Dc electric motor

Electric motors whether used in a simple toy or in complex production process involves the basic principle of electromagnetism. When a current passes through a conductor, magnetic field is created around the conductor (Pople 1998: 216). Once introduced in an external magnetic field usually by permanent magnets, this current-carrying conductor experiences a force which drives it to a direction perpendicular to both the direction of the current and external magnetic field (Mee 2008: 321).

A simple DC motor was created from copper wire, battery and ceramic magnet. First, a coil was made from the wire; such coil was secured by tying two protruding ends at opposite positions within the coil. The insulation on both ends were removed and prepared to be connected to a battery. Meanwhile, a set of cradle was made from bent clips, attached to the positive and negative ends of a battery. Between these clips, a ceramic magnet was fixed.

The coil was then finally connected with the battery by placing it on the cradle. (Fig. 1) As expected, once the coil was connected to the battery it began rotating. The battery provided the current while the magnet created the external magnetic field. Because the wire is made into a loop, the force due to the current and external magnetic field caused the rotation about its axis. However, the coil was spinning erratically because its ends were too loose in the cradle.

This could be solved by securing the axis of rotation of the coil: the upper end of the cradle could be a loop small just a little bigger in diameter than the cross section of the coil wire. This motion of a current-carrying loop in a magnetic field is used in many applications that require rotary motion like

simple toys, industrial fans, blowers and pumps and even disk drives (USNA 2010). Modern motors are improved by using more coil and stronger magnets and adding peripherals like brushes and commutators (Seale 2003).