NEW APPLICATION OF TRAVELING MAGNETIC FIELDS

Leonard R. Crow, Educational Electric Mfg. Company, Terre Haute

It is often desired to demonstrate traveling magnetic field phenomena to students so that the demonstration will be impressive and yet not complex and difficult to understand. It is chiefly for this reason that I have invented the motor described here.

The fundamental object of the device resides in the provision of a novel method of rotating a conductive element by producing traveling magnetic fields, annular in form, propagated in the direction of the desired line of movement of the conductive element by means of polyphase electric current or split single-phase current.

The device has for another object to provide a novel form of apparatus for carrying out the method aforesaid, comprising a laminated iron ring inclosed in a conductive element surrounded by annular coils so disposed and arranged that they will produce a traveling annular magnetic field, so that the conductive element will be subject to the effect of current induced in it by said traveling magnetic field and will be impelled with a velocity which approximates that of the traveling magnetic field and continues to travel at the attained velocity so long as current is supplied to the coils surrounding it.

A further object resides in the particular construction and arrangement of the parts which are described in the accompanying drawings.

The device, as illustrated in the drawings, shows the preferred form, although it is to be understood that modification in the construction and arrangement of the parts may be adapted without departing from the fundamental principle involved.

Figure 1 is a diagram of the elements necessary for the operation of the device. Figure 3 is an illustration of the device. Figure 2 is a cross sectional view of the movable ring element.

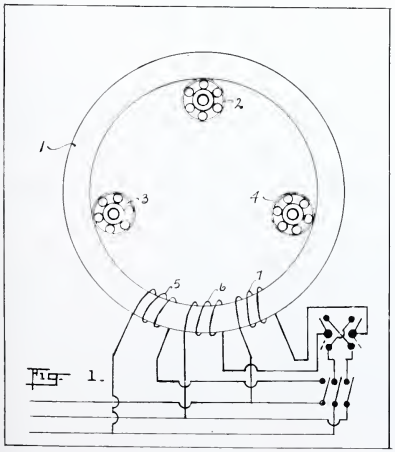

Fig. 1.

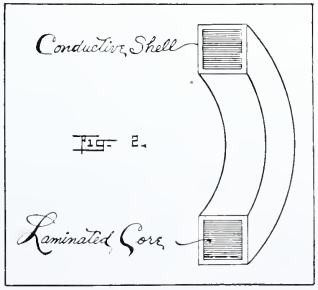

Fig. 2.

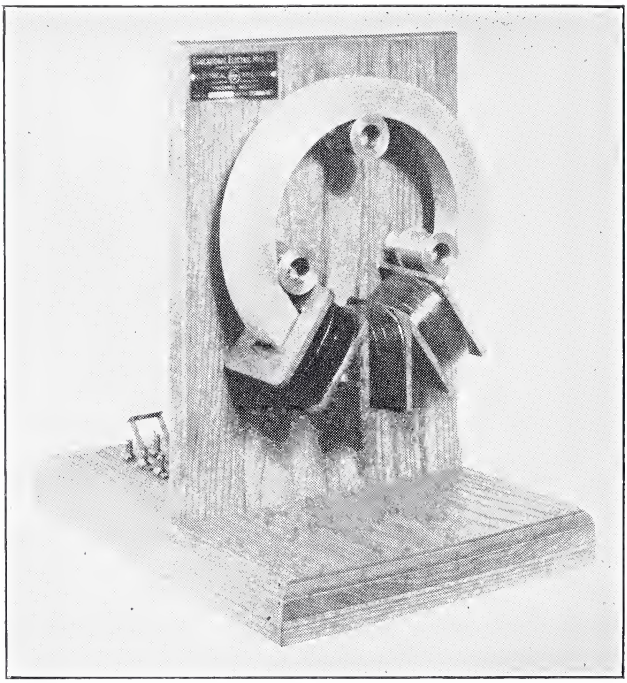

Fig. 3.

As illustrated in Figure 1, the device consists of a ring (1), ball and bearings (2, 3, and 4), coils (5, 6, and 7) connected to a source of three-phase current supply. The ring (1) is mounted upon the bearings so that it is free to revolve through the coils, which must be large enough inside diameter so that the ring can rotate freely through them without friction.

Figure 2, represents a heavy shell of aluminum, copper, or other suitable conductive material in which is disposed a ring of laminated iron or steel.

The coils constitute means for producing traveling magnetic fields, which are propagated longitudinally of the ring, and which induce currents in the ring, thereby setting up a force tending to move the ring through the coils.

As illustrated, the coils are supplied with current of the three-phase type, but obviously current of any other polyphase type might be employed by proper coil arrangement.

The velocity of the rotating ring cannot exceed that of the traveling field. The velocity of the traveling field is proportional to the pole pitch and the frequency of the inducing current so that by varying either one or both of these factors, the velocity of the traveling field may be correspondingly varied. Therefore, by proper selection of number and arrangement of coils the motor could be made to run at various speeds on a current of constant frequency.