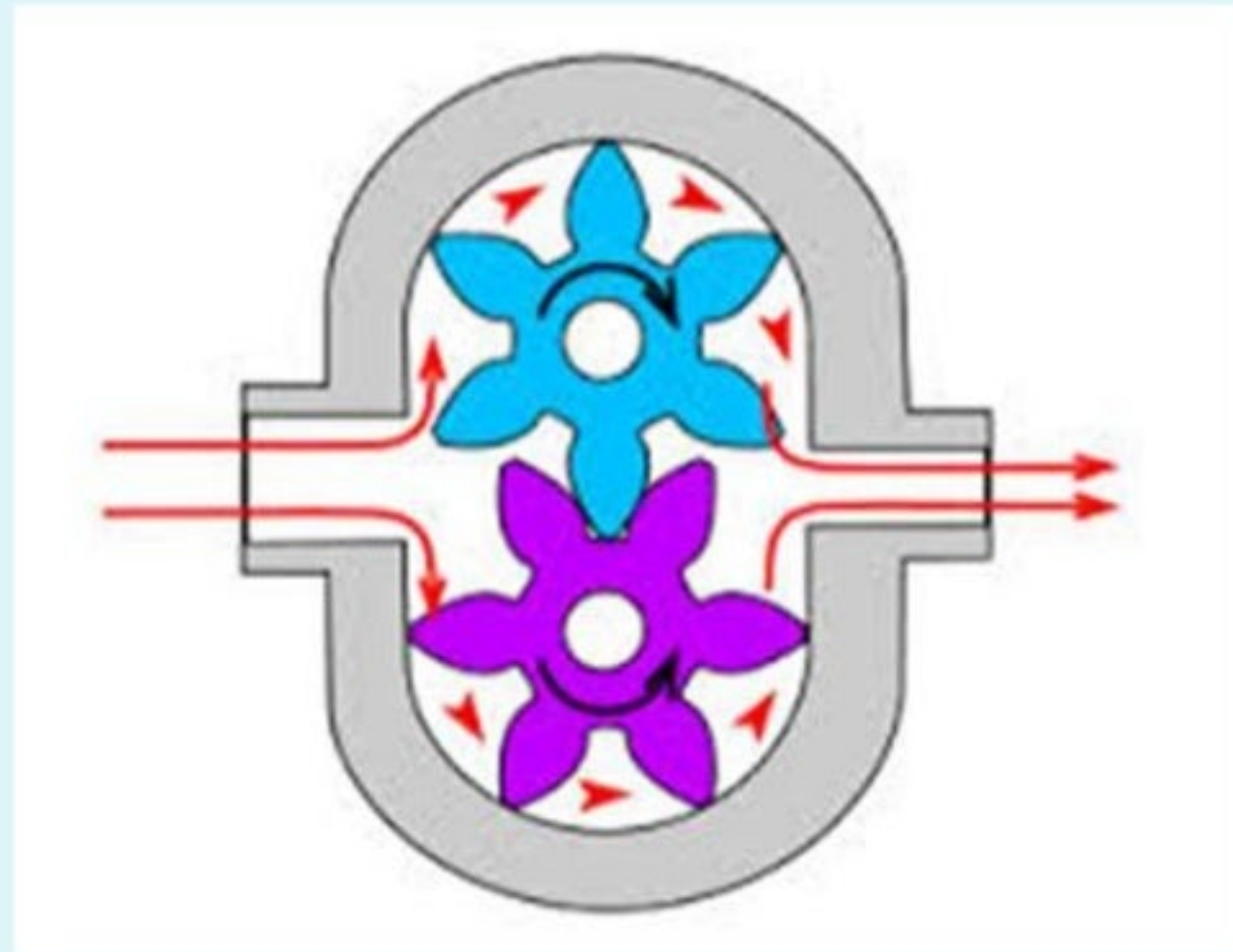


GEAR PUMP



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Introduction

☐ Learning Objective:

- Operation and maintenance of a Gear Pump.

☐ Specific Learning Objective:

- Describe the pump and the types of pumps.
- State of rotary pumps and gear pumps.
- Explain the operation principle of gear pumps.
- Discuss the maintenance of gear pumps and related safeties.
- Review of uses of gear pumps.

What is a pump?

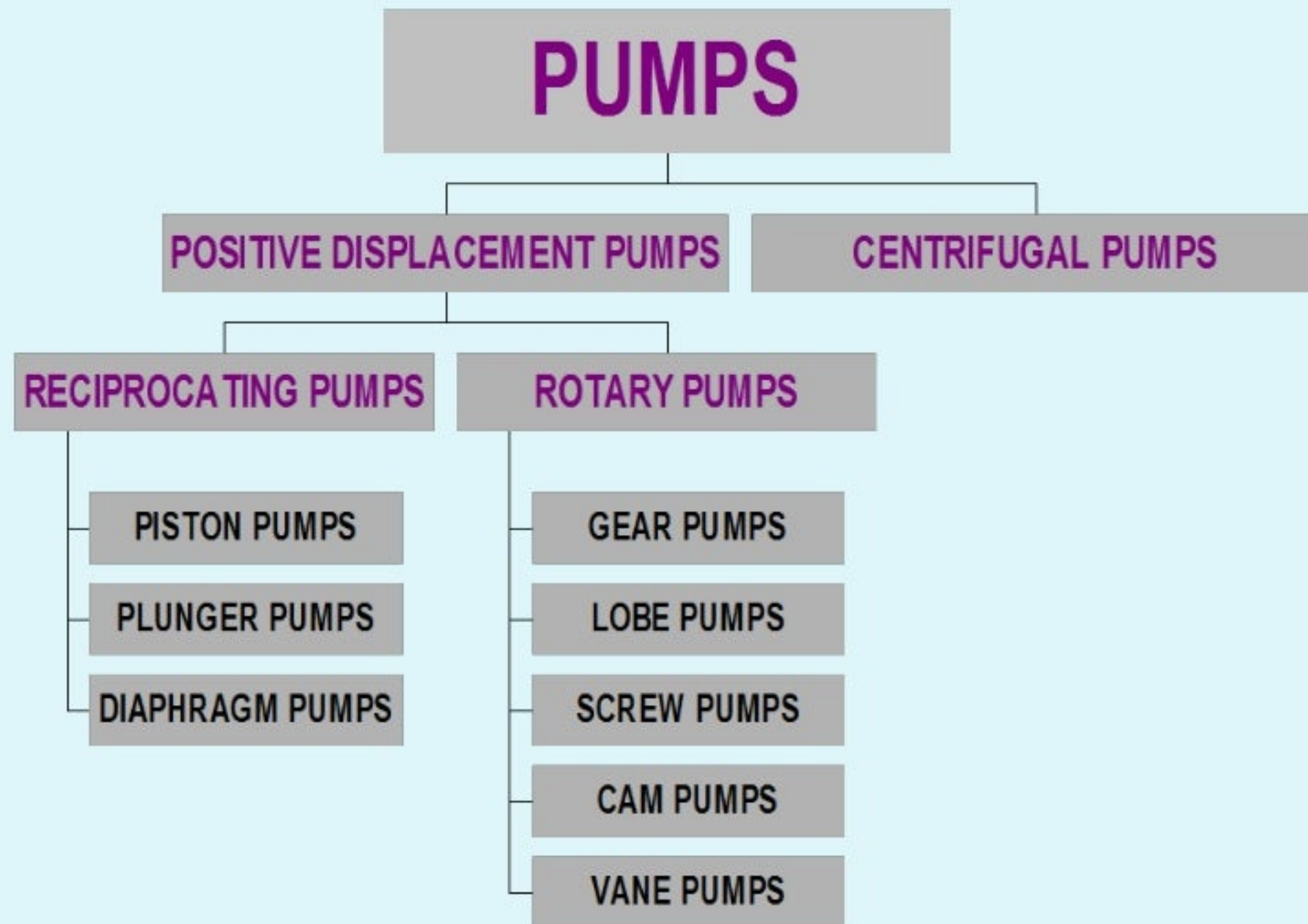
- ☐ Pumps are used to move any substance which flows or which can be made to flow.
- ☐ As a general rule, all pumps are designed to move fluid substances from one point to another by pulling, pushing or throwing or by some combination of these three methods.
- ☐ A pump is a device that adds energy to the fluid to enable it to move from one point to another.

What is a pump?

- ❑ Pumps are used to move any substance which flows or which can be made to flow.

So, pump is a device that adds energy to the fluid to enable it to move from one point to another.

Types of Pumps



Rotary Pumps

- Positive displacement type
- 👍 High pressure, high efficiency
- 👎 Liquids must be free of solids
- 👍 Handle viscous fluids

ROTARY PUMPS

GEAR PUMPS

LOBE PUMPS

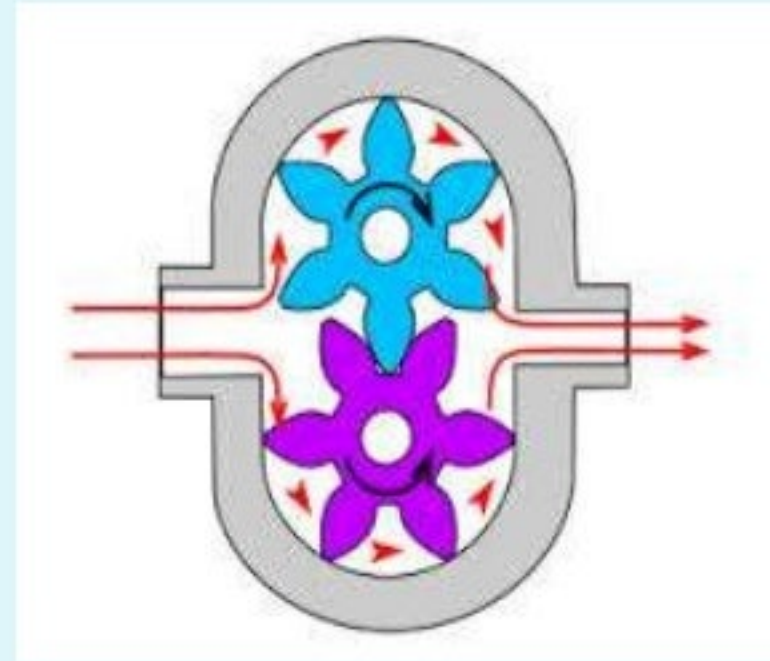
SCREW PUMPS

CAM PUMPS

VANE PUMPS

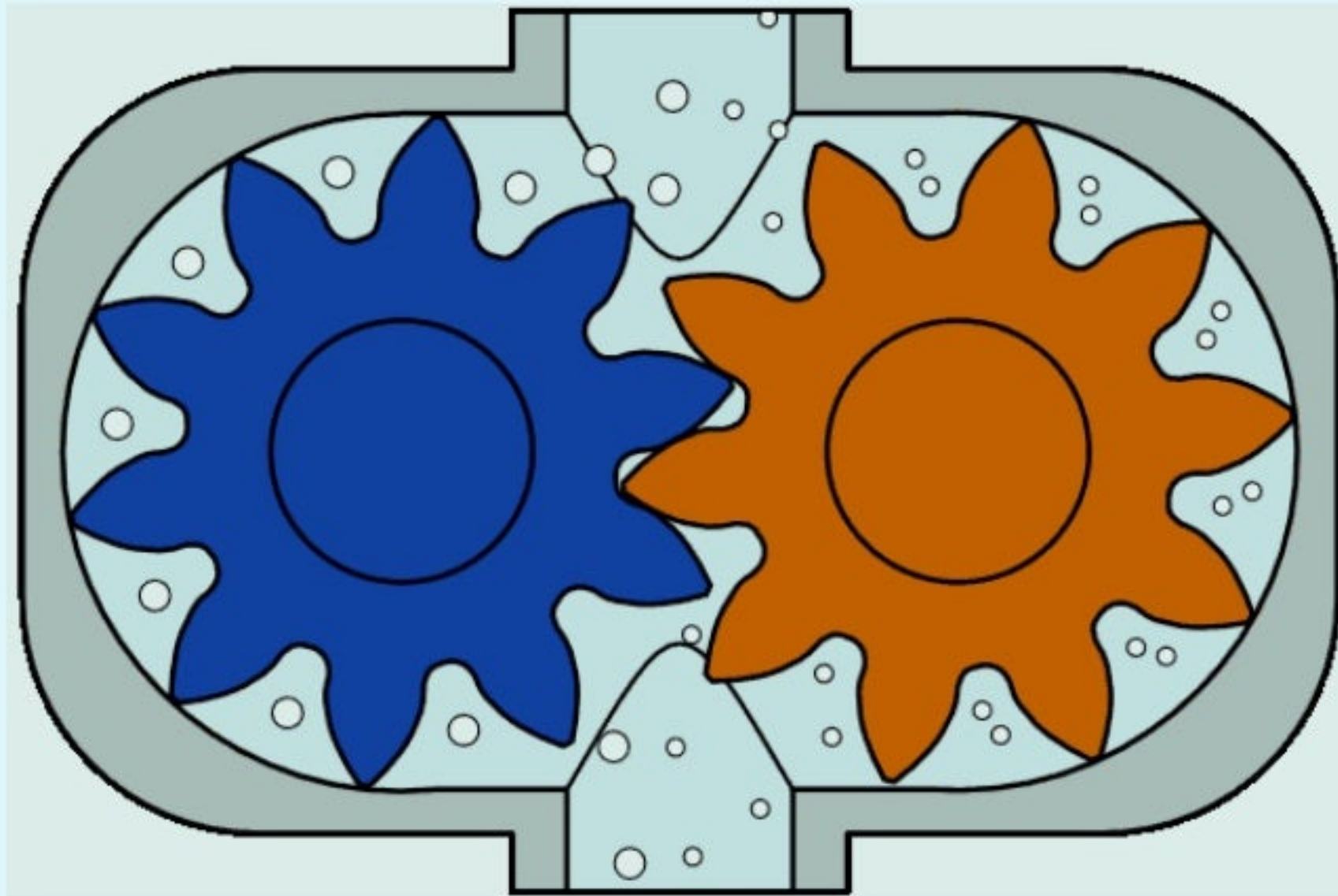


GEAR PUMPS



- A simple gear pump consists of two spur gears meshing together and revolving in opposite directions within a casing.
- Only a few thousandths of an inch clearance exists between the case and the gear faces and teeth extremities .

Animation of a Gear Pump



How a Gear Pump Works



Fig: 1 (Suction)

Fig: 2 (Liquid Displacing)

Fig: 3 (Discharge)

□ Fig: 1 (Suction)

As the gears rotate in opposite direction, the teeth disengage. So, the space again opens on the suction side, trapping new quantities of liquid and carrying it around the pump casing to the discharge.

□ Fig: 2 (Liquid Displacing)

Liquid travels around the interior of the casing in the pockets between the teeth and the casing -- it does not pass between the gears.

□ Fig: 3 (Discharge)

As the gears come back into mesh, the volume is reduced and the liquid is forced out of the discharge port

Types of Gears

There are three types of gears used in gear pumps:

1. Spur Gear

- A Spur gear is consist of straight gears which are parallel to the shaft.

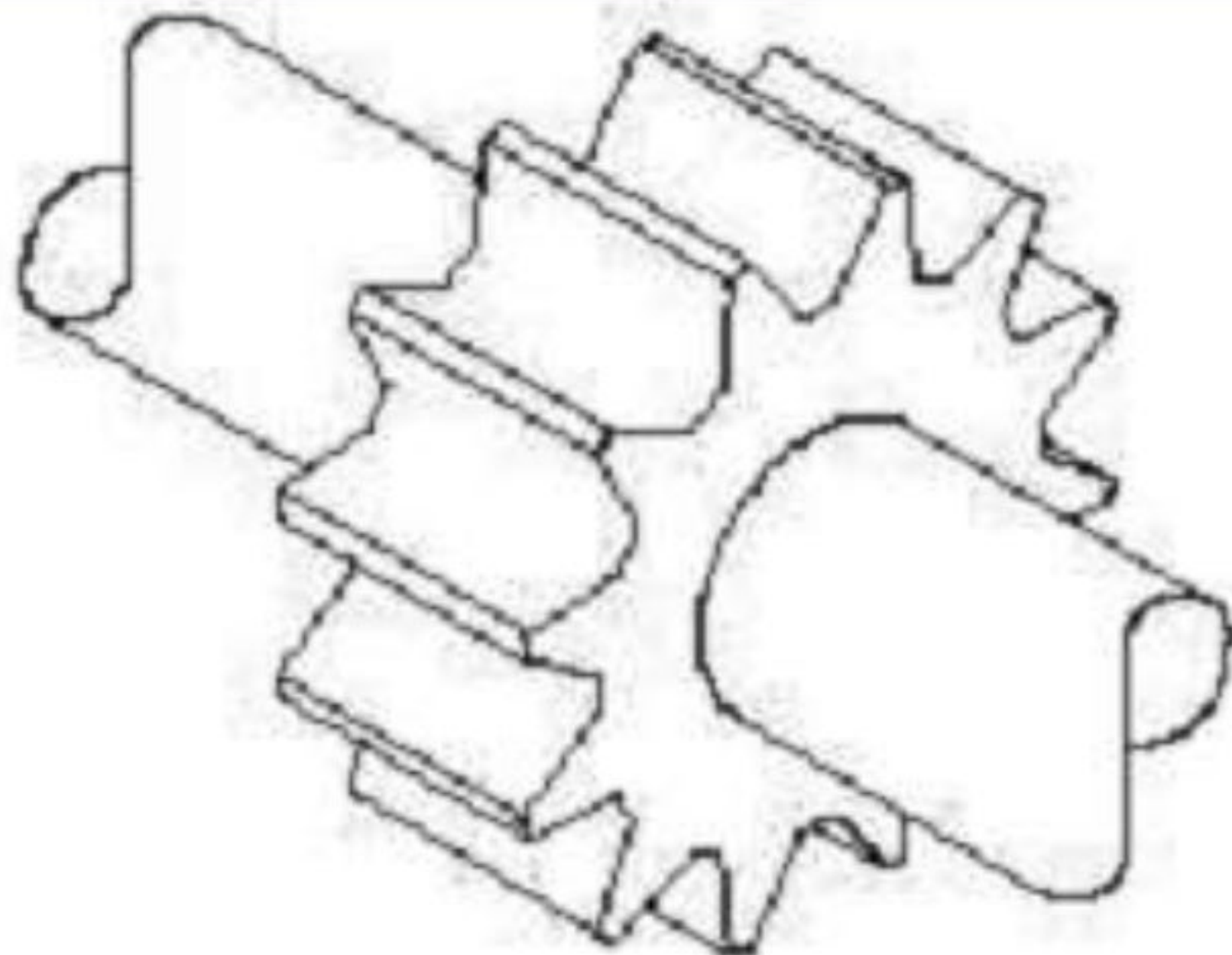
2. Helical Gear.

- A helix is the curve produced when a straight line moves up or down the surface of a cylinder.

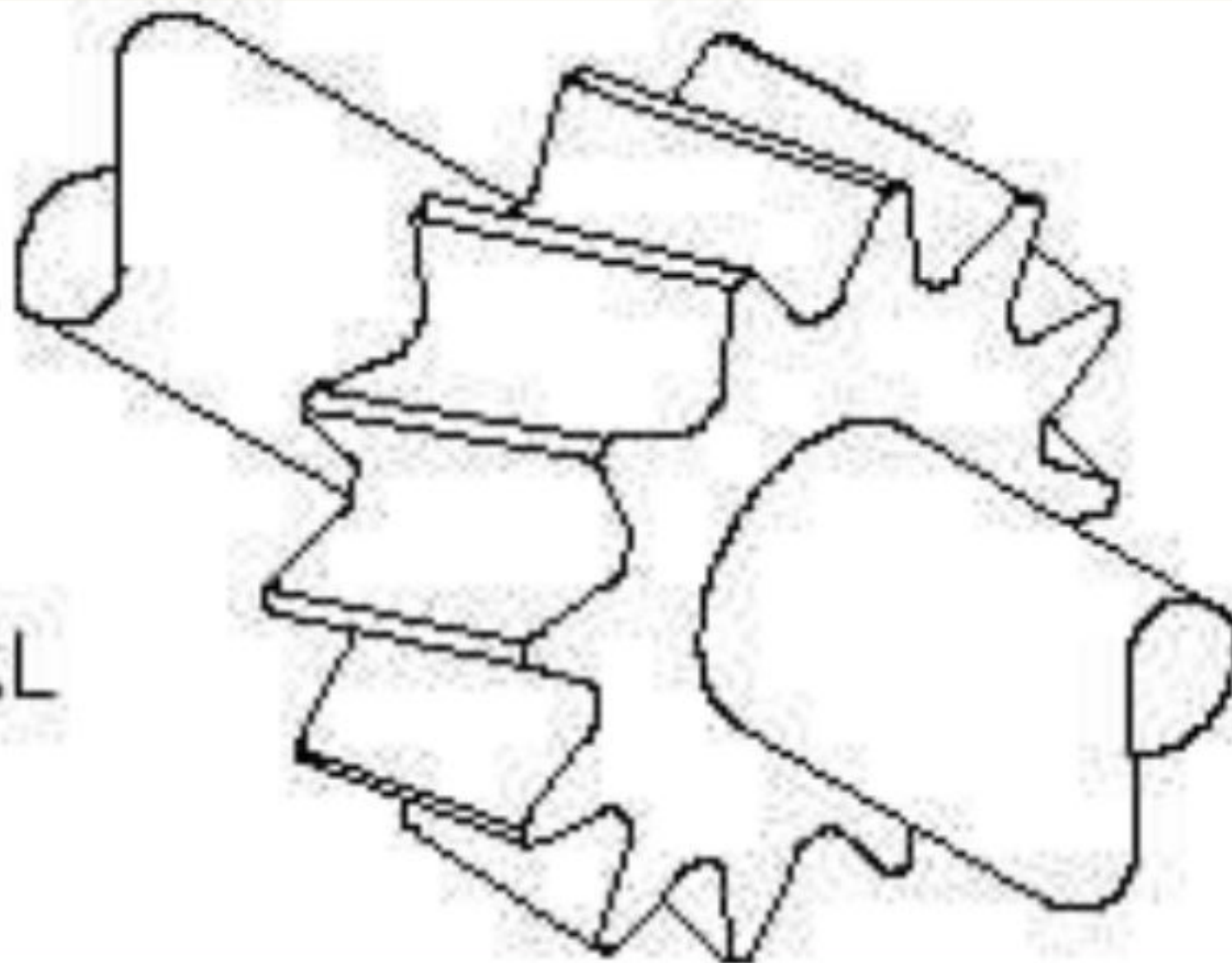
3. Herringbone gear.

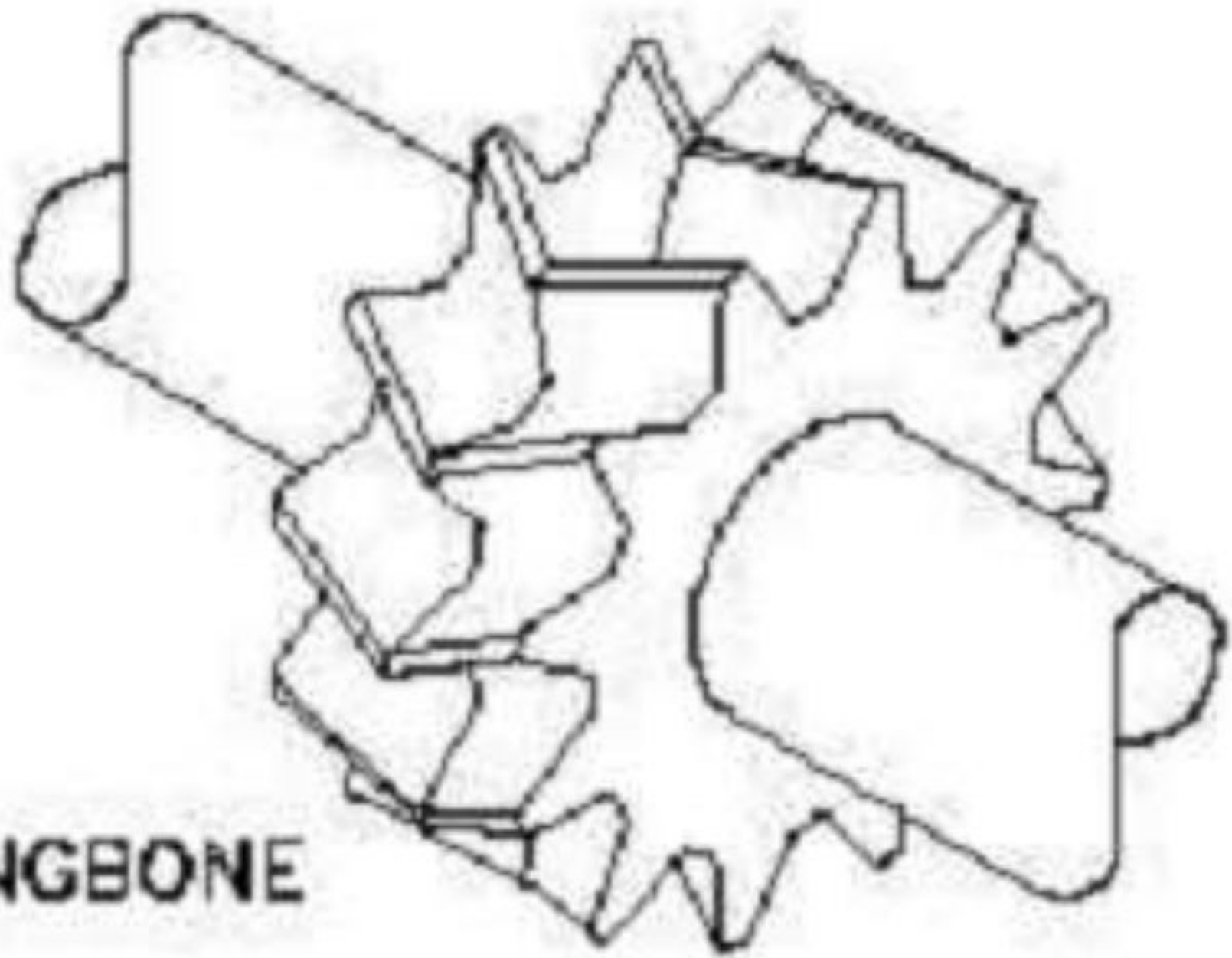
- A herringbone gear is composed of two helixes spiraling in different directions from the center of the gear.

SPUR



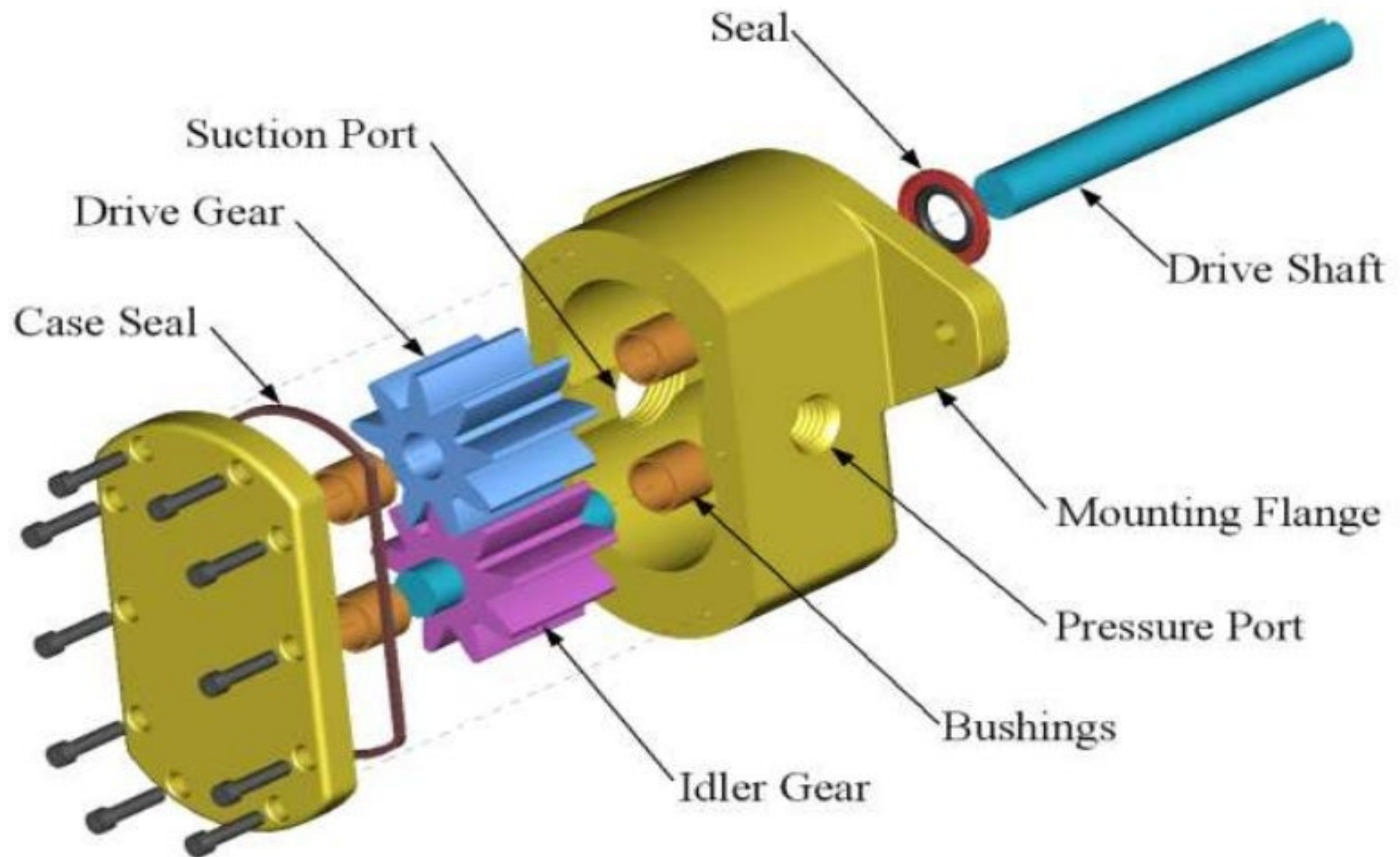
HELICAL





HERRINGBONE

Parts of a Gear Pump



Maintenance of Gear Pumps

- Comparing with other pumps, a gear pump need very less maintenance. Few maintenances are as follows:

1. Checking of back-lash clearances:

- If the back lash clearances become more than the limit, then need to change the gears. (Limit value is mentioned in Maker's manual)

2. Changing of bearings:

according to maker's instruction/PMS or if found damaged, the bearings need to change.

3. Gland packings/ mechanical Seal:

- Need to change if oil or liquid leaks from the pump gland.

Safeties in Gear Pumps

- As a positive displacement pump, a **RELIEF VALVE** is always fitted with the gear pump in order to protect from damage of pump casing or pipeline fittings due to accidental closure of pump discharge valve or any blockage in discharge pipelines.



Uses of Gear Pumps

- As the pump doesn't need any valve for pumping operation, so the gear pump is very effective to pump the heavy viscous liquids:
- Gear pumps are often used for pumping and transferring:
 - All kind of fuel oils,
 - Lub oils
 - Gear oils
 - Crude oil
 - Vegetable oils
 - Liquid Chemicals

Conclusion

- Can you remember how a gear pump works?
- Can you remember the safety device used in a Gear Pump?
- Can you tell me about maintenance of Gear Pumps?



Let us do some group discussion

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Any Question?



Thank you!