



**TELEPHONE DIAGRAMS**

# C O N T E N T S.

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PART IV.—HOUSE TELEPHONES.

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SECTION 1.

TWO TO TEN STATIONS;  
INTERCOMMUNICATION,  
NON-SECRET.

## Plate 79.

T.L. Diagram No. 230.

### HOUSE TELEPHONE SYSTEM.

For a full description of the Post Office System of House Telephones in Post Offices and Government Buildings, *see* Circular, Telephones (106), Monthly List, 1st January 1906.

*Fig. 1.*—Telephones in Pairs—in lieu of a speaking tube between two rooms only. For this service in Post Offices a stock of Telephones, G.B., Incomplete, House, for Single Receiver (in conjunction with 2 Receivers, Bell (Telephone No. 27) ; 2 Bells, Trembler, House,  $2\frac{1}{2}$ '' ; and 1 Battery, 2-cell Leclanché, No. 1, C.Z.), is available, and should be joined up on the principle shown in Diagram T.L. 154. On the stock becoming exhausted, the apparatus shown in the Plate (Fig. 1) will be used for this class of service.

#### APPARATUS SCHEDULE.

2 Telephones, No. 29. The description includes Hook for Micro Telephone ; Bell, Trembler, Press Button (all mounted on base) ; and Telephone No. 30 ; *or*

2 Telephones, No. 46. The description includes Cradle for Micro Telephone ; Bell, Trembler ; Press Button (all mounted on base) ; Rose, Wall, and 6-foot Cord, Flexible ; and Telephone No. 30.

FIGURE 1.

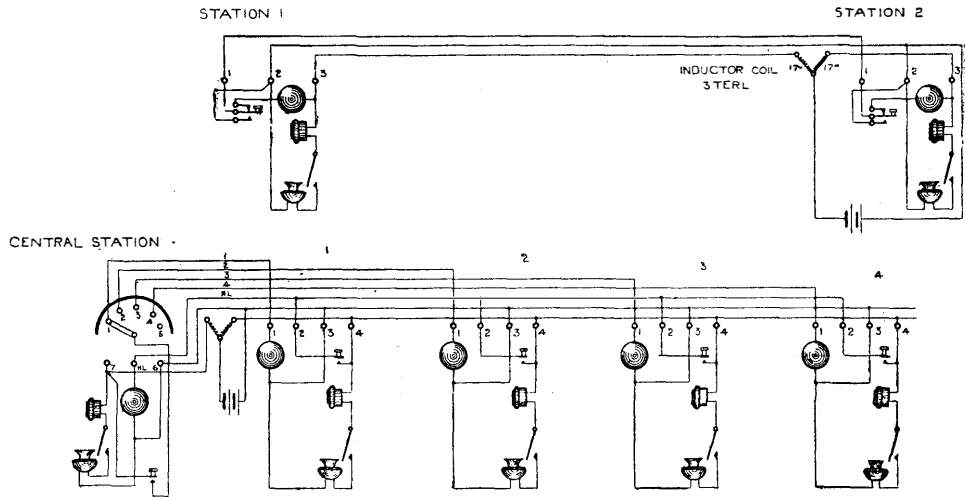


FIGURE 2.

Plate 79—*cont.*

1 Coil, Inductor, 3-terminal.

Battery, Leclanché, No. 1, C.Z., 3-cell.

The diagram provides for a simple Telephone Circuit connecting two stations. To call, the operator at Station 1 depresses the Press Button, thus causing the Bell at the distant station to ring. The operator there repeats the signal by the same process, and both operators complete the speaking circuit by depressing the Keys on the Micro Telephones.

*Fig. 2.*—Telephones between Central and Sub-Stations—in lieu of a number of speaking tubes radiating from a central point.

## APPARATUS SCHEDULE.

1 Telephone, No. 33 or No. 35. The description includes Hook for Micro Telephone; Selector Switch; Bell, Trembler; Press Button (all mounted on base); and Telephone, No. 30; •

1 Telephone, No. 50 or No. 52. The description includes Cradle for Micro Telephone; Selector Switch; Bell, Trembler; Press Button (all mounted on base); Rose, Wall, Circular, and 6-foot Cord, Flexible; and Telephone No. 30.

n Telephones, No. 31 or No. 48; similar to 3-terminal instruments shown in Fig. 1.

1 Coil, Inductor, 3-terminal.

Battery, Leclanché, No. 1, C.Z., 4-cell.

n Boxes, Junction, House, 7 or 12-wire. A Junction Box is used at each intermediate point; 7-wire for 5-way sets, and 12-wire for 10-way sets.

To gain the attention of any particular station, the Selector Switch is turned to the number required, and the Ringing Key is operated; the reply is given by the depression of the Ringing Key at the station called, and the operators at both

stations are placed in speaking communication immediately the contacts on the Micro Telephone Press Keys are made.

The Signalling and Speaking Circuits are similar to those shown on Fig. 1, with the exception that an additional signalling line is provided for outward ringing from Station No. 1. All ringing inwards from the out stations is on the common line H.L. (Home Line).



## Plate 80.

T.L. Diagram No. 231.

HOUSE TELEPHONE SYSTEM ;  
INTERCOMMUNICATION, NON-SECRET.

FIG. 1.—APPARATUS SCHEDULE.

- n Telephones, No. 33 or No. 35 ; or
- n Telephones, No. 50 or No. 52.
- 1 Coil, Inductor, 3-terminal.
- Battery, Leclanché, No. 1, C.Z., 4-cell.
- n Boxes, Junction, House, 7 or 12-wire. A Junction Box is used at each intermediate point.

The diagram provides for full intercommunication between all stations on the system, and it is possible for all stations to come in circuit for listening and speaking.

To gain the attention of any station, the operator turns the Selector Switch to the number of the station required, depresses the Press Button, lifts the Micro Telephone from the hook, makes the contact of the Press Key, and listens for a reply. The distant station operator lifts the Micro Telephone, depresses the Press Button, and is in immediate speaking communication. The selective signalling lines are in the ringing circuits only, the speaking being on the common leads.

*Figs. 2 and 3.*—These figures illustrate the current circulation in the ringing and speaking circuits. Fig. 2 represents the circuit conditions when Station 1 is ringing Station 2; Fig. 3, Station 1 speaking to Station 2.

The conditions in these circuits are similar to those shown in Fig. 1, Plate 79.

FIGURE 1

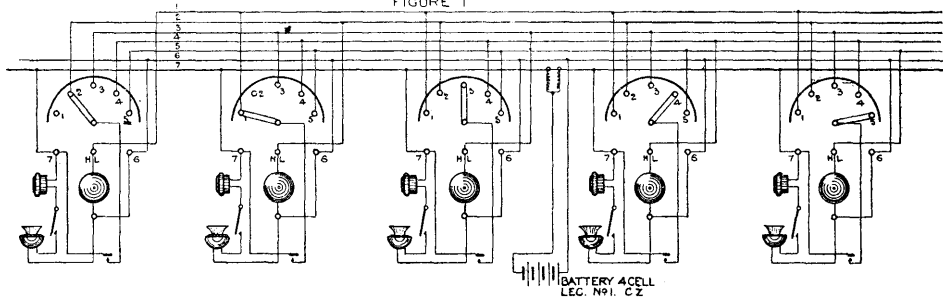


FIGURE 2  
LINE 2

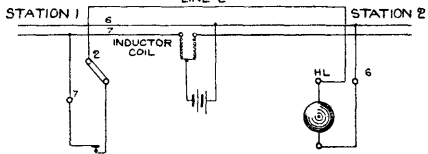
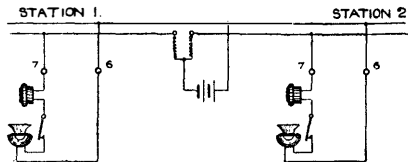


FIGURE 3





SECTION 2.

FIVE TO TWENTY STATIONS;  
INTERCOMMUNICATION,  
SECRET.

## Plate 81.

T.L. Diagram No. 232.

### HOUSE TELEPHONE SYSTEM. DIRECT CALL, INTERCOMMUNICATION (SECRET).

FIG. 1.—APPARATUS SCHEDULE.

n Telephones, No. 39, No. 41, No. 43, or No. 45. The description includes Hook for Micro Telephone; Selector Switch; Bell, Trembler; Press Button; Vibrator; Induction Coil; and Cut-in Relay (all mounted on base); Telephone No. 32; *or*

n Telephones, No. 56, No. 58, No. 60, or No. 62. The description includes Auto-Cradle for Micro Telephone; Selector Switch; Bell, Trembler; Press Button; Vibrator; Induction Coil; and Cut-in Relay (all mounted on base); Rose, Wall, and 6-foot Cord, Flexible; and Telephone No. 32.

n Boxes, Junction, House, 7, 12, 17, or 22-wire.

n Batteries, Leclanché, No. 1, C.Z., 3-cell.  
● One used at each point for speaking.

Battery, Leclanché, No. 1, C.Z., 3-cell. Ringing battery for whole system.

The diagram provides for full intercommunication between any two stations on the system without interference by any other station. Also any two stations up to the full number on the system can be speaking independently of any other two stations; for instance, if 15 instruments are installed, seven different conversations can be carried on simultaneously.

FIGURE 1

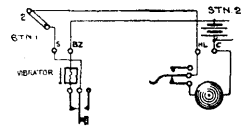
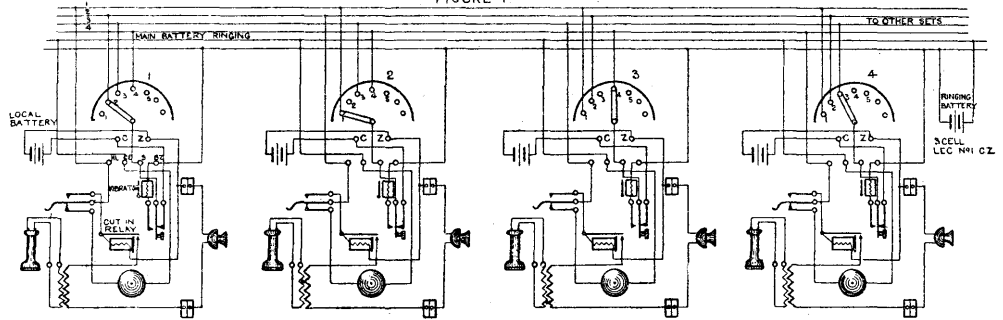


FIGURE 2

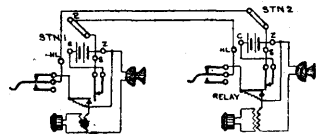


FIGURE 3

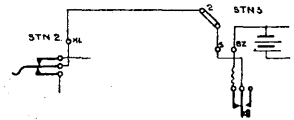


FIGURE 4

## Plate 81—*cont.*

The operator at the calling station turns the Selector Switch to the number of the station required and depresses the Ringing Key, at the same time lifting the Receiver from the Auto-Switch Hook; if the Telephone at the station called is in use, the Vibrator at the calling station will not be actuated, thus indicating that attention cannot be obtained. On the ring being received, the operator at the called station will lift the Receiver from the Auto-Switch Hook, turn the Switch Arm until the mechanical click of the Cut-in Relay is heard inside the Telephone case, when the two operators will find themselves in speaking communication.

The arrangement is such as to render it essential that the speaking batteries must be joined up so that they are in series in the circuits before the communication between any two stations can be established. After a conversation is completed, the Receiver must be placed on the rests or hooks, but it is not essential to replace the Selector Switch to any particular position.

*Fig. 2.*—Station 1 ringing Station 2. Switch at 1 turned to Position 2 and Button pressed; if circuit engaged, Vibrator silent.

*Fig. 3.*—Station 1 speaking to Station 2. Station 2 lifts Receiver and turns Switch until the Relay is heard making the Primary circuit.

*Fig. 4.*—Station 3 attempting to ring Station 2 while the latter is engaged. The ringing battery is disconnected owing to the Receiver at Station 2 being off the hook.





**Plate 82.**

T.L. Diagram No. 233.

HOUSE TELEPHONE SYSTEM. DIRECT  
CALL AND DELTA INTERCOMMUNICATION  
(SECRET).

APPARATUS SCHEDULE.

n Telephones, No. 39, No. 41, No. 43, No. 45, or No. 56, No. 58, No. 60, No. 62.

n Telephones, No. 37 or No. 54; similar to the first item, but with no Selector Switch or Switch arm provided.

n Boxes, Junction, House, 7, 12, 17, or 22-wire.

n Batteries, Leclanché No. 1, C.Z., 3-cell (Speaking, one for each point).

Battery, Leclanché, No. 1, C.Z., 3-cell (Ringing, one for whole system).

The arrangement is a modification of the system shown in Plate 81, and provides, in addition to the general arrangement, sub-stations that cannot communicate with the main system, but can be called and conversed with from a Central Station. In the diagram, A and B are sub-stations; No. 1 is the Central Station able to communicate with A and B; and No. 2 is a typical station on the general system. A special set of apparatus is provided at the sub-stations, identical in all respects to the Intercommunication apparatus, with the exception that no Selector Switch or Switch arm is provided. Circuits joined up in this manner are referred to as "Delta."

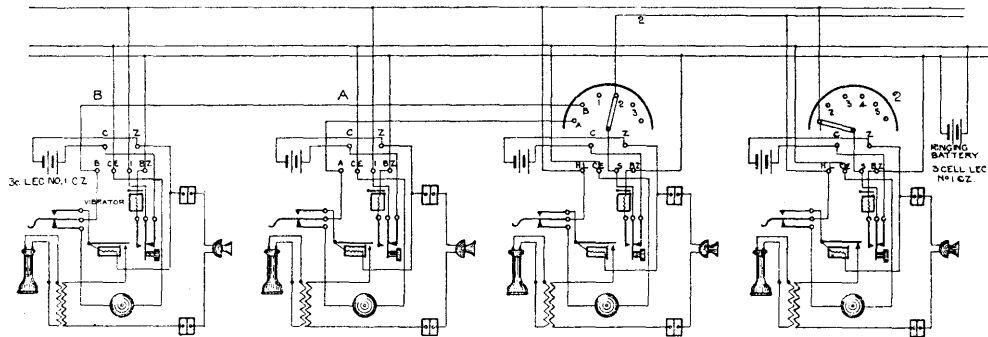


Plate 82.



PART V.—MISCELLANEOUS  
TELEPHONES AND CIRCUITS.

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SECTION 1.

MISCELLANEOUS TELEPHONES.

## Plate 83.

## MICRO TELEPHONE.

## APPARATUS SCHEDULE.

Telephone No. 28.

This description covers the complete instrument, including Cord, Flexible, No. 403.

The two Microphone conductors are distinguished by white strands bound over the tinsel, while the Receiver conductors are similarly bound with copper strands.

If facility for hanging up is required, Telephone No. 28 (with loop) or Telephone No. 28 (with hook) should be requisitioned.

## MICRO TELEPHONE.

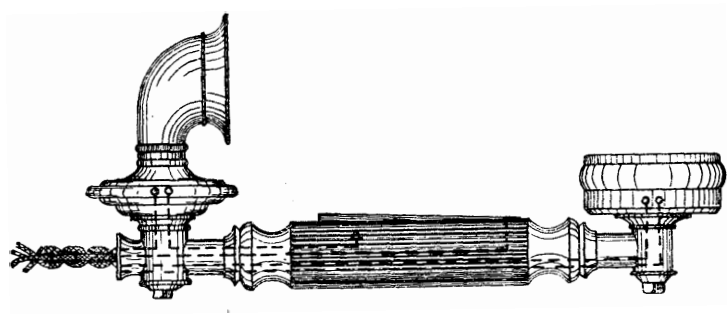


Plate 83.

**Plate 84.**TABLE TELEPHONE, WITH TREMBLER  
BELL "A."

## APPARATUS SCHEDULE.

Telephone No. 20.

The item includes Cord, Flexible, No. 602 ;  
Strip, Flexible Cord Connection, 6-terminal ; and  
Telephone No. 28.

A working current of 25 milliampères should  
be allowed for the Bell.

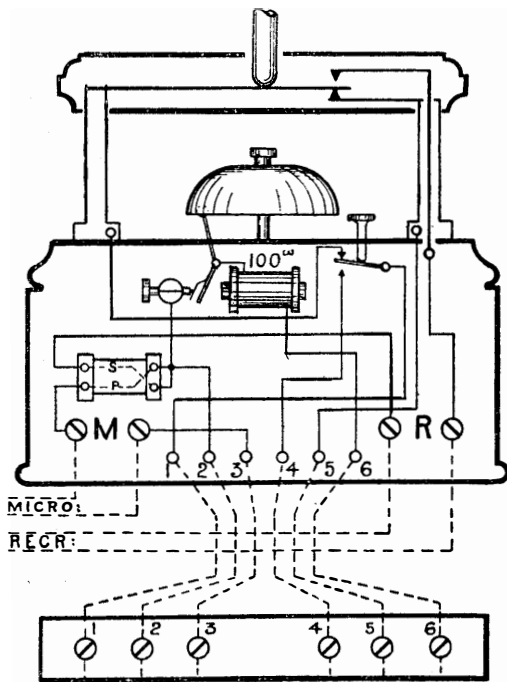


Plate 84.



## Plate 85.

## TABLE TELEPHONE, WITH MAGNETO BELL.

## APPARATUS SCHEDULE.

Telephone No. 26.

The item includes Cord, Flexible, No. 402; Strip, Flexible Cord Connection, 4-terminal; and Telephone No. 28.

This instrument was intended for use on Telephone Exchange systems where the subscriber is called by Generator and calls the Exchange on the permanent current system. It is now used on C.B.S. Exchanges. See Plates 42 and 47.

The Bell is removable by taking off the dome and removing the two connection screws. Adjustment of the bell hammers is effected by means of two screws in the armature, against which the hammer springs are set.

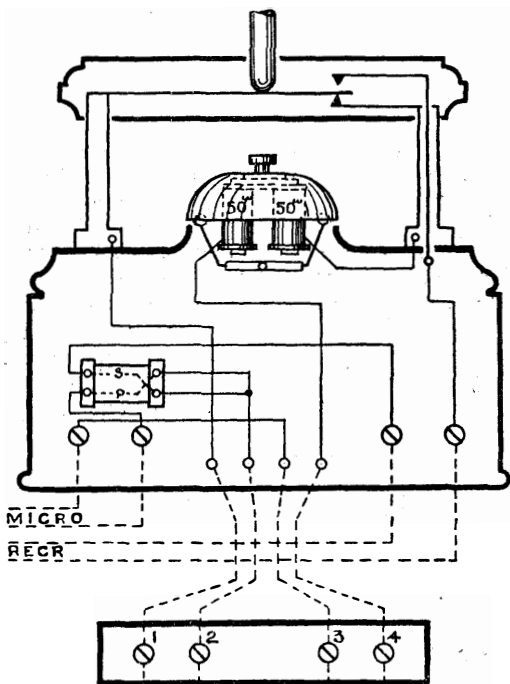


Plate 85.

**Plate 86.****TABLE TELEPHONE, WITHOUT BELL "A."****APPARATUS SCHEDULE.**

Telephone No. 24.

The item includes Cord, Flexible, No. 702; Strip, Flexible Cord Connection, 7-terminal; and Telephone No. 28.

This Telephone is used on Extension Circuits, C.B.S. The connections shown are equivalent to those which are obtainable with the P.O. Telephone for Granular Transmitter, "C," *i.e.*, the signalling apparatus joined to Terminals 1 and 5 is entirely disconnected from the line leads when the Micro Telephone is lifted. See Plates 47 and 49.

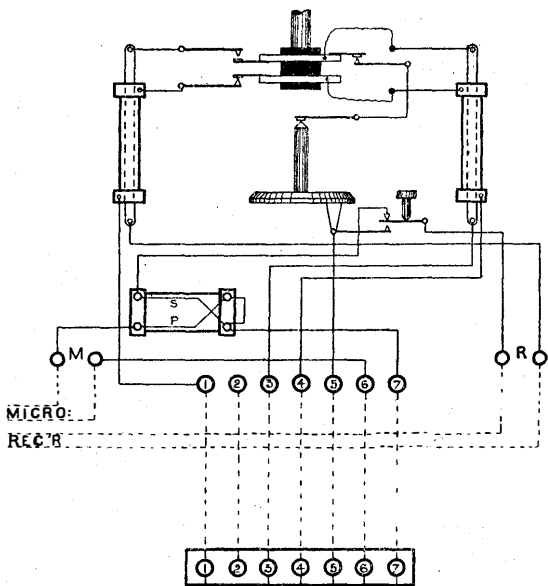


Plate 86.

## Plate 87.

## TABLE TELEPHONE, WITH GENERATOR.

## APPARATUS SCHEDULE.

Telephone No. 18.

The item includes Cord, Flexible, No. 604; Strip, Flexible Cord Connection, 6-terminal; and Telephone No. 28.

As only a speaking battery is required where Generator ringing is provided, arrangements have been made to supply a

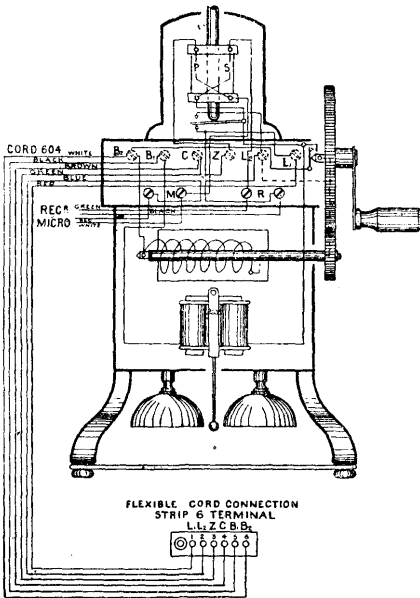
“Battery Box, Bracket, 2-cell,”  
upon which, by means of a

“Baseboard, Table Telephone”  
and two clamping screws, a Table Telephone, with Generator, can be converted into a complete Wall Telephone, including Battery Box. The Bracket Battery Box will contain two Dry Cells “Y” size, which are, of course, a separate item.

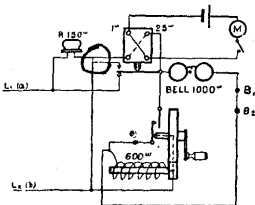
An earlier type of Table Telephone, with Generator, is fitted with a Flexible Cord Connection Block and Cord, Flexible, No. 603. As these Telephones are liable to be issued in execution of requisitions it will be necessary to specify “with Flexible Cord Connection Strips, 6-terminal” when they are to be used on Bracket Battery Boxes.

The spare Flexible Cord can be disposed of in the recess behind the Box, and the Battery leads taken through a hole provided below the Battery Case. The door of the Battery Box is fastened by means of a lock similar to those used for Magneto Bells.

This set is similar to Telephone, Table, with Generator, “B,” the latter being modified for C.B.S. working. See Plate 56.



NOTE.—The connection shown by dotted line is made through the base of the instrument.



**Plate 88.**

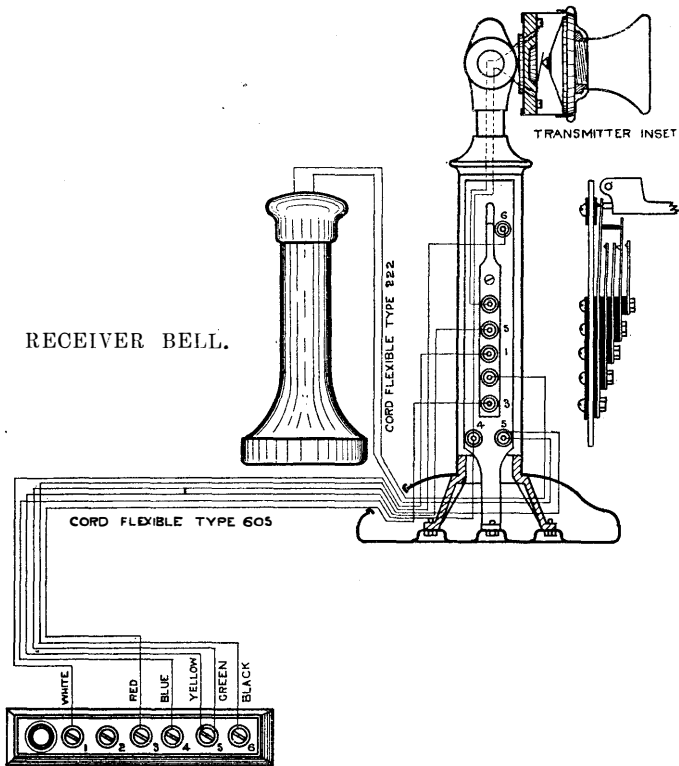
Diagram T.L. No. 337.

CONNECTIONS OF TELEPHONE, TABLE,  
P.B., TRANSMITTER TYPE.

## APPARATUS SCHEDULE.

Telephone No. 4. The description includes Cords, Flexible, Nos. 202 or 222 (Receiver cord), 223 (Transmitter cord), and 605 (for connecting the Telephone to Strip); Strip, Flexible, Cord Connection, 6-terminal, mounted; Transmitter; Inset; Receiver, Bell; and Label No. 78.

The combination of this Telephone with a Bell Set No. 5 forms the primary battery equivalent of the C.B. Table Set and Bell Set No. 1. The arrangement is suitable for working into C.B.S. Exchanges, *see* Plates 43, 44, and 48, and may also be used on long private wire circuits, in conjunction with a Generator, Table, for calling purposes. *See* Diagram T.L. No. 338.



STRIP, CORD CONNECTION, 6-FERMINAL.





## Plate 89.

POST OFFICE TELEPHONE FOR GRANULAR  
TRANSMITTER, "C."

## APPARATUS SCHEDULE.

## Telephone No. 21.

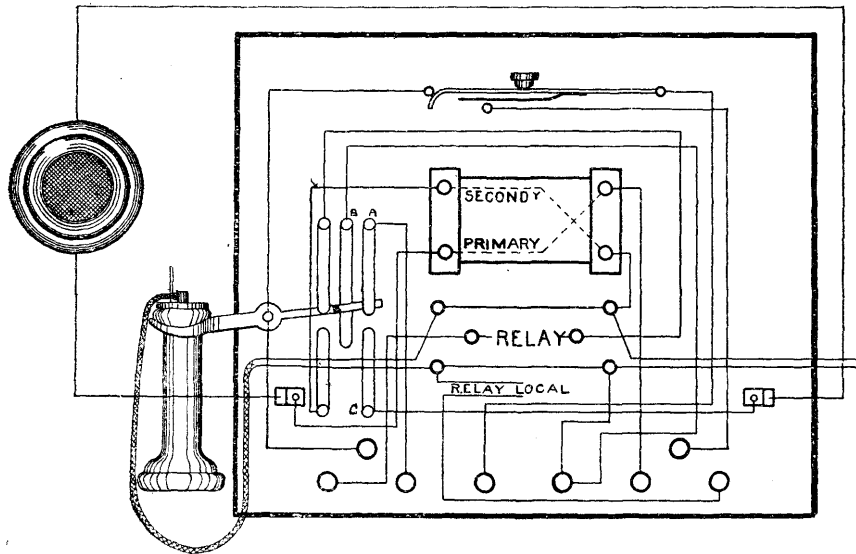
The item includes Cord, Flexible, No. 222 (for Bell Receivers) ; Receiver, Bell ; and Transmitter, Deckert, or Inset, ebonite, complete.

This form of Telephone provides all the connections made by the two-lever form of P.O. Telephone, and superseded the "Telephone, P.O., for Granular Transmitter" and "Telephone, P.O., for Granular Transmitter, "A."

The Switch lever is divided into two parts, the inner part being insulated from the outer. When the Receiver is in its rest, spring B is in electrical contact with spring A through the lever, in the speaking position B and C are electrically connected.

A fixed Rest will be provided for the right-hand Receiver under the description "Arm, Bell Receiver." This item, together with the Receiver and Cord, Flexible, No. 222, should be requisitioned separately when required. *See also* Plates 55 and 59.

It has been found advantageous on certain heavily-worked long distance circuits to equip P.O. Telephones with "Transmitters, Inset," and for that purpose ebonite cases are available under the stock title of "Case, Inset, Ebonite." The Case and the Transmitter will be supplied under the inclusive title of "Transmitter, Inset, Ebonite, Complete.'



TO SECOND  
RECEIVER  
WHEN  
REQUIRED.

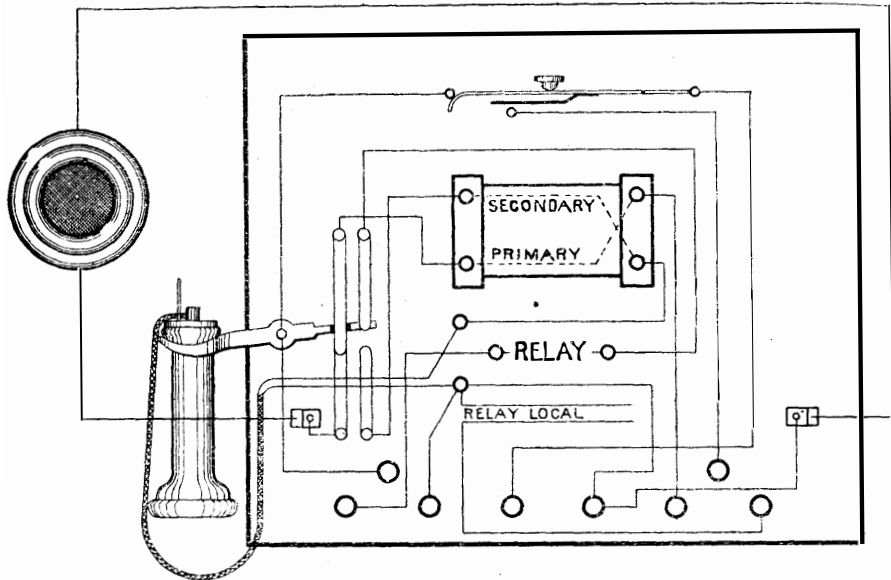
Plate 89.

**Plate 90.**

POST OFFICE TELEPHONE  
FOR GRANULAR TRANSMITTER, "A"  
(TELEPHONE No. 17).

The diagram shows the internal connections of the P.O. pattern Telephone as originally arranged with one movable Switch arm and a Deckert Transmitter. A second fixed arm was provided under the conditions detailed on page 242.

TEL. N° 17.



**Plate 91.****POST OFFICE TELEPHONE FOR GRANULAR  
TRANSMITTER (WITH TWO LEVERS).**

The diagram shows the internal connections of the P.O. pattern Telephone with two movable Switch arms and a Deckert Transmitter. The primary circuit is closed by the right-hand Switch lever coming in contact with the lower spring, the secondary being closed in a similar manner on the left side.

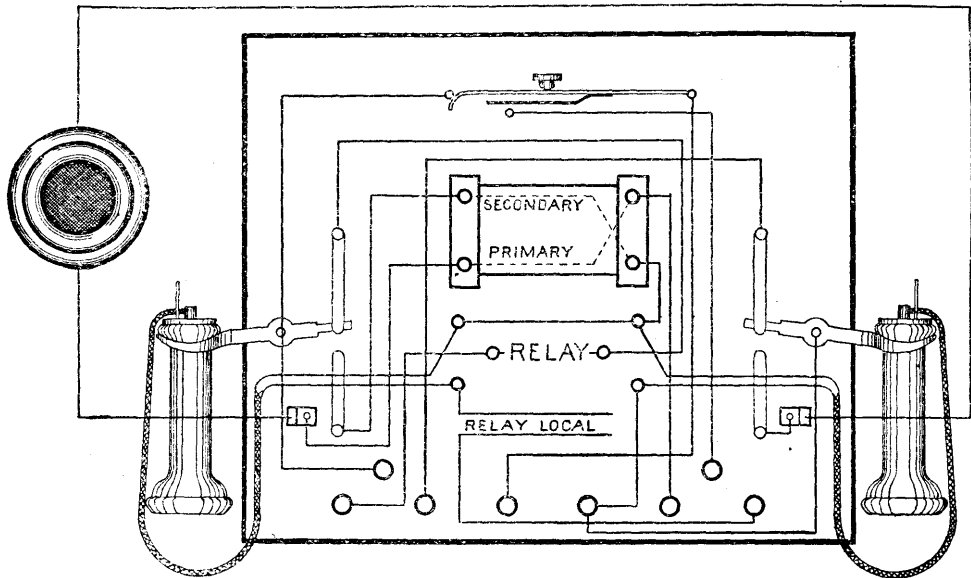


Plate 91.

**Plate 92.**

C.B.S. Diagram No. 123.

**CONNECTIONS OF TELEPHONE, WALL,  
INTERMEDIATE, WITH MAGNETO BELL AND  
GENERATOR.**

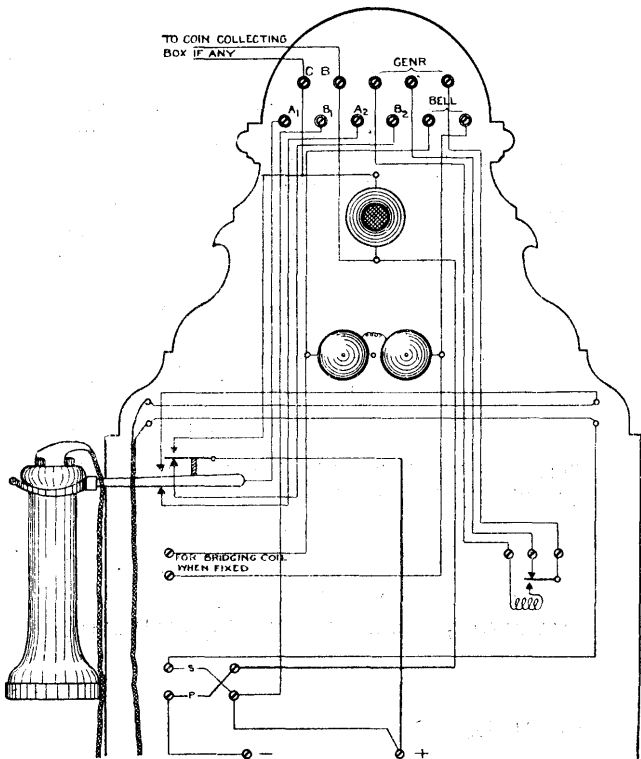
**APPARATUS SCHEDULE.**

Telephone No. 13. The description includes Bell, Magneto, 1,000 ohms; Generator Bracket, 3-terminal, unmounted; Coil, Induction,  $\frac{25}{1}$ ; Transmitter; Cord, Flexible, No. 222; Receiver, Bell; and 3 fixing screws and washers.

2 Cells, 2-block, Agglomerate, Complete.

This Set, which is similar to Telephone, No. 3, but with a Generator and five extra Terminals fitted and wiring re-arranged, is suitable for Intermediate working, and is capable of performing the same functions as a P.O. Telephone with Granular Transmitter, "C," with the advantage of having a Generator, Magneto Bell, and accommodation for a Speaking Battery within the case. See Plate 76.





**Plate 92.**

**Plate 93.****PORTABLE TELEPHONE WITH GENERATOR  
AND VIBRATOR.****APPARATUS SCHEDULE.**

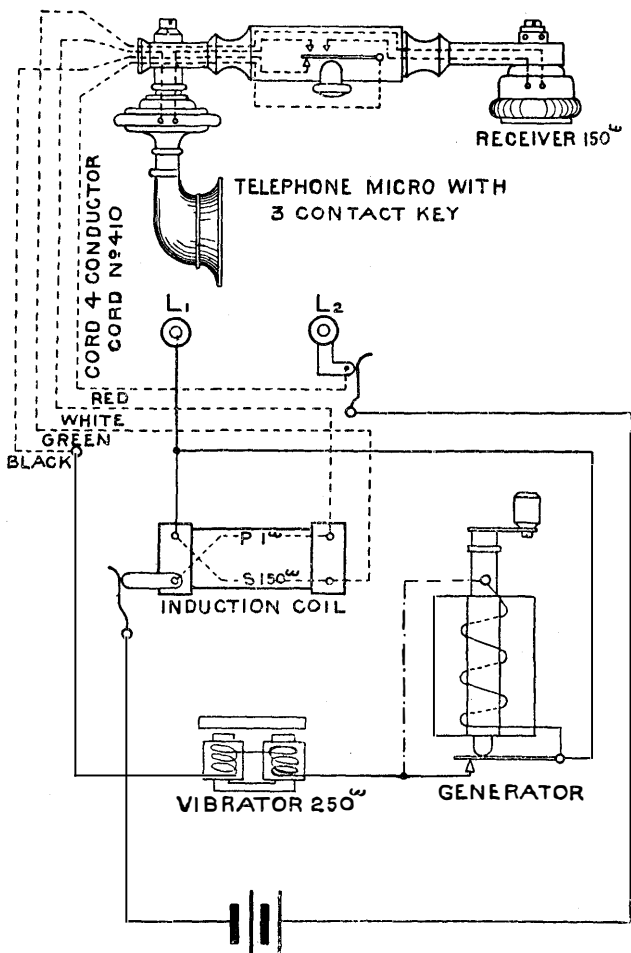
Telephone No. 42. The description includes a Telephone, No. 34 ; Vibrator (250 ohms) ; Generator ; and Induction Coil, <sup>150.</sup>  
1

The description Telephone No. 34 includes the Cord, Flexible, No. 410.

Two "Clamps, connecting, for Watch Receiver " and 1 "Cord, Flexible, No. 205," may be used for making the line connections, but they are separate items, as are also the 2 Cells, Dry (X), used in connection with the set.

The 3-contact Key on the Micro Telephone must be depressed for both speaking and listening.

Calls are received on the Vibrator, or "Buzzer," which is in circuit when the 3-contact Key is in the normal position.



SPEAKING BATTERY, 2 DRY CELLS.

Plate 93.

**Plate 93A.**

T.L. Diagram No. 445.

**PORTABLE TELEPHONE, TYPE 2,  
COMPLETE.****APPARATUS SCHEDULE.**

Telephone No. 44. The description includes a Telephone, No. 36 (Micro Telephone, with 3-contact key), Induction Coil  $\frac{75}{1.7}$ , Magneto Bell, 500 ohms; Generator, 500 ohms; Condenser, 1 m.f., and 2 dry cells, all of which are special to the instrument.

The connections of this telephone are so arranged that it can be used either on primary battery or C.B. circuits. The circuit is open, with the Magneto Bell and Condenser across the lines, until the press keys on the Micro-Telephone is operated. The battery is so placed that a conversation can be carried on between a lineman and a C.B. subscriber when the exchange battery is disconnected.

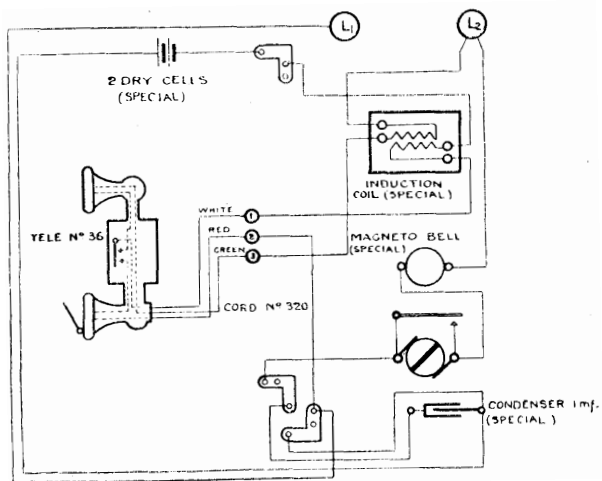
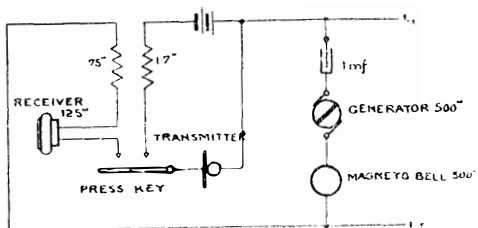


Plate 93A.

SECTION 2.

P.O. TELEPHONE WITH  
MAGNETO BELL AND GENERATOR;  
T.B.I. SWITCH.

## Plate 94.

### P.O. TELEPHONE, WITH MAGNETO BELL AND GENERATOR.

#### APPARATUS SCHEDULE.

Telephone No. 21.

Arm, Bell Receiver	} for Second Receiver,
Receiver, Bell, " D "	
Cord, Flexible, No. 222	

Bell, Magneto, 1,000 ohms.

Generator, Bracket, 3-terminal.

Magneto calling apparatus is sometimes used upon Coastguard and Public Office (Message) Circuits. The apparatus may also be used on other Telephone circuits (except Exchange Circuits) where Battery ringing is not specially required.

Not more than six Offices may be placed upon a circuit without special authority.

To ring, depress the Telephone Press Button, and turn the crank handle of the Generator continuously. If intermittent signals be required, turn the handle continuously and regulate signals by the Press Button. Jerking the handle of the Generator is liable to damage the gearing.

*See also page 152.*

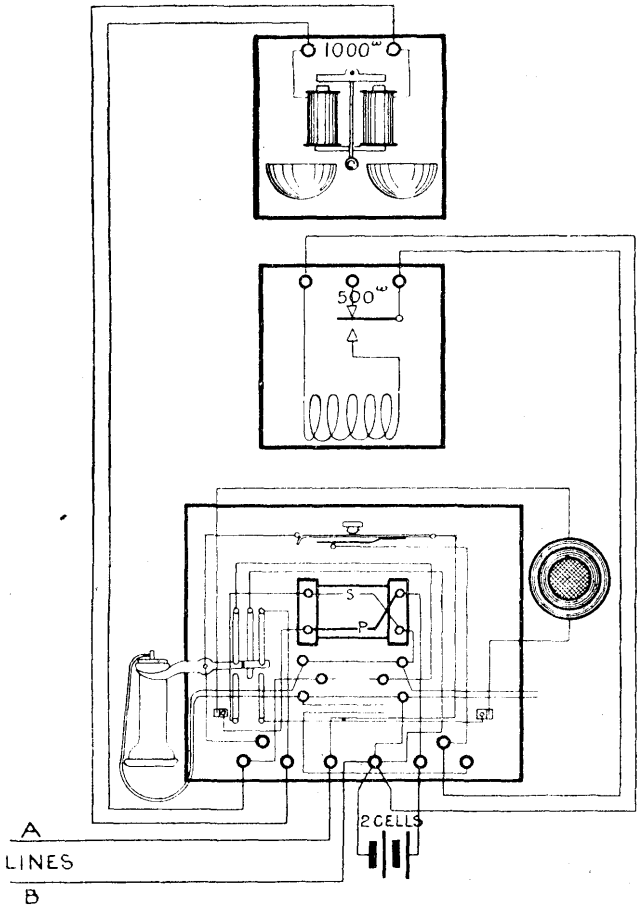


Plate 94.



## Plate 95.

TELEPHONE BRIDGE INTERMEDIATE  
SWITCH.

## APPARATUS SCHEDULE.

Telephone No. 21.

Arm, Bell Receiver  
Receiver, Bell, "D" } for Second Receiver,  
Cord, Flexible, No. 222 } if required.

Relay, F, 100 ohms or 1,000 ohms, unmounted.

Switch, Bridge, Intermediate.

2 Bells, Trembler, with Indicators.

Coil, Resistance, Various (R).

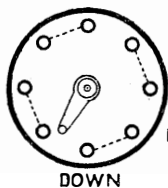
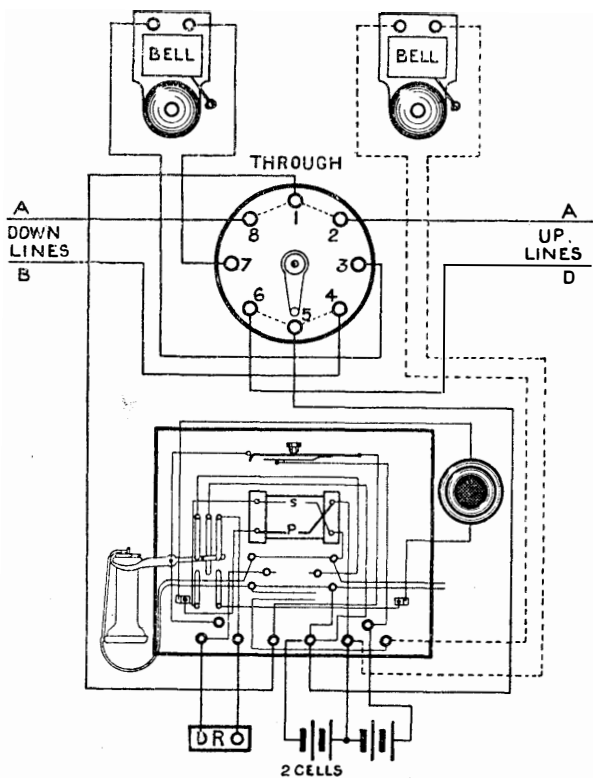
If a Balancing Resistance R is not required, the two Terminals of the Telephone to which it is usually connected should be joined direct.

When a Switch is used, if the Intermediate Office is off the Main Line, and has to be reached by a Branch, the Branch Line must consist of two wires for a single-wire circuit, and of four wires for a double-wire circuit.

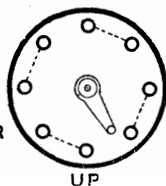
In the through position the Telephone is placed in the circuit in "Bridge."

The same formation of Switch is used for single-wire circuits.

It is sometimes desired that the Intermediate Office Telephone may, for purposes of privacy, not be in circuit when the line is "through." In such case the *Telephone* and left-hand *Bell* connection on the Switch may be interchanged, so that the



SWITCH  
POSITIONS FOR



**Plate 95.**

**Plate 95—cont.**

Bell may be in circuit when the Switch is at "through"; in this case the Relay (mounted) should be used in the Bell instead of in the Telephone Circuit. The Balancing Resistance R (if any) must also be placed in the Bell Relay Circuit, instead of in the position shown.

The foregoing arrangements provide for Battery ringing, but Magneto working can be arranged on similar lines. On a Magneto system the Relay Terminals would be strapped across, and a Bell, Magneto, connected to Terminals 1 and 3 in place of R. A Bell, Magneto, would also take the place of the left-hand Bell, Trembler, whilst the Generator would be connected to Terminals 5 and 7 of the P.O. Telephone, as in the preceding Plate.

SECTION 3.

TELEGRAM CONCENTRATION●  
SWITCH; SWITCHES AND KEYS

**Plate 96.**

T.L. Diagram No. 190.

SWITCHBOARD, MAGNETO (CONCENTRATION),  $\frac{2 + 5}{7}$ . FOR TELEGRAPH CIRCUITS  
WORKED BY TELEPHONE.

## APPARATUS SCHEDULE.

Switchboard, Magneto, (Concentration),  $\frac{2 + 5}{7}$ .

The description includes the Board, wired, and fitted with the following items:—

- 1 Indicator, N.P.C., 500 + 500 ohms,  $\frac{5}{5}$ , 6''.
- 1 Switchspring, 5-point,  $\frac{5}{5}$ , 6''.
- 1 Key, Type H 3 (oval),  $\frac{5}{5}$ , 6''.
- 2 Switchsprings, 5-point, with brass socket.
- 1 Strip, Cross Connection, 5 × 4.
- 1 Generator, Bracket, 3 terminals, unmounted.
- 1 Bell, Trembler, 3 terminals, Circular, 25 ohms.
- 1 Switch, Tumbler, 3 ampères (bronzed).
- 4 Plates, Cord Connection.
- 1 Coil, Induction,  $\frac{150}{1}$ .
- 1 Suspender for Micro Telephone.
- 3 Plates, Trembler Bell Connection.

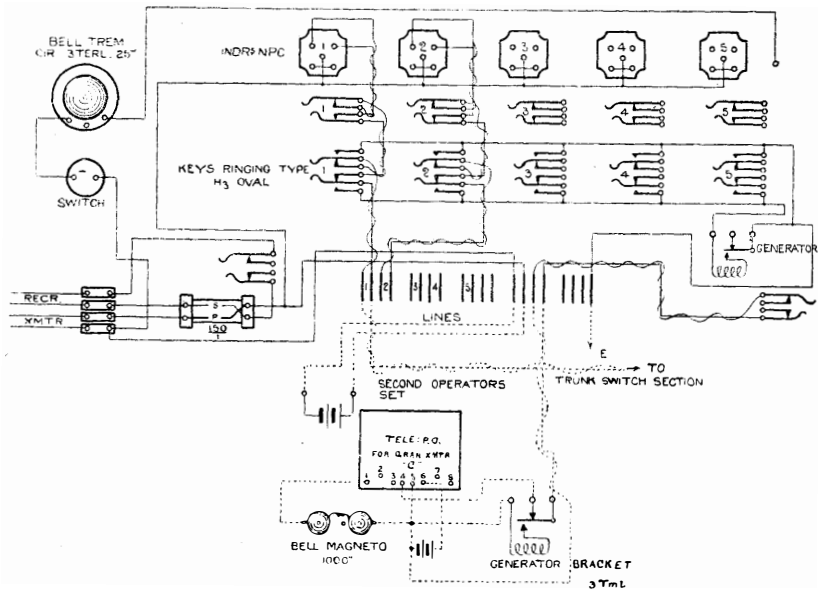


Plate 96.

## Plate 96—cont.

## SEPARATE ITEMS.

1 Telephone No. 28 (with hook).

1 Battery, Leclanché, Agglomerate, 6-block, 2-cell, No. 1, and the second operator's Complete Telephone Set as shown.

The dotted connections show the wiring that must be done locally.

If a circuit is associated with a local Switch Section, 50 Line, it should be terminated as an ordinary subscriber's line, and in this case the "B" side of the corresponding N.P.C. Indicator on the Magneto Switchboard should be earthed, and the inner "B" spring left disconnected. Terminal 3 of the P.O. Telephone (second operator's Set) should also be earthed.

These boards are made in three sizes, viz.:  $\frac{2+5}{7}$ ,  $\frac{4+7}{11}$ , and  $\frac{7+14}{21}$ , the dimensions being similar to those of Switchboards, Magneto, (C.B.S.), shown in Plate 53. The sizes indicate wiring for 2 Telephone Sets and 5 line circuits, 4 Telephone Sets and 7 line circuits, and 7 Telephone Sets and 14-line circuits respectively, including in each case the Switchboard Telephone as a Telephone Set. The term "line circuits" includes the Switch Section circuit. On the larger boards a Switch Telephone Connector is fitted, and a Breastplate Transmitter and Headgear Receiver, associated with Cords, Flexible, No. 206, and a Peg, Circular, Double, take the place of the Micro Telephone shown in this Plate.

In all cases the operator's and Telephone Sets are separate items, as are also the pairs of Pegs, No. 201, with Cords 16'', by means of which the connections between the sets and line circuits are made.

For a full description of the various arrangements and methods of operating, *see* Circular Telephones (100), Monthly List, September, 1905.



**Plate 97.****MISCELLANEOUS SWITCHES.**

The diagram shows the connections of the Switches in the various positions of the switch lever.

NAME OR TITLE	USE	E. IN. C. DRAWING No	CONNECTIONS IN POSITIONS				SIZE
			1	2	3	4	
SWITCH 5 TERMINAL 4 POSITION	TESTING STATIONS ON PARIS TELEPHONE LINE	II 26					5 1/2
" 7 " 2 " A	CALL OFFICE TELEPHONES	IV 66					4
" 8 " 3	BRIDGE INTER:	II 29					5 3/4
" 8 " 3	BRIDGE INTER (OLD PATTERN)						5 3/4

NAME OR TITLE	USE	E. IN. C. DRAWING No	CONNECTIONS IN POSITIONS				SIZE
			1	2	3	4	
SWITCH 9 TERMINAL 2 POSITION		810					4
" 10 " 2	EXCHANGE INTER (OLD PATTERN)	II 16					5 3/4
" 11 " 2 "	EXCHANGE INTER	II 29					5 3/4
" 4 " 3 "	DAY AND NIGHT						4 7/8 x 4 5/8

Plate 97.

**Plate 98.**

T.L. Diagram No. 53B.

**TYPES OF UNION KEYS.**

The Ebonite Barrel moves forward and presses against the Contact Springs when the key-handle is pushed back, and *vice versâ*. The diagrams provide for the Keys being pushed back to complete the "Speaking" connections, but the position of the Keys can be reversed, if required.

Column 1 shows the springs as viewed from the Key Plates.

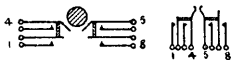
Column 2 shows the theoretical connections as represented on diagrams.

The numbers show the corresponding Springs in the two cases.

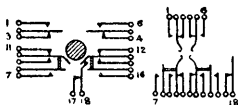
COLUMN 1      COLUMN 2



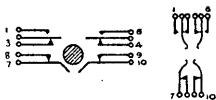
KEY TYPE U<sub>1</sub>  
(BLACK RED OR GREEN)



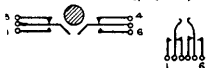
KEY TYPE U<sub>2</sub>  
(BLACK OR GREY.)



KEY TYPE U<sub>3</sub>  
(BLACK)

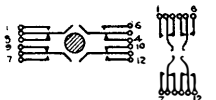


KEY TYPE U<sub>4</sub> (RED)

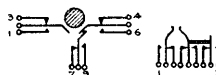


KEY TYPE U<sub>5</sub> (BLACK)

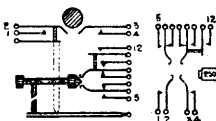
COLUMN 1      COLUMN 2



KEY TYPE U<sub>11</sub>  
(BLACK)

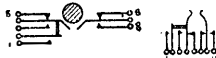


KEY TYPE U<sub>12</sub>  
(BLACK)



KEY TYPE U<sub>13</sub>

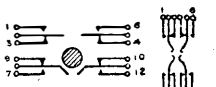
COLUMN 1      COLUMN 2



KEY TYPE U<sub>6</sub> (BLACK)



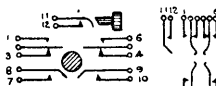
KEY TYPE U<sub>7</sub> (BLACK)



KEY TYPE U<sub>8</sub> (RED)



KEY TYPE U<sub>9</sub> (BLACK OR RED)

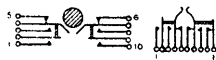


KEY TYPE U<sub>10</sub> (BLACK)

COLUMN 1      COLUMN 2



KEY TYPE U<sub>14</sub>



KEY TYPE U<sub>15</sub>



KEY TYPE U<sub>16</sub>



PART VI.—TABLES.

SECTION 1.

OPERATING CURRENTS  
OF INDICATORS, RELAYS, &c.

OPERATING PARTICULARS OF SOME OF THE TELEPHONE  
INDICATORS, RELAYS, &C., IN COMMON USE.

Title.	Resistance.	Figures of Merit in Milliampères.
<b>Indicators :—</b>		
Type 34 - - -	$1,000\omega$	7·5
" 34D - - -	$500\omega$	9
" 34B - - -	$300\omega$	12
" 39 - - -	$1,000\omega + 1,000\omega$	10 (through 1 coil).
" 41B - - -	$100\omega + 100\omega$	15 (coils in series).
" 6A - - -	$33\omega$ (50 $\omega$ with $500\omega$ shunt).	20
" 22A - - -	$600\omega + 45\omega$	7·5 (line coil). 40 (restoring coil).
Self-restoring -	$1,000\omega + 450\omega$	5 (line coil), 20 (restoring coil).
Switchspring, Type H 1.	$1,000\omega$	8
Switchspring, Type H 2.	$500\omega + 500\omega$	8 (coils in series).
Polarised No. 2 -	$1,000\omega$	3 (holds shutter up).
Non-polarised -	$100\omega$	11·5
" - - -	$1,000\omega$	5
" C. - - -	$500\omega + 500\omega$	6 (coils in series).
Galvanometer, Tele- phone Exchange.	$500\omega + 500\omega$	3 " "
<b>Relays :—</b>		
E 1 - - -	$50\omega + 50\omega$	12 " "
" - - -	$100\omega + 100\omega$	9 " "
" - - -	$200\omega + 200\omega$	6 " "
" - - -	$500\omega + 500\omega$	4 " "
" - - -	$1,000\omega + 1,000\omega$	3 " "
" - - -	$4,000\omega$	1·5
E 2 - - -	$500\omega + 500\omega$	3 (coils in series).
F - - -	$100\omega$	6
.. - - -	$1,000\omega$	2

H 1	-	-	-	$5\omega + 5\omega$	30 (coils in series).
"	-	-	-	$100\omega + 100\omega$	9 " "
"	-	-	-	$500\omega + 500\omega$	4 " "
"	-	-	-	$1,000\omega + 1,000\omega$	2.5 " "
"	-	-	-	$1,800\omega + 3,000\omega$	2.5 " "
					3 (1,800 $\omega$ coil),
					20 (3,000 $\omega$ coil
					platinoid wind-
					ing).
H 3	-	-	-	$60\omega$	12
H 4	-	-	-	$30\omega$	38
I polarised	-	-	-	$500\omega + 500\omega$	2 (coils in series).
I non-polarised	-	-	-	$500\omega + 500\omega$	2 " "



OPERATING PARTICULARS OF SOME OF THE TELEPHONE INDICATORS, &c.—*cont.*

Title.	Resistance.	Operating Current in Milliampères.	Releasing Current in Milliampères.	Remarks.
Relay:—				
Type 101J -	60 $\omega$	20	2	Line Relay C.B.
.. 111C -	30 $\omega$	73	63	Cut-off Relay C.B.
.. 118AG -	0.45 $\omega$	80	23	Pilot " "
.. 118AE -	12.5 $\omega$	15	3	Cord circuits, C.B. Ex.
.. 107G -	200 $\omega$ + 200 $\omega$	22 (Inner winding). 20 (Outer winding).	19.5 18	Tripping Relay machine ringing.
.. 108D -	12,000 $\omega$ + 27 $\omega$	1.5 (12,000 $\omega$ coil). 27 (27 $\omega$ coil)	0.4 7	
.. 122AB -	350 $\omega$	26	9	" "
.. 122E -	83.5 $\omega$	57	50	" "
.. 2001B -	200 $\omega$ + 200 $\omega$	12	—	Private Branch Ex. Swbds., C.B.
Meters:—				
Type 5A -	500 $\omega$ + 40 $\omega$	40	37	Subscribers.
.. 5B -	0.25 $\omega$	1.1 ampère	1 ampère (will not operate).	Effective Meter.
.. 5C -	500 $\omega$	40 milliampères	37 milli-amps. (will not operate).	Ineffective Meter.
Relays G 100A and G 101A.	200 $\omega$ + 200 $\omega$	18 milliampères	3.5	General Electric Coy.'s Line and Supervisory Relays.

OPERATING PARTICULARS OF SOME OF THE TELEPHONE INDICATORS, &c.—*cont.*

Title.	Resistance.	Operating Current in Milliampères.	Time.	Remarks.
Heat Coils A (green)	4·5 $\omega$ to 5·5 $\omega$	500	15 to 60 secs.	{ Standard type for all telephone circuits, and all telegraph circuits except C.B. and A.B.C.
„ B (red) -	3·5 $\omega$ to 4·1 $\omega$	500	Less than 210 secs.	
„ A (blue) -	13 $\omega$ to 16 $\omega$	250	15 to 60 secs.	{ Standard type for C.B. and A.B.C. telegraph circuits.
„ B (black)	28·5 $\omega$ to 31·5 $\omega$	170	Less than 210 secs.	
„ A (black)	25 $\omega$	250	30 secs.	
„ A (red) -	7·5 $\omega$ to 8·5 $\omega$	500	15 to 60 secs.	

It is important that the same type of Heat Coil should be fitted on both wires of telephone circuits.



SECTION 2.  
SWITCHBOARD CABLES.

## SWITCHBOARD CABLES, $\frac{N}{W}$ .

Two insulated conductors of the particular colours indicated to be symmetrically twisted together with a 3-inch right-hand lay except where otherwise required.

The cables are to be of the section and dimensions hereinafter indicated, and to be formed of cores laid up as described. The paired conductors to be laid up in the cores with an 8-inch left-handed lay.

A 21-wire round cable to consist of 21 singles, the differently coloured conductors as shown in column 1, or the differently coloured conductors as shown in column 3, as may be demanded, laid up in one core.

A 42-wire oval cable to consist of 21 pairs; the differently coloured conductors as shown in column 1 paired with white.

The cable to consist of three cores laid side by side, each core formed of seven pairs as follows:—pairs 1 to 7 inclusive laid up in one core, pairs 8 to 14 inclusive in the second core, and pairs 15 to 21 inclusive in the third core.

A 63-wire oval cable to consist of 21 pairs, the differently coloured conductors as shown in column 1 paired with white, and 21 singles, the differently coloured conductors threaded with red as shown in column 3.

The cable to consist of three cores laid side by side, arranged as follows:—pairs 1 to 11 inclusive laid up in one core, and pairs 12 to 21 inclusive in another core, and between these is to be placed a core made up of the 21 singles.

An 84-wire oval cable to consist of 42 pairs, as follows:—the 21 differently coloured conductors,

as shown in column 1, paired with white, and the 21 differently coloured conductors threaded with red, as shown in column 3, paired with red.

The cable to consist of all the pairs laid up in one core in such a manner that the red conductors come in the centre of the cable.

A 63-wire flat cable, to consist of 21 triplets, the coloured conductors, as shown in column 1, and the correspondingly coloured conductors, threaded with red, as shown in column 3, to be twisted together with a white conductor so as to form the triplets. The triplets so formed to be laid up round a press board tape 1 inch by  $\cdot 02$  inch, so as to form a single flat core.

**Table I.**

DIAMETER AND RESISTANCE OF CONDUCTORS.

Weight per Mile of Conductor.	Diameter.		Maximum Resistance per Statute Mile of Cable at 60° F.
	Minimum.	Maximum.	
Lbs.	Mils.	Mils.	Standard ohms.
9 $\frac{1}{4}$	23 $\frac{1}{2}$	24 $\frac{1}{2}$	95·87
12 $\frac{1}{2}$	27 $\frac{1}{2}$	28 $\frac{1}{2}$	70·96

NOTE.—To allow for variation of gauge and the tinning, the maximum resistance here specified is 3 per cent. higher than that of a pure copper wire of the standard weight.

Table II.

## EXTERNAL DIMENSIONS OF CABLES.

Type of Cable.	For Cables containing $9\frac{1}{4}$ lb. Conductors. (S.W.G. No. 23.)			For Cables containing $12\frac{1}{2}$ lb. Conductors.		
	Maximum Width.	Maximum Thickness.	Maximum Girth.	Maximum Width.	Maximum Thickness.	Maximum Girth.
	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.
42-wire oval	·750	·350	1·900	·800	·400	2·150
63-wire oval	·820	·420	2·250	·900	·500	2·500
84-wire oval	·900	·550	2·500	1·000	·600	2·850
63-wire flat	1·250	·320	3·000	—	—	—
21-wire round	—	Diameter. ·400	—	—	—	—



Table III.

## COLOUR SCHEME OF SWITCHBOARD CABLES.

Pairs.		Pairs.	
Col. 1.	Col. 2.	Col. 3.	Col. 4.
1 Blue - -	White.	22 Red Blue - -	Red.
2 Orange - -	..	23 Red Orange - -	..
3 Green - -	..	24 Red Green - -	..
4 Brown - -	..	25 Red Brown - -	..
5 Slate - -	..	26 Red Slate - -	..
6 Blue White - -	..	27 Red Blue White - -	..
7 Blue Orange - -	..	28 Red Blue Orange - -	..
8 Blue Green - -	..	29 Red Blue Green - -	..
9 Blue Brown - -	..	30 Red Blue Brown - -	..
10 Blue Slate - -	..	31 Red Blue Slate - -	..
11 Orange White - -	..	32 Red Orange White - -	..
12 Orange Green - -	..	33 Red Orange Green - -	..
13 Orange Brown - -	..	34 Red Orange Brown - -	..
14 Orange Slate - -	..	35 Red Orange Slate - -	..
15 Green White - -	..	36 Red Green White - -	..
16 Green Brown - -	..	37 Red Green Brown - -	..
17 Green Slate - -	..	38 Red Green Slate - -	..
18 Brown White - -	..	39 Red Brown White - -	..
19 Brown Slate - -	..	40 Red Brown Slate - -	..
20 Slate White - -	..	41 Red Slate White - -	..
21 Red - -	..	42 Red White - -	..

Columns 1, 2, 3, and 4 make an 84-wire cable.

Columns 1, 2, and 3 make a 63-wire cable.

Columns 1 and 2 make a 42-wire cable.

Column 1 or column 3 makes a 21-wire cable.

## LIST OF TELEPHONES.

The following list gives the designations of all Telephones stocked by the Department, and includes also the titles under which the sets were previously known. In addition each Instrument has a "Mark" Number which designates the exact details of its construction, and which does not form part of the stock title.

Odd numbers have been allocated to Wall Telephones and even numbers to Table Telephones. The original titles have been retained on the plates, but the new designations are quoted in the letterpress for the purpose of identification.

### *Wall Telephones.*

Title.	Previous Title.
Telephone—	
No. 1 - -	Telephone, Wall, C.B., complete.
No. 1 incomplete	Telephone, Wall, C.B.
No. 3 - -	Telephone, Wall, with Magneto Bell, complete.
No. 3 incomplete	Telephone, Wall, with Magneto Bell.
No. 3 - -	Telephone, Wall, with Magneto Bell, Type 2, complete.
No. 3 incomplete	Telephone, Wall, with Magnetic Bell Type 2.
No. 5 - -	Telephone, Wall, C.B., intermediate with Generator, complete.
No. 5 incomplete	Telephone, Wall, C.B. intermediate with Generator.
No. 7 incomplete	Telephone, Wall, C.B., with Rotary Key.
No. 7 - -	Telephone, Wall, C.B., with Rotary Key, complete.
No. 9 incomplete	Telephone, Wall, C.B., party line.
No. 9 - -	Telephone, Wall, C.B., party line, complete.
No. 11 incomplete	Telephone, Wall, with Magneto Bell and Generator.

Title.	Previous Title.
Telephone— <i>cont.</i>	
No. 11 - -	Telephone, Wall, with Magneto Bell and Generator, complete.
No. 11 incomplete	Telephone, Wall, with Magneto Bell and Generator, Type 2.
No. 11 - -	Telephone, Wall, with Magneto Bell and Generator, Type 2, complete.
No. 13 incomplete	Telephone, Wall, Intermediate, with Magneto Bell and Generator.
No. 13 - -	Telephone, Wall, Intermediate, with Magneto Bell and Generator, complete.
No. 13 incomplete	Telephone, Wall, Intermediate, with Magneto Bell and Generator, Type 2.
No. 13 - -	Telephone, Wall, Intermediate, with Magneto Bell and Generator, Type 2, complete.
No. 15 incomplete	Telephone, Wall, Intermediate, with Magneto and Trembler Bells and Generator.
No. 15 - -	Telephone, Wall, Intermediate, with Magneto and Trembler Bells and Generator, complete.
No. 15 incomplete	Telephone, Wall, Intermediate, with Magneto and Trembler Bells and Generator, Type 2.
No. 15 - -	Telephone, Wall, Intermediate, with Magneto and Trembler Bells and Generator, Type 2, complete.
No. 17 incomplete	Telephone, P.O., G.T.A.
No. 17 - -	Telephone, P.O., G.T.A., complete.
No. 19 incomplete	Telephone, P.O., G.T.B.
No. 19 - -	Telephone, P.O., G.T.B., complete.
No. 21 incomplete	Telephone, P.O., G.T.C.
No. 21 - -	Telephone, P.O., G.T.C., complete.
No. 21 incomplete	Telephone, P.O., with Inset Transmitter.
No. 21 - -	Telephone, P.O., with Inset Transmitter, complete.
No. 23 - -	Telephone, P.O., with Magneto Bell.
No. 25 - -	Telephone, P.O., with Magneto Bell and Generator.

Title.	Previous Title.
Telephone— <i>cont.</i>	
No. 27 - -	Telephone, G.B., incomplete, House for S.R.
No. 29 - -	Telephone, House, Wall, 3-terminal.
No. 31 - -	Telephone, House, Wall, 4-terminal.
No. 33 - -	Telephone, House, Wall, Intercommunication, 5-way.
No. 35 - -	Telephone, House, Wall, Intercommunication, 10-way.
No. 37 - -	Telephone, House, Wall, Intercommunication, Secret 1-way.
No. 39 - -	Telephone, House, Wall, Intercommunication, Secret 5-way.
No. 41 - -	Telephone, House, Wall, Intercommunication, Secret 10-way.
No. 43 - -	Telephone, House, Wall, Intercommunication, Secret 15-way.
No. 45 - -	Telephone, House, Wall, Intercommunication, Secret 20-way.
No. 47 - -	Telephone, Fire, P.O.

### *Table Telephones.*

Telephone—	
No. 2 incomplete	Telephone, Table, C.B., Transmitter type, Types 20 and 2602.
No. 2 - -	Telephone, Table, C.B., Transmitter type, Types 20 and 2602, complete.
No. 4 incomplete	Telephone, Table, P.B., Transmitter type.
No. 4 - -	Telephone, Table, P.B., Transmitter type, complete.
No. 6 incomplete	Telephone, Table, C.B., Transmitter type, Intermediate with Generator.
No. 6 - -	Telephone, Table, C.B., Transmitter type, intermediate with Generator, complete.
No. 8 incomplete	Telephone, Table, C.B., Intermediate with Generator.
No. 8 - -	Telephone, Table, C.B., Intermediate with Generator, complete.

Title.	Previous Title.
Telephone— <i>cont.</i>	
No. 10 incomplete	Telephone, Table, C.B., Transmitter type, with Press Button.
No. 10 - - -	Telephone, Table, C.B., Transmitter type, with Press Button, complete.
No. 12 incomplete	Telephone, Table, C.B., Micro type.
No. 12 - - -	Telephone, Table, C.B., Micro type, complete.
No. 14 incomplete	Telephone, Table, Transmitter type, with Generator.
No. 14 - - -	Telephone, Table, Transmitter type, with Generator, complete.
No. 16 incomplete	Telephone, Table, with Generator B.
No. 16 - - -	Telephone, Table, with Generator B, complete.
No. 18 incomplete	Telephone, Table, with Generator.
No. 18 - - -	Telephone, Table, with Generator, complete.
No. 20 incomplete	Telephone, Table, with Tumbler Bell A.
No. 20 - - -	Telephone, Table, with Tumbler Bell A, complete.
No. 22 incomplete	Telephone, Table, with Tumbler Bell B.
No. 22 - - -	Telephone, Table, with Tumbler Bell B, complete.
No. 24 incomplete	Telephone, Table, without Bell.
No. 24 - - -	Telephone, Table, without Bell, complete.
No. 26 incomplete	Telephone, Table, with Magneto Bell.
No. 26 - - -	Telephone, Table, with Magneto Bell, complete.
No. 28 - - -	Telephone, Micro.
No. 28 (with loop)	Telephone, Micro, with loop suspension.
No. 28 (with hook)	Telephone, Micro, with hook suspension.
No. 30 - - -	Telephone, Micro, House, with Press Key.
No. 32 - - -	Telephone, Micro, House, without Press Key.
No. 34 - - -	Telephone, Micro, with 3-contact Key (for Telephone No. 42).

Title.	Previous Title.
<i>Telephone--cont.</i>	
No. 36 - -	Telephone, Micro, with 3-contact Key (for Telephone No. 44).
No. 38 - -	Telephone, Micro, C.B.
No. 38 (with hook)	Telephone, Micro, C.B., with hook.
No. 40 incomplete	Telephone, Micro, P.O., incomplete.
No. 42 - -	Telephone, Portable, complete.
No. 44 - -	Telephone, Portable, complete, Type 2.
No. 46 - -	Telephone, House, Table, 3-terminal.
No. 48 - -	Telephone, House, Table, 4-terminal.
No. 50 - -	Telephone, House, Table, Intercommunication, 5-way.
No. 52 - -	Telephone, House, Table, Intercommunication, 10-way.
No. 54 - -	Telephone, House, Table, Intercommunication, Secret 1-way.
No. 56 - -	Telephone, House, Table, Intercommunication, Secret 5-way.
No. 58 - -	Telephone, House, Table, Intercommunication, Secret 10-way.
No. 60 - -	Telephone, House, Table, Intercommunication, Secret 15-way.
No. 62 - -	Telephone, House, Table, Intercommunication, Secret 20-way.
No. 64 - -	Adjustaphone, C.B., complete.
No. 66 - -	Telephone, Micro, Portable, complete.