



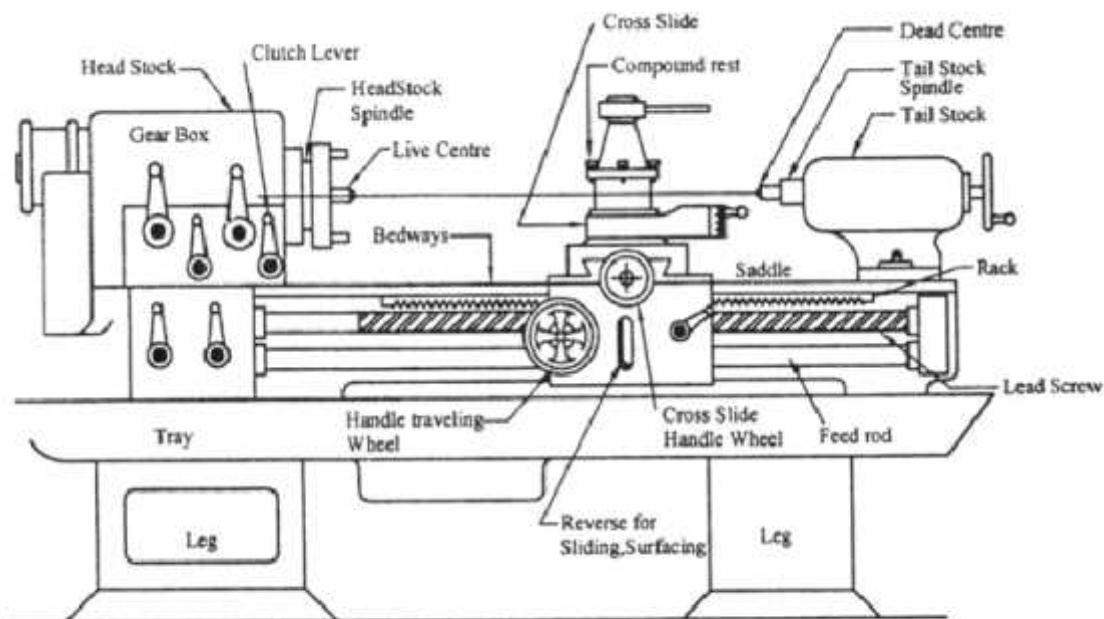
LATHE

Introduction:

Lathe is a machine tool, which is used to remove metal from work piece for required shape and size. This is done by holding the work piece firmly on the machine and turning it against the cutting tool, which will remove metal from the work in the form of chips.

Center lathe:

This lathe is the most important member of lathe family and most widely used. This lathe is also known as engine lathe. The basic parts of center lathe are bed, headstock, tailstock, and carriages, cross slide, compound rest, tool post and apron.



Centre Lathe

Bed:



It is the base of the lathe; the headstock and tailstock are located at either end of the bed and the carriage rests over the lathe bed and slides on it.

Headstock:

It carries a hollow spindle .A live center can be fitted in to hollow spindle. The live center rotates with the work piece and hence called live center.

Tailstock:

It is mounted on the bed at right angles end. It is used for supporting the right end of the work piece by means of a dead center. The dead center does not revolve with the work piece and hence called dead center.

Carriage:

It is supported on the lathe bed ways and can move in a direction parallel to the lathe axis .It carries saddle, cross slide, compound rest, tool post and apron. It is a H- shaped casting fitted over the bed. It moves along the guide way.

Cross slide:

It carries the compound rest and tool post. It is mounted on the top of the saddle. It may be moved by hand or may be given feed through apron mechanism.

Compound rest:

It is mounted on the cross –slide .It carries a circular bar called swivel plate, which is graduated on degrees. The upper part is known as the compound slide, and it can be moved by means of the hand wheel.

Tool post:

The tool post is fitted over the compound rest. the tool is clamped in the tool post.

Apron:

Lower part of the carriage is termed as the apron. It is attached to the saddle and hangs in front of the bed .It contains gear, clutch and lever for moving the carriage by a hand wheeler power feed.

Feed mechanism:

The movement of tool relative to the work is termed as feed. A lathe may have three types of feed: longitudinal, cross, and angular feed. The feed mechanisms have different units through which motion id transmitted from the head stock spindle to the carriage. Following are the units: end of bed gearing, feed gear box, feed rod and lead screw, apron mechanism.



Important operations of a Lathe

Turning:

The work piece is held in the chuck or between the centers. The turning tool is held parallel to the axis of the lathe spindle and a cylindrical surface is produced. For rough turning, the rate of feed of the tool is fast and the depth of cut is heavy. For rough turning the depth of cut may be from 2 to 5mm. For finishing turning the feed and depth of cut will be small. For this a finish turning tool is used and the depth of cut may be from 0.5 to 1mm.

Facing:

Facing is the machining of the end face of the work piece to make it flat. The work piece may be held in the chuck as between the centers. A facing tool is fed perpendicular to the axis of operation of the work piece. Only the face of the tool is machined in this processes and hence called facing.

Chamfering:

It is the process of leveling extreme end of the work piece. This is done to protect the end of the work piece from getting damaged. This operation is performed after turning, drilling, boring etc., It is a critical operation to be performed after thread cutting so that the end may pass firstly on the threaded work piece.

Knurling:

The adjustment screw of a micrometer is not smooth either axis cross or diamond shaped pattern is seen. The process by which such patterns are made is call knurling. It is done to give good gripped surface on the work piece. The teeth may be fine, medium or coarse. Very slow speeds are adapted for knurling.

Reaming:

The operations for finishing a drilled or bored hole for smooth finishing are called as reaming. The tool used is called as reamer. It has multiple cutting edges. The reamer is fitted in the tail stock spindle.

Drilling:

It is an operation for making a hole on a work piece. For drilling, work piece is held in the chuck on one side where as the other side remains free. The tool for drilling is called drill. The drill is inserted on the tailstock. When the job rotates, the drill bit is inserted in the tailstock by rotating the hand wheel.

Boring:



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It is a process for enlarging a hole produced by drilling. Boring itself cannot produce a hole. The work piece is held in a chuck or face plate. The boring tool is fixed and fed into the job.

Taper turning:

A large number of components used in engineering have a conical shape or a tapered shape. A taper is defined as the uniform change in diameter measured along its length.

Thread cutting:

It is the operations by which threads are cut on the surface of the work piece. The change of gear may be selected as

No of teeth on spindle gear= no. of teeth on lead screw.

Pitch of a thread to be cut = pitch of the lead screw threads.