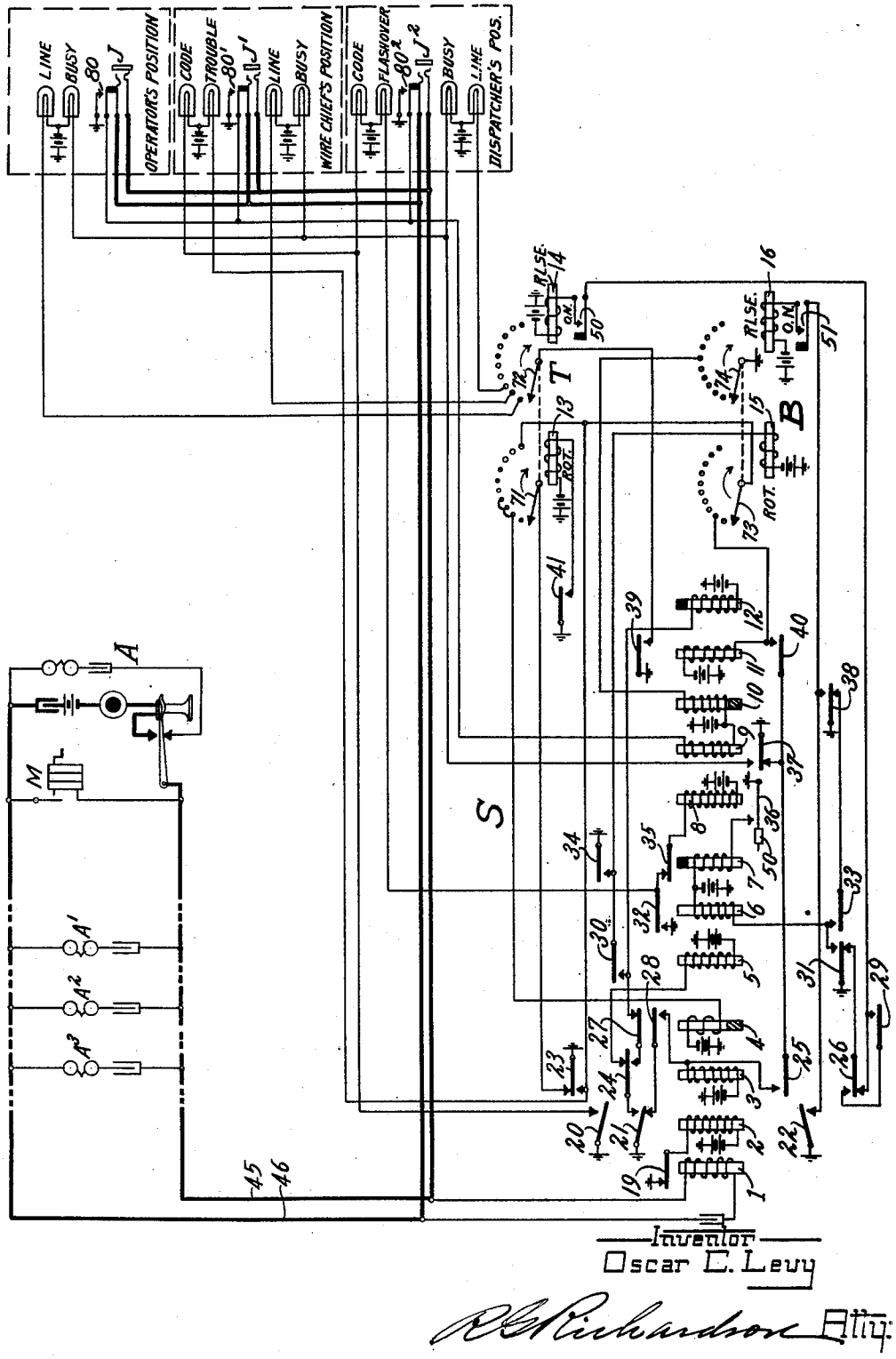
Dec. 2, 1930. O. C. LEVY 1,783,295

PARTY LINE TELEPHONE SYSTEM

Filed Oct. 29, 1928



Patented Dec. 2, 1930 1,783,295

UNITED STATES PATENT OFFICE

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PARTY-LINE TELEPHONE SYSTEM

Application filed October 29, 1928. Serial No. 315,702.

This invention relates to telephone systems in general, but more particularly to manual telephone systems of the magneto party-line type.

The present invention, however, deals with a telephone system of the above type which is privately owned, such as a private system for a power corporation, or the like; and which in addition to furnishing a regular telephone service for the employees located at different locations, also furnishes special testing and dispatching facilities.

It is well known that in telephone systems of the party-line magneto type a calling subscriber, in order to call the operator or another subscriber on his own line, must crank his magneto in accordance with certain codes dependent upon the party desired. The usual code for the operator is one long ring, while the subscribers' codes consist of a series of short rings or a plurality of short and long rings in various combinations. Since all signals are received at the operator's board it is necessary for an operator to be extremely diligent in order to distinguish calls which are intended for her.

The main object of the invention, briefly stated, is to relieve, to a certain degree, the burden on the operator by providing means for automatically distinguishing between the various subscriber codes and the operator's code so that the operator is signalled only when the subscriber rings the operator's code.

A feature of the invention relates to the means provided for selectively signalling either the regular operator, the wire chief, or the dispatcher at will by predetermined code rings.

Another feature relates to the manner in which the selecting device is changed over from a timing device to a selecting device provided the ring is of four seconds or more duration.

A further feature relates to the manner in which the wire chief or dispatcher is notified of various kinds of trouble.

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.

Referring now to the drawing, there is shown one of the party lines, comprising conductors 45 and 46, terminating in the substations A, A1, A2, and A3. Substation A consists of the usual ringer, receiver, transmitter, local battery, and magneto M commonly used on lines of this type. The substations A1, A2, and A3 are similar to substation A and only the associated ringers are shown.

One branch of the line conductors 45 and 46 terminates in the exchange in the alternating current relay 1 of the selecting device S while the other branch is terminated by multiple connections in jacks J, J1, and J2 located at the exchange or regular operator's position, the wire chief's position, and the dispatching operator's position. A line lamp and a busy lamp are associated with the party line at each of the various operator's positions. In addition to the line and busy lamps, the line equipment at the wire chief's position includes a code lamp and a trouble lamp, while the line equipment at the dispatcher's position includes a code lamp and a flashover lamp.

The selecting device S consists of a group of relays and two minor switches T and B. The relays in conjunction with the minor switches act in the capacity of a timing device to time the length of a code ring in order to selectively signal the various operators when their respective codes are rung. Relay 8 is provided with a weight 50 adjustable on the reed 36 which is fastened to the armature in such a manner that the reed 36 vibrates for approximately two seconds before it comes to rest against its make contact.

The minor switches T and B are simple rotary switches having stepping magnets and mechanism for rotating their respective wipers and release magnets for restoring the wipers to their normal position.

Having briefly described the apparatus embodying the feature of the invention, a detailed description will now be given of the operation taking place when a subscriber de-

sires to talk to another subscriber on a line other than his own. In this instance, as is well known, the calling subscriber must ring the regular exchange operator's code so that the operator may complete the connection to the desired subscriber.

It will now be assumed that the subscriber at substation A is the calling subscriber and that subscriber A desires a connection to a subscriber on another party line (not shown). The calling subscriber accordingly cranks his magneto in accordance with the exchange operator's code which in this case is one long ring of four seconds or more duration and one short ring. Responsive to the first long ring alternating current relay 1 energizes and at armature 19 opens the circuit of the normally energized relay 2 whereupon the latter relay releases. Relay 2, upon deenergizing, at armature 20 closes a circuit for lighting the code lamps at both the wire chief's and dispatcher's positions; at armature 21 closes an obvious circuit for energizing relay 5; and at armature 22 prepares a circuit for release magnet 16 of the minor switch B. Relay 5, upon energizing, at armature 30 prepares a circuit for relay 12 and at armature 31 closes an energizing circuit for relay 6. Upon energizing, relay 6, at armature 33, completes a locking circuit for itself by way of armature 38 and at armature 32 completes an energizing circuit for vibrating relay 8. Responsive to the closure of its circuit relay 8 starts to vibrate and is so adjusted that the reed spring 36 does not come to rest against its make contact until after a two-second interval at which time relay 7 is energized. Relay 7 is adjusted so that it is slow to operate and slow to release. When relay 7 energizes said relay at armature 34 closes a circuit for the stepping magnet 15 and at armature 35 opens the circuit extending to the vibrating relay 8.

If the ring is of two-seconds' duration or more relay 5 is maintained in operated position during this interval and therefore a circuit for energizing relay 12 may be traced from ground at armature 34 by way of armature 30 to the winding of relay 12 to battery. Relay 12, upon energizing, at armature 41 completes a circuit for the stepping magnet 13 thereby causing the wipers 71 and 72 of the switch T to be operated to their first positions.

Relay 8, upon deenergizing, opens the circuit of relay 7 which in turn deenergizes after a short interval. At armature 34 relay 7 opens the circuit of the rotary magnet 15 and the circuit of relay 12. Providing relay 2 is in deenergized position a circuit may be traced which is now effective for releasing the minor switch B as follows: ground by way of armature 22, off-normal springs 51 which are closed on the first step of the switch B, and

the operation of the release magnet 16 the minor switch B is released to its normal position at which point the off-normal springs 51 open. The deenergization of relay 12 merely opens the circuit of the rotary magnet 13 of the switch B. At armature 35 relay 7 reestablishes the circuit for the vibrating relay 8 whereupon the latter relay again starts to vibrate and again operates relay 7 after a two-second interval. When relay 7 pulls up the second time magnet 15 again operates to step the switch B as previously described and again operates the relay 12 provided relay 5 is maintained energized by a prolonged ring of four seconds or more. Relay 12 at armature 41 again closes the circuit for operating the stepping magnet 13 of the switch T.

In case the duration of the ring is less than four seconds, relay 1 will deenergize, relay 2 will energize, and relay 5 will deenergize before relay 7 operates for the second time. Relay 5, upon deenergizing, at armature 31 closes a circuit by way of armature 26 and off-normal springs 50 to the release magnet 14 of the switch T to cause the same to release.

However, in this case, since the operator is being called, the ring is of sufficient duration to keep relay 5 maintained until after the second operation of relay 7. The operation of stepping magnet 13 therefore rotates the wipers 71 and 72 into engagement with their second set of bank contacts. In this position a circuit may be traced for the change over relay 4 as follows: ground by way of armature 23 and its resting contacts, wiper 71, and winding of relay 4 to battery. Relay 4, upon energizing, at armature 28 prepares a circuit for energizing relay 3 and at armature 29 prepares a release circuit for release magnet 14.

The minor switch B continues to step and release at two-second intervals as long as relay 2 remains in deenergized position and the relays 7 and 8 function as long as relay 6 is locked up.

At the end of the long code ring relay 1 releases and reestablishes the energizing circuit for relay 2. Relay 2, upon energizing, at armature 20 opens the circuit extending to the code lamp; at armature 21 and its back contact opens the circuit of relay 5 which releases and at its front contact completes an energizing circuit for relay 3 by way of armature 28; and at armature 22 opens the release circuit extending to release magnet 16. Relay 3, upon energizing, at armature 23 and its resting contact removes ground from wiper 71 whereupon the slow acting change-over relay 4 deenergizes after an interval, and at its working contact closes a circuit for lighting the trouble lamp at the wire chief's position and also grounds the wiper 73 of the minor switch B. At armature 24 relay 3 opens a further

ing contact prepares an impulsing circuit to relay 12; at armature 25 completes a locking circuit for itself extending from grounded armature 37 and at armature 26 closes a circuit for energizing the release magnet 14 of the switch P as long as the slow acting relay 4 and the off-normal springs 50 are in operated position. Release magnet 14 energizes over the following circuit: ground by way of armature 31 and its resting contact, armature 26 and its working contact, armature 29, off-normal springs 50 and winding of release magnet 14 to battery. By the operation of the release magnet 14 the wipers 71 and 72 of the switch T are returned to their normal positions at which time the off-normal springs 50 break the circuit of the release magnet. After an interval of time for which it is adjusted, slow acting change-over relay deenergizes and at armature 28 opens the original energizing circuit of relay 3; and at armature 29 opens a point in the release circuit to release magnet 14 so as to render the release circuit extending to the release magnet 14 ineffective responsive to subsequent rings.

In this case, since the calling subscriber desires the regular exchange operator, he will operate his magneto for a short ring. Responsive to this ring, relay 1 energizes and causes the deenergization of relay 2. Relay 2, upon deenergizing, again lights the code lamps at the wire chief's and the dispatcher's positions and again operates the release magnet 16 in case the switch B is in an off-normal position; and at armature 21 instead of operating relay 5 as previously described, relay 2 now closes a circuit for relay 12 and the latter relay upon energizing transmits an impulse of current to the rotary magnet 13 of the switch T. After the short ring, relay 1 falls back and relay 2 deenergizes and extinguishes the code lamps, opens the circuit to relay 12, and opens the circuit to the release magnet 16. Responsive to the operation of the rotary magnet 13 wiper 72 of switch T is stepped into engagement with its first bank contact preparatory to signalling the exchange operator.

At this point it may be explained that although the trouble and flashover lamp at the wire chief's position and the dispatcher's position, respectively, are lighted such operators are apprised of the fact that there is no trouble due to the operation of their respective code lamps.

As previously described, relays 7 and 8 continue to operate intermittently as long as relay 6 is locked up and therefore relay 7 continues to operate stepping magnet 15 of switch B which has up to this time been released after each operation. At this time, however, the circuit of release magnet 16 is opened at armature 22 of relay 2 and the switch B is permitted to step without releasing. When wiper 73 of switch B reaches its second position relay 11 is energized over the following circuit: ground by way of armature 23 and its working contact, wiper 73 in engagement with its second bank contact, and winding of relay 11 to battery. Relay 11, upon energizing, at armature 40 completes a locking circuit for itself and at armature 39 grounds the wiper 72 thereby causing the line lamp at the exchange operator's position to be lighted. Responsive to the lighting of the lamp at the operator's position the exchange operator inserts the plug of her associated cord circuit (not shown) and in known manner completes the remainder of the connection. Responsive to the insertion of the plug, a circuit is closed by way of jack spring 80 and its working contact, conductor 81, to relay 9. Relay 9, upon energizing, at armature 37 and its working contact, closes a circuit for lighting the busy lamps at all of the operators' positions and at its resting contact opens the locking circuits of relays 3 and 11. Relay 11, upon deenergizing, at armature 40 opens a point in its own locking circuit and at armature 39 removes ground from wiper 72, thereby extinguishing the line lamp at the operator's position. Relay 3, upon deenergizing, at armature 23 opens the circuit extending to the trouble lamp at the wire chief's position; at armature 24 reestablishes the circuit for relay 5 at its resting contact and at its working contact opens the circuit extending to relay 12; at armature 25 opens a point in its own locking circuit; and at armature 26 and its resting contact closes the release circuit extending to the release magnet 14 whereupon the wipers of the switch T are returned to their normal position.

Minor switch B continues to step as previously described until its wiper 74 reaches its sixth bank contact whereupon relay 10 energizes. Relay 10, upon energizing, at armature 38 opens the locking circuit of relay 6 at its resting contact and at its working contact closes a circuit for operating the release magnet 16 of the switch B. The switch B releases in the same manner as previously described and opens the circuit of relay 10 which also releases after an interval. Relay 6, upon deenergizing, at armature 32 opens the circuit extending to the flashover lamp as well as the circuit extending to relay 8 and at armature 33 opens a further point in its locking circuit. From the foregoing it will be seen that both the switches B and T as well as all of the relays except relay 9 are now in their normal positions.

After conversation the release of the connection takes place in the well known manner and responsive to the removal of the plug from the jack J the circuit of relay 9 is opened, whereupon said relay falls back and extinguishes the busy lamps.

In case a calling subscriber or a line man should desire connection with either the wire

chief or the dispatcher, such party would ring the usual long ring of four seconds or more followed by either two short or three short rings dependent upon whether the wire chief or the dispatcher was wanted. After the long ring, two short rings would cause the switch T to move to its second position and signal the wire chief while three short rings, following the long ring, would signal the dispatcher. This operation is readily apparent from the foregoing description and therefore need not be described in detail.

Having described the detailed operation which takes place when any one of three operators is desired by a calling party, a brief description will be given of the operation which takes place when a calling subscriber calls another subscriber on his own line.

For this purpose it will be assumed that subscriber A desires to converse with subscriber A3 and that the code ring of subscriber A3 is two short rings followed by three short rings. In this case the duration of each ring is less than four seconds and therefore wiper 71 of switch T does not reach its second position responsive to the operation of relays 1, 2, and 5. Therefore, at the end of each short ring, in case the switch T or B should have been operated one step by the interrupter relays, relay 5 deenergizes and causes the release of switch T while relay 2 causes the release of switch B as previously described. Since it is necessary for switch T to reach its second position in order to operate relays 3 and 4, and since the operation of relays 3 and 4 is necessary to change over the circuit in order to selectively signal the various operators, it therefore follows that the operators are never signalled unless the duration of the code ring is of sufficient interval, four seconds or more, to permit the second operation of relay 7 to transmit a second impulse to the stepping magnet 13 before relay 5 deenergizes and closes the release circuit to the release magnet 14.

The interrupter relays, however, continue to operate in the manner previously described and after the calling subscriber has finished ringing the code of the called subscriber, switch B is permitted to operate without releasing. In this case no circuit is completed for relay 11 in the second position of switch B because relay 3 is not operated, but when switch B finally reaches its sixth position relay 10 energizes and causes the release of switch B and the deenergization of relay 6 to stop the operation of the interrupter relays 7 and 8. After an interval relay 10 releases and all apparatus in the selecting device S is in its normal position.

The called subscriber, upon recognizing his code call removes his receiver thereby completing the desired connection.

Several features which heretofore were inconvenient to explain will now be described.

One of the features relates to the trouble lamp at the wire chief's position which gives an indication to the wire chief of the failure of the normally energized relay 2 to function properly, of calls which are not answered by the exchange operator, and wrong calls or calls which are abandoned after the selector S has been partially operated.

In case the circuit of relay 2 should go open or such relay should fail to operate properly the same will release. The relays in the selecting device S will operate in the same manner as previously described except that relay 3 will not operate and relay 5 will be maintained energized. The operation is as follows: Relay 2, upon deenergizing, lights the code lamps at the wire chief's and dispatcher's positions, energizes relay 5, and prepares the release circuit of release magnet 16 so that switch B will always be returned to its normal position after each deenergization of rotary magnet 15. Relays 5, 6, 8, and 7 operate as previously described and relay 7 sends impulses to both magnet 15 and relay 12 and relay 12 responds to each energization of relay 7 and causes the operation of rotary magnet 13 to step the wipers 71 and 72 to their last set of bank contacts whereupon a circuit for lighting the trouble lamp may be traced as follows: ground by way of armature 23 and its resting contact, wiper 71 and last bank contact accessible thereto, and trouble lamp at the wire chief's position to battery. Switch T remains in this position until it is released. Due to the continuous lighting of the code and trouble lamps the wire chief is apprised of the fact that the selecting device S is not functioning properly and that the fault should be corrected.

A case of trouble will now be assumed in which the selecting device S operates correctly responsive to a subscriber ringing the code of the exchange operator and such operator does not answer the call because her line lamp is burned out. The selecting device S will operate in the same manner as previously described. Relay 3 will energize and light the trouble lamp. In this case the trouble lamp alone is maintained lighted until relay 9 is operated by one of the operators plugging in on the line. The wire chief will know after testing the line, if the exchange operator is at her position, that the line lamp associated with this line is burned out in case such operator did not receive the usual signal.

It will now be assumed that a calling subscriber has operated his magneto for one long

ring of four seconds duration or more and for some reason abandons the call.

In this case, as before, the relays operate in the same manner; relay 3 after a period of four seconds lighting the trouble lamp. The switch B continues to step without releasing since relay 2 is energized and energizes relay 11 after four seconds and relay 10 after twelve seconds. Relay 10 releases switch B and relay 6 thereby stopping the operation of the interrupter relays 7 and 8. Relay 3, however, is maintained until its locking circuit is opened by relay 9 which can only be operated by one of the operators plugging in on the line. In this case the wire chief will plug in on the line and if she gets no response to her inqury she will know that the call was abandoned.

Another feature to be described relates to the purpose of the flashover lamp at the dispatcher's position. In addition to the telephone line equipment, the dispatcher's position is also provided with the usual indicating instruments for a high voltage transmission power system. The indicating instruments such as voltmeters, ammeters, and watt meters and other indicating devices, such as lamps at the dispatcher's position inform her of any cases of trouble which may occur. In case of trouble or flashover in transmission cables or on transmission lines, due possibly to faulty insulation, a short circuit or other known causes, such trouble or flashover will cause a surge of alternating current to be induced in the telephone lines in the vicinity. This induced surge of alternating current will operate the A. C. relay 1 causing the operation of the selecting device S to light the flash over lamp at the dispatcher's position as previously described. This same flashover lamp action also takes place during code ringing but due to the operation of the transmission indicating devices at the dispatcher's position in combination with the flashover lamp indicates to the dispatcher the trouble and its approximate location. The particular flash over lamp which is lighted indicates to the dispatcher the approximate location of the trouble or at least which one of the transmission feed lines is in trouble because telephone lines run parallel, or nearly so, to the transmission lines.

Having 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, an operator's position, a party line terminating in said position, a magneto for each subscriber on said party line, means responsive only to the operation of one of said magnetos in accordance with one particular code for signalling the operator, and means responsive to the operation of one of said magnetos in accordance with the code assigned to a subscriber on said line for preventing the operator from being signalled.

2. In a telephone system, an operator's position, a party line terminating in said position, a magneto for each subscriber on said party line, a line signal for said line at said position, means responsive only to the operation of one of said magnetos in accordance with one particular code comprising a ring of predetermined duration followed by another ring for operating said line signal, and means for preventing the operation of said line signal responsive to the operation of one of said magnetos in accordance with subscriber code rings when a subscriber calls another subscriber on his own line.

3. In a telephone system, an operator's position, a party line terminating in said position, a magneto for each subscriber on said party line, a line signal for said line at said position, means responsive to the operation of one of said magnetos in accordance with a prolonged ring for preparing for the operation of said line signal, means responsive to a subsequent operation of said magneto for operating said line signal, and means for rendering said preparing means inoperative responsive to the operation of one of said magnetos in accordance with a subscriber's code ring when a subscriber calls another subscriber on his own line.

4. In a telephone system, a plurality of operator's positions, a party line terminating in said positions, a magneto for each subscriber on said line, a line signal for said line at each of said positions, means responsive to the operation of one of said magnetos in accordance with a prolonged ring for preparing for the operation of any one of said line signals, and means responsive to subsequent operations of said magneto in accordance with different codes for selecting and operating different ones of said line signals.

5. In a telephone system, a plurality of operator's positions, a party line terminating in said positions, a magneto for each subscriber on said line, a line signal for said line at each of said positions, means responsive to the operation of one of said magnetos in accordance with a prolonged ring for preparing for the operation of any one of said line signals, means responsive to subsequent operations of said magneto in accordance with different codes for selecting and operating different ones of said line signals, and means responsive to a calling subscriber operating his magneto in accordance with a subscriber's code for rendering said preparing means inoperative.

6. In a telephone system, an operator's position, a calling line terminating in said position, a line signal for said line at said position, a combined timing and selecting de-

vice, a hand generator on said line, and means responsive to the operation of said generator in accordance with a predetermined code for operating said device to select and operate said signal.

7. In a telephone system, a plurality of operator's positions, a party line terminating in said positions, a line signal at each of said positions for said line, a combined timing and selecting device, hand generators associated with each substation on said line for signalling subscribers on said line and for operating said device, and means responsive to the operation of said generators in accordance with predetermined codes for operating said device to select and operate only one of said line signals, the operated signal corresponding to the operated code.

8. In a telephone system, a relay interrupter adapted to generate impulses at predetermined time intervals, means for initiating the operation of said relay interrupter, a switch having a wiper operated one step responsive to each of said impulses, means for automatically releasing said switch responsive to said wiper reaching a predetermined position and for rendering said switch non-operative responsive to further impulses generated by said relay interrupter, and means for thereafter directively operating said switch.

9. In a telephone system, a relay interrupter, adapted to generate impulses at predetermined time intervals, means for initiating the operation of said relay interrupter, a switch having a wiper operated one step responsive to each of said impulses, means for automatically releasing said switch responsive to said wiper reaching a predetermined position and for rendering said switch non-operative responsive to further impulses generated by said relay interrupter, means for thereafter directively operating said switch, means for prematurely releasing said switch before the said wiper reaches said predetermined position, and means responsive to the premature release of said switch for rendering said switch non-responsive to said directive means.

10. In a telephone system, a relay interrupter adapted to generate impulses at predetermined timed intervals, means for initiating the operation of said relay interrupter, a switch having a wiper operated one step responsive to each of said impulses, means for automatically releasing said switch responsive to said wiper reaching a predetermined position and for rendering said switch non-operative responsive to further impulses generated by said relay interrupter, means for thereafter directly operating said switch, a second switch operated step by step responsive to said relay interrupter impulses, and means operated when said second switch reaches a predetermined point for releasing itself and for stopping the operation of said relay interrupter.

11. In a telephone system, a plurality of operators' positions, a calling line terminating in said positions, a line signal for said line at each of said operators' positions, a step-by-step switch, means controlled from said line for initially operating said switch as a timing device to step at predetermined time intervals, means for releasing said switch, and means controlled from said line for subsequently operating said switch as a selecting device to select and operate a particular one of said line signals.

12. In a telephone system, a plurality of operators' positions, a calling line terminating in said positions, a line signal for said line at each of said operators' positions, a step-by-step switch, means controlled from said line for initially operating said switch as a timing device to step at predetermined time intervals, means for releasing said switch, means controlled from said line for subsequently operating said switch as a selecting device to select and operate a particular one of said line signals, and means whereby said switch is never operated as a selecting device in case said switch takes less than a predetermined number of steps on its initial operation.

13. In a telephone system, a selecting device including a switch and a relay interrupter adapted to generate impulses at predetermined timed intervals, a subscriber's line terminating in said device, a magneto on said line, a relay in said device operated responsive to the operation of said magneto, means controlled by the operation of said relay for initiating the operation of said relay interrupter, said switch operated one step for each impulse generated by said relay interrupter, means controlled by said relay responsive to the cessation of the operation of said magneto for releasing said switch, a change-over relay in said device effecting when energized for rendering said switch non-responsive to said timed impulses and for rendering said switch responsive to directive control from said first relay, and means for energizing said change-over relay only in case said switch has been operated in its second step.

14. In a telephone system, a selecting device including a switch and a relay interrupter adapted to generate impulses at predetermined timed intervals, a subscriber's line terminating in said device, a magneto on said line, a relay in said device operated responsive to the operation of said magneto, means controlled by the operation of said relay for initiating the operation of said relay interrupter, said switch operated one step for each impulse generated by said relay interrupter, means controlled by said relay responsive to the cessation of the operation of said magneto for releasing said switch, a change-over relay in said device effective

when energized for rendering said switch non-responsive to said timed impulses and for rendering said switch responsive to directive control from said first relay, and means for energizing said change-over relay only in case said first relay is maintained in operated position by a continuous operation of said magnets until after the second impulse generated by said relay interrupter.

15. In a telephone system, an exchange operator's position, a wire chief's position, a party line terminating in said positions, a trouble signal for said line at said wire chief's position, a selecting device associated with said line, hand generators on said line for signalling subscribers on said line by code rings and for operating said device to selectively signal either the operator or the wire chief, means responsive to a calling subscriber ringing only a portion of an operator's code and then abandoning the call for operating said device, means responsive to the operation of said device for operating said trouble signal, and means operative in the case of an abandoned call for maintaining said signal in operated condition until the wire chief plugs in on the line.

16. In a telephone system, an exchange operator's position, a wire chief's position, a party line terminating in said positions, a line signal and a busy signal for said line at each of said positions, a code signal and a trouble signal for said line at said wire chief's position, a selecting device associated with said line, hand generators on said line for signalling by code rings subscribers on said line and for operating said device, means responsive to a calling subscriber ringing the code of the exchange operator for operating said device to operate the line signal associated with the exchange operator's position and to operate the code and trouble signals at the wire chief's position, means operative responsive to the exchange operator answering the call for operating the busy signals at said positions and for effecting said trouble signal, and means for maintaining said trouble signal in operated condition in case the exchange operator fails to answer the call.

17. In a telephone system, a wire chief's position, a party line terminating in said position, a trouble and a code lamp for said line at said position, a selecting device associated with said line, hand generators on said line for signalling by code subscribers on said line and for operating said device, means responsive to certain codes for operating said device to operate both said lamps, a busy lamp for said line at said position, means for operating said busy lamp when a call is answered, and means operative responsive to a case of trouble for lighting the trouble lamp alone whereby the wire chief is informed of the case of trouble.

18. In a telephone system, a dispatching operator's position, a subscriber's line terminating at said position, a flash-over signal for said line at said position, and means responsive to surges of alternating current induced in said line by trouble on power transmission lines for operating said signal whereby the dispatcher is informed by the combined operation of the trouble indicators for the transmission lines and the flash-over signal the approximate location of the trouble.

19. In a telephone system, a dispatching operator's position, a subscriber's line terminating at said position, a flash-over signal for said line at said position, and means for operating said signal responsive to currents being induced in said line from an adjacent power line.

20. In a telephone system, a dispatching operator's position, a subscriber's line terminating at said position, a flash-over signal for said line at said position, and means for operating said signal responsive to a subscriber's call and responsive to currents being induced in said line from an adjacent power line in case of trouble.

21. In a telephone system, a line terminating in a plurality of operators' positions, a signal for said line at each position, a hand generator associated with said line, and means responsive to the operation of said generator in accordance with a particular code for operating only the signal at a particular one of said positions.

22. In a telephone system, a line terminating in a plurality of operators' positions, a signal for said line at each position, a plurality of subscribers' stations on said line, a hand generator for each station, and means including the generator at a calling station for selectively operating the signals at said positions.

23. In a telephone system, a line terminating in a plurality of operators' positions, a signal for said line at each position, a hand generator associated with said line, and a combined timing and selecting switch controlled by said generator for selectively operating said signals.

24. In a telephone system, a plurality of operators' positions, a different predetermined code for calling different positions, a line terminating in said positions, a line signal for said line at each of said positions, a combined timing and selecting device, a hand generator on said line for operating said device, and means responsive to the operation of said generator in accordance with a particular one of said different codes for operating said device to select and operate only the line signal at a particular one of said positions.

25. In a telephone system, an operator's position, a combined timing and selecting device terminating a branch of said line, a line signal for said line at said position, hand

generators associated with each substation on said line for signalling the subscribers on the line and for operating said device, and means responsive to the operation of one of said generators in accordance with a predetermined code for operating said device to select and operate said line signal.

26. In a telephone system, a line extending from a subscriber's station to a plurality of operators' positions, a current generating device associated with the line at the station, a signal for the line at each position, and a switch controlled by said device for selectively operating said signals.

27. In a selective signalling device including an impulse generator and a control relay, a step-by-step switch, means controlled by said relay for rendering said generator effective to progressively operate said switch, and means responsive to the operation of the switch to a particular position for releasing the switch and for placing its further operation under the control of said relay independent of said generator.

28. In a selective signalling system, a line, means for connecting alternating current to the line in predetermined codes of long and short impulses, a selective signalling device including a step-by-step switch associated with said line, means in the device responsive to a long impulse of current for progressively operating said switch, and means responsive to the operation of the switch to a particular position for releasing the switch and for rendering it effective to operate responsive to short impulses of current.

29. In a signal selecting device, an impulse relay, an impulse generator controlled by said relay, and a step-by-step switch controlled initially by said generator and subsequently by said relay independent of said generator.

30. In a signal selecting device, an impulse relay, an interrupter controlled by said relay, and a switch initially operated automatically under control of said interrupter and subsequently operated directively under control of said relay.

31. In a signal selecting device, an impulse responsive relay, a stepping relay, an automatic switch controlled by said stepping relay, an interrupter, an initial circuit for said stepping relay including contacts of said interrupter, and a subsequent circuit for said stepping relay including contacts of said first relay.

32. In a signal selecting device adapted to receive a series of impulses, an interrupter, a switch, means for automatically operating said switch under control of said interrupter responsive to the first impulse of a series, and means for directively operating said switch independent of said interrupter responsive to succeeding impulses of the series.

33. In a signal selecting device adapted to receive a series of impulses, an interrupter, an automatic switch, a stepping circuit for said switch controlled by said interrupter effective responsive to the first impulse of a series, and a second stepping circuit for said switch independent of said interrupter effective responsive to succeeding impulses of the series.

In witness whereof, I hereunto subscribe my name this 26th day of October, A. D. 1928.

OSCAR C. LEVY.

DISCLAIMER

1,783,295.—*Oscar C. Levy*, Chicago, Ill. PARTY-LINE TELEPHONE SYSTEM. Patent dated December 2, 1930. Disclaimer filed August 26, 1933, by the patentee, assignee, *Associated Electric Laboratories, Inc.*, consenting.

Hereby enters this disclaimer to claims 1 to 7, inclusive, and 17 to 26, inclusive, in said patent specification which are in the following words, to-wit:

"1. In a telephone system, an operator's position, a party line terminating in said position, a magneto for each subscriber on said party line, means responsive only to the operation of one of said magnetos in accordance with one particular code for signalling the operator, and means responsive to the operation of one of said magnetos in accordance with the code assigned to a subscriber on said line for preventing the operator from being signalled.

"2. In a telephone system, an operator's position, a party line terminating in said position, a magneto for each subscriber on said party line, a line signal for said line at said position, means responsive only to the operation of one of said magnetos in accordance with one particular code comprising a ring of predetermined duration followed by another ring for operating said line signal, and means for preventing the operation of said line signal responsive to the operation of one of said magnetos in accordance with subscriber code rings when a subscriber calls another subscriber on his own line.

"3. In a telephone system, an operator's position, a party line terminating in said position, a magneto for each subscriber on said party line, a line signal for said line at said position, means responsive to the operation of one of said magnetos in accordance with a prolonged ring for preparing for the operation of said line signal, means responsive to a subsequent operation of said magneto for operating said line signal, and means for rendering said preparing means inoperative responsive to the operation of one of said magnetos in accordance with a subscriber's code ring when a subscriber calls another subscriber on his own line.

"4. In a telephone system, a plurality of operator's positions, a party line terminating in said positions, a magneto for each subscriber on said line, a line signal for said line at each of said positions, means responsive to the operation of one of said magnetos in accordance with a prolonged ring for preparing for the operation of any one of said line signals, and means responsive to subsequent operations of said magneto in accordance with different codes for selecting and operating different ones of said line signals.

"5. In a telephone system, a plurality of operator's positions, a party line terminating in said positions, a magneto for each subscriber on said line, a line signal for said line at each of said positions, means responsive to the operation of one of said magnetos in accordance with a prolonged ring for preparing for the operation of any one of said line signals, means responsive to subsequent operations of said magneto in accordance with different codes for selecting and operating different ones of said line signals, and means responsive to a calling subscriber operating his magneto in accordance with a subscriber's code for rendering said preparing means inoperative.

"6. In a telephone system, an operator's position, a calling line terminating in said position, a line signal for said line at said position, a combined timing and selecting device, a hand generator on said line, and means responsive to the operation of said generator in accordance with a predetermined code for operating said device to select and operate said signal.

"7. In a telephone system, a plurality of operator's positions, a party line terminating in said positions, a line signal at each of said positions for said line, a combined timing and selecting device, hand generators associated with each substation on said line for signalling subscribers on said line and for operating said device, and means responsive to the operation of said generators in accordance with predetermined codes for operating said device to select and operate only one of said line signals, the operated signal corresponding to the operated code."

"17. In a telephone system, a wire chief's position, a party line terminating in said position, a trouble and a code lamp for said line at said position, a selecting device associated with said line, hand generators on said line for signalling by code subscribers on said line and for operating said device, means responsive to certain codes for operating said device to operate both said lamps, a busy lamp for said line at said position, means for operating said busy lamp when a call is answered, and means operative responsive to a case of trouble for lighting the trouble lamp alone whereby the wire chief is informed of the case of trouble.

"18. In a telephone system, a dispatching operator's position, a subscriber's line terminating at said position, a flash-over signal for said line at said position, and means responsive to surges of alternating current induced in said line by trouble on power

transmission lines for operating said signal whereby the dispatcher is informed by the combined operation of the trouble indicators for the transmission lines and the flash-over signal the approximate location of the trouble.

"19. In a telephone system, a dispatching operator's position, a subscriber's line terminating at said position, a flash-over signal for said line at said position, and means for operating said signal responsive to currents being induced in said line from an adjacent power line.

"20. In a telephone system, a dispatching operator's position, a subscriber's line terminating at said position, a flash-over signal for said line at said position, and means for operating said signal responsive to a subscriber's call and responsive to currents being induced in said line from an adjacent power line in case of trouble.

"21. In a telephone system, a line terminating in a plurality of operators' positions, a signal for said line at each position, a hand generator associated with said line, and means responsive to the operation of said generator in accordance with a particular code for operating only the signal at a particular one of said positons.

"22. In a telephone system, a line terminating in a plurality of operators' positions, a signal for said line at each position, a plurality of subscribers' stations on said line, a hand generator for each station, and means including the generator at a calling station for selectively operating the signals at said positions.

"23. In a telephone system, a line terminating in a plurality of operators' positions, a signal for said line at each position, a hand generator associated with said line, and a combined timing and selecting switch controlled by said generator for selectively operating said signals.

"24. In a telephone system, a plurality of operators' positions, a different predetermined code for calling different positions, a line terminating in said positions, a line signal for said line at each of said positions, a combined timing and selecting device, a hand generator on said line for operating said device, and means responsive to the operation of said generator in accordance with a particular one of said different codes for operating said device to select and operate only the line signals at a particular one of said positions.

"25. In a telephone system, an operator's position, a combined timing and selecting device terminating a branch of said line, a line signal for said line at said position, hand generators associated with each substation on said line for signalling the subscribers on the line and for operating said device, and means responsive to the operation of one of said generators in accordance with a predetermined code for operating said device to select and operate said line signal.

"26. In a telephone system, a line extending from a subscriber's station to a plurality of operators' positions, a current generating device associated with the line at the station, a signal for the line at each position, and a switch controlled by said device for selectively operating said signals."

[*Official Gazette September 19, 1933.*]