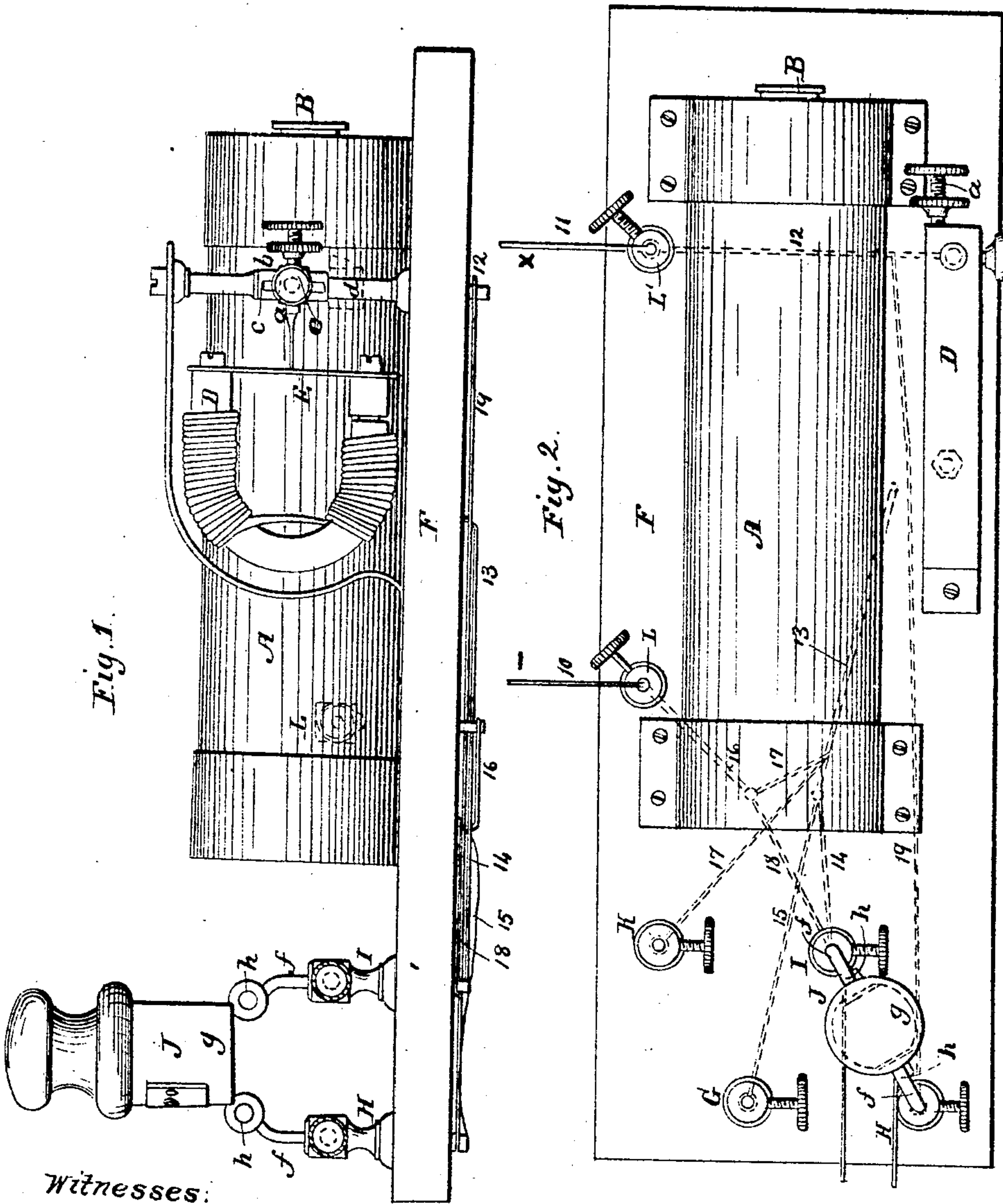


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J. KIDDER.
ELECTROMAGNETIC APPARATUS.



Witnesses:
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IMPROVED ELECTRO-MAGNETIC APPARATUS.

Specification forming part of Letters Patent No. **30,068**, dated September 18, 1860.

To all whom it may concern:

Be it known that I, JEROME KIDDER, of the city, county, and State of New York, have invented certain new and useful Improvements in Electro-Magnetic Machines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents a side elevation of my invention. Fig. 2 is a plan or top view of the same.

Similar letters of reference indicate corresponding parts in the two figures.

My invention consists in combining the ends of the two coils of fine wire contained in the helix of an electro-magnetic machine with a series of posts or studs and with the helix of the electro-magnet in such a manner that the currents produced by the electro-magnetic machine can be used either singly or in combination, and also direct or alternately, as will be hereinafter more fully described.

It consists, further, in connecting the first end of the inner coil with the ends of the big wire which forms the helix of the electro-magnet and the coil of the big wire in the interior of the cylinder, so as to form a direct current, as will be hereinafter more fully explained.

To enable those skilled in the art to make and use my invention, I will proceed to describe its construction and operation with reference to the drawings.

The cylinder A is provided with an inner and outer coil of fine wire in the usual manner. These coils connect with the battery and the intensity of the current passing through them is increased by a bunch of thin soft iron rods which are inclosed in a shell, B. This shell is inserted into a cavity in the center of the cylinder A, and by pushing in or pulling out this shell the intensity of the current is regulated to a certain extent. The wires of the battery are connected to the clamps L L', and an electro-magnet, D, with a magnetic hammer, E, serves to break and to close the circuit at the required intervals. The oscillations of the magnetic hammer are regulated by a check-screw, *a*, which passes through a head, *b*, that is adjusted by a slot, *c*, in the post *d* by means of a set-screw, *e*. By mov-

ing the screw *a* up or down the oscillations of the hammer are made longer or shorter, according to the nature and intensity of the current.

The whole apparatus is secured to a platform, F, made of wood or any other non-conducting material, and long enough to give room for the studs G, H, I, and K, which are arranged in such a manner that the distances between the studs G and H, H and I, I and K, K and G, G and I are equal one to the other, and that either one of the above-named pairs can be connected by the same circuit-changer J. A side elevation of this circuit-changer is represented in Fig. 1, and it consists of two legs, *f*, of metal wire, which are attached to a handle, *g*, of wood or some other non-conducting material, and which are provided with loops *h*, to which the usual handles of the electro-magnetic machine may be attached. The legs *f* of the circuit-changer are at such a distance one from the other that they can be inserted into either one of the above-named pairs of studs.

The connection of the different parts of my machine is as follows: The battery connects with the studs L L' by means of the wires 10 and 11, and the wire 11 may connect with the positive, and the wire 10 with the negative, pole of the battery. The stud L' connects by the wire 12 with the electric hammer E of the electro-magnet, and the end of the helix of the electro-magnet connects with a wire, 13, which forms the last end of the main coil on the cylinder. The last end of the inner coil of fine wire is represented by the wire 14, and the last end of the outer coil by the wire 15. The wire 14 connects with the stud I and the wire 15 with the stud G, as clearly shown in Fig. 2. The first end of the inner coil of fine wire connects through the wire 16 and through the wire 13 with the positive pole of the battery. The first end of the inner coil is represented by the wire 17, and the first end of the outer coil by the wire 18. The wire 17 connects with the stud K, and also with the large wire 13, and is wound round the same, thus making a direct communication between the first end of the inner coil and the helix of the electro-magnet, by which means a direct current can be produced without receiving it from the large wire, and so

secure a rapid vibration of the spring. The wire 18 is fastened to the stud I, and after being wound around the cylinder A it passes out to the stud G. The remaining stud, H, is brought in direct communication with the positive pole of the battery by means of the wire 19. By inserting the circuit-changer J into the studs H and I a direct current is created, which passes from the positive pole through the wires 12 and 19 to the stud H; thence through the person holding the handles of the electro-magnetic machine to the stud I, and through the wires 14 and 17, representing the inner coil, to the main wire, and through the wire 16, to the negative pole of the battery. This current, therefore, is a direct current of the inner coil. In the same manner, if the circuit-changer be inserted into the studs H and G a direct current of both coils is formed. By inserting the circuit-changer into the studs G and I an alternating current of the outer coil is formed, which will be readily understood by following the wires 12, 13, 15, 18, and 16. By connecting the studs I and K an alternating current of the inner coil is formed, which current is represented by the wires 12, 13, 14, 17, and 16, and in the same manner by connecting the studs G and K an alternating current of both coils is formed, which will be

readily understood by following the wires 12, 13, 15, 17, 14, 18, and 16. By these means the operator is enabled to produce five currents of a different nature and intensity by simply changing the position of the circuit-changer J, and the effect of my electro-magnetic machine can readily be arranged to suit any case that may come under the hands of the operator, and one of my machines can be used in all cases where electro-magnetism is generally applied, thus saving the operator the necessity of keeping on hand different electro-magnetic machines in order to be prepared for every case that may come before him.

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

1. The arrangement of the wires 12, 13, 14, 15, 16, 17, 18, and 19, in combination with the electro-magnet D and with the cylinder A, constructed and operating substantially in the manner and for the purposes set forth.

2. The arrangement of the wire 17, in combination with the wire 13, substantially in the manner and for the purpose set forth.

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Witnesses:

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