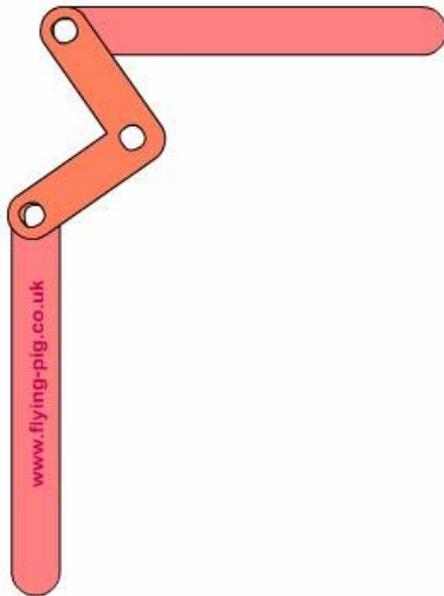
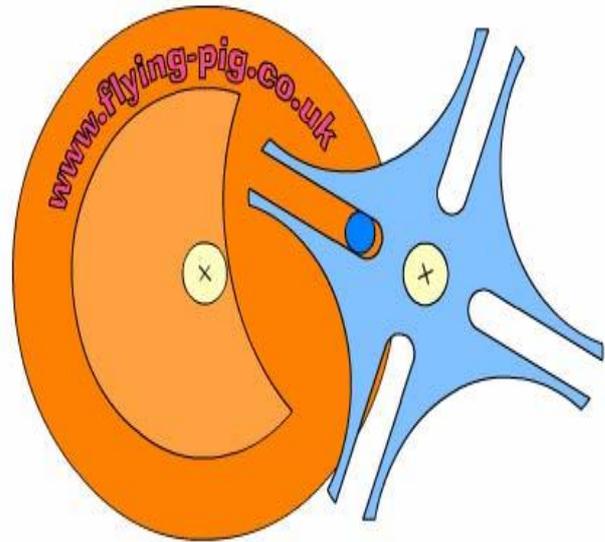


SOME OF THE MECHANISMS WHICH ARE USED IN DAY TO DAY LIFE

BELL CRANK:



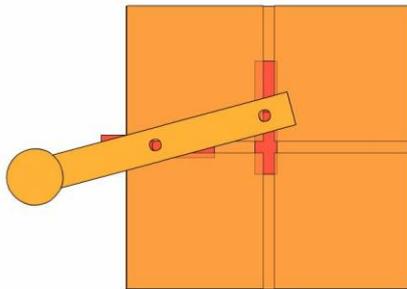
GENEVA STOP:



BELL CRANK: The bell crank was originally used in large house to operate the servant's bell, hence the name. The bell crank is used to convert the direction of reciprocating movement. By varying the angle of the crank piece it can be used to change the angle of movement from 1 degree to 180 degrees.

GENEVA STOP: The Geneva stop is named after the Geneva cross, a similar shape to the main part of the mechanism. The Geneva stop is used to provide intermittent motion, the orange wheel turns continuously, the dark blue pin then turns the blue cross quarter of a turn for each revolution of the drive wheel. The crescent shaped cut out in dark orange section lets the points of the cross past, then locks the wheel in place when it is stationary. The Geneva stop mechanism is used commonly in film cameras.

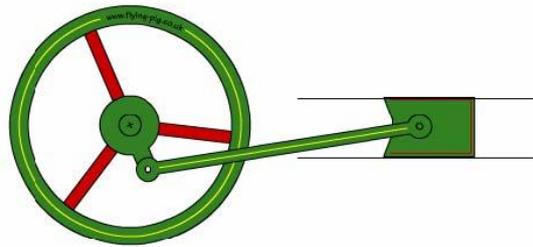
ELLIPTICAL TRAMMEL



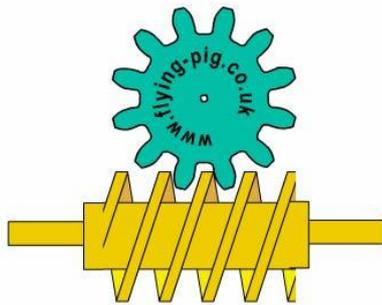
ELLIPTICAL TRAMMEL: This fascinating mechanism converts rotary motion to reciprocating motion in two axis. Notice that the handle traces out an ellipse rather than a circle. A similar mechanism is used in ellipse drawing tools.

PISTON ARRANGEMENT: This mechanism is used to convert between rotary motion and reciprocating motion, it works either way. Notice how the speed of the piston changes. The piston starts from one end, and increases its speed. It reaches maximum speed in the middle of its travel then gradually slows down until it reaches the end of its travel.

PISTON ARRANGEMENT

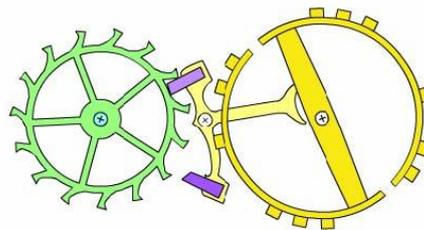


RACK AND PINION



RACK AND PINION: The rack and pinion is used to convert between rotary and linear motion. The rack is the flat, toothed part, the pinion is the gear. Rack and pinion can convert from rotary to linear or from linear to rotary. The diameter of the gear determines the speed that the rack moves as the pinion turns. Rack and pinions are commonly used in the steering system of cars to convert the rotary motion of the steering wheel to the side to side motion in the wheels. Rack and pinion gears give a positive motion especially compared to the friction drive of a wheel in tarmac. In the rack and pinion railway a central rack between the two rails engages with a pinion on the engine allowing the train to be pulled up very steep slopes.

RATCHET



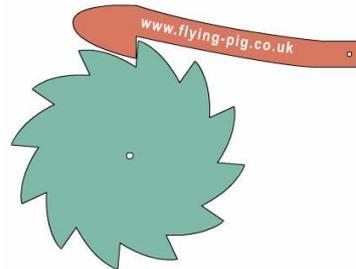
RATCHET: The ratchet can be used to move a toothed wheel one tooth at a time. The part used to move the ratchet is known as the pawl. The ratchet can be used as a way of gearing down motion. By its nature motion created by a ratchet is intermittent. By using two pawls simultaneously this intermittent effect can be almost, but not quite, removed. Ratchets are also used to ensure that motion only occurs in only one

direction, useful for winding gear which must not be allowed to drop. Ratchets are also used in the freewheel mechanism of a bicycle.

WORM GEAR



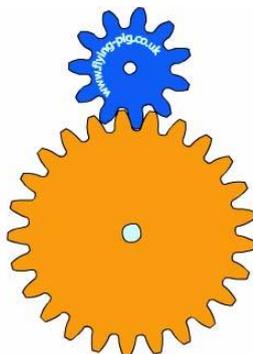
WATCH ESCAPEMENT.



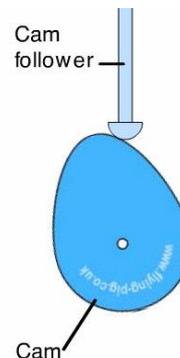
WORM GEAR: A worm is used to reduce speed. For each complete turn of the worm shaft the gear shaft advances only one tooth of the gear. In this case, with a twelve tooth gear, the speed is reduced by a factor of twelve. Also, the axis of rotation is turned by 90 degrees. Unlike ordinary gears, the motion is not reversible, a worm can drive a gear to reduce speed but a gear cannot drive a worm to increase it. As the speed is reduced the power to the drive increases correspondingly. Worm gears are a compact, efficient means of substantially decreasing speed and increasing power. Ideal for use with small electric motors.

WATCH ESCAPEMENT: The watch escapement is the centre of the time piece. It is the escapement which divides the time into equal segments. The balance wheel, the gold wheel, oscillates backwards and forwards on a hairspring (not shown) as the balance wheel moves the lever is moved allowing the escape wheel (green) to rotate by one tooth. The power comes through the escape wheel which gives a small 'kick' to the palettes (purple) at each tick.

GEARS



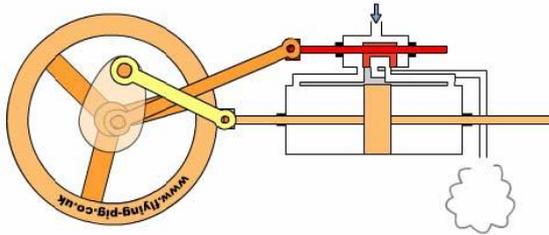
CAM FOLLOWER.



GEARS: Gears are used to change speed in rotational movement. In the example above the blue gear has eleven teeth and the orange gear has twenty five. To turn the orange gear one full turn the blue gear must turn $25/11$ or $2.2727r$ turns. Notice that as the blue gear turns clockwise the orange gear turns anti-clockwise. In the above example the number of teeth on the orange gear is not divisible by the number of teeth on the blue gear. This is deliberate. If the orange gear had thirty three teeth then every three turns of the blue gear the same teeth would mesh together which could cause excessive wear. By using none divisible numbers the same teeth mesh only every seventeen turns of the blue gear.

CAMS: Cams are used to convert rotary motion into reciprocating motion. The motion created can be simple and regular or complex and irregular. As the cam turns, driven by the circular motion, the cam follower traces the surface of the cam transmitting its motion to the required mechanism. Cam follower design is important in the way the profile of the cam is followed. A fine pointed follower will more accurately trace the outline of the cam. This more accurate movement is at the expense of the strength of the cam follower.

STEAM ENGINE.



Steam engines were the backbone of the industrial revolution. In this common design high pressure steam is pumped alternately into one side of the piston, then the other forcing it back and forth. The reciprocating motion of the piston is converted to useful rotary motion using a crank.

As the large wheel (the fly wheel) turns a small crank or cam is used to move the small red control valve back and forth controlling where the steam flows. In this animation the oval crank has been made transparent so that you can see how the control valve crank is attached.

Source : <http://nprcet.org/e%20content/mech/KM.pdf>