TELEPHONE DIAGRAMS

FOR OFFICIAL USE.

POST OFFICE TELEGRAPHS.

CONNECTIONS
OF
TELEPHONIC APPARATUS
AND
CIRCUITS.

GENERAL POST OFFICE,
1909.

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1909.

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Wt. 24414. 17,650. 1/10. E. & S. a 2

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PART VI.—TABLES, AND LIST OF TELEPHONES STOCKED.

PART II.—COMMON BATTERY SIGNALLING.

SECTION 1.

SUBSCRIBERS' APPARATUS ON DIRECT EXCHANGE CIRCUITS.

Plate 42.

C.B.S. Diagram No. 1.

COMMON BATTERY SIGNALLING.

Connections of Subscribers' Instruments. Table Telephone (with Micro Telephone).

Fig. 1.—Ordinary Arrangement.

Apparatus Schedule.

Telephone No. 26. The description includes Cord, Flexible, No. 402; Strip, Flexible, Cord Connection, 4-terminal; Coil, Induction, $\frac{25}{1}$; and Telephone, Micro (*see* page 230, Telephone No. 28).

Receiver, Watch, D, Complete (if required only). The description includes the Cord, Flexible, No. 222, when "complete" is specified.

Battery, Leclanché, Agglomerate, 6-block, 2-cell.

See Plate 85 for wiring diagram of the Instrument.

Fig. 2.—Table Set with Extension Bell.

Apparatus Schedule.

In addition to the above items:—

Bell, Magneto, 100 ohms.
Switch, Tumbler, 3 ampères (bronzed).

TELEPHONE, TABLE, WITH MAGNETO BELL.

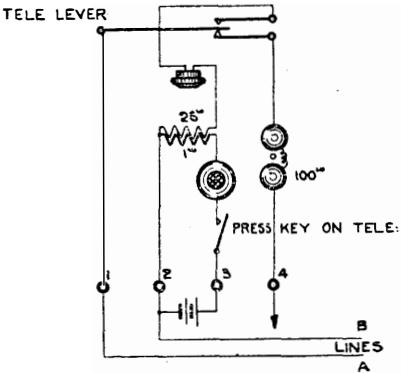


FIGURE 1

TELE. LEVER.

BELL, MAGNETO.

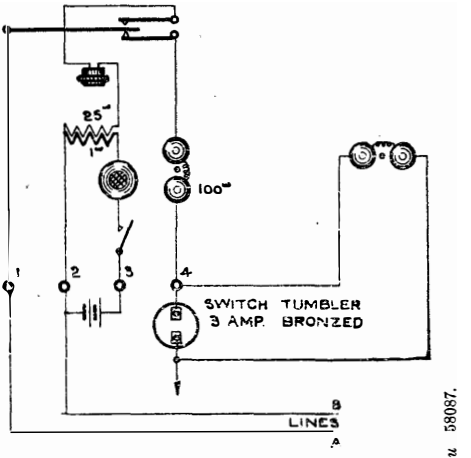


FIGURE 2

u 58087.

Plate 42.

The Telephone should stand on the desk or table in the position indicated by the subscriber. The Cord Connection Strip should be fixed to the ledge underneath desk or table in the vicinity of the user's position ; the actual position must be arranged with the subscriber. The Battery Box should be placed as near to the Telephone as possible, without being in close proximity to a fire or other source of heat, but in a position to suit the convenience of the subscriber.

The Switch, Tumbler, 3 ampères (bronzed), should be fitted at the Telephone, or at the Extension Bell, according to the subscriber's desire.

Plate 43.

C.B.S. Diagram No. 166A.

Connections of Subscribers' Instruments. Table Telephone, Transmitter Type.

Apparatus Schedule.

Telephone No. 4. The description includes Cords, Flexible, Nos. 222 (Receiver), 223 (Transmitter), and 605 (Strip); Strip, Flexible Cord Connection, 6-terminal; Transmitter, "Inset"; Receiver, Bell, "D"; and Label No. 78, 78A, or 78B. *See* Plate 88 for wiring of Telephone.

Receiver, Watch, "D," Complete (if required only).

Bell Set No. 5. The description includes Coil, Induction, $\frac{25}{1}$.

Battery, Leclanché, Agglomerate, 6-block 2-cell.

When an Extension Bell is required the following additional items should be requisitioned:—

Bell, Magneto, 100 ohms.
Switch, Tumbler, 3 ampères (bronzed).

The fitting particulars given on page 117 apply also in this case. The Bell Set should be mounted on the wall in a position indicated by the subscriber.

TELE., TABLE,
P.B. TRANSMITTER
TYPE.

TRANSMITTER
INSET.

BELL SET,
MAGNETO P.B.

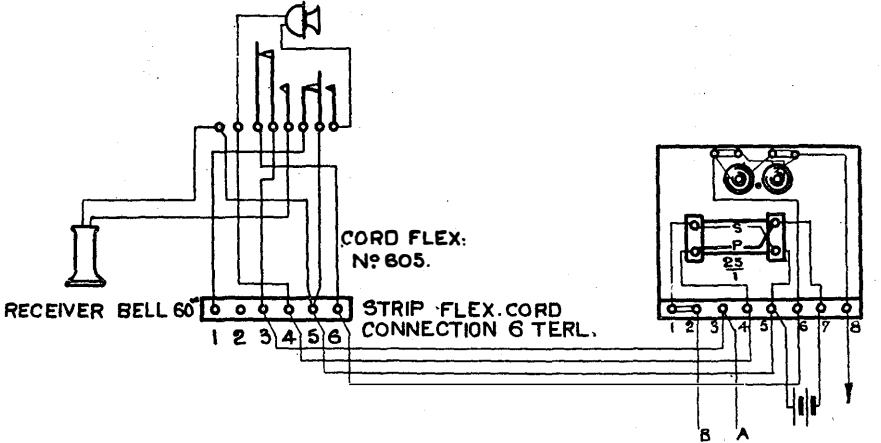


Plate 43.

Plate 44.

C.B.S. Diagram No. 16A.

Connections of Subscribers' Set with Wall Sockets and Plug.

Arrangement No. 1. Table Set with Micro Telephone.—Fig. 1.

Apparatus Schedule.

Telephone No. 26.
n Sockets, Wall, 4-hole.
Plug, Wall, 4-pin.
Bell, Magneto, 1,000 ohms.
Condenser, metal-cased, 2 m.f.
} for calling purposes, if Plug is inadvertently left out of socket.
Battery, Leclanché, Agglomerate, 6-block, 2-cell, No. 1.

See Plate 85 for wiring diagram of the instrument.

C.B.S. Diagram No. 166A.

Arrangement No. 2. Table Set, Transmitter Type.—Fig. 2.

Apparatus Schedule.

Telephone No. 4.
Bell Set No. 5.
n Sockets, Wall, 4-hole.

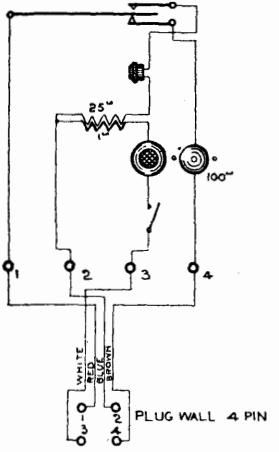
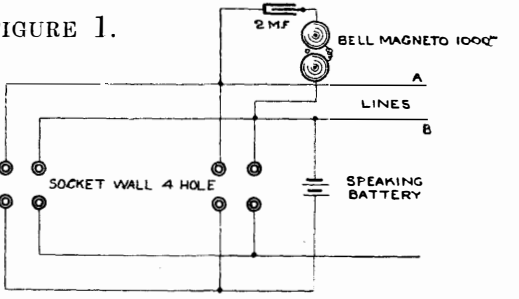


FIGURE 1.



TELEPHONE, TABLE, WITH MAGNETO BELL.

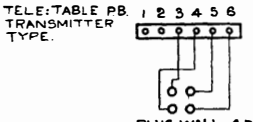


FIGURE 2.

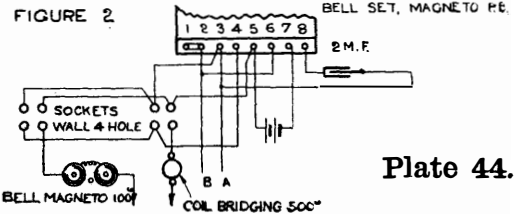


Plate 44.

Plug, Wall, 4-pin.

Bell, Magneto, 100 ohms (on second socket).

Coil, Bridging, 500 ohms (on first socket for clearing purposes).

Condenser, m.c., 2 m.f., for calling purposes, in series with Bell, if Plug is inadvertently left out of socket.

Battery, Leclanché, Agglomerate, 6-block, 2-cell.

Plate 45.

C.B.S. Diagram No. 2A.

Connections of Subscribers' Instruments. Wall Telephones.

Fig. 1.—Ordinary Arrangement.

Apparatus Schedule.

Telephone No. 3. The description includes Cord, Flexible, No. 222 (for Receiver); Receiver, Bell; Transmitter, Inset; Coil, Induction, $\frac{25}{1}$; Magneto Bell, 500 ohms + 500 ohms; and 3 fixing screws and washers.

2 Cells, 2-block, Agglomerate, Complete.

Label No. 53 (or 53B). The former is used when a "Busy Back" is fitted at the Exchange.

Receiver, Watch, "D," Complete (if required).

[*See also* Plates 45A and 55.]

Fig. 2.—Subscriber's Circuit with Extension Bell.

Apparatus Schedule.

In addition to the above items:—

Bell, Magneto, 100 ohms.

Switch, Tumbler, 3 ampères (bronzed).

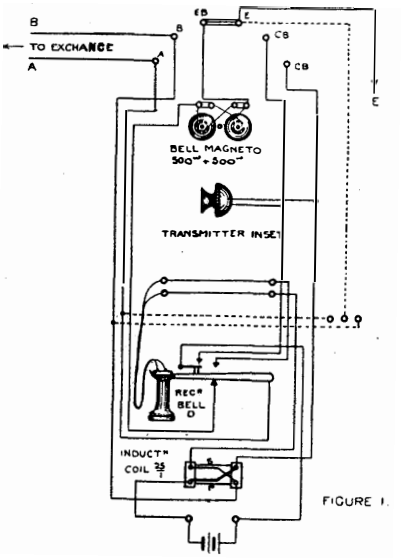


FIGURE 1.

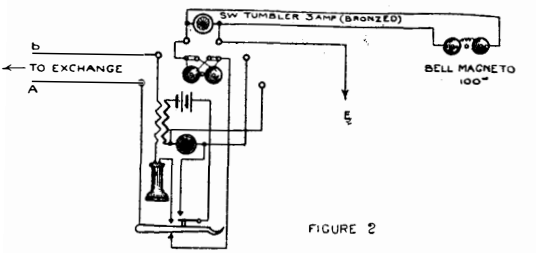


FIGURE 2

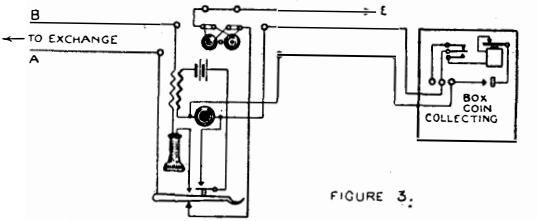


FIGURE 3.

Plate 45.

Plate 45—*cont.*

FIG. 3.—SUBSCRIBER'S CIRCUIT WITH COIN COLLECTING BOX.

APPARATUS SCHEDULE.

In addition to the items under Fig. 1 :—

Box, Coin, Collecting, Complete. Description includes the Cash Box.

Except when otherwise specified by the subscriber, the Telephone should be fixed upon the wall with its lower edge 36 inches from the floor. Where it is necessary to plug the wall, care must be taken to avoid unnecessary damage.

The Tumbler Switch may be fitted either adjacent to the Telephone, or to the Extension Bell, as desired.

The Coin Collecting Box should be fixed close to the right-hand side of the Telephone.

Plate 45A.

T.L. Diagram No. 439.

Telephone No. 3. (Telephone Wall with Magneto Bell, Type 2.)

The diagram shows the internal connections of the later pattern of primary battery wall instrument. The switchhook is detachable and forms no part of the electrical circuit, but the contacts operated by the hook and the external connections give the same facilities as those of the earlier instrument.

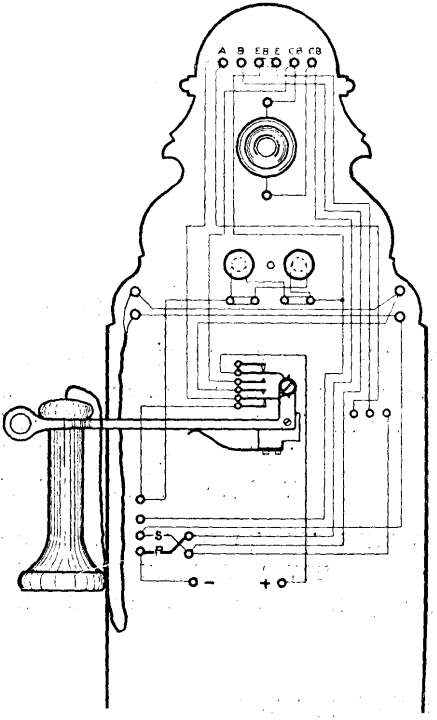


Plate 45A.

Plate 46.

C.B.S. Diagram No. 136.

Connections of Northern (formerly N.E.N.) District Wall Telephones for working to C.B.S. Exchanges.

Fig. 1.—Telephone No. 17.

Fig. 2.—Telephone No. 17.

Fig. 3.—Telephone No. 19. The description includes Cord, Flexible, No. 222; Coil, Induction $\frac{25}{1}$; Receiver, Bell; and Transmitter, Deckert.

See also Plate 55.

FIG. 1.

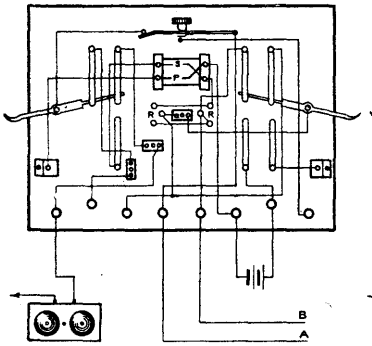


FIG. 2.

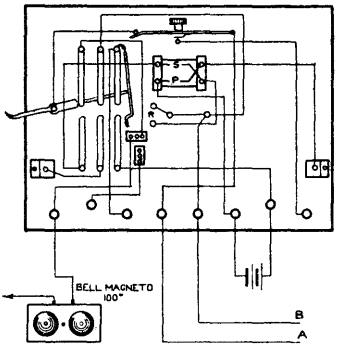


FIG. 3.

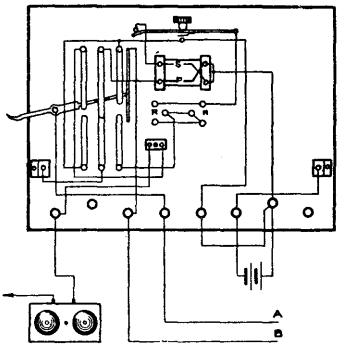


Plate 46.

SECTION 2.

SUBSCRIBERS' APPARATUS WITH SIMPLE EXTENSIONS.

Plate 47.

C.B.S. Diagram No. 3A.

Subscriber's Circuit with One Ordinary Extension.

Arrangement No. 1.—Table Telephone with Micro Telephone at each Point.

Apparatus Schedule.

Main Set.

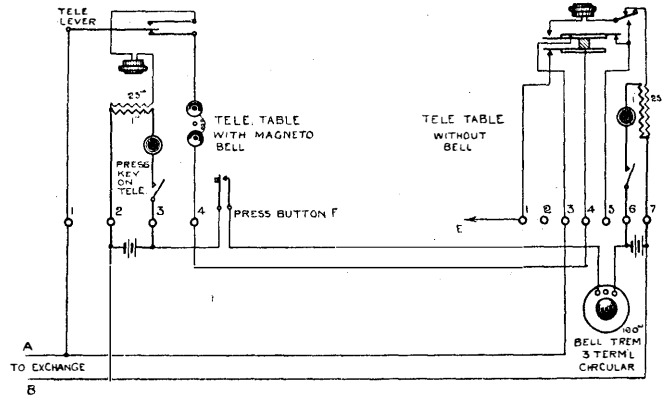
Telephone No. 26.
Press Button "F."
Battery, Leclanché, Agglomerate, 6-block, 2-cell.
Receiver, Watch, "D," Complete (if required).

Extension Set.

Telephone No. 24. The description includes Cord, Flexible, No. 702; Strip, Flexible Cord Connection, 7 terminals; Coil, Induction, $\frac{25}{1}$; and Telephone, No. 28. *See* Plate 86 for wiring diagram of instrument.
Receiver, Watch, D, Complete (if required).
Bell, Trembler, Circular, 100 ohms.
Battery, Leclanché, Agglomerate, 6-block, 2-cell.

The Exchange calls the Main Set, by generator on the A line and Earth, the latter point

MAIN SET. FIGURE 1. EXTENSION SET.



MAIN SET EXTENSION SET

FIGURE. 2

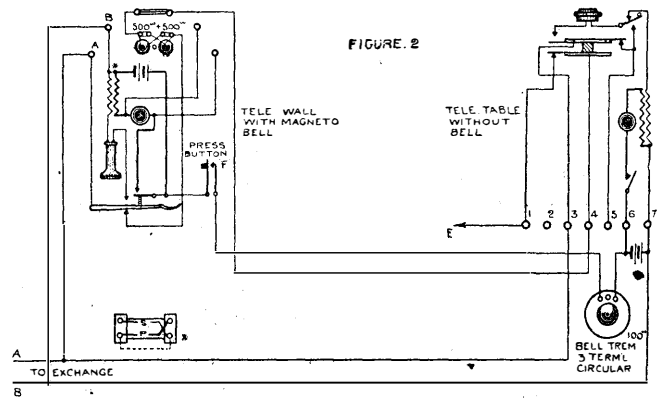


Plate 47.

Plate 47—*cont.*

being connected to terminal No. 1 on the Extension Strip. Either point calls the Exchange by lifting the Micro Telephone from the cradle, thereby joining the Receiver and Secondary across the lines.

The Main Set calls the Extension by depressing the Press Button "F" This operation joins the two speaking batteries in series through the Trembler Bell and B line. A clearing signal is sent to the Exchange by the replacement of the Micro Telephone on the cradle.

Arrangement No. 2.—Wall Telephone at Main Set, Table Telephone with Micro Telephone at Extension.

Apparatus Schedule.

Main Set.

Telephone No. 3.
Press Button "F."
Receiver, Watch, "D," Complete (if required).
Label, No. 53.
2 Cells, 2-block, Agglomerate, Complete.

The two windings of the Induction Coil are not ordinarily connected; the connections shown dotted in the small figure should therefore be made locally.

Extension Set.

Same as in Arrangement No. 1.

The fitting instructions given on pages 117 and 124 apply also in these cases. The Press Button "F" should be fitted on desk or table, and the Trembler Bell on the wall in positions agreed upon with the subscriber.

Plate 48.

C.B.S. Diagram No. 167.

Subscriber's Circuit with One Ordinary Extension.

Arrangement No. 3.—Table Telephone, Transmitter Type, at each Point.

Apparatus Schedule.

Main Set.

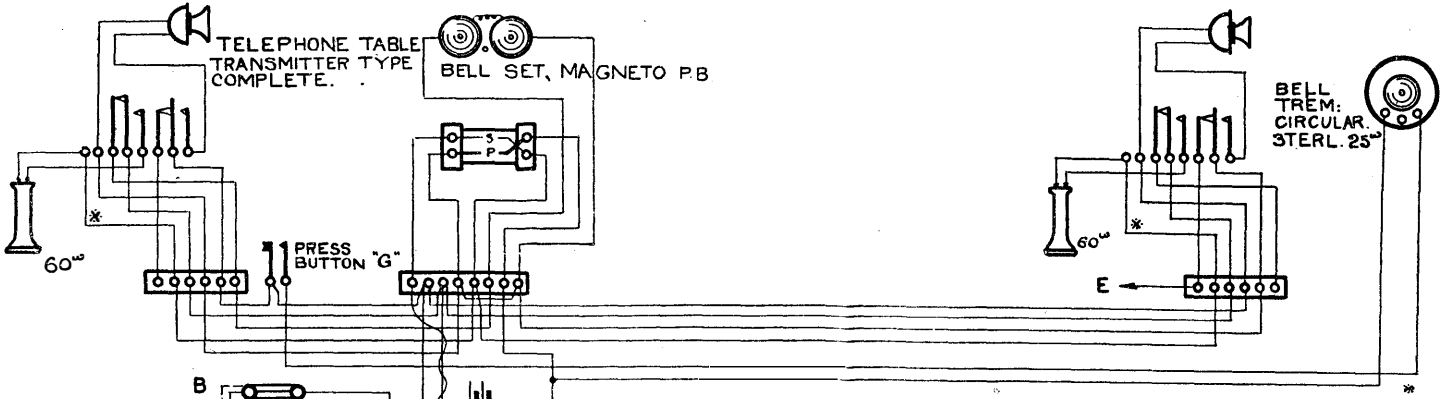
Telephone No. 4.
Bell Set No. 5.
Press Button "G."
Battery, Leclanché, Agglomerate, 6-block, 2-cell.
Receiver, Watch, "D," Complete (if required).

Extension Set.

Telephone No. 4.
Bell, Trembler, Circular, 25 ohms.
Receiver, Watch, "D," Complete (if required).

This arrangement, which makes use of the Main Set battery for calling the Extension, and utilises both the Main Set battery and Induction Coil for speaking at the Extension, should only be adopted when the Extension is not over 100 yards from the Main Set. *See* Plate 50 for longer distance arrangement.

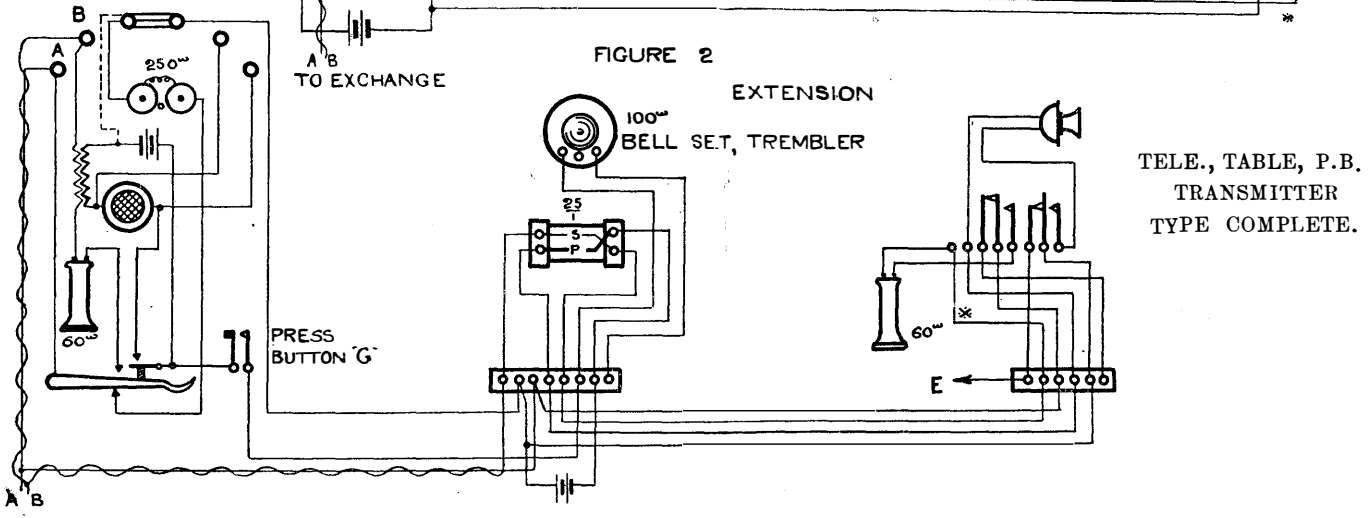
MAIN SET. FIGURE 1. EXTENSION.



MAIN SET.

FIGURE 2

EXTENSION



TELEPHONE, WALL, WITH MAGNETO BELL COMPLETE.

TO EXCHANGE.

Plate 48.

ARRANGEMENT No. 4.—WALL TELEPHONE AT MAIN SET; TABLE TELEPHONE, TRANSMITTER TYPE, AT EXTENSION.

APPARATUS SCHEDULE.

Main Set.

Telephone No. 3.
Press Button "G."
Receiver, Watch, "D," Complete (if required).
2 Cells, 2-block, Agglomerate, Complete.

The connection between the E.B. terminal and the negative battery terminal must be made locally.

Extension Set.

Telephone No. 4.
Bell Set No. 6 (Bell Set Trembler). The description includes a Coil, Induction, $\frac{25}{1}$.

The flexible lead (green binding) shown terminating on the second terminal of the Strip is connected to Terminal 5 when the Telephone is issued from stock, and the alteration should be made locally. *See* Plate 88 for wiring diagram of instrument.

Plate 49.

C.B.S. Diagram No. 4B.

Subscriber's Circuit with Two Ordinary Extensions.

Arrangement No. 1.—Table Telephone with Micro Telephone at each of the Three Points.

Apparatus Schedule.

Main Set.

Telephone No. 26.
2 Press Buttons "F."
Receiver, Watch, "D," Complete (if required).
Battery, Leclanché, Agglomerate, 6-block, 2-cell, No. 1.

Extension Set.

Telephone No. 24.
Bell, Trembler, Circular, 100 ohms.
Receiver, Watch, "D," Complete (if required).
Battery, Leclanché, Agglomerate, 6-block, 2-cell, No. 1.

Arrangement No. 2.—Wall Telephone at Main Set, Table Telephone with Micro Telephone at each Extension.

Apparatus Schedule.

Main Set.

Telephone No. 26.
2 Press Buttons, "F" (one for each extension).

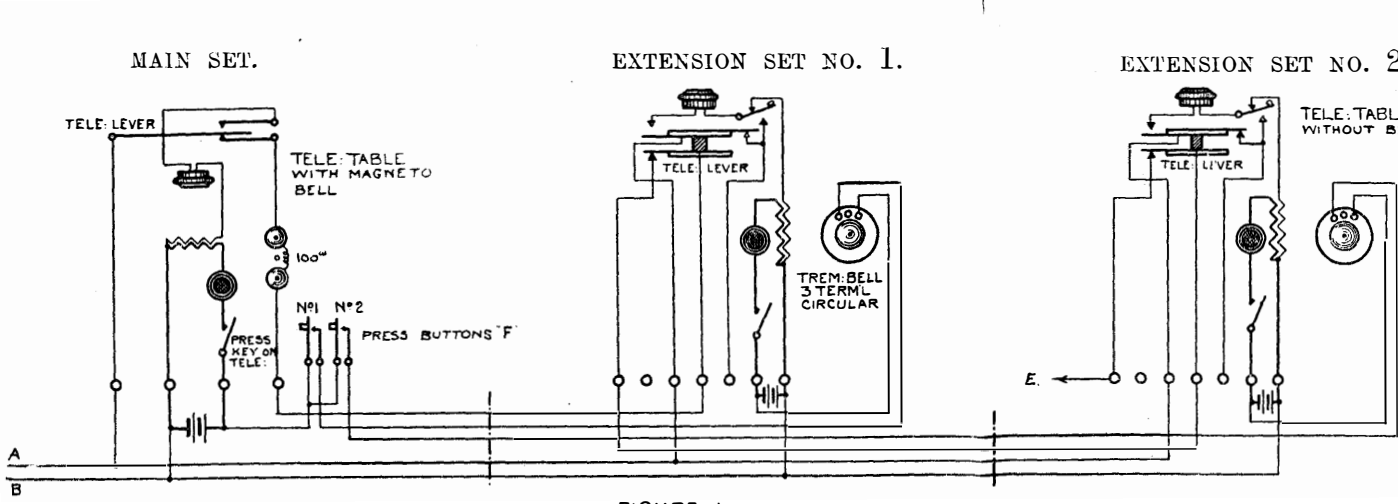


FIGURE 1

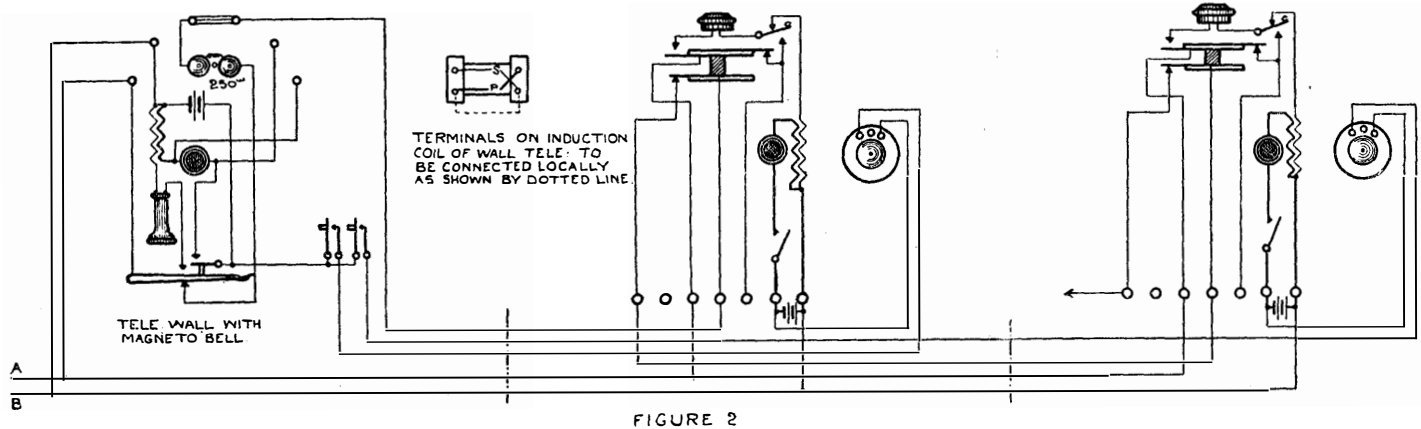


FIGURE 2

Plate 49.

Receiver, Watch, D, Complete (if required).
2 Cells, 2-block, Agglomerate, Complete.

Extension Sets.

Same as Arrangement No. 1.

Calling and clearing arrangement similar to that of Plate 47.

Plate 50.

C.B.S. Diagram No. 168.

Subscriber's Circuit with Two Ordinary Extensions.

Arrangement 3.—Table Telephone (Transmitter Type) at each of the Three Points. Fig. 1.

Apparatus Schedule.

Main Set.

Telephone No. 4.
Bell Set No. 5.
2 Press Buttons "G."
Battery, Leclanché, Agglomerate, 6-block, 2-cell.
Receiver, Watch, "D," Complete (if required).

Extension Set.

Telephone No. 4.
Bell Set No. 6.
Battery, Leclanché, Agglomerate, 6-block, 2-cell.
Receiver, Watch, "D," Complete (if required).

Arrangement No. 4.—Wall Telephone at Main Set, Table Telephones, Transmitter Type, at each Extension. Fig. 2.

Apparatus Schedule.

Main Set.

Telephone No. 3.
2 Press Buttons "G."

FIGURE 1.

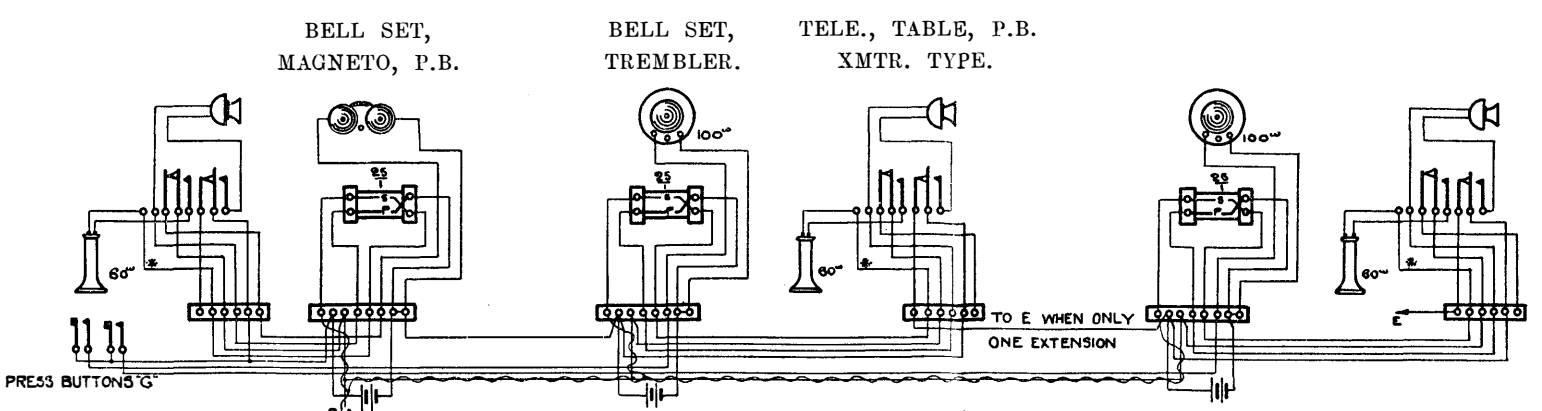


FIGURE 2.

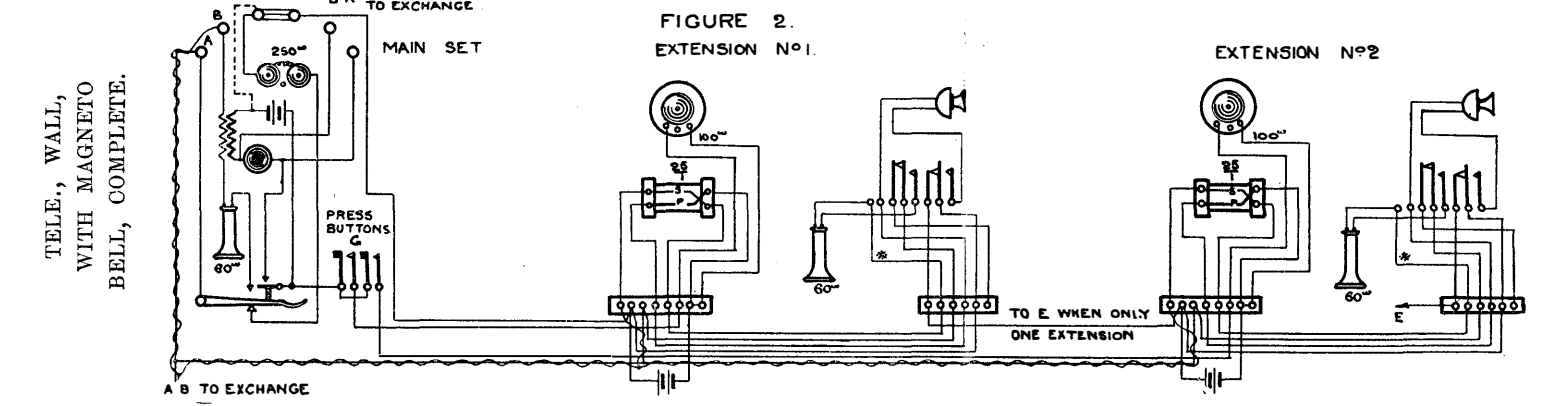


Plate 50.

Receiver, Watch, "B," Complete (if required).
2 Cells, 2-block, Agglomerate, Complete.

The connection between the E.B. terminal and the negative battery terminal must be made locally.

Extension Sets.

Same as Arrangement 3.

The flexible lead (green binding) shown as terminating on the second terminal of the Strip is connected to Terminal 5 when the Telephone is issued from stock. The alteration should be made locally. *See* Plate 88 for wiring diagram of instrument.

SECTION 3.

SUBSCRIBERS' APPARATUS WITH ONE EXTENSION AND INTERCOMMUNICATION.

Plate 51.

C.B.S. Diagram No. 5A.

Subscriber's Circuit with Extension, Intercommunication, and With or Without Secrecy.

Fig. 1.—Wiring of Intermediate Set.

Apparatus Schedule.

Telephone No. 15. The description includes Cord, Flexible, No. 222; Coil, Induction, $\frac{25}{1}$; Switch; Relay, E_1, 4,000 ohms; Transmitter, Inset; Generator, Bracket, 3-terminal, unmounted; Condenser, m.c., 1 m.f.; Receiver, Bell; and 4 fixing screws and washers.

2 Cells, 2-block, Agglomerate, Complete.

The tags of the Switch are shown as viewed from the back, E_1 being on the left. Switch Positions: Left Position, "Exchange," Keys E_1 and E_2 are actuated. Central Position, "Extension," none of the keys is actuated. Right Position, "Through," Keys T and T_2 are actuated. Plate 52 gives the circuit connections in the various positions of the keys.

Wiring Colours: A Exchange Line, red, R; B Exchange Line, blue, B; A Down Line, red and white, R & W; B Down Line, blue and white, B & W; Speaking Circuit Secondary, yellow, Y; Signalling, green, G.

In earlier patterns of this Instrument the Short Circuit Piece, shown in the diagram in the 4,000-ohms Relay Circuit, was fitted in the circuit of the Trembler Bell.

FIGURE 1.

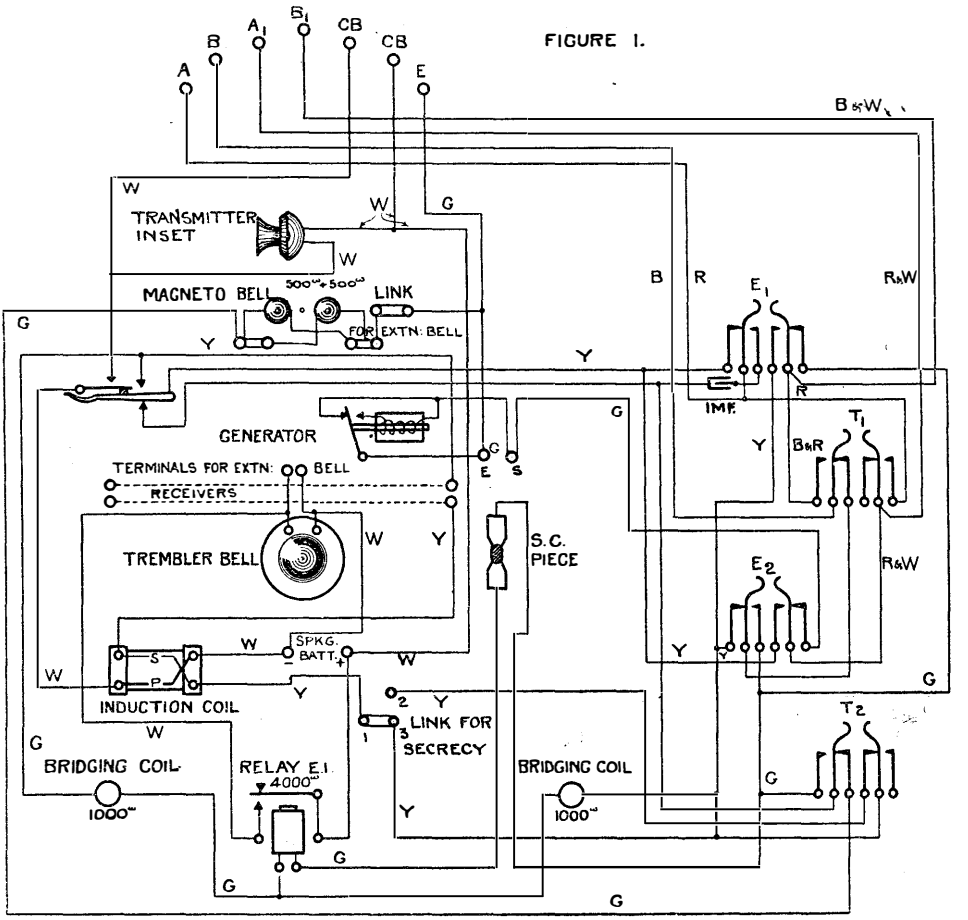


FIGURE 2.

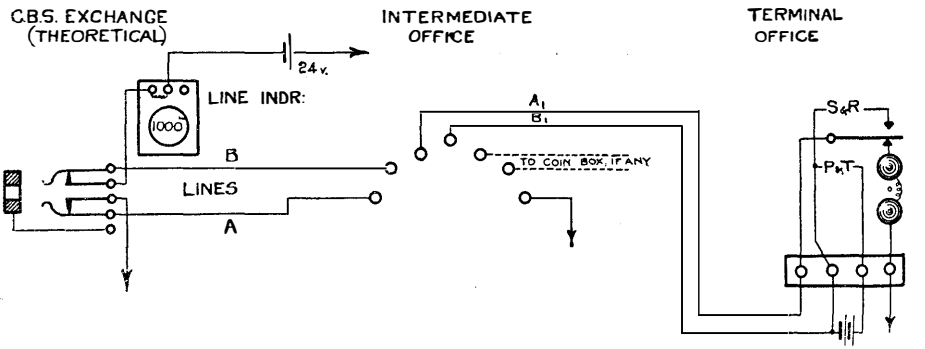


Plate 51.

FIG. 2.—CONNECTIONS OF CIRCUIT.

At the Terminal Office an ordinary C.B.S. Set is fitted, *i.e.*, a Telephone, No. 26; a Telephone, No. 3; or a Telephone, No. 4, with Bell Set No. 5. *See* Plates 42, 45, and 43 respectively.

Plate 52.

C.B.S. Diagram No. 6B.

Extension Circuit with Intercommunication. Circuit Conditions in the Various Positions of the Intermediate Switch.

Fig. 1.—Left Position, Exchange (Normal). The Exchange calls the Intermediate Office by Generator, ringing the Magneto Bell. To call the Exchange, the Intermediate Office raises the Receiver from the hook, and thereby connects the Receiver and Secondary across the Exchange Lines. The Intermediate Office calls the Extension by Generator through Earth and the Extension A Line. To give a call, the Extension, or Terminal, Office raises the Receiver from the hook, thereby connecting the Receiver and Secondary across the Extension Lines. A current then flows from the Earth on the positive pole of the Exchange Battery, through the short-circuited Generator at the Intermediate Office, the A Extension Line, Extension Set, Extension B Line, 4,000 ohms Relay, 1,000 ohms Bridging Coil, Exchange B Line, and Line Relay to the negative pole. This current is insufficient to operate the Line Relay at the Exchange, but actuates the 4,000 ohms Relay at the Intermediate Office, closing the Local Circuit in which is placed the Trembler Bell.

Fig. 2.—Central Position, Extension. Intermediate Office through to Terminal, both Receivers

FIGURE 1

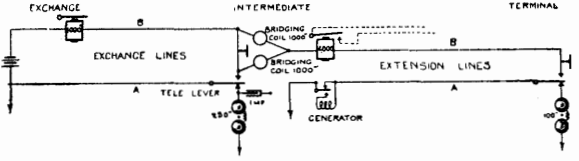


FIGURE 2

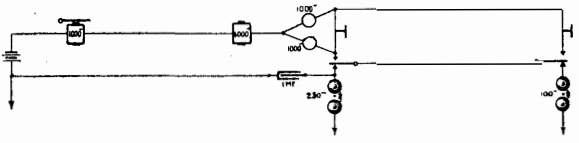


FIGURE 3

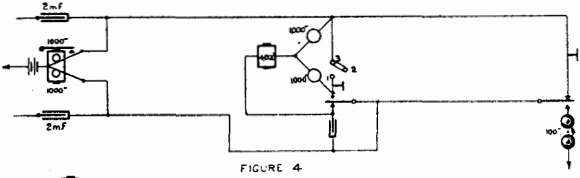


FIGURE 4

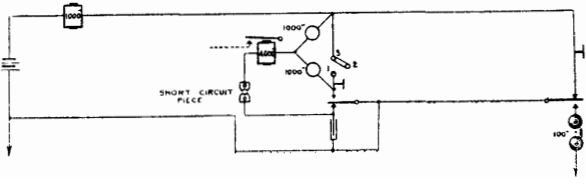


Plate 52.

on hooks. It will be seen that, when these two Stations are speaking, the former is still in a position to be called by the Exchange, the Magneto Bell in series with the Condenser being connected between the Exchange A Line and Earth.

Fig. 3.—Right Position, Through. Exchange through to Terminal Office (Day). The figure shows the clearing arrangements in the cords at the Exchange. When the Terminal Office hangs up the Receiver, the Clearing Indicator is actuated by the current which flows from the earthed Battery through the Magneto Bell, A Lines, and one coil of the Clearing Indicator. On withdrawing the peg, the Exchange conditions represented in Fig. 1 are restored; the 4,000 ohms Relay is actuated, and a Clearing Signal thereby sent to the Intermediate Office.

Fig. 4.—Right Position, Through. Exchange through to Terminal Office (Night). Same as Fig. 3, but in the Night extended condition the Short Circuit Plug, which normally completes the Relay Circuit, should be taken out. The condition of a Terminal Office is then that of an ordinary subscriber.

The Link and Terminals are shown in the "Secrecy" position. For triple communication 1 and 3 should be connected together, as shown on Plate 51.

SECTION 4.

PRIVATE BRANCH EXCHANGES.

Plate 53.

C.B.S. Diagram No. 89.

Connections of Switchboards, Magneto, C.B.S. $\frac{n+n'}{N}$; and Cases for Condensers and Battery, 18″ or 24″.

Apparatus Schedule.

Switchboard, Magneto, C.B.S. $\frac{n+n'}{N}$.

*Telephone, Micro, with Hook Suspension (Telephone No. 28) (with hook).

Case for Condensers and Battery, n inches.

n Condensers, m.c., 4 m.f.

n′ Condensers, m.c., 2 m.f.

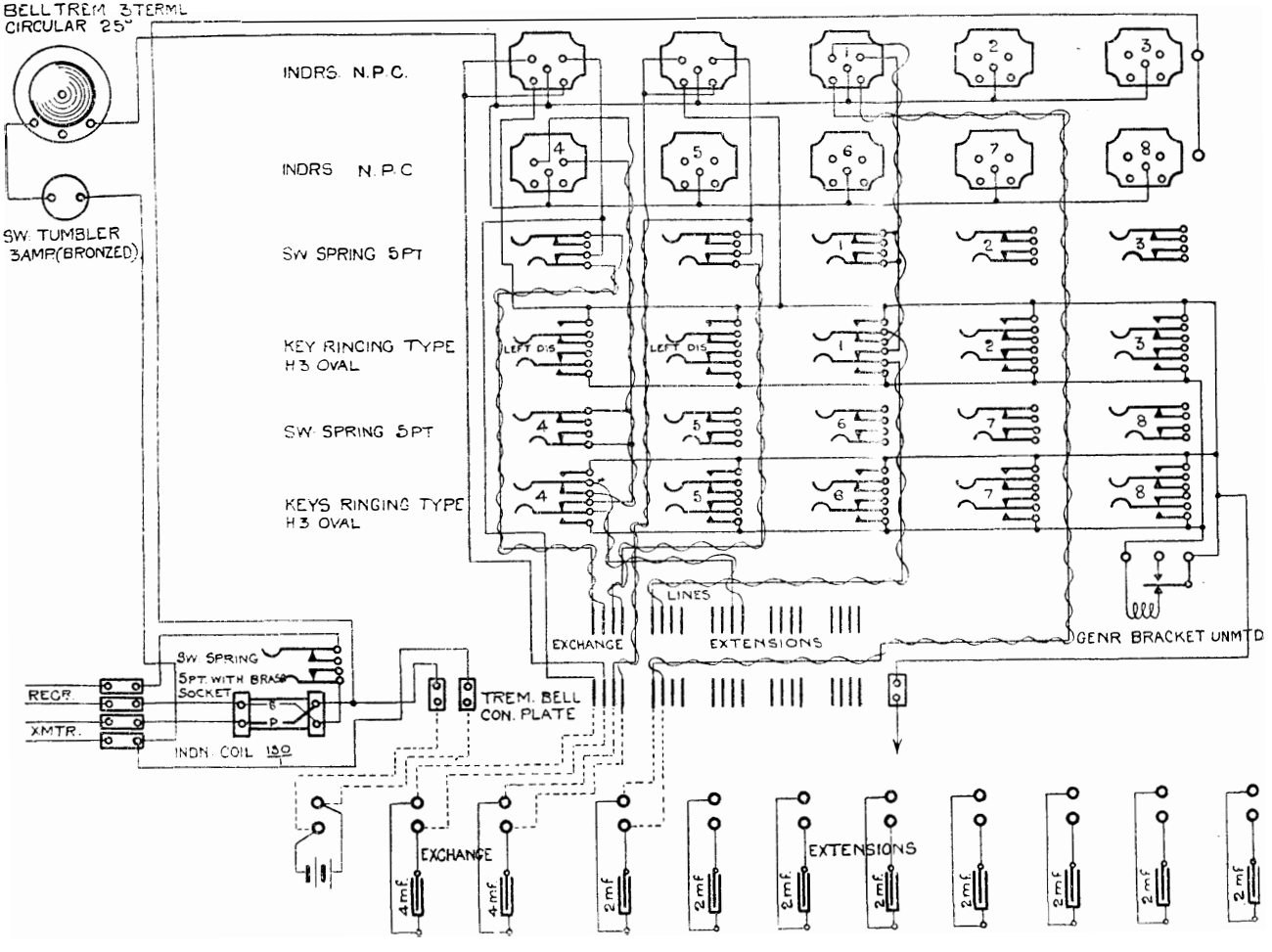
2 Cells, 2-block, Agglomerate, Complete.

Factory wiring is shown by full lines.

The wiring from the Battery and Condensers in the Case to the tags on the board must be done locally.

Standard sizes are $\frac{1+4}{5}$, $\frac{2+3}{5}$, $\frac{1+9}{10}$, $\frac{2+8}{10}$, $\frac{2+13}{15}$, and $\frac{2+18}{20}$. A Condenser,

* In certain areas where the use of Micro Telephones on Exchange circuits has been discontinued this item is replaced by a "Telephone Table, P.B., Transmitter Type. Complete" (Telephone No. 4), to be mounted on a "Baseboard for Table Telephone, P.B.," and attached to the wall by means of a "Bracket for Table Telephone." A later pattern of Switchboard is fitted with a "Hook Receiver F. with Switch Complete" and a fixed "Transmitter, Inset."



CASE FOR CONDENSERS AND BATTERY.

Plate 53.

4 m.f., should be requisitioned for each Exchange line, and a Condenser, 2 m.f., for each Extension. The 18″ Case will accommodate the equipment required up to the $\frac{2+8}{10}$ board, for larger sizes a 24″ Case will be necessary.

Plate 54 shows the circuit arrangements.

A larger type of Switchboard, Magneto, C.B.S., $\left(\frac{n+n'}{50}\right)$, has the apparatus fitted in a "Frame for Local Switch Section"; Drawing E.-in-C. 135, and wired to Diagram C.B.S. 130A. In this case 10 pairs of Pegs and Cords, with a corresponding number of Keys, Speaking and Ringing, Type U9, are fitted. Requisitions should include Case for Condensers, 21″, and two 2-m.f. Condensers (in parallel), which are used for each Exchange line, and one 2-m.f. Condenser for each pair of Pegs and Cords.

Plate 54.

C.B.S. Diagram No. 89.

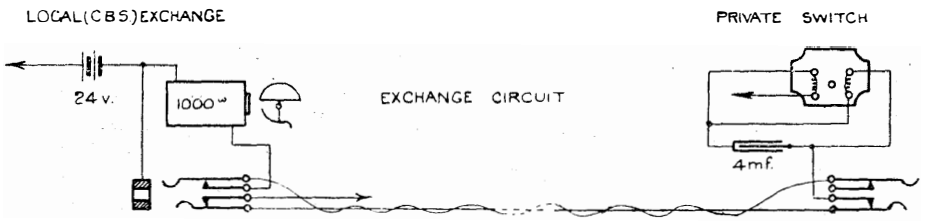
Circuit Arrangements on Switchboards, Magneto, C.B.S., Plate 53.

Signalling from the Exchange to the Switchboard is in the standard way, *i.e.*, on the A line and Earth. The windings of the Exchange Indicator on the private Switch are connected differentially in series, but across one winding a 4-m.f. Condenser is connected. This arrangement has the effect of upsetting the differentiality of the Indicator to alternating currents, and thereby causing it to be operated by Generator but not by direct current from the clearing battery.

The board calls the Exchange automatically by inserting a peg in the Exchange Switchspring—the other peg of the pair being in the speaking Switchspring—and the clearing signal is given by its withdrawal.

Calling and clearing between the board and the Extensions is by Generator. The Extensions clear automatically to the Exchange by the replacement of the Receiver on the hook, and at the same time "ring off" to the board by turning the handle of the Generator fitted in the set. Any Extension point may be connected to the Exchange for Night service by means of a pair of pegs and cords, and the ordinary Switchsprings.

A "Telephone No. 11," or its equivalent, should be used at an Extension Office. *See* Plates 55 and 56.


LOCAL (C.B.S.) EXCHANGE
PRIVATE SWITCH
24 v.
1000 ω
EXCHANGE CIRCUIT
4 m.f.

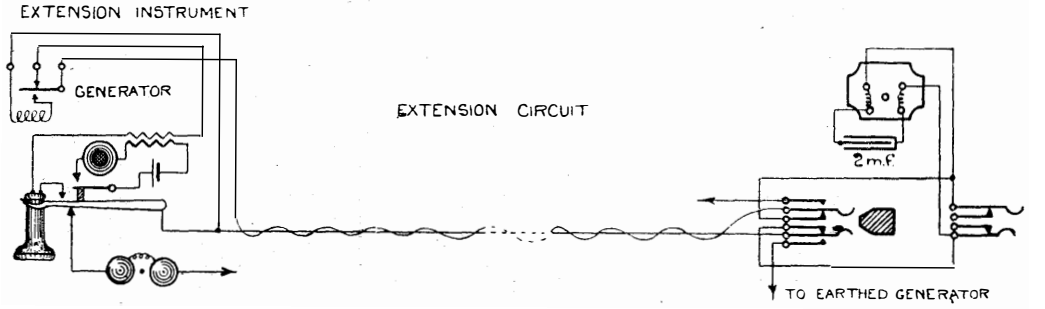

EXTENSION INSTRUMENT
GENERATOR
EXTENSION CIRCUIT
2 m.f.
TO EARTHED GENERATOR

Plate 54.

Plate 55.

C.B.S. Diagram No. 94.

Connections of Telephone Sets working to Switchboards, Magneto, C.B.S., Figs. 1 and 2. *See also* Plate 56.

Fig. 1.—P.O. Telephone for Granular Transmitter C.

Apparatus Schedule.

Telephone No. 21. The title includes Cord, Flexible, No. 222; Coil, Induction, $\frac{25}{1}$; Receiver, Bell; and Transmitter, Deckert, or Inset, Ebonite, Complete.

Bell, Magneto, 100 ohms.

Generator, Bracket, 3 terminals.

Battery, Leclanché, Agglomerate, 6-block, 2-cell, No. 1.

Arm, Bell Receiver
Receiver, Bell
Cord, Flexible, No. 222
} for second Receiver if required only.

This Figure shows the method of connecting up a P.O. Telephone set for C.B.S. working generally. In the ordinary case, however, the Generator is omitted, the A and B lines being led direct to terminals 4 and 5 respectively of the Telephone.

The combination given above is now available mounted, under the description "Telephone No. 25." The Case provides accommodation for a Speaking Battery of 2 Cells, 2-block, Agglomerate, Complete.

FIGURE 1.

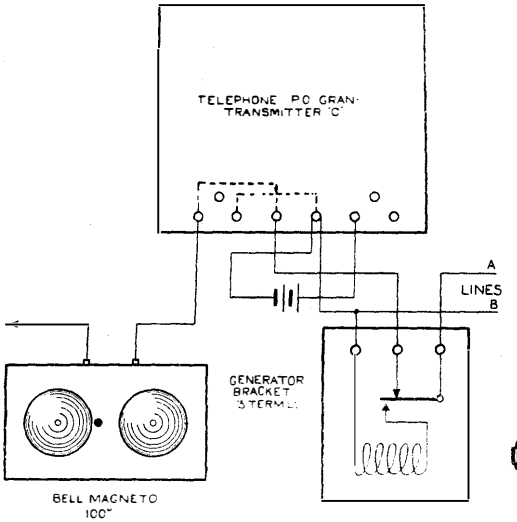
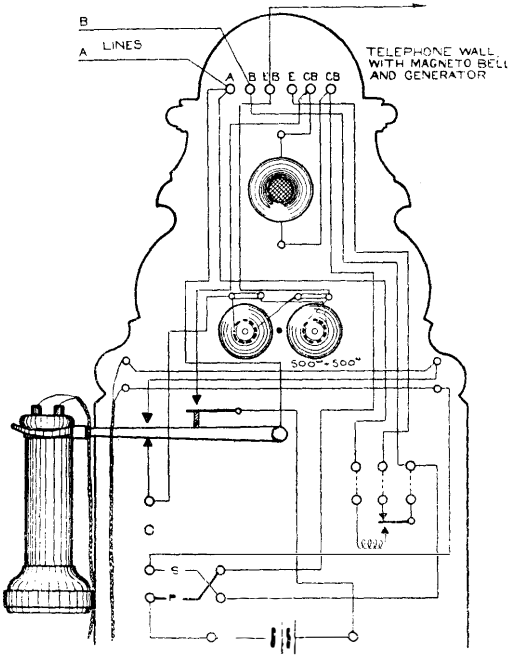


FIGURE 2.

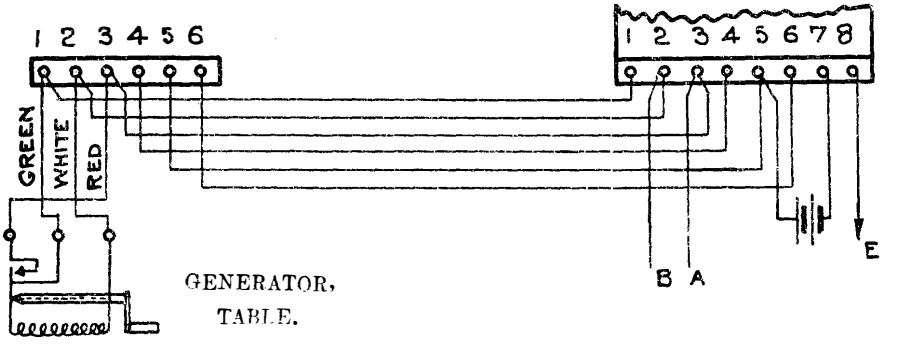


TELE., TABLE, P.B. TRANSR. TYPE.

FIGURE 3.

BELL SET, MAGNETO, P.B.

CORD, FLEXIBLE, 313.



GENERATOR, TABLE.

Plate 55.

FIG. 2.—FOR GENERAL USE. TELEPHONE, WALL, WITH MAGNETO BELL AND GENERATOR.

APPARATUS SCHEDULE.

Telephone No. 11. The title includes Cord, Flexible, No. 222; Transmitter, Inset; Coil, Induction, $\frac{25}{1}$; Generator, Bracket, 3 terminals, Unmounted; Bell, Magneto, 500 ohms + 500 ohms, coils in multiple; Receiver, Bell; and 3 fixing screws and washers.

Label 53c.

2 Cells, 2-block, Agglomerate, Complete.

If an Extension Bell is required, the following additional items must be requisitioned :—

Bell, Magneto, 100 ohms.
Switch, Tumbler, 3 ampères (bronzed).

This instrument should also be fitted for working on long Extension lines from Switchboards, Magneto (C.B.). *See* Plates 26 and 30.

See also Plate 56 for the equivalent Table Set, viz., Telephone No. 16 and Telephone No. 4, with Generator, Table shown in Fig. 3 of this Plate.

Plate 56.

C.B.S. Diagram No. 94, and
,, ,, No. 166, Fig. 4.

Connections of Telephone Sets for working to Switchboards, Magneto, C.B.S.

Table Telephone, with Generator, B.

Apparatus Schedule.

Telephone No. 16. The title includes Cord, Flexible, No. 604; Strip, Flexible Cord Connection, 6-terminal; Bell, Magneto, 1,000 ohms; Generator, 500 ohms; Coil, Induction, $\frac{25}{1}$; and Telephone No. 28.

Battery, Leclanché, Agglomerate, 6-block, 2-cell.

Hook, Receiver, "C" } (if required
Receiver, Watch, "D," Complete } only).

If an Extension Bell is required, a Bell, Magneto, 100 ohms, and Switch, Tumbler, 3 ampères (bronzed), should be requisitioned and connected between Terminal B2 and Earth.

Fig. 1 is a wiring diagram of the instrument, which is similar externally to that shown in Plate 87, but with the connections altered to suit the conditions of the system. Future deliveries of Table Telephones, with Generator (Telephones No. 18), will be wired to this diagram.

Fig. 2.—Explanatory diagram of the above.

This instrument should also be fitted (when a table set is required) for working on long extension lines from Switchboards, Magneto (C.B.). *See* Plates 27 and 30.

TABLE TELEPHONE, WITH GENERATOR "B" COMPLETE.

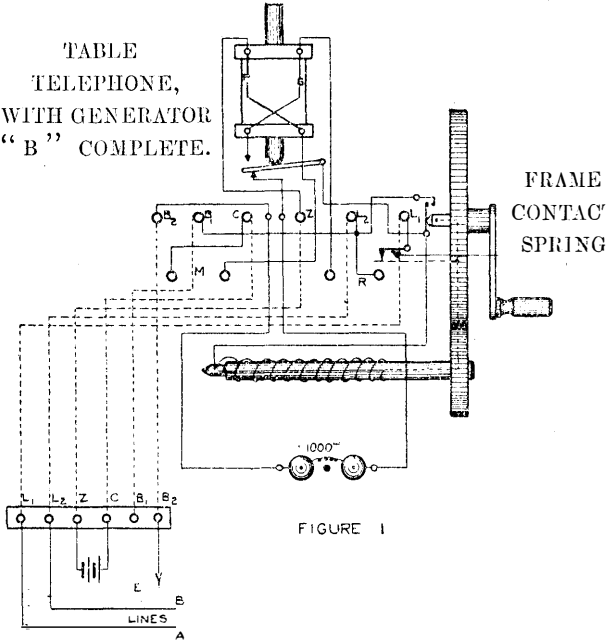


FIGURE 1

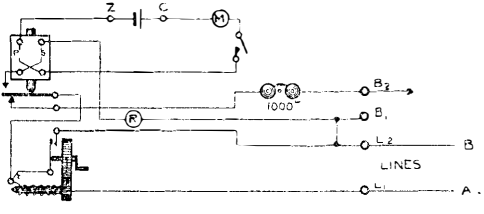


FIGURE 2

Plate 56.

SECTION 5.

PARTY LINE AND CALL OFFICE CIRCUITS.

Plate 57.

T.L. Diagram No. 106.

Provincial Party Line Circuit, Two to Ten Subscribers. Old Arrangement.

Apparatus Schedule.

For each Station.

Telephone No. 21.
Bell, Magneto, 1,000 ohms.
Condenser, metal-cased, 2 m.f. } *See* Notes.
Box, Coin Collecting, Complete }
Battery, Leclanché, Agglomerate, 6-block, 2-cell, No. 1.

At the terminal station, the earthed Magneto Bell must be connected to the A line *viâ* terminal 4 of the Telephone, and the Condenser omitted.

A Coin Collecting Box should not be fitted unless in exceptional circumstances. When the box is fitted, the additional internal connection shown dotted in the Telephone should be made by means of a piece of covered wire, one end being fixed to the screw of the Induction Coil and the other clamped below the lower contact of the Press Button.

Y Subscribers 1, 2, 3, 4, and 5 (shown in the diagram above the lines) are called by Generator on the B line and Earth; X Subscribers 1, 2, 3, 4, and 5 (shown in the diagram below the lines) are called by Generator on the A line and Earth. Calling, and clearing to the Exchange are performed automatically by raising the Receiver from, and replacing it on the hook. It is for the

latter purpose that the Condenser is omitted at the terminal station.

See Plate 58 for new arrangement.

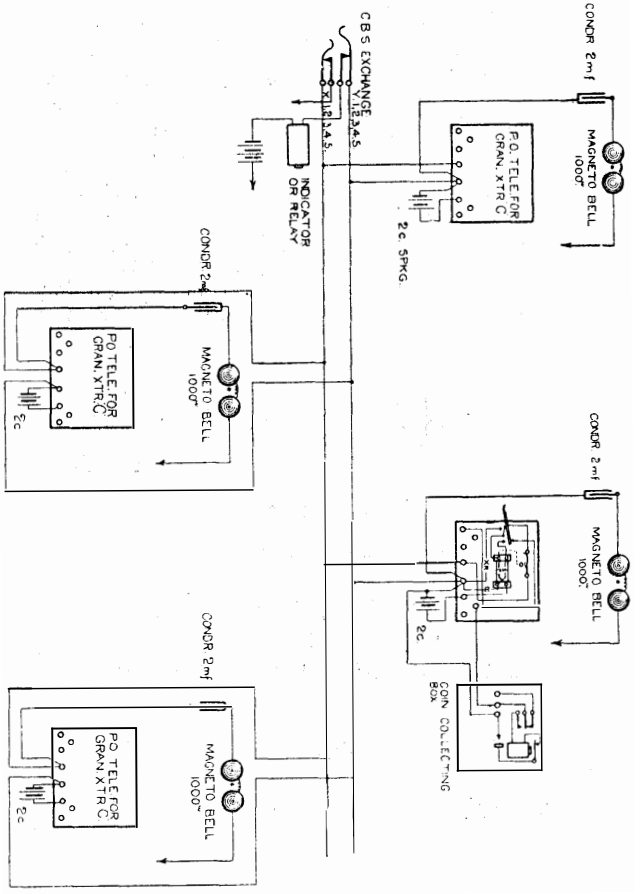


Plate 57.

Plate 58.

C.B.S. Diagram No. 141A.

Provincial Party Line Circuit, Two to Ten Subscribers. Arrangement for New Circuits.

Apparatus Schedule.

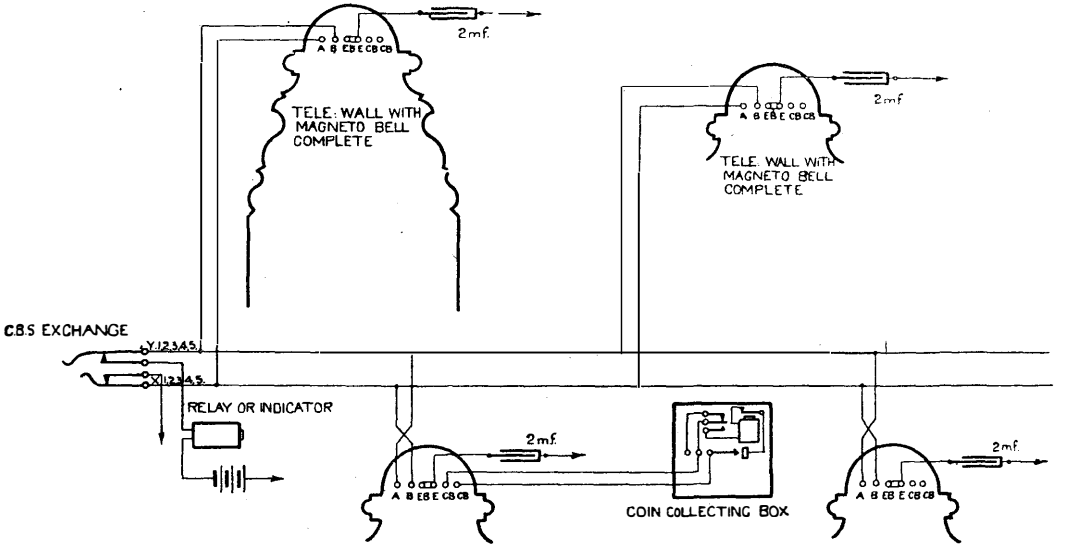
For each Station.

Telephone No. 3.
Condenser, metal-cased, 2 m.f. } *See* Notes.
Box, Coin Collecting, Complete }
2 Cells, 2-block, Agglomerate, Complete.

In order to obtain clearing signals at the Exchange at the close of a conversation, the Magneto Bell at the furthest office must be connected with the "A" line and the Condenser omitted; the connection to Earth being made direct to the terminal marked "E."

A Coin Collecting Box should not be fitted unless in exceptional circumstances.

This diagram supersedes the arrangement shown on Plate 57. X Subscribers 1, 2, 3, 4, and 5 (shown above the lines) are called by Generator on the A line and Earth; Y Subscribers 1, 2, 3, 4, and 5 (shown below the lines) are called by Generator on the B line and Earth. Calling and clearing to the Exchange are performed automatically by raising the Receiver from, and replacing it on the hook.



TELE. WALL WITH MAGNETO BELL COMPLETE.

TELE. WALL WITH MAGNETO BELL COMPLETE.

Plate 58.

Plate 59.

C.B.S. Diagram No. 145.

Call Office Switch; Fig. 1, Connections for One Telephone; Fig. 2, Connections for Two Telephones.

Apparatus Schedule.

Fig. 1.—The apparatus to be fitted on Wallboard and wired locally.

Wallboard, 15″ × 14″.
Bell, Magneto, 100 ohms.
Bell, Trembler, Circular, 25 ohms.
Switch, 6-terminal, 2-position.

Cabinet.

Telephone No. 21.
Receiver, Bell, "D" } for extra Receiver.
Arm, Bell Receiver } for extra Receiver.
Cord, Flexible, No. 222 } for extra Receiver.
Battery, Leclanché, Agglomerate, 6-block, 2-cell, No. 1.

Fig. 2.—Wallboard, Diagram C.B.S., No. 145, Fig. 2.

The description includes the Wallboard, 24″ × 16″, wired and fitted with Telephone, No. 21; Bell, Magneto, 100 ohms; Bell, Trembler, Circular, 25 ohms; and Switch, 6-terminal, 2-position.

Battery, Leclanché, Agglomerate, 6-block, 2-cell, No. 1.

FIGURE 1.

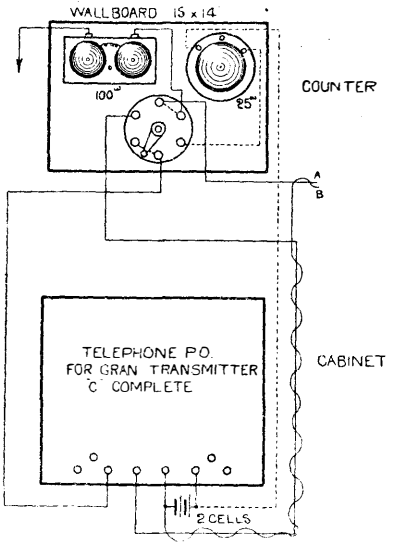


FIGURE 2.

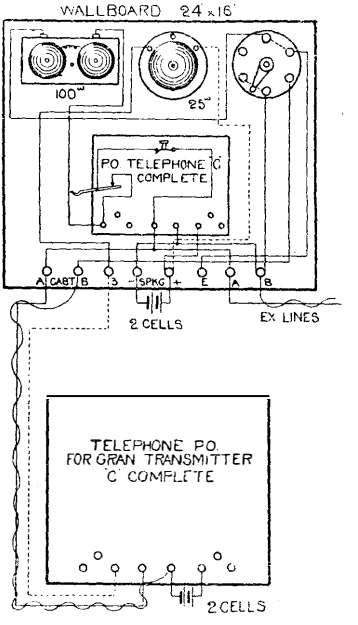


Plate 59.

Cabinet.

Telephone No. 21.
Receiver, Bell, "D"
Arm, Bell Receiver } for extra Receiver.
Cord, Flexible, No. 222
Battery, Leclanché, Agglomerate, 6-block, 2-cell.

The methods of operating in both cases are similar. Calls are received on the Magneto Bell, one terminal of which is earthed. In Fig. 1, to call the Exchange, the Switch is turned to the Cabinet position and the Receiver raised from the hook. In this position the replacement of the Receiver causes the Trembler Bell to ring.

In Fig. 2, where a Telephone is provided at the Counter, the raising of the Receiver cuts off the Magneto Bell and calls the Exchange. By turning the Switch to the Cabinet position, the Cabinet Telephone is connected to the Exchange lines in parallel with the Counter Telephone. The Trembler Bell will ring when the Receiver of the Cabinet Telephone has been replaced on the hook.

In both cases a clearing signal is sent to the Exchange by turning the Switch to "Normal," the A line being thereby earthed through the Magneto Bell.

For connections of Call Office Switch connected with Trunk Switch Section "D," *see* Plate 72 and full description in Circular E 11.

Plate 60.

C.B.S. Diagram No. 146.

Call Office Switchboard with Two to Five Circuits, including National Telephone Company's.

Apparatus Schedule.

Wallboard, Diagram C.B.S. 146. The description includes the Wallboard, 24″ × 16″, fitted with the following :—

Case, Switch, and Indicator, $13\frac{1}{4}$″.

Indicator, N.P., 100 ohms, $\frac{1}{5}$ (Line Indicators).

Indicator, N.P., 100 ohms, $\frac{2}{5}$ (Cabinet Indicators).

Switchspring, 5-point, $\frac{5}{5}$.

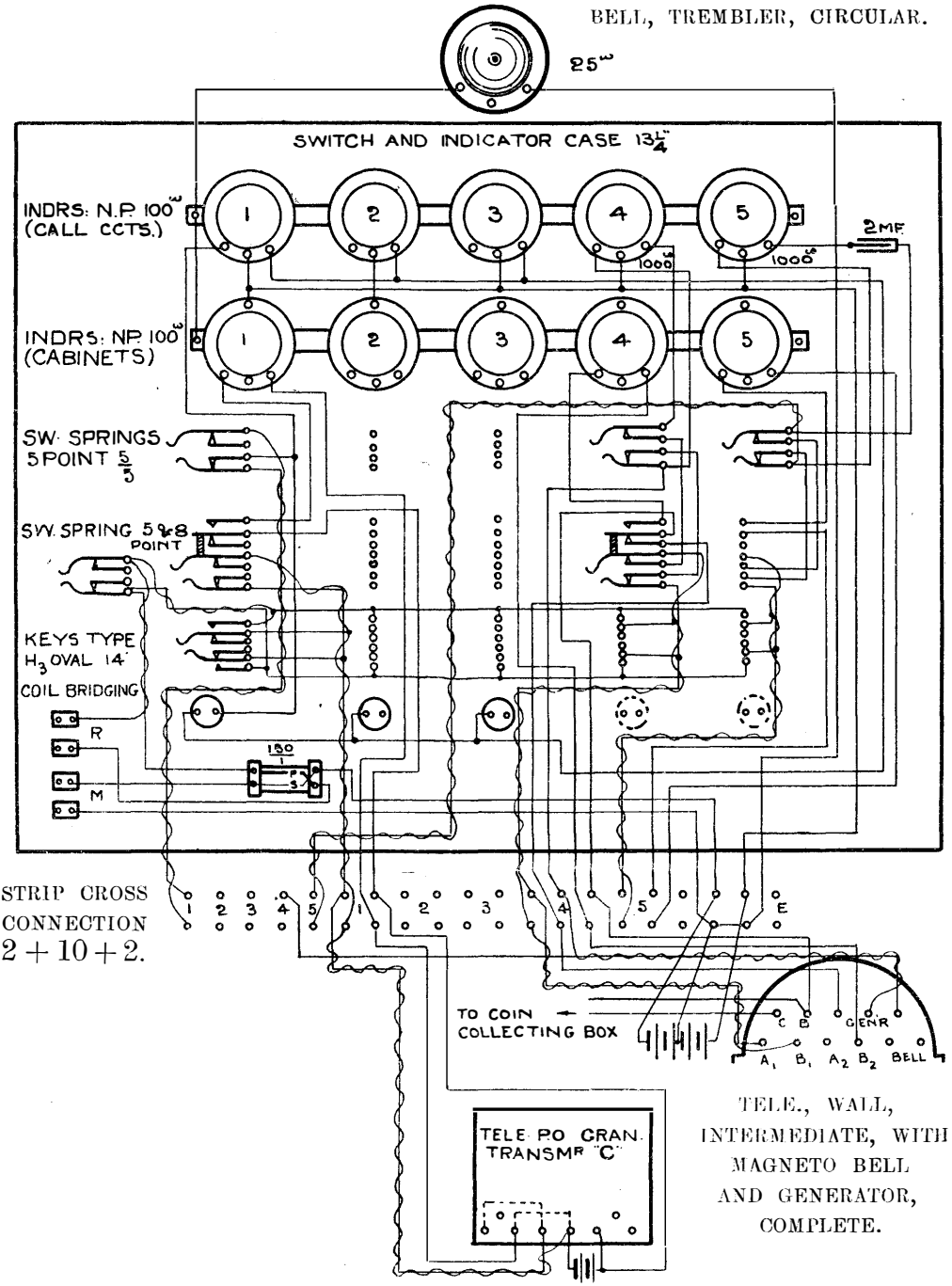
,, 5-point and 8-point, $\frac{1+5}{6}$.

Key, Type H_3 (Oval), 14″, $\frac{5}{5}$.

5 Coils, Bridging, 120 ohms.

Coil, Induction, $\frac{150}{1}$.

4 Plates, Connection, Trembler Bell.
Bell, Trembler, Circular, 25 ohms.
Suspender for Micro Telephone.
Strip, Cross Connection, 2 × 10 × 2.



TELE., WALL, INTERMEDIATE, WITH MAGNETO BELL AND GENERATOR, COMPLETE.

Plate 60.

Telephone No. 28 (with hook).
n pairs Pegs 201, Black or Red, with Cord 16″.
Battery, Leclanché, Agglomerate, 6-block, 4-cell.

The Wallboard as issued from Store will be wired for 5 P.O., C.B.S. Exchange circuits similar to No. 1. Arrangements for circuits to the Company's Magneto and C.B. Exchanges are shown in positions Nos. 4 and 5 respectively, and will be altered locally where required. The additional fittings for the alterations are as follows :—

1 Indicator, N.P., 1,000 ohms, for each Magneto Exchange.

1 Indicator, N.P., 1,000 ohms and 1 Condenser, m.c., 2 m.f. } for each C.B. Exchange.

P.O. Cabinets (including N.T. Co.'s C.B. Cabinets if any).

Telephone No. 21.
Arm, Bell Receiver
Receiver, Bell, "D"
Cord, Flexible, No 222 } Second Receiver.
Battery, Leclanché, Agglomerate, 6-block, 2-cell.

N.T. Co.'s Magneto Exchange Cabinet.

Telephone No. 13.
Receiver, Watch, "D," Complete.
2 Cells, 2-block, Agglomerate, Complete.

See Plate 92 for details of Telephone set.

For full details of the fitting and working of this Switchboard, *see* Circular E 11.

SECTION 6.

EXCHANGE CONNECTIONS.

Plate 61.

C.B.S. Diagram No. 150A.

Section, Local Switch (Provincial), 50 and 80 Line, Circuit Connections, Wiring Diagram C.B.S. 132B.

Fig. 1.—Subscribers' Circuit. When the Receiver is raised, the battery circuit is completed from Earth on the inner A spring, A line, subscribers' apparatus, B line, and calling Indicator. The clearing circuit is completed through the switchspring socket and third point of the peg. *See* Fig. 3.

Fig. 2.—Transfer Circuit. The Local Section is called automatically by the insertion of a peg in the Transfer Switchspring on the Trunk Section, both Indicators being thereby joined in series with the battery. The Local Section operator replies by inserting one of the Special Answering Pegs of the two pairs provided for the purpose in the corresponding Switchspring on the Local Section. This causes both Indicators to disappear. The Indicator at the Trunk Section will, however, reappear when the corresponding Special Calling Peg is inserted in the required subscriber's Switchspring, and will continue to show, in the intervals between the rings, until the subscriber raises his Receiver in reply, *see* Fig. 3. The Transfer Circuits have to be fitted locally.

Fig. 3.—Pegs and Cords Circuit. The wiring of the ordinary cord circuits is shown in full lines. In the Special Cord Circuits (Nos. 1 and 10, the thimbles of the pegs of which are distinguished by a white ring) for use on Transfer circuits, the lead "C" is connected to the local contact of Indicator "I" (as shown by the dotted line) instead of to the middle point of the left Indicator.

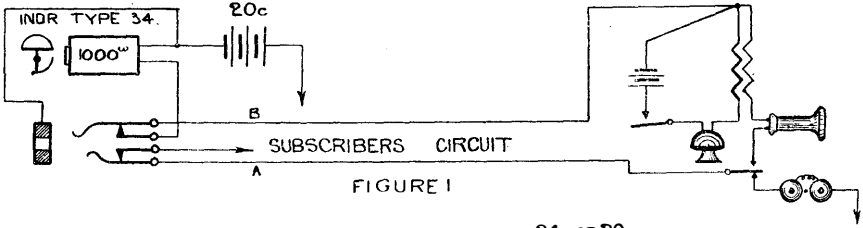


FIGURE 1

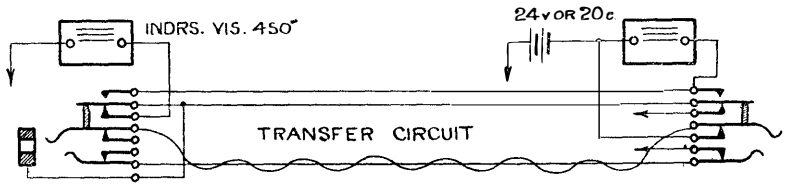
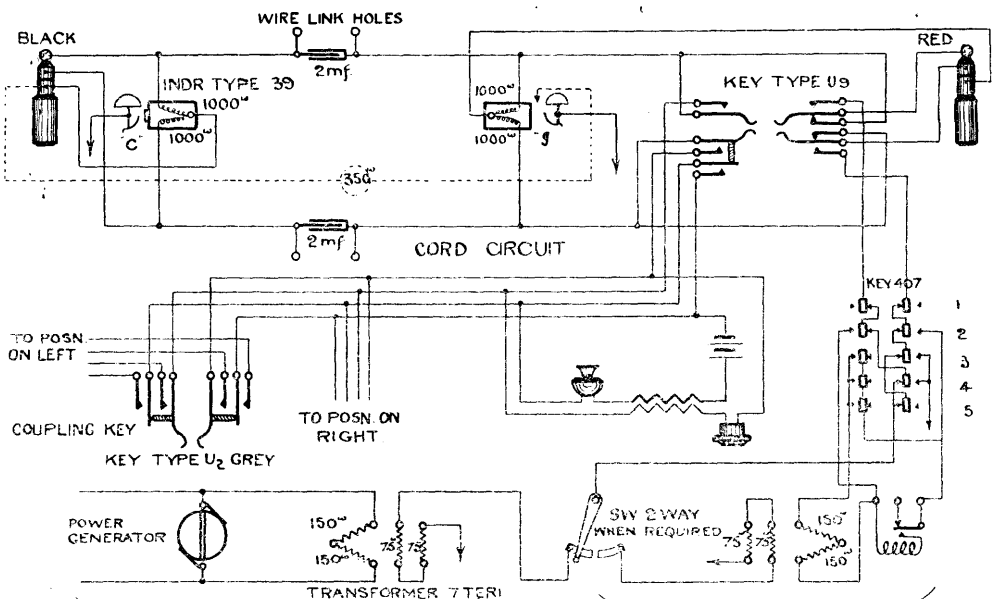


FIGURE 2



COMMON TO EXCHANGE. 1 SET PER SECTION.

FIGURE 3.

Plate 61.

Plate 62—*cont*

The insertion of a peg in the Line Switchspring breaks the circuit through the Relay, Single Vertical Coil, and the lamps are extinguished.

Fig. 2.—Connections of Subscriber's Circuit on Local Switch Sections, 200 Line C.B.S. (Permanent Current Converted), London.

The arrangement is similar to that described under Fig. 1, the only differences being the use of 8-point Switchsprings instead of 5-point, and the omission of the Night Relay—the Bell being connected direct to the Battery with a 500-ohms Resistance Block in series. The Calling Lamp circuit is completed through the medium of the upper springs of the 8-point Switchspring; when a peg is inserted in the Switchspring, the circuits of both the Calling Lamp and the Line Relay are therefore broken and the lamp extinguished.

The clearing arrangements on the Cord Circuits of these boards are on similar lines to those described on page 169 with, however, differentially-wound Relays in place of the Indicators, Type 39, and fitted with clearing lamps in their local circuits.

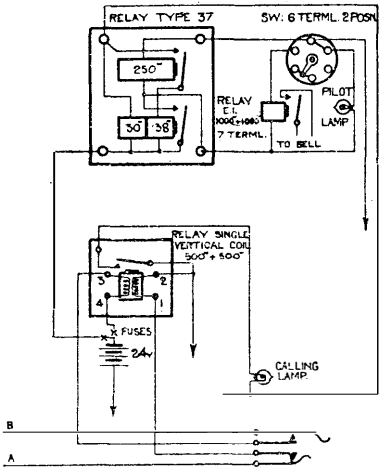


FIGURE 1.

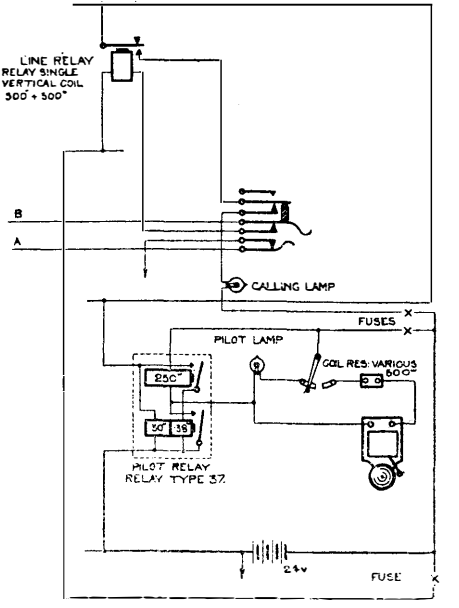


FIGURE 2.

Plate 62.

Plate 62.

C.B.S. Diagram No. 60.
E.C. Diagram No. 451.

Connections of Subscriber's Circuits on 200-line Boards.

Fig. 1.—Connections of Subscriber's Circuit on Local Switch Sections, 200 Line, C.B.S. for Trunk Exchanges.

Normally, the Subscriber's A line is earthed through a 100-ohms Magneto Bell. When the Receiver is raised from the hook, a loop is made across the lines by way of the Receiver and Secondary of the Induction Coil. The connection between the A and B lines closes the battery circuit through the coils of the Relay, Single Vertical Coil, in the local circuit of which is placed in series the Calling Lamp and 30-ohms coil of the Pilot Relay. The latter is actuated, and the lower contact is closed, joining up in parallel the Pilot Lamp and the 250-ohms coil of the Pilot Relay (Type 37) on the battery. The closing of the upper contact of the latter short circuits the 30-ohms coil by the 38-ohm coil, and the Calling Lamp receives practically the full pressure of the battery and lights up if it has not already done so. Relay E_1, 1,000 ohms + 1,000 ohms, is substituted for the Pilot Lamp at night time by the movement of the Switch, a Trembler Bell being fitted in the local circuit to give an audible signal.

Subscribers clear automatically by earthing the A line through the Magneto Bell, the circuit being completed through the A coils of the Indicators, Type 39, the third point of the pegs, and switchspring sockets. When a subscriber is connected to a Trunk, by way of the Transfer circuit outlined in Fig. 2, the single clearing signal on the right Indicator is repeated by means of the armature contact to the visual Indicator on the Trunk Section. When the Trunk operator removes the peg from the Transfer Switchspring, the battery is applied to the A and B lines, and the left Indicator is then energised. A double-clearing signal is thus given as on the ordinary pair of pegs and cords.

The Coupling Key, Type U 2 Grey, is wired so as to enable one operator to attend to more than one position in the less busy portions of the day.

The wiring of the Party Line Ringing Key, Type 407, is arranged to provide for the following methods of Generator ringing :—

Key 1. Spare.

Key 2 depressed. Alternations on loop (from Bracket Generator).

Key 3 depressed. Alternations on A line and Earth. B line earthed. For ordinary and X Party Line subscribers.

Key 4 depressed. Alternations on B line and Earth. A line earthed. Y Party Line subscribers.

Key 5 depressed. Alternations on A line and Earth. B line disconnected.

For Party Line Subscribers' connections, *see* Plates 57 and 58.

Where a Power Generator is not fitted, the Switch, 2-way, is not required, the lead from the Key being connected direct to the unearthed primary winding of the Transformer.