

UNITED STATES PATENT OFFICE.

FRED BRAINARD COREY, OF BOSTON, MASSACHUSETTS.

ELECTROMAGNET.

SPECIFICATION forming part of Letters Patent No. 541,471, dated June 25, 1895.

Application filed April 15, 1895. Serial No. 545,760½. (No model.)

To all whom it may concern:

Be it known that I, FRED BRAINARD COREY, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Electromagnets, of which the following is a specification.

My invention relates to electro magnets designed for actuating apparatus in which a mechanical movement is effected by electrical means, and especially to such apparatus as requires that this movement shall be made slowly, as is ordinarily accomplished by means of a solenoid whose action upon an iron core or plunger is retarded by a dash-pot.

The objects of this invention are to provide a means for producing the desired movement of the apparatus and to retard this movement so that it shall be effected gradually without the interposition of a dash-pot and thus to lessen the cost of manufacture of the actuating device or magnet.

The invention is especially applicable to automatic rheostats and similar apparatus.

My invention consists of an electro magnet having segmental annular pole surfaces, an armature revoluble about the axis of said annular pole surfaces, the ends of said armature being in close proximity to said pole surfaces, pieces of magnetizable metal loosely fitted into recesses in either end of said armature, and a spring tending to oppose the action of the magnet in turning the armature so as to place its center line parallel to the axis of the magnetizing coils.

In the accompanying drawings, which illustrate the invention, Figure 1 is a plan of the apparatus, partially in section, as preferably constructed, while Fig. 2 is a side elevation of the same.

A A represent a piece of iron, preferably a casting, which forms the core of the magnetizing coils C, C', and at the same time serves as a support for the other portions of the device or mechanism.

B, B' are the pole pieces of the magnet, which are preferably shaped as shown, secured to the core A A by the screws b, and whose pole surfaces B', B² are concentric with the shaft or spindle E which supports the armature D, and is in most cases firmly fastened

thereto. F is a stop against which the armature D is normally held by the spring G. This spring is adjustable by means of the thread H and the nut I, or any similar device. In either end of the armature D are recesses J, J' containing pieces K, K' of magnetizable metal which are loosely fitted therein.

The operation of my invention is as follows: With no energizing current in the coils C, C', the apparatus will be in the position shown in the drawings. When current is admitted into the coils C, C' through the wires a—c and c—d, and the coils become energized, the magnetic circuit will be as follows: Through the core A A, the pole piece B, the pole surface B', through the intervening air space to the armature D, through the air space to the pole surface B² of the pole piece B', and thence to the core A A forming a closed circuit. The magnetizable portions of the circuit will at once tend to move in such manner as to decrease the reluctance or magnetic resistance of the circuit, and hence the magnetizable pieces K, K' will move into contact with the polar surfaces B' B², and will be held against these surfaces with a force depending upon their size and form and also upon the magnetic flux through them. For the same reason the armature will tend to rotate about the center of the shaft or spindle E, in the direction indicated by the arrow L, and to place itself parallel to the axis of the magnetizing coils C, C'. This motion of the armature will be in opposition to the tension of the spring G, and will be retarded by the friction of the parts K, K' against the polar surfaces B' B². It has been found by experiment that it is possible so to regulate the tension of the spring G and the friction of the parts K, K' against the polar surfaces B', B², as to cause the movement of the armature to be gradual, which is the nature of the movement desired. The adjustment of the friction is effected by a proper formation of the parts K, K'. Now, when from any cause the flow of current in the energizing coils C, C' is interrupted, the spring G will immediately return the armature D to its former position, as shown. The mechanism that is to be actuated by this magnet will be made fast to the armature D, either directly or through its shaft or spindle E.

Having described the operation of and the results secured by my invention, I declare that what I claim is--

1. In an electro magnet having segmental
5 pole surfaces the combination with a revol-
ble armature, of pieces of magnetizable metal
loosely fitted into recesses in the said arma-
ture, in such manner as to be drawn into con-
10 tact with the said pole surfaces when current
is admitted to the energizing coils, and retard
the movement of the armature, as and for the
purpose set forth.

2. An electro magnet having segmental pole
surfaces, a pivoted armature having its ends
15 in close proximity to the said pole surfaces

which latter conform to the path of movement
of the ends of the armature, and magnetizable
metal pieces loosely connected with the arma-
ture and adapted to be drawn into contact
with the pole surfaces, substantially as set 20
forth.

In testimony whereof I have signed my
name to this specification, in the presence of
two subscribing witnesses, this 12th day of
April, A. D. 1895.

FRED BRAINARD COREY.

Witnesses:

ARTHUR W. CROSSLEY,
C. L. COREY.