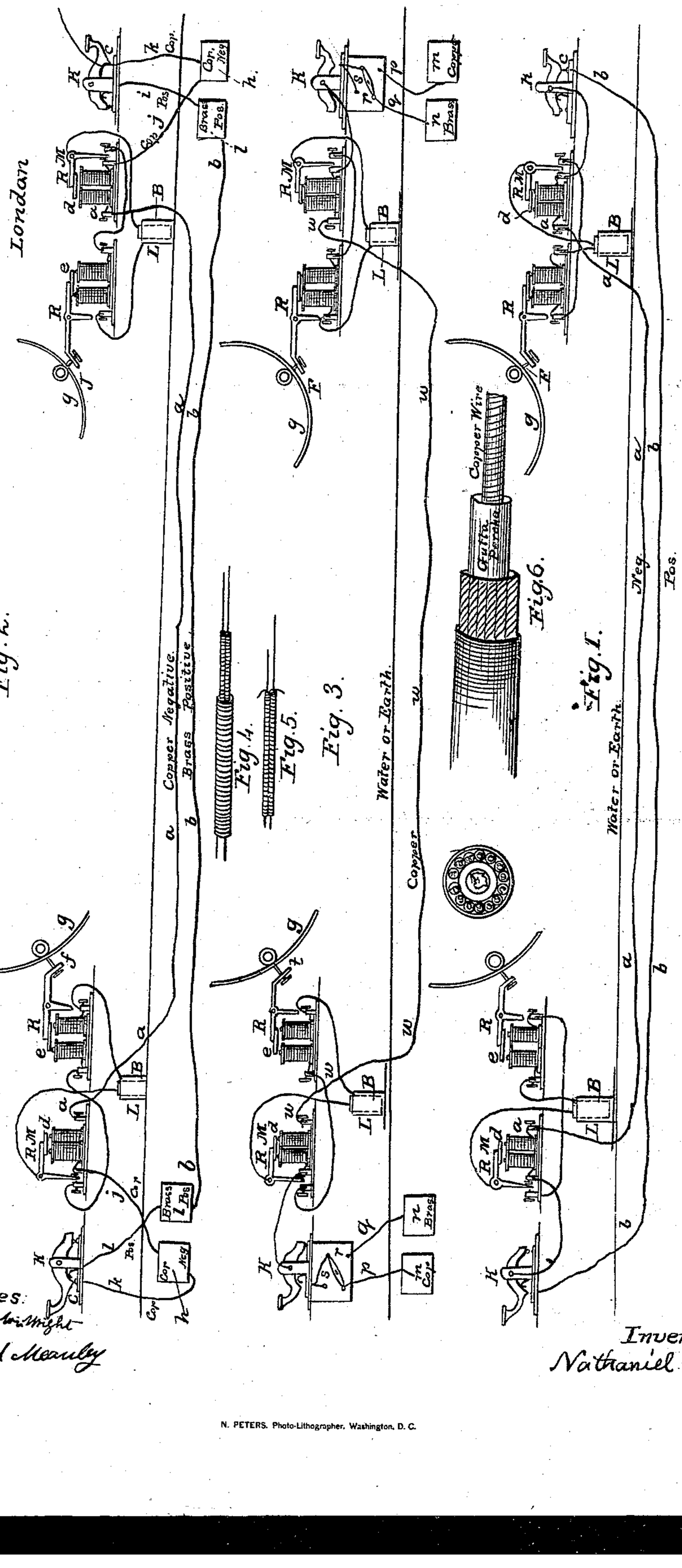
N. PARKS.

Telegraph.

No. 33,098. Patented Aug. 20, 1861.



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IMPROVEMENT IN TELEGRAPHING.

Specification forming part of Letters Patent No. **33,098**, dated August 20, 1861.

To all whom it may concern:

Be it known that I, NATHANIEL PARKS, of Rome, in the county of Oneida and State of New York, have invented an Improved Method of Communicating by Means of Electric Telegraphy; and I hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My plan has for its object the overcoming of some, if not all, of the causes that prevent the obtaining of an effective working-current at the extremity of an extended submarine, subaqueous, or subterranean conductor, especially if at any point of that conductor defective or imperfect insulation exists. The theory has been generally adopted that wherever such defective insulation exists the current is there dissipated or wasted, being conducted away by the surrounding water. This is not always the case. Following the making of the circuit at the battery or sending-station in the usual method, and consequent thereupon, a secondary power through decomposition or chemical action is generated at the before-mentioned point of imperfect insulation. This power makes use of the same conductor to reach the receiving-instrument, where, without provision against its effects, it obstructs the action of the armature, either embarrassing or preventing its response altogether. It is not instantaneously generated, neither does it cease at the instant the circuit is broken at the battery; but, having a distinct circuit of its own around by the receiving-instrument, will operate the latter for a limited time after the main circuit is broken by simply breaking its particular circuit at or near the instrument. The power will soon be exhausted; but by renewing the main circuit at the battery the power is renewed and the same difficulties occur as before.

The plan I have devised to remove these embarrassments, preventing the action of the armature of the receiving-instrument, is the breaking and restoring simultaneously or nearly so the circuit at the receiving-station with that at the sending or dispatching station. The necessity of this will be evident when the fact is indicated that the new circuit, which has been alluded to, is without the control of the operator. The receiving-instrument must, therefore, be of the class called "printing-instruments," providing for cotemporary movement. After each signal the circuit here must be severed and renewed again timely for a consecutive and following signal. The instrument must be particularly arranged for this by mechanical devices.

The difficulty experienced in causing a sufficient working-current to exhibit itself at the remote extremity of a greatly-extended submarine, subaqueous, or subterranean conductor, indicates the object of my invention to be that of providing such a conductor as shall coustitute a battery of itself, or an auxiliary one, in order to produce an augmentation of electricity sufficient to operate the instrument through the action of the surrounding water, or the moisture contained in the surrounding earth, upon the aforesaid conductor, and likewise to present a plan by which this or any imperfectly-insulated cable is to be operated successfully.

In illustrating my invention I propose to employ the electro-magnetic system of telegraphing and the instrument known as "Morse's," with a local battery and a relay-magnet at each terminal station.

The accompanying drawings, which form part of this specification, represents three different modes of applying the invention, each representing a line of telegraph with the instruments at the terminal stations, which, for the sake of illustration, I have marked respectively "London" and "New York."

In the several views the letters K denote the operating-keys; R M, the relay or receiving magnets; R, the register; L B, the local battery; and similar letters of reference denote in all cases corresponding parts of the instruments and apparatus.

I will first proceed to describe the mode of application shown in Figure 1. In this mode two conducting-wires are used through the whole length of the line—viz., one, *a*, of copper, (represented in red color in the drawings,) and one, *b*, of brass or other metal positive to copper, (represented in black)—both submerged in water or buried in the earth, except a sufficient portion of each end of the line to make the connections with the instrument. Means must be taken to prevent them from coming in

contact throughout their entire length. The wire *b*, of positive metal, is connecteddirectly with the anvil C of each key, and the copper wire with each relay-magnet, which is connected with the key-lever, the register, and the local battery at the same station, in the manner common to Morse's telegraph. When the key at one end of the line is open the wires *a* and *b* become a battery, and a current of electricity is caused to pass along the positive wire *b* toward the closed key, and from thence, through the helices of the corresponding relay-magnet, along the copper wire *a*, and, to complete its circuit, through the water to the positive wire. This current changes the relay-magnet at the station where the key is closed, and attracts the armature *d* thereof, thus closing the local circuit, which attracts the armature *c* of the register-magnet and brings the pen or style F into contact with the paper G.

One method of telegraphing in this form of conductor is simply as follows: When no message is being sent in either direction both keys are closed, which stops the aforesaid action of the wires *a b* and leaves the local circuit at each end of the line open, and the styles F out of contact with the paper, but as soon as the operator at either end—London, for instance—wishes to send a message he opens his key and at once converts the wires *a b* into a battery, and causes a current to pass through the coil of the relay-magnet at the opposite end—New York—and brings into action the local circuit there, and causes the armature and the register-magnet to be attracted and the pen or style to be brought into contact with the paper, which is intended to be moved by clockwork, in the manner common to Morse's telegraph. The message is produced by opening and closing the key, as in Morse's telegraph, with the ordinary system of batteries, except that the pen or style is in this case brought into contact when the key is open instead of when it is closed. When the message is completed the operator closes his key, so that messages can be sent from the other end.

In the mode of application shown in Fig. 2 two similar wires, *a b*, one of copper and the other of brass or other positive metal, are employed, and two large plates, *h i*, one of copper and the other of brass or other positive metal, are submerged in the water, or buried in the ground very near, but not touching each other, at each end of the line. The copper wire *a* is connected with the two relay-magnets, and the positive wire with the two positive plates *i i*. The usual system of connections is made between the relay, the register, and the local battery at each end of the line, and one extremity of the helix-wire of each relay-magnet is connected by a copper wire, *j*, with the copper plate *h* at the same end of the line, and the copper plate is connected with the anvil *c* of the operating-key by a copper wire, *k*. Each plate *i* of positive metal is connected by a wire, C, of similar metal, with the lever of the key at the same end of the line. When the key at one end of the line is closed and that on the other is open the wires *a* and *b* become a battery, and the plates *h i* may be considered as portions of the same battery as the said wires, and a current of electricity is caused to pass along the positive wire *b* to the closed key, and thence through the said key along the copper wire *a*, through the helices of the corresponding relay-magnets, and again along the copper wire through the helices of the relay at the other end of the line, along the wire *j* to the plate *h*, whence it passes through the water to the plate *i* and positive wire *b*, thus completing its circuit. The current thus produced, it will be seen, changes both relay-magnets, and hence brings both local circuits into operation, and attracts the armature of both register-magnets, and throws their pens or styles up against the paper G. In this mode of applying my invention both keys are left open when no message is being sent, in which condition of the keys there is no battery-like action of the wires and plates; and when it is desired to send a message from either end the closing of the key at both ends causes the above-described battery-like action of the wires and plates to commence and the registers to be operated, and the message is sent by opening and closing the key. When the message is completed the key is left open, and the line is in condition for a message to be sent the opposite way by closing and opening the key at the other end. This method of operation admits of a copy being taken at the sending-station, as the instruments of both ends operate alike.

In the mode of application shown in Fig. 3 only one conducting-wire, W, of the whole length of the line is used, and this should be of copper. The said line is connected with the helices of the relay-magnets at the extremities of the line, and each of said magnets is connected in the usual manner with the key-lever, the register, and the local battery at its end of the line. At each end of the line there is a large plate, *m*, of copper, and another large plate, *n*, of brass or other positive metal, both submerged in the water or buried in the earth, and these are respectively connected by wires *p q*, of similar metal, with the wooden stands *t t* of the operating-keys at different points, so that either may be brought in connection with the anvil *c* of the key at its end of the line by means of a movable coupling or switch-piece *r*, which is fitted to turn on a stationary pin, S, secured in the stand T. When the coupling-bars *r r* at the two ends of the line are adjusted to connect the copper plate *m* at one end, and the positive plate *n* at the other end with their respective keys, as is shown in Fig. 3, and both keys are closed, a galvanic action is established between the connected positive plate and the copper wire W and the plate *m* at the opposite end, and a current of electricity is caused to pass from the positive plate through the key and helix of the relay-magnet

at its own end of the line along the wires W, to and through the helix of the relay-magnet, and through the key at the other end, and thence to the connected copper plate, completing its circuit to the connected positive plate through the water or earth. The current thus produced charges both relay-magnets and brings both local circuits into action and causes the pens or styles of both registers to make contact with the paper.

In the preceding method of applying my invention both copper plates are coupled with the keys, and both keys closed when no message is being sent, and in that condition of the parts there is no battery-like action; but when a message is to be sent from one end of the line the operator at that end couples the positive plate with his key, and by opening and closing his key he operates the pens or styles of the registers at both ends of the line. When his message has been completed he uncouples the positive and couples the copper plate and closes his key, so that his end of the line is in condition for receiving. This method of operation, like that illustrated in Fig. 2, admits of a copy of the message being taken at the sending-station.

Any of the before-described modes of applying my invention admits of intermediate stations, and at these stations the same operating apparatus will be employed as at the terminal stations.

To facilitate the laying of the conducting-wires where two are employed the whole length of the line, and at the same time to prevent contact the one with the other, both may be bound together by a yarn or strand of cotton or any textile substance, so applied as to interpose itself between them. Although this will become saturated with moisture when submerged or buried, this will not prevent the combined galvanic action which is intended.

I have represented by Figs. 4 and 5 two methods of binding the wires together. In the first method a yarn or strand is first wound round one wire, then both are laid together and bound by a second yarn or strand wound round the two. In the second method a yarn or strand is wound in the form of the figure 8 around both wires.

Having, through diligent and persevering application, discovered the cause of the retardation, or, more properly, prolongation of signal, I have devised a method to counteract this, so as to permit the prompt release of the armature. The method alluded to is applicable to cables of the construction of the present Atlantic cable, as well as those herein described. To operate according to this system requires instruments or apparatus that provide for simultaneous movement at both extremities of the line. Some of this class are already well known, so that a description is unnecessary.

The mode of application will be as follows, assuming any two places, as New York and London, for the purpose of illustration, and supposing a cable laid with copper ground plates and connections. Now, let it be desired to send a message from London to New York by the closing and opening of the circuit in the usual manner, the instruments should be so arranged that at the indication of a letter or signal the circuit or circuits at the receiving-instrument should be severed and resumed again immediately, and in time for the consecutive letter which is to be transmitted from London. The same relatively will take place in the transmission of a message from New York to London—that is, at the instant a letter is manifested at London the connection existing between the magnet there and its ground-plate must be cut off and restored in the revolution of the type-wheel, such being supposed to be used.

Having fully explained my plan, I claim—

The system of operating non-insulated or imperfectly-insulated cables or metallic conductors by such arrangement or modification of the receiving-instrument as will provide for the results indicated in the preceding specification.

NATHANIEL PARKS.

Witnesses:

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