2 Sheets—Sheet 1.

# R. E. HOUSE.

## ELECTRIC TELEGRAPH APPARATUS.

No. 180,097. Patented July 25, 1876.

Fig. 1.

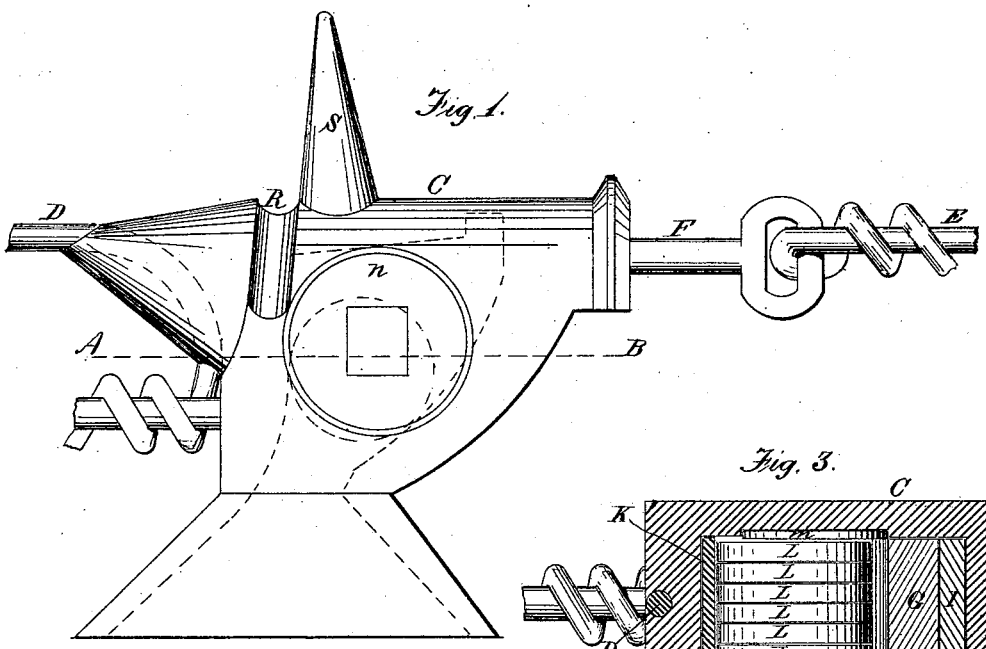



Fig. 3.

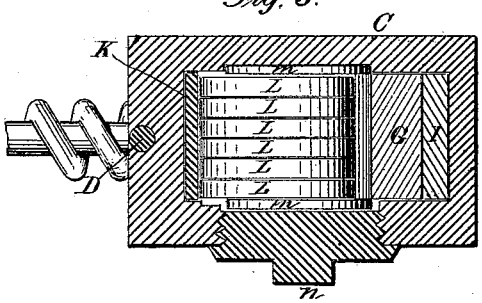



Fig. 2.

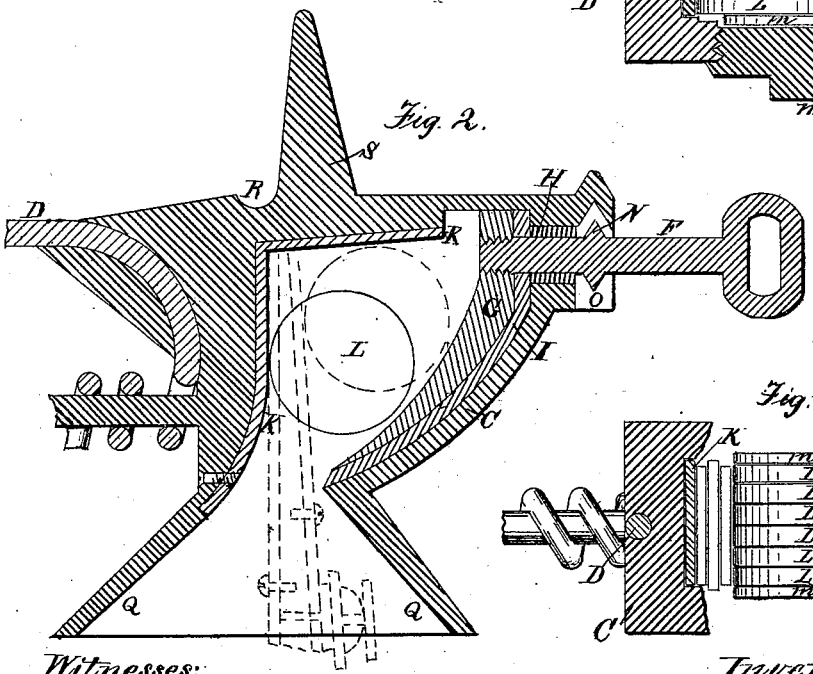
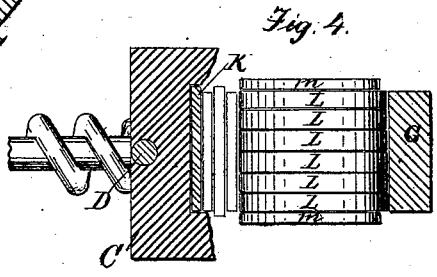



Fig. 4.




Witnesses;
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by Hill & Ellsworth
His Attorneys

2 Sheets—Sheet 2.

# R. E. HOUSE.

## ELECTRIC TELEGRAPH APPARATUS.

No. 180,097. Patented July 25, 1876.

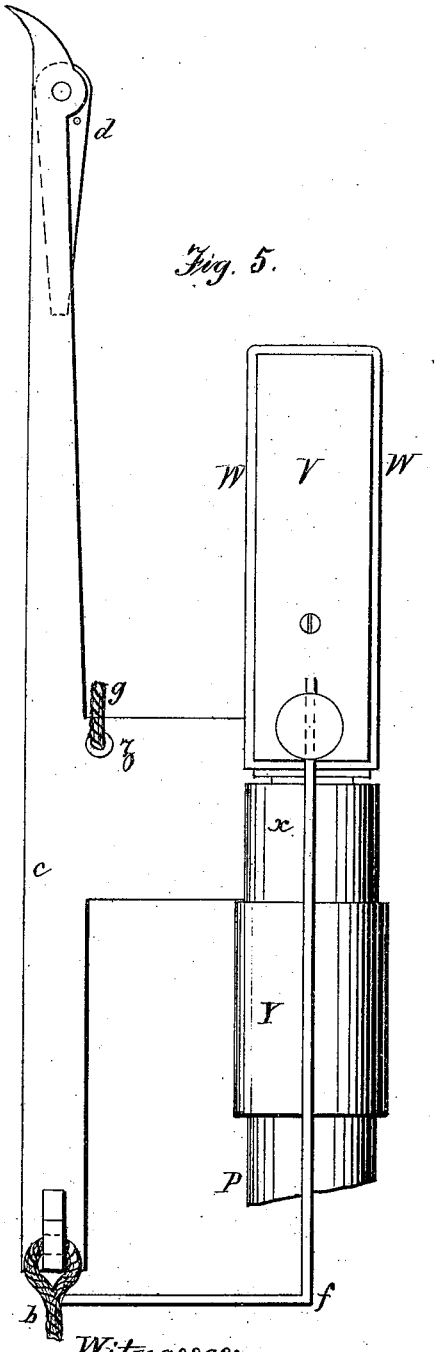


Fig. 5.

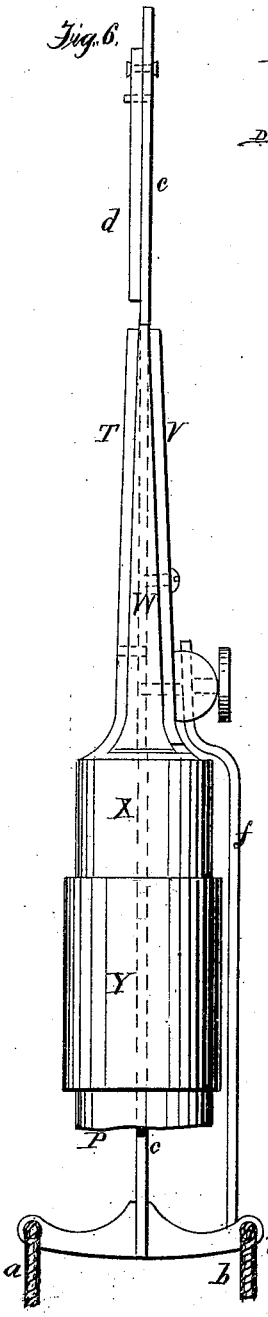


Fig. 6.

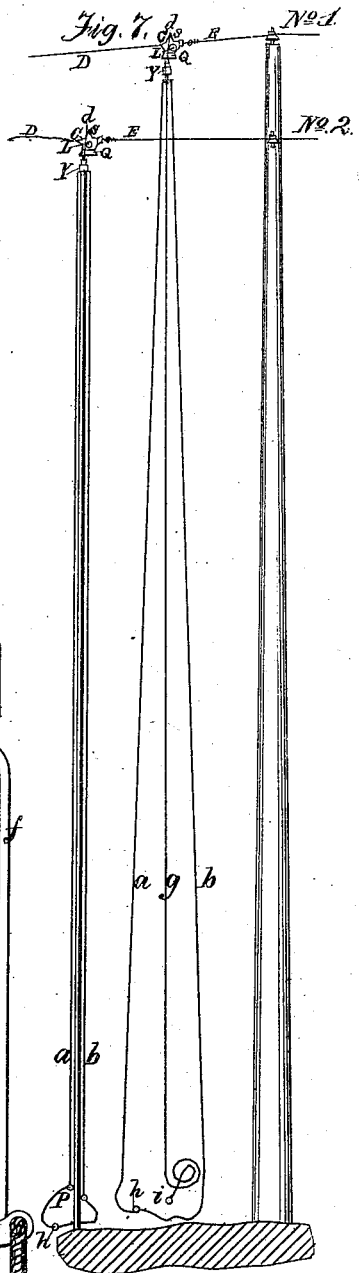


Fig. 7.

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# UNITED STATES PATENT OFFICE.

ROYAL E. HOUSE, OF BINGHAMTON, NEW YORK.

## IMPROVEMENT IN ELECTRIC-TELEGRAPH APPARATUS.

Specification forming part of Letters Patent No. **180,097**, dated July 25, 1876; application filed May 3, 1871.

*To all whom it may concern:*

Be it known that I, ROYAL E. HOUSE, of Binghamton, in the county of Broome and State of New York, have invented certain Improvements in Telegraph Apparatus, of which the following is a specification:

The object of this invention is to provide a convenient and ready means by which messages may be taken from, or sent upon, telegraph-lines, at or from points intermediate between the regular stations, for the purpose of testing the condition of the line from point to point, or of communicating from, or receiving at, such points, information of any kind, without the trouble of climbing from the ground to the telegraph-line, or the delay of making a journey to the regular station. To this end the main principle of the invention consists in attaching to, or arranging in, the telegraph line or lines, at such distances apart as may be deemed best, suitable devices or instrumentalities by which the electric currents may at any time be readily interrupted and caused to descend from one end of the line, thus broken, to a receiving or transmitting instrument near the ground, and to ascend therefrom to the other end of said line and pass along in the usual manner.

The apparatus by which I carry this principle into practical operation consists, in general terms, in two parts, viz: first, a device, to be permanently arranged in the line, and through which the electric currents of the line normally pass without interruption; and, secondly, a portable device to be carried with the ordinary receiving or transmitting instrument, of such a character that it can be readily raised by a cord or pole and connected with the first-mentioned device, and which will then operate to break the continuity of the main line and turn the currents down through the receiving or transmitting instrument and up into the main line again, in substantially the same manner as at an ordinary telegraph-station.

Figure 1 is a side elevation of the device, which is permanently attached to or arranged in the telegraph-line at different points between the stations. Fig. 2 is a longitudinal vertical section of the same, showing in dotted lines the position of the "key" of the portable part of the apparatus when the latter is hoisted into place to break the continuity of the main line and turn the currents down through the transmitting or receiving instrument. Fig. 3 is a horizontal section of the permanent device, taken in line A B of Fig. 1. Fig. 4 is a horizontal section of the same, when the portable part of the apparatus is attached, and showing particularly the position of the rollers and the key under such circumstances. Fig. 5 is an elevation of the portable part of the apparatus. Fig. 6 is an elevation of the same at right angles to that shown in Fig. 5; and Fig. 7 is a section of a telegraph-line, with both parts of the apparatus in connection, both on the upper and on the lower wires of the line or lines, and showing particularly the use of the cord for raising the portable part to the upper wire, and the pole for more conveniently raising and applying the same to the lower wire or wires.

In Figs. 1, 2, 3, 4, and 7, C is a case of suitable form and material, cast or malleable iron being preferable. This case has a suitable mechanical and electrical connection with the end of the telegraph-wire D, while the opposite end of this case is suitably fixed to the end of the telegraph-wire E by means of the metallic rod F, Figs. 1, 2, and 7, and the metallic inclined plane G, Figs. 2 and 3, which rod and metallic inclined plane have a good electric connection with each other and with the end of the telegraph-line E, but are insulated from the case by insulators H and I. The insulator H forms a water-tight joint between the case C and rod F, for the purpose of protecting the inside of the case and its appendages from moisture. To make more perfect insulation between rod F and case C, a collar, N, is placed around the rod to intercept and throw off the water. This collar should be suitably formed, and covered by shed O. (Shown in Fig. 2.)

In order to obtain an unoxidizable surface of platinum or other suitable material inside of the case C, and thereby to insure a perfect electrical connection, a metal plate, K, having a platinum surface, is inserted in the case C, as shown in Figs. 2, 3, and 4, and electrically connected to the wire D. The intervening

space between the metallic piece K and inclined plane G is occupied by rollers L, L, L, L, L, and L. The sides of the case C are insulated from the rollers by insulators *m* and *m*, Figs. 3 and 4, holding the rollers in vertical position, while they rest on the inclined plane G and metallic piece K, so as to form a line of good electric conductors, sufficient to enable the electric current to pass from E to D through F, G, L, K, and C, or from D to E through C, K, L, G, and F. The surface of each roller L, the inclined plane G, and metallic piece K, have their proper electrical connection made by the weight of the rollers L, L, L, L, L, and L, and should be made of metal least liable to oxidize—such as gold, or platinum, or any cheaper metal that will answer the purpose.

The weight of each roller L, and the number of rollers employed in each case C, should be such as to insure a perfect electrical connection with the inclined plane G, the metallic piece K, and the key.

On the under side of case C is an aperture, the sides Q Q of which taper in all directions for guiding the key. The upper surface of case C is inclined to the wire D, so that a cord, *g*, thrown over said wire, can be readily slid from the wire to the case, and lodged in the groove R, by a person standing upon the ground beneath.

The projection S is formed suitable for holding the cord *g* in its proper place when used for drawing up the portable part of the apparatus, and inserting its key between the rollers L, L, L, L, L, and L, and the metallic piece K, fixed in case C, Figs. 2 and 4.

For convenience the case C may be cast in a single piece, with an aperture left for allowing to be placed in proper position the rollers L, inclined plane G, and insulator I, after which this aperture is filled and made watertight by a metallic piece, *n*.

The case C must be made suitable to protect from moisture the surface of the rollers L, the metallic piece K, and the inclined plane G.

Having described that part of the apparatus which is permanently connected with the telegraph-line, I will now describe that part which is portable, and which is used, when required, to test the electric current of the telegraph-line, or transmit or receive a telegram. This part of the apparatus comprises the key, with appendages for operating it and conducting the electric current from the telegraph-line to the receiving, testing, or transmitting instrument near the ground, and then back to the line.

The key (best shown in Figs. 5 and 6) is composed of two pieces of metal, T and V, insulated from each other by insulator W, to which they are fastened. This insulator is of sufficient width to prevent the sides of the pieces of metal T and V from coming in contact with case C when in use. This key is fixed to a handle, *c*, by means of socket X, so as to form a good electric connection with conductor T, but to be insulated from conductor V. Below socket X on handle *c* is another socket, Y, for receiving the end of a suitable pole, P, and to the upper end of handle *c* is fixed a hinged arm, *d*, which can be opened out, hung over the telegraph-wire, and slid along into the groove R, so as to bring the key directly under the opening Q, in which position an upward thrust of the pole will connect the fixed and movable parts of the apparatus, and effect the necessary electric communication between the line and the instrument below.

Beneath socket Y, fixed on the handle *c*, is a cross-piece, which has cords *a* and *b* (best shown in Fig. 6) fastened on each end, of sufficient length to extend from the ground to the telegraph-line. Each of these cords contains an insulated electric conductor extending its entire length. The upper end of the conductor in cord *a* has a good electric connection with metallic conductor T by means of *c* and X. The other conductor in cord *b* has a good electric connection with metallic conductor V by means of electric conductor *f*, but is suitably insulated from T, X, *c*, and *a*.

In handle *c* is fastened one end of cord *g*. To the other end of this cord is fastened weight *i*, Figs. 5 and 6. (Best shown in Fig. 7.) The length of this cord should be twice the distance of the telegraph-line from the ground.

The position of the cords *a* and *b*, pole P, the cord *g*, and weight *i*, when in use, is best shown in Fig. 7.

The mode of operating with the key and its appendages will now be explained.

When it shall be deemed expedient to test the electric current, or transmit or receive a telegram by the use of the telegraph-wire No. 1, Fig. 7, the pole P may be dispensed with, and one end of cord *g* fastened in handle *c* at Z. The end of the cord with weight *i* must be thrown over the telegraph-wire D, No. 1. This cord is then drawn to projection S, Figs. 1 and 2, so as to rest in groove R, after which the key is drawn to its place in case C by pulling the weighted end of cord *g*, and guiding the key by means of the cords *a* and *b*, so that it will enter the key-hole in case C, and then pass up into the case, moving the rollers L, L, L, L, L, and L up the inclined plane G, thus making room for the key between the rollers and metallic piece K, Fig. 4, (best shown by dotted lines in Fig. 2,) and causing the electric current of the telegraph-line to pass from E to D through F G L V *f b h a c* X T R C, so that the instrument *h* may be operated, the key being held in proper position by cord *g*.

The withdrawing of the key is effected by liberating cord *g* and pulling cords *a* and *b*, by which rollers L, L, L, L, L, and L fall back on inclined plane G, making the electric connection with metallic piece K by contact with these rollers, as before described.

When wire No. 2 is to be used, instead of wire No. 1, for avoiding the difficulty of throwing weight *i* over wire No. 2 and under wire No. 1, the pole P is used, and the cord *g* and

weight *i* are dispensed with by being unfastened from handle *c;* arm *d* is set at right angles to the vertical piece *c*, to which it is hinged; the end of pole P is inserted in socket Y, Figs. 5 and 6; the cords *a* and *b* are fastened to the lower end of pole P, and are connected with the instrument *h* in Fig. 7; the end of the pole P, attached to the key, is raised so that arm *d* rests on wire No. 2 at D, and is moved up to projection S on case C. When in this position the key is shoved up sufficiently to enter the key-hole Q in case C, after which the key is held in proper position, by the pole P resting on the ground, while the electric current of wire No. 2 is being tested, or a telegram is being sent or received on instrument *h*, after which the key may be withdrawn by taking down pole P.

To prevent malicious persons from interfering with the unoxidized surfaces in case C and injuring the electric current of the telegraph-line, the unoxidized surfaces in case C are connected with the telegraph-wire at such points as not to be accessible to persons climbing the nearest pole, such pole being of sufficient length to prevent any interference with the telegraph-line from the ground. Additional security is also given by placing such instrument in parts of the line passing by one or more houses selected for preventing interferences.

I claim as my invention—

1. In telegraphy, the combination of the following elements, viz: First, an instrument or device arranged permanently in the line, and having two electrically-conducting surfaces insulated from each other, one being in electric connection with one end of the telegraph-wire, and the other with the other end of said wire, and having, also, a movable conductor, which normally forms an electric communication directly between the two insulated surfaces, but can be displaced to break said communication temporarily; and, secondly, a portable instrument adapted to be elevated and connected to the permanent device aforesaid, to displace said movable conductor, break said direct electric connection between the ends of said wires, and turn the electric currents down to and through a receiving, testing, or transmitting instrument at the ground below, substantially as and for the purposes set forth.

2. In such device, to be attached permanently to the line, a hollow case, C, having interior unoxidizable surfaces, closed on its sides and top to protect said surfaces, and adapted to be attached to, and form the supporting connection between, the ends of the telegraph-wires, substantially as and for the purposes set forth.

3. In such device, to be attached permanently to the line, a hollow case, C, closed at the sides and top, and having an internal cavity, larger at its upper than at its lower end, for the purpose of containing the movable electric conductor, substantially as set forth.

4. In such device, to be attached permanently to the line, the hollow case C, having the inclined platinum surfaces G K in its interior chamber, the one communicating electrically with the rod F, and the other with the wire D, substantially as and for the purposes set forth.

5. In such device, to be attached permanently to the line, the hollow case C, having the flaring mouth Q on its under side, through which access can be had to the insulated surfaces connected with the two ends of the wire, substantially as and for the purposes set forth.

6. In such device, to be attached permanently to the line, the protecting and supporting case, having the groove R arranged in such relation to the working parts and to the portable instrument that, when the supporting cord or arm of the latter lies in said groove, the fixed and portable parts of the apparatus will be in the proper relative positions for sliding easily into connection, substantially as and for the purposes set forth.

7. In such device, to be attached permanently to the line, the protecting and supporting case having a stop, S, arranged in such relation to the working parts, and to the portable instrument, that when the supporting cord or arm of the latter lies adjacent to the base of the stop, the fixed and portable parts of the apparatus will be in the proper relative positions for sliding easily into connection, substantially as and for the purposes described.

8. In such device, to be attached permanently to the line, a supporting and protecting case, the upper side of which at, at least, one end, is beveled or inclined from a stop, S, or groove R, down to the socket which receives the end of the telegraph-wire, substantially as and for the purposes set forth.

9. In such device, to be attached permanently to the line, a supporting and protecting case, having an interior chamber wider at its upper than at its lower end, in combination with a loose electrically conducting block, disk, or series of disks, arranged within said chamber, and operating to make or break the continuity of the currents from wire to wire, substantially as described.

10. In the portable part of an apparatus, for the purpose aforesaid, the key, having the electrically conducting surfaces T V separated from each other by the non-conducting material W, substantially as and for the purposes set forth.

11. In the portable part of an apparatus, for the purpose aforesaid, the key T V W, combined with the arm *d*, and lifting-cord *g*, substantially as and for the purpose described.

12. In the portable part of an apparatus, for the purpose aforesaid, the key T V W, combined with the pole-socket Y, substantially as and for the purpose set forth.

13. In the portable part of an apparatus, for the purpose aforesaid, the key T V W, combined with the insulated wires *a b*, connected

respectively to the insulated surfaces T V, and of sufficient length to extend to a sending or receiving instrument on the ground, substantially as and for the purposes specified.

14. In the portable part of an apparatus, for the purpose aforesaid, a key, T V W, in which the interposed insulating material W projects vertically above, and laterally beyond, the conducting-surfaces T V, substantially as and for the purposes set forth.

15. In an apparatus, for the purposes aforesaid, consisting of a fixed part attached to the line, and a portable part connected with the sending, receiving, or testing instrument, I claim the fixed part arranged on the wires of the line at a distance from the telegraph-posts or supports, so as to be beyond the reach of a person climbing thereon.

ROYAL E. HOUSE.

Witnesses:
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S. J. HOYT.