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AMERICAN TELEPHONE AND TELEGRAPH COMPANY
295 NORTH MAPLE AVENUE
BASKING RIDGE, NEW JERSEY 07920

0214

DRAWING NOTICE

SEP 1982

TITLE
STEP-BY-STEP SYSTEMS
NO. 1, 350A, 355A, 360A, OR 35E97
COIN TRUNK CIRCUIT
FOR USE PRECEDING A FIRST SELECTOR
SERVING PREPAYMENT COIN LINES
ARRANGED FOR DELAYED CHARGING

SD-31592-02 ISSUE 38A
CD ISSUE 11B | APPX 5A ADD.
RATING MFR DISC
SYSTEM STEP-BY-STEP

DATE APR 29 1982
DRAWING DISTRIBUTION CODE: 3D99
CLEI BASIC CODE:

DESCRIPTION

6.1 COIN TRUNK CIRCUIT

(a) FUNCTIONAL DESCRIPTION OF CHANGE: Prior to this change the life expectancy of the CDP neon lamp in Figure "G" was too short.

The wiring configuration is changed and an OPTO-isolator added to reduce the current flow through the neon lamp.

This change is required when the coin trunk circuit SD-31592-02 is associated with the local coin overtime (LCOT) feature.

(b) EXTENT OF CHANGE: A KS20289L6C 7.15K or a KS20289L6C 4.64K RES, a 4B OPTO-isolator, a 458H diode and a KS20423L11 50MF capacitor along with a wiring change is required per coin trunk circuit to be changed.

(c) COORDINATING CIRCUIT CHANGES: None.

(d) EQUIPMENT INFORMATION: affected, covered by WE drawing J33015B-( ).

(e) EQUIPMENT DESIGN REQUIREMENTS: not affected.

(f) TRANSMISSION: not affected.

(g) TRAFFIC: not affected.

6.2 SUPPLEMENTARY INFORMATION

(a) DIRECT CURRENT DRAIN DATA: is not affected.

(b) ALTERNATING CURRENT DRAIN DATA: is not affected.

CIRCUIT DESCRIPTION

CD-31592-02
ISSUE 11B
APPENDIX 4D
DWG ISSUE 37D
DISTN CODE 3D99

13

STEP-BY-STEP SYSTEMS
NO. 1, 350A, 355A, 360A, OR 35E97
COIN TRUNK CIRCUIT
FOR USE PRECEDING A FIRST SELECTOR
SERVING PREPAYMENT COIN LINES
ARRANGED FOR DELAYED CHARGING

CHANGES

D. Description of Changes

D.01 The connection on lead C was changed from contact 5B to 3T on relay C.

D.02 The connection on lead S was changed from contact 3T to 5B on relay C.

D.03 These changes were made on a D no-record basis to agree with the manufacturing information.

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DEPT 55213-DAJ

WE DEPT 45230-RWH-JTT-PG

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DRAWING NOTICE

TITLE
STEP-BY-STEP SYSTEMS
NO. 1, 350A, 355A, 360A OR 35E97
COIN TRUNK CIRCUIT
FOR USE PRECEDING A FIRST SELECTOR
SERVING PREPAYMENT COIN LINES
ARRANGED FOR DELAYED CHARGING

SD-31592-02 ISSUE 36A
CD ISSUE 11B APPX 3A ADD.
RATING MFR. DISC.
SYSTEM STEP-BY-STEP

DATE AUG 22 1980
DRAWING DISTRIBUTION CODE: 3D99
CLE BASIC CODE:

DESCRIPTION

6.1 LOCAL COIN OVERTIME CHARGING (LCOT)

(a) FUNCTIONAL DESCRIPTION OF CHANGE: 1. This change is made to increase the life of lamp CDP which is used with the LCOT feature.

(b) EXTENT OF CHANGE: 1. Resistor CR Option YL or resistor CRP Option YM and diodes CCB and CRB are added while lamp CDN and resistor CDP are removed.

(c) COORDINATING CIRCUIT CHANGES: none

(d) EQUIPMENT INFORMATION: job basis

(e) EQUIPMENT DESIGN REQUIREMENTS: not affected

(f) ENGINEERING COMPLAINT: No. NTU-9076

(g) TRANSMISSION: not affected

(h) TRAFFIC: not affected

6.2 SUPPLEMENTARY INFORMATION

(a) DIRECT CURRENT DRAIN DATA: is not affected

(b) ALTERNATING CURRENT DRAIN DATA: is not affected

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DRAWING NOTICE

TITLE

STEP-BY-STEP SYSTEMS
NO. 1, 350A, 355A, 360 OR 35E97
COIN TRUNK CIRCUIT
FOR USE PRECEEDING A FIRST SELECTOR
SERVING PREPAYMENT COIN LINES
ARRANGED FOR DELAYED CHARGING

SD-31592-02 ISSUE 35B
CD ISSUE 11B APPX 2B ADD.
RATING MFR DISC
SYSTEM STEP-BY-STEP

DATE NOV 27 1979
DRAWING DISTRIBUTION CODE: 3D99
CLE BASIC CODE:

DESCRIPTION 2027-7

6.1 COIN TRUNK

(a) FUNCTIONAL DESCRIPTION OF CHANGE: This change adds Option YK to remove the initial coin test that is made by the RT relay.

(b) EXTENT OF CHANGE: This change requires a wiring change only.

(c) COORDINATING CIRCUIT CHANGES: none

(d) EQUIPMENT INFORMATION: job basis

(e) EQUIPMENT DESIGN REQUIREMENTS: not affected

(f) TRANSMISSION: not affected

(g) TRAFFIC: not affected

(h) NOTIFICATION TO TEL: required

6.2 SUPPLEMENTARY INFORMATION

(a) DIRECT CURRENT DRAIN DATA: is not affected

(b) ALTERNATING CURRENT DRAIN DATA: is not affected

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OCT 31 1980
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STEP-BY-STEP SYSTEMS
NO. 1, 350A, 355A, 360A, OR 35E97
COIN TRUNK CIRCUIT
FOR USE PRECEDING A FIRST SELECTOR
SERVING PREPAYMENT COIN LINES
ARRANGED FOR DELAYED CHARGING

CHANGES

B. Changes in Apparatus

B.01 Added

CCB Diode 533K - Fig. G

CRB Diode 533K - Fig. G

CR Resistor KS-20289 L6C, 383 - Fig. 1 - Option YL

CRP Resistor KS-20289 L6C, 1.0K - Fig. 1 - Option YM

B.02 Removed

CDN Neon Lamp 5AHB - Fig. G

CDP Resistor KS-13492 L2, 510 - Fig. G

D. Description of Changes

D.01 Option YL has been added to Fig. 1 and rated Standard. Option YL adds resistor CR.

D.02 Option YM has been added to Fig. 1 and rated Standard. Option YM adds resistor CRP.

D.03 Figure G is modified by removing neon lamp CDN and resistor CDP and adding diodes CCB and CRB.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5413-DAJ

WE DEPT 45230-BRS-JTT-MS

CD-31592-02
ISSUE ~~11B~~
APPENDIX 2B
DWG ISSUE 35B
DISTN CODE 3D99

STEP-BY-STEP SYSTEMS
NO. 1, 350A, 355A, 360 OR 35E97
COIN TRUNK CIRCUIT
FOR USE PRECEDING A FIRST SELECTOR
SERVING PREPAYMENT COIN LINES
ARRANGED FOR DELAYED CHARGING

CHANGES

D. Description of Changes

D.01 Option YK is added to Fig. 1 to defeat the initial coin present test.

D.02 Circuit Note 103 on sheet 4 is updated.

D.03 Circuit Notes 117 and 118 are added to set 4.

F. Changes in CD Sections

F.01 In SECTION I, under 2. GENERAL DESCRIPTION OF OPERATION, add the following at the end of 2.01:

With option YK a ground start line circuit must be used.

F.02 In SECTION II, under 1. COIN TRUNK SEIZURE - PREPAY SERVICE, change 1.05 to read as follows:

1.05 Without YK the initial rate deposited provides a resistance ground of approximately 1000 ohms. Thus relay RT operates with option YK, the loop current is sufficient to operate relay KT even if the coin ground is not present. Relay RT operated, closes the operate path for relay S.

F.03 In SECTION II, under 1. COIN TRUNK SEIZURE - PREPAY SERVICE, add the following to the end of 1.06 (d):

Operates over the customers loop, if option YK is provided. If option YK is not provided, relay R operates to the 1000-ohm coin ground.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5242-DAJ

WE DEPT 45820-GRB-WEA-SVB

CIRCUIT DESCRIPTION

MAR 2 3 1979

CD-31592-02
ISSUE 11B
APPENDIX 1A
DWG ISSUE 34A
DISTN CODE 3D99

STEP-BY-STEP SYSTEMS
NO. 1, 350A, 355A, 360A OR 35E97
COIN TRUNK CIRCUIT
FOR USE PRECEDING A FIRST SELECTOR
SERVING PREPAYMENT COIN LINES
ARRANGED FOR DELAYED CHARGING

CHANGES

B. Changes in Apparatus

B.01 Added

K Diodes 533K, Fig. 1, Option YD

D. Description of Changes

D.01 The operate battery for relay BT is changed from -110 volt to -48 volt, in Fig. 1 under option YD.

D.02 Diode K is added to Fig. 1 under option YD to prevent a ground feedback path with the LCOT feature.

D.03 Leads DS5 and DS5A to LCOT are removed.

D.04 Leads S1 and S2 to the LCOT circuit have been rerouted to allow the forced disconnect function of LCOT to operate.

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DEPT 5242-DAJ

WE DEPT 45820-BRS-WEA-GLW

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195 BROADWAY, NEW YORK, N.Y. 10007

DRAWING NOTICE

TITLE Step-by-Step Systems-No. 1,350A, 355A, 360A or 35E97 - Coin Trunk Circuit - For Use Preceding a First Selector Serving Prepayment Coin Lines - Arranged for Delayed Charging

SD-31592-02 ISSUE 33B

CD ISSUE 11B APPX ADD.

RATING Manufacture Discontinued

SYSTEM SXS

DATE JUNE 13, 1975

DRAWING DISTRIBUTION CODE: 3D99

DESCRIPTION

6.1 Project: Local Coin Overtime Charging

6.2 This change for TELCO consideration is to add a feature.

6.21 This circuit is modified to provide the Local Coin Overtime Charging Feature when used with an LCOT charging circuit, SD-35046-01.

6.22 When modified for the LCOT feature, the following apparatus must be added: three 446 type diodes, 2 glow lamps and one KS type carbon resistor. This apparatus is added per Option YD.

6.23 A 535 type capacitor replaces a 439 type capacitor per Option YH or YJ.

6.3 This change covers: Manufacturing change.

6.4 This B change does not require WECO notification to TELCO.

6.5 Transmission is not affected by changes in this issue.

6.6 Direct Current Drain Data is affected by this issue but is negligible.

6.7 Equipment information is on a job basis.

6.8 Equipment Design Requirements are not affected.

OCT 1 1975

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195 BROADWAY, NEW YORK, N.Y. 10007

SD-31592-02 ISSUE 32B
CD 10D APP. 2B
RATING Manufacture Discontinued
SYSTEM SXS
DATE December 26, 1973

DWG DIST CODE: 3D99

DRAWING NOTICE

TITLE

Step-By-Step Systems - No. 1, 350A, 355A, 360A, Or 35E97 - Coin Trunk Circuit - For Use Preceding A First Selector - Serving Prepayment Coin Lines - Arranged For Delayed Charging

DESCRIPTION

6.1 PROJECT: Improved Coin Trunk Operation (SG7-W22)

6.2 This change for TELCO consideration is to improve coin trunk operation by eliminating the possibility of a lock-up condition from a false ground (E.C. PTS-2251)

6.21 Option ZZ is added and rated Standard. This option provides field modification information for the elimination of false ground lock-up.

6.22 Option YB is added and rated Standard. This option provides for elimination of false lock-up on a standard basis.

6.3 This change covers: Improvements in design with no added service, testing, or maintenance features.

6.4 This B change does not require WECO notification to TELCO.

6.5 Transmission is not affected by changes in this issue.

6.6 Direct Current Drain Data is not affected by this issue.

6.7 Equipment information is on a job basis.

6.8 Equipment Design Requirements are not affected.

STEP-BY-STEP SYSTEMS
NO. 1, 350A, 355A, 360A OR 35-E-97
COIN TRUNK CIRCUIT
FOR USE PRECEDING A FIRST SELECTOR SERVING PREPAYMENT COIN LINES ARRANGED FOR DELAYED CHARGING

CHANGES

B. Changes in Apparatus

B.1 Added

BT, 221B Resistor, 6040 ohms ±2%, Option YB Fig. 1

D. Description of Changes

D.1 Option ZZ is added and rated standard. This option provides means for applying a field modification to disable the function of the BT relay. This option eliminates the possibility of a false ground lock-up.

D.2 Option YB is added and rated standard and options YZ and YC are designated and rated standard. Options YA and YC provide the BT relay-false ground fraud test. Option YB eliminates the BT relay feature.

D.3 Circuit Notes 102 and 103 are changed to reflect the above modification. Circuit Notes 112, 113 and 114 are added to reference the above modifications.

F. Changes in Description of Operation

F.1 Added

SECTION V - MANUFACTURING TESTING REQUIREMENTS

This circuit shall meet all the requirements listed in the circuit requirements table; particularily the operate requirement on the (RT) relay should be insured.

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DEPT 5245-LCB
WECO DEPT 5152-REA-WEA

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DRAWING NOTICE

SD-31592-02 ISSUE 31D
CD 10D APP. 1D
RATING Mfr. Disc.
SYSTEM SXS
DATE September 27, 1972
DWG DIST CODE: 3D99

TITLE

Step-By-Step Systems - No. 1, 350A, 355A, 360A Or 35E97 - Coin Trunk Circuit - For Use Preceding A First Selector - Serving Prepayment Coin Lines - Arranged For Delayed Charging

DESCRIPTION

6.1 Project: 911 Emergency Service

6.2 This change for TELCO consideration, is to add options for connection to 911 Emergency Service Trunks.

6.21 Option ZX is designated and Option ZY is added to furnish more reliable coin refund operation when used with the 911 Emergency Service Trunk. Both options are rated Standard.

6.22 References to Options ZX and ZY are added to Notes 102 and 103. Note 11 is added.

6.23 This change requires minor wiring changes only.

6.3 This circuit is rerated to Manufacture Discontinued. The distribution code is changed and replacement information is added to the title box.

6.4 Connecting information is added to Figs. A, B, E and F.

6.5 Option ZW is added to Option S in Fig. 1. This addition was previously omitted on Issue 30D.

6.6 The Circuit Requirements Table is changed to include test note 8 for the B relay.

6.7 The battery variations table is corrected.

6.8 This change covers: Rating change.

6.9 This D change does not require WECO notification to TELCO.

6.10 Transmission is not affected by changes in this issue.

6.11 Direct Current Drain Data is not affected by this issue.

6.12 Equipment information is affected and will be covered by WECO drawing J33015B-( ) which will be available about 3/1/73.

6.13 Equipment Design Requirements will be available about 6/1/72 in J33015, BSP Section 814-523-151, Issue 10, Addendum 1.

CD-31592-02
ISSUE 10D
APPENDIX 1D
DWG ISSUE 31D

10

STEP-BY-STEP SYSTEMS
NO. 1, 350A, 355A, 360A OR 35-E-97
COIN TRUNK CIRCUIT
FOR USE PRECEDING A FIRST SELECTOR
SERVING PREPAYMENT COIN LINES
ARRANGED FOR DELAYED CHARGING

CHANGES

D. Description of Changes

D.1 Option ZX is designated and Option ZY is added to furnish more reliable coin refund operation when this circuit is used with 911 Emergency Service Trunks. Options ZX and ZY are both rated Standard.

D.2 References to options ZX and ZY are added to notes 102 and 103.

D.3 The circuit rating is changed to "MFR. DISC." on this issue. Replacement information is added to the title box.

D.4 Option ZW is added to option S in Fig. 1 to correct an error on Issue 30D.

D.5 The Circuit Requirements table is changed to include test note 8 for the pulse repeating requirements for relay R.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5225-LCB
WECO DEPT 5152-JMS-WEA

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DRAWING NOTICE

SD-31592-02		ISSUE	30D
CD	10D	APP.	
RATING	AT&TCo. Std.		
SYSTEM	Step By Step		
DATE	December 8, 1969		

DWG DIST CODE D99

TITLE

Step By Step Systems - No. 1, 350A, 355A, 360A Or 35E97- Coin Trunk Circuit - For Use Preceding A First Selector - Serving Prepayment Coin Lines - Arranged For Delayed Charging
EM/EL is not required.

DESCRIPTION

6.1 Project: Coin Service Improvement

6.2 This change requires coordination with another circuit, Auxiliary Coin Trunk SD-32538-01.

6.3 This change for TELCO consideration, is to add feature. This change will permit loop operation for coin service (Dial Tone First) service when under control of the new auxiliary coin trunk SD-32538-01. Five new leads are added to provide inter-connection with the auxiliary coin trunk.

6.4 D changes. Does not require WECO notification to TELCO.

6.5 Transmission is not affected by changes in this issue.

6.6 Direct Current Drain Data is not affected by this issue.

6.7 Equipment information is affected and will be covered by WECO drawing J33015B, which will be available on/about the first quarter of 1970.

6.8 Equipment Design Requirements will be available on/about the second quarter of 1970 in J33015, BSP sec. 814-523-151 issue 10.

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STEP-BY-STEP SYSTEMS NO. 1, 350A, 355A, 360A OR 35E97 COIN TRUNK CIRCUIT FOR USE PRECEDING A FIRST SELECTOR SERVING PREPAYMENT COIN LINES ARRANGED FOR DELAYED CHARGING

TABLE OF CONTENTS

SECTION I - GENERAL DESCRIPTION

1. PURPOSE OF CIRCUIT

1.01 This circuit is used to provide dial service to coin stations. It is arranged to automatically collect or return the coin deposited, as required, after each call. When Fig. B is used, it is arranged to delay setting up the charge condition until 2 to 5 seconds after the called party answers. It

functions with circuits arranged to time the call and collect the coin for each 5-minute interval of conversation.

SECTION II - DETAILED DESCRIPTION

1. ORIGINATING A CALL

1.01 The following description applies to S wiring or to T wiring on calls not originating on lines equipped with long line circuits. When T wiring is used, leads E and F are normally connected through normal post springs of the line finder; or if Fig. 4 is used, springs 2 and 3T LL, except on levels on which long line circuits are used.

1.02 When a prepayment coin station is connected to this circuit by a preceding circuit, relay L operates over the subscriber loop, in turn operating N and DD. N operated operates NN, which closes the circuit to the associated first selector operating relay P1, provides a holding circuit for DD, and changes from battery to the ring through the noninductive winding of RT to battery through the operating winding of RT and the primary winding of BT. It also removes ground from relay L, secondary winding, which then holds in series with the 6000-ohm winding of BT, but BT does not operate at this time. Relay DD operated connects ground to the sleeve lead to hold the line finder. When the C inductor is connected across the tip and ring leads by the operation of DD, the A relay in the first selector operates and an associated common shelf relay completes the dial tone path to the line through a winding of the A relay of the selector. When this circuit is connected to a TOUCH-TONE converter or common control originating register, the return of dial tone is under control of these circuits. The dial tone path is closed to the calling subscriber through resistors B and C when Z option is used. Otherwise, it is not closed until the coin is deposited, as described in 2.01.

2. COIN DEPOSITED

2.01 When the coin is deposited by the calling subscriber, RT operates, operating S, which locks to battery through its front contacts; operates H and HH; supplies dial tone to the calling subscriber, if not already supplied through Z option; connects R to the ring of the line; and removes battery from RT, which releases, and from the 29-ohm winding of relay L, which is held operated by the 800-ohm winding for a time. R operated operates D and closes a path for holding the A relay of the first selector when NN releases. D operated holds DD operated. H operated takes over the control of HH from S. HH operated releases N and NN, separates the sleeves of the line finder and first selector, supplements the ground on the sleeve from DD to the line finder, and with F option connects coin return battery to relay C. N released short-circuits L, releasing it. N and NN are slow in releasing in order to insure that R is fully operated before NN releases and opens the bridge to the first selector, in case L releases when the coin is deposited.

2.02 The purpose of the BT relay is to block the operation of the coin trunk in case of an irregular condition on the line. The operation is as follows: BT operated locks to the sleeve, through its tertiary winding, and resistor J (the function of which is to prevent BT from overheating on its tertiary winding) and opens the circuit to S, preventing its operation and preventing dialing. It is necessary for the calling subscriber to hang up his receiver after the irregular condition ceases before a further attempt can be made on the call.

3. PULSING

ROTARY DIALING

3.01 Relay R functions to repeat pulses from the subscriber's dial to the first selector. D is slow in operating and releases on the first dial pulse, and remains released during the pulsing of each digit. This causes DD to remain normal during the pulsing of each digit to aid the pulsing condition.

"TOUCH-TONE" CALLING

3.02 On TOUCH-TONE calls the R relay remains operated during transmission of tones and does not operate and release as in the case of rotary dialing. The TOUCH-TONE signals are translated into dial pulses by the converter or originating register and then transmitted to the selector.

4. CALL CHARGED

NO DELAYED OR OVERTIME CHARGING - FIG. A

4.01 If the call is one on which a charge should be made, the line current is reversed when the called party answers, operating P and releasing P1 which was previously operated. With P1 released and P operated, J and C operate and lock. The J relay operated operates K, reverses the tip and ring leads from the first selector, and short-circuits P, which releases. The reversal of the tip and ring leads causes P1 to operate. K operates K1 through the front contact of P1. K1 operated locks and removes the short circuit from P. If, due to an irregular operation at the called station, battery and ground again reverse before K1 operates, P1 will release, but K1 will operate through the back contact of P.

4.02 Relay C operated locks and operates A and also sets the circuit so as to collect the coin when the calling subscriber disconnects. Relay A operated disconnects the tip

and ring of the calling line from the T inductor and R relay, releasing R, and connects the tip and ring through P and P1 to the first selector. R released releases D and, in turn, DD. DD released performs no useful function at this time. The reversal of the line by the operation of J is necessary to keep the tip side of the line, which is grounded at the station as long as a coin is in the box, always connected through relay P to the ground side of the connection.

WITH DELAYED CHARGING AND NO OVERTIME - FIG. B

4.03 With Fig. B the operation is as described in 4.01 and 4.02, except that the operation of C, instead of connecting positive coin battery to relay I, connects that relay to the 2B spring of T1, and the relays of Fig. B function as follows.

4.04 When the called subscriber answers, P2 operates, in turn closing the circuit of T to lead PKU or A. This lead is grounded for 1/2 second once every 3 seconds (except that when the interrupter circuit is not in use, lead PKU is grounded). When T operates, it grounds lead ST (when J option is used, to start the interrupter or to keep it operating). When H option is used, T operates to close contacts 5/6T and 3/4B only, operating fully when lead A is opened. T locks to P2 through T1. 2-1/2 seconds after ground is removed from lead A, this lead is again grounded; or 2 seconds after lead PKU is opened, ground is connected to lead INT. Either of these through a make contact of T operates T1.

4.05 T1 operated locks to off-normal ground, releases T, and connects positive instead of negative coin battery to relay I. If P2 releases before T operates, T1 is released and the above sequence of operation will be repeated when P2 again operates. Fig. B thus insures against false charging when busy flashes or other transient conditions operate P2.

OVERTIME CHARGING WITH NO DELAY CHARGING - FIG. E

4.06 With Fig. E the operation is as described in 4.01 and 4.02, except that the operation of relay C grounds the C and B leads for the purpose of starting the associated timer. Relay C locks under control of the timing circuit F lead, operates relay A, and also sets the circuit so as to collect the coin when the calling subscriber disconnects. The start relay in the timing circuit locks to lead B. During the interval from the time that the coin is collected by the associated coin collect and monitor circuit after 4-1/2 minutes of conversation until the 5-minute period is reached, battery is removed from the F lead, allowing relay C to release, so that if the subscriber disconnects during this interval, any coin deposited will be returned by this circuit. Relay A operated disconnects the tip and ring of the calling line from the T inductor and R relay, thus releasing R, and connects the tip and ring through P and P1 relays to the first selector. Relay R released releases D and DD.

OVERTIME CHARGING WITH DELAYED CHARGING - FIG. F

4.07 With Fig. F the operation is the same as described in 4.03 through 4.05, except that the operation of relay C, instead of connecting positive coin battery to relay I, connects that relay to the 2B spring of relay T1, and the relays in Fig. F function as follows.

4.08 When the called subscriber answers, P2 relay operates, in turn closing the circuit of T to lead PKU or A. This lead is grounded for 1/2 second once every 3 seconds, (except that when the interrupter circuit is not in use, lead PKU is grounded). When T operates, it grounds lead ST (when ZE option is used, to start the interrupter or keep it operating). When ZD option is used, relay T operates to close contacts 5/6T and 3/4B only, operating fully when lead A is opened. Relay T locks to P2 through relay T. 2-1/2 seconds after ground is removed from lead A, the A lead is again grounded; or 2 seconds after lead PKU is opened, ground is connected to lead INT. Either of these leads through a make contact of T operates T1.

4.09 Relay T1 operated locks to off-normal ground, releases T, and connects positive instead of negative coin battery to relay I. If P2 releases before T operates, T1 is released and the above sequence of operation will be repeated when P2 again operates. Fig. F thus insures against false charging when busy flashes or other transient conditions operate P2. During the interval from the time that the coin is collected by the associated coin collect and monitor circuit, after 4-1/2 minutes of conversation until the 5-minute period is reached, battery is removed from the T1 relay, allowing it to release so that, if the subscriber disconnects during this interval, any coin deposited will be returned by this circuit.

5. CALL NOT CHARGED

5.01 If the line current is not reversed, P, K, and K1 will not operate and the circuit remains in a condition to return the coin when the calling party disconnects. On this type of call, A does not operate, and the A and B capacitors placed in the tip and ring leads provide the talking circuit, and relay R and inductor T provide the talking battery and ground supply.

6. DISCONNECT

CALL CHARGED - C RELAY OPERATED

6.01 When the calling subscriber disconnects, the line finder is still held operated by ground at the contacts of HH. S and A release when ground is removed from the selector sleeve and cause X to operate under control of a ground interruption on lead D, lighting the green alarm lamp A. Ground is intermittently and alternately connected to leads P and I for an interval of 1/2-second duration each. This feature is used to cause the coin control battery of this circuit, as described later, to be connected to the subscriber line for 1/2-second duration and thereby insure sufficient time for proper operation of the coin box magnet. Y operated locks under control of HH and connects battery to the winding of B, which operates when ground is received on the I lead. If the called subscriber should hang up before the calling subscriber, the line current is reversed when the called station disconnects, operating P and releasing P1. P operated with P1 released short-circuits the winding of J, causing it to release. J released releases K and short-circuits P. P1 operated and K released releases K1. J released places the P relay again on the ground side of the line. If the calling party disconnects first, J, K, and K1, and with Fig. B or F, T releases when HH releases (see 7.02).

NONCHARGE CALL - C RELAY NORMAL

6.02 When the calling station disconnects, R releases, releasing D and DD, and opens the loop to the succeding switches. After an interval, ground is removed from the sleeve of the selector. From this point on, the circuit functions as described in 6.01, except J, K, and K1 will not have been operated.

7. COIN CONTROL

7.01 The operation of B connects positive or negative coin battery to the line to dispose of the coin. If the coin is to be collected, positive battery is connected to the winding of I through the front contact of C, and with Fig. B or Fig. F, through front contact of T1. The operation of a relay in the timing circuit, after extending the talking circuit through the trunk finder and associated coin collect circuit, grounds the G lead through contacts 4/5B of relay T1, holds relay S operated, and grounds the sleeve to prevent the connection from releasing until the coin collect circuit has collected the coin. If the coin is to be returned, the negative battery is connected to the line through the front contact of B or HH, and back contact of relay T1, and front contact of C, with Fig. B or F, through the winding of I. I now operates in series with the coin magnet and remains operated during the time that the battery is connected to the line. Battery through the coin magnet should cause disposal of the coin, but the magnet will hold ground on the tip of the line as long as it is operated. The operation of I connects battery to hold H operated, since the operating circuit for this relay is opened when B operates. When the I lead ground is removed, B releases, removing the coin collect or return current, releasing I, and holding H operated. At the next closure of ground to the I lead, B reoperates, connecting coin disposal current to the line. The coin should have been disposed of on the first application of the potential, which upon the removal of the potential, restores the coin magnet to normal, and no current should flow through I on the subsequent application of the coin potential.

RELEASE OF CIRCUIT - A OR G OPTION

7.02 With B operated and I normal, H releases, releasing HH which (a) removes ground from the line finder sleeve, (b) releases B, Y, and also C, K, K1, and T1 if operated, (c) connects battery to RB1 of RT, (d) opens leads CT and CT1, and (e) removes battery from lead A. The release of B connects the incoming tip and ring to relay L, thus restoring the circuit to normal.

RELEASE OF CIRCUIT - F OPTION

7.03 The circuit functions as described in 7.02, except that when HH releases, B remains locked to lead I, and HH removes the coin return battery from 5B(C) with Fig. A, B, or E furnished, or 3(C) with Fig. F. Thus, B remains operated for approximately 1/2 second until ground is removed from lead I. This insures sufficient time for the line finder cut-through relay to release before the incoming tip and ring are connected to relay L.

8. STUCK COIN

X WIRING

8.01 If for any reason the coin is not properly disposed of, B continues to function under control of the I lead ground. After an interval of time, the associated alarm circuit will indicate a trouble condition by audible and visual alarms.

Y WIRING

8.02 Y wiring provides a connection to battery on the IB lead in the associated Coin Trunk Timed Release Circuit. When this circuit is used, the continued attempts of the Coin Trunk Circuit to dispose of the coin are limited by the timing of the Release Circuit. At the end of the time period, battery is removed from the IR lead and the circuit functions as though the coin had been dis-

posed of, restoring to normal as described in 7.01 through 7.03.

9. CALLS TO SPECIAL SERVICE OPERATOR

9.01 On calls to a special service operator, the selector level trunk is so arranged that battery and ground are reversed immediately when the operator answers. This causes the circuit to function as described in 4.01 through 4.09. If coin collect current is supplied to the line from the trunk, P remains released and P1 releases. If coin return current is applied to the line from the trunk, P operates and P1 remains operated. Neither relay performs a useful function at this time.

9.02 On a rering by the special service operator, P may operate on ringing current. If P remains operated due to earth potential, with P1 released, it shunts down J. H released releases K and short-circuits P. The earth potential which may have held P will not operate if the short-circuit is removed. The release of J also reverses the tip and ring, operating P1, which shunts down K1.

10. CONTACT PROTECTION

10.01 Resistors D and F at relay DD are connected to the A and B capacitors during the application of coin battery to the line, and in this connection, they are used to protect the contacts which control the application of the battery to the coin magnet. Capacitor D and resistor E are used to protect the pulsing contacts of relay R.

11. OPERATION WHEN T WIRING OK WITH A LINE FINDER

11.01 The T wiring is used only when the lines on certain levels in the associated line finder group are equipped with long line circuits. The line finders are then equipped with normal post springs that operate on the multiple bank levels on which all the working lines are provided with long line circuits. When the normal post springs on the line finder operate, leads E and F (which are connected together when the finder is normal for the purpose of making the finder busy by grounding the sleeve at the associated first selectors) are opened, and lead F is connected to lead A. When a call is originated, the long line circuit closes a bridge across the tip and ring, which operates L. L operates N and DD. N operates NN. NN closes a bridge across the tip and ring toward the first selector. The only useful function of DD at this time is that it grounds the sleeve so as to hold the line finder until HH operates. The bridge across the tip and ring causes the operation of relays in the first selector that supply a holding ground over the S lead. When ground is returned over the S lead from the first selector, A and S operate (relay A operating over the A and F leads, in turn operating S which locks to the sleeve). The operation of A closes the tip and ring through from the long line circuit to the first selector, operates P1, and allows L, N, NN, and DD to release. The operation of S operates H and HH. H locks under control of B. The test for presence of the coin at the substation is made in the long line circuit, and therefore, RT and BT do not enter into the circuit operation on this call; similarly, the dial pulses are repeated in the long line circuit so that R is not used. When the call is answered, P operates, P1 releases, and the circuit functions as described in 4.01. However, the only useful function in the operation of P and release of P1 is to operate C from a ground on HH and set the circuit in a position to collect the coin when the subscriber disconnects. When the calling subscriber disconnects, the circuit functions as described in 6.01 and 6.02. If the call is answered, C is operated, causing coin collect current to be applied to the line, and if the call is not answered, C is normal and coin return current is then applied to the line. On calls to the special service operator, P operates and P1 releases, which operates C and sets the circuit in a position to collect the coin when the subscriber disconnects. The operation of J, K, and K1 serves no useful function on this type of call because the transformer in the long line circuit prevents the coin ground from grounding the tip conductor in this circuit.

12. OPERATION WHEN FIG. 4 AND T WIRING ARE USED WITH A ROTARY SWITCH

12.01 Fig. 4 and T wiring are used when this circuit is assocaited with a subscriber rotary line circuit, which, in turn, is associated with a long line circuit. When this circuit is seized by the subscriber rotary line circuit, ground is advanced on lead A which operates LL of Fig. 4. Leads E and F (which are connected together through 2 and 3 break of LL are opened and lead F is connected to lead A or D. When a call is originated, the long line circuit closes a bridge across the tip and ring, which operates L. L operates N and DD. N operates NN. NN closes a bridge across the tip and ring toward the first selector. The only useful function of DD at this time is that it grounds the sleeve so as to hold the subscriber rotary line circuit until HH operates. The bridge across the tip and ring causes the operation of relays in the first selector that supply a holding ground over the S lead. When ground is returned over the S lead from the first selector, A operates over the A and F leads, in turn operating S which locks to the sleeve. The operation of A closes the tip and ring through from the long line circuit to the first selector, operates P1; and releases L, the slow release N, NN, and DD. The operation of S operates H and HH. H locks under control of B. HH separates the S lead between the subscriber

rotary line circuit and first selector, and grounds the S lead to the subscriber rotary line circuit. The test for presence of the coin at the substation is made in the long line circuit, and therefore RT and BT do not enter into the circuit operation on this call; similarly, the dial pulses are repeated in the long line circuit so that R is not used. When the call is answered, P operates, P1 releases, and the circuit functions as described in 4.01. However, the only useful function in the operation of P and release of P1 is to operate C from a ground on HH and set the circuit in a position to collect the coin when the subscriber disconnects. When the calling subscriber disconnects, the circuit functions as described 6.01 and 6.02, except instead of a line finder circuit, a subscriber rotary line circuit is used. When the line circuit disconnects, ground is removed from lead A, thereby releasing LL and reconnecting leads E and F together.

12.02 If the call is answered, C is operated, causing coin collect current to be applied to the line, and if the call is not answered, C is normal and coin return current is then applied to the line. On calls to the special service operator, P operates and P1 releases, which operates C and sets the circuit in a position to collect the coin when the subscriber disconnects. The operation of J, K, and K1 serves no useful function on this type of call because the transformer in the long line circuit prevents the coin ground from grounding the tip conductor in this circuit.

13. TEST JACKS

T JACK

13.01 Insertion of a plug in jack T grounds the S lead toward the line finder, making that circuit busy.

TT JACK

13.02 Pulse repeating tests of relay R are made by connecting the pulsing test set to jacks T and TT. TT cuts off the associated selector and provides locking ground for relay S. Momentary operation of key SC in all but the earliest pulse repeating test sets operates RT and, in turn, S. Where the pulse repeating test set is not so arranged, RT must be momentarily operated manually.

OT JACK

13.03 The OT jack is provided for the purpose of controlling the operation of the coin collect and monitor circuit when testing without waiting for the timer to time out the 4-1/2 minute and 5-minute intervals. The OT jack may also be used to check the accuracy of the timer.

14. CLASS OF SERVICE TONE - LINE NO. METHOD OF COIN CONTROL - FIG. 2

14.01 Where the line number method of coin control is used, a class of service tone is required. This is provided by Fig. 2.

15. CUTOFF KEYS FOR A, I, AND P LEADS - FIG. 3

15.01 If the A lead becomes accidentally grounded, no alarm will be sounded, and the interrupter circuit will not start. If the P lead is grounded, the first coin pulse may be short, resulting in a stuck coin condition at the coin box. If the P lead is grounded, the coin trunk will not release at the end of the call.

15.02 To aid in locating such troubles, the A, I, and P leads are carried through the key of Fig. 3, which will isolate the trunks in groups of 10. To guard against leaving the key inadvertently operated, a guard lamp is associated with the key.

16. USE IN OFFICES EQUIPPED WITH "CAMA" TRUNKS - FIG. 2 (ZH OPTION)

16.01 Direct ground is required on lead A to restrict coin lines from CAMA trunks.

17. CLASS OF SERVICE TONE 35-E97 ONLY (ZN OPTION)

17.01 The CL inductor and CL capacitor are arranged to permit a number checking tone which may be connected to the sleeve of the subscriber line to be transmitted to the operator to indicate the class of service.

18. LINE IDENTIFICATION

18.01 Capacitor CL allows an identifying tone or pulse to pass over the sleeve lead from the selector circuit to the line finder circuit where the identification of coin lines is required in offices employing number checking, ANI-TYPE B, or ANI-TYPE C. Inductor CL maintains a low resistance ground to the line finder sleeve and provides a high impedance to the transmission of identifying tone over the sleeve lead in offices with number checking or ANI-TYPE B. Diode A also maintains a low resistance holding ground on the line finder sleeve and is used to provide a high impedance to identifying pulses over the sleeve lead in offices with ANI-TYPE C.

19. LINE GROUP EQUIPPED WITH AUXILIARY COIN TRUNKS (ZW OPTION)

LINE FINDER AND LINE SWITCH OFFICE

19.01 Option ZW is used when this circuit is preceded by an auxiliary coin trunk. When this circuit is seized, ground is placed on

the A lead from the auxiliary coin trunk to operate the A relay. The A relay operated closes the tip and ring leads through to the associated first selector. The subscriber loop across the tip and ring causes relays in the selector to operate which, in turn, supplies dial tone to the calling subscriber and returns ground on the S lead. Ground on the S lead operates the S relay to battery on the contacts of the operated A relay. The operation of S operates relays H and HH. Relays L, D, DD, N, and NN do not enter into the circuit operation when this circuit is connected to an auxiliary coin trunk. The test for the presence of coin at the substation is made in the auxiliary coin trunk; therefore, the RT and BT relays are not used. Similarly, the dial pulses are repeated in the auxiliary coin trunk so that the R relay is not used. When the call is answered, relay P operates and the circuit functions as described in 4. and 5. of this section, except that the A relay has been operated and is controlled by the auxiliary coin trunk instead of by the C relay or DLL circuit. Also, the R, D, and DD relays will not be involved as mentioned above. If the call is to a free number, the auxiliary coin trunk will disable operation of the J relay via the J and J1 leads. An example of this type of call would be from a TOUCH-TONE coin station to an operator. When the operator answers, the tip and ring is reversed. By disabling the J relay, this reversal passes positive battery on the ring and ground on the tip from the recording completing trunk back to the coin station to disable the TOUCH-TONE dial.

19.02 Upon disconnect of the call, the circuit will function as described under 6., with one exception. If the call was directed to an announcement in the auxiliary coin trunk, the subscriber loop to this circuit and the first selector would be disconnected. The A relay and the first selector will release. However, this circuit will be held busy by the battery applied to the C lead in the auxiliary coin trunk which will hold the H and HH relays operated. The HH relay operated will maintain a supervisory ground on this circuit and on the S lead towards the line finder until the calling subscriber disconnects. On disconnect, coin potential is applied through the I relay winding towards the coin station on the tip side of the line.

SECTION III - REFERENCE DATA

1. WORKING LIMITS

1.01 Maximum external circuit loop resistance for subscriber pulsing and supervision - See Range Chart.

1.02 Earth Potential Limits

		Relay (P)	
Neg Limit		Maximum 10V	
		Min Conduc Lp	Max. Pos EP
Positive Limits	0 Ohms	9.5	V
	105 Ohms	10	V
	220 Ohms	10.5	V
	320 Ohms	11	V
	425 Ohms	11.5	V
	530 Ohms	12	V

1.03 Minimum Insulation Resistance: 20,000 ohms.

2. FUNCTIONAL DESIGNATIONS

None.

3. FUNCTIONS

3.01 To provide for connecting a prepayment coin station to a first selector or selector repeater.

3.02 To provide for transmitting dial tone from the selector, TOUCH-TONE converter, or originating register circuit to the calling subscriber.

3.03 To test for the presence of a coin in the coin box.

3.04 To repeat dial pulses after the coin is deposited.

3.05 To automatically return the coin on all uncompleted calls and on completed calls on which there is no charge.

3.06 To automatically collect the coin on completed calls to stations on which a charge is to be made.

3.07 To automatically collect the coin on completed calls to the special service operator unless the operator otherwise disposes of the coin before disconnecting.

3.08 To cut out the coin test and pulse repeating equipment when preceded by a long line circuit.

3.09 With Fig. B, to defer setting up the charge condition until 2 to 5 seconds after answer by the called party.

3.10 To indicate a trunk which has failed to dispose of a coin.

3.11 To start the associate timer when the called party answers on local charge calls.

3.12 To extend the talking circuit to the associated coin collect and monitor circuit.

3.13 To provide direct ground to the A lead in Fig. 2 in offices equipped with CAMA trunk.

3.14 To permit identification of calling number where ANI-TYPE B or ANI-TYPE C is provided.

3.15 To provide for loop operation when an auxiliary coin trunk precedes this circuit and the coin stations are arranged for dial-tone-first operation.

3.16 To elimininate the pulse repeating and coin test features when an auxiliary coin trunk precedes this circuit, since these functions are performed in the auxiliary coin trunk.

4. CONNECTING CIRCUITS

4.01 When this circuit is listed on a keysheet, the connecting information thereon shall be followed as indicated in Table A.

SECTION IV - REASONS FOR REISSUE

C. Changed and Added Functions

C.1 This circuit is changed to function with an auxiliary coin trunk which is required when coin stations are arranged for dial-tone-first operation.

D. Description of Changes

D.1 In Fig. 1, at leads T, R, and S, "TO AUX COIN TRUNK OR" is added to the connecting information.

TABLE A

Circuit	No. 1 or 350A	360A	No. 355A	35E97
(a) Line Finder Circuit	SD-31530-01*	SD-31530-01	SD-32000-01*	SD-32000-01
(b) Selector Circuit	SD-30200-01*	SD-30200-02*	SD-31735-01*	SD-30910-01*
(c) Interrupter and Alarm Circuit for Prepay Coin Trunks	SD-30852-01*	SD-31975-01	SD-31975-01	SD-31975-01
(d) Coin Trunk Timed Release Circuit	SD-31861-01	SD-31861-01	SD-31861-01	SD-31861-01
(e) Subline Circuit Equipped With Rotary Line Switch	SD-31259-01	SD-31259-01	SD-31259-01	
(f) Miscellaneous Alarm Circuit for Prepayment Coin Box Trunks		SD-31978-01	SD-31978-01	SD-31978-01
(g) Selector Repeater	SD-31914-01*		SD-31914-01*	
(h) Pulsing Test Set	SD-90469-02	SD-90469-02	SD-31858-01	SD-31858-01
(i) Timing Circuit for Coin Trunks	SD-31893-01 or Special SD-32115-01		SD-31893-01 or Special SD-32115-01	
(j) Interrupter and Alarm Circuit To Provide a Delay Interval for Use With 804C Ringing Power Plant	SD-32180-01		SD-32180-01	
(k) Converter Trunk - TOUCH-TONE Calling - SD-32326-01.				
(l) Register Trunk and Link - SD-34535-01 (trunk position).				
(m) Auxiliary Coin Trunk - SD-32538-01.				

* Typical circuit

D.2 Option ZV is added to reflect the fact that in dial-tone-first operation the ring side of the line is open when coin potentials are applied to the tip side.

D.3 The BC lead (option ZW) is added to place the alarm relays for this circuit under control of the auxiliary coin trunk during the coin return function.

D.4 Two new leads designated J and J1 (option ZW) are added. This places the operation of the J relay under control of the auxiliary coin trunk when a noncharge-type call is made.

D.5 C lead (option ZW) is added to hold this circuit busy by the auxiliary coin trunk when a call is routed to an announcement.

D.6 The S1 lead (option ZW) is added to permit the auxiliary coin trunk to monitor the S lead toward the first selector on a noncharge-type call.

D.7 Contacts 2T and 3T of the BT relay are strapped together (ZW option) to assure continuity to the S relay winding when associated with an auxiliary coin trunk.

D.8 Option ZW designates that the A lead is cross-connected to the auxiliary coin trunk instead of the line finder or Fig. 4 when an auxiliary coin trunk precedes this circuit.

D.9 The caption under Fig. 2 previously read, "Class of Service Tone Control for Line No. Method of Coin Control or for Use in Restricting Coin Lines From CAMA Trunks."

D.10 Reference to options ZV and ZW is added to Note 102.

D.11 Circuit Note 111 is added with reference to the use of options ZV and ZW.

D.12 Fig. 56 and 58 are rated Mfr Disc. on this issue.

D.13 Fig. 59, 60, and 61 are added on this issue to reflect cross-connect information to the auxiliary coin trunk.

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DRAWING NOTICE

SD-31592-02 ISSUE 29D
CD 9D APP. 8D
RATING AT&TCo. Std.
SYSTEM Step-By-Step
DATE December 8, 1969
DWG DIST CODE D99

TITLE

Step-By-Step Systems - No.1, 350A, 355A, 360A Or 35E97 - Coin Trunk Circuit - For Use Preceding A First Selector - Serving Prepayment Coin Lines - Arranged For Delayed Charging

EM/EL is not required.

DESCRIPTION

6.1 Project: (CLI) Calling Line Identification.

6.2 This change for TELCO consideration is to remove the feature which provides for operation with the (CLI) Calling Line Identification equipment. This is in accordance with a modification in design of the CLI System. This change restores the circuit to its status prior to issue 28D which is in agreement with WECO's drawings

6.21 Option "ZT" is removed and former wiring designated "ZS" option is restored as fixed wiring. This involves elimination of the T R and S lead multiple to the CLI Scanner Access Circuit and removal of the 426 diode from the S lead.

6.22 This change is made on a D no-basis per agreement with WECo.

6.23 Changes shown on issue 28D are canceled by this change.

6.3 The Current Drain Data for this circuit is not affected by changes in this issue.

6.4 D change. Requires WECo notification to Telco.

6.5 Equipment information is not affected.

6.6 Equipment Design Requirements are not affected.

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DRAWING NOTICE

SD-31592-02

CD	9D	ISSUE	28D
RATING	AT&TCo. Std.	APP.	7D
SYSTEM	Step-By-Step		
DATE	May 2, 1968		

DWG DIST CODE 1D99

TITLE

Step-By-Step Systems - No. 1, 350A, 355A, 360A, Or 35E97 - COIN TRUNK CIRCUIT - For Use Preceding A First Selector - Serving Prepayment Coin Lines - Arranged For Delayed Charging

DESCRIPTION

6.1 A change is made which allows the circuit to function with Calling Line Identification equipment.

6.11 The change provides access leads to the tip, ring, and sleeve and ground decoupling of the sleeve holding ground.

6.12 The access leads are used by CLI scanning equipment. The sleeve decoupling provides for the use of ANI tones prior to calling party disconnect.

6.13 This change requires the addition of a 426F diode and a wiring change.

6.2 The Current Drain Data for this circuit is not affected by changes in this issue.

6.3 D change. Requires WECo notification to Telco.

6.4 Equipment information is affected and will be covered by drawing J33015B to be prepared by WECo.

6.5 Equipment Design Requirements are not affected.

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DRAWING NOTICE

SD-31592-02 ISSUE 27D
CD 9D APP. 6D
RATING AT&TCo Standard
SYSTEM Step-by-Step
DATE December 17, 1965

TITLE

Step-by-Step Systems - No. 1, 350A, 355A, 360A Or 35E97 - COIN TRUNK CIRCUIT - For Use Preceding A First Selector - Serving Prepayment Coin Lines - Arranged For Delayed Charging

DESCRIPTION

6.1 Provision is made for the class of service tone features of this circuit to be used with other methods of coin control, such as the inband method.

6.11 This is accomplished by removing specific reference to the line number method of coin control in Note 102 for class of service functions. No change in wiring or apparatus is required.

6.2 Overtime charging is rated Mfr. Disc. due to lack of demand.

6.3 The Current Drain Data for this circuit is not affected by changes on this issue.

6.4 D change. Does not require WECo notification to Tel Co.

6.5 Equipment information is affected and will be covered by drawing J33015B to be prepared by WECo.

6.6 Equipment Design Requirements will be covered in B.S.P. Section AA231.820 (J33015) Iss. 6 Appx. 8.

No engineering letter will be issued.

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DRAWING NOTICE

SD-31592-02 ISSUE 26D
CD 9D APP. 5D
RATING AT&TCo. Std. A&M Only For 350A, 360A & 35E97
System Step-by-Step
Date November 17, 1964

TITLE

Step-By-Step systems - No. 1, 350A, 355A 360A Or 35E97 - Coin Trunk Circuit - For Use Preceding A First Selector - Serving Prepayment Coin Lines - Arranged For Delayed Charging - And Overtime Charging

DESCRIPTION

6.1 On this reissue the drawing is rated A&M Only for SXS 350A offices in line with the general program for rating 350A offices A&M Only.

6.2 This circuit is reissued to clarify note 102 in regard to the use of options when connection is made to ANI type B or C.

6.3 The Current Drain Data for this circuit is not affected by changes on this issue.

6.4 D change. Does not require WECo. notification to Tel Co.

6.5 Equipment information is not affected.

6.6 Equipment Design Requirements are not affected.

No engineering letter will be issued.

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DRAWING NOTICE

SD-31592-02		ISSUE	25D
CD	9D	APP.	4D
RATING	AT&TCo. Std.		
SYSTEM	Step-By-Step		
DATE	February 11, 1964		

TITLE

Step-By-Step Systems - No. 1, 350A, 355A, 360A or 35E97 - Coin Trunk Circuit - For Use Preceding A First Selector - Serving Prepayment Coin Lines - Arranged For Delayed Charging - And Overtime Charging

DESCRIPTION

6.1 This circuit is reissued to permit line identification in offices employing ANI - Type B.

6.11 To accomplish this revision an existing option ZN is designated for use where ANI - Type B is required. This option had previously been used only where a class of service tone had been required in a 35E97 office.

6.2 This circuit is also reissued to permit line identification in offices employing ANI Type C.

6.21 To accomplish this change 1-426F diode is added, and a CL2M.F capacitor, presently shown as used only in 35E97 offices is required. Option ZQ is assigned for use with ANI type C.

6.3 CRT test requirements are revised.

6.4 The Current Drain Data for this circuit is not affected by changes on this issue.

6.5 D change. Does not require WECo. notification to Tel. Co.

6.6 Equipment information is affected and will be covered by drawing LJ33015B.

6.7 Equipment Design Requirements will be covered in B.S.P. Section AA231.820 (J33015) Iss. 6. Appx. 2.

No engineering letter will be issued.

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DRAWING NOTICE

SD-31592-02 ISSUE 23D
CD 9D APP. 2D
RATING AT&TCo. Std.
SYSTEM Step-By-Step
DATE August 23, 1963

TITLE

Step-By-Step Systems - No. 1, 350A, 355A, 360A Or 35E97 - Coin Trunk Circuit - For Use Preceding A First Selector - Serving Prepayment Coin Lines - Arranged For Delayed Charging - And Overtime Charging

DESCRIPTION

6.1 This circuit is arranged to provide operation with Non-Common Control Touch-Tone Calling Equipment & Step-By-Step Common Control Equipment.

6.11 This change involves additional cross connecting information only & no circuit changes are required.

6.2 The Current Drain Data for this circuit is not affected by changes on this issue.

6.3 D change. Requires WECo. notification to Tel. Co.

6.4 Equipment information is not affected.

6.5 Equipment Design Requirements are not affected.

No engineering letter will be issued.

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DRAWING NOTICE

SD-31592-02		ISSUE	24B
CD	9D	APP.	3B
RATING	AT&TCo. Std.		
SYSTEM	Step-By-Step		
DATE	August 23, 1963		

TITLE

Step-By-Step Systems - No. 1, 350A, 355A, 360A Or 35E97 - Coin Trunk Circuit - For Use Preceding A First Selector - Serving Prepayment Coin Lines - Arranged For Delayed Charging - And Overtime Charging

DESCRIPTION

6.1 To improve the reliability of the pulsing circuit a new circuit requirement note is added for relay D.

6.2 This note calls for a pulsing test at Loop "O" 6PPS to be made. If the D relay tends to follow the pulses it should be stiffened within its test requirement.

6.3 The Current Drain Date for this circuit is not affected by changes on this issue.

6.4 B change. Requires WECo. notification to Tel Co.

6.5 Equipment information is not affected.

6.6 Equipment Design Requirements are not affected.

No engineering letter will be issued.

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JUN 10 1963

dr

SD-31592-02 ISSUE 22D
CD 9D APP. 1D
RATING AT&TCo Standard
SYSTEM SXS
DATE Mar. 15, 1963

DRAWING NOTICE

TITLE

Step-by-Step Systems - No.1, 350A, 355A, 360A Or 35E97 - Coin Trunk Circuit - For Use Preceding A First Selector - Serving Prepayment Coin Lines - Arranged For Delayed Charging - And Overtime Charging

DESCRIPTION

6.1 Reissued sheets 1, 2, 3
Total reissued sheets 3

6.2 The Mfr. Disc. 111A-60ohm resistor (ZO option) is superseded by the 227C -59 ohm resistor (ZP option)

6.3 Circuit Note 103 and the Options Used Table are revised to reflect this change.

6.4 The Current Drain Data for this circuit is not affected by changes on this issue.

6.5 D change. Does not require WECo notification to Tel. Co.

6.6 Equipment information is affected and will be covered by drawing J33015B-().

6.7 Equipment Design Requirements are not affected.

No engineering letter will be issued.

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195 BROADWAY, NEW YORK 7

SD-31592-021-023 ISSUE 21D
CD 9D APP.
RATING AT&TCo Std.
SYSTEM Step-By-Step
DATE October 13, 1961

DRAWING NOTICE

TITLE

Step-By-Step Systems - No. 1, 350A, 355A, 360A Or 35E97 - Coin Trunk Circuit - For Use Preceding A First Selector - Serving Prepayment Coin Lines - Arranged For Delayed Charging - And Overtime Charging

DESCRIPTION

6.1 To permit the operation of this circuit with a Subscribers Rotary Line Circuit equipped with a Dial Long Line Circuit, Figure 4 was added.

6.2 Figure 4, consisting of one U type relay controls the A or D, E and F leads of this circuit. This figure in effect replaces the action, the line finder normal post springs had on these leads.

6.3 The Current Drain Data for this circuit is not affected by changes on this issue.

6.4 Equipment information is affected and will be covered by drawing J-33015B-1.

6.5 Equipment Design Requirements are covered in BSP Section AA231.820 (J-33015) Iss. 5 Appx. 3.

No engineering letter will be issued.

RS

AMERICAN TELEPHONE AND TELEGRAPH COMPANY
195 BROADWAY, NEW YORK 7

DRAWING NOTICE

SD-31592-021-023		ISSUE	20B
CD	8D	APP.	1B
RATING	AT&TCo Std.		
SYSTEM	Step-By-Step		
DATE	February 21, 1961		

TITLE

Step-By-Step Systems - No. 1, 350A, 355A, 360A Or 35E97 - Coin Trunk Circuit - For Use Preceding A First Selector - Serving Prepayment Coin Lines - Arranged For Delayed Charging - And Overtime Charging

DESCRIPTION

6.1 The "RLS" leads inthe cross connecting figures are rated "A&M Only."

6.2 The operate current flow values and the spring gauging requirements are changed on the "S" relay to prevent the false operation of the BT relay when used with the 233 coin station.

6.3 The following information previously covered in Bell System Practices is made, on this issue, a part of the SD and CD information: [Cross-connection Procedures].

6.4 The Current Drain Data for this circuit is not affected by changes on this issue.

6.5 Equipment information is not affected.

6.6 Equipment Design Requirements are not affected.

No engineering letter will be issued.

AMERICAN TELEPHONE AND TELEGRAPH COMPANY
195 BROADWAY, NEW YORK 7

SD-31592-021-023 ISSUE 19

CD 8D APP.

DRAWING NOTICE

RATING AT&TCo Standard
SYSTEM Step-By-Step
DATE January 28, 1959

TITLE

Step-By-Step Systems - No. 1, 350A, 355A, 360A Or 35E97 -
Coin Trunk Circuit - For Use Preceding A First Selector -
Serving Prepayment Coin Lines - Arranged for Delayed Charging -
And Overtime Charging

DESCRIPTION

6.1 Reason for reissued is to provide class of service tone transmission tothe operator in 35-E-97 offices.

6.2 Current Drains are not affected.

6.3 Equipment information will be covered by J-33015B.

6.4 Equipment Design Requirements will be available in Section AA231.820 (J33015) Iss. 5, of the Bell System Practices about June, 1959.

No engineering letter will be issued.

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AMERICAN TELEPHONE AND TELEGRAPH COMPANY
195 BROADWAY, NEW YORK 7

SD-31592-021-023 ISSUE 18B
CD 7B APP.
RATING AT&TCo Std.
SYSTEM Step-By-Step
DATE October 22, 1958

DRAWING NOTICE

TITLE

Step-By-Step Systems - No. 1, 350A, 355A, 360A Or 35E97 - Coin Trunk Circuit - For Use Preceding A First Selector - Serving Prepayment Coin Lines - Arranged For Delayed Charging - And Overtime Charging

DESCRIPTION

6.1 Reissued to provide a direct ground on the "A" lead when this trunk is used in offices equipped with CAMA trunks, thereby controlling restricted service over the fourth lead.

6.2 Current Drains are not affected.

6.3 Equipment information is not affected.

6.4 Equipment Design Requirements are not affected.

An engineering letter will be issued.

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AMERICAN TELEPHONE AND TELEGRAPH COMPANY
195 BROADWAY, NEW YORK 7

SD-31592-021-023 ISSUE 17-D
CD 6-D APP. 1-D
RATING AT&TCo Std.
SYSTEM Step-By-Step - Ckt.
DATE Dec. 28, 1954

DRAWING NOTICE

TITLE

Step-By-Step Systems - No. 1, 350A, 355A, 360A, Or 35-E-97 - Coin Trunk Circuit - For Use Preceding A First Selector - Serving Prepayment Coin Lines - Arranged For Delayed Charging - And Overtime Charging.

DESCRIPTION

Provision is made for the use of this circuit in 360A and 35-E-97 offices, arranged for the line number method of coin control.

Current drain not affected.

Equipment information is covered on J33015B, Iss. 8.

Engineering Requirements are covered in BSP AA231.820 (J33015), Iss. 4.

An engineering letter will be issued.

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195 BROADWAY, NEW YORK 7

SD-31592-021-023 ISSUE 16-D
CD 6-D APP.
RATING AT&TCo Std.
SYSTEM Step-by-Step - Ckt.
DATE March 31, 1954

DRAWING NOTICE

TITLE

Step-by-Step Systems - No. 1, 350A or 355A - Coin Trunk Circuit - For Use Preceding a First Selector - Serving Prepayment Coin Lines - With or Without Delayed Charge - Arranged For Overtime Charging

DESCRIPTION

1.1 A non-operate requirement is added for the Y relay to prevent its operation on the charging current of the contact protecting condenser in the associated interrupter and Alarm Circuit SD-30852-01. Such false operation may result in a short pulse of a coin control current, and a stuck coin at the station.

1.2 Fig. 2 is added for use with the line number method of coil control to provide a direct or 3000 ohm ground, which indicates to the Aux. Trunk SD-32025-01, that a coin station is calling. Heretofore there has been no uniform method of supplying this ground.

1.3 Fig. 3 provides for sectionalizing the A, I, and P leads as an aid in restoring service and locating a ground when any of these becomes accidentally grounded.

Equipment Information is covered on J33015.

Engineering Requirements will be covered in B.S.P. AA231.820 (J33015), on the next reissue to add suppl. lists 8 & 9 under J33015B for Ckt. Figs. 2 & 3 respectively.

No engineering letter will be issued.

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AMERICAN TELEPHONE AND TELEGRAPH COMPANY
195 BROADWAY, NEW YORK 7

SD-31592-021-023 ISSUE 15-D
CD 5-D APP.
RATING AT&TCo Std
SYSTEM Step-By-Step - Ckt.
DATE August 27, 1953

DRAWING NOTICE

TITLE

Step-By-Step Systems - No. 1, 350A Or 355A - Coin Trunk Circuit - For Use Preceding A First Selector - Serving Prepayment Coin Lines - With Or Without Delayed Charge - Arranged For Over time Charging

DESCRIPTION

1.1 The use of relays E589, E626, B500 and 149CG is rated "Mfr. Disc." for this circuit. This is in furtherance of a general program of rerating obsolescent apparatus to carry realistic ratings.

1.2 A feature for overtime charging is added on an optional basis. Figure E covers the feature for no delay charging and figure F for delayed charging.

Current drain is not affected.

Equipment information is covered on ED-31043-01, Issue 2-D.

Engineering Requirements are covered in BSP AA231.820 (J33015) Issue 3, App. 2.

No engineering letter will be issued.

STEP BY STEP SYSTEMS
NO. 1, 350A, 355A, 360A OR 35E97
COIN TRUNK CIRCUIT
FOR USE PRECEDING A FIRST SELECTOR
SERVING PREPAYMENT COIN LINES
ARRANGED FOR DELAYED CHARGING

CHANGES

A. Changed and Added Functions

A.1 The feature that provides for operation with calling line identification (CLI) equipment is removed from the circuit in accordance with a change in design of the CLI system. The circuit is restored without record to its condition prior to Issue 28D per agreement with WECo.

B. Changes in Apparatus

B.1 Removed

Diode B, 426F, Option ZT

D. Description of Changes

D.1 Option ZT is removed and former wiring designated ZS is restored as fixed wiring. This involves elimination of the T-, R-, and S-lead multiple to the CLI Scanner Access Circuit and removal of the B diode in the S lead to the first selector.

D.2 Circuit Note 109 is removed and reference to options ZS and ZT is removed from the Record Note 103 and the Options Used table.

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DEPT 5823-JLB-MR

(S). Where the pulse repeating test set is not so arranged, (RT) must be momentarily operated manually.

17,3 (OT) Jack

The (OT) jack is provided for the purpose of controlling the operation of the coin collect and monitor circuit when testing without waiting for the timer to time-out the 4-1/2 minute and 5 minute intervals. The (OT) jack may also be used to check the accuracy of the timer.

18. CLASS OF SERVICE TONE-LINE NO. METHOD OF COIN CONTROL - FIG. 2

Where the line number method of coin control is used, a class of service tone is required. This is provided by Fig. 2.

19. CUT-OFF KEYS FOR A, I AND P LEADS FIG. 3

If the A lead becomes accidentally grounded, no alarm will be sounded, and the interrupter circuit will not start. If the P lead is grounded, the first coin pulse may be short, resulting in a stuck coin condition at the coin box. If the P lead is grounded, the coin trunk will not release at the end of the call.

To aid in locating such troubles, the A, I, and P leads are carried thru the key of Fig. 3, which will isolate the trunks in groups of 10. To guard against leaving the key inadvertently operated, a guard lamp is associated with the key.

20. USE IN OFFICES EQUIPPED WITH CAMA TRUNKS - FIG. 2 ("ZH" OPTION)

Direct ground is required on "A" lead to restrict coin lines from CAMA trunks.

21. CLASS OF SERVICE TONE 35-E97 ONLY (ZN OPTION)

The (CL) retard coil and (CL) capacitor are arranged to permit a number checking tone which may be connected to the sleeve of the subscriber's line to be transmitted to the operator to indicate the class of service.

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DEPT. 2363-WF-FBB-EP

returned, the negative battery is connected to the line through the front contact of (B) or (HH) and the back contact of relay (T1) and front contact of (C) with Fig. B or F, through the winding of (I). (I) now operates in series with the coin magnet and remains operated during the time that the battery is connected to the line. Battery through the coin magnet should cause disposal of the coin, but the magnet will hold ground on the tip of the line as long as it is operated. The operation of (I) connects battery to hold (H) operated since the operating circuit for this relay is opened when (B) operates. When the "I" lead ground is removed (B) releases, removing the coin collect or return current, releasing (I) and holding (H) operated. At the next closure of ground to the "I" lead (B) reoperates, connecting coin disposal current to the line. The coin should have been disposed of on the first application of the potential, which upon the removal of the potential, restores the coin magnet to normal, and no current should flow through (I) on the subsequent application of the coin potential.

11.2 Release of Circuit - "A" or "G" Option

With (B) operated and (1) normal (H) releases, releasing (HH) which (a) removes ground from the line finder sleeve, (b) releases (B), (Y), and also (C), (K), (K1) and (T1) if operated, (C) connects battery to "RB1" of (RT), (d) opens leads "CT" and "CT1", and (e) removes battery from lead "A". The release of (B) connects the incoming tip and ring to relay (L) thus restoring the circuit to normal.

11.3 Release of Circuit - "F" Option

The circuit functions as described in the preceding paragraph except that when (HH) releases (B) remains locked to lead "I", and (HH) removes the coin return battery from 5B(C) with Figs. A, B or E furnished or 3(C) with Fig. F. Thus (B) remains operated for approximately 1/2 second until ground is removed from lead "I". This insures sufficient time for the line finder cut through relay to release before the incoming tip and ring are connected to relay (L).

12. STUCK COIN

12.1 "X" Wiring

If for any reason the coin is not properly disposed of, (B) continues to function under control of the "I" lead ground. After an interval of time the associated alarm circuit will indicate a trouble condition by audible and visual alarms.

12.2 "Y" Wiring

"Y" wiring provides a connection to battery on the "IB" lead in the associated "Coin Trunk Timed Release Circuit". When this circuit is used the continued attempts of the Coin Trunk Circuit to dispose of the coin are limited by the timing of the Release Circuit. At the end of the time period battery is removed from the "IR" lead and the circuit functions as though the coin had been disposed of, restoring to normal as described in Paragraph 11.

13. CALLS TO SPECIAL SERVICE OPERATOR

On calls to a special service operator, the selector level trunk is so arranged that battery and ground are reversed immediately when the operator answers. This causes the circuit to function as described in Paragraph 8. If coin collect current is supplied to the line from the trunk, (P) remains released and (P1) releases. If coin return current is applied to the line from the trunk, (P) operates and (P1) remains operated. Neither relay performs a useful function at this time.

On a rering by the special service operator, (P) may operate on ringing current. If (P) remains operated due to earth potential with (P1) released it shunts down (J). (J) releases releases (K) and short-circuits (P). The earth potential which may have held (P) will not operate if after the short-circuit is removed. The release of (J) also reverses the tip and ring operating (P1) which shunts down (K1).

14. CONTACT PROTECTION

Resistances (D) and (F) at relay (DD) are connected to the "A" and "B" condensers during the application of coin battery to the line and in this connection are used to protect the contacts which control the application of thhs battery to the coin magnet. Condenser (D) and resistance (E) are used to protect the pulsing contacts of relay (R).

15. OPERATION WHEN "T" WIRING OK WITH A LINE FINDER

The "T" wiring is used only when the lines on certain levels in the associated line finder group are equipped with long line circuits. The line finders are then equipped with normal post springs that operate on the multiple bank levels on which all the working lines are provided with long line circuits. When the normal post springs on the line finder operate, leads "E" and "F", (which are connected together when the finder is normal for the purpose of making the finder busy by grounding the sleeve at the associated first selectors) are opened and lead "F" is connected to lead "A". When a call is originated the long line circuit closes a bridge across the tip and ring which operates (L). (L) operates (N) and (DD). (N) operates (NN). (NN) closes a bridge across the tip and ring toward the first selector. The only useful function

of (DD) at this time is that it grounds the sleeve so as to hold the line finder until (HH) operates. The bridge across the tip and ring causes the operation of relays in the first selector that supply a holding ground over the "S" lead. When ground is returned over the "S" lead from the first selector (A) and (S) operate (relay (A) operating over the "A" and "F" leads in turn operating (S) which locks to the sleeve). The operation of (A) closes the tip and ring through from the long line circuit to the first selector, operates (P1) and allows (L), (N), (NN) and (DD), to release. The operation of (S) operates (H) and (HH). (H) locks under control of (B). The test for presence of the coin at the substation is made in the long line circuit and therefore (RT) and (BT) do not enter into the circuit operation on this call; similarly, the dial pulses are repeated in the long line circuit so that (R) is not used. When the call is answered (P) operates, (P1) releases, and circuit functions are described in the first paragraph of Section 8. However the only useful function in the operation of (P) and release of (P1) is to operate (C) from a ground on (HH) and sets the circuit in a position to collect the coin when the subscriber disconnects. When the calling subscriber disconnects the circuit functions as described under Section 10. If the call is answered (C) is operated causing coin collect current to be applied to the line and if the call is not answered (C) is normal and coin return current is then applied to the line. On calls to the special service operator (P) operates and (P1) releases which operates (C) and sets the circuit in a position to collect the coin when the subscriber disconnects. The operation of (J), (K) and (K1) serves no useful function on this type of call because the repeating coil in the long line circuit prevents the coin ground from grounding the tip conductor in this circuit.

16. OPERATION WHEN FIGURE 4, AND "T" WIRING ARE USED WITH A ROTARY SWITCH

Figure 4 and "T" wiring are used when this circuit is associated with a subscribers rotary line circuit, which in turn is associated with a long line circuit. When this circuit is seized by the subscribers rotary line circuit ground is advanced on lead "A" which operates (LL) of Figure 4, Leads "E" and "F" (which are connected together through 2 and 3 break of (LL) are opened and lead "F" is connected to lead "A or D". When a call is originated the long line circuit closes a bridge across the tip and ring which operates (L). (L) operates (N) and (DD). (N) operates (NN). (NN) closes a bridge across the tip and ring toward the first selector. The only useful function of (DD) at this time is that it grounds the sleeve so as to hold the subscribers rotary line circuit until (HH) operates. The bridge across the tip and ring causes the operation of relays in the first selector that supply a holding ground over the "S" lead. When ground is returned over the "S" lead from the first selector (A) operates over the "A" and "F" leads in turn operating (S) which locks to the sleeve. The operation of (A) closes the tip and ring through from the long line circuit to the first selector, operates (P1) and releases (L), the slow release (N), (NN), and (DD). The operation of (S) operates (H) and (HH). (H) locks under control of (B). (HH) separates the "S" lead between the subscribers rotary line circuit and first selector, and grounds the "S" lead to the subscribers rotary line circuit. The test for presence of the coin at the substation is made in the long line circuit and therefore (RT) and (BT) do not enter into the circuit operation on this call; similarly, the dial pulses are repeated in the long line circuit so that (R) is not used. When the call is answered (P) operates, (P1) releases, and circuit functions as described in the first paragraph of Section 8. However the only useful function in the operation of (P) and release of (P1) is to operate (C) from a ground on (HH) and sets the circuit in a position to collect the coin when the subscriber disconnects. When the calling subscriber disconnects the circuit functions as described under Section 10, except instead of a line finder circuit a subscribers rotary line circuit is used. When the line circuit disconnects ground is removed from lead "A", thereby releasing (LL) and reconnecting leads "E" and "F" together.

If the call is answered (C) is operated causing coin collect current to be applied to the line and if the call is not answered (C) is normal and coin return current is then applied to the line. On calls to the special service operator (P) operates and (P1) releases which operates (C) and sets the circuit in a position to collect the coin when the subscriber disconnects. The operation of (J), (K) and (K1) serves no useful function on this type of call because the repeating coil in the long line circuit prevents the coin ground from grounding the tip conductor in this circuit.

17. TEST JACKS

17.1 (T) Jack

Insertion of a plug in jack (T) grounds the "S" lead toward the line finder, making that circuit busy.

17.2 (TT) Jack

Pulse Repeating tests of relay (R) are made by connecting the pulsing test set to jacks (T) and (TT). (TT) cuts off the associated selector and provides locking ground for relay (S). Momentary operation of key (SC) in all but the earliest pulse repeating test sets operates (RT) and in turn

finder and first selector and supplements the ground on the sleeve from (DD) to the line finder, and with "F" option connects coin return battery to relay (C). (N) released short-circuits (L), releasing it. (N) and (NN) are slow in releasing in order to insure that (R) is fully operated before (NN) releases and opens the bridge to the first selector, in case (L) releases when the coin is deposited.

The purpose of the (BT) relay is to block the operation of the coin trunk in case of an irregular condition on the line. The operation is as follows: (BT) operated locks to the sleeve, through its tertiary winding and resistance J (the function of which is to prevent (BT) from overheating on its tertiary winding) and opens the circuit to (S) preventing its operation and preventing dialing. It is necessary for the calling subscriber to hang up his receiver after the irregular condition ceases before a further attempt can be made on the call.

7. DIALING

Relay (R) functions to repeat pulses from the subscriber's dial to the first selector. (D) is slow in operating and releases on the first dial pulse, and remains released during the pulsing of each digit. This causes (DD) to remain normal during the pulsing of each digit to aid the pulsing condition.

8. CALL CHARGED

8.1 No Delayed or Overtime Charging - Fig. A

If the call is one on which a charge should be made, the line current is reversed when the called party answers, operating (P) and releasing (P1) which was previously operated. With (P1) released and (P) operated, (J) and (C) operate and lock. The (J) relay operated operates (K), reverses the tip and ring leads from the first selector and short-circuits (P) which releases. The reversal of the tip and ring leads causes (P1) to operate. (K) operates (K1) through the front contact of (P1). (K1) operated locks and removes the short circuit from (P). If due to an irregular operation at the called station battery and ground again reverse before (K1) operates, (P1) will release, but (K1) will operate through the back contact of (P).

Relay (C) operated locks and operates (A) and also sets the circuit so as to collect the coin when the calling subscriber disconnects. Relay (A) operated disconnects the tip and ring of the calling line from the (T) retardation coil and (R) relay, releasing (R), and connects the tip and ring through (P) and (P1) to the first selector. (R) released releases (D) and in turn (DD). (DD) released performs no useful function at this time. The reversal of the line by the operation of (J) is necessary to keep the tip side of the line, which is grounded at the station as long as a coin is in the box, always connected through relay (P) to the ground side of the connection.

8.2 With Delayed Charging and No Overtime - Fig. B

With Fig. B the operation is as described in Par. 8.1 except that the operation of (C), instead of connecting positive coin battery to relay (I) connects that relay to the 2B spring of (T1), and the relays of Fig. B function as follows:

When the called subscriber answers (P2) operates, in turn closing the circuit of (T) to lead "PKU" or "A". This lead is grounded for 1/2 second once every 3 seconds (except that when the interrupter circuit is not in use, lead "PKU" is grounded). When (T) operates, it grounds lead "ST" (when "J" option is used, to start the interrupter or to keep it operating). When "H" option is used, (T) operates to close contacts 5/6T and 3/4B only, operating fully when lead "A" is opened. (T) locks to (P2) thru (T1). 2-1/2 seconds after ground is removed from lead "A", this lead is again grounded or 2 seconds after lead "PKU" is opened, ground is connected to lead "INT". Either of these thru a make contact of (T), operates (T1).

(T1) operated locks to off normal ground, releases (T), and connects positive coin battery to relay (I) instead of negative. If (P2) releases before (T) operates, (T1) is released and the above sequence of operation will be repeated when (P2) again operates. Fig. B thus insures against false charging when busy flashes or other transient conditions operate (P2).

8.3 Overtime Charging With No Delay Charging - Fig. E

With Fig. E the operation is as described in Par. 8.1 except that the operation of relay (C) grounds the "C" and "B" leads for the purpose of starting the associated timer. Relay (C) locks under control of the timing circuit "F" lead, operates relay (A) and also sets the circuit so as to collect the coin when the calling subscriber disconnects. The start relay in the timing circuit locks to lead "B". During the interval from the time that the coin is collected by the associated coin collect and monitor circuit after 4-1/2 minutes of conversation until the 5 minutes period is reached, battery is removed from the "F" leak allowing relay (C) to release so that if the subscriber disconnects during this interval, any coin deposited will be returned by this circuit. Relay (A) operated disconnects the tip and ring of the calling line from the (T) retard coil and

(R) relay thus releasing (R), and connects the tip and ring thru (P) and (P1) relays to the first selector. Relay (R) released releases (D) and (DD).

8.4 Overtime Charging With Delayed Charging - Fig. F

With Fig. F the operation is the same as described in Par. 8.2 except that the operation of relay (C), instead of connecting positive coin battery to relay (I), connects that relay to the 2B spring of relay (T1), and the relays in Fig. F function as follows:

When the called subscriber answers (P2) relay operates, in turn closing the circuit of (T) to lead "PKU" or "A". This lead is grounded for 1/2 second once every 3 seconds, (except that when the interrupter circuit is not in use, leak "PKU" is grounded). When (T) operates, it grounds lead "ST" (when "ZE" option is used, to start the interrupter or keep it operating). When "ZD" option is used, relay (T) operates to close contacts 5/6T and 3/4B only, operating fully when lead "A" is opened. Relay (T) locks to (P2) thru relay (T). 2-1/2 seconds after ground is removed from lead "A", the "A" lead is again grounded or 2 seconds after lead "PKU" is opened, ground is connected to lead "INT". Either of these leads thru a make contact of (T), operates (T1).

Relay (T1) operated, locks to off normal ground, releases (T) and connects positive coin battery to relay (I) instead of negative. If (P2) releases before (T) operates, (T1) is released and the above sequence of operation will be repeated when (P2) again operates. Fig. F thus insures against false charging when busy flashes or other transients conditions operate (P2). During the interval from the time that the coin is collected by the associated coin collect and monitor circuit after 4-1/2 minutes of conversation until the 5 minutes period is reached, battery is removed from the (T1) relay allowing it to release so that if the subscriber disconnects during this interval, any coin deposited will be returned by this circuit.

9. CALL NOT CHARGED

If the line current is not reversed (P), (K) and (K1) will not operate and the circuit remains in a condition to return the coin when the calling party disconnects. On this type of call, (A) does not operate and the (A) and (B) condensers placed in the tip and ring leads provide the talking circuit, and relay (R) and retardation coil (T) provide the talking battery and ground supply.

10. DISCONNECT

10.1 Call Charged ((C) Relay Operated)

When the calling subscriber disconnects, the line finder is still held operated by ground at the contacts of (HH). (S) and (A) release when ground is removed from the selector sleeve and cause (X) to operate under control of a ground interruption on lead "D", lighting the green alarm lamp (A). Ground is intermittently and alternately connected to leads "P" and "I" for an interval of 1/2 second duration each. This feature is used to cause the coin control battery of this circuit, as described later, to be connected to the subscriber's line for 1/2 second duration and thereby insure sufficient time for proper operation of the coin box magnet. (Y) operated locks under control of (HH) and connects battery to the winding of (B) which operates when ground is received on the "I" lead. If the called subscriber should hang up before the calling subscriber, the line current is reversed when the called station disconnects, operating (P) and releasing (P1). (P) operated with (P1) released short-circuit the winding of (J) causing it to release. (J) released releases (K) and short-circuits (P). (P1) operated and (K) released release (K1). (J) released places the (P) relay again on the ground side of the line. If the calling party disconnects first, (J), (K) and (K1) and with Fig. B or F, (T) release when (HH) releases (see 11.2).

10.2 Noncharge Call ((C) Relay Normal)

When the calling station disconnects (R) releases, releasing (D) and (DD), and opens the loop to the succeeding switches. After an interval ground is removed from the sleeve of the selector. From this point on, the circuit functions as described in the preceding paragraph, except the (J), (K) and (K1) will not have been operated.

11. COIN CONTROL

11.1 The operation of (B) connects positive or negative coin battery to the line to dispose of the coin. If the coin is to be collected, positive battery is connected to the winding of (I) through the front contact of (C) and with Fig. B or Fig. F through front contact of (T1). The operation of a relay in the timing circuit, after extending the talking circuit through the trunk finder and associated coin collect circuit grounds the "G" lead through contacts 4/5B of relay (T1), holds relay (S) operated and grounds the sleeve to prevent the connection from releasing until the coin collect circuit has collected the coin. If the coin is to be

STEP-BY-STEP SYSTEMS
NO. 1, 350A, 355A, 360A or 35E97
COIN TRUNK CIRCUIT
FOR USE PRECEDING A FIRST SELECTOR SERVING PREPAYMENT COIN LINES ARRANGED FOR DELAYED CHARGING AND OVERTIME CHARGING

CHANGES

B. CHANGES IN APPARATUS

B.1 Added

Figure 4
U114 (LL) Relay

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 Figure 4 is added to facilitate the use of this circuit with a Subscribers Rotary Line Ckt. equipped with a Dial Long Line Ckt.

1. PURPOSE OF CIRCUIT

1.1 This circuit is used to provide dial servide to prepayment coin stations. It is arranged to automatically collect or return the coin deposited as required, after each call. When Fig. B is used, it is arranged to delay setting up the charge condition until 2 to 5 seconds after the called party answers. It functions with circuits arranged to time the call and collect the coin for each five minute interval of conversation.

2. WORKING LIMITS

2.1 Maximum external circuit loop resistance for subscriber's pulsing and supervision - See Range Chart.

2.2 Earth Potential Limits:

Relay (P)

Neg. Limit — Maximum 10V

	Min. Conduc. Lp.	Max. Pos. E.P.
Positive Limits	0 Ohms	9.5 V
	105 "	10 "
	220 "	10.5 "
	320 "	11 "
	425 "	11.5 "
	530 "	12 "

2.3 Minimum Insulation Resistance - 20,000 Ohms.

3. FUNCTIONS

3.01 To provide for connecting a prepayment coin station to a first selector or selector repeater.

3.02 To provide for transmitting dial tone from the selector circuit to the calling subscriber.

3.03 To test for the presence of a coin in the coin box.

3.04 To repeat dial pulses after the coin is deposited.

3.05 To automatically return the coin on all uncompleted calls and on completed calls on which there is no charge.

3.06 To automatically collect the coin on completed calls to stations on which a charge is to be made.

3.07 To automatically collect the coin on completed calls to the special service operator unless the operator otherwise disposes of the coin before disconnecting.

3.08 To cut out the coin test and pulse repeating equipment when preceded by a long line circuit.

3.09 With Fig. B, to defer setting up the charge condition until 2 to 5 seconds after answer by the called party.

3.10 To indicate a trunk which has failed to dispose of a coin.

3.11 To start the associate timer when the called party answers on local charge calls.

3.12 To extend the talking circuit to the associated coin collect and monitor circuit.

3.13 To provide direct ground to the A lead in Fig. 2 in offices equipped with CAMA trunk.

4. CONNECTING CIRCUITS

When this circuit is shown on a keysheet, the connecting information thereon shall be followed.

		No. 1 or 350A	360A	No. 355A	35E97
4.01	Line Finder Circuit	SD-31530-01*	SD-31530-01	SD-32000-01*	SD-32000-01
4.02	Selector Circuit	SD-30200-01*	SD-30200-02*	SD-31735-01*	SD-30910-01*
4.03	Interrupter and Alarm Circuit for Prepay Coin Trunks	SD-30852-01*	SD-31975-01	SD-31975-01	SD-31975-01
4.04	Coin Trunk Timed Release Circuit	SD-31861-01	SD-31861-01	SD-31861-01	SD-31861-01
4.05	Subline Circuit Equipped with Rotary Line Switch	SD-31259-01	SD-31259-01	SD-31259-01	
4.06	Miscellaneous Alarm Circuit for Prepayment Coin Box Trunks		SD-31978-01	SD-31978-01	SD-31978-01
4.07	Selector Repeater	SD-31914-01*		SD-31914-01*	
4.08	Pulsing Test Set	SD-90469-02	SD-90469-02	SD-31858-01	SD-31858-01
4.09	Timing Circuit for Coin Trunks	SD-31893-01 or Special SD-32115-01		SD-31893-01 or Special SD-32115-01	
4.10	Interrupter and Alarm Circuit to Provide a Delay Interval for Use with 804C Ringing Power Plant	SD-32180-01		SD-32180-01	

*Typical Circuit

DESCRIPTION OF OPERATION

5. ORIGINATING A CALL

The following description applies to "S" wiring or to "T" wiring on calls not originating on lines equipped with long line circuits. When "T" wiring is used, leads "E" and "F" are normally connected through normal post springs of the line finder or if Figure 4 is used, springs 2 and 3T(LL), except on levels on which long line circuits are used.

When a prepayment coin station is connected to this circuit by a preceeding circuit relay (L) operates over the subscriber's loop, in turn operating (N) and (DD). (N) operated operates (NN), which closes the circuit to the associated first selector operating relay (P1), provides a holding circuit for (DD); and changes from battery to the ring through the noninductive winding of (RT) to battery through the operating winding of (RT) and the primary winding of (BT). It also removes ground from relay (L), secondary winding, which then holds in series with the 6000 ohm winding of (BT), but (BT) does not operate at this time. Relay (DD) operated connects ground to the sleeve lead to hold the line finder. When the (C) retardation coil is connected across the tip and ring leads by the operation of (DD), the (A) relay in the first selector operates and an associated common shelf relay completes the dial tone path to the line through a winding of the (A) relay of the selector. The dial tone path is closed to the calling subscriber through resistances (B) and (C) when "Z" option is used. Otherwise, it is not closed until the coin is deposited, as described in Paragraph 6.

6. COIN DEPOSITED

When the coin is deposited by the calling subscriber, (RT) operates, operating (S), which locks to battery through its front contacts, operates (H) and (HH), supplies dial tone to the calling subscriber, if not already supplied through "Z" option, connects (R) to the ring of the line and removes battery from (RT) which releases and from the 29 ohm winding of relay (L), which, however is held operated by the 800 ohm winding for a time. (R) operated operates (D) and closes a path for holding the (A) relay of the first selector when (NN) releases. (D) operated holds (DD) operated (H) operated takes over the control of (HH) from (S). (HH) operated, releases (N) and (NN), separates the sleeves of the line

STEP BY STEP SYSTEMS
NO. 1, 350A, 355A, 360A OR 35E97
COIN TRUNK CIRCUIT
FOR USE PRECEDING A FIRST SELECTOR
SERVING PREPAYMENT COIN LINES
ARRANGED FOR DELAYED CHARGING
AND OVERTIME CHARGING

CHANGES

B. CHANGES IN APPARATUS

B.1 Superseded	Superseded by
111A - 60-ohm Resistor, "ZO" Option	227C - 59-ohm Resistor, "ZP" Option

D. DESCRIPTION OF CHANGES

D.1 The Mfr Disc. 111A 60-ohm resistor ("ZO" option) is superseded by the 227C 59-ohm resistor ("ZP" option).

D.2 Circuit Note 103 and the Options Used Table are revised to reflect this change.

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DEPT 6261-PJH-AFB

STEP-BY-STEP SYSTEMS
NO. 1, 350A, 355A, 360A OR 35E97
COIN TRUNK CIRCUIT
FOR USE PRECEDING A FIRST SELECTOR
SERVING PREPAYMENT COIN LINES
ARRANGED FOR DELAYED CHARGING
AND OVERTIME CHARGING

CHANGES

D. DESCRIPTION OF CHANGES

D.1 In Fig. A and B at leads "S", "R", and "T", "or to trunk circuit" is added to the connecting information. In Fig. E and F at leads "A", "S", "R", and "T", "or to trunk circuit" is added to the connecting information.

F. CHANGES IN CD SECTIONS

F.1 Change 3.02 to read, "to provide for transmitting dial tone from the selector, TOUCH-TONE Converter or Originating Register Circuit to the calling subscriber."

F.2 Under 4., Connecting Circuits, add:

4.11 Converter Trunk - TOUCH-TONE Calling - SD-32326-01.

4.12 Register Trunk and Link - SD-32353-01 (Trunk Portion).

F.3 In 5., second subparagraph, add the following after the fifth sentence: "When this circuit is connected to a TOUCH-TONE converter or Common Control originating register, the return of dial tone is under control of these circuits."

F.4 Change the heading of 7. to read "PULSING" and number the present subparagraph:

7.1 Rotary Dial Calling

F.5 Add:

7.2 TOUCH-TONE Calling

On TOUCH-TONE calls, the R relay remains operated during transmission of tones and does not operate and release as in the case of rotary dialing. The TOUCH-TONE signals are translated into dial pulses by the converter or originating register and then transmitted to the selector.

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DEPT 2363-RJJ-GO

STEP BY STEP SYSTEMS
NO. 1, 350A, 355A, 360A OR 35E97
COIN TRUNK CIRCUIT
FOR USE PRECEDING A FIRST SELECTOR
SERVING PREPAYMENT COIN LINES
ARRANGED FOR DELAYED CHARGING
AND OVERTIME CHARGING

CHANGES

C. CHANGES IN CIRCUIT REQUIREMENTS OTHER THAN THOSE CAUSED BY CHANGES IN APPARATUS

C.1 Circuit requirement Note 3, Page 1 and circuit requirement Note 7, Page 4 are removed and replaced by a new note. The removed note read: When operating on lead "A", relay DD should remain normal. If it tends to operate, stiffen relay D within present limits.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 2363-CEH-RJJ

STEP-BY-STEP SYSTEMS
NO. 1, 350A, 355A, 360A OR 35E97
COIN TRUNK CIRCUIT
FOR USE PRECEDING A FIRST SELECTOR
SERVING PREPAYMENT COIN LINES
ARRANGED FOR DELAYED CHARGING
AND OVERTIME CHARGING

CHANGES

A. Changed and Added Functions

A.1 Permits identification of calling number where ANI-type B or ANI-type C is provided.

B. Changes in Apparatus

B.1 ADDED

1-426F Diode, Option ZQ

D. Description of Changes

D.1 The Feature or Option Table, Note 102, is revised to show that option ZN is also for use with ANI-type B offices.

D.2 Option ZQ is added to allow this circuit to operate with ANI-type C offices. Reference to this option is added to the Options Used Table and Notes 102 and 103.

D.3 Option ZR shows the former wiring, and is designated for use when option ZQ is not required. Reference to this option is added to the Options Used Table and Notes 102 and 103.

D.4 The CL capacitor had previously been designated for use only with option ZN.

D.5 Note 102 is modified to show that ANI-type C cannot be used with the class-of-service tone feature in 35E97 offices.

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DEPT 2363-RJA-RJJ

STEP BY STEP SYSTEMS
NO. 1, 350A, 355A, 360A OR 35E97
COIN TRUNK CIRCUIT
FOR USE PRECEDING A FIRST SELECTOR
SERVING PREPAYMENT COIN LINES
ARRANGED FOR DELAYED CHARGING
AND OVERTIME CHARGING

CHANGES

D. Description of Changes

D.1 This circuit is reissued to rate it A&M Only for 350A offices.

D.2 This circuit is reissued to clarify Note 102 in regard to the use of options when connection is made to ANI type B or C.

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DEPT 2363-NPS-RJJ,Jr.

STEP BY STEP SYSTEMS
NO. 1, 350A, 355A, 360A OR 35E97
COIN TRUNK CIRCUIT
FOR USE PRECEDING A FIRST SELECTOR
SERVING PREPAYMENT COIN LINES
ARRANGED FOR DELAYED CHARGING

CHANGES

D. Description of Changes

D.1 Circuit Note 102 is revised to clarify the use of options when connection is made to class of service tone or ANI-type B or C.

D.2 Note 301 is added to the circuit to supplement this revision.

D.3 Fig. E and F are rated Mfr Disc. on this issue and so designated in Note 103.

D.4 Fig. 56 and 57 are revised to reflect the change in rating of Fig. E and F and Note 207 is added.

D.5 Reference to Fig. E and F is removed from Note 102.

D.6 Options ZD, ZE,and ZJ are rated Mfr Disc. and reference to them is removed from Note 102, in conjunction with the rating change of Fig. E and F.

D.7 Option ZG is rated Mfr Disc. on this issue and shown in Note 103.

D.8 Reference to overtime charging is removed from the circuit title on this issue.

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DEPT 2363-WCB-RJJ

Dept 1141 JUL 2 196

CD-31592-02
ISSUE 9D
APPENDIX 7D
DWG ISSUE 28D

STEP BY STEP SYSTEMS
NO. 1, 350A, 355A, 360A, OR 35E97
COIN TRUNK CIRCUIT
FOR USE PRECEDING A FIRST SELECTOR
SERVING PREPAYMENT COIN LINES
ARRANGED FOR DELAYED CHARGING

CHANGES

A. Changes and Added Functions

A.1 Permits immediate ANI identification of calling line when calling line identification is provided.

B. Changes in Apparatus

B.1 Added

B Diode 426F, Fig. 1, Option ZT
Wire Option ZT and ZS, Fig. 1

D. Description of Changes

D.1 Option ZT is added to give calling line identification equipment access to coin box tip, ring, and sleeve leads.

D.2 Diode B is added to decouple all sleeve holding grounds from the point at which the ANI tone is applied.

D.3 Option ZS shows former wiring and is rated Mfr Disc.

F. Changes in Circuit Description

F.1 Under DESCRIPTION OF OPERATION, add:

22. CALLING LINE IDENTIFICATION (CLI)

Option ZT is added to give the CLI scanner access to the tip, ring, and sleeve leads.

Diode B provides for ANI identification of the calling coin station before disconnect. The CLI equipment applies a sufficient dc potential to the scanner sleeve access lead to back bias diode B. This decouples all sleeve holding grounds from the ANI circuit during the identification process.

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DEPT 5643-GHP-MR

returned, the negative battery is connected to the line through the front contact of (B) or (HH) and the back contact of relay (T1) and front contact of (C) with Fig. B or F, through the winding of (I). (I) now operates in series with the coin magnet and remains operated during the time that the battery is connected to the line. Battery through the coin magnet should cause disposal of the coin, but the magnet will hold ground on the tip of the line as long as it is operated. The operation of (I) connects battery to hold (H) operated since the operating circuit for this relay is opened when (B) operates. When the "I" lead ground is removed (B) releases, removing the coin collect or return current, releasing (I) and holding (H) operated. At the next closure of ground to the "I" lead (B) reoperates, connecting coin disposal current to the line. The coin should have been disposed of on the first application of the potential, which upon the removal of the potential, restores the coin magnet to normal, and no current should flow through (I) on the subsequent application of the coin potential.

11.2 Release of Circuit - "A" or "G" Option

With (B) operated and (1) normal (H) releases, releasing (HH) which (a) removes ground from the line finder sleeve, (b) releases (B), (Y), and also (C), (K), (K1) and (T1) if operated, (c) connects battery to "RB1" of (RT), (d) opens leads "CT" and "CT1", and (e) removes battery from lead "A". The release of (B) connects the incoming tip and ring to relay (L) thus restoring the circuit to normal.

11.3 Release of Circuit - "F" Option

The circuit functions as described in the preceding paragraph except that when (HH) releases (B) remains locked to lead "I", and (HH) removes the coin return battery from 5B(C) with Figs. A, B or E furnished or 3(C) with Fig. F. Thus (B) remains operated for approximately 1/2 second until ground is removed from lead "I". This insures sufficient time for the line finder cut through relay to release before the incoming tip and ring are connected to relay (L).

12. STUCK COIN

12.1 "X" Wiring

If for any reason the coin is not properly disposed of, (B) continues to function under control of the "I" lead ground. After an interval of time the associated alarm circuit will indicate a trouble condition by audible and visual alarms.

12.2 "Y" Wiring

"Y" wiring provides a connection to battery on the "IB" lead in the associated "Coin Trunk Timed Release Circuit". When this circuit is used the continued attempts of the Coin Trunk Circuit to dispose of the coin are limited by the timing of the Release Circuit. At the end of the time period battery is removed from the "IR" lead and the circuit functions as though the coin had been disposed of, restoring to normal as described in Paragraph 11.

13. CALLS TO SPECIAL SERVICE OPERATOR

On calls to a special service operator, the selector level trunk is so arranged that battery and ground are reversed immediately when the operator answers. This causes the circuit to function as described in Paragraph 8. If coin collect current is supplied to the line from the trunk, (P) remains released and (P1) releases. If coin return current is applied to the line from the trunk, (P) operates and (P1) remains operated. Neither relay performs a useful function at this time.

On a rering by the special service operator, (P) may operate on ringing current. If (P) remains operated due to earth potential with (P1) released it shunts down (J). (J) released releases (K) and short-circuits (P). The earth potential which may have held (P) will not operate if after the short circuit is removed. The release of (J) also reverses the tip and ring operating (P1) which shunts down (K1).

14. CONTACT PROTECTION

Resistances (D) and (F) at relay (DD) are connected to the "A" and "B" condensers during the application of coin battery to the line and in this connection are used to protect the contacts which control the application of this battery to the coin magnet. Condenser (D) and resistance (E) are used to protect the pulsing contacts of relay (R).

15. OPERATION WHEN "T" WIRING IS USED

The "T" wiring is used only when the lines on certain levels in the associated line finder group are equipped with long line circuits. The line finders are then equipped with normal post springs that operate on the multiple bank levels on which all the working lines are provided with long line circuits. When the normal post springs on the line finder operate, leads "E" and "F", (which are connected together when the finder is normal for the purpose of making the finder busy by grounding the sleeve at the associated first selectors) are opened and lead "F" is connected to lead "A". When a call is originated the long line circuit closes a bridge across the tip and ring which operates (L). (L) operates (N) and (DD). (N) operates (NN). (NN) closes a bridge across the tip and ring toward the first selector. The only useful function of (DD) at this time is that it grounds the

sleeve so as to hold the line finder until (HH) operates. The bridge across the tip and ring causes the operation of relays in the first selector that supply a holding ground over the "S" lead. When ground is returned over the "S" lead from the first selector (A) and (S) operate (relay (A) operating over the "A" and "F" leads in turn operating (S) which locks to the sleeve). The operation of (A) closes the tip and ring through from the long line circuit to the first selector, operates (P1) and allows (L), (N), (NN) and (DD), to release. The operation of (S) operates (H) and (HH). (H) locks under control of (B). The test for presence of the coin at the substation is made in the long line circuit and therefore (RT) and (BT) do not enter into the circuit operation on this call; similarly, the dial pulses are repeated in the long line circuit so that (R) is not used. When the call is answered (P) operates, (P1) releases, and circuit functions as described in the first paragraph of Section 8. However the only useful function in the operation of (P) and release of (P1) is to operate (C), which locks to the sleeve and sets the circuit in a position to collect the coin when the subscriber disconnects. When the calling subscriber disconnects the circuit functions as described under Section 10. If the call is answered (C) is operated causing coin collect current to be applied to the line and if the call is not answered (C) is normal and coin return current is then applied to the line. On calls to the special service operator (P) operates and (P1) releases which operates (C) and sets the circuit in a position to collect the coin when the subscriber disconnects. The operation of (J), (K) and (K1) serves no useful function on this type of call because the repeating coil in the long line circuit prevents the coin ground from grounding the tip conductor in this circuit.

16. TEST JACKS

(T) Jack

Insertion of a plug in jack (T) grounds the "S" lead toward the line finder, making that circuit busy.

16.2 (TT) Jack

Pulse Repeating tests of relay (R) are made by connecting the pulsing test set to jacks (T) and (TT). (TT) cuts off the associated selector and provides locking ground for relay (S). Momentary operation of key (SC) in all but the earliest pulse repeating test sets operates (RT) and in turn (S). Where the pulse repeating test set is not so arranged, (RT) must be momentarily operated manually.

16.3 (OT) Jack

The (OT) jack is provided for the purpose of controlling the operation of the coin collect and monitor circuit when testing without waiting for the timer to time out the 4-1/2 minute and 5 minute intervals. The (OT) jack may also be used to check the accuracy of the timer.

17. CLASS OF SERVICE TONE-LINE NO. METHOD OF COIN CONTROL - FIG. 2

Where the line number method of coin control is used, a class of service tone is required. This is provided by Fig. 2.

18. CUT-OFF KEYS FOR A, I AND P LEADS FIG. 3

If the A lead becomes accidentally grounded, no alarm will be sounded, and the interrupter circuit will not start. If the P lead is grounded, the first coin pulse may be short, resulting in a stuck coin condition at the coin box. If the P lead is grounded, the coin trunk will not release at the end of the call.

To aid in locating such troubles, the A. I. and P. leads are carried thru the key of Fig. 3, which will isolate the trunks in groups of 10. To guard against leaving the key inadvertently operated, a guard lamp is associated with the key.

19. USE IN OFFICES EQUIPPED WITH CAMA TRUNKS - FIG. 2 ("ZH" OPTION)

Direct ground is required on "A" lead to restrict coin lines from CAMA trunks.

20. CLASS OF SERVICE TONE 35-E-97 ONLY (ZN OPTION)

The (CL) retard coil and (CL) capacitor are arranged to permit a number checking tone which may be connected to the sleeve of the subscriber's line to be transmitted to the operator to indicate the class of service.

from (S). (HH) operated, releases (N) and (NN), separates the sleeves of the line finder and first selector and supplements the ground on the sleeve from (DD) to the line finder, and with "F" option connects coin return battery to relay (C). (N) released short-circuits (L), releasing it. (N) and (NN) are slow in releasing in order to insure that (R) is fully operated before (NN) releases and opens the bridge to the first selector, in case (L) releases when the coin is deposited.

The purpose of the (BT) relay is to block the operation of the coin trunk in case of an irregular condition on the line. The operation is as follows: (BT) operated locks to the sleeve through its tertiary winding and resistance J (the function of which is to prevent (BT) from overheating on its tertiary winding) and opens the circuit to (S) preventing its operation and preventing dialing. It is necessary for the calling subscriber to hang up his receiver after the irregular condition ceases before a further attempt can be made on the call.

7. DIALING

Relay (R) functions to repeat pulses from the subscriber's dial to the first selector. (D) is slow in operating and releases on the first dial pulse, and remains released during the pulsing of each digit. This causes (DD) to remain normal during the pulsing of each digit to aid the pulsing condition.

8. CALL CHARGED

8.1 No Delayed or Overtime Charging - Fig. A

If the call is one on which a charge should be made, the line current is reversed when the called party answers, operating (P) and releasing (P1) which was previously operated. With (P1) released and (P) operated, (J) and (C) operate and lock. The (J) relay operated operates (K), reverses the tip and ring leads from the first selector and short-circuits (P) which releases. The reversal of the tip and ring leads causes (P1) to operate. (K) operates (K1) through the front contact of (P1). (K1) operated locks and removes the short circuit from (P). If due to an irregular operation at the called station battery and ground again reverse before (K1) operates, (P1) will release, but (K1) will operate through the back contact of (P).

Relay (C) operated locks and operates (A) and also sets the circuit so as to collect the coin when the calling subscriber disconnects. Relay (A) operated disconnects the tip and ring of the calling line from the (T) retardation coil and (R) relay, releasing (R), and connects the tip and ring through (P) and (P1) to the first selector. (R) released releases (D) and in turn (DD). (DD) released performs no useful function at this time. The reversal of the line by the operation of (J) is necessary to keep the tip side of the line, which is grounded at the station as long as a coin is in the box, always connected through relay (P) to the ground side of the connection.

8.2 With Delayed Charging and No Overtime - Fig. B

With Fig. B the operation is as described in Par. 8.1 except that the operation of (C), instead of connecting positive coin battery to relay (I) connects that relay to the 2B spring of (T1), and the relays of Fig. B function as follows:

When the called subscriber answers (P2) operates, in turn closing the circuit of (T) to lead "PKU" or "A". This lead is grounded for 1/2 second once every 3 seconds (except that when the interrupter circuit is not in use, lead "PKU" is grounded). When (T) operates, it grounds lead "ST" (when "J" option is used, to start the interrupter or to keep it operating). When "H" option is used, (T) operates to close contacts 5/6T and 3/4B only, operating fully when lead "A" is opened. (T) locks to (P2) thru (T1). 2-1/2 seconds after ground is removed from lead "A", this lead is again grounded or 2 seconds after lead "PKU" is opened, ground is connected to lead "INT". Either of these thru a make contact of (T), operates (T1).

(T1) operated locks to off normal ground, releases (T), and connects positive coin battery to relay (I) instead of negative. If (P2) releases before (T) operates, (T1) is released and the above sequence of operations will be repeated when (P2) again operates. Fig. B thus insures against false charging when busy flashes or other transient conditions operate (P2).

8.3 Overtime Charging With No Delay Charging - Fig. E

With Fig. E the operation is as described in Par. 8.1 except that the operation of relay (C) grounds the "C" and "B" leads for the purpose of starting the associated timer. Relay (C) locks under control of the timing circuit "F" lead, operates relay (A) and also sets the circuit so as to collect the coin when the calling subscriber disconnects. The start relay in the timing circuit locks to lead "B". During the interval from the time that the coin is collected by the associated coin

collect and monitor circuit after 4-1/2 minutes of conversation until the 5 minutes period is reached, battery is removed from the "F" lead allowing relay (C) to release so that if the subscriber disconnects during this interval, any coin deposited will be returned by this circuit. Relay (A) operated disconnects the tip and ring of the calling line from the (T) retard coil and (R) relay thus releasing (R), and connects the tip and ring thru (P) and (P1) relays to the first selector. Relay (R) released releases (D) and (DD).

8.4 Overtime Charging With Delayed Charging - Fig. F

With Fig. F the operation is the same as described in Par. 8.2 except that the operation of relay (C), instead of connecting positive coin battery to relay (I), connects that relay to the 2B spring of relay (T1), and the relays in Fig. F function as follows:

When the called subscriber answers (P2) relay operates, in turn closing the circuit of (T) to lead "PKU" or "A". This lead is grounded for 1/2 second once every 3 seconds, (except that when the interrupter circiit is not in use, lead "PKU" is grounded). When (T) operates, it grounds lead "ST" (when "ZE" option is used, to start the interrupter or keep it operating). When "ZD" option is used, relay (T) operates to close contacts 5/6T and 3/4B only, operating fully when lead "A" is opened. Relay (T) locks to (P2) thru relay (T). 2-1/2 seconds after ground is removed from lead "A", the "A" lead is again grounded or 2 seconds after lead "PKU" is opened, ground is connected to lead "INT". Either of these leads thru a make contact of (T), operates (T1).

Relay (T1) operated, locks to off normal ground, releases (T) and connects positive coin battery to relay (I) instead of negative. If (P2) releases before (T) operates, (T1) is released and the above sequence of operations will be repeated when (P2) again operates. Fig. F thus insures against false charging when busy flashes or other transients conditions operate (P2). During the interval from the time that the coin is collected by the associated coin collect and monitor circuit after 4-1/2 minutes of conversation until the 5 minutes period is reached, battery is removed from the (T1) relay allowing it to release so that if the subscriber disconnects during this interval, any coin deposited will be returned by this circuit.

9. CALL NOT CHARGED

If the line current is not reversed (P), (K) and (K1) will not operate and the circuit remains in a condition to return the coin when the calling party disconnects. On this type of call, (A) does not operate and the (A) and (B) condensers placed in the tip and ring leads provide the talking circuit, and relay (R) and retardation coil (T) provide the talking battery and ground supply.

10. DISCONNECT

10.1 Call Charged ((C) Relay Operated)

When the calling subscriber disconnects, the line finder is still held operated by ground at the contacts of (HH). (S) and (A) release when ground is removed from the selector sleeve and cause (X) to operate under control of a ground interruption on lead "D", lighting the green alarm lamp (A). Ground is intermittently and alternately connected to leads "P" and "I" for an interval of 1/2 second duration each. This feature is used to cause the coin control battery of this circuit, as described later, to be connected to the subscriber's line for 1/2 second duration and thereby insure sufficient time for proper operation of the coin box magnet. (Y) operated locks under control of (HH) and connects battery to the winding of (B) which operates when ground is received on the "I" lead. If the called subscriber should hang up before the calling subscriber, the line current is reversed when the called station disconnects, operating (P) and releasing (P1). (P) operated with (P1) released short-circuit the winding of (J) causing it to release. (J) released releases (K) and short-circuits (P). (P1) operated and (K) released release (K1). (J) released places the (P) relay again on the ground side of the line. If the calling party disconnects first, (J), (K) and (K1) and with Fig. B or F, (T) release when (HH) releases (see 11.2).

10.2 Noncharge Call ((C) Relay Normal)

When the calling station disconnects (R) releases, releasing (D) and (DD), and opens the loop to the succeeding switches. After an interval ground is removed from the sleeve of the selector. From this point on, the circuit functions as described in the preceding paragraph, except the (J), (K) and (K1) will not have been operated.

11. COIN CONTROL

11.1 The operation of (B) connects positive or negative coin battery to the line to dispose of the coin. If the coin is to be collected, positive battery is connected to the winding of (I) through the front contact of (C) and with Fig. B or Fig. F through front contact of (T1). The operation of a relay in the timing circuit, after extending the talking circuit through the trunk finder and associated coin collect circuit grounds the "G" lead through contacts 4/5B of relay (T1), holds relay (S) operated and grounds the sleeve to prevent the connection from releasing until the coin collect circuit has collected the coin. If the coin is to be

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COIN TRUNK CIRCUIT
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ARRANGED FOR DELAYED CHARGING
AND OVERTIME CHARGING

CHANGES

B. CHANGES IN APPARATUS

B.1 Added

(CL) Inductor
274 K
ZN option

(CL) Capacitor
2 M.F.
ZN option

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 Added ZN option to provide class of service tone transmission to the operator in 35-E-97 office.

D.2 Designated ZM option to be used when ZN is not required.

D.3 Revised Notes 102 and 103 to reflect above changes.

All other headings under Changes, no change.

1. PURPOSE OF CIRCUIT

1.1 This circuit is used to provide dial service to prepayment coin stations. It is arranged to automatically collect or return the coin deposited as required, after each call. When Fig. B is used, it is arranged to delay setting up the charge condition until 2 to 5 seconds after the called party answers. It functions with circuits arranged to time the call and collect the coin for each five minute interval of conversation.

2. WORKING LIMITS

2.1 Maximum external circuit loop resistance for subscriber's pulsing and supervision - See Range Chart.

2.2 Earth Potential Limits:

	Relay (P)	
Neg. Limit	Maximum 10V	
	Min. Conduc. Lp.	Max. Pos. E.P.
Positive Limits	0 Ohms	9.5 V
	105 "	10 "
	220 "	10.5 "
	320 "	11 "
	425 "	11.5 "
	530 "	12 "

2.3 Minimum Insulation Resistance - 20,000 Ohms.

3. FUNCTIONS

3.01 To provide for connecting a prepayment coin station to a first selector or selector repeater.

3.02 To provide for transmitting dial tone from the selector circuit to the calling subscriber.

3.03 To test for the presence of a coin in the coin box.

3.04 To repeat dial pulses after the coin is deposited.

3.05 To automatically return the coin on all uncompleted calls and on completed calls on which there is no charge.

3.06 To automatically collect the coin on completed calls to stations on which a charge is to be made.

3.07 To automatically collect the coin on completed calls to the special service operator unless the operator otherwise disposes of the coin before disconnecting.

3.08 To cut out the coin test and pulse repeating equipment when preceded by a long line circuit.

3.09 With Fig. B, to defer setting up the charge condition until 2 to 5 seconds after answer by the called party.

3.10 To indicate a trunk which has failed to dispose of a coin.

3.11 To start the associate timer when the called party answers on local charge calls.

3.12 To extend the talking circuit to the associated coin collect and monitor circuit.

3.13 To provide direct ground to the A lead in Fig. 2 in offices equipped with CAMA trunk.

4. CONNECTING CIRCUITS

When this circuit is shown on a keysheet, the connecting information thereon shall be followed.

	No. 1 or 350A	360A	No. 355A	35E97
4.1 Line Finder Circuit	SD-31530-01*	SD-31530-01	SD-32000-01*	SD-32000-01
4.2 Selector Circuit	SD-30200-01*	SD-30200-02*	SD-31735-01*	SD-30910-01*
4.3 Interrupter and Alarm Circuit for Prepay Coin Trunks	SD-30852-01*	SD-31975-01	SD-31975-01	SD-31975-01
4.4 Coin Trunk Timed Release Circuit	SD-31861-01	SD-31861-01	SD-31861-01	SD-31861-01
4.5 Subline Circuit Equipped with Rotary Line Switch	SD-31259-01		SD-31259-01	
4.6 Miscellaneous Alarm Circuit for Prepayment Coin Box Trunks		SD-31978-01	SD-31978-01	SD-31978-01
4.7 Selector Repeater	SD-31914-01*		SD-31914-01*	
4.8 Pulsing Test Set	SD-90469-02	SD-90469-02	SD-31858-01	SD-31858-01
4.9 Timing Circuit for Coin Trunks	SD-31893-01 or Special SD-32115-01		SD-31893-01 or Special SD-32115-01	
4.10 Interrupter and Alarm Circuit to Provide a Delay Interval for Use with 804C Ringing Power Plant	SD-32180-01		SD-32180-01	

*Typical Circuit

DESCRIPTION OF OPERATION

5. ORIGINATING A CALL

The following description applies to "S" wiring or to "T" wiring on calls not originating on lines equipped with long line circuits. When "T" wiring is used, leads "E" and "F" are normally connected through normal post springs of the line finder except on levels on which long line circuits are used.

When a prepayment coin station is connected to this circuit by a line finder, relay (L) operates over the subscriber's loop, in turn operating (N) and (DD). (N) operated operates (NN), which closes the circuit to the associated first selector operating relay (P1); provides a holding circuit for (DD); and changes from battery to the ring through the noninductive winding of (RT) to battery through the operating winding of (RT) and the primary winding of (BT). It also removes ground from relay (L), secondary winding, which then holds in series with the 6000 ohm winding of (BT), but (BT) does not operate at this time. Relay (DD) operated connects ground to the sleeve lead to hold the line finder. When the (C) retardation coil is connected across the tip and ring leads by the operation of (DD), the (A) relay in the first selector operates and an associated common shelf relay completes the dial tone path to the line through a winding of the (A) relay of the selector. The dial tone path is closed to the calling subscriber through resistances (B) and (C) when "Z" option is used. Otherwise, it is not closed until the coin is deposited, as described in Paragraph 6.

6. COIN DEPOSITED

When the coin is deposited by the calling subscriber, (RT) operates, operating (S), which locks to battery through its front contacts, operates (H) and (HH), supplies dial tone to the calling subscriber, if not already supplied through "Z" option, connects (R) to the ring of the line and removes battery from (RT) which releases and from the 29 ohm winding of relay (L), which, however is held operated by the 800 ohm winding for a time. (R) operated operates (D) and closes a path for holding the (A) relay of the first selector when (NN) releases. (D) operated holds (DD) operated (H) operated takes over the control of (HH)

STEP-BY-STEP SYSTEMS
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AND OVERTIME CHARGING

CHANGES

C. CHANGES IN CIRCUIT REQUIREMENTS OTHER THAN THOSE APPLYING TO ADDED, SUPERSEDED OR REMOVED APPARATUS

C.1 The operate current flow values and the spring gauging of the "S" relay is changed to prevent the false operation of the "BT" relay when used with the 233-type coin station.

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connects (R) to the ring of the line and removes battery from (RT) which releases and from the 29 ohm winding of relay (L), which, however is held operated by the 800 ohm winding for a time. (R) operated operates (D) and closes a path for holding the (A) relay of the first selector when (NN) releases. (D) operated holds (DD) operated (H) operated takes over the control of (HH) from (S). (HH) operated, releases (N) and (NN), separates the sleeves of the line finder and first selector and supplements the ground on the sleeve from (DD) to the line finder, and with "F" option connects coin return battery to relay (C). (N) released short-circuits (L), releasing it. (N) and (NN) are slow in releasing in order to insure that (R) is fully operated before (NN) releases and opens the bridge to the first selector, in case (L) releases when the coin is deposited.

The purpose of the (BT) relay is to block the operation of the coin trunk in case of an irregular condition on the line. The operation is as follows: (BT) operated locks to the sleeve, through its tertiary winding and resistance J (the function of which is to prevent (BT) from overheating on its tertiary winding) and opens the circuit to (S) preventing its operation and preventing dialing. It is necessary for the calling subscriber to hang up his receiver after the irregular condition ceases before a further attempt can be made on the call.

7. DIALING

Relay (R) functions to repeat pulses from the subscriber's dial to the first selector. (D) is slow in operating and releases on the first dial pulse, and remains released during the pulsing of each digit. This causes (DD) to remain normal during the pulsing of each digit to aid the pulsing condition.

8. CALL CHARGED

8.1 No Delayed or Overtime Charging - Fig. A

If the call is one on which a charge should be made, the line current is reversed when the called party answere, operating (P) and releasing (P1) which was previously operated. With (P1) released and (P) operated, (J) and (C) operate and lock. The (J) relay operated operates (K), reverses the tip and ring leads from the first selector and short-circuits (P) which releases. The reversal of the tip and ring leads causes (P1) to operate. (K) operates (K1) through the front contact of (P1). (K1) operated locks and removes the short circuit from (P). If due to an irregular operation at the called station battery and ground again reverse before (K1) operates, (P1) will release, but (K1) will operate through the back contact of (P).

Relay (C) operated locks and operates (A) and also sets the circuit so as to collect the coin when the calling subscriber disconnects. Relay (A) operated disconnects the tip and ring of the calling line from the (T) retardation coil and (R) relay, releasing (R), and connects the tip and ring through (P) and (P1) to the first selector. (R) released releases (D) and in turn (DD). (DD) released performs no useful function at this time. The reversal of the line by the operation of (J) is necessary to keep the tip side of the line, which is grounded at the station as long as a coin is in the box, always connected through relay (P) to the ground side of the connection.

8.2 With Delayed Charging and No Overtime - Fig. B

With Fig. B the operation is as described in Par. 8.1 except that the operation of (C), instead of connecting positive coin battery to relay (I) connects that relay to the 2B spring of (T1), and the relays of Fig. B function as follows:

When the called subscriber answers (P2) operates, in turn closing the circuit of (T) to lead "PKU" or "A". This lead is grounded for 1/2 second once every 3 seconds (except that when the interrupter circuit is not in use, lead "PKU" is grounded). When (T) operates, it grounds lead "ST" (when "J" option is used, to start the interrupter or to keep it operating). When "H" option is used, (T) operates to close contacts 5/6T and 3/4B only, operating fully when lead "A" is opened. (T) locks to (P2) thru (T1). 2-1/2 seconds after ground is removed from lead "A", this lead is again grounded or 2 seconds after lead "PKU" is opened, ground is connected to lead "INT". Either of these thru a make contact of (T), operates (T1).

(T1) operated locks to off normal ground, releases (T), and connects positive coin battery to relay (I) instead of negative. If (P2) releases before (T) operates, (T1) is released and the above sequence of operations will be repeated when (P2) again operates. Fig. B thus insures against false charging when busy flashes or other transient conditions operate (P2).

8.3 Overtime Charging with No Delay Charging - Fig. E

With Fig. E the operation is as described in Par. 8.1 except that the operation of relay (C) grounds the "C" and "B" leads for the purpose of starting the associated timer. Relay (C) locks under control of the timing circuit "F" lead, operates relay (A) and also sets the circuit so as to collect the coin when the calling subscriber disconnects. The start relay in the timing circuit locks to lead "B". During the interval from the time that the coin is collected by the associated coin

collect and monitor circuit after 4-1/2 minutes of conversation until the 5 minutes period is reached, battery is removed from the "F" lead allowing relay (C) to release so that if the subscriber disconnects during this interval, any coin deposited will be returned by this circuit. Relay (A) operated disconnects the tip and ring of the calling line from the (T) retard coil and (R) relay thus releasing (R), and connects the tip and ring thru (P) and (P1) relays to the first selector. Relay (R) released releases (D) and (DD).

8.4 Overtime Charging with Delayed Charging - Fig. F

With Fig. F the operation is the same as described in Par. 8.2 except that the operation of relay (C), instead of connecting positive coin battery to relay (I), connects that relay to the 2B spring of relay (T1), and the relays in Fig. F function as follows:

When the called subscriber answers (P2) relay operates, in turn closing the circuit of (T) to lead "PKU" or "A". This lead is grounded for 1/2 second once every 3 seconds, (except that when the interrupter circuit is not in use, lead "PKU" is grounded). When (T) operates, it grounds lead "ST" (when "ZE" option is used, to start the interrupter or keep it operating). When "ZD" option is used, relay (T) operates to close contacts 5/6T and 3/4B only, operating fully when lead "A" is opened. Relay (T) locks to (P2) thru relay (T). 2-1/2 seconds after ground is removed from lead "A", the "A" lead is again grounded or 2 seconds after lead "PKU" is opened, ground is connected to lead "INT". Either of these leads thru a make contact of (T), operates (T1).

Relay (T1) operated, locks to off normal ground, releases (T) and connects positive coin battery to relay (I) instead of negative. If (P2) releases before (T) operates, (T1) is released and the above sequence of operations will be repeated when (P2) again operates. Fig. F thus insures against false charging when busy flashes or other transients conditions operate (P2). During the interval from the time that the coin is collected by the associated coin collect and monitor circuit after 4-1/2 minutes of conversation until the 5 minutes period is reached, battery is removed from the (T1) relay allowing it to release so that if the subscriber disconnects during this interval, any coin deposited will be returned by this circuit.

9. CALL NOT CHARGED

If the line current is not reversed (P), (K) and (K1) will not operate and the circuit remains in a condition to return the coin when the calling party disconnects. On this type of call, (A) does not operate and the (A) and (B) condensers placed in the tip and ring leads provide the talking circuit, and relay (R) and retardation coil (T) provide the talking battery and ground supply.

10. DISCONNECT

10.1 Call Charged ((C) Relay Operated)

When the calling subscriber disconnects, the line finder is still held operated by ground at the contacts of (HH). (S) and (A) release when ground is removed from the selector sleeve and cause (X) to operate under control of a ground interruption on lead "D", lighting the green alarm lamp (A). Ground is intermittently and alternately connected to leads "P" and "I" for an interval of 1/2 second duration each. This feature is used to cause the coin control battery of this circuit, as described later, to be connected to the subscriber's line for 1/2 second duration and thereby insure sufficient time for proper operation of the coin box magnet. (Y) operated locks under control of (HH) and connects battery to the winding of (B) which operates when ground is received on the "I" lead. If the called subscriber should hang up before the calling subscriber, the line current is reversed when the called station disconnects, operating (P) and releasing (P1). (P) operated with (P1) released short-circuit the winding of (J) causing it to release. (J) released releases (K) and short-circuits (P). (P1) operated and (K) released release (K1). (J) released places the (P) relay again on the ground side of the line. If the calling party disconnects first, (J), (K) and (K1) and with Fig. B or F, (T) release when (HH) releases (see 11.2).

10.2 Noncharge Call ((C) Relay Normal)

When the calling station disconnects (R) releases, releasing (D) and (DD), and opens the loop to the succeeding switches. After an interval ground is removed from the sleeve of the selector. From this point on, the circuit functions as described in the preceding paragraph, except the (J), (K) and (K1) will not have been operated.

11. COIN CONTROL

11.1 The operation of (B) connects positive or negative coin battery to the line to dispose of the coin. If the coin is to be collected, positive battery is connected to the winding of (I) through the front contact of (C) and with Fig. B or Fig. F through front contact of (T1). The operation of a relay in the timing circuit, after extending the talking circuit through the trunk finder and associated coin collect circuit grounds the "G" lead through contacts 4/5B of relay (T1), holds relay (S) operated and grounds the sleeve to prevent the connection from releasing until the coin collect circuit has collected the coin. If the coin is to be

returned, the negative battery is connected to the line through the front contact of (B) or (HH) and the back contact of relay (T1) and front contact of (C) with Fig. B or F, through the winding of (I). (I) now operates in series with the coin magnet and remains operated during the time that the battery is connected to the line. Battery through the coin magnet should cause disposal of the coin, but the magnet will hold ground on the tip of the line as long as it is operated. The operation of (I) connects battery tohold (H) operated since the operating circuit for this relay is opened when (B) operates. When the "I" lead ground is removed (B) releases, removing the coin collect or return current, releasing (I) and holding (H) operated. At the next closure of ground to the "I" lead (B) reoperates, connecting coin disposal current to the line. The coin should have been disposed of on the first application of the potential, which upon the removal of the potential, restores the coin magnet to normal, and no current should flow through (I) on the subsequent application of the coin potential.

11.2 Release of Circuit - "A" or "G" Option

With (B) operated and (1) normal (H) releases, releasing (HH) which (a) removes ground from the line finder sleeve, (b) releases (B), (Y), and also (C), (K), (K1) and (T1) if operated, (c) connects battery to "RB1" of (RT), (d) opens leads "CT" and "CT1", and (e) removes battery from lead "A". The release of (B) connects the incoming tip and ring to relay (L) thus restoring the circuit to normal.

11.3 Release of Circuit - "F" Option

The circuit functions as described in the preceding paragraph except that when (HH) releases (B) remains locked to lead "I", and (HH) removes the coin return battery from 5B(C) with Figs. A, B or E furnished or 3(C) with Fig. F. Thus (B) remains operated for approximately 1/2 second until ground is removed from lead "I". This insures sufficient time for the line finder cut through relay to release before the incoming tip and ring are connected to relay (L).

12. STUCK COIN

12.1 "X" Wiring

If for any reason the coin is not properly disposed of, (B) continues to function under control of the "I" lead ground. After an interval of time the associated alarm circuit will indicate a trouble condition by audible and visual alarms.

12.2 "Y" Wiring

"Y" wiring provides a connection to battery on the "IB" lead in the associated "Coin Trunk Timed Release Circuit". When this circuit is used the continued attempts of the Coin Trunk Circuit to dispose of the coin are limited by the timing of the Release Circuit. At the end of the time period battery is removed from the "IR" lead and the circuit functions as though the coin had been disposed of, restoring to normal as described in Paragraph 11.

13. CALLS TO SPECIAL SERVICE OPERATOR

On calls to a special service operator, the selector level trunk is so arranged that battery and ground are reversed immediately when the operator answers. This causes the circuit to function as described in Paragraph 8. If coin collect current is supplied to the line from the trunk, (P) remains released and (P1) releases. If coin return current is applied to the line from the trunk, (P) operates and (P1) remains operated. Neither relay performs a useful function at this time.

On a rering by the special service operator, (P) may operate on ringing current. If (P) remains operated due to earth potential with (P1) released it shunts down (J). (J) released releases (K) and short-circuits (P). The earth potential which may have held (P) will not operate if after the short circuit is removed. The release of (J) also reverses the tip and ring operating (P1) which shunts down (K1).

14. CONTACT PROTECTION

Resistances (D) and (F) at relay (DD) are connected to the "A" and "B" condensers during the application of coin battery to the line and in this connection are used to protect the contacts which control the application of this battery to the coin magnet. Condenser (D) and resistance (E) are used to protect the pulsing contacts of relay (R).

15. OPERATION WHEN "T" WIRING IS USED

The "T" wiring is used only when the lines on certain levels in the associated line finder group are equipped with long line circuits. The line finders are then equipped with normal post springs that operate on the multiple bank levels on which all the working lines are provided with long line circuits. When the normal post springs on the line finder operate, leads "E" and "F", (which are connected together when the finder is normal for the purpose of making the finder busy by grounding the sleeve at the associated first selectors) are opened and lead "F" is connected to lead "A". When a call is originated the long line circuit closes a bridge across the tip and ring which operates (L). (L) operates (N) and (DD). (N) operates (NN). (NN) closes a bridge across the tip and ring toward the first selector. The only useful function of (DD) at this time is that it grounds the

sleeve so as to hold the line finder until (HH) operates. The bridge across the tip and ring causes the operation of relays in the first selector that supply a holding ground over the "S" lead. When ground is returned over the "S" lead from the first selector (A) and (S) operate (relay (A) operating over the "A" and "F" leads in turn operating (S) which locks to the sleeve). The operation of (A) closes the tip and ring through from the long line circuit to the first selector, operates (P1) and allows (L), (N), (NN) and (DD) to release. The operation of (S) operates (H) and (HH). (H) locks under control of (B). The test for presence of the coin at the substation is made in the long line circuit and therefore (RT) and (BT) do not enter into the circuit operation on this call; similarly, the dial pulses are repeated in the long line circuit so that (R) is not used. When the call is answered (P) operates, (P1) releases, and circuit functions as described in the first paragraph of Section 8. However the only useful function in the operation of (P) and release of (P1) is to operate (C), which locks to the sleeve and sets the circuit in a position to collect the coin when the subscriber disconnects. When the calling subscriber disconnects the circuit functions as described under Section 10. If the call is answered (C) is operated causing coin collect current to be applied to the line and if the call is not answered (C) is normal and coin return current is then applied to the line. On calls to the special service operator (P) operates and (P1) releases which operates (C) and sets the circuit in a position to collect the coin when the subscriber disconnects. The operation of (J), (K) and (K1) serves no useful function on this type of call because the repeating coil in the long line circuit prevents the coin ground from grounding the tip conductor in this circuit.

16. TEST JACKS

(T) Jack

Insertion of a plug in jack (T) grounds the "S" lead toward the line finder, making that circuit busy.

16.2 (TT) Jack

Pulse Repeating tests of relay (R) are made by connecting the pulsing test set to jacks (T) and (TT). (TT) cuts off the associated selector and provides locking ground for relay (S). Momentary operation of key (SC) in all but the earliest pulse repeating test sets operates (RT) and in turn (S). Where the pulse repeating test set is not so arranged, (RT) must be momentarily operated manually.

16.3 (OT) Jack

The (OT) jack is provided for the purpose of controlling the operation of the coin collect and monitor circuit when testing without waiting for the timer to time out the 4-1/2 minute and 5 minute intervals. The (OT) jack may also be used to check the accuracy of the timer.

17. CLASS OF SERVICE TONE-LINE NO. METHOD OF COIN CONTROL - FIG. 2

Where the line number method of coin control is used, a class of service tone is required. This is provided by Fig. 2.

18. CUT-OFF KEYS FOR A, I AND P LEADS FIG. 3

If the A lead becomes accidentally grounded, no alarm will be sounded, and the interrupter circuit will not start. If the P lead is grounded, the first coin pulse may be short, resulting in a stuck coin condition at the coin box. If the P lead is grounded, the coin trunk will not release at the end of the call.

To aid in locating such troubles, the A. I. and P. leads are carried thru the key of Fig. 3, which will isolate the trunks in groups of 10. To guard against leaving the key inadvertently operated, a guard lamp is associated with the key.

19. USE IN OFFICES EQUIPPED WITH CAMA TRUNKS - FIG. 2 ("ZH" OPTION)

Direct ground is required on "A" lead to restrict coin lines from CAMA trunks.

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DEPT. 2336-AH-RCD-KM

STEP BY STEP SYSTEMS
NO. 1, 350A, 355A, 360A OR 35E97
COIN TRUNK CIRCUIT
FOR USE PRECEDING A FIRST SELECTOR
SERVING PREPAYMENT COIN LINES
ARRANGED FOR DELAYED CHARGING
AND OVERTIME CHARGING

CHANGES

A. CHANGED AND ADDED FUNCTIONS

A.1 To provide direct ground to the A lead in Fig. 2 in offices equipped with CAMA trunk.

C. CHANGES IN CIRCUIT REQUIREMENTS OTHER THAN THOSE APPLYING TO ADDED OR REMOVED APPARATUS

C.1 The current flow values for the (B) relay were formerly: Operate test 24.5, Readj: 23. (No nonoperate was shown).

C.2 Circuit preparation information for (I) relay was revised to facilitate adjustment procedure.

C.3 The (P) and (P2) relays were regrouped on the table to clarify which requirement was applied.

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 Added "or for use in offices equipped with CAMA trunks" to Fig. 2 title to facilitate grounding the A lead when CAMA trunks are required.

D.2 Revised Note 102 to provide use in offices equipped with CAMA trunks.

All other headings under Changes, no change.

1. PURPOSE OF CIRCUIT

1.1 This circuit is used to provide dial service to prepayment coin stations. It is arranged to automatically collect or return the coin deposited as required, after each call. When Fig. B is used, it is arranged to delay setting up the charge condition until 2 to 5 seconds after the called party answers. It functions with circuits arranged to time the call and collect the coin for each five minute interval of conversation.

2. WORKING LIMITS

2.1 Maximum external circuit loop resistance for subscriber's pulsing and supervision - See Range Chart.

2.2 Earth Potential Limits:

	Relay (P)	
Neg. Limit	Maximum 10V	
	Min. Conduc. Lp.	Max. Pos. E.P.
Positive Limits	0 Ohms	9.5 V
	105 "	10 "
	220 "	10.5 "
	320 "	11 "
	425 "	11.5 "
	530 "	12 "

2.3 Minimum Insulation Resistance - 20,000 Ohms.

3. FUNCTIONS

3.01 To provide for connecting a prepayment coin station to a first selector or selector repeater.

3.02 To provide for transmitting dial tone from the selector circuit to the calling subscriber.

3.03 To test for the presence of a coin in the coin box.

3.04 To repeat dial pulses after the coin is deposited.

3.05 To automatically return the coin on all uncompleted calls and on completed calls on which there is no charge.

3.06 To automatically collect the coin on completed calls to stations on which a charge is to be made.

3.07 To automatically collect the coin on completed calls to the special service operator unless the operator otherwise disposes of the coin before disconnecting.

3.08 To cut out the coin test and pulse repeating equipment when preceded by a long line circuit.

3.09 With Fig. B, to defer setting up the charge condition until 2 to 5 seconds after answer by the called party.

3.10 To indicate a trunk which has failed to dispose of a coin.

3.11 To start the associate timer when the called party answers on local charge calls.

3.12 To extend the talking circuit to the associated coin collect and monitor circuit.

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4. CONNECTING CIRCUITS

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

		No. 1 or 350A	No. 355A
4.01	Line Finder Circuit	SD-31530-01*	SD-32000-01*
4.02	Selector Circuit	SD-30200-01*	SD-31735-01*
4.03	Interrupter and Alarm Circuit for Prepay Coin Trunks	SD-30852-01*	SD-31975-01
4.04	Coin Trunk Timed Release Circuit	SD-31861-01	SD-31861-01
4.05	Sub-Line Circuit Equipped with Rotary Line Switch	SD-31259-01	SD-31259-01
4.06	Miscellaneous Alarm Circuit for Prepayment Coin Box Trunks		SD-31978-01
4.07	Selector Repeater	SD-31914-01*	SD-31914-01*
4.08	Pulsing Test Set	SD-90469-01 or SD-90469-02	SD-90469-01 or SD-90469-02
4.09	Timing Circuit for Coin Trunks	SD-31893-01 or Special SD-32115-01	SD-31893-01 or Special SD-32115-01
4.10	Interrupter and Alarm Circuit to Provide a Delay Interval for Use with 804C Ringing Power Plant	SD-32180-01	SD-32180-01

*Typical Circuit

DESCRIPTION OF OPERATION

5. ORIGINATING A CALL

The following description applies to "S" wiring or to "T" wiring on calls not originating on lines equipped with long line circuits. When "T" wiring is used, leads "E" and "F" are normally connected through normal post springs of the line finder except on levels on which long line circuits are used.

When a prepayment coin station is connected to this circuit by a line finder, relay (L) operates over the subscriber's loop, in turn operating (N) and (DD). (N) operated operates (NN), which closes the circuit to the associated first selector operating relay (P1); provides a holding circuit for (DD); and changes from battery to the ring through the noninductive winding of (RT) to battery through the operating winding of (RT) and the primary winding of (BT). It also removes ground from relay (L), secondary winding, which then holds in series with the 6000 ohm winding of (BT), but (BT) does not operate at this time. Relay (DD) operated connects ground to the sleeve lead to hold the line finder. When the (C) retardation coil is connected across the tip and ring leads by the operation of (DD), the (A) relay in the first selector operates and an associated common shelf relay completes the dial tone path to the line through a winding of the (A) relay of the selector. The dial tone path is closed to the calling subscriber through resistances (B) and (C) when "Z" option is used. Otherwise, it is not closed until the coin is deposited, as described in Paragraph 6.

6. COIN DEPOSITED

When the coin is deposited by the calling subscriber, (RT) operates, operating (S), which locks to battery through its front contacts, operates (H) and (HH), supplies dial tone to the calling subscriber, if not already supplied through "Z" option,

STEP-BY-STEP SYSTEMS NO. 1, 350A, 355A, 360A OR 35E97 COIN TRUNK CIRCUIT FOR USE PRECEDING A FIRST SELECTOR SERVING PREPAYMENT COIN LINES ARRANGED FOR DELAYED CHARGING AND OVERTIME CHARGING

CHANGES

C. CHANGES IN CIRCUIT REQUIREMENTS OTHER THAN THOSE APPLYING TO ADDED OR REMOVED APPARATUS

C.1 The Readjust nonoperate for relay Y was formerly 9.5.

C.2 Note 3 is added on page 3.

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 The title formerly was

STEP-BY-STEP SYSTEMS
NO. 1, 350A OR 355A
COIN TRUNK CIRCUIT

for use preceding a first selector serving prepayment coin lines with or without delayed charge arranged for overtime charging.

D.2 In Figs. B and F, the multiple Top information for leads INT and PKO was "To max 9 other Figs. B (or F)."

D.3 In Note 102 reference to 360A and 35E97 was added, and the information for Fig. 3 under "Feature or option" was only "Cutoff key for "A," "I" and "P" leads." Reference to ZK and ZL options was associated with Y, ZA and X, A options, respectively instead of with Fig. 3.

D.4 Voltage limits were formerly shown as 45-50V.

D.5 Cross-connection Figs. 56 and 57 are revised.

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4. CONNECTING CIRCUITS

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

		No. 1 or 350A	360A	No. 355A	35E97
4.1	Line Finder Circuit	SD-31530-01*	SD-31530-01	SD-32000-01*	SD-32000-01
4.2	Selector Circuit	SD-30200-01*	SD-30200-02*	SD-31735-01*	SD-30910-01*
4.3	Interrupter and Alarm Circuit for Prepay Coin Trunks	SD-30852-01*	SD-31975-01	SD-31975-01	SD-31975-01
4.4	Coin Trunk Timed Release Circuit	SD-31861-01	SD-31861-01	SD-31861-01	SD-31861-01
4.5	Subline Circuit Equipped with Rotary Line Switch	SD-31259-01		SD-31259-01	
4.6	Miscellaneous Alarm Circuit for Prepayment Coin Box Trunks		SD-31978-01	SD-31978-01	SD-31978-01
4.7	Selector Repeater	SD-31914-01*		SD-31914-01*	
4.8	Pulsing Test Set	SD-90469-02	SD-90469-02	SD-31858-01	SD-31858-01

*Typical Circuit

	No. 1 or 350A	360A	No. 355A	35E97
4.9 Timing Circuit for Coin Trunks	SD-31893-01 or Special SD-32115-01		SD-31893-01 or Special SD-32115-01	
4.10 Interrupter and Alarm Circuit to Provide a Delay Interval for Use with 804C Ringing Power Plant	SD-32180-01		SD-32180-01	

All other headings, no change.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT. 2313-OCH-RLL-HK

STEP-BY-STEP SYSTEMS
NO. 1, 350A OR 355A
COIN TRUNK CIRCUIT
FOR USE PRECEDING A FIRST SELECTOR
SERVING PREPAYMENT COIN LINES
WITH OR WITHOUT DELAYED CHARGE
ARRANGED FOR OVERTIME CHARGING

CHANGES

B. CHANGES IN APPARATUS

B.1 Added

18BD Res. (K) Fig. 2
2AF Key Unit) Fig. 3
2Y Lamp)

C. CHANGES IN CIRCUIT REQUIREMENTS OTHER THAN THOSE APPLYING TO ADDED OR REMOVED APPARATUS

C.1 The current flow values for the (Y) relay were formerly: Operate Test 20, Readj. 18. (No non-operate was shown).

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 Fig. 2 is added to provide direct or 3000 ohm ground on the "A" lead to the first selector, when the line number method of coin control is used. This indicates to the Auxiliary Trunk beyond the first selector that the call is from a coin line.

D.2 "ZJ" option is assigned to lead "A" Fig. E to eliminate conflicting information as to the use of the "A" lead since in Fig. E, the "A" lead is used when special service trunks provide access to the operator. In this case the "A" lead ground indicates that overtime charging is not required. Special service trunks are not used with the line number method of coin control.

D.3 Fig. 3 is added to provide for sectionalizing the A, I, and P leads to facilitate restoring service and locating trouble when any of these leads becomes accidently grounded.

D.4 Notes 102 and 103 are revised to refer to Figs. 2 and 3 and options ZH, ZI, and ZJ.

D.5 Wiring for Fig. 2 and ZI and ZH options is added in Fig. 56 ZJ wiring is indicated and the A lead to line finders is rated Mfr. Disc. In Figs. 54 and 55 the RS and A jumpers to line finder circuit is rated Mfr. Disc. and the A jumper between the coin trunk and Selector Circuit T.S. and the A lead cable conductor to Fig. 52 or 56 is added. Reference to circuit Fig. 2 is added.

D.6 The P, A and I leads to alarm and timed release circuits in Fig. 56 are rated Mfr. Disc., replaced by the added P, A and I lead wiring in Fig. 57 and added Fig. 58. Reference to Circuit Fig. 3 is added in Fig. 57. Note 205 is added.

All other headings under changes, no change.

1. PURPOSE OF CIRCUIT

1.1 This circuit is used to provide dial service to prepayment coin stations. It is arranged to automatically collect or return the coin deposited as required, after each call. When Fig. B is used, it is arranged to delay setting up the charge condition until 2 to 5 seconds after the called party answers. It functions with circuits arranged to time the call and collect the coin for each five minute interval of conversation.

2. WORKING LIMITS

2.1 Maximum external circuit loop resistance for subscriber's pulsing and supervision - See Range Chart.

2.2 Earth Potential Limits:

Relay (P)

Neg. Limit — Maximum 10V

	Min. Conduc. Lp.	Max. Pos. E.P.
Positive Limits	0 Ohms	9.5 V
	105 "	10 "
	220 "	10.5 "
	320 "	11 "
	425 "	11.5 "
	530 "	12 "

2.3 Minimum Insulation Resistance - 20,000 Ohms.

3. FUNCTIONS

3.01 To provide for connecting a prepayment coin station to a first selector or selector repeater.

3.02 To provide for transmitting dial tone from the selector circuit to the calling subscriber.

3.03 To test for the presence of a coin in the coin box.

3.04 To repeat dial pulses after the coin is deposited.

3.05 To automatically return the coin on all uncompleted calls and on completed calls on which there is no charge.

3.06 To automatically collect the coin on completed calls to stations on which a charge is to be made.

3.07 To automatically collect the coin on completed calls to the special service operator unless the operator otherwise disposes of the coin before disconnecting.

3.08 To cut out the coin test and pulse repeating equipment when preceded by a long line circuit.

3.09 With Fig. B, to defer setting up the charge condition until 2 to 5 seconds after answer by the called party.

3.10 To indicate a trunk which has failed to dispose of a coin.

3.11 To start the associate timer when the called party answers on local charge calls.

3.12 To extend the talking circuit to the associated coin collect and monitor circuit.

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4. CONNECTING CIRCUITS

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

		No. 1 or 350A	No. 355A
4.1	Line Finder Circuit	SD-31530-01*	SD-32000-01*
4.2	Selector Circuit	SD-30200-01*	SD-31735-01*
4.3	Interrupter and Alarm Circuit for Prepay Coin Trunks	SD-30852-01*	SD-31975-01
4.4	Coin Trunk Timed Release Ckt.	SD-31861-01	SD-31861-01
4.5	Sub-Line Circuit Equipped with Rotary Line Switch	SD-31259-01	SD-31259-01
4.6	Miscellaneous Alarm Circuit for Prepayment Coin Box Trunks		SD-31978-01
4.7	Selector Repeater	SD-31914-01*	SD-31914-01*
4.8	Pulsing Test Set	SD-90469-01 or SD-90469-02	SD-90469-01 or SD-90469-02
4.9	Timing Circuit for Coin Trunks	SD-31893-01 or Special SD-32115-01	SD-31893-01 or Special SD-32115-01
4.10	Interrupter and Alarm Ckt. to Provide a Delay Interval for Use with 804C Ringing Power Plant	SD-32180-01	SD-32180-01

*Typical Circuit

DESCRIPTION OF OPERATION

5. ORIGINATING A CALL

The following description applies to "S" wiring or to "T" wiring on calls not originating on lines equipped with long line circuits. When "T" wiring is used, leads "E" and "F" are normally connected through normal post springs of the line finder except on levels on which long line circuits are used.

When a prepayment coin station is connected to this circuit by a line finder, relay (L) operates over the subscriber's loop, in turn operating (N) and (DD). (N) operated operates (NN), which closes the circuit to the associated first selector operating relay (P1); provides a holding circuit for (DD); and changes from battery to the ring through the noninductive winding of (RT) to battery through the operating winding of (RT) and the primary winding of (BT). It also removes ground from relay (L), secondary winding, which then holds in series with the 6000 ohm winding of (BT), but (BT) does not operate at this time. Relay (DD) operated connects ground to the sleeve lead to hold the line finder. When the (C) retardation coil is connected across the tip and ring leads by the operation of (DD), the (A) relay in the first selector operates and an associated common shelf relay completes the dial tone path to the line through a winding of the (A) relay of the selector. The dial tone path is closed to the calling subscriber through resistances (B) and (C) when "Z" option is used. Otherwise, it is not closed until the coin is deposited, as described in Paragraph 6.

6. COIN DEPOSITED

When the coin is deposited by the calling subscriber, (RT) operates, operating (S), which locks to battery through its front contacts, operates (H) and (HH), supplies dial tone to the calling subscriber, if not already supplied through "Z" option, connects (R) to the ring of the line and removes battery from (RT) which releases and from the 29 ohm winding of relay (L), which, however, is held operated by the 800 ohm winding for a time. (R) operated operates (D) and closes a path for holding the (A) relay of the first selector when (NN) releases. (D) operated holds (DD) operated. (H) operated takes over the control of (HH) from (S). (HH) operated, releases (N) and (NN), separates the sleeves of the line finder and first selector and supplements the ground on the sleeve from (DD) to the line finder, and with "F" option connects coin return battery to relay (C). (N) released short-circuits (L), releasing it. (N) and (NN) are slow in releasing in order to insure that (R) is fully operated before (NN) releases and opens the bridge to the first selector, in case (L) releases when the coin is deposited.

The purpose of the (BT) relay is to block the operation of the coin trunk in case of an irregular condition on the line. The operation is as follows: (BT) operated locks to the sleeve, through its tertiary winding and resistance J (the function of which is to prevent (BT) from overheating on its tertiary winding) and opens the circuit to (S) preventing its operation and preventing dialing. It is necessary for the calling subscriber to hang up his receiver after the irregular condition ceases before a further attempt can be made on the call.

7. DIALING

Relay (R) functions to repeat pulses from the subscriber's dial to the first selector. (D) is slow in operating and releases on the first dial pulse, and remains released during the pulsing of each digit. This causes (DD) to remain normal during the pulsing of each digit to aid the pulsing condition.

8. CALL CHARGED

8.1 No Delayed or Overtime Charging - Fig. A

If the call is one on which a charge should be made, the line current is reversed when the called party answers, operating (P) and releasing (P1) which was previously operated. With (P1) released and (P) operated, (J) and (C) operate and lock. The (J) relay operated operates (K), reverses the tip and ring leads from the first selector and short-circuits (P) which releases. The reversal of the tip and ring leads causes (P1) to operate. (K) operates (K1) through the front contact of (P1). (K1) operated locks and removes the short circuit from (P). If due to an irregular operation at the called station battery and ground again reverse before (K1) operates, (P1) will release, but (K1) will operate through the back contact of (P).

Relay (C) operated locks and operates (A) and also sets the circuit so as to collect the coin when the calling subscriber disconnects. Relay (A) operated disconnects the tip and ring of the calling line from the (T) retardation coil and (R) relay, releasing (R), and connects the tip and ring through (P) and (P1) to the first selector. (R) released releases (D) and in turn (DD). (DD) released performs no useful function at this time. The reversal of the line by the operation of (J) is necessary to keep the tip side of the line, which is grounded at the station as long as a coin is in the box, always connected through relay (P) to the ground side of the connection.

8.2 With Delayed Charging and No Overtime - Fig. B

With Fig. B the operation is as described in Par. 8.1 except that the

operation of (C), instead of connecting positive coin battery to relay (I) connects that relay to the 2B spring of (T1), and the relays of Fig. B function as follows:

When the called subscriber answers (P2) operates, in turn closing the circuit of (T) to lead "PKU" or "A". This lead is grounded for 1/2 second once every 3 seconds (except that when the interrupter circuit is not in use, lead "PKU" is grounded). When (T) operates, it grounds lead "ST" (when "J" option is used, to start the interrupter or to keep it operating). When "H" option is used, (T) operates to close contacts 5/6T and 3/4B only, operating fully when lead "A" is opened. (T) locks to (P2) thru (T1). 2-1/2 seconds after ground is removed from lead "A", this lead is again grounded or 2 seconds after lead "PKU" is opened, ground is connected to lead "INT". Either of these thru a make contact of (T), operates (T1).

(T1) operated locks to off normal ground, releases (T), and connects positive coin battery to relay (I) instead of negative. If (P2) releases before (T) operates, (T1) is released and the above sequence of operations will be repeated when (P2) again operates. Fig. B thus insures against false charging when busy flashes or other transient conditions operate (P2).

8.3 Overtime Charging with No Delay Charging - Fig. E

With Fig. E the operation is as described in Par. 8.1 except that the operation of relay (C) grounds the "C" and "B" leads for the purpose of starting the associated timer. Relay (C) locks under control of the timing circuit "F" lead, operates relay (A) and also sets the circuit so as to collect the coin when the calling subscriber disconnects. The start relay in the timing circuit locks to lead "B". During the interval from the time that the coin is collected by the associated coin collect and monitor circuit after 4-1/2 minutes of conversation until the 5 minutes period is reached, battery is removed from the "F" lead allowing relay (C) to release so that if the subscriber disconnects during this interval, any coin deposited will be returned by this circuit. Relay (A) operated disconnects the tip and ring of the calling line from the (T) retard coil and (R) relay thus releasing (R), and connects the tip and ring thru (P) and (P1) relays to the first selector. Relay (R) released releases (D) and (DD).

8.4 Overtime Charging with Delayed Charging - Fig. F

With Fig. F the operation is the same as described in Par. 8.2 except that the operation of relay (C), instead of connecting positive coin battery to relay (I), connects that relay to the 2B spring of relay (T1), and the relays in Fig. F function as follows:

When the called subscriber answers (P2) relay operates, in turn closing the circuit of (T) to lead "PKU" or "A". This lead is grounded for 1/2 second once every 3 seconds, (except that when the interrupter circuit is not in use, lead "PKU" is grounded). When (T) operates, it grounds lead "ST" (when "ZE" option is used, to start the interrupter or keep it operating). When "ZD" option is used, relay (T) operates to close contacts 5/6T and 3/4B only, operating fully when lead "A" is opened. Relay (T) locks to (P2) thru relay (T). 2-1/2 seconds after ground is removed from lead "A", the "A" lead is again grounded or 2 seconds after lead "PKU" is opened, ground is connected to lead "INT". Either of these leads thru a make contact of (T), operates (T1).

Relay (T1) operated, locks to off normal ground, releases (T) and connects positive coin battery to relay (I) instead of negative. If (P2) releases before (T) operates, (T1) is released and the above sequence of operations will be repeated when (P2) again operates. Fig. F thus insures against false charging when busy flashes or other transients conditions operate (P2). During the interval from the time that the coin is collected by the associated coin collect and monitor circuit after 4-1/2 minutes of conversation until the 5 minutes period is reached, battery is removed from the (T1) relay allowing it to release so that if the subscriber disconnects during this interval, any coin deposited will be returned by this circuit.

9. CALL NOT CHARGED

If the line current is not reversed (P), (K) and (K1) will not operate and the circuit remains in a condition to return the coin when the calling party disconnects. On this type of call, (A) does not operate and the (A) and (B) condensers placed in the tip and ring leads provide the talking circuit, and relay (R) and retardation coil (T) provide the talking battery and ground supply.

10. DISCONNECT

10.1 Call Charged ((C) Relay Operated)

When the calling subscriber disconnects, the line finder is still held operated by ground at the contacts of (HH). (S) and (A) release when ground is removed from the selector sleeve and cause (V) to operate under control of a ground interruption on lead "P", lighting the green alarm lamp (A). Ground is intermittently and alternately connected to leads "P" and "1" for an interval of 1/2 second duration each. This feature is used to cause the coin

control battery of this circuit, as described later, to be connected to the subscriber's line for 1/2 second duration and thereby insure sufficient time for proper operation of the coin box magnet. (Y) operated locks under control of (HH) and connects battery to the winding of (B) which operates when ground is received on the "I" lead. If the called subscriber should hang up before the calling subscriber, the line current is reversed when the called station disconnects, operating (P) and releasing (P1). (P) operated with (P1) released short-circuits the winding of (J) causing it to release. (J) released releases (K) and short-circuits (P). (P1) operated and (K) released release (K1). (J) released places the (P) relay again on the ground side of the line. If the calling party disconnects first, (J), (K) and (K1) and with Fig. B or F, (T) release when (HH) releases (see 11.2).

10.2 Noncharge Call ((C) Relay Normal)

When the calling station disconnects (R) releases, releasing (D) and (DD), and opens the loop to the succeeding switches. After an interval ground is removed from the sleeve of the selector. From this point on, the circuit functions as described in the preceding paragraph, except the (J), (K) and (K1) will not have been operated.

11. COIN CONTROL

11.1 The operation of (B) connects positive or negative coin battery to the line to dispose of the coin. If the coin is to be collected, positive battery is connected to the winding of (I) through the front contact of (C) and with Fig. B or Fig. F through front contact of (T1). The operation of a relay in the timing circuit, after extending the talking circuit through the trunk finder and associated coin collect circuit grounds the "G" lead through contacts 4/5B of relay (T1), holds relay (S) operated and grounds the sleeve to prevent the connection from releasing until the coin collect circuit has collected the coin. If the coin is to be returned, the negative battery is connected to the line through the front contact of (B) or (HH) and the back contact of (C) with Fig. A or E and through the front contact of (B) or (HH) and the back contact of relay (T1) and front contact of (C) with Fig. B or F, through the winding of (I). (I) now operates in series with the coin magnet and remains operated during the time that the battery is connected to the line. Battery through the coin magnet should cause disposal of the coin, but the magnet will hold ground on the tip of the line as long as it is operated. The operation of (I) connects battery to hold (H) operated since the operating circuit for this relay is opened when (B) operates. When the "I" lead ground is removed (B) releases, removing the coin collect or return current, releasing (I) and holding (H) operated. At the next closure of ground to the "I" lead (B) reoperates, connecting coin disposal current to the line. The coin should have been disposed of on the first application of the potential, which upon the removal of the potential, restores the coin magnet to normal, and no current should flow through (I) on the subsequent application of the coin potential.

11.2 Release of Circuit - "A" or "G" Option

With (B) operated and (1) normal (H) releases, releasing (HH) which (a) removes ground from the line finder sleeve, (b) releases (B),(Y), and also (C), (K), (K1) and (T1) if operated, (c) connects battery to "RB1" of (RT), (d) opens leads "CT" and "CT1", and (e) removes battery from lead "A". The release of (B) connects the incoming tip and ring to relay (L) thus restoring the circuit to normal.

11.3 Release of Circuit - "F" Option

The circuit functions as described in the preceding paragraph except that when (HH) releases (B) remains locked to lead "I", and (HH) removes the coin return battery from 5B(C) with Figs. A, B or E furnished or 3(C) with Fig. F. Thus (B) remains operated for approximately 1/2 second until ground is removed from lead "I". This insures sufficient time for the line finder cut through relay to release before the incoming tip and ring are connected to relay (L).

12. STUCK COIN

12.1 "X" Wiring

If for any reason the coin is not properly disposed of, (B) continues to function under control of the "I" lead ground. After an interval of time the associated alarm circuit will indicate a trouble condition by audible and visual alarms.

12.2 "Y" Wiring

"Y" wiring provides a connection to battery on the "IB" lead in the associated "Coin Trunk Timed Release Circuit". When this circuit is used the continued attempts of the Coin Trunk Circuit to dispose of the coin are limited by the timing of the Release Circuit. At the end of the time period battery is removed from the "IB" lead and the circuit functions as though the coin had been disposed of, restoring to normal as described in Paragraph 11.

13. CALLS TO SPECIAL SERVICE OPERATOR

On calls to a special service operator, the selector level trunk is so arranged that battery and ground are reversed immediately when the operator answers. This causes the circuit to function as described in Paragraph 8. If coin collect current is supplied to the line from the trunk, (P) remains released and (P1) releases. If coin

return current is applied to the line from the trunk, (P) operates and (P1) remains operated. Neither relay performs a useful function at this time.

On a rering by the special service operator, (P) may operate on ringing current. If (P) remains operated due to earth potential with (P1) released it shunts down (J). (J) released releases (K) and short-circuits (P). The earth potential which may have held (P) will not operate if after the short circuit is removed. The release of (J) also reverses the tip and ring operating (P1) which shunts down (K1).

14. CONTACT PROTECTION

Resistances (D) and (F) at relay (DD) are connected to the "A" and "B" condensers during the application of coin battery to the line and in this connection are used to protect the contacts which control the application of this battery to the coin magnet. Condenser (D) and resistance (E) are used to protect the pulsing contacts of relay (R).

15. OPERATION WHEN "T" WIRING IS USED

The "T" wiring is used only when the lines on certain levels in the associated line finder group are equipped with long line circuits. The line finders are then equipped with normal post springs that operate on the multiple bank levels on which all the working lines are provided with long line circuits. When the normal post springs on the line finder operate, leads "E" and "F", (which are connected together when the finder is normal for the purpose of making the finder busy by grounding the sleeve at the associated first selectors) are opened and lead "F" is connected to lead "A". When a call is originated the long line circuit closes a bridge across the tip and ring which operates (L). (L) operates (N) and (DD). (N) operates (NN). (NN) closes a bridge across the tip and ring toward the first selector. The only useful function of (DD) at this time is that it grounds the sleeve so as to hold the line finder until (HH) operates. The bridge across the tip and ring causes the operation of relays in the first selector that supply a holding ground over the "S" lead. When ground is returned over the "S" lead from the first selector (A) and (S) operate (relay (A) operating over the "A" and "F" leads in turn operating (S) which locks to the sleeve). The operation of (A) closes the tip and ring through from the long line circuit to the first selector, operates (P1) and allows (L), (N), (NN) and (DD) to release. The operation of (S) operates (H) and (HH). (H) locks under control of (B). The test for presence of the coin at the substation is made in the long line circuit and therefore (RT) and (BT) do not enter into the circuit operation on this call; similarly, the dial pulses are repeated in the long line circuit so that (R) is not used. When the call is answered (P) operates, (P1) releases, and circuit functions as described in the first paragraph of Section 8. However the only useful function in the operation of (P) and release of (P1) is to operate (C), which locks to the sleeve and sets the circuit in a position to collect the coin when the subscriber disconnects. When the calling subscriber disconnects the circuit functions as described under Section 10. If the call is answered (C) is operated causing coin collect current to be applied to the line and if the call is not answered (C) is normal and coin return current is then applied to the line. On calls to the special service operator (P) operates and (P1) releases which operates (C) and sets the circuit in a position to collect the coin when the subscriber disconnects. The operation of (J), (K) and (K1) serves no useful function on this type of call because the repeating coil in the long line circuit prevents the coin ground from grounding the tip conductor in this circuit.

16. TEST JACKS

16.1 (T) Jack

Insertion of a plug in jack (T) grounds the "S" lead toward the line finder, making that circuit busy.

16.2 (TT) Jack

Pulse Repeating tests of relay (R) are made by connecting the pulsing test set to jacks (T) and (TT). (TT) cuts off the associated selector and provides locking ground for relay (S). Momentary operation of key (SC) in all but the earliest pulse repeating test sets operates (RT) and in turn (S). Where the pulse repeating test set is not so arranged, (RT) must be momentarily operated manually.

16.3 (OT) Jack

The (OT) jack is provided for the purpose of controlling the operation of the coin collect and monitor circuit when testing, without waiting for the timer to time out the 4-1/2 minute and 5 minute intervals. The (OT) jack may also be used to check the accuracy of the timer.

17. CLASS OF SERVICE TONE-LINE NO. METHOD OF COIN CONTROL - FIG. 2

Where the line number method of coin control is used, a class of service tone is required. This is provided by Fig. 2.

18. CUT-OFF KEYS FOR A, I AND P LEADS FIG. 3

If the A lead becomes accidentally grounded, no alarm will be sounded, and the interrupter circuit will not start. If the P lead is grounded, the first coin pulse may be short, resulting in a stuck coin condition at the coin box. If the P lead is grounded, the coin trunk will not release at the end of the call.

To aid in locating such troubles, the A. I. and P leads are carried thru the key of Fig. 3, which will isolate the trunks in groups of 10. To guard against leaving the key inadvertently operated, a guard lamp is associated with the key.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 2313-OCH-RLL-OE

STEP BY STEP SYSTEMS
NO. 1, 350A OR 355A
COIN TRUNK CIRCUIT
FOR USE PRECEDING A FIRST SELECTOR
SERVING PREPAYMENT COIN LINES
WITH OR WITHOUT DELAYED CHARGE
ARRANGED FOR OVERTIME CHARGING

CHANGES

A. CHANGED AND ADDED FUNCTIONS

A.1 An optional feature is added for overtime charging with no delay or with delayed charging.

B. CHANGES IN APPARATUS

B.1 Added

Figure E
(OT) 238 Type Jack

Figure F
(OT) 238 Type Jack
(T1) U327 Relay

B.2

Superseded	Superseded By
Relay E589	Relay E1446
Relay E626	Relay E888
Relay B500	Relay B36
Relay 149CG	Relay 149AR
Relay E626) or Relay E888)	"ZB" Option Relay R200 - "ZC" Option

C. CHANGES IN CIRCUIT REQUIREMENTS OTHER THAN THOSE APPLYING TO ADDED OR REMOVED APPARATUS

C.1 Test note 5 for the (BT) relay formerly read: "Conn. bat. to 3B (C) for Fig. A or 1B (T1) for Fig. B.

D. DESCRIPTION OF CIRCUIT CHANGES

D.01 The use of the E589, E626, B500 and 149CG relays is rated Mfr. Disc. to show realistic ratings for obsolescent apparatus.

D.02 The multiple strap information for "PKU" and "INT" leads on Fig. B formerly read: "To max. 49 other ckts."

D.03 The use of "ZB" option is rated Mfr. Disc. and is superseded by "ZC" option in order to provide for charging.

D.04 Figures E and F and options "ZD" and "ZE" are added to note 102 and to options used table.

D.05 Options "ZB", "ZC", Figs. E and F, and relays E888, E626, B36, B500, 149AR, 149CG, E1446 and E589 are added to note 103.

D.06 The "F" lead is added for Fig. E to provide battery to relay (C) from the timing ckt.

D.07 Note 107 is added.

D.08 Options "ZB", "ZC", "ZF" and "ZG" are added to options used table.

D.09 Figs. E and F are added to provide for overtime charging.

D.10 Cross-connection Fig. 57 is added.

D.11 Prior to this issue Fig. 56 applied for Figs. 1, A or B and D. Reference to options "ZB", "ZC", "ZD" and "ZE" is added in Fig. 56.

All other headings under Changes, no change.

1. PURPOSE OF CIRCUIT

1.1 This circuit is used to provide dial service to prepayment coin stations. It is arranged to automatically collect or return the coin deposited as required, after each call. When Fig. B is used, it is arranged to delay setting up the charge condition until 2 to 5 seconds after the called party answers. It functions with circuits arranged to time the call and collect the coin for each five minute interval of conversation.

2. WORKING LIMITS

2.1 Maximum external circuit loop resistance for subscriber's pulsing and supervision - See Range Chart.

2.2 Earth Potential Limits:

Relay (P)

Neg. Limit Maximum 10V

	Min. Conduc. Lp.	Max. Pos. E.P.
Positive Limits	0 Ohms	9.5 V
	105 "	10 "
	220 "	10.5 "
	320 "	11 "
	425 "	11.5 "
	530 "	12 "

2.3 Minimum Insulation Resistance - 20,000 Ohms.

3. FUNCTIONS

3.01 To provide for connecting a pre-payment coin station to a first selector or selector repeater.

3.02 To provide for transmitting dial tone from the selector circuit to the calling subscriber.

3.03 To test for the presence of a coin in the coin box.

3.04 To repeat dial pulses after the coin is deposited.

3.05 To automatically return the coin on all uncompleted calls and on completed calls on which there is no charge.

3.06 To automatically collect the coin on completed calls to stations on which a charge is to be made.

3.07 To automatically collect the coin on completed calls to the special service operator unless the operator otherwise disposes of the coin before disconnecting.

3.08 To cut out the coin test and pulse repeating equipment when preceded by a long line circuit.

3.09 With Fig. B, to defer setting up the charge condition until 2 to 5 seconds after answer by the called party.

3.10 To indicate a trunk which has failed to dispose of a coin.

3.11 To start the associate timer when the called party answers on local charge calls.

3.12 To extend the talking circuit to the associated coin collect and monitor circuit.

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4. CONNECTING CIRCUITS

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

		No. 1 or 350A	No. 355A
4.1	Line Finder Circuit	SD-31530-01*	SD-32000-01*
4.2	Selector Circuit	SD-30200-01*	SD-31735-01*
4.3	Interrupter and Alarm Circuit for Prepay Coin Trunks	SD-30852-01*	SD-31975-01
4.4	Coin Trunk Timed Release Ckt.	SD-31861-01	SD-31861-01
4.5	Sub-Line Circuit Equipped with Rotary Line Switch	SD-31259-01	SD-31259-01
4.6	Miscellaneous Alarm Circuit for Prepayment Coin Box Trunks		SD-31978-01
4.7	Selector Repeater	SD-31914-01*	SD-31914-01*
4.8	Pulsing Test Set	SD-90469-01 or SD-90469-02	SD-90469-01 or SD-90469-02
4.9	Timing Circuit for Coin Trunks	SD-31893-01 or Special SD-32115-01	SD-31893-01 or Special SD-32115-01
4.10	Interrupter and Alarm Ckt. to Provide a Delay Interval for Use with 804C Ringing Power Plant	SD-32180-01	SD-32180-01

*Typical Circuit

DESCRIPTION OF OPERATION

5. ORIGINATING A CALL

The following description applies to "S" wiring or to "T" wiring on calls not originating on lines equipped with long line circuits. When "T" wiring is used, leads "E" and "F" are normally connected through normal post springs of the line finder except on levels on which long line circuits are used.

When a prepayment coin station is connected to this circuit by a line finder, relay (L) operates over the subscriber's loop, in turn operating (N) and (DD). (N) operated operates (NN), which closes the circuit to the associated first selector operating relay (P1); provides a holding circuit for (DD); and changes from battery to the ring through the noninductive winding of (RT) to battery through the operating winding of (RT) and the primary winding of (BT). It also removes ground from relay (L), secondary winding, which then holds in series with the 6000 ohm winding of (BT),but (BT) does not operate at this time. Relay (DD) operated connects ground to the sleeve lead to hold the line finder. When the (C) retardation coil is connected across the tip and ring leads by the operation of (NN), the (A) relay in the first selector operates and an associated common shelf relay completes the dial tone path to the line through a winding of the (A) relay of the selector. The dial tone path is closed to the calling subscriber through resistances (B) and (C) when "Z" option is used. Otherwise, it is not closed until the coin is deposited, as described in Paragraph 6.

6. COIN DEPOSITED

When the coin is deposited by the calling subscriber, (RT) operates, operating (S), which locks to battery through its front contacts, operates (H) and (HH), supplies dial tone to the calling subscriber, if not already supplied through "Z" option, connects (R) to the ring of the line and removes battery from (RT) which releases and from the 29 ohm winding of relay (L), which, however, is held operated by the 800 ohm winding for a time. (R) operated operates (D) and closes a path for holding the (A) relay of the first selector when (NN) releases. (D) operated holds (DD) operated. (H) operated takes over the control of (HH) from (S). (HH) operated, releases (N) and (NN), separates the sleeves of the line finder and first selector and supplements the ground on the sleeve from (DD) to the line finder, and with "F" option connects coin return battery to relay (C). (N) released short-circuits (L), releasing it. (N) and (NN) are slow in releasing in order to insure that (R) is fully operated before (NN) releases and opens the bridge to the first selector, in case (L) releases when the coin is deposited.

The purpose of the (BT) relay is to block the operation of the coin trunk in case of an irregular condition on the line. The operation is as follows: (BT) operated locks to the sleeve, through its tertiary winding and resistance J (the function of which is to prevent (BT) from overheating on its tertiary winding) and opens the circuit to (S) preventing its operation and preventing dialing. It is necessary for the calling subscriber to hang up his receiver after the irregular condition ceases before a further attempt can be made on the call.

7. DIALING

Relay (R) functions to repeat pulses from the subscriber's dial to the first selector. (D) is slow in operating and releases on the first dial pulse, and remains released during the pulsing of each digit. This causes (DD) to remain normal during the pulsing of each digit to aid the pulsing condition.

8. CALL CHARGED

8.1 No Delayed or Overtime Charging - Fig. A

If the call is one on which a charge should be made, the line current is reversed when the called party answers, operating (P) and releasing (P1) which was previously operated. With (P1) released and (P) operated, (J) and (C) operate and lock. The (J) relay operated operates (K), reverses the tip and ring leads from the first selector and short-circuits (P) which releases. The reversal of the tip and ring leads causes (P1) to operate. (K) operates (K1) through the front contact of (P1). (K1) operated locks and removes the short circuit from (P). If due to an irregular operation at the called station battery and ground again reverse before (K1) operates, (P1) will release, but (K1) will operate through the back contact of (P).

Relay (C) operated locks and operates (A) and also sets the circuit so as to collect the coin when the calling subscriber disconnects. Relay (A) operated disconnects the tip and ring of the calling line from the (T) retardation coil and (R) relay, releasing (R), and connects the tip and ring through (P) and (P1) to the first selector. (R) released releases (D) and in turn (DD). (DD) released performs no useful function at this time. The reversal of the line by the operation of (J) is necessary to keep the tip side of the line, which is grounded at the station as long as a coin is in the box, always connected through relay (P) to the ground side of the connection.

8.2 With Delayed Charging and No Overtime - Fig. B

With Fig. B the operation is as described in Par. 8.1 except that the operation of (C), instead of connecting positive

coin battery to relay (I) connects that relay to the 2B spring of (T1), and the relays of Fig. B function as follows.

When the called subscriber answers (P2) operates, in turn closing the circuit of (T) to lead "PKU" or "A". This lead is grounded for 1/2 second once every 3 seconds, (except that when the interrupter circuit is not in use, lead "PKU" is grounded). When (T) operates, it grounds lead "ST" (when "J" option is used, to start the interrupter or to keep it operating). When "H" option is used, (T) operates to close contacts 5/6T and 3/4B only, operating fully when lead "A" is opened. (T) locks to (P2) thru (T). 2-1/2 seconds after ground is removed from lead "A", this lead is again grounded or 2 seconds after lead "PKU" is opened, ground is connected to lead "INT". Either of these, thru a make contact of (T), operates (T1).

(T1) operated locks to off normal ground, releases (T), and connects positive coin battery to relay (I) instead of negative. If (P2) releases before (T) operates, (T1) is released and the above sequence of operations will be repeated when (P2) again operates. Fig. B thus insures against false charging when busy flashes or other transient conditions operate (P2).

8.3 Overtime Charging with No Delay Charging - Fig. E

With Fig. E the operation is as described in Par. 8.1 except that the operation of relay (C) grounds the "C" and "B" leads for the purpose of starting the associated timer. Relay (C) locks under control of the timing circuit "F" lead, operates relay (A) and also sets the circuit so as to collect the coin when the calling subscriber disconnects. The start relay in the timing circuit locks to lead "B". During the interval from the time that the coin is collected by the associated coin collect and monitor circuit after 4-1/2 minutes of conversation until the 5 minutes period is reached, battery is removed from the "F" lead allowing relay (C) to release so that if the subscriber disconnects during this interval, any coin deposited will be returned by this circuit. Relay (A) operated disconnects the tip and ring of the calling line from the (T) retard coil and (R) relay thus releasing (R), and connects the tip and ring thru (P) and (P1) relays to the first selector. Relay (R) released releases (D) and (DD).

8.4 Overtime Charging with Delayed Charging - Fig. F

With Fig. F the operation is the same as described in Par. 8.2 except that the operation of relay (C), instead of connecting positive coin battery to relay (I), connects that relay to the 2B spring of relay (T1), and the relays in Fig. F function as follows:

When the called subscriber answers (P2) relay operates, in turn closing the circuit of (T) to lead "PKU" or "A". This lead is grounded for 1/2 second once every 3 seconds, (except that when the interrupter circuit is not in use, lead "PKU" is grounded). When (T) operates, it grounds lead "ST" (when "ZE" option is used, to start the interrupter or keep it operating). When "ZD" option is used, relay (T) operates to close contacts 5/6T and 3/4B only, operating fully when lead "A" is opened. Relay (T) locks to (P2) thru relay (T). 2-1/2 seconds after ground is removed from lead "A", the "A" lead is again grounded or 2 seconds after lead "PKU" is opened, ground is connected to lead "INT". Either of these leads thru a make contact of (T), operates (T1).

Relay (T1) operated, locks to off normal ground, releases (T) and connects positive coin battery to relay (I) instead of negative. If (P2) releases before (T) operates, (T1) is released and the above sequence of operations will be repeated when (P2) again operates. Fig. F thus insures against false charging when busy flashes or other transients conditions operate (P2). During the interval from the time that the coin is collected by the associated coin collect and monitor circuit after 4-1/2 minutes of conversation until the 5 minutes period is reached, battery is removed from the (T1) relay allowing it to release so that if the subscriber disconnects during this interval, any coin deposited will be returned by this circuit.

9. CALL NOT CHARGED

If the line current is not reversed (P), (K) and (K1) will not operate and the circuit remains in a condition to return the coin when the calling party disconnects. On this type of call, (A) does not operate and the (A) and (B) condensers placed in the tip and ring leads provide the talking circuit, and relay (R) and retardation coil (T) provide the talking battery and ground supply.

10. DISCONNECT

10.1 Call Charged ((C) Relay Operated)

When the calling subscriber disconnects, the line finder is still held operated by ground at the contacts of (HH). (S) and (A) release when ground is removed from the selector sleeve and cause (Y) to operate under control of a ground interruption on lead "P", lighting the green alarm lamp (A). Ground is intermittently and alternately connected to leads "P" and "I" for an interval of 1/2 second duration each. This feature is used to cause the coin

control battery of this circuit, as described later, to be connected to the subscriber's line for 1/2 second duration and thereby insure sufficient time for proper operation of the coin box magnet. (Y) operated locks under control of (HH) and connects battery to the winding of (B) which operates when ground is received on the "I" lead. If the called subscriber should hang up before the calling subscriber, the line current is reversed when the called station disconnects, operating (P) and releasing (P1). (P) operated with (P1) released short-circuits the winding of (J) causing it to release. (J) released releases (K) and short-circuits (P). (P1) operated and (K) released release (K1). (J) released places the (P) relay again on the ground side of the line. If the calling party disconnects first, (J), (K) and (K1) and with Fig. B or F, (T) release when (HH) releases (see 11.2).

10.2 Noncharge Call ((C) Relay Normal)

When the calling station disconnects (R) releases, releasing (D) and (DD), and opens the loop to the succeeding switches. After an interval ground is removed from the sleeve of the selector. From this point on, the circuit functions as described in the preceding paragraph, except the (J), (K) and (K1) will not have been operated.

11. COIN CONTROL

11.1 The operation of (B) connects positive or negative coin battery to the line to dispose of the coin. If the coin is to be collected, positive battery is connected to the winding of (I) through the front contact of (C) and with Fig. B or Fig. F through front contact of (T1). The operation of a relay in the timing circuit, after extending the talking circuit through the trunk finder and associated coin collect circuit grounds the "G" lead through contacts 4/5B of relay (T1), holds relay (S) operated and grounds the sleeve to prevent the connection from releasing until the coin collect circuit has collected the coin. If the coin is to be returned, the negative battery is connected to the line through the front contact of (B) or (HH) and the back contact of (C) with Fig. A or E and through the front contact of (B) or (HH) and the back contact of relay (T1) and front contact of (C) with Fig. B or F, through the winding of (I). (I) now operates in series with the coin magnet and remains operated during the time that the battery is connected to the line. Battery through the coin magnet should cause disposal of the coin, but the magnet will hold ground on the tip of the line as long as it is operated. The operation of (I) connects battery to hold (H) operated since the operating circuit for this relay is opened when (B) operates. When the "I" lead ground is removed (B) releases, removing the coin collect or return current, releasing (I) and holding (H) operated. At the next closure of ground to the "I" lead (B) reoperates, connecting coin disposal current to the line. The coin should have been disposed of on the first application of the potential, which upon the removal of the potential, restores the coin magnet to normal, and no current should flow through (I) on the subsequent application of the coin potential.

11.2 Release of Circuit - "A" or "G" Option

With (B) operated and (I) normal (H) releases, releasing (HH) which (a) removes ground from the line finder sleeve, (b) releases (B), (Y), and also (C), (K), (K1) and (T1) if operated, (c) connects battery to "RB1" of (RT), (d) opens leads "CT" and "CT1", and (e) removes battery from lead "A". The release of (B) connects the incoming tip and ring to relay (L) thus restoring the circuit to normal.

11.3 Release of Circuit - "F" Option

The circuit functions as described in the preceding paragraph except that when (HH) releases (B) remains locked to lead "I", and (HH) removes the coin return battery from 5B(C) with Figs. A, B or E furnished or 3(C) with Fig. F. Thus (B) remains operated for approximately 1/2 second until ground is removed from lead "I". This insures sufficient time for the line finder cut through relay to release before the incoming tip and ring are connected to relay (L).

12. STUCK COIN

12.1 "X" Wiring

If for any reason the coin is not properly disposed of, (B) continues to function under control of the "I" lead ground. After an interval of time the associated alarm circuit will indicate a trouble condition by audible and visual alarms.

12.2 "Y" Wiring

"Y" wiring provides a connection to battery on the "IB" lead in the associated "Coin Trunk Timed Release Circuit". When this circuit is used the continued attempts of the Coin Trunk Circuit to dispose of the coin are limited by the timing of the Release Circuit. At the end of the time period battery is removed from the "IB" lead and the circuit functions as though the coin had been disposed of, restoring to normal as described in Paragraph 11.

13. CALLS TO SPECIAL SERVICE OPERATOR

On calls to a special service operator, the selector level trunk is so arranged that battery and ground are reversed immediately when the operator answers. This causes the circuit to function as described in Paragraph 8. If coin collect current is supplied to the line from the trunk, (P) remains released and (P1) releases. If coin

return current is applied to the line from the trunk, (P) operates and (P1) remains operated. Neither relay performs a useful function at this time.

On a rering by the special service operator, (P) may operate on ringing current. If (P) remains operated due to earth potential with (P1) released it shunts down (J). (J) released releases (K) and short-circuits (P). The earth potential which may have held (P) will not operate it after the short circuit is removed. The release of (J) also reverses the tip and ring operating (P1) which shunts down (K1).

14. CONTACT PROTECTION

Resistances (D) and (F) at relay (DD) are connected to the "A" and "B" condensers during the application of coin battery to the line and in this connection are used to protect the contacts which control the application of this battery to the coin magnet. Condenser (D) and resistance (E) are used to protect the pulsing contacts of relay (R).

15. OPERATION WHEN "T" WIRING IS USED

The "T" wiring is used only when the lines on certain levels in the associated line finder group are equipped with long line circuits. The line finders are then equipped with normal post springs that operate on the multiple bank levels on which all the working lines are provided with long line circuits. When the normal post springs on the line finder operate, leads "E" and "F", (which are connected together when the finder is normal for the purpose of making the finder busy by grounding the sleeve at the associated first selectors) are opened and lead "F" is connected to lead "A". When a call is originated the long line circuit closes a bridge across the tip and ring which operates (L). (L) operates (N) and (DD). (N) operates (NN). (NN) closes a bridge across the tip and ring toward the first selector. The only useful function of (DD) at this time is that it grounds the sleeve so as to hold the line finder until (HH) operates. The bridge across the tip and ring causes the operation of relays in the first selector that supply a holding ground over the "S" lead. When ground is returned over the "S" lead from the first selector (A) and (S) operate (relay (A) operating over the "A" and "F" leads in turn operating (S) which locks to the sleeve). The operation of (A) closes the tip and ring through from the long line circuit to the first selector, operates (P1) and allows (L), (N), (NN) and (DD) to release. The operation of (S) operates (H) and (HH). (H) locks under control of (B). The test for the presence of the coin at the substation is made in the long line circuit and therefore (RT) and (BT) do not enter into the circuit operation on this call; similarly, the dial pulses are repeated in the long line circuit so that (R) is not used. When the call is answered (P) operates, (P1) releases, and circuit functions as described in the first paragraph of Section 8. However the only useful function in the operation of (P) and release of (P1) is to operate (C), which locks to the sleeve and sets the circuit in a position to collect the coin when the subscriber disconnects. When the calling subscriber disconnects the circuit functions as described under Section 10. If the call is answered (C) is operated causing coin collect current to be applied to the line and if the call is not answered (C) is normal and coin return current is then applied to the line. On calls to the special service operator (P) operates and (P1) releases which operates (C) and sets the circuit in a position to collect the coin when the subscriber disconnects. The operation of (J),(K) and (K1) serves no useful function on this type of call because the repeating coil in the long line circuit prevents the coin ground from grounding the tip conductor in this circuit.

16. TEST JACKS

16.1 (T) Jack

Insertion of a plug in jack (T) grounds the "S" lead toward the line finder, making that circuit busy.

16.2 (TT) Jack

Pulse Repeating tests of relay (R) are made by connecting the pulsing test set to jacks (T) and (TT). (TT) cuts off the associated selector and provides locking ground for relay (S). Momentary operation of key (SC) in all but the earliest pulse repeating test sets operates (RT) and in turn (S). Where the pulse repeating test set is not so arranged, (RT) must be momentarily operated manually.

16.3 (OT) Jack

The (OT) jack is provided for the purpose of controlling the operation of the coin collect and monitor circuit when testing, without waiting for the timer to time out the 4-1/2 minute and 5 minute intervals. The (OT) jack may also be used to check the accuracy of the timer.

DESCRIPTION OF OPERATION

5. ORIGINATING A CALL

The following description applies to "S" wiring or to "T" wiring on calls not originating on lines equipped with long line circuits. When "T" wiring is used, leads "E" and "F" are normally connected through normal post springs of the line finder except on levels on which long line circuits are used.

When a prepayment coin station is connected to this circuit by a line finder, relay (L) operates over the subscriber's loop, in turn operating (N) and (DD). (N) operated operates (NN), which closes the circuit to the associated first selector operating relay (P1); provides a holding circuit for (DD); and changes from battery to the ring through the noninductive winding of (RT) to battery through the operating winding of (RT) and the primary winding of (BT). It also removes ground from relay (L), secondary winding, which then holds in series with the 6000 ohm winding of (BT),but (BT) does not operate at this time. Relay (DD) operated connects ground to the sleeve lead to hold the line finder. When the (C) retardation coil is connected across the tip and ring leads by the operation of (NN), the (A) relay in the first selector operates and an associated common shelf relay completes the dial tone path to the line through a winding of the (A) relay of the selector. The dial tone path is closed to the calling subscriber through resistances (B) and (C) when "Z" option is used. Otherwise, it is not closed until the coin is deposited, as described in Paragraph 6.

6. COIN DEPOSITED

When the coin is deposited by the calling subscriber, (RT) operates, operating (S), which locks to battery through its front contacts, operates (H) and (HH), supplies dial tone to the calling subscriber, if not already supplied through "Z" option, connects (R) to the ring of the line and removes battery from (RT) which releases and from the 29 ohm winding of relay (L), which, however, is held operated by the 800 ohm winding for a time. (R) operated operates (D) and closes a path for holding the (A) relay of the first selector when (NN) releases. (D) operated holds (DD) operated. (H) operated takes over the control of (HH) from (S). (HH) operated, releases (N) and (NN), separates the sleeves of the line finder and first selector and supplements the ground on the sleeve from (DD) to the line finder, and with "F" option connects coin return battery to relay (C). (N) released short-circuits (L), releasing it. (N) and (NN) are slow in releasing in order to insure that (R) is fully operated before (NN) releases and opens the bridge to the first selector, in case (L) releases when the coin is deposited.

The purpose of the (BT) relay is to block the operation of the coin trunk in case of an irregular condition on the line. The operation is as follows: (BT) operated locks to the sleeve, through its tertiary winding and resistance J (the function of which is to prevent (BT) from overheating on its tertiary winding) and opens the circuit to (S) preventing its operation and preventing dialing. It is necessary for the calling subscriber to hang up his receiver after the irregular condition ceases before a further attempt can be made on the call.

7. DIALING

Relay (R) functions to repeat pulses from the subscriber's dial to the first selector. (D) is slow in operating and releases on the first dial pulse, and remains released during the pulsing of each digit. This causes (DD) to remain normal during the pulsing of each digit to aid the pulsing condition.

8. CALL CHARGED

8.1 No Delayed or Overtime Charging - Fig. A

If the call is one on which a charge should be made, the line current is reversed when the called party answers, operating (P) and releasing (P1) which was previously operated. With (P1) released and (P) operated, (J) and (C) operate and lock. The (J) relay operated operates (K), reverses the tip and ring leads from the first selector and short-circuits (P) which releases. The reversal of the tip and ring leads causes (P1) to operate. (K) operates (K1) through the front contact of (P1). (K1) operated locks and removes the short circuit from (P). If due to an irregular operation at the called station battery and ground again reverse before (K1) operates, (P1) will release, but (K1) will operate through the back contact of (P).

Relay (C) operated locks and operates (A) and also sets the circuit so as to collect the coin when the calling subscriber disconnects. Relay (A) operated disconnects the tip and ring of the calling line from the (T) retardation coil and (R) relay, releasing (R), and connects the tip and ring through (P) and (P1) to the first selector. (R) released releases (D) and in turn (DD). (DD) released performs no useful function at this time. The reversal of the line by the operation of (J) is necessary to keep the tip side of the line, which is grounded at the station as long as a coin is in the box, always connected through relay (P) to the ground side of the connection.

8.2 With Delayed Charging and No Overtime - Fig. B

With Fig. B the operation is as described in Par. 8.1 except that the operation of (C), instead of connecting positive

coin battery to relay (I) connects that relay to the 2B spring of (T1), and the relays of Fig. B function as follows.

When the called subscriber answers (P2) operates, in turn closing the circuit of (T) to lead "PKU" or "A". This lead is grounded for 1/2 second once every 3 seconds, (except that when the interrupter circuit is not in use, lead "PKU" is grounded). When (T) operates, it grounds lead "ST" (when "J" option is used, to start the interrupter or to keep it operating). When "H" option is used, (T) operates to close contacts 5/6T and 3/4B only, operating fully when lead "A" is opened. (T) locks to (P2) thru (T). 2-1/2 seconds after ground is removed from lead "A", this lead is again grounded or 2 seconds after lead "PKU" is opened, ground is connected to lead "INT". Either of these, thru a make contact of (T), operates (T1).

(T1) operated locks to off normal ground, releases (T), and connects positive coin battery to relay (I) instead of negative. If (P2) releases before (T) operates, (T1) is released and the above sequence of operations will be repeated when (P2) again operates. Fig. B thus insures against false charging when busy flashes or other transient conditions operate (P2).

8.3 Overtime Charging with No Delay Charging - Fig. E

With Fig. E the operation is as described in Par. 8.1 except that the operation of relay (C) grounds the "C" and "B" leads for the purpose of starting the associated timer. Relay (C) locks under control of the timing circuit "F" lead, operates relay (A) and also sets the circuit so as to collect the coin when the calling subscriber disconnects. The start relay in the timing circuit locks to lead "B". During the interval from the time that the coin is collected by the associated coin collect and monitor circuit after 4-1/2 minutes of conversation until the 5 minutes period is reached, battery is removed from the "F" lead allowing relay (C) to release so that if the subscriber disconnects during this interval, any coin deposited will be returned by this circuit. Relay (A) operated disconnects the tip and ring of the calling line from the (T) retard coil and (R) relay thus releasing (R), and connects the tip and ring thru (P) and (P1) relays to the first selector. Relay (R) released releases (D) and (DD).

8.4 Overtime Charging with Delayed Charging - Fig. F

With Fig. F the operation is the same as described in Par. 8.2 except that the operation of relay (C), instead of connecting positive coin battery to relay (I), connects that relay to the 2B spring of relay (T1), and the relays in Fig. F function as follows:

When the called subscriber answers (P2) relay operates, in turn closing the circuit of (T) to lead "PKU" or "A". This lead is grounded for 1/2 second once every 3 seconds, (except that when the interrupter circuit is not in use, lead "PKU" is grounded). When (T) operates, it grounds lead "ST" (when "ZE" option is used, to start the interrupter or keep it operating). When "ZD" option is used, relay (T) operates to close contacts 5/6T and 3/4B only, operating fully when lead "A" is opened. Relay (T) locks to (P2) thru relay (T). 2-1/2 seconds after ground is removed from lead "A", the "A" lead is again grounded or 2 seconds after lead "PKU" is opened, ground is connected to lead "INT". Either of these leads thru a make contact of (T), operates (T1).

Relay (T1) operated, locks to off normal ground, releases (T) and connects positive coin battery to relay (I) instead of negative. If (P2) releases before (T) operates, (T1) is released and the above sequence of operations will be repeated when (P2) again operates. Fig. F thus insures against false charging when busy flashes or other transients conditions operate (P2). During the interval from the time that the coin is collected by the associated coin collect and monitor circuit after 4-1/2 minutes of conversation until the 5 minutes period is reached, battery is removed from the (T1) relay allowing it to release so that if the subscriber disconnects during this interval, any coin deposited will be returned by this circuit.

9. CALL NOT CHARGED

If the line current is not reversed (P), (K) and (K1) will not operate and the circuit remains in a condition to return the coin when the calling party disconnects. On this type of call, (A) does not operate and the (A) and (B) condensers placed in the tip and ring leads provide the talking circuit, and relay (R) and retardation coil (T) provide the talking battery and ground supply.

10. DISCONNECT

10.1 Call Charged ((C) Relay Operated)

When the calling subscriber disconnects, the line finder is still held operated by ground at the contacts of (HH). (S) and (A) release when ground is removed from the selector sleeve and cause (Y) to operate under control of a ground interruption on lead "P", lighting the green alarm lamp (A). Ground is intermittently and alternately connected to leads "P" and "I" for an interval of 1/2 second duration each. This feature is used to cause the coin

control battery of this circuit, as described later, to be connected to the subscriber's line for 1/2 second duration and thereby insure sufficient time for proper operation of the coin box magnet. (Y) operated locks under control of (HH) and connects battery to the winding of (B) which operates when ground is received on the "I" lead. If the called subscriber should hang up before the calling subscriber, the line current is reversed when the called station disconnects, operating (P) and releasing (P1). (P) operated with (P1) released short-circuits the winding of (J) causing it to release. (J) released releases (K) and short-circuits (P). (P1) operated and (K) released release (K1). (J) released places the (P) relay again on the ground side of the line. If the calling party disconnects first, (J), (K) and (K1) and with Fig. B or F, (T) release when (HH) releases (see 11.2).

10.2 Noncharge Call ((C) Relay Normal)

When the calling station disconnects (R) releases, releasing (D) and (DD), and opens the loop to the succeeding switches. After an interval ground is removed from the sleeve of the selector. From this point on, the circuit functions as described in the preceding paragraph, except the (J), (K) and (K1) will not have been operated.

11. COIN CONTROL

11.1 The operation of (B) connects positive or negative coin battery to the line to dispose of the coin. If the coin is to be collected, positive battery is connected to the winding of (I) through the front contact of (C) and with Fig. B or Fig. F through front contact of (T1). The operation of a relay in the timing circuit, after extending the talking circuit through the trunk finder and associated coin collect circuit grounds the "G" lead through contacts 4/5B of relay (T1), holds relay (S) operated and grounds the sleeve to prevent the connection from releasing until the coin collect circuit has collected the coin. If the coin is to be returned, the negative battery is connected to the line through the front contact of (B) or (HH) and the back contact of (C) with Fig. A or E and through the front contact of (B) or (HH) and the back contact of relay (T1) and front contact of (C) with Fig. B or F, through the winding of (I). (I) now operates in series with the coin magnet and remains operated during the time that the battery is connected to the line. Battery through the coin magnet should cause disposal of the coin, but the magnet will hold ground on the tip of the line as long as it is operated. The operation of (I) connects battery to hold (H) operated since the operating circuit for this relay is opened when (B) operates. When the "I" lead ground is removed (B) releases, removing the coin collect or return current, releasing (I) and holding (H) operated. At the next closure of ground to the "I" lead (B) reoperates, connecting coin disposal current to the line. The coin should have been disposed of on the first application of the potential, which upon the removal of the potential, restores the coin magnet to normal, and no current should flow through (I) on the subsequent application of the coin potential.

11.2 Release of Circuit - "A" or "G" Option

With (B) operated and (I) normal (H) releases, releasing (HH) which (a) removes ground from the line finder sleeve, (b) releases (B), (Y), and also (C), (K), (K1) and (T1) if operated, (c) connects battery to "RB1" of (RT), (d) opens leads "CT" and "CT1", and (e) removes battery from lead "A". The release of (B) connects the incoming tip and ring to relay (L) thus restoring the circuit to normal.

11.3 Release of Circuit - "F" Option

The circuit functions as described in the preceding paragraph except that when (HH) releases (B) remains locked to lead "I", and (HH) removes the coin return battery from 5B(C) with Figs. A, B or E furnished or 3(C) with Fig. F. Thus (B) remains operated for approximately 1/2 second until ground is removed from lead "I". This insures sufficient time for the line finder cut through relay to release before the incoming tip and ring are connected to relay (L).

12. STUCK COIN

12.1 "X" Wiring

If for any reason the coin is not properly disposed of, (B) continues to function under control of the "I" lead ground. After an interval of time the associated alarm circuit will indicate a trouble condition by audible and visual alarms.

12.2 "Y" Wiring

"Y" wiring provides a connection to battery on the "IB" lead in the associated "Coin Trunk Timed Release Circuit". When this circuit is used the continued attempts of the Coin Trunk Circuit to dispose of the coin are limited by the timing of the Release Circuit. At the end of the time period battery is removed from the "IB" lead and the circuit functions as though the coin had been disposed of, restoring to normal as described in Paragraph 11.

13. CALLS TO SPECIAL SERVICE OPERATOR

On calls to a special service operator, the selector level trunk is so arranged that battery and ground are reversed immediately when the operator answers. This causes the circuit to function as described in Paragraph 8. If coin collect current is supplied to the line from the trunk, (P) remains released and (P1) releases. If coin

return current is applied to the line from the trunk, (P) operates and (P1) remains operated. Neither relay performs a useful function at this time.

On a rering by the special service operator, (P) may operate on ringing current. If (P) remains operated due to earth potential with (P1) released it shunts down (J). (J) released releases (K) and short-circuits (P). The earth potential which may have held (P) will not operate it after the short circuit is removed. The release of (J) also reverses the tip and ring operating (P1) which shunts down (K1).

14. CONTACT PROTECTION

Resistances (D) and (F) at relay (DD) are connected to the "A" and "B" condensers during the application of coin battery to the line and in this connection are used to protect the contacts which control the application of this battery to the coin magnet. Condenser (D) and resistance (E) are used to protect the pulsing contacts of relay (R).

15. OPERATION WHEN "T" WIRING IS USED

The "T" wiring is used only when the lines on certain levels in the associated line finder group are equipped with long line circuits. The line finders are then equipped with normal post springs that operate on the multiple bank levels on which all the working lines are provided with long line circuits. When the normal post springs on the line finder operate, leads "E" and "F", (which are connected together when the finder is normal for the purpose of making the finder busy by grounding the sleeve at the associated first selectors) are opened and lead "F" is connected to lead "A". When a call is originated the long line circuit closes a bridge across the tip and ring which operates (L). (L) operates (N) and (DD). (N) operates (NN). (NN) closes a bridge across the tip and ring toward the first selector. The only useful function of (DD) at this time is that it grounds the sleeve so as to hold the line finder until (HH) operates. The bridge across the tip and ring causes the operation of relays in the first selector that supply a holding ground over the "S" lead. When ground is returned over the "S" lead from the first selector (A) and (S) operate (relay (A) operating over the "A" and "F" leads in turn operating (S) which locks to the sleeve). The operation of (A) closes the tip and ring through from the long line circuit to the first selector, operates (P1) and allows (L), (N), (NN) and (DD) to release. The operation of (C) operates (H) and (HH). (H) locks under control of (E). The test for the presence of the coin at the substation is made in the long line circuit and therefore (RT) and (BT) do not enter into the circuit operation on this call; similarly, the dial pulses are repeated in the long line circuit so that (R) is not used. When the call is answered (P) operates, (P1) releases, and circuit functions as described in the first paragraph of Section 8. However the only useful function in the operation of (P) and release of (P1) is to operate (C), which locks to the sleeve and sets the circuit in a position to collect the coin when the subscriber disconnects. When the calling subscriber disconnects the circuit functions as described under Section 10. If the call is answered (C) is operated causing coin collect current to be applied to the line and if the call is not answered (C) is normal and coin return current is then applied to the line. On calls to the special service operator (P) operates and (P1) releases which operates (C) and sets the circuit in a position to collect the coin when the subscriber disconnects. The operation of (J),(K) and (K1) serves no useful function on this type of call because the repeating coil in the long line circuit prevents the coin ground from grounding the tip conductor in this circuit.

16. TEST JACKS

16.1 (T) Jack

Insertion of a plug in jack (T) grounds the "S" lead toward the line finder, making that circuit busy.

16.2 (TT) Jack

Pulse Repeating tests of relay (R) are made by connecting the pulsing test set to jacks (T) and (TT). (TT) cuts off the associated selector and provides locking ground for relay (S). Momentary operation of key (SC) in all but the earliest pulse repeating test sets operates (RT) and in turn (S). Where the pulse repeating test set is not so arranged, (RT) must be momentarily operated manually.

16.3 (OT) Jack

The (OT) jack is provided for the purpose of controlling the operation of the coin collect and monitor circuit when testing, without waiting for the timer to time out the 4-1/2 minute and 5 minute intervals. The (OT) jack may also be used to check the accuracy of the timer.

STEP BY STEP SYSTEMS
NO. 1, 350A OR 355A
COIN TRUNK CIRCUIT
FOR USE PRECEDING A FIRST SELECTOR
SERVING PREPAYMENT COIN LINES
WITH OR WITHOUT DELAYED CHARGE
ARRANGED FOR OVERTIME CHARGING

CHANGES

A. CHANGED AND ADDED FUNCTIONS

A.1 An optional feature is added for overtime charging with no delay or with delayed charging.

B. CHANGES IN APPARATUS

B.1 Added

Figure E
(OT) 238 Type Jack

Figure F
(OT) 238 Type Jack
(T1) U327 Relay

B.2

Superseded	Superseded By
Relay E589	Relay E1446
Relay E626	Relay E888
Relay B500	Relay B36
Relay 149CG	Relay 149AR
Relay E626) or Relay E888) "ZB" Option	Relay R200 - "ZC" Option

C. CHANGES IN CIRCUIT REQUIREMENTS OTHER THAN THOSE APPLYING TO ADDED OR REMOVED APPARATUS

C.1 Test note 5 for the (BT) relay formerly read: "Conn. bat. to 3B (C) for Fig. A or 1B (T1) for Fig. B.

D. DESCRIPTION OF CIRCUIT CHANGES

D.01 The use of the E589, E626, B500 and 149CG relays is rated Mfr. Disc. to show realistic ratings for obsolescent apparatus.

D.02 The multiple strap information for "PKU" and "INT" leads on Fig. B formerly read: "To max. 49 other ckts."

D.03 The use of "ZB" option is rated Mfr. Disc. and is superseded by "ZC" option in order to provide for charging.

D.04 Figures E and F and options "ZD" and "ZE" are added to note 102 and to options used table.

D.05 Options "ZB", "ZC", Figs. E and F, and relays E888, E626, B36, B500, 149AR, 149CG, E1446 and E589 are added to note 103.

D.06 The "F" lead is added for Fig. E to provide battery to relay (C) from the timing ckt.

D.07 Note 107 is added.

D.08 Options "ZB", "ZC", "ZF" and "ZG" are added to options used table.

D.09 Figs. E and F are added to provide for overtime charging.

D.10 Cross-connection Fig. 57 is added.

D.11 Prior to this issue Fig. 56 applied for Figs. 1, A or B and D. Reference to options "ZB", "ZC", "ZD" and "ZE" is added in Fig. 56.

All other headings under Changes, no change.

1. PURPOSE OF CIRCUIT

1.1 This circuit is used to provide dial service to prepayment coin stations. It is arranged to automatically collect or return the coin deposited as required, after each call. When Fig. B is used, it is arranged to delay setting up the charge condition until 2 to 5 seconds after the called party answers. It functions with circuits arranged to time the call and collect the coin for each five minute interval of conversation.

2. WORKING LIMITS

2.1 Maximum external circuit loop resistance for subscriber's pulsing and supervision - See Range Chart.

2.2 Earth Potential Limits:

Relay (P)

		Min. Conduc. Lp.	Max. Pos. E.P.
Neg. Limit	Maximum 10V		
Positive Limits	0 Ohms		9.5 V
	105 "		10 "
	220 "		10.5 "
	320 "		11 "
	425 "		11.5 "
	530 "		12 "

2.3 Minimum Insulation Resistance - 20,000 Ohms.

3. FUNCTIONS

3.01 To provide for connecting a pre-payment coin station to a first selector or selector repeater.

3.02 To provide for transmitting dial tone from the selector circuit to the calling subscriber.

3.03 To test for the presence of a coin in the coin box.

3.04 To repeat dial pulses after the coin is deposited.

3.05 To automatically return the coin on all uncompleted calls and on completed calls on which there is no charge.

3.06 To automatically collect the coin on completed calls to stations on which a charge is to be made.

3.07 To automatically collect the coin on completed calls to the special service operator unless the operator otherwise disposes of the coin before disconnecting.

3.08 To cut out the coin test and pulse repeating equipment when preceded by a long line circuit.

3.09 With Fig. B, to defer setting up the charge condition until 2 to 5 seconds after answer by the called party.

3.10 To indicate a trunk which has failed to dispose of a coin.

3.11 To start the associate timer when the called party answers on local charge calls.

3.12 To extend the talking circuit to the associated coin collect and monitor circuit.

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4. CONNECTING CIRCUITS

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

		No. 1 or 350A	No. 355A
4.1	Line Finder Circuit	SD-31530-01*	SD-32000-01*
4.2	Selector Circuit	SD-30200-01*	SD-31735-01*
4.3	Interrupter and Alarm Circuit for Prepay Coin Trunks	SD-30852-01*	SD-31975-01
4.4	Coin Trunk Timed Release Ckt.	SD-31861-01	SD-31861-01
4.5	Sub-Line Circuit Equipped with Rotary Line Switch	SD-31259-01	SD-31259-01
4.6	Miscellaneous Alarm Circuit for Prepayment Coin Box Trunks		SD-31978-01
4.7	Selector Repeater	SD-31914-01*	SD-31914-01*
4.8	Pulsing Test Set	SD-90469-01 or SD-90469-02	SD-90469-01 or SD-90469-02
4.9	Timing Circuit for Coin Trunks	SD-31893-01 or Special SD-32115-01	SD-31893-01 or Special SD-32115-01
4.10	Interrupter and Alarm Ckt. to Provide a Delay Interval for Use with 804C Ringing Power Plant	SD-32180-01	SD-32180-01

*Typical Circuit

STEP-BY-STEP SYSTEMS
NO. 1, 350A OR 355A
COIN TRUNK CIRCUIT
FOR USE PRECEDING A FIRST SELECTOR SERVING PREPAYMENT COIN LINES WITH OR WITHOUT DELAYED CHARGE

CHANGES

C. CHANGES IN CIRCUIT REQUIREMENTS OTHER THAN THOSE APPLYING TO ADDED OR REMOVED APPARATUS

C.1 Note 4 page 1 was added for relay (B).

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 Option F is added to provide for locking relay (B) to 60 IPM lead I to hold this relay after (HH) releases, and thus prevent reoperation of (L) and (DD) before the associated line finder has had time to release.

All other headings under Changes, no change.

1. PURPOSE OF CIRCUIT

1.1 This circuit is used to provide dial service to prepayment coin stations. It is arranged to automatically collect or return the coin deposited as required, after each call. When Fig. B is used, it is arranged to delay setting up the charge condition until 2 to 5 seconds after the called party answers.

2. WORKING LIMITS

2.1 Maximum external circuit loop resistance for subscriber's pulsing and supervision - See Range Chart.

2.2 Earth potential limits:

Relay (P)

Neg. Limit — Maximum 10V

	Min. Conduc. Lp.	Max. E.P.	Pos.
Positive Limits	0 Ohms	9.5 V	
	105 "	10 "	
	220 "	10.5 "	
	320 "	11 "	
	425 "	11.5 "	
	530 "	12 "	

2.3 Minimum insulation resistance - 20,000 ohms.

3. FUNCTIONS

3.01 To provide for connecting a prepayment coin station to a first selector or selector repeater.

3.02 To provide for transmitting dial tone from the selector circuit to the calling subscriber.

3.03 To test for the presence of a coin in the coin box.

3.04 To repeat dial pulses after the coin is deposited.

3.05 To automatically return the coin on all uncompleted calls and on completed calls on which there is no charge.

3.06 To automatically collect the coin on completed calls to stations on which a charge is to be made.

3.07 To automatically collect the coin on completed calls to the special service operator unless the operator otherwise disposes of the coin before disconnecting.

3.08 To cut out the coin test and pulse repeating equipment when preceded by a long line circuit.

3.09 With Fig. B, to defer setting up the charge condition until 2 to 5 seconds after answer by the called party.

3.10 To indicate a trunk which has failed to dispose of a coin.

4. CONNECTING CIRCUITS

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

		No. 1 or 350A	No. 355A
4.1	Line Finder Circuit	SD-31530-01*	SD-32000-01*
4.2	Selector Circuit	SD-30200-01*	SD-31735-01*
4.3	Interrupter and Alarm Circuit for Prepay Coin Trunks	SD-30852-01*	SD-31975-01
4.4	Coin Trunk Timed Release Ckt.	SD-31861-01	SD-31861-01
4.5	Sub-Line Circuit Equipped with Rotary Line Switch	SD-31259-01	SD-31259-01
4.6	Interrupter and Alarm Circuit for delay interval	SD-31494-01	SD-31978-01
4.7	Selector Repeater	SD-31914-01*	SD-31914-01*

*Typical Circuit

DESCRIPTION OF OPERATION

5. ORIGINATING A CALL

The following description applies to "S" wiring or to "T" wiring on calls not originating on lines equipped with long line circuits. When "T" wiring is used, leads E and F are normally connected through normal post springs of the line finder except on levels on which long line circuits are used.

When a prepayment coin station is connected to this circuit by a line finder, relay (L) operates over the subscriber's loop, in turn operating (N) and (DD). (N) operated operates (NN), which closes the circuit to the associated first selector operating relay (P1); provides a holding circuit for (DD); and changes from battery to the ring through the noninductive winding of (RT) to battery through the operating winding of (RT) and the primary winding of (BT). It also removes ground from relay (L), secondary winding, which then holds in series with the 6000 ohm winding of (BT), but (BT) does not operate at this time. Relay (DD) operated connects ground to the sleeve lead to hold the line finder. When the (C) retardation coil is connected across the tip and ring leads by the operation of (NN), the (A) relay in the first selector operates and an associated common shelf relay completes the dial tone path to the line through a winding of the (A) relay of the selector. The dial tone path is closed to the calling subscriber through resistances (B) and (C) when "Z" option is used. Otherwise, it is not closed until the coin is deposited, as described in Paragraph 6.

6. COIN DEPOSITED

When the coin is deposited by the calling subscriber, (RT) operates, operating (S), which locks to battery through its front contacts, operates (H) and (HH), supplies dial tone to the calling subscriber, if not already supplied through "Z" option, connects (R) to the ring of the line and removes battery from (RT) which releases and from the 29 ohm winding of relay (L), which, however, is held operated by the 800 ohm winding for a time. (R) operated operates (D) and closes a path for holding the (A) relay of the first selector when (NN) releases. (D) operated holds (DD) operated. (H) operated takes over the control of (HH) from (S). (HH) operated, releases (N) and (NN), separates the sleeves of the line finder and first selector and supplements the ground on the sleeve from (DD) to the line finder, and with "F" option connects coin return battery to relay (C). (N) released short-circuits (L), releasing it. (N) and (NN) are slow in releasing in order to insure that (R) is fully operated before (NN) releases and opens the bridge to the first selector, in case (L) releases when the coin is deposited.

The purpose of the (BT) relay is to block the operation of the coin trunk in case of an irregular condition on the line. The operation is as follows: (BT) operated locks to the sleeve, through its tertiary winding and resistance J (the function of which is to prevent (BT) from overheating on its tertiary winding) and opens the circuit to (S) preventing its operation and preventing dialing. It is necessary for the calling subscriber to hang up his receiver after the irregular condition ceases before a further attempt can be made on the call.

7. DIALING

Relay (R) functions to repeat pulses from the subscriber's dial to the first selector. (D) is slow in operating and releases on the first dial pulse, and remains released during the pulsing of each digit. This causes (DD) to remain normal during the pulsing of each digit to aid the pulsing condition.

8. CALL CHARGED

8.1 No Delayed Charging - Fig. A

If the call is one on which a charge should be made, the line current is reversed when the called party answers, operating (P) and releasing (P1) which was previously operated. With (P1) released and (P) operated, (J) and (C) operate and lock. The (J) relay operated operates (K), reverses the tip and ring leads from the first selector and short circuits (P) which releases. The reversal of the tip and ring leads causes (P1) to operate. (K) operates (K1) through the front contact of (P1). (K1) operated locks and removes the short circuit from (P). If due to an irregular operation at the called station battery and ground again reverse before (K1) operates, (P1) will release, but (K1) will operate through the back contact of (P).

Relay (C) operated locks and operates (A) and also sets the circuit so as to collect the coin when the calling subscriber disconnects. Relay (A) operated disconnects the tip and ring of the calling line from the (T) retardation coil and (R) relay, releasing (R), and connects the tip and ring through (P) and (P1) to the first selector. (R) released releases (D) and in turn (DD). (DD) released performs no useful function at this time. The reversal of the line by the operation of (J) is necessary to keep the tip side of the line, which is grounded at the station as long as a coin is in the box, always connected through relay (P) to the ground side of the connection.

8.2 With Delayed Charging - Fig. B

With Fig. B the operation is as described in par. 8.1 except that the operation of (C), instead of connecting positive coin battery to relay I connects that relay to the 2B spring of T1, and the relays of Fig. B function as follows.

When the called subscriber answers (P2) operates, in turn closing the circuit of (T) to lead PKU or A. This lead is grounded for 1/2 second once every 3 seconds, (except that when the interrupter circuit is not in use, lead PKU is grounded.) When (T) operates, it grounds lead "ST" (when "J" option is used, to start the interrupter or to keep it operating). When "H" option is used, (T) operates to close contacts 5/6T and 3/4B only, operating fully when lead A is opened. T1 locks to P2 thru T. 2-1/2 seconds after ground is removed from lead "A", this lead is again grounded or 2 seconds after lead PKU is opened, ground is connected to lead INT. Either of these, thru a make contact of T, operates T1.

T1 operated locks to off normal ground, releases T, and connects positive coin battery to relay I instead of negative. If P2 releases before T operates, T1 is released and the above sequence of operations will be repeated when P2 again operates. Fig. B thus insures against false charging when busy flashes or other transient conditions operate P2.

9. CALL NOT CHARGED

If the line current is not reversed (P), (K) and (K1) will not operate and the circuit remains in a condition to return the coin when the calling party disconnects. On this type of call, (A) does not operate and the (A) and (B) condensers placed in the tip and ring leads provide the talking circuit, and relay (R) and retardation coil (T) provide the talking battery and ground supply.

10. DISCONNECT

10.1 Call Charged ((C) Relay Operated)

When the calling subscriber disconnects, the line finder is still held operated by ground at the contacts of (HH). (S) and (A) release when ground is removed from the selector sleeve and cause (Y) to operate under control of a ground interruption on lead "P", lighting the green alarm lamp (A). Ground is intermittently and alternately connected to leads "P" and "I" for

an interval of 1/2 second duration each. This feature is used to cause the coin control battery of this circuit, as described later, to be connected to the subscriber's line for 1/2 second duration and thereby insure sufficient time for proper operation of the coin box magnet. (Y) operated locks under control of (HH) and connects battery to the winding of (B) which operates when ground is received on the "I" lead. If the called subscriber should hang up before the calling subscriber, the line current is reversed when the called station disconnects, operating (P) and releasing (P1). (P) operated with (P1) released short-circuits the winding of (J) causing it to release. (J) released releases (K) and short-circuits (P). (P1) operated and (K) released release (K1). (J) released places the (P) relay again on the ground side of the line. If the calling party disconnects first, (J), (K) and (K1) and with Fig. B, (T) release when (HH) releases (see 11.2).

10.2 Noncharge Call ((C) Relay Normal)

When the calling station disconnects (R) releases, releasing (D) and (DD), and opens the loop to the succeeding switches. After an interval ground is removed from the sleeve of the selector. From this point on, the circuit functions as described in the preceding paragraph, except the (J), (K) and (K1) will not have been operated.

11. COIN CONTROL

11.1 The operation of (B) connects positive or negative coin battery to the line to dispose of the coin. If the coin is to be collected, positive battery is connected to the winding of (I) through the front contact of (C) and with Fig. B, (T). If the coin is to be returned, the negative battery is connected to the line through the front contact of (B) or (HH) and the back contact of (C), through the winding of (I). (I) now operates in series with the coin magnet and remains operated during the time that the battery is connected to the line. Battery through the coin magnet should cause disposal of the coin, but the magnet will hold ground on the tip of the line as long as it is operated. The operation of (I) connects battery to hold (H) operated since the operating circuit for this relay is opened when (B) operates. When the "I" lead ground is removed (B) releases, removing the coin collect or return current, releasing (I) and holding (H) operated. At the next closure of ground to the "I" lead (B) reoperates, connecting coin disposal current to the line. The coin should have been disposed of on the first application of the potential, which upon the removal of the potential, restores the coin magnet to normal, and no current should flow through (I) on the subsequent application of the coin potential.

11.2 Release of Circuit - A or G Option

With (B) operated and (I) normal (H) releases, releasing (HH) which (a) removes ground from the line finder sleeve, (b) releases (B), (Y), and also (C), (K), (K1) and (T1) if operated, (c) connects battery to RB1 of (RT), (d) opens leads "CT" and "CT1", and (e) removes battery from lead "A". The release of (B) connects the incoming tip and ring to relay (L) thus restoring the circuit to normal.

11.3 Release of Circuit, F Option

The circuit functions as described in the preceding paragraph except that when (HH) releases (B) remains locked to lead "I", and (HH) removes the coin return battery from 5B(C). Thus (B) remains operated for approximately 1/2 second until ground is removed from lead "I". This insures sufficient time for the line finder cut through relay to release before the incoming tip and ring are connected to relay (L).

12. STUCK COIN

12.1 "X" Wiring

If for any reason the coin is not properly disposed of, (B) continues to function under control of the "I" lead ground. After an interval of time the associated alarm circuit will indicate a trouble condition by audible and visual alarms.

12.2 "Y" Wiring

"Y" wiring provides a connection to battery on the "1B" lead in the associated "Coin Trunk Timed Release Circuit". When this circuit is used the continued attempts of the Coin Trunk Circuit to dispose of the coin are limited by the timing of the Release Circuit. At the end of the time period battery is removed from the "1B" lead and the circuit functions as though the coin had been disposed of, restoring to normal as described in Paragraph 11.

13. CALLS TO SPECIAL SERVICE OPERATOR

On calls to a special service operator, the selector level trunk is so arranged that battery and ground are reversed immediately when the operator answers. This causes the circuit to function as described in Paragraph 8.

If coin collect current is supplied to the line from the trunk, (P) remains released and (P1) releases. If coin return current is applied to the line from the trunk, (P) operates and (P1) remains operated. Neither relay performs a useful function at this time.

On a rering by the special service operator, (P) may operate on ringing current. If (P) remains operated due to earth potential with (P1) released it shunts down (J). (J) released releases (K) and short-circuits (P). The earth potential which may have held (P) will not operate it after the short circuit is removed. The release of (J) also reverses the tip and ring operating (P1) which shunts down (K1).

14. CONTACT PROTECTION

Resistances (D) and (F) at relay (DD) are connected to the "A" and "B" condensers during the application of coin battery to the line and in this connection are used to protect the contacts which control the application of this battery to the coin magnet. Condenser (D) and resistance (E) are used to protect the pulsing contacts of relay (R).

15. OPERATION WHEN "T" WIRING IS USED

The "T" wiring is used only when the lines on certain levels in the associated line finder group are equipped with long line circuits. The line finders are then equipped with normal post springs that operate on the multiple bank levels on which all the working lines are provided with long line circuits. When the normal post springs on the line finder operate, leads "E" and "F", (which are connected together when the finder is normal for the purpose of making the finder busy by grounding the sleeve at the associated first selectors) are opened and lead "F" is connected to lead "A". When a call is originated the long line circuit closes a bridge across the tip and ring which operates (L). (L) operates (N) and (DD). (N) operates (NN). (NN) closes a bridge across the tip and ring toward the first selector. The only useful function of (DD) at this time is that it grounds the sleeve so as to hold the line finder until (HH) operates. The bridge across the tip and ring causes the operation of relays in the first selector that supply a holding ground over the "S" lead. When ground is returned over the "S" lead from the first selector (A) and (S) operate (Relay (A) operating over the "A" and "F" leads in turn operating (S) which locks to the sleeve). The operation of (A) closes the tip and ring through from the long line circuit to the first selector, operates (P1) and allows (L), (N), (NN) and (DD) to release. The operation of (S) operates (H) and (HH). (H) locks under control of (B). The test for the presence of the coin at the substation is made in the long line circuit and therefore (RT) and (BT) do not enter into the circuit operation on this call; similarly, the dial pulses are repeated in the long line circuit so that (R) is not used. When the call is answered (P) operates, (P1) releases, and circuit functions as described in the first paragraph of Section 8. However the only useful function in the operation of (P) and release of (P1) is to operate (C) which locks to the sleeve and sets the circuit in a position to collect the coin when the subscriber disconnects. When the calling subscriber disconnects the circuit functions as described under Section 10. If the call is answered (C) is operated causing coin collect current to be applied to the line and if the call is not answered (C) is normal and coin return current is then applied to the line. On calls to the special service operator (P) operates and (P1) releases which operates (C) and sets the circuit in a position to collect the coin when the subscriber disconnects. The operation of (J), (K) and (K1) serves no useful function on this type of call because the repeating coil in the long line circuit prevents the coin ground from grounding the tip conductor in this circuit.

16. TEST JACKS

16.1 (T) Jack

Insertion of a plug in jack (T) grounds the "S" lead toward the line finder, making that circuit busy.

16.2 (TT) Jack

Pulse Repeating tests of relay (R) are made by connecting the pulsing test set to jacks (T) and (TT). (TT) cuts off the associated selector and provides locking ground for relay (S). Momentary operation of Key (SC) in all but the earliest pulse repeating test sets operates (RT) and in turn (S). Where the pulse repeating test set is not so arranged, (RT) must be momentarily operated manually.

STEP BY STEP SYSTEMS
NO. 1, 350A OR 355A
COIN TRUNK CIRCUIT
FOR USE PRECEDING A FIRST SELECTOR SERVING PREPAYMENT COIN LINES WITH OR WITHOUT DELAYED CHARGE

CHANGES

B. CHANGES IN APPARATUS

B.1	Superseded	Superseded By	Added
	R109 Relay (HH) Fig. C 149S Relay (H) 149CG Relay (N) "D" Option	U914 Relay (HH) Fig. D Y78 Relay (H) Y263 Relay (H) "B" Option	K2 Lamp (A) 2A Option

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 Fig. C is set off and rated Mfr. Disc. and Fig. D is added. This provides additional contacts on the HH relay which permit a) starting the interrupter circuit over leads "CT" and "CT1" when the interrupter circuit requires this connection (similar to R opt. Fig. C), b) provides separate off normal and line finder sleeve grounds, (similar to G option of Fig. C) and c) provides for opening coin return battery on disconnect, required when 10¢ initial charge coin service is provided - (similar to F option of Fig. C).

D.2 The 149 Type relays (H) and (N) are replaced by "Y" Type relays to secure the advantages of lower first cost and lower maintenance.

D.3 Notes 102 and 103 are revised for record of the above changes.

D.4 The K2 lamp is shown as an option for use when the coin trunk timed release circuit is used to maintain satisfactory illumination when in series with 125 ohms in the "A" lead of the coin trunk timed release circuit.

D.5 Notes 105 and 106 added.

All other headings, no change.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 3310-OCH-RLL-YP

CD-31592-02
Issue 4-B
Appendix 2-B
Dwg. Iss. 14-B

JUL 19 1951

STEP BY STEP SYSTEMS
NO. 1, 350A or 355A
COIN TRUNK CIRCUIT
FOR USE PRECEDING A FIRST SELECTOR
SERVING PREPAYMENT COIN LINES
WITH OR WITHOUT DELAYED CHARGE

CHANGES

C. CHANGES IN CIRCUIT REQUIREMENTS OTHER THAN THOSE APPLYING TO ADDED OR REMOVED APPARATUS

C.1 Test clip data formerly read: to 3B (c) for secondary test of (BT) R 2099 relay.

C.2 Test note No. 5 is added to test secondary of (BT) R 2099 relay.

C.3 Test clip data for (I) B 500 relay formerly read connect battery to IT (B).

All other headings, no change.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 3310-CFC-RLL-FI

STEP-BY-STEP SYSTEMS
NO. 1, 350A OR 355A
COIN TRUNK CIRCUIT
FOR USE PRECEDING A FIRST SELECTOR
SERVING PREPAYMENT COIN LINES
WITH OR WITHOUT DELAYED CHARGE

CHANGES

A. CHANGED AND ADDED FUNCTIONS

A.1 The circuit is arranged for delayed charging.

B. CHANGES IN APPARATUS

B.1 Added

206GG Relay (P2) rated Mfr. Disc.
280H Relay (P2) rated Std.
U851 Relay (T)
U564 Relay (T1)

C. CHANGES IN CIRCUIT REQUIREMENTS OTHER THAN THOSE APPLYING TO ADDED OR REMOVED APPARATUS

C.1 For the P1 relay, the "Block" inf. was formerly "(R) O, (DD) NO, (C) (J) NO".

C.2 "Block (S) O" was removed for the (R) relay pulsing test and the last sentence of note 3 p. 2 was added.

C.3 Prior to Iss. 10-D current flow operate requirements forrelay (S) were Test 39, Readj. 41.

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 Fig. A was formerly part of Fig. 1. Fig. B is added for use where a delay period is required before setting the circuit for charging.

D.2 Information at Multiple Taps was added.

D.3 The connecting information for Leads "P", "CT", and "CT1" was formerly the same as for leads "A", "I" and "IB".

D.4 In Notes 102 and 103, information for options K, M, H & J and Figs. A and B was added, and Note 104 was added.

D.5 In Note 103, R Option was listed for Issue 5-D as follows. If job records do not specify R, R was furnished - see Note 102-R was A & M Only. This statement was incorrect after Issue 5-D, as job records would not list R, and R was not furnished. R was unnecessary, as the new Interrupter circuit SD-30852-01 did not have CT and CT1 leads connecting to this circuit. The listing for Iss. 5 was therefore removed. On Iss. 10-D, G option was added alternate to R to use 3/4 top (HH) for off normal ground, retaining 5/6 bottom (HH) for sleeve ground to improve circuit operation.

D.6 Cross Connection Figs. 51 and 52 were revised to agree with the above changes.

D.7 Note 201 formerly read: "Relays 239GU and 206N shall be mounted on not less than 3-1/2" centers horizontally or vertically with respect to themselves as well as with respect to all other inductive apparatus.

D.8 The last line of the title was added, replacing two lines which read "ARRANGED TO BRING IN AN ALARM WHEN TROUBLE GROUND EXISTS ON RING OF COIN LINE".

D.9 The Equipment Designation of this circuit was (CC TRK).

E. CHANGES IN TRANSMISSION REQUIREMENTS

E.1 The Transmission Requirements formerly showed a figure for the circuit arrangement for a local call on which no charge is made; - i.e., Similar to the left hand figure from A to B.

All other headings under Changes, no change.

1. PURPOSE OF CIRCUIT

1.1 This circuit is used to provide dial service to prepayment coin stations. It is arranged to automatically collect or return the coin deposited as required, after each call. When Fig. B is used, it is arranged to delay setting up the charge condition until 2 to 5 seconds after the called party answers.

2. WORKING LIMITS

2.1 Maximum external circuit loop resistance for subscriber's pulsing and supervision - See Range Chart.

2.2 Earth potential limits:

	Relay (P)	
Neg. Limit	Maximum 10V	
	Min. Conduc. Lp.	Max. Pos. E.P.
Positive Limits	0 Ohms	9.5 V
	105 "	10 "
	220 "	10.5 "
	320 "	11 "
	425 "	11.5 "
	530 "	12 "

2.3 Minimum insulation resistance - 20,000 ohms.

3. FUNCTIONS

3.01 To provide for connecting a prepayment coin station to a first selector or selector repeater.

3.02 To provide for transmitting dial tone from the selector circuit to the calling subscriber.

3.03 To test for the presence of a coin in the coin box.

3.04 To repeat dial pulses after the coin is deposited.

3.05 To automatically return the coin on all uncompleted calls and on completed calls on which there is no charge.

3.06 To automatically collect the coin on completed calls to stations on which a charge is to be made.

3.07 To automatically collect the coin on completed calls to the special service operator unless the operator otherwise disposes of the coin before disconnecting.

3.08 To cut out the coin test and pulse repeating equipment when preceded by a long line circuit.

3.09 With Fig. B, to defer setting up the charge condition until 2 to 5 seconds after answer by the called party.

3.10 To indicate a trunk which has failed to dispose of a coin.

4. CONNECTING CIRCUITS

When this circuit is shown on a keysheet, the connecting information thereon shall be followed.

		No. 1 or 350A	No. 355A
4.1	Line Finder Circuit	SD-31530-01*	SD-32000-01*
4.2	Selector Circuit	SD-30200-01*	SD-31735-01*
4.3	Interrupter and Alarm Circuit for Prepay Coin Trunks	SD-30852-01*	SD-31975-01
4.4	Coin Trunk Timed Release Ckt.	SD-31861-01	SD-31861-01
4.5	Sub-Line Circuit Equipped with Rotary Line Switch	SD-31259-01	SD-31259-01
4.6	Interrupter and Alarm Circuit for delay interval	SD-31494-01	SD-31978-01
4.7	Selector Repeater	SD-31914-01*	SD-31914-01*

*Typical Circuit

DESCRIPTION OF OPERATION

5. ORIGINATING A CALL

The following description applies to "S" wiring or to "T" wiring on calls not originating on lines equipped with long line circuits. When "T" wiring is used, leads E and F are normally connected through normal post springs of the line finder except on levels on which long line circuits are used.

When a prepayment coin station is connected to this circuit by a line finder, relay (L) operates over the subscriber's loop, in turn operating (N) and (DD). (N) operated operates (NN), which closes the circuit to the associated first selector operating relay (P1); provides a holding circuit for (DD); and changes from battery to the ring through the noninductive winding of (RT) to battery through the operating winding of (RT) and the primary winding of (BT). It also removes ground from relay (L), secondary winding, which then holds in series with the 6000 ohm winding of (BT), but (BT) does not operate at this time. Relay (DD)

operated connects ground to the sleeve lead to hold the line finder. When the (C) retardation coil is connected across the tip and ring leads by the operation of (NN), the (A) relay in the first selector operates and an associated common shelf relay completes the dial tone path to the line through a winding of the (A) relay of the selector. The dial tone path is closed to the calling subscriber through resistances (B) and (C) when "Z" option is used. Otherwise, it is not closed until the coin is deposited, as described in Paragraph 6.

6. COIN DEPOSITED

When the coin is deposited by the calling subscriber, (RT) operates, operating (S), which locks to battery through its front contacts, operates (H) and (HH), supplies dial tone to the calling subscriber, if not already supplied through "Z" option; connects (R) to the ring of the line and removes battery from (RT) which releases and from the 29 ohm winding of relay (L), which, however, is held operated by the 800 ohm winding for a time. (R) operated operates (D) and closes a path for holding the (A) relay of the first selector when (NN) releases. (D) operated holds (DD) operated. (H) operated takes over the control of (HH) from (S). (HH) operated, releases (N) and (NN), separates the sleeves of the line finder and first selector and supplements the ground on the sleeve from (DD) to the line finder. (N) released short-circuits (L), releasing it. (N) and (NN) are slow in releasing in order to insure that (R) is fully operated before (NN) releases and opens the bridge to the first selector, in case (L) releases when the coin is deposited.

The purpose of the (BT) relay is to block the operation of the coin trunk in case of an irregular condition on the line. The operation is as follows: (BT) operated locks to the sleeve, through its tertiary winding and resistance J (the function of which is to prevent (BT) from overheating on its tertiary winding) and opens the circuit to (S) preventing its operation and preventing dialing. It is necessary for the calling subscriber to hang up his receiver after the irregular condition ceases before a further attempt can be made on the call.

7. DIALING

Relay (R) functions to repeat pulses from the subscriber's dial to the first selector. (D) is slow in operating and releases on the first dial pulse, and remains released during the pulsing of each digit. This causes (DD) to remain normal during the pulsing of each digit to aid the pulsing condition.

8. CALL CHARGED

8.1 No Delayed Charging - Fig. A

If the call is one on which a charge should be made, the line current is reversed when the called party answers, operating (P) and releasing (P1) which was freviously operated. With (P1) released and (P) operated, (J) and (C) operate and lock. The (J) relay operated operates (K), reverses the tip and ring leads from the first selector and short circuits (P) which releases. The reversal of the tip and ring leads causes (P1) to operate. (K) operates (K1) through the front contact of (P1). (K1) operated locks and removes the short circuit from (P). If due to an irregular operation at the called station battery and ground again reverse before (K1) operates, (P1) will release, but (K1) will operate through the back contact of (P).

Relay (C) operated locks and operates (A) and also sets the circuit so as to collect the coin when the calling subscriber disconnects. Relay (A) operated disconnects the tip and ring of the calling line from the (T) retardation coil and (R) relay, releasing (R), and connects the tip and ring through (P) and (P1) to the first selector. (R) released releases (D) and in turn (DD). (DD) released performs no useful function at this time. The reversal of the line by the operation of (J) is necessary to keep the tip side of the line, which is grounded at the station as long as a coin is in the box, always connected through relay (P) to the ground side of the connection.

8.2 With Delayed Charging - Fig. B

With Fig. B the operation is as described in par. 8.1 except that the operation of (C), instead of connecting positive coin battery to relay I connects that relay to the 4B spring of T1, and the relays of Fig. B function as follows.

When the called subscriber answers (P2) operates, in turn closing the circuit of (T) to lead PKU or A. This lead is grounded for 1/2 second once every 3 seconds, (except that when the interrupter circuit is not in use, lead PKU is grounded.) When (T) operates, it grounds lead "ST" (when "J" option is used, to start the interrupter or to keep it operating). When "H" option is used, (T) operates to close contacts 5/6T and 3/4B only, operating fully when lead A is opened. T1 locks to P2 thru T. 2-1/2 seconds after ground is removed from lead "A", this lead is again grounded or 2 seconds after lead PKU is opened, ground is connected to

lead INT. Either of these, thru a make contact of T, operates T1.

T1 operated locks to off normal ground, releases T, and connects positive coin battery to relay I instead of negative. If P2 releases before T operates, T1 is released and the above sequence of operations will be repeated when P2 again operates. Fig. B thus insures against false charging when busy flashes or other transient conditions operate P2.

9. CALL NOT CHARGED

If the line current is not reversed (P), (K) and (K1) will not operate and the circuit remains in a condition to return the coin when the calling party disconnects. On this type of call, (A) does not operate and the (A) and (B) condensers placed in the tip and ring leads provide the talking circuit, and relay (R) and retardation coil (T) provide the talking battery and ground supply.

10. DISCONNECT

10.1 Call Charged ((C) Relay Operated)

When the calling subscriber disconnects, the line finder is still held operated by ground at the contacts of (HH). (S) and (A) release when ground is removed from the selector sleeve and cause (Y) to operate under control of a ground interruption on lead "P", lighting the green alarm lamp (A). Ground is intermittently and alternately connected to leads "P" and "I" for an interval of 1/2 second duration each. This feature is used to cause the coin control battery of this circuit, as described later, to be connected to the subscriber's line for 1/2 second duration and thereby insure sufficient time for proper operation of the coin box magnet. (Y) operated locks under control of (HH) and connects battery to the winding of (B) which operates when ground is received on the "I" lead. If the called subscriber should hang up before the calling subscriber, the line current is reversed when the called station disconnects, operating (P) and releasing (P1). (P) operated with (P1) released short-circuits the winding of (J) causing it to release. (J) released releases (K) and short-circuits (P). (P1) operated and (K) released release (K1). (J) released places the (P) relay again on the ground side of the line. If the calling party disconnects first, (J), (K) and (K1) and with Fig. B, (T) release when (HH) releases (see 11.2).

10.2 Noncharge Call ((C) Relay Normal)

When the calling station disconnects (R) releases, releasing (D) and (DD), and opens the loop to the succeeding switches. After an interval ground is removed from the sleeve of the selector. From this point on, the circuit functions as described in the preceding paragraph, except the (J), (K) and (K1) will not have been operated.

11. COIN CONTROL

11.1 The operation of (B) connects positive or negative coin battery to the line to dispose of the coin. If the coin is to be collected, positive battery is connected to the winding of (I) through the front contact of (C) and with Fig. B (T). If the coin is to be returned, the negative battery is connected to the line through the front contact of (B) and the back contact of (C), through the winding of (I). (I) now operates in series with the coin magnet and remains operated during the time that the battery is connected to the line. Battery through the coin magnet should cause disposal of the coin, but the magnet will hold ground on the tip of the line as long as it is operated. The operation of (I) connects battery to hold (H) operated since the operating circuit for this relay is opened when (B) operates. When the "I" lead ground is removed (B) releases, removing the coin collect or return current, releasing (I) and holding (H) operated. At the next closure of ground to the "I" lead (B) reoperates, connecting coin disposal current to the line. The coin should have been disposed of on the first application of the potential, which upon the removal of the potential, restores the coin magnet to normal, and no current should flow through (I) on the subsequent application of the coin potential.

11.2 With (B) operated and (I) normal, (H) releases, in turn releasing (HH) and removing ground from the sleeve of the line finder, which releases and also restores the circuit to normal.

12. STUCK COIN

12.1 "X" Wiring

If for any reason the coin is not properly disposed of, (B) continues to function under control of the "I" lead ground. After an interval of time, the associated alarm circuit will indicate a trouble condition by audible and visual alarms.

12.2 "Y" Wiring

"Y" wiring provides a connection to battery on the "1B" lead in the associated "Coin Trunk Timed Release Circuit". When this circuit is used the continued attempts of the Coin Trunk Circuit to dispose of the coin are limited by the timing of the Release Circuit. At the end of the time period battery is removed from the "1B" lead and the circuit functions as though the coin had been disposed of, restoring to normal as described in Paragraph 11.

13. CALLS TO SPECIAL SERVICE OPERATOR

On calls to a special service operator, the selector level trunk is so arranged that battery and ground are reversed immediately when the operator answers. This causes the circuit to function as described in Paragraph 8. If coin collect current is supplied to the line from the trunk, (P) remains released and (P1) releases. If coin return current is applied to the line from the trunk, (P) operates and (P1) remains operated. Neither relay performs a useful function at this time.

On a rering by the special service operator, (P) may operate on ringing current. If (P) remains operated due to earth potential with (P1) released it shunts down (J). (J) released releases (K) and short-circuits (P). The earth potential which may have held (P) will not operate it after the short circuit is removed. The release of (J) also reverses the tip and ring operating (P1) which shunts down (K1).

14. CONTACT PROTECTION

Resistances (D) and (F) at relay (DD) are connected to the "A" and "B" condensers during the application of coin battery to the line and in this connection are used to protect the contacts which control the application of this battery to the coin magnet. Condenser (D) and resistance (E) are used to protect the pulsing contacts of relay (R).

15. OPERATION WHEN "T" WIRING IS USED

The "T" wiring is used only when the lines on certain levels in the associated line finder group are equipped with long line circuits. The line finders are then equipped with normal post springs that operate on the multiple bank levels on which all the working lines are provided with long line circuits. When the normal post springs on the line finder operate, leads "E" and "F", (which are connected together when the finder is normal for the purpose of making the finder busy by grounding the sleeve at the associated first selectors) are opened and lead "F" is connected to lead "A". When a call is originated the long line circuit closes a bridge across the tip and ring which operates (L). (L) operates (N) and (DD). (N) operates (NN). (NN) closes a bridge across the tip and ring toward the first selector. The only useful function of (DD) at this time is that it grounds the sleeve so as to hold the line finder until (HH) operates. The bridge across the tip and ring causes the operation of relays in the first selector that supply a holding ground over the "S" lead. When ground is returned over the "S" lead from the first selector (A) and (S) operate (Relay (A) operating over the "A" and "F" leads in turn operating (S) which locks to the sleeve). The operation of (A) closes the tip and ring through from the long line circuit to the first selector, operates (P1) and allows (L), (N), (NN) and (DD) to release. The operation of (S) operates (H) and (HH). (H) locks under control of (B). The test for the presence of the coin at the substation is made in the long line circuit and therefore (RT) and (BT) do not enter into the circuit operation on this call; similarly, the dial pulses are repeated in the long line circuit so that (R) is not used. When the call is answered (P) operates, (P1) releases, and circuit functions as described in the first paragraph of Section 8. However the only useful function in the operation of (P) and release of (P1) is to operate (C) which locks to the sleeve and sets the circuit in a position to collect the coin when the subscriber disconnects. When the calling subscriber disconnects the circuit functions as described under Section 10. If the call is answered (C) is operated causing coin collect current to be applied to the line and if the call is not answered (C) is normal and coin return current is then applied to the line. On calls to the special service operator (P) operates and (P1) releases which operates (C) and sets the circuit in a position to collect the coin when the subscriber disconnects. The operation of (J), (K) and (K1) serves no useful function on this type of call because the repeating coil in the long line circuit prevents the coin ground from grounding the tip conductor in this circuit.

16. TEST JACKS

16.1 (T) Jack

Insertion of a plug in jack (T) grounds the "S" lead toward the

line finder, making that circuit busy.

16.2 (TT) Jack

Pulse Repeating test of relay (R) are made by connecting the pulsing test set to jacks (T) and (TT). (TT) cuts off the associated selector and provides locking ground for relay (S). Momentary operation of Key (SC) in all but the earliest pulse repeating test sets operates (RT) and in turn (S). Where the pulse repeating test set is not so arranged, (RT) must be momentarily operated manually.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 3310-OCH-RLL-AU

CD-31592-02
Issue 3-D
Appendix 1-D
Dwg. Issue 11-D

STEP-BY-STEP SYSTEMS
NO. 1 350A OR 355A
COIN TRUNK CIRCUIT
FOR USE PRECEDING A FIRST SELECTOR SERVING PREPAYMENT COIN LINES WITH OR WITHOUT DELAYED CHARGE

CHANGES

C. CHANGES IN CIRCUIT REQUIREMENTS OTHER THAN THOSE APPLYING TO ADDED OR REMOVED APPARATUS

C.1 Test Note 3, page 1, was added.

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 2B of Relay (Y) was formerly connected in error to 2T(C), instead of, as now shown, to 4T(C).

All other headings, no change.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 3310-OCH-RLL-ES

STEP-BY-STEP SYSTEMS
NO. 1, 350A OR 355A
COIN TRUNK CIRCUIT
FOR USE PRECEDING A FIRST SELECTOR
SERVING PREPAYMENT COIN LINES
ARRANGED TO BRING IN ALARM WHEN TROUBLE
GROUND EXISTS ON RING OF COIN LINE

CHANGES

B. CHANGES IN APPARATUS

	Superseded	Superseded By
B.1	54C Retard Coil (C) "W" Option	274C Retard Coil (C) "V" Option

B.2 Note 103 was revised to record this change.

B.3 The core symbol "D" was added for relay BT since this relay acts on a differential basis when a coin is deposited in the coin box at the calling subscriber station.

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 Fig. 53 is rated Mfr. Disc. since the cross connection information shown therein is covered on the line finder circuit drawings, and corresponding information will be added to the rotary line switch drawings on the next reissue.

D.2 Figs. 54 and 55 are added to provide for cross connecting coin trunks to selector or selector repeater circuits at the distributing frame when required.

All other headings no change.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 3320-OCH-RCD-NM

STEP-BY-STEP SYSTEMS
NO. 1, 350A OR 355A
COIN TRUNK CIRCUIT
FOR USE PRECEDING A FIRST SELECTOR SERVING PREPAYMENT COIN LINES ARRANGED TO BRING IN ALARM WHEN TROUBLE GROUND EXISTS ON RING OF COIN LINE

CHANGES

B. CHANGES IN APPARATUS

B.1 Superseded	Superseded By
"U" 239GU	"P" 280U
"Q" 206N	"N" 280U

C. CHANGES IN CIRCUIT REQUIREMENTS OTHER THAN THOSE APPLYING TO ADDED OR REMOVED APPARATUS

C.1 In Ckt. Req. Table (P) relay "U" option, the After Soak was Opr.-80, N.O. 80. In Ckt. Req. Table (P1) Relay "Q" option, the After Soak was Opr.-125, N.O. 125.

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 "U", "Q", "P" & "N" options were not shown in Option Table U, Trans. Req. or Record of Figs. Table and (P) & (P1) 280U relay were not shown.

D.2 In Ckt. Req. Table the (P1) 206N Rel. After Soak was Opr.-125, N.O. 125.

All other headings, no change.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 3330-AJB-CCF-YT

STEP-BY-STEP SYSTEMS
NO. 1, 350A OR 355A
COIN TRUNK CIRCUIT
FOR USE PRECEDING A FIRST SELECTOR SERVING PREPAYMENT COIN LINES ARRANGED TO BRING IN ALARM WHEN TROUBLE GROUND EXISTS ON RING OF COIN LINE

CHANGES

C. CHANGES IN CIRCUIT REQUIREMENTS OTHER THAN THOSE APPLYING TO ADDED OR REMOVED APPARATUS

C.1 For the (BT) relay, Sec. Operate the test clip data was formerly Conn. Bat. 3YT (BT) and the test set preparation was "Bat."; "Insulate" information and Test Note 2 were not shown. With this Circuit Preparation the operate current could not be obtained. Test Clip datum for T winding was "Conn. Grd." YB1 (BT). The test note "Insert dummy plug in jack (T)" was added on pages 2 and 3 with reference thereto for relays (K1) and (S).

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 The lead between 3(P) and 2(P1) was added to insure operation of (K1) after (J) and (K) operate, in case the reversal causing (P) and (P1) to operate (J) is terminated before (K1) operates.

All other headings under "Changes", No change.

1. PURPOSE OF CIRCUIT

1.1 This circuit is used to provide dial service to prepayment coin stations. It is arranged to automatically collect or return the coin deposited as required, after each call.

2. WORKING LIMITS

2.1 Maximum external circuit loop resistance for subscriber's pulsing and supervision - See Range Chart.

2.2 Earth potential limits:

	Relay (P)	
Neg. Limit	Maximum 10V	
	Min. Conduc. Lp.	Max. Pos. E.P.
Positive Limits	0 Ohms	9.5 V
	105 "	10 "
	220 "	10.5 "
	320 "	11 "
	425 "	11.5 "
	530 "	12 "

2.3 Minimum insulation resistance - 20,000 ohms.

3. FUNCTIONS

3.1 To provide for connecting a prepayment coin station to a first selector or selector repeater.

3.2 To provide for transmitting dial tone from the selector circuit to the calling subscriber.

3.3 To test for the presence of a coin in the coin box.

3.4 To repeat dial pulses after the coin is deposited.

3.5 To automatically return the coin on all uncompleted calls and on completed calls on which there is no charge.

3.6 To automatically collect the coin on completed calls to stations on which a charge is to be made.

3.7 To automatically collect the coin on completed calls to the special service operator unless the operator otherwise disposes of the coin before disconnecting.

3.8 To cut out the coin test and pulse repeating equipment when preceded by a long line circuit.

4. CONNECTING CIRCUITS

When this circuit is shown on a keysheet, the connecting information thereon shall be followed.

		No. 1 or 350A	No. 355A
4.1	Line Finder Circuit	SD-31530-01*	SD-32000-01*
4.2	Selector Circuit	SD-30200-01*	SD-31735-01*
4.3	Coin Trunk Alarm Circuit	SD-30852-01*	SD-31975-01
4.4	Coin Trunk Timed Release Ckt.	SD-31861-01	SD-31861-01
4.5	Sub-Line Circuit Equipped with Rotary Line Switch	SD-31259-01	SD-31259-01
4.6	Selector Repeater	SD-31914-01*	SD-31914-01*

*Typical Circuit

DESCRIPTION OF OPERATION

5. ORIGINATING A CALL

The following description applies to "S" wiring or to "T" wiring on calls not originating on lines equipped with long line circuits. When "T" wiring is used, leads E and F are normally connected through normal post springs of the line finder except on levels on which long line circuits are used.

When a prepayment coin station is connected to this circuit by a line finder, relay (L) operates over the subscriber's loop, in turn operating (N) and (DD). (N) operated operates (NN), which closes the circuit to the associated first selector operating relay (P1); provides a holding circuit for (DD); and changes from battery to the ring through the noninductive winding of (RT) to battery through the operating winding of (RT) and the primary winding of (BT). It also removes ground from relay (L), secondary winding, which then holds in series with the 6000 ohm winding of (BT), but (BT) does not operate at this time. Relay (DD) operated connects ground to the sleeve lead to hold the line finder. When the (C) retardation coil is connected across the tip and ring leads by the operation of (NN), the (A) relay in the first selector operates and an associated common shelf relay completes the dial tone path to the line through a winding of the (A) relay of the selector. The dial tone path is closed to the calling subscriber through resistances (B) and (C) when "Z" option is used. Otherwise, it is not closed until the coin is deposited, as described in Paragraph 6.

6. COIN DEPOSITED

When the coin is deposited by the calling subscriber, (RT) operates, operating (S), which locks to battery through its front contacts, operates (H) and (HH), supplies dial tone to the calling subscriber, if not already supplied through "Z" option, connects (R) to the ring of the line and removes battery from (RT) which releases and the 29 ohm winding of relay (L), which, however, is held operated by the 800 ohm winding for a time. (R) operated operates (D) and closes a path for holding the (A) relay of the first selector when (NN) releases. (D) operated holds (DD) operated. (H) operated takes over the control of (HH) from (S). (HH) operated, releases (N) and (NN), separates the sleeves of the line finder and first selector and supplements the ground on the sleeve from (DD) to the line finder. (N) released short-circuits (L), releasing it. (N) and (NN) are slow in releasing in order to insure that (R) is fully operated before (NN) releases and opens the bridge to the first selector in case (L) releases when the coin is deposited.

The purpose of the (BT) relay is to block the operation of the coin trunk in case of an irregular condition on the line. The operation is as follows: (BT) operated locks to the sleeve, through its tertiary winding and resistance J (the function of which is to prevent (BT) from overheating on its tertiary winding) and opens the circuit to (S) preventing its operation and preventing further dialing. It is necessary for the calling subscriber to hang up his receiver after the irregular condition ceases before a further attempt can be made on the call.

7. DIALING

Relay (R) functions to repeat pulses from the subscriber's dial to the first selector. (D) is slow in operating and releases on the first dial pulse, and remains released during the pulsing of each digit. This causes (DD) to remain normal during the pulsing of each digit to aid the pulsing condition.

8. CALL CHARGED

If the call is one on which a charge should be made, the line current is reversed when the called party answers, operating (P) and releasing (P1) which was previously operated. With (P1) released and (P) operated, (J) and (C) operate and lock. The (J) relay operated operates (K), reverses the tip and ring leads from the first selector and short circuits (P) which releases. The reversal of the tip and ring leads causes (P1) to operate. (K) operates (K1) through the front contact of (P1). (K1) operated locks and removes the short circuit from (P). If due to an irregular operation at the called station battery and ground again reverse before (K1) operates, (P1) will release, but (K1) will operate through the back contact of (P).

Relay (C) operated locks and operates (A) and also sets the circuit so as to collect the coin when the calling subscriber disconnects. Relay (A) operated disconnects the tip and ring of the calling line from the (T) retardation coil and (R) relay, releasing (R), and connects the tip and ring through (P) and (P1) to the first selector. (R) released releases (D) and in turn (DD). (DD) released performs no useful function at this time. The reversal of the line by the operation of (J) is necessary to keep the tip side of the line, which is grounded at the station as long as a coin is in the box, always connected through relay (P) to the ground side of the connection.

9. CALL NOT CHARGED

If the call is one on which no charge is to be made, the line current is not reversed. (P), (K) and (K1) will, therefore, not operate and the circuit remains in a condition to return the coin when the calling party disconnects. On this type of call, (A) does not operate and the (A) and (B) condensers placed in the tip and ring leads provide the talking circuit, and relay (R) and retardation coil (T) provide the talking battery and ground supply.

10. DISCONNECT

10.1 Call Charged ((C) Relay Operated)

When the calling subscriber disconnects, the line finder is still held operated by ground at the contacts of (HH). (S) and (A) release when ground is removed from the selector sleeve and cause (Y) to operate under control of a ground interruption on lead "P", lighting the green alarm lamp (A). Ground is intermittently and alternately connected to leads "P" and "I" for an interval of 1/2 second duration each. This feature is used to cause the coin control battery of this circuit, as described later, to be connected to the subscriber's line for 1/2 second duration and thereby insure sufficient time for proper operation of the coin box magnet. (Y) operated locks under control of (HH) and connects battery to the winding of (B) which operates when ground is received on the "I" lead. If the called subscriber should hang up before the calling subscriber, the line current is reversed when the called station disconnects, operating (P) and releasing (P1). (P) operated with (P1) released short-circuits the winding of (J) causing it to release. (J) released releases (K) and short-circuits (P). (P1) operated and (K) released release (K1). (J) released places the (P) relay again on the ground side of the line. If the calling party disconnects first, (J), (K) and (K1) release when (HH) releases (see 11.2).

10.2 Noncharge Call ((C) Relay Normal)

When the calling station disconnects (R) releases, releasing (D) and (DD), and opens the loop to the succeeding switches. After an interval ground is removed from the sleeve of the selector. From this point on, the circuit functions as described in the preceding paragraph, except the (J), (K) and (K1) will not have been operated.

11. COIN CONTROL

11.1 The operation of (B) connects 110 volts positive or negative battery to the line to dispose of the coin. If the coin is to be collected, 110 volts positive battery is connected to the winding of (I) through the front contact of (C). If the coin is to be returned, the 110 volts negative battery is connected to the line through the front contact of (B) and the back contact of (C), through the winding of (I). (I) now operates in series with the coin magnet and remains operated during the time that the battery is connected to the line. Battery through the coin magnet should cause disposal of the coin, but the magnet will hold ground on the tip of the line as long as it is operated. The operation of (I) connects battery to hold (H) operated since the operating circuit for this relay is opened when (B) operates. When the "I" lead ground is removed (B) releases, removing the coin collect or return current, releasing (I) and holding (H) operated. At the next closure of ground to the "I" lead (B) reoperates, connecting coin disposal current to the line. The coin should have been disposed of

on the first application of the potential, which upon the removal of the potential, restores the coin magnet to normal, and no current should flow through (I) on the subsequent application of the coin potential.

11.2 With (B) operated and (I) normal, (H) releases, in turn releasing (HH) and removing ground from the sleeve of the line finder, which releases and also restores the circuit to normal.

12. STUCK COIN

12.1 "X" Wiring

If for any reason the coin is not properly disposed of, (B) continues to function under control of the "I" lead ground. After an interval of time, the associated alarm circuit will indicate a trouble condition by audible and visual alarms.

12.2 "Y" Wiring

"Y" wiring provides a connection to battery on the "1B" lead in the associated "Coin Trunk Timed Release Circuit". When this circuit is used the continued attempts of the Coin Trunk Circuit to dispose of the coin are limited by the timing of the Release Circuit. At the end of the time period battery is removed from the "1B" lead and the circuit functions as though the coin had been disposed of, restoring to normal as described in Paragraph 11.

13. CALLS TO SPECIAL SERVICE OPERATOR

On calls to a special service operator, the selector level trunk is so arranged that battery and ground are reversed immediately when the operator answers. This causes the circuit to function as described in Paragraph 8. If coin collect current is supplied to the line from the trunk, (P) remains released and (P1) releases. If coin return current is applied to the line from the trunk, (P) operates and (P1) remains operated. Neither relay performs a useful function at this time.

On a rering by the special service operator, (P) may operate on ringing current. If (P) remains operated due to earth potential with (P1) released it shunts down (J). (J) released releases (K) and short-circuits (P). The earth potential which may have held (P) will not operate it after the short circuit is removed. The release of (J) also reverses the tip and ring operating (P1) which shunts down (K1).

14. CONTACT PROTECTION

Resistances (D) and (F) at relay (DD) are connected to the "A" and "B" condensers during the application of coin battery to the line and in this connection are used to protect the contacts which control the application of this battery to the coin magnet. Condenser (D) and resistance (E) are used to protect the pulsing contacts of relay (R).

15. OPERATION WHEN "T" WIRING IS USED

The "T" wiring is used only when the lines on certain levels in the associated line finder group are equipped with long line circuits. The line finders are then equipped with normal post springs that operate on the multiple bank levels on which all the working lines are provided with long line circuits. When the normal post springs on the line finder operate, leads "E" and "F", (which are connected together when the finder is normal for the purpose of making the finder busy by grounding the sleeve at the associated first selectors) are opened and lead "F" is connected to lead "A". When a call is originated the long line circuit closes a bridge across the tip and ring which operates (L). (L) operates (N) and (DD). (N) operates (NN). (NN) closes a bridge across the tip and ring toward the first selector. The only useful function of (DD) at this time is that it grounds the sleeve so as to hold the line finder until (HH) operates. The bridge across the tip and ring causes the operation of relays in the first selector that supply a holding ground over the "S" lead. When ground is returned over the "S" lead from the first selector (A) and (S) operate (Relay (A) operating over the "A" and "F" leads in turn operating (S) which locks to the sleeve). The operation of (A) closes the tip and ring through from the long line circuit to the first selector, operates (P1) and allows (L), (N), (NN) and (DD) to release. The operation of (S) operates (H) and (HH). (H) locks under control of (B). The test for the presence of the coin at the substation is made in the long line circuit and therefore (RT) and (BT) do not enter into the circuit operation on this call; similarly, the dial pulses are repeated in the long line circuit so that (R) is not used. When the call is answered (P) operates, (P1) releases, and circuit functions as described in the first paragraph of Section 8. However, the only useful function in the operation of (P) and release of (P1) is to operate (C) which locks to the sleeve and sets the circuit in a position to collect the coin when the subscriber disconnects. When

the calling subscriber disconnects the circuit functions as described under Section 10. If the call is answered (C) is operated causing coin collect current to be applied to the line and if the call is not answered (C) is normal and coin return current is then applied to the line. On calls to the special service operator (P) operates and (P1) releases which operates (C) and sets the circuit in a position to collect the coin when the subscriber disconnects. The operation of (J), (K) and (K1) serves no useful function on this type of call because the repeating coil in the long line circuit prevents the coin ground from grounding the tip conductor in this circuit.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 3330-OCH-FJS-ML

STEP BY STEP SYSTEMS
NO. 1, 350A OR 355A
COIN TRUNK CIRCUIT
FOR USE PRECEDING A FIRST SELECTOR
SERVING PREPAYMENT COIN LINES
ARRANGED TO BRING IN ALARM WHEN TROUBLE
GROUND EXISTS ON RING OF COIN LINE

CHANGES

C. CHANGES IN CIRCUIT REQUIREMENTS OTHER THAN THOSE APPLYING TO ADDED OR REMOVED APPARATUS

C.1 Requirements for the (BT) R2099 relay are changed from:

Block or Insulate	Conn. Bat.	Conn. Grd.	Test Set Prep.	See Test Note No.	Test Wdg.	Remarks
(S)NO		4B(NN)	GRD	1/2	P	
(S)NO		4B(NN)	GRD.	2	P	
(S)NO	3B(C)	1B(NN)	M	1/2	S	Insulate 1B(NN)
(S)NO		1T(BT)	GRD.	1/2	T	

Test Notes:

1. Arm. need not touch core.
2. Make ckt. busy from Jack (T).

All other headings, no change.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 3330-MCK-FJS-KM

STEP-BY-STEP SYSTEMS
NO. 1, 350A OR 355A
COIN TRUNK CIRCUIT
FOR USE PRECEDING A FIRST SELECTOR
SERVING PREPAYMENT COIN LINES
ARRANGED TO BRING IN AN ALARM WHEN TROUBLE
GROUND EXISTS ON RING OF COIN LINE

CHANGES

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 Lead "A" is added to Common Number and Class Circuit to provide for the use of this circuit in offices having Automatic Ticketing.

D.2 "R" Option is rated "A&M Only" since it is not required with the new Interrupter and Alarm circuit SD-30852-01 for Prepay Coin Trunks. That circuit is arranged to start from battery over lead "A". Circuit note 103 is added and Note 102 is revised to record this change.

D.3 In Figs. 51 and 52, the "A" lead to the Common Number and Class Ckt. is added and the "CT" and "CT1" leads are indicated as "R" Option. For the time being, at least, it is considered economical for reasons of uniformity to retain the internal wiring for the "CT" and "CT1" leads in all cases.

All other headings, no change.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 3330-MCK-FJS-AW

CD-31592-02
Issue 1
Appendix 3-B
Dwg. Issue 4-B

STEP-BY-STEP SYSTEMS
NO. 1, 350A OR 355A
COIN TRUNK CIRCUIT
FOR USE PRECEDING A FIRST SELECTOR SERVING PREPAYMENT COIN LINES ARRANGED TO BRING IN AN ALARM WHEN TROUBLE GROUND EXISTS ON RING OF COIN LINE

CHANGES

C. CHANGES IN CIRCUIT REQUIREMENTS OTHER THAN THOSE APPLYING TO ADDED OR REMOVED APPARATUS

C.1 Blocking information for the (P) and (P1) relays is changed from (K)O to (DD)NO.

All other headings, no change.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 3330-MCK-FJS-AX

CD-31592-02
Issue 1
Appendix 2-B
Dwg. Issue 3-B

STEP-BY-STEP SYSTEMS
NO. 1, 350A, OR 355A
COIN TRUNK CIRCUIT
FOR USE PRECEDING A FIRST SELECTOR SERVING PREPAYMENT COIN LINES ARRANGED TO BRING IN ALARM WHEN TROUBLE GROUND EXISTS ON RING OF COIN LINE

CHANGES

C. CHANGES IN CIRCUIT REQUIREMENTS OTHER THAN THOSE APPLYING TO ADDED OR REMOVED APPARATUS

C.1 Page 3 - (S) relay - "Cont. Press." column changed from SPL. to L.

All other headings, no change.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 3330-VJA-FJS-IF

STEP-BY-STEP SYSTEMS
NO. 1, 350A, OR 355A
COIN TRUNK CIRCUIT
FOR USE PRECEDING A FIRST SELECTOR
SERVING PREPAYMENT COIN LINES
ARRANGED TO BRING IN ALARM WHEN TROUBLE
GROUND EXISTS ON RING OF COIN LINE

CHANGES

C. CHANGES IN CIRCUIT REQUIREMENTS OTHER THAN THOSE APPLYING TO ADDED OR REMOVED APPARATUS

C.1 A non-operate adjustment was added for the (S) relay, and the operate adjustment was changed from Test 47, readj. 33, to the new values shown. Note 1 which applied to the (S) relay was removed. It read, "Min. 8 gm. on the 6T spring and the specified tension for "L" cont. press. on all other springs."

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 The replacement note was added, and "355A" was added in the second line of the title.

D.2 Cross connection Fig. 51 was revised, and Figs. 52 and 53 were added.

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4. CONNECTING CIRCUITS

When this circuit is shown on a keysheet, the connecting information thereon shall be followed.

		No. 1 or 350A	No. 355A
4.1	Line Finder Circuit	SD-31530-01	SD-32000-01
4.2	Selector Circuit	SD-30200-01	SD-31735-01
4.3	Coin Trunk Alarm Circuit	SD-30852-01	SD-31975-01
4.4	Coin Trunk Timed Release Ckt.	SD-31861-01	SD-31861-01
4.5	Sub Line Circuit Equipped with Rotary Line Switch	SD-31259-01	SD-31259-01
4.6	Selector Repeater	SD-31914-01	SD-31914-01

All other headings, No change.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 3330-OCH-FJS-BZ

STEP-BY-STEP SYSTEMS
NO. 1 OR 350A
COIN TRUNK CIRCUIT
FOR USE PRECEDING A FIRST SELECTOR SERVING PREPAYMENT COIN LINES ARRANGED TO BRING IN ALARM WHEN TROUBLE GROUND EXISTS ON RING OF COIN LINE

1. PURPOSE OF CIRCUIT

1.1 This circuit is used to provide dial service to prepayment coin stations. It is arranged to automatically collect or return the coin deposited as required, after each call.

2. WORKING LIMITS

2.1 Maximum external circuit loop resistance for subscriber's pulsing and supervision - See Range Chart.

2.2 Earth potential limits:

Relay (P)

Neg. Limit — Maximum 10V

	Min. Conduc. Lp.	Max. Pos. E.P.
Positive Limits	0 Ohms	9.5 V
	105 "	10 "
	220 "	10.5 "
	320 Ohms	11 V
	425 "	11.5 "
	530 "	12 "

2.3 Minimum insulation resistance - 20,000 ohms.

3. FUNCTIONS

3.1 To provide for connecting a prepayment coin station to a first selector or selector repeater.

3.2 To provide for transmitting dial tone from the selector circuit to the calling subscriber.

3.3 To test for the presence of a coin in the coin box.

3.4 To repeat dial pulses after the coin is deposited.

3.5 To automatically return the coin on all uncompleted calls and on completed calls on which there is no charge.

3.6 To automatically collect the coin on completed calls to stations on which a charge is to be made.

3.7 To automatically collect the coin on completed calls to the special service operator unless the operator otherwise disposes of the coin before disconnecting.

3.8 To cut out the coin test and pulse repeating equipment when preceded by a long line circuit.

4. CONNECTING CIRCUITS

When this circuit is shown on a Key sheet, the connecting information thereon shall be followed.

4.1 Line Finder Circuit - SD-31530-01.

4.2 Selector Circuit - SD-30200-01.

4.3 Coin Trunk Alarm Circuit - (Coin Trunk) SD-30852-01, SD-31227-01.

4.4 Coin Trunk Timed Release Circuit - SD-31861-01.

4.5 Subscriber line circuit equipped with rotary line switch SD-31259-01.

4.6 Selector Repeater - SD-31914-01.

DESCRIPTION OF OPERATION

5. ORIGINATING A CALL

The following description applies to "S" wiring or to "T" wiring on calls not originating on lines equipped with long line circuits. When "T" wiring is used, leads E and F are normally connected through normal post springs of the line finder except on levels on which long line circuits are used.

When a prepayment coin station is connected to this circuit by a line finder, relay (L) operates over the subscriber's loop, in turn operating (N) and (DD). (N) operated operates (NN), which closes the circuit to the associ-

ated first selector operating relay (P); provides a holding circuit for (DD); and changes from battery to the ring through the noninductive winding of (RT) to battery through the operating winding of (RT) and the primary winding of (BT). It also removes ground from relay (L), which then holds in series with 6000 ohms (winding of BT), but (BT) does not operate at this time. Relay (DD) operated connects ground to the sleeve lead to hold the line finder. When the (C) retardation coil is connected across the tip and ring leads by the operation of (NN), the (A) relay in the first selector operates and an associated common shelf relay completes the dial tone path to the line through a winding of the (A) relay of the selector. The dial tone path is closed to the calling subscriber through resistances (B) and (C), when "Z" option is used. Otherwise, it is not closed until the coin is deposited, as described in Paragraph 6.

6. COIN DEPOSITED

When the coin is deposited by the calling subscriber, (RT) operates, operating (S), which locks to battery through its front contacts, operates (H) and (HH), supplies dial tone to the calling subscriber, if not already supplied through "Z" option, connects (R) to the ring of the line and removes battery from (RT) which releases and the 29 ohm winding of relay (L), which, however, is held operated by the 800 ohm winding for a time. (R) operated operates (D) and closes a path for holding the (A) relay of the first selector when (NN) releases. (D) operated holds (DD) operated. (H) operated takes over the control of (HH) from (S). (HH) operated, releases (N) and (NN), separates the sleeves of the line finder and first selector and supplements the ground on the sleeve from (DD) to the line finder. (N) released short-circuits (L), releasing it. (N) and (NN) are slow in releasing in order to insure that (R) is fully operated before (NN) releases and opens the bridge to the first selector in case (L) releases when the coin is deposited.

The purpose of the (BT) relay is to block the operation of the coin trunk in case of an irregular condition on the line. The operation is as follows: (BT) operated locks to the sleeve, thru its tertiary winding and resistance J (the function of which is to prevent (BT) from overheating on its tertiary winding) and opens the circuit to (S) preventing its operation and preventing further dialing. It is necessary for the calling subscriber to hang up his receiver after the irregular condition ceases before a further attempt can be made on the call.

7. DIALING

Relay (R) functions to repeat pulses from the subscriber's dial to the first selector. (D) is slow in operating and releases on the first dial pulse, and remains released during the pulsing of each digit. This causes (DD) to remain normal during the pulsing of each digit to aid the pulsing condition.

8. CALL CHARGED

If the call is one on which a charge should be made, the line current is reversed when the called party answers, operating (P) and releasing (P1) which was previously operated. With (P1) released and (P) operated, (J) and (C) operate and lock. The (J) relay operated operates (K), reverses the tip and ring leads from the first selector and short circuits (P) which releases. The reversal of the tip and ring leads causes (P1) to operate. (K) operates (K1) through the front contact of (P1). (K1) operated locks and removes the short circuit from (P).

Relay (C) operated locks and operates (A) and also sets the circuit so as to collect the coin when the calling subscriber disconnects. Relay (A) operated disconnects the tip and ring of the calling line from the (T) retardation coil and (R) relay, releasing (R), and connects the tip and ring through (P) and (P1) to the first selector. (R) released releases (D) and in turn (DD). (DD) released performs no useful function at this time. The reversal of the line by the operation of (J) is necessary to keep the tip side of the line, which is grounded at the station as long as a coin is in the box, always connected through relay (P) to the ground side of the connection.

9. CALL NOT CHARGED

If the call is one on which no charge is to be made, the line current is not reversed. (P), (K) and (K1) will, therefore, not operate and the circuit remains in a condition to return the coin when the calling party disconnects. On this type of call, (A) does not operate and the (A) and (B) condensers placed in the tip and ring leads provide the talking circuit, and relay (R) and retardation coil (T) provide the talking battery and ground supply.

10. DISCONNECT

10.1 Call Charged ((C) Relay Operated)

When the calling subscriber disconnects, the line finder is still held

operated by ground at the contacts of (HH). (S) and (A) release when ground is removed from the selector sleeve and cause (Y) to operate under control of a ground interruption on lead "P", lighting the green alarm lamp (A). Ground is intermittently and alternately connected to leads "P" and "I" for an interval of 1/2 second duration each. This feature is used to cause the coin control battery of this circuit, as described later, to be connected to the subscriber's line for 1/2 second duration and thereby insure sufficient time for proper operation of the coin box magnet. (Y) operated locks under control of (HH) and connects battery to the winding of (B) which operates when ground is received on the "I" lead. If the called subscriber should hang up before the calling subscriber, the line current is reversed when the called station disconnects, operating (P) and releasing (P1). (P) operated with (P1) released short-circuits the winding of (J) causing it to release. (J) released releases (K) and short-circuits (P). (P1) operated and (K) released release (K1). (J) released places the (P) relay again on the ground side of the line. If the calling party disconnects first, (J), (K) and (K1) release when (HH) releases (see 11.2).

10.2 Noncharge Call ((C) Relay Normal)

When the calling station disconnects (R) releases, releasing (D) and (DD), and opens the loop to the succeeding switches. After an interval ground is removed from the sleeve of the selector. From this point on, the circuit functions as described in the preceding paragraph, except the (J), (K) and (K1) will not have been operated.

11. COIN CONTROL

11.1 The operation of (B) connects 110 volts positive or negative battery to the line to dispose of the coin. If the coin is to be collected, 110 volts positive battery is connected to the winding of (I) through the front contact of (C). If the coin is to be returned, the 110 volts negative battery is connected to the line through the front contact of (B) and the back contact of (C), through the winding of (I). (I) now operates in series with the coin magnet and remains operated during the time that the battery is connected to the line. Battery thru the coin magnet should cause disposal of the coin, but the magnet will hold ground on the tip of the line as long as it is operated. The operation of (I) connects battery to hold (H) operated since the operating circuit for this relay is opened when (B) operates. When the "I" lead ground is removed (B) releases, removing the coin collect or return current, releasing (I) and holding (H) operated. At the next closure of ground to the "I" lead (B) reoperates, connecting coin disposal current to the line. The coin should have been disposed of on the first application of the potential which upon the removal of the potential restores the coin magnet to normal and no current should flow through (I) on the subsequent application of the coin potential.

11.2 With (B) operated and (I) normal, (H) releases, in turn releasing (HH) and removing ground from the sleeve of the line finder, which releases and also restores the circuit to normal.

12. STUCK COIN

12.1 "X" Wiring

If for any reason the coin is not properly disposed of, (B) continues to function under control of the "I" lead ground. After an interval of time, the associated alarm circuit will indicate a trouble condition by audible and visual alarms.

12.2 "Y" Wiring

"Y" wiring provides a connection to battery on the "1B" lead in the associated "Coin Trunk Timed Release Circuit". When this circuit is used the continued attempts of the Coin Trunk Circuit to dispose of the coin are limited by the timing of the Release Circuit. At the end of the time period battery is removed from the "1B" lead and the circuit functions as though the coin had been disposed of, restoring to normal as described in Paragraph 11.

13. CALLS TO SPECIAL SERVICE OPERATOR

On calls to a special service operator, the selector level trunk is so arranged that battery and ground are reversed immediately when the operator answers. This causes the circuit to function as described in Paragraph 8. If coin collect current is supplied to the line from the trunk, (P) remains released and (P1) releases. If coin return current is applied to the line from the trunk, (P) operates and (P1) remains operated. Neither relay performs a useful function at this time.

On a rering by the special service operator, (P) may operate on ringing current. If (P) remains operated due to earth potential with (P1) released it shunts down (J). (J) released releases (K) and short-circuits (P). The earth potential which may have held

(P) will not operate it after the short circuit is removed. The release of (J) also reverses the tip and ring operating (P1) which shunts down (K1).

14. CONTACT PROTECTION

Resistances (D) and (F) at relay (DD) are connected to the "A" and "B" condensers during the application of coin battery to the line and in this connection are used to protect the contacts which control the application of this battery to the coin magnet. Condenser (D) and resistance (E) are used to protect the pulsing contacts of relay (R).

15. OPERATION WHEN "T" WIRING IS USED

The "T" wiring is used only when the lines on certain levels in the associated line finder group are equipped with long line circuits. The line finders are then equipped with normal post springs that operate on the multiple bank levels on which all the working lines are provided with long line circuits. When the normal post springs on the line finder operate, leads "E" and "F", (which are connected together when the finder is normal for the purpose of making the finder busy by grounding the sleeve at the associated first selectors) are opened and lead "F" is connected to lead "A". When a call is originated the long line circuit closes a bridge across the tip and ring which operates (L). (L) operates (N) and (DD). (N) operates (NN). (NN) closes a bridge across the tip and ring toward the first selector. The only useful function of (DD) at this time is that it grounds the sleeve so as to hold the line finder until (HH) operates. The bridge across the tip and ring causes the operation of relays in the first selector that supply a holding ground over the "S" lead. When ground is returned over the "S" lead from the first selector (A) and (S) operate (Relay (A) operating over the "A" and "F" leads). The operation of (A) closes the tip and ring through from the long line circuit to the first selector and allows (L), (N), (NN) and (DD) to release. The operation of (S) operates (H) and (HH) which locks to the sleeve. The test for the presence of the coin at the substation is made in the long line circuit and therefore (RT) and (BT) do not enter into the circuit operation on this call; similarly, the dial pulses are repeated in the long line circuit so that (R) is not used. When the call is answered (P) operates and circuit functions as described in the first paragraph of Section 8. However, the only useful function in the operation of (P) and release of (P1) is to operate (C) which locks to the sleeve and sets the circuit in a position to collect the coin when the subscriber disconnects. When the calling subscriber disconnects the circuit functions as described under Section 10. If the call is answered (C) is operated causing coin collect current to be applied to the line and if the call is not answered (C) is normal and coin return current is then applied to the line. On calls to the special service operator (P) operates and (P1) releases which operates (C) and sets the circuit in a position to collect the coin when the subscriber disconnects. The operation of (J), (K) and (K1) serves no useful function on this type of call because the repeating coil in the long line circuit prevents the coin ground from grounding the tip conductor in this circuit.

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