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METHOD OF OPERATION
TRUNK CIRCUITS

Miscellaneous - Arranged For Cross Connecting In Rear Of Desk - Local Test Desk - Panel Machine Switching System.

DEVELOPMENT

1. PURPOSE OF CIRCUIT

This circuit provides means for connecting local test desk or repair clerks desks with line switch, line finder or manual switchboard, zero operator, various other desks or a local station.

2. WORKING LIMITS

None.

OPERATION

3. PRINCIPAL FUNCTIONS

- 3.1 To establish connections between the local test desk or repair clerks desk and various other desks or central office equipment.
- 3.2 To signal the operator on incoming calls.
- 3.3 To provide supervision.
- 3.4 To prevent recall of the operator.

4. CONNECTING CIRCUITS

- 4.1 Telephone circuit in the desk.
- 4.2 Trunk keys in the desk
- 4.3 Subscribers line equipment, machine switching or manual switchboard.
- 4.4 Tie lines from other desks.
- 4.5 Auxiliary Signal Circuit.

DESCRIPTION OF OPERATION

5. FIGURE 1.

This figure is provided for the purpose of giving two-way service between the desk and the "A" switchboard in a machine switching office. On an incoming call the plug of the zero operator's cord is inserted in the outgoing trunk multiple jack at the "A" switchboard. Battery through 500 ohms is connected to the "S" lead causing the (L) relay to operate. The (L) relay operated closes the auxiliary signal circuit and flashes the desk lamp connected to lead "TK" under control of the #149 or #160 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 S to ground through 300 ohms, (c) releases the (L) relay thus opening the auxiliary signal circuit.

6. 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" lead thus operating a relay and lights a lamp at the "A" switchboard as a signal to the zero operator.

7. 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 "S" to ground through 300 ohms 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.

8. FIGURE 2.

This figure is provided for the purpose of giving two-way service between the desk and central office either manual or machine switching.

the latter equipped with either line finders or line switches. On 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 latter's locking winding. The (L) relay operates through its outer 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 (A) resistance and the (A) 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.

9. OUTGOING CALLS

To originate a call from the desk in a machine switching equipment the trunk key is operated. The (A) resistance and the (A) 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 same manner except that the dial is not used, the call being passed to the operator at the switchboard. 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.

10. 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.

11. FIGURE 3.

This figure is provided for two-way ringdown operation where CB supervision is not required. On incoming calls 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 the outer to ground in the auxiliary signal circuit. The (L) relay operated, connects interrupted battery over lead TL to the trunk lamp, causing the lamp to flash until the call is answered.

12. 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 TL thereby changing the flashing signal to a steady signal as a busy signal.

13. 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.

14. DISCONNECTION

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

15. FIGURE 4.

This figure is provided for the purpose of providing a trunk line to other desks. On an incoming call the key at the distant desk is operated and 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 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 "TK". 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 300 ohms.

16. 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.

17. 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 re-signal. 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.

18. FIGURES 5, 6, 7 AND 8.

These figures are provided to give two-way service between the desk and local stations. When the receiver at the local station is removed from the switchhook the (L) relay operates. The (L) relay operated (a) closes the talking circuit through to the (L) keys, (b) operates the (L-1) relay. The (L-1) relay operated, lights lamps at the trouble desk and test desks at the respective positions to which this circuit is connected. When "A" wiring is used, the (L-1) relay operated, flashes the 2-U lamp at the trouble desk and chief switchman's position, under control of the interrupter, as a signal to the desk operator that a call is waiting. When the (L) key at the desk is operated, the (CO) relay operates. The (CO) relay operated, (a) releases the (L-1) relay, (b) changes the 2-U lamp to a steady light, (c) locks under control of the (L) relay. When the receiver at the local station is replaced upon the switchhook, the (L) relay releases. The (L) relay released, (a) releases the (CO) relay and opens the talking circuit. The (CO) relay released, extinguishes the 2-U lamp. The (L) key released, restores the circuit to normal.

19. DESK CALL TO STATION

On a call from the desk to the station, the (L) key is operated. The ringing key in the telephone circuit is operated, ringing the bell

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at the local station. The (L) key operated, operates the (CO) relay. The (CO) relay operated, lights the 2-U lamp as a busy signal. When the receiver at the called station is removed from the switchhook, the (L) relay operates. The (L) relay operated, (a) trips the ringing current, (b) closes the talking circuit through to the desk, (c) furnishes talking battery. The (L-1) relay does not operate on this condition. Disconnection takes place as described in paragraph 18.

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BMS

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