

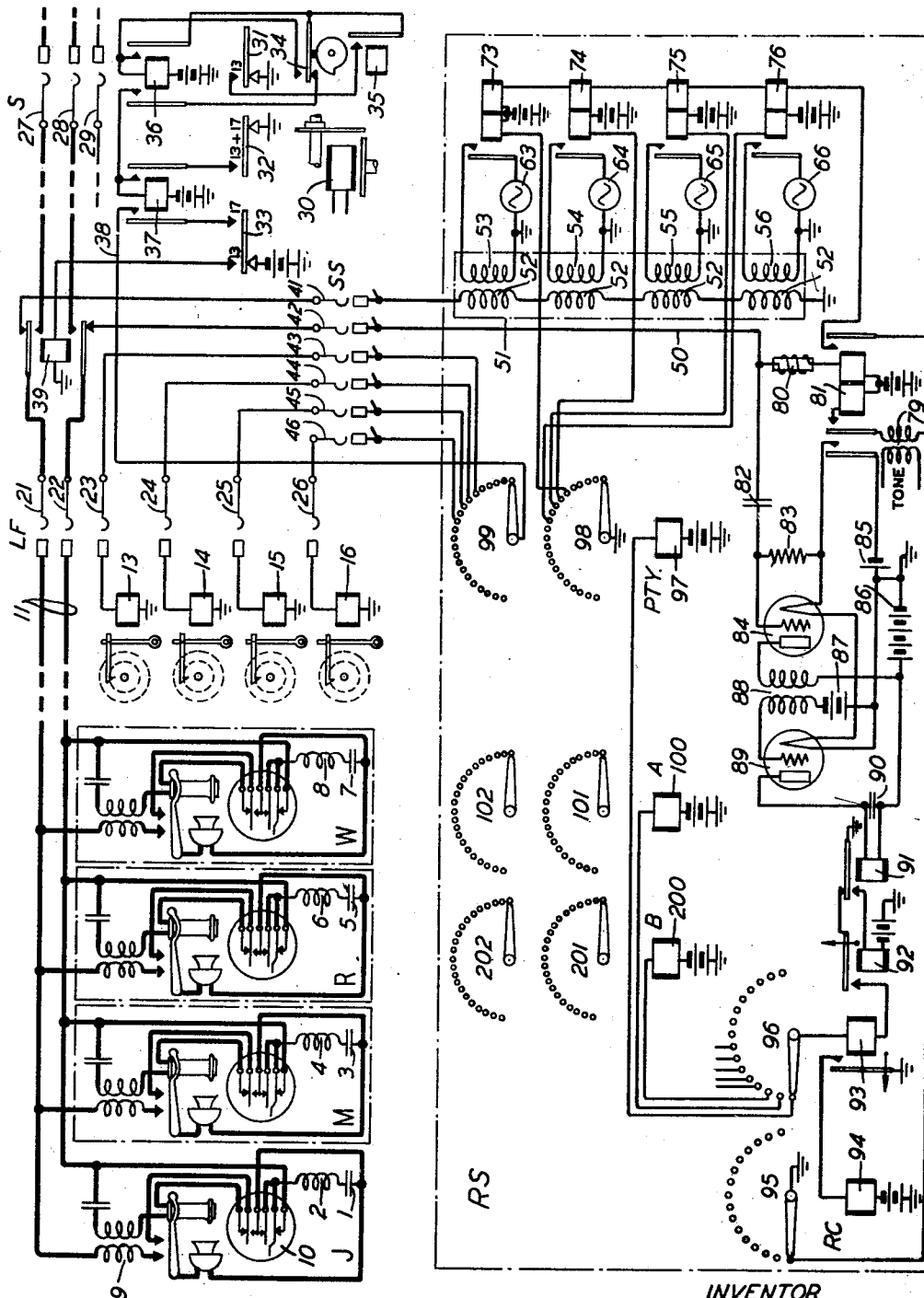
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TELEPHONE EXCHANGE SYSTEM

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TELEPHONE EXCHANGE SYSTEM

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This invention relates to telephone systems and particularly to party line systems in which connections are obtained by calling dials at the substations and in which service charges are made automatically.

The objects are to facilitate the establishment of connections by subscribers on a party line, to insure the proper assessment of service charges against calling parties, to render it impossible for a calling subscriber to evade the service charge, and to otherwise improve systems of this character.

Systems have been proposed heretofore in which tests are made by the application of sources of alternating current of different frequencies to identify the calling station in order to enable the selection and operation of the corresponding message register. It has also been suggested to employ alternating current impulses for the purpose of controlling the selective operation of automatic switches. Moreover, it is old for a calling subscriber on a party line to send a special code individually characteristic of his station to effect the selection and operation of his service meter.

According to the present invention, advantages are secured over arrangements of the foregoing character by means of a party line telephone system in which a calling party, by first dialing his own party designation, selects one of a number of sources of alternating current. This selected source is individual to the calling station and may be used only by that station for dialing alternating-current impulses to cause the selective operation of the central office switches to complete the connection to the called line. These results are secured by equipping the several stations on a party line with circuits tuned respectively to different frequency sources of alternating current so that any particular party will be able to send switch operating impulses only if he has first dialed the code identifying his station. The act of dialing the identifying code of the calling station in addition to causing the selection of the proper source to enable further dialing also causes the selection and operation of the calling subscriber's message register. Should a

calling party attempt to evade the service charge by dialing the code of another station, the frequency thus selected will not correspond with the tuned circuit at his station and any further operation of his dial will fail to establish the desired connection. Not only will he fail to secure a connection, but none of the service meters associated with his line will be operated.

The drawing shows the invention applied to a four-party line in an automatic telephone system.

The drawing shows, diagrammatically, four subscribers' stations J, M, R and W, a line-finder switch LF and an associated selector switch S, and a register sender RS for recording the office and numerical digits of a called subscriber's number and for controlling the operation of the various switches used in extending a connection between a calling and a called station.

The telephone equipment at each of the subscribers' stations J, M, R and W is of the usual type, provided with a dialing device for use in directing the extension of the calling line to any other line with which a connection is desired; the ringing equipment has been omitted since it is not involved in this invention. Each of these stations is also provided with an alternating-current filter; the filter at station J comprises the condenser 1 and coil 2; the filter at station M comprises the condenser 3 and coil 4; the filter at station R comprises the condenser 5 and coil 6; and the filter at station W comprises the condenser 7 and coil 8. Each of these filters, or networks, is connected in series with the transmitter and interrupter contacts of the dialing device but is normally short-circuited by other contacts of the dial. When the dial is moved off normal, after the receiver has been removed from the receiver hook, this short circuit is opened and the dialing circuit includes the filter. Thus, when the subscriber at station J is originating a call, the dialing loop is traced from the upper conductor of line 11 through the winding of induction coil 9, the left contacts of the receiver-hook springs, the upper front contact of the dial springs, through condenser 1 and coil 2, and through the interrupter contacts

10 of the dial to the lower conductor of line 11. The filter at station J is designed to pass current of one frequency; the filter at station M is designed to pass current of a second frequency; the filter at station R is designed to pass current of a third frequency; and the filter at station W is designed to pass current of a fourth frequency.

The line 11 connects to terminals in the banks of a group of line-finders in the central office including the line-finder switch LF which is represented by the brushes designated 21 to 26, inclusive. The usual line and line cut-off relays are provided but are not shown in the drawing as they are not necessary to a clear understanding of the invention. The message registers 13, 14, 15 and 16 are provided for separately registering the calls originated and completed from each of the four stations of line 11. The line-finder LF is permanently associated with a first selector switch S which is represented schematically by the brushes 27, 28 and 29. The line-finder LF and selector S may be of the panel type and of substantially the same construction and operation as is shown and described in the patent to O. H. Kopp No. 1,589,402, issued June 22, 1926. The line-finder selector unit includes a sender-selector switch SS which is represented by the brushes 41 to 46, inclusive, for extending a calling line to an idle register sender such as RS; the patent to Stearn et al. 1,395,977 issued November 1, 1921, discloses a system in which a sender selector of the rotary type is used for this purpose. The line-finder selector unit includes a sequence switch represented by the magnet 30 and the cams 31, 32 and 33, for controlling the operating circuits of this unit. The sequence switch may be similar to that illustrated in the aforementioned Kopp and Stearn et al. patents. The line-finder selector unit also includes the usual supervisory relay 35 which is operated in consequence of the answer of the called subscriber, and the charging relays 36 and 37 which control the operation of the calling subscriber's message register. The control relay 39 is provided for transferring the calling line from connection with the register sender to the brushes of selector S to establish the talking circuit.

The register sender RS is in general of the same character as the register senders shown and described in the above mentioned patents to Kopp and Stearn et al. The switches for recording the digits dialed by the calling subscriber include a party-designation register in addition to the usual office code and numerical registers. The party-designation register PTY is represented by the stepping magnet 97 and brushes 98 and 99 together with the associated terminal banks; the office code and numerical registers are represented by the registers A and B, comprising the stepping magnets 100 and 200 with the banks and

brushes 101 and 102 and 201 and 202; the remaining register switches are omitted in their entirety. The usual register-control switch is provided for successively directing the dial impulses to the proper register switches; this control switch RC comprises the stepping magnet 94, the brushes 95 and 96 and their associated terminal banks. All of the registers and the register-control switches are of the type in which the brushes are advanced one step by each release of the stepping magnet.

Since alternating current is used for transmitting dial impulses the register sender RC includes the transformer 51 which has four primary windings 53, 54, 55 and 56 and a secondary winding 52 which inductively cooperates with each of the primary windings to impose alternating potentials of four different frequencies across the calling line at the time that the first letter or digit is dialed. The potentials of the four frequencies are supplied to the primary windings of the transformer by the sources 63, 64, 65 and 66 under the control of relays 73, 74, 75 and 76. The first digit dialed indicates which of the stations on a party line is the calling station; and during the dialing of this digit relays 73, 74, 75 and 76 are all operated to simultaneously impose the four dialing-frequency potentials on the line. During the dialing of the subsequent digits, only that one of relays 73, 74, 75 or 76 is operated which is effective to impose the dialing-frequency potential which corresponds to the first digit dialed. Consequently, if a calling subscriber falsely dials a party designation other than his own, the filter at his station will not pass the current from the potential source corresponding to the filter at his station, and the further dialing by the calling subscriber will not be registered at the central office. A vacuum-tube receiver, comprising the tubes 84 and 89, is provided for responding to the alternating-current impulses created by the operation of the dial. The vacuum tubes 84 and 89 are of the usual three element type comprising a filament, a plate and a grid. The battery 85 supplies current for the filaments of both tubes and supplies the grid potential for tube 84, the battery 86 supplies current for the plate circuits of both tubes, and the battery 87 supplies the grid potential for tube 89. The grid of tube 84 is connected through condenser 82 to conductor 50 which is included in the dialing circuit as hereinafter described. Changes in the potential of conductor 50 are transmitted to the grid of tube 84, thereby causing variations of current in the plate circuit of this tube. The plate circuit of tube 84 is inductively coupled by transformer 88 to the grid of tube 89 which acts as an amplifier. An impulse relay 91 is connected in the plate circuit of tube 89. When the filament circuits are closed by the

operation of the relay 81 upon seizure of the register sender, the plate circuit current through the winding of relay 91 is effective to operate this relay. Each time the dial circuit is opened, the current in the plate circuit of tube 89 is reduced sufficiently to cause the release of relay 91. The trains of dial impulses received by relay 91 are successively directed to the various registers by the register-control switch RC.

Further understanding of the invention will be more easily obtained by assuming the origination of a call at the various stations of line 11 and describing the operation of the equipment shown. Assume first that the subscriber at station J has originated a call, that the line 11 has been extended through brushes 21 and 22 of line-finder LF and through brushes 41 and 42 of the associated sender-selector SS to the register sender RS. The line relay 81 of the register sender operates in a circuit which may be traced from battery through its right winding, winding of retard coil 80, conductor 50, terminal and brush 42 of the sender-selector, lower back contact of relay 39, brush 22 and terminal of line-finder LF, over the lower conductor of line 11, through the lowest and the middle back contacts of the dial 10 at station J, through the transmitter, the left receiver-switch contact, the left winding of induction coil 9, back over the upper conductor of line 11, terminal and brush 21 of line-finder LF, upper back contact of relay 39, brush 41 and terminal of sender-selector SS, through the secondary winding 52 of transformer 51, to ground. Relay 81 closes a locking circuit through its left winding and inner left front contact, through the secondary winding of tone transformer 79, through the normal terminal and brush 95 of the register-control switch, to ground. A dial tone is induced in this circuit through the windings of tone transformer 79 as a signal to the calling subscriber that the dial may be effectively operated. Relay 81 also closes a circuit through its right front contact for operating relays 73, 74, 75 and 76; and, with each of relays 73, 74, 75 and 76 operated, the various sources of dialing potentials 63, 64, 65 and 66 are respectively connected to the primary windings 53, 54, 55 and 56 of the transformer 51. Relay 81 also closes the circuit for energizing the filaments of tubes 84 and 85, thereby rendering these tubes effective to respond to dial impulses. The current in the plate circuit of tube 89 operates the impulse relay 91, and relay 91 in turn closes a circuit for operating relay 92.

The calling subscriber first dials a letter or numerical digit which corresponds to the particular party designation of the station. To illustrate, at station J, the letter J (or digit 5) should be dialed; at station M, the letter M (or digit 6) should be dialed; at station

R, the letter R (or digit 7) should be dialed; and at station W, the letter W (or digit 9) should be dialed. Since the call in question is from station J, the letter J (or digit 5) is dialed to indicate to the central office apparatus that station J is the calling station. When the dial is moved off normal, and as long as the dial is out of its normal position, the middle and upper back contacts of the dial are opened and the front contacts are closed; the lowest back contacts of the dial (that is, the interrupter contacts of the dial) remain closed until the dial begins its return movement. Thus, the direct current circuit through the right winding of relay 80 is opened at the off-normal contacts of the dial, and the alternating-current dialing circuit is rendered effective since the opening of the middle back contacts of the dial has opened the short circuit across the condenser 1 and coil 2. During the return of the dial to normal the current in the dialing circuit is successively interrupted five times at the lowest contacts of the dial. At each interruption, the potential of conductor 50 is increased since there is no longer a potential drop in the windings of the relay 81 and coil 80. The impulse variations in the potential of conductor 50 are amplified by the vacuum tubes 84 and 89 so that the corresponding variations in the current through the winding of relay 91 are effective to cause the alternate release and reoperation of this relay.

The first release of relay 91, upon receipt of the impulses created by the dialing of the party-designation digit, closes a circuit from ground at its back contact, through the front contact of relay 92, winding of relay 93, brush 96 and normal terminal, through the winding of stepping magnet 97, to battery. Relay 93 and magnet 97 both operate in this circuit. Relay 93 closes a circuit for operating the stepping magnet 94 of the register-control switch. When relay 91 reoperates at the end of the first impulse, magnet 97 releases thereby advancing the brushes 98 and 99 one step, that is, from their normal to their first off-normal position. The alternate release and reoperation of relay 91 in response to each of the succeeding impulses created by the dialing of the party-designation digit, causes the alternate operation and release of magnet 97 thus advancing the brushes 98 and 99 to the fifth off-normal terminal of their banks. Relay 92 remains operated during the receipt of impulses since this relay is slow in releasing. Relay 93 is also slow in releasing so that it remains operated until all of the impulses, corresponding to a single digit have been received. When relay 93 releases, magnet 94 releases thereby advancing the brushes 95 and 96 of the register-control switch one step to the first off-normal position.

When brush 95 is advanced from its normal position, the dial tone circuit through

the left winding of relay 81 is opened and the circuit through the right windings of relays 73, 74, 75 and 76 is opened. Relays 74, 75 and 76 release but relay 73 remains operated since its left winding is energized in a circuit which passes through the fifth off-normal terminal and brush 98 of the party-designation register. The dialing-frequency potential source 63 continues to be inductively imposed on the line 11 through windings 53 and 52 of transformer 51, but the dialing-frequency potential sources 64, 65 and 66 are no longer operatively associated with the transformer. The dialing of each of the office code and numerical digits is now effective to repeat the cycle of operations described above as being responsive to the dialing of the party-designation digit. The impulses created by the dialing of the first office code digit are directed to magnet 100, those created by the dialing of the second office code digit are directed to magnet 200, and the succeeding trains of impulses are successively directed by the register-control switch RC to the remaining register switches in like manner.

If the subscriber at station J has dialed any other party designation (or a digit other than 5) further dialing would be ineffective. To illustrate, if the subscriber at station J dials M (or 6) as the first digit, brush 98 is advanced to the sixth off-normal terminal. Since relay 74 is now held operated, while relays 73, 75 and 76 release, the dialing-frequency potential source 64 remains operatively associated with transformer 51. But the condenser 1 and coil 2 do not permit current of this frequency to pass so that the opening and closing of the interrupter contacts of the dial do not cause corresponding impulses to be received by relay 91. This condition would also result if either of dialing-frequency potential sources 75 or 76 were at this time operatively associated with transformer 51.

When the brushes of selector switch S and the other necessary switches have been directionally advanced under the control of the register sender RS to extend the connection to the desired line, the sequence switch of selector S is advanced under the control of the register sender in the usual manner into the proper position for closing the talking path between the calling and called lines. This operation is fully described in the aforementioned patents to Kopp and Stearn et al. When the sequence switch enters position 13, assuming this to be the talking position, a circuit for operating relay 39 is closed from ground through the winding of this relay, and through the left springs of sequence switch cam 33, to battery. Relay 39 disconnects line 11 from the register sender RS and extends this connection to brushes 27 and 28. The register sender is, ordinarily, entirely

disconnected from the line-finder selector unit after talking selection is completed, the ringing of the called station being automatically controlled by the penultimate selector of those used in completing the connection; but in the system here illustrated the register sender remains connected with the line-finder selector unit until the connection is released by the calling subscriber. When the called subscriber answers, assuming that to be the case, the supervisory relay 35 is operated in the usual manner as is fully described in the aforementioned patents to Kopp and Stearn et al. As soon as the upper contacts of interrupter 34 are closed, after relay 35 has operated, a circuit is closed from ground through the left springs of sequence-switch cam 31, front contact of relay 35, upper contacts of interrupter 34, through the winding of relay 36, to battery. Relay 36 operates and locks through its right front contact and the front contact of relay 35, to the same ground. The interrupter 34 is designed to close its lower contacts two seconds after it opens its upper contacts. If relay 35 has not released before the lower contacts of interrupter 34 are closed, relay 37 is operated in a circuit from battery through its winding, left front contact of relay 36, lower contacts of interrupter 34, front contact of relay 35, to ground at sequence-switch cam 31. Relay 37 locks through its front contact to ground at sequence switch cam 32 until the sequence switch has advanced beyond position 17. No further operation takes place until the calling subscriber replaces the receiver upon the receiver hook, at which time the sequence switch magnet 30 is energized to advance the switch into position 17, in which position the meter 13 of the calling station J is operated. The circuit for operating meter 13 is traced from ground through the winding of this meter, brush 23 of line-finder LF, brush 43 of sender-selector SS, the fifth off-normal terminal and brush 99 of the party-designation register, over conductor 38, through the left front contact of relay 37, and through the upper right and lower contacts of sequence-switch cam 33 to battery. The register sender RS is thereafter released, the line-finder switch LF and the selector S being restored to normal in the usual manner.

If the call originates at station M, the calling subscriber dials the letter M (or digit 6) as the first digit, the party-designation register being thereby advanced to the sixth off-normal position; in this case relay 74 is held operated, after the brushes of the register-control switch RC have advanced out of their normal position, to render the dialing-frequency potential source 64 continuously effective in cooperation with transformer 51 to supply dialing current which is passed by the condenser 3 and coil 4. If the call originates at station R, the calling subscriber dials the

letter R (or digit 7) as the first digit, the party-designation register being thereby advanced to the seventh off-normal position; in this case relay 75 is held operated to render the dialing-frequency potential source 65 continuously effective in cooperation with transformer 51 to supply dialing current which is passed by the condenser 5 and coil 6. If the call originates at station W, the calling subscriber dials the letter W (or digit 9) as the first digit, the party-designation register being thereby advanced to the ninth off-normal position; in this case relay 76 is held operated to render the dialing-frequency potential source 66 continuously effective in cooperation with transformer 51 to supply dialing current which is passed by the condenser 7 and coil 8.

It is, of course, understood that the application of the invention is not limited to the specific arrangement disclosed. An advantageous modification of this arrangement would consist of providing station designation relays in the line-finder selector unit which would control the operation of the calling subscriber's meter. These relays could be operated under control of brush 99 at the time that the sequence switch of the selector S is advanced to the talking position and the register sender RS could then be released as soon as talking selection is completed in the usual manner.

What is claimed is:

1. The combination in a telephone system of a line having a calling dial, a plurality of sources of current each of a different characteristic, automatic switches, means responsive to the operation of said dial for selecting a particular one of said sources of current, and means responsive to other operations of said dial for sending impulses of current supplied from said selected source to cause the selective operation of said automatic switches.

2. The combination in a telephone system of a line having a number of stations thereon, calling dials for said stations, sources of alternating current of different frequencies, each source being individual to a particular one of said stations, automatic selector switches, means responsive to the operation of the dial at a calling station for selecting the source of current individual to said station, and means controlled by other operations of said dial for sending impulses of current supplied from said selected source to effect the operation of said automatic selector switches.

3. In a telephone system, a line having a calling dial at a substation thereof, a plurality of sources of current, each of a different electrical characteristic, automatic switches, means responsive to an initial operation of said dial for choosing a particular one of said sources of current, and means responsive to

other operations of said dial for transmitting impulses supplied from said chosen source of current to cause the selective operation of said switches, said last means being ineffective to cause the operation of said switches in case said dial is actuated to select a source of current other than said particular source of current.

4. In a telephone system, a line serving a plurality of subscribers' stations, a calling device at each of said stations, a plurality of sources of current each of a different characteristic, filters one at each of said stations for passing current from a different one of said sources, and means responsive to the operation of the dialing device at any one of said stations for rendering the corresponding one of said sources effective during the further operation of said device.

5. In a telephone system, a line serving a plurality of subscribers' stations, a calling device at each of said stations, a plurality of sources of potential each of a different characteristic, filters one for each of said stations for passing current from a different one of said sources, means for imposing all of said sources of potential on said line, and means responsive to the operation of the dial at any one of said stations for imposing a single one of said sources on said line during the further operation of said dial.

6. In a telephone system, a line serving a plurality of subscribers' stations, a calling device at each of said stations, filters one for each of said stations each of said filters designed to pass current of a different characteristic, a plurality of sources of current each of a different characteristic, automatic switches, means responsive to the operation of the dialing device at any one of said stations for selecting a particular one of said sources of current, and means responsive to other operations of said dial for sending impulses of current supplied from said selected source to cause the operation of said automatic switches.

7. In a telephone system, a line serving a plurality of subscribers' stations, a calling device at each of said stations, a plurality of sources of potential each of a different characteristic, filters one for each of said stations for passing current from a different one of said sources, means responsive to the operation of the dialing device at a calling one of said stations for imposing a single one of said sources on said line, automatic switches, and means effective only if said single source is the source corresponding to said calling station for advancing said switches in response to the further operation of said device.

8. In a telephone system, a line having a number of substations thereon, calling dials for said substations, a plurality of sources of alternating current having different fre-

- quencies each individual to a particular one of said stations, tuned circuits for said substations each circuit exclusively tuned to the frequency of the source individual thereto, automatic switches, means for connecting all of said sources to the line to enable a calling party to dial a preliminary series of impulses to select the source of current individual to his station, means for disconnecting the remaining sources of current from said line, and means responsive to subsequent operations of said dial for sending impulses of current from the selected source to actuate said automatic switches.
9. The combination in a telephone system of a line having a plurality of substations thereon, calling dials for said substations, a plurality of sources of current, each of a different characteristic, selector switches, registers respectively individual to said substations, means responsive to the operation of the dial at a calling substation for selecting a particular one of said sources of current and for selecting the register individual to said substation, means responsive to other operations of said calling dial for sending impulses of current supplied from said selected source to cause the operation of said automatic switches, and means for operating the selected register.
10. In a telephone system, a line having a number of substations thereon, calling dials for said substations, a plurality of sources of alternating current having different frequencies each individual to a particular one of said substations, automatic switches, message registers individual respectively to said substations, a control switch, means responsive to a preliminary operation of a calling dial for operating said control switch to select the source of current individual to the calling substation and for selecting the message register individual to said substation, means responsive to further operations of the calling dial for operating said automatic switches by means of impulses furnished by said selected source of current, and means for actuating the selected message register.
11. In a telephone system, a line serving a plurality of subscribers' stations, a calling device at each of said stations, a message register for each of said stations, a plurality of sources of potential each of a different characteristic, filters one for each of said stations for passing current from a different one of said sources, means responsive to the operation of the dialing device at a calling one of said stations for selecting a particular one of said sources of current, and means effective only if said selected source is the one corresponding to the filter at said calling station for operating the message register of said calling station.
12. In a telephone system, a line serving a plurality of subscribers' stations, a calling dial at each of said stations, a message register for each of said stations, a plurality of sources of current each of a different characteristic, filters one for each of said stations, each of said filters designed to pass current from a different one of said sources, automatic switches, control means responsive to the operation of the dial at a calling one of said stations for selecting a particular one of said sources of current, means responsive to other operations of said dial for sending impulses of current supplied from said selected source to operate said automatic switches, and means cooperating with said control means for operating the message register of said calling station.
13. The combination in a telephone system of a line serving a plurality of subscribers' stations, a calling dial for each of said stations, a message register for each of said stations, a plurality of sources of current each of a different characteristic, filters one for each of said stations, each of said filters designed to pass current from a different one of said sources, automatic switches, means responsive to the operation of the dial at a calling one of said stations for selecting a particular one of said sources of current and for selecting one of said message registers, means responsive to the operation of said dial for sending impulses of current supplied from said selected source to operate said automatic switches, and means for operating said selected message register.
14. In a telephone system, a line serving a plurality of subscribers' stations, a calling dial for each of said stations, a message register for each of said stations, a plurality of sources of current each of a different characteristic, filters one at each of said stations for passing current from a different one of said sources, means responsive to the operation of the dial at any one of said stations for rendering the corresponding one of said sources effective during the further operation of said dial and for selecting the corresponding one of said message registers, and means for operating the selected message register.
15. In a telephone system, a line serving a plurality of subscribers' stations, a calling dial for each of said stations, a message register for each of said stations, a plurality of sources of potential each of a different characteristic, filters one for each of said stations tuned to pass current from a different one of said sources, means for imposing all of said sources of potential on said line, means responsive to the operation of the dial at any one of said stations for imposing a single one of said sources on said line during the further operation of said dial and for selecting one of said message registers, and means for operating said selected register.
16. In a telephone system, a line serving a

plurality of subscribers' stations, a calling dial for each of said stations, a message register for each of said stations, a plurality of sources of potential each of a different characteristic, filters one for each of said stations
 5 tuned to pass current from a different one of said sources, means for imposing all of said sources of potential on said line, means responsive to the operation of the dial at any
 10 one of said stations for imposing a single one of said sources on said line during the further operation of said dial and for selecting one of said message registers, automatic switches responsive to said further operation
 15 of said dial, and means for operating said selected register.

17. In a telephone system, subscribers' lines, each of said lines having a plurality of stations, a calling dial for each subscribers'
 20 station, a message register individual to each of said stations, a plurality of sources alternating current for use in transmitting dial impulses, the current from each source being
 25 of a different frequency, an induction coil and a condenser at each of said stations tuned to pass current from a different one of said sources and a meter control switch operative
 30 in response to the dialing of a first digit at a calling one of said stations for selecting the message register which corresponds to the digit dialed and for rendering that one of
 35 said sources which corresponds to the digit dialed effective to thereafter supply the dialing current.

18. In a telephone system, subscribers' lines, each of said lines having a plurality of stations, a calling dial for each subscribers'
 40 stations, a message register individual to each of said stations, a plurality of sources alternating current for use in transmitting dial impulses, the current from each source
 45 being of a different frequency, an induction coil and a condenser at each of said stations tuned to pass current from a different one of said sources, a meter control switch operative
 50 in response to the dialing of a first digit at a calling one of said stations for selecting the message register which corresponds to the digit dialed and for rendering that one of said sources which corresponds
 55 to the digit dialed effective to thereafter supply the dialing current, and means for operating the selected register.

19. In a telephone system, subscribers' lines, each of said lines having a plurality of stations, a calling dial for each subscribers'
 60 station, a message register individual to each of said stations, a plurality of sources of alternating current for use in transmitting dial impulses, the current from each source being
 65 of a different frequency, an induction coil and a condenser at each of said stations tuned to pass current from a different one of said sources, a meter control switch operative in response to the dialing of a first digit at a

calling one of said stations for selecting the message register which corresponds to the digit dialed and for rendering that one of
 70 said sources which corresponds to the digit dialed effective to thereafter supply the dialing current, automatic register switches, means effective to operate said register switches in response to the further operation
 75 of said dial, and means for operating the selected message register.

20. In a telephone system, subscribers' lines each of said lines having a plurality of stations, a calling dial for each subscribers'
 80 station, a message register individual to each of said stations, a plurality of sources alternating current for use in transmitting dial impulses, the current from each source being of a different frequency, an induction coil and a condenser at each of said stations tuned to pass current from a different one of said
 85 sources, a meter control switch operative in response to the dialing of a first digit at a calling one of said stations for selecting one of said message registers and for rendering one of said sources effective to supply the
 90 dialing current during the further operation of said dial, means effective only if the source thus rendered effective corresponds to said calling station for responding to the further operation of said dial, and means effective only if the selected message register
 95 is the register of said calling station for operating said selected message register.

In witness whereof, I hereunto subscribe my name, this 22d day of September, 1931.
 100 ROBERT F. MASSONNEAU.

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