

A. G. HOLCOMB,  
Telegraph-Relay Instrument.

No. 28,274.

Patented May 15, 1860.

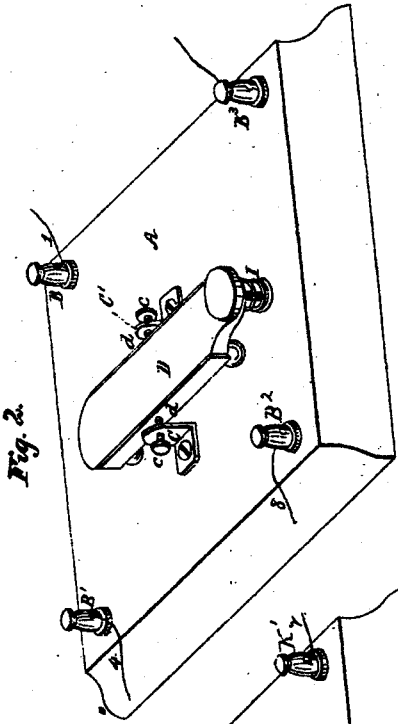


Fig. 2.

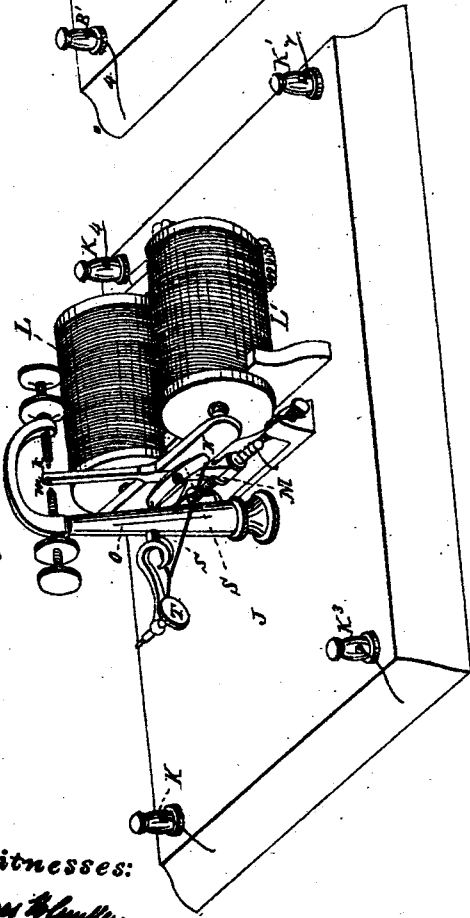


Fig. 1.

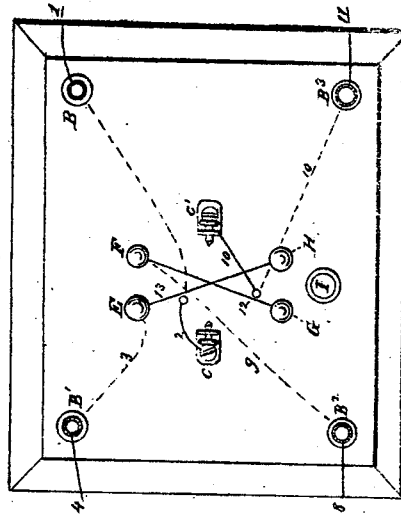


Fig. 3.

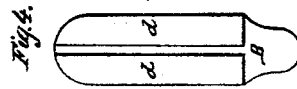


Fig. 4.

Witnesses:  
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# UNITED STATES PATENT OFFICE.

ALFRED G. HOLCOMB, OF NEW YORK, N. Y.

## IMPROVEMENT IN TELEGRAPHIC INSTRUMENTS.

Specification forming part of Letters Patent No. 28,274, dated May 15, 1860.

*To all whom it may concern:*

Be it known that I, ALFRED G. HOLCOMB, of the city, county, and State of New York, have invented a certain new and useful Improvement in Electric Telegraph Apparatus; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification.

The object of my said invention is to increase the movement of the armature-lever by allaying the residual magnetism in the relay-magnet after breaking the circuit of the main battery, as hereinafter explained; and the invention further consists in an arrangement for increasing the retentive capacity of the electro-magnet.

In the accompanying drawings, Figure 1 is a perspective view of the relay-magnet. Fig. 2 is a perspective view of my improved manipulator. Fig. 3 is a plan of the manipulator with the key removed. Fig. 4 is an under-side view of the key.

A is the base of the manipulator, provided at its four corners with binding-posts B B' B<sup>2</sup> B<sup>3</sup>, and near the center with metallic brackets C C'.

D represents a key the central portion of which is of non-conducting material, separating longitudinally the metallic sides *d d'*.

*c c'* are metallic pivots tapped into the brackets C C'. The said pivots form the fulcrum of the key D and afford electrical connection with its respective sides.

E F G H are metallic points projecting upward from the base A, and each communicating with one end of the respective portions *d* and *d'* of the key as either end is depressed.

I is a spring serving to elevate the front end of the key after depression, and so retain it while at rest.

J is the wooden base of the relay-magnet, provided at its four corners with binding-posts K K' K<sup>2</sup> K<sup>3</sup>.

The magnet L L' may be of customary construction, but in the present illustration is provided with hollow of bush-cores *l*, of soft iron, interposed between the spools and the steel cores *l'*, by which means a greater amount of residual magnetism is retained.

M is the armature-lever, pivoted at the base in customary manner, and provided near the

top with a platina point, *m*. The armature N may be of either steel or soft iron.

O is the metallic standard communicating with the vibrating end of the armature-lever by the platina point *o*. *p* is its insulating point or stop. The points *o* and *p* are fixed in the ends of thumb-screws provided with customary check-nuts, as seen in the drawings.

S is the spring employed to draw the armature-lever from the magnet when released. The said spring is connected by means of a silken cord, *s*, with a thumb-screw, T, to permit the adjustment of its tension. The tension of the said spring is so adjusted as to equal in force the residual magnetism in the cores or armature, and thus hold the armature-lever midway between the points *o* and *p*, when the relay-magnet is disconnected from the main battery.

K<sup>2</sup> and K<sup>3</sup> are the binding-posts of the positive and negative wires of the local battery, and communicate with the standard O and armature-lever M, respectively, by conducting-wires passing beneath the base.

The main conducting-wires are arranged and connected with the various parts of the apparatus as shown in the drawings, and as will be more fully understood from the following explanation of the operation of the apparatus.

While the apparatus is in its normal position the current passes from the platina or positive pole of the main battery over the wire 1 to the binding-post B; thence over the wire 2 beneath the base to the bracket C and pivot *c*; thence over the side *d* of the key to the point E; thence over the wire 3 beneath the base to the binding-post B', and thence over the line-wire 4 to the binding-post K of the magnet. It is then conducted by a wire beneath the base to the coil L, traverses this and the coil L', and passes over a wire beneath the base to the binding-post K' and earth-wire 7.

S is the earth-wire of the main battery, connected to the binding-post B<sup>2</sup> of the manipulator, from whence the current passes beneath the base over the wire 9 to the point F; thence over the side *d'* of the key to the pivot *c'* and bracket C'; thence over the wire 10 to the binding-post B<sup>3</sup>, and thence over the wire 11 to the zinc or negative pole of the main battery.

The effect of the above-described current is

to magnetize the cores of the relay-magnet and draw the armature-lever toward the insulating-point *p*, thus breaking the local circuit. Let the rear end of the key *D* be now elevated from the points *E* and *F*, the circuit of the main battery will be broken, and the magnetism in the cores being insufficient to hold the armature-lever in contact with the insulating-point, it will be drawn by the spring *S* to its point of equilibrium between the points *o* and *p*; but a further depression of the front end of the key, bringing it in contact with the points *G* and *H*, causes the current to flow from the platina pole over the wire 1, post *B*, wire 2, bracket *C*, side *d* of key, stud *G*, wire 12, point *F*, wire 9, post *B*<sup>2</sup>, wires 8 and 7, post *K*', coils *L*' and *L*, post *K*, wire 4, post *B*', wire 3, point *E*, wire 13, point *H*, side *d*' of key, bracket *C*', wire 10, post *B*<sup>3</sup>, and wire 11, to the zinc pole of the main battery, thus reversing the direction of the current through the coils of the relay-magnet and allaying its residual magnetism by partially changing its polarity, the effect of which is to enable the spring *S* to draw the platina point *x* in close contact with the platina point *o*, and thus complete the local circuit.

It will be seen that by the above-described arrangement of key, points, and wires a single motion of the key is made to not only break or complete the circuit, as the case may be, but to first break it and then complete it in reverse direction, the effect of which is to greatly increase the variations of the magnet

in its active and inactive conditions and correspondingly increase the power exerted upon the armature-lever by the magnet and spring, respectively.

It is well known that with the apparatus now in common use the presence of either electricity or moisture in the atmosphere renders it impossible to effect a sufficient movement of the armature to produce intelligible signals. By the use of the reverse current I am enabled, with a battery of a given power, to work effectually with a greater movement of the armature than is otherwise practicable.

It is not necessary that the residual magnetism should be confined to the cores of the electro-magnet. It may be in the armature or induced through either the armature or cores by a magnet placed in any suitable position.

I claim as new and of my invention herein and desire to secure by Letters Patent—

1. Producing an additional movement of the armature-lever by reversing the electrical current in the coils of the magnet, substantially as set forth.

2. The arrangement of the steel cores *l*' and iron bush-cores *l*, in combination with the coils of the electro-magnet.

In testimony of which invention I hereunto set my hand.

ALFRED G. HOLCOMB.

Witnesses:

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