

WILLIAM C. BARNEY.  
Improvement in Telegraphy.

No. 123,441.

Patented Feb. 6, 1872.

Fig. 1.

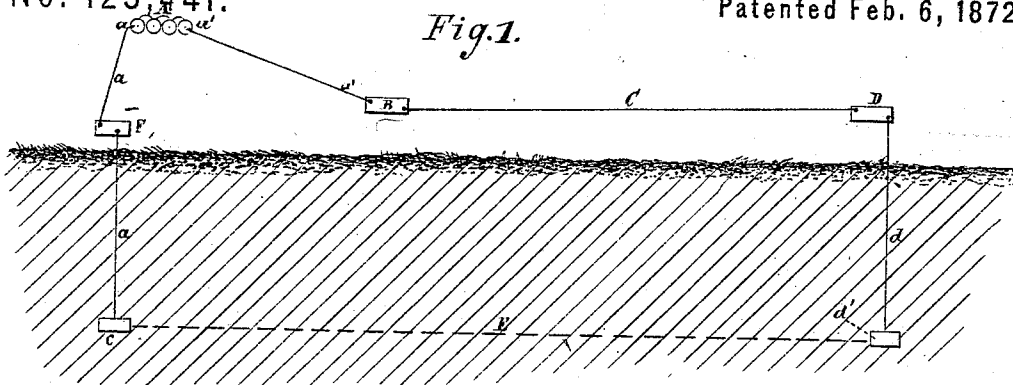


Fig. 2.

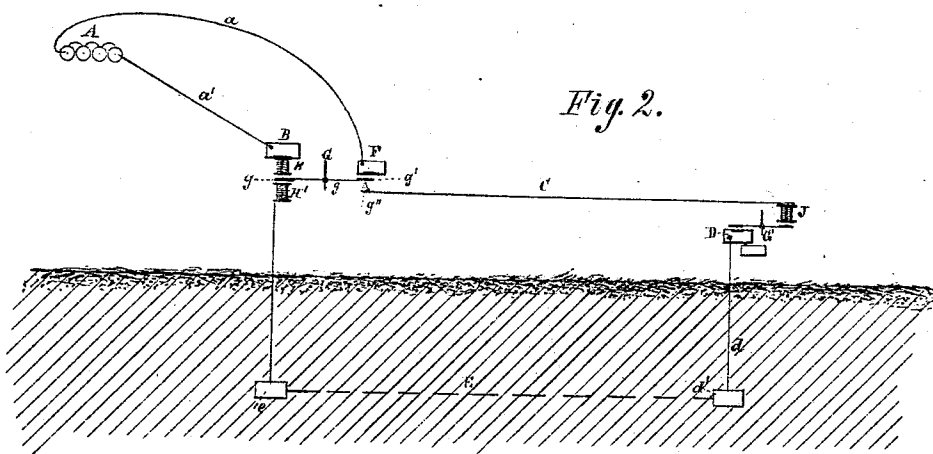
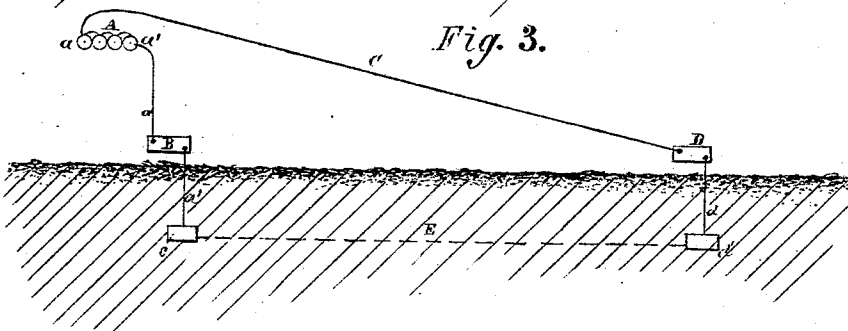


Fig. 3.



Witnesses:

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## UNITED STATES PATENT OFFICE.

WILLIAM C. BARNEY, OF WASHINGTON, ASSIGNOR TO FRANKLIN STEELE,  
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## IMPROVEMENT IN TELEGRAPHY.

Specification forming part of Letters Patent No. 123,441, dated February 6, 1872.

Specification describing Improvement in the Art of Telegraphy, invented by WILLIAM C. BARNEY, of Washington city, in the District of Columbia.

The invention will first be fully described and then clearly pointed out in the claims.

Figure 1 represents an electro-chemical telegraph, that marks the message by passing the galvanic current through chemically-prepared paper and dissolving the compound employed thereon. Fig. 2 is a view of the Morse telegraph, sufficiently changed to operate in connection with my invention. Fig. 3 is a view of the modification which, by connecting the positive pole directly with the ground, enables the ground current to be employed before the electro-fluid has made a transit of the wire.

A represents battery; *a*, wire that leads from negative pole thereof into the earth; and *a'*, the wire that leads to the transmitter. B is the transmitter. C represents the line of conducting-wire between any two points, as New York and Washington. D is the receiver to which said line of wire reaches, and *d* the wire which leads from it into the ground. E is the ground-line, which makes the circuit complete.

It is a well-known fact that conductivity is a property which not only belongs to all bodies in a greater or less degree, but it was also known as long ago as 1836 that the earth was a body which possessed this property to such a degree that a perfect circuit could readily be formed by including it as one of the intermediate conducting bodies. Up to the present time, however, the only practical use to which this discovery has been applied is that same one not only foreshadowed, but fully described, by the great German scientist, Steinheil.

Practical telegraphists have long felt and appreciated the great inconvenience and loss of time in repeating messages to verify their correctness. As now performed, the wire must be disconnected with the battery at one end and connected at the other. After much thought, labor, and practical experiment, I have discovered that the earth current may be utilized so as to overcome this difficulty and produce a very great economy of time and money.

In drawing it will be observed that I have interposed an ordinary receiver, F, between

the negative pole of the battery and the ground plate *c*.

The mode of operation in an electro-chemical telegraph, which I have repeatedly verified, is as follows: The current of electricity, passing from the positive pole of battery through wire *a'* to transmitter B, performs its function in this manipulator. It then passes over the wire C to receiver D and marks the message. It then moves across the ground-line E, through wire *a*, to the receiver F, and repeats the message. The message is thus repeated and verified at the initial point from which it started, and by the same current or messenger which delivered it at its ultimate destination. I will now show how it may be applied to the Morse system of telegraphing.

In Fig. 2, G represents the Morse hand-lever for breaking or completing the circuit. *g* is a bar of iron, which is placed between two electro-magnets, H H'. At the other end is placed the platinum point *g*<sup>1</sup>, which connects with and leads to the wire-line C. At the end of wire-line is a magnet, J, which operates lever G'. The current passes from positive pole *a'* through manipulator B, and magnet H draws the end *g* of lever up and connects end *g*<sup>1</sup> with platinum point *g*<sup>2</sup> and wire-line C. The current now passes to magnet J, operates lever G', and leaves the message at receiver D. Thence it passes through wire *d* into the ground, across to wire *e*; then to the magnet H', which operates lever G and causes it to repeat message at F.

It will be observed that in these two figures of the drawing there is a manipulator at each end, as well as a receiver. The manipulator which is placed at the end where it is intended to receive message, (or the appropriate signal,) is closed down to complete the circuit, while the other is placed at liberty to enable operator to close and break it intermittently. Thus a message is repeated at the same end of line from whence sent, or another brought from the other end by the same battery and by the same receiver F, arranged as has been specified.

In Fig. 3 it will be seen that the positive electricity, after going through the manipulator B, passes directly from wire *a'* into the ground at *e'*; thence across to *d'*, up wire *d* to

receiver, and delivers message without having been over the air-line C at all. It then passes back over the wire to the negative pole of the battery.

The advantage of this arrangement is, that under certain conditions of the atmosphere the latter presents conducting-surfaces which are equally as good or better than the wire, while it is a well-known property of the fluid to take (where two equally-good conductors are presented) the one that leads by the shortest route to the negative pole of the battery.

The earth is not subject, as far as I am aware, to any disturbing causes which would neutralize its conductivity or prevent its action from being entirely uniform. Hence this utilization of the ground-current produces a more uniform and reliable intermediate conductor between the manipulator and the message-receiver.

Having thus described all that is necessary to a full understanding of my invention, what I esteem to be new, and desire to secure by Letters Patent, is—

1. The method herein described of sending a message over the ground-line from a transmitting to a receiving instrument before it has made a transit of the wire—that is to say, by placing the transmitting instrument between the positive pole of the battery and ground and connecting the air-line with the negative pole of battery, substantially as described.

2. The method of arranging the message-receiver or message-repeater between the ground-wire E and negative pole *a* of the battery, as and for the purpose described.

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Witnesses: .

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