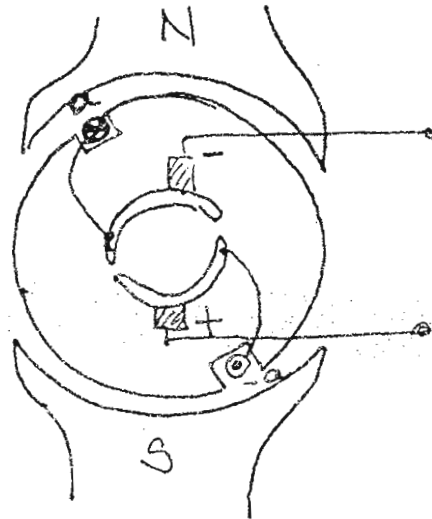


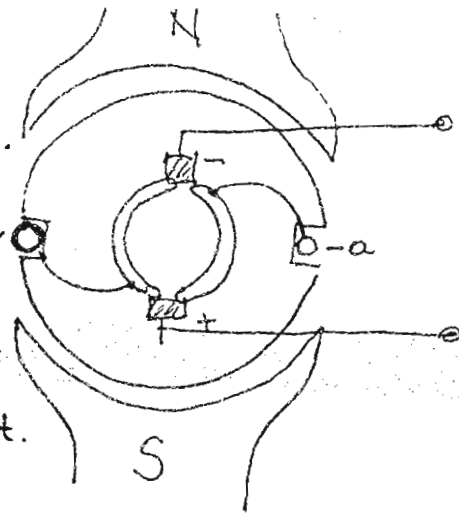
at t_3 :

Induced emf in conductor "a" has a reverse polarity that is \otimes , with respect to time instant t_1 .



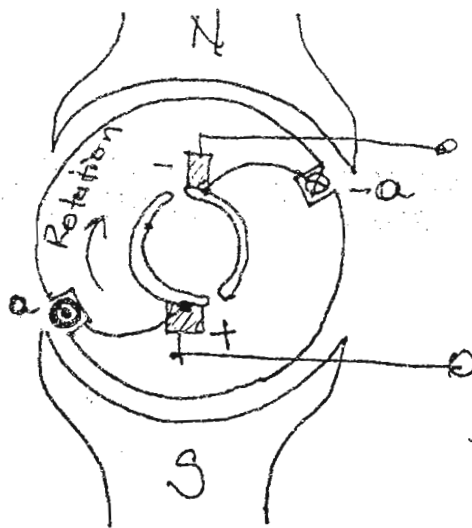
at t_2 :

Armature coil sides "a" and "-a" midway between salient field poles. Induced emf is ZERO. This is the COMMUTATION instant. Polarity of induced armature emf and direction of armature conductor current will reverse at this instant.



at t_1 :

Induced emf in armature conductor "a" has \odot polarity.



An illustration of generating AC, commutating the current and providing rectification mechanically by the brush/commutator arrangement.

Magnetic Axis of the Field (O-Axis)

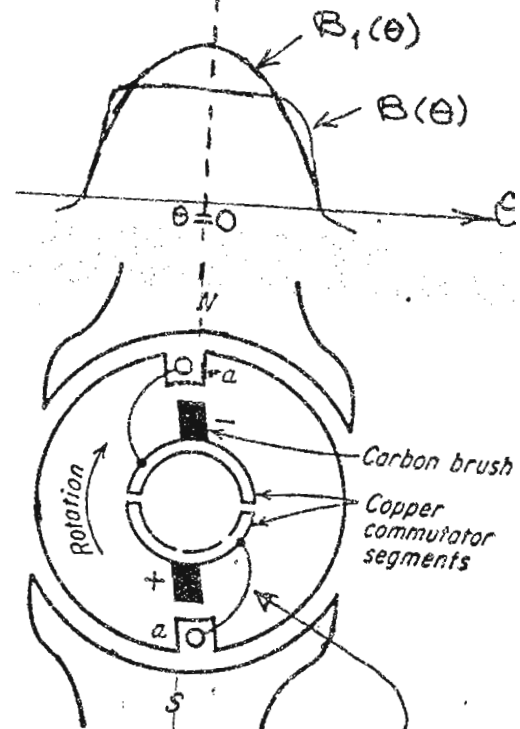


FIG. 3-16. Elementary d/c machine with commutator.

Armature coil side are connected to associated commutator segments with 90° electrical shift in space

That is why the brushes are physically positioned just under salient field poles.

However in the schematic diagram they are shown in the quadrature axis, because this is the position of armature conductors to which they are connected.

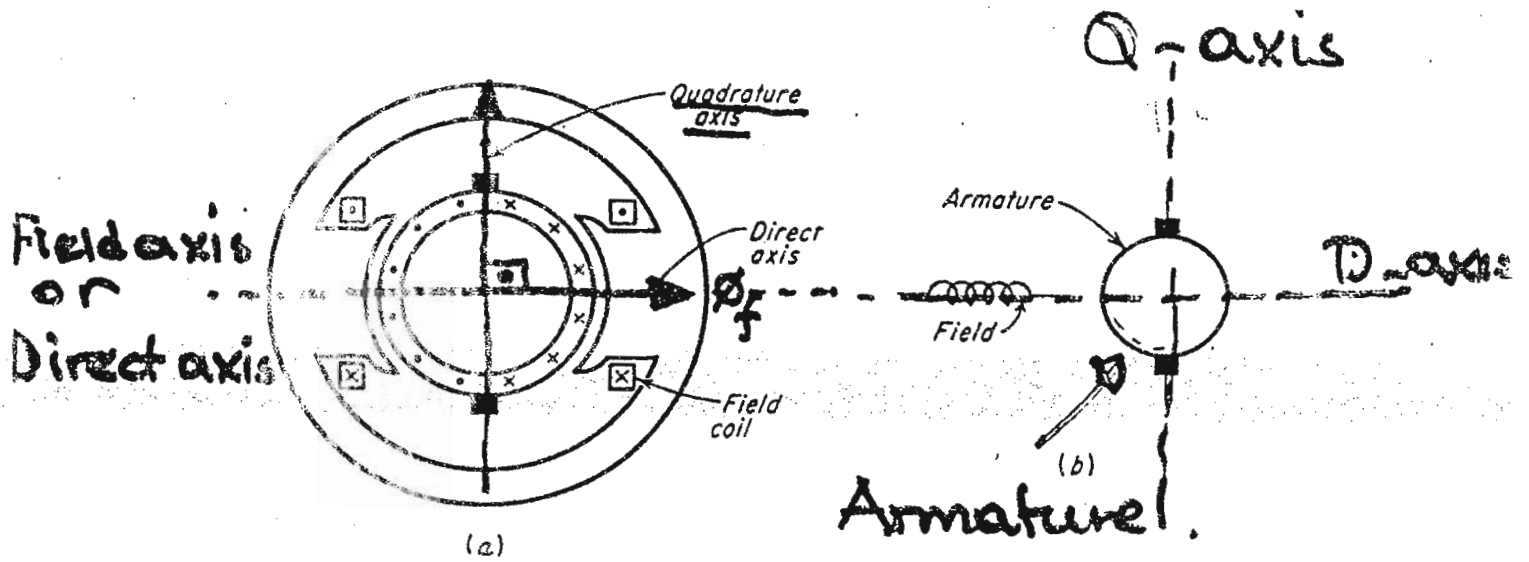


FIG. 3-34. Schematic representations of a d-c machine.

The brushes are located so that commutation occurs when the coil sides are in the neutral zone, midway between the field poles

The axis of the armature mmf wave is then 90° electrical from the axis of field poles (D-axis).

In the schematic representation the brushes are then shown in the quadrature axis because this is the position of armature coils to which they are connected.

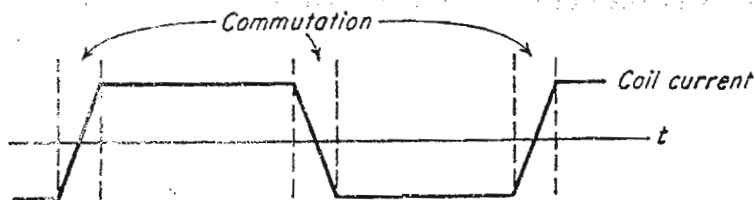


FIG. 3-33. Waveform of current in an armature coil with linear commutation.

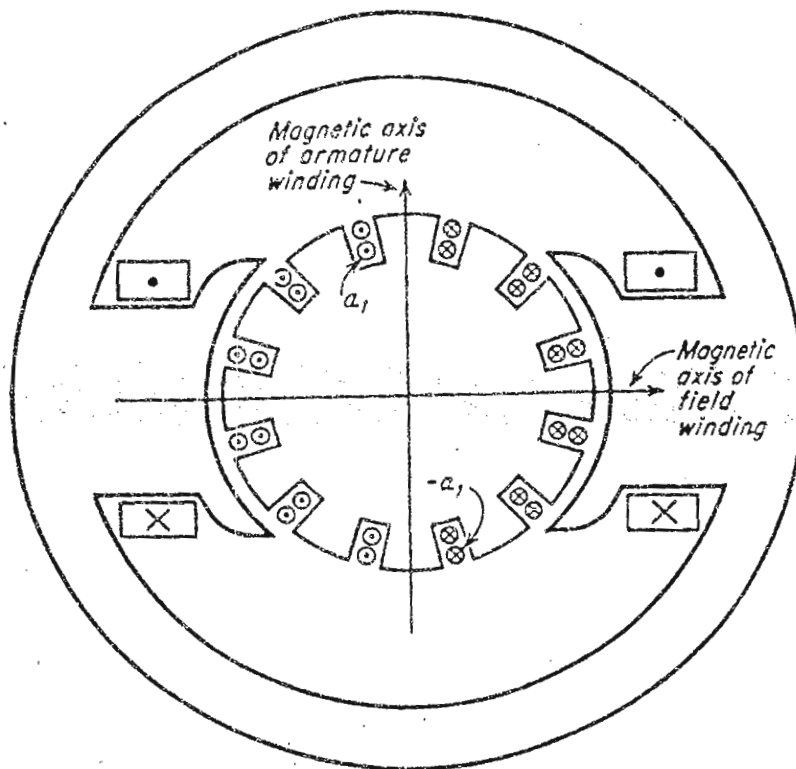


FIG. 3-19. Cross section of a 2-pole d-c machine.

The effect of distributing the wdg in several slots is shown in Fig 4.8. The generated voltage as observed from the brushes is the sum of the rectified voltages of all coils in series between brushes and is shown by the rippling line labeled e_a in Fig 4.8.

With a dozen commutator segments per pole, the ripple becomes very small, and the average generated voltage observed from the brushes equals the sum of the average values of the rectified coil voltages.

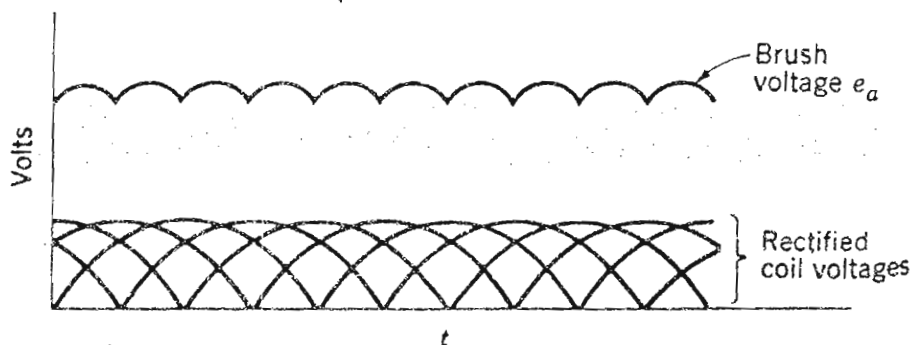


Fig. 4-8. Rectified coil voltages and resultant voltage between brushes in a dc machine.

Field Core

