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METHOD OF OPERATION
TRUNK CIRCUIT
Miscellaneous - Repair Clerks Desk - Panel System.

DEVELOPMENT

1. PURPOSE OF CIRCUIT

FIGURE 1

1.01 This circuit provides means for establishing incoming and outgoing service to and from desks and may be used in offices arranged with either line switches or line finders. It is also arranged for similar service to manual switchboards.

FIGURES 2 AND 6

1.02 This circuit is for use in connecting the local test desk or repair clerk's desk with various other desks in the same office.

FIGURE 3

1.03 This circuit provides means for communicating between the local test desk and other desks where the latter are equipped for ringdown equipment.

FIGURE 4

1.04 This circuit is for use in connecting the local test desk or repair clerk desk to the zero operator located at the "A" switchboard in a Full Mechanical Office.

FIGURE 5

1.05 This circuit is used for directing incoming calls from the district or office multiple to the repair clerk's desk.

2. WORKING LIMITS

FIGURE 1

2.01 The (B6), (SLV) relay - External sleeve resistance - minimum 32 ohms to ground and maximum 220 ohms to battery, for lines to manual switchboard.

2.02 The B124 (SLV) relay - Maximum external sleeve resistance 231 ohms - For first lines of a P.B.X. group not connected to line finders or line switches.

2.03 The B244 (SLV) relay. External sleeve resistance - maximum 231 ohms to battery minimum 640 ohms to ground when used with line switch circuits and minimum 1045 ohms to ground when used with line finder circuits. For "M" wiring, maximum 231 ohms to battery and minimum 95 ohms to ground for both line switch and line finder circuits.

FIGURES 2 AND 6

2.04 None.

FIGURE 3

2.05 None.

FIGURE 4

2.06 None.

FIGURE 5

2.07 None.

OPERATION

3. PRINCIPAL FUNCTIONS

FIGURE 1

3.01 Signals the desk operator on incoming calls.

3.02 Establishes a busy signal.

3.03 Prevents recall of operator.

3.04 Arranged for outgoing service.

FIGURES 2 AND 6

3.05 To connect the local test desk or repair clerk's desk with various other desks.

3.06 To provide supervision over the trunk line.

FIGURE 3

3.07 This circuit provides a connection between the local test desk and other desks.

FIGURE 4

3.08 To connect the local test desk or repair clerk with the zero operator at the "A" switchboard.

3.09 To provide supervision over the trunk line.

FIGURE 5

3.1 Arranged to transfer incoming calls to other positions.

3.2 Applies audible ringing tone to the line.

3.3 Flashes a lamp at the repair clerk's desk.

4. CONNECTING CIRCUITS

FIGURE 1

4.01 Telephone circuit in the desk.

4.02 Trunk keys in the desk.

4.03 Subscriber's line equipment - Machine Switching, or Manual Switchboard.

FIGURES 2 AND 6

4.04 Various desk tie line circuits such as trouble desk or mechanical assistant chief operator's desk.

4.05 Trunk line keys and lamp circuit.

FIGURE 3

4.06 Auxiliary Signal Circuit.

4.07 Local test desk.

4.08 Repair clerk's desk.

FIGURE 4

4.09 Tie line from desks.

4.1 Trunk keys - repair clerk's desk.

FIGURE 5

4.2 This circuit functions with district and office selectors on the incoming end, and connects to the trunk keys, telephone circuit auxiliary signal make busy and transfer circuit at the repair clerk's desk.

DESCRIPTION OF OPERATION

FIGURE 1

5. INCOMING CALLS

When the tip, ring and sleeve terminals of this circuit are seized by the final selector, or when the plug of a calling cord is inserted in a jack associated with this circuit at the manual switchboard, the (SLV) relay operates from battery over the S lead, and furnishes battery for holding the (L) relay locked through the latters locking winding. The (L) relay operates through its inner winding on ringing current, and locks through its inner winding to ground in the auxiliary signal circuit. The (L) relay operated, causes the lamps at the desk to flash. The call is answered by operating a key at the desk, thereby operating the (B) and (CO) relays. The (B) relay operated, short circuits the 1 mf condenser and bridges the outer winding of the (L) relay across the trunk, thereby tripping machine ringing. The operation of the (CO) relay releases the (L) relay and replaces interrupted battery over the L lead by steady battery, causing the desk lamps to burn steadily as a busy signal. The (CO) relay operated, locks through its outer winding to ground on the armature of the (SLV) relay.

6. OUTGOING CALLS

To originate a call from the desk in a machine switching equipment the trunk key is operated. The condenser being shunted by operation of the (B) relay bridges the (L) relay winding across the line and thereby causes the line relay in the line circuit to operate. Upon receiving the dial tone the attendant at the desk dials the desired number. A call to a manual switchboard is performed in the samemanner except that the dial is not used, the call being passed to the operator at the switchboard.

7. Should a call be originated at the desk and abandoned before the line has been seized, either by the mechanically functioned apparatus in a machine switching system or by the operator in a manual office, the opportunity for the (L) relay to become locked and thereby display an incoming signal has been eliminated. On incoming calls the (SLV) relay operates as before over the S lead to the final or switchboard multiple. When the (L) relay operates from ringing current its locking winding is in series with the break contact of the (CO) relay and the make contact of the (SLV) relay. When the operator at the desk answers by operating the key the (CO) relay is operated, releasing the current to the locking winding of the (L) relay. The (CO) relay will remain operated under control of the (SLV) relay after the operator at the desk disconnects. When the final selector or the manual operator disconnects, the (SLV) relay releases and the (CO) relay is restored to normal.

8. DISCONNECTION

When the trunk key is restored to normal the (B) relay is released, opening the DC bridge across the line. The mechanical apparatus in a machine switching equipment is released and the (SLV) relay restores to normal. The (CO) relay then releases and the busy lamp signal is extinguished. The disconnection on a connection to a manual equipment is performed in the same manner except that the disconnection at the switchboard is accomplished by the operator removing the plug from the jack.

FIGURES 2 AND 6

9. INCOMING CALL

When the key at the desk to which this trunk line is connected is operated, the (L) relay operates from battery over lead (S). The (L) relay operated, closes the auxiliary signal circuit and flashes the desk lamp connected to lead TL under control of the No. 149 type interrupter. When the call is answered by the operation of the key at the desk, the (CO) relay operates to ground over lead K. The (CO) relay operated, (a) causes the signal lamp at the desk to light steadily as a busy signal (b) releases the (L) relay thus opening the auxiliary signal circuit (c) locks over lead (S) to ground through 500 ohms.

10. OUTGOING CALL

On an outgoing call the operation of the desk key into the talking position causes the (CO) relay to operate. The (CO) relay operated, connects battery through its 500 ohm winding to the (S) lead thus operating a relay and lighting a signal lamp at the desk at which this trunk terminates.

11. DISCONNECTION

If the local test desk man disconnects first by returning the desk key to normal, the (CO) relay is held operated over lead (S) thereby preventing a resignal. When the key at the other desk is restored to normal, the (CO) relay releases, extinguishing the signal lamp and restoring the circuit to normal.

FIGURE 3

12. INCOMING CALLS

When ringing current is applied across the tip and ring of the trunk at the distant desk, the (L) relay operates through its inner winding and locks through its outer to ground in the auxiliary signal circuit. The (L) relay operated, connects interrupted battery over lead L to the trunk lamp, causing the lamp to flash until the call is answered.

13. ANSWERING THE CALL

When the call is answered by operating the trunk key, the (CO) relay operates. The (CO) relay operated, (a) releases the (L) relay, (b) disconnects the interrupted battery and connects battery to the lead C, thereby changing the flashing signal to a steady signal as a busy signal.

14. OUTGOING CALLS

On outgoing calls the trunk key is operated, operating the (CO) relay through its primary winding. The (CO) relay operated, (a) disconnects the locking circuit of the (L) relay, (b) connects battery to the trunk lamp, which lights as a busy signal. The ringing key in the telephone circuit is operated, operating the (L) relay without effect during the ringing period, and causing the trunk lamp at the distant desk to light.

15. DISCONNECTION

When the trunk key is restored to normal, the (CO) relay releases, restoring the circuit to normal.

FIGURE 4

16. INCOMING CALL

When the plug of the zero operator's cord is inserted in the outgoing trunk multiple jack at the "A" switchboard, battery is connected to lead "S1" through 500 ohms when "S" wiring is used, or 300 ohms when "R" wiring is used causing the (L) relay to operate. The (L) relay operated closes

the auxiliary signal circuit and flashes the desk lamp connected to lead L under control of the No. 149 type interrupter. When the call is answered by the operation of the key at the desk the (B) relay operates. The (B) relay operated (a) connects the 54-B retardation coil across the tip and ring thus giving supervision to the zero operator's cord circuit, (b) operates the (CO) relay. The (CO) relay operated (a) causes the signal lamp at the desk to light steadily as a busy signal, (b) locks over lead "S1" to ground, (c) releases the (L) relay thus opening the auxiliary signal circuit.

17. OUTGOING CALL

On an outgoing call the operation of the desk key to the talking position causes the (B) and (CO) relays to operate in turn. The (CO) relay operated, connects battery through its 500 ohm winding to the S-1 lead when "S" wiring is used or thru its 300 ohm winding when "R" wiring is used, thus operating a relay and lighting a lamp at the "A" switchboard as a signal to the zero operator.

18. DISCONNECTION

If the desk man disconnects first by returning the desk key to normal, the (B) relay releases, removing the retardation coil from across the line thus causing the supervisory lamp in the zero operator's cord circuit to light as a disconnect signal. The (CO) relay however remains operated over lead "S1" to ground through 300 ohms when "S" wiring is used or to 500 ohms when "R" wiring is used, causing the signal lamp at the desk to remain lighted. When the zero operator removes the plug of the cord from the jack, the (CO) relay releases, extinguishing the desk signal lamp and restoring the circuit to normal. Should the zero operator disconnect first, the (CO) relay is held operated by the (B) relay until the trunk key is restored to normal.

FIGURE 5

19. "W" AND "Y" WIRING WITH "Y" APPARATUS

19.1 When this circuit is seized by a district or office selector the (L1) relay operates over the tip and ring through the winding of a polarized relay in the selector circuit. This latter relay does not operate because battery is connected to the tip of the trunk. The (L1) relay operated operates the (L) relay from ground on the contact of the (S) relay. The (L) relay operated, (a) connects interrupted battery to lead "L" flashing the lamp at the repair clerk's desk, (b) places an audible ringing tone on the subscriber's line and (c) connects battery to lead "T" causing the buzzer in the auxiliary signal circuit to operate if the buzzer key is operated.

19.2 When the repair clerk answers ground on the "K" lead operates the (S) relay. The (S) relay operated, (a) releases the (L) relay which causes the lamp at the desk to stop flashing, disconnects the source of audible ringing tone and stops the buzzer in the auxiliary signal circuit, (if no other associated trunk is calling at this time), (b) connects steady battery to the "L" lead if "X" wiring is used as a busy signal indication in the case of multipled positions, (c) locks to ground on the sleeve of theselector circuit.

19.3 The (L1) relay remains bridged across the line during conversation and does not release until the calling selector releases. If the selector releases before the repair clerk releases, the (S) relay is held over the "K" lead and ground is maintained on the selector sleeve making the selector test busy until finally the clerk releases the (S) relay restoring the circuit to normal. If the repair clerk releases before the selector circuit releases the (S) relay will be held by ground on the selector sleeve until the selector finally releases.

20. "W" AND "U" WIRING

20.1 When the trunk is seized by a district or office selector the (L) relay operates over the tip and ring conductors through the winding of the relay in the selector circuit. The (L) relay operated functions as described in paragraph 19.1. When the repair clerk answers the (S) relay operates. The (S) relay operated functions as described in paragraph 19.2.

20.2 The circuit is restored to normal as described in paragraph 19.3, except that the (L1) relay under this condition is not used.

21. TRANSFER KEY OPERATED

21.1 When the key in the transfer circuit is operated ground is placed on lead "R" by a relay in the transfer circuit which makes the trunk test busy and thereby causes the selector to seize a trunk which has been transferred to the sender monitor's position.

22. "Z" WIRING

22.1 When "Z" wiring is used the functions of leads "A", "B", "C" and "R" which terminate at the repair clerk's desk are transferred to leads "T", "S", "L" and "R" respectively, which terminate at the sender monitor's position. The operation of the key in the transfer circuit transfers lead "A" from its

normal connection with lead "B" to lead "C". The circuit then functions (except for the operation of the (L1) relay, as explained below), as described in paragraphs 19.1, 19.2, 19.3, 20.1, 20.2 and 21, the sender monitor handling the call in the same manner as the repair clerk. The sender monitor's circuit is arranged to provide a holding path for the (L1) relay when the answering key is in the talking position. The (L1) relay therefore will not release under this condition until both the selector releases and the key is placed in a non-talking position.

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