9.1 PRINCIPLE OF A GENERATOR

An electrical generator is a machine which converts *mechanical energy* (or power) *into electrical energy* (or power). It works on the following principle :

"Whenever a conductor cuts magnetic flux, dynamically induced e.m.f. is produced in it according to Faraday's law of electromagnetic induction".

9.2 PARTS OF A D.C. MACHINE

A D.C. machine consists of two main parts :

1. **Stationary part :** designed mainly for *producing magnetic flux.*

2. **Rotating part :** called *armature*, where mechanical energy is converted into electrical (electric generator) or, conversely, electrical energy into mechanical (electric motor).

Fig. 9.1 shows the sectional view of a four pole D.C. machine.

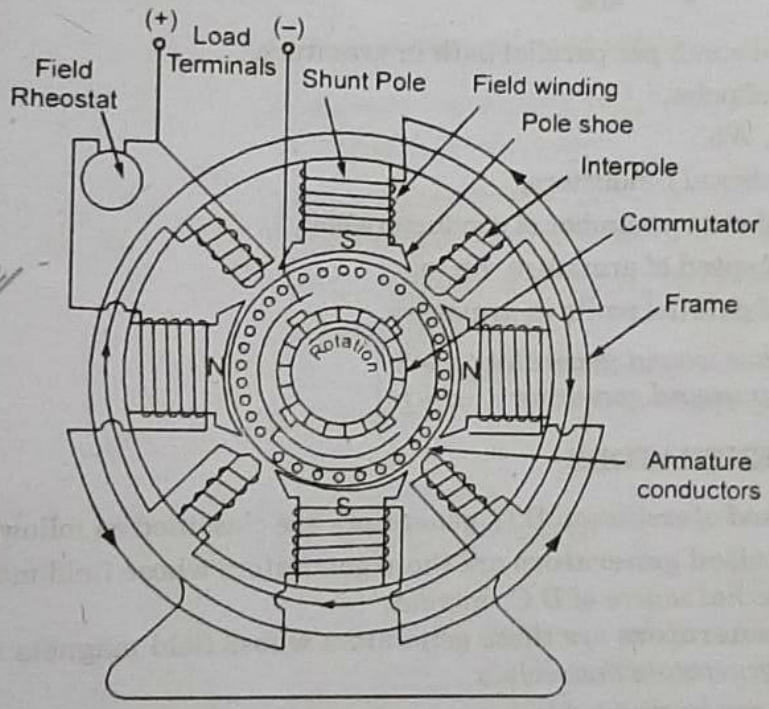

Fig. 9.1. Sectional view of a four pole D.C. machine.

The various parts of a D.C. machine are enumerated below :

(i) Frame (ii) Field poles

(*iii*) Commutating poles (*iv*) Armature
(*v*) Commutator (*vi*) Brush gear
(*vii*) Armature shaft bearings (*viii*) Armature windings.

— According to the degree of closure produced by winding, armature windings are of the following two types :

1. Open coil winding.
2. Closed coil winding.

The closed armature windings are of two types :

(*i*) Ring winding. (*ii*) Drum winding.

In general there are two types of drum armature windings :

(*i*) Lap winding. (*ii*) Wave winding.

'Lap winding' *is suitable for comparatively low voltage but high current generators where as* **'Wave winding'** *is used for high voltage, low current machines.*

In the **'lap winding'** the *finish of each coil is connected to the start of the next coil so that winding or commutator pitch is unity*. In the **'wave winding'** the finish of coil is connected to the start of another coil *well away* from the first coil.

9.3. E.M.F. EQUATION OF A GENERATOR