

(No Model.)

R. M. HUNTER.

ELECTRIC SIGNAL.

No. 257,948.

Patented May 16, 1882.

Fig. 1

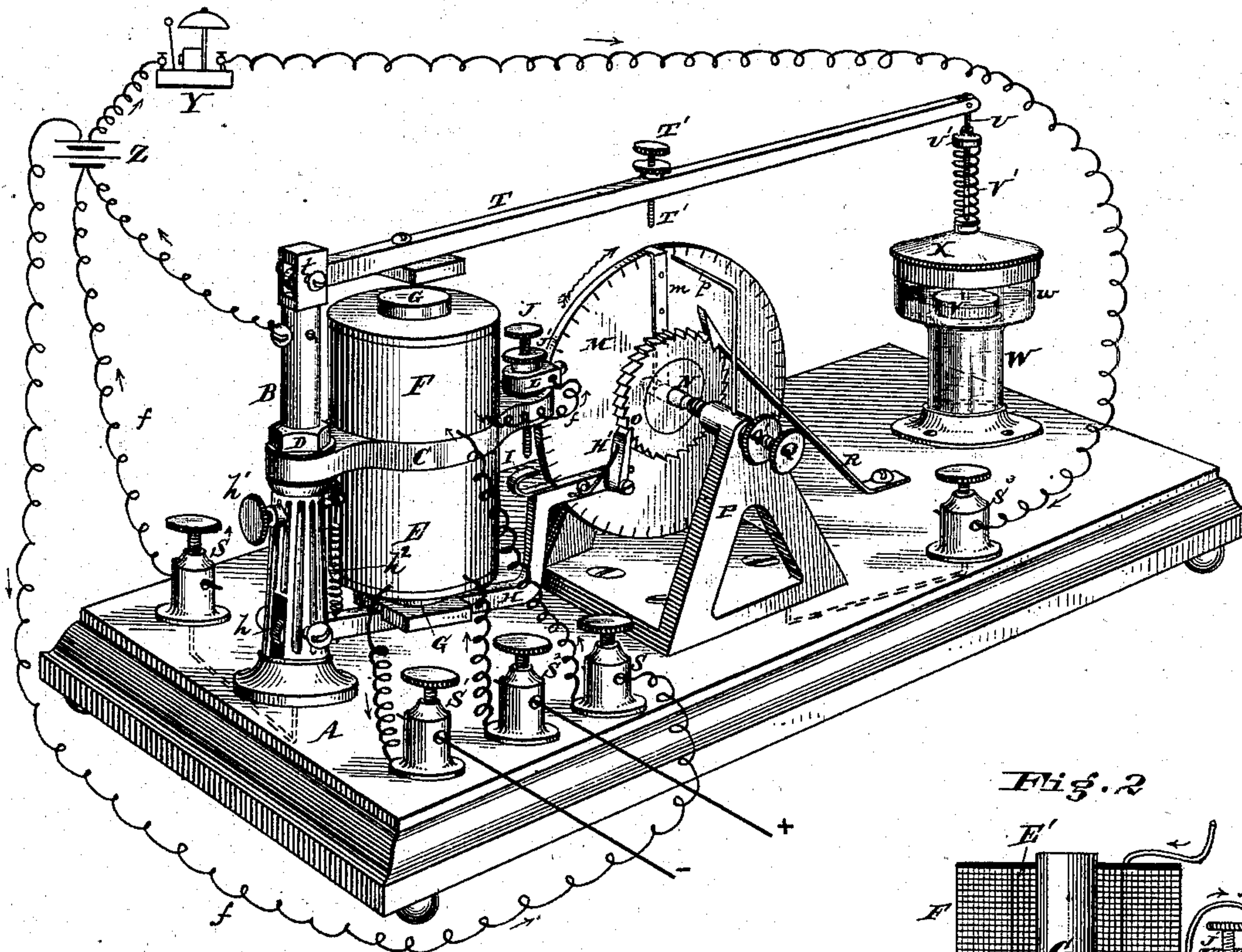


Fig. 2

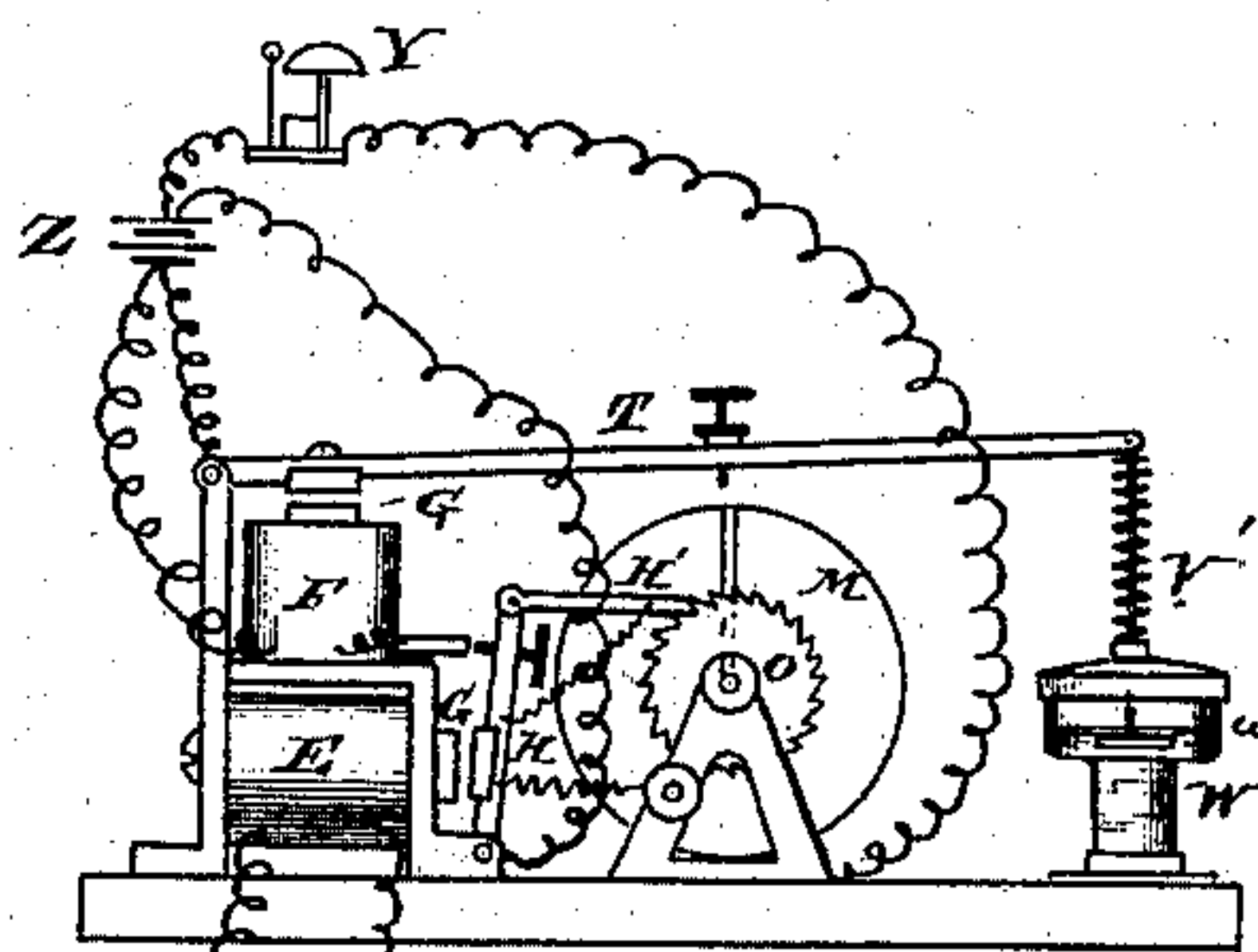
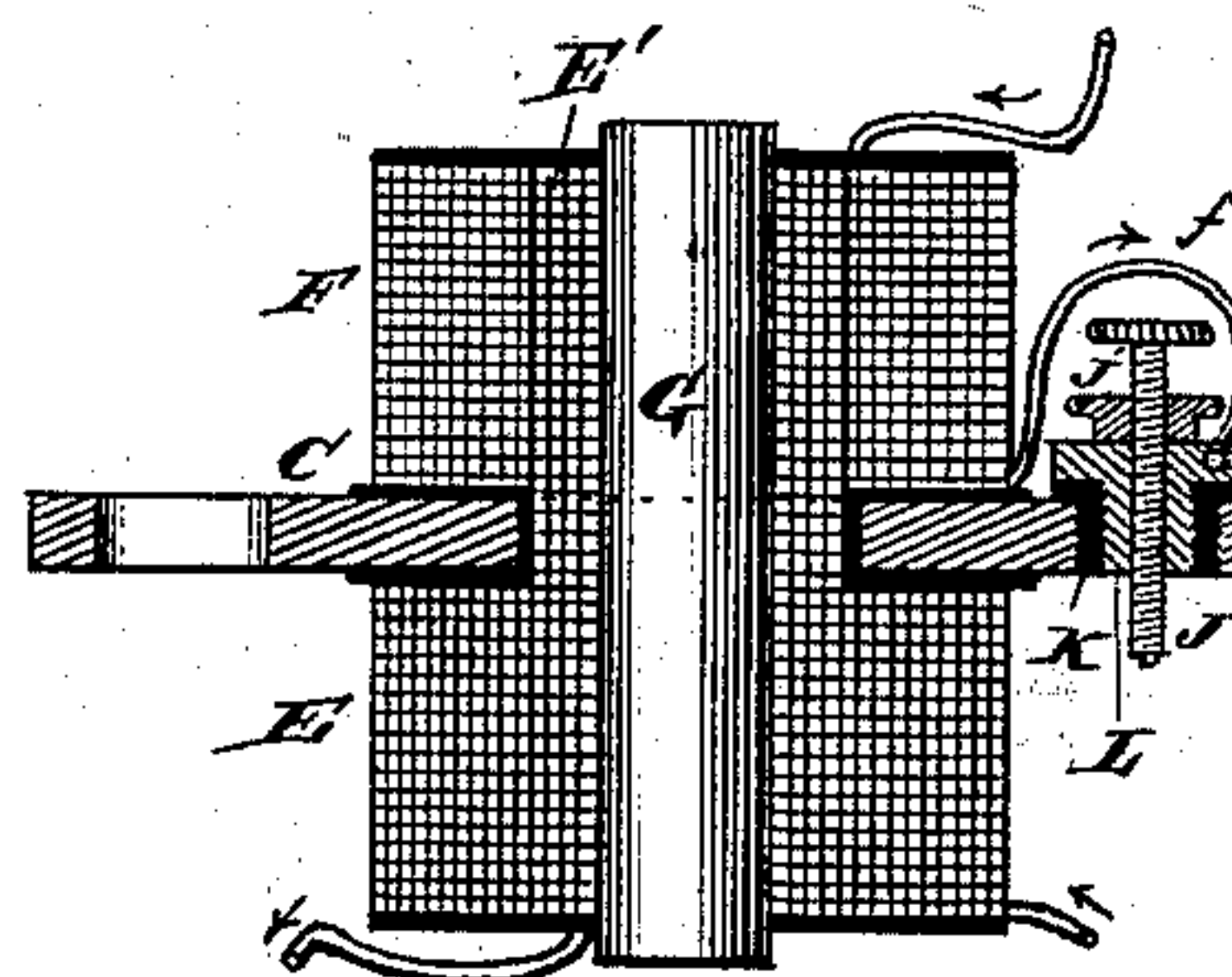


Fig. 3

Attests  
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# UNITED STATES PATENT OFFICE.

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## ELECTRIC SIGNAL.

SPECIFICATION forming part of Letters Patent No. 257,948, dated May 16, 1882.

Application filed October 18, 1881. (No model.)

*To all whom it may concern:*

Be it known that I, RUDOLPH M. HUNTER, of the city and county of Philadelphia, and State of Pennsylvania, have invented a new and useful Improvement in Electric Signals, of which the following is a specification.

My invention relates to electric signals in general, but more particularly to signals for telephonic purposes; and it consists in a contact-wheel having a single contact-point in its circumference, combined with an electro-magnet adapted to rotate said contact-wheel step by step, and a device to complete a local circuit through the contact-point on said contact-wheel, said local circuit being circuited through the signal bell or alarm; further, in an electro magnet or magnets adapted to rotate a contact circle or wheel step by step, and at the ending of each of said movements completing a local circuit through a coil or helix to magnetize a core, said core being arranged to attract an armature or retarding device adapted to close a second contact and complete a local circuit through the electric bell; further, in a contact-lever combined with a retarding device adapted to descend slowly but raise quickly; further, in combining two helices and two armatures with three circuits, one of which is circuited through the main line or an auxiliary relay, another of which is circuited through the local battery and one armature, and the remaining one being circuited through the local battery, electric bell, and the other armature; and, finally, in many details of construction, all of which are fully set forth in the following specification and shown in the accompanying drawings, which form part thereof.

The object of this invention is to provide a signaling device at each station on a telephone-line to enable the operator to signal any station desired. The object is, further, to dispense with a central station and to enable signaling to be carried on over a single wire over which an electric current of uniform strength is passing, and thereby dispense with variable battery-power.

In the drawings, Figure 1 is a perspective view of my improved electric signaling device. Fig. 2 is a section of one form of double electro-magnet, and Fig. 3 is a side elevation of a modified form of my improved device.

A is the bed-plate, upon which is secured

the upright post B, carrying the supporting-piece C, which is secured in place by the nut D. This piece C supports and carries the electro-magnet coils E and F, in the center of which is located the iron core G. Part of the wire of coil E may extend up around the upper part of the core G, as shown at E' in Fig. 2, and, if desired, the core may be made in two parts, insulated from each other, so that the lower part might be magnetized without changing the upper part; but I prefer the former construction, as shown in Fig. 2. The ends of bobbin or helix E are connected with the binding-posts S' S<sup>2</sup>, which receive the two ends of the line-wire. One end of bobbin or helix F is connected to binding-post S, which receives a local-circuit wire, f, connected with one pole of local battery Z.

Pivoted to the post B at h is the armature H, the end of which is provided with a spring-finger, H', adapted to mesh with a ratchet-wheel, O, secured to and insulated from a shaft, N, carrying the contact-wheel M, furnished with a single contact, m, connecting the periphery with the shaft N. The armature H may be adjusted by the thumb-screw h' and spring h<sup>2</sup>, and is provided with a contact, I, preferably made of a spring. An ordinary adjusting-spring may be used, if desired, to withdraw the armature H quickly away from the magnet E; but it is not absolutely required in the construction shown in Fig. 1, as gravity performs that function.

The piece C carries the insulating-bushing K over the contact-spring I on armature H, said bushing carrying a metallic nut, L, through which the contact-screw J passes, and in which it is adjusted. The nut or metallic bushing L is connected to the other end of the bobbin or helix F. If desired, the piece C may be made of insulating material and the bushings dispensed with. The other pole of battery Z is connected through binding-post S<sup>4</sup> with the armature H, thereby completing the local circuit through the helix F.

The shaft N is pivoted between set-screws Q Q', carried by frame P. A spring-tooth, R, presses against the ratchet-wheel O, to prevent its moving unless positively rotated by the armature H. A pointer, p, secured to the frame P, indicates the signaling-point. One pole of battery Z is connected with one bind-



ing-post on the electric bell Y, the other binding-post being connected with the frame P and contact *m* through the binding-post S<sup>3</sup>. The other pole of battery Z is connected with the armature-lever T, pivoted to the post B at *t* through post B. The lever T is provided with contact adjustable screw T' at a point above the center of the contact-wheel M. The end of the lever T is secured to a rod, U, carrying a plunger or piston, V, on its lower end, which works in a glass or metallic cylinder, W, provided with the enlarged diameter *w*. The rod U is guided through the cap or cover X, and is screw-threaded and furnished with an adjustable nut, U', between which and the cap is a spring, V', which tends to keep the lever up and free of the contact-wheel M. The spring may be arranged in any other desirable manner, if desired. The cylinder W contains glycerine or other liquid; or mercury may be used, in which latter case an iron piston, V, would be used, and in all cases this piston almost fits the cylinder at its smallest diameter, but is much smaller than the large part *w* of the cylinder.

If desired, the wire connecting the upper part of post B with battery Z may be dispensed with, as its function would be performed by wire secured to binding-post S<sup>4</sup>.

This device would work without the use of the upper helix, F, but not so positively or in such a satisfactory manner.

The operation is as follows: The operator at one station works his key until the number on contact circle or wheel M indicating the station he is desirous of signaling is in front of the pointer *p*. Now, if he works his key quickly, the lever T could not descend to complete the local circuit through the alarm, as the magnet operating said lever would not have received its full power until at the end of each stroke of the key, when the armature H completes the local circuit through said magnet, and time would be required before the piston V could descend in the small part of cylinder W, and force the liquid above it. Every oscillation or movement of the armature H closes the local circuit through the magnet F. Upon opening the key or breaking contact the spring V' forces the lever quickly back to its original position, as the enlargement *w* in the cylinder offers no resistance to the upward movement of the piston V, and as the piston enters the enlarged diameter the liquid quickly runs under the piston into the small diameter. Therefore by this device there is considerable resistance to the downward movement of the piston, but none to its upward movement. Now, if the operator keeps his key closed, the local circuit through the coil F will have been completed and will have time to pull the lever T down, operating the alarm or signal bell, as it then has time to overcome the resistance offered by the piston and small cylinder. The time and power required to operate this retarding device may be regulated by the adjustment of the spring

V' and piston and by the diameter of the small and large parts of the cylinder W.

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

1. In an electric call or signal, an electromagnetic core and means to magnetize and demagnetize it with the line-circuit, in combination with two armatures arranged one at each end or pole of said core, one of which armatures is provided with rotating devices and the other with circuit-closing devices, and a contact-wheel having a conducting-point on its periphery, one of said armatures operating to intermittently rotate said contact-wheel and the other of said armatures operating to close a local circuit through said contact-wheel.

2. In an electric call or signal, two electric coils or helices, means to actuate or electrify one of them by the line-circuit and the other by a local circuit, in combination with an alarm-bell, a local battery, two local circuits, a contact-wheel, an armature actuated by one of said helices to intermittently rotate said contact-wheel and complete at every stroke one of the local circuits through the other helix, and an armature operated by said helix in the local circuit to close the other local circuit through the alarm-bell.

3. In an electric signal, two electric coils or helices, means in the line-circuit to control the passage of electricity through one of said helices, a contact-wheel, and an armature to rotate said contact-wheel, and provided with means to close a local circuit through the other of said helices at every stroke, in combination with a second armature actuated by the local-circuited helix to complete a local circuit through the alarm-bell, two local circuits, and a retarding device to prevent the latter of said armatures descending too rapidly to close the alarm-circuit.

4. In an electric signal, the combination of two electric coils or helices, a line-circuit through one of said coils and a local circuit through the other of said coils, and mechanism arranged to complete the local circuit through one coil upon a current being passed through the other coil, with mechanism, substantially as described, to complete a single local alarm-circuit, said mechanism being operated and controlled by both of said helices jointly, substantially as and for the purpose specified.

5. In an electric signal, two helices, two armatures, a contact-wheel, an alarm, and three circuits, one of which is the main-line and is circuited through one of said helices, the second a local circuit through the other helix, and the third a local circuit through the alarm, in combination with mechanism to close both the first and second of said circuits at every stroke of the key or closing of the line-circuit, and means to close the third of said circuits through the alarm upon holding said first and second circuits closed.

6. In an electric signal, the combination of core G, helix EE', of two diameters, armature



H, with its spring-finger H', contact-wheel M, and armature T, independent of armature H, provided with contact-screw T', substantially as and for the purpose specified.

5 7. In an electric signal, the combination of core G, helix E E', armature H, with its spring-finger H', contact-wheel M, armature T, provided with contact-screw T', and a retarding device to prevent the armature T (said core G  
10 being the common attraction for both of said armatures H and T) from falling quickly.

8. A retarding device for electric signals, which consists of a cylinder having the small diameter W and large diameter w, in combination with a piston or plunger, V, adapted to  
15 vertical movement, a spring, V', or its equivalent, to hold said piston above or at the top of said small diameter of the cylinder, an armature-lever attached to said plunger and provided with a contact to complete a local circuit  
20 which is independent of the electro-magnet which actuates said armature, and an electro-magnet to actuate said armature-lever and force the plunger down into the small diameter  
25 of the cylinder.

9. In an electric signal, the combination of core G, helices E F, armature H, provided with a contact, I, bushing L, or its equivalent, and a contact-screw, J, said armature operating to complete a local circuit through helix F,  
30 substantially as and for the purpose specified.

10. In an electric signal, the combination of helices E and F, core G, common to both of said helices, armature H, provided with spring-finger H', means, substantially as described, to  
35 complete a circuit through helix F every time a current is passed through helix E, contact-wheel M, armature T, provided with contact-screw T' and contact-screw J, in circuit with helix F, substantially as and for the purpose  
40 specified.

11. In an electric signal, a retarding device which consists of a vessel having two diameters, the smaller being at the bottom, and a plunger or piston which before action is above  
45 the small diameter and in the large diameter, so as to leave a clear passage-way for the liquid from above the piston to below the same after it has been fully raised, in combination with an alarm-circuit, a contact to close said  
50 alarm-circuit and controlled by said plunger and its operating electro-magnet, and an electro-magnet to actuate said plunger and force it down into the small diameter, substantially  
55 as set forth.

In testimony of which invention I hereunto set my hand.

RUDOLPH M. HUNTER.

Witnesses:

JOHN W. STEWARD,  
R. A. CAVIN.