CIRCUIT DESCRIPTION SWITCHING SYSTEMS DEVELOPMENT DEPARTMENT

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PANEL SYSTEMS FLOOR ALARM BOARD MISCELLANEOUS AND AUXILIARY ALARM CIRCUIT

CHANGES

B. CHANGES IN APPARATUS

B.1 Added

2Y lamp (RA), Fig. 95 2Y lamps (ANN SYS)) and (GUARD)) RlO61 relay (AS)) Fig. 96 Rl270 relay (ACO)) 92A key (ACO)) 2Y lamp (N CARRIER), Fig. 97

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 In Fig. 70, "ZJ" option wiring is added to provide for transfer of alarms with tone distinction for the 3A Announcement System Control Circuit. The former wiring is shown as "ZI" option. Circuit note 156 is added to cover "ZI" and "ZJ" options.

D.2 Fig. 95 is added to provide alarms for the Announcement System 4A
Distributing and Alarm Circuit, "ZI" option furnished, and to provide for transfer of alarms with tone distinction, "ZJ" option furnished.

D.3 Fig. 96 is added to provide alarms for the audichron converter of the 4A Announcement System, "ZK" option furnished, and to provide for transfer of these alarms to an alarm receiving center "ZL" option furnished. Circuit note 157 is added to cover "ZK" and "ZL" options.

D.4 Fig. 97 is added to provide alarms for the type N Carrier Telephone Circuits.

 D.5 The connecting information for Fig. 94 is changed to show connections to the No. 12 S. O. Desk Cord and Speed of Answering Circuits.

D.6 Cross-connection Figs. 70L, 95K, 96K & 97K are added.

All other headings under Changes, no change.

1. PURPOSE OF CIRCUIT

1.1 To provide miscellaneous and auxiliary alarms at the floor alarm board. 2. WORKING LIMITS

2.1 None.

3. FUNCTIONS

3.1 To provide means for connecting together the audible alarms adjacent alarm boards or power alarm cabinet, and to provide means for similar interconnections with ground cutoff relay offices or crossbar offices.

3.2 To provide "other floor" pilot lamps and exit pilot lamps to indicate trouble conditions on other floors.

3.3 To provide a floor alarm board pilot lamp associated with alarms which do not light aisle pilot lamps.

3.4 To provide a night alarm key for disconnecting alarms wanted only at night.

3.5 To provide aisle pilot audible alarms for different groups of equipment.

3.6 To provide miscellaneous signals as shown on the drawing.

3.7 To provide for transfer of alarms to an alarm receiving center during light load periods.

3.8 To provide Ringing Plant Failure Lamp when it is required.

4. CONNECTING CIRCUITS

When this circuit is listed on a key sheet, the connecting information thereon is to be followed.

4.01 Audible Alarm Switching Circuit, ES-20410-01.

4.02 Miscellaneous Circuit for Miscellaneous Interrupter Frame, SD-21666-01.

4.03 Audible Alarm Circuit for Floor Alarm Board, SD-21819-01.

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^{4.04} Power Alarm Cabinet Miscellaneous and Auxiliary Alarm Circuit, SD-21820-01.

4.05 Floor Alarm Board Fuse and Time Alarm Circuit, SD-21201-01.	4.26
4.06 "A" Switchboard Trip Start and Link Circuit, SD-21105-01.	4.27
4.07 "B" Switchboard Trip Start and Link Circuit, SD-21105-01.	4.28
4.08 Dial Test Circuit, SD-21385-01.	4.29
4.09 Ringer and Dial Test Circuit, SD-21094-01, SD-21094-02 and SD-21096-01.	4.30 H
4.10 Link and Start Circuits, SD-21714-01 and SD-21713-01.	4.31 H
4.11 Trip, Start and Allotter Circuit for Intercepting Trunk Finders, SD-21561-01.	4.32
4.12 Allotter Alarm and Make Busy Circuit for Manual Subscriber	4.33 (
Lines, SD-21720-01.	4.34 (
4.13 Chief Switchman's Desk Auxiliary Signal Circuit, SD-20391-01.	4.35 I
4.14 Extension Alarm Circuit from PBX or Community Dial Office, SD-92617-01.	4.36
4.15 Announcement Supply Alarm Cir- cuits, SD-90256-01 and	4.37
SD-90260-01.	4.38 1
4.16 Announcement Desk Circuit, SD-90253-01.	
4.17 Announcement Desk Transmitting Repeating Alarm Circuit.	4.39
SU-90255-01.	4.40
4.18 130-Volt Power Supply Circuit, SD-80082-01, SD-80760-01.	SD-9621
4.19 "A" Switchboard Intercepting and Verification Request Trunk Cir-	4.41
cuit, SD-21633-01.	4.42
4.20 Pulse Checking Circuit, SD-90437-01.	4.43
4.21 Emergency Alarm Circuit, SD-90437-01.	4.44
4.22 Coin Control Circuit, SD-21705-01.	SD-950
4.23 Outgoing Trunk Circuit for Special Service to Central "A"	4.45
bard, bb-youy-or	4.46
Make-Busy Frame, SD-21663-01.	4.47 (
4.25 Auxiliary Signal Circuit for Plugging Up Circuit Panel, SD-90594-01.	4.48
4u-21620-01.	

6	Telephone	Repeater	Battery	Supply
	Circuit,	SD-90516-0	01.	

- 7 Power System Power Alarm Circuit, SD-80413-01.
- 28 Power Alarm Relay Circuit, SD-21744-01.

Key Pulsing "A" Swbd. Incoming Selector Circuit, SD-21693-01.

- 30 Key Pulsing "A" Swbd. District Selector Circuit, SD-21181-01.
- .31 Key Pulsing "A" Swbd. Outgoing Trunk Circuit, SD-21179-01.
- 32 Alarm Circuit for 60-Cycle Supply, SD-95005-01.
- .33 Outgoing Trunk Test Board Auxiliary Signal Circuit, SD-20388-01.
- .34 Central Office Control and Distributing Circuit, SD-96035-01.
- .35 Power Supply Circuit, Regulated Rectifier, SD-80816-01.
- ..36 Ringing Power Alarm Circuit, SD-80731-01.
- .37 Ten-party Code Ringing Interrupter and Alarm Circuit, SD-21846-01.
- .38 No-Voltage and Fuse Alarm Circuit, SD-95035-01.
- 4.39 "A" Swbd. Fuse Alarm Circuit, SD-96153-01.
- 4.40 34 Announcement System Control Circuit, SD-96199-01 and SD-96249-01.
- 4.41 Power Supply for 3A Announcement System, SD-80732-01.
- 4.42 Audible Alarm Circuit for Operating Room, SD-21884-01.
- 4.43 Emergency Ringing Circuit, SD-95083-01.

4.44 Calculagraph Supply and Distribution Fuse Alarm Circuit, SD-95085-01.

- 4.45 Line Load Control Circuit, SD-96387-01.
- ...46 Private Line Conference Circuit, SD-96391-01 and SD-96392-01.
- 4.47 Clock Circuit, ES-20016-01.
- .48 Air Raid Warning Control Circuit, SD-95332-01.

4.49 Dial Tone Speed Register Circuit, SD-96403-01.

4.50 Prepayment Coin Suspension Signal Control and Alarm Circuit, SD-95357-01.

4.51 Coin Zone Outgoing Trunk Circuit, SD-96366-01.

4.52 Cable Insulation Alarm Circuit, SD-96348-01.

4.53 Fuse Alarm Circuit, SD-90263-01.

4.54 Multi-frequency current supply and Distribution Circuit SD-95391-01.

4.55 Alarm Transfer Circuit, SD-20733-01.

4.56 Miscellaneous Alarm Circuit, ES-20241-01.

4.57 Alarm Receiving Circuit, SD-95418-01.

- 4.58 Power Audible Alarm Circuit, SD-80730-01.
- 4.59 Emergency Power Supply Circuit, SD-80844-01.

4.60 8-Party Semi-Selective Ringing Interrupter and Alarm Circuit, SD-95674-01.

4.61 Information Desk Start Circuit, SD-90006-01.

4.62 Major Audible Alarm Circuit, SD-95454-01.

4.63 Multi-Line Service Observing Circuit, SD-95563-01.

4.64 Multi-Line Service Observing Circuits for use with Service Observing Desk No. 12.

- 4.641 Speed of Answer Observing, SD-95563-01.
- 4.642 Toll Swbd. No. 1 Cord Observing, DC & MFKP, SD-56298-01.
- 4.643 Toll Swbd. No. 1 Cord Observing, DP, SD-56296-01.

4.644 Toll Swbd. No. 1 Sleeve Supervision, Cord Observing, MFKP, SD-56254-01.

- 4.645 Toll Swbd. No. 3 Cord Observing, DC & MFKP, SD-56316-01.
- 4.646 Toll Swbd. No. 3 Cord Observing, DP, SD-56294-01.
- 4.647 Toll Swbd. No. 3C or 3CL Cord Observing, DP SD-56295-01.

4.648 DSA Swbd. No. 13 or 15 Cord Observing, DC & MFKP, SD-95564-01.

4.649 DSA Swbd. No. 13, 14 or 15 Cord Observing, DP, SD-95605-01.

4.65 Announcement System No. 4A Distributing and Alarm Circuit for Dual Channel Announcement Machine, SD-95540-01.

4.66 Announcement System No. 4A Distributing and Alarm Circuit for Distributing Center, SD-95546-01.

4.67 Announcement System No. 4A Application Schematic, SD-95159-01.

4.68 Type N Carrier Telephone V.F. Alarm and Order Wire Signaling Circuit, SD-95143-01.

4.69 Type N Carrier Telephone Signaling Order Wize and Alarms Line Bridging, Cut-off Relay and Power Supply Arrangements, SD-95142-01.

4.70 "NI" Carrier Telephone Application Schematic for Terminal, SD-95121-01.

4.71 "NI" Carrier Telephone Application Schematic for Repeater, SD-95124-01.

DESCRIPTION OF OPERATION

5. D-C AUXILIARY SIGNAL (FIG. 1)

5.1 ("G" Option)

When "PA" wiring is furnished, connection of ground to the DG or UR lead operates relay (UL), operating relay (DA), operating the (DA) relay of the adjacent alarm board, if a con-trolling alarm switching key is oper-ated, and lighting the (DFL) lamps, Fig. 4, at all floor alarm boards and in the power room. Operation of relay (DA) operates the D-C bell or tone bar signal of the associated alarm board and closes a circuit for operating an audible signal in the operating room. When "XB" wiring is furnished, lamps are lighted and the d-c signals are operated by means of relays in the aubi-ble alarm circuit. When Fig. 63 is furnished, each operation of relay (AR) operates two or more tone bar signals. When a Ringing Plant Failure Lamp is required, the "MJ" lead will be grounded by the operation of the (MJ) relay in Fig. 78 when a Ringing Plant Failure occurs. This will operate the (DA) relay. With the (DL) relay normal, the Power Failure Lamp at the Floor Alarm Boards and Power Alarm Cabinet will not be operated. With the (DA) relay

operated the DC audible signal will be operated. A ringing Plant Failure Lamp will be lighted by the operation of the relay in Fig. 78.

5.2 Alarms Transferred to Alarm Receiving Center ("F" Option)

This circuit functions as described in paragraph 5.1 except that relay (DA) or the audible alarm circuit relays operate a major alarm at an Alarm Receiving Center instead of a D-C bell or tone bar in the local office.

6. A-C AUXILIARY SIGNAL (FIG. 2)

6.1 ("G" Option)

When "PA" wiring is furnished, connection of ground to the AG lead operates relay (AL), operating relay (AA), operating the (AA) relay of the adjacent alarm board, if a controlling alarm switching key is operated, and lighting the (AFL) lamps, Fig. 4, at all floor alarm boards and in the power room. Operation of relay (AA) operates the a-c ringer of the associated alarm board. When "XB" wiring is furnished, lamps are lighted and the a-c signals are operated by means of relays in the audible alarm circuit. When a Ringing Plant Failure Lamp is required, the "MN" lead will be grounded by the oper-ation of the (MN) relay in Fig. 78 when a Ringing Plant Failure occurs. This will operate the (AA) relay. With (AL) relay normal, the Power Failure Lamp at the Floor Alarm Boards and Power Alarm Cabinet will not be operated and instead a ringing Plant Failure Lamp will be operated by the operation of the relay in Fig. 78. Relay (AA) operated will operate the AC audible signal.

6.2 Alarms Transferred to Alarm Receiving Center ("F" Option)

This circuit functions as described in paragraph 6.1 except that relay (AA) or the audible alarm circuit relays operate a minor alarm at an Alarm Receiving Center instead of the A-C Signal in the local office.

7. POWER ALARM FLOOR PILOTS (FIG. 3) (A&M ONLY)

Operation of the d-c auxiliary signal at the power alarm cabinet, or operation of a major alarm in the power alarm circuit, lights a lamp (DPL) at each alarm board. Operation of the power alarm cabinet a-c auxiliary signal or operation of a minor alarm in the power alarm circuit lights a lamp (APL) at each alarm board. When a Ringing Plant Failure Lamp is required the circuit is so arranged that the (DPL) and (APL) lamps will not be operated and instead a Ringing Plant Failure Lamp will be lighted. 8. FLOOR ALM. BD. FLOOR PILOTS (FIG. 4) (A&M ONLY)

Operation of the d-c auxiliary signal at a floor alarm board lights a corresponding lamp (DFL) at each floor alarm board and a lamp in the power alarm circuit. Operation of a floor alarm board a-c auxiliary signal lights a corresponding lamp (AFL) at each floor alarm board and a lamp in the power alarm circuit. Where "M" wiring is furnished, the power room lamps are on the power board.

9. ALARM BATTERY SUPPLY (FIG. 5)

This figure furnishes battery for alarms associated with the d-c auxiliary signal and for some alarms associated with the a-c auxiliary signal. The power fuse from which the battery is drawn is connected to direct battery and is independent of all other power fuses.

10. ALARM SWITCHING KEYS (FIG. 6) (A&M ONLY)

Key (SW) when operated, connects together the auxiliary signals of two alarm boards, in such a manner that an alarm at one of the alarm boards operates the audible signals at both alarm boards.

11. FRAME TEST BATTERY (FIGS. 7 AND 8)

One connection block is furnished on each side of the frame to supply 24-volt battery, 48-volt battery, ground and ground through 12,000 ohms resistance for testing purposes.

12. A-C AUX. SIGNAL FOR "A" SWBD. (FIG. 9) (A&M ONLY)

Operation of a fuse at the "A" switchboard closes the circuit to light lamp (A BD FA) and operate the (AC) relay, Fig. 24, or the (NB) relay, Fig. 58 or 68.

13. "B" SWBD. LINK GROUP MAKE-BUSY SIGNAL (FIG. 10)

When a plug is inserted in the make-busy jack of either subgroup, the corresponding lamp at the floor alarm board is lighted.

14. CONTINUOUS RINGING ALARM RELAY (FIG. 11)

Operation of an alarm which requires the continuous ringing night alarm operates relay (CR), which connects together leads AG and BG, to continuously operate the a-c auxiliary signal.

15. INTERMITTENT RINGING ALARM RELAY (FIG. 12)

Operation of an alarm which requires the intermittent ringing night alarm, operates relay (TR), which connects together leads C and E, to intermittently operate the a-c auxiliary signal.

16. NIGHT ALARM (FIG. 13)

When leads AG and BG are connected together and key (NA) is normal, ground is connected to lead AG of Fig. 2, 47 or 65, operating the a-c auxiliary signal. When leads C and E are connected together and key (NA) is normal, relay (RT) operates on machine ringing current and releases during the silent interval, intermittently connecting ground to lead AG of Fig. 2, 47 or 65, to cause intermittent operation of the a-c auxiliary signal.

- 17. RINGING CURRENT SUPPLY LAMPS (FIG. 14)
- 17.1 ("G" Option)

This figure furnished continuous ringing current and machine ringing current for the alarm board alarms.

17.2 Alarms Transferred to Alarm Receiving Center ("F" Option)

The machine ringing supply (lead "A") and the continuous ringing supply (lead "D") to Figs. 15 to 21 is opened to silence the audible alarm signals for Figs. 15 to 21.

The audible alarm signals for these figures are transferred to the alarm receiving center at the auxiliary alarm ckt. (Fig. 2).

18. AISLE PILOT AUDIBLE ALARMS (FIGS.15, 16, 17, 18, 19, 20 AND 21)

An aisle pilot audible alarm is furnished for each alarm group. A fuse alarm, or other minor trouble condition recuiring a continuous alarm, causes operation of relay (LF), (SF), or (F), which disconnects the machine ringing current supply and connects continuous ringing current to the associated subset. A time alarm or other minor trouble condition requiring an intermittent alarm causes operation of relay (LT), (ST) or (T), which connects machine ringing current to the associated subset.

19. DIAL TESTER ALARM (FIG. 22)

When the dial test circuit (AL) relay operates, ground on lead DT lights lamp (DT and operates the (AC) relay, Fig. 24 or the (MB) relay, Fig. 50 or 68.

20. RINGING TESTER ALARM (FIG. 23)

When the ringer and dial test circuit (AL) relay operates, ground on lead TL lights lamp (TL) and operates the (AC) relay, Fig. 24, or the (NB) relay, Fig. 58 or 68.

- 21. A-C AUXILIARY RELAY (FIG. 24) (A&M ONLY)
- 21.1 ("ZA" Option)

Operation of an alarm which requires continuous operation of the alarm board a-c auxiliary signal, operates relay (AC), which closes the a-c auxiliary signal circuit.

21.2 Alarms Transferred to Alarm Receiving Center ("ZB" Option)

When relay (AC) is connected to a motor stop alarm circuit, the operation of relay (AC) due to the stopping of an associated motor connects ground to lead "MS1" which operates a major alarm at the alarm receiving center.

22. TRUNK FINDER GROUP, LINK SUBGROUP AND ALLOTTER SUBGROUP MAKE-BUSY SIGNALS (FIG. 25)

When the make-busy key of a group or subgroup is operated, the corresponding lamp at the floor alarm board is lighted.

23. INCOMING CALL SIGNAL LAMP (FIG. 26)

A call incoming to the chief switchman's desk or key cabinet lights lamps (CS) or (KC) and operates the night alarm, or operates the (NA) relay Fig. 59.

24. FLOOR PILOT LAMPS FOR GRD. CUT-OFF RELAY OFFICE ALARM BOARDS (FIG. 27) (A&M ONLY)

Operation of the d-c auxiliary signal at a floor alarm board for a ground cut-off relay office, lights a corresponding (DFL) lamp at each floor alarm board. Operation of the a-c auxiliary signal at a ground cut-off relay office floor alarm board, lights a corresponding (AFL) lamp at each floor alarm board.

25. ALARM SWITCHING KEY (FIG. 28) (A&M ONLY)

Operation of key (SW) connects the d-c and a-c auxiliary signals of the floor alarm board to the audible alarm circuit of an adjacent floor alarm board or power alarm cabinet for ground cutoff relay office.

26. PULSE MACHINE FLOOR PILOT LAMP (FIG. 29) (A&M ONLY)

Operation of an alarm associated with the pulse machine circuits of a ground cut-off relay office, lights the (PM) lamps at the floor alarm boards.

27. FLOOR ALARM BOARD PILOT LAMPS FOR EXTENSION ALM. CKT. FROM PBX OR COMMUNITY DIAL OFFICE (FIG. 30) (A&M ONLY)

Lamps (PBXA) are lighted when the d-c alarm of the PBX alarm cabinet operates to indicate a trouble condition which requires immediate attention. Lamps (PBXB) are lighted when the a-c alarm of the PBX alarm cabinet operates to indicate a relatively unimportant trouble condition.

28. ALARM SWITCHING KEY FOR EXTENSION ALM. CKT FROM PBX OR COMMUNITY DIAL OFFICE (FIG. 31) (A&M ONLY)

Operation of key (PBX SW) connects the audible alarms of the extension alarm circuit to the auxiliary signal circuits of the alarm board nearest the chief switchman's desk in such a manner that operation of an extension alarm operates the corresponding audible alarm of the alarm board.

29. ANNOUNCEMENT DESK ANNOUNCEMENT SUPPLY ALARM (FIG. 32)

When the repeater switch is improperly operated, when the repeater tube fails to function properly, or when a line becomes open, lamp (SA), (RA) or (LA) respectively, lights and the d-c auxiliary signal operates. When "EP" wiring is furnished, the auxiliary signal is controlled by the (DE) relay, Fig. 56. Lamp (P) is lighted when a key in the announcement supply circuit is operated to silence the alarms.

30. ANNOUNCEMENT DESK ALARMS (FIG. 33)

When the (TBL) key in the announcement desk circuit is operated or when there is failure of the plate or filament circuit of an associated repeater, lamp (TD) lights and the d-c auxiliary signal operates. When "EP" wiring is furnished, the auxiliary signal is controlled by the (DE) relay, Fig. 56.

31. ANNCUNCEMENT POWER ALARM FOR 130-VOLT POWER SUPPLY (FIG. 34) (MFR. DISC.)

Trouble in the power supply unit causes operation of the (EA) relay, which lights lamp (PP) and operates the d-c auxiliary signal. When "EP" wiring is furnished, the auxiliary signal is controlled by the (DE) relay, Fig. 56. Lamp (G) is lighted when a key in the power supply circuit is operated to silence the alarms. 32. INTERCEPTING TRUNK ALARM FOR TROUBLE GROUNDS (FIG. 35)

A trouble ground in an intercepting trunk circuit causes operation of relay (GA) which closes the circuit for intermittently operating the associated aisle pilot audible alarm, lights lamp (GA) and causes intermittent operation of the alarm board night alarm.

33. TIME PULSE CHECKING CIRCUIT ALARM (FIGS. 36 AND 37)

When an extra pulse is produced by the district timing circuit, when any secondary group relay fails to release, and when any secondary group relay fails to operate, the pulse checking circuit disconnects the timing circuit from the districts and closes the circuits to light lamp (PC) and operate the alarm board d-c auxiliary signal. When "EP" wiring is furnished, the auxiliary signal is controlled by the (DE) relay, Fig. 56. When key (PC) is momentarily operated, the alarms are retired ("G" Option). The alarms may also be retired by the operation of an alarm release relay in the alarm transfer ckt. which removes ground from lead AR2 ("F" Option).

34. ANNOUNCEMENT POWER ALARM FOR 130-VOLT POWER SUPPLY (FIG. 38) (MFR. DISC.)

Operation of a battery discharge fuse or service fuse operates the (MA) relay, which lights lamp (MA) and operates the d-c auxiliary signal. Failure of current from the charging rectifier operates the (EA) relay, which lights lamp (EA) and operates the a-c auxiliary signal. The (EA) relay may be released by operating the (ALM TRNS) key, which also lights lamp (G). When rectifier current is restored, the (EA) relay operates, lighting lamp (EA) and operating the a-c auxiliary signal. When the key is released, the alarms are retired. When "EP" wiring is furnished, the d-c auxiliary signal is controlled by the (UE) relay, Fig. 56 and the a-c auxiliary signal is controlled by the (AE) relay, Fig. 57.

35. ALARM FOR EMERGENCY ALARM CKT. (FIG. 39)

Operation of the emergency alarm circuit auxiliary signal circuit or failure of alarm circuit battery, lights lamp (E) and operates the d-c auxiliary signal. When "EP" wiring is furnished, the auxiliary signal is controlled by the (JE) relay Fig. 56.

36. ALARM FOR COIN CONTROL CIRCUIT FOR INC. SELECTORS AND RECORDING COMPLETING TRUNKS (FIG. 40)

A trouble ground in the coin control circuit causes operation of the (TB)

relay which lights lamp (TG) and operates the a-c auxiliary signal. When "EP" wiring is furnished, the auxiliary signal is controlled by the (AE) relay, Fig. 57.

37. TIMING CKT. ALARM FOR SPECIAL SERVICE OG.T. CKTS. TO CENTRAL "A" SWBD. (FIG. 41)

Operation of the (GA) relay in the outgoing trunk circuit, lights lamp (CT) and operates the d-c auxiliary signal. When "EP" wiring is furnished, the auxiliary signal is controlled by the (DE) relay, Fig. 56.

38. COIN CONTROL ALARM (FIG. 42)

Failure of the coin control circuit to collect a coin causes operation of the (A) relay at the sender make busy frame, operating relay (C), which lights lamp (C), lights the aisle pilot lamp and causes continuous or intermittent operation of the associated aisle pilot audible alarm and of the alarm board night alarm depending upon whether "T" or "R" wiring is furnished.

39. TIMED RELEASE SENDER DISCONNECT TONE BATTERY CROSS ALARM (FIG. 43) ("A&M ONLY")

Connection of battery to a lead which supplies a disconnect tone to the sender, operates the (T) relay at the sender make busy frame, operating relay (DT) which lights lamp (DT), lights the aisle pilot lamp and causes intermittent operation of the associated aisle pilot audible alarm and of the alarm board night alarm.

40. PLUGGING UP CKT. PANEL AUXILIARY SIG. CKT. ALARM (FIG. 44)

Operation of the (C) relay in the auxiliary signal circuit, lights lamp (PG) and operates the a-c auxiliary signal. When "EP" wiring is furnished, the auxiliary signal is controlled by the (AE) relay, Fig. 57.

41. TELEPHONE REPEATER BATTERY SUPPLY ALARM (FIG. 45)

Failure of filament current operates the battery supply circuit relay, lighting lamp (TR) and operating the d-c auxiliary signal. When "EP" wiring is furnished, the auxiliary signal is controlled by the (DE) relay, Fig. 56.

- 42. D-C AUXILIARY SIGNAL FOR FLOOR ALARM BOARD NEAREST POWER ROOM (FIG. 46) (MFR. DISC.)
- 42.1 ("G" Option)

When "NP" wiring is furnished connection of ground to the DG or UR lead operates relay (DL), operating

relay (DA), operating the (DA) relay of the adjacent alarm board, if a con-trolling alarm switching key is oper-ated, lighting the (DRL) lamps, Fig. 4, at all floor alarm boards and lighting a lamp in the power alarm circuit. Operation of relay (DA) operates the d-c bell or tone bar signal of the associated alarm board and connects ground to lead AB to cause operation of the power room d-c bell if the power alarm circuit (ALM MULT) key is operated. When a major alarm condition occurs in the power alarm circuit, ground is connected to lead AB and to lead A, if the trouble is at the power board, or to lead H, if the trouble is at the ringing power board. Ground on lead AB operates relay (PD) which locks on lead AB, lights lamp (PD) or (RPD) and operates relay (PD), operating relay (DA), operating the (DA) relay relay (DA), operating the (DA) relay of the adjacent alarm board, if a con-trolling alarm switching key is oper-ated, and lighting a lamp (μ PL), Fig. 3, at each alarm board. Operation of relay (μ A) operates the d-c bell or tone bar signal of the associated alarm board. When Fig. 63 is furnished, each operation of relay (AR) operates two or more tone bar signals.

When "EP" wiring is furnished the signals are operated by means of relays in the audible alarm circuit, and a major power alarm operates the power failure alarm.

42.2 Alarms Transferred to Alarm Receiving Center ("F" Option)

This circuit functions as described in paragraph 42.1 except that relay (DA) or the audible alarm circuit relays operate a major alarm at the alarm receiving center instead of a D-C bell or tone bar in the local office.

A ground on lead "AB" from the Power System Power Alarm Circuit operates a power failure alarm at the alarm receiving center instead of a D-C bell or tone bar in the local office.

- 43. A-C AUXILIARY SIGNAL FOR FLOOR ALARM BOARD NEAREST POWER ROOM (FIG. 47) (MFR. DISC.)
- 43.1 ("G" Option)

When "NP" wiring is furnished, connection of ground to the AG lead operates relay (AL), operating relay (AA), operating the (AA) relay of the adjacent alarm board, if a controlling alarm switching key is operated, lighting the (AFL) lamps, Fig. 4, at all floor alarm boards and lighting a lamp in the power alarm circuit. Operation of relay (AA) operates the a-c ringer of the associated alarm board and connects ground to lead a-c to cause

operation of the power room ringer if the power alarm circuit (ALM MULT) key is operated. When a minor alarm condition occurs in a power alarm circuit for which Fig. 46 is furnished, ground is connected to lead AC and to lead A of Fig. 46, if the trouble is at the power board, or to lead H of Fig. 46 if the trouble is at the ringing power board. Ground on lead AC operates relay (PA) which locks on lead AC, lights a lamp (APL), Fig. 3, at each alarm board, operates relay (AA), and operates the (AA) relay of the adjacent alarm board, if a controlling alarm switching key is operated. Operation of relay (AA) operates the ringer of the associated alarm board. Ground on lead A or lead H lights lamp (PA) or (RPA), respectively, shown in Fig. 46.

When a minor alarm condition occurs in a power alarm circuit for which Fig. 52 is furnished, ground is connected to lead A of Fig. 52 and to lead AC.

When "EP" wiring is furnished, the signals are operated by means of relays in the audible alarm circuit.

43.2 Alarms Transferred to Alarm Receiving Center ("F" Option)

This circuit functions as described in paragraph 43.1 except that relay (AA) or the audible alarm circuit relays operate a minor alarm at the alarm receiving center instead of the A-C ringer in the local office.

A ground on lead "AC" from the Power System Power Alarm Ckt. operates a minor power alarm at the alarm receiving center instead of the A-C Ringer in the local office.

44. PICK-UP ALARM FOR 301C POWER PLANT (FIG. 48)

Failure of the pick-up current supply or grounding of a pick-up lead will operate the (PG) relay, lighting lamp (PU) and operating the a-c auxiliary signal. When "EP" wiring is furnished, the auxiliary signal is controlled by the (AE) relay, Fig. 57.

45. TEST LEAD ALARM (FIG. 49) (MFR. DISC.)

When a terminal of the primary winding of the (DT) relay in the outgoing trunk, district or incoming circuit becomes grounded, or when the (DT) relay secondary winding is open the unbalanced condition produced in the Wheatstone Bridge circuit, composed of the (DT) relay windings and resistances (B) and (C), operates relay (T), releasing relay (TA) which lights lamp (SS) and operates the d-c auxiliary signal. When "EP" wiring is furnished, the auxiliary signal is controlled by the (DE) relay, Fig. 56. When the trouble condition has been corrected, momentary operation of key (SS) or a momentary ground on lead "ARL" from the alarm transfer ckt. ("F" option) operates relay (TA), which locks up under control of relay (T) and retires the alarms.

46. NO VOLTAGE AND FUSE ALARM FOR 6V. 60 CYCLE LAMP SUPPLY FOR IDLE INDICATING LAMPS (FIG. 50)

When a fuse operates or a power failure occurs in the power supply circuit for idle indicating lamps, ground is connected to the FP lead, operating relay (FP) which closes a circuit for intermittently operating the associated aisle pilot audible alarm, lights lamp (FP) and causes intermittent operation of the alarm board night alarm.

47. INCOMING CALL SIGNAL LAMP FOR OG.T. TEST BOARD (FIG. 51)

A call incoming to the outgoing trunk test board lights lamps (TS) and operates the night alarm or operates the (NA) relay, Fig. 59.

- 48. D-C AUXILIARY SIGNAL FOR FLOOR ALARM BOARD NEAREST POWER ROOM (FIG. 52) (MFR. DISC.)
- 48.1 ("G" Option)

When "NP" wiring is furnished connection of ground to the DG or DR lead operates relay (DL), operating relay (DA), operating the (DA) relay of the adjacent alarm board, if a controlling alarm switching key is operated, lighting the (DFL) lamps, Fig. 4, at all floor alarm boards, and lighting a lamp in the power alarm circuit. Operation of relay (DA) operates the tone bar signal of the associated alarm board and connects ground to lead AB to cause operation of the power room d-c bell if the power alarm circuit (ALM MULT) key is operated.

When a major alarm condition occurs in the power alarm circuit, ground is connected to leads AB and D. Ground on lead AB operates relay (PD) which locks on lead AB, lights lamp (PD), operates relay (DA), operates the (DA) relay of the adjacent alarm board, if a controlling alarm switching key is operated, and lights a lamp (DPL), Fig. 3 at each alarm board. Operation of relay (DA) operates the tone bar signal of the associated alarm board. When Fig. 65 is furnished, each operation of relay (AR) operates two or more tone signals.

When a minor alarm condition occurs in the power alarm circuit, ground on lead A lights lamp (PA). When "EP" wiring is furnished, the signals are operated by means of relays in the audible alarm circuit, and a major power alarm operates the power failure alarm.

48.2 Alarms Transferred to Alarm Receiving Center ("F" Option)

This circuit functions as described in paragraph 48.1 except that relay (DA) operates a major alarm at the alarm receiving center instead of a tone bar in the local office.

A ground on lead "AB" from the Power System Power Alarm Ckt. operates a power failure alarm at the alarm receiving center instead of the tone bar in the local office.

49. ALARM FOR SUBSCRIBER OPERATED ANNOUNCEMENT SERVICE (FIG. 53)

Failure of either announcement channel causes operation of the (RA) relay, which lights lamp (AT) and operates the d-c auxiliary signal. When "EP" wiring is furnished, the auxiliary signal is controlled by the (DE) relay, Fig. 56. When the (RLS ALM) key is operated to silence the auxiliary signal, lamp (AG) is lighted.

50. K.P. "A" SWBD. SEL. AND OG.T. CIRCUITS TEST LEAD ALARM (FIG. 54)

When a terminal of the primary winding of the (DT) relay in the outgoing, trunk, district or incoming circuit becomes grounded, or when the (DT) relay secondary winding is open, the unbalanced condition produced in the Wheatstone bridge circuit, composed of the (DT) relay windings and resistances (B) and (C) operates relay (T), releasing relay (TA) which lights lamp (SS) and operates the d-c auxiliary signal. When "EP" wiring is furnished, the auxiliary signal is controlled by the (DE) relay, Fig. 56. When the trouble condition has been corrected, momentary operation of key (SS) or momentary operation of a relay in the alarm transfer ckt. grounds lead "ARI" ("F" Option) and operates relay (TA), which locks up under control of relay (T) and retires the alarms. When a multiple lamp is provided at another floor alarm board, release of relay (TA) also operates the relay which controls the d-c audible signal for that alarm board.

51. POWER SUPPLY REGULATED RECTIFIER ALARM (FIG.55) (MFR. DISC.)

Failure of current in the rectifier supplying 130 volt power, releases the (TR) relay, operating relay (RA) which lights lamp (RA) and operates the a-c auxiliary signal. When "EP" wiring is furnished, the auxiliary signal is controlled by the (AE) relay, Fig. 57.

52. D-C ALARM RELAY (FIG. 56)

Operation of any associated alarm operates relay (DE), which operates the d-c auxiliary signal and lights the floor alarm board pilot lamp.

53. A-C ALARM RELAY (FIG. 57)

Operation of any associated alarm operates relay (AE), which operates the a-c auxiliary signal and lights the floor alarm board pilot lamp.

54. A-C AUXILIARY RELAY (FIG. 58)

54.1 ("ZA" Option)

Operation of any associated alarm operates relay (NB), which operates the a-c auxiliary signal and lights the floor alarm board pilot lamp.

54.2 Alarms Transferred to Alarm Receiving Center ("ZB" Option)

When relay (NB) is connected to a Motor Stop Alarm Ckt., the operation of relay (NB) due to the stopping of an associated motor, connects ground to lead "MSI" to operate a major alarm at the alarm receiving center.

55. NIGHT ALARM RELAY (FIG. 59)

When key (NA), Fig. 13, is normal, and leads "NA" and "NG" are connected together by the associated alarm circuit, relay (NA) operates, operating the a-c auxiliary signal and lighting the floor alarm board pilot lamp.

56. D-C ALARM RELAY FOR RINGING POWER ALARMS (FIG. 60)

Operation of a ringing power failure alarm operates relay (DG), which operates the floor signal relay for the floor on which the ringing machine is located, and operates a power failure relay, which causes operation of the power failure audible signals on all floors and prevents operation of the power room floor signal relay.

57. EIGHT-PARTY SEMI-SELECTIVE RINGING ALARM OR TEN-PARTY CODE RINGING ALARM (FIG. 61)

Operation of the (AL) relay in the ringing interrupter and alarm circuit, lights lamp (CR) and operates the d-c auxiliary signal. When "EP" wiring is furnished, the auxiliary signal is controlled by the (DE) relay, Fig. 56.

58. TONE BAR SIGNAL (FIG. 62)

The tone bar signal operates under control of the interrupters to produce a major audible alarm.

The tone bar signal can also operate under control of the major audible alarm circuit and when it is operated in conjunction with a single stroke bell in the major audible alarm circuit it produces a coded alarm signal.

59. D-C AUXILIARY SIGNAL RELAY (FIG. 63)

Operation of relay (AR), under control of the interrupters, operates two or more tone bar signals to produce a major audible alarm.

The operation of relay AR, under control of the major audible alarm circuit operates two or more tone bar signals to produce a portion of a coded alarm signal. The other portion of the coded alarm signal is produced by a single stroke bell in the major audible alarm circuit.

60. D-C AUXILIARY SIGNAL FOR FLOOR ALARM BOARD NEAREST POWER ROOM (FIG. 64)

60.1 ("G" Option)

When "NP" wiring is furnished, connection of ground to the "DG" or "DR" lead operates relay (DL), operat-ing relay (DA), operating the (DA) relay of the adjacent alarm board, if a controlling alarm switching key is operated, lighting the (DFL) lamps, Fig. 4, at all floor alarm boards, and lighting a lamp in the power alarm cir-cuit. Operation of relay (DA) operates the tone bar signal of the associated alarm board and connects ground to lead "TB" to cause operation of the power room tone bar signal if the power alarm circuit (ALM MULT) key is operated. When a major alarm condition occurs in the power alarm circuit, ground is con-nected to leads MJ or PF and D. Ground on lead MJ or PF operates relay (PD) which operates relay (DA), operates the (DA) relay of the adjacent alarm board, if a controlling alarm switching key is operated, and lights a lamp (DPL), Fig. 3 at each alarm board. Operation of relay (DA) operates the tone bar signal of the associated alarm board, and closes a circuit for operating an audible signal in the operating room. Ground on lead D lights lamp (PD).

When "EP" wiring is furnished, the signals are operated by means of relays in the audible alarm circuit, and a major power alarm operates the power failure alarm. When Fig. 63 is furnished, each operation of relay (AR) operates two or more tone bar signals.

60.2 Alarms Transferred to Alarm Receiving Center ("F" Option)

This circuit functions as described in paragraph 60.1 except that relay (DA) operates a major alarm at the alarm receiving center instead of a tone bar at the local office. A ground on lead "MJ" from the Power System Power Alarm Ckt. operates a power failure alarm at the alarm receiving center instead of a tone bar in the local office.

61. A-C AUXILIARY SIGNAL FOR FLOOR ALARM BOARD NEAREST POWER ROOM (FIG. 65)

61.1 ("G" Option)

When "NP" wiring is furnished, connection of ground to the "AG" lead operates relay (AL), operating relay (AA), operating the (AA) relay of the adjacent alarm board, if a controlling alarm switching key is operated, lighting the (AFL) lamps, Fig. 4, at all floor alarm boards and lighting a lamp in the power alarm circuit. Operation of relay (AA) operates the a-c ringer of the associated alarm board and connects ground to lead "AC" to cause operation of the power room ringer if the power alarm circuit (ALM MULT) key is operated.

When a minor alarm condition occurs in a power alarm circuit, ground is connected to leads AC and A. Ground on lead "AC" operates relay (PA) which locks on lead "AC", lights a lamp (APL), Fig. 3, at each alarm board, operates relay (AA) and operates the (AA) relay of the adjacent alarm board if a controlling alarm switching key is operated. Operation of relay (AA) operates the ringer of the associated alarm board. Ground on lead "A" lights lamp (PA).

When "EP" wiring is furnished, the signals are operated by means of relays in the audible alarm circuit.

61.2 Alarms Transferred to Alarm Receiving Center ("F" Option)

This circuit functions as described in paragraph 61.1 except that relay (AA) operates a minor alarm at the alarm receiving center instead of an A-C ringer in the local office. Ground on lead "AC" from the Power System Power Alarm Ckt. operates a minor power alarm at the alarm receiving center instead of an A-C ringer in the local office.

62. ALARM BATTERY SUPPLY ALARM FOR 301C POWER PLANT (FIG. 66)

Operation of the power room fuse furnishing alarm battery supply current connects ground to lead "E", operating subsets "A" on all floors.

63. NO-VOLTAGE AND FUSE ALARM (FIG. 67)

Operation of a load fuse, or failure of the supply of 130 volt current, operates the (MA) relay, which lights lamp (MA) and operates the d-c auxiliary signal. Failure of current from the rectifier, while reserve battery supply is still available, operates the (A) relay, which lights lamp (EA) and operates the a-c auxiliary signal. The (A) relay may be released by momentarily operating a key which operates the (LU) relay, lighting lamp (G) and retiring the alarms. When rectifier current is restored, the (LU) relay releases, extinguishing lamp (G). When "EP" wiring is furnished, the d-c auxiliary signal is controlled by the (DE) relay, Fig. 56.

64. A-C AUXILIARY RELAY (FIG. 68)

64.1 ("ZA" Option)

Operation of any associated alarm operates relay (NB), which operates the a-c auxiliary signal and lights the floor alarm board pilot lamp.

64.2 Alarms Transferred to Alarm Receiving Center ("ZB" Option)

When relay (NB) is connected to a Motor Stop Alarm Ckt. the operation of relay (NB) due to the stopping of an associated motor connects ground to lead "MS1" to operate a major alarm at the alarm receiving center.

65. "A" SWITCHBOARD FUSE ALARM (FIG. 69)

Operation of a positional fuse in the "A" switchboard, operates a relay in the "A" switchboard fuse alarm circuit. This relay provides ground to light the (AS) lamp and to operate the a-c auxiliary signal.

66. ALARM FOR ANNOUNCEMENT SYSTEM 3A CONTROL CIRCUIT (FIG. 70)

66.1 ("ZI" Option)

Failure of either announcement channel causes operation of a relay in the control circuit, which lights the (RA) lamp and operates the a-c auxiliary signal. Failure of both announcement channels or failure of the load announcement machine during recording, causes the operation of the d-c auxiliary signal. When this figure is used with Figs. 56 and 57, the d-c and a-c auxiliary signals are controlled by the (DE) and (AE) relays in Figs. 56 and 57, respectively. When the release key in the control circuit is operated to silence the auxiliary signal, lamp (P) is lighted.

66.2 Alarms Transferred to an Alarm Receiving Center ("ZJ" Option)

The circuit functions as described in paragraph 66.1 except that failure of the announcement systems channels or of the load announcement machine causes the operation of distinctive alarms at an Alarm Receiving Center instead of the a-c or d-c signal at the local office.

67. POWER FAILURE ALARM FOR ANNOUNCE-MENT SYSTEM 3A (FIG. 71)

If the regular power supply of the 3A announcement system fails, the release of a relay in the power supply circuit starts the operation of the reserve power supply machine and also operates relay (A) from the reserve power supply. Relay (A) operating, in turn operates relay (WP) over lead "A". Relay (WP) operating, lights the (W. B. PWR. TRNS.) lamp and operates the a-c auxiliary signal. When the (ALM. RLS) key in the power supply circuit is operated, relay (WG) operates and locks over lead "A", releasing relay (WP) and lighting the (W. B. PWR. GUARD) lamp. The release of relay (WP) extinguishes the (W. B. Pwr. TRNS.) lamp and releases the a-c auxiliary signal circuit. When the regular power supply is restored relay (WG) releases, extinguishing the (W. E. PWR. GUARD) lamp and restoring the circuit to normal. When this figure is used with Fig. 57, the a-c aux. sig. is controlled by the (AE) relay in Fig. 57.

68. EMERGENCY RINGBACK ALARM (FIG. 72)

When the emergency ringing circuit is in use, the operation of the (ST) relay in that circuit lights the (ER) lamp over lead ER and operates the a-c auxiliary signal. When "EP" wiring is furnished, the auxiliary signal is controlled by the (AE) relay in Fig. 57.

69. NO SUCH NUMBER TONE SUPPLY ALARM (FIG. 73)

When a trouble condition occurs in the no such number tone supply circuit, ground is connected to leads NT and AG to light lamp (NT) and to operate the a-c auxiliary alarm. When EP wiring is furnished the auxiliary signal is controlled by the (AE) relay in Fig. 57.

70. POWER SUPPLY NO VOLTAGE ALARM (FIG. 74)

When there is a failure in the 60 cycle power used for calculagraphs, a relay in the calculagraph supply and fuse alarm circuit releases and connects ground to leads "DF" and "PF", lamp (CAL) lights and the major alarm sounds in the usual way by the closure of ground on lead "DG", or lead "DE" if the office is arranged for lighting an aisle pilot at the floor alarm board.

71. POWER SUPPLY TRANSFER TO RESERVE ALARM (FIG. 74)

This alarm operates when there is a failure in the 60 cycle power used for calculagraphs. The power supply circuit under this condition will transfer automatically to a d-c reserve and operate a relay in the calculagraph supply and distribution fuse alarm circuit. Ground is connected to leads "R" and "F", lighting lamp (TRS) and caus-ing the audible alarm to sound in the usual way by grounding lead "AG" or, if the office is arranged to light an aisle pilot at the floor alarm board, lead "AE" will be grounded to operate relay (AE) in Figure 57. Relay (AE) then causes the audible alarm to sound and an aisle pilot to light at the floor alarm board. The alarm may be silenced by operating a key in the calculagraph supply and fuse alarm circuit, but lead "F" will be grounded again, as a warning to restore the key, when the 60 cycle power is restored and the power supply circuit transfers from the reserve power.

72. DISTRIBUTION FUSE ALARM (FIG. 75)

When a fuse supplying 60 cycle 20-24 V battery operates, leads "R" and "F" are grounded. Lamp (CF) lights and the audible alarm sounds in the usual way by the closure of ground to lead "AG" to lead "AE".

73. ALARM FOR LINE LOAD CONTROL FEATURE (FIG. 76)

When the class B or class C keys of the line load control circuit are operated to suspend outward service on those classes of lines, ground is connected to leads "G" and "DL", lighting lamp (LLC) and causing the audible alarm to sound over lead "DE" or lead "DG", as a warning signal that these keys have been operated. The alarms are retired by the operation of another key in the line load control circuit. Likewise an alarm will be given if one of the load control relays in the trip and start circuit becomes falsely operated because of a trouble conditioh.

74. AUXILIARY SIGNAL CIRCUIT FOR 803-C RINGING PLANT (FIG. 77) (MFR. DISC.)

When a major alarm condition occurs in the associated a-c power alarm circuit, leads RJA and RMJ are grounded, operating relays (R1) and (R2). Relay (R1) grounds leads DG, D and DF, to light major alarm lamps and to cause the major audible alarms to sound. If a minor alarm condition occurs in the associated a-c power alarm circuit, leads RMA and RMN are grounded operating relays (R3) and (R4). Relay (R3) connects ground to leads AG, A and F, to light minor alarm lamps and to sound the minor audible alarms. When either relay (R1) or (R3) operates lamp (RING MACHINE) of Fig. 79 lights to indicate a trouble condition in the ringing plant.

75. AUXILIARY SIGNAL RELAYS FOR POWER ALARM CIRCUIT FOR RINGING, COIN CONTROL AND TONE LEADS (FIG. 78)

When a major or minor alarm condition occurs in the power alarm circuit for ringing, coin control and tone leads and a Ringing Plant Failure Lamp and a Power Failure Lamp is required the DG or AG lead will be grounded operating the (MJ) or (MN) relays and since "ZC" Option will be furnished the DG lead to Fig. 1 will be grounded by the operation of the (MJ) relay or the AC lead to Fig. 2 will be grounded by the operation of the (MJ) relay or the AC lead to Fig. 2 will be grounded by the operation of the (MN) relay. The DG lead ground will operate the (DL) relay in Fig. 1 which in turn will operate the (DPL) Power Failure Lamp at the Floor Alarm Boards and Power Alarm Cabinets, and also operate the (DA) relays of that figure. The (DA) relay will operate the major audible alarm signal. The AG lead ground will operate the (AL) relay in Fig. 1 which in turn will operate the (APL) Power Failure Lamp at the Floor Alarm Boards and Power Alarm Cabinets and also operate the (AA) relay of that figure. The (AA) relay will operate the minor audible signal.

When a major or minor alarm condition occurs in the power alarm circuit for ringing, coin control and tone leads and a Ringing Plant Failure Lamp only is required the MJ or MN lead will be grounded operating the (MJ) or (MN) relays, and since "ZD" option will be furnished the MJ lead to Fig. 1 will be grounded by the operation of the (MJ) relay or the MN lead to Fig. 2 will be grounded by the operation of the (MN) relay. The MJ lead ground will operate the (DA) relay in Fig. 1 which will operate the major audible alarm signal. The MN lead ground will operate the minor audible alarm signal. Operation of either the (MJ) or (MN) relay will ground leads to operate a Ringing Machine pilot lamp in Fig. 79 or Fig. 89 or in the Miscellaneous Alarm Circuit.

76. PILOT LAMP FOR RINGING MACHINES (FIG. 79)

The (Ringing Machines) pilot lamp of this circuit will be operated by the operation of relays in Fig. 78 when this lamp operates in conjunction with the Power Failure Lamp.

77. ALARM FOR PRIVATE LINE CONFERENCE CIRCUIT OR FOR AIR RAID WARNING CONTROL CIRCUIT (FIG. 80)

If a trouble occurs in a private line conference circuit, a lamp individual to that circuit lights, and ground is connected to leads "G" and "DL". Lamp (PLC) will light over lead "G" and ground on lead "DL" will cause the major audible alarm to sound.

If a trouble occurs in an air raid warning control circuit, ground is connected to leads "G" and "DL". Lamp (ARA) will light over lead "G" and ground on lead "DL" will cause the major audible alarm to sound.

78. MAJOR AND MINOR ALARMS FOR POWER SYSTEMS CIRCUIT (FIGS. \$2 AND \$1)

When a minor alarm condition occurs in the associated power systems circuit, leads "A" and "F" (Fig. 81) are grounded. Ground on lead "A" causes the pilot lamp to light, and ground on lead "F" causes the minor audible alarm to sound. When a major alarm condition occurs in the associated power systems circuit, leads "D" and "DF" (Fig. 82) are grounded. Ground on lead "D" causes the pilot lamp to light, and ground on lead "DF" causes the major audible alarm to sound.

79. DIAL TONE SPEED REGISTER CIRCUIT ALARM (FIG. 83)

When the dial tone speed register circuit fails to cut through to dial tone within a certain interval after a test call has been started, ground is connected to leads "G" and "AG". Lamp (DTS) will light over lead "G", and ground on lead "AG" will cause the minor audible alarm to sound.

80. PREPAYMENT COIN SUSPENSION ALARM (FIG. 84)

When a trouble cross, ground or open occurs in the prepayment coin suspension circuit or the associated control circuit which would cause failure of these circuits to function, a normally operated relay in the control circuit releases, connecting ground to leads "A" and "MJ". Lamp (PCS) will light over lead "A", and ground on lead "MJ" will cause the major alarm to sound. 81. ALARM FOR OUTGOING TRUNK CIRCUIT FOR DIAL COIN ZONE SERVICE (FIG. 85)

When the time alarm relays in the outgoing coin zone trunk circuit operate, ground is connected to lead "T", operating relay (CZS). Lamp (CZS) lights and the audible alarm will operate under control of the (NA) key of Fig. 13. If aisle pilot audible alarms are provided, one of these alarms will operate under control of ground on lead "T", "LT" or "ST".

82. ALARM FOR CABLE INSULATION ALARM CIRCUIT (FIG. 86)

When the cable insulation fails below its lowest allowable value, a relay in the cable insulation alarm circuit operates, connecting ground to leads "DL" and "R", operating relay (DL) and lighting the aisle pilot lamp. Relay (DL) operating, lights lamp (MP) in the floor alarm board, brings in an audible alarm and connects a supplementary ground to the aisle pilot lamp.

83. A-C AUXILIARY SIGNAL FOR FUSE ALARM CIRCUIT (FIG. 87)

When a fuse operates in the fuse alarm circuit for Local Test Desk No. 14, Repair Service Desk No. 2 and Test Supervisors Private Desk it operates a relay which grounds the "TD" lead to light a lamp and operate a relay which brings in an audible alarm. When the fuse is replaced, the audible alarm and the lamp are retired.

84. ALARM FOR MULTI-FREQUENCY CURRENT SUPPLY AND DISTRIBUTION CIRCUIT (FIG. 88)

The operation of relay (ALM) in the Multi-frequency Current Supply and Distribution Circuit due to a trouble in that circuit causes relay (MFA) to operate which in turn lights class lamp (MF) and operates the D-C auxiliary alarm signal. When "EP" wiring is furnished the auxiliary signal is controlled by relay (DE) Fig. 56.

85. PILOT LAMP FOR ALARM RECEIVING CKT. (FIG. 89)

When the alarm receiving circuit receives a trouble indication, the receiving circuit connects ground to lead "W" to light lamp (RC). This lamp indicates that a trouble has been registered in the alarm receiving circuit.

86. PILOT LAMP FOR RINGING PLANT FAILURE (FIG. 90)

The Ringing Plant Failure Lamp is operated by the operation of relays in Fig. 78 when a failure occurs in the ringing power plant and only the Ringing Plant Failure Lamp is to operate. The Power Failure Lamp is to remain dark.

87. PILOT LAMP FOR RINGING PLANT FAILURE FOR OTHER RINGING PLANT WHEN MORE THAN ONE RINGING PLANT IS IN THE SAME BUILDING (FIG. 90)

The Ringing Plant Failure Lamp is operated when a ringing plant failure occurs in the Miscellaneous Alarm Circuit and the "RP" lead is grounded.

88. AUXILIARY SIGNAL CIRCUIT FOR 803-C RINGING PLANT OUTSIDE OF POWER ROOM (FIG. 92)

When a major alarm condition occurs in the associated a-c power alarm circuit, leads DF and D are grounded, operating relays (Rl) and (R2). Relay (Rl) grounds leads DG, D, DF, and K to light major alarm lamps and to cause the major audible alarms and the power failure alarms in the power room to sound. If a minor alarm condition occurs in the associated a-c power alarm circuit, leads F and A are grounded operating relays (R3) and (R4). Relay (R3) connects ground to leads AG, A and F, to light minor alarm lamps and to sound the minor audible alarms. When either relay (R1) or (R3) operates, lamp (RING MACHINE) of Fig. 79 lights to indicate a trouble condition in the ringing plant.

- 89. D-C AUXILIARY SIGNAL FOR FLOOR ALARM BOARD NEAREST POWER ROOM (FIG. 93)
- 89.1 "G" Option

When an alarm circuit connects ground to lead "DG" or "DR" this ground is connected through, to lead "DG" to the Audible Alarm Circuit for Floor Alarm Board SD-21819-01 Fig. 1, which in turn connects ground to lead "DA". Ground on lead "DA", through the contacts of interrupters (FA) and (FA1) operate tone bar Fig. 62 or relay (AR) Fig. 63 which in turn operates tone bar Fig. 62.

When the power audible alarm circuit SU-80730-01, connects ground to lead "PF" due to a trouble in the power room, this ground is connected through, to lead PF to the audible alarm circuit for floor alarm board SU-21819-01, Fig. 22 which in turn connects ground to lead "DH" to SU-21819-01 Fig. 3. This ground on lead "DH", SD-21819-01 Fig. 3 operates the power failure D-C Bell. A power failure of equipment outside the power room will cause the audible alarm circuit for floor alarm board to connect ground to lead PF which is connected through to lead PF to the Power Audible Alarm Circuit SD-80730-01. Ground on lead "PF" SD-80730-01 will operate the power failure D-C Bell in the power room if the alarm multiple key in the power room is operated.

A ground on lead DA, DC or DS from various circuits operates relay (DA) which in turn connects ground to lead "T" to operate an audible alarm in the operating room if the alarm key is operated.

89.2 "F" Option

This circuit functions as described in paragraph 89.1 except that a ground on lead "PF" from the power audible alarm circuit or lead "DA" from the audible alarm circuit for floor alarm board is connected through to lead "PA1" or "DC1" to the alarm transfer circuit and functions to operate an alarm at an alarm receiving center.

90. ALARM FOR MULTI-LINE SERVICE OBSERVING CIRCUIT OR NO. 12 DESK CORD AND SPEED OF ANSWER CIRCUITS (FIG. 94)

When a trouble occurs in a service observing circuit, the associated circuit connects ground to leads F and G to operate the minor audible signal and light the SO lamp at the floor alarm board. When this figure is used with Fig. 57, ground on lead F operates relay AE Fig. 57 which in turn operates the minor audible signal and lights the green pilot.

- 91. ALARM FOR ANNOUNCEMENT SYSTEM 4A DISTRIBUTING AND ALARM CIRCUIT (FIG. 95)
- 91.1 ("ZI" Option)

If voice failure occurs in either unit of the audichron machine or a fuse operates in the audichron machine, the distributing and alarm circuit functions to light the (RA) lamp and operate the a-c auxiliary signal. Voice failure occurring in both units of the audichron machine or failure of the distributing relays to operate or release causes the (RA) lamp to light and operates the d-c auxiliary signal. When this figure is used with Figs. 56 and 57, the d-c and a-c auxiliary signals are controlled by the (DE) and (AE) relays, respectively.

91.2 Alarms Transferred to an Alarm Receiving Center("ZJ" Option)

The circuit functions as described in paragraph 91.1 except that failure of the audichron machine or distributing relays causes the operation of distinctive alarms at an Alarm Receiving Center instead of the a-c or d-c signal at the local office.

92. ALARM FOR ANNOUNCEMENT SYSTEM NO. 4A AUDICHRON CONVERTER (FIG. 96)

92.1 ("ZK" Option)

If the regular power supply of the audichron converter fails and the load is transferred to the battery driven machine, ground is connected to the "C" lead, operating the (AS) relay. The (AS) relay operated, lights the (ANN SYS) lamp and operates the a-c auxiliary signal under control of the (ACO) relay normal. When the (ACO) key is operated the (ACO) relay operates and locks under control of the (AS) relay, removing the a-c signal and the (ANN SYS) lamp indication and lighting the (GUARD) lamp. When this figure is used with Fig. 57, the a-c auxiliary signal is controlled by the (AE) relay. 92.2 Alarms Transferred to an Alarm Receiving Center ("ZL" Option)

The circuit functions as described in paragraph 92.1 except that relay (AS) operates a minor power alarm at an Alarm Receiving center instead of the a-c signal at the local office.

93. ALARM FOR TYPE N CARRIER TELEPHONE CIRCUIT (FIG. 97)

When a minor alarm condition occurs, leads F and G are grounded by the operation of a relay in the Type N carrier telephone circuit, lighting the (NC) lamp and operating the a-c auxiliary signal. When this figure is used with Fig. 57, the a-c auxiliary signal is controlled by the (AE) relay.

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