Principle of electric motor

Principle of Electric Motor An electric motor is a device that converts electrical energy into mechanical energy (Wikipedia, n. d The principle of an electric motor is based on electromagnetism and according to it when a current carrying conductor passes through a magnetic field it experiences a force. The direction of force is determined by the right hand thumb rule, which states that if the right thumb points towards the current of the conductor and the finger in the right hand point in the direction of external magnetic field, then the force on the conductor is directed outwards of the palm (Thinkquest, 1999)

If the current carrying conductor is bent in a rectangular loop, then the two opposite sides that are at right angles to the magnetic field will experience force (Hyper Physics, n. d.). The direction of the force on both rectangular loop sides will be opposite to each other and therefore will produce a torque to the loop and the loops will continuously rotate.

In practical applications an electric motor have a large number of loops attached to the coil armature and the magnetic field is generally produced by large electromagnets. Mainly two types of electric motors are widely used and there is slight difference between the working principles of DC and AC electric motors.

Working of DC and AC electric Motor: In DC electric motor electricity to the armature coil is supplied through a commutator. Commutator reverses the current after every half cycle so that the torque applied to the armature is in one direction only and thus the coil rotates in single direction.

In an AC electric motor the AC current is passed through the rotating contacts. These rotating contacts are also called brushes and the main disadvantage of these AC motors is that a part of energy is wasted as heat,

which also shorten the life of the electric motor, however in an AC motor the magnetic field is also produced by same AC voltage (Hyper Physics, n. d.). The coil for producing electromagnetic field is also known as stator and the other coil attached to the core is known as armature. The diagram of the DC and Ac motor is given in Figure-1.

Discussion: So these two types of common electrical motors as we have seen above are the best example of utilizing electromagnetic principles for our use. As it is the fundamental principle that energy can neither be created nor be destroyed but it can be converted from one form to another. The conversion of one form of energy to other form should be carried out in an efficient way but as we have seen lots of energy is wasted as heat. Further an electrical wiring is made around a soft iron core and due to heat the iron core also damages quickly hence the life of the motor is also limited. These are some of the disadvantages of these electrical motors, however a number of new modifications such as coreless DC motors, AC induction motors, brush less DC motors has already been in use for minimizing some of the problems associated with the conventional motors.

Conclusion: Electric motors are necessary equipments used in our day-to-day life. These are essential items in some of our home appliances such as fan, pool pumps, fridges, washing machines, fan-forced ovens etc and we will remain dependant on various electrical motors.

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FIG 1: DC and AC ELECTRIC MOTORS

[Figure taken from the website http://hyperphysics. phy-astr. gsu. edu/hbase/magnetic]