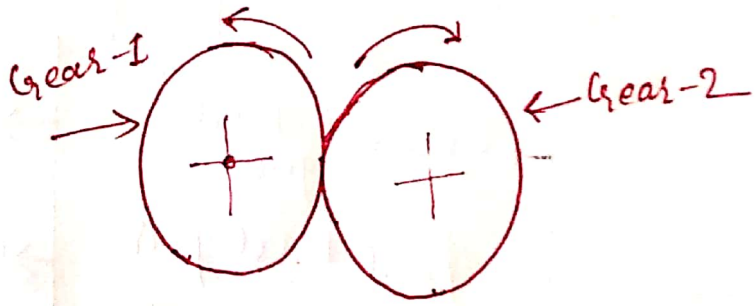
UNI-2

Gears and gear trains (IInd Portion)

* Gear :-

→ Gears are used to transmit motion from one shaft to another or b/w a shaft and a slide. This is acompalished by successively engaging teeth

→ A gear is a kind of machine elements in which teeth are cut around cylindrical or cone shaped surface with equal spacing. By meshing a pair of these elements, they are used to transmit rotations and forces from the driving shaft to the driven shaft.



→ Gears are generaly made by milling operation

→ Gears are made of cast iron, steel, brass, bronze ~~and~~, plastic etc.

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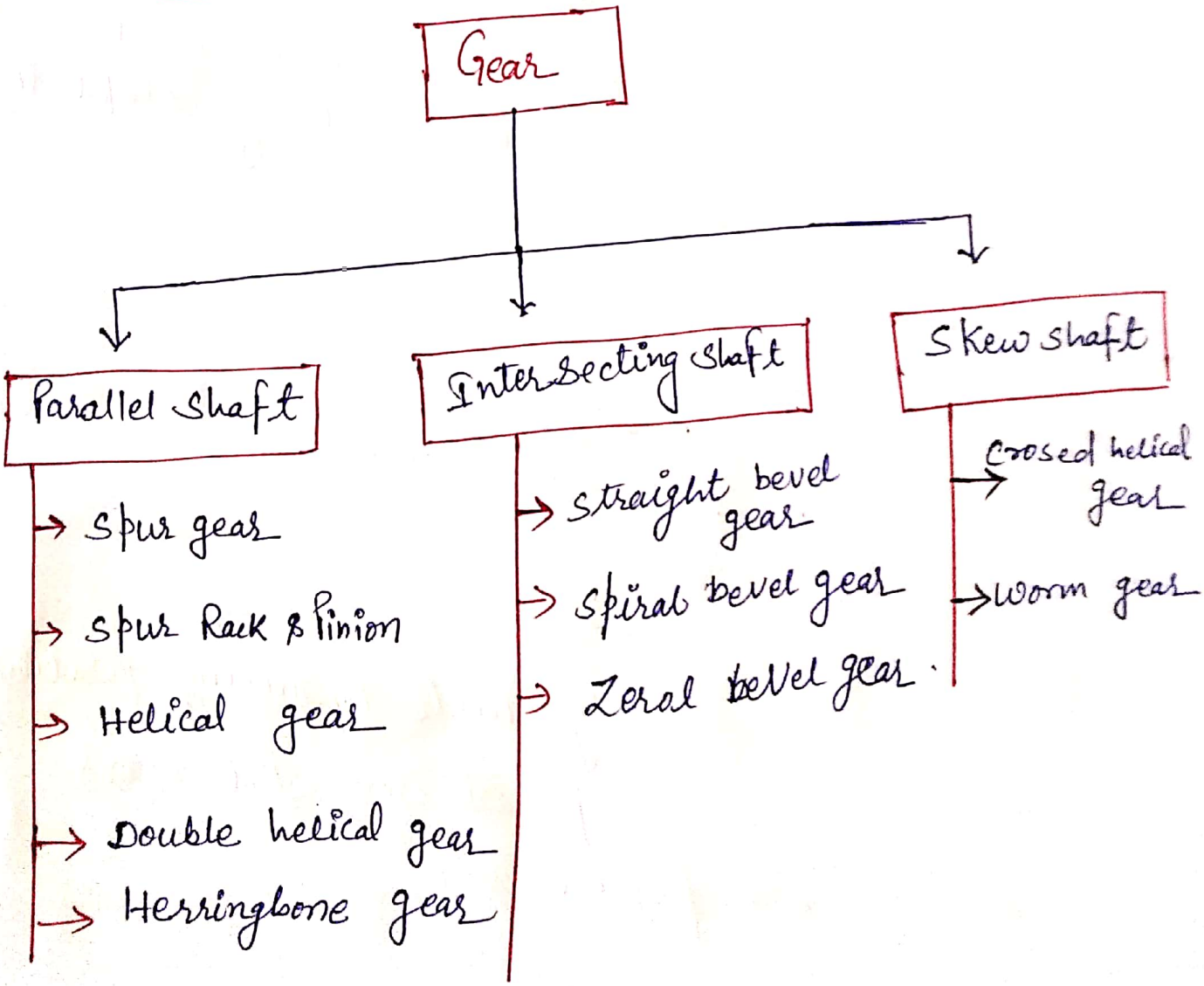
* Application of gear :-

- → Metal cutting machine
- → Power Plants
- → Automobiles
- → Toys
- → Washing machine
- → Material hangeling equipments, etc.

* Types of Gear :-



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1.) A/c to Parallel shaft of gear:-

i) Spur gear :-

They have straight teeth parallel to the axes and thus, are not subjected to axial thrust due to tooth load.

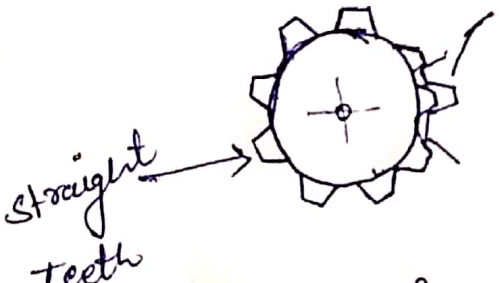

fig:- spur gear

Application:- ① In Automobile
② In Toys
③ In watch
④ Metal cutting machine.
⑤ In cycle etc.

ii) Spur Rack and Pinion:-

Spur Rack is a special case of a spur gear where it made of infinite diameter so that the pitch surface is plane.

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→ The Spur Rack and Pinion gear used to convert Rotary motion into translatory motion or vice versa.

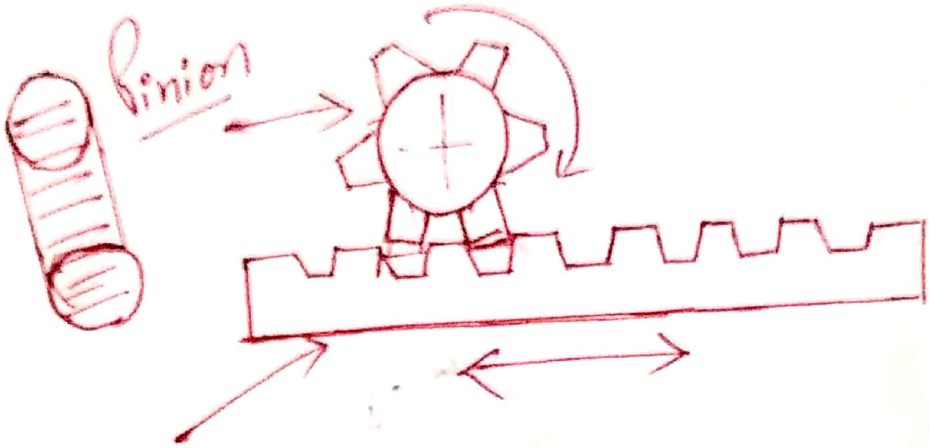

Fig:- Rack and Pinion

Application:- It is used in a lathe in which the rack transmits motion to the saddle.

(1) It is also used in steering ~~of vehicle~~ system of cars buses etc.

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iii) Helical gear:-

→ In helical gear, the teeth are curved, each being helical in shape.

→ Two mating gears have the same helix angle but have teeth of opposite hand.

→ Helical gears are normally preferred to work under heavy load efficiency.

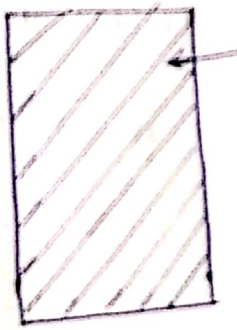

Fig: Helical gear.

Application of helical gear:-

(1) used in fertilizer industries, printing industries
(2) used in Automobile gear box
(3) Steam and gas turbine for speed reduction

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iv) Double helical gear and Herringbone gear :-

→ A double helical gear is equivalent to a pair of helical gear secured togetether.
one having a right-hand helix angle and other a left helix angle.

→ In double helical gear. the teeth of the two rows are separated by a groove used for tool run out.

→ The axial thrust which occurs in case of single helical gear is eliminated in double helical gears.

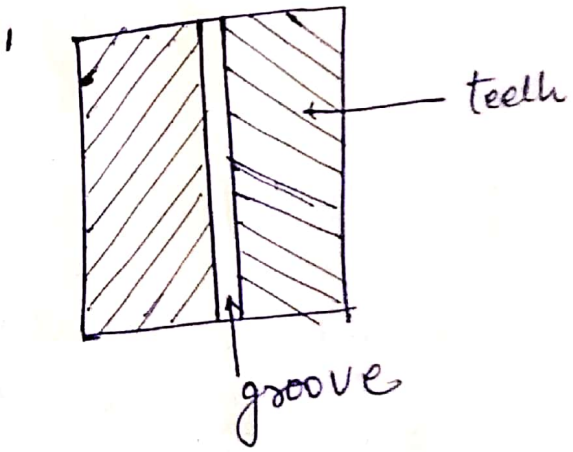

fig:- Double helical gear

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Herringbone gear :-

→ A herringbone gear. a specific type of double helical gear. is a special type of gear that is a side to side combination of two ~~lead~~ helical gear of opposite hand.

→ If the left and the right inclination of a double helical gear meet at a common apex and there is no groove in b/w the gear is known as herringbone gear.

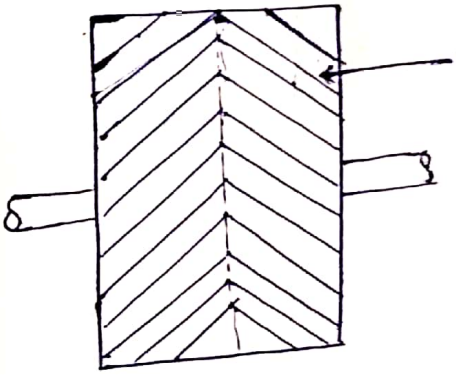

Fig:- Herringbon gear

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2.) Intersecting shaft :-

1) Straight bevel gear :-

→ The teeths are straight, radial to the point of intersection of the shaft axes and vary in cross-section throughout their length.

→ Generally they are used to connect shaft at right angle which run at low speed.

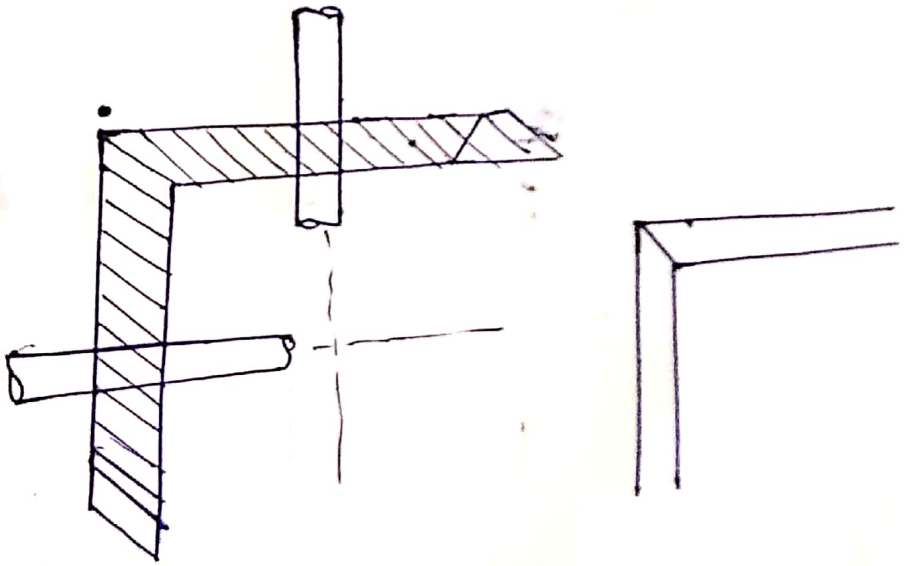

Fig :- Bevel gear.

Application :-

① used in differential gear of automobile

② Used in governors.

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ii) Spiral bevel gear :- [Helical bevel gear]

→ When the teeth of bevel gear are inclined at an angle to the face of the bevel, they are known as spiral bevel gear or helical bevel gear.

→ They are smother in action and quiter than straight tooth bevel gear as there is gradual load application and ~~too~~ low impact stress.

→ They are generary used ~~in~~ for drive the differential of an automobile

iii) Zerol bevel gear :-

→ Spiral bevel gears with curved teeth but with a Zero degree spiral angle are known as Zerol ~~be~~ bevel gear.

→ Theire tooth action and end thrust are the same as that of straight bevel gear and, therefore, can be used in the same mounting.

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3. Skew shaft :-

i) Worm Wheel gear :-

Worm gear is a special case of a spiral gear in which the larger wheel, usually, has a hollow or concave shape such that a portion of the pitch diameter of the other gear is enveloped on it.

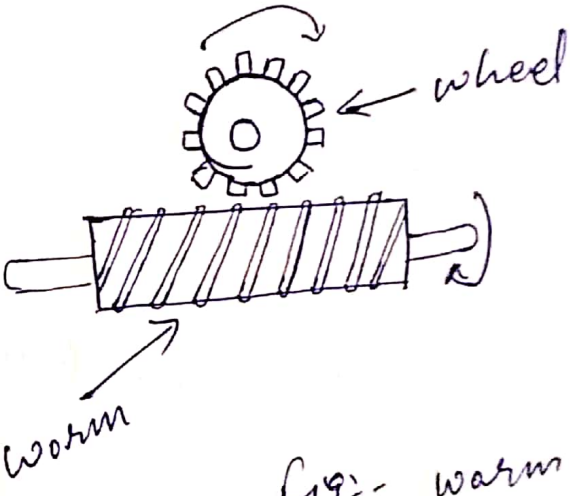

Fig:- warm wheel gear

Application of worm wheel gear

1. conveyors
2. speed reducer
3. lift
4. Automobile steering mechanism
5. Presses. etc.

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