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TELEGRAPH BREAKING SYSTEM

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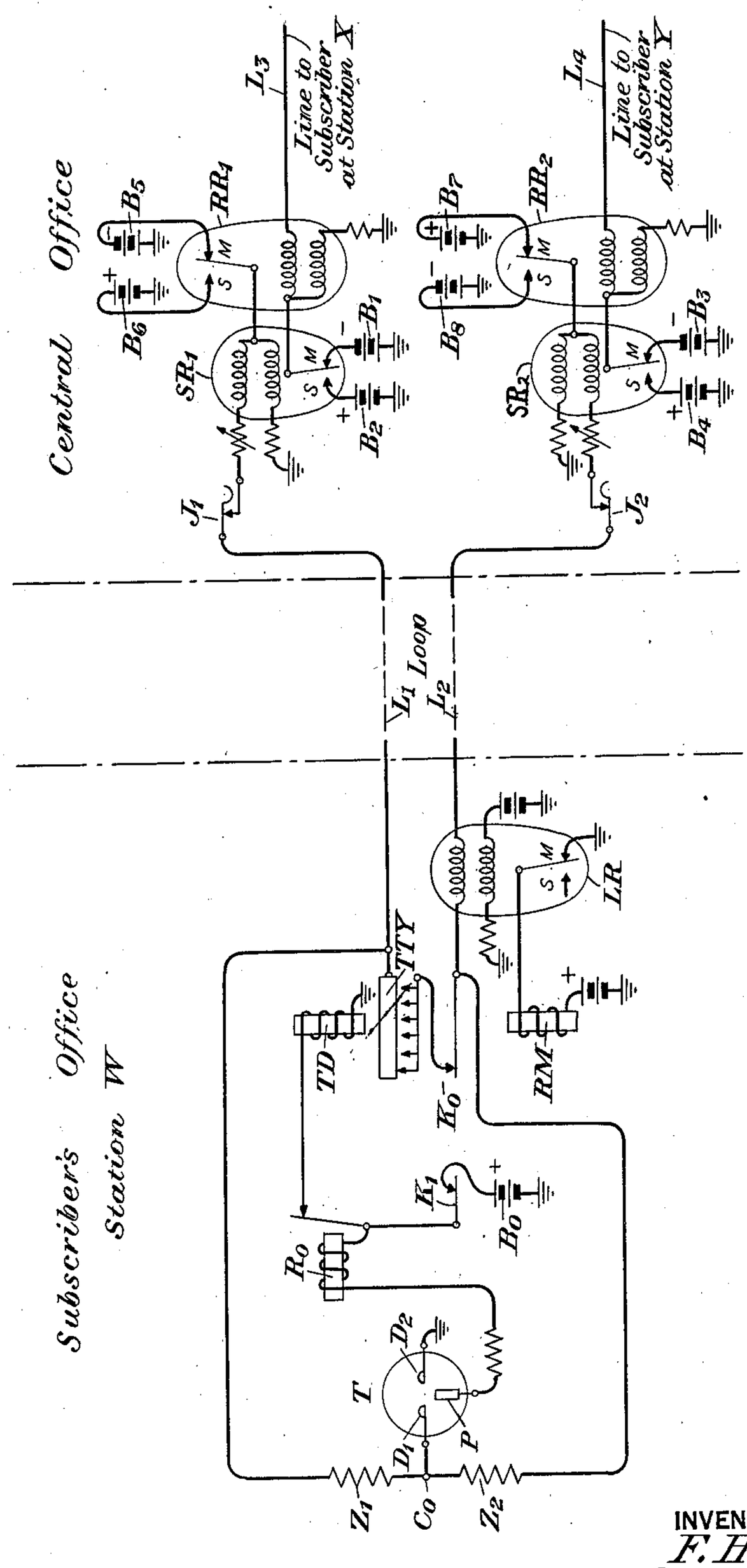

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TELEGRAPH BREAKING SYSTEM

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This invention relates to telegraph and teletypewriter systems and, more particularly, to apparatus for breaking the transmission over telegraph and teletypewriter systems.

In teletypewriter systems providing service for a plurality of subscribers' stations over interconnected circuits, it happens that two or more of the interconnected subscribers' stations may start to send at approximately the same time. Such a condition occurs frequently with systems bearing a heavy traffic. In such prior systems a considerable number of characters may be sent before it becomes apparent at one or several of the stations that another of the stations is sending. This is a troublesome condition which sometimes entails the loss of one or more messages. The situation has been found to be quite acute in systems having a type of message traffic consisting especially of very short messages in considerable volume.

One of the objects of this invention is to provide a teletypewriter system which produces an instantaneous positive break as soon as a spacing signal is received in the loop and thereby reduce the difficulties experienced heretofore when two or more stations attempt to send at the same time.

According to the present invention it is proposed to provide at a subscriber's teletypewriter station an arrangement including, for example, a gas tube and a relay in addition to the usual sending and receiving equipment. This will be so set up that if a break or spacing signal is received at a subscriber's station, the gas tube will become ionized and the relay will become operated to break the station's transmission.

This invention will be better understood from the more detailed description hereinafter following when read in connection with the accompanying drawing showing one embodiment of the invention merely for the purpose of illustration.

Referring to the drawing, there is shown a subscriber's teletypewriter station designated W which may include the usual teletypewriter equipment such as the sending contact apparatus TTY, the break contact K_0, the line relay LR, the receiving magnet RM which is controlled by the line relay LR, and the transmitter-distributor TD which controls the sending contact apparatus TTY. This teletypewriter equipment is connected to a loop including conductors L_1 and L_2 which may extend to a central office as shown. Bridged across the sending contact equipment TTY and the contact K_0 is a circuit including two approximately equal resistors Z_1 and Z_2 which are arranged in series relationship. The control gap D_1—D_2 of a gas-filled tube T is connected between the point C_0 which is the terminal common to resistors Z_1 and Z_2 and ground. The plate or anode P of tube T is connected in series with the winding of a relay R_0, the key K_1, battery B_0 and ground. When the enclosed gas becomes ionized due to the presence of a sufficient or predetermined voltage on the control gap D_1—D_2, current will flow from battery B_0 through the winding of relay R_0 to operate relay R_0, as will be explained hereinafter. The armature of relay R_0 will then open the circuit of the transmitter-distributor TD and the station W will be unable to send teletypewriter characters or signals to the central office.

At the central office two jacks J_1 and J_2 are shown connected to the loop conductors L_1 and L_2, respectively, jack J_1 being associated with a line L_3 which may extend to a teletypewriter subscriber X, jack J_2 being associated with a line L_4 which may extend to another teletypewriter subscriber Y. It will be understood that lines L_3 and L_4 may pass through repeater circuits of well-known type (at other central offices) and that these lines may also lead to still other subscribers' stations (not shown).

The jack J_1 is connected through the upper or main winding of a sending relay SR_1 to the armature of a receiving relay RR_1. The armature of the sending relay SR_1 is connected through the upper or main winding of the receiving relay RR_1 to line L_3. Likewise jack J_2 is connected to the armature of a corresponding receiving relay RR_2 through the lower or main winding of a corresponding sending relay SR_2. Moreover, the armature of relay SR_2 is connected through the upper or main winding of relay RR_2 to line L_4. Each of the sending relays SR_1 and SR_2 and each of the receiving relays RR_1 and RR_2 may have a second or biasing winding as shown in the drawing.

The apparatus is shown in its idle condition in the drawing. When the subscriber at station W wishes to send, he will operate the transmitter-distributor TD which will then operate the sending contact equipment TTY in a well-known manner. The marking and spacing pulses of each teletypewriter character will be transmitted over line L_1 of the loop to the central office. There the received pulses will operate relay SR_1 in the usual way to alternately connect oppositely poled batteries B_1 and B_2 through the main winding of relay RR_1 to line L_3 which extends to station X. The pulses emanating from the

sending equipment TTY will likewise pass through the upper or main winding of the line relay LR, over the loop conductor L_2 to the central office, the received pulses operating relay SR_2 in a well-known manner. The armature of the latter relay will connect oppositely poled batteries B_3 and B_4 through the main winding of relay RR_2 to line L_4 which extends to station Y. At station W the relay LR will repeat the pulses to the teletypewriter receiving magnet RM to provide the home copy.

Likewise signals may be transmitted from one of the other stations, such as X, to stations W and Y. As the marking and spacing pulses travel over line L_3, they cause the receiving relay RR_1 to operate to connect the oppositely poled batteries B_5 and B_6 through the main winding of relay SR_1 to the loop conductor L_1. These pulses operate the relay LR and are thereby repeated to the receiving magnet RM at station W. These pulses return over loop conductor L_2 and accordingly operate the relay SR_2 to connect batteries B_3 and B_4 to the line L_4. The pulses are thus received at station Y. Signals may be transmitted from station Y over line L_4 to stations W and X, but this need not be described.

In the idle condition of the apparatus the oppositely poled batteries B_5 and B_7 are connected through the armatures and marking contacts M of relays RR_1 and RR_2 and over loop conductors L_1 and L_2, respectively, to the series resistors Z_1 and Z_2. These resistors therefore carry no current during the idle condition because these resistors are short-circuited by the contacts of the transmitter TTY. As the point C_0 is at the approximate electrical center of the loop circuit, practically no voltage will be applied to the control gap D_1—D_2 of tube T and therefore the gas within tube T will remain deionized. The gas within tube T will likewise remain deionized when signals are sent from station W over loop conductors L_1—L_2 to the central office. This is because such signals will not move the armatures of relays RR_1 and RR_2 from their marking contacts M. When the armatures of relays RR_1 and RR_2 are on their contacts M, oppositely poled batteries B_5 and B_7 of equal potential will be connected to the loop conductors L_1—L_2 under such conditions and point C_0 still being at the approximate electrical center of the circuit, practically no voltage will be applied to the control gap of tube T. The opening and closing of the contacts of the transmitting equipment TTY will therefore fail to cause tube T to flash. While signals are being transmitted from station W, a small current will flow through resistors Z_1 and Z_2.

However, if one of the stations, such as station X, starts to send, whether station W is sending or not, the armature of relay RR_1 will thereupon move to its spacing contact S. In that event the batteries B_6 and B_7—which are of the same polarity—will be connected by loop conductors L_1—L_2 to resistors Z_1 and Z_2 and the potential of electrode D_1 of tube T will be raised to a positive potential equal to that of batteries B_6 and B_7 while the other control gap electrode D_2 remains grounded. Hence the gas within the tube will become ionized. Current will then flow from battery B_0 through the winding of relay R_0 and over the main gap P—D_2 of tube T_1 thereby operating relay R_0. The operation of relay R_0 will open the circuit of the back contact of its armature and hence the transmitter-distributor tape stop magnet TD will receive no more current from battery B_0. Therefore the teletypewriter sending equipment TTY will cease to operate. The ionization of the gas within tube T, the consequent operation of relay R_0 and release of the transmitter-distributor TD in response to a break or spacing pulse from one of the stations such as X or Y, represent important features of this arrangement.

When a break or spacing pulse arrives over line L_4, batteries B_5 and B_8 will both be connected to the loop circuit L_1—L_2. The potential of electrode D_1 will then be negative sufficiently to ionize the tube T as already considered heretofore. The operation is in other respects similar to that already described.

The potential of battery B_0 is higher than that required to sustain ionization of the gas within tube T after ionization has previously been initiated by the application of a predetermined voltage to the control gap D_1—D_2. Hence relay R_0 will remain operated and the teletypewriter at station W will remain unoperable until the battery B_0 is disconnected from the transmitter-distributor circuit. This may be accomplished by operating the non-locking key K_1 to restore the circuit to its initial condition, whereupon relay R_0 will be released and tube T dionized. The transmitter-distributor TD will be reconnected to battery B_0 through the armature and back contact of relay R_0, thereby enabling the local teletypewriter apparatus to operate thereafter. The tube T will, however, remain dionized until another break or spacing pulse arrives from one of the stations X or Y.

Thus it will be apparent that when one of the stations X or Y is sending, the station W will be unable to send although all signals will be received by the relay LR at station W and repeated to the receiving magnet RM.

If at any time station W and station X, for example, both attempt to send, and station X sends its first spacing pulse however short before the spacing pulse from station Y arrives, the armature of relay RR_1 will move to its spacing contact, tube T will flash and render impossible any transmission from station W. Thus station X will obtain control of the circuit and disable station W so that the latter station may not send any signals. The disability of the station W transmitter will be indicated by the illumination of tube T which is an unpainted gas tube of, for example, the 313C type.

It will be understood that an arrangement including an unpainted gas tube such as T and a relay such as R_0 may be installed at stations X and Y and at any other points. Each such arrangement will respond to a break signal to stop the local transmitter and prevent the loss of any part of the message to be transmitted.

While this invention has been shown and described in a certain particular embodiment merely for the purpose of illustration, it will be understood that the general principles of this invention may be applied to other and widely varied organizations without departing from the spirit of the invention and the scope of the appended claims.

What is claimed is:

1. In a telegraph system, the combination of a loop circuit over which signals may be transmitted, a transmitter connected to said loop circuit, a pair of equal resistors connected in series with each other across said transmitter, a gas tube connected to the terminal common to said resistors, means responsive to a break signal re-

ceived over said loop circuit to ionize the gas within said tube, and means responsive to the ionization of the gas within said gas tube to prevent any further transmission of signals by said transmitter over said loop circuit.

2. In a telegraph system, the combination of a telegraph transmitter, a pair of equal resistors connected in series with each other across the terminals of said transmitter, a gas tube connected between the terminal common to said resistors and ground, means responsive to a break signal to fire said gas tube, and means responsive to the firing of said gas tube to prevent said transmitter from transmitting signals.

3. A breaking arrangement for the transmitter of a telegraph system, comprising a gas tube having a control gap and a main gap, a relay connected to the main gap of said tube, the control gap of said tube being connected to the terminals of said transmitter, control apparatus for said transmitter, means responsive to a break signal to fire the control gap of said tube, and means responsive to the operation of said relay to operate said control apparatus to prevent transmission by said transmitter.

4. In a teletypewriter system, the combination of a teletypewriter, a loop connected to said teletypewriter, a control device to stop said teletypewriter, and means responsive to a break signal received over said loop to operate said control device so as to stop said teletypewriter, said means including a gas tube, means for applying voltages received over said loop to said gas tube to ionize the gas contained therein, and means responsive to the ionization of the gas within said tube to open the circuit of said control device.

5. In a teletypewriter system, the combination of a teletypewriter, a loop connected to the contacts of said teletypewriter, a control device for said teletypewriter, a relay the armature of which is connected to said control device to control the flow of current through said control device, a resistor connected to the contacts of said teletypewriter, and a gas tube having its control gap connected between a point on said resistor and ground, the main gap of said tube being connected in series with the winding of said relay.

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