

FRANK L. POPE.

Improvement in Electric-Telegraph Apparatus.

No. 126,486.

Patented May 7, 1872.

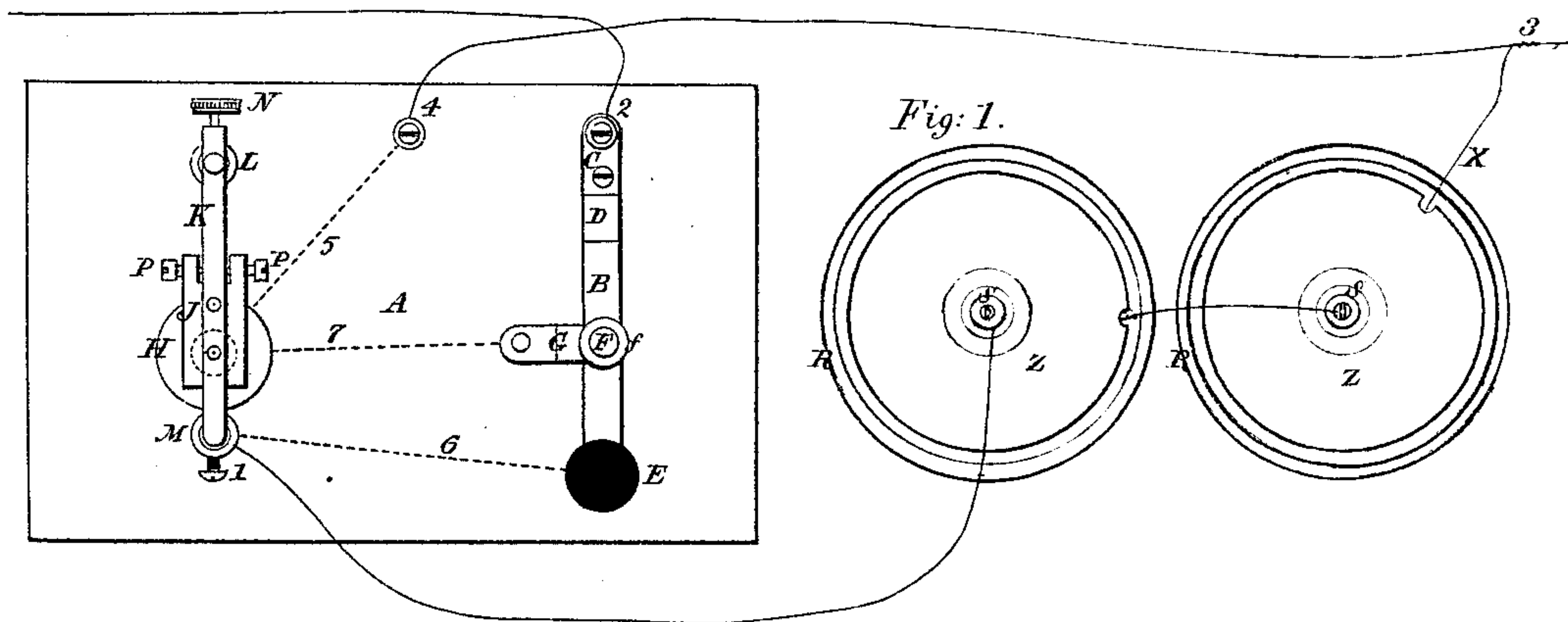


Fig. 2.

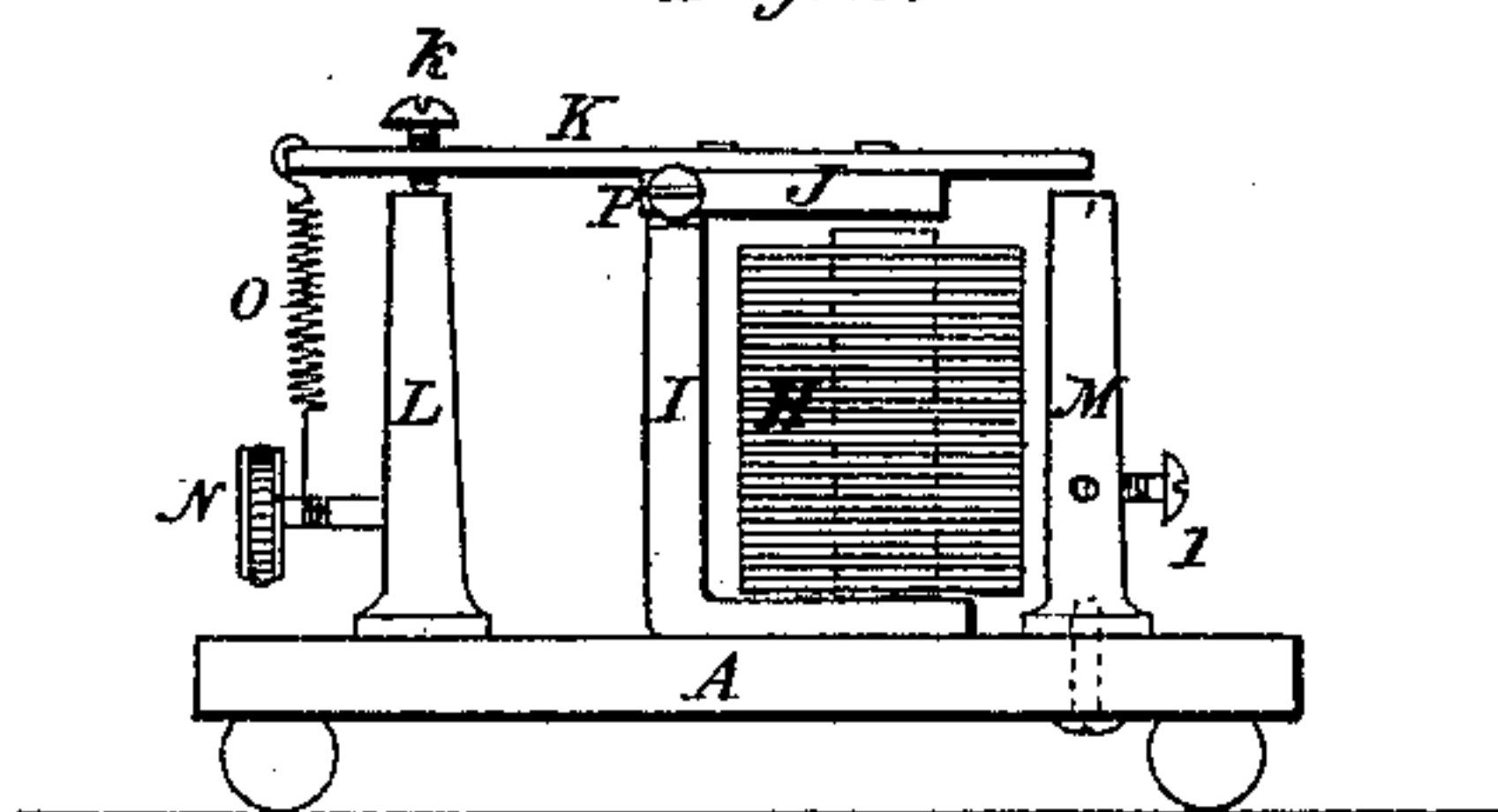


Fig. 3.

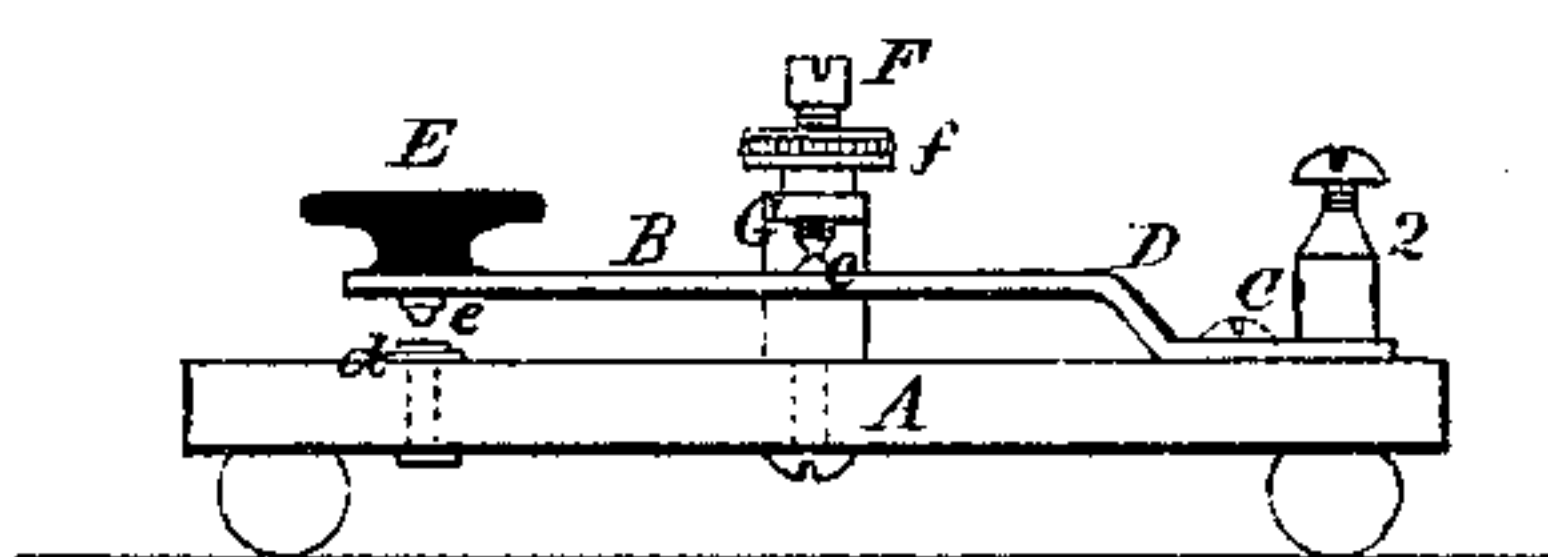
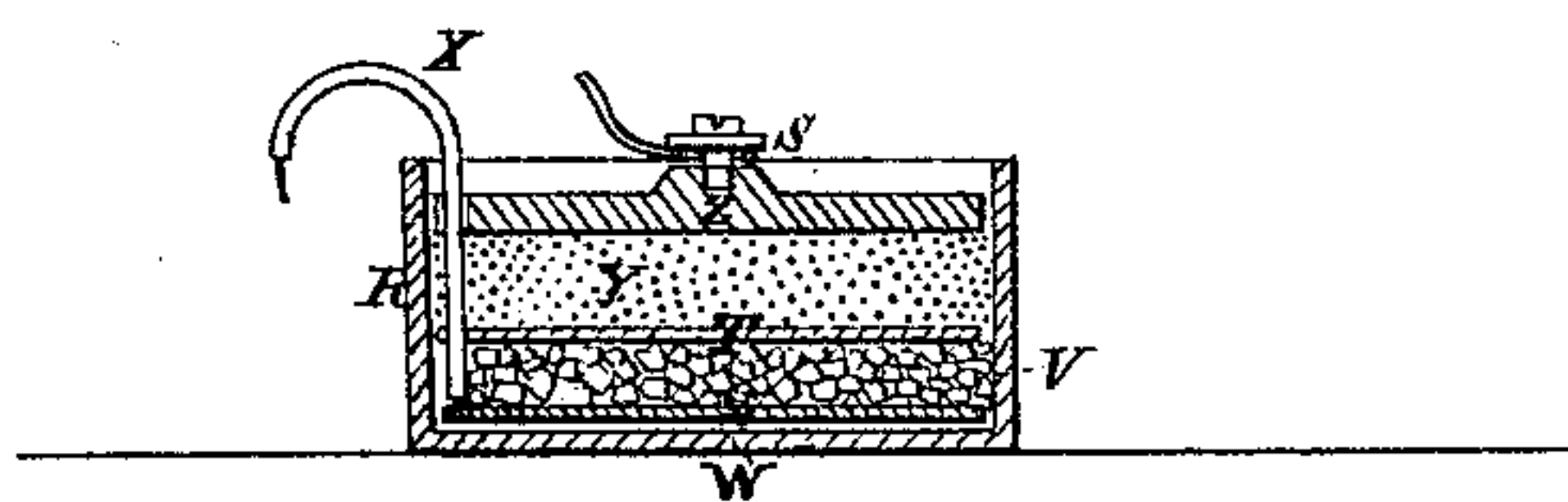


Fig. 4.



0 1 2 3 4 5 6  
Scale of Inches.

WITNESSES:

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# UNITED STATES PATENT OFFICE.

FRANK L. POPE, OF ELIZABETH, NEW JERSEY.

## IMPROVEMENT IN ELECTRIC-TELEGRAPH APPARATUS.

Specification forming part of Letters Patent No. 126,486, dated May 7, 1872.

Specification describing certain Improvements in Electric-Telegraph Apparatus, invented by FRANK L. POPE, of Elizabeth, in the county of Union and State of New Jersey.

My invention consists of a telegraphic transmitting-key, of the form technically called a "strap-key," with a sounder having an electro-magnet and armature of peculiar construction, and a galvanic battery so constructed and arranged as to remain in action for a great length of time, and also capable of being transported or shaken without injury, the whole forming a simple and inexpensive telegraphic apparatus for the use of persons employed in learning the art of telegraphy, or for short telegraphic lines for commercial and other purposes.

In the annexed drawing, Figure 1 is a plan view of the apparatus, showing the transmitting-key, sounder, and battery, together with the connecting wires. Fig. 2 is a side elevation of the sounder, showing the construction of the electro-magnet and its armature. Fig. 3 is a side elevation of the transmitting-key. Fig. 4 is a vertical section of one of the elements of the battery, showing its internal arrangement.

A is the base upon which the transmitting-key and sounder are placed, and which may be made of hard wood or other suitable material. B, Figs. 1 and 3, is a strap of sheet metal, preferably of brass, secured to the base at its rear end by means of a screw, C, and having a bend at D, which acts as a spring to prevent the platina point *e* from coming in contact with the anvil *d* when the apparatus is in its normal position, as shown in the drawing. A screw, F, provided with a lock-nut, *f*, is mounted upon a metallic standard, G, and is provided at its lower extremity with a platina-tipped point. A corresponding platina point, *e*, upon the upper surface of the strap B, is kept in contact with the point of the screw F by the elasticity of the said strap at the point D. It will therefore be understood that an electric current entering the strap B by means of a wire attached to the binding-post 2 upon the said strap, will pass through the point *e* and screw F to the standard G; but if the strap be depressed by the finger of the operator acting upon the knob E, the contact at *e* will be broken, and another contact established be-

tween the point *e* and the anvil *d*, to which the electric current from 2 will now be directed. When the finger of the operator is withdrawn the contact between *e* and *d* will be broken, and that between *e* and F again restored, by means of the elasticity of the strap B. H, Figs. 1 and 2, is an electro-magnetic helix, of the ordinary form and construction, inclosing a cylindrical soft-iron core, as clearly shown by the dotted lines. The lower end of this cylindrical core is screwed into an angular soft-iron bar, I, which is secured in any suitable manner to the base A. A soft-iron armature, J, is pivoted to the upper extremity of the bar I by means of screws P P or in any other suitable manner, as shown in Figs. 1 and 2. The armature J is by this means placed in magnetic contact with the soft-iron bar I. A bar or lever, K, composed of some suitable non-magnetic metal—such as brass, for example—is firmly attached to the armature J, as shown in the drawing, so as to partake with it in its movements. The armature J and its attached bar or lever K are capable of a vertical movement upon the screws P P as a center, this movement being limited in either direction by the sounding-posts L or M. The stroke or movement of the lever K is adjustable by means of the screw *k*. The downward motion of the lever K is caused by the attraction of the core of the electro-magnetic helix H exerted upon the armature J, and its upward motion by the action of the retractile spring O when the action of the electro-magnet ceases. The tension of the spring O may be regulated by any suitable device, such, for instance, as that shown at N in Fig. 2. This arrangement of an electro-magnet, armature, lever, retractile spring, and sounding-posts, is technically termed a sounder. The lever K, in its vibrations alternately striking upon the posts L and M, produces sounds which may be made to convey an intelligible meaning to a person skilled in the art of telegraphy. R, Figs. 1 and 4, is a cylindrical glass jar open at the top. At the bottom of the jar R is placed a circular disk of sheet-lead, W. Upon this is placed a quantity of sulphate of copper in the form of crystals V, and above this a disk, which may be made of felt, cloth, leather, paper, or other suitable porous material. Above this is placed a layer of some substance capable of being



permeated by a liquid, such as sand or common sawdust, for example. This material is represented by the letter Y, and upon it rests a circular zinc plate, Z. It is not essential that the plate W be composed of lead, as iron, copper, or other metals may be substituted if necessary or preferable. A wire, X, covered with a suitable insulating coating, is attached to the plate or disk W, and projects upward out of the jar, as shown in Fig. 4.

The arrangement last described forms a complete galvanic element when saturated with a solution of sulphate of zinc, the plate Z forming the negative and the plate W the positive pole of the said element. Any required number of these elements may be connected in series, the projecting wire X being attached to the zinc Z of the next succeeding element by means of the flat-headed screw S, Fig. 4. This mode of attachment is much more simple and less costly than the binding screw usually employed for this purpose, and is equally convenient and secure.

In Fig. 1 two elements are thus shown connected in series.

In Fig. 1 the key, sounder, and battery are shown with the connecting-wires properly arranged. The line-wire leading to the distant station is attached to the binding-post 2. The wire leading to the earth is attached to the binding-post 4, and the wire X from the battery is also connected to the earth. The opposite pole of the battery is connected with the post M at 1, and also with the anvil *d*, Fig. 3, by means of a wire running from M underneath the base, as indicated by the dotted line 6 in Fig. 1. The binding-post 4 is also connected by the wire 5 through the helix H, and wire 7 to the standard G.

When the key B is depressed a circuit is formed from the zinc pole of the battery at S, through 1 and 6, to the anvil *d*, point *e*, key or strap B, and binding-post 2, and thence over the line to the distant station, returning by the earth in a well-known manner to the point 3, and thence to the opposite pole of the battery X. When the key is in its normal position a current from the distant station entering the binding-post 2 will pass through the key or strap B, point *e*, screw F, standard G, wire 7, helix H, wire 5, and screw 4, to the earth. Thus the electro-magnetic helix H is traversed only by received, and not by transmitted, currents.

The mode of transmitting communications by means of this apparatus, being well understood by those skilled in the art, needs no explanation.

I do not claim the arrangement of the helix H and its core in relation to the bar I and armature J, as I am aware this is not new; nor do I claim distinctively the key or strap B and its appurtenances, as described. I am furthermore aware that the arrangement of the different parts of a galvanic element, substantially as hereinbefore described, has heretofore been employed; but

I claim as my invention—

The combination of the helix H, angular bar I, and armature J, arranged, substantially as described, with the lever or bar K and sounding-posts L and M, the whole combined, arranged, and operated substantially as and for the purpose hereinbefore set forth.

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Witnesses:

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