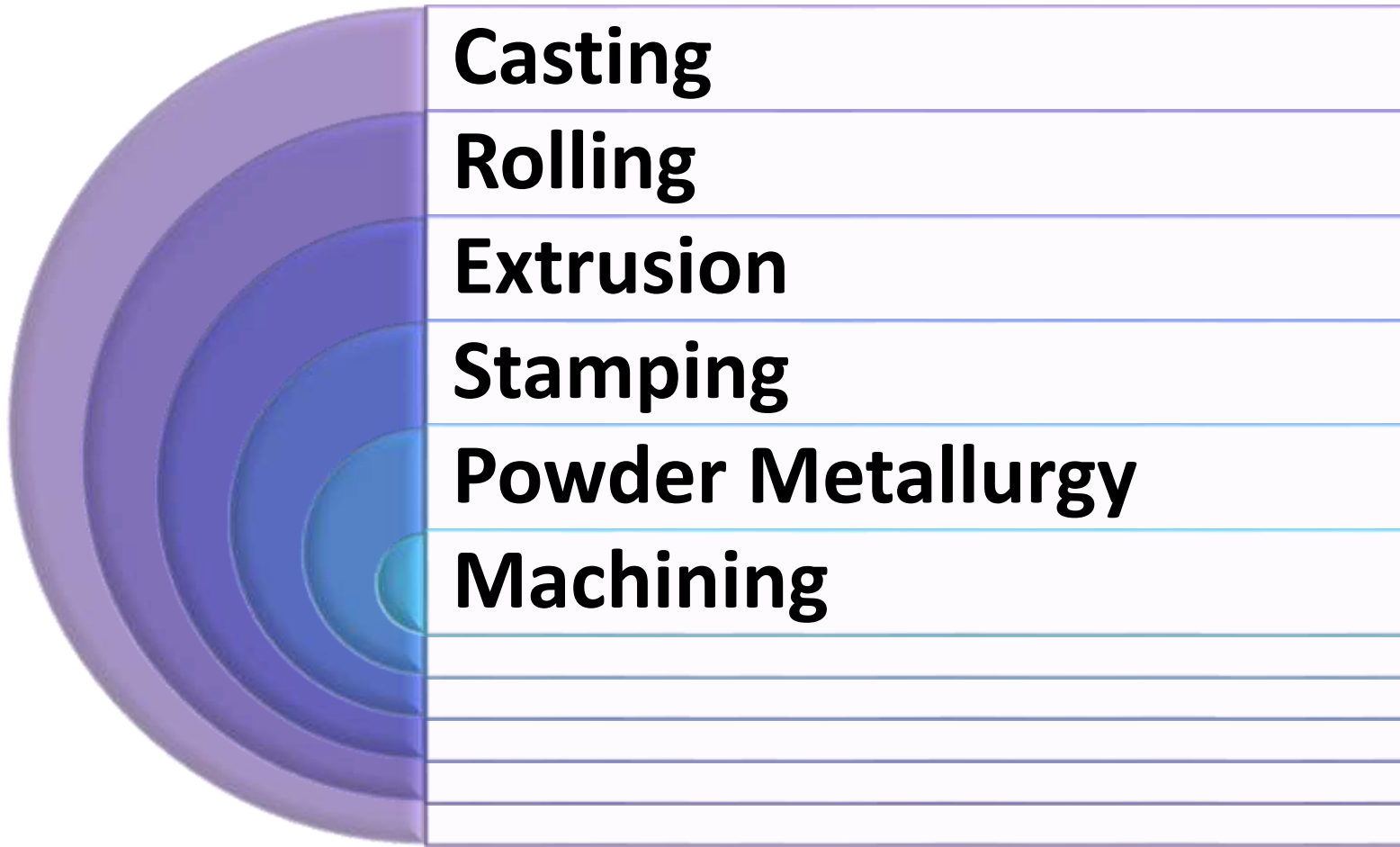


Gear Cutting

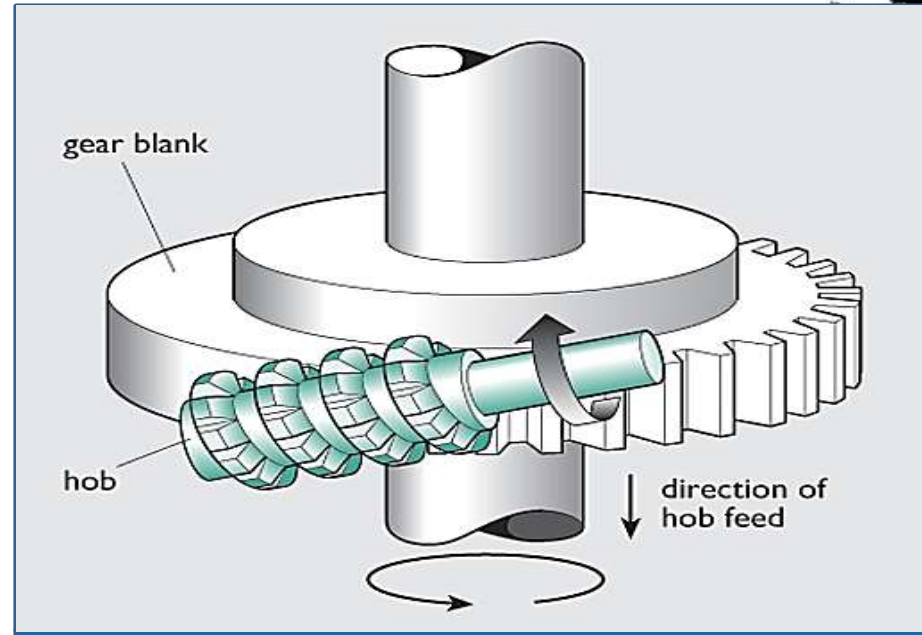
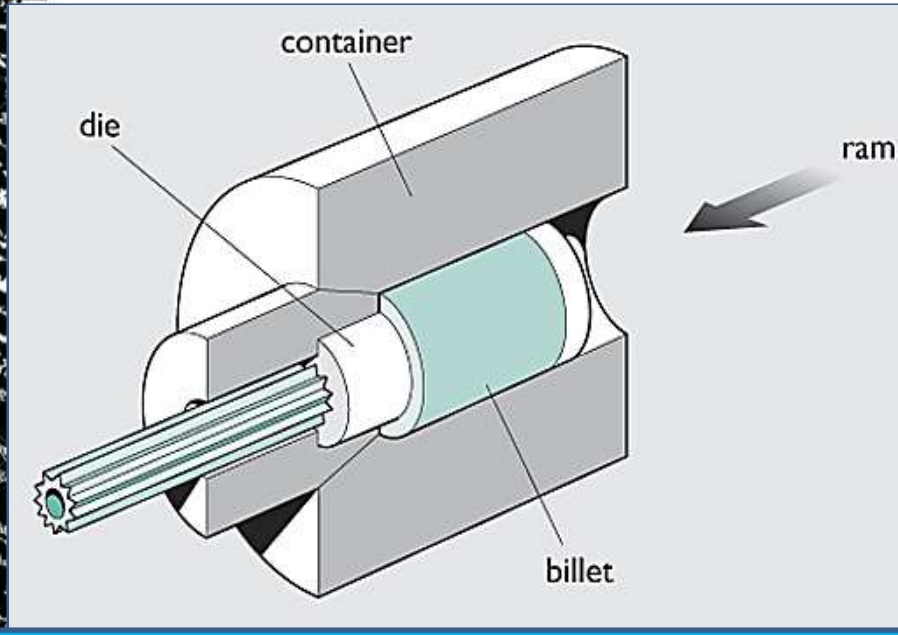
Introduction

- A gear is a rotating machine part having cut teeth's, which mesh with another toothed part to transmit torque.
- Gear is cut from round blank carrying teeth along its periphery.
- Gear cutting is specialized job.
- Gear cutting is any machining process for creating a gear.

Gear manufacturing methods

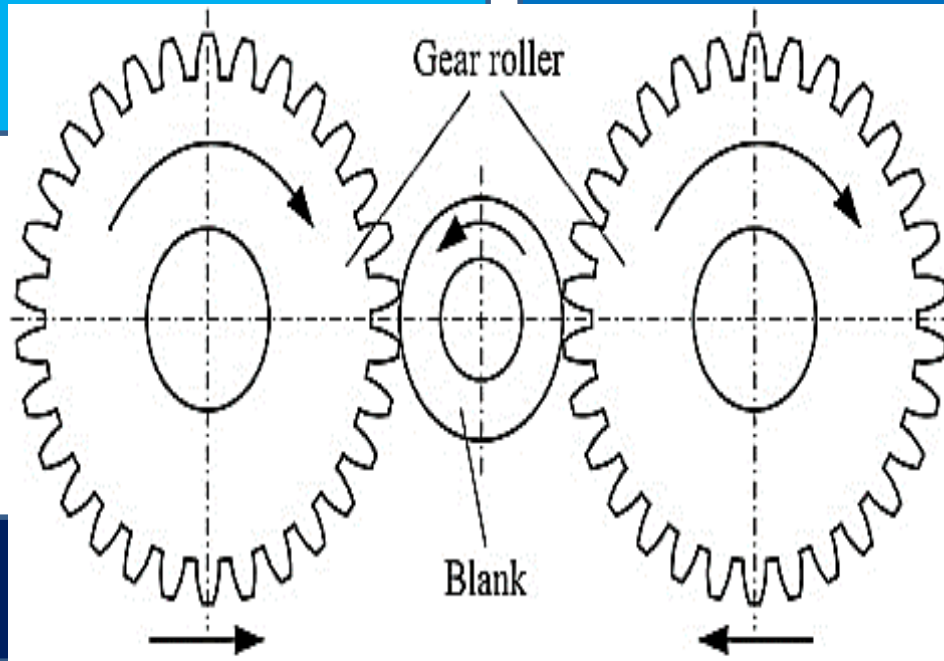


Gear manufacturing methods



Extrusion

Machining

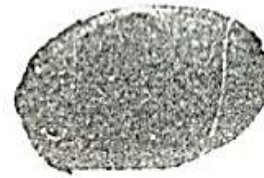


Rolling

Gear manufacturing methods



Casting



Blended Powder



Compacted Rigid Tooling
(Powder compacted rigidly)



Pre-sinter



Repress or Coining



Re-sinter



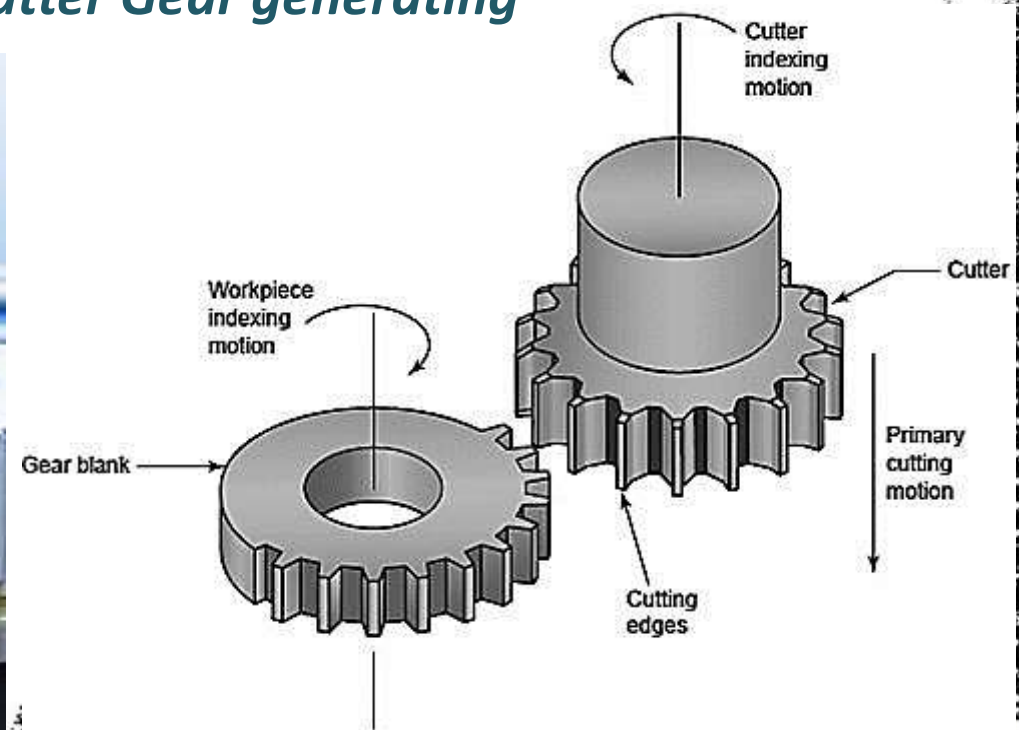
Gear

Powder Metallurgy

Gear shaping

Principle-

- In this process, a pinion shaped cutter is used, which is mounted with its axis vertical & is reciprocating up & down. This process is the most versatile of all gear cutting processes. Also, the cutter and the gear blank both are rotated slowly about their own axis.
- It is also known as ***Pinion Cutter Gear generating***



Cont..

Advantages

- Most Accurate gear tooth profiles are generated by this method.
- Rate of production of gear is higher than form cutter method..
- The same cutter of any given pitch can cut gears of any number of teeth of same pitch.

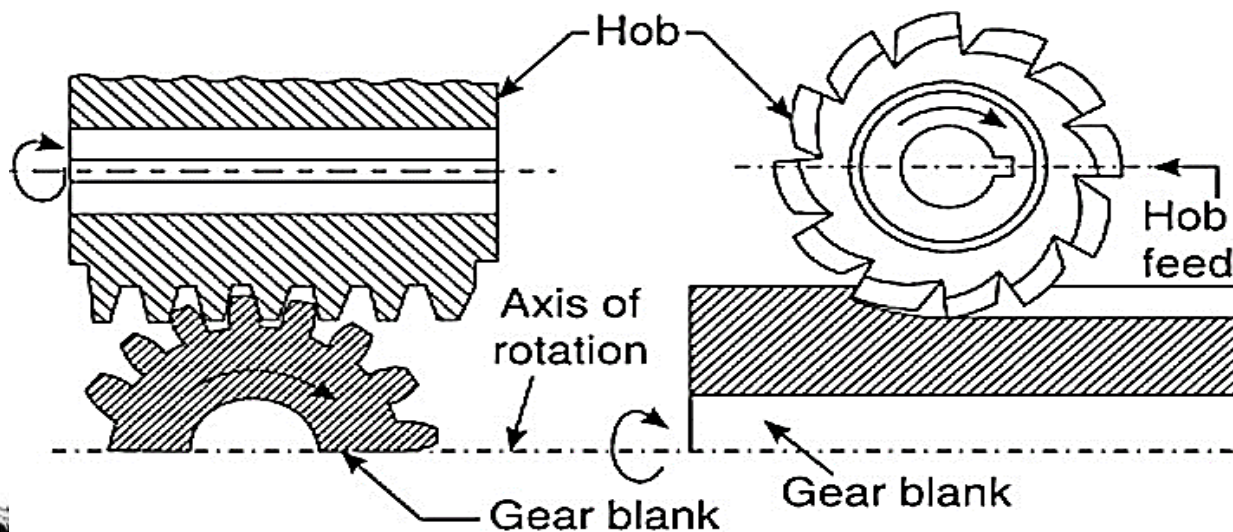
Disadvantages

- Not suitable for internal gears Owing to the reciprocating action of cutter, there is no cutting on the return stroke in gear shaper.
- Worms & Worm wheels cannot be generated on gear shaper.
- The rate of production is lower than gear hobbing process due to periodical indexing hence more machining time.

Gear Hobbing

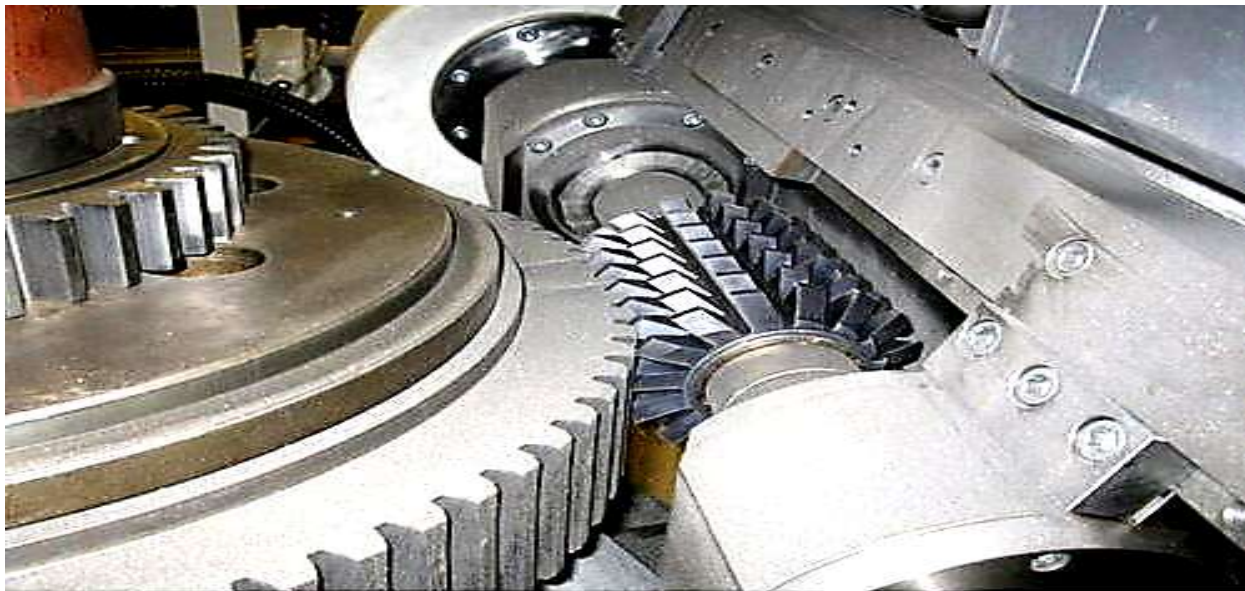
Principle: -

- Gear Hobbing is also a milling operation, but the cutter, called a **hob**, is much more complex and therefore much more expensive than a form milling cutter.
- Special milling machines (called Hobbing machines) are required to accomplish the relative speed and feed motions between the cutter and the gear blank. It is the hob has a slight helix and its rotation must be coordinated with the much slower rotation of the gear blank in order for the hob's cutting teeth to mesh with the blank's teeth as they are being cut.
- This is accomplished for a spur gear by offsetting the axis of rotation of the hob by an amount equal to 90° less the helix angle relative to the axis of the gear blank.



Cont..

- Hob teeth are shaped to match the tooth space and are interrupted with grooves to provide cutting surfaces.
- It rotates about an axis normal to that of the gear blank, cutting into the rotating blank to generate the teeth. It is the most accurate of the roughing processes since no repositioning of tool or blank is required and each tooth is cut by multiple hob-teeth, averaging out any tool errors.



Rack cutter gear generating process

Principle:-

- Gear cutting using rack type cutter Gear shaping is performed by a rack cutter with **3–6 straight teeth**.
- The cutters reciprocate parallel to the work axis when cutting spur gears, and parallel to the helix angle when cutting helical gears.
- In addition to the reciprocating action of the cutter, there is synchronized rotation of the gear blank with each stroke of the cutter, with a corresponding advance of the cutter in a feed movement.

