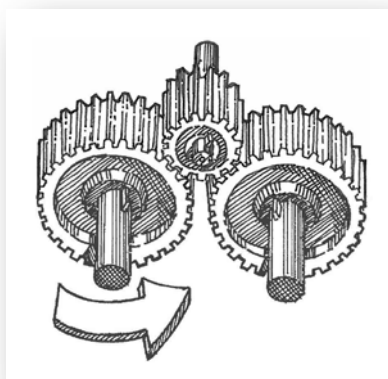


# Basic Gear Systems

A number of gears connected together is called a “Gear Train” The gear train is another mechanism for transmitting rotary motion and torque. Unlike a belt and pulley, or Chain and sprocket, no linking device (belt or chain) is required. Gears have teeth which interlock (or mesh) directly with one another.



Features of a “Gear train” transmission systems:

## Advantages

The main advantages of a gear train transmission systems is that because the teeth on any gear intermesh with the next gear in the train the gears cannot slip. (An exact ratio is maintained.) Large forces can be transmitted. The number of turns a gear makes can be easily controlled. High ratios between the input and the output are easily possible.

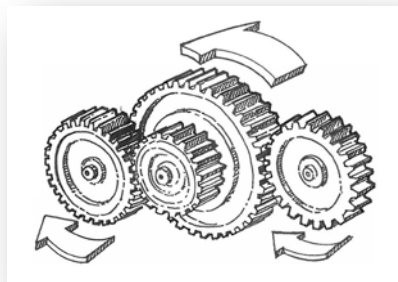
## Disadvantages

The main disadvantage of a gear system is it usually needs a lubrication system to reduce wear to the teeth. Oil or grease is used to reduce friction and heat caused by the teeth rubbing together.

## Using gear systems to change direction

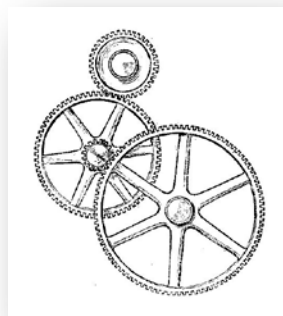
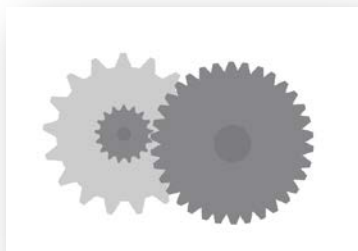
### Changing the direction of the output gear

If a driven gear is required to turn in the same direction as the driver gear, an idler gear has to be introduced between the two. The idler gear does not change the speed of the driven gear. In this example, one revolution of the driver gear turns the driven gear once. The actual size of the idler gear does not matter!



### Compound gear systems

Sometimes a simple gear train cannot provide a big enough gear ratio. If a large reduction in speed (or increase) is required then more than one set of gears can be used together. This is referred to as - "Compound gear trains".



Centre lathes, like the ones found in school workshops, have compound gear trains that transmit rotary motion from an electric motor through to the headstock spindle. The leadscrew, which allows the tool post to travel on automatic feed, also operates from this compound gear train. Compound gear trains involve several pairs of meshing gears. They are used where large speed changes are required or to get different outputs moving at different speeds.