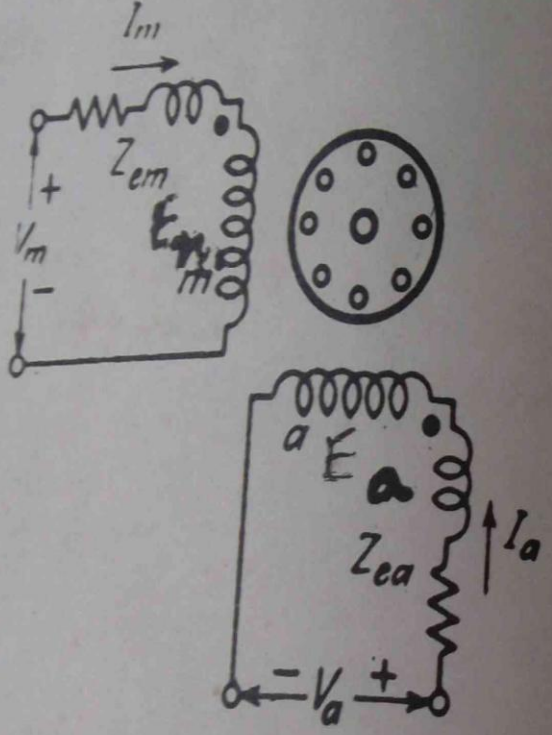

Fig. 17-1.

CHAPTER 17

TWO-PHASE INDUCTION MACHINES

TWO-PHASE SYMMETRICAL COMPONENTS

In the same way that an unbalanced three-phase system can be resolved into three sets of symmetrical components, so an unbalanced two-phase system can be resolved into two sets of two-phase symmetrical components. These are called the positive-and negative-sequence components, denoted by suffixes f and b respectively; there is no zero-sequence component.

Thus, in Figure 17-1, the asymmetrical voltages V_a and V_m are equivalent to the two systems shown. The set of components V_{af}, V_{mf} is the positive set because it has the same phase sequence as the original system; the components V_{ab} and V_{mb} form the negative-sequence set. Analytically these may be written

$$V_a = V_{af} + V_{ab} = jV_{mf} - jV_{mb}$$

$$V_m = V_{mf} + V_{mb}$$

so that

$$V_{mf} = \tfrac{1}{2}\left(V_m - jV_a\right) \quad \ldots (17-1)$$

$$V_{mb} = \tfrac{1}{2}\left(V_m + jV_a\right) \quad \ldots (17-2)$$

A similar analysis is possible for two-phase unbalanced currents: in an obvious notation,

$$I_a = I_{af} + I_{ab} = jI_{mf} - jI_{mb}$$

$$I_m = I_{mf} + I_{mb}$$

Figure 17-1. Two-phase induction motor