MIT - WORLD PEACE UNIVERSITY

F.Y. B. TECH.

Trimester - I

Subject : Basic Mechanical Engineering.

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Batch : I3

Experiment : 3

Name of Experiment : Demonstration of various operations on a Lathe machine.

Performed on : 2nd September 2021

Submitted on : 9th September 2021

Aim :

To study the various operations such as Turning, facing, boring, taper turning, knurling, grooving, threading etc on a centre lathe Machine.

Theory :

A product is made up of many components which are manufactured over by various processes such as casting, forging, welding, machining etc. depends on the application and cost of that particular component. These can be done on a centre Lathe Machine.

Lathe :

is a machine tool which rotates the work piece on its axis to perform various operations such as cutting, sanding, knurling, drilling or deformation with tools that are applied to the work piece to create an object which has symmetry about an axis of rotation.

rainbow

examples of objects that can be made on a lathe include - candlestick holders, gun barrels, sticks, bowls, table legs, baseball bats, musical instruments, crankshafts etc.

Lathe Operations :

The variation of tool ends and a kinematic relation between the tool and workpiece results in different operations on a lathe. Some are explained below :

(1) **Turning :** This is the basic operation of lathe Machine to produce cylindrical surfaces. The tool is fed parallel to the rotating work axis to create cylindrical surfaces.

(2) **Facing :** The tool is fed radially into the rotating work on one end to create a flat surface.

(3) **Taper Turning :** Instead of feeding the tool parallel to the axis of rotation of the work, the tool is fed at an angle, thus creating a tapered cylinder or conical shape.

(4) **Chamfering :** The cutting edge of the tool is used to cut an angle of the corner of the cylinder forming what is called a chamfer.

(5) **Knurling :** It is a metal forming operation used to produce a regular cross hatched pattern on the work surface.

Components of a Lathe Machine and their functions:

(1) **Bed:** Almost all lathes have a horizontal beam is called as bed. It has guide ways on it for sliding and supporting tail stock and carriage

(2) **Head stock:** At one end of the bed (mostly left) is a head stock. It contains drive mechanism with necessary speed change arrangement to achieve different speeds. It is also having a chuck used to hold the job.

(3) **Tail stock:** It is placed opposite to headstock. It can move along guide ways. Its main applications are to hold long jobs to avoid vibrations and excessive deformation and for drilling axial holes in the work piece. It can also hold tools such as drills, reamers, etc to drill, ream etc.

(4) **Carriage:** It is located between headstock and tailstock. It can be moved in any direction horizontally, and can be fixed in any position. It has the following parts:

i. **Saddle:** Base Portion located across bed. carries cross slide and tool post.

ii. **Apron:** It is attached to the saddle and appears as hanging on the front side. It consists of gears for motion transmission.

iii. **Cross slide:** It is mounted on top of saddle and acts as support to compound rest.

iv. **Compound rest:** It is mounted on a cross slide and consists of swivel and top slide.

v. Tool Post : It is used to hold the tool position as per requirement.

Conclusion :

The components, working and applications of the Lathe were studied.

Lathe is a machine which rotates the work piece on its axis to perform various operations.

The major operations on the Lathe ~~Operations~~ Machine were studied and understood. Operations like Turning, Facing, Chamfering, Taper Turning, Drilling, Knurling were studied in detail.

Questions

(1). List out ~~types~~ of Lathe

A. i. Centre Lathe Machine
2. Speed Lathe Machine
3. Bench Lathe Machine
4. Toolroom Lathe Machine
5. Capstan and Turret Lathe Machine.

(2) How is size of a lathe Specified ?

A. Lathe size, is the dimension of the largest cylinder that can be machined on it. Two main dimensions frequently included in Lathe Model code are:
i. Distance between chuck and Tailstock
ii. Max diameter of detail (a) Over Lathe Bed
(b) Over Carriage.

3. What are the different components mounted on a Lathe? Explain any 2.

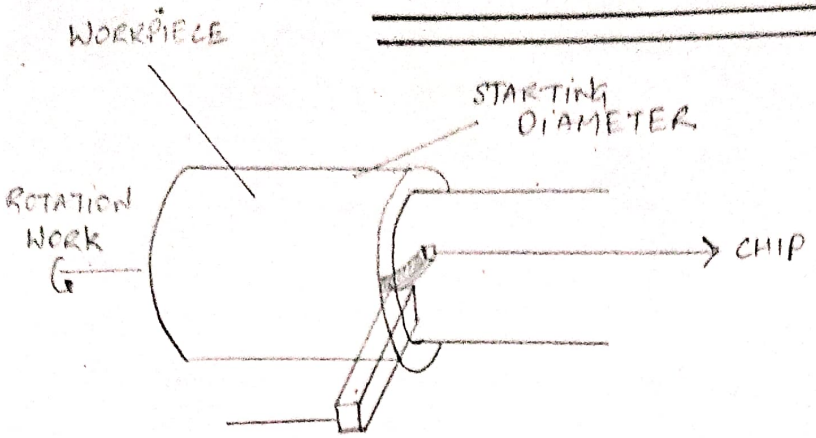
A The components of a carriage are:

1. Saddle
2. Cross-slide
3. Apron
4. Compound Rest
5. Tool-Post

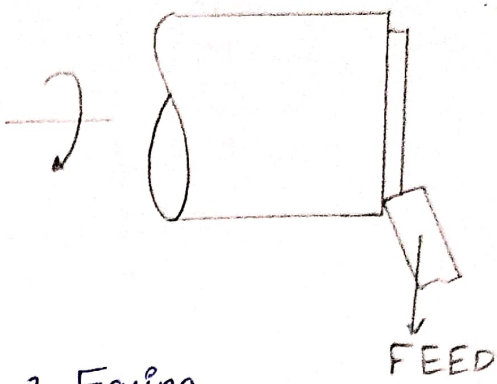
→ Saddle is the base portion located ~~between headstock and tailstock~~ across lathe bed and carries cross slide and ~~tool~~ post. It can be moved longitudinally along the bed.

→ Cross slide : It is mounted on top of the saddle and acts as support to compound rest.

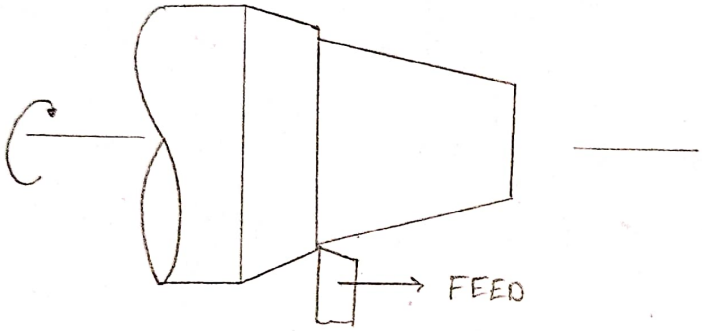
Various Lathe Operations



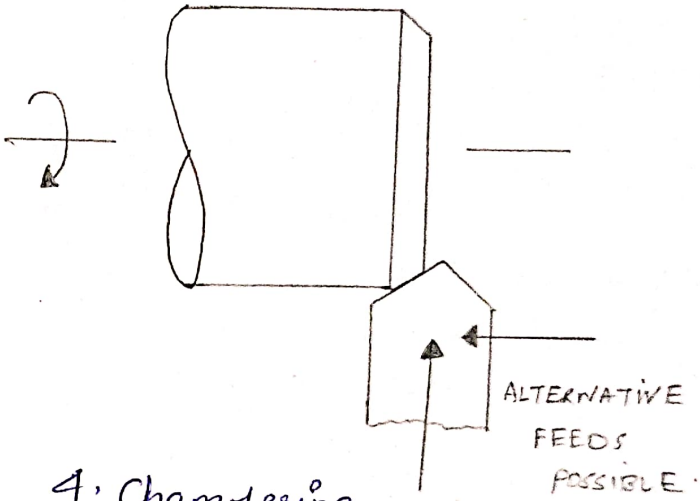
1. Turning.



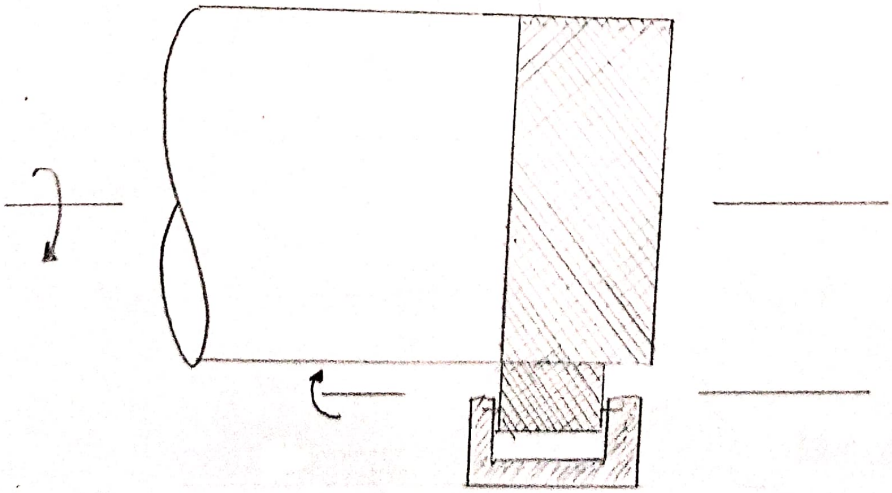
2. Facing



3. Taper Turning



4. Chamfering.



5. Knurling