(No Model.) 2 Sheets—Sheet 1.

S. M. PLUSH & W. P. PHELPS.

SELF ADJUSTING RELAY FOR PRINTING TELEGRAPHS.

No. 252,896. Patented Jan. 31, 1882.

Fig. 1

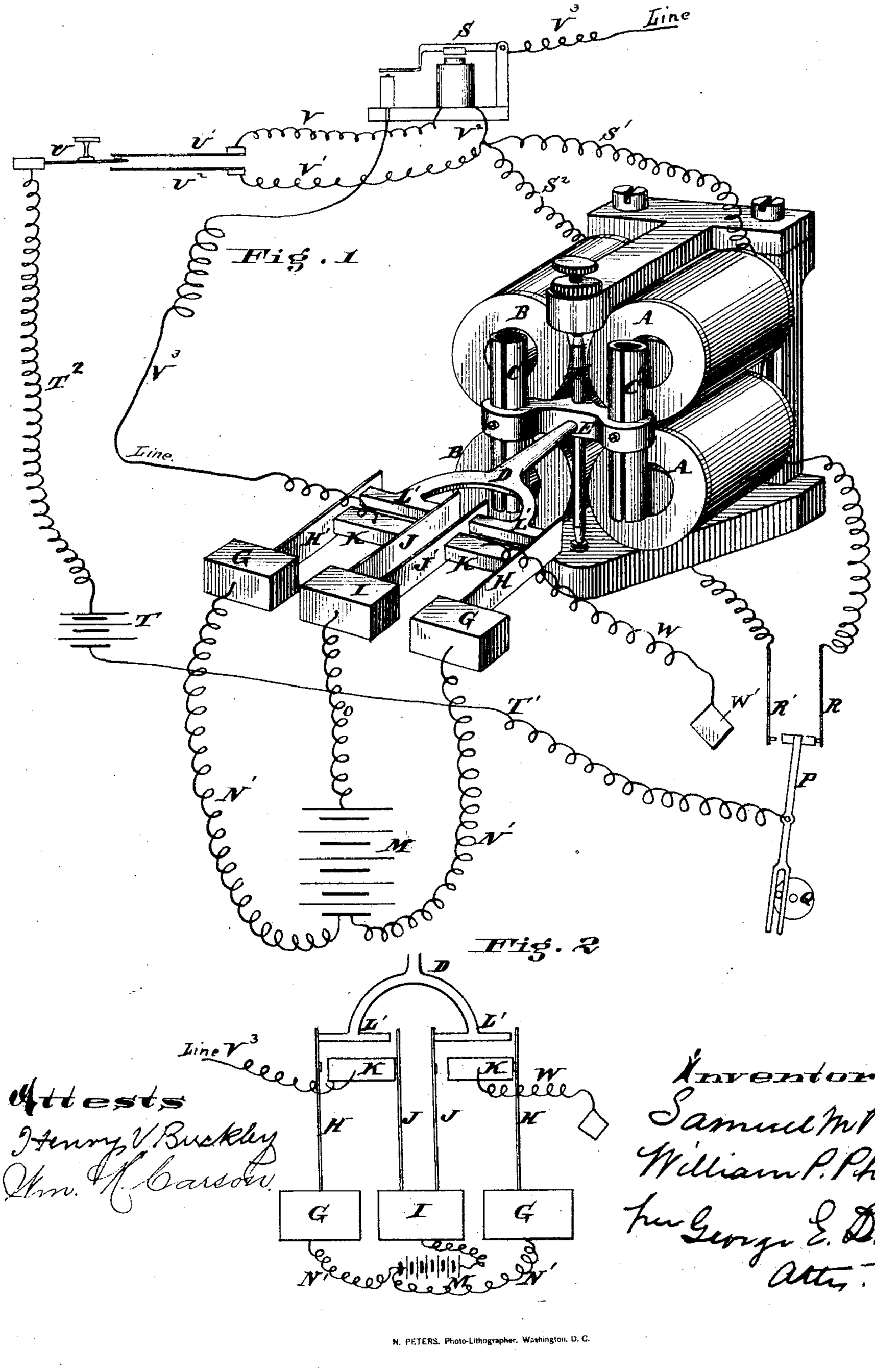

Fig. 2

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Wm. H. Carson.

Inventor
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per George E. Buckley
Atty.

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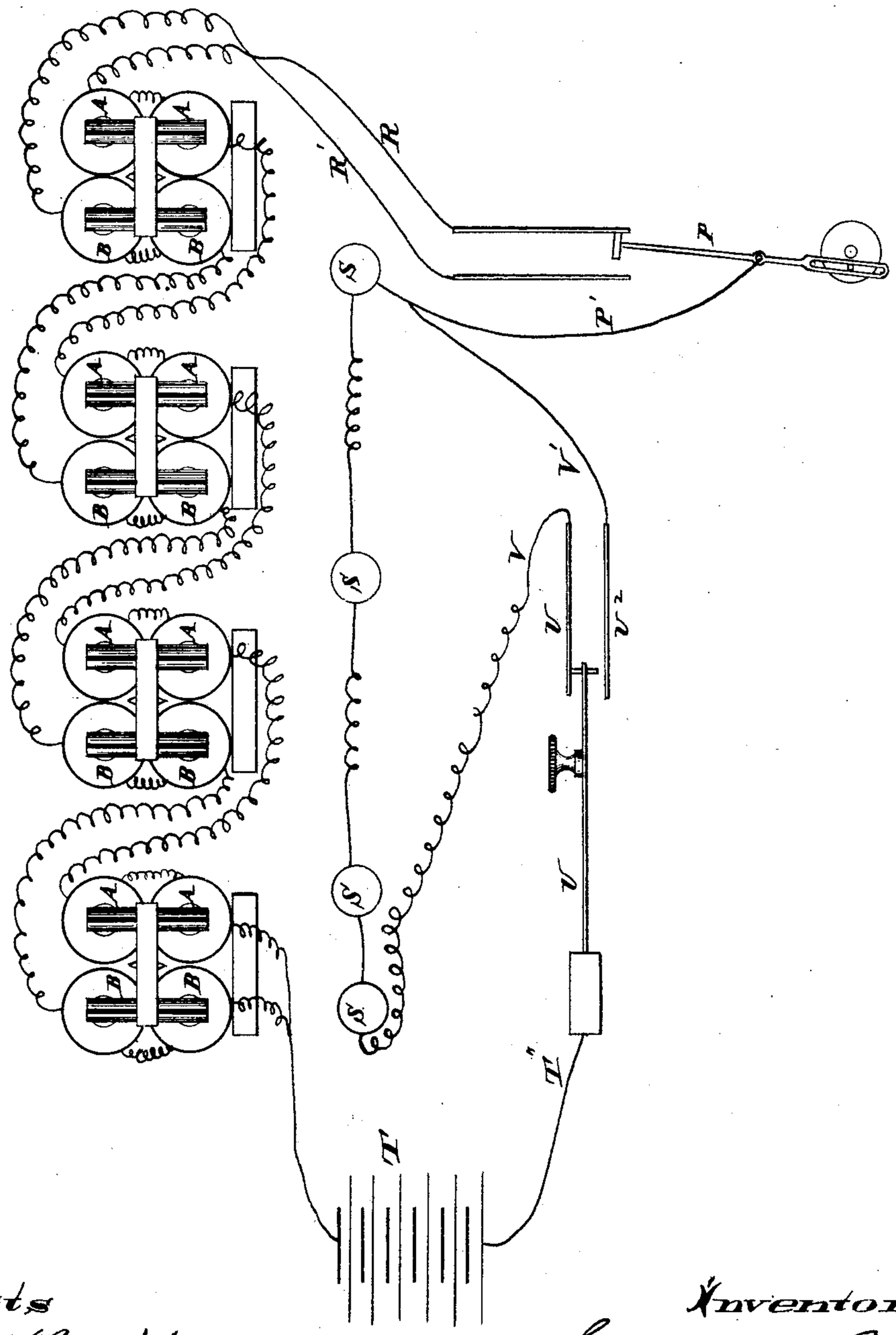

Fig. 3.

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UNITED STATES PATENT OFFICE.

SAMUEL M. PLUSH AND WILLIAM P. PHELPS, OF PHILADELPHIA, PA.

SELF-ADJUSTING RELAY FOR PRINTING-TELEGRAPHS.

SPECIFICATION forming part of Letters Patent No. 252,896, dated January 31, 1882.

Application filed February 14, 1881. (No model.)

To all whom it may concern:

Be it known that we, SAMUEL M. PLUSH, M. D., and WILLIAM P. PHELPS, both of the city and county of Philadelphia, State of Pennsylvania, have invented a certain new and useful Improved Self-Adjusting Relay for Printing-Telegraphs; and we do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the annexed drawings, making part hereof.

The nature of the invention will be fully shown by the following specification and claims.

The object of the invention is to accomplish absolute certainty and rapidity of vibration by means of a self-adjusting relay as distinguished from accomplishing the same thing by ordinary mechanical means.

We design our device for working a pole-changer; but it can be used for breaking and closing circuit when a pole-changer is not employed. The prime object is to multiply the number of pole changers or circuits to any extent without burdening the transmitter with mechanical devices which would increase the friction.

In the drawings, Figure 1, Sheet 1, is a perspective view of our device, showing the magnets, battery, armatures, pole-changer, and the connections; Fig. 2, a detached plan or top view of the pole-changer; Fig. 3, Sheet 2, shows a number of simple and self-adjusting relays, and one local battery.

A A represent one pair of electro-magnets; B B, another pair; C C′, the armatures. These armatures are held suspended vertically before the faces of magnets A A and B B.

D is a forked arm, attached rigidly to the armature-lever E, which is in turn sustained by the upright shaft F. These parts constitute the self-adjusting relay.

The pole-changer consists of blocks G G, which sustain the horizontal band springs H H′, and block I and springs J J′.

K K are horizontal lugs or blocks, which are faced with platinum at their respective ends for the springs J J and H H′ to impinge against. The two forked ends of arm D are each furnished with a cross-bar, L L′, which are parallel to the blocks K K, and which bars serve to actuate the movement of the springs from and against the blocks K K.

M is the battery, one pole of which is connected to blocks G G by the wires N N′. The other pole is connected to the block I by wire O.

P is a lever with a cross or T-shaped head. Each end of this cross is platinum-pointed. This lever is pivoted at its middle and is actuated from side to side by a crank, Q, at its lower end.

R R′ are two springs, between which the cross-piece of lever P vibrates. Spring R is connected to the electro-magnets A A by a wire, and spring R′ to the electro-magnets B B by a similar wire.

S is a repeating-relay, to which both pairs of magnets A A B B are connected by wires S′ S².

T is a local battery for operating the self-adjusting relay and the repeating-relay S. One pole of this battery is connected with lever P by wire T′, and the other pole to the spring of a repeat-key, U, by wire T². The spring U′ of this key is in turn connected by the wire V with the magnet of the repeating-relay S. The other spring, U², is connected by wire V′ with the wires S′ S² of the self-adjusting relay. These three wires form a junction, as shown, and are connected from that point of junction with the magnet of the relay S. One end of key U vibrates between the springs U′ U².

The wire V³ represents the line.

W is a wire passing from the pole-changer to the ground. It is represented as terminating in a copper plate, W′, which is to be buried.

The operation is as follows: The battery is charged. The initial movement is the vibration of the lever P, which is accomplished by an electro-motor, clock-work, or other convenient means. When the lever P is in position to touch the spring R the current from battery T passes through wire T′ to the electro-magnets A A, thence through wire S′ to the repeating-magnet S, thence through wire V to spring U′, and through repeat-key U and connecting-wire T² to the battery T. The result of the magnets A A being so charged will be that the armature C′ will be attracted to the ends of these magnets, which it faces, and will cause the forked arm D to be so vibrated as to throw the ends of cross-pieces L′ L′ away from springs H′ and J′, against which they were resting, and allow these two springs to form contact with the

blocks K K, thereby presenting one pole of the battery M to the line V^3 and the other to the ground W. One pole of this battery M is connected by wire O to the block I, and the other pole of this battery is connected by wires N′ N′ to the blocks G G. The action above described closes the circuit in such manner that it is complete through block G, spring H′, and lug K with the line from one pole, and through block I, spring J′, and the other lug K with the ground from the other pole. When, on the other hand, the lever P is thrown over against the spring R′, the circuit is broken at R after being completed at spring R′, which completes it to magnets B B, which attract the armature C, which so vibrates the arm D as to throw its cross-pieces L′ L′ away from the springs J H and against the springs J′ H′, thus breaking the connection of the two latter with the lugs K K and allowing the two former, J H, respectively, to rest against the lugs K K. This reverses the connection of the poles of the battery with regard to their connection with the line and ground, respectively, and connects with the ground that pole which was by the former action connected with the line, and with the line that pole which was connected with the ground. Whether magnets A A or B B are charged, the current is always passing through either wire S′ or S^2 to the repeating-relay S, thereby keeping the line always closed through the platinum points attached to its armature in the relay S. To open the line for repeating letters or other purposes, it is simply necessary to open the repeating relay. This is done by pressing upon the key U, thereby closing the circuit to spring U^2 and wire V′, and thence to the self-adjusting relay.

We have not described the instrument we use, because any instrument which is worked by polarity can be used in connection with our device.

The peculiarity in this device is that we substitute an additional pair of magnets in our self-adjusting relay in place of the spring which was before used, thereby compensating for any variation in the strength of the battery. The battery first operates through one set of magnets and is then detached from that pair and shifted to another pair of magnets, instead of to a spring, which latter requires constant personal supervision, whereas our device requires none.

In all the changing, as above described, from one spring to another, connection is first made with the second spring before the circuit with the first is broken, excepting in the pole-changer.

By adding self-adjusting relays and charging them, any number of additional circuits can be worked by the same local battery. An additional self-adjusting relay is added for each new circuit.

In Fig. 3, Sheet 2, we show four self-adjusting relays, A A B B, and four simple relays, S S S S, all worked or charged by a single local battery, T, that is in the same local circuit. It will be seen that in all the series of pairs of magnets A A the pairs are connected by one set of wires one to another continuously, and the pairs B B are similarly connected by another set of wires. All the simple relays S S are also connected together by wires between them. A wire, P′, connects the last simple relay S with the lever P. Each of the simple relays represents a line which passes through it, as shown at V^3, Fig. 1. Each self-adjusting relay will require a pole-changer and main battery, as shown at M and G H I, Fig. 1. A connection could be made directly from the local battery T to the lever P, as shown in Fig. 1; but we have represented it as in Fig. 3 simply to show an alternative. The current passes through all the simple relays to lever P, unless the key U is pressed down upon spring U^2, in which case it passes along wires V′ P′ to the lever. With this slight difference the working is relatively the same as is already described of Fig. 1, as will be seen on reference to the drawings. The same pairs of magnets are charged from the same wire-connections as are there shown for only one self-adjusting relay, and the action of the current is the same in both cases.

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

1. In a transmitting telegraphic mechanism, a self-adjusting relay, in combination with the main circuit, the latter being controlled by said relay, which is composed of two pairs of magnets, with a suitable armature attachment, in combination with an initial mechanism for alternating the electric current from one pair of magnets to the other, connected substantially as and for the purposes described.

2. A simple spring-relay, S, in combination with the self-adjusting relay, so connected that it can be operated at will without opening or disturbing the self-adjusting relay, and operated by the same local battery, T, as the self-adjusting relay, substantially as described.

3. The combination of the self-adjusting relay and a pole-changing mechanism, connected as described, whereby any number of relays can be added, and any number of circuits operated by an initial mechanism, P, with a single local battery, T, substantially as described.

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WILLIAM P. PHELPS.

Witnesses:
GEORGE E. BUCKLEY,
HENRY V. BUCKLEY.