RATCHET AND PAWL

A is the **ratchet wheel**, and *B* is an oscillating lever carrying the **driving pawl**, *C*. A **supplementary pawl** at *D* prevents backward motion of the wheel.

When arm *B* moves counterclockwise, pawl *C* will force the wheel through a fractional part of a revolution dependent upon the motion of *B*. When the arm moves back (clockwise), pawl *C* will slide over the points of the teeth while the wheel remains at rest because of fixed pawl *D*, and will be ready to push the wheel on its forward (counterclockwise) motion as before.

The amount of backward motion possible varies with the pitch of the teeth. This motion could be reduced by using small teeth, and the expedient is sometimes used by placing several pawls side by side on the same axis, the pawls being of different lengths.

The contact surfaces of wheel and pawl should be inclined so that they will not tend to disengage under pressure. This means that the common normal at *N* should pass between the pawl and the ratchet-wheel centers. If this common normal should pass outside these limits, the pawl would be forced out of contact under load unless held by friction. In many ratchet mechanisms the pawl is held against the wheel during motion by the action of a spring.

The usual form of the teeth of a ratchet wheel is that shown in the above Figure, but in feed mechanisms such as used on many machine tools it is necessary to modify the tooth shape for a reversible pawl so that the drive can be in either direction. The following Sim Design example of a ratchet also includes a four bar linkage.