Mechanical systems and control

Spur Gears

Mechanical systems and control can be described as any combination of levers, linked levers, wheels, cams, pulleys and/or gears. If most of these components are put together it makes a machine.

A gear system is one example of a mechanical system. Gears are simple machines that rotate. Gears work together with other gears to form a gear system. Each gear has teeth or cogs. These cogs mesh in with the cogs of another gear, or with racks. In this section you will learn about bevel gears, worm gears and rack-and-pinion gears. You will also study different kinds of rotation movement.

1.1 Spur gears of equal size counter-rotating

A spur gear is basically a circular disk or plate with grooved teeth, it is straight-cut and has a simple design. Watches and wind turbines often make use of spur gears. In this case we are focusing on spur gears that are equal in size and counter-rotate.

1.2 Spur gears of unequal size counter-rotating

In this case the gears are not equal in size, but they still counter-rotate.

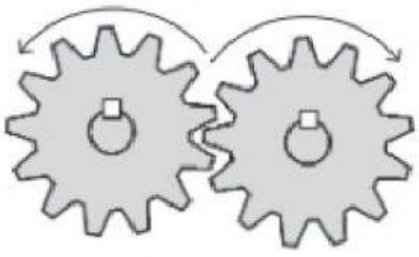

FIGURE 20 Spur gears of equal size, counter-rotating

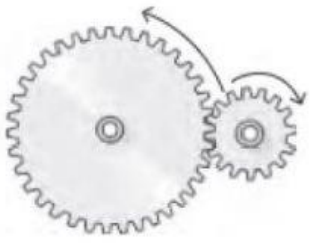

FIGURE 21 Spur gears of unequal size, counter-rotating

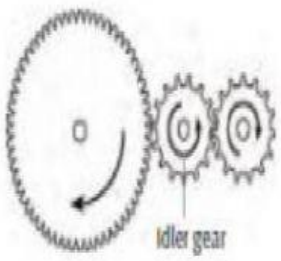

FIGURE 22 Spur gears using an idler gear to synchronise rotation.

1.3 Spur gears using an idler gear to synchronise rotation

An idler gear is a gear placed between two others to transfer motion without a change of direction. The purpose of the idler gear is to synchronise, to cause or operate, with exact coincidence in time or rate. We synchronise our watches to show the same time at any given moment.

In this case the bigger and smaller gears turn in the same direction at the same time.

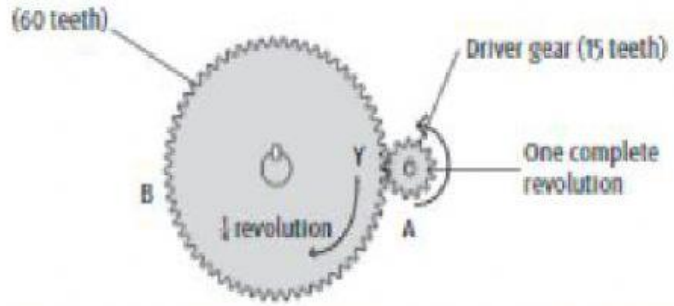

FIGURE 19 The components of a gear

1 Explain the use of spur gears.
2 When spur gears of different sizes engage the smaller gear is called the p___n and the bigger one is a g___r.
3 A is the d___g gear and B is the d___n gear.
4 The speed ratio of gears is also called gear v___.
5 Do the gears in **FIGURE 19** turn in the right direction? Yes or no?
6 What is the use of adding a spur gear in between two other gears? See **FIGURE 22**.

Answers

1.

2.

3.

4.