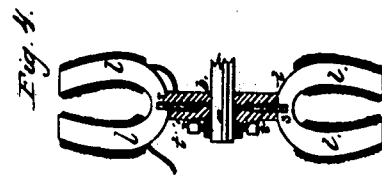
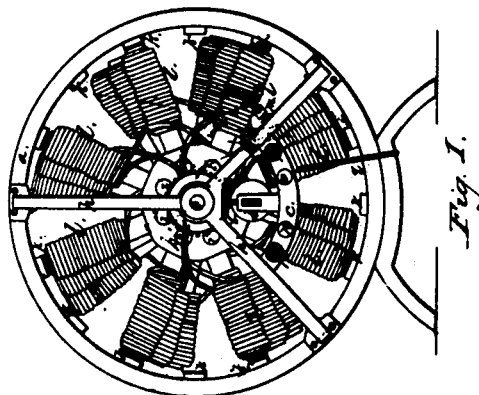
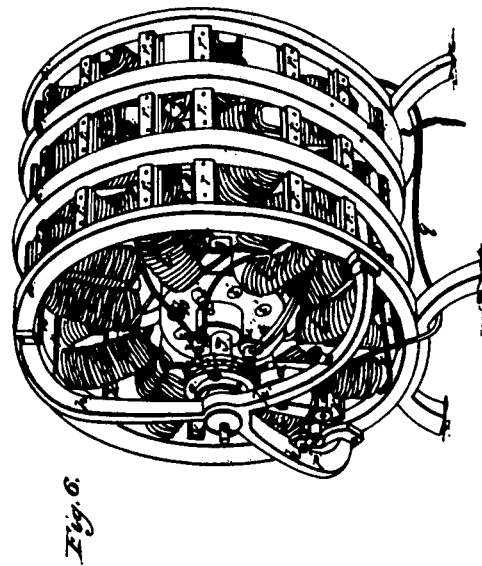
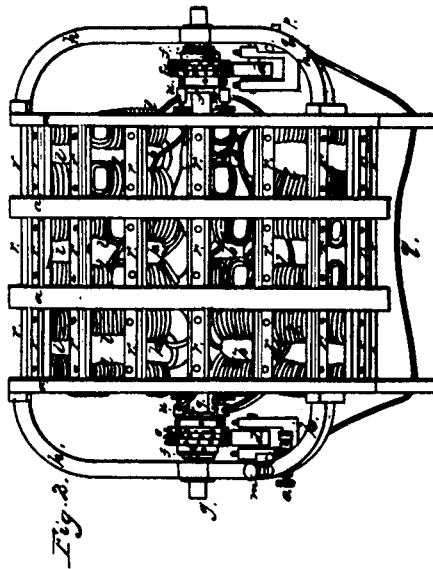
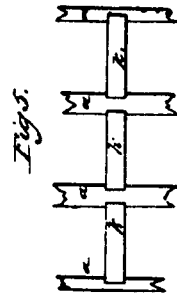
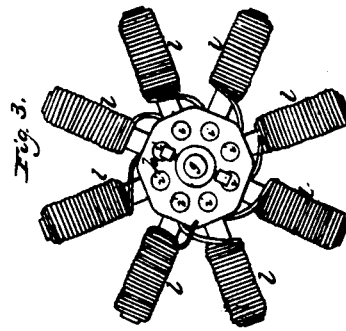


J. NEFF.
Electrical Motor.

No. 7,889.

Patented Jan. 7, 1891.



UNITED STATES PATENT OFFICE.

JACOB NEFF, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN ELECTRO-MAGNETIC ENGINES.

Specification forming part of Letters Patent No. 7,889, dated January 7, 1851.

To all whom it may concern:

Be it known that I, JACOB NEFF, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and Improved Electro-Magnetic Engine; and I do hereby declare that the following is a full clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a side elevation; Fig. 2, an end elevation; Fig. 3, a view of the magnetic disk or wheel and magnets; Fig. 4, a transverse section through the wheel and one pair of magnets, showing the manner of insulating the magnets from the wheel; Fig. 5, a portion of the circular frames, showing the arrangements of the armatures; Fig. 6, a perspective view of the engine.

The same letters always referring to the same parts a reference to the particular figures is not deemed necessary.

Letter *a*, circular frame; *b*, magnetic wheel or disk; *c*, support for the friction-roller, &c.; *d*, friction-roller; *e*, break, which is composed of as many disks as there are magnetic wheels, each one being insulated from the other, (in the model there are three separate disks; *f*, collar made of ivory or any non-conducting substance for the purpose of insulating the break from the shaft; *g*, shaft; *h*, shaft-supporters; *i*, nuts securing the magnet in their places; *k*, armatures; *l*, magnets; *m* and *n*, screw-posts for connecting with the battery; *o*, screw-post for the reverse motion; *p*, insulating-screws which hold the supporters *c* in their places; *q*, wire connecting screw-post *o* with the brake on the other end of the shaft, by which a reversed motion of the engine is obtained; *r*, bars to which the armatures are fastened; *s*, screw for securing the magnets in their places; *t*, ivory-washer; *u*, screw-posts for connecting the wire of the magnets with the brake.

The construction of the machine is as follows: The frame *a* being made of iron or any suitable metal, with cross-bars of the same, to which the armatures are attached in such a manner that each magnet has a separate armature. Said armatures are made of soft iron, and sufficiently large to cover both faces of the electro-magnets. If the frame be made of

iron the armatures must be insulated from it, and of suitable thickness. The magnetic wheel or disk is so constructed as to admit of the complete insulation of the magnets, which may be accomplished as shown in Fig. 4, which is as follows: The nuts *i* being insulated from the wheel by any non-conducting substance and tightly driven into the wheel, are now drilled and tapped for the purpose of receiving the screw *s*, the screw passing through an ivory washer *t*, which fits into a countersink and forms a seat for the magnet, the hole in the washer being just large enough to admit the screw, which passes into a chamber somewhat larger than itself. I do not, however, confine myself to this particular method of insulating the magnets.

The break is composed of three separate disks. The outside ones have flanges for the better securing them to the shaft by means of set-screws, and also that they may be set as circumstances require. The disks are separated from each other by any of the non-conducting substances. The inner or middle disk is held in its place by insulated screws passing through the outer disk. Each disk has sixteen platina points on its periphery corresponding in number to the armatures *k*, their use being to complete the circuit when the battery is connected to the screw-posts *m* and *n*, by which means the magnets are magnetized as they come in contact with the friction-rollers *d* and demagnetized as they leave it. The friction-rollers *d* are made of any suitable metal and covered with platina, working under the breaks, and retained in their proper position by set-screws above their journals and spiral springs beneath.

I use for my magnets any of the known forms of the horseshoe or U magnets, the same being wrapped by insulated copper or other wire, one end of which is securely fixed in the wheel *b*, as shown in Fig. 4, the other end being attached to the screw-post *u* in the break *e*.

To put the machine in operation it is only necessary to attach the wires of the battery to the screw-posts *m* and *n*, when the electric current proceeds from the battery, passing from the screw-post *m* up the leg of the support *h* into the shaft *g*; thence into the first disk or wheel through the copper wire proceeding from said wheel round the magnets attached to the said wheel, along the wire to the

screw-post *u* into the first or outer break; thence by means of the points to the friction-roller *d*, where it meets the current from the opposite pole of the battery, which has passed from the battery through the screw-post *n* to the friction-roller *d*, thus completing the circuit of the current of electricity, and making magnets of the U-shaped pieces of iron, which magnets commence drawing when the edge of the magnets is near the edge of the armatures, and continue pulling until the magnets are immediately under or opposite to the armatures. The connection is then broken and the magnets pass freely under the armatures. The second or middle wheel now occupies the same position that the first did at the starting of the machine, the current passing in the same manner from the screw-post *m* into the wheel; thence through the wires surrounding the magnets in the said wheel into the middle break to the friction-roller *d*, the magnets on the second or middle wheel operating in a similar manner as did those of the first. The operation is repeated in the same manner by the third or last wheel carrying the current into its accompanying break. The first wheel is

now charged and the same operation is repeated, and so on successively, by which means a continuous motion is kept up. To produce a reverse action detach the wire leading from the battery to the screw-post *n*, and attach it to screw-post *o*, and the operation is complete, another set of breaks on the other end of the shaft being brought into operation so adjusted as to act in the opposite direction.

In order to control the power of the engine I propose to attach a governor to it which shall act upon a lever which shall be connected to the negative plate or plates of the battery, by which means the amount of electricity can be regulated. I do not confine myself to the use of any particular battery.

What I claim as my improvement and wish to secure by Letters Patent, is—

The insulated disks in combination with the platina points to act in concert with the magnetic wheels, in manner and form and for purposes herein described.

JACOB NEFF.

Witnesses:

FREEMAN SCOTT,
JOHN KERN.