

SENDER MONITOR CIRCUITS AND SENDER MAKE-BUSY FRAME DESCRIPTION PANEL OFFICES

1. GENERAL:

- 1.1 This section describes the sender monitor and associated equipment where the sender monitor functions are handled at one or more of the intercepting positions of the "A" switchboard of panel offices.
- 1.2 The location of the sender monitor position equipment at the "A" switchboard instead of at the trouble desk, results in the following advantages:
 - (a) The subscriber's service on irregular traffic is improved, especially during night hours.
 - (b) The load can be handled more economically in that the traffic people are enabled to team it with their other loads at the switchboard. This economy is most marked for the night periods.
 - (c) The problem of operator relief, absence, etc., is simplified.
- 1.3 The sender supervisory circuits, the coin control supervisory circuits, the permanent signal holding trunks, the plugging-up lines, the repair service clerk's trunks for night service, and other miscellaneous associated circuits are installed in the intercepting positions at the head of the panel "A" board.
- 1.4 The make-busy jacks for the subscribers' senders are mounted on a sender make-busy frame located in the switchroom. The master alarms described in paragraph 3.4 are brought in on the floor alarm board located on the same floor with the subscribers' senders and relayed on a "floor basis" to other floors. The chief switchman's desk under this arrangement is the coordinating center of the maintenance activities. Accordingly, the talking trunks to carry on the necessary maintenance communications appear not only in this desk but also at the sender make-busy frame, which is ordinarily located near the former.

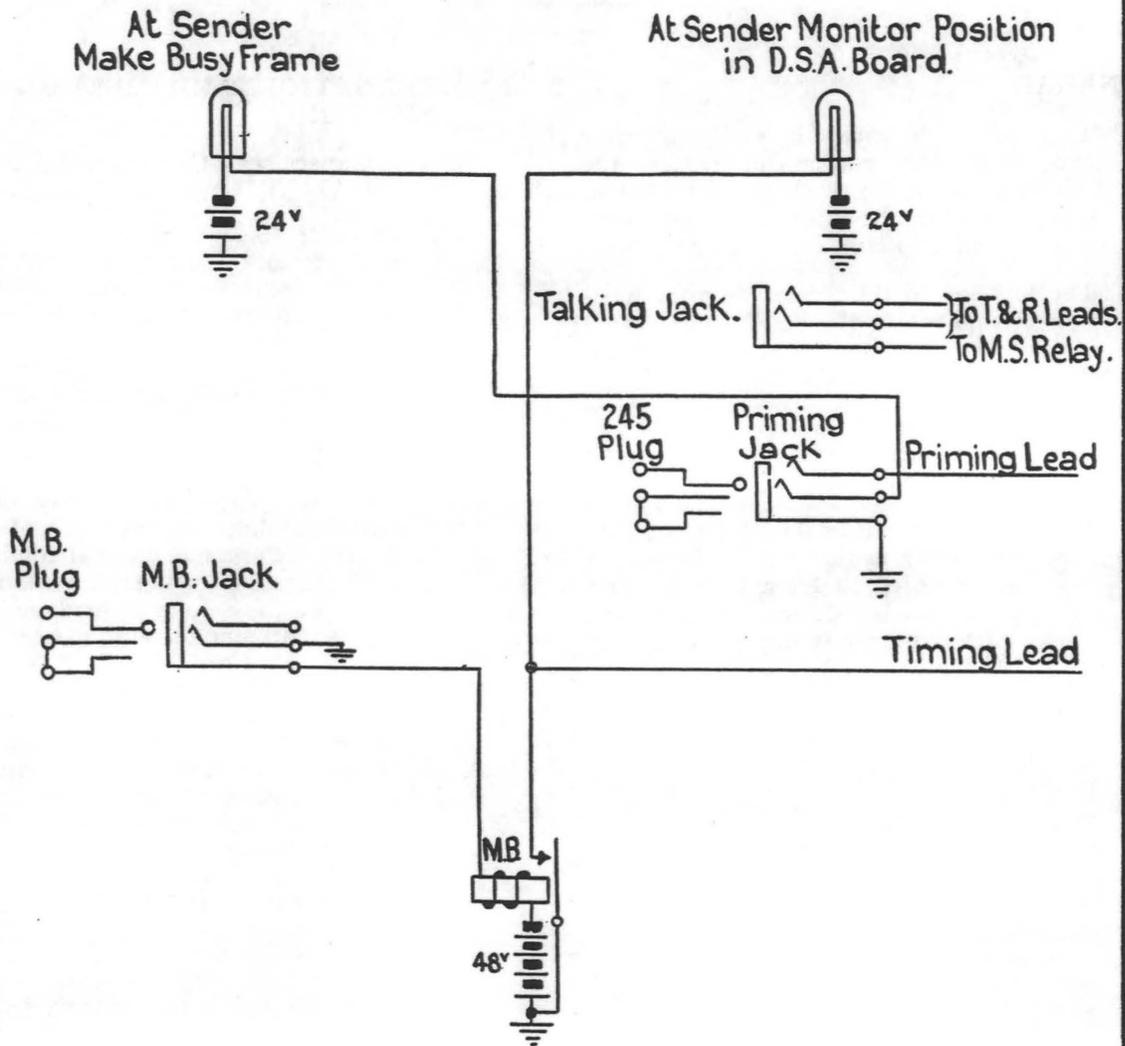
2. DESCRIPTION AND METHOD OF OPERATION:

Sender Supervisory Circuits and Coin Control Circuits:

- 2.1 Drawing 706-548 on page 2 shows in schematic form, the arrangement of the supervisory circuit for non-coin senders. Each sender supervisory circuit consists of one lamp, a priming jack, and a talking jack located in the switchboard, and a make-busy jack and a lamp located at the sender make-busy frame. The lamp at the switchboard indicates by a flashing condition that the sender is "stuck," due to some equipment irregularity or due to partial dialing on the part of the subscriber. Permanent signal conditions are not indicated on the sender lamp, inasmuch as the sender is arranged to route permanent signals automatically to the permanent signal holding trunks. The insertion of a shield (No. 245 plug) in the priming jack causes the lamp at the sender make-busy frame to light and the lamp at the switchboard continues to flash until a make-busy plug is inserted in the make-busy jack, at which time it becomes steadily lighted. If, for any reason, the trouble clears before the sender is made busy, the lamp at the switchboard will be extinguished.
- 2.2 The No. 245 plug is a brass plug which when inserted in the priming jack, makes electrical contact between the ring and the sleeve of the jack. The plug is provided with a metal shield for covering the associated lamp located immediately above the priming jack. This shield reduces the glare of the illuminated lamp, but the operator can distinguish the condition of the lamp through a small hole in the center of the shield.
- 2.3 When a stuck sender lamp signal lights, the operator challenges by plugging an intercepting operator's cord into the talking jack. If a subscriber is not on the line, the cord is pulled down. To release the sender by priming, the intercepting operator's cord is momentarily inserted

NON-COIN SENDER SUPERVISORY AND MAKE BUSY CIRCUIT

706-548
Information



Note; This schematic is based upon the decoder type sender.

- into the priming jack. If the sender does not release after this priming operation, a No. 245 plug is placed in the priming jack. This causes the associated lamp signal at the sender make-busy frame to light. In case it is desired to hold a sender for tracing and clearing of trouble by the maintenance man, the operator may at once (that is, without priming) insert the No. 245 plug in the priming jack.
- 2.4 On the receipt of the signal at the sender make-busy frame, the maintenance man can, if he desires, place a make-busy plug in the make-busy jack of the sender. If the stuck sender is to be traced, a make-busy plug is inserted in the make-busy jack and the lamp at the switchboard becomes steadily lighted. When the maintenance man, after disposing of the trouble, removes the make-busy plug, the lamp at the switchboard is extinguished. The No. 245 plug is then removed from the priming jack.
- 2.5 The coin sender supervisory circuit is the same as the non-coin sender supervisory circuit except that an additional lamp is provided which indicates by a steadily lighted condition that the subscriber has failed to deposit a coin. On receipt of this signal the operator after connecting an intercepting operator's cord to the talking jack challenges and asks the subscriber to deposit a coin.
- 2.6 The coin control supervisory circuit consists of a talking jack, a priming jack and a lamp. The lamp has two conditions, a steadily lighted condition to indicate that the coin control circuit has failed in the process of returning the coin, and a slow flash to indicate that the control circuit has failed in the process of collecting the coin. On receipt of one of these signals, the operator after connecting an intercepting operator's cord to the talking jack challenges and attempts to collect or return the coin as the case may be by means of one of the coin control keys in the cord circuit. The operator should then release the circuit by inserting the plug of the cord momentarily into the priming jack.
- 2.7 The sender supervisory and coin control circuits are not associated with the panel pilot nor the regular night alarm audible signal. These circuits are, however, associated with a separate audible signal consisting of a buzzer and a night alarm key common to these circuits.
- Permanent Signal Holding Trunk:**
- 2.8 A permanent signal holding trunk is a holding circuit to which the sender causes a subscriber's line to be connected automatically under certain trouble conditions or if dialing is not started within a measured time interval. The line on which this condition exists is said to be "permanent." A line on which a "permanent" condition exists is connected to a permanent signal holding trunk, so that the sender can be released and the line held for observation.
- 2.9 The permanent signal holding trunk circuit terminates at the switchboard in a lamp, a jack and a holding key. When a line is connected to a permanent signal holding trunk, the lamp flashes with a slow flash (60 interruptions per minute). To challenge, the operator connects an intercepting operator's cord to the jack. After disconnecting this cord the lamp becomes steadily lighted. The operator notes the time at which she challenged and at the end of the specified time interval reports the case to the maintenance people. If, however, the permanent condition disappears before the end of the time interval, the line is automatically released from the permanent signal holding trunk and the lamp becomes extinguished.
- 2.10 If the holding key of the permanent signal holding trunk is operated, the trunk does not disconnect when the permanent condition is removed, but gives a disconnect signal instead. This signal is a fast flash of 150 interruptions per minute.
- 2.11 A permanent signal holding trunk key may be operated under the following conditions:
- If an outside repairman calls the permanent signal holding trunk to have the number of a line identified.
 - If the number of permanent signals occurring simultaneously or in a short period indicates a cable failure condition and the connections tend to fall away, the holding keys can be operated to hold the permanent signal holding trunk connections until the cable affected is identified.
- 2.12 An overflow circuit is associated with the permanent signal holding trunks. This circuit is provided with a lamp and a key. When all the permanent signal holding trunks in a group are busy and another line served by this group becomes "permanent," the line will be connected to the permanent signal overflow terminal and the lamp in the overflow circuit will be lighted. The operation of the association key extinguishes the pilot lamp.

2.13 In addition to these features, there is provided in the local test desk a key which, when operated, places tone on the permanent signal holding trunks. This key is used primarily for identifying lines which become "permanent" due to a cable failure. In such a case, the key is operated to place tone on all permanent signal holding trunks. The frame man after locating the cable in trouble, can test for tone on the protector springs of the lines in this cable and immediately pull the heat coils on lines on which he finds tone, to release the permanent signal holding trunks.

Plugging-Up Line:

2.14 Plugging-up lines are used for disconnecting subscriber's lines which are in trouble from the common central office equipment, and are arranged to connect the line and equipment to answering jacks at the switchboard. The plugging-up line circuit terminates in jacks at the main frame, and is connected to the subscriber's line at the protectors by means of a cord terminating in a main frame plug.

2.15 The part of the circuit which connects to the central office equipment is used for intercepting incoming calls to the subscriber's line and is called a trouble intercepting trunk. The part of the circuit which connects to the line conductors is called a trouble observation and test trunk. This trunk affords a means for establishing test connections to the line from the test desk. A lamp signal is provided to indicate when the line becomes clear.

2.16 The trouble intercepting trunk terminates in a jack and a lamp. In party line offices, special cords known as trouble intercepting cords are required for answering the trouble intercepting trunks. Where the trouble intercepting trunks must be answered with trouble intercepting cords, the trunks are associated with a separate pilot located in the panel in which the circuits are terminated. When trouble intercepting cords are not required, the intercepting trunks are associated with the regular panel pilot.

2.17 The trouble observation and test trunk terminates in a lamp, a jack and a key. The key is arranged to transfer the circuit of the lamp. If the line is permanent, the lamp is extinguished with the key in the normal position. When the line comes clear, the lamp lights and it can be extinguished by operating the key. The test desk man can get access to the line for

test purposes by requesting the operator to connect a test cord to the trouble observation and test trunk jack.

2.18 There is also a green lamp associated with the plugging-up circuit. This lamp remains lighted while the plugging-up circuit is in use. It is located with the apparatus of the trouble observation and test trunk.

Repair Service Clerks' Trunk for Night Service:

2.19 Trunks are usually provided in the sender monitor position for receiving trouble reports at night from subscribers when the repair service clerks are off duty. Some of the regular repair service clerks' trunk circuits are transferred to the switchboard by the operation of a key located in the repair service desk. The trunk when transferred, terminates at the switchboard in an answering jack and lamp.

Talking Trunks to Sender Make-Busy Frame and Repair Service Desk:

2.20 A talking trunk is provided between the sender monitor position and the sender make-busy frame. This is a two-way automatic circuit terminating at the switchboard in an answering jack and lamp for incoming service and an outgoing trunk jack for outgoing service. This trunk terminates at the sender make-busy frame in a lamp and key and a multiple appears in the chief switchman's desk and also in the outgoing trunk test board if specified.

2.21 A similar trunk is provided between the sender monitor position and the repair service desk.

Test Trunk from Local Test Desk:

2.22 Test trunks from the local test desk terminate in cords at the sender monitor position. These trunks afford a means for the test desk man to get access to lines connected to the trouble observation and test trunks and the permanent signal holding trunks for test purposes. Disconnect lamps are associated with the cord circuits.

Call Circuit from Local Test Desk:

2.23 A call circuit is provided between the local test desk and the sender monitor position by means of which the test desk man can communicate with the operator to have her establish test trunk connections. This call circuit terminates in a lamp and two locking keys, one of which is located in the keyshelf of the sender

monitor position and the other in the adjacent position.

- 2.24 When the test desk man operates the call circuit key at the test desk the lamp is lighted at the switchboard and the test desk man receives a tone signal until the operator answers. The operation of the key at the switchboard connects the call circuit to the operator's telephone set.

Emergency Completing Cord:

- 2.25 The emergency completing cord circuit affords a means for connecting a subscriber to the special service operator if his call has resulted in a stuck sender or has reached a permanent signal holding trunk due to a failure to dial. The use of this cord is usually limited to emergency cases.
- 2.26 The emergency completing cord circuit is provided with a key and a supervisory lamp in the sender monitor position and terminates in an answering jack and lamp at one of the special service positions. The key at the sender monitor position permits the sender monitor operator to pass the information on the call to the special service operator in case conditions make this procedure more desirable than to request the subscriber to repeat the information to the special service operator. The special service operator can complete the call from the jack in which the emergency completing cord circuit terminates in her position.

Trouble Intercepting Cord:

- 2.27 The trouble intercepting cord circuit is required in party line offices for use with the plugging-up line circuits. This cord circuit is arranged to trip machine ringing, give supervision to the intercepting operator and prevent setting up a charge condition when answering calls for either tip or ring parties. A special cord circuit is required to obtain these features due to the fact that the ringing and supervisory features of the incoming selector circuit may be associated with either the tip or ring side of the plugging-up circuit depending upon the party called. The regular intercepting operator's cord circuit will not function when connected to a plugging-up line if the call is for a tip party.
- 2.28 The regular intercepting operator's cord circuit when used with plugging-up line circuits in individual line offices provides all the features of the trouble intercepting cord and in this case, therefore, the latter cord is not required.

Intercepting Operator's Cord Arranged for Sender Monitor Operation:

- 2.29 The intercepting operator's cord circuit at the sender monitor position has the same features as the regular intercepting operator's cord circuit in the intercepting positions and in addition, it is provided with coin control keys.

3. SWITCH ROOM CIRCUITS:

Sender Make-Busy Circuit:

- 3.1 The make-busy jack and lamp for subscribers' senders are located on the sender make-busy frame. The make-busy jacks for "B" senders shown on the miscellaneous circuit drawing for the "B" sender test frame, are located on the "B" sender test frame.

All-Senders-Busy Alarm Circuit for Subscribers' Senders:

- 3.2 In sender selector-type offices, an all-senders-busy alarm circuit is employed which provides a timing feature for bringing in an alarm signal on the occurrence of a sender overload condition of sufficient importance to warrant the attention of the maintenance people. With the sender monitor facilities located at the "A" board, it is also desirable to give an indication of an overload condition of the senders to the traffic people so that they can release for service senders held for tracing which have not been made busy by the maintenance people.

Line Finder Trip Circuit Alarm Circuit for Link-Type Offices:

- 3.3 A line finder trip circuit alarm circuit is provided that has the following features: A trip circuit pilot mounted on the line finder frame is lighted if the trip circuit fails to release within a time interval of 5 to 12 seconds. The audible signal is brought in approximately 7 seconds later if the trouble condition persists. The alarm circuit is associated with the white aisle pilot and the audible signal is arranged to ring intermittently. The appearance of the aisle pilot signal and the audible signal is simultaneous. A pilot lamp is also located on the floor alarm board. There is also a register per line-group which scores once for each time the automatic release feature of the trip circuit operates. The register and relay equipment of the circuit are mounted on the link finder frame.

Master Alarm Pilots:

- 3.4 In general, master alarm pilots which heretofore were located in the trouble desk are not provided. These alarm pilots are not considered necessary in view of the fact that an alarm grouping arrangement is provided to group the master alarms so that a maintenance man on any floor may have knowledge of an alarm on that or any other floor.
- 3.5 The master alarm grouping arrangement consists of a number of grouping keys and associated floor pilots. At each floor alarm board there is provided a floor pilot for each of the other floor alarm boards. When an alarm appears at one floor alarm board, the associated floor pilot lamps, in all the floor alarm boards light. The operation of the grouping keys which are located on the floor alarm board nearest the chief switchman's desk, associates the floor pilots at the various floor alarm boards with the audible alarm. Therefore, an alarm appearing on one floor will cause an alarm to appear on all other floors to which that floor is grouped. The grouping keys are arranged to group the floors in a definite sequence.

Chief Switchman's Desk:

- 3.6 With the sender monitor at the "A" board, trouble reports are made to the chief switchman's desk and talking trunks for this purpose are terminated directly at this desk. The talking trunk from the sender monitor position to the sender make-busy frame is multiplied at the chief switchman's desk. The talking trunk arrangements for the chief switchman's desk, the sender make-busy frame, switchman's desk and outgoing trunk test board are shown on drawing 706-550, page 7.

Sender Make-Busy Frame—Talking Trunks:

- 3.7 The talking trunks which are used to the greatest extent by the maintenance man at the sender make-busy frame are those to the sender monitor, to the repair clerk and to the service observing operator. However, since there is only one telephone set in the chief switchman's desk, other lines appearing in the chief switchman's desk are multiplied at the sender make-busy frame as shown on drawing 706-550, so that if a call comes in when the telephone set in the chief switchman's desk is in use, the call can be answered at the sender make-busy frame. A handset is provided at the sender make-busy frame for use with the talking trunks.

Switchman's Desk:

- 3.8 The switchman's desk circuit is connected to the chief switchman's desk and to the outgoing trunk test board by means of the two-way automatic tie line. A dial station telephone is usually provided at the switchman's desk, and is assigned a number in the official group.

4. EQUIPMENT ARRANGEMENTS:**Switchboard Face Equipment:**

- 4.1 A typical face equipment layout for the dialing type "A" board is shown on page 8. This photograph shows several panels of a switchboard in which sender monitor circuits are located.
- 4.2 The trouble intercepting pilot lamp is equipped with a plain red lamp cap. This lamp is designated by means of a number plate engraved ^{TBL} INT. The location of this pilot lamp is in the extreme right-hand drilling of the panel in which the trouble intercepting trunks are located.
- 4.3 The permanent signal overflow pilot lamp is equipped with a green lamp cap. This pilot is designated with the 1-B number plate engraved ^{PS} OFL. It is located immediately to the left of the auxiliary pilot except where this location interferes with the test desk call circuit pilot in which case it should be immediately to the right of the line auxiliary pilot. The key associated with the permanent signal overflow pilot is located at one side of and immediately adjacent to the pilot.
- 4.4 The test desk call circuit pilot is equipped with a white lamp cap with a black cross. It is designated with a number plate engraved TEST.

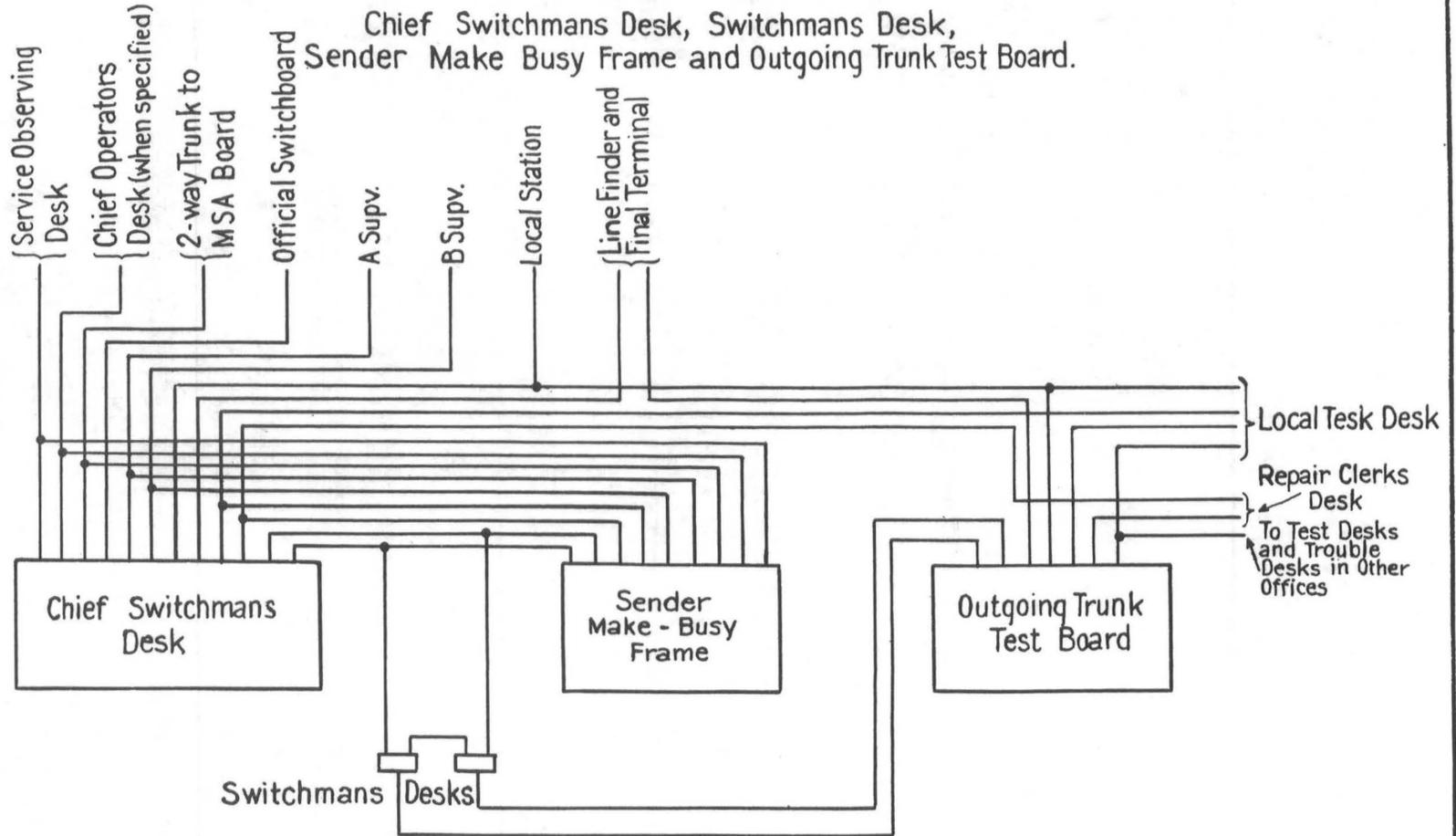
Switchboard Keyshelf Equipment:

- 4.5 A typical keyshelf arranged for sender monitor operation is shown on page 9. The position shown in the photograph is arranged for four intercepting operator's cords in cord positions 8 to 11 inclusive, one trouble intercepting cord in cord position 6 and one emergency completing cord in cord position 5. The test trunks from the local test desk terminate in cords located at the left of the position in cord positions 1 and 2.
- 4.6 The key for the incoming call circuit from the local test desk is located immediately to the left of the emergency completing cord key.

PANEL DIAL OFFICES TALKING TRUNKS

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Chief Switchmans Desk, Switchmans Desk,
Sender Make Busy Frame and Outgoing Trunk Test Board.



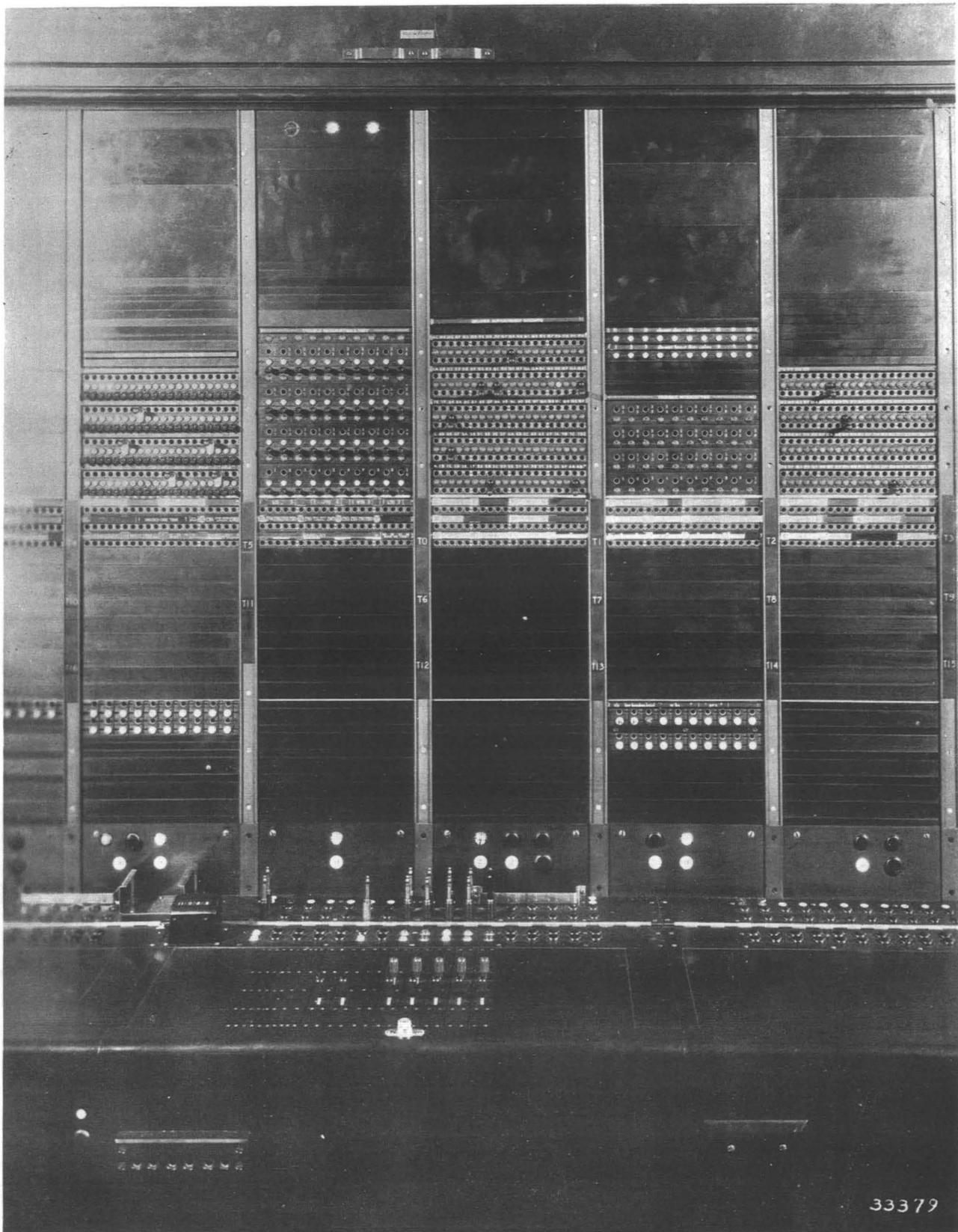
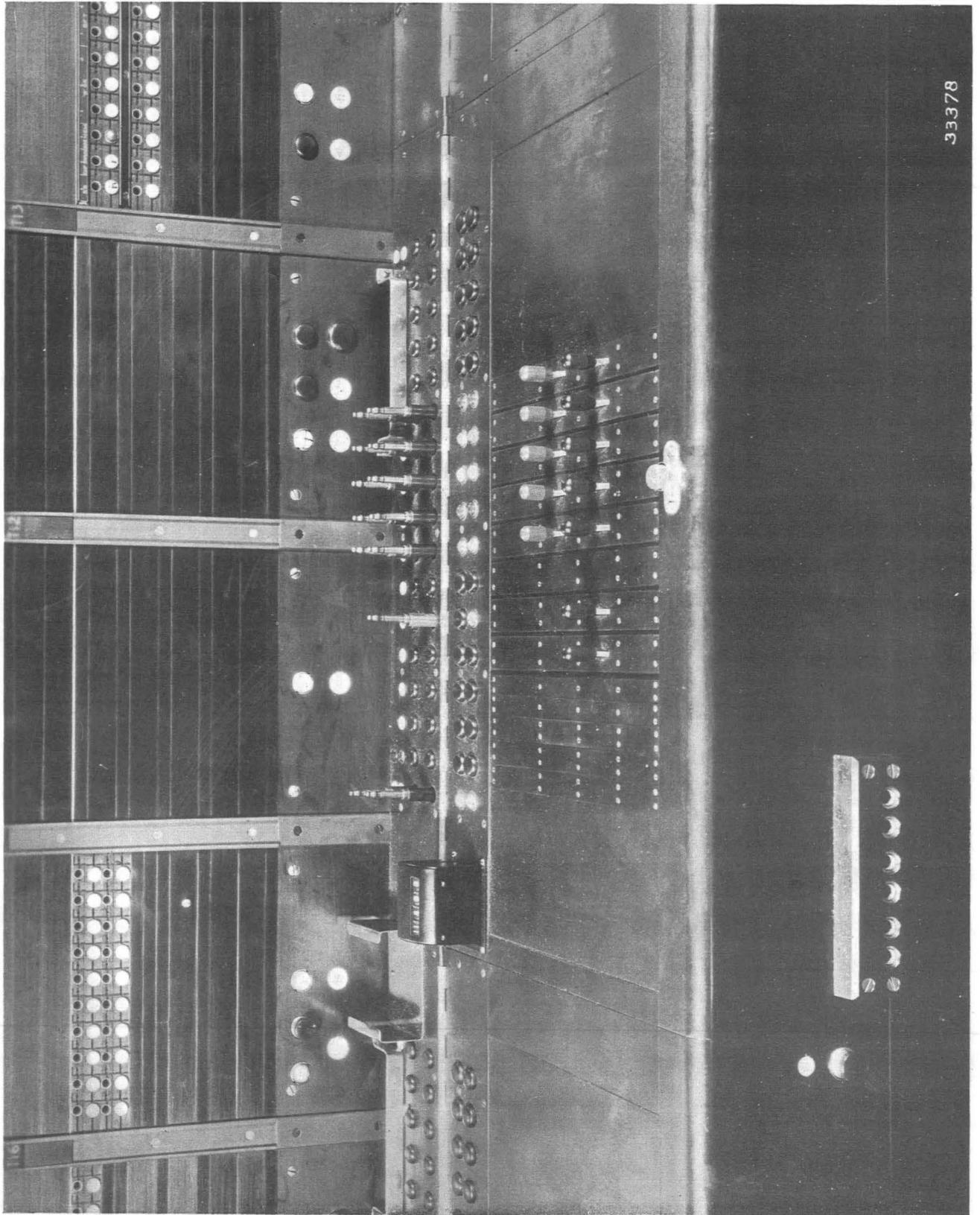


PLATE 1



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PLATE 2

4.7 In all other respects the keyshelf equipment for the intercepting position arranged for sender monitor operation is the same as the equipment of the regular intercepting position.

Switch Room Equipment—Sender Make-Busy Frame:

4.8 The sender make-busy frame which is usually located adjacent to the sender test frame consists of a single bay arranged to mount the make-busy jacks and lamps for 400 subscribers' senders, 40 sender frame make-busy jacks for decoder senders, and 8 keys universally wired for the talking trunks. Space is also reserved on this frame for jacks for service observing purposes. The arrangement of the equipment on the sender make-busy frame is shown on page 11 which shows a sender make-busy frame and a floor alarm board.

4.9 The make-busy jacks for the "B" switchboard senders are located on the sender test frame for testing these senders.

5. CIRCUIT AND EQUIPMENT ARRANGEMENTS—EARLIER OFFICES:

5.1 Where sender monitor position equipment is changed from its position at the trouble desk to the panel "A" board, changes in the circuits involved are made, primarily to care for different sleeve conditions and different sender signals. As these changes involve circuit modifications which may vary due to the circuits originally provided, the necessary circuit changes and the location of the position and other equipment are indicated in the drawings prepared for each installation. The method of operation for sender monitor position equipment when changed from the trouble desk is usually the same as for equipment originally designed for operation at the "A" switchboard.

6. CIRCUITS AND CIRCUIT DESCRIPTIONS:

6.1 Table 1 is a list of the circuit drawings pertaining to Sender Monitor equipment, where the position equipment is designed for installation at the panel "A" board. Detailed circuit descriptions are found in the associated CD sheets. Circuit Drawings pertaining to sender monitor equipment moved from the trouble desk are furnished locally for each installation.

TABLE 1

Panel "A" Board Circuit Drawings:

Cord Circuits

Test Trunk from Local Test Desk	ES-359603
Emergency Completing Cord ..	SD-20377-01
Trouble Intercepting Cord	SD-20375-01
Intercepting Cord Arranged for Sender Monitor Operation ...	SD-20373-01

Jack-Ended Circuits

Plugging-Up Line	SD-20376-01
Permanent Signal Holding Trunk	SD-21016-01
Trunk Transferred from Repair Service Desk for Night Service (Answering Jack)	ES-358023
Talking Trunks to Repair Service Desk and Sender Make-Busy Frame—	
Answering Jack	ES-358023
Outgoing Trunk Multiple Jack	ES-20290-01
Sender Supervisory Circuit—See Sender Circuit	
Coin Control Supervisory Circuit—See Coin Control Circuit	

Miscellaneous Circuits

Call Circuit from Local Test Desk	ES-240256
Permanent Signal Overflow Circuit	SD-20372-01
Auxiliary Signal Circuit	SD-20374-01

Switch Room Circuit Drawings:

Sender Make-Busy Frame	
Sender Make-Busy Circuit	SD-21236-01
Telephone and Talking Trunks	SD-20390-01

Chief Switchman's Desk

Telephone Circuit	SD-20361-01
Key and Lamp Circuit	SD-21356-01
Tie Line to Other Desks and Supervisors	SD-20392-01
Trunk to Line Finder and Final Terminal	SD-20167-01
Trunk to Official P.B.X.	SD-20394-01
Auxiliary Signal and Night Alarm Circuit	SD-20391-01
Emergency Alarm Circuit	SD-21270-01

Switchman's Desk

Telephone and Line Circuits ...	SD-21156-01
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Miscellaneous Talking Trunks

Line to Local Station	ES-226095
Two-Way Automatic Tie Line ..	SD-20424-011

Miscellaneous Alarm Circuits

Alarm Grouping Circuit	SD-21203-01
Trip Circuit Alarm (Line Finder Trip Circuit)	ES-20298-011

(This section consists of excerpts from D and R Bulletin No. 410.)

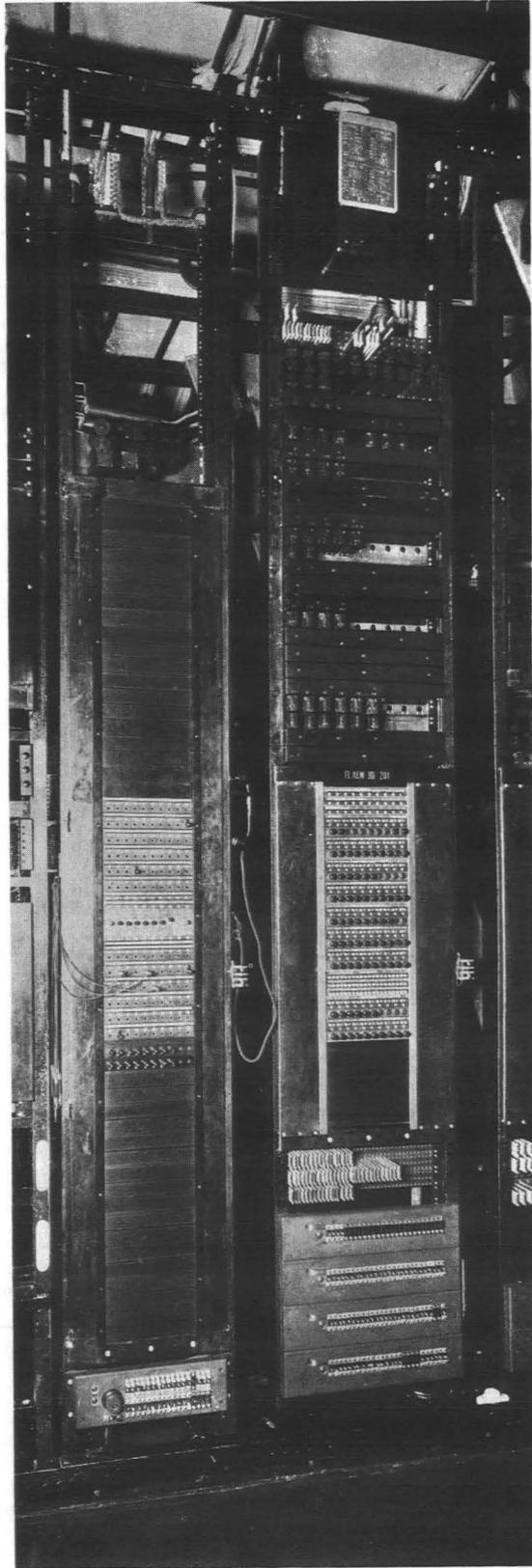


PLATE 3