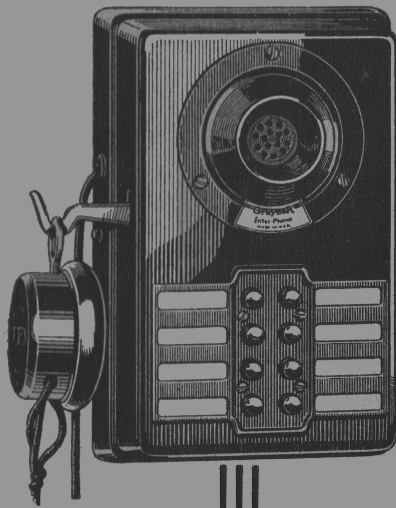


Installing and Maintaining GraybaR Inter-Phones

BULLETIN T 105

Issued April 1, 1937



• CONTENTS •

GENERAL LAYOUT OF A SYSTEM

	Page
Wiring Recommendations	2
Cable Terminals and Connecting Blocks.....	3
Power Supply	3
Cable Requirements	4

SYSTEM INSTALLATIONS

	Page		Page
System 1 and 1-A.....	5-9	System 18-C	26
System 11	10-11	System 20	27-29
System 11-A and B....	12	System 21	30-34
System 12	13-14	System 22	35-37
System 12-A and AC...15-17		Vestibule Inter-Phones and Mail Boxes	
System 12-B and C....18-19		Systems 20, 21, 22....	38-39
System 12-SS	20-21	Outfit 30-A and B.....	40
System 14 and 14-C....22-23		Outfit 31-A and B.....	40
System 15	24-25	Outfit 17	40

INSTALLING AND MAINTAINING INTER-PHONES



The Graybar Inter-Phone was designed to save unnecessary footsteps in homes, offices, stores, industrial plants, hotels, hospitals and public buildings.

Millions of such footsteps are wasted every day because of the lack of some inter-communicating telephone system which could be depended on at any time to carry a message privately, clearly and instantly to anyone in any other part of the building.

The Graybar Inter-Phone is such a system. Whether the problem be the more efficient operation of the home or the factory, the Inter-Phone can help to solve it.

No system, however, can deliver the service of which it is capable unless it is properly installed and maintained. The instructions contained in this book have been prepared so that the person who installs or maintains any Graybar System can do his job in a manner which will secure the maximum of service from these Inter-Phones with a minimum of operating and repair expense.

We cannot emphasize too strongly the necessity of following these instructions, in order to secure the satisfactory and continuous service which Graybar Inter-Phones are designed to give.

GENERAL LAYOUT OF A SYSTEM

GENERAL INSTRUCTIONS

Wiring Recommendations

The wiring for an Inter-Phone System should be carefully protected against mechanical injury and moisture, particularly where it passes through floors or walls.

Even the slightest amount of moisture may affect the insulation of poorly protected wiring to such an extent as to impair the service of the system.

Inter-Phone wiring should be separated as far as possible from water or steam pipes or other electric circuits. If Inter-Phone wiring is not in conduit all crossings should be above other pipes or electric circuits and if run parallel with other electric circuits there should be a separation of at least six inches, or more if these other electric circuits carry alternating current.

Depending on the layout of the system, the most economical wiring arrangement may be either to loop from station to station or run separate circuits to a station from the nearest terminal box.

For a circuit or part of a circuit requiring more than five conductors the use of cable is recommended because of the ease with which it may be installed.

Interior Construction

For use in dry places:

Open Wiring or Braided Cable or No. 19—2 or 3 conductor, twisted "Interior" telephone wire.

For use in damp places, or in conduit:

Lead covered cable, or No. 18—2 or 3 conductor, twisted "Bridle" wire.

Cable should be supported by cable clamps of suitable size; wire by cable clamps, bridle rings or insulated staples. Openings through floors or walls through which wiring passes should be bushed with iron conduit.

Exterior Construction

For open wiring:

Lead covered Inter-Phone cable, or No. 18—2 or 3 conductor twisted "Bridle" wire.

Cable may be supported by cable rings from a messenger wire, or attached to wall surfaces by cable clamps.

Bridle wire may be supported by bridle rings, or preferably by "Pierce" Wireholders, on either poles or a wall surface.

For underground wiring, in conduit:

Lead covered, Inter-Phone cable, or No. 19 rubber insulated, lead covered, 1 or 2 pair Type "L.S." cable.

If an outdoor overhead run of cable supported on a messenger wire is of any length, and particularly if cable is supported by metal cable clamps, it is recommended that the messenger wire be grounded as a protection against lightning.

Cable or wire entering a building from outdoors should be bent down to form a drip loop at the point of entrance.

Information as to the ringing voltage and the wire size requirements for circuits of various lengths is given under the description of each system herein.

For long line use, the instruments of the No. 1 System may be equipped with high resistance bells and buzzers which will operate on 24 volts D. C. or A. C.

If the system uses cable sometimes it is practical to increase the conductivity of the ringing circuit by using two or more of the conductors in the cable in multiple.

GENERAL LAYOUT OF A SYSTEM

Cable Terminals and Connecting Blocks

A cable terminal or connecting block must be used wherever in an Inter-Phone System a splice or junction in the wiring is necessary.

Not more than four cables or sets of wires should terminate on one cable terminal or connecting block, and the several wires which may be attached to one terminal post should be separated by the washers with which it is equipped.

No. 19 type cable terminals are recommended for use in dry places. They are equipped with fanning strip and metal cover.

No. 14 type cable terminals may be used in damp places or outdoors, where connection between a cable and open wiring is necessary. A splice with a wiped joint is necessary to connect this type of terminal to the cable of the system.

No. 8 or No. 30 type connecting blocks are not equipped with covers and therefore should be installed usually in some form of cabinet or box. For the larger sizes a fanning strip is desirable.

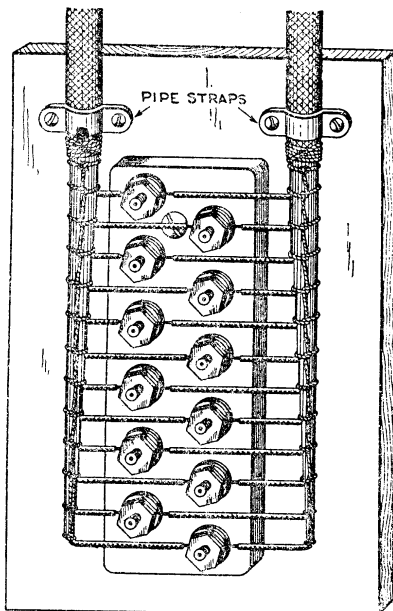


Figure 1

All cable ends to be connected to a cable terminal or connecting block should be formed and laced with twine, so that each conductor will terminate at the proper point for connection to its terminal post neatly and securely. After forming the cable end may be

taped and should then be shellacked or painted with a weatherproof paint as a further protection against moisture (see Figure 1).

The insulation on the conductors of Western Electric Inter-Phone cable is waxed. Should the cable used for an Inter-Phone System have dry or unimpregnated insulation the cable end should be thoroughly boiled out with melted paraffine after forming.

If any large number of loose wires are connected to a terminal it is well also to form and lace them.

No external cable terminal is necessary when a wall type Inter-Phone is installed.

Inter-Phone Sets

Our standard Inter-Phones are not designed for use in damp places or outdoors unless they are housed in a weatherproof cabinet or otherwise protected.

Where flush type wall sets are to be used, the outlet boxes, though a part of the set, are detachable and can be installed while the building is under construction. The fronts, containing the working parts can be attached later. Hangers are furnished to support the outlet box between wall studs in frame construction. Outlet box has conduit knockouts in top, bottom and back. Flush wall Inter-Phones should be mounted so that the top edge of the outlet box is approximately five feet from the floor.

Where surface type wall Inter-Phones are to be used the wall should be completely finished before the set is mounted. If the surface type Inter-Phone is to be mounted over a flush outlet box the wiring may be brought into the set thru a hole provided in the back plate of the case. Surface type Inter-Phones should be mounted so that the transmitter will be approximately 4 ft. 10 inches from the floor.

Power Supply

Power for the operation of Inter-Phone systems can be obtained from:

DRY CELLS, preferably of the type designed for telephone work. Dry cells should be installed in a dry, warm place, easily accessible. It is recommended that they be contained in a cabinet or metal battery box. Common talking systems use the same battery for talking and ringing, for other systems ringing current may be low voltage A.C. obtained from a bellringing transformer of not less than 50 watts capacity.

RECTIFIER. Where alternating current is available a rectifying device may be used in the place of a battery. This device converts 110 volts alternating current into low voltage direct current. It also provides low voltage alternating current for use in the ringing circuit of the system.

GENERAL LAYOUT OF A SYSTEM

Cable Requirements**Nos. 142-B, 161-B, 162-B, and 185-B TYPE CABLE**

The first group (consisting of code Nos. 142-B, 161-B, 162-B and 185-B) covers cables having four, eight and twelve single wires of No. 22 B. & S. gauge. In this type of cable, the following colors are standard:

Wire No.	1—Blue
"	2—Orange
"	3—Green
"	4—Brown
"	5—Slate
"	6—Blue-White
"	7—Blue-Orange
"	8—Blue-Green
"	9—Blue-Brown
"	10—Blue-Slate
"	11—Orange-White
"	12—White

No. 164-B TYPE CABLE

The second group (consisting of code No. 164-B) covers cables having six single wires No. 22 B. & S. gauge, two pairs of No. 18 B. & S. gauge and two spare single wires No. 22 B. & S. gauge. In this type of cable the following colors are standard:

Single Wire:

No. 1—No. 22 B. & S.	Blue
" 2—	Orange
" 3—	Green
" 4—	Brown
" 5—	Slate
" 6—	Blue-White

Pair Wire:

No. 1—No. 18 B. & S.	Red-Blue paired with White
" 2—	Red-Orange paired with White

Spare Wire:

No. 1—No. 22 B. & S.	White
" 2—	Black-White

Nos. 244-B, 245-B, 246-B, 247-B, 248-B, 249-B, 250-B and 251-B TYPE CABLE

The third group (consisting of above mentioned code Nos.) covers cables having eight to thirty-three pairs No. 22 B. & S. gauge wire and two pairs No. 18 B. & S. gauge. These cables also contain two single spare wires of No. 22 B. & S. gauge. In this type of cable the following colors are standard:

Pair No. 1—No. 22 B. & S.	Blue paired with White
Pair No. 2—No. 22 B. & S.	Orange paired with White
Pair No. 3—No. 22 B. & S.	Green paired with White
Pair No. 4—No. 22 B. & S.	Brown paired with White
Pair No. 5—No. 22 B. & S.	Slate paired with White

Pair No. 6—No. 22 B. & S.	Blue-White paired with White
Pair No. 7—No. 22 B. & S.	Blue-Orange paired with White
Pair No. 8—No. 22 B. & S.	Blue-Green paired with White
Pair No. 9—No. 22 B. & S.	Blue-Brown paired with White
Pair No. 10—No. 22 B. & S.	Blue-Slate paired with White
Pair No. 11—No. 22 B. & S.	Orange-White paired with White
Pair No. 12—No. 22 B. & S.	Orange-Green paired with White
Pair No. 13—No. 22 B. & S.	Orange-Brown paired with White
Pair No. 14—No. 22 B. & S.	Orange-Slate paired with White
Pair No. 15—No. 22 B. & S.	Green-White paired with White
Pair No. 16—No. 22 B. & S.	Green-Brown paired with White
Pair No. 17—No. 22 B. & S.	Green-Slate paired with White
Pair No. 18—No. 22 B. & S.	Brown-White paired with White
Pair No. 19—No. 22 B. & S.	Brown-Slate paired with White
Pair No. 20—No. 22 B. & S.	Slate-White paired with White
Pair No. 21—No. 22 B. & S.	Blue paired with Red
Pair No. 22—No. 22 B. & S.	Orange paired with Red
Pair No. 23—No. 22 B. & S.	Green paired with Red
Pair No. 24—No. 22 B. & S.	Brown paired with Red
Pair No. 25—No. 22 B. & S.	Slate paired with Red
Pair No. 26—No. 22 B. & S.	Blue-White paired with Red
Pair No. 27—No. 22 B. & S.	Blue-Orange paired with Red
Pair No. 28—No. 22 B. & S.	Blue-Green paired with Red
Pair No. 29—No. 22 B. & S.	Blue-Brown paired with Red
Pair No. 30—No. 22 B. & S.	Blue-Slate paired with Red
Pair No. 31—No. 22 B. & S.	Orange-White paired with Red
Pair No. 32—No. 22 B. & S.	Orange-Green paired with Red
Pair No. 33—No. 22 B. & S.	Orange-Brown paired with Red
Pair No. 1—No. 18 B. & S.	Red-Blue paired with White
Pair No. 2—No. 18 B. & S.	Red-Orange paired with White
Spare Wire No. 1—No. 22 B. & S.	Red-White
Spare Wire No. 2—No. 22 B. & S.	Black-White

INTER-PHONE SYSTEM No. 1 (old)

(For new system No. 1-A, see Pages 8 and 9)

Wiring Requirements

The circuit may be either *full metallic* or *common return*. By "full metallic" is meant that there will be † an individual pair of conductors for each station in the system, thereby producing a full metallic talking circuit. In a common return circuit only † one wire is required for each station in the system and a common wire furnishes the return path for the talking current. The former is recommended as it is less subject to trouble in the form of inductive disturbances and cross-talk. All sets are arranged for full metallic wiring, but can be readily changed by the installer for use in a common return circuit.

Tracing and connecting the various wires will be greatly facilitated by taking advantage of the color scheme used in Inter-Phone Cable.

A Full Metallic System requires:—

1 pair of No. 22 B. & S. gauge wires for each station.

2 pairs of No. 18 B. & S. gauge wires for the talking and ringing battery.

For example, a 12-station full metallic system requires 12 pairs No. 22 B. & S. gauge (line) wires and 2 pairs No. 18 B. & S. gauge (battery) wires. A schematic of a full metallic Inter-Phone System No. 1 is illustrated on page 7.

A pair of flexible conductors equipped with fork tips will be found in each Inter-Phone for connecting to the home line terminals of the set. The home line terminals are those to which the home line of each set is connected. The home line is the individual line assigned to the set. For instance, in a system consisting of six stations the pair of line wires connected to terminals No. 1 would be the home line for station No. 1; the pair of line wires connected to terminals No. 2 would be the home line for station No. 2; and so on.

The two flexible conductors for the home line terminals are covered with differently colored insulation. Always connect the *red* conductor to the *upper* home line terminal and the *black* conductor to the *lower* home line terminal in each Inter-Phone.

A red push button cap is furnished with each set for use in indicating the button of the home line key.

The two wires (No. 18 B. & S. gauge) connected to the ringing battery should be fastened to terminals marked "ringing battery + and —" in each set of the system. The two wires (No. 18 B. & S. gauge)

connected to the talking battery should be connected to terminals marked "talking battery + and —" in each set. The wire fastened to the positive or carbon terminal of the battery must always be connected to the terminal in the instrument marked with "+" sign; and the wire fastened to the negative or zinc terminal of the battery to the terminal in the instrument marked with a "—" sign.

A Common Return System requires:—

1 No. 22 B. & S. gauge line wire for each station.

3 No. 18 B. & S. gauge wires for the talking and ringing battery.

For example, a 12-station common return system requires 12 line wires No. 22 B. & S. gauge and 3 battery wires No. 18 B. & S. gauge. A schematic of Inter-Phone System No. 1 with common return wiring is illustrated on page 7.

As mentioned above, all our standard Inter-Phones are arranged for full metallic wiring, but only a few simple changes are necessary to modify them for common return system. The changes required will be as follows: (See Figure 2).

1st: Connect the + and — talking battery terminals together in each set. No wires from the cables should be connected to these terminals.

2nd: Connect the black flexible conductor in each set to the + ringing battery terminal.

3rd: Strap all the lower line terminals in each set together.

4th: Connect the — talking battery wire in cable to lower line terminal No. 1.

5th: Connect the red flexible conductor to the upper terminal of the home line.

6th: Connect line wires to upper line terminals, i.e., line wire No. 1 to upper terminal No. 1.

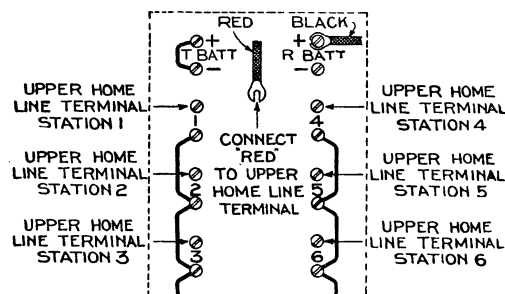


Figure 2

†This does not include the battery wires.

INTER-PHONE SYSTEM No. 1 (old)

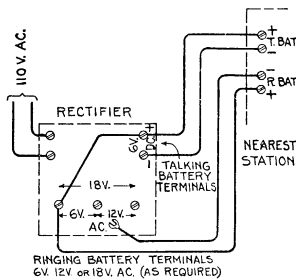
(For new system No. 1-A, see Pages 8 and 9)

Battery Requirements

Two separate sets of batteries are required—one set for talking and another for ringing. The cells of each battery should be connected in series and the carbon terminals of both batteries strapped together. This is necessary to eliminate any possibility of cross-ringing, i.e., ringing a bell at any station other than the one called.

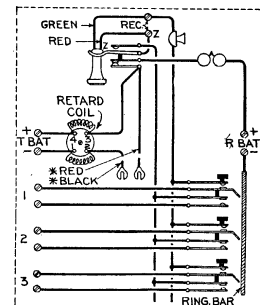
Five dry cells should be used in all cases for the talking circuit. The number of cells for the ringing circuit depends upon the distance between the stations. The following number of dry cells will be required when the distance between the stations farthest apart does not exceed the length of line listed below. (This information is based on the use of the standard Inter-Phone cables recommended for system No. 1 having No. 22 B. & S. gauge line wires and No. 18 B. & S. gauge battery feed wires.)

Length of Line	No. of cells required for ringing battery
300 feet	4
1000 "	5
1500 "	7



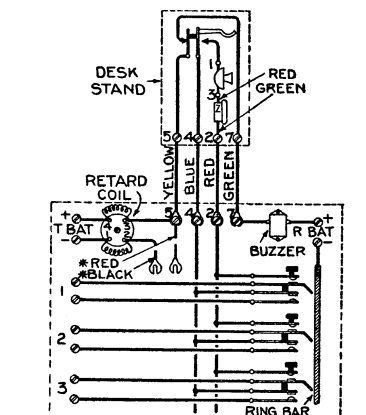
Method of Connecting Rectifier

Schematic of
No. 1038-C, 1139-C & 1239-C
(No. 6038-C, 6139-C & 6239-C Hand Sets)
System-1

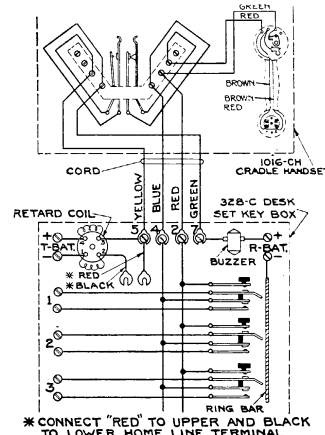


Schematic of
Nos. 1324 & 1355 Wall Types
System-1

* Connect "Red" to Upper and "Black" to Lower Home Line Terminal



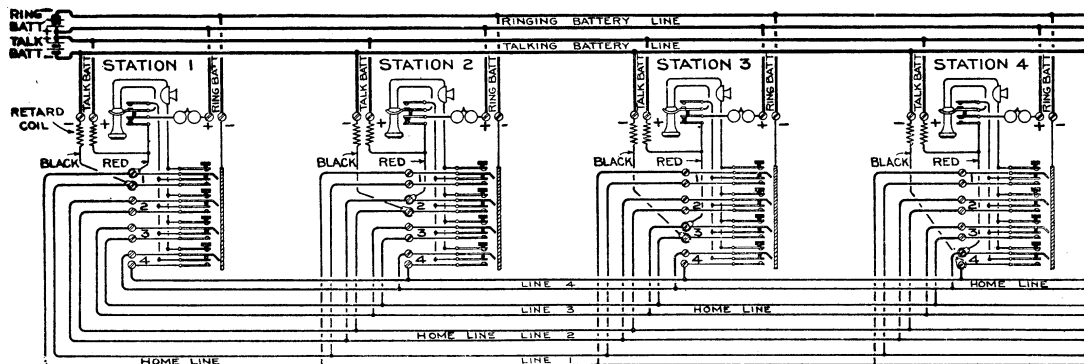
Schematic of
No. 6016 Desk Set Type—System-1
* Connect "Red" to Upper and "Black" to Lower Home Line Terminal



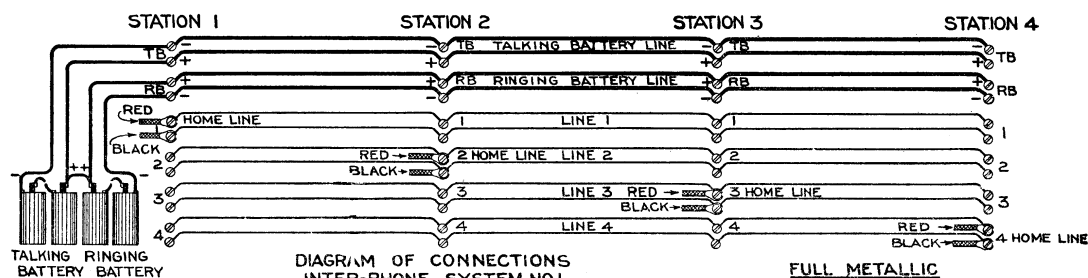
Schematic of
No. 6016-CH, 6116-CH & 6216-CH
Cradle Type Hand Sets
System-1

INTER-PHONE SYSTEM No. 1 (old)

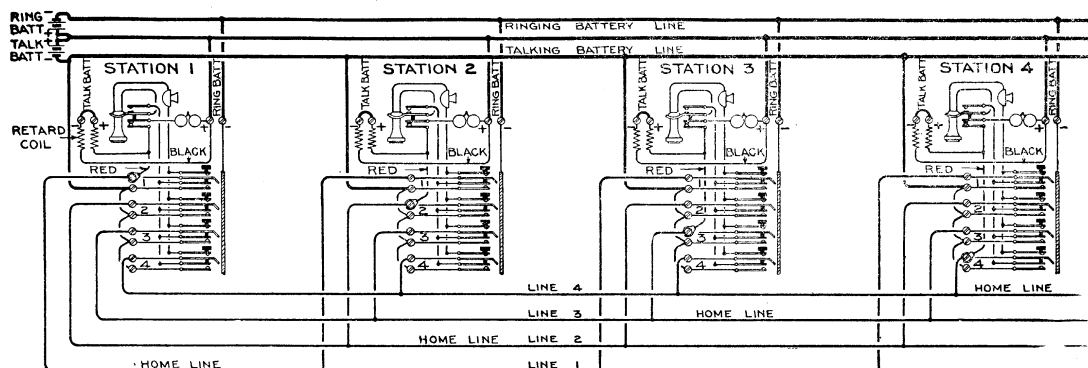
(For new system No. 1-A, see Pages 8 and 9)

SCHEMATIC WIRING DIAGRAM OF INTERPHONE SYSTEM NO. 1
"SELECTIVE RINGING-SELECTIVE TALKING"
SHOWING CONNECTIONS OF FOUR STATIONS ONLY

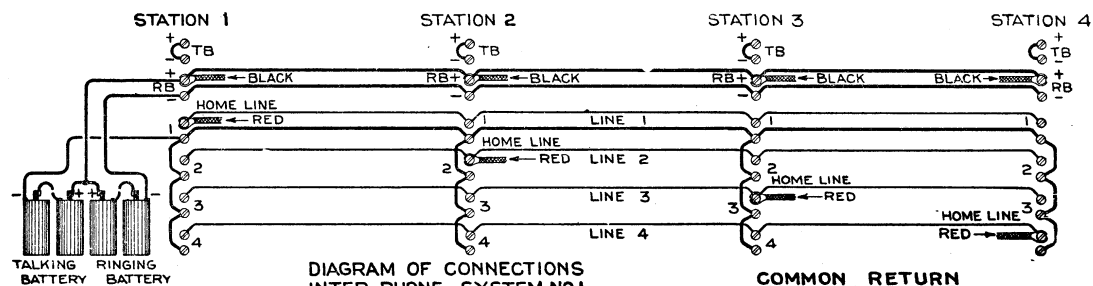
FULL METALLIC

DIAGRAM OF CONNECTIONS
INTER-PHONE SYSTEM NO. 1

FULL METALLIC

SCHEMATIC WIRING DIAGRAM OF INTERPHONE SYSTEM NO. 1
"SELECTIVE RINGING-SELECTIVE TALKING"
SHOWING CONNECTIONS OF FOUR STATIONS ONLY

COMMON RETURN

DIAGRAM OF CONNECTIONS
INTER-PHONE SYSTEM NO. 1

COMMON RETURN

INTER-PHONE SYSTEM No. 1-A

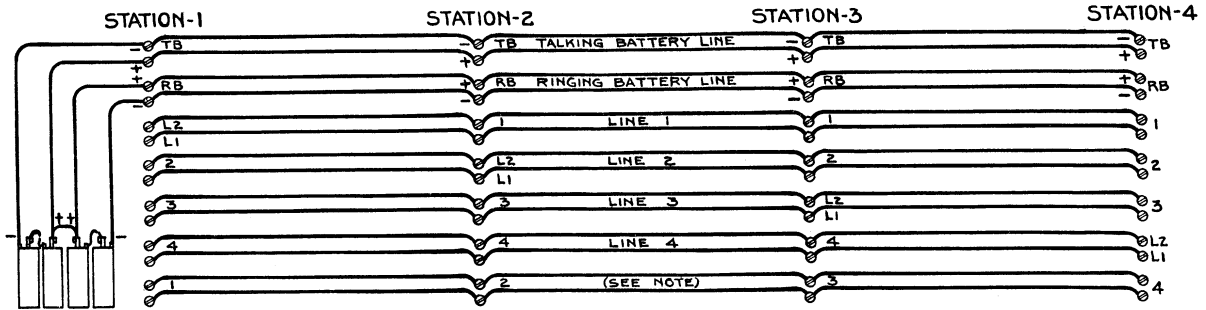
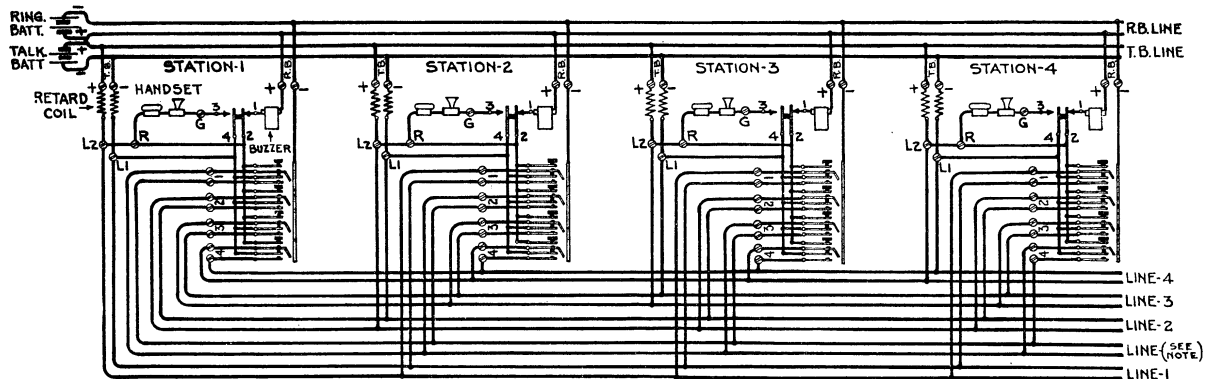
































































































































DIAGRAM OF CONNECTIONS
INTER-PHONE SYSTEM NO.1-A
SHOWING CONNECTIONS OF FOUR STATIONS

FULL METALLIC



SCHEMATIC WIRING DIAGRAM - INTERPHONE SYSTEM NO.1-A
SELECTIVE RINGING - SELECTIVE TALKING
SHOWING CONNECTIONS OF FOUR STATIONS ONLY

FULL METALLIC

TABLE SHOWING LINE CONNECTIONS FOR A SEVEN STATION SYSTEM								
CABLE PAIRS	CONDUCTOR PAIR COLORS	STATION TERMINAL CONNECTIONS						
		STATION-1	STATION-2	STATION-3	STATION-4	STATION-5	STATION-6	STATION-7
1 ST PAIR #18B&S	RED-BLUE	→ 	→ 	→ 	→ 	→ 	→ 	→ 
	WHITE	→ 	→ 	→ 	→ 	→ 	→ 	→ 
2 ND PAIR #18B&S	RED-ORANGE	→ 	→ 	→ 	→ 	→ 	→ 	→ 
	WHITE	→ 	→ 	→ 	→ 	→ 	→ 	→ 
1 ST PAIR #22 B&S	BLUE	→ 	→ 	→ 	→ 	→ 	→ 	→ 
	WHITE	→ 	→ 	→ 	→ 	→ 	→ 	→ 
2 ND PAIR #22 B&S	ORANGE	→ 	→ 	→ 	→ 	→ 	→ 	→ 
	WHITE	→ 	→ 	→ 	→ 	→ 	→ 	→ 
3 RD PAIR #22 B&S	GREEN	→ 	→ 	→ 	→ 	→ 	→ 	→ 
	WHITE	→ 	→ 	→ 	→ 	→ 	→ 	→ 
4 TH PAIR #22 B&S	BROWN	→ 	→ 	→ 	→ 	→ 	→ 	→ 
	WHITE	→ 	→ 	→ 	→ 	→ 	→ 	→ 
5 TH PAIR #22 B&S	SLATE	→ 	→ 	→ 	→ 	→ 	→ 	→ 
	WHITE	→ 	→ 	→ 	→ 	→ 	→ 	→ 
6 TH PAIR #22 B&S	BLUE-WHITE	→ 	→ 	→ 	→ 	→ 	→ 	→ 
	WHITE	→ 	→ 	→ 	→ 	→ 	→ 	→ 
7 TH PAIR #22 B&S	BLUE-ORANGE	→ 	→ 	→ 	→ 	→ 	→ 	→ 
	WHITE	→ 	→ 	→ 	→ 	→ 	→ 	→ 
NOTE: * = HOME LINE TERMINALS								

NOTE: * = HOME LINE TERMINALS

INTER-PHONE SYSTEM No. 1-A

Wiring Requirements

The No. 1-A Inter-Phone System is connected up for full metallic service, namely a pair of conductors for each station in the system, also two pairs of No. 18 B. & S. gauge wires for the talking and ringing battery.

For example, a 7 station full metallic Inter-Phone system requires 7 pairs of No. 22 B. & S. gauge line wires, and 2 pairs of No. 18 B. & S. gauge battery wires. Refer to the schematic wiring of the system No. 1-A herewith.

Two of the No. 18 B. & S. gauge wires should be connected to the ringing battery and connections from these wires made to Inter-Phone set terminals marked "— and + R. BAT." This parallel connection should be made to each set in the system. The other two No. 18 B. & S. gauge wires should be connected to the talking battery in the system and these wires should connect in turn to the Inter-Phone set terminals marked "— and + T. BAT." It is important to note that the wire which is fastened to the positive or carbon terminal of the battery is always connected to the terminal in the Inter-Phone marked "+" (plus) and the wire fastened to the negative or zinc terminal of the battery should be connected to the terminal in the Inter-Phone marked "—" (minus).

Battery Requirements

Two sets of batteries are required for operating the system, one set for talking and the other set for ringing. The cells of each battery should be connected in series, and the carbon terminals of both batteries strapped together as shown in the circuit diagram. This connection is necessary to eliminate the possibility of cross-ringing, namely ringing a bell at any station other than the one called.

Three to five dry cells should be used for the talking circuit. The number of cells for the ringing circuit depends upon the overall length of line. The following number of dry cells will be required where the distance between the stations farthest apart does not exceed the length of line listed below.

(This information is based on the use of the standard Inter-Phone cables recommended for system No. 1-A having 22 B. & S. gauge line wires and No. 18 B. & S. gauge battery feed wires.)

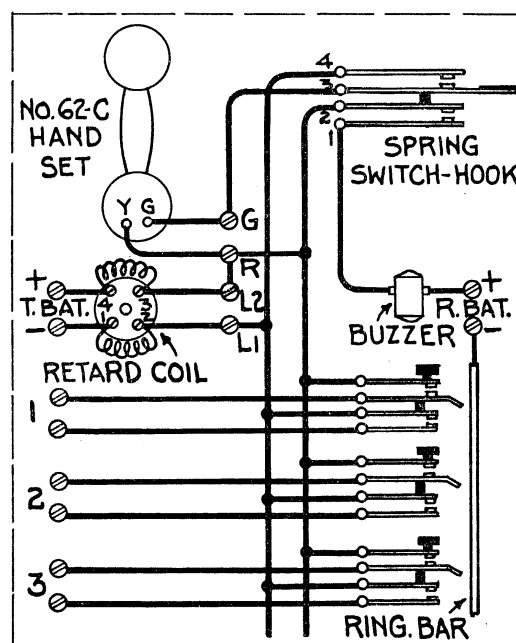
Length of Line	No. of Cells for Ringing Battery
300 feet	4
1,000 feet	5
1,500 feet	7

In place of dry cells a copper oxide rectifier may be used for both talking and ringing service whenever 110 volts AC current is available for this purpose. With this unit it will be possible to obtain a continual source of operating current for the No. 1-A Inter-Phone system. The copper oxide rectifier will operate from 110 volts AC and will furnish 6 volts DC for the talking battery supply of the system, and also an AC supply for the ringing circuit of the system. The method of connecting this rectifier is indicated on page 6.

Operation of System

After completing the installation work it will be necessary to fill out the designation card to slip in the card holder frames of each set. The designation card should indicate the name and station number to which each button of the set connects.

When making a call the button marked with the name and number of the station wanted should be operated to its way down position. This rings the bell of the station called. The called party will answer by simply removing the handset from the cradle and no other operation is required. After the conversation the handsets are replaced on the cradle at both stations; this will reset the operated key of the calling station, restoring the button to its normal position.



**SCHEMATIC OF
NO. 6140-C HAND SET INTER-PHONE
SYSTEM NO. 1A**

INTER-PHONE SYSTEM No. 11

Wiring Requirements

For connecting the Inter-Phones of this system the following number of wires are required:

- 3 wires common to all stations, and
- 1 individual wire for each station in the system.

For example, a System No. 11 consisting of five stations requires a total number of eight wires.

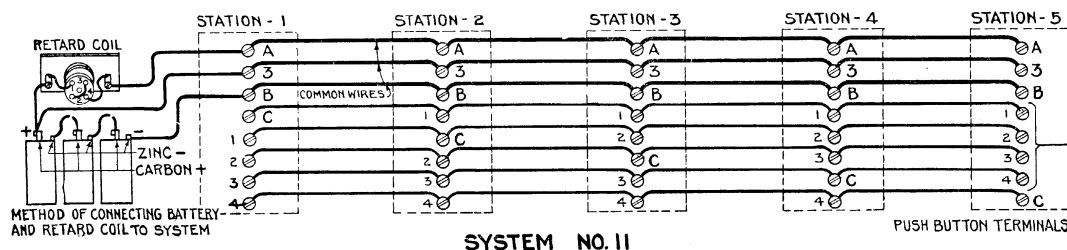
Battery Requirements

Only one battery is required to furnish current for

talking and ringing. Do not use more than five dry cells connected in series. When using wires of No. 22 B. & S. gauge size (as contained in the standard Inter-Phone cables recommended for this system) the wire distance between the two sets farthest apart should not exceed 750 feet (as this is the longest distance over which satisfactory ringing can be secured). On longer lines, larger wires should be used as follows:

- 750-1000 ft.—No. 20 B. & S. gauge
- 1000-1500 ft.—No. 18 B. & S. gauge
- 1500-2500 ft.—No. 16 B. & S. gauge

DIAGRAM OF CONNECTIONS



Connecting Battery & Retardation Coil

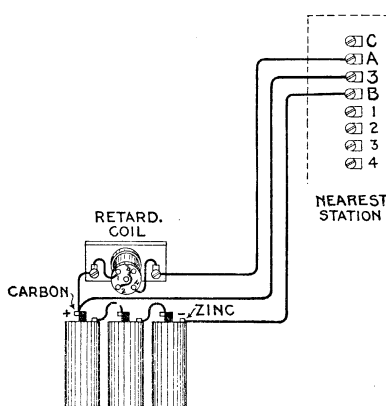


Figure A

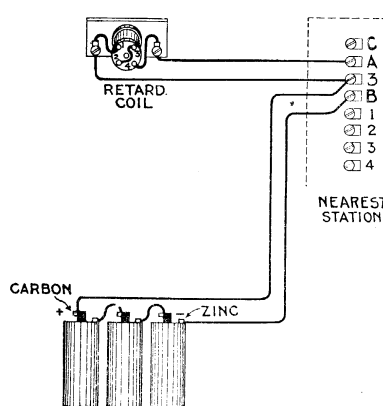


Figure B

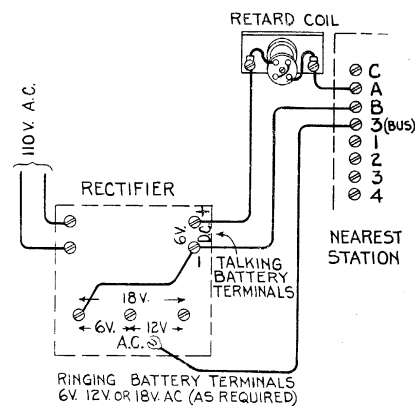


Figure C

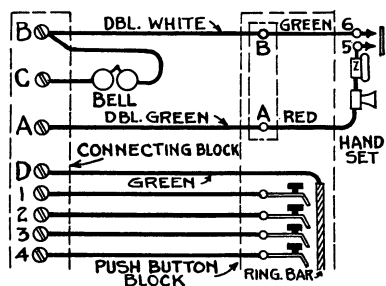
(A) The retardation coil may be mounted close to the battery or at a point between the battery and the nearest station. The connections should be made as shown in Fig. A. Three wires should be run from the battery and coil to the nearest station as shown.

(B) In case the coil is to be mounted close to the nearest station, the connections should be made as shown in Fig. B.

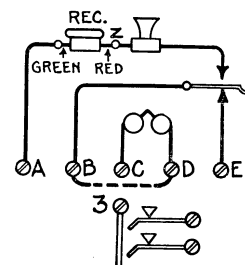
(C) If rectifier is used in place of dry cells, connections should be made as shown in Fig. C.

INTER-PHONE SYSTEM No. 11

(Continued)

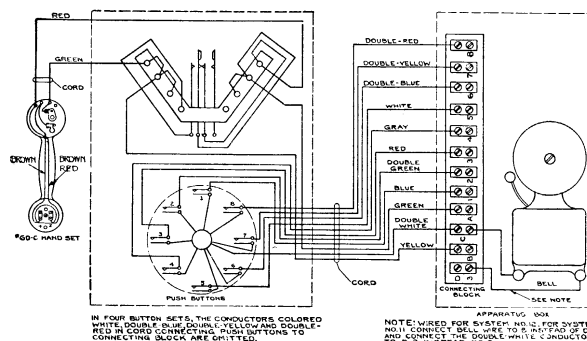


**SCHEMATIC OF
NO. 6034-AZ, BB, BG & BH SYSTEM No. 11**

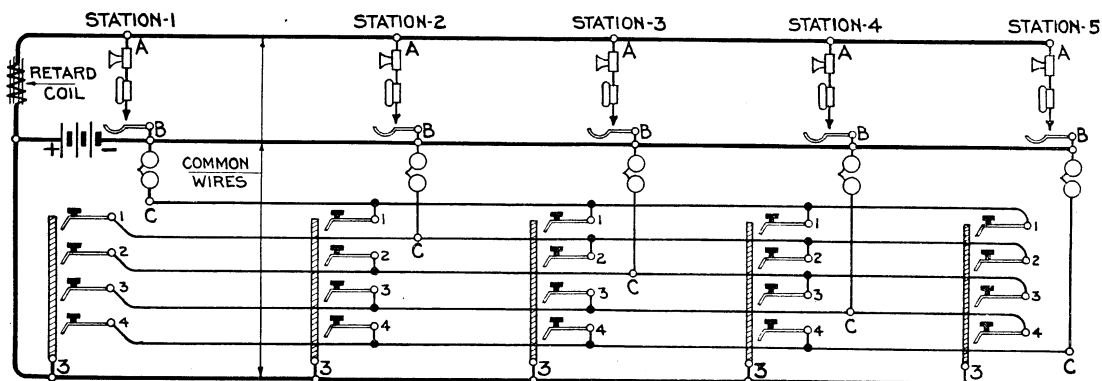


**SCHEMATIC OF
NO. 2527-C & 2539-C TYPES
SYSTEM 11**

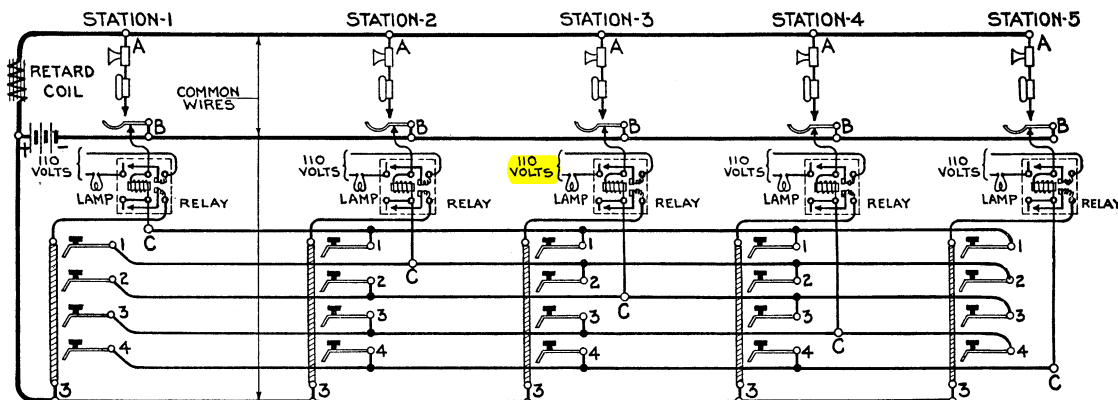
DOTTED LINES DENOTE METHOD
OF CONNECTING STRAP WIRES
FURNISHED WITH EACH SET



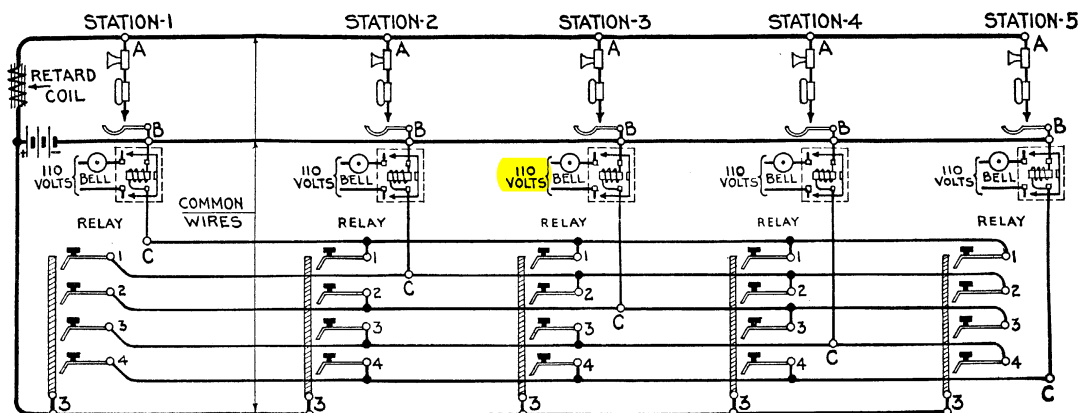
**SCHEMATIC OF
NO. 6044C-4 & C-8 & NO. 6145 C-4 & C-8
HAND SETS
SYSTEMS NO. 11 & 12**



SCHEMATIC WIRING DIAGRAM-SYSTEM No. 11

INTER-PHONE SYSTEM No. 11-A**Arranged for Lamp Signals**SCHEMATIC WIRING DIAGRAM-SYSTEM No. 11
ARRANGED FOR LAMP SIGNAL

Where a silent signal in place of an audible signal is required, it is recommended that a locking relay type ADBXI be installed as illustrated in the above system 11-A schematic wiring diagram. By depressing the button of the desired station, the relay at that station is actuated and locked electrically, lighting the light at that station which remains burning until the call is answered.

INTER-PHONE SYSTEM No. 11-B**Arranged for Loud Ringing Bells**SCHEMATIC WIRING DIAGRAM-SYSTEM No. 11
ARRANGED FOR LOUD RINGING BELL

The above schematic wiring diagram illustrates the system No. 11-B circuit with type ABTXI relays installed for operating a loud ringing bell or horn. The relay is actuated by the Inter-Phone system battery, 6 volts D.C., while the bell or horn is operated from the 110 volt power circuit. This system is recommended where a loud signal is needed to penetrate noise or cover a large area.

INTER-PHONE SYSTEM No. 12**Wiring Requirements**

For connecting the sets of this system the following number of wires are required between master station and outlying stations:

- 3 wires common to all stations in the system, and
- 1 individual wire for each outlying station.

For example, a No. 12 System consisting of one master and four outlying stations requires a total of seven wires. The diagram of connections indicates to which terminals the wires should be connected.

Tracing and connecting the wires will be greatly facilitated by taking advantage of the color scheme used in Western Electric Inter-Phone Cable. When using cable it will be more economical to run the

cable between the Inter-Phones only, connecting the battery to the circuit by means of separate wires.

Battery Requirements

Only one battery is required to furnish current for talking and ringing. Do not use more than five dry cells connected in series. When using wires of No. 22 B. & S. gauge (as contained in the standard Inter-Phone cables recommended for this system) the wire distance between the master and the farthest outlying station should not exceed 750 feet (as this is the longest distance over which satisfactory ringing can be secured). On lines of greater length larger wire should be used as follows:

750-1000 ft.—No. 20 B. & S. gauge

1000-1500 ft.—No. 18 B. & S. gauge

1500-2500 ft.—No. 16 B. & S. gauge

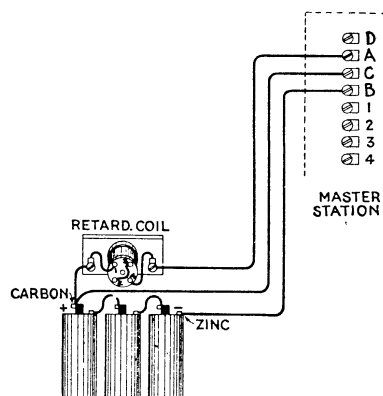
Connecting Battery and Retardation Coil to Master Station

Figure A

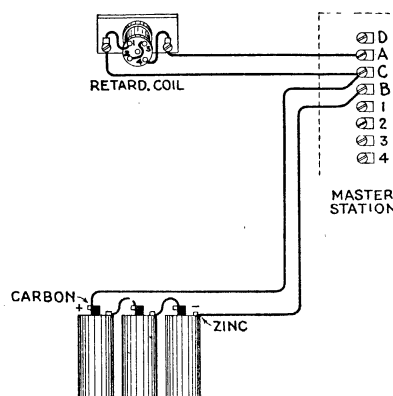


Figure B

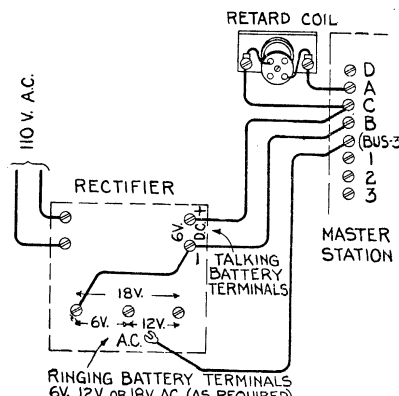
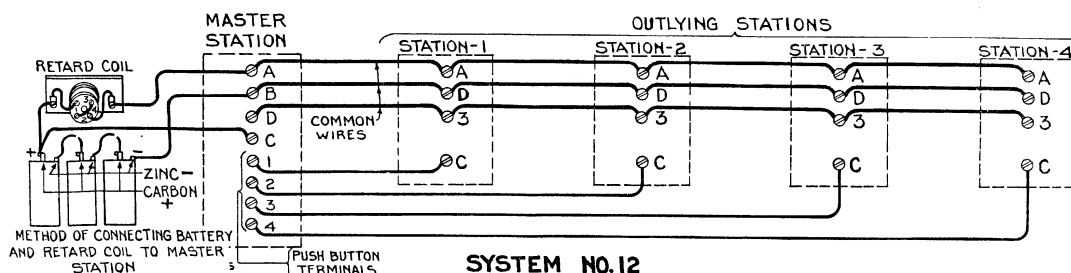


Figure C

The retardation coil may be mounted close to the battery (Fig. A) or at a point between the battery and the master station (Fig. B). A rectifier unit

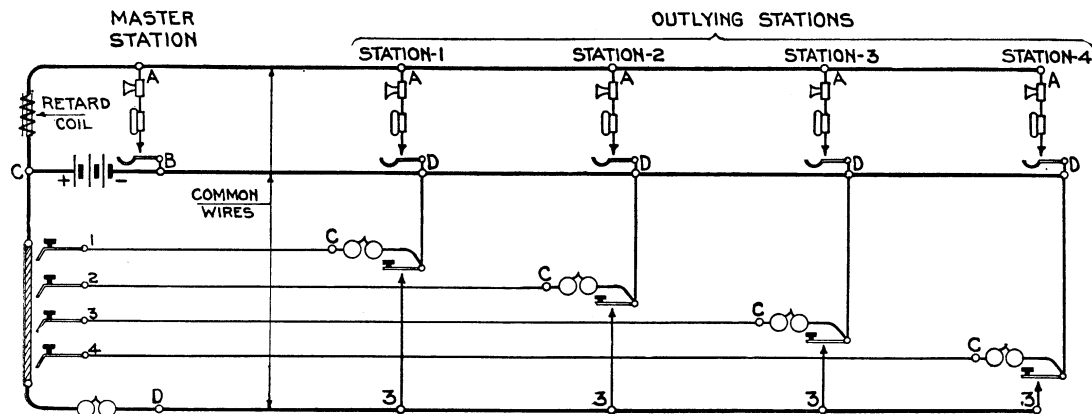
may be used in place of dry cells for both talking and ringing service. If Rectifier is used in place of dry cells, connections should be made as shown in Fig. C.



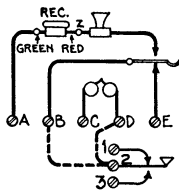
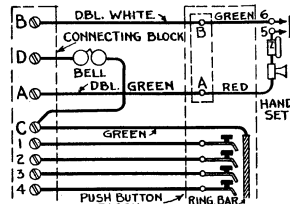
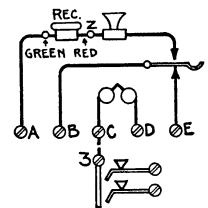
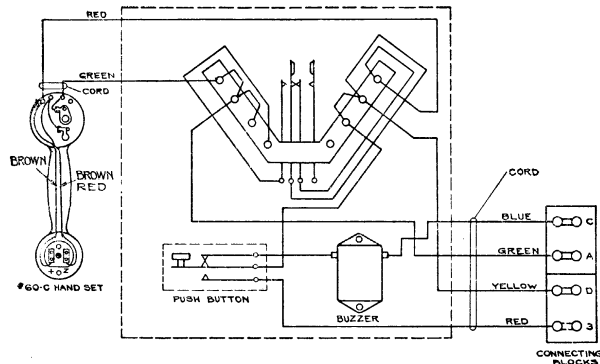
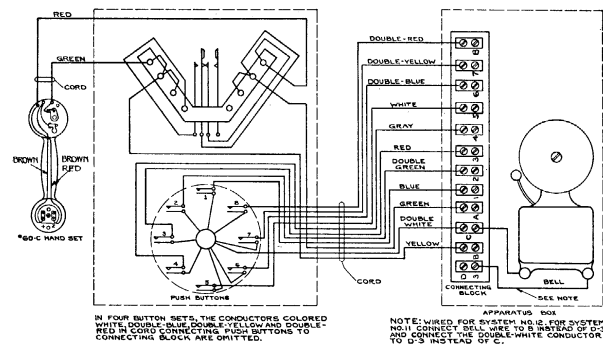
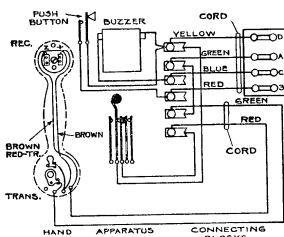
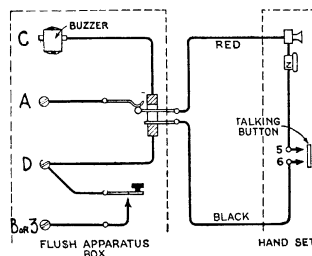
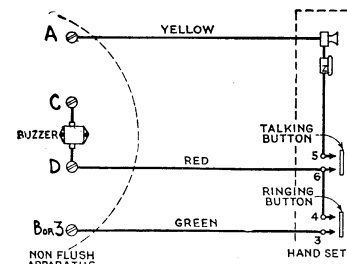
SYSTEM NO. 12

DIAGRAM OF CONNECTIONS

INTER-PHONE SYSTEM No. 12



SCHEMATIC WIRING DIAGRAM-SYSTEM No. 12

SCHEMATIC OF
NO. 52527-C1 & 2539-C1
OUTLYING STATION
SYSTEM 12
DOTTED LINES DEMOTE METHOD
OF CONNECTING STRAP WIRES
FURNISHED WITH EACH SETSCHEMATIC OF
NO. 6034-AZ, BB, BG & BH SYSTEM No. 12SCHEMATIC OF
NO. 52527-C & 2539-C TYPES
MASTER STATION
SYSTEM 12
DOTTED LINES DEMOTE METHOD
OF CONNECTING STRAP WIRES
FURNISHED WITH EACH SETSCHEMATIC OF
NO. 6044-C-1 & AC-1 & NO. 6145-C1 & AC-1 SETS
SYSTEMS 12, 12-A & 12-ACSCHEMATIC OF
NO. 6044-C-4 & C-8 & NO. 6145 C-4 & C-8 HAND SETS
SYSTEMS NO. 11 & 12SCHEMATIC OF
NO. 6038 C1 & AC-1 & NO. 6139 C1 & AC-1 SETS
SYSTEMS 12, 12-A & 12-ACSCHEMATIC OF
NO. 6042 E & K OUTLYING STATIONS-SYSTEM 12SCHEMATIC OF
NO. 6043-E OUTLYING STATION-SYSTEM 12

INTER-PHONE SYSTEM Nos. 12-A AND 12-AC**General**

The Master Station includes a desk-set, a push button block and an annunciator (one push button and annunciator drop for each outlying station). The outlying stations may consist of wall, desk and hand set Inter-Phones, as required.

A No. 51-H retardation coil is required for the Nos. 12-A and 12-AC Systems. The coil may be mounted close to the battery and connected by means of three wires as shown in the diagram of connections or it may be mounted in the annunciator and wired to the connecting stock, thus eliminating one of the three wires running to the battery.

Wiring Requirements

For connecting the sets of this system the following number of wires are required between Master Station and outlying stations:

- 2 wires common to all stations in the system, and
- 2 individual wires for each outlying station.

For example, a No. 12-A or No. 12-AC System, consisting of one master and four outlying stations, requires a total of ten wires.

The method of installing and connecting up the master station depends upon its location. The connecting block, furnished with the master set, should be mounted under or near the table or desk upon which the desk set and push-button block rests. The 5½ foot flexible cord of the desk set may then be connected to the terminal block allowing enough slack in the cord to permit moving the telephone about the desk. The push-button block may also be connected in a similar manner by a flexible cord furnished special for this purpose, or the block may be fastened in a stationary position at the side or top

of the desk and wired to the connecting block by braided or lead covered cable. The line connections from the outlying stations should terminate at both the annunciator and connecting block as shown in the diagram of connections. If cable is used, it can be terminated at the annunciator and the remaining wires spliced to a smaller size cable for connections to the terminal block.

**Battery Requirements
System No. 12-A**

Only one battery is required to furnish current for talking and ringing. Do not use more than five dry cells connected in series. When using wires of No. 22 B. & S. gauge (as contained in standard Inter-Phone cables) the wire distance between the master and the farthest outlying station should not exceed 750 feet (as this is the longest distance over which satisfactory ringing can be secured). On lines of greater length, larger wire should be used as follows:

750-1000 ft.—No. 20 B. & S. gauge

1000-1500 ft.—No. 18 B. & S. gauge

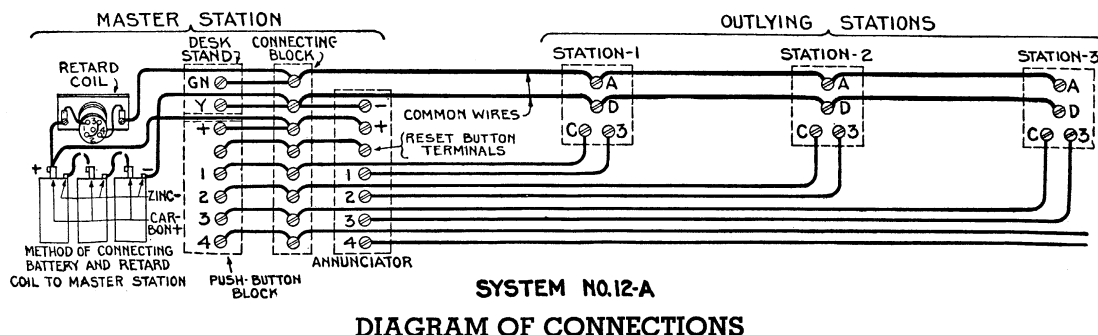
1500-2500 ft.—No. 16 B. & S. gauge

NOTE: A rectifier unit may be used in place of dry cells for both talking and ringing service.

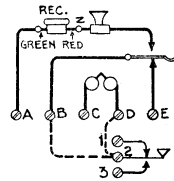
System No. 12-AC

Only one battery is required to furnish current for talking and ringing. This may consist of dry cells, storage battery or a rectifier to total 24 volts direct current.

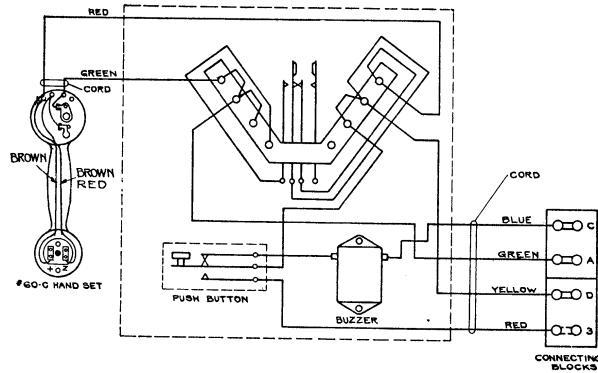
This system can also be arranged for dry cell operation for the talking circuit and a bell ringing transformer for the ringing circuit. Further information will be furnished upon request.



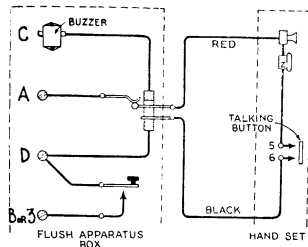
INTER-PHONE SYSTEM No. 12-A



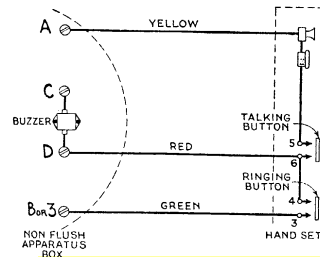
SCHEMATIC OF
NO. 2527-C1 & 2539-C1
OUTLYING STATION
SYSTEM 12-A
DOTTED LINES DENOTE METHOD
OF CONNECTING STRAP WIRES
FURNISHED WITH EACH SET



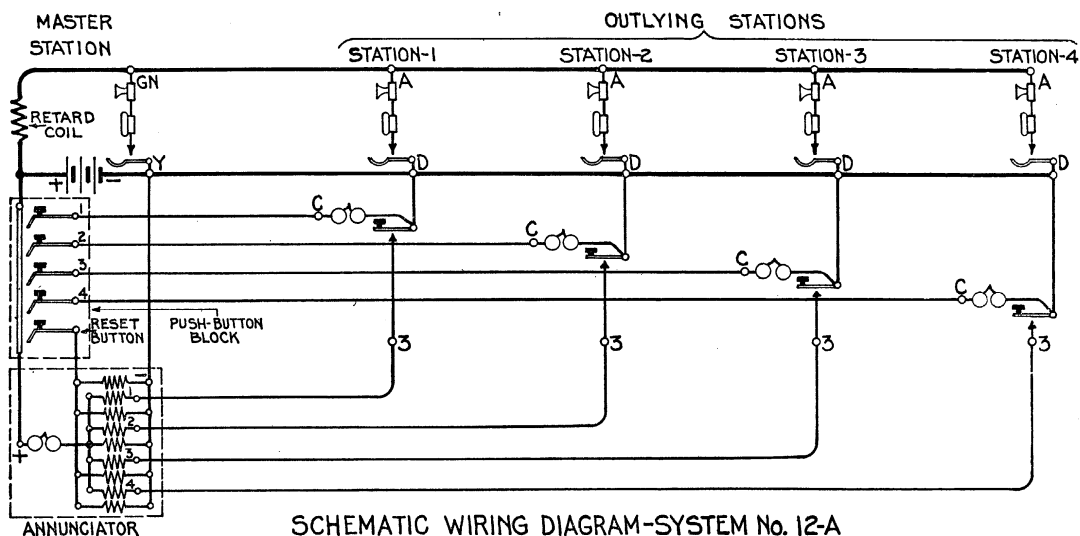
SCHEMATIC OF
NO. 6044-C1 & AC1 & NO. 6145-C1 & AC1 SETS
SYSTEMS 12, 12-A & 12-AC



SCHEMATIC OF
NO. 6042 E&K OUTLYING STATIONS-SYSTEM 12 A



SCHEMATIC OF
NO. 6043-E OUTLYING STATION-SYSTEM 12 A



SCHEMATIC WIRING DIAGRAM-SYSTEM No. 12-A

INTER-PHONE SYSTEM No. 12-AC

(Continued)

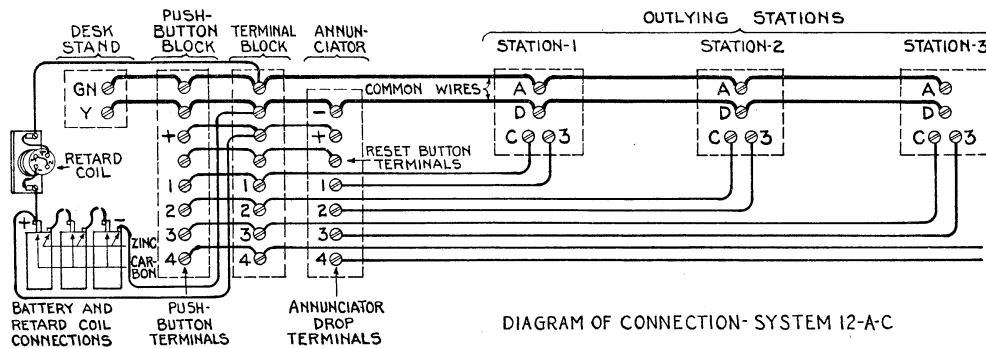
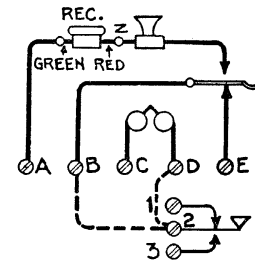
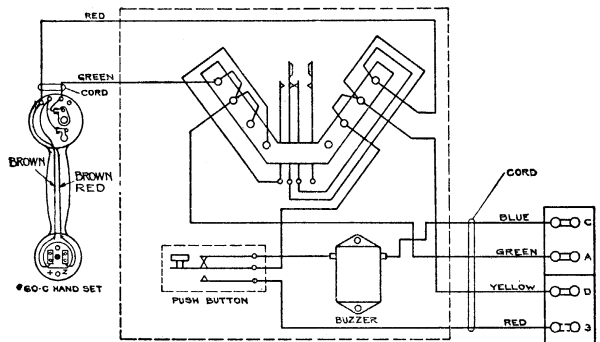
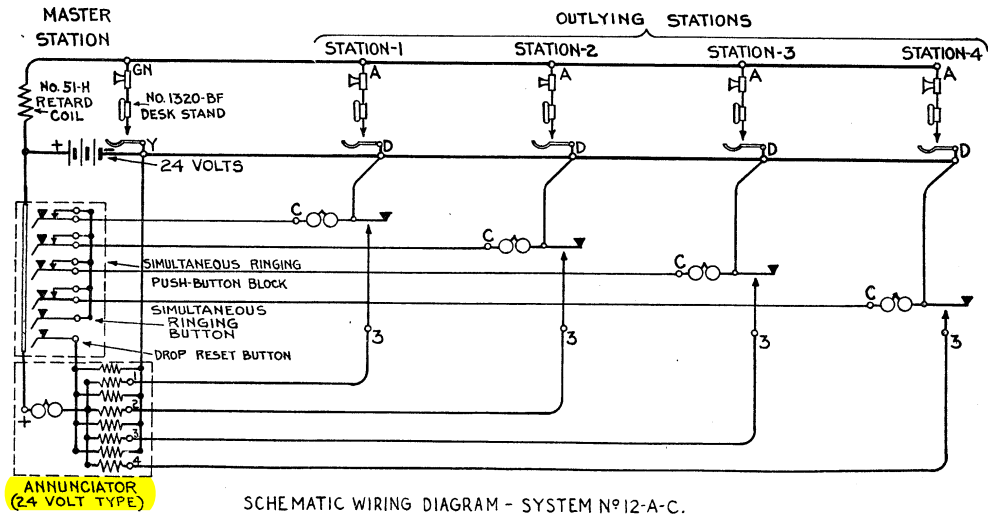


DIAGRAM OF CONNECTIONS

INTER-PHONE SYSTEM No. 12-B & C**General**

There are two wiring arrangements depending upon whether the master station annunciator is furnished with or without push-buttons for calling the outlying stations. In either case, the method of connection is shown in the following diagrams entitled System No. 12-C "Annunciator with push-buttons" and System No. 12-B "Annunciator without push-buttons."

Wiring Requirements**SYSTEM NO. 12-B****ANNUNCIATOR WITHOUT PUSH BUTTONS**

- 1 wire common to all stations, and
- 1 individual wire from the master station to each outlying station.

SYSTEM No. 12-C**ANNUNCIATOR WITH PUSH BUTTONS**

- 1 wire common to all stations, and

2 individual wires from the master station to each outlying station.

Battery Requirements

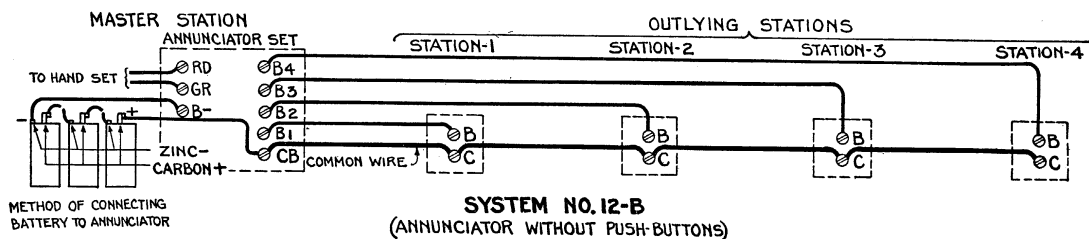
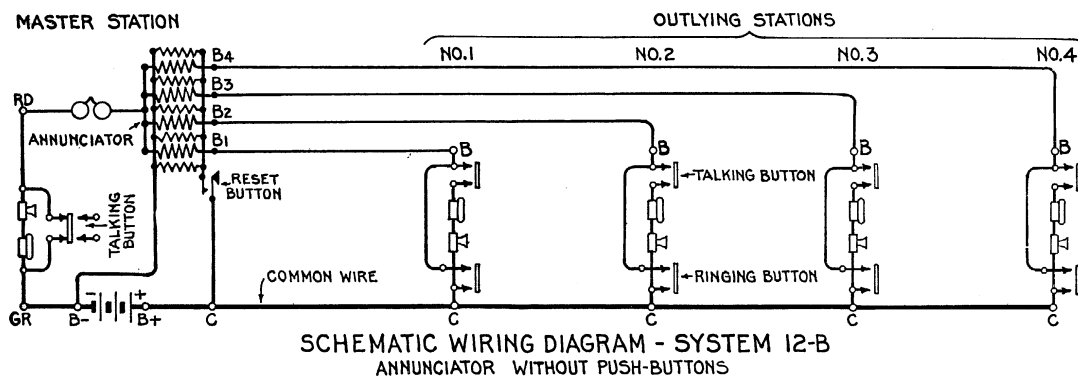
Only one battery is required to furnish the current for talking and ringing. Do not use more than four dry cells connected in series.

When using wires of No. 22 B. & S. gauge size (as contained in the standard Inter-Phone cables recommended for this system) the wire distance between the master and the farthest outlying station should not exceed 250 feet (as this is the longest distance over which satisfactory ringing can be secured). On the longer lines, larger wire should be used as follows:

250-400 ft.—No. 20 B. & S. gauge

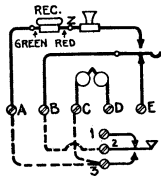
400-600 ft.—No. 18 B. & S. gauge

600-1000 ft.—No. 16 B. & S. gauge

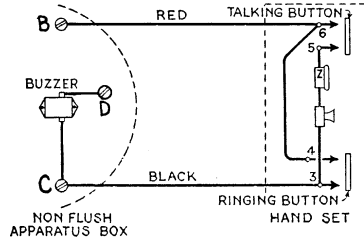
**DIAGRAM OF CONNECTIONS**

INTER-PHONE SYSTEM No. 12-B & C

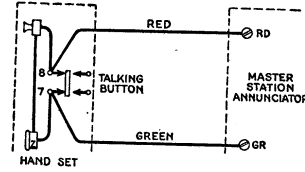
(Continued)



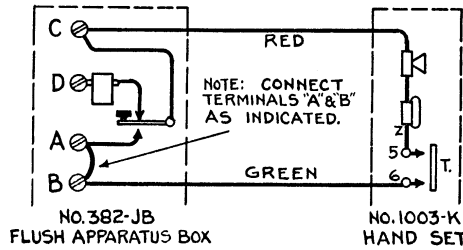
SCHEMATIC OF
NO. 2527-C1 & 2539-C1
SYSTEM 12 B & C
DOTTED LINES DENOTE METHOD
OF CONNECTING STRAP WIRES
PUBLISHED WITH EACH SET



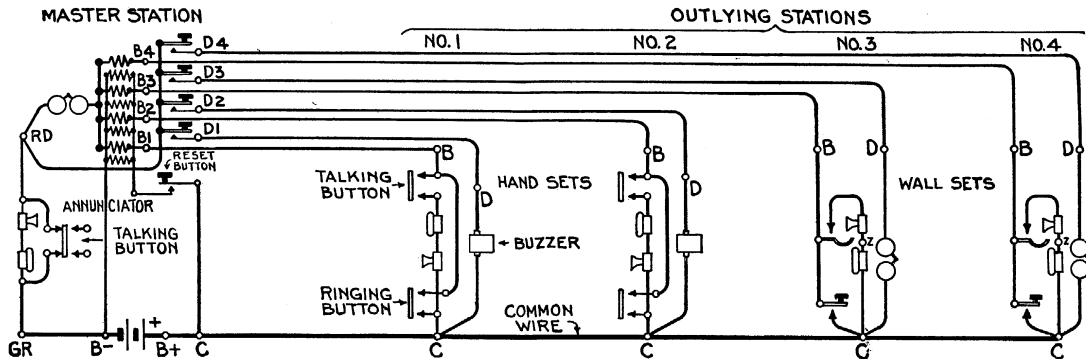
SCHEMATIC OF
NO. 6043 D - OUTLYING STATIONS - SYSTEM 12 B & C



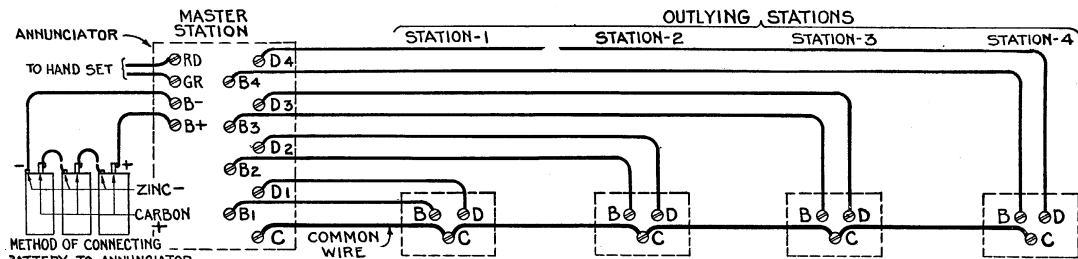
SCHEMATIC OF
NO. 1003-D HAND SET - SYSTEM 12 B & C
FOR MASTER STATION WITH ANNUNCIATOR



SCHEMATIC OF
NO. 6042-D & M - SYSTEM 12 B & C



SCHEMATIC WIRING DIAGRAM - SYSTEM 12-C
ANNUNCIATOR WITH PUSH-BUTTONS



SYSTEM NO. 12-C (ANNUNCIATOR WITH PUSH-BUTTONS)

DIAGRAM OF CONNECTIONS

INTER-PHONE SYSTEM No. 12-SS

WITH SECRET SERVICE

GENERAL

Purpose

To provide non-interfering or secret service between a master station and any number of outlying stations. The Master Station can connect his line to any one of the outlying stations and no other outlying station can listen in on the conversation.

Type of Apparatus

The Master Station equipment is composed of a cradle type handset, a key box and an electric reset type annunciator as follows:

Outlying Station Inter-Phones

The outlying station Inter-Phones may be composed of flush or surface type wall sets, cradle type or handset types as follows:

No. of Buttons	Metal Wall Surface	Inter-Phones Flush
1	2527C-1	2539C-1

Hand Set Inter-Phones

Cradle Type	Surface Box Type	Flush Box Type
6145C-1	6043E 6139C-1	6042K

For schematic wiring diagrams of wall, desk and hand set types refer back to System 12-A.

Wiring and Battery Requirements

Three strap connections must be made to the terminals of the No. 328 key box at the Master Station. The method of making the line connections to this key box and associated Inter-Phones is indicated on the diagram herewith. In addition the last button in this key box will be used as a drop reset button for the annunciator. If this button is not required it may be used for an additional station in the system.

One common wire and three individual wires are required for each outlying station in the system.

Only one battery is required for furnishing the talking and the ringing current. Not more than five dry cells should be used for this battery. This will take care of up to 750 feet of No. 22 B. & S. gauge Inter-Phone cable wire. On lines of greater length larger wire should be used as follows:

750-1000 feet—No. 20 B. & S. gauge

1000-1500 feet—No. 18 B. & S. gauge

1500-2500 feet—No. 16 B. & S. gauge

See wiring diagram and diagram of connections herewith for the connection between the Master Station and each outlying station.

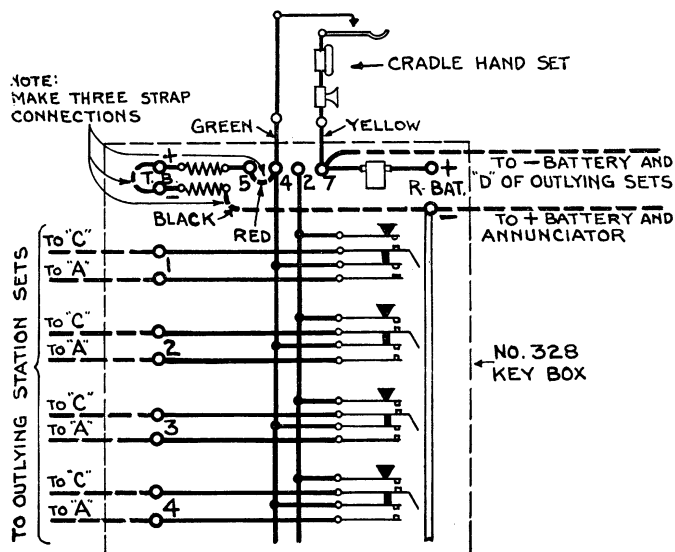
Master Station Equipment

No. of Outlying Stations	Desk Set Key Box No.	Cradle Set No.	Cable Terminal Number	Flexible Cable Code No.	Annunciator	
					Surface (S)	Flush (S)
5	*328C-6	1145C-0	19-A	416	403-6	409-6
11	*328C-12	1145C-0	19-A	428	403-12	409-12
15	*328C-16	1145C-0	19-B	436	403-16	409-16
19	*328C-20	1145C-0	19-B	444	403-20	409-20
23	*328C-24	1145C-0	19-B	452	403-24	409-24

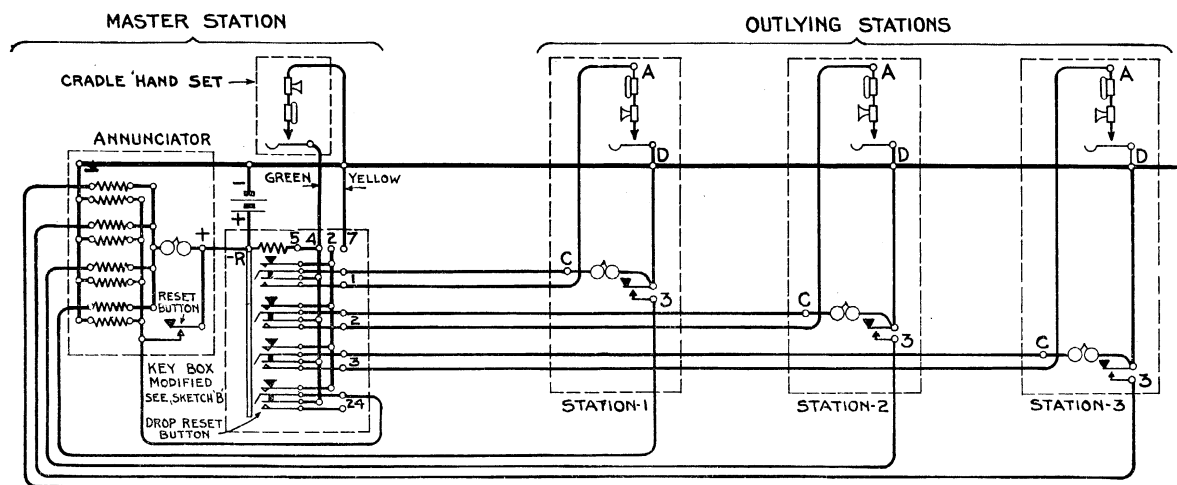
(*) Last button in each key box to be used as a reset button for annunciator drops.

(S) Unless otherwise specified the No. 403 type annunciator will be furnished.

INTER-PHONE SYSTEM No. 12-SS WITH SECRET SERVICE



CONNECTIONS OF MASTER STATION INTER-PHONE



SCHEMATIC WIRING DIAGRAM - SYSTEM No. 12-SS

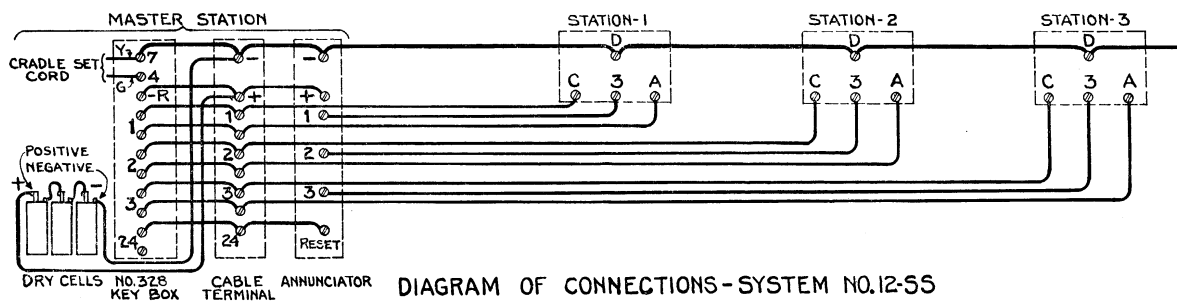


DIAGRAM OF CONNECTIONS - SYSTEM No. 12-SS

INTER-PHONE SYSTEM No. 14 & 14-C**(Two Stations Only)****General**

The No. 14 System consists of two stations only. Two wires are required for connecting up both stations with a dry cell battery at each station.

Wiring and Battery Requirements

Only two wires are required to connect the two

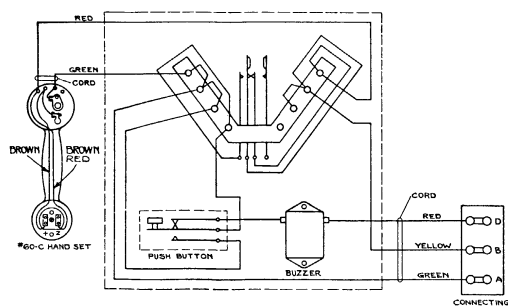
stations. The size of the wires is determined by the distance between the stations.

A battery of three dry cells is required at each station to furnish current for talking and ringing if the length of line is 750 feet or less. If the length of the line is increased, additional dry cells are required at each station to insure satisfactory ringing as follows:

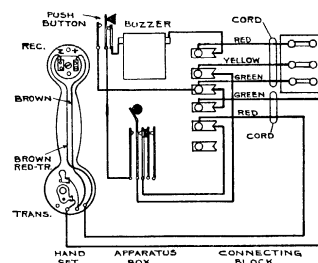
Distance Between Stations up to	750 Ft.	1000 Ft.	1500 Ft.	2000 Ft.	2500 Ft.	3000 Ft.	4000 Ft.	5000 Ft.	6000 Ft.
No. B. & S. Gauge Copper Wire	18	18	18	16	16	14	14	12	12
No. of Dry Cells for Each Station	3	4	5	4	5	4	5	4	5

When additional cells are required, they must be connected in series with the original cells and the zinc or negative pole must be connected to terminal

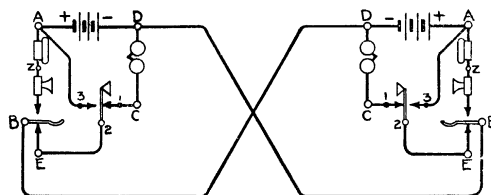
"3." When so arranged, the wire between "A" and "3" in each station must be cut. This applies to No. 2527-C-1 and No. 2539-C-1 wall Inter-Phones only.



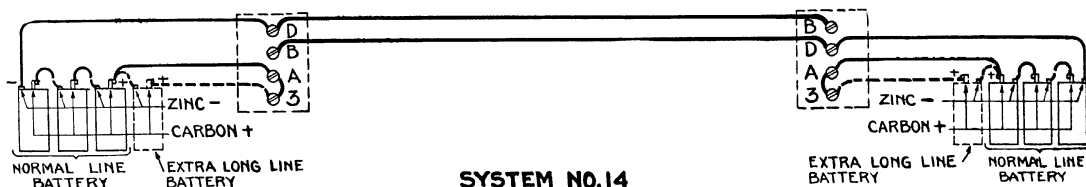
**Schematic of
No. 6044-B-1 & No. 6145-B-1 Inter-Phone
Systems 14 & 14-C**



**Schematic of
No. 6038-B-1 & No. 6139-B-1 Inter-Phone
Systems 14 & 14-C**



SCHEMATIC WIRING DIAGRAM - SYSTEM NO. 14



**SYSTEM NO. 14
DIAGRAM OF CONNECTIONS**

INTER-PHONE SYSTEM No. 14 & 14-C**(Two Stations Only)****General**

The No. 14-C System consists of two stations only. Three wires are required for connecting both stations, with a dry cell battery at one station only.

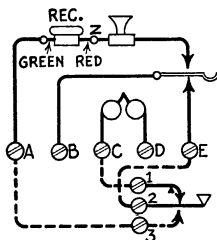
Wiring and Battery Requirements

Three wires are required for connecting the two stations. Only one battery is required to furnish current for talking and ringing, also, a No. 51-H retardation coil. Do not use more than five dry cells connected in series. The wire distance between both stations should not exceed 270 feet when using No. 22 B. & S. gauge wire. On longer lines, larger wires should be used as follows:

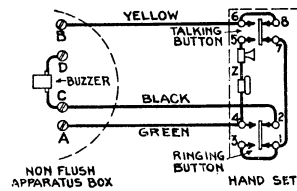
250-400 feet—No. 20 B. & S. gauge wire

400-600 feet—No. 18 B. & S. gauge wire

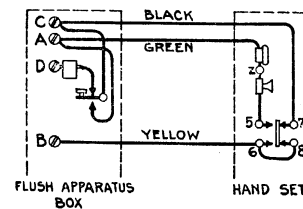
600-1000 feet—No. 16 B. & S. gauge wire



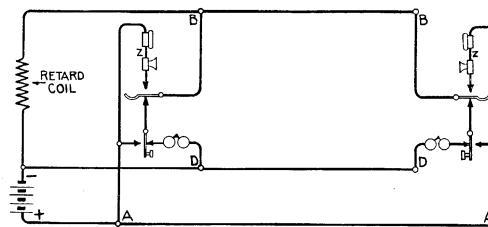
**Schematic of
Nos. 2527-C-1 & 2539-C-1
System 14**
Dotted Lines Denote Method
of Connecting Strap Wires



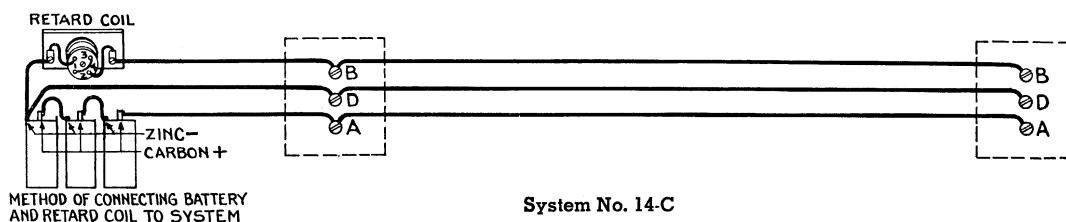
**Schematic of
No. 6043-P Systems 14 & 14-C**



**Schematic of
Nos. 6042-AE & AF
Systems 14 & 14-C**



Schematic Wiring Diagram—System No. 14-C



System No. 14-C

INTER-PHONE SYSTEM No. 15**General**

System No. 15 provides code ringing service. Each set is equipped with one push button, which, when depressed, rings the bells at all other stations.

Wiring and Battery Requirements

Four wires, common to all Inter-Phones are required for connecting the sets of the system. Only one battery is required to furnish current for talking and ringing, also, a No. 51-H Retardation Coil. Do not use more than five dry cells connected in series. The battery requirements of this system are listed below and are determined by the number of Inter-Phones to be connected, the length of line and the size of wire to be used.

Number of Stations	3				4				5				6				7			8		
COPPER WIRE																						
B. & S. Gauge No.		16	18	20	22	16	18	20	22	16	18	20	22	16	18	20	22	16	18	20	16	18
Length of Line— 250 Ft.		4	4	4	5	4	4	4	5	4	4	4	5	4	4	4	5	4	4	5	4	5
" " " — 500 "		4	4	4	5	4	4	5		4	4	5		4	4	5		4	5		5	5
" " " — 750 "		4	4	5		4	4	5		4	5			4	5			5	5		5	
" " " —1000 "		4	5			4	5			5	5			5				5			5	
" " " —1250 "		4	5			5				5				5				5			5	
" " " —1500 "		5				5				5				5				5			5	

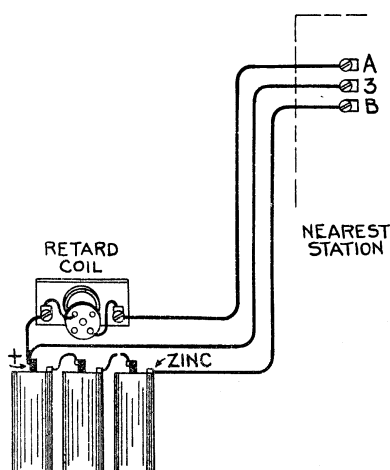


Figure A

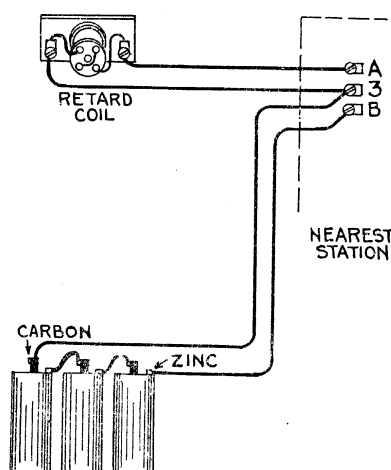


Figure B

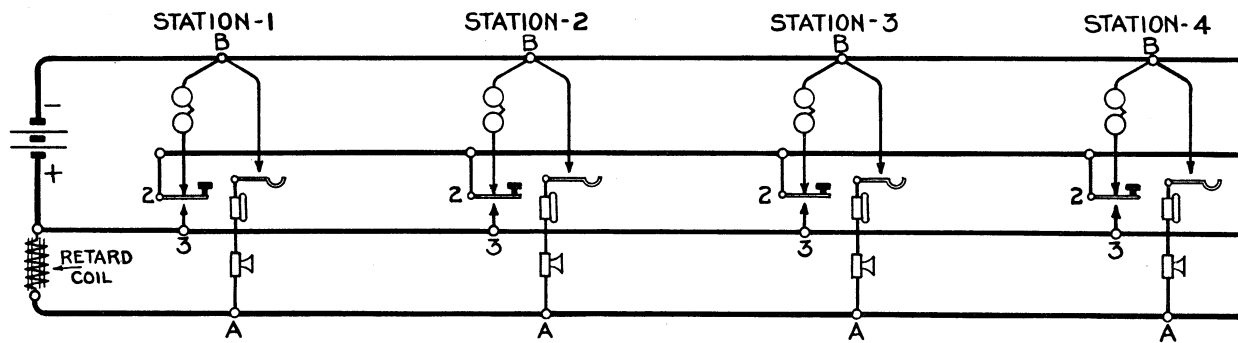
(A) The retardation coil must be mounted close to the battery or at a point between the battery and the nearest station. The connections should be made as shown in Fig. A. Three wires should be run from

the battery and coil to the nearest station.

(B) In case the coil is to be mounted close to the nearest station, the connections should be made as shown in Fig. B.

INTER-PHONE SYSTEM No. 15

Wiring Diagrams



SCHEMATIC WIRING DIAGRAM - SYSTEM 15

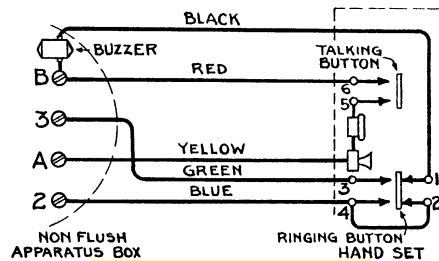
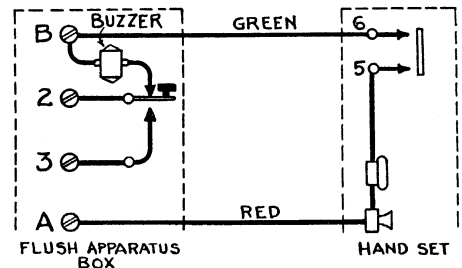
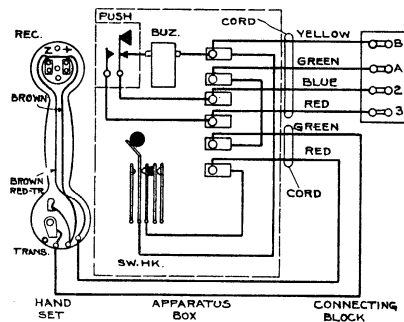
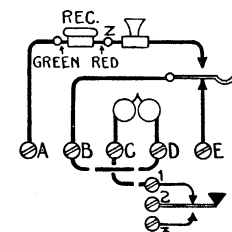
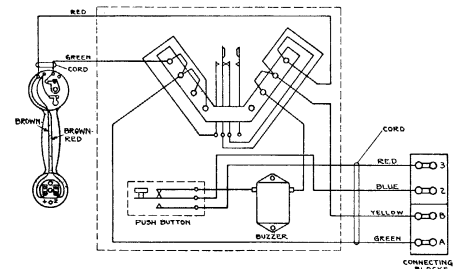
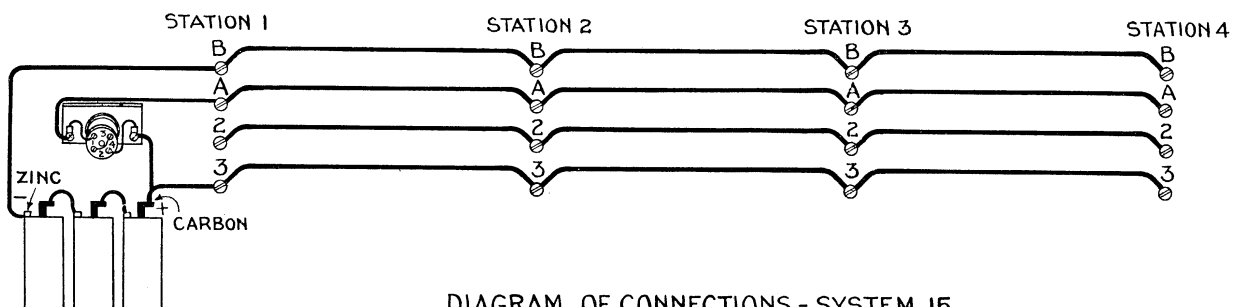
SCHEMATIC OF
NO. 6043-CD SYSTEM-15SCHEMATIC OF
NO. 6042-CD SYSTEM-15SCHEMATIC OF
NO. 6038 D-1 & NO. 6139 D-1 INTER-PHONES
SYSTEM-15SCHEMATIC OF
NO'S 2527-C-1 & 2539-C-1
SYSTEM 15
DOTTED LINES DENOTE METHOD
OF CONNECTING STRAP WIRESSCHEMATIC OF
NO. 6044-D-1 & NO. 6145-D-1 SYSTEM 15

DIAGRAM OF CONNECTIONS - SYSTEM 15

INTER-PHONE SYSTEM No. 18-C

General

System No. 18-C consists of a master station annunciator equipped with drops and jacks, one for each outlying station in the system. An answering cord is provided at the annunciator for answering and calling purposes.

To call an outlying station, the annunciator operator inserts the answering cord plug in one of the jacks and depresses the ringing button. This signals the outlying station and the operator depresses the talking button in the hand set for conversation.

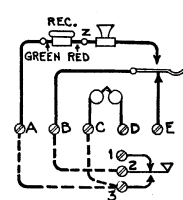
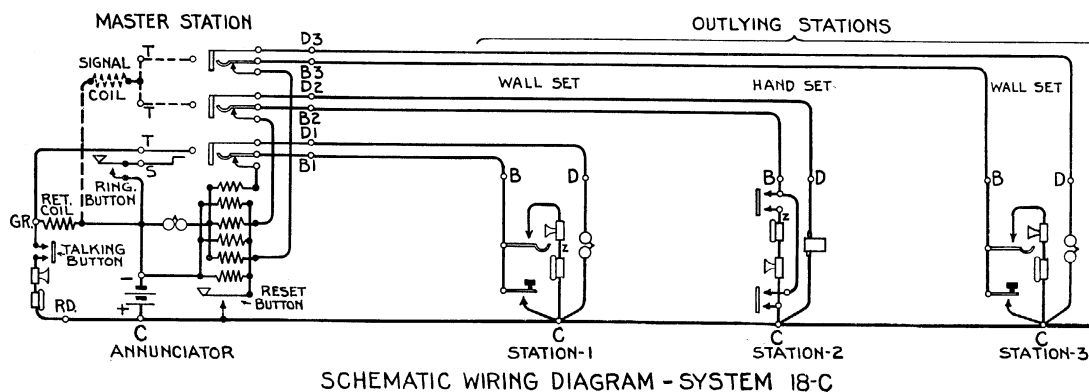
Wiring and Battery Requirements

The following number of wires are required between master station and outlying stations:

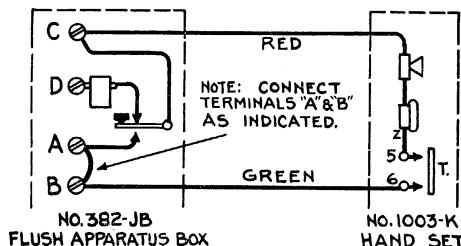
- 1 common wire for all stations in the system.
- 2 individual wires for each outlying station.

For example, a No. 18-C system consisting of one master and 20 outlying stations requires a total of 41 wires.

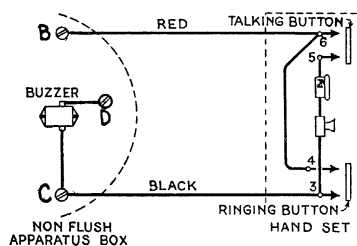
Only one battery is required to furnish current for talking and ringing. Five or more dry cells connected in series should be used, depending upon the length of line and number of stations. Refer to battery requirements of system No. 12-A.



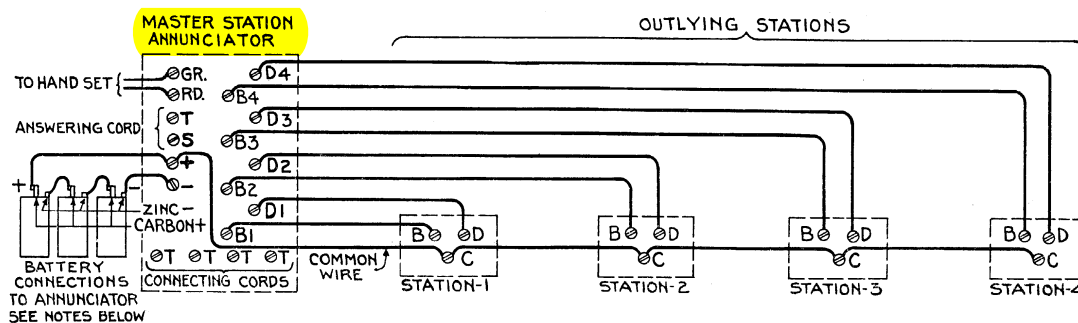
SCHEMATIC OF
NO. 2527-C1 & 2539-C1
OUTLYING STATION
SYSTEM 18-C
DOTTED LINES DENOTE METHOD
OF CONNECTING STRAP WIRES
FURNISHED WITH EACH SET



SCHEMATIC OF
NO. 6042-D & M - SYSTEM 18-C



SCHEMATIC OF
NO. 6043 D - OUTLYING STATIONS-SYSTEM 18-C



APARTMENT HOUSE SYSTEM No. 20

General

There are six circuit arrangements of the No. 20 Apartment House Inter-Phone Systems, differing only in the number of apartments to be installed and whether a janitor, laundry or tradesmen's Inter-Phone is specified.

The No. 1520-R Vestibule Inter-Phone is equipped with one push-button for connecting to the janitor's set. The push-button plate, provided for mounting beside the Inter-Phone, is equipped with buttons for connecting to each apartment set. The vestibule Inter-Phone and associated push-button plate should be mounted in the wall with the mail boxes.

Wall opening dimensions and framing details for the No. 1520-R Vestibule Inter-Phone, the push-button plates and the mail boxes are shown hereinafter.

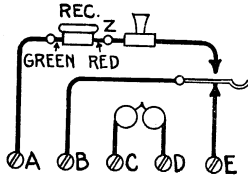
Wiring Requirements

System No. 20-A:

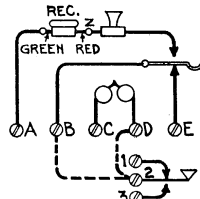
- †3 Wires common to all Inter-Phones.
- 1 Individual wire for each suite Inter-Phone.

System No. 20-D:

- †4 Wires common to all Inter-Phones.
- 1 Individual wire for each suite Inter-Phone.
- *1 Extra wire connecting vestibule and janitor's or laundry Inter-Phones.



SCHEMATIC OF
NO'S 2527-C-0 & 2539-C-0
SYSTEMS 21-D & E
JANITOR or LAUNDRY



SCHEMATIC OF
NO'S 2527-C-1 & 2539-C-1
SYSTEM NO. 20-A
(SUITE)

System No. 20-E:

- †5 Wires common to all Inter-Phones.
- 1 Individual wire for each suite Inter-Phone.
- *1 Extra wire connecting vestibule, janitor and laundry Inter-Phone.

System No. 20-G:

- †4 Wires common to all Inter-Phones.
- 1 Individual wire for each suite Inter-Phone.
- *1 Extra wire connecting vestibule and janitor's Inter-Phone.

System No. 20-H:

- †5 Wires common to all Inter-Phones.
- 1 Individual wire for each suite Inter-Phone.
- *1 Extra wire connecting vestibule, janitor and laundry Inter-Phone.

System No. 20-J:

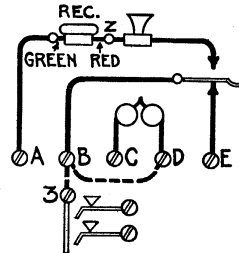
- †3 Wires common to all Inter-Phones.
- 2 Individual wires for each suite Inter-Phone.
- 2 Extra wires connecting vestibule to janitor Inter-Phones.

*When using cable these extra wires can be disregarded, as one of the individual wires from vestibule to suite sets can be utilized for this connection.

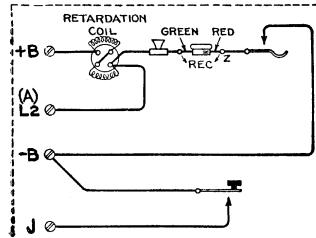
†Includes one common wire for door opener.

Battery Requirements

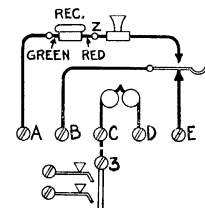
Each system requires one battery to furnish current for talking and ringing. Do not use more than five dry cells connected in series. When using wires of No. 22 B. & S. gauge (as contained in standard Western Electric Inter-Phone Cables) the wire dis-



SCHEMATIC OF
NO'S 2527-C-2 & 2539-C-2
SYSTEMS 20-DEGH & J
(SUITE)



SCHEMATIC OF
NO. 1520-R SYSTEM NO. 20 & 22



SCHEMATIC OF
NO'S 2527-C & 2539-C
SYSTEMS 20-G & H
JANITOR & LAUNDRY

tance between the two stations farthest apart should not exceed 750 feet (as this is the longest distance over which satisfactory ringing can be secured). On lines of greater length, larger wires should be used as follows:

750 to 1000 feet—No. 20 B. & S. gauge

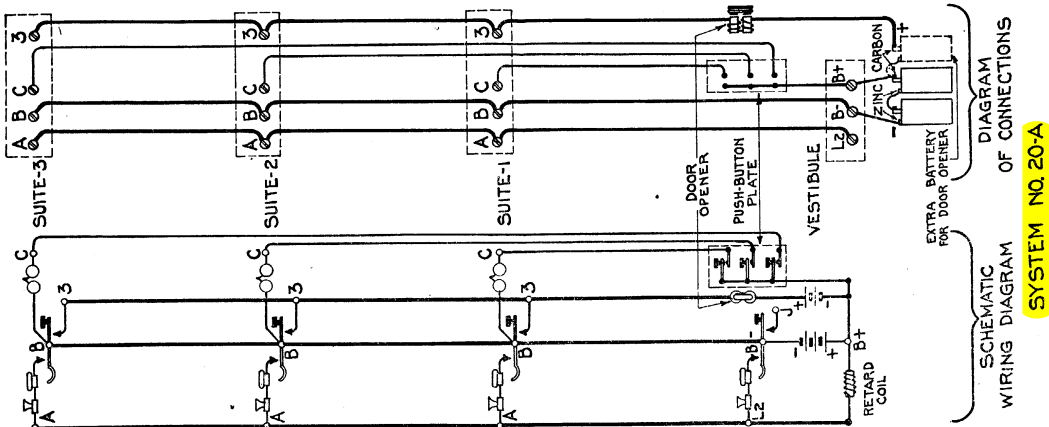
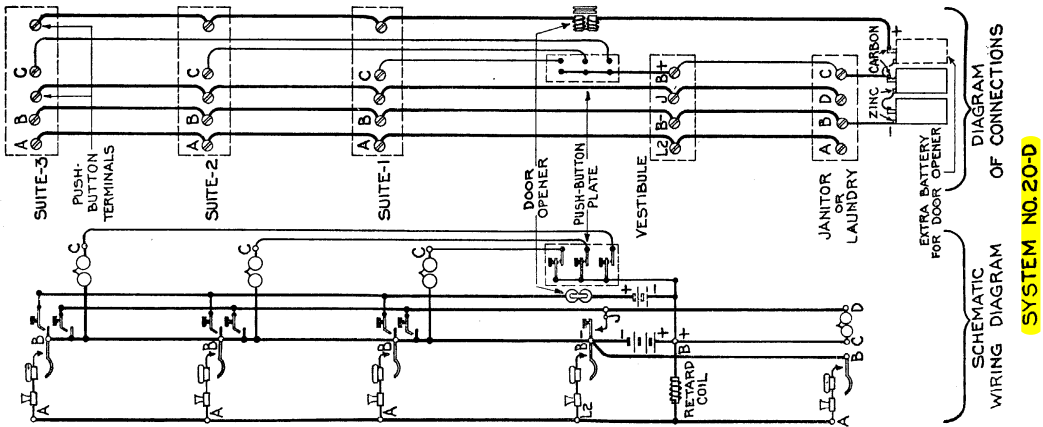
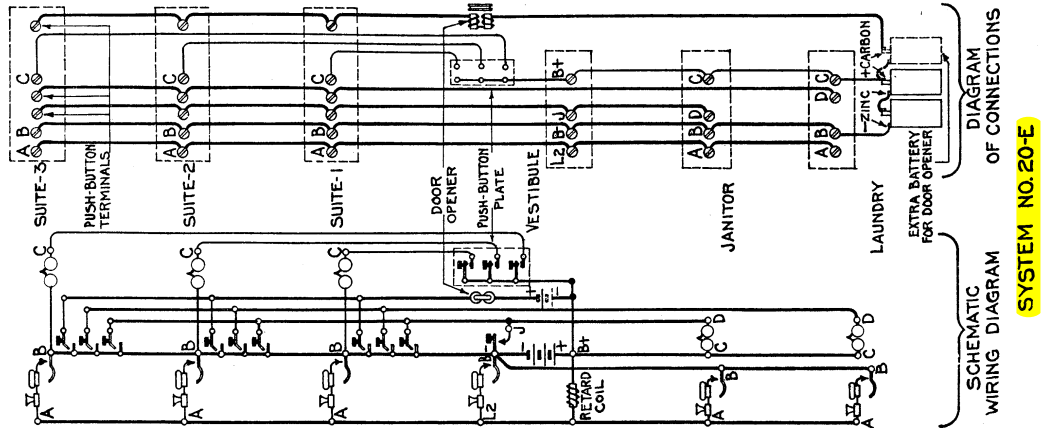
1000 to 1500 feet—No. 18 B. & S. gauge

1500 to 2500 feet—No. 16 B. & S. gauge

If a door opener is included in the system, additional dry cells will be required. The number of additional cells depends upon the working of the opener and the adjustment of the door. Two or three cells have generally been found sufficient for this purpose.

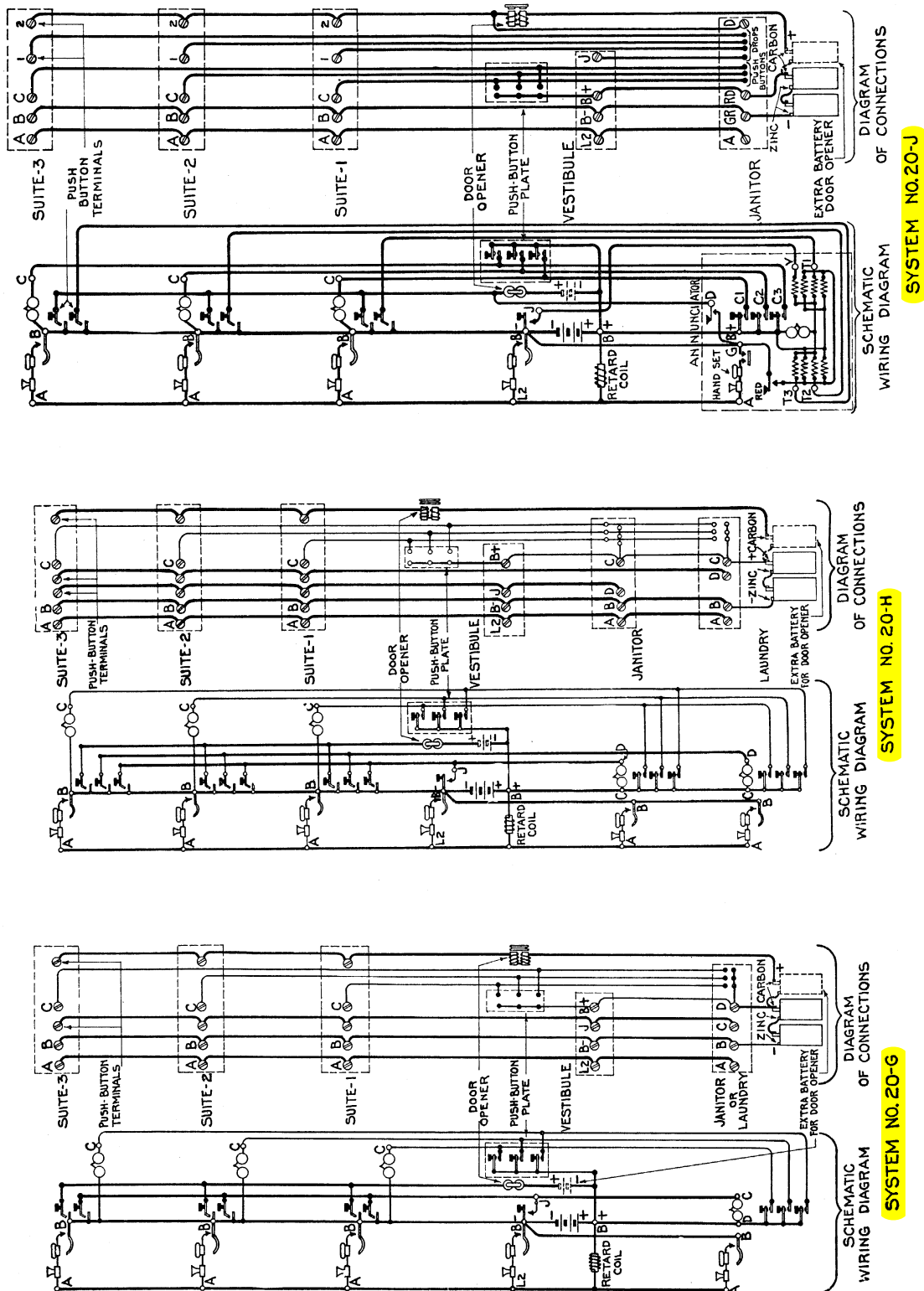
APARTMENT HOUSE SYSTEM No. 20

Wiring Diagrams



APARTMENT HOUSE SYSTEM No. 20

Wiring Diagrams



APARTMENT HOUSE SYSTEM No. 21**General**

The No. 21 apartment house Inter-Phone system has six circuit arrangements which use the 1524-F type vestibule Inter-Phone, and three circuit arrangements which use the 1524-F type vestibule Inter-Phone.

No. 1524-E Inter-Phone has a button in the face plate which must be depressed while a conversation is being carried on.

No. 1524-F Inter-Phone is similar to the 1524-E but has no talking button, employing instead a relay which closes the talking circuit when the receiver of any suite set is off its hook.

Both types of vestibule Inter-Phone have a button for calling the janitor and are to be associated with suitable plates bearing buttons for calling the suites.

The vestibule Inter-Phones and associated push-button plates are to be installed in the vestibule wall with the mail-boxes. Wall opening dimensions and framing details for the vestibule equipment are shown hereinafter.

System No. 21-A & AR:

- †3 Wires common to all Inter-Phones.
- 1 Individual wire for each suite Inter-Phone.

System No. 21-D & DR:

- †4 Wires common to all Inter-Phones.
- 1 Individual wire for each suite Inter-Phone.
- *3 Extra wires connecting vestibule, janitor, or laundry Inter-Phone and battery.

System No. 21-E:

- †5 Wires common to all Inter-Phones.
- 1 Individual wire for each suite Inter-Phone.
- *4 Extra wires connecting vestibule, janitor, or laundry Inter-Phone and battery.

System No. 21-G & GR:

- †4 Wires common to all Inter-Phones.
- 1 Individual wire for each suite Inter-Phone.
- *4 Extra wires connecting vestibule, janitor, Inter-Phone and battery.

System No. 21-H:

- †5 Wires common to all Inter-Phones.
- 1 Individual wire for each suite Inter-Phone.
- *4 Extra wires connecting vestibule, janitor, or laundry Inter-Phone and battery.

System No. 21-J:

- †3 Wires common to all Inter-Phones.
- 2 Individual wires for each suite Inter-Phone.
- 2 Extra wires connecting vestibule and janitor's Annunciator.
- 3 Extra wires connecting vestibule to battery.

*When using cable these extra wires can be disregarded, as one of the individual wires from vestibule to suite can be utilized for this connection.

†Includes one common wire for door opener.

Note

In systems No. 21-DR and GR an extra button is required at the janitor or laundry station. This button is used to cut out the vestibule loud speaker when the janitor's set is in communication with a suite set.

In No. 21-DR this button is provided on the janitor's set. In No. 21-GR it is provided in a separate push button block.

APARTMENT HOUSE SYSTEM No. 21

(Continued)

Battery Requirements

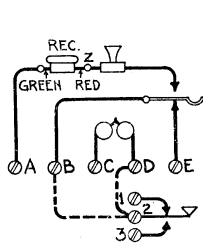
Each system requires three sets of batteries to furnish current for talking and ringing, each set to consist of three dry cells connected in series. When using wires of No. 22 B. & S. gauge (as contained in standard Inter-Phone Cables) the wire diameter between the two stations farthest apart should not exceed 750 feet (as this is the longest distance over which satisfactory ringing can be secured). On lines of greater length, larger wires should be used as follows:

750 to 1000 feet—No. 20 B. & S. gauge

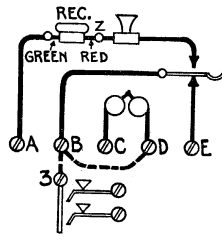
1000 to 1500 feet—No. 18 B. & S. gauge

1500 to 2500 feet—No. 16 B. & S. gauge

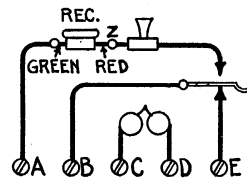
If a door opener is included in the system, additional dry cells will be required. The number of additional cells depends upon the working of the opener and the adjustment of the door. Two or three cells have generally been found sufficient for this purpose.



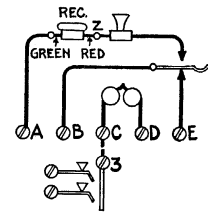
SCHEMATIC OF
NO'S 2527-C-1 & 2539-C-1
SYSTEM NO. 21-A&AR
(SUITE)



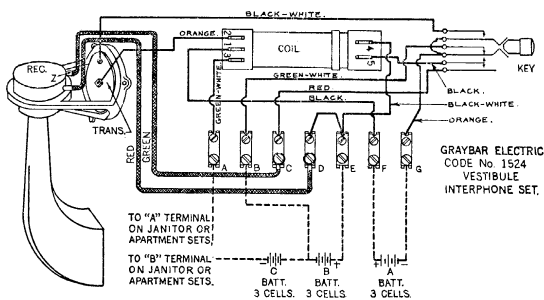
SCHEMATIC OF
NO'S 2527-C-2 & 2539-C-2
SYSTEMS 21-D, E, G, H, J, DR & GR
(SUITE)



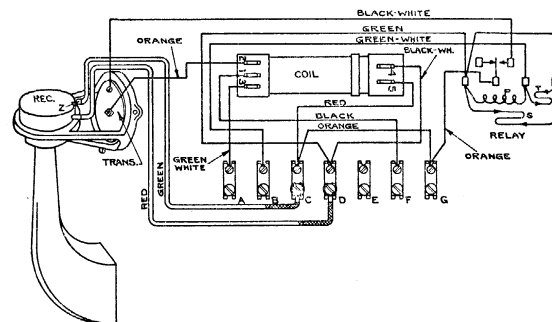
SCHEMATIC OF
NO'S 2527-C-0 & 2539-C-0
SYSTEMS 20-D&E
JANITOR OR LAUNDRY



SCHEMATIC OF
NO'S 2527-C & 2539-C
SYSTEMS 21-G&H
JANITOR & LAUNDRY



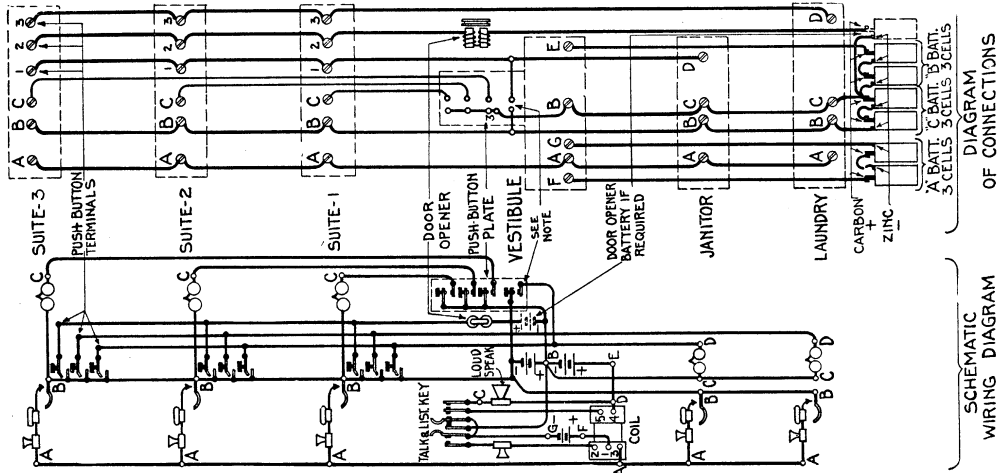
NO. 1524-E
VESTIBULE INTERPHONE
WIRING



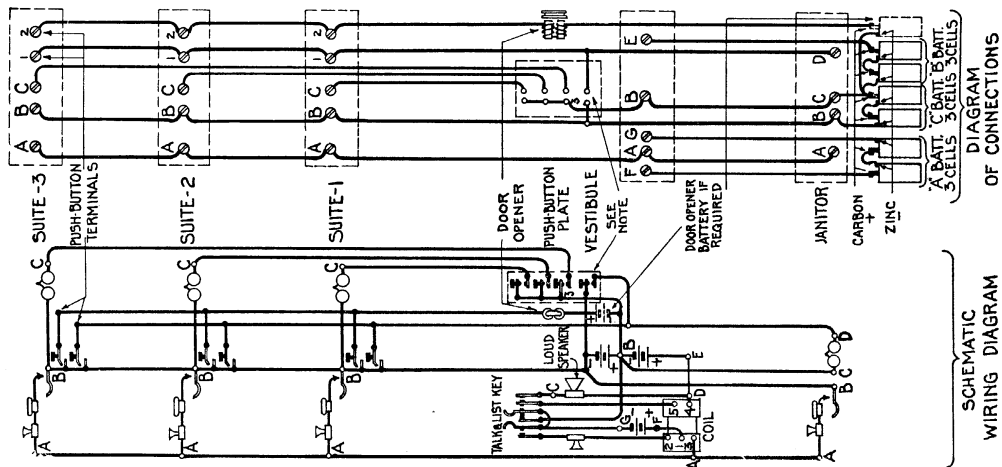
NO. 1524-F
VESTIBULE INTERPHONE
WIRING

APARTMENT HOUSE SYSTEM No. 21

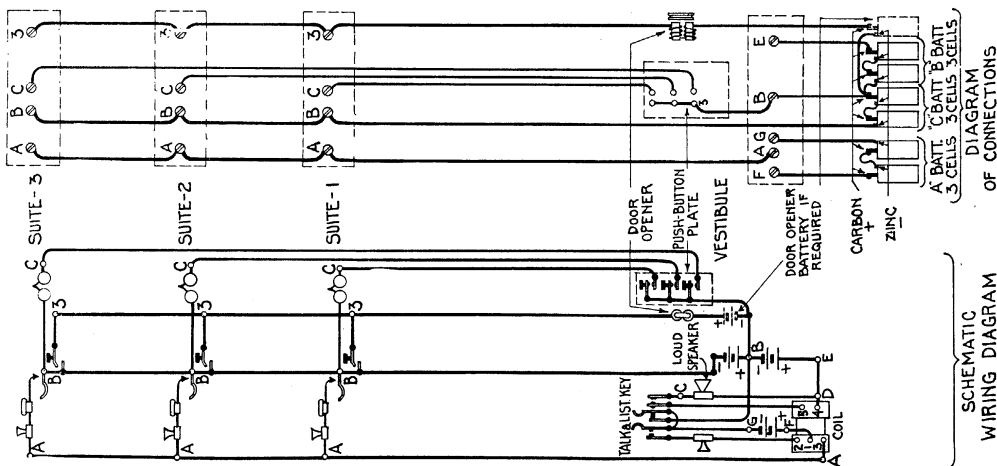
Wiring Diagrams



SYSTEM NO. 21-E



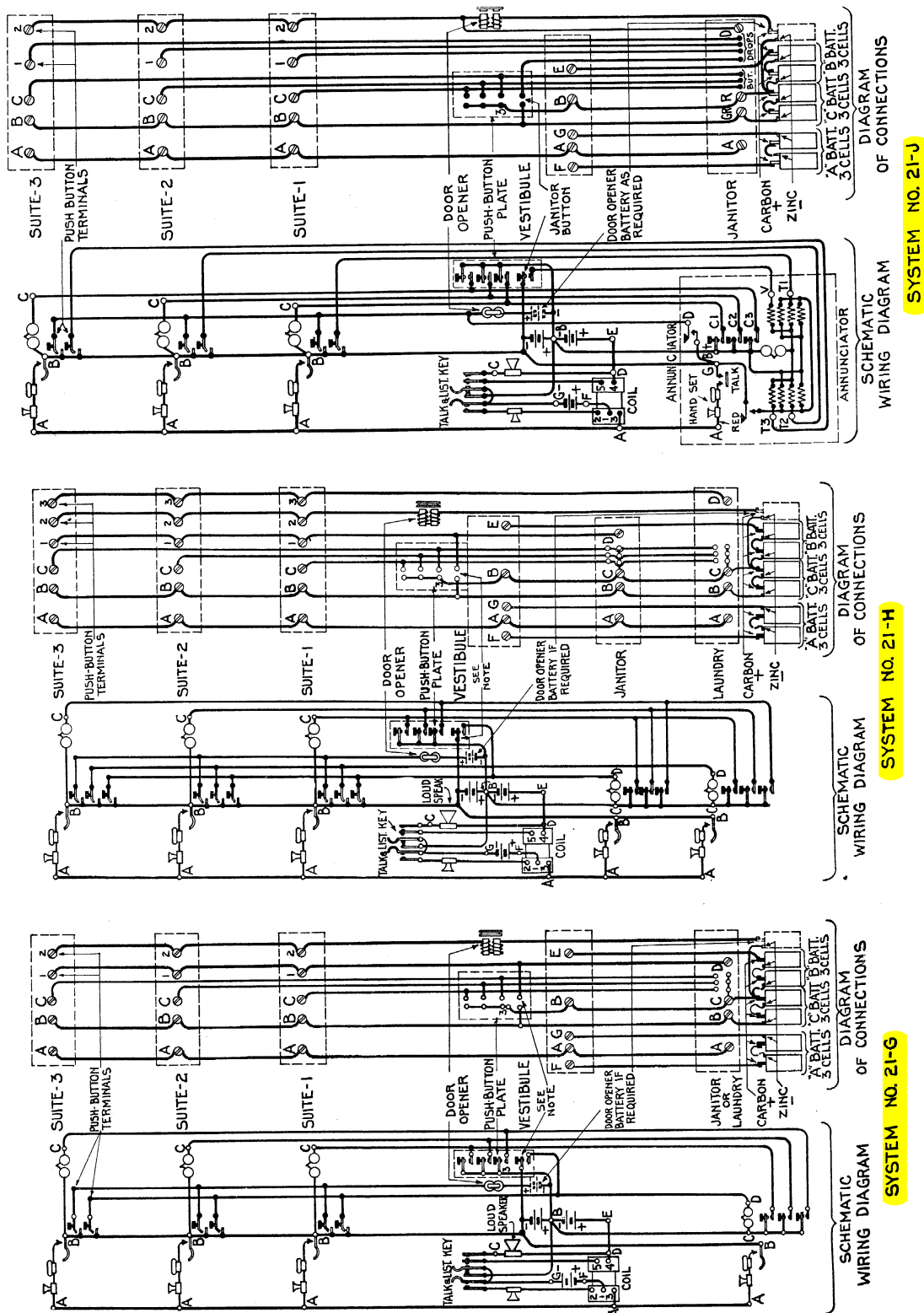
SYSTEM NO. 21-D



SYSTEM NO. 21-A

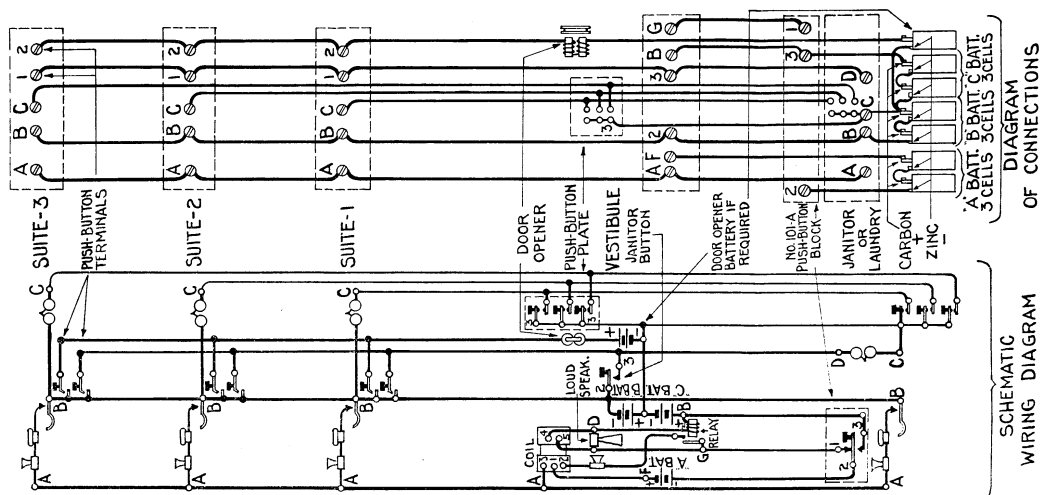
APARTMENT HOUSE SYSTEM No. 21

Wiring Diagrams

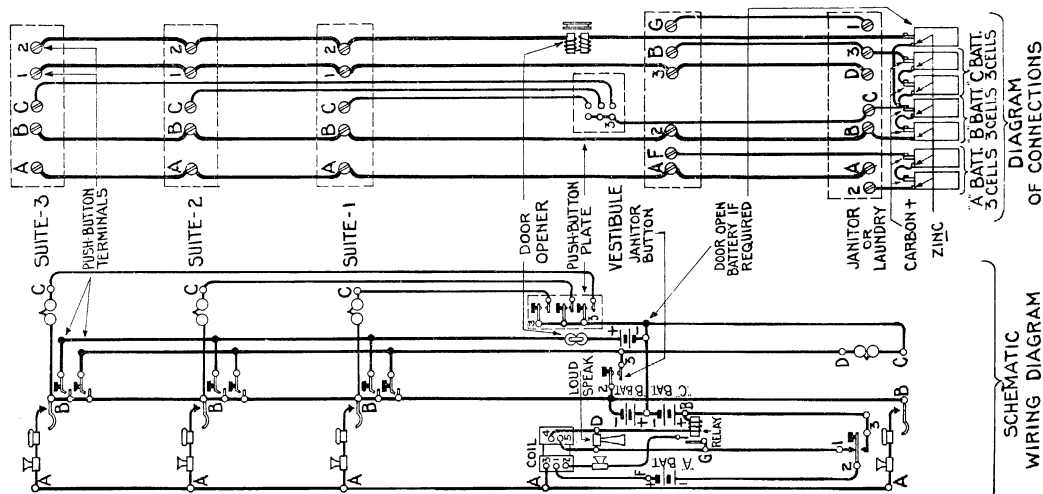


APARTMENT HOUSE SYSTEM No. 21

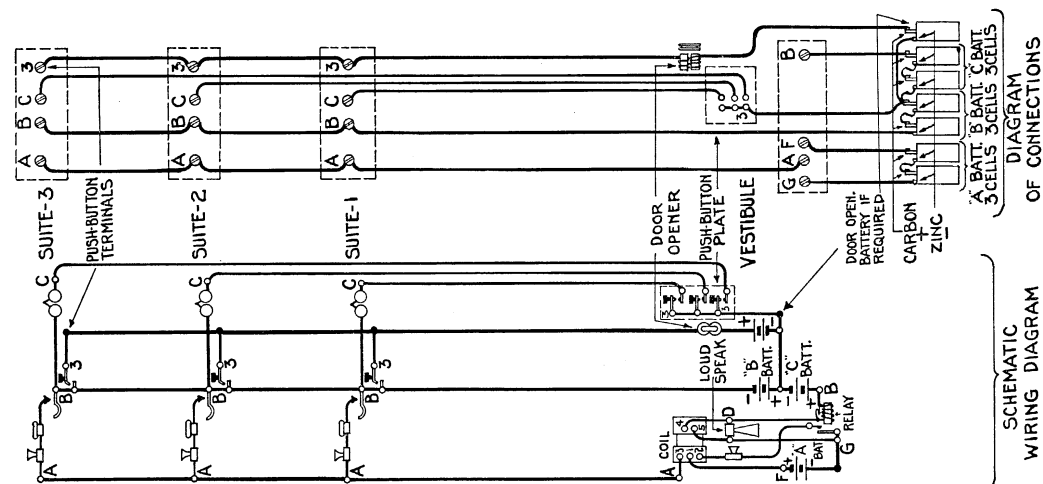
Wiring Diagrams



SYSTEM NO. 21-GR



SYSTEM NO. 21-DR



SYSTEM NO. 21-AR

APARTMENT HOUSE SYSTEM No. 22**General**

The No. 22 system consists of two or more No. 20 common talking systems previously described, but arranged so that each system or section terminates at one janitor's annunciator. There are three circuit arrangements of the No. 22 system differing only in the calling and answering service requirements between the janitor and the apartments.

Each vestibule equipment of the No. 22 system consists of the No. 1520-R vestibule Inter-Phone and associated Push Button Plate, both having the same size face plate to match up with the mail boxes for group mounting arrangement.

The No. 1520-R vestibule Inter-Phone is equipped with a push button for calling the janitor's annunciator and the push button plates are equipped with buttons for calling each apartment in the section.

The wall opening dimensions and framing details for the No. 1520-R vestibule Inter-Phone, push button plate and mail boxes are shown hereinafter.

Wiring Requirements**System No. 22-D:**

- 4 Wires common to all Inter-Phones in each section and to the janitor's annunciator (2 wires for talking circuit, 1 wire for calling the janitor's annunciator and 1 wire for the door opener).
- 1 Individual wire to each suite Inter-Phone from the vestibule push button plate in each section (for calling each suite from the vestibule).
- 2 Extra wires for connecting vestibule set to janitor's annunciator and battery in each section (1 wire from vestibule push button plate to janitor's annunciator and 1 wire for door opener to battery of system).

System No. 22-G:

- 4 Wires common to all Inter-Phones in each section and to the janitor's annunciator (2 wires for the talking circuit, 1 wire for calling the janitor annunciator and 1 wire for the door opener).

- 1 Individual wire to each suite Inter-Phone from the vestibule push button plate and the janitor's annunciator push button (for calling each suite).
- 2 Extra wires for connecting vestibule set to janitor's annunciator and to the battery (1 wire for connecting the common side of the push button in each set and 1 wire from the door opener to the battery).

System No. 22-J:

- 3 Wires common to all Inter-Phones in each section and to the janitor's annunciator (2 wires for the talking circuit and 1 wire for the door opener.)
- 2 Individual wires to each suite Inter-Phone (1 wire from the vestibule push button plate and the janitor's annunciator push buttons (for calling each suite). 1 wire to the janitor's annunciator drop from each suite and the vestibule (for calling the janitor).
- 2 Extra wires for connecting vestibule set to janitor's annunciator and to the battery (1 wire for connecting the common side of the push button in each set, and 1 wire from the door opener to the battery).

Battery Requirements

Each system requires one battery to furnish current for talking and ringing. Do not use more than five dry cells connected in series. However, multiple sets of five dry cells may be connected for large installations. When using wires of No. 22 B. & S. gauge as contained in Western Electric Inter-Phone cable, the wire distance between the two stations farthest apart should not exceed 750 feet (as this is the longest distance over which satisfactory ringing can be secured). On lines of greater length, larger wire should be used as follows:

750 to 1000 feet—No. 20 B. & S. gauge

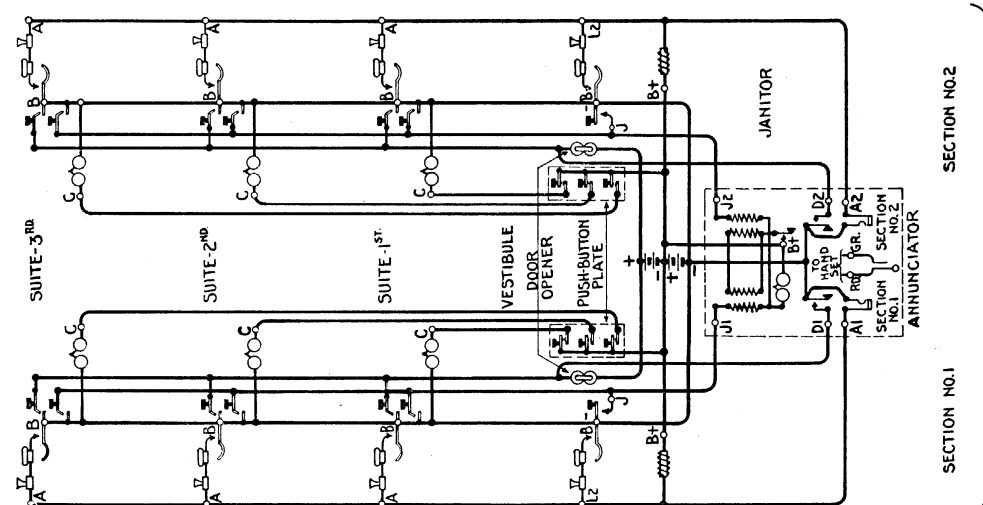
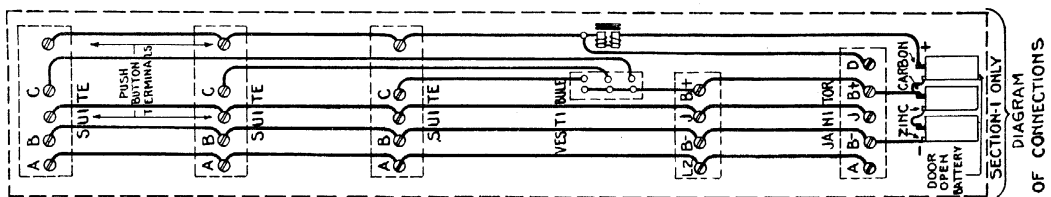
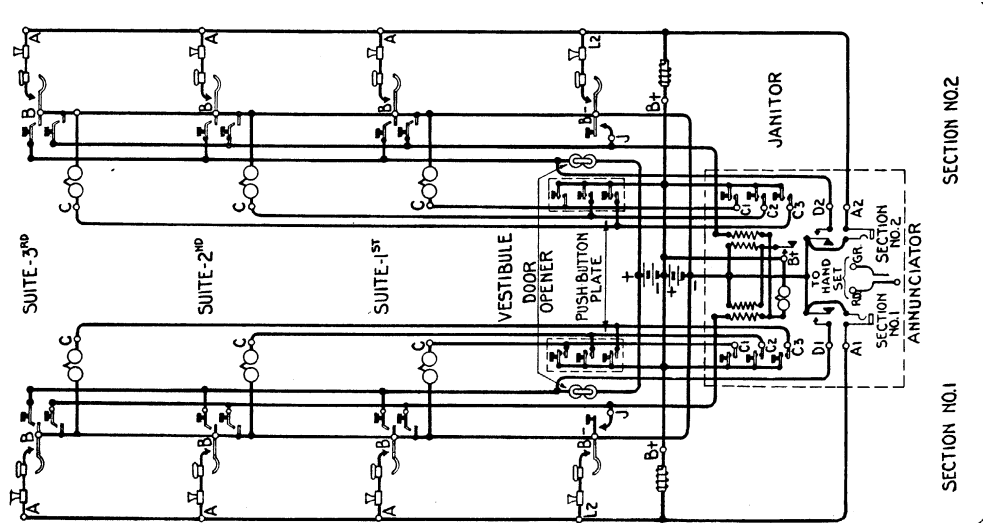
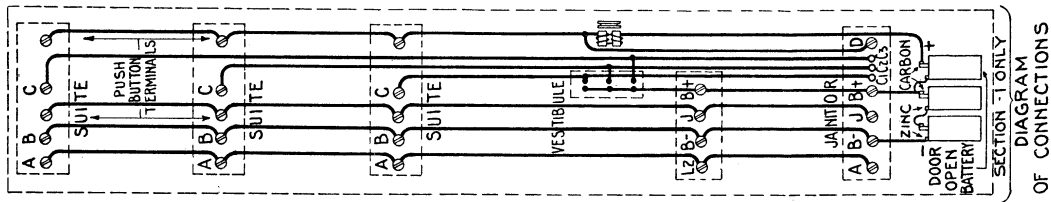
1000 to 1500 feet—No. 18 B. & S. gauge

1500 to 2500 feet—No. 16 B. & S. gauge

Additional dry cells are required in the system for the door openers. The number of batteries required for this purpose will depend upon the type of door opener used.

APARTMENT HOUSE SYSTEM No. 22

Wiring Diagrams

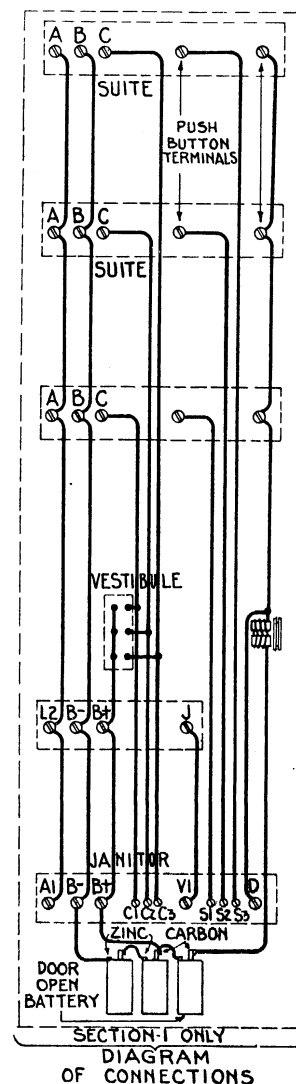
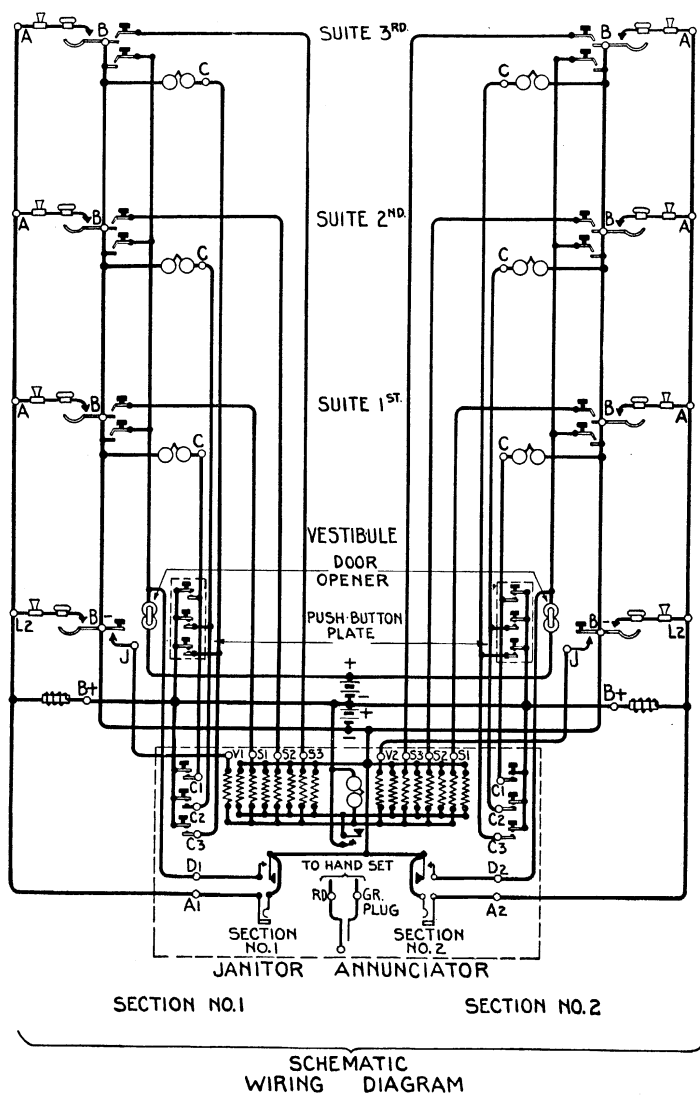


SYSTEM NO. 22-G

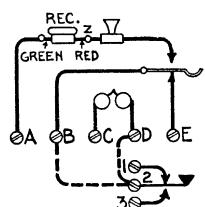
SYSTEM NO. 22-D

APARTMENT HOUSE SYSTEM No. 22

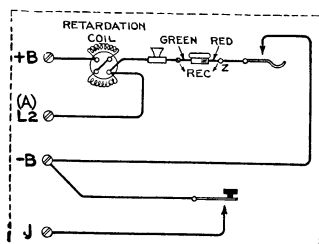
Wiring Diagrams



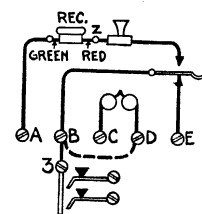
System No. 22-J



SCHEMATIC OF
NO'S 2527-C-1 & 2539-C-1
SYSTEM NO. 22-D, G & J
(SUITE)



SCHEMATIC OF
NO.1520-R SYSTEM NO.20&22



SCHEMATIC OF
NO'S 2527-C-2 & 2539-C-2
SYSTEM NO. 22-DG&J
(SUITE)

VESTIBULE INTER-PHONES AND MAIL BOXES SYSTEMS 20, 21 & 22

Showing Suggested Methods of Framing

Mail Boxes must be securely fastened from the **INSIDE** so as to prevent theft of the boxes after the Post Office Lock has been installed. This is one

FIG. 1 shows the mail box set in the wall screwed from the inside to wood framing top and bottom. Due to the recessed mounting holes of the mail box, these screws are very easily inserted as it is not necessary to hold the screw driver in a vertical position.

FIG. 2 shows the mail box set in the wall, screwed from the inside to wood studding in back of the box. The depth of the wall opening in this case depends on the thickness of the studding in back of the box.

FIG. 3 shows the mail boxes, mounted in double tier, dove-tailed, screwed from the inside to wood framing top and bottom and center.

FIG. 4 shows mail boxes mounted in double tier, but screwed from the inside to wood studding in back of the boxes. The depth of the wall opening depends on the thickness of the wood studding in back of the boxes.

of the requirements of the Postal Authorities.

The illustrations below are merely general suggestions for typical mounting, the details of which may be altered to suit the particular wall conditions.

The height of the Post Office Lock from the floor must not be more than 5 FEET 5 INCHES.

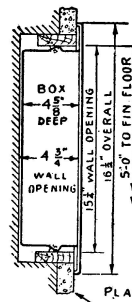


FIG. 1
TOP & BOTTOM MOUNTING
SINGLE ROW

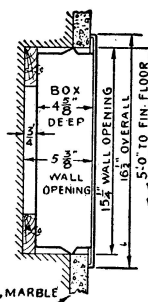


FIG. 2
BACK MOUNTING
SINGLE ROW

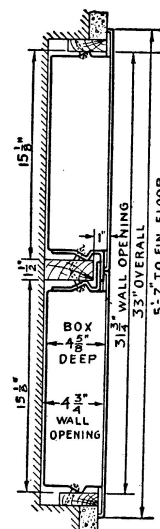


FIG. 3
TOP & BOTTOM MOUNTING
DOUBLE ROW

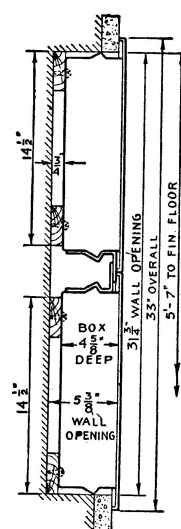


FIG. 4
BACK MOUNTING
DOUBLE ROW

Model No. 30A Without Bell Button or Speaking Tube—(Fig. 5)
Model No. 30A—Push Buttons in Flange—(Fig. 6)

SINGLE ROW MOUNTING					DOUBLE ROW MOUNTING				
No. of Units	Wall Opening Width	Wall Opening Height	Overall Dim. Width	Overall Dim. Height	No. of Units	Wall Opening Width	Wall Opening Height	Overall Dim. Width	Overall Dim. Height
3	10 3/4	15 1/4	11 5/8	16 1/2	8	14 1/2	31 3/4	15	33
4	14 1/4	15 1/4	15	16 1/2	10	17 1/2	31 3/4	18 3/4	33
5	17 1/2	15 1/4	18 3/8	16 1/2	12	20 7/8	31 3/4	21 3/4	33
6	20 7/8	15 1/4	21 3/4	16 1/2	14	24 1/4	31 3/4	25 1/4	33
7	24 1/4	15 1/4	25 1/8	16 1/2	16	27 5/8	31 3/4	28 1/8	33
8	27 5/8	15 1/4	28 3/8	16 1/2	18	32 1/8	31 3/4	33 1/8	33
9	32 1/8	15 1/4	33 1/8	16 1/2	20	35 3/4	31 3/4	36 3/4	33
10	35 3/4	15 1/4	36 3/4	16 1/2	22	39 1/8	31 3/4	40 1/8	33
11	39 1/8	15 1/4	40 1/8	16 1/2	24	42 5/8	31 3/4	43 1/8	33
12	42 5/8	15 1/4	43 1/8	16 1/2	26	46	31 3/4	46 7/8	33
13	46	15 1/4	46 7/8	16 1/2	28	49 3/8	31 3/4	50 1/4	33
14	49 3/8	15 1/4	50 1/4	16 1/2	30	52 3/4	31 3/4	53 3/8	33
15	52 3/4	15 1/4	53 3/8	16 1/2	32	56 1/8	31 3/4	57	33
16	56 1/8	15 1/4	57	16 1/2	34	61	31 3/4	61 7/8	33
17	61	15 1/4	61 7/8	16 1/2	36	64 3/8	31 3/4	65 1/4	33
18	64 3/8	15 1/4	65 1/4	16 1/2	38	67 3/4	31 3/4	68 3/8	33
19	67 3/4	15 1/4	68 3/8	16 1/2	40	71 1/8	31 3/4	72	33
20	71 1/8	15 1/4	72	16 1/2	42	74 3/4	31 3/4	75 3/8	33
21	74 3/4	15 1/4	75 3/8	16 1/2	44	77 7/8	31 3/4	78 3/4	33
22	77 7/8	15 1/4	78 3/4	16 1/2	46	81 1/4	31 3/4	82 1/8	33
23	81 1/4	15 1/4	82 1/8	16 1/2	48	84 5/8	31 3/4	85 1/2	33
24	84 5/8	15 1/4	85 1/2	16 1/2	50	89 1/2	31 3/4	90 3/8	33
25	89 1/2	15 1/4	90 3/8	16 1/2	52	92 3/4	31 3/4	93 3/4	33
26	92 3/4	15 1/4	93 3/4	16 1/2	54	96 1/4	31 3/4	97 1/8	33
27	96 1/4	15 1/4	97 1/8	16 1/2	56	99 5/8	31 3/4	100 1/2	33
28	99 5/8	15 1/4	100 1/2	16 1/2	58	103	31 3/4	103 3/8	33
29	103	15 1/4	103 3/8	16 1/2	60	106 3/8	31 3/4	107 1/4	33
30	106 3/8	15 1/4	107 1/4	16 1/2					
TOP OF WALL OPENING 60 INCHES FROM FLOOR					TOP OF WALL OPENING 67 INCHES FROM FLOOR				

Mail Box is 4 5/8" Deep. Make Wall Opening 4 3/4" Deep.
Furnished in 3, 4, 5, 6, 7, 8 Units to a Gang.

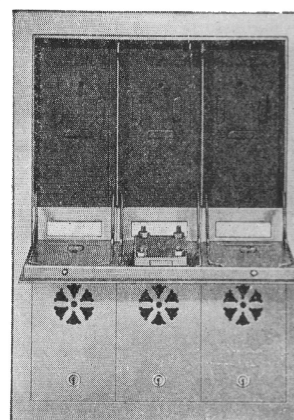


FIG. 5

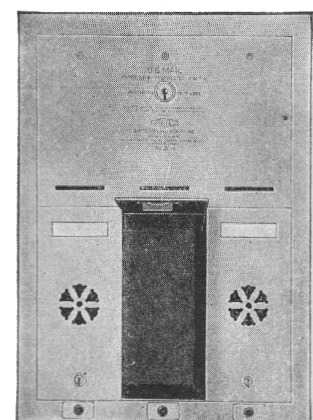
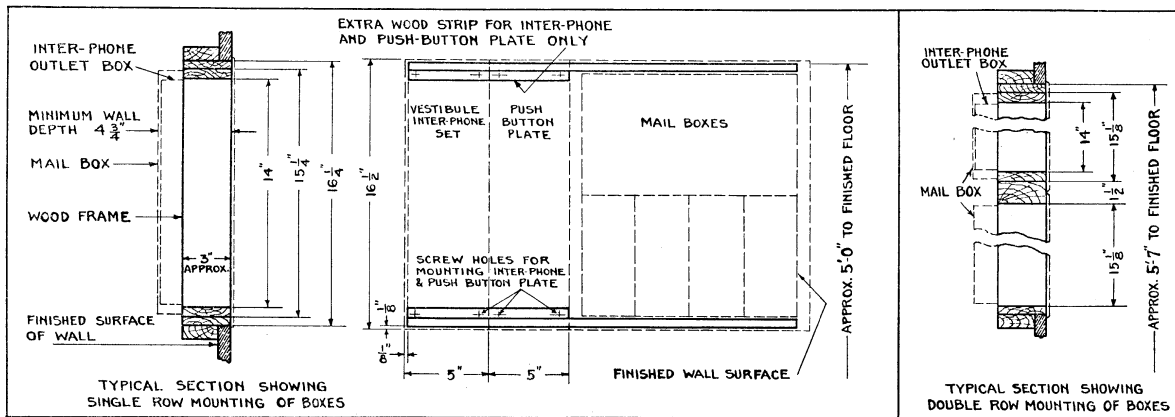


FIG. 6

VESTIBULE INTER-PHONES AND MAIL BOXES

Framing Details and Mail Box Dimensions



Framing Details For No. 1520-R, No. 1524-E and No. 1524-F and Associated Plates For Use With Vestibule Inter-Phone Systems 20, 21 & 22

Side Mounting

When the Inter-Phone and Push Button Plates are mounted on the side, add to the overall width of the mail box, the width of the plate or plates plus the telephone and deduct 11/16" for the wall opening.

Center Mounting

When the Inter-Phone and Push Button Plates are mounted in the center, add to the overall width of the mail box the width of the plate or plates plus the telephone and deduct 14/16" for the wall opening.

Dimensions for Wall Cut

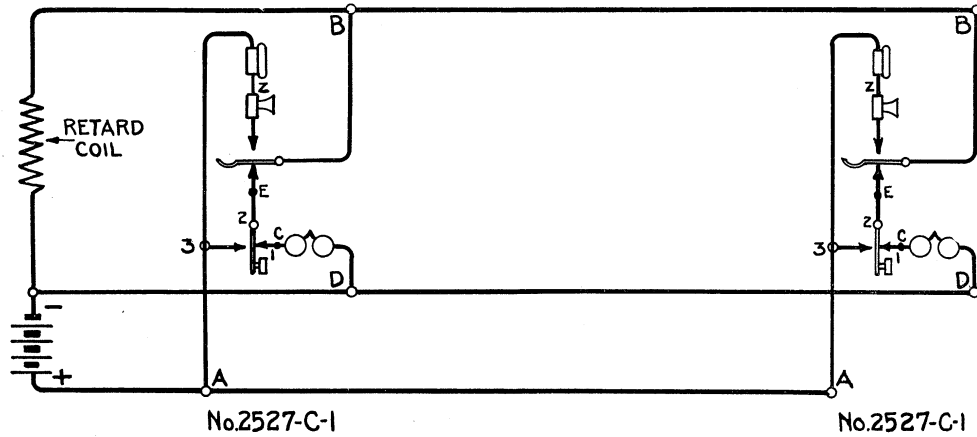
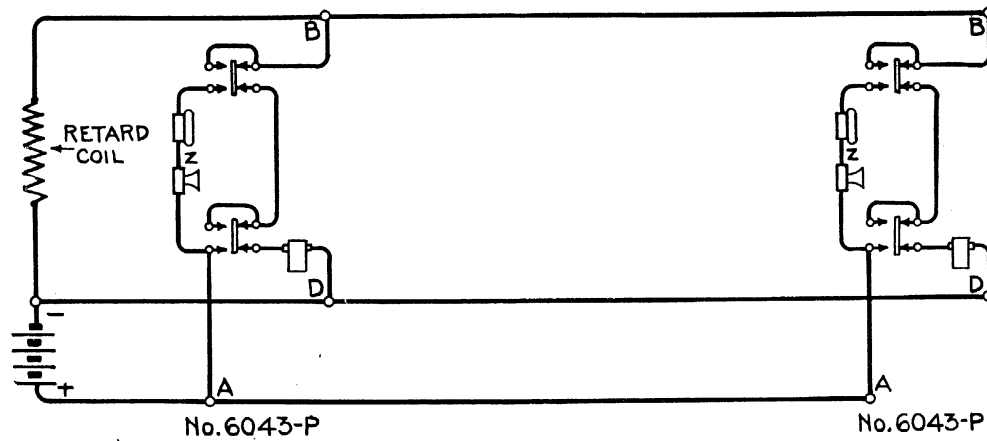
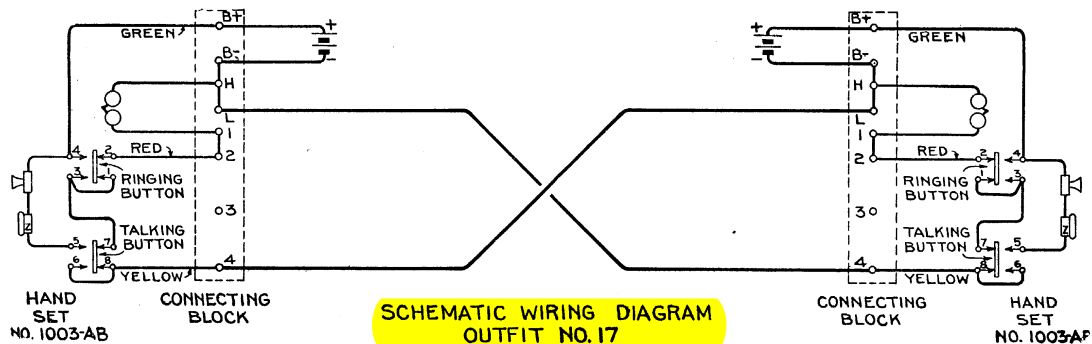
Single Row Mounting

Wall-cut Height	15 1/4"
Overall Height	16 1/2"
Wall Depth	4 3/4"
Top of Wall Cut—from Floor.....	60"

Double Row Mounting

Wall-cut Height	31 3/4"
Overall Height	33"
Wall Depth	4 3/4"
Top of Wall Cut—from Floor.....	67"

INTER-PHONE OUTFITS

SCHEMATIC WIRING DIAGRAM
OUTFITS No. 30-A & BSCHEMATIC WIRING DIAGRAM
OUTFITS No. 31-A & B

Distributed By
Stromberg-Carlson Telephone Manufacturing Company

General Office and Factory

100 CARLSON ROAD

Telephone Culver 260

ROCHESTER, NEW YORK

Branch

2017 GRAND AVENUE

Telephone Harrison 6618

KANSAS CITY, MISSOURI

Branch

390 FOURTH STREET

Telephone Douglas 4220

SAN FRANCISCO, CALIFORNIA

Branch

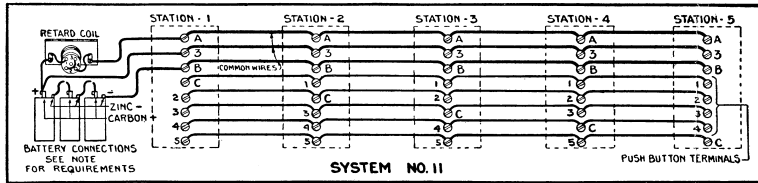
564-70 WEST ADAMS ST.

Telephone State 4236

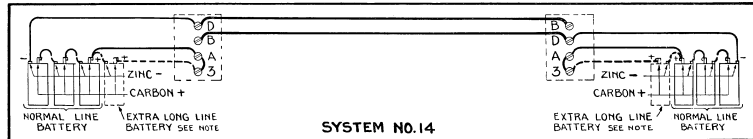
CHICAGO, ILLINOIS

Graybar Electric

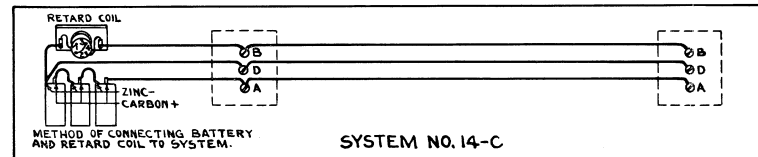
Diagrams of Connections for Common Talking Inter-Phones Systems No's 11, 12, 12-A, 12-B, 12-C, & 12-AC, 12-SS, 14, 14-C, 15 and 18-C Using Wall, Desk or Hand Set Type Inter-Phones



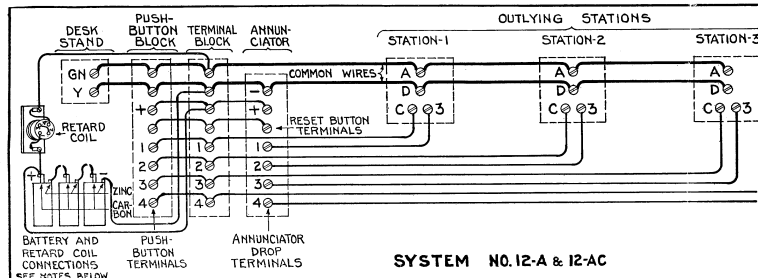
SELECTIVE RINGING—COMMON TALKING



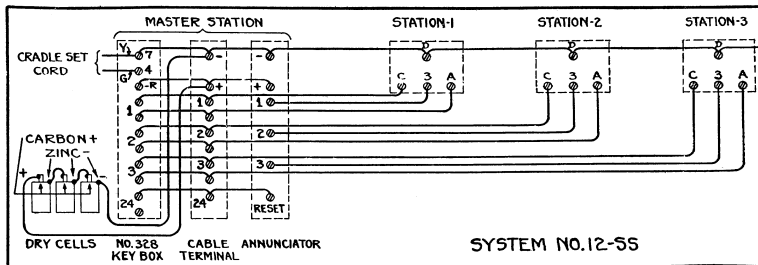
TWO STATION—PRIVATE LINE—TWO WIRES



TWO STATIONS—PRIVATE LINE—THREE WIRES



MASTER PUSH-BUTTON BLOCK AND ANNUNCIATOR—TWO-WAY SERVICE



MASTER KEY BOX AND ANNUNCIATOR—SECRET SERVICE

Battery Requirements of Systems No's 11, 12, 12-A, 12-SS & 18-C

Only one battery is required to furnish current for talking and ringing. Do not use more than five Blue Bell dry cells connected in series. When using wires of No. 22 B. & S. gauge (as contained in the standard Inter-Phone cables recommended for this system) the wire distance between the master and the farthest outlying station should not exceed 750 feet. On lines of greater length larger wire should be used as follows:

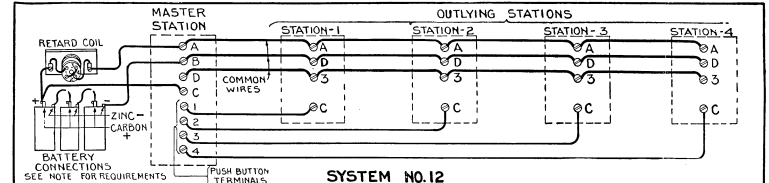
750-1000 ft.	1000-1500 ft.	1500-2500 ft.
No. 20 B. & S. gauge	No. 18 B. & S. gauge	No. 16 B. & S. gauge

Battery Requirements of System No. 14

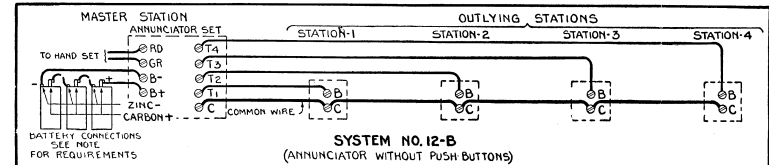
A battery of three Blue Bell dry cells is required at each station to furnish current for talking and ringing if the length of line is 750 feet or less. If the length of the line is increased, additional dry cells are required at each station to insure satisfactory ringing as follows:

Distance Between Stations up to	750 Ft.	1000 Ft.	1500 Ft.	2000 Ft.	2500 Ft.	3000 Ft.	4000 Ft.	5000 Ft.	6000 Ft.
No. B. & S. Gauge	18	18	18	16	16	14	14	12	12
Copper Wire									
No. of Dry Cells for Each Station	3	4	5	4	5	4	5	4	5

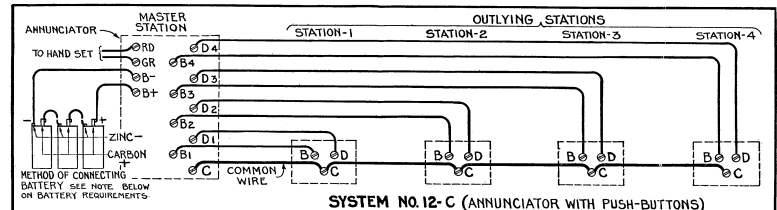
When additional cells are required, they must be connected in series with the original cells and the zinc or negative pole must be connected to terminal "3." When so arranged, the wire between "A" and "3" in each station must be cut. This applies to No. 1527-C-1 and No. 1539-C-1 wall Inter-Phones only.



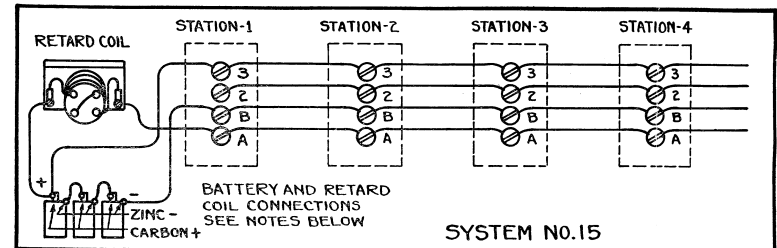
MASTER STATION—COMMON TALKING



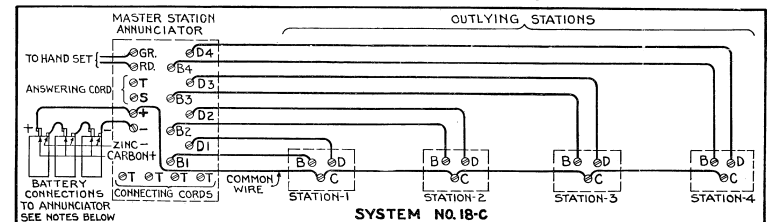
MASTER ANNUNCIATOR—ONE-WAY RINGING—COMMON TALKING



MASTER ANNUNCIATOR—TWO-WAY RINGING—COMMON TALKING



CODE RINGING—COMMON TALKING



MASTER ANNUNCIATOR—NON-INTERFERING

Battery Requirements of System No. 12-B & C

Only one battery is required to furnish the current for talking and ringing. Do not use more than four Blue Bell dry cells connected in series.

When using wires of No. 22 B. & S. gauge size (as contained in the standard Inter-Phone cables recommended for this system) the wire distance between the master and the farthest outlying station should not exceed 250 feet, as this is the longest distance over which satisfactory ringing can be secured. On the longer lines, larger wire should be used as follows:

250-400 ft.	400-600 ft.	600-1000 ft.
No. 20 B. & S. gauge	No. 18 B. & S. gauge	No. 16 B. & S. gauge

Battery Requirements of System No. 12-AC

A 24 volt battery is required for this system. This may consist of Blue Bell dry cells or storage batteries, depending upon the installation requirements.

Battery Requirements of System No. 14-C & 15

Only one battery is required to furnish current for talking and ringing. Do not use more than five Blue Bell dry cells connected in series. The battery requirements of this system are listed below and are determined by the number of Inter-phones to be connected, the length of line and the size of wire to be used.

The battery may be connected at any station in the system.

Number of Stations	2	3	4	5	6	7	8
Copper Wire—							
B. & S. Gauge No.	16 18 20 22	16 18 20 22	16 18 20 22	16 18 20 22	16 18 20 22	16 18 20 22	16 18 20 22
Length of Line—250 Ft.	4 4 4 4	4 4 4 4	4 4 4 4	4 4 4 4	4 4 4 4	4 4 4 4	4 4 4 4
" " " " 500 "	4 4 4 4	4 4 4 4	4 4 4 4	4 4 4 4	4 4 4 4	4 4 4 4	4 4 4 4
" " " " 750 "	4 4 4 4	4 4 4 4	4 4 4 4	4 4 4 4	4 4 4 4	4 4 4 4	4 4 4 4
" " " " 1000 "	4 4 4 4	4 4 4 4	4 4 4 4	4 4 4 4	4 4 4 4	4 4 4 4	4 4 4 4
" " " " 1250 "	4 4 4 4	4 4 4 4	4 4 4 4	4 4 4 4	4 4 4 4	4 4 4 4	4 4 4 4
" " " " 1500 "	5 5	5 5	5 5	5 5	5 5	5 5	5 5