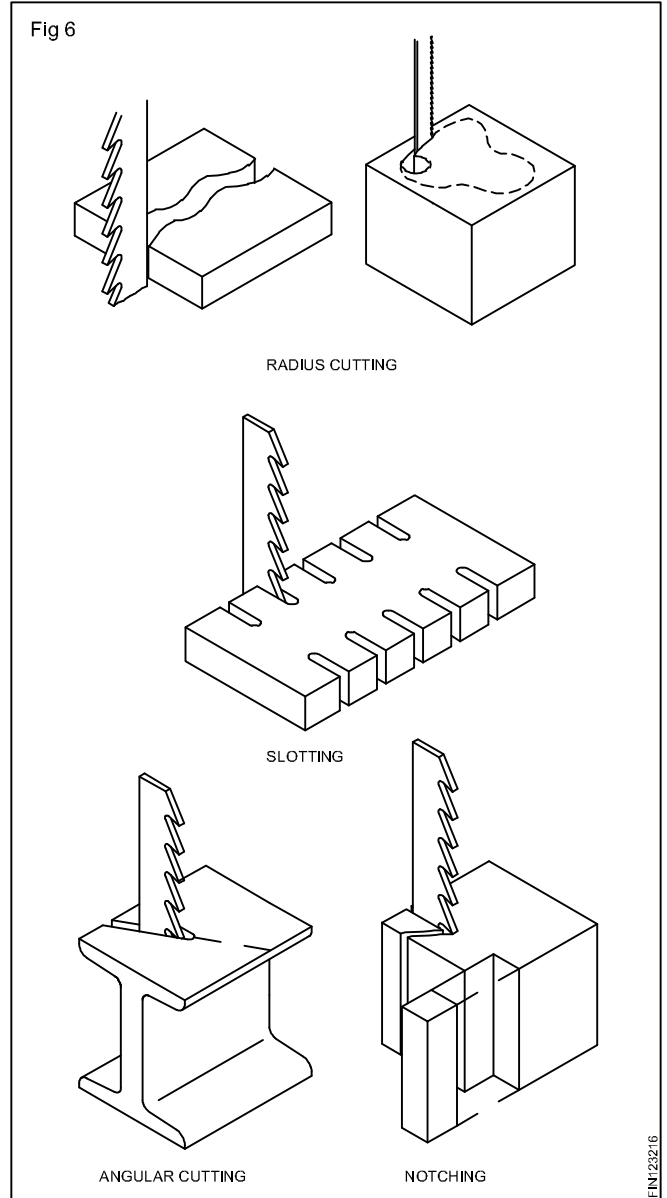
These machines are widely used for tool-room work, and not as a machine for cutting raw material stock.

**Precautions to be observed while machine sawing**

In order to work safely and efficiently, certain precautions are to be observed.

While taking measurements of the work for setting, always stop the machine.

Projecting ends of the work should be well guarded, so that safety may be provided to others.



Ensure that the work does not protrude into the gangways.

When sawing thin pieces, hold the material flat in the vice to prevent the saw teeth from breaking.

Ensure a cutting fluid is used always.

Avoid giving excessive cutting pressure, because this can cause breakage to the blade, and cut work out of square.

When several pieces of the same length are to be cut, use a stop gauge.

When holding short workpieces in a vice, be sure to place a short piece of the same thickness in the opposite end. This will prevent the vice from twisting when it is tightened.

Lubricate the machines on the indicated points using oil can, oil gun or grease gun as specified by the machine manufacturer.