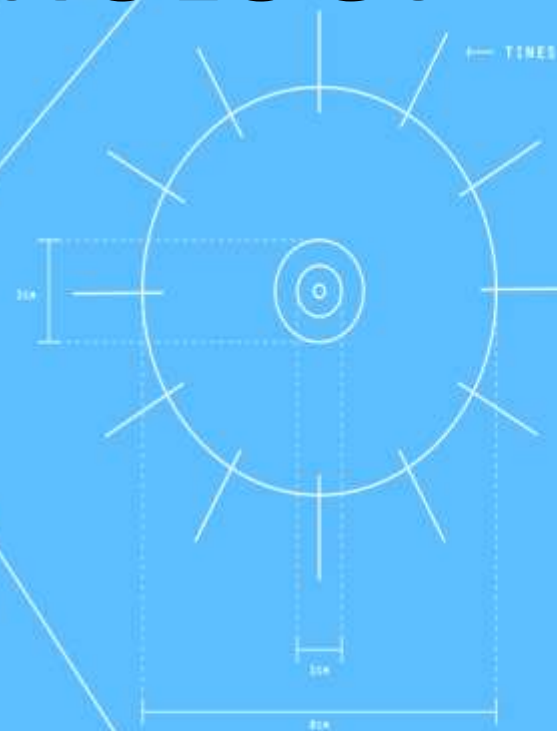
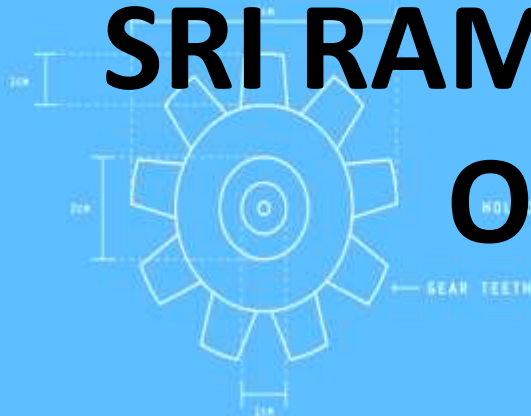


GEAR 1

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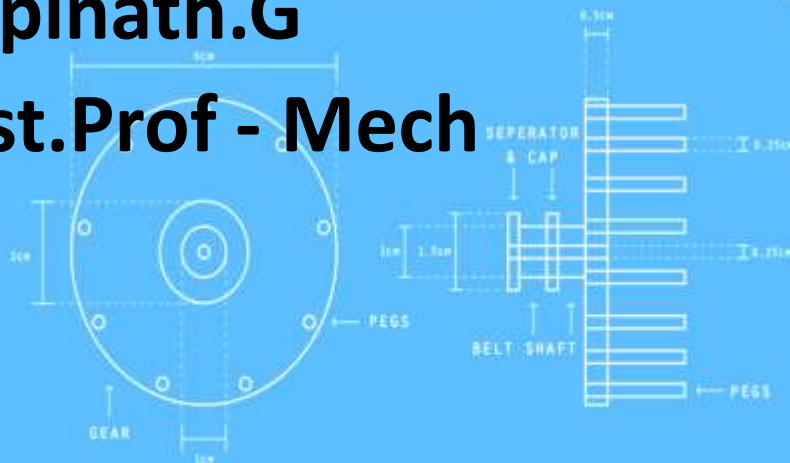
GEAR 3



GEAR 2

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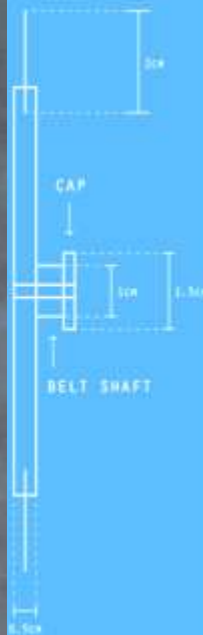
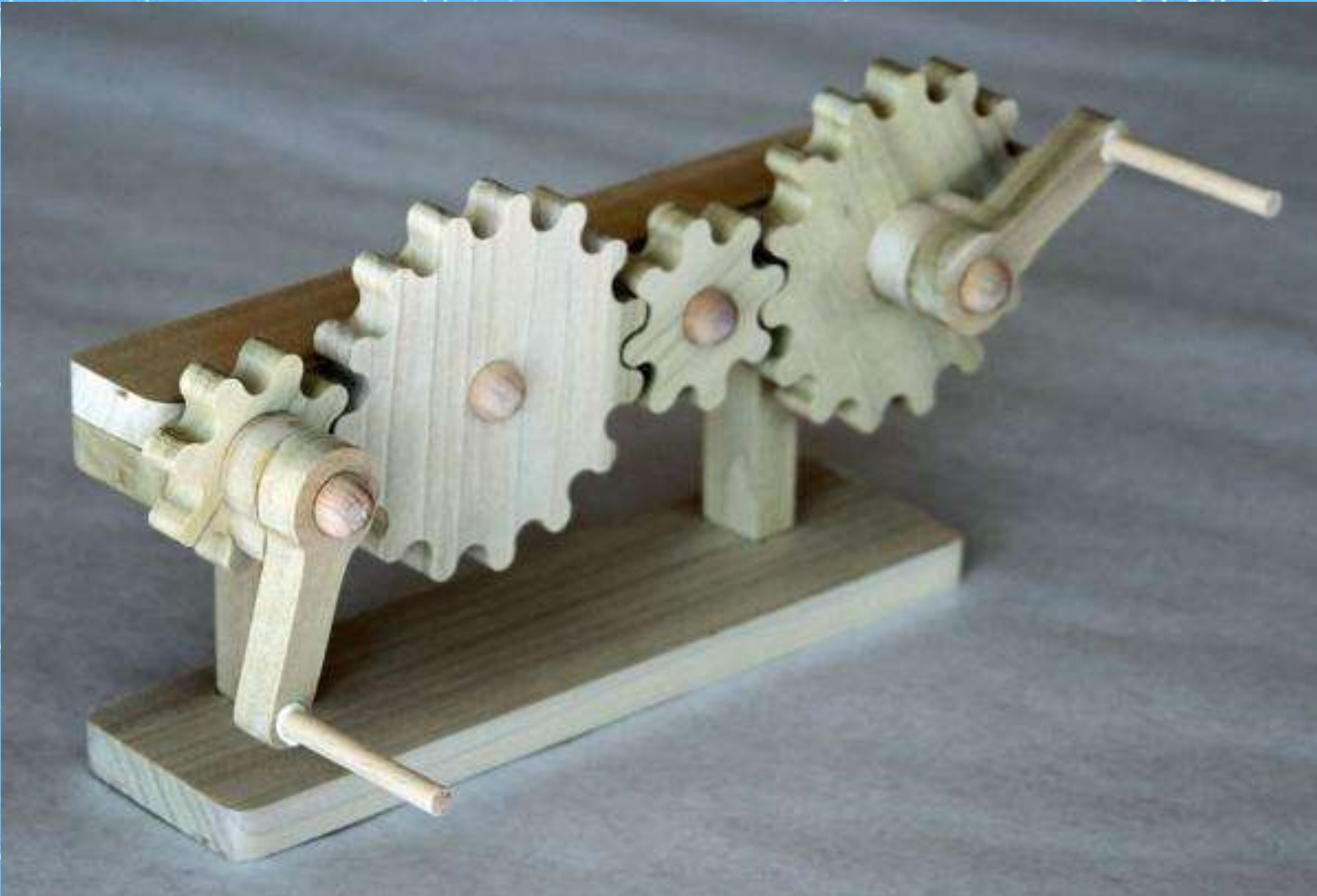
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SCALE 1:1

GEAR 1

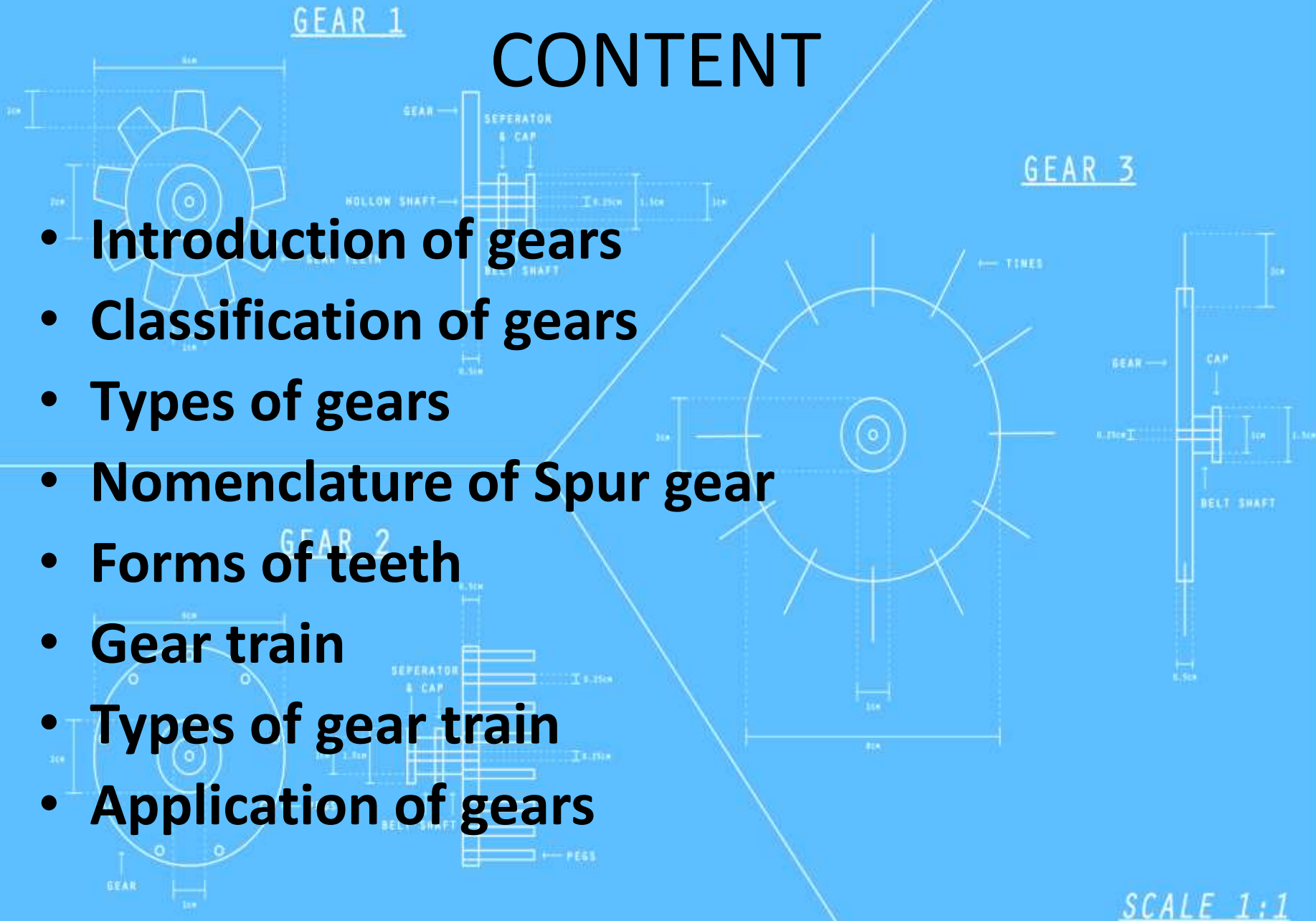
Gears



SCALE 1:1

CONTENT

- Introduction of gears
- Classification of gears
- Types of gears
- Nomenclature of Spur gear
- Forms of teeth
- Gear train
- Types of gear train
- Application of gears



SCALE 1:1

GEAR 1

Introduction

GEAR 3

Gears are used to transmit motion from one shaft to another or between shaft and a slide. This is achieved by successfully engaging teeth. Gears used no intermediate links or connector and transmit the motion by direct contact. The surface of two bodies make a tangential contact. The two bodies have either a rolling or a sliding motion along the tangent at the point of contact.

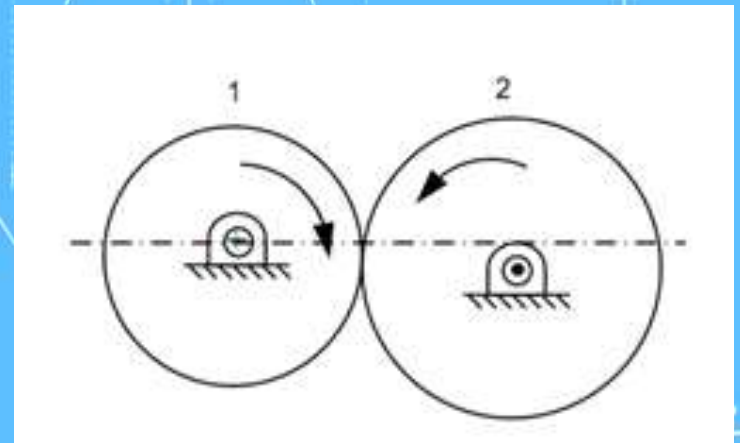
GEAR 2

SCALE 1:1

If power transmit between two shafts is small motion between them may be obtain by using two plane cylinder or discs 1 and 2 if there is no slip of one surface relative to another a definite motion of 1 can be transmit to 2 or vice-versa the wheel is termed as friction wheel.

Assuming no slipping of the two surfaces then the linear velocity will be

$$V_p = \omega_1 r_1 = \omega_2 r_2$$

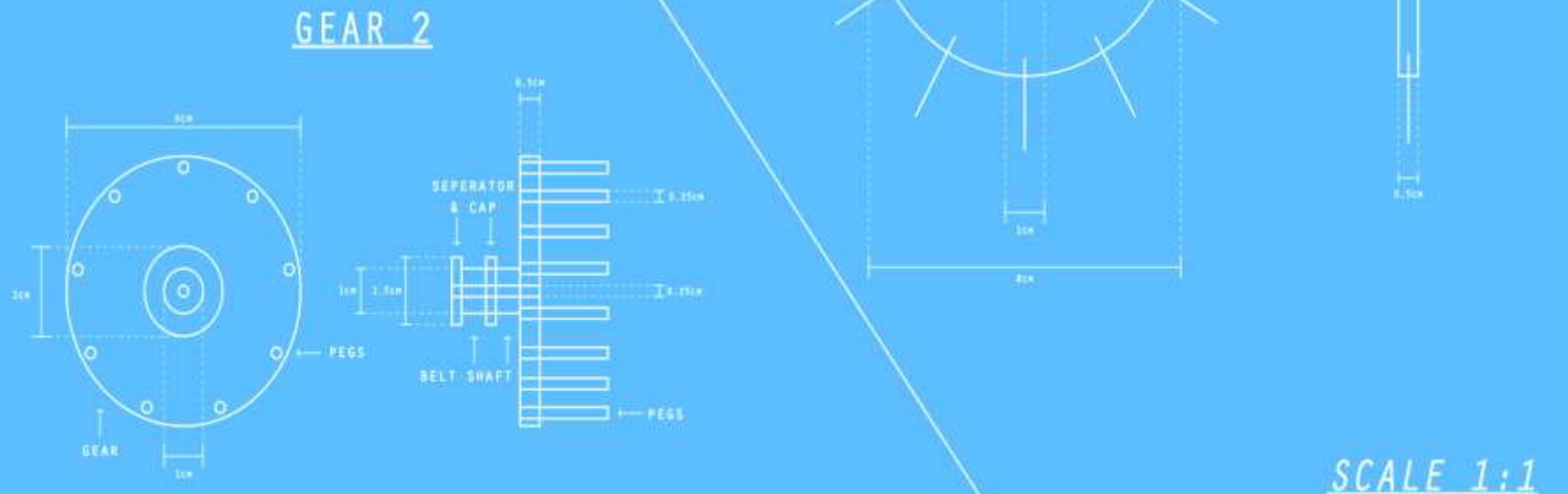


$$= 2\pi N_1 r_1 = 2\pi N_2 r_2$$

$$= \omega_1 / \omega_2 = N_1 / N_2 = r_2 / r_1$$

$$\Rightarrow \omega \propto 1/r$$

Angular velocity is inversely proportional to radii of the disc which shows the discs is rolling without slipping.



[illegible]

1. Parallel

3. Non-Intersecting & Non-Parallel

1. Low velocity

3. High velocity

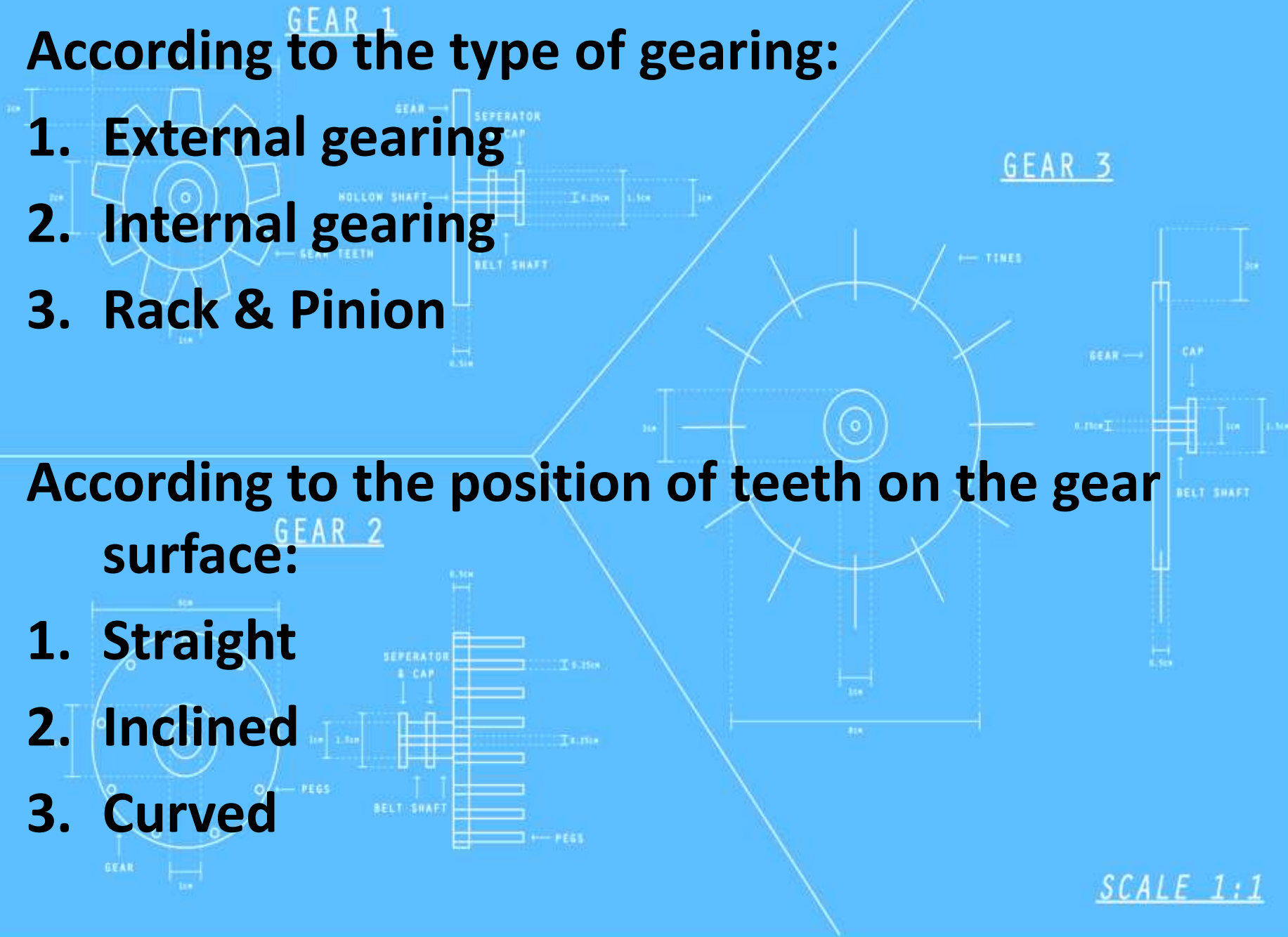
SCALE 1:1

According to the type of gearing:

1. External gearing
2. Internal gearing
3. Rack & Pinion

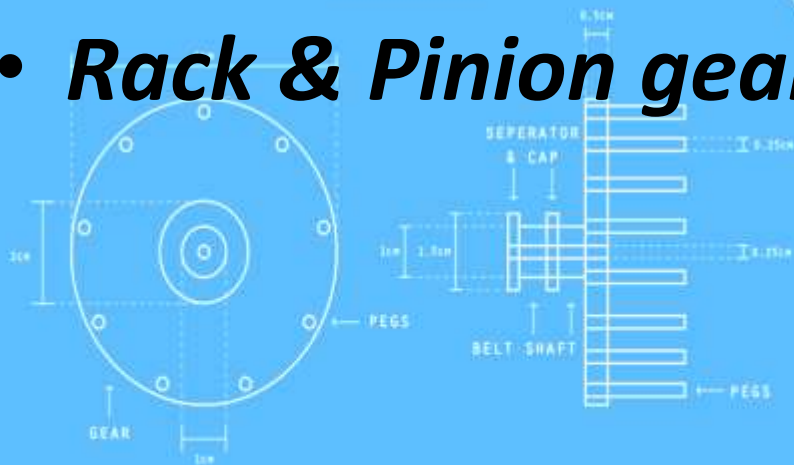
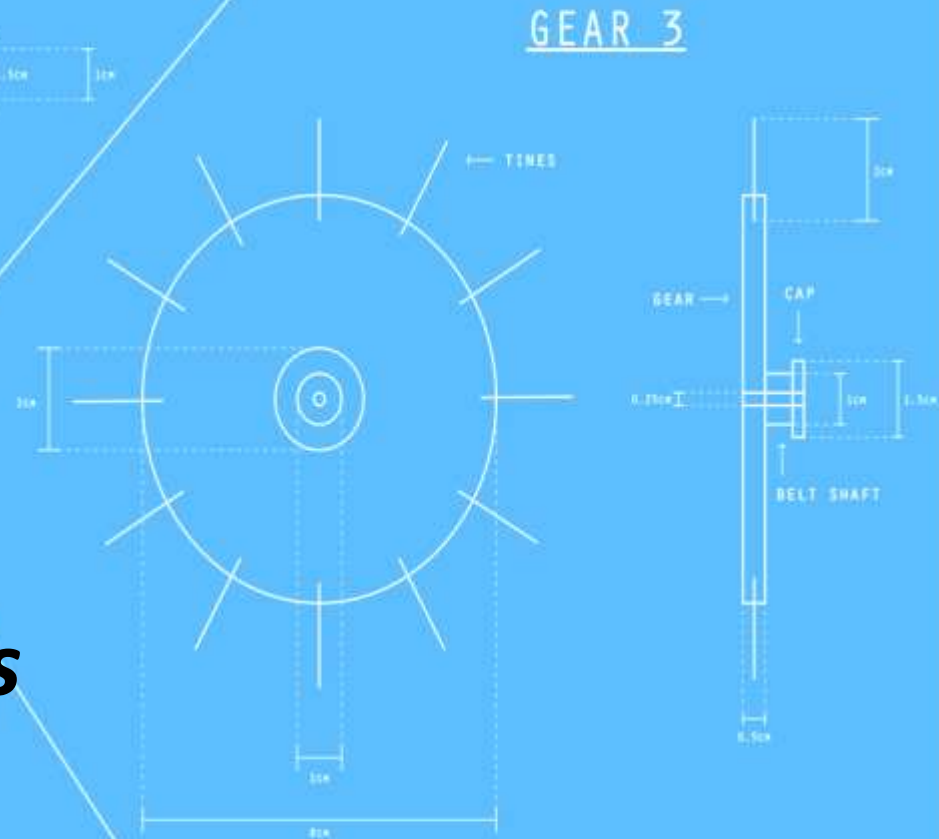
According to the position of teeth on the gear surface:

1. Straight
2. Inclined
3. Curved



Types of Gears

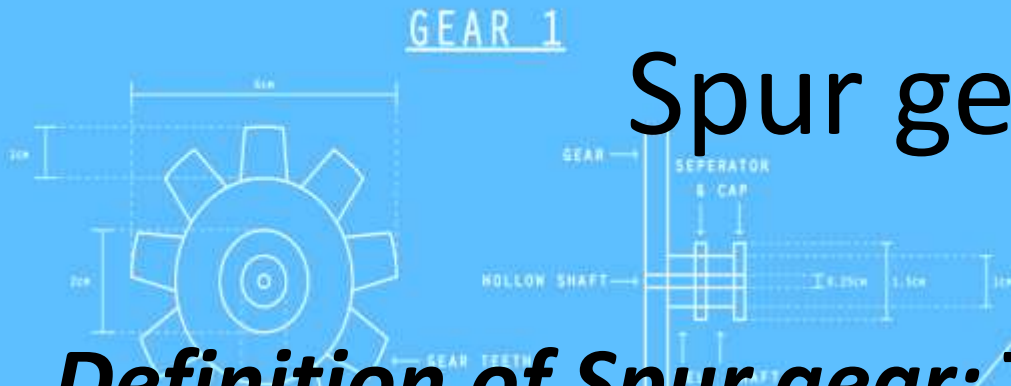
- ***Spur gears***
- ***Helical gears***
- ***Bevel gears***
- ***Worm gears***
- ***Rack & Pinion gears***



SCALE 1:1

Spur gears

Definition of Spur gear: Tooth profile is parallel to the axis of rotation, transmits motion between parallel shafts.



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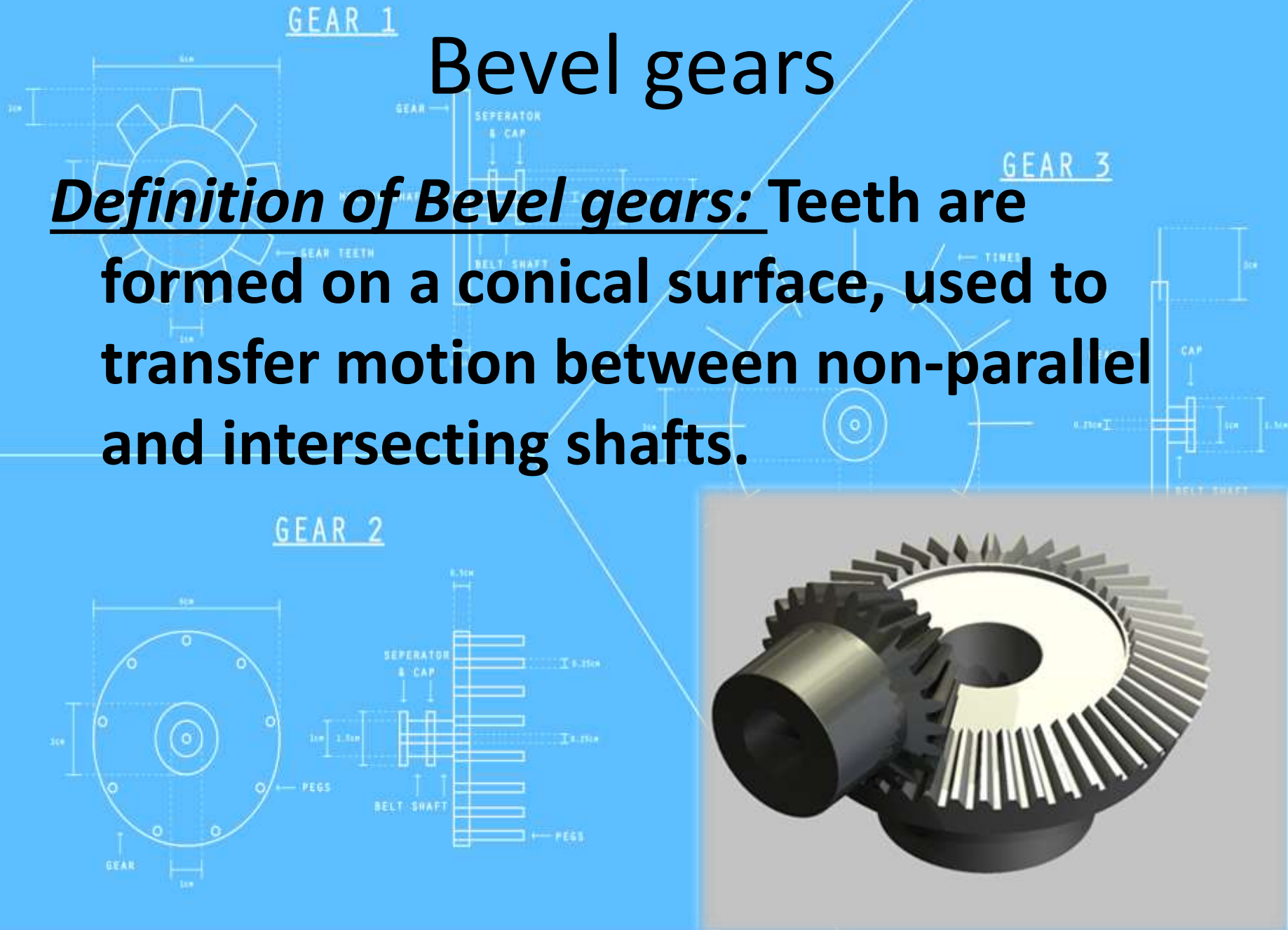
GEAR 1 Helical gears

GEAR 2



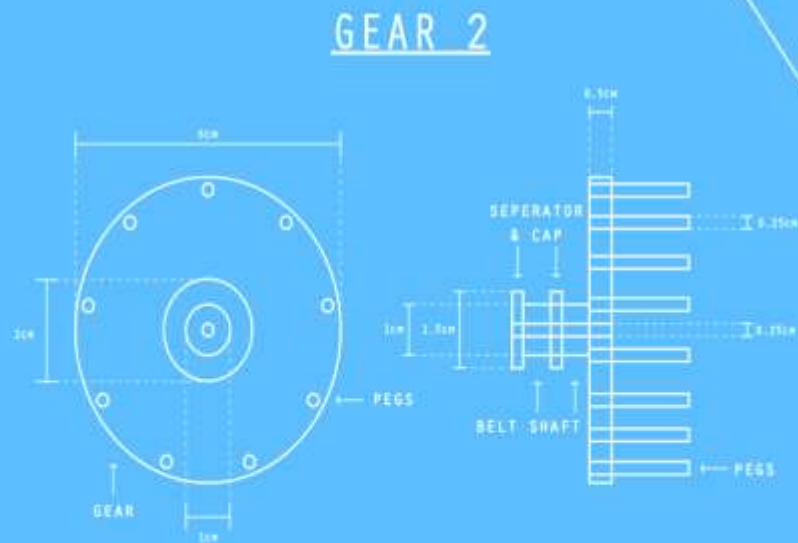
Bevel gears

Definition of Bevel gears: Teeth are formed on a conical surface, used to transfer motion between non-parallel and intersecting shafts.



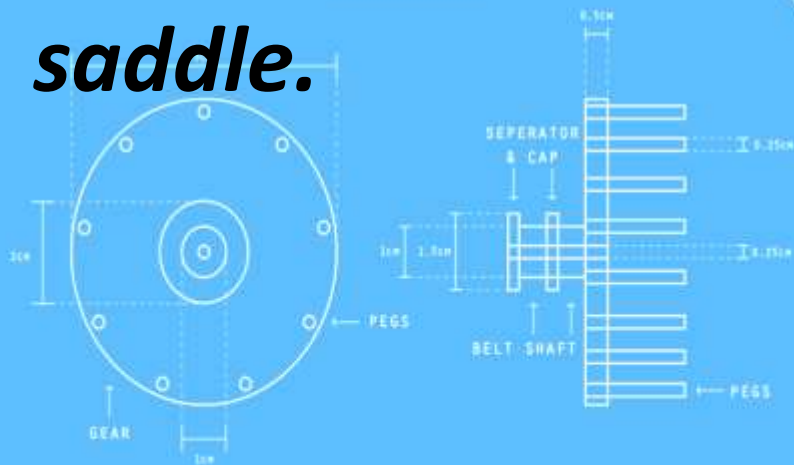
Worm gears

Definition of Worm gears: It consists of a helical gear and a power screw (worm), used to transfer motion between non-parallel and non-intersecting shafts.

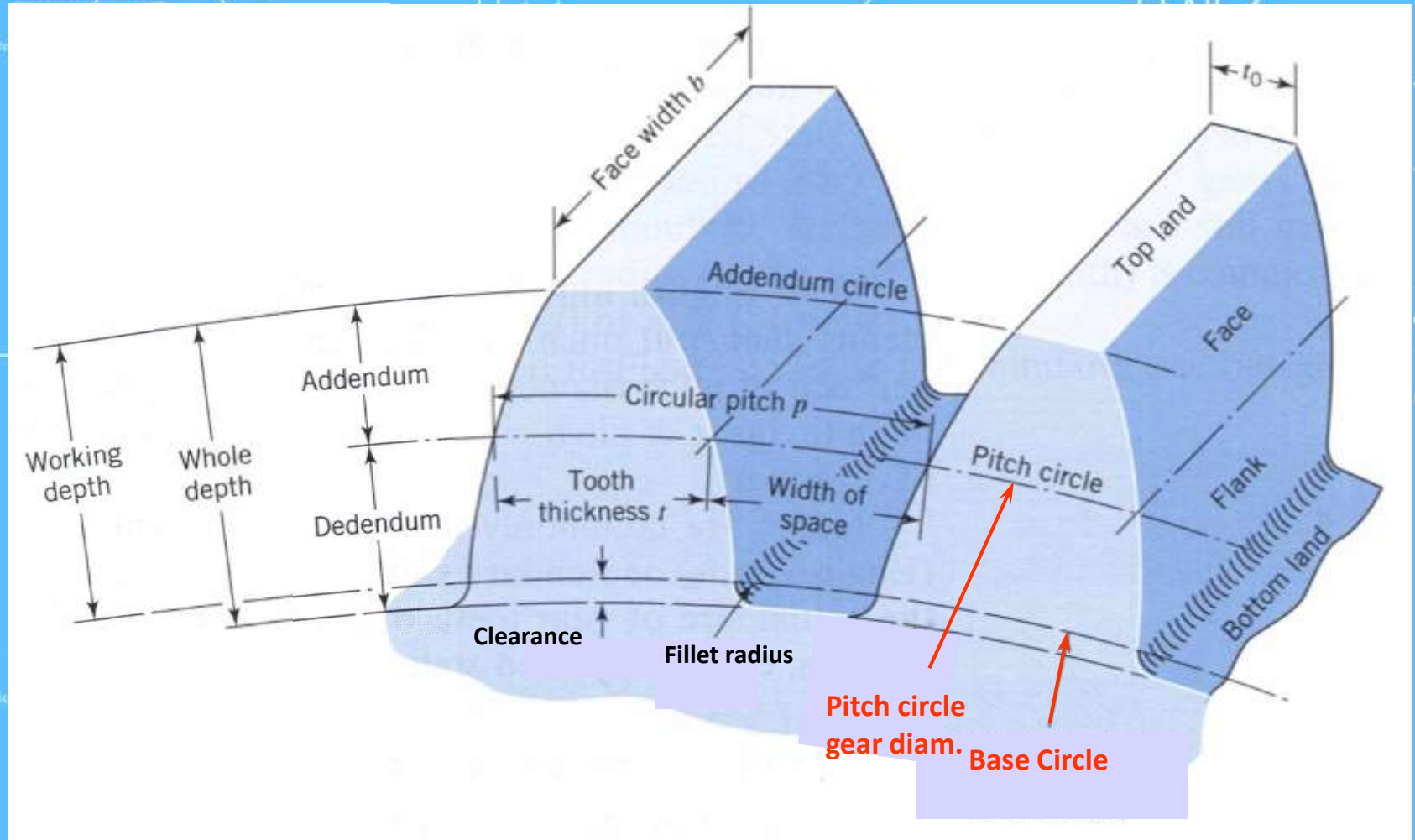


GEAR 1 Rack & Pinion gears

Definition of Rack & Pinion gears: *The rack & pinion combination converts rotary motion into translatory motion or vice-versa. It is used in Lathe machine in which the rack transmits motion to the saddle.*



Nomenclature of Spur gear teeth



SCALE 1:1

GEAR 1

TERMINOLOGY

- **Top land-** It is the surface of the top of the tooth.
- **Bottom land-** The surface of the bottom of the tooth.
- **Face-** Tooth surface between the pitch circle and the top land.
- **Flank-** Tooth surface between the pitch circle & the bottom land.

GEAR 3

SCALE 1:1

- **Addendum-** It is the radial height of the tooth above the pitch circle.
- **Dedendum-** It is the radial depth of the tooth below the pitch circle.
- **Space width-** It is the width of the tooth space along the pitch circle.
- **Face width-** The length of the tooth parallel to the gear axis.
- **Tooth thickness-** It is the thickness at the tooth measured along the pitch circle.

SCALE 1:1

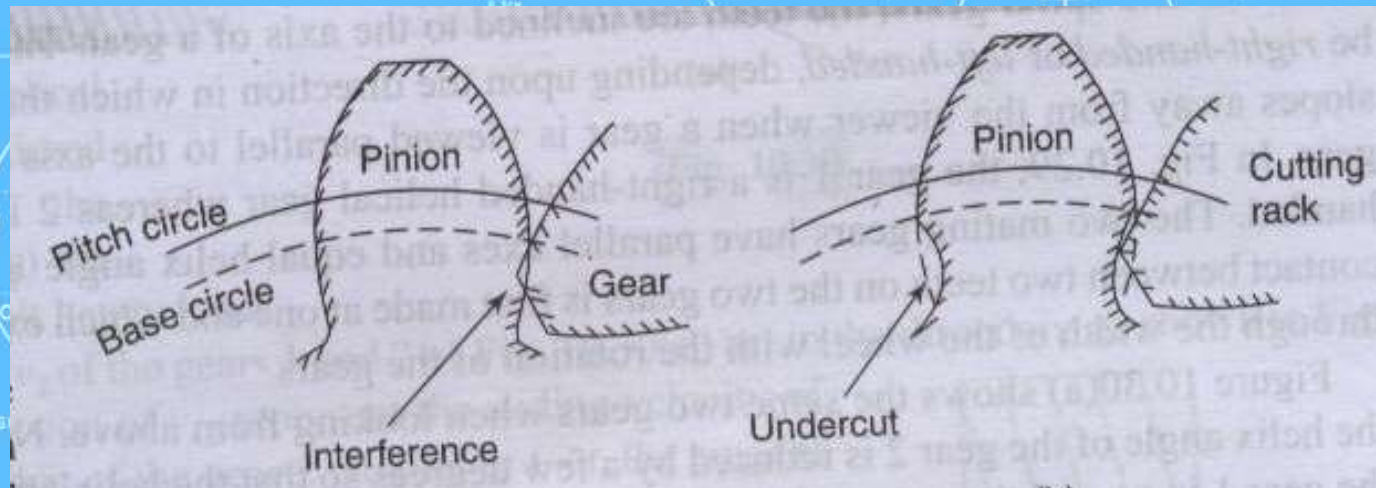
GEAR 1

Undercutting

A portion of its dedendum falls inside the base circle. The profile of the tool inside the base circle is radial. A gear having its material removed in this manner is known as undercut and this process is known as undercutting.

GEAR 2

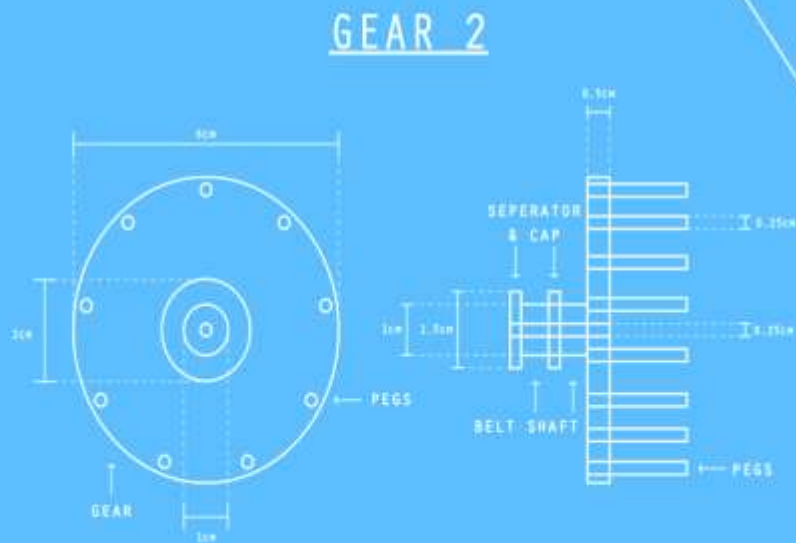
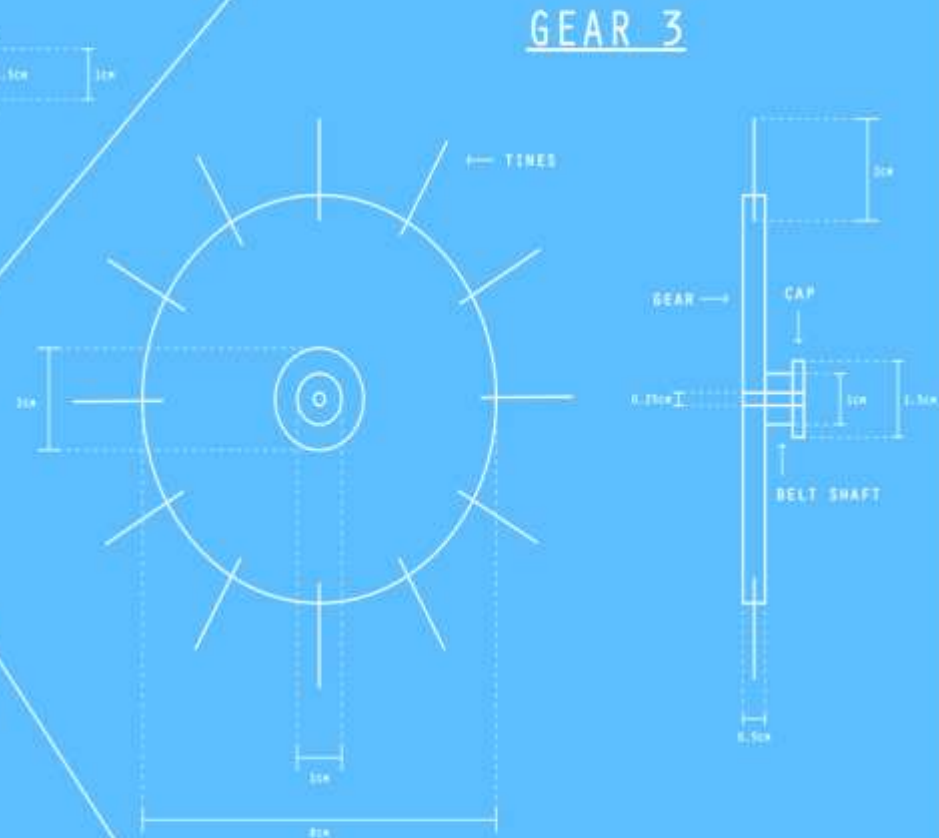
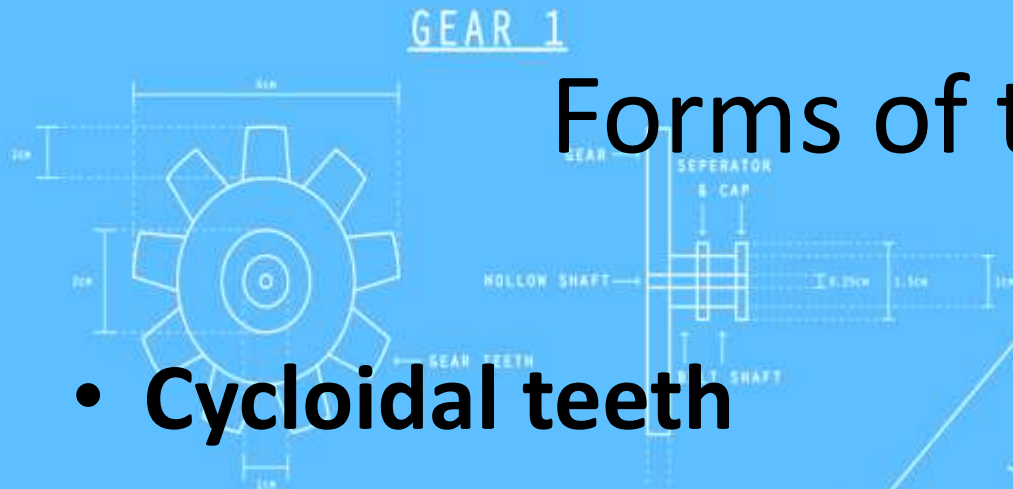
GEAR 3



SCALE 1:1

Forms of teeth

- Cycloidal teeth
- Involute teeth



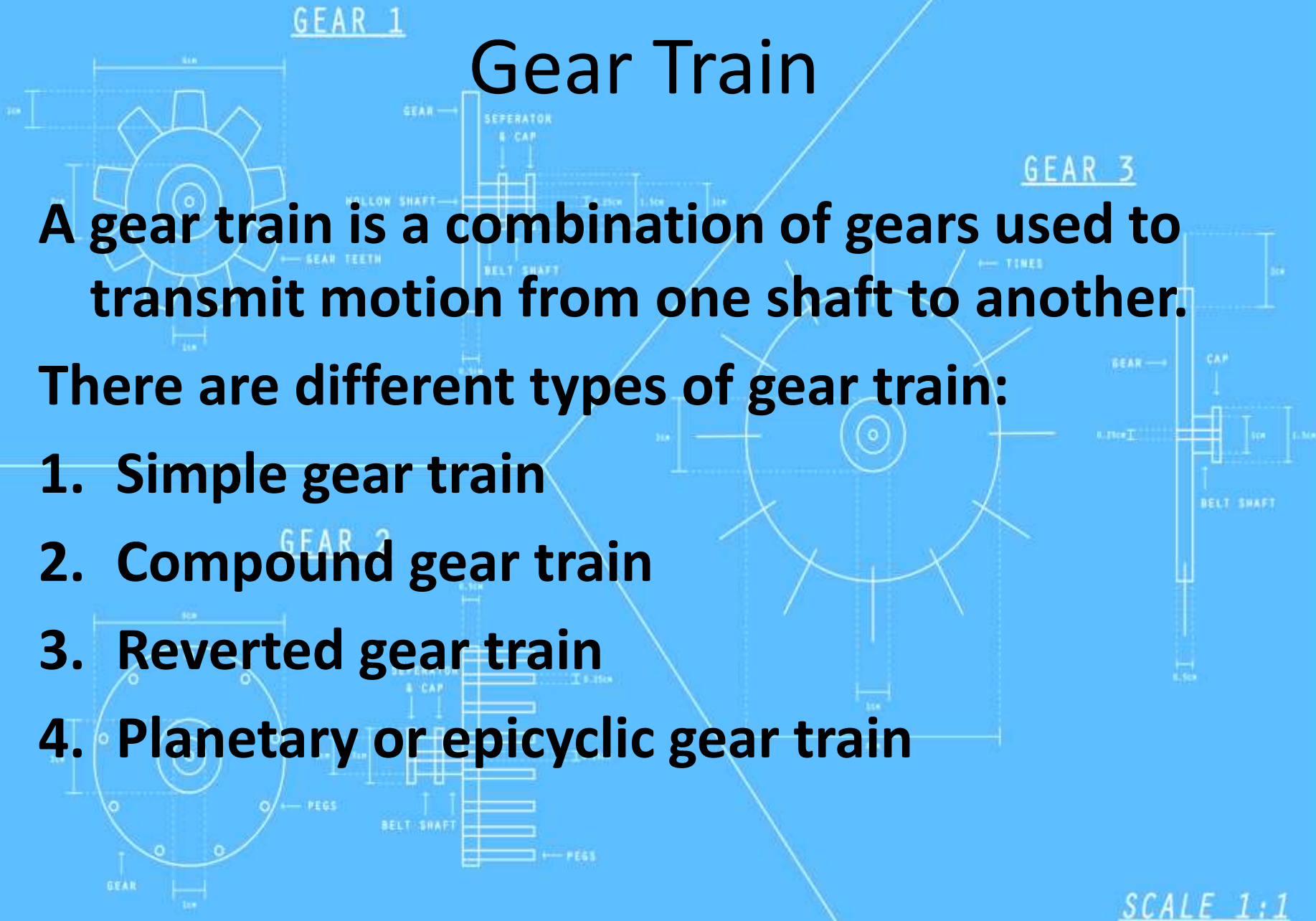
SCALE 1:1

Gear Train

A gear train is a combination of gears used to transmit motion from one shaft to another.

There are different types of gear train:

1. Simple gear train
2. Compound gear train
3. Reverted gear train
4. Planetary or epicyclic gear train



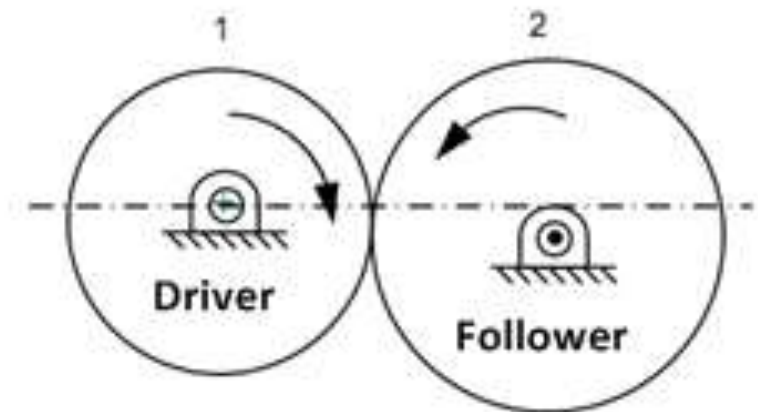
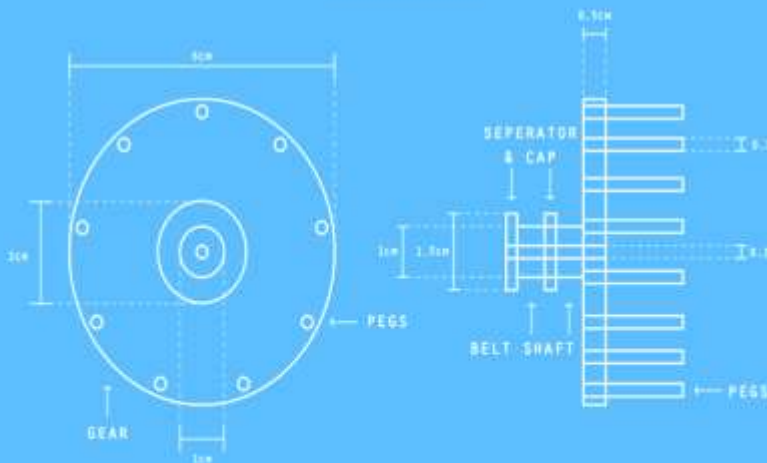
GEAR 1

Simple gear train

In this gear train there is only one gear on each shaft is known as simple gear train.

When 1st gear rotates then the follower i.e. 2nd gear rotates in opposite direction simultaneously.

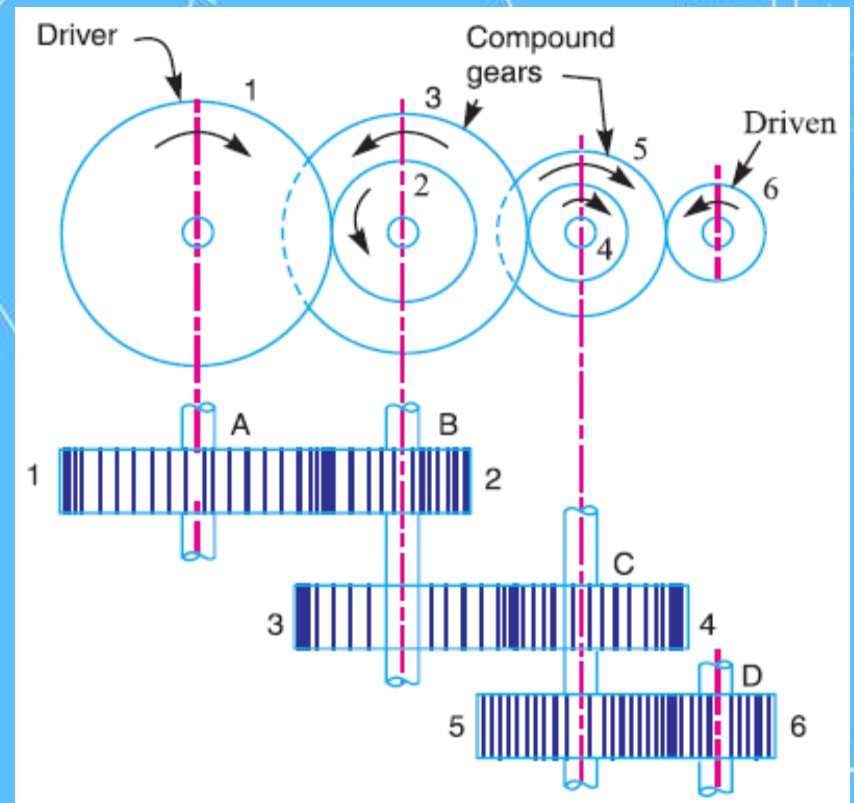
GEAR 3



SCALE 1:1

Compound gear train

A series of gears are connected in such a way that two or more gears rotate about an axis with same angular velocity. It is known as compound gear train.



1:1

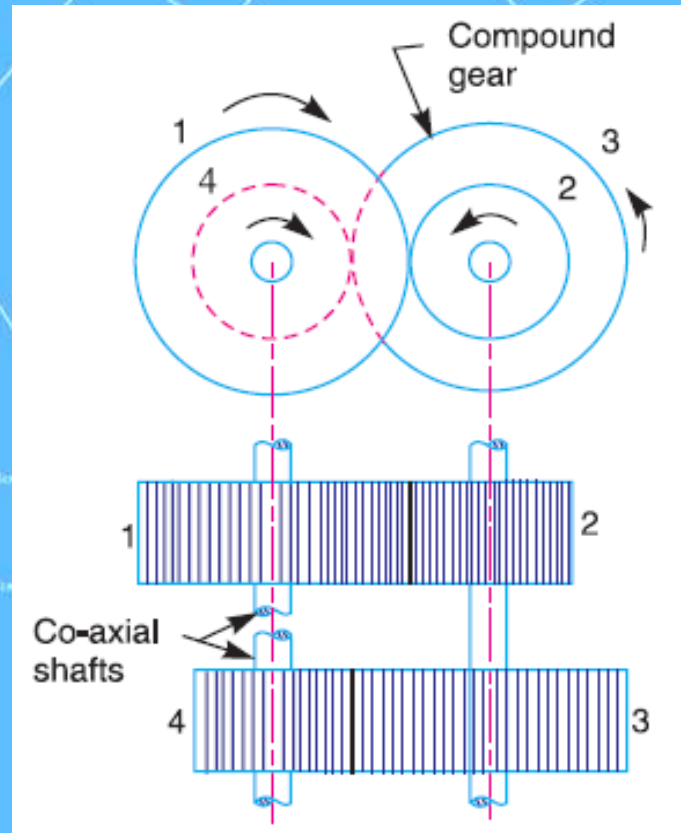
GEAR 1

Reverted gear train

If the axes of driver shaft and driven shaft is co-axial, then the gear train is known as reverted gear train.

GEAR 3

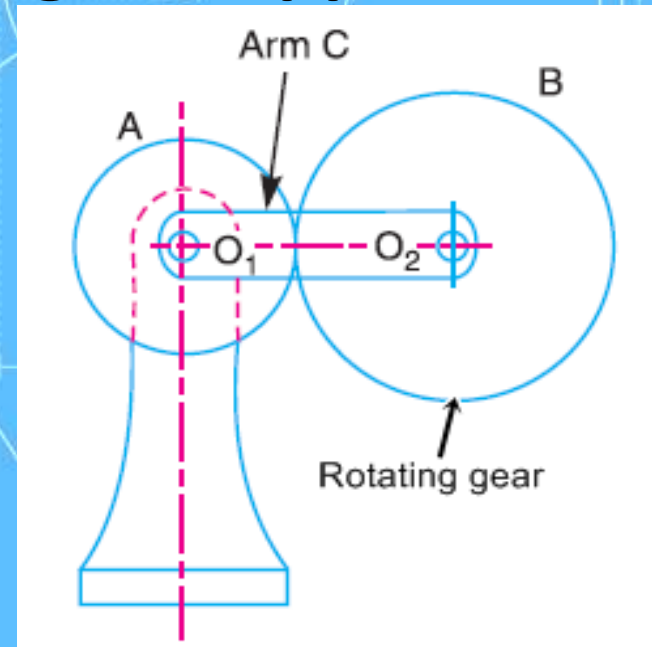
GEAR 2



SCALE 1:1

Planetary/Epicyclic gear train

One of the gear is rotating over and around another gear. Epi means over, Cyclic means around. There is an arm connecting such two gears. This gear train finds great application in various field.



Advantages:

- 1. It transmit exact velocity ratio.**
- 2. It has high efficiency.**
- 3. It has reliable service.**
- 4. It may be used to transmit large power.**

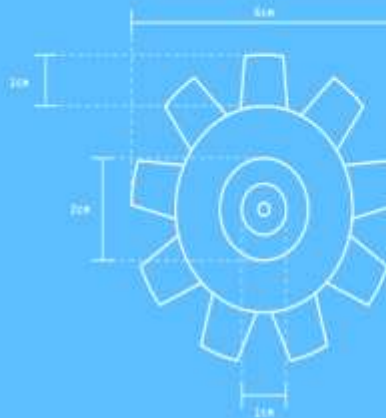
Disadvantages:

- 1. The manufacture of gears requires special tools and equipments.**
- 2. The error in cutting teeth may cause vibration & noise during operation.**

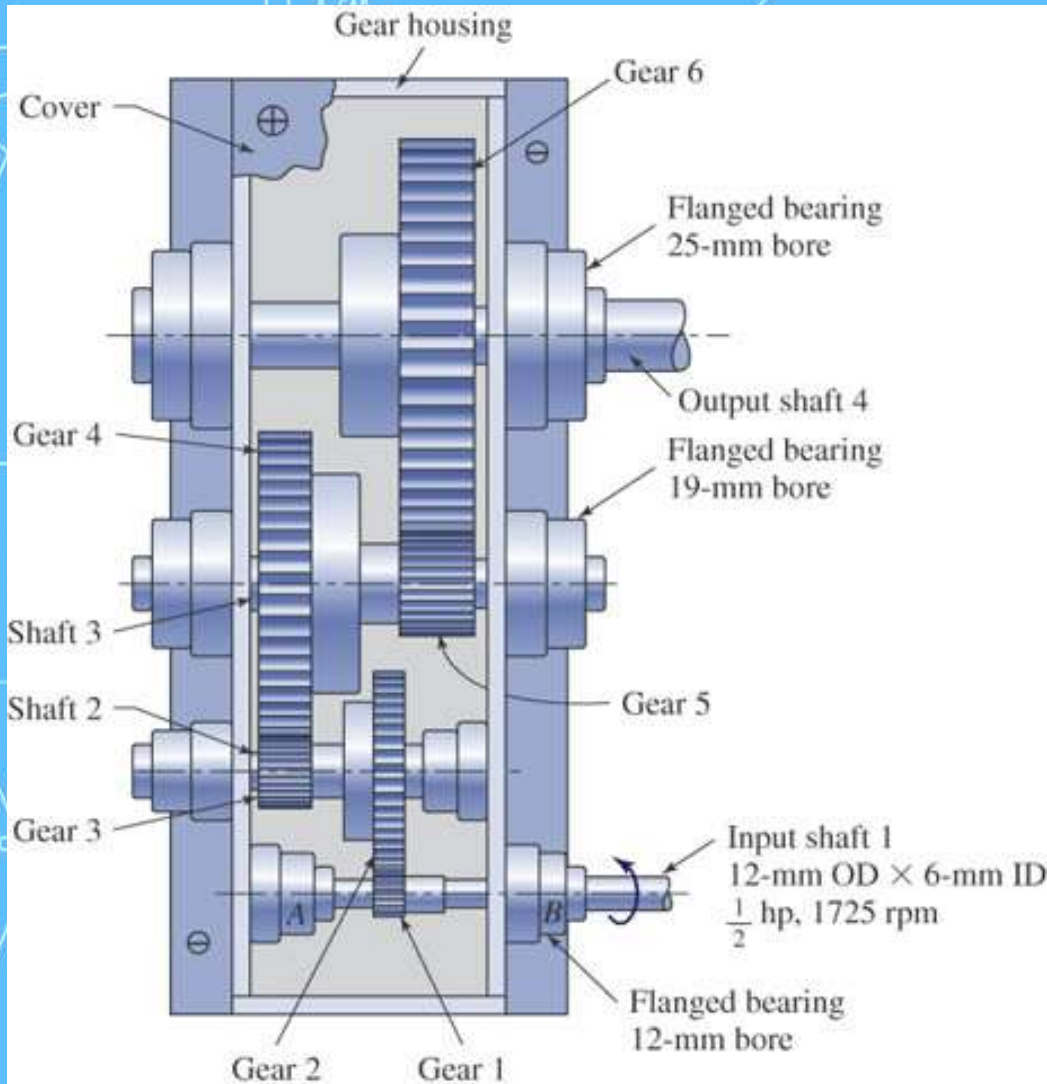
SCALE 1:1

GEAR 1

Gear Box Design



GEAR
SEPARATOR



GEAR 3



SCALE 1:1

GEAR 1 Differential Gear Design

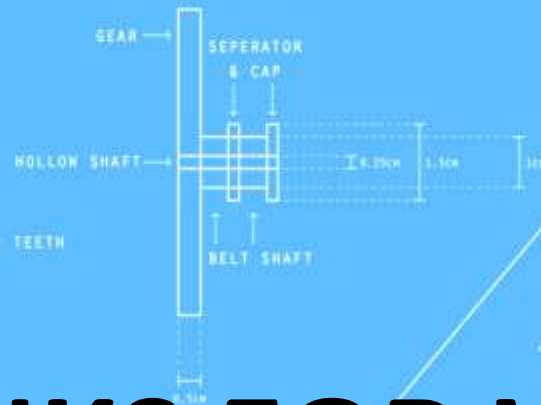
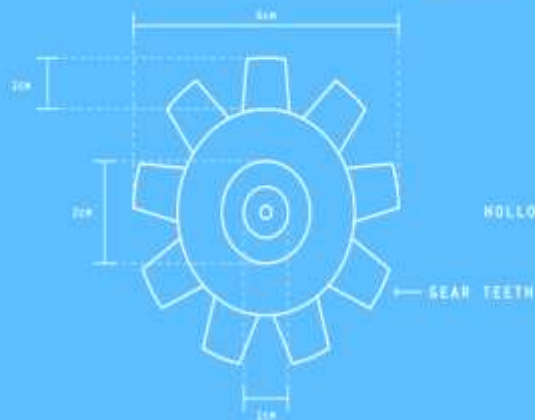


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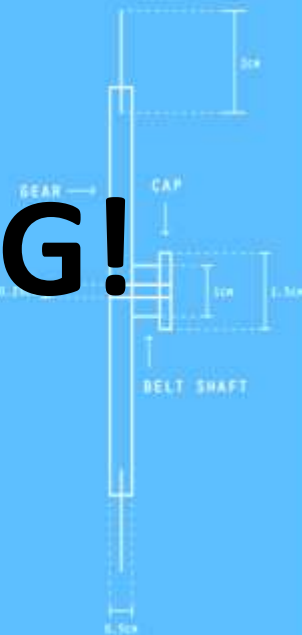


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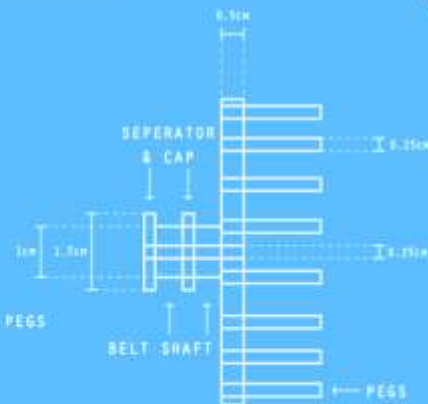
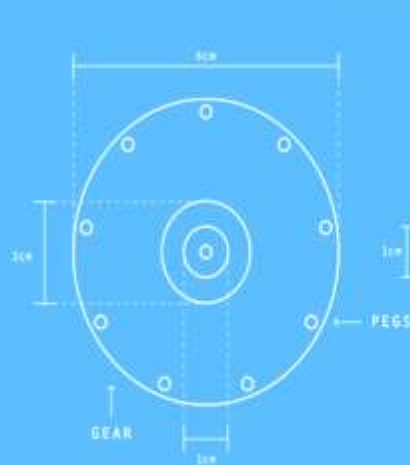
GEAR 1



GEAR 3



GEAR 2



THANKS FOR WATCHING!

SCALE 1:1