

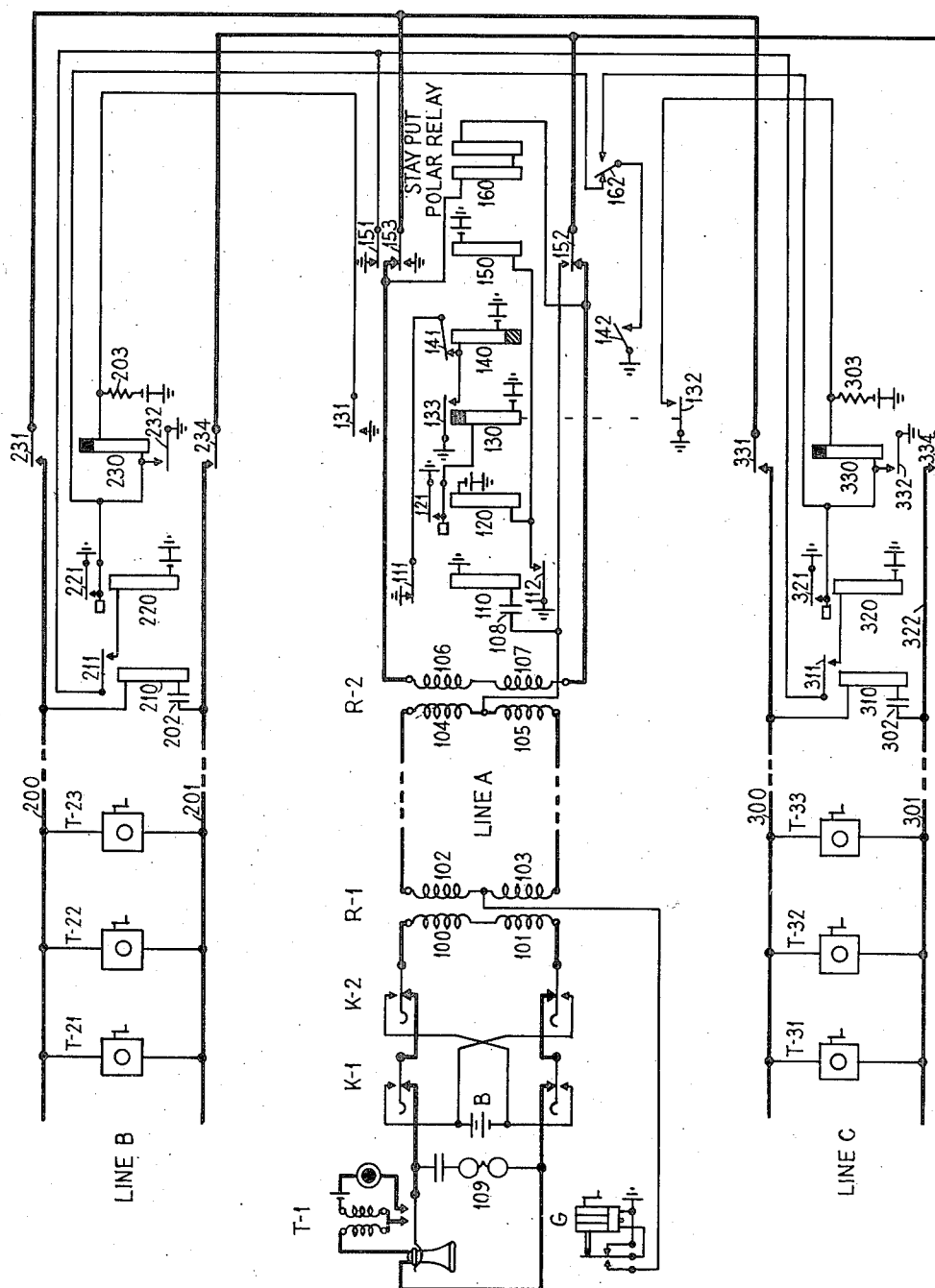
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TELEPHONE SYSTEM

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TELEPHONE SYSTEM

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The present invention relates to telephone systems in general, but is concerned more particularly with telephone systems of the magneto party line type. The principal feature of this invention is to provide means whereby a control line, one of three magneto lines terminating at a common switching point, may be connected with either of the remaining lines through the agency of electromagnetic devices at said common point, actuated by current from a remote station on said control line under independent control of the attendant at said station.

A further feature of the invention relates to means whereby the calling station (hereinafter referred to as the control station) after having selected the desired party line, may signal a desired station thereon by the further operation of the magneto generator at the control station.

It is well known that in telephone systems of the party line magneto type a calling subscriber, in order to call another subscriber in his own line, must crank his magneto in accordance with certain codes dependent upon the party desired. A still further feature of the invention relates to means whereby any station on either of the aforementioned party lines may, by proper operation of the associated magneto, cause his own party line to become connected with the control line and thereafter signal the control station.

Other features and advantages of this invention will be apparent from the following detailed description of the drawing which shows by means of the usual circuit diagram a sufficient amount of apparatus to enable the invention to be understood.

The various relays diagrammatically shown throughout the drawing, except the polar relay 160, are of the general type ordinarily employed in automatic telephone systems. The polar relay is of the stay-put type, i. e., its armature remains in its last operated position even though the energizing circuit of the relay be opened. Attention is also directed to the use of certain time delay devices, which may be explained in connection with relays 120 and 130. The vibrating contact associated with armature 121 is weighted to give a delay of approximately three seconds in the operation of relay 130. The latter relay is slow to operate, and for that reason will not energize when armature 121 first strikes the weighted contact, nor will it energize on the pulses of current produced by the weighted contact vibrating against armature 121; but when the vibrations cease a continuous circuit will be

established and relay 130 will subsequently energize.

Referring now to the drawing, the control line is shown as line A and the control station comprises the local battery telephone T—1, magneto G, keys K—1 and K—2, repeating coil R—1 and the battery B. The equipment at the common switching point consists of the repeating coil R—2 and all of the relays shown on the drawing. The two party lines are shown as line B, across which is bridged a plurality of magneto telephones such as T—21; and line C, across which is bridged a plurality of magneto telephones such as T—31.

Having briefly described the apparatus embodying the features of the invention, a detailed description will now be given of the operation of the system.

Control station selects party line

The attendant of the control station may prepare for the selection of line B by the momentary operation of key K—1; or for the selection of line C by the momentary operation of key K—2. In either case the potential of battery B is impressed upon windings 100 and 101 of the repeating coil R—1, the current flow resulting therefrom will induce a pulse of current through windings 102 and 103 of repeating coil R—1, over line A and through windings 104 and 105 of repeating coil R—2. The latter mentioned flow of current will in turn induce a pulse of current in a circuit traceable from the upper terminal of winding 106 of repeating coil R—2, stay-put polar relay 160, armature 152 and its break contact, through winding 107 of repeating coil R—2 to the lower terminal of winding 106. The direction of current flow in the latter traced circuit will depend upon whether key K—1 or K—2 was operated, and the armature 162 of the stay-put polar relay 160 will assume and retain a position in accordance with the direction of the momentary current flow. For the purpose of explanation it will be assumed that key K—1 was momentarily operated and that armature 162 took up the position shown on the drawing.

The attendant will next operate the magneto G for a "short" ring, which we will assume has a duration of less than one second. The circuit from the grounded magneto extends over the simplex of line A, through condenser 108 and the alternating current relay 110 to ground. Relay 110, upon energizing, will close a circuit to relays 120 and 150 in parallel. Relay 150 will energize, but without effect at this time. Relay 120 will energize, but will not remain operated long

enough to cause the energization of relay 130. A further result of the energization of relay 110 is the opening of the locking circuit of relay 140 at armature 111.

- 5 Relay 140 will now deenergize and close a circuit from ground at armature 142, armature 162, through relay 230 and resistance 203 to battery. Relay 230, upon energizing, will lock itself up by way of armature 232, and by virtue of
10 armatures 231 and 234 will connect the control line A with the party line B.

Control station signals desired station on selected party line

- 15 The magneto stations bridged across line B have been assigned codes comprising only combinations of "short" rings. The attendant at the control station will next operate his magneto G in accordance with the code of the desired station on line B. Relays 110, 120, and 150 will operate as before explained in response to each
20 "short" ring. Relay 150 will now function to extend a ringing circuit in parallel with condenser 108 and alternating current relay 110 which may be traced by way of make contact and armature
25 152, armature 234, through the ringers bridged across line B, armature 231, to ground at the make contact of armature 153.

- Attention is also directed to the fact that alternating current relay 210 will energize on each
30 "short" ring impressed upon line B, but without effect at this time because of the absence of ground at armature 151.

- Mention may be made of the fact that a code made up of a single "short" ring must not be
35 assigned on line B, for the reason that the "short" ring given by the control station to seize line B will splash over after the energization of relay 230.

- 40 *Control station disconnects selected party line*

- The attendant at the control station, in order to disconnect the selected party line, will operate his magneto G for a "long" ring, which must have a duration in excess of the time delay characteristic of relays 120 and 130 and may be visualized as being in excess of three seconds. In response to this ring relays 110, 120 and 150 will energize as before explained. The continued
50 duration of the ring will result in the eventual energization of relay 130 which, in turn, will cause the operation of relay 140, the latter relay opening the operating circuit of relay 230 at armature 142. A further result of the energization of relay 130 is the connection of ground at armature
55 131 to a point between resistance 203 and relay 230, thereby causing the deenergization of the latter relay, and thus effecting the disconnect from line B.

- 60 At the end of the "long" ring alternating current relay 110 will deenergize and close a locking circuit for relay 140, and will also open the multiple circuit to relays 120 and 150. Relay 130 will next deenergize and open the circuit in shunt of
65 relay 230, whereupon the system is again in normal position.

Station on party line connects with control station

- 70 As was previously explained, the subscribers on line B call each other by operating their respective magnetos in accordance with codes comprising only short rings. Alternating current relay 210 will respond to each such ring and will
75 close a circuit from ground at armature 151, ar-

mature 211 through relay 220 to battery. Relay 220 will energize, but will not remain operated long enough to cause the energization of relay 230.

In the event that a subscriber on line B desires to call the control station he will operate his magneto for a "long" ring, whereupon relays 210 and 220 will be energized for the length of time necessary to cause the operation of relay 230. Relay 230, upon energizing, will lock itself up at armature 232, and at armatures 231 and 234 will connect line B with line A. A continuation of this same ring will splash over and actuate the ringer 109 at station T-1. It is to be noted that the stay-put polarized relay 160 is across the line at this time; its operation on ringing current is unlikely, but in any event would be without effect at this time because of the open circuit at armature 142.

The disconnect can only be accomplished by a long ring from magneto G of control station T-1.

Control station connects first and second party lines

With the system at normal, the attendant at control station T-1 may operate the magneto G for a "short" ring, thus causing the deenergization of relay 140 and the energization of either relay 230 or 330, depending upon the last operated position of stay-put polar relay 160. The attendant will next momentarily operate keys K-1 and K-2 in sequence, thereby changing the position of the stay-put polar relay 160 and insuring the operation of both relays 230 and relay 330. Line B is now connected to line C and station selection may be accomplished by code ringing either from a station on line B, a station on line C, or from control station T-1.

The disconnect can only be accomplished by a long ring from magneto G of control station T-1.

Having thus described the invention, its utility and operation, what is considered new and is desired to have protected by Letters Patent will be set forth in the appended claims.

What is claimed is:

1. In a telephone system, a common switching point, a control line terminating in said switching point, a party line terminating in said switching point, a magneto for each subscriber on said party line, and means including a vibratory contact and a slow-to-operate relay fully operated by said vibratory contacts responsive only to the operation of one of said magnetos in accordance with one particular code for establishing connections with said control line and said slow to operate relay remaining unoperated by said vibratory contacts responsive to the operation of one of said magnetos in accordance with the code assigned to a subscriber on said party line thereby preventing connection with said control line.

2. A plurality of lines entering a common switching point, a remote station in the first line, a polarized relay at said switching station differently operable for connecting with either one of two other lines, two independently operable line connecting relays for connecting the first line with said two other lines and actuated according to the operation of the said polarized relay, means for locking the line connecting relays in an actuated position, and means for thereafter interrupting the energizing circuit of the locked relay.

3. The combination of a plurality of lines entering a common switching point, a remote station on a first said line, means at said remote station for applying current of a first and second

polarity at will, means at said remote station for applying alternating current at will, a relay at said common switching point differentially responsive to said polarities of current, a second relay at said common switching point responsive to said alternating current, two independently operable line connecting relays for connecting the first line with said two other lines and actuated according to the operation of the said first and second relays, and means for thereafter interrupting the circuit of the said connecting relay.

4. The combination of a plurality of lines entering a common switching point, a remote station on a first said line, two independently operable line connecting relays for connecting the first line with said two other lines, means at said remote station for applying current of a first and second polarity at will, a relay at said common switching point differentially responsive to said polarities of current to select the said line connecting relay next to be operated, a hand generator at said remote station, means responsive to a short operation of said hand generator to energize a previously selected line connecting relay, and means responsive to a long operation of said hand generator to deenergize a previously energized connecting relay.

5. In a telephone system, a plurality of party lines, a line connecting relay for each line, a second relay for each line having a vibrating contact for controlling its corresponding line connecting relay, a ringing relay for each line for controlling its corresponding second relay, a control line normally disconnected from said party lines, and contacts on said line connecting relays operative to connect said party lines to said control line only in case the corresponding ringing relay is operated for a predetermined time sufficient to cause prolonged closure of said vibratory contacts.

6. In a telephone system, a plurality of party lines, a control line normally disconnected from said party lines, a line connecting relay for each party line having contacts operative to connect such party lines to said control line, means including vibratory contacts associated with each party line for operating its corresponding line connecting relay and contacts to connect such party line to said control line only in response to application of ringing current to such line for a predetermined prolonged period, and means associated with said control line for selectively controlling the energization of said line connect-

ing relays to connect said control line with said party lines or to interconnect said party lines.

7. In a telephone system, a plurality of party lines, a control line normally disconnected from said party lines, a line connecting relay for each party line having contacts operative to connect such party lines to said control line, means including vibratory contacts individually operated by each party line for operating its corresponding line connecting relay and contacts to connect such party line to said control line only in response to application of ringing current to such line for a predetermined prolonged period, a locking circuit for each line connecting relay for locking said relays in their energized positions, and means solely under control of said control line for releasing the energized line connecting relays.

8. In a telephone system, a plurality of party lines, a control line normally disconnected from said party lines, a line connecting relay for each party line having contacts operative to connect such party lines to said control line, means including vibratory contacts associated with each party line and controlled by the subscribers thereon for operating its corresponding line connecting relay and contacts to connect such party line to said control line only in response to application of ringing current to such line for a predetermined prolonged period, means associated with said control line for selectively controlling the energization of said line connecting relays to connect said control line with said party lines or to interconnect said party lines, and means controlled from said control line for deenergizing said line connecting relays.

9. In a telephone system, a party line, a control line normally disconnected from said party line, a control relay for said party line having vibrating contacts intermittently closed and opened on initial operation of said relay and maintained closed only after a prolonged operation of said relay, subscriber controlled means on said party line for controlling the operation of said control relay for short or prolonged durations, a slow-to-operate line connecting relay, an operating circuit including said contacts effective to operate said line connecting relay only in case said contacts are maintained closed for a predetermined time, and contacts on said line connecting relay for connecting said party line to said control line in response to the operation of said line connecting relay.

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