

No. 873,757.

PATENTED DEC. 17, 1907.

I. KITSEE.

TRANSMITTING DEVICE FOR ELECTRIC TELEGRAPHY.

APPLICATION FILED MAR. 16, 1905.

Fig. 1.  $\mathcal{A}$

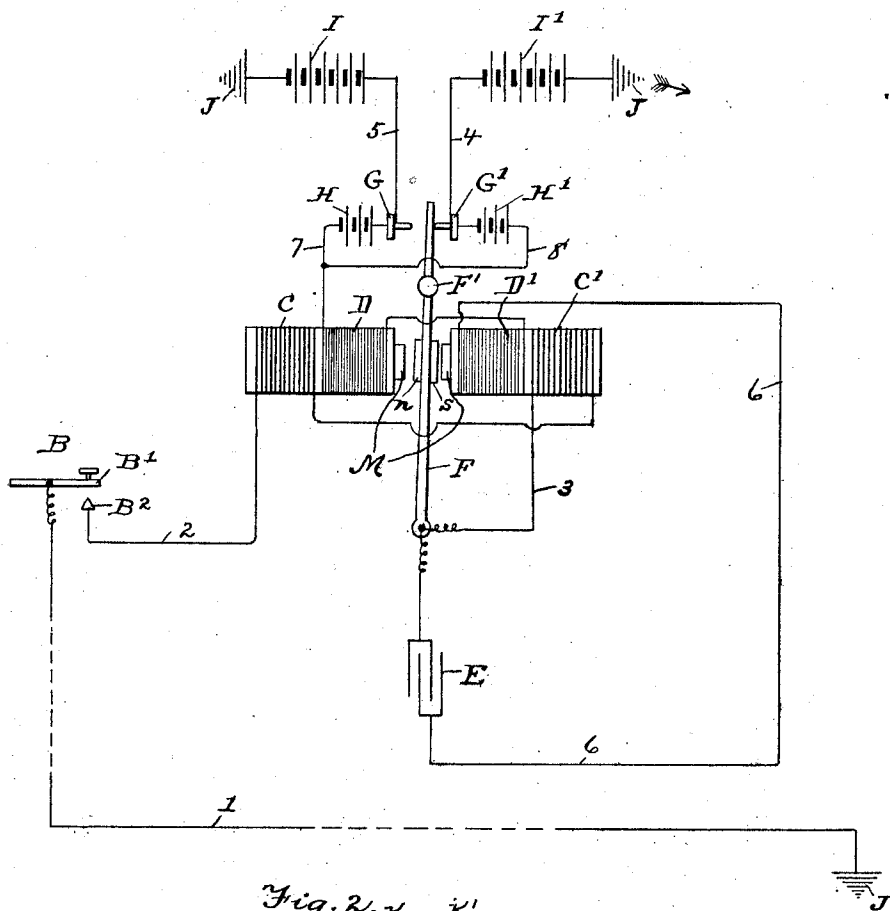


Fig. 2.  $\kappa$   $\kappa'$

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# UNITED STATES PATENT OFFICE.

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## TRANSMITTING DEVICE FOR ELECTRIC TELEGRAPHY.

No. 873,757.

Specification of Letters Patent.

Patented Dec. 17, 1907.

Application filed March 16, 1905, Serial No. 250,387.

*To all whom it may concern:*

Be it known that I, ISIDOR KITSEE, of the city and county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Transmitting Devices for Electric Telegraphy, of which the following is a specification.

My invention relates to an improvement in transmitting devices for electric telegraphy.

The usual code of telegraphy consists of dots and dashes and the key employed to transmit such dots and dashes consists of a movable lever and a stationary contact, the lever is generally connected to the line of transmission grounded at the distant end and the stationary contact is connected to a source of current grounded at the transmitting station. The depression of the lever sends an impulse over the line. If this depression lasts for one time-unit, the transmitted impulse actuates the receiving instrument at the distant station in a manner so that the receiving operator recognizes the same as a dot, and if this depression of the lever lasts for a longer time than one-unit, then the receiving operator recognizes the same as a dash. In this system the transmitted impulses are of one polarity. On submarine cables a double key is employed whereby with the aid of one lever a positive impulse and with the second lever a negative impulse is sent over the line.

In Letters Patent No. 777,259, dated December 13th, 1904, I have described a method whereby the speed of transmission is claimed to be accelerated. This method consists in the transmission of what are technically called "true reversals," that is, a system in which a positive impulse is always followed by a negative impulse, or vice versa, and in which every impulse is of substantially the same intensity and duration and in which the dots and dashes are differentiated whereby a dot is characterized by one impulse, the polarity of which does not come into consideration, and in which a dash is characterized by two impulses in quick succession, the second impulse always of opposite polarity to the first.

It is the aim of my invention to enable the operator to transmit with the usual key and in the usual manner succeeding impulses of opposite polarities and of substantially the same intensity and duration in accordance

with a code whereby a dot is transcribed by one impulse and a dash by two or more impulses of opposite polarities, and in quick succession.

For this reason my invention consists substantially in the devices and arrangements as will hereinafter be more fully described, illustrated in the drawing, and more especially pointed out in the claims following the specification.

In the drawing, Figure 1 is a diagrammatic view embodying my invention; and Fig. 2 is a modification of part of Fig. 1.

In Fig. 1, A is what I call an intermediate device as an entirety and B the transmitting key as an entirety. Of this transmitting key B<sup>1</sup> is the movable lever and B<sup>2</sup> the stationary contact. The transmitting lever is here connected with the line 1 grounded at the distant point J. The device A embraces the electro-magnets M provided with the coils C and C' and the coils D and D', the polarized armature F, and the contacts G and G'. The coils C and C' are connected with one terminal through wire 2 with the point B<sup>2</sup> of the key B and with the other terminal through wire 3 with the polarized armature F. The contact G is connected through wire 5 with one pole of a source of current, here shown as the positive pole of the battery I and the contact G' is connected through wire 4 with the opposite pole of a source of current, here shown as the negative pole of the battery I' both grounded at J. The armature F is provided with the means, here shown as a weight F', tending to unbalance the center of gravity, thereby compelling the armature to fall against one or the other of the contacts G or G' when brought into motion; therefore one or the other of the sources of current I or I' will always be connected through one or the other of the contacts with the armature and through the same and the coils C and C' with the contact B<sup>2</sup> of the key B.

In the drawing, the armature F is illustrated engaging the contact G'. When therefore the lever B<sup>1</sup> is brought in contact with the point B<sup>2</sup> a circuit is established in which the current flows from the positive pole of battery I', ground J, distant ground J, line 1, lever B<sup>1</sup>, contact B<sup>2</sup>, wire 2, coils C and C', wire 3, lever or armature F, contact G', wire 4, back to the negative pole of the battery I'. But the connections of the coils

C and C' are to each other such that the current-flow through both of said coils will energize their cores in a manner so that the core ends near the armature will always be of the same polarity. In other words, if the current-flowing through C and C' will energize the core of C so that the end near the armature will be "S" (south) this same current-flow will energize the core of coil C' in an alike manner and the core end of this coil near the armature will also be "S" (south) and if the current-flow is reversed, the core-ends of both of these coils near the armature will be "N" (north.)

The relation of the sources of current I and I' as to the coils C and C' are such that the current-flow of I' will tend to make the core-ends near the armature "S" (south) and the current-flow of I through these coils will make the core-ends near the armature "N" (north). It is now supposed as is illustrated in the drawing, that the right-hand-side of the armature is "S" (south) and the left-hand-side of the armature is "N" (north).

When therefore, as is illustrated, the armature rests at the stop G' connected to the battery I', and the circuit is established including this battery, and the coils C and C', it is obvious that, as the flow of these currents tending to make the core-ends near the armature "S" and as the right-hand side of the armature is "S", the left-hand side being "N", the armature will be repelled from the core of C' and will be attracted by the core of C; the armature will therefore break its connection with G' and will make contact with G; but as the battery I is connected with the positive pole to contact G, the current will flow in the opposite direction from the former current-flow through the coils C and C', and both the core ends near the armature will then be "N" and as the left-hand side of the armature is "N" and the right-hand-side is "S", it is also obvious that the armature will be repelled from G and attracted so as to make contact with G', and this to and fro movement of the armature will continue as long as the circuit between B' and B<sup>2</sup> is established; it being understood that the armature, as soon as repelled from one contact can only come to rest against the other contact and not midway between these two contacts. It is now supposed that the operator is transmitting a letter over the line consisting of, say a dot and a dash, such as the letter "A" according to the Morse alphabet, and it is supposed that before the transmitting commences, the armature rests against the contact G'. As soon as the lever B' touches the contact B<sup>2</sup> the circuit including the coils and the line is established, and the current will flow from I' in the direction of the arrow, through said line and coil, but as the core-ends near the armature will be made "S" (south) through the flow of said current, the

armature will be repelled from G' and will come to rest at G.

As the transmission of a dot according to the Morse alphabet only requires the contact of the lever with the contact-point for one time-unit, and as it takes a time-unit for the armature to move away from G' and to come in contact with G, the lever B' will be released before the armature contacts with G and therefore the circuit will be open when such contact takes place, and the lever will come to rest at G. In transmitting the dash, the operator again depresses the lever B' of the key B. A circuit is again established including the coil and line but this time the current will flow in a direction opposite from the direction of the former flow, and the armature F will be repelled from G and come in contact with G' and then be repelled from G', and come in contact with G and as in transmitting a symbol equal to a dash, the key is depressed for two units of time, the circuit between B' and B<sup>2</sup> will last long enough to allow two impulses to be transmitted over the line, one impulse from the battery I when the armature rests against G and one impulse from the battery I' when the armature rests against G', and as then the lever is released, the armature when again attracted by G will find the circuit open.

In considering the working of this arrangement, the time lapsing between the making of the contact of the armature F with one or the other of the contacts G or G', and the repelling of the armature from such contacts, may be too short for the transmission of an impulse over the line so as to be effectually felt at the receiving instrument, and it is therefore necessary to provide means to prolong this contacting for a further length of time. And I have made use of an auxiliary device to effect this purpose. In Fig. 1, this auxiliary device consists of sources of current and condenser; and in the drawing one source of current is designated as II, the second source of current as II' and the condenser as E; and I have provided for these sources of current and condenser the two coils D and D'. The source of current II is connected with the positive pole to the contact G and with the negative pole, through wire 7, with one terminal of coil D, the other terminal connected with the coil D', the second terminal of D' being connected through wire 6 with one part of condenser E, the other part of which is connected to the armature F. The source of current II' is connected with the negative pole to contact G' and with the positive pole through wire 8 with wire 7. The coils D and D' are arranged in a manner so that when the circuit including the source II' is closed through the contacting of the lever F with G', a momentary current is flowing through E in the

direction so as to counteract entirely the flow of the current from  $C^1$  on the core, that is, as the flow of  $I^1$  tends to make the core end near the armature "S" (south) the momentary flow of current through condenser E tends to make the core-ends near the armature "N" (north) counteracting, as said above, the straight flow of  $I^1$  and thereby holding for a fraction of time longer, the armature F against the stop  $G^1$ ; but as soon as the condenser E is fully charged, the flow will cease; it is obvious that then the energizing effect of  $I^1$  will come in full play and the armature will be repelled from  $G^1$ . When then the armature comes to rest at G the condenser E will be charged oppositely, and this will tend to make the core-ends near the armature "S" (south) and therefore the flow of the current I will again be counteracted and the armature will rest for a fraction of time against the contact G; when the entire charge of the condenser has taken place then this momentary current will cease and the armature will be repelled from the contact G.

In Fig. 2 I have provided the contacts G and  $G^1$  with very light and easily compressible springs or other metallic pieces, which may follow the movement of the armature F for a certain distance away from the contacts G and  $G^1$ , so as to prolong mechanically the contact with the source I or  $I^1$  and these pieces are designated in the drawing as K and  $K^1$ .

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. A transmitting device comprising the key proper, said key connected with one part to the line of transmission, a polarized relay, sources of current operatively connected with opposite poles to said relay, the coils of said relay connected with one terminal to part of the key proper and with the other terminal to the armature of said relay, and means whereby through the movement of the armature one or the other of the sources

of current is alternately connected through the key proper to the line of transmission.

2. In telegraphy, a transmitting station embracing a transmitting key connected with the interposition of a polarized electro-magnetic device to the line of transmission, the polarized device provided on each side of the armature with contacts connected each with a source of current, two coils for said polarized electro-magnet, the coils connected in a manner, so as to connect automatically for each depression of the key the line of transmission with a different source of current.

3. In telegraphy a transmitting station embracing a transmitting key connected with the interposition of a polarized electro-magnetic device to the line of transmission, the polarized device provided on each side of the armature with contacts, provided also with means to connect a source of current with one polarity to the line when resting at one contact and to connect a second source of opposite polarity to the line when connecting with the second contact and electric means to alternately connect the armature with one or the other of said contacts through the depression of the key proper.

4. In telegraphy, a transmitting device embracing the key proper, a polarized relay operatively connected to the key and to two sources of current, the key operatively connected with the line of transmission, the coils of said relay arranged and connected so as to produce in the armature of said relay an automatic movement connecting alternatively with one or the other of the sources of current, and electro-static means to prolong the contact-period of the armature with one or the other of said sources.

In testimony whereof, I hereby sign my name in the presence of two subscribing witnesses, this ninth day of March, A. D. 1905.

ISIDOR KITSEE.

Witnesses:

EDITH R. STILLEY,  
H. C. YETTER.