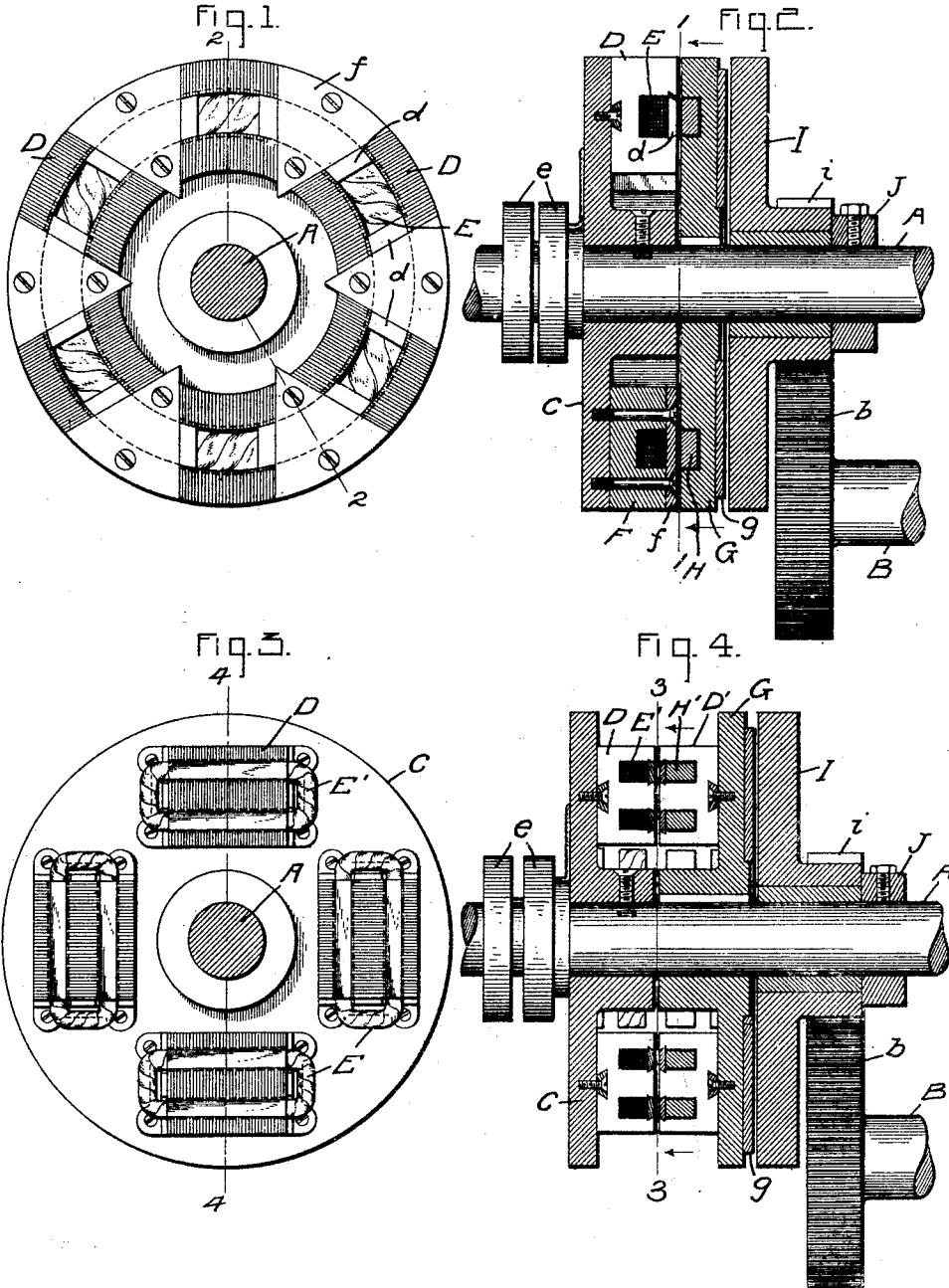


A. G. DAVIS.
ALTERNATING CURRENT CLUTCH.
APPLICATION FILED MAR. 27, 1908.

905,797.

Patented Dec. 1, 1908.



WITNESSES.

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ALTERNATING-CURRENT CLUTCH.

No. 905,797.

Specification of Letters Patent.

Patented Dec. 1, 1908.

Application filed March 27, 1908. Serial No. 423,554.

To all whom it may concern:

Be it known that I, ALBERT G. DAVIS, a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Alternating-Current Clutches, of which the following is a specification.

My invention relates to magnetically-actuated clutching devices for clutches and brakes, and its object is to provide a novel form of clutch or brake which is efficiently operable on alternating-current.

The ordinary form of magnetic clutch or brake, operated on direct-current, comprises an energizing coil and an armature of magnetic material adapted to be drawn toward the coil by magnetic attraction, and by its movement to bring the engaging surfaces of the clutch or brake together. Such a device may not be adapted for operation on alternating-current, because, in order to obtain any degree of efficiency, it is necessary thoroughly to laminate the armature, which sometimes makes it difficult to obtain a mechanically satisfactory structure.

My invention consists in a magnetic clutch or brake operated, not by the attraction between a coil and an armature of magnetic material, but by the repulsion between two windings in inductive relation to each other and carrying alternating-currents flowing in relatively opposite directions in the two windings. If an alternating-current flows in one of two windings in inductive relation to each other, an electromotive force will be induced in the other winding. It is, therefore, unnecessary to supply currents to both windings. One winding may be made a short-circuited conductor of simple construction.

My invention will best be understood by reference to the accompanying drawing, in which

Figures 1 and 2 show respectively cross-sectional end and side-elevations of a magnetic clutch arranged in accordance with my invention, the cross-section of Fig. 1 being taken on the dotted line 1—1 of Fig. 2, and the cross-section of Fig. 2 being taken on the dotted line 2—2 of Fig. 1; and Figs. 3 and 4 show similar views of a modified construction.

In Figs. 1 and 2, A and B represent two shafts which it is desired to clutch together. Fastened to the shaft A is the plate C carry-

ing a number of bundles of laminations D. Carried by these laminations is a coil E, which surrounds the shaft A. The bundles of laminations D are separated by blocks F of non-magnetic material, such as brass or wood. The coil E is held in position by non-magnetic wedges *d* and plates *f*. G is a member which is keyed to, but movable axially on, the shaft, and which carries a short-circuited conductor H in inductive relation to the coil E. If current is supplied to the coil E through the collector rings *e*, a current will be induced in the short-circuited conductor H, which will flow in an opposite direction relatively to the current in coil E. These two currents produce a strong repulsion, which forces the member G toward the right. This member may be provided with a friction-plate *g* adapted to engage member I, which is loose on the shaft A, but which is clutched to the shaft A by the frictional engagement of member G. The member I carries a pinion *i* engaging a gear *b* on the shaft B. J represents a collar fastened to the shaft A to receive the end-thrust on the member I, due to the pressure against it of the member G. The member G, which is made of iron or steel so as to afford a good magnetic path for the flux surrounding the coil E and conductor H, need not be laminated, since the currents induced in this member simply increase the repulsion effect of the currents induced in the conductor H.

In the construction of Figs. 3 and 4, in place of a single coil surrounding the shaft, a plurality of coils E' are placed on the member C, and in place of a single short-circuited conductor, there are a plurality of short-circuited conductors H'. The magnetic material D', in which these conductors are embedded may not be laminated. Except for the change in the form of the windings, the construction of Figs. 3 and 4 is the same as that of Fig. 2, and the mode of operation of the two structures is the same.

I do not desire to limit myself to the particular construction and arrangement of parts here shown, but aim in the appended claims to cover all modifications which are within the scope of my invention.

By the expression "flowing in opposite directions", I do not wish to limit myself to a phase-difference of exactly 180°, since it will be clear that the effect will be produced by other phase differences in which only com-

ponents of the currents will literally flow in opposite directions.

What I claim as new, and desire to secure by Letters Patent of the United States, is,—

5 1. A device having two relatively movable members having windings inductively related to each other, connections for causing alternating-currents to flow in opposite directions in said windings, and clutching
10 means actuated by the relative movement of said members.

2. A device having two relatively movable members, one having a winding adapted to be supplied with alternating-current and the
15 other having a short-circuited conductor in inductive relation to the winding on the first member, and clutching means actuated by the relative movement of said members.

3. A device having two relatively movable
20 members, one having a laminated core and a winding thereon, and the other having a short-circuited conductor in inductive relation to said winding, and clutching means actuated by the relative movement of said
25 members.

4. A device having opposing surfaces relatively movable in parallel planes and adapted for frictional engagement with each other, and means for producing relative
30 movement of said surfaces in a direction perpendicular to said planes comprising two relatively movable members having wind-

ings inductively related to each other, and connections for causing alternating-currents to flow in opposite directions in said wind- 35 ings.

5. A device having opposing surfaces relatively movable in parallel planes and adapted for frictional engagement with each other, and means for producing rela- 40 tive movement of said surfaces in a direction perpendicular to said planes comprising two relatively movable members, one having a winding adapted to be supplied with alternating-current and the other having a
45 short-circuited conductor in inductive relation to the winding on the first member.

6. A device having opposing surfaces relatively movable in parallel planes and adapted for frictional engagement with 50 each other, and means for producing relative movement of said surfaces in a direction perpendicular to said planes comprising two relatively movable members, one having a laminated core and a winding thereon, and 55 the other having a short-circuited conductor in inductive relation to the winding on the first member.

In witness whereof, I have hereunto set my hand this 25th day of March, 1908.

ALBERT G. DAVIS.

Witnesses:

BENJAMIN B. HULL,
HELEN ORFORD.