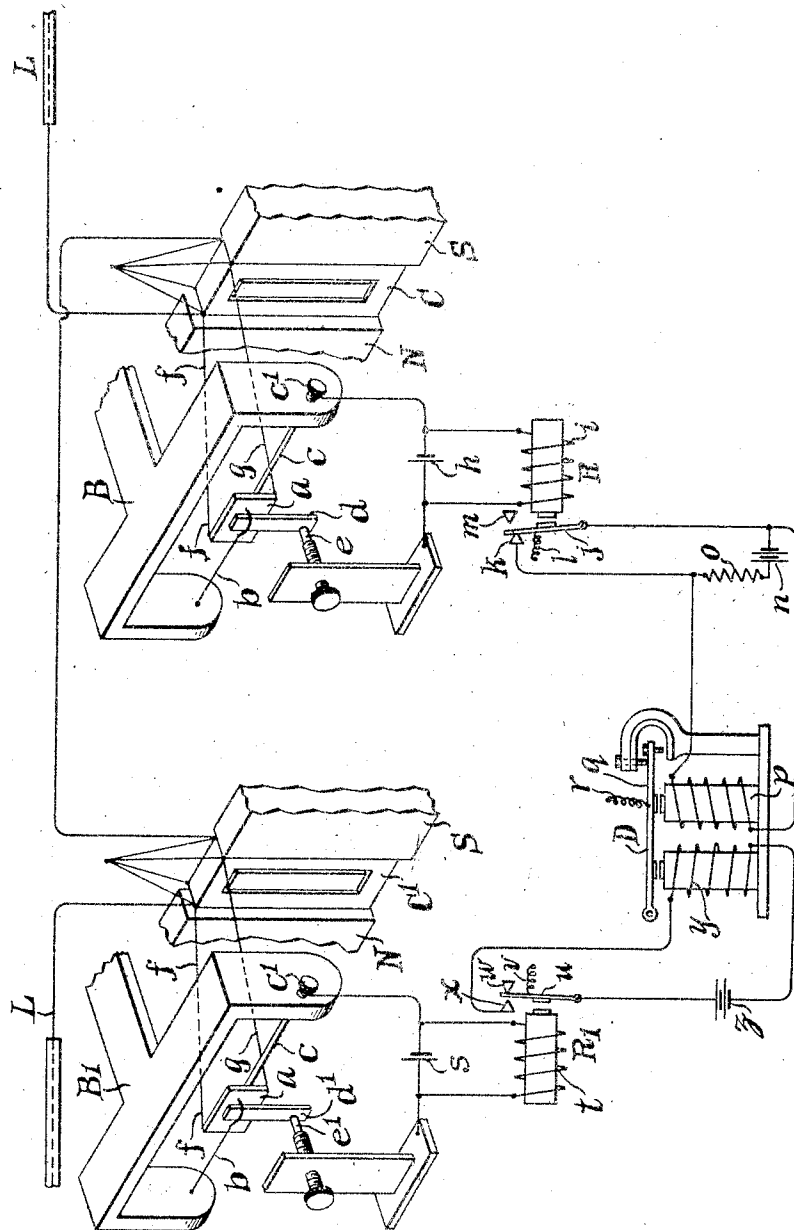


I. KITSEE.
CABLE RELAY APPARATUS.

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1,011,210.

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WITNESSES

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CABLE-RELAY APPARATUS.

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To all whom it may concern:

Be it known that I, ISIDOR KITSEE, a citizen of the United States, residing in the city of Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented a new and useful Cable-Relay Apparatus, of which the following is a specification.

My invention relates to telegraphy, and particularly to telegraphy over cables or long lines or circuits in which the disturbing effects to capacity are great.

In the ordinary practice of cable telegraphy dots are represented in transmission by, for example, positive impulses of current, while the dashes are represented by negative impulses, both the positive and negative impulses being of relatively short and substantially equal duration. And in such practice the siphon recorder or other receiving instrument responds in one direction to the positive impulses and in another direction to the negative impulses, such deflections being then translated into signals or messages.

It is the object of my invention in such a common system of telegraphy, to provide means at the receiving station whereby the received dots and dashes may be read from an ordinary telegraph sounder or may be recorded as ordinary dots and dashes on a Morse inker or recorder. To this end I employ a sounder or recorder having two windings each in a different circuit, one winding being for the purpose of reproducing or recording dots, while the other is for the purpose of reproducing or recording dashes. And in conjunction with these separated sounder or recorder windings, I employ relays controlled by the receiving positive and negative cable impulses, in a manner hereinafter described.

For an illustration of one of the forms my invention may take, reference is to be had to the accompanying drawing, which is a diagrammatic view of receiving apparatus.

The apparatus here shown may be at a station intermediate the ends of a cable or line or may be a terminal receiving station. The cable or line is represented by L in series with which are connected the two siphon recorder coils C and C' suspended between the magnetic poles N S in the well known manner.

B is a bracket between the depending arms of which is mounted the member *a* supported by the thread or wire *b* put in tension by the thread or wire *c*. The plate or member

a carries the contact *d* adapted to coöperate with the adjustable stationary contact *e*. Threads or fibers *f* and *g* connect from the coil C with diagonally opposed corners of the plate or member *a*, so that rotation of the coil C within its field in response to received current will move the contact *d*. In normal condition the contact *d* is in engagement with contact *e*. And similar parts are associated with the other coil C', and normally the contact *d'* is in engagement with contact *e'*. Electrical communication with the contact *d* is made through the plate or member *a*, the wire or fiber *c*, through its screw head *c'*.

Having one pole connected to the contact *e* is a gravity or bluestone or other battery *h* having its other pole connected to *c'*, and therefore to *d*. Therefore, the battery *h* is normally short circuited since the contacts *d* and *e* are normally in engagement with each other. In shunt with the battery *h* is connected the winding *i* of the relay or electromagnet R whose tongue or armature *j* is normally held in engagement with contact *k* by the spring *l*. The magnet R may be a long pull magnet. A front stop *m* is also provided. When the armature or tongue *j* is in engagement with contact *k* the battery *n* is short circuited through resistance *o*, such resistance being suitably sufficient to prevent the rapid deterioration of the battery *n* when contacts *j* and *k* are in engagement with each other. In shunt to the battery *n* and resistance *o* is connected one winding *p* of the sounder or recorder D, whose armature lever *q* is normally retracted by the spring *r*.

Short circuited by the contacts *d'* and *e'* at the left, is a gravity or bluestone or other battery *s* in shunt with which is the winding *t* of a second relay or electromagnet R' whose tongue or armature *u* is normally retracted by spring *v* against insulated stop *w*. When the tongue *u* engages the contact *x* the circuit of the second winding *y* of the sounder or recorder D is closed through the battery *z*.

The operation is as follows: The received positive and negative impulses traverse the windings of the coils C and C' causing each to deflect, or tend to deflect, in the magnetic field as well understood in the art of siphon recorders. In the case of the coil C' a positive impulse, representing, for example, a dot, causes a movement in such direction

as to momentarily separate the contact d' from the contact e' , those contacts being normally in engagement with each other, and this momentary separation of d' and e' causes the electromagnet or relay R^1 to be momentarily energized, thus causing the armature or tongue u to momentarily engage the contact w and then return to the back stop v . This means the momentary energization of the sounder or recorder magnet whose winding is y causes the sounder or recorder to reproduce a short click or dot. Any negative impulse traversing the coil C' has no effect upon the contacts d' and e' except to bring them slightly more firmly into engagement with each other. A positive impulse traversing the coil C has no effect upon the contacts d and e except to bring them more firmly into engagement with each other. Upon the passage of a negative impulse, however, representing a dash, the coil C deflects slightly and momentarily separates contact d from contact e . As a result of this momentary separation the relay or electromagnet R is momentarily energized resulting in the attraction of the armature or tongue j away from the contact k against the stop m , the armature j immediately returning, however, into engagement with contact k . The time of travel of armature j from k to m and return is considerable however, the stop m and contact k being relatively widely separated. During this outward and return travel of the armature j the sounder or recorder magnet whose winding is p is energized causing the armature q to be held attracted a length of time corresponding with the time consumed in the travel of j from k to m and return, thus producing a dash either by sound or record. By my arrangement, therefore, though the cable impulses are of opposite polarities and of relatively short duration, I am enabled to reproduce dots and dashes either by sound or record just as in the case of an ordinary Morse telegraph line.

And irrespective of whether the coils C and C' are in the same or different instruments, they may be connected in parallel with each other instead of in series as shown, it being only necessary that one coil shall separate its controlled contacts in response to an impulse of one polarity while the other impulse shall separate its controlled contacts in response to an impulse of another polarity. And while I have shown the contacts normally in engagement with each other to be separated in response to an impulse, it is to be understood that they may be so arranged that in response to an impulse they are momentarily closed.

What I claim is:

1. The combination with a line or cable carrying impulses of different polarities and

of substantially equal duration, of two windings associated with said line or cable, means responsive to a line or cable impulse of one polarity for momentarily energizing one of said windings to produce a dot, and means responsive to a line or cable impulse of the other polarity for energizing the second winding a relatively greater period to produce a dash.

2. The combination with a line or cable carrying short impulses of different polarities, of a relay associated with said line or cable, a local circuit controlled by said relay, and a signal translating instrument included in said local circuit, said local circuit having its condition altered by said relay for a greater period of time than the momentary energization of said relay, whereby a dash is produced by said signal translating instrument in response to a line or cable impulse.

3. The combination with a line or cable carrying impulses of different polarities and of substantially equal duration, of a relay associated with said line or cable, a local circuit controlled by said relay, and a signal translating instrument included in said local circuit, said signal translating instrument being energized for a greater period than the period of operation of said relay, whereby said signal translating instrument produces a dash in response to a line or cable impulse.

4. The combination with a line or cable carrying impulses of different polarities and of substantially equal duration, two relays associated with said line or cable, a winding controlled by each relay, one of said windings momentarily energized in response to a line or cable impulse to produce a dot, the other winding energized a relatively greater period in response to a line or cable impulse for producing a dash.

5. The combination with a line or cable carrying short impulses of different polarities, of contacts momentarily separated in response to an impulse of one polarity, a relay momentarily energized in response to such separation, and a winding of a signal reproducing instrument momentarily energized by said relay, contacts momentarily separated in response to an impulse of the other polarity, a second relay momentarily energized in response to such separation, and a second winding of a signal reproducing instrument energized by said relay for a relatively greater period for producing a dash.

6. The combination with a line or cable carrying short impulses of different polarities, means for momentarily energizing a winding of a signal reproducing instrument in response to an impulse of one polarity, a relay momentarily energized in response to an impulse of the other polarity,

a second winding of a signal reproducing instrument normally short circuited by the relay contacts, the time of separation of the relay contacts being relatively great.

5 7. In combination with a line or cable carrying short impulses of different polarities, of a relay momentarily energized in response to an impulse of one polarity, a winding of a signal reproducing instrument
10 momentarily energized by said relay, means responsive to an impulse of the other polarity for momentarily energizing a second relay, the contacts of said second relay normally short circuiting a second winding of
15 a signal reproducing instrument, the time of separation of the contacts of said second relay being relatively great.

8. The combination with a line or cable carrying short impulses, of a relay momentarily energized in response to an impulse, an instrument winding normally short circuited by the relay contacts, the travel of the movable relay contact being relatively great, whereby said instrument
25 winding is energized during the forward and return movement of the movable contact of said relay.

9. The combination with a line or cable carrying short impulses of different polarities, of a coil traversed by the line current, contacts normally in engagement with each other and momentarily separated by said coil in response to an impulse of one polarity, a winding of a signal reproducing instrument momentarily energized in response to the contact separation, a second coil, contacts normally in engagement and momentarily separated by said second coil in response to an impulse of the other polarity,
40 a relay momentarily energized in response to the contact separation, a second winding of a signal reproducing instrument normally short circuited by the relay contacts and energized for a relatively great time

during the forward and return movement of the movable contact of said relay.

10. The combination with a line or cable carrying short impulses of different polarities, of a signal reproducing instrument having two windings, means for energizing one of said windings momentarily in response to an impulse of one polarity, and means responsive to an impulse of the other polarity for energizing the second winding a relatively greater period.

11. Means for translating relatively short positive and negative line or cable impulses into dots and dashes comprising a signal reproducing instrument having two windings, means responsive to an impulse of one polarity for momentarily energizing one winding to produce a dot, and means responsive to an impulse of the other polarity for energizing the second winding a relatively greater period to produce a dash.

12. The combination with a line or cable carrying short impulses of different polarities, of a signal reproducing instrument having two windings, the circuit of one winding being normally open, and means for momentarily closing said circuit in response to an impulse of one polarity, a relay momentarily energized in response to an impulse of the other polarity, a second winding of a signal reproducing instrument and a source of energy being normally short circuited by the relay contacts, the separation of the relay contacts being for a relatively great period in response to the momentary energization of said relay.

In testimony whereof I have hereunto affixed my signature in the presence of the two subscribing witnesses:

ISIDOR KITSEE.

Witnesses:

A. E. STEINBOCK,
ELEANOR T. McCALL.