

(No Model.)

2 Sheets—Sheet 1.

J. B. ATWATER.

ROTARY ELECTRO MAGNETIC MOTOR.

No. 278,760.

Patented June 5, 1883.

Fig 1.

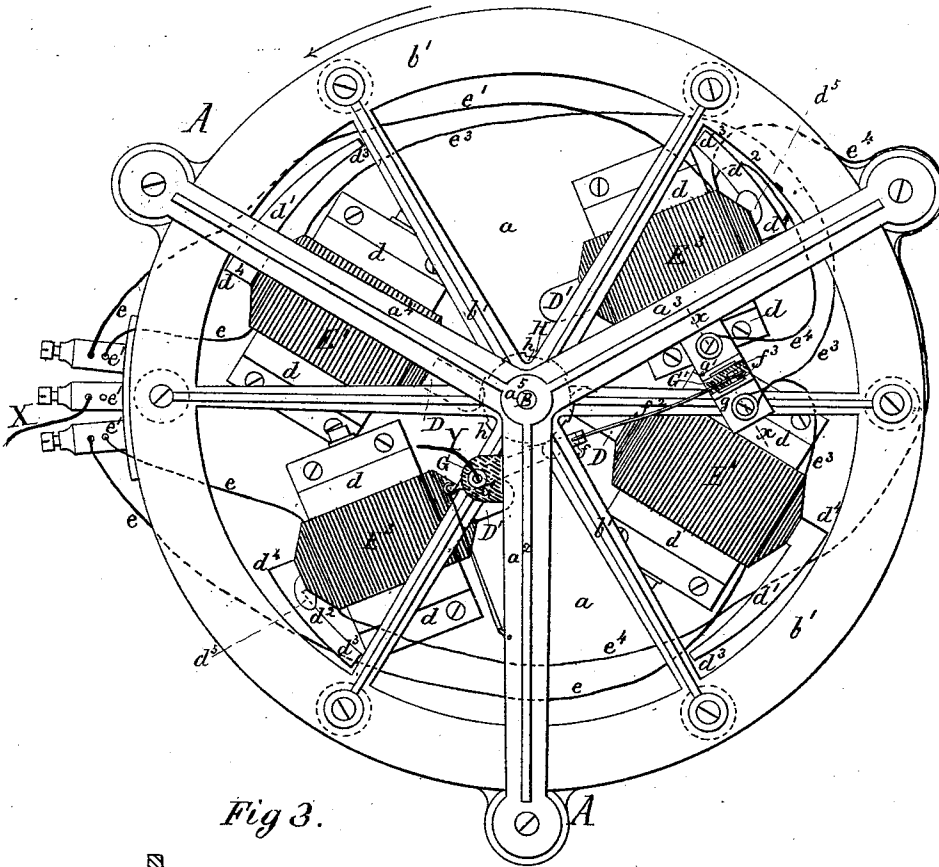


Fig 3.

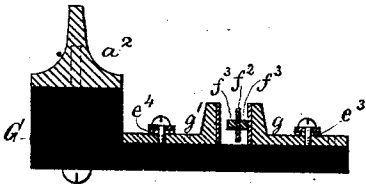
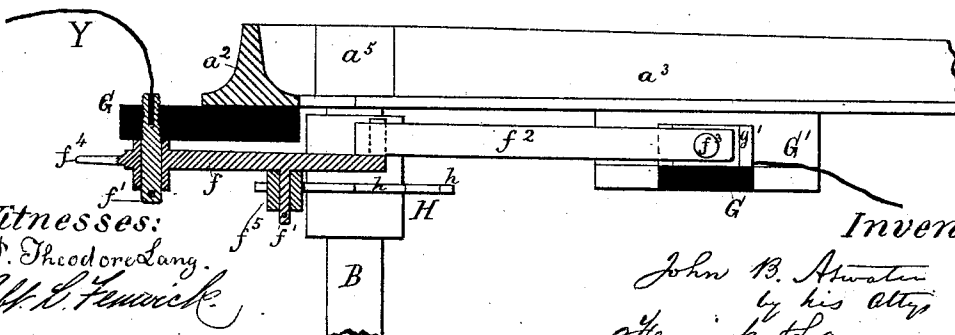


Fig 4.



Witnesses:

J. P. Theodore Lang.

H. E. Fenwick.

Inventor:

John B. Atwater
by his atty
Fenwick & Lawrence

(No Model.)

2 Sheets—Sheet 2.

J. B. ATWATER.

ROTARY ELECTRO MAGNETIC MOTOR.

No. 278,760.

Patented June 5, 1883.

Fig 2.

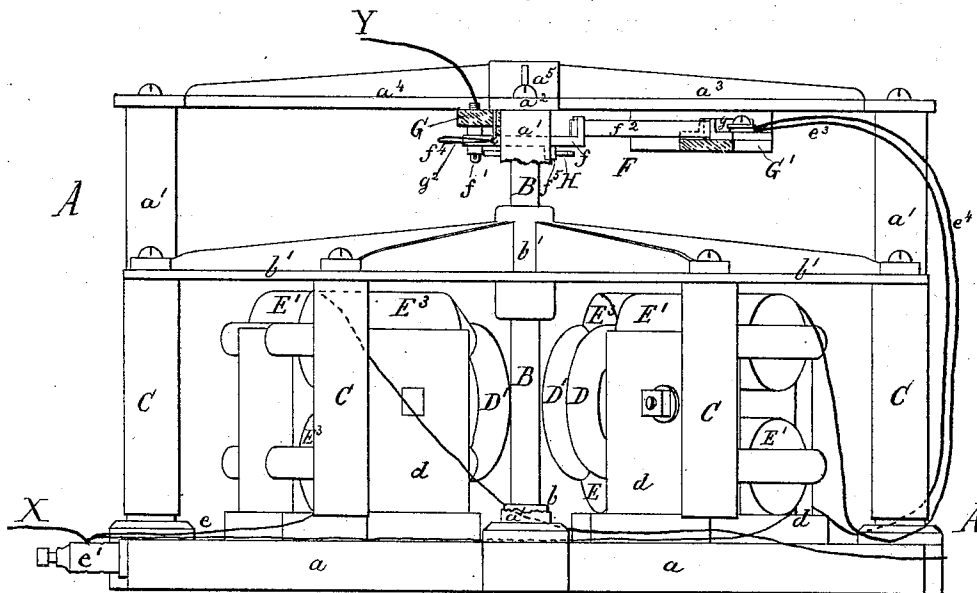
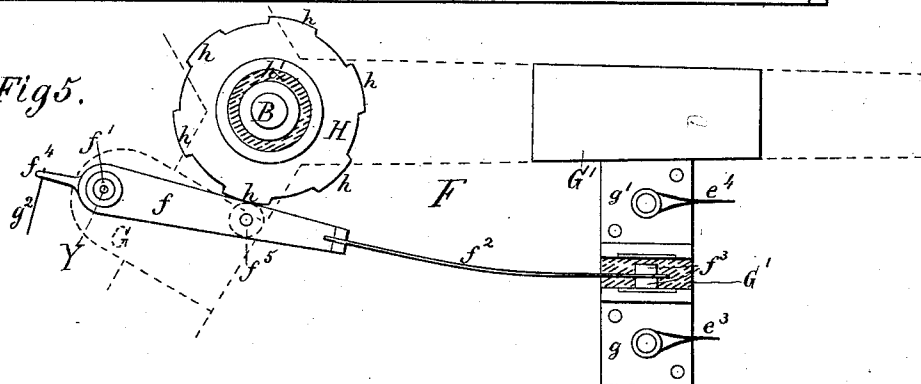


Fig 5.



Witnesses:

J. P. Theodore & Lang

H. L. Lawrence

Inventor:

John B. Atwater
by his attys

Henrick & Lawrence

UNITED STATES PATENT OFFICE.

JOHN B. ATWATER, OF CHICAGO, ILLINOIS.

ROTARY ELECTRO-MAGNETIC MOTOR.

SPECIFICATION forming part of Letters Patent No. 278,760, dated June 5, 1883.

Application filed November 27, 1882. (No model.)

To all whom it may concern:

Be it known that I, JOHN B. ATWATER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new Rotary Magnetic Motor, of which the following is a specification.

My invention relates to rotary magnetic motors having a number of external rotating armatures and a double set of rigid or stationary magnets having angular pole extensions, the said extensions standing alternately in opposite directions, whereby a very effective and compact motor is obtained, as will be hereinafter described.

In the accompanying drawings, Figure 1 is a top view of the machine. Fig. 2 is an elevation of the same. Fig. 3 is a detail section of a portion of the switch in the line xx of Fig. 1. Fig. 4 is a detail sectional view of the switch-lever and its attachment to the main frame, the parts in the rear being shown in elevation. Fig. 5 is a detail top view of the switch-gear.

In the drawings, A represents a suitable frame, consisting of a bottom, a , columns a' , and radial top connections, a^2 a^3 a^4 , united to a central boss, a^5 .

An upright central shaft, B, has its upper bearing in the boss a^5 , and its lower bearing in a suitable foot-block, b . To this shaft B a wheel, b' , is fixedly attached, which carries a number of vertical armatures, C, circularly and equidistantly arranged, as shown.

Between the armatures C and shaft B, and fastened by means of suitable supporting-stands, d , to the bottom a , are two sets of horse-shoe-magnets, D D and D' D', having coils E' E' E', of ordinary insulated wire, and angular pole extensions d' d^2 , and held in proper position opposite the traveling armatures. The one set of magnets, D, is provided with long pole extensions d' , and the other set of magnets, D', with short pole extensions d^2 , and the so provided magnets are arranged in alternate order around the center of the machine, as shown. The long pole extensions stand with their ends or toes d^3 toward the approaching armatures, the said ends, by reason of the eccentric arrangement of the extensions, being nearer the center of the machine or more distant from the path of the armatures than the

heels d^4 of the magnets, and thus the greatest attraction is always toward the heel of said long pole extensions. The position of the short pole extensions d^2 is the reverse of that of the long ones, and their eccentric relation to the armatures is also reversed; or, in other words, their heels d^4 stand toward the approaching armatures, so that in the operation of the machine the armatures pass said heels d^4 before passing the toes d^3 , and the heels d^4 of the pole extensions d^2 are farther away from the path of the armatures than the toes. By this arrangement of the two sets of magnets and their pole extensions the attractive force of each increases in the same direction all around when the magnets are charged. The lower coils, E' E', of the magnets are connected by means of conducting-wires e to binding-posts e' , as shown, suitably attached to the frame A, while one of the binding-posts e' is connected with the negative pole of an electric or galvanic battery by means of a conducting-wire, X.

The upper coils, E' E', are, by means of conducting-wires e^2 e^4 , connected to a switch, F, as shown. This switch F consists of a conducting-lever, f , pivoted at f' to a non-conducting arm, G, and having a conducting spring extension, f^2 , with platinum-plated tappet-heads f^3 , and a pair of platinum-faced binding-plates, g g' , fastened to a non-conducting arm, G', opposite to each other, at such distance as to allow the heads f^3 a reasonable amount of play between them. The arms G G' are suitably fastened to the frame A, and a spring, g^2 , fastened to the frame A and to a projecting hook, f^4 , of the lever f , applies the necessary tension of the said lever toward a cam-wheel, H, on the shaft B. The lever f is provided with an anti-friction roller, f^5 , which bears against the cams h of the wheel H. The wheel H is insulated by means of a hard-rubber or other non-conducting bushing, h' . The number of said cams h is equal to the number of armatures C, whereby the number of oscillations of the lever f is doubled. Now, as the lever f is connected by means of a conducting-wire, Y, with the positive pole of a galvanic battery, and as the two conducting-wires e^2 are connected to the binding-plate g and the conducting-wires e^4 to the binding-plate g' , it will be seen that the magnets D D' are alternately charged as the arma-

tures C pass by them. The shape of the long pole extensions is preferably curved and tapering, although other shapes may answer well, so long as the eccentric arrangement is retained.

5 The short pole extensions stand in a reverse position in relation to the long pole extensions, for the reason that, the corresponding armatures having been attracted from the toes to the heels of the long pole extensions, the preceding armatures are then attracted toward the heels of the short pole extensions; or, in other words, they serve to help the armatures in passing centers which occur between the breaking of magnetic force at the heels of the long pole extensions, and continue the motion of the armature-wheel until the succeeding armatures have arrived at the toes of the newly-charged long pole extensions and yield to their attraction. It is proposed to use six or eight magnets in machines of considerable power, half the number of which will have short pole extensions.

It will be seen that the operation of my machine is to first draw one given rotating armature from the toe to the heel of a rigid eccentrically-arranged or inclined magnetic long pole extension, and immediately after this to draw its next preceding rotating armature along from the heel to the toe of a short rigid inclined or eccentrically-arranged magnetic pole extension, and then to continue the motion of the armature-wheel by drawing the armature next following the given armature along the said long pole extension, and then to draw the first-mentioned given armature from heel to toe of the said short pole extension, whereupon a second succeeding armature following the given one is drawn from the toe to the heel of the said long pole extension, at which instant the armature next following the given one arrives at the next magnet, and is driven from the heel to the toe of its short pole extension, at which time the given armature has arrived at the next follow-

ing pair of magnets, thus completing a full half-rotation of the armature-wheel. A succession of similar movements will complete a full rotation of the armature-wheel.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a magnetic motor, the combination, with external armatures C, which rotate around stationary magnets, of inclined or eccentrically-arranged magnets D and D', which respectively have long and short pole extensions d' d'' , and are arranged in alternate order around the center of the machine, with the toes d' of the long pole extensions and with the heels d'' of the short pole extensions toward the approaching armatures, whereby in the operation of the machine the armatures approach the short pole extensions at the heels d' and leave them at the toes d'' , and approach the long pole extensions at the toes d' and leave them at the heels d'' , and thus the attractive force in both sets of magnets increases in the same direction, substantially as described.

2. In a magnetic motor, the combination of the external rotating armatures C, stationary magnets D D', constructed with long and short pole extensions d' d'' , and arranged in pairs, and relatively inclined as shown, and a switch-gear, F, for operating said magnets successively in two alternate sets, substantially as and for the purpose described.

3. The switch F, consisting of the insulated spring-lever f , having tension-spring g'' , anti-friction roller f^3 , and tappet-heads f^3 , insulated cam-wheel H, insulated binding-plates g g' , in combination with the rotating armatures C, stationary magnets D D', arranged in pairs, to be operated in two alternate sets, substantially as and for the purpose described.

JOHN B. ATWATER.

In presence of—

A. D. BEECHER,
CHAS. H. ROGERS.