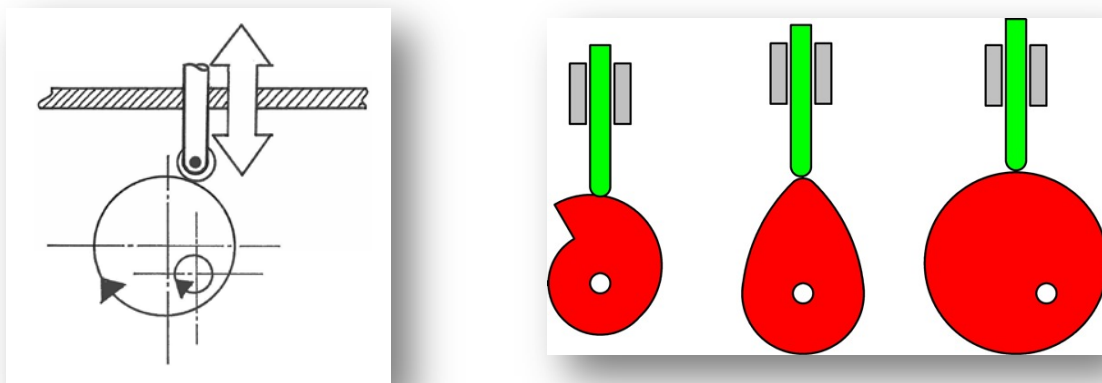


Cams

A cam and follower mechanism is a profiled shape mounted on a shaft that causes a lever or follower to move. Cams are used to convert rotary to linear (reciprocating) motion. As the cam rotates, the follower rises and falls in a process known as reciprocating motion.

The motion of the follower is restricted to a pre-determined pattern by a guide. The follower maintains contact with the cam through the force of gravity or by a spring. The total range of movement produced by the cam is called the stroke. The range of movement of the follower will depend on the distance from the shaft supporting the cam to the upper and lower points of the rotation circle. Cams are commonly used in engines to control valves (in which the valve is the follower), sewing machines, children's toys and many other mechanical applications.

The shapes of individual Cams are designed to produce specific types of motion.



Cams come in a variety of shapes and sizes - the most common types (from left to right): snail shaped, pear shaped and a circular with an off-centre hole. As the cams rotate, the followers reciprocate motion according to the profile of each cam. For example, cams that have a pear shape will cause the follower to lift, to fall and then to pause before repeating the action. The cams that have a circular shape, sometimes referred to as eccentric cams, will cause a smooth rise and fall movement with no pause. This is known as harmonic action.

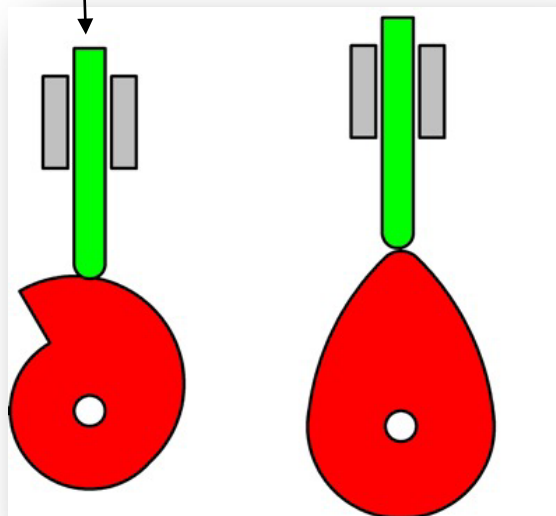


Toy (automata) using cams

Whenever using a cam and follower, several considerations need to be taken. The lever shaft usually has to be kept in contact with the cam; using a roller follower can assist this. The sliding surfaces must also be kept well lubricated to reduce wear.

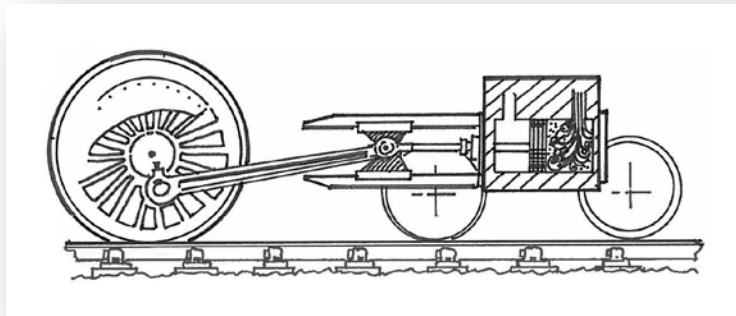
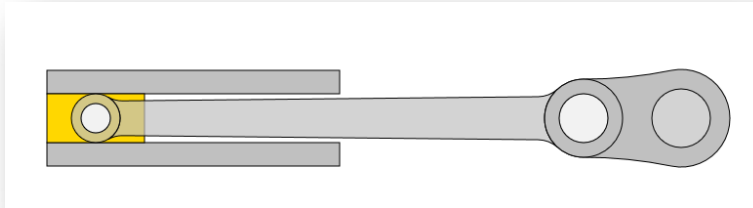
Cams - Lift, fall and dwell

Cams can provide a **lift** (when the follower is moving up), **fall** (when the follower is moving downwards) and **dwell** (when the follower is not moving). The shape of the cam is altered to give the movement that is required in the mechanism.



Crank and Slider

A crank is a device through which rotary motion and torque can be applied to a shaft. The simplest device is a crank handle. When a number of cranks are incorporated into a shaft, it is called a crankshaft. The most common application of the crankshaft is in the motor car engine. A crankshaft, connecting rod and piston, is one example of a crank and slider mechanism.



The crank and slider is another mechanism which can convert rotary motion into linear motion. By rotating the crank, the slider is forced to move backwards and forwards. This motion is called reciprocating motion. Alternately, if the slider produces the input motion (as in the case of a piston) the crank is forced to rotate. The distance moved by the slider, is dependent upon the length of the crank. As the crank rotates through 180 degrees, the slider moves a distance equal to twice the length of the crank.