TOLL SYSTEMS
SIGNALING
TELEPHONE ORDER WIRE CIRCUIT
1000 CYCLE OR 1900 CYCLE RINGDOWN SIGNALING

CHANGES

B. CHANGES IN APPARATUS

B.1	Superseded	Superseded By
	Repeating Coil Type 173A	Repeating Coil Types 173E or 173ES

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 The information for the "J" and "J1" leads in Figs. 5, 7, 11 and 12 is amended to allow duplication of these figures.

D.2 This reissue allows one Fig. 5 per connecting test board to be used, when two or more of these test boards are to be multipled to the same order wire. This permits those test boards which do not answer an incoming call to receive a recall signal. Refer to Note 197.

D.3 This reissue allows one Fig. 12 per connecting test board to be used when two or more of these test boards are to be multipled to the same order wire. This permits a recall signal to be received at each test board. Refer to Note 108.

D.4 This reissue allows one Fig. connecting test board to be us when two or more of these test boards are to be multipled to the same order wire. This permits a recall signal to be received at each test board. Refer to Note 106.

D.5 Repeating coil Type 173 has been rated M.D., and is superseded by Type 173E or 173ES.

All other headings, no change.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 2342-AAC-FSE-FW

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CHANGES

B. CHANGES IN APPARATUS

B.1 Added

2 KS-8512 L6B resistances (C), (D) in Fig. 2

D. DESCRIPTION OF CIRCUIT CHANGES:

D.1 Options "Q" and "R" added to Figs. 1, 2 and 9. Option "R" is a record of former wiring and provides for 24 volt operation. Option "Q" arranges the circuit for 48 volt operations for type "N" Carrier Telephone Order Wire applications for offices provided with 48 volt battery only.

D.2 Notes 101, 102 and 103 revised relative to D.1 above.

D.3 Title of drawing was changed to add reference to 1900 cycle ringdown signaling.

D.4 Title of Fig. 2 was revised to include reference to 1900 cycle signaling.

D.5 Title of Fig. 1 was changed to add reference to appearance at type "N" Carrier Terminal or Central points.

D.6 Connecting circuit information on Figs. 1 and 2 was revised to add reference for type "N" Carrier Telephone Order Wire applications.

All other headings under Changes, no change.

1. PURPOSE OF CIRCUIT

1.1 This drawing shows connections between telephone order wire signaling and talking circuits.

2. WORKING LIMITS

2.1 None.

3. FUNCTIONS

3.1 To provide means of signaling between main stations on local order wires.

3.2 To provide means for talking over a telephone order wire.

3.3 To provide a television order circuit between television operating centers.

4. CONNECTING CIRCUITS

4.01 Cut-off Relay Circuits - SD-61390-02, SD-61832-01, SD-55393-01, SD-64419-01 and SD-55560-01.

4.02 1000 cycle d-c Signaling Circuits SD-61385-02, SD-64419-01 and SD-55392-01.

4.03 Telephone Set Balancing Network - SD-59046-01.

4.04 1000-20 cycle Signaling Circuit - SD-61385-03.

4.05 "K" Carrier Telephone Trunk Circuit - SD-64310-01.

4.06 Telephone Order Wire Application Schematic - SD-55385-01.

4.07 D-C-20 cycle Signaling Circuit - SD-55560-01.

4.08 Toll Test Board No. 4, 5 or 18B Telegraph Test Board No. 9, Trunk Jack Circuit - SD-62805-01.

4.09 Test and Control Bd. No. 8, Toll Test Bd. No. 16, 17B or 18B Jack Ckts. - SD-64545-01.

4.10 Television Order Wire Circuit - SD-56112-01.

4.11 Application Schematic - Television Order Circuits - SD-56205-01.

4.12 Jack Circuit - 17C Toll Test Bd. SD-68122-01.

4.13 Trk. Jk. Circuit for V.F. Channel Patch Bays - SD-59437-01.

4.14 Night Alarm and Auxiliary Sig. Circuit - SD-55039-01.

4.15 Type "N" Carrier Order Wire and and Alarm Circuit - SD-95142-01.

4.16 Type "N" Carrier Voice frequency Alarm Circuit - SD-95143-01.

4.17 V3 Telephone Repeater Line and Balancing Application Schematic - SD-95144-01.

DESCRIPTION OF OPERATION

5. GENERAL

Figs. 1 to 12, inclusive cover circuit arrangements for use at terminals of local telephone order wires. Figs. 101 to 110 are information figures showing how Figs. 1 to 10 are connected to voice circuits and signaling circuits of telephone order wire systems.

When this circuit is used to provide a television order circuit, Fig. 2 or 3 and Fig. 9 are furnished connecting to the television order wire circuit and to the application schematic - television order circuits. Figs. 101, 102, 103 and 104 show the arrangements for this condition. Fig. 10 is not provided for television order circuit use.

For further information showing how this circuit is associated with a television operating center, refer to CD-56112-01.

For applications to type "N" Carrier Order Wire refer to J-98704.

6. SENDING AND RECEIVING CIRCUIT FOR RINGDOWN ORDER WIRE - 1000-20 CYCLE SIGNALING CIRCUIT - JACK CIRCUIT AT OUTPUT SEALED TEST TERMINAL BAY OR AT THIS BAY AND AT V.F. 4-WIRE JACK BAY - SEE FIGS. 102 AND 104.

Fig. 3 covers a relay arrangement for use at the terminal of an order wire using 1000 cycle ringdown signaling in connection with the reuse of an existing 1000-20 cycle terminal ringer. Incoming 20 cycle signals from the terminal ringer, over leads "T2" and "R2" or "T" and "R" with "Z" option, operates relay (J). Relay (J) in operating operates relay (A) in a local circuit. Relay (A) in operating locks up to ground appearing on the "J" lead through a series circuit composed of any one or all of the following: the jack contacts of Fig. 1 and 6 or the back contacts of the (S1) relay in Fig. 11 and connects battery to lead "L" to light the order wire lamp in Figs. 1 and 6 or the lamp in the trunk jack circuit for V.F. channel patch bay connected to Fig. 1. Relay (A) is released and the lamp extinguished by breaking the series continuity of the "U" lead when the call is answered. Also lead (G) is connected to lead "BR". For a recall signal with the continuity of the J lead broken, the (A) relay will be operated but will not lock up. The order wire lamp in Figs. 1 and 6 and the lamp in the trunk jack circuit connected to Fig. 1 will light for the duration of the incoming signal. Outgoing signals are transmitted by connecting ground to lead "SS" by the operation of the (RING) key in Fig. 1, 6 or 11. This operates relay (R) to connect a source of 20 cycle ringing current to leads "T" and "R" to the drop side of the terminal ringer. The operation of relay "R" also disconnects relay (J) to prevent lighting the order wire lamps at the local end. Leads "T", "R", "G" and "BR" in Fig. 1 connect to a jack in the "K" carrier telephone trunk circuit for use in talking to the auxiliary station over the order wire. In this connection, signaling is accomplished over the alarm trunk circuit.

7. SENDING AND RECEIVING CIRCUIT FOR RINGDOWN ORDER WIRE - 1000-20 CYCLE SIGNAL CIRCUIT - JACK CIRCUIT AT OUTPUT SEALED TEST TERMINAL BAY AND APPEARANCES AT TOLL TEST BOARD NO. 4, 5 OR 18B - SEE FIGS. 106 AND 108.

Incoming 20-cycle signals from the terminal ringer over leads "T2" and "R2" or "T" and "R" with "Z" option operates relay (J) in Fig. 3, which causes relay (A) to operate and lock up. This connects battery to lead "L" to light the order wire lamps in Fig. 1 and at the toll test board appearances over the "L" lead of Fig. 5. When the call in answered at the toll test board, battery is applied to lead "S" in Fig. 5 to cause relay (S) to operate. Relay (S)in operating causes relay (A) to release by opening lead "J" in Fig. 1 extinguishing the lamp. It also connects lead "G" to lead "BR", and opens the "L" lead in Fig. 5 to prevent the line lamps at the test board from lighting on a recall signal. For a recall signal, with a cord circuit connected at the toll test board jack, 20 cycles from the terminal ringer will be received over leads "T" and "R" to cause the 20 cycle relay in the cord circuit to operate, which lights a lamp associated with this cord circuit. Also relay (J) in Fig. 3 will operate to cause relay (A) to operate, which causes the order wire lamp in Fig. 1 to light for the duration of the incoming signal. Outgoing signals from the "Output Sealed Test Terminal Bay" are transmitted the same as described in Section 6. Signaling from the test board is accomplished by applying 20 cycles to leads "T" and "R" in Fig. 5 by the operation of the cord circuit ringing key. This 20 cycle is applied to the drop side of the terminal ringer through back contacts of relay (R) in Fig. 3. Signaling from the test board will also cause relays (J) and (A) in local Fig. 3 to operate, which causes the order wire lamp in Fig. 1 at the local end to light for the duration of the outgoing signal.

8. SENDING AND RECEIVING CIRCUIT FOR RINGDOWN ORDER WIRE - 1000 CYCLE D-C SIGNALING CIRCUIT - JACK CIRCUIT AT OUTPUT SEALED TEST TERMINAL BAY OR AT THIS BAY AND AT V.F. 4-WIRE JACK BAY - SEE FIGS. 101 AND 103.

Fig. 2 covers relays for a sending and receiving circuit for use with order wire using 1000 cycle ringdown signaling in connection with 100 d-c signaling circuits. Incoming signals cause the 1000 cycle-DC signal receiving device to connect battery to lead "SG". This operates relay (A) on its primary winding. Relay (A) in operating locks up to ground appearing over the "J" lead through a series circuit composed of any one or all of the following: The jack circuits of Figs. 1 and 6 and the back contacts of the (S1) relay in Fig. 11 and connects battery to lead "L" to light the order wire lamp in Figs. 1 and 6 and the lamp in the trunk jack circuit for V.F. channel patch bays connected to Fig. 1. When the call is answered the continuity of the "J" lead is broken which releases relay (A), extinguishing the lamps. For a recall signal with the continuity of the "J" lead broken the "A" relay will operate but will not lock up. The order wire lamps light for the duration of the incoming signal. Outgoing signals are transmitted by connecting ground to lead "SS" by the operation of the (RING) key in Fig. 1, 6 or 11. This operates relay (R) to connect battery to lead "SG" to operate the 1000 cycle-DC signaling circuit to send out a 1000 cycle signal.

9. SENDING AND RECEIVING CIRCUIT FOR RINGDOWN ORDER WIRE - 1000 CYCLE D-C SIGNALING CIRCUIT - JACK CIRCUIT AT "OUTPUT SEALED TEST TERMINAL BAY" AND APPEARANCES AT TOLL TEST BOARD NO. 4, 5 OR 18B - SEE FIGS. 105 AND 107.

Incoming signals cause the 1000 cycle d-c signal circuit to apply battery to lead "SG", which causes relay (A) in Fig.2 to operate and lock up. This causes the order wire lamp of Fig. 1 and the lamps at the toll test board to light. When the call is answered at the "Sealed Test Term. Bay" the lamp is extinguished by the opening of the jack contacts in Fig. 1. When the call is answered at the toll test board, battery is applied to lead "S", to cause relay (S) to operate. Relay (S) in operating causes relay (A) in Fig. 2 to release by opening lead "J" in Fig. 1, extinguishing the lamp. It also connects lead "G" to lead "BR" and opens the "L" lead in Fig. 5. For a recall signal, with a cord circuit connected at the toll test board jack, the incoming 1000 cycle signal causes the 1000 cycle d-c signal circuit to apply battery to the "SG" lead, which causes relay "A" in Fig. 2 to operate. This causes the order wire lamp to light in Fig. 1 for the duration of the incoming signal. Also battery is applied to the "SG" lead to the DC-20 cycle signaling circuit, which causes this circuit to operate to apply 20 cycles to the test board over the "T" and "R" leads. This causes the 20 cycle relay in the cord circuit to operate to light the lamp associated with this cord circuit. Outgoing signals from Figs. 1, 6 or 11 are transmitted the same as described in Section 8. Signaling from the toll test board is accomplished by applying 20 cycles to leads "T" and "R" in Fig. 5 by the operation of the cord circuit ringing key. This 20 cycles is applied to the drop side of the d-c 20 cycle signaling circuit, which operates to apply battery to its "SG" lead. This applies battery to the "SG" lead to the 1000 cycle-DC signal circuit through a back contact of the "R" relay in Fig. 2, which causes the 1000 cycle d-c signaling circuit to send out a 1000 cycle signal. Relay "A" in Fig. 2 is also operated, which causes the order wire lamp in Fig. 1 at the local end to light for the duration of the outgoing signal.

10. SENDING AND RECEIVING CIRCUIT FOR RINGDOWN ORDER WIRE - 1000 CYCLE D-C SIGNALING - JACK CIRCUIT AT "OUTPUT SEALED TEST TERMINAL BAY" AND APPEARANCES AT TEST AND CONTROL BD. #8 OR T.T. BD. #16, 17B, 18B OR 17C - SEE FIGS. 109 & 110.

For connection to Test and Control Bd. #8 or to T.T. Bd. #16, 17B or 18B Fig. 7 is provided. For connection to T.T. Bd. #17C Fig. 12 is provided.

Incoming signals cause the 1000 cycle d-c signal circuit to apply battery to lead "SG" which causes relay (A) in Fig. 2 to operate and lock up. This connects battery to the "L" lead to Figs. 1, 7 and 12. This causes the order wire lamp in Fig. 1, and the line lamps at the test board to light. When the call is answered at the "Sealed Test Terminal Bay" the "J" lead in Fig. 1 is opened at the jack contacts, which extinguishes the lamps. When the call is answered at a test board connecting to Fig. 7, battery is applied to lead "S" in Fig. 7, which causes relay (S) to operate on its secondary winding. Relay (S) operated opens the "J" lead to extinguish the lamps, connects lead (BR) to lead (G), opens lead "L" in Fig. 7 to prevent the line lamp from lighting on a recall signal, and connects the winding of relay (C) to lead "L" to Fig. 1. For a recall signal, with a cord circuit connected at the test board, the incoming signal causes relay (A) in Fig. 2 to operate, which applies

battery to the (L) lead. This causes the lamp in Fig. 1 to light, and also cause relay (C) in Fig. 7 to operate. This applies ground to lead "S" through the pri. wdg. of relay (S) which causes the cord lamp to light. These lamps light for the duration of the incoming signal. When a call is answered at T.T. Bd. #17C with the connecting cord circuit battery is applied to lead "LO" to operate relay (S2). Relay (S2) operated opens the "J" lead to extinguish the lamps and connects lead "BR" to lead "G". For a recall signal the (A) relay will operate but not lock up, lighting the order wire lamp in Fig. 1 and the line lamp of the 17C T.T. Bd. for the duration of the incoming signal. For an outgoing signal from a test board connected to Fig. 7, battery is applied to lead (T) in Fig. 7 which causes relay (SS) to operate through the 1-2 wdg. of the 307P retardation coil, Relay (SS) operated applies ground to the "SS" lead, which causes relay (R) in Fig. 2 to operate. This applies battery to the "SG" lead, which causes the 1000 cycle DC signal circuit to send out a 1000 cycle signal.

For an outgoing signal from T.T. Bd. #17C battery is applied to lead "OS" by the operation of a key in the position circuit of the #17C T.T. Bd. which operates relay (R1) in Fig. 12. Relay (R1) operated applies ground over the "SS" lead to operate relay (R) in Fig. 2. This applies battery to the "SG" lead which causes the 1000 cycle-DC signal circuit to send out a 1000 cycle signal.

11. SENDING AND RECEIVING CIRCUIT FOR TELEVISION ORDER CIRCUIT - 1000 CYCLE D-C SIGNALING CIRCUIT - APPEARANCES IN TELEVISION OPERATING CENTERS - SEE FIGS. 101 AND 103.

Figs. 101 and 103 show typical television order Circuit (TVOC) arrangements at intermediate and terminal points respectively. These figures when used to provide a TVOC, operate the same as when used with Fig. 1. The TVOC provides a key and relay instead of a key and jack per Fig. 1. An order circuit lamp is also provided by the TVOC.

12. SENDING AND RECEIVING CIRCUIT FOR TELEVISION ORDER CIRCUIT - 1000-20 CYCLE SIGNALING CIRCUIT - APPEARANCES IN TELEVISION OPERATING CENTERS - SEE FIGS. 102 AND 104

Figs. 102 and 104 show typical television order circuit (TVOC) arrangements at intermediate and terminal points respectively. As described above in par. 11, the TVOC replaces Fig. 1 under these conditions.

13. APPLICATION TO TYPE "N" CARRIER TELEPHONE ORDER WIRE

For application to type "N" Carrier Telephone Order Wire Figs. 1, 2 and 9 are employed. The functions of these figures are described elsewhere in this circuit description. The only difference being that these figures may be provided in an office having 48 volt battery only. In this case "Q" option is provided. "Q" option provides for a 48 volt lamp in Fig. 1 and for 48 volt operation of the relays in Figs. 2 and 9. Reistances (C) and (D) in Fig. 2 are in series with the windings of relay (A) and drop the supply to 24 volts so as not to affect the operate and release times of relay (A). Also instead of utilizing 1000 cycle ringdown signaling a 1900 cycle signaling source may be provided.

14. ALARM CUT-OFF KEY (FIG. 4)

When Fig. 4 is used in connection with Figs. 2 or 3, relay (A) can lock up under control of the jack circuit (Fig. 1 or 6) or relay "S" in Fig. 5 or 7 with key (ALM CO) not operated. When an office is only partially attended key (ALM CO) is operated which opens the locking path for relay (A), preventing the continuous operation of the alarm circuit.

15. LINE TERMINATION (FIG. 9)

When Fig. 9 is used in connection with Fig. 1, resistance "A" in series with condenser "B" is normally connected to the (T) and (R) leads of Fig. 1, which provides a line termination. When a tel. set or cord is inserted in any of the order wire jacks the (BR) and (G) leads of Fig. 1 are connected together, which causes relay (B) in Fig. 9 to operate to remove the termination. Fig. 9 also supplies a grd. connection to the "Ring" keys in Figs. 1 and 6 when it is not supplied from the tel. order wire application schematic.

16. SIGNAL SENDING AND RECEIVING CIRCUIT (FIG. 10)

Fig. 10 is a modification of Fig. 2 to permit the use of cut-off relay and 1000 cycle signal receiving circuits equipped with d-c signaling over

"ST" and "G" leads in place of the "SG" lead. Incoming signals cause the signal receiving device to connect ground to lead "G" to operate relay (A) which performs the same functions as in Fig. 2. For outgoing signals the operation of relay (R) connects ground to lead "ST" to operate the signaling circuit.

17. INFORMATION FIGURES

The information figures numbered 101 to 110 cover methods for connecting together various parts of the order wire system to meet the requirements under different conditions.

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