

**PLUGGING-UP LINE CIRCUITS
TESTS
NO. 1 CROSSBAR OFFICES**

1. GENERAL

1.01 This section describes a method of making tests of the plugging-up line circuits in No. 1 crossbar offices.

1.02 It is reissued to include a test of the S relay, and tests of the coin control and ringback features on plugging-up line circuit SD-95399-01. It also includes tests for plugging-up line circuit SD-95597-01.

1.03 The tests covered are:

Plugging-up Line Circuit SD-25149-01

(A) Operate and Release Test of the L Relay and Test of the Supervisory Features

(B) Test of Tip and Ring Continuity and Line Busy Lamp

(C) Test of Incoming Call Reroute Feature

Plugging-up Line Circuits SD-90587-01, SD-95597-01 and SD-96084-01

(D) Operate and Release Test of the L Relay and Test of the Supervisory Features

(E) Test of Tip and Ring Continuity and Line Busy Lamp

(F) Test of Cut-Through Feature (SD-95597-01 and SD-96084-01 Only)

(G) Test of Incoming Call Reroute Feature

Plugging-up Line Circuit SD-95399-01

(H) Operate and Release Test of the L Relay and Test of the Supervisory Features

(I) Test of Tip and Ring Continuity and Line Busy Lamp

(J) Test of Incoming Call Reroute Feature

(K) Test of Coin Control Feature

(L) Test of Ringback Feature

1.04 An assistant or operator will be required at the switchboard for Tests (B), (H), (I), (K), and (L).

1.05 An assistant will be required at the plugging-up panel for Tests (D), (E), and (F).

1.06 Before connecting the cord to the 35-type test set as described in these tests, check that all short-circuiting switches of the telegraph keys are open and that the slides of all rheostats are in their extreme right position. Also check that the BATT & GRD CO key is operated and the REV key is normal in order to provide a metallic connection for checking battery and ground polarity in addition to circuit continuity.

2. APPARATUS

2.01 The apparatus required for each test is shown in the following list: The details for each item are covered in the indicated paragraphs.

Apparatus	Tests											
	A	B	C	D	E	F	G	H	I	J	K	L
35-type Test Set (2.02)	1	-	1	1	-	-	1	1	-	1	1	-
Cord (2.03)	1	-	-	-	-	-	-	-	-	-	-	-
Dial Hand Test Set (2.04)	-	1	-	1	1	-	1	1	-	1	1	-
Cord (2.05)	-	1	1	2	1	1	1	2	1	2	1	2
Cord (2.06)	-	-	1	1	-	-	1	1	-	1	1	-
Subscriber Set (2.07)	-	-	-	-	-	-	-	-	-	-	-	1
Cord Tip (2.08)	-	2	2	4	2	2	2	4	2	2	3	4
Stop-watch (2.09)	-	-	-	-	-	-	1	-	-	-	-	-
Connecting Clip (2.10)	-	-	-	-	-	-	-	-	-	-	-	1

2.02 35-type Test Set.

Note: For Test (K) a No. 35D or No. 35F set is required.

2.03 P3F Cord 6 feet long equipped with a No. 309 Plug on one end and a No. 310 Plug on the other end (3P12E).

2.04 No. 1011G Dial Hand Test Set equipped with a 2W41A Cord Assembly or the replaced No. 1011C Hand Set equipped with one No. 360A and one No. 360B Tool.

Note: The 2W41A Cord Assembly consists of one W2CJ Cord equipped with a No. 471A Jack on one end and a No. 360A and a No. 360B Tool on the other end. The No. 411A Tools which are also furnished with the cord assembly are not required for these tests.

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2.05 PLM Cord 6 feet long equipped with one No. 289B Plug on one end and with No. 360C Tools on the tip conductors and No. 360A Tools on the sleeve conductors at the other end.

2.06 W3M Cord 6 feet long equipped with one No. 310 Plug on one end and with a No. 360C Tool on the tip conductor, a No. 360B Tool on the ring conductor, and a No. 360A Tool on the sleeve conductor at the other end (3W4A).

2.07 No. 531A-3 or equivalent Subscriber Set equipped with a two conductor cord, made up locally, connected to the L1 and L2 terminals. The other end of each of the cords shall be equipped with No. 360C Tools. (See Fig. 7.)

2.08 No. 141 Cord Tip.

2.09 KS-3008 Stop-watch or Second-indicating Watch.

2.10 No. 365 Tool (Connecting Clip).

3. METHOD

Plugging-up Line Circuit SD-25149-01

(A) Operate and Release Test of the L Relay and Test of the Supervisory Features

3.01 This test checks the ability of the plugging-up line circuit L relay to operate on an approximate 4800-ohm line loop and to release against an approximate 15,000-ohm line leak. It also checks the supervisory features and associated auxiliary alarm.

3.02 At the DSA switchboard sender monitor position, connect the Test T & R jack of the 35-type test set to the trouble observation and test jack of the plugging-up line circuit to be tested, using a P3F cord as shown in Fig. 1. Set up 3.2 milliamperes (15,000 ohms) in circuit 1 and 10 milliamperes (4800 ohms) in circuit 2 of the 35-type test set.

3.03 With the short-circuiting switch of the circuit 1 telegraph key operated, operate and release the circuit 2 telegraph key

slowly (approximately 1 second intervals) and observe that the line L lamp and auxiliary lamp at the sender monitor position light and extinguish as the key is operated and released. Also observe that the auxiliary alarm is sounded when the auxiliary lamp is lighted. Satisfactory operation and release of the line L relay are indicated by the lighting and extinguishing of the line L lamp.

3.04 With the telegraph key 2 of the 35-type test set normal, operate the TR (transfer) key of the circuit under test and observe that the line L lamp and auxiliary lamp light, and the auxiliary alarm is sounded.

3.05 With the TR key of the circuit under test operated, operate and release the telegraph key 2 of the 35-type test set and observe that the line L lamp and auxiliary lamp are extinguished and relighted, and the auxiliary alarm is silenced and sounded again.

3.06 Remove the P3F cord from the trouble observation and test jack of the plugging-up line circuit. Momentarily connect an answering cord to the trouble observation and test jack of the circuit under test. Observe that the line L and auxiliary lamps are extinguished, and the auxiliary alarm is silenced when the cord is connected to the jack, and that the line L and auxiliary lamps relight, and the auxiliary alarm is again sounded when the cord is disconnected. Restore the TR key to normal. Observe that the line L lamp and auxiliary lamp are extinguished and the auxiliary alarm is silenced.

3.07 Apply this test to all the plugging-up line circuits to be tested before proceeding with the succeeding tests.

(B) Test of Tip and Ring Continuity and Line Busy Lamp

3.08 This test checks the continuity of the plugging-up line circuit tip and ring conductors between the main distributing frame jack box (tip springs of A and B jacks) and the trouble observation and test jack at the

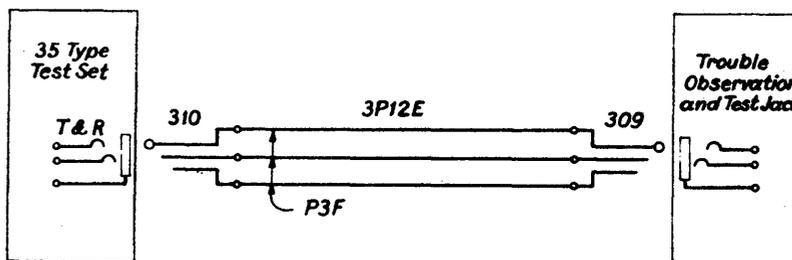


Fig. 1

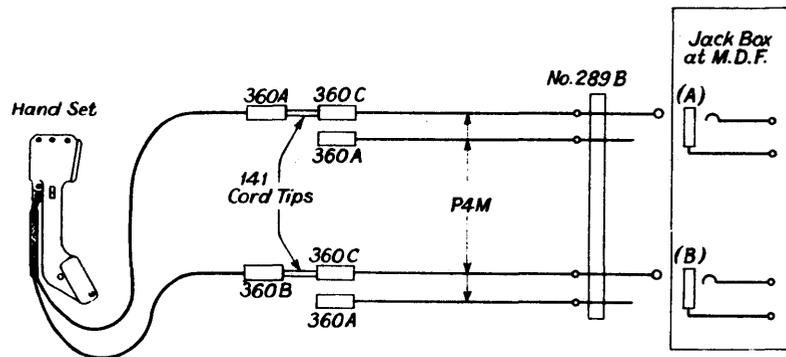


Fig. 2

DSA switchboard sender monitor position, and it checks that the line BY (busy) lamp lights at the sender monitor position when a plug is inserted into the associated A and B jacks at the main distributing frame. It also checks the continuity of the tip and ring conductors and the B lead multiple between jack boxes at the main distributing frame.

3.09 With the Nos. 360A and B tools of the hand set connected to the No. 360C tools of the P4M cord, using two No. 141 cord tips as shown in Fig. 2, connect the No. 289B plug to the first appearance at the main distributing frame of the A and B jacks of the circuit to be tested. When the operator or assistant answers, verify that the line BY (busy) lamp is lighted and that the line L and auxiliary lamps are extinguished. Remove the No. 289B plug from the A and B jacks.

3.10 Repeat 3.09 connecting the No. 289B plug to each appearance at the main distributing frame of the A and B jacks of the circuit being tested.

3.11 Apply this test to all the plugging-up line circuits to be tested before proceeding with the succeeding tests.

(C) Test of Incoming Call Reroute Feature

3.12 This test checks for the presence of resistance battery on the sleeve of the B jack, and ground on the sleeve of the A jack at the main distributing frame which are used in the normal function of the plugging-up line to cause the terminating marker to reroute a call to a plugged-up line, to trouble intercept. It also checks the continuity and polarity of the A and B jack sleeve multiple between jack boxes at the main distributing frame.

3.13 With the No. 310 plug of the W3M cord connected to the Test T & R jack of the 35-type test set and the No. 360C and B tools of this W3M cord connected to the No. 360A tools of the P4M cord, using two No. 141 cord tips as shown in Fig. 3, connect the No. 289B plug to the first appearance at the main distributing frame of the A and B jacks of the circuit to be tested.

3.14 With the BATT & GRD CO key operated and the REV key normal, operate the short-circuiting switch of the telegraph key of circuit 1 of the 35-type test set and adjust the variable resistance so that a convenient reading is obtained, preferably 100 milliamperes.

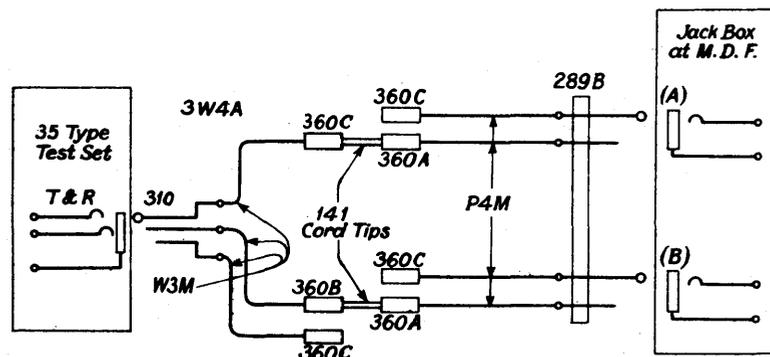


Fig. 3

3.23 Set up 3.2 milliamperes (15,000 ohms) in circuit 1 and 10 milliamperes (4800 ohms) in circuit 2 of the 35-type test set. With the short-circuiting switch of the circuit 1 telegraph key operated, operate and release the telegraph key of circuit 2 slowly (approximately 1 second intervals) and verify with the assistant that the line L and white aisle pilot lamps light and extinguish as the key is operated and released. Also verify that the minor continuous alarm is sounded when the line L lamp is lighted. Satisfactory operation and release of the line L relay are indicated by the lighting and extinguishing of the line L lamp.

3.24 Remove the No. 289B plug from the A and B jacks of the plugging-up line circuit under test and request the assistant to restore the TR key to normal. Verify with the assistant that the line L lamp is extinguished.

3.25 Apply this test to all the plugging-up line circuits to be tested before proceeding with the succeeding tests.

(E) Test of Tip and Ring Continuity and Line Busy Lamp

3.26 This test checks the continuity of the tip and ring conductors between the main distributing frame jack box (tip springs of A and B jacks) and the L (line) jack at the plugging-up panel, and it checks that the line B (busy) lamp lights at the plugging-up panel when a plug is inserted into the associated A and B jacks at the main distributing frame. It also checks the continuity of the tip and ring conductors (tip springs of A and B jacks) and the multiple of the line and busy signal leads between jack boxes at the main distributing frame.

3.27 Request the assistant to operate the TR keys of all the plugging-up line circuits to be tested and to answer the line L lamp signals as they appear.

3.28 With the Nos. 360A and B tools of the hand set connected to the No. 360C tools of the P4M cord, using two No. 141 cord tips as shown in Fig. 2, connect the No. 289B plug to the A and B jacks at the first appearance at the main distributing frame of the circuit to be tested. When the assistant answers, verify that the line L lamp is extinguished and that the line B (busy) lamp is lighted. Also verify that the line L and white aisle pilot lamps were lighted and that the minor continuous alarm was sounded before the line signal was answered. Restore the TR key to normal.

3.29 Repeat 3.28, connecting the No. 289B plug to each appearance at the main distributing frame of the A and B jacks of the circuit under test.

3.30 Apply this test to all the plugging-up line circuits to be tested before proceeding with the succeeding tests.

(F) Test of Cut-Through Feature (SD-95597-01 and SD-96084-01 Only)

3.31 This test checks the ability of the plugging-up line circuit to cut through automatically to reestablish the connection between the subscriber line and the line circuit when the trouble is corrected, where this feature is provided. It also checks that the line L lamp lights to indicate a cut-through condition.

3.32 Request the assistant to operate the CT keys of all the plugging-up line circuits to be tested and to answer the line L lamp signals as they appear, (in 3.35 for circuit SD-96084-01 the signals must be answered promptly in order to check the approximate time interval). Also verify that the TR keys of all the plugging-up line circuits to be tested are normal.

3.33 With the Nos. 360A and B tools of the hand set connected to the No. 360A tools of the P4M cord, using two No. 141 cord tips as shown in Fig. 5, connect the No. 289B plug to the A and B jacks of the plugging-up circuit to be tested.

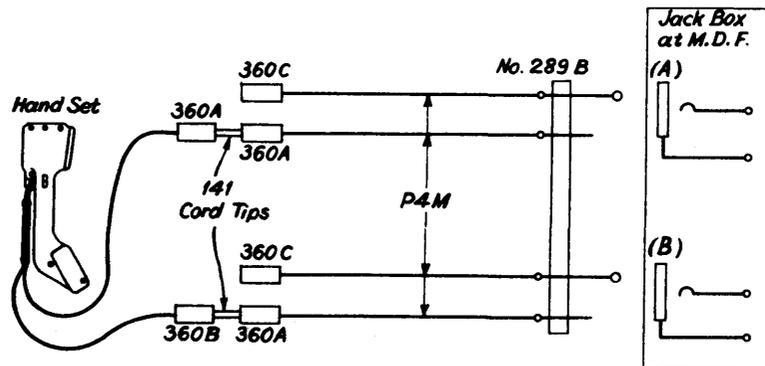


Fig. 5

3.34 Where plugging-up line circuit SD-95597-01 is being tested, the line L lamp should light immediately upon connection of the No. 289B plug to the A and B jacks, and the auxiliary signal circuit alarms will function. When the assistant answers, verify that the line L lamp remains lighted and the auxiliary signal circuit alarms continue to function. Request the assistant to restore the CT key and to disconnect from the plugging-up line circuit being tested.

3.35 Where plugging-up line circuit SD-96084-01 is being tested, the line L lamp should light and the assistant answer in approximately 28 to 58 seconds after the No. 289B plug is connected to the A and B jacks. Check with stopwatch. Verify that the auxiliary signal circuit alarms did not function when the L lamp lighted previous to answering the call, and that the line L lamp remains lighted when the call is answered. Request the assistant to restore the CT key and to disconnect the cord from the plugging-up line circuit being tested.

3.36 Apply this test to all the plugging-up line circuits to be tested as required before proceeding with the succeeding tests.

(G) Test of Incoming Call Reroute Feature

3.37 This test checks for the presence of resistance battery on the sleeve of the B jack, and ground on the sleeve of the A jack at the main distributing frame which are used in the normal function of the plugging-up line to cause the terminating marker to reroute a call to a plugged-up line to trouble intercept. It also checks the continuity and polarity of the A and B jack sleeve multiple between jack boxes at the main distributing frame.

3.38 With the No. 310 plug of the W3M cord connected to the Test T & R jack of the 35-type test set and the No. 360C and B tools of this W3M cord connected to the No. 360A tools of the P4M cord, using two No. 141 cord tips as shown in Fig. 3, connect the No. 289B plug to the first appearance at the main distributing frame of the A and B jacks of the circuit to be tested.

3.39 With the BATT & GRD CO key operated and the REV key normal, operate the short-circuiting key of the telegraph key of circuit 1 of the 35-type test set and adjust the variable resistance so that a convenient reading is obtained, preferably 100 milliamperes.

3.40 Without changing the setting of the 35-type test set connect the No. 289B plug to each appearance of the A and B jacks of the circuit under test. Observe the meter readings.

An appreciable deviation from an average reading is an indication of trouble. Remove the No. 289B plug from the A and B jacks.

3.41 Apply this test to all the plugging-up line circuits to be tested.

Plugging-up Line Circuit SD-95399-01

(H) Operate and Release Test of the L Relay and Test of the Supervisory Features

3.42 This test checks the ability of the plugging-up line circuit L relay to operate on an approximate 4800-ohm line loop and to release against an approximate 15,000-ohm line leak, and the ability of the S relay to operate on an approximate 1500-ohm loop and to release against an approximate 15,000-ohm line leak. It also checks the supervisory features and associated auxiliary alarm and it checks the ability of the circuit to repeat switchhook supervision to the toll switchboard cord supervisory lamp.

3.43 At the main distributing frame, establish communications with the operator or assistant at the toll switchboard using the hand set with the Nos. 360A and B tools connected to the No. 360C tools of the P4M cord, using two No. 141 cord tips as shown in Fig. 4, and with the No. 289B plug connected to the A and B jacks of a plugging-up line circuit other than the one to be tested. Inform the operator as to the line circuit to be tested, and request that the TR key be restored to normal if operated and that the line signals not be answered until requested.

3.44 At the main distributing frame, connect the Test T & R jack of the 35-type test set to the A and B jacks of the plugging-up line circuit to be tested using a W3M cord with the Nos. 360C and B tools connected to the No. 360C tools of the P4M cord, using two No. 141 cord tips as shown in Fig. 4. Verify with the operator that the line BY (busy) lamp is lighted.

3.45 Set up 3.2 milliamperes (15,000 ohms) in circuit 1, 10 milliamperes (4800 ohms) in circuit 2, and 32 milliamperes (1500 ohms) in circuit 3 of the 35-type test set. With the short-circuiting switch of the circuit 1 telegraph key operated, operate and release the telegraph key of circuit 2 slowly and verify with the operator that the line ANS and auxiliary lamps light and extinguish as the key is operated and released. Also verify that the auxiliary alarm is sounded when the line ANS lamp is lighted. Satisfactory operation and release of the line L relay are indicated by the lighting and extinguishing of the line ANS lamp.

3.46 Request the operator to operate the TR key and verify that the line ANS and auxiliary lamps light and the auxiliary alarm is sounded.

3.47 Operate and release the circuit 2 telegraph key of the 35-type test set and verify with the operator that the line ANS and auxiliary lamps extinguished and relighted and the auxiliary alarm silenced and resounded. Request the operator to restore the TR key.

3.48 Operate, and hold operated, the circuit 3 telegraph key of the 35-type test set and verify with the operator that the line ANS lamp is lighted. Request the operator to connect an answering cord to the ANS (answering) jack of the circuit under test and verify that the line ANS lamp is extinguished and that the answering cord supervisory lamp is extinguished.

3.49 Release and operate the circuit 3 telegraph key of the 35-type test set slowly (approximately 1 second intervals) and verify with the operator that the answering cord supervisory lamp lighted and extinguished with the release and operation of the key.

3.50 Release the circuit 3 telegraph key of the 35-type test set, disconnect the No. 289B plug from the A and B jacks of the plugging-up line circuit and request the operator to disconnect the answering cord.

3.51 Apply this test to all the plugging-up line circuits to be tested before proceeding with the succeeding tests.

(I) Test of Tip and Ring Continuity and Line Busy Lamp

3.52 This test checks the continuity of the plugging-up line circuit tip and ring conductors between the main distributing frame jack box (tip springs of A and B jacks) and the line ANS (answering) jack at the toll switchboard, and it checks that the line BY (busy) lamp lights at the toll switchboard when a plug is inserted into the associated A and B jacks at the main distributing frame. It also checks the continuity of the tip and ring conductors between the A and B jacks at the main distributing frame and the TST (test) jack at the toll switchboard, and it checks the continuity of the tip and ring (tip springs of A and B jacks) and the B lead multiple between jack boxes at the main distributing frame.

3.53 With the Nos. 360A and B tools of the hand set connected to the No. 360C tools of the P4M cord, using two No. 141 cord tips as shown in Fig. 2, connect the No. 289B plug to the first appearance at the main distributing

frame of the A and B jacks of the circuit to be tested. When the operator answers, verify that the line BY (busy) lamp is lighted and that the line ANS and auxiliary lamps are extinguished.

3.54 Request the operator or assistant to disconnect the answering cord from the ANS jack and connect it to the TST jack of the plugging-up line circuit under test. When the operator answers, verify that the line ANS lamp is extinguished. Remove the No. 289B plug from the A and B jacks.

3.55 Repeat 3.53 and 3.54 connecting the No. 289B plug to each appearance at the main distributing frame of the A and B jacks of the circuit being tested.

3.56 Apply this test to all the plugging-up line circuits to be tested before proceeding with the succeeding tests.

(J) Test of Incoming Call Reroute Feature

3.57 This test checks for the presence of resistance battery on the sleeve of the B jack, and ground on the sleeve of the A jack at the main distributing frame which are used in the normal function of the plugging-up line to cause the terminating marker to reroute a call to a plugged-up line to trouble intercept. It also checks the continuity and polarity of the A and B jack sleeve multiple between jack boxes at the main distributing frame.

3.58 With the No. 310 plug of the W3M cords connected to the Test T & R jack of the 35-type test set and the No. 360C and B tools of this W3M cord connected to the No. 360A tools of the P4M cord, using two No. 141 cord tips as shown in Fig. 3, connect the No. 289B plug to the first appearance at the main distributing frame of the A and B jacks of the circuit to be tested.

3.59 With the BATT & GRD CO key operated and the REV key normal, operate the short-circuiting switch of the telegraph key of circuit 1 of the 35-type test set and adjust the variable resistance so that a convenient reading is obtained, preferably 100 milliamperes.

3.60 Without changing the setting of the 35-type test set connect the No. 289B plug to each appearance at the main distributing frame of the A and B jacks of the circuit under test. Observe the meter readings. An appreciable deviation from an average reading is an indication of trouble. Remove the No. 289B plug from the A and B jacks.

3.61 Apply this test to all the plugging-up line circuits to be tested.

(K) Test of Coin Control Feature

3.62 This test checks for the presence of coin collect or return potential on both the tip and ring of the plugging-up circuit at the main distributing frame jack box when it is applied at the answering jack by the operator.

3.63 At the main distributing frame establish communications with the operator or assistant at the toll switchboard using the hand set connected as shown in Fig. 2 and with the No. 289B plug connected to the A and B jacks of a plugging-up line other than the one to be tested.

3.64 Connect the No. 310 plug of the W3M cord to the Test T & R jack of the 35D or F test set. Connect the No. 360C tool on the tip of the W3M cord to either one of the No. 360C tools on the P4M cord using a No. 141 cord tip and connect the No. 360B tool of the W3M cord to ground using the No. 365 connecting clip as shown in Fig. 6. Operate the VM key of the 35-type test set and request the operator or assistant at the switchboard to connect an answering cord to the ANS (answering) jack of the circuit to be tested and to apply a coin return condition through the cord. Observe that the voltmeter indicates the applied voltage. Request the operator or assistant to release the operated coin control key.

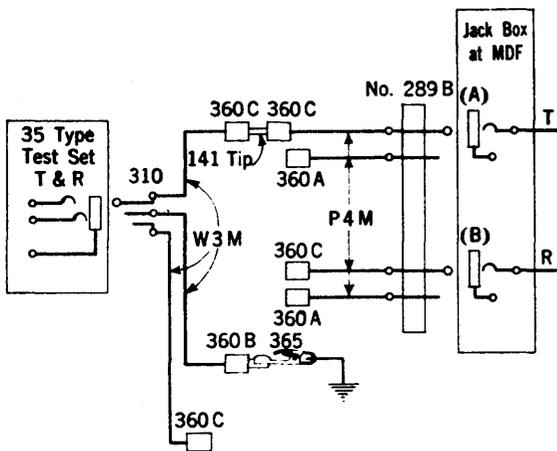


Fig. 6

3.65 Disconnect the No. 360C tool of the W3M cord from the No. 360C tool of the P4M cord used in 3.64 and connect it to the other No. 360C tool of the P4M cord. Request the operator to apply a coin return condition through the cord and observe that the voltmeter indicates the applied voltage. Request the operator or assistant to release the coin key and remove the answering cord from the ANS jack. Remove the No. 289B plug from the plugging-up jack at the main frame.

(L) Test of Ringback Feature

3.66 This test checks the ability of the plugging-up circuit to connect ringing current to a line when the operator operates the ringing key of a cord connected to the ANS jack of the plugging-up circuit.

3.67 Connect the subscriber set (see 2.07) to the P4M cord and connect the No. 289B plug to the A and B jacks of the plugging-up circuit to be tested. (See Fig. 7.) Request the operator or assistant at the switchboard to connect an answering cord into the ANS (answering) jack of the circuit to be tested and to operate the ringing key associated with the answering cord. Observe that the bell in the subscriber set rings. Request the operator to release the ringing key and remove the cord from the ANS jack.

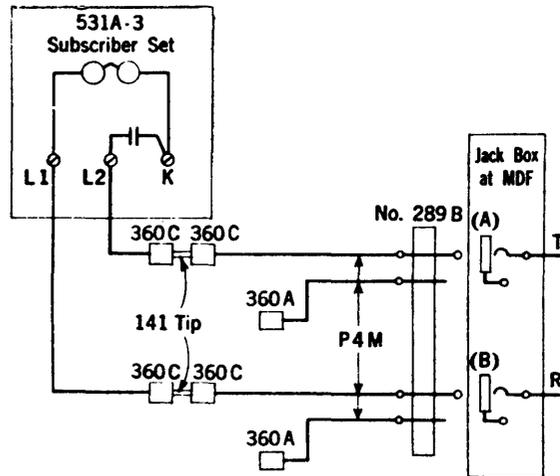


Fig. 7

4. REPORTS

4.01 The required record of these tests should be entered on the proper form.