No. 689,489. Patented Dec. 24, 1901.

S. C. HARRIS.

ELECTRICAL DEVICE.

(Application filed Mar. 28, 1901.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1

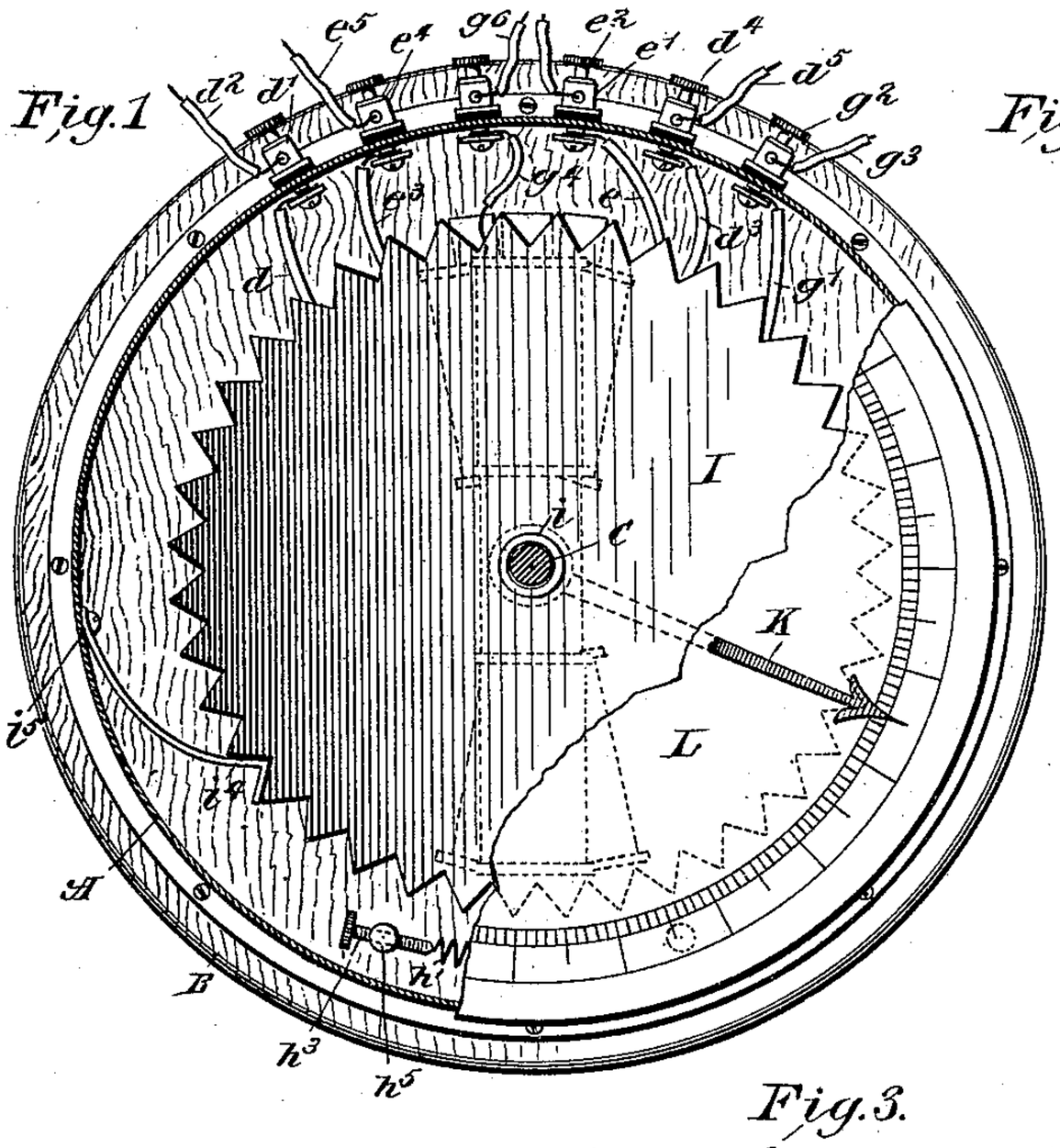


Fig. 2.

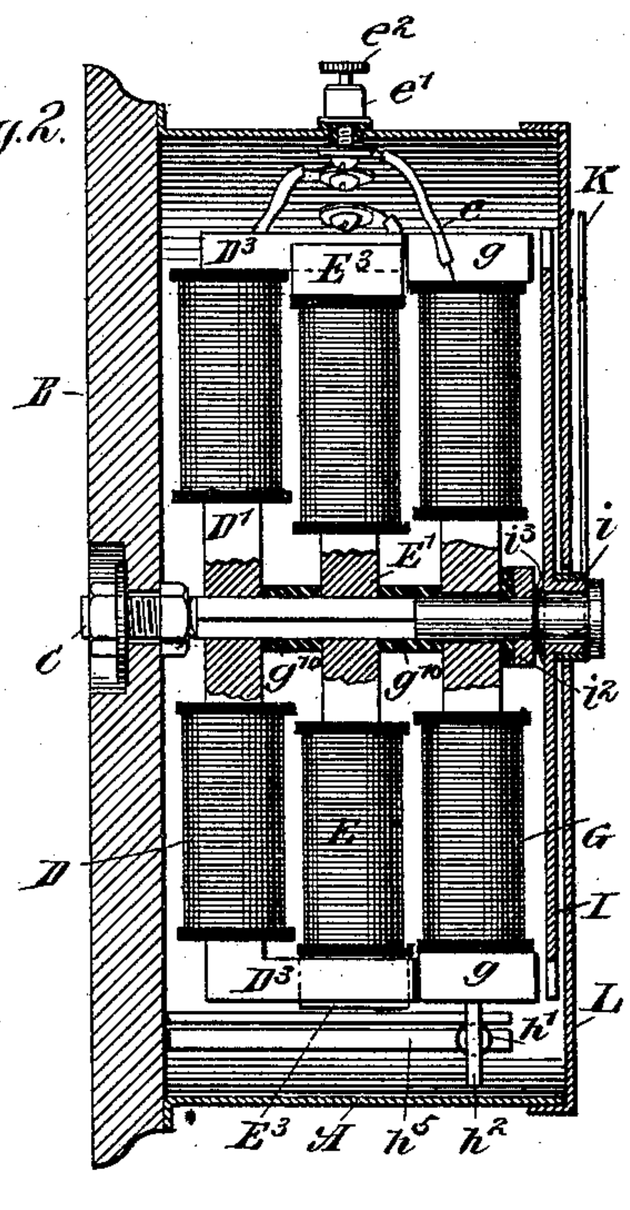
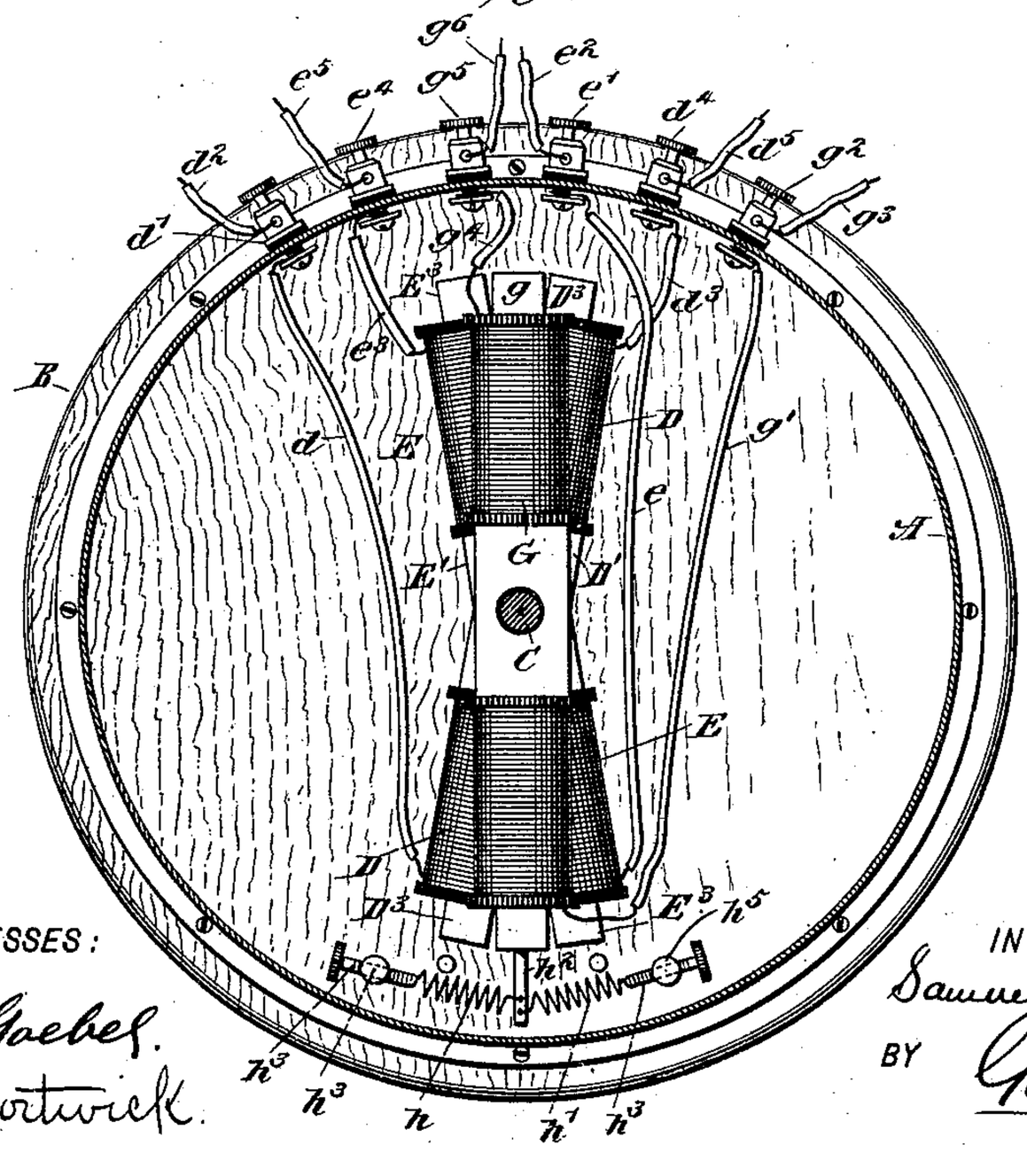


Fig. 3.



WITNESSES:

William P. Goebel.

M. Van Nortwick.

INVENTOR

Samuel C. Harris

BY George Cook

ATTORNEY.

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Fig. 4.

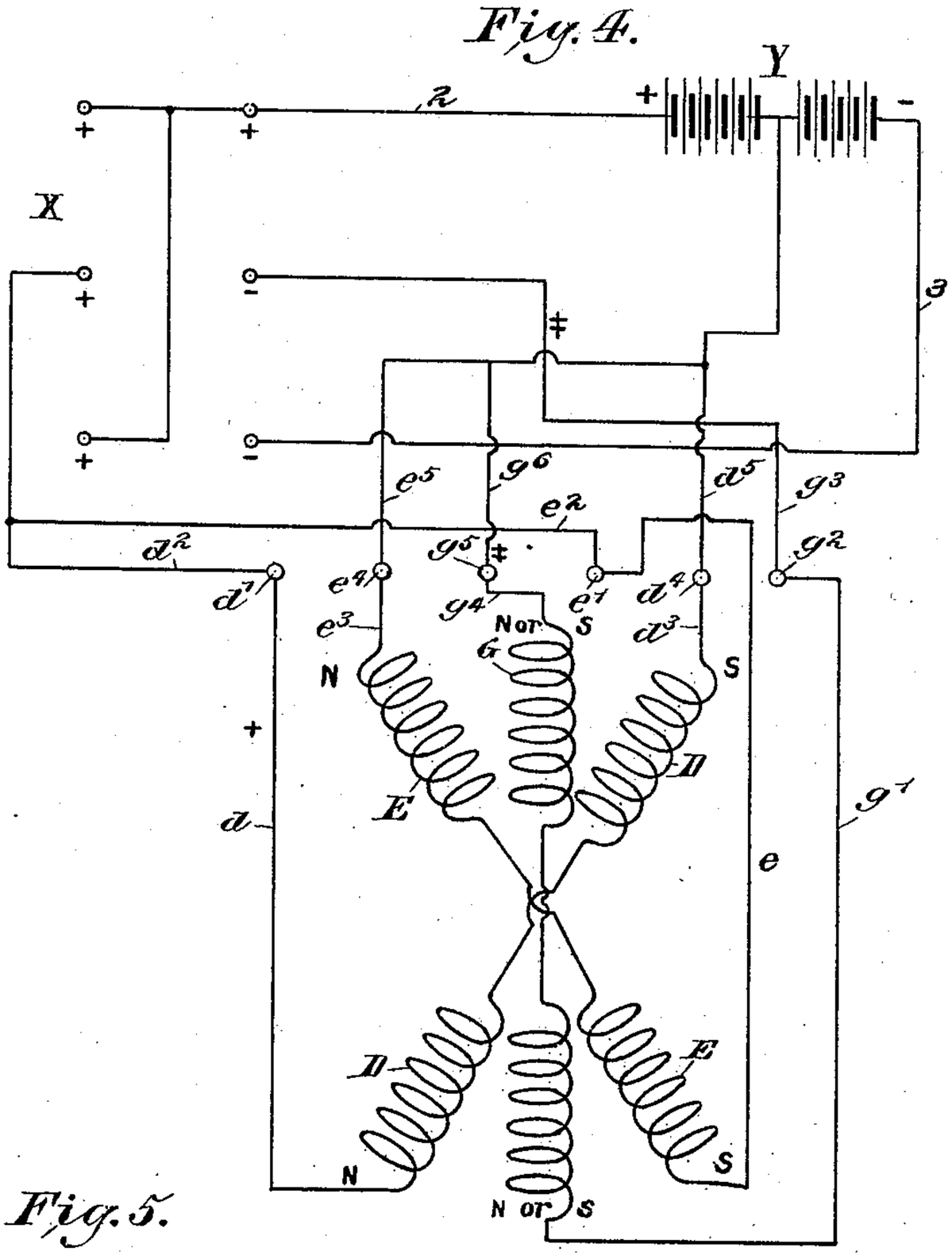


Fig. 5.

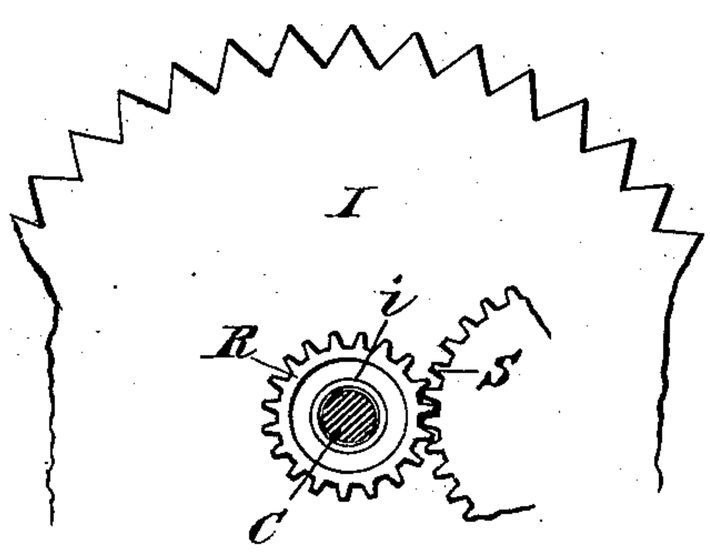


Fig. 6.

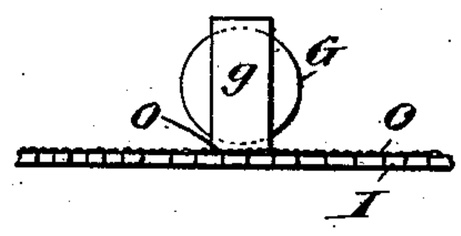
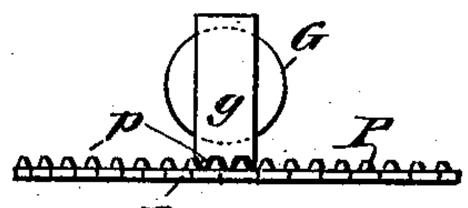


Fig. 7.



WITNESSES:

W. H. Stubbs

M. Van Natwick

INVENTOR

Samuel C. Harris

BY Georgeboch

ATTORNEY

UNITED STATES PATENT OFFICE.

SAMUEL C. HARRIS, OF NEW YORK, N. Y.

ELECTRICAL DEVICE.

SPECIFICATION forming part of Letters Patent No. 689,489, dated December 24, 1901.

Application filed March 28, 1901. Serial No. 53,160. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL C. HARRIS, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have made and invented certain new and useful Improvements in Electric Devices, of which the following is a specification.

My invention relates to an improvement in electric devices, and more particularly to that kind or character of device which is adapted for use as an indicator—such as a clock, cyclometer, &c.—and which may also be employed as a motor, the object of the same being to provide such a device which shall be simple and cheap to manufacture and of few parts and which shall be effective in use.

With these and other ends in view my invention consists in certain novel features of construction and combinations of parts, as will be hereinafter fully described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a plan view of my improved device, the lid or cover being partially broken away. Fig. 2 is a view, partly in section and partly in elevation, showing the relative arrangement of the several magnets. Fig. 3 is a plan view with the lid or cover and the revolving armature removed. Fig. 4 is a diagrammatic view showing the circuits in connection with a source of current and a pole-changing switch. Figs. 5, 6, and 7 are views of modifications.

In the accompanying drawings I have shown my improved device constructed and arranged as an indicator, but would have it understood that I do not limit the same to such purpose, as from the following description it will be evident that it may be adapted for various uses.

Referring to the drawings, A represents a box or receptacle, preferably made of metal and secured to a base B, formed of wood or other suitable material. From the base B extends upwardly a central shaft C, to which are immovably secured the two magnets D E, one above the other and at an angle with each other. These magnets D E may be either permanent or electro magnets in accordance with the purpose to which the device is to be put and in accordance with the strength or power to be secured. In the drawings I have illustrated these magnets as electromagnets, the core-piece D′ of the magnet D being so wound that the north pole thereof will be adjacent to the south pole of the core-piece E′ of the magnet E. From one end of the magnet D leads the positive wire or conductor d to the binding-post d', and from the latter the wire or conductor d^2 to a pole-changing switch X, and from there to a suitable source of electricity—as, for instance, the battery Y—and from the opposite end of said magnet D leads the negative wire d^3 to the binding-post d^4 and from the latter the wire or conductor d^5 to the battery Y, the latter being connected with the switch X by means of the wires or conductors 2 3, as illustrated in Fig. 4. From one end of the magnet E leads the wire or conductor e to the binding-post e', and from the latter leads the wire or conductor e^2, connecting with the conductor d^2, and from the opposite end of said magnet E leads the wire or conductor e^3 to the binding-post e^4, and from the latter leads the wire or conductor e^5, connecting with the wire d^5 and with the battery Y, it being understood that said binding-posts are insulated from the metal box or receptacle A, to which they are secured.

As illustrated in Fig. 2, the core-piece of the magnet D has its ends D^3 extended upwardly until the extreme ends thereof lie in about the same plane as the upwardly-extended ends E^3 of the core-piece of the magnet E—that is, the extreme ends of the core-pieces of both magnets lie in about the same horizontal plane. On the shaft C is loosely mounted the magnet G, said magnets D, E, and G being separated by the insulating-blocks g^{10}, fitting around said shaft C and between the core-pieces of said magnets. The ends g of the core-piece of the magnet G are enlarged in order that said ends g as said magnet G oscillates on the shaft C will come into close proximity with the ends D^3 and E^3 of the cores of their respective magnets, as illustrated in Fig. 2. From one end of the magnet G leads the wire or conductor g' to the binding-post g^2, from which latter leads the wire or conductor g^3 to the switch X, and from the opposite end of said magnet G leads the wire or conductor g^4 to the binding-post g^5, from which leads the wire or conductor g^6, connecting with the wire e^5, said binding-post being

secured to and insulated from the receptacle A. The normal position of the magnet G is such that the enlarged ends *g* will be equally distant from the upwardly-extending ends of the magnets D E, as illustrated in Fig. 3, said magnet G being retained in this position when the circuit is broken and the magnets not excited by means of the springs *h h'*, one end of which is secured to the pin h^2, projecting from one end of the core-piece of said magnet G, and their opposite ends secured to the adjusting-screws h^3, passing through the upper ends of posts h^5, the lower ends of said posts being secured in the base B.

From the foregoing description it will be understood that when the magnets are excited the superposed magnet G will be drawn over and in alinement with one of the lower magnets D E in accordance with the direction in which the current travels around said magnet G—that is, if the current flows around the magnet G in a certain direction the north pole of said magnet will be drawn to the south pole of the magnet E and the south pole of said magnet G drawn over by the north pole of said magnet E, the ends of the magnet D repelling the ends of said magnet G at the same time. If the current be traveling around the magnet G in the opposite direction, said magnet G will swing to the opposite side—that is, over and in alinement with the magnet D, said magnet G thus acting as an armature to the lower magnets and oscillated or moved in one direction or the other in accordance with the direction of the current traveling around said magnet G and accordingly as to which end is the north pole thereof, it being understood that the current always travels around the magnets D E in one certain and predetermined direction, the north poles of said magnets thus always remaining north and the south poles always remaining south.

From the foregoing description it will be understood that the device is capable of exerting great power, in that the armature G, in itself a magnet, is attracted, drawn, or moved in one direction by one magnet and simultaneously repelled in the same direction by a second magnet.

On the shaft C is mounted the disk or plate I, said disk being provided with a central opening and with a sleeve *i*, through which passes said shaft, the disk being free to rotate thereon. This circular plate or disk is preferably held a slight distance above the magnet G by means of the sleeve i^2, resting on the core-piece of said magnet G and fitting around the shaft C and on which sleeve rests a spring i^3, the tendency of the latter being to retain the disk or circular plate I in such a position that when the magnets are not excited the periphery thereof will just clear the enlarged ends *g* of the core-piece of said magnet G and allow the latter to turn or move without coming into frictional contact with the under surface of said disk or plate I, while, as before described, the magnet G acts as an armature to the magnets D E, and the circular plate or disk I acts as an armature to it, (the said magnet G,) for when said magnets are excited said plate I will be drawn downwardly until the periphery thereof comes into contact with the enlarged ends *g* of the core-piece of said magnet G, the spring i^3 being slightly flattened by the pull, the armature or disk I being held in such position during the excitement of the magnets. When the circuit is broken or the flow of current around the magnets interrupted, the plate I will be slightly raised out of contact with the magnet G by the spring i^3 allowing said magnet G to return to its normal position without moving said plate or armature I. When the circuit is again completed, the armature I will be instantly drawn into contact with the magnet G, which, as before described, will immediately move into alinement with either the magnet D or E, moving with it and in the same direction the armature I and to the same extent as said magnet G. Upon interruption of the current the plate I is slightly raised and the magnet G returns to its normal position. In other words, when the magnets are excited and the magnet G oscillated the plate I will be rotated in the same direction, the speed at which said plate I rotates depending upon the rapidity of interruptions of the current.

In order to prevent any backward movement of the disk or plate I, the edge thereof is serrated to receive the bent end of the spring i^4, the opposite end i^5 of which may be secured to the box or receptacle A, this spring preventing any accidental movement of said plate, but at the same time permitting it to be rotated in either direction when the magnets are excited, as before described. In order to utilize the rotation of this plate or armature I, I may secure to the sleeve *i* a hand or pointer K, located over and above the cover or top L, which may have a scale marked thereon or applied thereto, or, if desired, it will be understood that the sleeve *i* may be formed with gear-teeth R to mesh with those on a gear-wheel S to transmit the motion to any place or point desired, as illustrated in Fig. 5.

It will be evident to those persons skilled in the art without further illustration or description that many other ways and means may be employed for transmitting the motion of the armature I—as, for instance, instead of serrating the edge thereof it may be provided with teeth to mesh with a gear. It will be further understood by those skilled in the art that in order to insure the plate or armature I traveling with the oscillating magnet G the enlarged ends *g* of the core-piece of said magnet G may be roughened, as illustrated at *o*, Fig. 6, and likewise the under side of the plate or armature I, as at O, or, as illustrated in Fig. 7, the enlarged ends *g* of the core-piece may be provided with teeth *p* to mesh

with similar teeth P, provided on the plate I. It will also be evident that instead of employing two magnets D E one or the other may be omitted; but I prefer to use two, as by so doing the magnet G and armature I may be caused to move in either direction, which would not be the case were only magnet D or E employed. I would therefore have it understood that I do not limit my invention to the precise construction and arrangement of details shown and described; but,

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a device of the character described, the combination with one or more stationary magnets, of an oscillating magnet acting as an armature for said former magnet, and a superposed disk or plate acting as an armature for said oscillating magnet and adapted to move therewith when said oscillating magnet is excited, substantially as described.

2. In a device of the character described, the combination with a stationary magnet or magnets, of an oscillating magnet acting as an armature for said former magnet, a disk or plate located above said oscillating magnet and acting as an armature therefor, and adapted to be moved therewith when said magnets are excited, and means for holding said disk or plate against movement when said magnets are not excited, substantially as described.

3. In a device of the character described, the combination with two stationary magnets placed at an angle with each other, of a superposed oscillating magnet adapted to act as an armature to said stationary magnets, means for holding said oscillating magnet in a position equally distant between said stationary magnets when the same are not excited, and a disk or plate acting as an armature to said oscillating magnet and adapted to be held in contact and moved therewith when said magnets are excited, and means for holding said disk or plate stationary when said magnets are not excited, substantially as described.

4. In a device of the character described, the combination with a receptacle having a central shaft C, of stationary magnets D, E, mounted on said shaft and at an angle with each other, an oscillating magnet G located above said stationary magnets an equal distance between the two when said magnets are not excited, a disk or plate I mounted on said shaft and above said oscillating magnet, and adapted to act as an armature therefor and be moved therewith when said oscillating magnet is excited, and means for holding said disk or plate I stationary when said oscillating magnet G is not excited, substantially as described.

Signed at New York, in the county of New York and State of New York, this 26th day of March, A. D. 1901.

SAMUEL C. HARRIS.

Witnesses:
GEORGE COOK,
M. VAN NORTWICK.