

**KELLOGG SWITCHBOARD AND SUPPLY COMPANY  
CHICAGO, ILLINOIS**



**Kellogg Bulletin 39  
1908**

**Push Button Intercommunicating  
Telephones**

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# Kellogg Switchboard and Supply Company

Chicago

Push Button  
Intercommunicating  
Telephones

INTER. C. TEL.

THE  
KELLOGG SWITCHBOARD &  
SUPPLY COMPANY  
CHICAGO



New Push Button Intercommunicating Telephone System is as valuable a time saver in the home as in the office.

It is a business systematizer without equal for use in Stores, Warehouses, Factories, Mills, Residences, Schools, Libraries, Hospitals, all public buildings.

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## KELLOGG INTERCOMMUNICATING SYSTEMS



Fig. 1

The new wall type Intercommunicating Telephone  
Twenty-three Station Size

With the ever increasing demand on the factory manager for system and reduction of waste, the telephone is coming into great favor. Today all progressive business houses are equipping their plants with private exchanges for interconnecting the various departments.

Such equipment gives an almost instantaneous means of directing the whole business force and provides a certain way of getting immediate answers to any of the questions that may arise between departments in a busy day.

This effectiveness of the telephone, so greatly appreciated in a business house, is attracting attention in other lines, and with the improvements made by the Kellogg Company in a system espe-

cially designed for intercommunication, it is considered good economy to equip hospitals, schools, libraries, apartments and residences with telephones in the different rooms, or between floors or departments. The amount of time this saves and the satisfaction derived is best appreciated by those who have installed the Kellogg system.

Where the number of calls per day is so great as to justify an operator, a private switchboard is commonly used, but in many cases the need of an operator would prohibit the use of a private telephone plant, and it is for the purpose of getting the best communication between different stations in a building without an operator that the Intercommunicating system has been designed.

The Growing  
Demand for  
Inter-  
communicating  
Telephone  
Systems

No Operator  
Required

## PUSH BUTTON INTERCOMMUNICATING TELEPHONES

In brief, the intercommunicating system requires the following elements: A telephone set for each station, provided with a key or jack for every other station to be communicated with; battery to supply talking and ringing current; and wires to connect stations. A pair of wires per key made into a cable has proven most satisfactory.

Essential  
Elements

From this it appears that we have two types or systems, those using jacks and plugs for connections and those employing keys for this purpose. The Kellogg Company has been making a high-grade system of the jack and plug type for some years (Bulletin No. 15), but is now supplying the perfected New Key Type Intercommunicating System.

The Most  
Popular  
Types

### THE NEW KELLOGG KEY TYPE INTERCOMMUNICATING SYSTEM

The new system is manufactured in two standard styles—Wall Set and Desk Set. Each of these can be furnished in two sizes containing twelve and twenty-four keys, respectively. The twelve-key size (Figures 3 and 9) can be used for any number of stations to an ultimate of eleven, and the twenty-four key size (Fig. 1) for an ultimate of twenty-three stations; one of the keys having a green button, being for the purpose of ringing the bell of the desired station.

Two Standard  
Styles  
Manufactured  
by  
Kellogg  
Company

Fig. 1 shows the external appearance of the wall set, which is neat, compact and very accessible. A card holder or designation strip is placed at each key. Into this strip a card may be inserted, giving the name of the party who will be called by depressing this button. By removing the cover in front, as illustrated (Fig. 2), every piece of apparatus is in plain sight and easily accessible.

Simplicity  
and  
Accessibility

The Desk Set uses the standard Kellogg desk stand with a key box; this style (as shown in Fig. 3), because of its convenience and elegance, is preferred in many cases. A view of this key box (Fig. 4) with cover removed (Fig. 5) shows it to be just as accessible as the wall set.

Convenience

It will be seen that the same key unit is used in both styles. In this set a buzzer is provided in place of the bell of the wall set, mounted on a neat oak base equipped with the proper binding posts as shown (Fig. 6).

Both the wall and desk sets have been designed for hard service and the usual careful work has been placed on these instruments. The talking circuit is exactly the same as that of our telephones used in the largest exchanges and is alike for both style of sets; wall sets can be used indiscriminately with the desk sets in the same system.

Both Styles  
Equally  
Reliable and  
Interchange-  
able

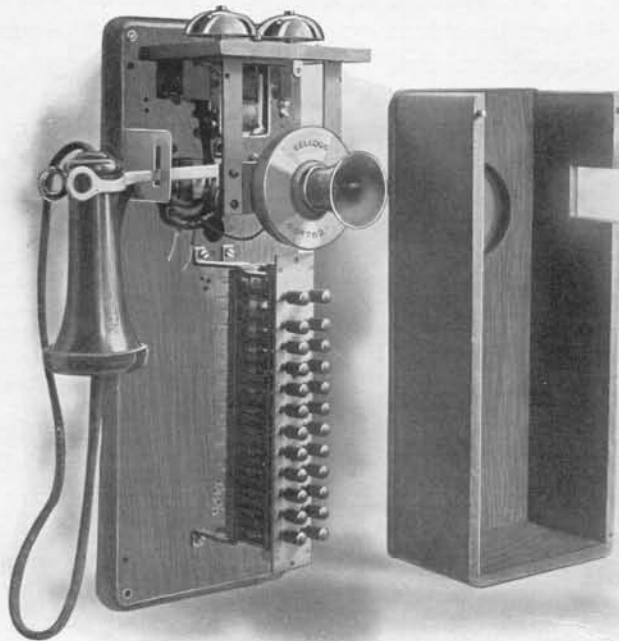


Fig. 2

Twenty-three station wall set, cover removed—very compact

System  
Simple to  
Apply

To equip a factory or building with this system is a simple matter. First determine the number of stations required with possible additions, and the number of each style—desk and wall. This will show whether the twelve or twenty-four-key size is most suitable. The distance between stations will give an idea as to the number of feet of cable required; also the battery necessary, which varies from nine to fifteen dry cells.

No  
Inductive  
Disturbance

Talking battery is fed through retardation coils and one coil is provided for each pair of wires running to the first station from the battery. These coils prevent inductive interference or cross-talk between lines. Fig. 7 shows a strip with one coil exposed.

Readily  
Changed for  
Trunk Service

Sometimes it is desirable to be able to talk direct from the Intercommunicating system to any city subscriber. This is easily arranged. Provision has been made in all the sets, so that two of the keys in the twelve-key and four in the twenty-four-key size can be used for trunk service.

## PUSH BUTTON INTERCOMMUNICATING TELEPHONES

In case trunks to a city office are used, one of the stations designated "The Attendant's Station" answers incoming calls for parties in the Intercommunicating System. An extension bell at the Attendant's Station is necessary for each trunk. For the proper supervision of calls an Attendant's Station Box is required. This is shown in Fig. 8.

### OPERATION

Operation of the Kellogg Key Type Intercommunicating System is simple and direct; press the button corresponding to the desired station, then push the green button, which rings the bell of the desired station. This is shown in Fig. 9—an eleven line wall set in operation. In answering a call at any station all that is necessary is to press the red button and remove the receiver from the hook in the regular manner. The same simplicity holds in case of calls over the trunk line to the city exchange.

When the extension bell rings at the Attendant's Station, the person at that station presses the trunk button and learns from the calling city subscriber the name of the desired party. The called station is rung in the usual way as described above. If the party cannot be obtained the Attendant's Station replies to that effect, hangs up the receiver and presses the disconnect push button in the Attendant's Station. The mechanical signal indicates when the called station has answered the city subscriber.

### DESCRIPTION OF PARTS

It is a recognized fact that in order to get the same reliable and efficient service from an Intercommunicating System, as from the best city exchanges, the apparatus employed must be of the same standard of excellence. The Kellogg Company has in the design of this system made constant effort to employ as much of its standard apparatus as possible, the excellence of which is undenied. Where special parts are necessary they are of the same grade of perfection.

The telephone boxes are simple in outline, present a neat and handsome appearance, are compact and of few parts; very durable and substantial. The apparatus is mounted in a convenient and accessible manner so that when the box is opened all the working parts are exposed for inspection and repair.

The woodwork used is taken from extra selected stock thoroughly seasoned. All oak employed is quarter-sawed and the hand-rubbed varnish finish is of such character that it will not show ordinary wear.

Instantaneous  
Operation

Simple  
Trunk  
Line  
Operation

Importance of  
High Grade  
Apparatus in  
Inter-  
communicating  
Systems

Woodwork

Transmitter



Receiver

Fig. 3

The new Kellogg desk set Intercommunicating system in operation  
Eleven Station Size

Hookswitch

The hook switch is our latest long lever self contained type. The springs are of the best grade of German silver, with platinum contacts. It is strong and positive in its operation, and the particular design of the platinum points gives dust proof contact.

Coils

The Retardation coils are standard coils used in large numbers and are thoroughly efficient.

Condensers

The Condensers are carefully designed and tested; they are the standard Kellogg product.

Ringers

The direct current vibrating bell used in the wall set is thoroughly dependable and will operate with small battery consumption.

Keys

The Keys are assembled into a Key unit, making the construction self-contained and rigid with no possibility of the individual parts getting out of adjustment. The same unit is used in both wall and desk sets.

Key  
Construction  
and Marking

The individual keys are of the same grade of material and workmanship as our standard switchboard keys. The first two keys at the top in the 12-size and the first four in the 24-size unit, have extra springs so that one or all may be used for trunk service if desired. These keys have the letters X and Y stamped opposite the extra springs.

The transmitter, which is the vital part of any telephone, is the regular Kellogg long distance transmitter, the recognized standard since 1901. Years of hard service under most trying conditions give it a reputation which is unapproached for reliability and long life.

The receiver is the standard Kellogg, used in the largest independent exchanges in the country.

The hook switch is our latest long



## PUSH BUTTON INTERCOMMUNICATING TELEPHONES

All keys except the one used for answering (home station key) and the ringing key are provided with black buttons. The button of this home station key is red and that of the ringing key, green.

The connecting keys are automatically locking, i. e., when any button is depressed the key remains in that position. Only the pressing of another connecting button can release it. The pressing of the ringing button does not restore other keys and it is non-locking.

Only one key, that with the green button, can ring other stations, and this prevents the unpleasant annoyance of false ringing, as may be the case where every key is also a ringing key, there being some temptation for those who pass by to press the buttons to "see how they work." The separate ringing key also simplifies the construction and wiring of the individual keys.

The Desk Stand (shown in operation in Fig. 3) is our new type Kellogg Indestructible Stand, which we are furnishing to the regular telephone trade, and is unsurpassed in strength, neatness, reliability and durability.

The Desk Set box (Fig. 6) which is used with the Desk Stand consists of a finely finished oak base, with buzzer and our standard nickel plated binding posts.

The Key box is attractive and of the same finish as the wall set. The special design makes it possible to quickly get at the keys for inspection or repairs. The Key unit is identically the same as used in the wall set. This Key box can be operated in either a vertical or horizontal position or changed as desired as it need not be permanently attached to a desk or table.

The extension bell used for receiving trunk calls is the same as used on our regular common battery telephone lines. It contains the usual ringer and condenser, and corresponds in finish with the remainder of the equipment.

The Attendant's Station box (Fig. 8) consists of a neat small oak cabinet of standard finish. It is large enough to contain the supervisory equipment for two trunk lines which consist of one mechanical signal, one relay, one condenser and a push button per trunk.



Fig. 4

Eleven station size, desk set key box, showing arrangement of key buttons and station name slips

Automatic  
Locking

Non-  
Interference

Desk Stand

Desk Set  
Box

Key Box

Extension  
Bell

Attendant's  
Station  
Box

The individual parts of the Kellogg Intercommunicating System are made to work one with the other; are carefully and neatly assembled and thoroughly tested before shipping.

INSTALLATION

Assembling  
of Sets



Fig. 5

Eleven station desk set key box with cover removed—very accessible

The wall sets after being mounted in their respective places are complete after connecting the receiver cord terminals to the binding posts. The desk set is complete after connecting the receiver cord to the posts in base of desk stand and connecting the four conductor cord to the desk set box containing the buzzer.

Where an Attendant's Station is required, the Attendant's Station box should be placed so that the

signal can be readily seen and the push button easily reached. The extension bell may be located at any convenient place.

Wiring

The wiring between stations is done by means of cables consisting of twisted pair wires, preferably No. 22 B. & S. gauge, but in case the distance between the first and last station is short No. 24 B. & S. gauge may be used. Where the places wired are at all damp, moisture proof cable must be used, otherwise standard switchboard cable is sufficient.

Besides the pair of wires for each station and one extra for emergency, two pairs should be provided to carry the ringing current, the two similar wires of a pair being connected in multiple for this purpose. The wires having solid colors are connected to the tip side of the keys; those with a white tracer to the sleeve.

The number of dry cells required is given in the following table:

	No. of Dry cells for talking	For Ringing	Total
11 Stations, with 1,000 ft. cable.....	3	6	9
11 Stations, with 2,000 ft. cable.....	4	7	11
23 Stations, with 1,000 ft. cable.....	6	6	12
23 Stations, with 2,000 ft. cable.....	8	7	15

## PUSH BUTTON INTERCOMMUNICATING TELEPHONES

The cells should be connected in series; that is, the zinc of one to the carbon of the next. In the 23 station size the talking battery should be connected in multiple in two groups, each group having an equal number of cells connected in series.

The batteries should be placed in a location which is dry and of fairly even temperature. A place near the first station is desirable.

A pair of wires is run from the talking battery to the retardation coils, there being one coil per line. These coils have two windings through which battery is fed to the instruments for talking. Care must be taken in connecting up these coils, to see that when current is flowing out over the line and hence through both coils, the magnetism is not neutralized.

A pair of wires also carries current from the ringing battery to the strip of retardation coils at which point they are spliced to the ringing leads in the cable extending to all the stations. The two solid colored wires being spliced to the conductor attached to the carbon, the other two being spliced to the conductor fastened to the zinc.

From the tip and sleeve side of the retardation coils the cable is carried to the tip and sleeve side of the keys at the first station and then multiplied to all other stations. All corresponding keys have the same colored wires of the cable connected to them in the same manner. The wires of the different cables, having same colors are connected together whenever one forms a branch of the other.

To facilitate and improve the work of branching the cables it is desirable to use a terminal strip. The wires of a cable being soldered to this strip at the junction point, allows other cables to be conveniently tapped on and in case of trouble, gives a convenient point at which to open the cable and test.

Where trunks are used the trunk lines are wired to the T and S posts of the extension bell and from there to the similarly marked posts on the Attendant's Station box. From the posts stamped X and Y on this box, wires are run to the springs stamped X and Y on the corresponding trunk key, and the tip and sleeve wires are connected to the corresponding springs of the same key.

In the desk set four wires are required between the desk set box (buzzer) and the keys. Wires from the posts stamped 3 and 4 are connected to spring stamped D and C of the home key, respectively. Wire from post R is connected to the tip of the home key and that from post 1 to the spring of the ringing key, stamped + battery.



Fig. 6

Assembling of Batteries

Connecting of Coils

Point at Which Ringing Battery Leads Connect to Cable

Connecting of Keys

Use of Terminal Strips

Connecting of Attendant's Station

Connection of Desk Set Box

The complete marking of the different terminals enumerated above, together with the complete set of instructions and circuit drawings furnished with our systems, makes it easy to install them.

### METHOD OF OPERATION

Without  
Trunk  
Lines

When one station desires connection with another the button corresponding with the station desired is depressed until key locks. The green button is then pressed. This puts negative ringing battery out on the tip side of the line through the bell of the desired station, through the switch hook and then to the positive side of the ringing battery. The party answering the call depresses the home station or red button till the key locks. This connects the telephone set of the called instrument to the line and as soon as the receiver is lifted from the hook, the two stations are connected together for conversation. The battery furnished from the battery feed retardation coils supplies current for the transmitters. When the receivers are off the hook, the bells are disconnected from the line so that the stations in this condition cannot be called. When conversation is finished it is not necessary to restore the connecting keys to their normal positions as the act of hanging up the receivers puts the apparatus in position to be called.

With  
Trunk  
Lines

When a trunk bell rings, the attendant in answering will depress the corresponding button till key locks. This connects the attendant's talking apparatus to the trunk and also bridges a mechanical signal across the line, thus holding the trunk connection, and preventing the disconnect signal from being given at Central without regard to the position of the attendant's receiver. After ascertaining what station is wanted, the attendant will call it in the usual manner and tell them to go in on the proper trunk at their station. As soon as the called station removes the receiver from the hook, the mechanical signal at the attendant's station will be restored, thus notifying

the attendant that the connection is completed and nothing further is required of him. If it is not possible to reach the party called, after notifying the calling party to that effect, the attendant will press the push button in the Attendant's Station box, which will restore the mechanical signal to its normal position, and give the disconnect signal at the central office.

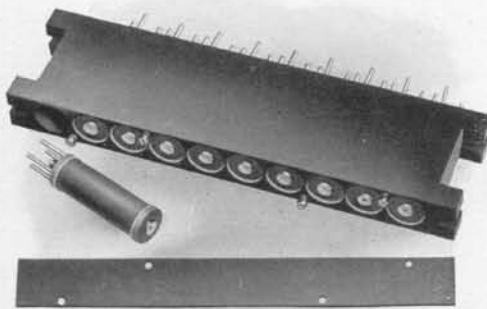


Fig. 7

## PUSH BUTTON INTERCOMMUNICATING TELEPHONES

When one of the stations desires a connection with a central office line, the corresponding trunk key is depressed and the receiver removed from the hook. If the trunk is not busy, this act will operate the signal at the exchange. Nothing is required of the attendant for outgoing trunk calls.



Fig. 8  
Attendant station box

### CODE NUMBERS OF INTERCOMMUNICATING SETS

#### SETS USED AT REGULAR STATIONS

Code 100, Wall Set for 11 stations.  
 " 104, Desk " " 11 "  
 " 102, Wall " " 23 "  
 " 106, Desk " " 23 "

#### SETS USED AT ATTENDANT'S STATIONS

Code 101, Wall Set for 10 stations and 1 Common Battery Trunk Line.

	9	"	"	2	"	"	"	"
" 105, Desk	"	"	10	"	"	1	"	"
	9	"	"	2	"	"	"	"
" 103, Wall	"	"	22	"	"	1	"	"
	21	"	"	2	"	"	"	"
	20	"	"	3	"	"	"	"
	19	"	"	4	"	"	"	"
" 107, Desk	"	"	22	"	"	1	"	"
	21	"	"	2	"	"	"	"
	20	"	"	3	"	"	"	"
	19	"	"	4	"	"	"	"

DETAIL OF EQUIPMENT



Fig. 9

Eleven station wall set in operation

**WALL TYPE**

11 line capacity.  
Code number of set, 100.

Consists of—  
One No. 22 C. Transmitter,

One No. 24 B. Ringer,  
One No. 10 Condenser,  
One No. 9 A. Retardation Coil,

One No. 77 Hook-switch,  
12 Keys.

Receiver hard rubber or composition, as specified.

Code No. 101.  
11 line capacity.

Consists of same as Code No. 100 with addition of one attendant station box for one or two trunk lines and one No. 18 A. Extension Bell for each trunk line.

Code No. 102.  
23 station capacity.

Consists of—  
One No. 22 C. Transmitter,

One No. 24 B. Ringer,  
One No. 10 Condenser,  
One No. 9 A. Retardation Coil,

One No. 77 Hook-switch,  
24 Keys.

Receiver hard rubber or composition, as specified.

Code No. 103.  
23 station capacity.

Equipment same as No. 102, with the addition of one or two attendant station boxes for 1, 2, 3, or 4 trunk lines and one No. 18 A. Extension Bell for each trunk line.

**DESK TYPE**

Code No. 104.  
11 station capacity.

1 Key Box (12 keys),  
1 No. 64 Desk Stand,  
1 200 Desk Set Box.

Code No. 105.  
11 station capacity.

Equipment similar to No. 104 with the

addition of an attendant station box for one or two trunks, and one No. 18 A. Extension Bell for each trunk line.

Code No. 106.

23 station capacity.  
1 Key Box (24 keys),  
1 No. 64 Desk Stand,  
1 No. 200 Desk Set Box.

Code No. 107.  
24 line capacity.

1 Key Box (24 keys),  
1 No. 64 Desk Stand,  
1 No. 200 Desk Set Box.

One or two attendant station boxes for 1, 2, 3, or 4 trunk lines with one No. 18 A. Extension Bell for each trunk line.

INTER. C. TEL

