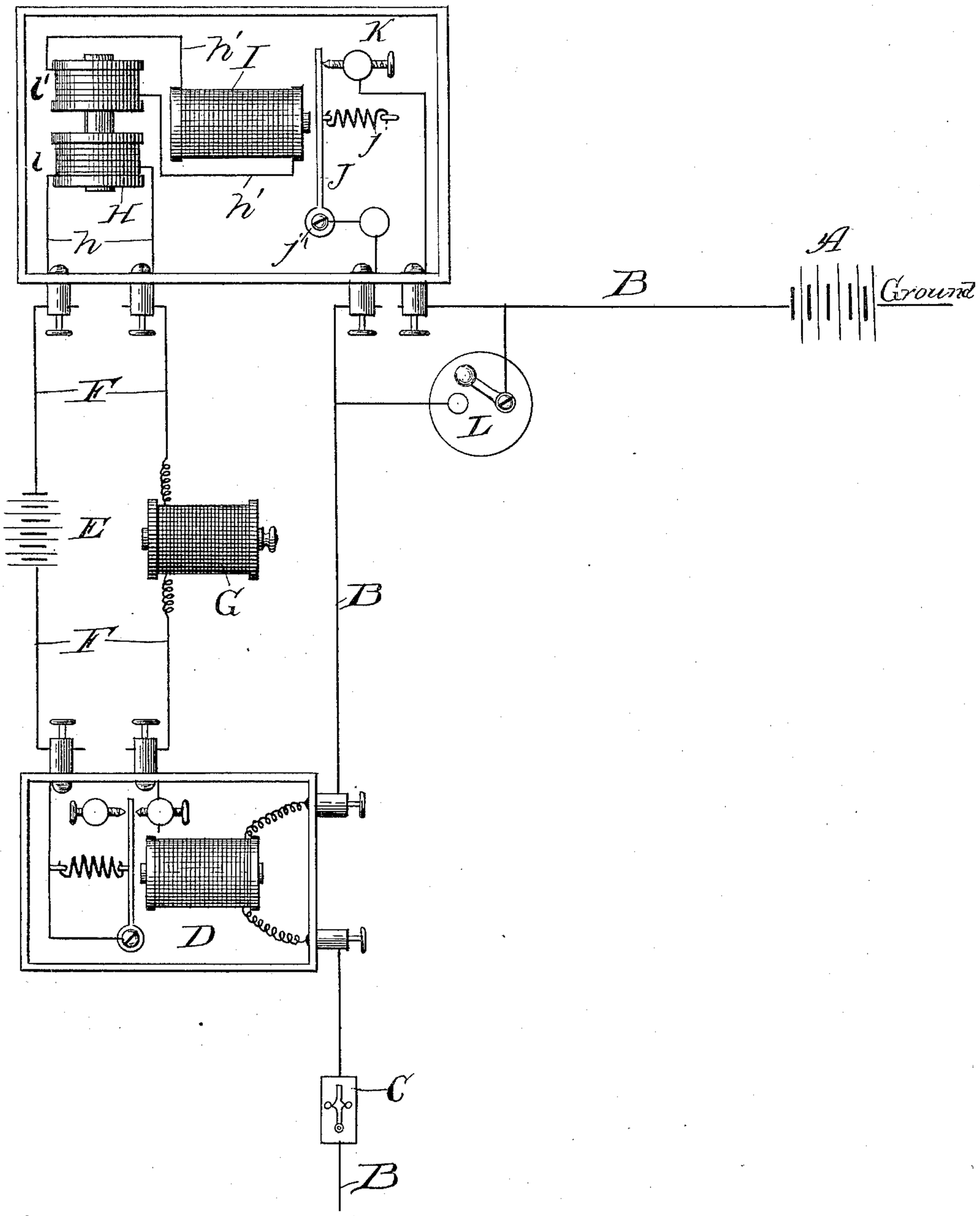
(No Model.)

C. P. CARR.

AUTOMATIC ADJUSTER FOR TELEGRAPH LINES.

No. 432,724. Patented July 22, 1890.



Witnesses:
Samuel E. Hibben.
Clifford O. Ohlito.

Inventor:
Courtland P. Carr
By Banning & Banning & Payson.
Atty's.

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UNITED STATES PATENT OFFICE.

COURTLAND P. CARR, OF CHICAGO, ILLINOIS.

AUTOMATIC ADJUSTER FOR TELEGRAPH-LINES.

SPECIFICATION forming part of Letters Patent No. 432,724, dated July 22, 1890.

Application filed November 26, 1889. Serial No. 331,595. (No model.)

To all whom it may concern:

Be it known that I, COURTLAND P. CARR, a citizen of the United States, residing at Chicago, Cook county, Illinois, have invented a new and useful Improvement in Automatic Adjusters, of which the following is a specification.

Whenever, in working a telegraph-line in dry weather, the circuit is broken at a key, every instrument on the line instantly loses its magnetism, allowing the armature to fall back, producing a certain sound. When the key is closed, (closing the circuit,) all the instruments are instantly magnetized, pulling the armatures over, producing another certain sound. All Morse characters are communicated by means of these two sounds in strokes of different lengths. It is important to have all the instruments magnetize and demagnetize instantaneously upon the opening or closing of a key in the circuit in order to transmit signals quickly and accurately. The magnetizing is produced from the terminal or main batteries on the wire, and in dry weather everything works satisfactorily; but in wet or heavy weather the dampness produces a partial grounding of the wire, and at such times, when the circuit is broken at a key located at or near one end of the line, the magnetism in the distant relays is held in the coils by the distant battery partially grounding by the rain. The farther away from the breaking-key the instrument is the more the signal is held back. If, therefore, the wire is automatically opened at or near each main battery at every break in the circuit by a key, all magnetism will disappear instantly from the relays on the wire, as there is no current left in the line to hold or produce the magnetism.

The object, therefore, of my invention is to provide a device which shall automatically cut off for an instant every main battery on the line whenever any key on the circuit is opened.

Speaking broadly, this device consists of an induction-coil, the primary circuit of which is cut into the local circuit of a relay in series with the sounder thereof, the secondary circuit being connected in series with a suitably-arranged electro-magnet. The primary circuit of the coil could, if desired, be cut in like manner into the main line itself; but I do not consider that the device when so constructed is as effective as when the coil is used with the local circuit of the relay.

My improved adjuster is simpler, more reliable, and cheaper in construction than any of the devices hitherto employed to effect the same results; and my invention consists in the features and details of construction hereinafter described and claimed.

The drawing gives a general plan view of the main line, &c., and a single relay-station equipped with my device.

The construction of the adjuster is the same at each relay or when the coil is cut into the main line.

A is the main battery; B, the main line; C, a key for opening and closing the line; D, a common relay; E, the local battery; F, the wire of the local circuit; G, the sounder; H, an induction-coil; *l*, the primary and *l'* the secondary circuit thereof; I, an electro-magnet; J, the armature thereof; *j*, a spring attached to such armature; K, a contact-point, and L a switch.

When my device is to be used, the main and local batteries, main line, keys, relays, and sounders are made in the well-known manner and require no further description. I next make, also in the usual manner, the induction-coil H. The primary circuit of this coil is cut, as shown, into the local circuit in series with the sounder G. I then make the electro-magnet I and connect therewith the secondary circuit of the induction-coil, so that the magnet is actuated by the current induced in such secondary circuit by the action of the local battery upon the primary circuit. Next is made the armature J, pivoted, as shown, at *j'* and provided with a spring *j*, by which it is held normally against a contact-point K, but which may be overcome when the armature is attracted, as hereinafter set forth.

The main line B is connected at one side to the contact-point and at the other to the armature J, whereby when the armature rests against the contact-point the line is closed, and when the armature is withdrawn from such point the line will be open, cutting off the battery A.

As is well known, an induced current of very brief duration will be created in the secondary circuit of the induction-coil H whenever the main line is opened or closed, the current induced by a "break" or opening of the line being of shorter duration and higher potential than that induced by a "make" or closing of the line. Any induced current will cause the magnet I to attract its armature J. The latter is, however, withheld by the spring *j*, and the tension of this spring should be such that, while the current induced by a break will be strong enough to overcome the spring and withdraw the armature from the contact-point, the current induced by a make will have no effect upon the armature. The induced current ceasing, the armature will be brought back against the contact-point by means of the spring. I prefer, also, to provide a switch L for the purpose of cutting out the adjuster when it is not needed. The relay should be adjusted for the next point on the line equipped with my improvement or for the most distant office on the line.

The operation of the device will be obvious from the above description of its construction; but I will state it here again briefly. Whenever any key on the circuit is opened, causing a break, the induced current created in the secondary circuit of the induction-coil will act by means of the magnet I to withdraw the armature J and cut off all the batteries on the line. This current lasts for an instant and then ceases, when the armature is drawn back by its spring and the line closed. The current induced by a make in the line will, as above stated, be insufficient to withdraw the armature from the contact-point, whereby the line remains closed to transmit the message. By this cutting off of all the line-batteries on the opening of any key the efficient working of the line is assured, and no matter how heavy the weather the line will never become weather-bound.

The use of this device will not interfere in any way with the sending of messages over the line, inasmuch as it is only the opening of the key that causes a sufficiently strong current in the induction-coil to attract the armature J and cut off the batteries, while the current induced by closing the key to send a message over the line is not sufficiently strong to overcome the tension of the spring.

Since the device acts automatically, it requires scarcely any attention and no additional skill to operate it, all that is needed being to move the switch L, so as to cut the adjuster in or out of the circuit as it is needed.

Although I have described an electro-magnet I in connection with the induction-coil, a polarized magnet could, if desired, be substituted therefor, and I do not desire to limit myself to any particular form of magnet.

I claim—

1. In an automatic adjuster, an induction-coil having its primary circuit cut into the local circuit of a relay in series with the sounder, and its secondary circuit connected in series with a magnet, substantially as described.

2. An automatic adjuster for telegraph-lines comprising an induction-coil having its primary circuit cut into local circuit of a relay in series with the sounder, an electro-magnet connected in series with the secondary circuit of the coil, an armature attracted by such magnet, a contact-point, and a spring holding the armature normally against such contact-point, the main line being connected at one side to the armature and at the other to the contact-point, substantially as described.

3. The combination of the main line B, relay D, local circuit F, induction-coil H, electro-magnet I, armature J, spring *j*, contact-point K, and switch L, operating substantially as described.

COURTLAND P. CARR.

Witnesses:
GEORGE S. PAYSON,
SAMUEL E. HIBBEN.