

FACTS CONCERNING DYNAMO ELECTRIC MACHINES AND THEIR MANAGEMENT.*

A dynamo consists of the field and the armature. The field consists of the magnets, which are solidly connected with the iron frame. The magnet are iron cores, on which layers of insulated wire are wound. These magnets belong to the class of electro-magnets, as they become magnetic only when the current is passing through their coils. Between the poles of the magnet the armature rotates. The armature consists of an iron or steel shaft, to which a number of coils of insulated wire are affixed.

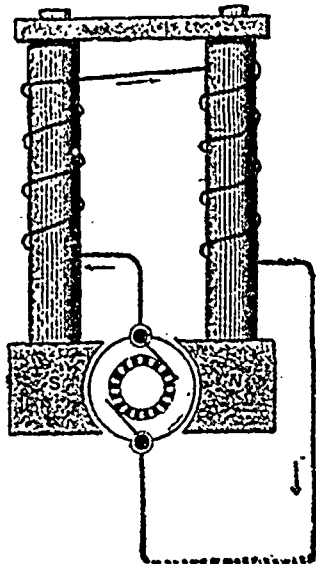


FIG. 1—THE SERIES DYNAMO.

Metal plates or bundles of wire called brushes conduct the current generated in the armature to the lamp circuit.

The two main types of dynamos are :

A, The continuous current dynamo. The current generated in this dynamo always flows in the same direction. The armature of this dynamo has a commutator from which the current is taken off by the brushes.

B, The alternating current dynamo. The current generated in this machine flows at rapid intervals first in one and then in the other direction. This dynamo has no commutator but simply a collector consisting of two metal rings on which the brushes rest. The magnets of the alternating current machine require, however, a continuous current for excitation. This current is

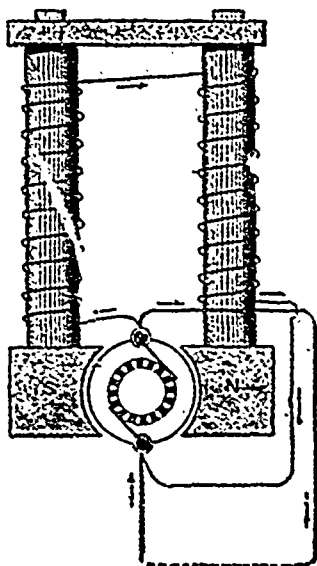


FIG. 2—THE SHUNT DYNAMO.

generated by an extra continuous current machine of small size, which is called the exciter.

A, The series dynamo, Fig. 1. Magnet, armature and lamp circuit are connected one behind the other, that is, in series; that is to say, the current generated in the armature passes in equal strength through field magnets and lamp circuit. These machines are mostly used for arc lighting.

B, The shunt dynamo, also called derived circuit dynamo. The coils of wire wound around the field magnets in Fig. 2, are connected in shunt or parallel to the brushes. Only a compara-

tively small part of the current generated in the armature is used for excitation of the field coils, while the greater part of the current is conducted from the brushes to the lamp circuit. These machines generally have a resistance box, rheostat or regulator which is connected in the shunt winding of the field. By putting

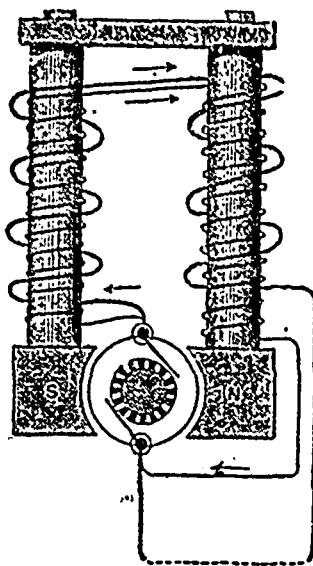


FIG. 3—THE COMPOUND DYNAMO.

more or less resistance in the field of these machines the e. m. f. at the binding post of the machine can be decreased or increased. Shunt dynamos are mostly used for incandescent lighting. In some systems, however, they are used for arc lighting also.

C, The Compound Dynamo. This dynamo, Fig. 3, combines in its fields the winding of both the series and the shunt dynamo. The magnets are wound with thick wire, which is in series with the armature and the lamp circuit. In addition they have a winding of fine wire, which is in shunt with the brushes. This dynamo generally has a resistance box put in the shunt winding of the fields, for the same purpose as explained under B. Compound dynamos are mostly used for incandescent lighting.

The field wire coils of an alternating current dynamo, Fig. 4, have no connection with the brushes of the dynamo at all. The fields are separately excited, as mentioned in the foregoing, by a little continuous current dynamo, called an exciter. The alternating current machines were used formerly for arc lighting mainly—very little, however, in the United States—but recently have been introduced for long distance incandescent lighting by means of transformers or converters.

In the preparation of a new dynamo for operating, iron parts which have to be fitted to each other must be carefully cleaned

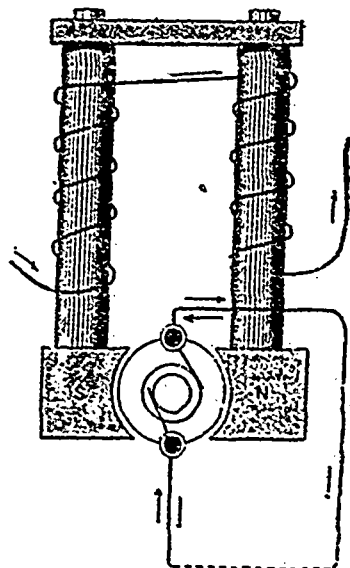


FIG. 4—THE ALTERNATING CURRENT DYNAMO.

with fine emery cloth. When the armature is put into the dynamo, extra precaution is necessary in order to avoid any injuries to the insulation of the wire and to the commutator. The armature should be carried by a man on each end of the shaft. Heavy armatures should be supported by a board put underneath the armature, and each end carried by an additional man.

* From the "Dynamo Tender's Hand-Book."