

Block 5, 4

15

**IDLE TRUNK AND POSITION
INDICATING EQUIPMENTS**

A. R. BROGAN

Western Electric Company
INCORPORATED

INSTALLATION DEPARTMENT

Issued by
GENERAL INSTALLATION ENGINEER
AUGUST, 1928
Reprinted April, 1929

21 (2)

PRINTED IN U. S. A.

PREFACE

This pamphlet is issued for the benefit of the Western Electric Installer and describes briefly the interconnection and operation of Idle Trunk and Position Indicating equipments.

The contents of this pamphlet are based on information issued by the American Telephone and Telegraph Company and the Bell Telephone Laboratories, Inc.

While a particular type of apparatus is discussed, this publication will not be reissued in the event of a change in this apparatus. If a change is of sufficient importance or general interest, a new pamphlet will be written.

The contents of this pamphlet are of a purely descriptive nature and are not designed to prescribe methods or instructions for the installation of central-office equipment.

CONTENTS

INTRODUCTION

- Completing a Call
- Call-Circuit Method
- Straightforward-Trunking Method
- Individual Busy Test
- Preferential Markings
- Group Busy Tone
- Idle Trunk Indicating
- Idle Trunk and Position Indicating

TYPICAL LAYOUT OF IDLE TRUNK AND POSITION INDICATING EQUIPMENTS

- Completing Office
- Originating Office

TYPICAL OPERATION OF IDLE TRUNK AND POSITION INDICATING EQUIPMENTS

- Traffic Operation
- Circuit Operation

FLEXIBILITY OBTAINED BY THE USE OF CROSS-CONNECTIONS

- Change in the Number of Trunks in a Lamp Sub-Group
- Change in the Number of Lamp Sub-Groups in a Trunk Sub-Group
- Change in the Number of Trunk Sub-Groups in a Trunk Group

DEFINITION OF TERMS

DRAWINGS

- Fig.1. Typical Layout of Idle Trunk and Position Indicating Equipments
- Fig.2. Partial Schematic of Idle Trunk and Position Indicating Equipments

QUESTIONS

IDLE TRUNK AND POSITION INDICATING EQUIPMENTS

By A.R. Brogan

of the

GENERAL INSTALLATION ENGINEER'S ORGANIZATION

INTRODUCTION

The Idle Trunk Indicating and the Idle Trunk and Position Indicating equipments provide lamp signals at "A", Toll or Tandem boards to aid originating operators in selecting idle Straightforward Trunks outgoing to Automatic Listening positions of completing "B", Tandem or Toll-Tandem operators.

The need of such equipments may be realized by considering the following description of the various methods of locating idle Straightforward Trunks.

At the end of this pamphlet, definitions of the new terms used herein are given.

Completing a Call

When an originating operator, such as an "A" operator, desires to further the completion of a call by using a trunk circuit outgoing to a completing operator, such as a "B" operator, she must be informed by some means as to what trunk of a group of trunks is idle and ready for her use.

Call-Circuit Method

If the Call-Circuit method of trunking is followed, the originating operator passes the called subscriber's number over a call-circuit to a completing operator. The completing operator, in turn, verbally assigns an idle trunk to the originating operator. The originating operator then plugs her calling cord into an OGT jack of the assigned trunk.

Straightforward-Trunking Method

If the Straightforward method of trunking is followed, the originating operator has no means other than a trunk circuit to enable her to communicate the called number to the completing operator and, therefore, she is required to select a trunk without the aid of the completing operator.

Individual Busy Test

The originating operator may, in the case of Straightforward-Trunking operation, locate an idle trunk by testing the sleeve of each OGT jack of the group of trunks until the test of one of the jacks does not cause a busy-test click in her telephone receiver. The originating operator would then plug her calling cord into the jack of the idle trunk and listen for the spurts of high-tone that indicate the connection

of her telephone set, by means of the trunk, to the completing operator's telephone set.

Preferential Markings

If the group of trunks from the originating office to the completing office is rather large, the originating operator will, during the heavy traffic periods, lose considerable time in making the individual busy-tests described above. This condition may be improved by theoretically dividing the group of trunks into sub-groups of several trunks each and so marking the first jack of each sub-group that the originating operator can readily see, by the particular type of marking, at what trunk jacks she should start making the individual busy-tests. These markings are known as "preferential test markings"; the marked jacks are known as "preferential jacks".

Group Busy Tone

A further decrease in the time required by the originating operator to locate an idle trunk may be effected by providing an auxiliary circuit that will connect a "group busy tone" (low tone) to the left-hand jack of each sub-group of five trunks when all trunks of that sub-group are busy. This sub-group of trunks is known as a "tone sub-group". If the originating operator finds one tone sub-group busy, she will then test the left-hand jack of another tone sub-group. If any of the trunks of this second sub-group are idle, a group-busy tone will not be heard and the originating operator will then make an individual busy-test of each jack of this sub-group until an idle trunk is found. The left-hand jack, or "master busy jack", is indicated by a conspicuous marking so that it may be located, as soon as possible, by the originating operator.

Idle Trunk Indicating

The use of any of the aforementioned methods makes it necessary for the originating operator to make one or more individual busy-tests before she can locate an idle trunk to the desired office. The necessity of making even one busy test may be eliminated if the scheme known as Idle Trunk Indicating is followed. When this scheme is followed, the group of trunks to a given completing office is divided into sub-groups of several trunks each. The idle trunk is indicated by the lighting of a lamp that is in place above the trunk jack at the originating board. The indicating lamps, which are set in combination lamp and designation strips having a capacity of twenty lamps

each, appear in multiples on the 6-, 12- or 18-panel basis. In most instances, a light will appear above the jack of the lowest-numbered idle trunk of each sub-group. As soon as the originating operator plugs her calling cord into the jack of an idle trunk, the light associated with that trunk is extinguished and a light appears at the next lowest-numbered idle trunk of the sub-group. If all trunks of a sub-group are busy, all indicating lamps of that sub-group are extinguished. Idle Trunk Indicating may be suspended during light traffic hours by the use of a key in the switchboard. If the indicating lamps are arranged on the 6-panel basis, a lamp will be in place above each trunk jack and its multiples. If the 12- or 18-panel arrangement is used, there will be certain multiple appearances of trunk jacks that will not have lamps associated with them and, therefore, the group-busy tone feature will be provided to facilitate the locating of idle trunks by the originating operators sitting in front of the "non-indicated jacks".

Idle Trunk and Position Indicating

The Idle Trunk Indicating Circuit indicates an idle trunk to the originating operator, but it does not indicate that the idle trunk appears before an idle completing operator who can give it immediate attention. An arrangement that will indicate an idle trunk that terminates at the trunk position of an idle completing operator is obtained by placing the Idle Trunk Indicating Circuit of the originating office under the control of Idle Position Indicator Circuits associated with the trunk positions of the completing operators. This plan is known as Idle Trunk and Position Indicating.

Under this plan, a lighted indicating lamp indicates that the associated trunk is idle and that one of the following conditions exists: The trunk terminates before an idle completing operator; the trunk terminates before one of a "team" of completing operators, all of whom are simultaneously busy; the trunk terminates before one of a team of completing operators, some of whom are busy while the rest have "all-trunks-busy" conditions on the sub-groups of trunks incoming from the particular originating office; the trunk terminates in an indicating position that is "unoccupied" but grouped to another indicating position that is "idle" and has an "all-trunks-busy" condition on its sub-groups of trunks incoming from the particular originating office; the trunk terminates in an indicating position that is unoccupied but grouped to a "PCI" or a "PCITS" position that is "occupied" and idle. It will be noted that, under any of these conditions, the connection to the completing operator will result either immediately or very soon after the originating operator plugs into the idle trunk. If the trunks terminate in completing positions that are

unoccupied and not grouped to another position arranged for Position Indicating, or if all trunks of a sub-group of trunks have been selected, none of those trunks will be indicated. The Position Indicator Circuit is so arranged that it will continue to function when the trunks are split and grouped into various combinations at the completing positions. The Idle Trunk and Position Indicator Circuits not only serve to indicate idle trunks that appear before idle operators, but also serve to distribute or concentrate traffic over straightforward trunks in a very efficient manner.

TYPICAL LAYOUT OF IDLE TRUNK AND POSITION INDICATING EQUIPMENTS

The following is a brief explanation of the typical layout of Idle Trunk and Position Indicating Equipments shown in Figure 1.

In this explanation we will consider the facilities for the completion of calls over Automatic Listening Straightforward Trunks that originate in a certain "A" office, the "L" office, and terminate in a certain "B" office having the "B" positions "5", "6" and "7".

Completing Office

A total of 30 Automatic-Listening Straightforward (ALSF) Trunks are provided between the "A" and "B" offices. This group of trunks is known as a "trunk group", the definition and example of which are given in definition (1), of Figure 1. This trunk group of 30 trunks is distributed evenly among the "B" positions "5", "6" and "7", which arrangement insures more efficient completion of calls than would be possible if all 30 trunks terminated in but one "B" position.

Each of the three sets of 10 trunks that terminate in "B" positions "5", "6" and "7" is known as a "trunk sub-group". the definition and example of which are given in definition (2) of Figure 1. This trunk sub-group will be referred to as the "L" sub-group, because it originates at the "L" office. The trunks of each trunk sub-group are associated with but one of the five Trunk Splitting Circuits of a "B" position in order to provide the proper indications at the "A" board ends of these trunks when the "B" positions are split and grouped. The trunks of any indicated trunk sub-group should not be so arranged that the operation of any Trunk Splitting Key would split the trunk sub-group. If the trunk sub-group in "B" position "5" consisted of trunks 1 to 15, instead of trunks 1 to 10, the Splitting Key "10/11" would be made ineffective and the "20/21" key would be used for splitting that trunk sub-group from the next trunk sub-group.

The Trunk Splitting Keys "48/1" and "10/11", in the case of "B" position "5", not only control the Trunk Splitting Cir-

ouits of the "B" position but also control the Indicator Splitting Circuit associated with that position. The Indicator Splitting Circuit serves to split the "Sub-Group Indicator Circuit", associated with the "L" sub-group, from all other Sub-Group Indicator Circuits of the "B" position when the "L" sub-group of trunks is split from all other trunk sub-groups of the position.

The Sub-Group Indicator Circuit of a "B" position is normally under the control of the Operator's Control Circuit of the position and the Common Equipment and "Office Circuits" that are common to the Sub-Group Indicator Circuits of the "L" sub-groups in all "B" positions. A Sub-Group Indicator Circuit may be placed under the control of an "indicating" ALSF position on the left or on the right, or, under the control of a PCI or PCITS position on the left or on the right.

The completing operators at "B" positions "5", "6" and "7" are known as a team; the definition of an "L" team is given in definition (3) of Figure 1.

Originating Office

Each of the three "L" sub-groups are subdivided at the "A" board into "lamp sub-groups", the definition and example of which are given in definition (4) of Figure 1. This sub-division of each of the trunk sub-groups into two lamp sub-groups of five trunks each makes it possible to distribute a trunk sub-group among more than one "A" operator. The indicating lamps appear on a 12-panel basis and, therefore, the "A" board panels "2", "4", and "6" are not equipped with combination lamp and designation strips. To facilitate the testing of these non-indicated appearances of trunks, the jacks "80", "85", "90" and "95" in panels "2", "4" and "6" may be used as master busy jacks and the Group Busy Tone feature be provided. The sleeve relay equipment for 120 OGT jack circuits and all their multiples is assembled in the form of a unit known as the Idle Trunk Indicator Circuit Unit. The sleeve relay circuits are subdivided in the same manner as the associated trunks and each subdivision of five "SI" relays has individual control leads connecting it to the particular Indicator Control Circuit that has been assigned to a certain trunk sub-group. Each Indicator Control Circuit of the "A" office is connected by means of a cable pair to the "B" office Sub-Group Indicator Circuit that is associated with the same trunk sub-group.

TYPICAL OPERATION OF IDLE TRUNK AND POSITION INDICATING EQUIPMENTS

Traffic Operation

We will now consider the completion of a call over an Automatic-Listening Straightforward-Trunk that is arranged for Idle Trunk and Position Indicating in accordance with Figure 1.

The "A" operator has just received, from a calling subscriber, the office name and station number of a called subscriber whose telephone set is connected to the "B" office having the ALSF positions "5", "6" and "7".

With the TALK key of the Subscribers Cord Circuit operated and the calling cord in hand, the "A" operator scans the multiple appearances of the group of trunks outgoing to the desired "B" office for a lighted indicating lamp. She sees a lighted indicating lamp over jack "90" in panel "3" of the "A" board and directly plugs the calling cord into that jack.

With the insertion of the calling cord into the trunk jack. The indicating light at jack "90" is extinguished immediately; the "A" Operator's Telephone Set is automatically connected, by means of the Straightforward Trunk and the associated Sequence Circuit of the trunk position, to the "B" Operator's Control Circuit which sends the order-passing signal of two spurts of high-tone to the "A" operator and then completes the talking circuit between the "A" and "B" operators for order-passing; the "A" operator verbally passes the called station number to the "B" operator who may, or may not, acknowledge the receipt of the order, depending upon the local operating practices; no light appears at any jack of either of the first and second lamp sub-groups, trunks "90" to "94" and "85" to "89" in panels "3" and "5" respectively, unless, for example, all of the "B" positions "5", "6" and "7" are busy, or, "B" positions "5" and "6" are busy while there is an all-trunks-busy condition on the "L" sub-group of "B" position "7".

As soon as the "B" operator receives the called number, she releases her Operator's Control and Telephone Circuits from the Straightforward Trunk by either momentarily depressing a release key or plugging the trunk cord into the called subscriber's line jack. The indicating lamps at the jacks of the lowest-numbered idle trunks of the first and second lamp sub-groups will now light, if the Operator's Control Circuit of "B" position "6" has not been made busy by the selection of another trunk of that position.

With the connection of the trunk cord to the subscriber's line, ringing current is automatically connected to that line to ring the called subscriber's bell. When the called subscriber answers, ringing is stopped and the subscriber-to-subscriber talking circuit is established over the Straightforward Trunk.

When the "A" operator disconnects the calling cord from jack "90", after the two subscribers have finished their conversation, the indicating lamp above jack "90" will light, if "B" position "6" is idle or is indicating under one of the various conditions previously mentioned under "Idle Trunk and Position Indicating."

Circuit Operation

The following explanation, together with Figure 2, gives the details of the operation of the Idle Trunk and Position Indicating Circuits when a call is completed over an Automatic-Listening Straightforward-Trunk in accordance with the description previously given under "Traffic Operation".

The lighting of the indicating lamp at Jack "90", in panel "3" of the "A" board, indicates that the trunk associated with that jack is idle and, in this case, terminates in an idle trunk position - "B" position "6".

The Splitting Keys "48/1" in "B" positions "6" and "7" are operated so that position "6" will not be grouped to either "B" position "5" or "7". The "48/1" keys operate the "S-1" relays of the Indicator Splitting Circuits associated with those keys and thus open the "L" leads between trunk positions "5", "6" and "7".

The selected trunk is in the first of the two lamp sub-groups of the trunk sub-group that terminates in trunk cords "11" to "20" of "B" position "6". Therefore, the indications at the originating end of that trunk are under the control of the second Sub-Group Indicator Circuit of Position "6".

Since position "6" is occupied, its transmitter relay "T" is operated and, consequently, the "C" and "PO" relays of the Indicator Splitting Circuit are operated. The "C" relay now causes the "G-2" and "I-2" relays of the second Sub-Group Indicator Circuit to operate. The operation of the "I-2" relay supplies battery, from the winding of the "TB-2" relay, over the ring side of an interoffice cable pair to operate the "L" relay in circuit "2" of the Indicator Control Circuit equipment at the "A" office. The operating circuit of the "L" relay is completed to ground by means of the tip side of the interoffice cable pair, which is grounded at the MDF of the "B" office. The "TB-2" relay does not operate at this time because of the 24,000 ohms of resistance offered by the secondary winding of the "L" relay in the "A" office.

The operation of the "L" relay of Indicator Control Circuit "2" causes the "L-1" relay of the same circuit to operate. The "L-1" relay now supplies battery over an individual battery lead "B-1" to each of the two subdivisions of sleeve relays that are associated with the two lamp sub-groups appearing as trunks "90" to "94" and "85" to "89" in panels "3" and "5", respectively, of the "A" Board.

Since trunk "90" is idle, the associated "SL" relay is normal. The upper contact of this "SL" relay now connects "B-1" lead battery, over an "L" lead, to the indicating lamp above the jack of trunk "90", thus lighting the lamp.

When the "A" calling cord is plugged into the idle trunk jack "90", the associated "SL" relay, which has one terminal of its winding connected to relay-rack ground, is operated by battery through resistance in the sleeve circuit of the calling cord, over a sleeve lead of the OGT multiple, to the "SL" relay. The operation of the "SL" relay extinguishes the light of the indicating lamp by transferring the "B-1" battery lead from that lamp to the "SL" relay of the succeeding trunk "91". If trunk "91" is idle, its "SL" relay will be normal and, therefore, its indicating lamp will be lighted, indicating that trunk "91" is the lowest-numbered idle trunk of the first lamp sub-group.

The connection of the "A" calling cord to trunk jack "90" also causes the selected trunk to be automatically connected to the Operator's Control Circuit of "B" position "6". The "AL" relay of the Operator's Control Circuit now operates and short-circuits the winding of the "C" relay of the Indicator Splitting Circuit of "B" position "6". The release of the "C" relay permits the "G-2" and "I-2" relays of the second Sub-Group Indicator Circuit to release. The release of the "I-2" relay causes the "L" and "L-1" relays of the associated Indicator Control Circuit of the "A" office to release. The "L-1" relay now disconnects "B-1" lead battery from the contacts of the "SL" relays of the two lamp sub-groups of the trunk sub-group to "B" position "6". Therefore, while the "AL" relay of the "B" Operator's Control Circuit is operated, battery will not be supplied to any of the indicating lamps of the trunk sub-group, except: When both the "I-1" and "I-3" relays (shown in Figure 1) of "B" positions "5" and "7", respectively, are normal simultaneously, or, as another example, when the "TB-3" of "B" position "7" is operated while the "I-1" relay of "B" position "5" is normal.

When the operator at "B" position "6" releases her Operator's Control Circuit from the incoming trunk, the "AL" relay is released. The release of the "AL" relay removes the short circuit from around the "C" relay of the Indicator Splitting Circuit and allows that relay to reoperate. The "C" relay then supplies battery to reoperate the "G-2" relay which, in turn, reoperates the "I-2" relay. The operation of the "I-2" relay is followed by the reoperation of the "L" and "L-1" relays of the Indicator Control Circuit of the "A" office. The "L-1" relay supplies battery to the contacts of the "SL" relays of the two lamp sub-groups, and, if any of the trunks associated with these relays is idle, an indicating light will appear over the jack of that trunk.

The connection of the trunk cord to the called subscriber's line, after the trunk circuit has been disconnected from the Operator's Control Circuit, does not affect the operation of the Idle Trunk and Position Indicating Circuits.

When the "A" operator disconnects the

calling cord from OGT jack "90", after the subscribers have finished their conversation, the "SL" relay associated with that jack will release. This "SL" relay will then transfer "B-1" lead battery from the "SL" relay of the succeeding trunk to the indicating lamp of trunk "90", which will re-light. Trunk "90" is now idle and may be used in completing another call to the completing office in which it terminates.

If an all-trunks-busy condition had occurred on the trunk sub-group terminating in "B" position "6" while the "A" calling cord was connected to the OGT jack of trunk "90", the "O-1" and "O-2" relays of Indicator Control Circuit "2" would have been operated by "B-1" lead battery through the make contacts of the "SL" relays associated with the two lamp sub-groups having jacks "90" to "94" and "85" to "89", respectively, in panels "3" and "5" of the "A" board. The make contacts of the "O-1" and "O-2" relays, in series, provide a short circuit around the 24,000-ohm winding of the associated "L" relay. This reduces the "L" relay's resistance to the resistance of its "P" winding, which is 160 ohms, and thus allows the "TB-2" relay in the "B" office to operate. One of the functions of the "TB-2" relay is to supply battery, from the "C" relay of the Indicator Splitting Circuit of a trunk position, for operating the "G" relay of the next Sub-Group Indicator Circuit on the left or on the right, for example, the "G-1" relay of "B" position "5" or the "G-3" relay of "B" position "7"; or to operate both of these "G" relays. When a Sub-Group Indicator Circuit in the position on the left or in the position on the right is controlled by the "TB" relay of the home position, the trunk sub-group associated with the Sub-Group Indicator Circuit of the trunk position on the left or on the right is considered as an "overflow sub-group". The "48/1" key of a "B" position must be released before a trunk sub-group of that position can function as an "overflow sub-group".

FLEXIBILITY OBTAINED BY THE USE OF CROSS-CONNECTIONS

Because of changing traffic requirements, it will be necessary, from time to time, to change the number and location of the terminating appearances of Straightforward Trunks outgoing from an originating office to a completing office.

In order to facilitate such changes, the Idle Trunk and Position Indicating units in the originating and completing offices are provided with terminal strips arranged for the termination of cross-connections, as well as permanent cabling.

By rearranging cross-connections, changes may be made in any of the following:

- (a) Number of trunks in a lamp sub-group in the OGT multiple of an originating office.
- (b) Number of lamp sub-groups in a trunk sub-group.

(c) Number of trunk sub-groups in a trunk group.

(d) Number of trunk positions in a team of trunk positions.

(e) Location of appearances of lamp sub-groups in OGT multiple.

(f) Location of trunk sub-groups in trunk positions of a completing office.

Some of the changes mentioned above are explained in the following.

Change in the Number of Trunks in a Lamp Sub-Group

When the number of trunks in a lamp sub-group is to be increased or decreased, the connections that terminate on certain "C-1" and "C-2" punchings of the Idle Trunk Indicator Circuit unit shall be so arranged that the sleeve relays of the O.G. Trunks to be added or removed will be included in or excluded from the lamp sub-group, respectively. The "C-1" and "C-2" punchings and associated connections are shown in Figure 2.

Change in the Number of Lamp Sub-Groups in a Trunk Sub-Group

A change in the number of lamp sub-groups in a trunk sub-group necessitates the addition or removal of cross-connections between certain "B" and "TG" punchings on the horizontal and vertical sides of the IDF: also between certain "B", "TG", "C-1" and "C-2" punchings of the Idle Trunk Indicator Circuit unit. See Figure 2.

If a lamp sub-group is added to a trunk sub-group, it will be necessary to use an additional "O" relay of the Indicator Control Circuit, for example, an "O-3" relay.

Change in the Number of Trunk Sub-Groups in a Trunk Group

If a trunk sub-group is added to a trunk group, it will be necessary to use an additional Indicator Control Circuit in the originating office and an additional Sub-Group Indicator Circuit in the completing office. These two circuits will be connected together by means of cross-connections at the main distributing-frames of the originating and completing offices and by a cable pair between these offices.

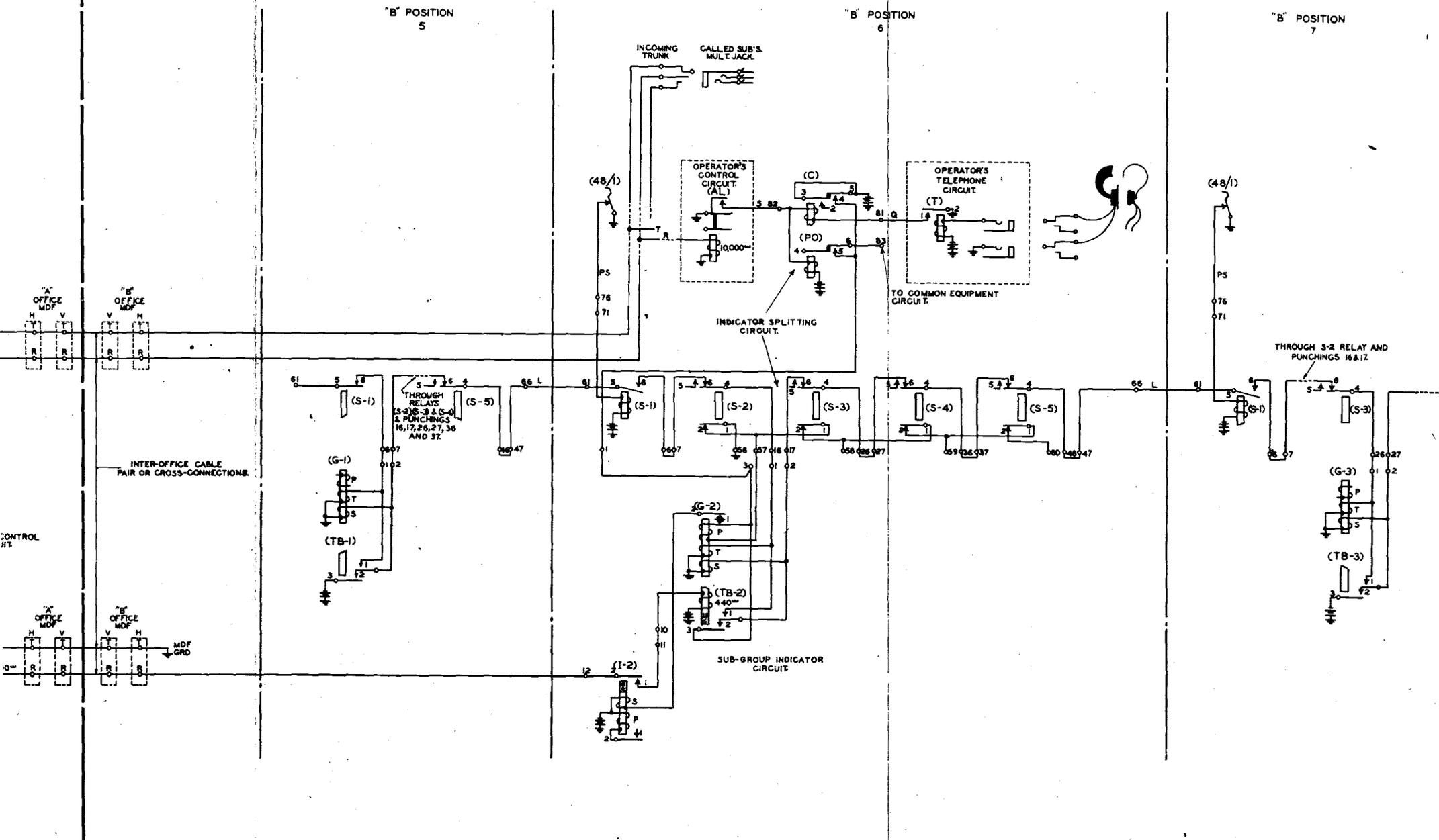
The connection of the Indicator Control Circuit to the lamp sub-groups that it is to serve will be effected at the "B", "TG", "C-1" and "C-2" punchings previously mentioned in "Change in the Number of Lamp Sub-Groups in a Trunk Sub-Group."

The connection of the Sub-Group Indicator Circuit to the Indicator Splitting Circuit of the trunk position in which the new sub-group of trunks is terminated, and to the Common Equipment and Office Circuits, directly or through the Sub-Group Indicator Circuit of another trunk position, will be effected at the relay rack by means of cross-connections.

DEFINITION OF TERMS

- "All-trunks-busy" is that condition of a trunk sub-group that exists when the "TB" relay of the associated Sub-Group Indicator Circuit is operated. In service, the "TB" relay operates when all trunks of a trunk sub-group are selected at the "A", Toll or Tandem board.
- "Busy" is that condition of a trunk position which exists when the "AL" relay ("TA" relay, if Tandem) of its Operator's Control or the "SL" relay ("SA" relay, if Tandem) of its Emergency Listening Circuit is operated.
- "Idle" is that condition of a trunk position which exists when the "AL" relay ("TA" relay, if Tandem) of its Operator's Control or the "SL" relay ("SA" relay, if Tandem) of its Emergency Listening Circuit is normal.
- "Indicating" is that function of a trunk position which takes place when the "I" relay of a Sub-Group Indicator Circuit of that position is operated.
- "Lamp sub-group" is a subdivision of a trunk sub-group at the "A", Toll or Tandem board.
- "No indicating" is that function of a trunk position which takes place when the "I" relay of a Sub-Group Indicator Circuit of that position is normal.
- "Non-indicated jacks" are those jacks, in the OGT multiple of the originating office, that have no indicating lamps directly above them to indicate when any of the associated trunks are idle.
- "Occupied" is that condition of a trunk position which exists when the transmitter relay of the Operator's Telephone Circuit of that position is operated.
- "Office Circuit" is that circuit of three relays, such as the "PL", "RL" and "TL", which is common to all Sub-Group Indicator Circuits associated with trunks incoming from a particular "A", Toll or Tandem Office.
- "PCI" is now used instead of "RCI" as the standard abbreviated designation for Call Indicator trunks or positions that are to be operated in connection with Panel offices.
- "PCITS" is now used instead of "CITS" as the standard abbreviated designation for Call Indicator trunks or positions that are designed for ultimate operation with Panel offices, but are temporarily arranged for straightforward operation with Manual offices.
- "Sub-Group Indicator Circuit" is that circuit of three relays, such as the "I-1", "G-1" and "TB-1", which provides indications on the associated trunk sub-group.
- "Team" is that group of trunk operators in a completing office whose services are required in the completion of all calls incoming to that office over the trunk group from a certain originating office. If five "B" operators serve all trunks incoming from five different "A" offices, such as offices L, M, N, O and P, this group of five trunk operators may be referred to as the L, M, N, O or P team.
- "Tone sub-group" is a subdivision of a trunk sub-group, at the "A", Toll or Tandem board, that has low-tone connected to its first or master-busy jack when all its trunks are selected or busy at the originating office.
- "Trunk group" is all of the trunks from a given "A", Toll or Tandem office to a given "B", Tandem or Toll-Tandem office.
- "Trunk sub-group" is that portion of a trunk group that terminates in a single "B", Tandem or Toll-Tandem position.
- "Unoccupied" is that condition of a trunk position which exists when the transmitter relay of the Operator's Telephone Circuit is normal.

COMPLETING "B" OFFICE.



RP-7247

Partial Schematic of Idle Trunk and Position Indicating Equipments

QUESTIONS

The following list of questions is supplied to the reader as a guide to what may be considered the important points in the description of this equipment. The answers to some will be found stated in a single sentence or paragraph, while others will require a digest of several paragraphs. It is suggested that the reader test the completeness of the information gained from reading this pamphlet by answering each question and then referring to the text to see that the answers are correct.

Answers to these questions should not be sent in unless specifically requested.

1. Name five schemes that may be followed by an originating operator in locating an idle OGT?
2. Under which of the five schemes of locating an idle OGT is it always necessary for an originating operator to make an individual busy-test?
3. Under what conditions would it be necessary for an originating operator to make an individual busy-test of OGT's arranged for Idle Trunk Indicating or Idle Trunk and Position Indicating?
4. Which of the five schemes of locating an idle OGT require the installing of additional equipment?
5. How do preferential markings aid originating operators in selecting idle OGT?
6. How would an originating operator know which of the OGT jacks associated with a tone sub-group is the master busy jack?
7. What is the purpose of Idle Trunk and Position Indicating equipments?
8. Are the indicating lamps located above or below the jacks of OGT's arranged for Idle Trunk and Position Indicating?
9. What additional feature is provided with Idle Trunk and Position Indicating to aid an originating operator in selecting idle trunks that terminate before her in non-indicated jacks?
10. If the second, third and fourth OGT's of a lamp sub-group of five trunks are selected or busy, at which jack will there be a lighted indicating lamp?
11. What are several of the conditions that will cause an indicating light to appear above an idle OGT arranged for Idle Trunk and Position Indicating?
12. Under what conditions would there be no indicating light above an idle OGT arranged for Idle Trunk and Position Indicating?
13. What is a "trunk group"?
14. Would there be more than one trunk group provided between a certain originating office and a certain completing office?
15. What is a "trunk sub-group"?
16. What Position Indicating equipment in a completing office is individual to a trunk sub-group?
17. What Position Indicating equipment in a completing office is common to all trunk sub-groups of a trunk group from a certain originating office?
18. Should an indicated trunk sub-group be so arranged in a completing position that the operation of a Trunk Splitting Key would split the trunk sub-group?
19. What is the function of an Indicator Splitting Circuit?
20. What is a Sub-Group Indicator Circuit?
21. From what types of completing positions can a Sub-Group Indicator Circuit be controlled?
22. What is an "L team"?
23. What Idle Trunk Indicating equipment in an originating office is common to a trunk sub-group?

QUESTIONS (continued)

24. Into what two types of sub-groups may a trunk sub-group be divided at an originating office?
25. What is a "lamp sub-group"?
26. What Idle Trunk Indicating equipment in an originating office is individual to a lamp sub-group?
27. What Idle Trunk Indicating equipment in an originating office may be common to a maximum of four lamp sub-groups?
28. What changes should be made in the wiring of Idle Trunk Indicator Circuit Units when two trunks are to be transferred from one lamp sub-group to another lamp sub-group?
29. What additional wiring and equipment would be required with the addition of a lamp sub-group to a trunk sub-group?
30. What is a "tone sub-group"?
31. Would it be proper to have one Indicator Control Circuit of an originating office serve more than one trunk sub-group?
32. If a trunk group consists of five indicated trunk sub-groups, how many interoffice cable pairs will be required for carrying indicating signals between the originating office and the associated completing office?
33. A list of questions on the performance of Idle Trunk and Position Indicating Circuits is given in the following:
- (a) When an idle OGT is selected by an originating operator, what happens to the light of the indicating lamp of that OGT? Also, what signal is given by the next idle OGT of the same trunk sub-group? Is the completing position "busy" at this time?
 - (b) What signal is given by the indicating lamp of an idle OGT that terminates in a certain completing position, when that position becomes busy and then when it becomes idle?
 - (c) When the originating operator disconnects her Cord Circuit from the OGT jack, will there be a lighted indicating lamp above that jack?
 - (d) When is a trunk sub-group considered an "overflow sub-group"?
 - (e) When does an "all-trunks-busy" condition take place?
34. What changes in the number and location of the terminating appearances of straight-forward trunks may be made by rearranging cross-connections?