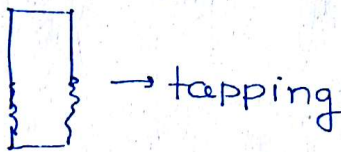
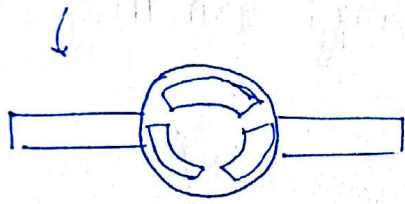


Screw and Gear manufacturing:-

Lathe-chasing:-

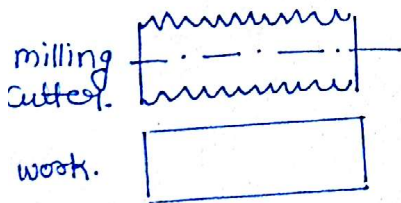
Cutting screw thread over a lathe is called thread chasing but when a lathe is hand automated to produce screw thread in mass is called Swiss automated.

Die threading:-



Die threading is a process of producing external thread and tapping is a process of producing internal thread manually.

Thread Milling:- once the required depth is achieved tool is withdraw and work blank is index. any type of thread can be produce on milling machine



but thread produce are accurate. Because index mechanism are not accurate.

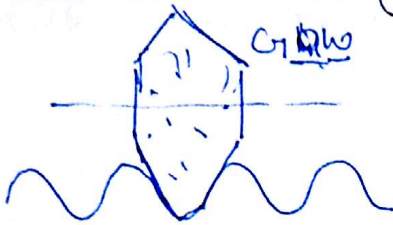
Thread Rolling:- Thread are produced by purely plastic deformation.

work bank is pressed between the two plate die. Whatever threads on the die will be reproduce on the work. Since the thread are produced by plastic

deformation so thread will stronger but thread only produced on soft material only.

Internal thread Can't produce.

Thread Grinding:- Since it is Form Grinding wheel wear will be quite high so threads will be expansive but most accurate threads are produce by thread Grinding.

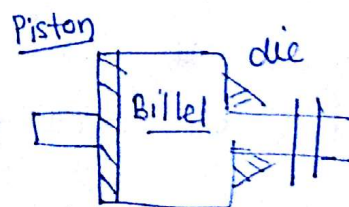
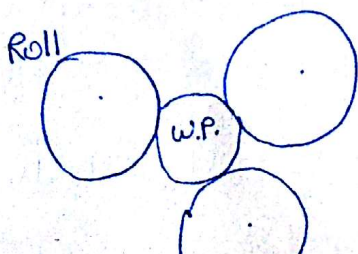


Gear Materials:-

1. Cast iron (for heavy gear) by Casting
2. steel (power transmission)
3. Bronze - (worm Gears) } because it has high resistance
4. Al alloy (Noise less operation)
5. Plastics & Nylons
 - ↓ toys
 - ↓ Xerox Machine.

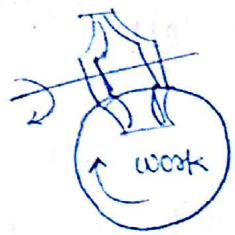
Methods of Gear Manufacturing:

- ① Casting
- ② Forming
 - Rolling
 - Extrusion (both direct & indirect) } both are used for soft material.

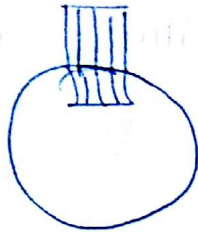


both spur & helical gear can produce.

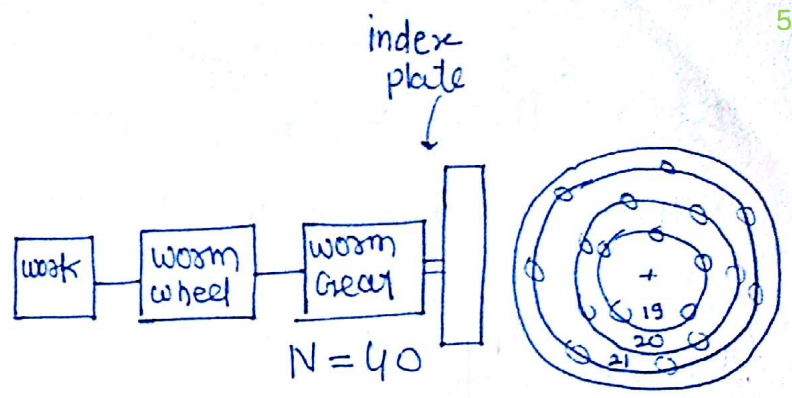
Gear milling



Slab milling



eng milling



19, 20, 21

* No. of teeth on ^{worm} Gear ~~is 40~~ (N=40) Always (until Not Given)

eg. N=30 (suppose we have to produce on work)

$$\frac{40}{N} = \frac{40}{30} = 1\frac{1}{3} \rightarrow \text{multiple this digit with an enter so it become either 19, 20, 21}$$

$$N = 1 + \frac{1}{21} \rightarrow \text{put pin in 7th hole after 1 complete rotation}$$

if $N = 50$

$$\frac{40}{N} = \frac{40}{50} = \left(\frac{4}{5}\right) \times \frac{4}{4} = \frac{16}{21}$$

16th hole

Gears can be cut on a gear machine both by using slab milling and end milling process.

Once the required tooth depth is achieved cutter is withdrawn and work blank is index by one pitch

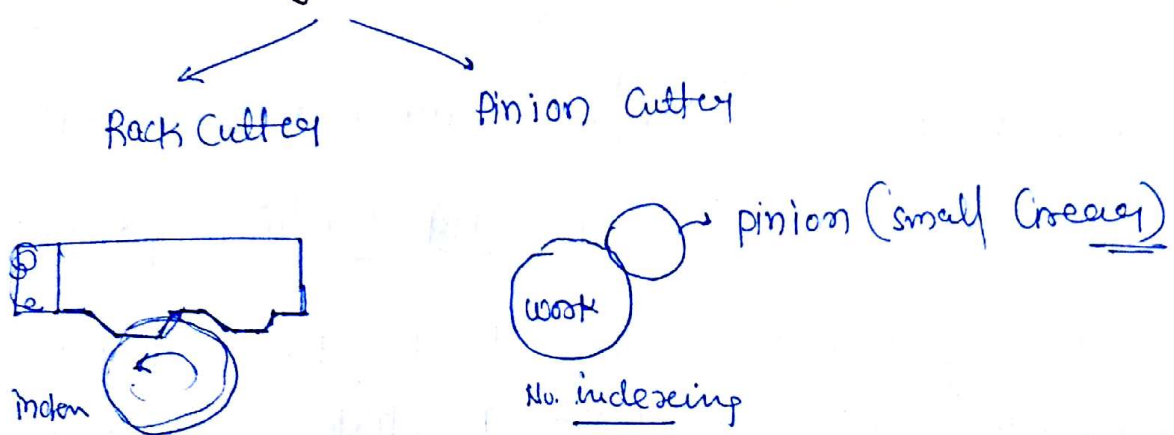
Since indexing mechanism is govern by Gear train So this pitch will have backlash error in it.

So teeth produce will not be accurate by any type of Gear cut on a milling machine.

Gear broaching:-

- Broaches that are used for machining of Gear are initial a pilot hole is drilled in the workpiece and when we pull the broach through it all the teeth can be produce
- ⇒ Both internal as well as external Gear can be produce by this method.
- ⇒ Very accurate ~~and~~ Gear can be produced since broaches are expensive so used only for mass production.

Gear shaping :-



In Gear shaper with Rack type cutter once the required tooth depth is achieved cutting tool is ~~with~~ withdrawn ~~as~~ and workpiece is indexed.

only external gears produce by this method
 Since there is indexing mechanism so ~~Good~~
 Gear produce will not be accurate

In pinion type cutter once the required depth is achieved three motion start simultaneously (i) Rotatory motion of pinion
 (ii) ——— work
 (iii) Reciprocating motion of pinion.

Since there is a Continuous Indexing mechanism is involved so gear produced will be accurate.

Both internal as well as external gear can be produced by shaping machine

Both helical and spur gear can be cut but when the helical gear has to be produce work is mounted on the helical drive.

Gear hobbing



ψ = helix angle

$\phi = 90^\circ - \psi$ (for spur Gear)

$$\frac{\text{rpm of Hob}}{\text{rpm of work}} = N$$

double start = $\frac{N}{2}$
 = $\frac{N}{3}$

It is the fastest method of producing gears. By using a single hob any type of helical and spur Gear can be produced.

Hob works on the principle of a screw thread but it is a splined screw in which each and every thread act like cutting edge.

Initially hob is lowered to a point to cover the entire tooth depth then 3 motions start simultaneously.

- (i) Rotating motion of hob
- (ii) Rotational motion of work
- (iii) Axial movement of work

The rpm of work and hob should be such that if it is a single start hob, in one rotation of hob work should advance by

1 pitch and so on - -

This process can not produce internal Gear and Gear with splines.