This M. of O. was prepared from T-431571, Issue 8.

METHOD OF OPERATION
SELECTOR CIRCUIT

Cordless, Incoming from Manual Tandem Office - 4-Party Semi-Selective Ringing - Panel Machine Switching System.

DEVELOPMENT

1. PURPOSE OF CIRCUIT

This circuit is for use at a cordless "B" board in establishing signaling and talking connections for calls between a manual tandem office and a final selector in a full mechanical office.

2. WORKING LIMITS

This circuit is required to work over a maximum external loop of 4980 ohms and a minimum leak of 30,000 ohms at the incoming end, and over subscribers loops having a maximum resistance of 900 ohms and a minimum leak of 10,000 ohms at the outgoing end.

OPERATION

3. PRINCIPAL FUNCTIONS

The principal functions of this circuit are:

3.1 Starting the associated trunk selector and sender selector circuits.

3.2 Brush selection.

3.3 Group selection.

3.4 Selecting idle trunk.

3.5 Ringing the called station.

3.6 Establishing the talking connection.

3.7 Returning to normal.

3.8 Lighting and flashing signal lamps as an indication of the progress of the call.

4. CONNECTING CIRCUITS

This circuit connects with:

4.1 An outgoing trunk from a No. 1 manual Tandem office.

4.2 A standard link allotter.

4.3 A standard final selector.

DESCRIPTION OF OPERATION

5. ASSIGNMENT

On receiving an order over the call wire from the manual tandem board, the cordless B operator assigns an idle trunk. When the tandem operator inserts the plug of the cord in the jack of the assigned trunk, the (A) relay operates over the trunk and thru the polarized relay bridged across the line at the tandem board. The (A) relay operated, operates the (L) relay thru its 1200 ohm winding. The (L) relay operated lights the (WH) guard lamp as an indication to the cordless B operator that the tandem operator has inserted the plug of the cord in the proper trunk jack.

6. SELECTING SENDER

When the assignment key is operated, the (R) magnet operates advancing the switch to position 2. The operation of the assignment key also operates the peg count register. With the switch in position 2, the (L) relay releases but the (WH) guard lamp remains lighted due to ground on cam I. Ground is connected to the start lead (ST) causing the trunk selector to hunt for the open circuit on the hunting lead (HTG) and the sender selector to hunt for an idle sender. With the switch in position 2 ground is also connected to the hold lead (HLD). When the

thousands, hundreds, tens and units keys of the cordless key circuit have been depressed, ground from the key circuit thru the sender selector and allotter circuits is put on the advance lead (ADV) advancing the switch to position 3. With the switch in position 3, the white lamp is extinguished and the green lamp flickers from ground thru the 149-E interrupter until the switch enters position 12 as an indication that selection is in progress. The associated sender circuit connects ground to the fundamental lead (FUND) operating the (L) relay thru its 1200 ohm winding. The (L) relay operated advances the switch to position 4, cam A advancing it to position 5. In position 5 the (L) relay locks thru its 1200 ohm winding to ground over the (FUND) lead.

7. BRUSH AND GROUP SELECTION

When the switch enters position 5, the UP magnet operates for brush selection to ground on cam 3. As the selector moves upward ground from the A commutator is intermittently connected to the (FUND) lead, causing the stepping relay to release and re-operate until the proper brush has been selected. When sufficient impulses have been sent back to satisfy the sender the (FUND) circuit is opened in the sender, releasing the (L) relay. The (L) relay released, (a) releases the UP magnet stopping the upward movement of the selector (B) advances the switch to position 6. With the switch in position 6, the trip magnet (TM) operates. Ground from the associated sender is again connected to the fundamental lead (FUND) operating the (L) relay and advancing the switch to position 7. In position 7, the (L) relay locks thru its 1200 ohm winding to ground on the (FUND) lead and the UP magnet operates for group selection. The trip magnet (TM) being operated in positions 6 to 8 causes the previously selected set of brushes to trip as the selector moves upward. Ground is intermittently connected to the (FUND) lead by the B commutator, causing the stepping relay to release and re-operate until the proper group has been selected. When sufficient impulses have been sent back to satisfy the sender the fundamental circuit is opened, releasing the (L) relay. The (L) relay released, (a) releases the UP magnet thus stopping the brushes at the selected group, (b) advances the switch to position 8. The (L) relay re-operates in position 8 thru its 800 ohm winding. The (L) relay operated advances the switch to position 9. If the first trunk of the selected group is idle as the switch enters

position 9, the (L) relay releases, but should the first trunk of the group be busy, the (L) relay locks thru its 1200 ohm winding to ground on the sleeve of the busy trunk.

8. TRUNK HUNTING

The (L) relay held operated in position 9 operates the UP magnet, causing the selector to travel upward. The (L) relay is held operated between terminals thru its 800 ohm winding to ground on the C commutator. When an idle trunk is found, the (L) relay releases as there is no ground on the sleeve terminal. The (L) relay released, (a) releases the UP magnet stopping the brushes on the selected trunk terminals, (b) advances the switch to position 10, cam A advancing it to position 11.

9. TRUNK CLOSURE

The (L) relay released grounds the sleeve of the trunk making it busy to other hunting ss selectors. In positions 10 to 17, the trunk is made busy by ground on cam I. In position 11, the (FUND) and (FR) leads are connected thru to the tip and ring for selection beyond. When the selection beyond is completed ground in the associated sender circuit is connected to the (ADV) lead, advancing the switch to position 12. In position 12 the ground is removed from the holding lead (HLD), releasing the associated sender circuit. If the plug of the tandem cord has not been inserted in the outgoing trunk jack, the switch remains in position 12 causing the (WH) guard lamp and the (GR) busy lamp to light steadily as an indication to the cordless operator that the trunk is not yet closed. When the plug of the tandem cord is inserted in the outgoing trunk jack the (A) relay operates. The (A) relay operated, operates the (L) relay which locks thru its 800 ohm winding to ground on cam I from position 12 to 12-1.4 and advances the switch to position 13. In positions 13 and 14, the (WH) guard lamp is extinguished but the (GR) busy lamp remains lighted. With the switch in position 13 the (PU) relay operates, (assuming that a trunk in group 0 or 2 has been selected) to ground on the armature of the (A) relay. The (PU) relay operated, advances the switch to position 14 for one ring code ringing. With the switch in position 14 the (L) relay operates to ground at the (A) relay.

10. ONE RING CODE

With the switch in position 14, "One Ring" ringing current is

connected to the called line for ringing direct or "One Ring" stations on party lines. The switch has two ringing positions, namely 14 and 15. In position 14 "One Ring" current is connected to the called line while in position 15 "Two Ring" current is connected to the line. Stations which are rung with "One Ring" current are assigned numbers in the final multiple which are reached thru final trunks in either the 0 or 2 groups on the incoming frame. Stations which are rung with "Two Ring" current are assigned numbers in the final multiple which are reached thru final trunks in either the 1 or 3 groups on the incoming frame. The ringing of stations on the tip side of the line is cared for by a cross-connecting and reversing scheme at the distributing frame. The switch stops in position 14 when the selector is on a final trunk so located that the circuit to the P commutator is open, but it advances to position 15 when the selector is on a trunk so located that the circuit thru the P commutator is closed.

11. TWO RING CODE

For two ring calls a final trunk terminating in the second or fourth group is selected and a circuit is closed thru the P commutator operating the (L) relay. The (PU) relay operates in position 13 to ground thru the PU interrupter, locking under control of the R relay and advancing the switch to position 14. The (L) relay remains operated thru its 800 ohm winding to ground on the P commutator, advancing the R switch to position 15. With the switch in position 15 "Two Ring" current is connected to the called line. An audible ringing tone is sent back to the calling subscriber thru the .02 MF condenser on cam E.

12. RECEIVER REMOVED FROM SWITCHHOOK

When the receiver at the called station is removed from the switchhook with the switch in position 14 or 15, the (R) relay operates. The (R) relay operated, release the (PU) relay, advancing the switch to position 16. In position 16 the tip and ring are connected thru for talking and the (S) relay operates thru the subscriber's set. The (S) relay operated, operates the (S-1) relay, reversing battery and ground over the tip and ring of the trunk, operating the polarized supervisory relay in the trunk circuit in the originating local office.

13. DISCONNECTION

When the receiver at the called station is replaced on the switchhook the (S) relay releases, in turn releasing the (S-1) relay. The (S-1) released, reverses battery and ground over the tip and ring of the trunk, releasing the polarized relay in the outgoing trunk circuit, thereby lighting the supervisory lamp in the originating A operator's cord circuit. When the plug of the A cord is withdrawn from the trunk jack, the (A) relay releases, releasing the (L) relay. The (L) relay released with the switch in position 16, (a) causes the white and green lamps to flash slowly as a disconnect signal (b) operates the (NB) relay intermittently which closes the Cordless Night Alarm Circuit. When the disconnect key is depressed, the switch is advanced to position 18, where the DOWN magnet operates, returning the selector to normal. When the selector reaches the bottom of the frame, the Y commutator advances the switch to position 1.

14. OVERFLOW

If all the trunks in a group are busy, the selector while trunk hunting in position 9, advances to the top of the group and to the overflow terminal. As the sleeve of the overflow terminal is not grounded the (L) relay releases, releasing the UP magnet and advancing the switch to position 10, cam A advancing it to position 11. Ground on the Z commutator advances the switch to position 12. In position 12 the (L) relay operates thru its 1200 ohm winding to ground on the armature of the A relay, advancing the switch to position 13. Ground on the Z commutator advances the switch to position 17. In position 17 the (L) relay re-operates causing the white lamp to flicker as a signal to the cordless B operator that all trunks are busy. When the disconnect key is operated, the switch is advanced to position 18. In position 18, the (WH) guard and the GR busy lamp flash and the DOWN magnet operates, returning the selector to normal. When the selector reaches the bottom of the frame, ground on the Y commutator advances the switch to normal.

15. TELL TALE

Should the selector travel to the top of the frame during selection, ground on the X commutator advances the switch to

position 11. In position 11, the GR busy lamp flickers. The switch remains in position 11 until the disconnect key is operated. The operation of the disconnect key advances the switch to position 18. In position 18 the DOWN magnet operates, restoring the selector to normal.

16. THE OPERATOR DEPRESSES WRONG ASSIGNMENT KEY

If the wrong assignment key is depressed the switch of the associated trunk advances to position 2. With the switch in position 2, the WH guard lamp lights steadily. When the assignment key of a second trunk is depressed the (L) relay operates thru the common strapping to ground on the contacts of the operated key. The (L) relay operated, locks thru its 800 ohm winding and advances the switch to position 4, the A cam advancing it to position 5. In position 5 the (L) relay releases, advancing the switch to position 6. With the switch in position 6, ground on the Y commutator advances the switch to normal.

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METHOD OF OPERATION

Selector Circuit - Cordless - Incoming From Manual Tandem Office - 4 Party Semi-Selective Ringing - Panel Machine Switching System.

Under heading of Working Limits, add Par. 2.1 as follows:-

The ringing trip range of the 114-AK relay when used with AC-DC is 750 ohms.

ENG: P.E.B.
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BMS

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