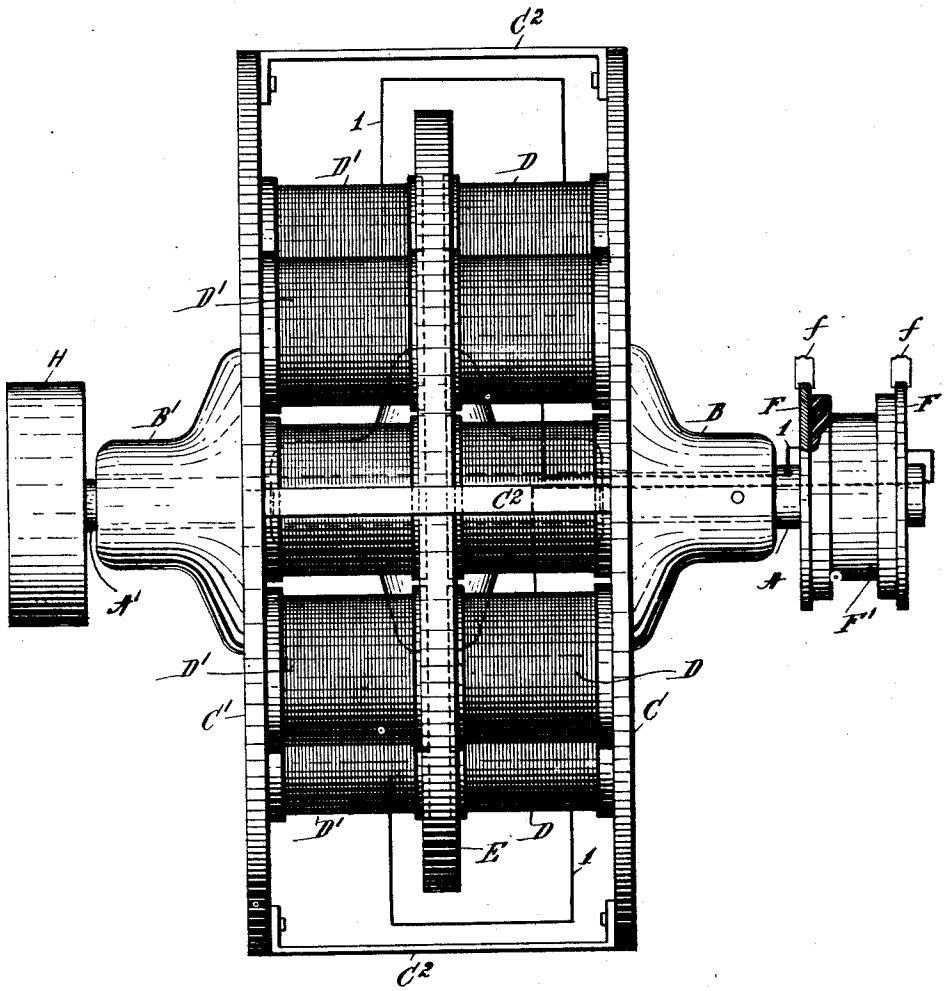
July 13, 1926. 1,592,804

E. T. YOUNG

ELECTRIC CLUTCH

Filed March 24, 1921 3 Sheets-Sheet 1

Fig. 1.



INVENTOR:
Edward T. Young.
By
ATTORNEYS:

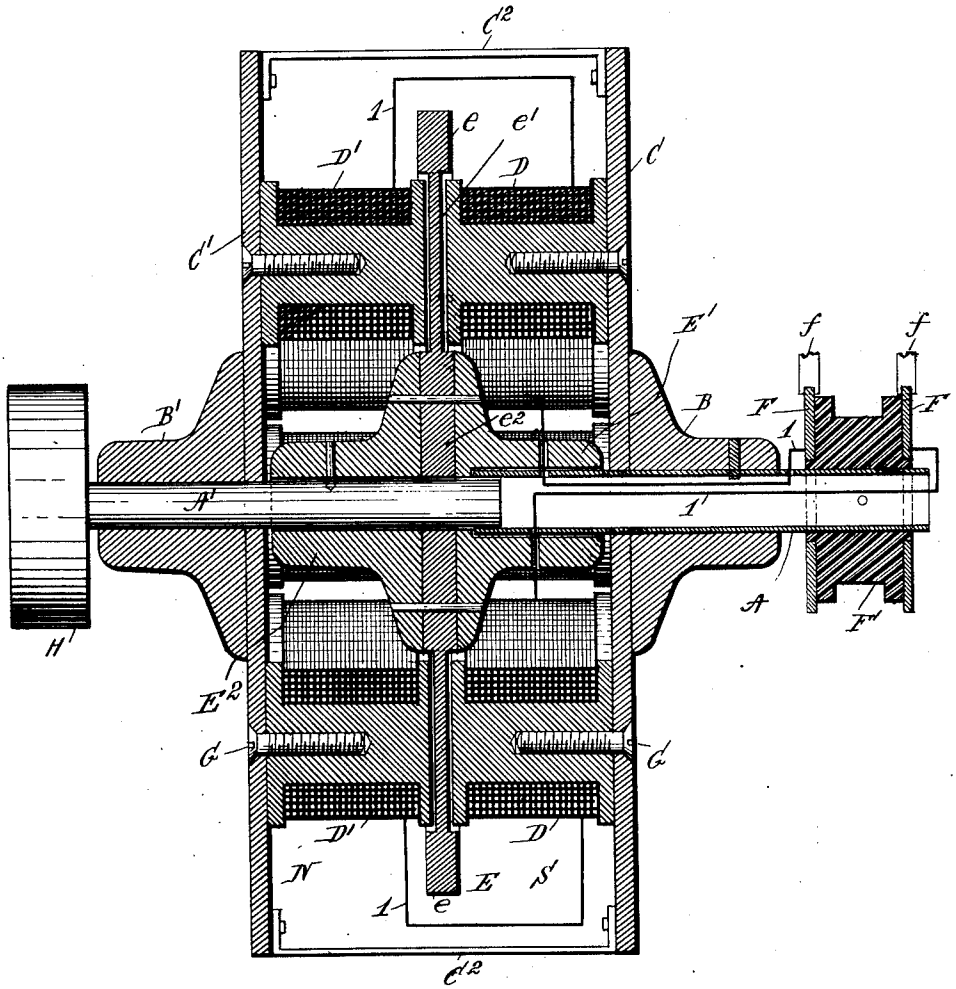
July 13, 1926. 1,592,804

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ELECTRIC CLUTCH

Filed March 24, 1921 3 Sheets-Sheet 2

Fig. 2.



INVENTOR:
Edward T. Young
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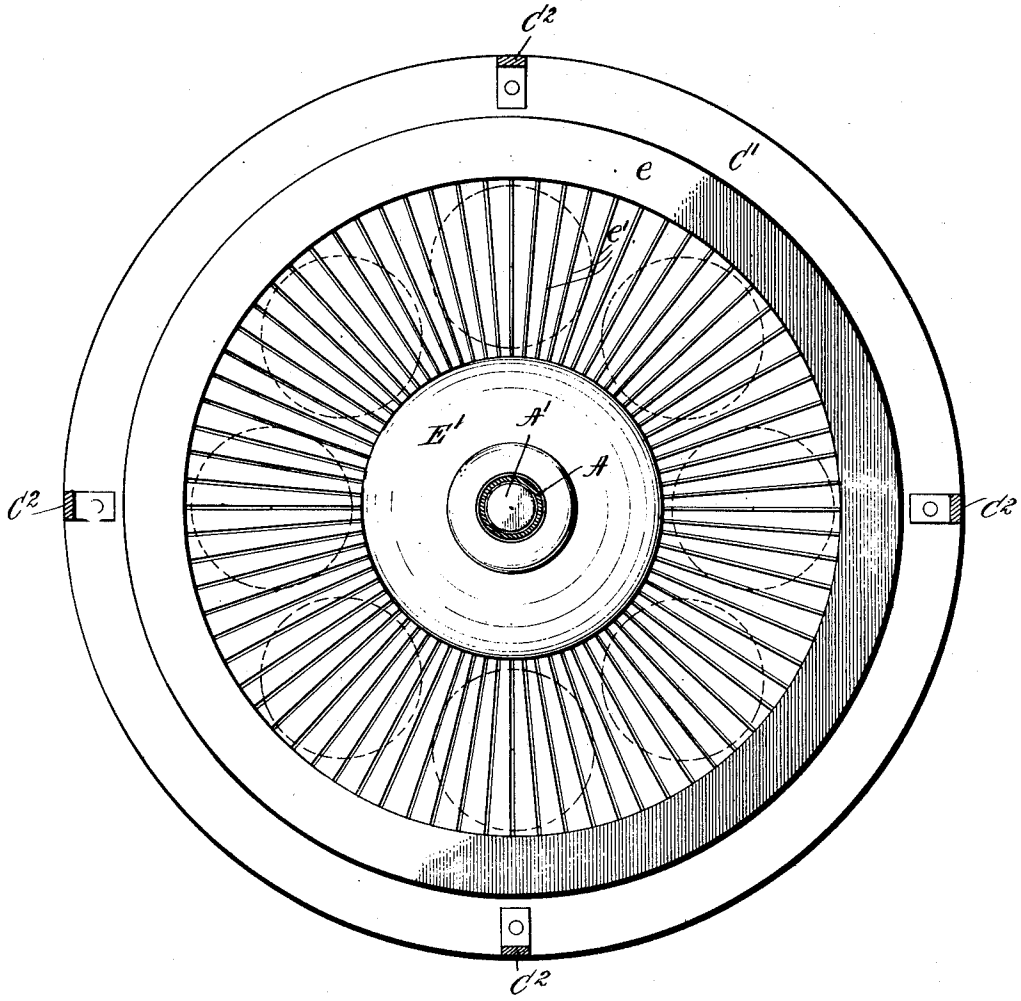
July 13, 1926. 1,592,804

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ELECTRIC CLUTCH

Filed March 24, 1921 3 Sheets-Sheet 3

Fig. 3.



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Patented July 13, 1926. 1,592,804

UNITED STATES PATENT OFFICE.

EDWARD T. YOUNG, OF MILTON, MASSACHUSETTS; ELLEN PRENTIS YOUNG, ADMINISTRATRIX OF SAID EDWARD T. YOUNG, DECEASED, ASSIGNOR OF ONE-HALF TO EDWARD E. BADGER, OF BOSTON, MASSACHUSETTS.

ELECTRIC CLUTCH.

Application filed March 24, 1921. Serial No. 455,177.

It is well known that a magnetic field rotating near a plate of metal will induce currents which will tend to rotate it. With this in mind I have invented a clutch in which one member comprises a plurality of strong magnetic fields and the other a metal disk of such construction that a path of low resistance is provided for the induced currents without the generation of substantially any heat. By rotating one of these members the other member will be likewise rotated and the speed of rotation, i. e. the slip, be controlled by the amount of electric current used in creating the plurality of magnetic fields. My preferred embodiment of this invention is one in which the driven member is a disk of peculiar construction arranged between two sets of electromagnets in close proximity, the armature disk being constructed of such form and capacity that it will take care of all currents induced in it so that there will be substantially no resistance to the flow of the current induced therein by the magnetic fields. Moreover, the arrangement of the electromagnets results in practically no waste space so that in the arrangement shown the spokes of the armature are all in magnetic fields of substantially the same strength.

My invention in its preferred form will be understood by reference to the drawings, in which—

Figure 1 is an elevation of apparatus embodying my invention,

Fig. 2 being a longitudinal section, and

Fig. 3 is a vertical section to show the armature in side elevation.

A is a hollow shaft pinned to which is a hub B on which is mounted a disk C carrying eight electromagnets D insulated therefrom. A^1 is a shaft one end of which is supported in the open end of the hollow shaft A as a bearing. A second hub B^1 carrying a disk C^1 is mounted to turn on the shaft A^1. The disk C^1 carries eight electromagnets D^1 insulated therefrom. The disks C, C^1 are connected by braces C^2 so that they will be rotated together. As shown four braces are carried directly across from one disk to the other, but their number should be sufficient to make a firm structure and they may be otherwise arranged if desired to make with the disks a strong cage.

The number of electromagnets may be varied, but they should be an even number for reasons hereinafter given and preferably should be of such size or of such number that when arranged around the centre of the disk C they will be in close proximity. Between these electromagnets and also mounted fast on the shaft A^1 are the hubs E^1, E^2 between which is a copper disk E. This disk or armature is somewhat thicker near its periphery as at *e*, the thick portion forming a felly and this rim or felly is connected by a series of spokes e^1 with a central section e^2 which is also considerably thicker than the spokes, the amount of metal in e^2 substantially equaling the amount of metal in the felly *e* and also equaling the amount of metal in all of the spokes so that there shall be paths for the passage of currents induced by the magnets as described below, which paths shall be of equal resistance throughout and thus substantially no heat will be developed. E^1, E^2 are hubs riveted to the armature the hub E^2 being riveted to the shaft A^1 and the hub E^1 serving as a bearing for the end of the hollow shaft A. Preferably the armature is insulated from all the parts connected with it.

The electromagnets are arranged in series so that their poles alternate in all directions. That is to say, the north pole of each alternate electromagnet attached to disk C is opposite the south pole of the opposing electromagnet on disk C^1 and the south poles of the other magnets on disk C are opposite the north poles of the opposing magnets on disk C^1. The electromagnets are arranged on each disk so that no two adjacent magnets have the same polarity. In the drawings the various poles are indicated by the letters N. and S., respectively. The electromagnets are insulated from the disks C, C^1.

F are two contact disks by which and suitable brushes *f*, *f* the electric circuit of the several electromagnets is connected to a direct current generator, the circuit being indicated by the wire 1 which passes from one of the contact disks F through the hollow shaft A to the electromagnets D, D^1 and then back through the hollow shaft A to the other contact disk F. Between these disks is a pulley F^1 constructed to insulate the disks F from each other by which power may be applied to the electromagnet system

to turn it. The electromagnets are connected with their respective disks by means of screws G and as stated above the disks C, C^1 are connected mechanically to rotate together. The shaft A^1 carries the pulley H, by which power may be transmitted to the work to be driven.

When the disks C, C^1 are rotated, a direct current being applied through the disks F, a constant current flows through the various electromagnets and they are strongly magnetized. As a result because of the magnetic circuits induced through the central disk, that disk is caused to rotate with the disks C, C^1 according to the strength of the current, that is, the magnetic strength of the electromagnets, and hence by controlling the current the speed of rotation of the disk E may be varied as desired. The disk E being connected with the object to which power is to be applied through the shaft A^1, pulley H, etc. will cause it to be rotated at a desired speed.

This form of construction of clutch has been found very useful in automobiles, sewing machines and other like mechanisms, especially where a simple means of controlling speed is desired.

Those skilled in the art will understand that other arrangements of electromagnets and other circuits than that shown may be used to embody my invention and that other sources of electric current may be availed of than that referred to above. For my invention relates to the creation of a plurality of movable magnetic fields so arranged and correlated with an armature that the movement of any one will cause the movement of the others. The above described arrangement, however, has proved useful in practice and is the best now known to me.

What I claim as my invention is:—

The clutch above described comprising a driving element and a driven element, one of said elements comprising two sets of electromagnets connected to a common source of electricity and adapted to be rotated together, and the other element comprising a shaft, a disk forming an armature mounted on said shaft and located in the air gap between said sets of electromagnets, said disk comprising a hub, a felly and connections between said hub and said felly comprising spokes whereby heat developed in the operation of said clutch will be radiated.

EDWARD T. YOUNG.