(Model.)

# J. P. STABLER.

## COMBINED POLE CHANGING AND INTENSITY KEY.

No. 250,594. Patented Dec. 6, 1881.

*Fig. 1.*

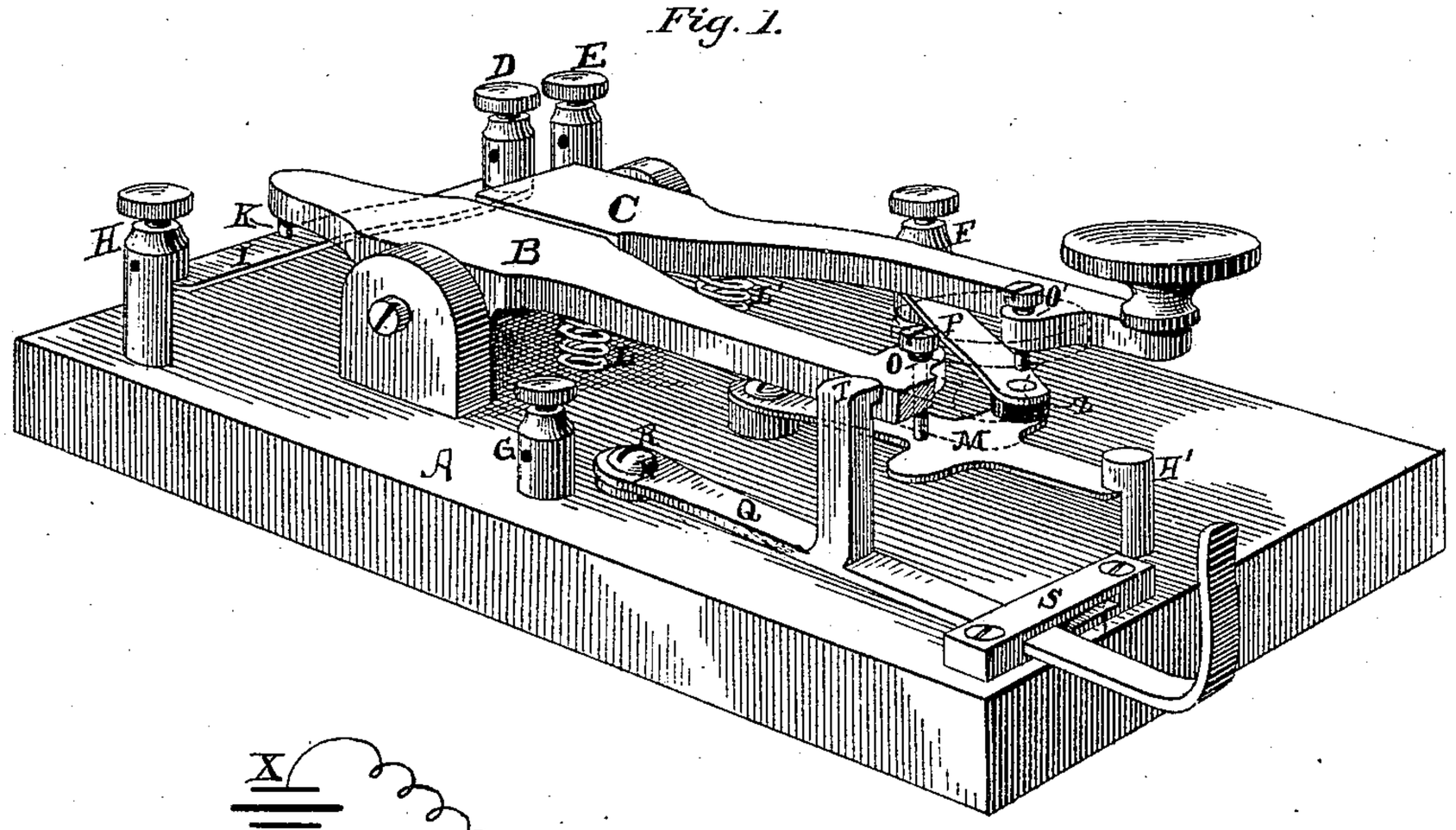
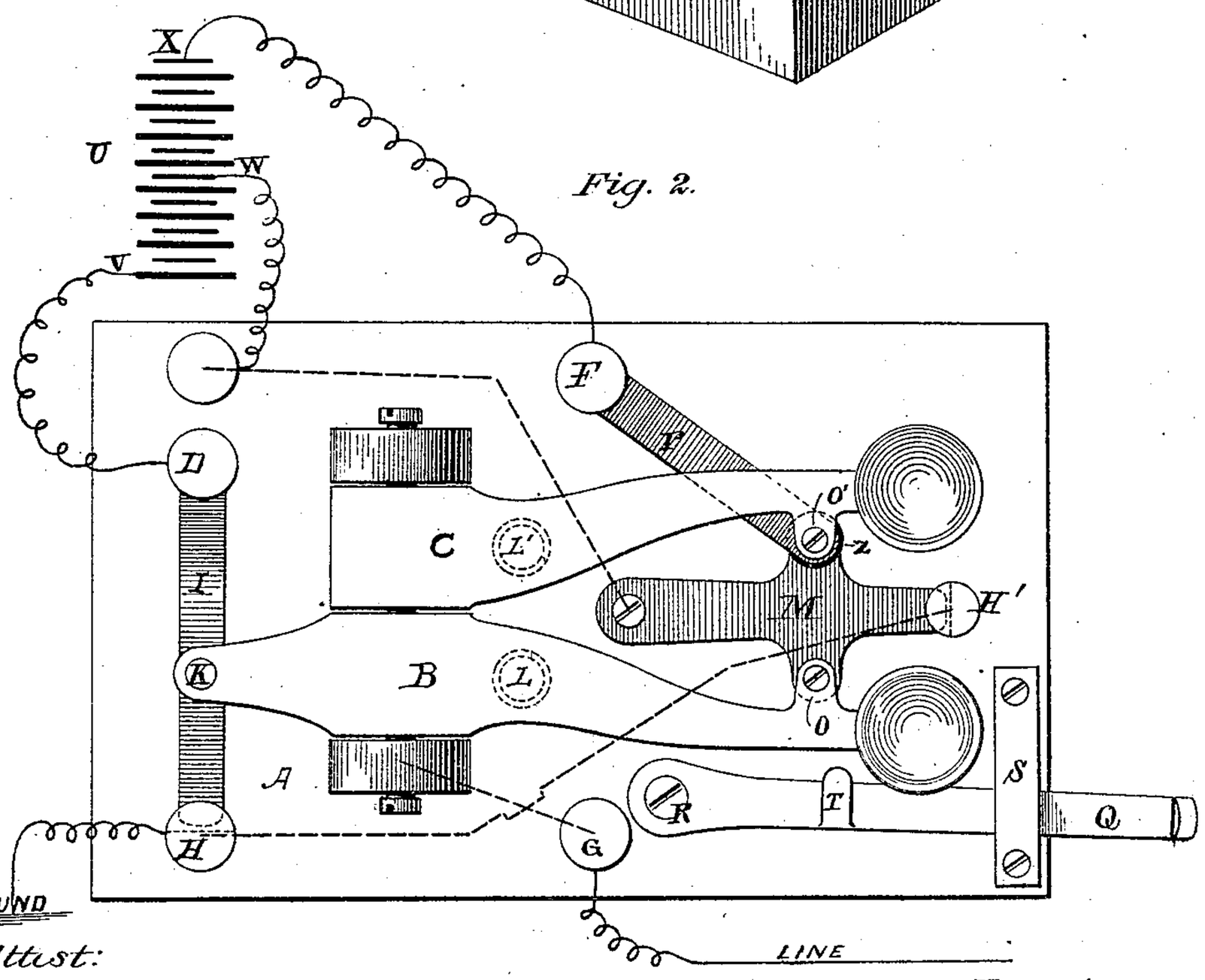



*Fig. 2.*

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# UNITED STATES PATENT OFFICE.

JAMES P. STABLER, OF SANDY SPRING, MARYLAND.

## COMBINED POLE-CHANGING AND INTENSITY KEY.

SPECIFICATION forming part of Letters Patent No. 250,594, dated December 6, 1881.

Application filed June 21, 1881. (Model.)

*To all whom it may concern:*

Be it known that I, JAMES P. STABLER, of Sandy Spring, Montgomery county, in the State of Maryland, have invented a new and useful Combined Pole-Changing and Intensity Key, and that the following is a full and accurate description of the same.

This key is especially adapted for the operation of signaling apparatus covered by Patent No. 235,058, granted to me November 30, 1880; but I do not wish to restrict its use to that purpose. It is a modification of the double key described in said patent, designed to secure a more perfect working of the instruments in the hands of inexperienced operators or in times of haste, and also greater economy of battery.

Before describing my improvement I will point out the sources of possibly defective operation sought to be obviated. In the double key referred to the depression of either lever would change the polarity of the current applied to the line and operate the polarized armatures; but if the lever I (as shown in the drawings and specification of said patent) were depressed the polarity of the current would not only be changed but its intensity greatly increased, thus operating the armatures with unnecessary force, tending to throw the ratchet-wheels forward by their own momentum after the pawl movement was completed, and thus carrying the index-hands beyond their proper positions of rest. There was also a tendency to weaken or even reverse the permanent polarity of the armatures by suddenly charging the electro-magnets against which they rested by too strong a reversed current.

My present invention obviates these objections; and it consists of two key-levers, one of which has such contact-points and connections as will control and direct the current of a battery, so that the polarity of the same may be rapidly changed and the current directed to the line, and by the other the current of the battery re-enforced by that of another battery may be used to operate parts of the apparatus not sufficiently sensitive to be affected by the weaker currents.

In practice the battery may consist of several cells, and the first-named key may control the current of a certain number of said cells, while the second-named key controls the currents from the whole.

That others may fully understand my invention I will more particularly describe it, having reference to the accompanying drawings, wherein—

Figure 1 is a perspective view of my compound key. Fig. 2 is a plan of the same, with the battery-connections indicated.

A is the key-base, of wood or other non-conductor. B and C are two keys. D E F are binding-posts for battery-connections with the keys. G is a binding-post for line-connection, electrically connected with the pivot of the keys from the under side of the key-base, as shown by dotted lines. H is a post for ground-connection, also connected from beneath with the post H′. I is a metal spring firmly attached at one end to post D, with its free end playing in a notch cut in the sides of post H. K is a contact-screw, which rests upon spring I when lever B is in normal position, depressing it so that its free end does not touch post H. L L′ are two spiral springs placed between the keys and base to hold them in proper position. M is also a metal spring, with its fixed end connected from below with post E, and its free end playing in a notch in H′ similar to that in H, but always making connection with H′, unless depressed by the contact-screws O and O′, which pass through projections on the side of the keys. P is a spring with its fixed end attached to post F, and its free end resting upon a thin non-conducting button, Z, attached to spring M, insulating the two springs from each other. Q is a lever pivoted at R, and having a lateral movement under guide S. Near its middle is a hook, T, extending upward and to the right, which, when key B is depressed, may be made to hook over its top and prevent its returning all the way to its normal position, and thus put key B out of action by breaking contact with springs I and M.

Having described all the parts of this key, I will now explain its operation.

U is a battery, with, say, its positive pole V connected with post D, and its negative pole X with post F. The positive pole connects with the line through spring I, screw K, key B, and post G. The negative pole X, however, has, when the key is at rest, no connection beyond the spring P, because the screw O′ does not touch it except when the key C is depressed

and the button Z insulates it from the spring M and its ground-connection H′. The circuit being incomplete there is no current through the whole battery so long as neither key is depressed; but from the negative pole W of one of the intermediate cells—say the middle one—there is a connection through post E and spring M with ground at H′. V, the positive terminal of the battery, being connected with the line through spring I and lever B, the circuit is complete through the cells from V to W, and a current from those cells passes over the line so long as the key is in normal position; but if key B is depressed the screw O makes contact with spring M, at the same time depressing it and breaking its ground-connection at H′. This also removes the pressure of screw K on spring I, breaking the connection at that point and allowing spring I to make ground at H, thus reversing the current. The release of key B again reverses the current by restoring the former connections. In this way a to-and-fro current can be applied to the line from a single cell or battery of any required strength; but in the operation of the signaling apparatus it is necessary at certain times to apply a stronger current, always of like polarity to that delivered to the line through spring M, which is done by the use of the lever Q and key C, as follows: When by alternate depression and release of the key B the index-hands have been brought into such position as to place any required bell in circuit, the lever Q is moved to the right with the thumb, so that the hook T shall reach over the top of the depressed key B and check its upward movement when it has risen sufficiently to break contact with spring M, but before its contact is made with spring I, thus grounding both the poles V and W. Now, if key C is depressed, the screw O′ first makes connection with the negative pole X through spring P, and then breaks the ground-connection of pole W by depressing spring M, thereby completing the circuit through the whole battery and delivering its current over the line. By repeated depression and release of key C the circuit is alternately made and broken without change of polarity, as the ground-connection of the positive pole V remains intact so long as key B is cut out by the hook T. Thus any desired number of strokes can be made upon the bell without moving the index-hands and throwing the bell out of circuit. When the call has been answered the lever Q is moved to the left and the key B instantly resumes its normal position, delivering the current from the opposite pole V to the line which moves the indexes forward one point, throwing the bell upon which the call was made out of circuit.

It will be observed that whenever the key B is cut out by the hook T the armatures have been attracted to one of the motive magnets by a current from the negative pole W, and will remain in that position until a positive current is applied to the line, and as the key C also delivers the current from the negative pole X it cannot move the armatures, but has the effect of increasing their permanent polarity by its greater intensity.

It is also evident that if the key C is depressed while key B is in normal position the reversed and re-enforced current will not be delivered to the line, because it is short-circuited back to the battery through key B and spring I. Thus it will be seen that this arrangement renders it impossible to move the index-hands or injure the polarized armatures by the use of the re-enforced current which operates the bells.

I claim—

1. The spring M, in electrical connection with one pole of the battery, and with a ground-post, and a spring, P, in electrical connection with the re-enforce battery and of same polarity as spring M, and in insulated contact with said spring, combined with the line-circuit key C, which, when depressed, closes connection with spring P and breaks the ground-connection of spring M, whereby the re-enforced current is passed to the line, as set forth.

2. The springs I M P, combined with the levers B C, with their contact-points arranged as described, whereby no accidental pressure of either lever will throw into the line the re-enforced current until the instruments have been actuated by the current from spring M, which is of like polarity to the re-enforced current.

3. The spring I, connected with one pole of the battery and in temporary contact with the ground-post, and a spring, M, in connection with the other pole of the battery and in temporary contact with the ground-post, and the key B, provided with contact-points K O, combined with the key C and the spring P, which has similar polarity with the spring M, whereby, if said key C shall be depressed while key B is closed on either of said springs I or M, the current over spring P will be short-circuited back to the battery, and thereby avoid all danger of deranging the mechanisms operated by the reversed currents of the weaker battery.

4. The springs I and M, severally connected with opposite poles of a battery, and respectively in temporary contact with ground-posts H H′, combined with a pivoted hand-key, B, adapted to be moved from its initial position by the operator and not otherwise, the contact-points K O, attached to said key on opposite sides of its axis and in position to engage with said springs, whereby the operator may at will and by one movement make electrical contact with and break the ground-connection of either of said springs, and charge the line with a current of either polarity, as desired.

5. The springs I and M, and contact-points K O, arranged on the key-lever B, as described, combined with the hook T, whereby said key may either alternately connect with one or the other spring, or be disconnected from both by said hook T, but cannot be connected with one spring until contact with the other is broken.

6. A spring, I, one end in permanent connection with one pole of the battery and the other end in temporary connection with the ground, and a similar spring, M, one end whereof is in permanent connection with the opposite pole of said battery and the other end in temporary connection with the ground, and a spring, P, one end whereof is in permanent connection with a re-enforce battery of the same polarity as the battery end of spring M, combined with keys B and C, the former whereof may make and break contact with either pole of the battery at will, and when out of action the other key may introduce a re enforce current of the same polarity as that delivered through spring M and key B.

7. A spring, I, permanently in connection at one end with one pole of the battery and the other end in temporary contact with the ground-post, and a spring, M, at one end permanently in connection with the other pole of said battery, and at its opposite end in temporary connection with the ground-post, combined with a pivoted hand-key, B, adapted to be moved and controlled by the operator, but not otherwise, and provided with a spring, L, to retain said key in its initial position, and the contact-points K O, adapted to engage said springs alternately, whereby either pole of the battery may be put on the line at will.

8. The key B, with its contact-points K O, and the springs I and M, controlled by said key, as set forth, combined with the lever Q and hook T, whereby said key may be held out of action, as desired.

9. The springs I and M, connected permanently with opposite poles of the battery, and temporarily in contact with the ground-post, and a key, B, provided with contact-points adapted to close with one or the other of said springs respectively, but not simultaneously, whereby the operator may at will close either pole of the battery with the line, combined with a spring, P, permanently in connection with one pole of a re-enforce battery, and in insulated contact with the spring I or M, whichever has a polarity similar to spring P, and the intensity-key C, whereby at will the operator may close the re-enforce battery on the line and thus augment the intensity of the electrical impulse, as set forth.

10. Two keys mounted upon an axis common to both, and thereby connected with the line, one of said keys provided with opposite polarity contacts, whereby the operator may close either pole of the battery with said axis and the line, and the other of said keys provided with a single polarity contact with a re-enforce battery, whereby the intensity of currents of one polarity may at will be increased and sent over said axis to the line, as set forth.

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Witnesses:
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