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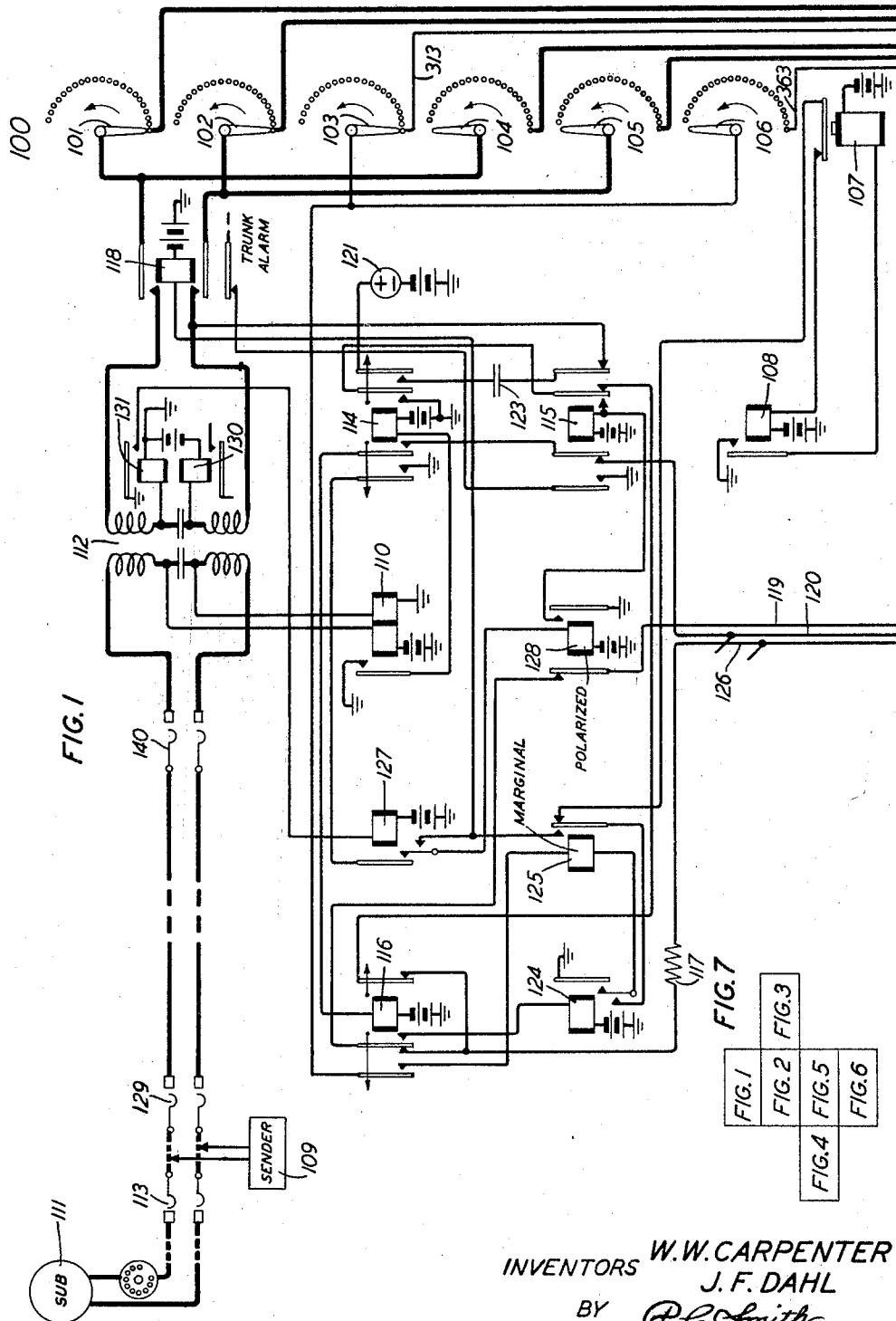
W. W. CARPENTER ET AL

1,868,309

TELEPHONE SYSTEM

Filed Nov. 12, 1931

6 Sheets-Sheet 1



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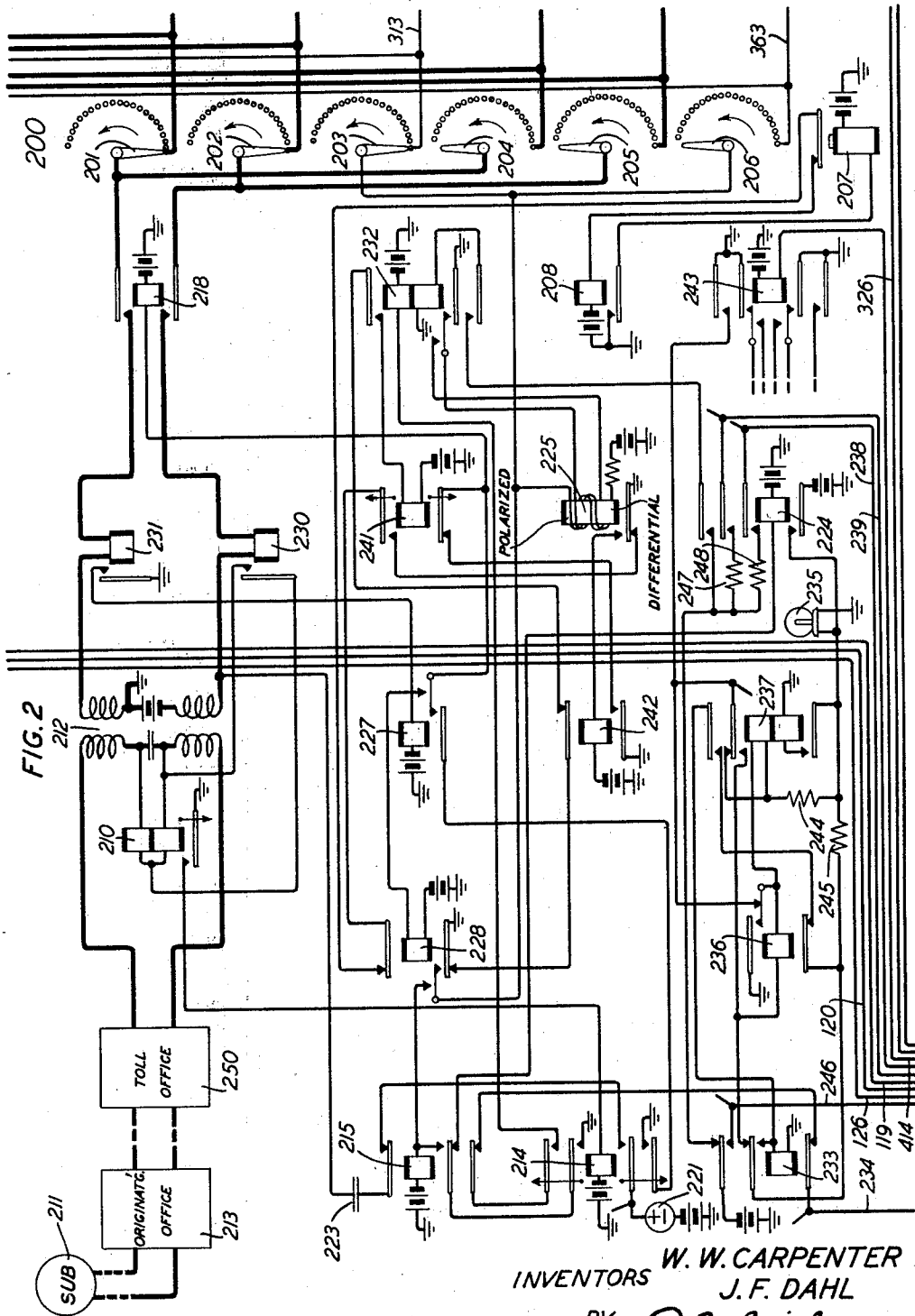
W. W. CARPENTER ET AL

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TELEPHONE SYSTEM

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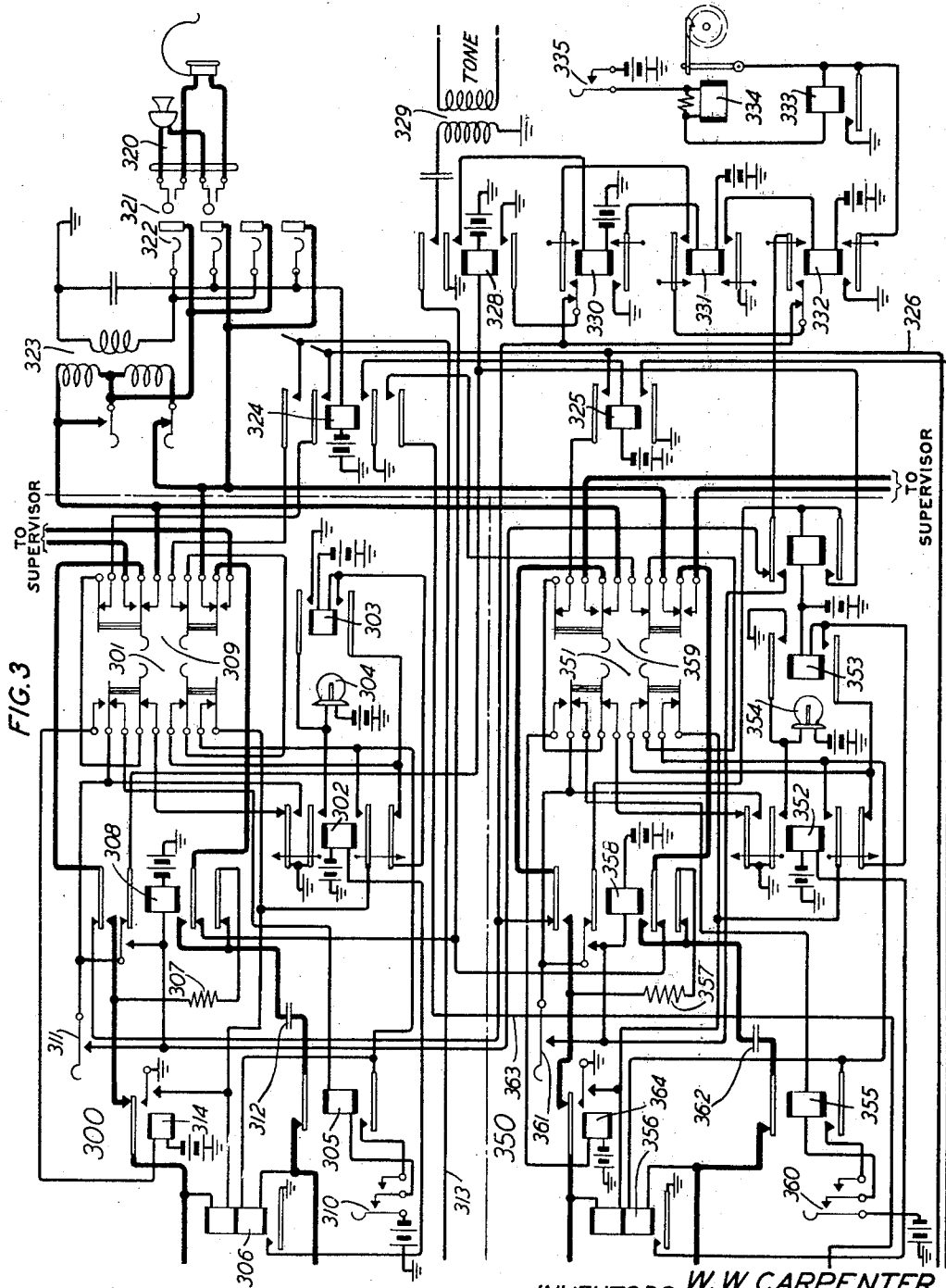
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TELEPHONE SYSTEM

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6 Sheets-Sheet 3



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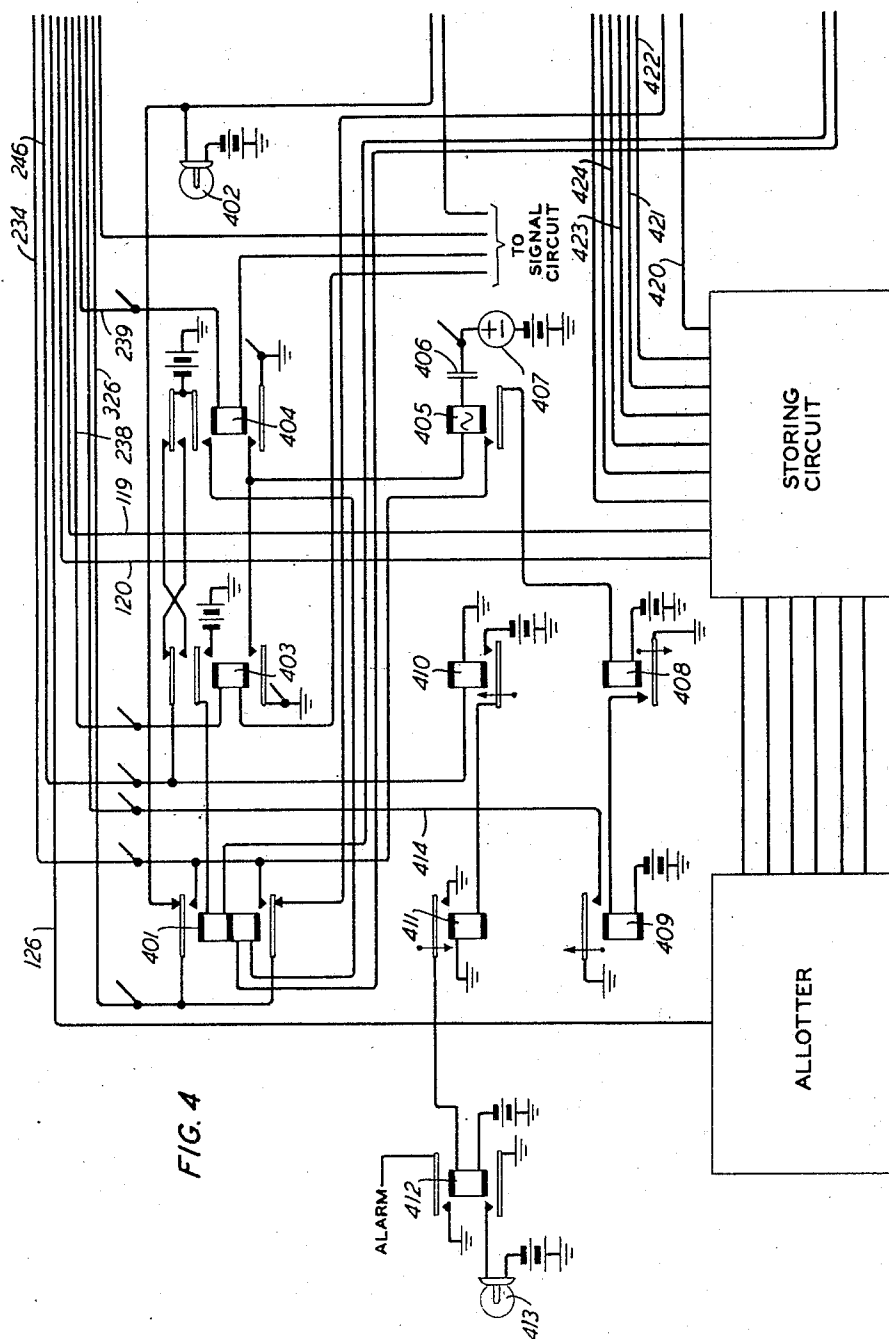
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TELEPHONE SYSTEM

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6 Sheets-Sheet 4



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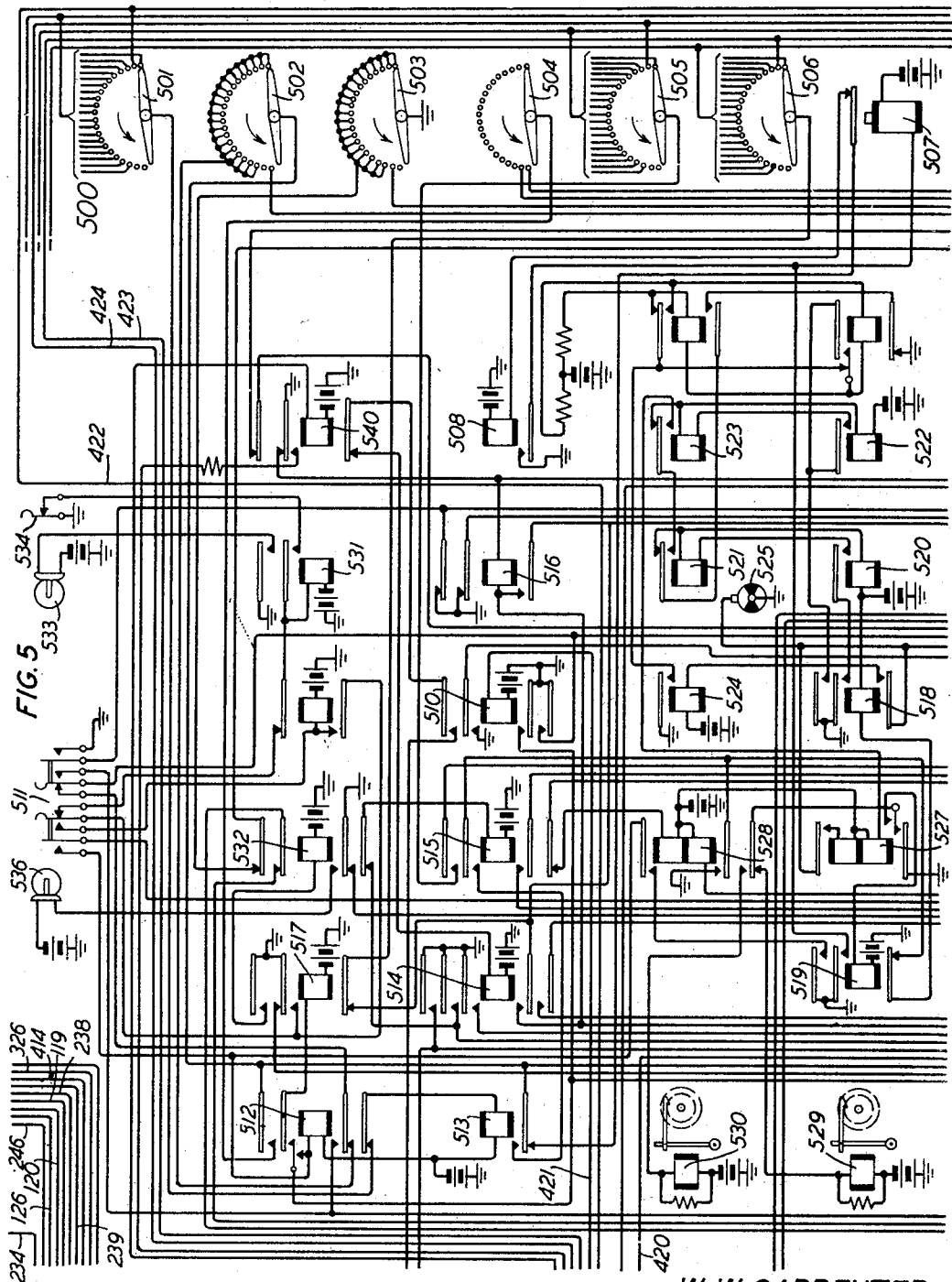
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1,868,309

TELEPHONE SYSTEM

Filed Nov. 12, 1931

6 Sheets-Sheet 5



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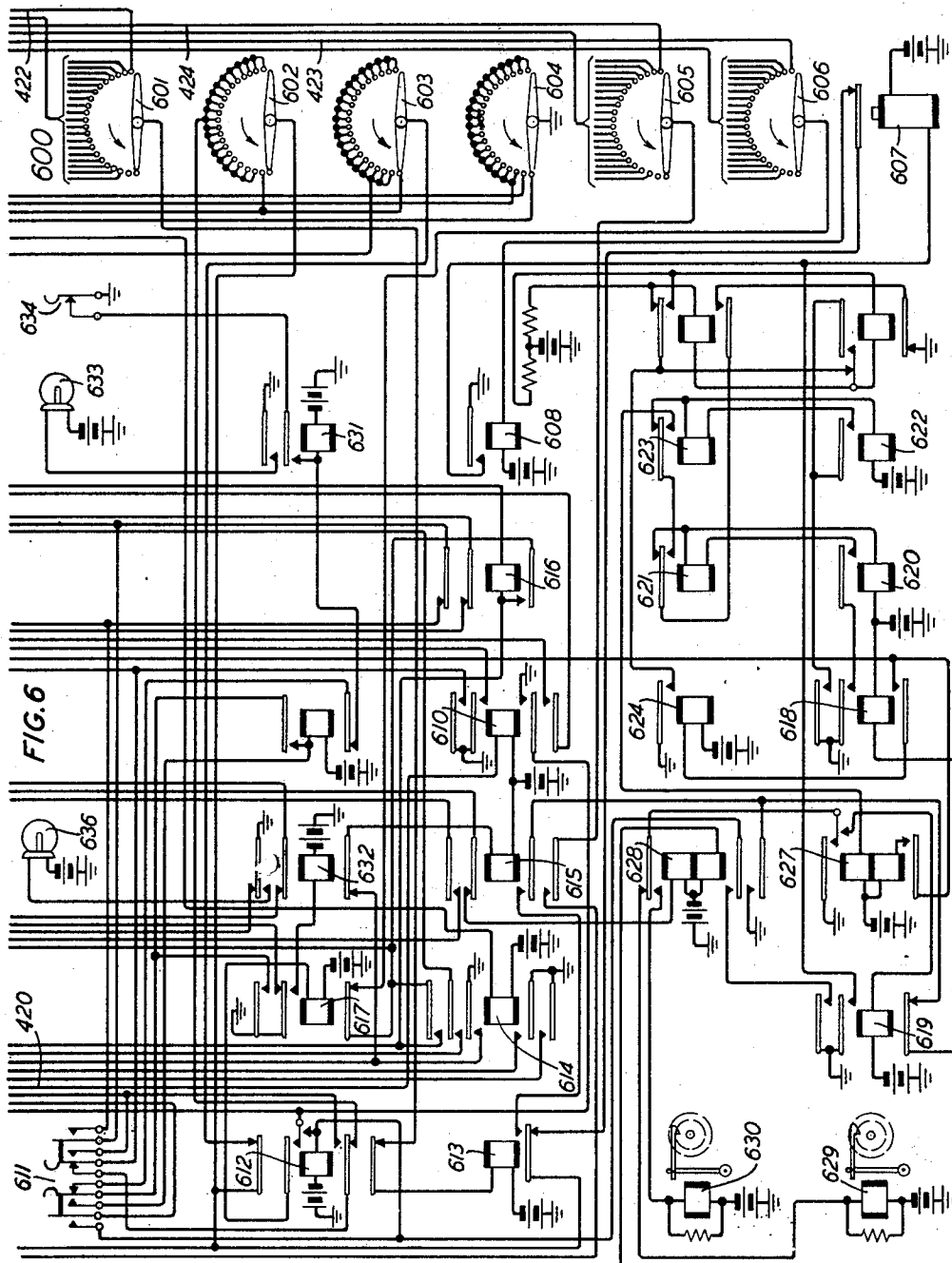
W. W. CARPENTER ET AL

1,868,309

TELEPHONE SYSTEM

Filed Nov. 12, 1931

6 Sheets-Sheet 6



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UNITED STATES PATENT OFFICE

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TELEPHONE SYSTEM

Application filed November 12, 1931. Serial No. 574,490.

This invention relates to arrangements in telephone systems for handling such special services as the giving of information etc., and has for its object to increase the efficiency with which such service may be given in connection with particular calls.

More specifically stated the invention provides for an arrangement at an information office whereby calls from toll operators are given preference over calls from subscribers. The present embodiment of the invention is a modification of the information office disclosed and claimed in Patent No. 1,816,634 to Carpenter et al., granted July 28, 1931. In that patent, calls incoming to the information office are stored and are then distributed to idle operators' positions in the order stored. In the present disclosure when a call is received which originated at a toll operator's position the local calls continue to be stored but the distribution to operators' positions is suspended until the toll operator has been connected with an idle information operator.

The invention will be more clearly understood from consideration of the following description in connection with the accompanying drawings, in which:

Fig. 1 shows a calling subscriber's line, a diagrammatic showing of dial equipment for connecting the line with the information office, and an incoming trunk at the information office;

Fig. 2 shows a diagrammatic connection between a calling subscriber and a toll office together with a trunk from the toll office to the information office;

Fig. 3 shows an operator's position at the information office;

Fig. 4 includes a diagrammatic representation of a allotter and a storing circuit for use with the trunk of Fig. 1 together with a part of the start circuit of Figs. 5 and 6;

Figs. 5 and 6 show a start circuit by means of which calls stored on the storing circuit are directed to the operator's position; and

Fig. 7 shows the manner of arranging Figs. 1 to 6.

When a subscriber at substation 111 in a dial office wishes to be connected with an in-

formation operator, he dials the number of that operator as given in the directory. His line will be extended by line finder 113 and under the control of sender 109, district selector 129 and office selector 140 to an idle trunk outgoing to the information office. When the trunk is found, the sender proceeds to control talking selection in the well known manner and the district selector connects a relay across the tip and ring conductors. Relay 110 is thereby operated, in turn operating relay 114. Relay 114 connects ringing source 121, through condenser 123, to the lower right winding of repeating coil 112 thereby transmitting an induced ringing tone to the calling subscriber to indicate that the call is progressing. Relay 114 connects ground over its inner right contact, inner right back contact of relay 115, right back contact of relay 116, through resistance 117 to conductor 126 leading to the allotter of Fig. 4. A branch of this circuit extends over the inner left back contact of relay 116, back contact of relay 128 to conductor 119 to identify the trunk at the storing circuits. Relay 114 also connects relay 116 over the inner left contact of relay 114 and the left back contact of relay 115 to conductor 120, which also leads to the storing circuit.

The connection of ground to conductor 126 indicates to the allotter that a call has been received and the allotter functions to cause an idle storing circuit to hunt for the trunk identified by ground on conductor 119. When the storing circuit finds this trunk, it interlocks with the trunk circuit by connecting ground to conductor 120. The storing circuit also transfers conductor 119 into connection with conductor 423 leading to the start circuit where it extends to a terminal of brush 505 individual to the particular storing circuit. In addition it connects ground to conductors 420, 421 and 422. The operation of the allotter and storing circuit is fully described in the above identified patent to Carpenter et al.

The operation of relay 116 over conductor 120 disconnects ground from conductor 126 to free the allotter for use with other calls and transfers conductor 119 to the winding

of relay 124. Relay 116 also connects the winding of relay 125 to brushes 103 and 106 in preparation for connection with an operator's position.

The start circuit shown in Figs. 5 and 6 includes two start switches which are used alternately unless one of them is disabled in which case the other operates continuously. Switches 500 and 600 serve to give a starting signal to the trunk over which stored calls have been received in a predetermined order which is the same as that in which the storing circuits are allotted. The start circuit is also arranged to function only if an idle operator's position is in readiness for a call.

When a position is occupied the operator inserts the plug 321 connected to her headset 320 in the position jack 322 operating relay 324. This relay in turn operates relay 325. The operation of relay 324 connects battery through relay 303 over the back contact of relay 302, normal contacts of keys 301 and 309, outer upper contact of relay 324 to conductor 313, to mark the receiving circuit 300 as idle. Similarly, relay 353 is connected to conductor 363 to mark the receiving circuit 350 as idle. Relay 324 also connects ground over the upper back contact of relay 302, contacts of keys 301 and 309, inner upper contact of relay 324 to conductor 326 marking it idle to the start circuit, while relay 325 closes a similar circuit over the back contact of relay 352 to conductor 326. Conductor 326 extends in a similar manner to the receiving circuits of all other operators so that as long as a single receiving circuit is idle this conductor will be grounded.

The connection of ground by the storing circuit to conductors 421 and 420 to indicate to the start circuit that a call is waiting operates relays 510 and 610. If at the same time ground is connected to conductor 326 indicating that a receiving circuit is idle, a circuit will be closed from grounded conductor 326 over the upper back contact of relay 401 to lamp 402, and over outer upper contact of relay 510, lower contact of relay 540, winding of relay 514 to battery, and over the lower back contact of relay 401, outer lower contact of relay 610, upper back contact of relay 540, winding of relay 614 to battery lighting lamp 402 and operating relays 514 and 614. Relay 510 in operating also closes the circuit from ground at its outer lower contact, contact of key 511, inner lower back contact of relay 512, off-normal contacts associated with brush 502, back contact of relay 513, normal contact of magnet 507, winding of relay 508, to battery. Relay 508 closes an obvious circuit for magnet 507 which causes switch 500 to step forward. Assuming that the brushes of switch 500 are standing in the position shown, after one step switch 500 will engage a set of terminals connected with the storing circuit assumed to be associated

with the trunk of Fig. 1. Since, when the trunk and storing circuit were interconnected, ground was also connected to conductor 422, a circuit now exists from brush 501, outer lower contact of relay 512 to battery through the winding of relay 513 which operates and opens the operating circuit of the switch to prevent its further advance. A circuit is also closed from battery through relay 124 as previously traced to conductor 423 and brush 506, lower contact of relay 517, inner lower contact of relay 514, through the winding of relay 516 to ground at the inner upper back contact of relay 540. Relay 516 operates in this circuit locking over its lower contact in place of the contact of relay 514.

Relay 124 also operates connecting ground to the winding of relay 125 to complete the test circuit and connecting ground over the back contacts of relay 125 and magnet 107 to the winding of relay 108. Relay 108 operates magnet 107 and together they cause the advance of switch 100 in search of an idle receiving circuit. When such a circuit is found as indicated by the presence of battery on conductor 313 or conductor 363, relay 125 operates, opening the circuit of relay 108 and bringing switch 100 to rest. Relay 125 connects ground to the winding of relay 118. Relay 118 extends the talking conductors to the receiving circuit. Assuming that circuit 300 was selected, a circuit is completed from ground through the winding of relay 131, upper right winding of repeating coil 112, upper contact of relay 118, brush 101, upper winding of relay 306, lower normal contact of key 301, lower winding of relay 306, brush 102, lower front contact of relay 118, lower right winding of repeating coil 112, winding of relay 130 to battery. Relays 130, 131 and 306 operate in this circuit. Relay 130 has no function with trunks incoming from dial offices but in trunks incoming from manual offices has its contacts connected in a manner similar to relay 230 of the trunk of Fig. 2. Relay 131 closes an obvious circuit for relay 127 which in turn closes a holding circuit for relay 118 over its inner contact to ground at the outer left contact of relay 114, and operates relay 128 which in turn operates relay 115. Relay 115 locks under the control of relay 114 independent of relay 128. It also opens the interlocking circuit between relay 116 and the storing circuit thus permitting the restoration of the storing circuit to normal and the release of the start circuit for use with other stored calls. Relay 115 also opens the circuit through the ringing tone source 121 thus removing the induced tone as an indication to the calling subscriber that the call is about to be answered. Relay 116 releases in turn releasing relays 124 and 125. When relay 116 releases, ground is discon-

nected from conductor 313 and relay 303 releases.

In the operator's receiving circuit when relay 303 operated in series with relay 125 it locked independent of relay 302, lighting lamp 304 to indicate to the operator that the corresponding receiving circuit at her position has been selected. Relay 306 operates as above described connecting ground to the winding of relay 302. At this time resistance 307 and condenser 312 are connected in parallel with relay 306 to prevent objectionable noises in the operator's telephone. Relay 302 closes an additional circuit for lamp 304, closes a shunt around the contact of key 301, thus rendering the circuit of relay 306 independent of that key, and closes a circuit from ground at its outer upper front contact, inner upper normal contact of relay 308, winding of relay 328 to battery. Relay 328 initiates the successive operation of relays 330, 331, 332 and 308 which control the transmission of two short impulses of tone to the operator's telephone by intermittently connecting the secondary of the tone coil 329 in series with the operator's receiver. Relay 332 is also arranged to operate the peg count meter 334 if key 335 is closed.

Relay 308 in operating, following the termination of the second impulse of tone, locks over its inner upper contact to ground at the outer upper front contact of relay 302. It also extends the tip and ring conductors through to the operator's telephone set and opens the circuit for the tone control relays permitting these relays to release. It also removes the bridge through resistance 307 from the talking conductors permitting conversation to take place.

When the operator has finished giving the desired information to the calling subscriber, she operates disconnect key 301. The operation of this key closes a circuit from ground at the outer upper contact of relay 302, over the upper operated contact of key 301, winding of relay 314 to battery. Relay 314 opens the tip conductor and connects ground over its front contact to the windings of relay 306 in parallel. The connection of ground to the lower winding of relay 306 holds relay 130 operated but is ineffective. The connection of ground to the upper winding of relay 306 shunts relay 131 which release in turn releasing relays 127, 128 and 118. The release of relay 118 releases relays 130 and 306 while relay 306 in turn releases relay 302. The release of relay 302 extinguishes lamp 304 as an indication to the information operator that her circuit has been disconnected and that she may restore the disconnect key 301 whereupon the receiving circuit 300 is restored to normal and battery through relay 303 is again connected to conductor 313.

In the trunk circuit relays 115, 114 and 110 remain operated under the control of the dial

equipment at the originating office. When the calling subscriber restores his receiver, the dial equipment is restored to normal and these relays release. With relay 118 released indicating that the information operator has disconnected and relay 115 operated indicating that the incoming end of the connection has not been released, a circuit is closed for the trunk alarm which operates after an interval to indicate the unstandard condition.

When it becomes necessary in the extension of a toll call for the toll operator to use the information service, she inserts the plug of a cord at her position into a jack leading to a trunk such as that shown in Fig. 2. This operation completes a circuit from battery and ground in the cord circuit over the tip and ring conductors of the trunk to the left windings of repeating coil 212 and the windings of relay 210 in series. Relay 210 operates in this circuit in turn operating relay 214. Relay 214 in operating closes a circuit from battery through the winding of relay 224, inner lower back contact of relay 215, inner upper front contact of relay 214 to ground. Relay 214 also closes a circuit from ringing source 221, inner lower front contact of relay 214, upper back contact of relay 215, condenser 223, lower right winding of repeating coil 212 to battery. A tone resembling the usual ringing tone is thereby transmitted over the trunk to the toll operator.

Relay 224 closes an obvious circuit for lamp 235 and connects battery from the upper back contact of relay 233, through resistances 248 and 247 to conductors 238 and 239 which extend to the start circuit. In the start circuit these conductors are connected to windings of relays 403 and 404 which are in turn connected to ground in the signal circuit except when all of the operators' positions are busy. Relays 403 and 404 connect battery through the windings of relay 401 over the back contacts of relays 616 and 516 to ground. This insures that relay 401 cannot be operated during the time that the start circuit is actually functioning to start the hunting operation of a subscriber's trunk. Relay 401 operated, conductor 326 which is grounded by the operator's telephone circuit, is disconnected from the contacts of relays 510 and 610 thus preventing the operating of relays 514 and 614 and suspending the starting of hunting by other subscribers' trunks. At the same time relay 401 connects conductor 326 to conductor 234 and thence over the lower back contact of relay 233, outer lower back contact of relay 215, outer upper front contact of relay 214, upper winding of relay 232 to battery.

Relay 232 operates, locking in a circuit from ground through its lower winding and inner lower contact, outer upper contact of relay 224, to battery at the outer upper con-

tact of relay 233. Relay 232 connects ground to the polarizing winding of relay 225 and connects ground through the operating winding of relay 225 to brushes 203 and 206 to prepare a test circuit to determine when an idle operator's receiving circuit is engaged. Switch 200 has no normal position and when the trunk is idle, stands in engagement with the receiving circuit last used. If that circuit is idle when the test circuit is prepared, battery will be connected to conductor 313 or 363 in the manner above described and relay 225 will operate. If the receiving circuit is busy, battery will be absent and relay 225 cannot operate. If two trunks test the same receiving circuit simultaneously, the relay windings are so arranged that neither test relay can operate. When relay 232 operated, it also closed a circuit from battery through the winding of relay 241, upper front contact of relay 232, back contact of relay 242, lower back contact of relay 228 to ground. The operation of relay 241 closes a circuit from battery through the winding of relay 208, back contact of magnet 207, back contact of relay 228, front contact of relay 241 to ground at the back contact of relay 225. If relay 225 does not operate, relay 208 will now operate to close an obvious circuit for magnet 207 which in attracting its armature opens the circuit of relay 208. Relay 208 thereupon releases opening the circuit of magnet 207 which also releases advancing switch 200 into engagement with the next receiving circuit. If this receiving circuit is also busy, relay 208 reoperates and the cycle is repeated until an idle receiving circuit is found.

When such a circuit is engaged, relay 225 operates opening the circuit of relay 208 and closing an obvious circuit for relay 242. Relay 242 opens the circuit of relay 241 and when relay 241 releases a circuit is closed from ground at the front contact of relay 242 over the back contact of relay 241 to the winding of relay 218 and battery. Relay 218 in operating extends the tip and ring conductors of the trunk to the tip and ring conductors of the receiving circuit, thereby completing a circuit from battery through the lower right winding of repeating coil 212, winding of relay 230, lower contact of relay 218, brush 202 through the lower winding of relay 306, normal contact of key 301, upper winding of relay 306, brush 201, upper contact of relay 218, winding of relay 231, upper right winding of repeating coil 212 to ground. Relay 230 in operating closes a shunt around the lower winding of relay 210 to operate a supervisory signal in the toll operator's cord circuit. Relay 231 in operating closes an obvious circuit for relay 227. Relay 227 closes a holding circuit for relay 218 to the outer lower contact of relay 214. It also connects relay 228 to ground at the contact of relay

214 causing the operation of relay 228. Relay 228 closes an obvious circuit for relay 215. It also connects ground to brushes 203 and 206 holding relay 303 operated and shunting the operating winding of relay 225 causing that relay to release in turn releasing relay 242. Relay 215 in operating locks over its inner lower front contact to the inner upper front contact of relay 214. It disconnects the ringing tone from the trunk as an indication that the call is about to be answered. In addition it opens the circuit of relay 224 and the energizing circuit of relay 232. Relay 224 releases in turn opening the locking circuit of relay 232 so that relay 232 also releases. The release of relay 224 also extinguishes the lamp 235. With relay 232 released, relay 225 is disconnected from conductor 313. The release of relay 224 also releases relays 403 and 404 in the start circuit in turn releasing relay 401 and restoring the operativeness of the start circuit. In the operator's position the circuits function as previously described, relay 303 remaining locked over conductor 313 to ground at the front contact of relay 228.

At the termination of the conversation the operator operates disconnect key 301, operating relay 314 as before. Relay 314 opens the tip conductor and connects ground to the windings of relay 306 in parallel. Relay 231 is shunted and releases while both relays 306 and 230 are held operated. The release of relay 231 opens the circuit of relay 227 which in turn releases relays 218 and 228. Relay 228 in releasing disconnects ground from conductor 313 releasing relay 303. The release of relay 218 opens the circuit by which relays 230 and 306 were held operated and these relays release. Relay 306 in turn releases relay 302 which extinguishes lamp 304 indicating to the information operator that she may now release the disconnect key 301. The restoration of the disconnect key releases the disconnect relay 314 and reconnects relay 303 to conductor 313 so that the receiving circuit is now ready for reselection.

The release of relay 230 opens a shunt around lower winding of relay 210 and transmits a supervisory signal to the toll operator. Relay 215 is held operated under the control of relay 214 until the toll operator removes her cord circuit from the trunk jack to release relays 210 and 214 and restore the trunk circuit to normal. Disconnection by the toll operator whether before or after disconnection by the information operator will restore the trunk circuit to normal.

If the information operator cannot give the necessary information at once, she may wish to resignal the toll operator when the information has been obtained. To do so, she operates flashing key 310. This key connects battery through the winding of relay 305, over key 301 to ground at the outer upper

front contact of relay 302. With relay 305 operated the ring conductor is disconnected from the operator's telephone and battery from the flashing key is connected over the front contact of relay 305 to the windings of relay 306 in parallel. Battery through the upper winding of relay 306 is connected through the winding of relay 231 to ground holding relays 306 and 231 operated, while battery to the lower winding of relay 306 is connected through the winding of relay 230 to battery thus shunting relay 230. Relay 230 opens the shunt around the lower winding of relay 210 as a signal to the toll operator. Relays 305 and 230 follow the operation of the flashing key resulting in a flashing signal at the toll operator's position.

If either conductor 238 or conductor 239 is open or grounded, the start circuit cannot function properly. If either of these conductors is open, the corresponding start switch will not give preferential service, while if either of them is grounded, service by the corresponding start switch will be prevented as long as the grounded condition continues. To guard against such conditions a circuit is closed whenever one of the relays 403 or 404 operates alone to operate relay 410. Relay 410 causes the successive operation of relay 411 and relay 412 which lights lamp 413 and closes an alarm circuit. Relays 410 and 411 are slow to operate to allow sufficient time for the trunk to find an operator's position if possible.

During the progress of a toll call the operation of either relay 403 or 404 closes a circuit for relay 405 in series with condenser 406 and interrupted ringing source 407. Each closure of the ringing interrupter operates relay 405 which connects relay 408 over the contact of relay 405 to grounded conductor 326. Relay 408 in turn operates relay 409 which in turn connects ground to conductor 414 and the winding of relay 243. During the silent interval relays 405, 408 and 409 release. Relay 243, which is common to a plurality of similar trunks, is therefore intermittently operated. At the first operation of relay 243, following the operation of relay 224, a circuit is closed from ground over its upper contact, normal contact and winding of relay 236, inner upper back contact of relay 233, through resistance 245, to battery at the lower contact of relay 224. Relay 236 operates, locking to ground at its front contact and closes a circuit from battery over the lower contact of relay 224, through resistance 244, upper winding of relay 237, front contact of relay 236 to ground. However, relay 237 is shunted by ground over the upper contact of relay 243 connected over the back contact of relay 237 to resistance 244 in shunt of the upper winding of that relay. During the silent interval, relay 243 releases opening this shunt, and relay 237 operates,

locking through its lower winding and lower contact to battery at the lower contact of relay 224. The next operation of relay 243 connects ground over the inner upper front contact of relay 237 to the winding of relay 236 in shunt of battery through resistance 245, thereby releasing relay 236. Since relay 237 is held locked, a circuit is now closed from ground through the winding of relay 233, outer upper contact of relay 237, lower back contact of relay 236, resistance 245, lower contact of relay 224 to battery. However, relay 236 cannot operate since it is shunted by the same ground which shunts the winding of relay 236. At the next silent interval this ground is removed and relay 233 operates, locking over its inner upper contact through resistance 245 to battery. The operation of relay 233 disconnects battery from the upper contacts of relay 224, releasing relays 403, 404 of the start circuit and opening the locking circuit of relay 232 of the trunk circuit. It also disconnects battery from the winding of relay 236 to prevent its reoperation. In addition it opens the energizing circuit of relay 232 thereby completely isolating the trunk from the start circuit. It also connects battery over its outer upper front contact to conductor 246 which extends to the winding of relay 410 to cause the operation of the alarm in the manner previously described.

What is claimed is:

1. In a telephone system, a first plurality of trunk circuits, a second plurality of trunk circuits, a plurality of operators' positions, means to extend calls to said trunk circuits, means responsive to the extension of calls to said first plurality of trunk circuits for storing said calls, means to extend said calls to idle operators' positions in the order in which they are stored, and means responsive to the extension of a call to one of said second plurality of trunk circuits to suspend the extension of stored calls to operators' positions.

2. In a telephone system, a first group of trunk circuits, a second group of trunk circuits, a plurality of operators' positions, a plurality of storing circuits, an allotter, means in said allotter responsive to the extension of calls to said trunk circuits of said first group for causing said storing circuits to be associated with said trunk circuits in a predetermined order, a start circuit, means controlled by said start circuit to cause the connection of said first group of trunk circuits with said operators' positions in the same order as said storing circuits were allotted, and means responsive to the extension of a call to one of said second group of trunk circuits to disable said start circuit.

3. In a telephone system, a first group of trunk circuits, a second group of trunk circuits, a plurality of operators' positions, a

plurality of storing circuits, an allotter, means in said allotter responsive to the extension of calls to trunk circuits of said first group for causing said storing circuits to be associated with said trunk circuits in a predetermined order, a start circuit, means controlled by said start circuit effective as long as one of said operators' positions is idle to cause the connection of said trunk circuits with said operators' positions in the same order as said storing circuits were allotted, and means responsive to the extension of a call to one of said second groups of trunk circuits to render said start circuit means ineffective regardless of the idle condition of said operators' positions.

4. In a telephone system, a centralized information office, local trunk circuits incoming to said office from local offices, toll trunk circuits incoming to said office from toll offices, a plurality of operators' positions at said information office, means for extending calls to said trunk circuits, means responsive to the extension of calls to said local trunk circuits for storing said calls, means for distributing said stored calls to said operators' positions in the order in which they were stored, and means responsive to the extension of a call to one of said toll trunk circuits for rendering said distributing means ineffective.

5. In a telephone system, a centralized information office, local trunk circuits incoming to said office from local offices, toll trunk circuits incoming to said office from toll offices, a plurality of operators' positions at said information office, means for extending calls to said trunk circuits, means responsive to the extension of calls to said local trunk circuits for storing said calls, a start circuit for causing the distribution of said calls to said operators' positions in the order stored, and means responsive to the extension of a call to one of said toll trunks for rendering said start circuit ineffective.

6. In a telephone system, a centralized information office, local trunk circuits incoming to said office from local offices, toll trunk circuits incoming to said office from toll offices, a plurality of operators' positions at said information office, means for extending calls to said trunk circuits, means responsive to the extension of calls to said local trunk circuits for storing said calls, a start circuit for causing the distribution of said calls to said operators' positions in the order stored, means under the control of said operators' positions for rendering said start circuit effective, and means responsive to the extension of a call to one of said toll trunks for rendering said position controlled means ineffective on said start circuit.

7. In a telephone system, a centralized information office, local trunk circuits incoming to said office from local offices, toll trunk

circuits incoming to said office from toll offices, a plurality of operators' positions at said information office, means for extending calls to said trunk circuits, means responsive to the extension of calls to said local trunk circuits for storing said calls, a start circuit for causing the distribution of said calls to said operators' positions in the order stored, means under the control of said operators' positions for rendering said start circuit effective only if one of said positions is idle, and means responsive to the extension of a call to one of said toll trunks for rendering said start circuit ineffective irrespective of the condition of said operators' positions.

8. In a telephone system, a centralized information office, local trunk circuits incoming to said office from local offices, toll trunk circuits incoming to said office from toll offices, a plurality of operators' positions at said information office, means for extending calls to said trunk circuits, means responsive to the extension of calls to said local trunk circuits for storing said calls, a start circuit, means under the control of said start circuit to cause said local trunk circuits to be associated with operators' positions in the order in which the incoming calls were stored, a conductor connecting said start circuit and said operators' positions, means at each operator's position to mark said conductor when said position is idle, and means responsive to the extension of a call to one of said toll trunk circuits for disconnecting said conductor from said start circuit.

9. In a telephone system, a centralized information office, local trunk circuits incoming to said office from local offices, toll trunk circuits incoming to said office from toll offices, a plurality of operators' positions at said information office, means for extending calls to said trunk circuits, means responsive to the extension of calls to said local trunk circuits for storing said calls, a start circuit, means under the control of said start circuit to cause said local trunk circuits to be associated with operators' positions in the order in which the incoming calls were stored, a conductor connecting said start circuit and said operators' positions, means at each operator's position to mark said conductor when said position is idle, and means responsive to the extension of a call to one of said toll trunk circuits for disconnecting said conductor from said start circuit, and for extending said conductor to said toll trunk circuit.

10. In a telephone system, a centralized information office, switch-ended local trunk circuits incoming to said office from local offices, switch-ended toll trunk circuits incoming to said office from a toll office, a plurality of operators' positions at said information office, means for extending calls to said trunk circuits, means responsive to the extension of calls to said local trunk circuits for storing

said calls, a start circuit, means under the control of said start circuit to cause the switches of said local trunk circuits to hunt for idle operators' positions, a conductor connecting said start circuit and said operators' positions, means at each operator's position to mark said conductor when said position is idle, means responsive to the extension of a call to one of said toll trunk circuits for disconnecting said conductor from said start circuit and extending it to said toll trunk circuit, and means operated over said conductor for causing the switch of said toll trunk to hunt for an idle operator's position.

responsive to the extension of calls to said local trunk circuits for storing said calls, a start circuit for causing the distribution of said calls to said operators' positions in the order stored, means responsive to the extension of a call to one of said toll trunks for rendering said start circuit ineffective, means to associate said toll trunk circuit with an operator's position, and means responsive to said association for again rendering said start circuit effective.

14. In a telephone system, a centralized information office, local trunk circuits incoming to said office from local offices, toll trunk circuits incoming to said office from toll offices, a plurality of operators' positions at said information office, means for extending calls to said trunk circuits, means responsive to the extension of calls to said local trunk circuits for storing said calls, a start circuit for causing the distribution of said calls to said operators' positions in the order stored, means under the control of said operators' positions for rendering said start circuit effective, means responsive to the extension of a call to one of said toll trunks for rendering said position controlled means ineffective on said start circuit, means to associate said toll trunk circuit with an operator's position, and means responsive to said association for again rendering said position controlled means effective on said start circuit.

15. In a telephone system, a centralized information office, local trunk circuits incoming to said office from local offices, toll trunk circuits incoming to said office from toll offices, a plurality of operators' positions at said information office, means for extending calls to said trunk circuits, means responsive to the extension of calls to said local trunk circuits for storing said calls, a start circuit, means under the control of said start circuit to cause said local trunk circuits to be associated with operators' positions in the order in which the incoming calls were stored, a conductor connecting said start circuit and said operators' positions, means at each operator's position to mark said conductor when said position is idle, means responsive to the extension of a call to one of said toll trunk circuits for disconnecting said conductor from said start circuit, and for extending said conductor to said toll trunk circuit, means to associate said toll trunk circuit with an operator's position, and means responsive to said association for restoring the connection of said conductor to said start circuit.

In witness whereof, we hereunto subscribe our names this 9th day of November 1931.

WARREN W. CARPENTER.
JACK F. DAHL.

12. In a telephone system, a centralized information office, local trunk circuits incoming to said office from local offices, toll trunk circuits incoming to said office from toll offices, a plurality of operators' positions at said information office, means for extending calls to said trunk circuits, means responsive to the extension of calls to said local trunk circuits for storing said calls, means for distributing said stored calls to said operators' positions in the order in which they were stored, means responsive to the extension of a call to one of said toll trunks for rendering said distributing means ineffective, means to associate said toll trunk circuit with an operator's position, and means responsive to said association for again rendering said distributing means effective.

13. In a telephone system, a centralized information office, local trunk circuits incoming to said office from local offices, toll trunk circuits incoming to said office from toll offices, a plurality of operators' positions at said information office, means for extending calls to said trunk circuits, means