# Lathe Practice

# Introduction

**Lathe is a machine, which removes the metal from a piece of work to the required shape &size**

# Types of Lathe

**Engine Lathe**

The most common form of lathe, motor driven and comes in large variety of sizes and shapes.

**Bench Lathe**

A bench top model usually of low power used to make precision machine small work pieces.

**Tracer Lathe**

a lathe that has the ability to follow a template to copy a shape or contour.

**Automatic Lathe**

A lathe in which the work piece is automatically fed and removed without use of an operator. Cutting operations are automatically controlled by a
sequencer of some form

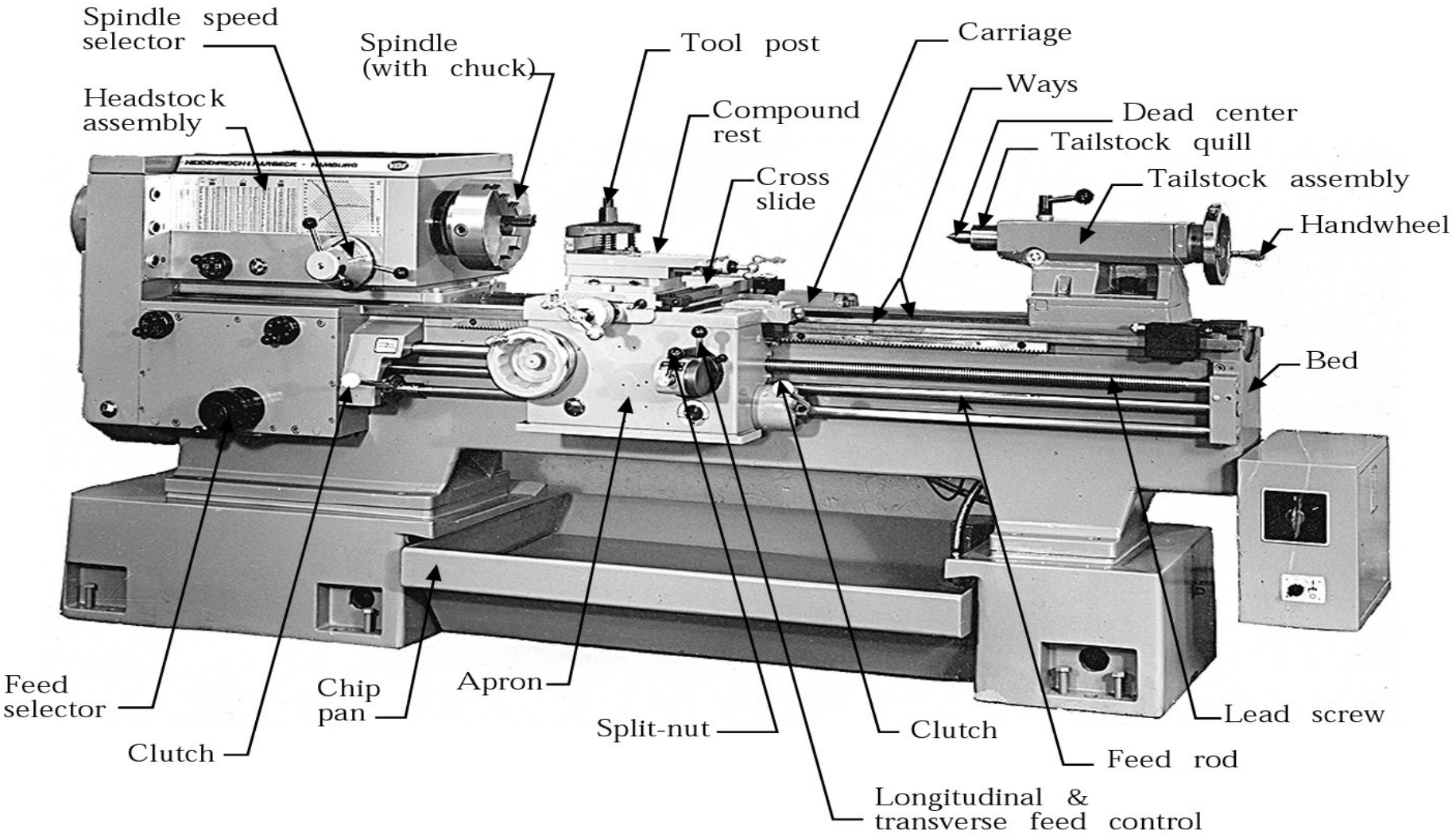
**Turret Lathe**

lathe which have multiple tools mounted on turret either attached to the tailstock or the cross-slide, which allows for quick changes in tooling and cutting operations.

**Computer Controlled Lathe**

A highly automated lathe, where both cutting, loading, tool changing, and part unloading are automatically controlled by computer coding.

# Component Description



# Lathe Operations

**Turning:**produce straight, conical, curved, or grooved workpieces

**Facing**: to produce a flat surface at the end of the part or for making face grooves.

**Boring:** to enlarge a hole or cylindrical cavity made by a previous process or to produce circular internal grooves.

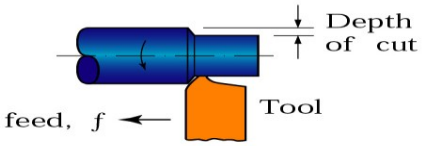
**Drilling:** to produce a hole by fixing a drill in the tailstock

**Threading:** to produce external or internal threads

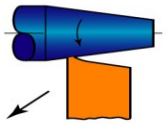
**Knurling:** to produce a regularly shaped roughness on cylindrical surfaces

# Lathe Operations

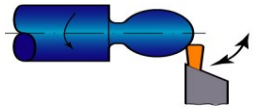
(a) Straight turning



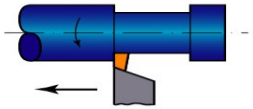

(b) Taper turning



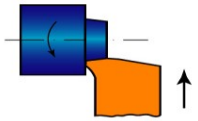
(c) Profiling



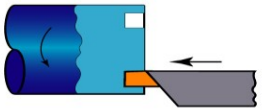
(d) Turning and external grooving



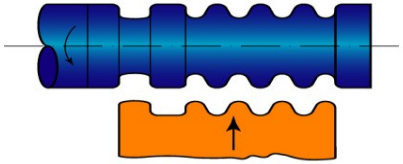
(e) Facing



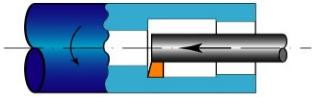
(f) Face grooving



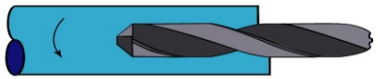
(g) Cutting with a form tool



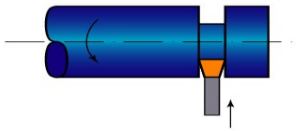
(h) Boring and internal grooving



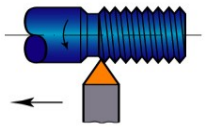
(i) Drilling



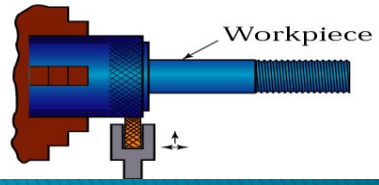
(j) Cutting off



(k) Threading

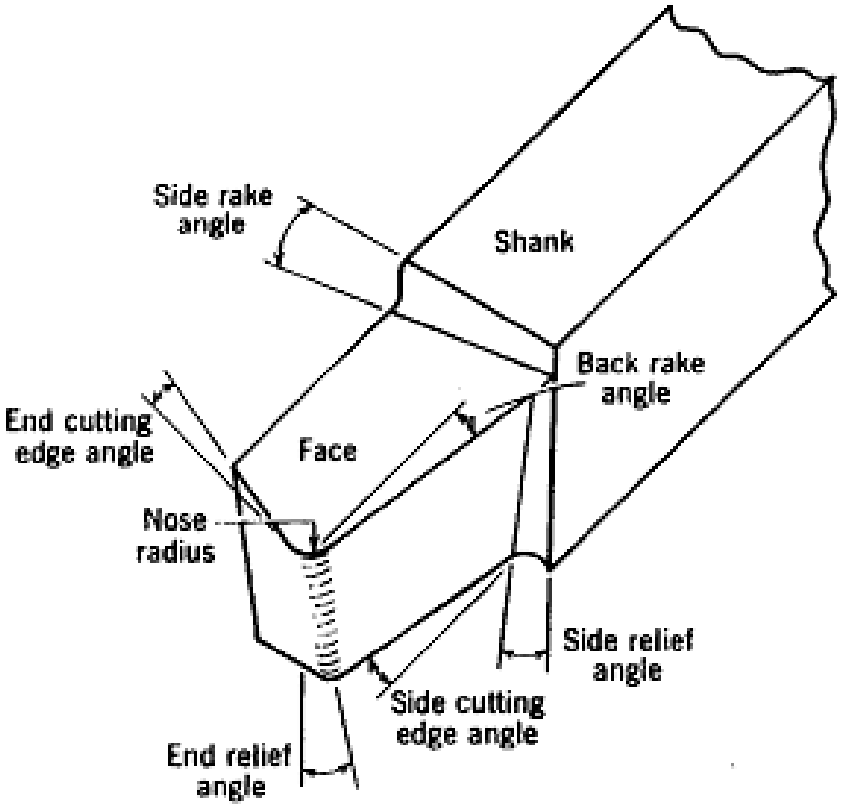


(l) Knurling



# Cutting Tools

**Single point cutting tool**



# Work Holding Devices

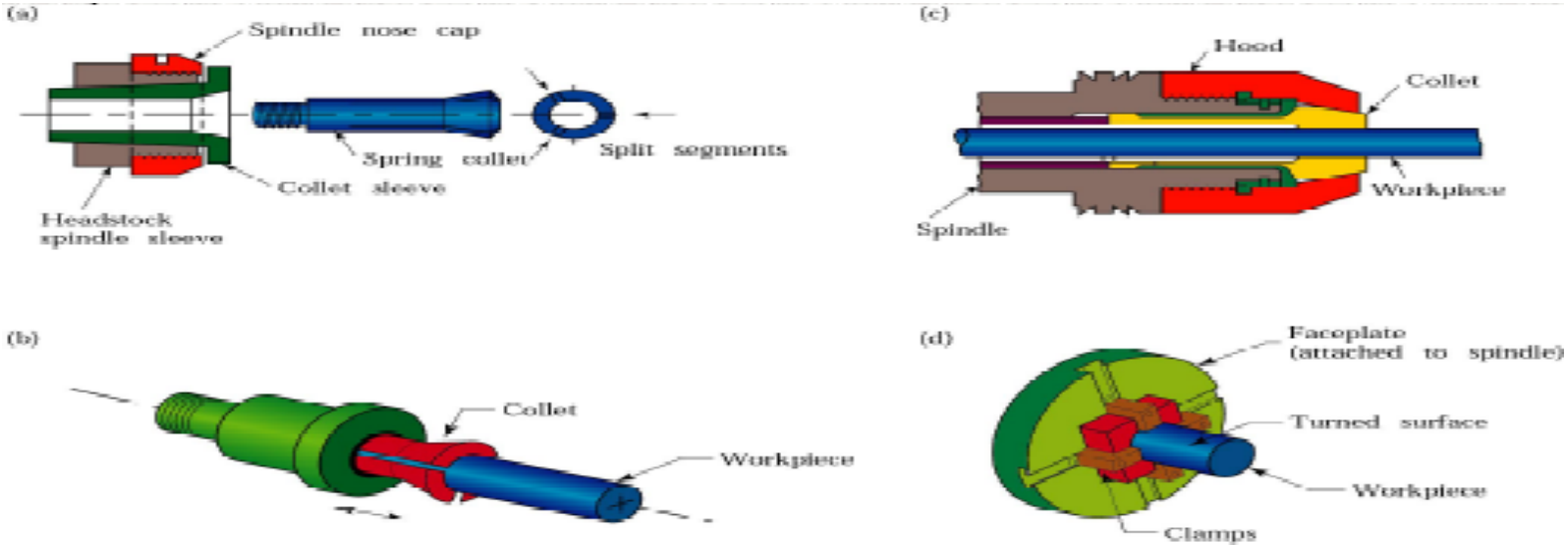



*Fig : (a) and (b) Schematic illustrations of a draw-in-type collets. The workpiece is placed in the collet hole, and the conical surfaces of the collet are forced inward by pulling it with a draw bar into the sleeve. (c) A push-out type collet. (d) Workholding of a part on a face plate.*

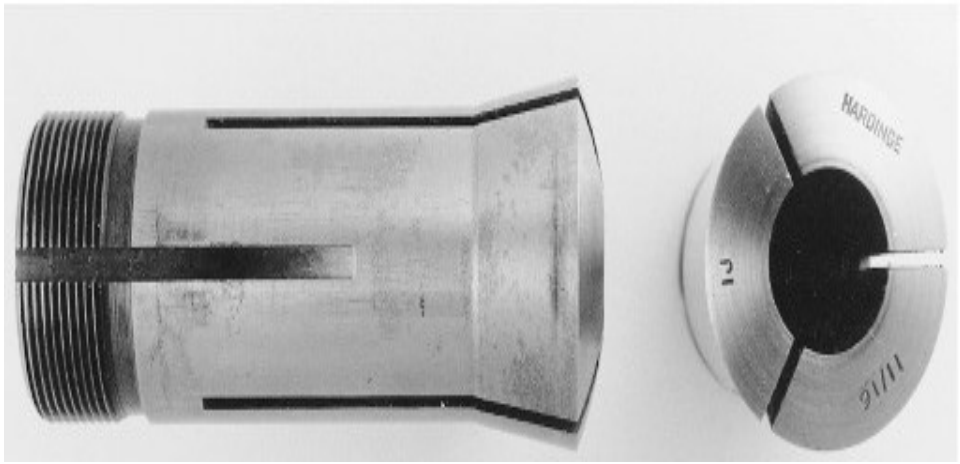
## Three jaw chuck

**- For holding cylindrical stock centered.**
**- For facing/center drilling the end of your aluminum stock**

## Four-Jaw Chuck

**- This is independent chuck generally has four jaws , which are adjusted individually on the chuck face by means of adjusting screws**

# Collet Chuck




**Collet chuck is used to hold small workpieces**

# Magnetic Chuck


**Thin jobs can be held by means of magnetic chucks.**

Cutting speed (V) = ΠDN/1000 M/min

Depth of cut (D) = $(D_1-D_2)/2$ mm

Where $D_1$=original diameter and $D_2$ = final diameter of the work piece

Metal Removal Rate (MRR) = Π x D x d x f  mm3

In terms of cutting speed (V in mm/min), MRR=1000 x V x d x f

Where D represents original diameter of the work piece in mm
Where N represents revolution per minute (rpm)

Where d represents depth of cut in mm

Where f represents feed in mm/rev

Taper Turning
Tan α = $(D_1- D_2)/2L$  where α = angle of taper

$D_1$= major diameter in mm
$D_2$= minor diameter in mm
L= Length of taper in mm
The taper is defined as K = $(D_1- D_2)/L$

# References

Book
• work shop Technolgy by Hajra choudry
• Advances in Manufacturing Technology C.J Thomas

Website
• www. engbasics.com
• www. efunda.com