Gear Encyclopedia Article

Gear

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Gear

A gear is a component of a machine that is designed to transfer motion between rotating shafts.

A gear usually consists of a wheel with teeth around its edges, and gears operate in pairs as the teeth of one gear slip into the teeth of the other. (A tooth on a gear is also called a *cog*.) If a shaft, called the *driving shaft*, turns a wheel, this motion can be transferred to the second gear and its corresponding shaft, the *driven shaft* because the gears' teeth interlock.

The smaller (in diameter) of two engaged gears is called the "pinion." If the driving shaft is the pinion, the gear pair acts to slow the rotation down, increasing the torque, or transmitted force, of the driving shaft. Vice-versa, if the driven shaft is the pinion, the pair acts to increase the rotation, decreasing the torque. Properly-designed gears can in this way be used to transfer power, and to do so efficiently, the gear teeth must be carefully designed and constructed.

Gears work best when their two shafts are not far apart, but they need not be parallel. Appropriate gears can be made whether the driving and driven shafts are parallel or nonparallel, or intersecting or nonintersecting. Different gears are designed for each case. Parallel shafts are usually connected with spurred or helical gearing, spur gears being the most familiar type of straight, toothed gear. Helical gears have twisted, screw-like teeth. Intersecting shafts require a beveled gear, which has tapered teeth around a section of a cone. Nonparallel, nonintersecting shafts are usually connected by a "worm" and a gear, where the worm resembles a screw.

Gears pairs can be used in a series in order to obtain larger changes (ratios) in speed and torque. Gears are found in everything from clocks to bicycles to cars to heavy machinery.