## *GEAR(S)*

Definition;

Gear is the machine component that is used to transmit **Mechanical Power** from one shaft to another shaft by successively changing of its teeth.

Also, Gear is simply known as the simple machine because of the following reason that **it produces a change in torque** and thus creating a mechanical advantage through their Gear Ratio.

Also, Gear can be defined ***as a rotating machine that has got teeth which mesh with another toothed part so as to transmit torque.***

So, Gears are used to transmit power and motion and Geared devices changes speed, torque and direction of a power source.

### ADVANTAGES OF GEAR(S)

i. It transmits exact velocity ratio.
ii. It can be used to transmit large power.
iii. It has high efficiency.
iv. It has reliable service.
v. It is compact in construction.
vi. It may be used for small center distance of shafts.

### DISADVANTAGES OF GEAR(S)

i. It is manufacturing costly, because it requires special tools and equipment's.
ii. Error in cutting teeth can cause vibration and noises during its operation.
iii. It requires suitable lubricant and reliable method of applying it for proper operations.
iv. No flexibility
v. It is not suitable when shafts are at distance.

### CLASSIFICATION OF GEARS

Gears have been classified according to the following categories;

- According to the position of axes of shafts.
- According to the peripheral velocity of the gears.
- According to the type of Gearing.
- According to the position of teeth on the gear surface.

- According to the position of axes of shafts

These axes of shafts that motion is to be transmitted may be

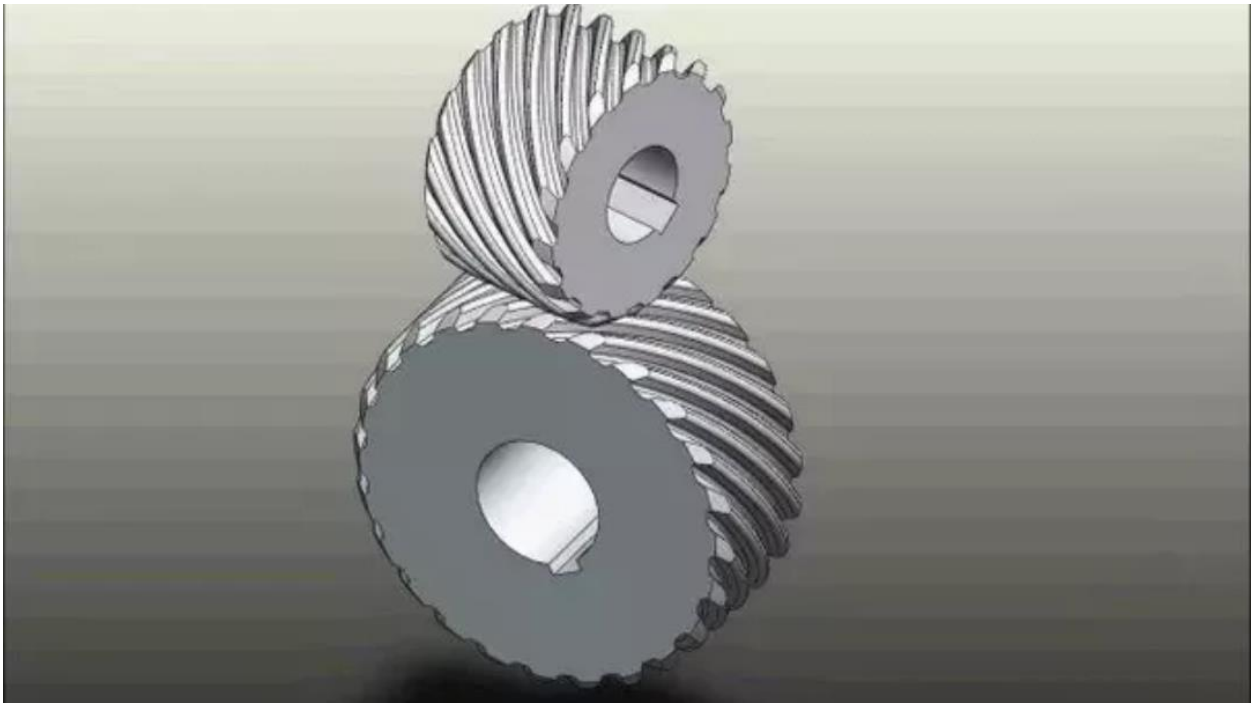
- Parallel
- Intersecting
- Non-intersecting
- Non-parallel

The two parallel and coplanar shafts are called Spur Gear

Another name given to Spur Gearing is Helical Gearing i.e. Helical gears which are of two types that is Single and Double Helical Gear, are shown below

And Non-Parallel and Intersecting but coplanar shafts are called bevel gears, they are shown below

The Non-Intersecting and non-parallel that is non-coplanar shafts connected by gear are called skew bevel gears or spiral gears'



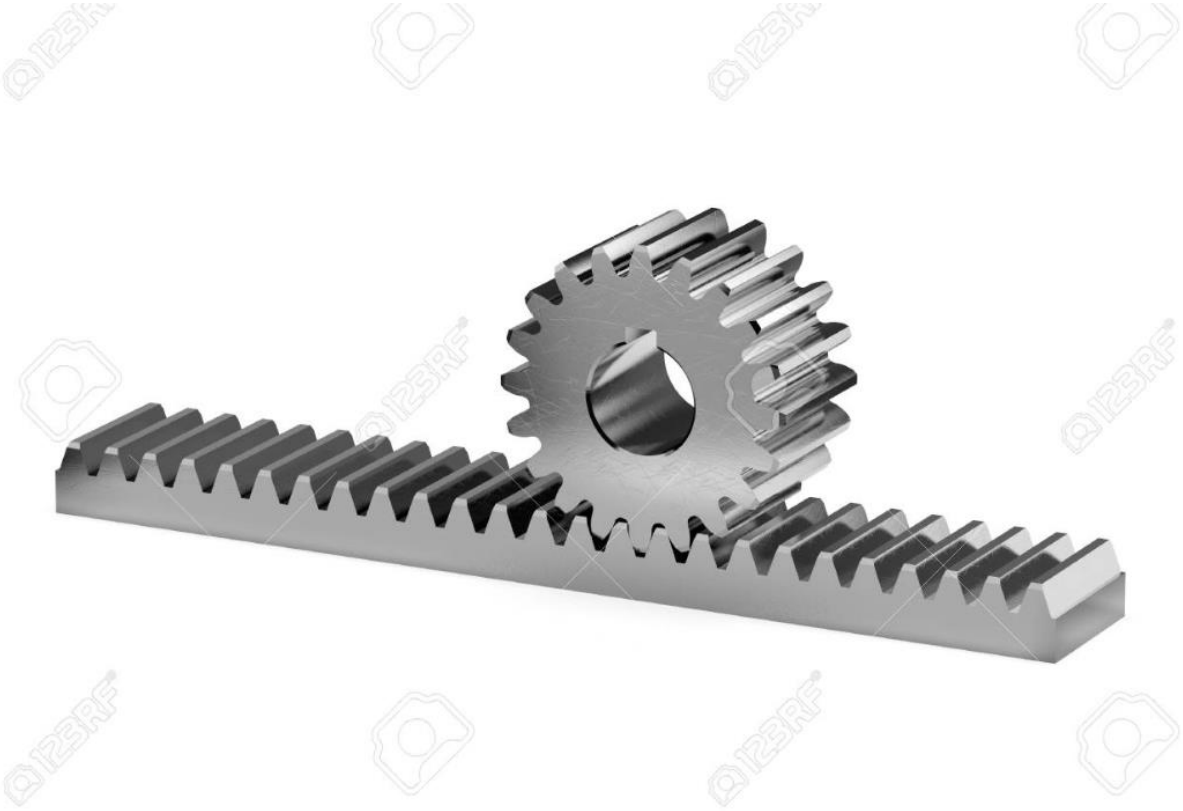
- According to the peripheral velocity of the gears
  Here it includes the following types;
  - Low velocity, gears having velocity less that 3m/s
  - Medium velocity, gears having velocity between 3m/s-15m/s
  - High velocity, gears having velocity greater than 15m/s.

- According to the type of Gearing
  Here it includes the following;
  - External gearing
  - Internal gearing
  - Rack and Pinion.

External gearing means gears mesh externally with each other whereby larger is called Spur gear and the smaller one is called pinion.

Internally gearing means gears mesh internally with each other whereby the larger gear is called Annular and the smaller one is called Pinion.

But note that sometimes the two-wheel mesh both externally and internally and this type is called Rack and Pinion whereby straight-line gear is called Rack and the circular wheel is called Pinion.



- According to the position of teeth on the gear surface

Here at this type it includes the following

- Straight
- Inclined
- Curved

Whereby spur gears have straight teeth, helical gears have inclined teeth and the spiral gears have curved teeth.