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[54] **INTERPHONE DEVICE HAVING PRESENCE
 INDICATOR MEANS**
4 Claims, 3 Drawing Figs.

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 (L), 81 (C), 37; 179/34, 31, 37-40, 1.1; 340/332

ABSTRACT: An interphone designed for mutual conversa-
 tion-type interphone systems and having a plurality of high im-
 pedance lamps the turning-on of which indicates the presence
 of personnel by the corresponding other interphones. A capacitor
 is connected to the lamp source supply lines for
 preventing crosstalk.

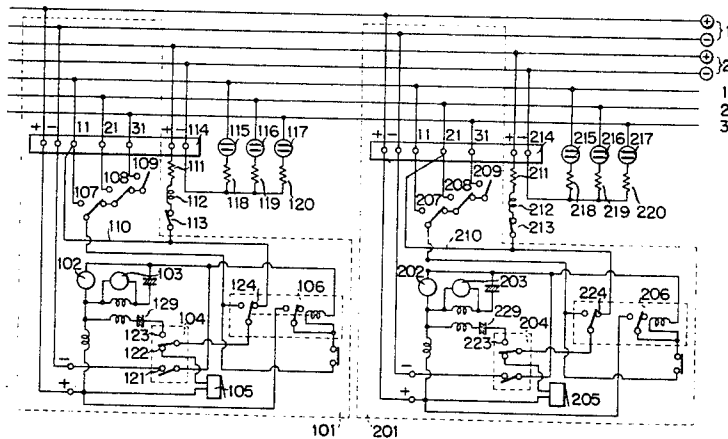


FIG. 1A

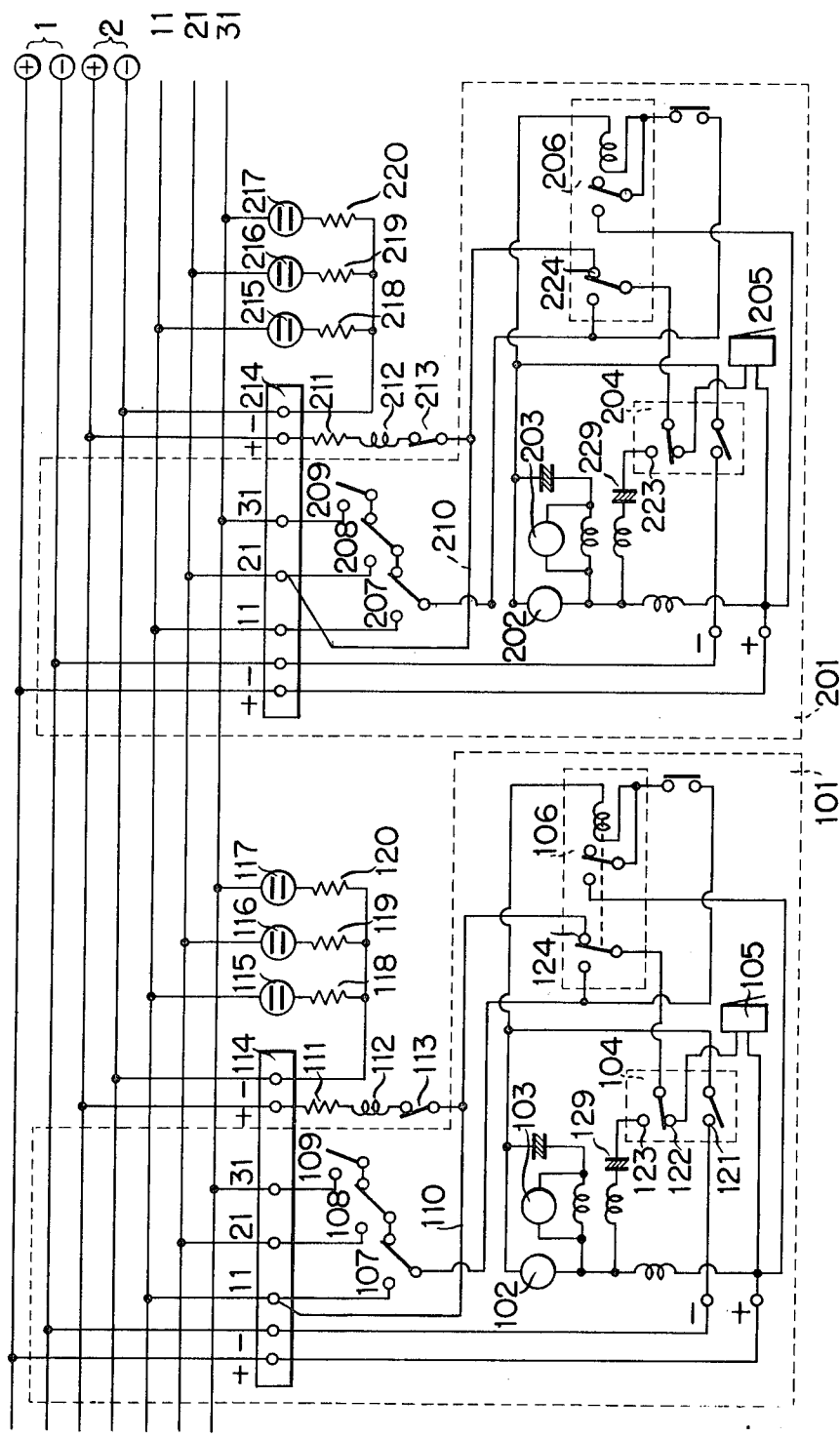


FIG. 1B

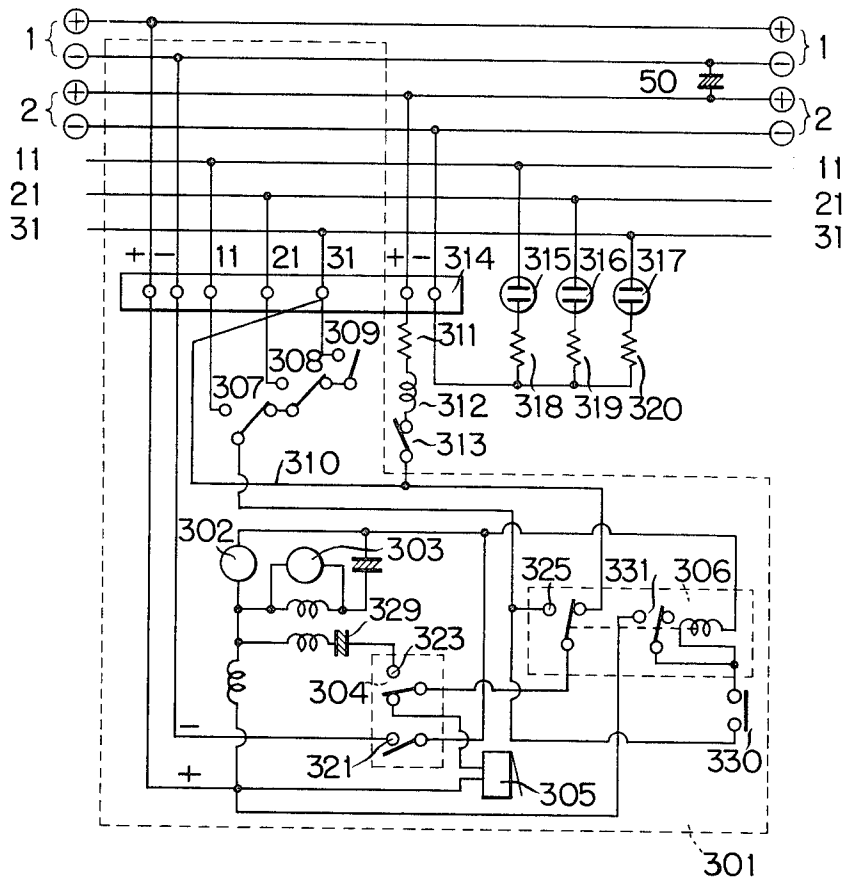
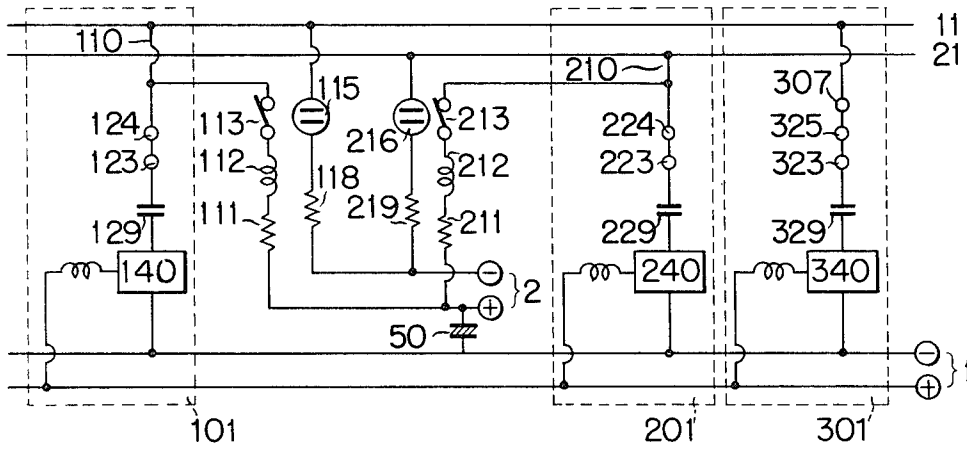


FIG. 2



INTERPHONE DEVICE HAVING PRESENCE INDICATOR MEANS

BACKGROUND OF THE INVENTION

The present invention relates to a selective address-type interphone which is provided with a presence indicator which indicates whether the other interphones in the system are ready to respond to a call—that is, whether these interphones are attended by personnel or not.

In the usual interphone system of the type to which the present invention appertains, the calling of a called party is effected by means of a buzzer lightening of a lamp. When there is a person taking care of the call interphone, he or she can immediately respond to the call, but when he or she does not attend to it the calling could possibly be indefinitely continued for a long time without being responded. The continued calling without response is not only a loss of power, but also greatly decreases the working efficiency, especially when a number of interphones are to a common circuit as in hospitals and business offices.

An object of this invention is to provide an interphone with a presence indicator having a plurality of lamps corresponding to individual interphones. The indicator is inserted between a separate lamp source feed lines and the corresponding speaking lines, so that the presence of a person by or taking care of another interphone may be indicated by lighting the corresponding one of these lamps.

Another object of this invention is to provide an interphone which can eliminate the decrease of working efficiency resulting from efforts to call an interphone when one is present in the place where it is located.

The invention may be more fully understood from the following detailed description taken in conjunction with the accompanying drawings, in which:

FIGS. 1A and 1B are circuit diagrams indicating one embodiment of an interphone having a presence indicator according to the invention; and

FIG. 2 is a circuit diagram illustrating the manner of preventing the crosstalk of the interphone having a presence indicator according to the invention.

Referring now to FIGS. 1A and 1B there are shown a plurality, for example three in the FIG, of interphones 101, 201, and 301, surrounded with a dotted line, connected in parallel with one another to a pair of DC power source feed lines 1 having opposite polarities. These interphones respectively comprise transmitters 102, 202 and 302, receivers 103, 203 and 303, hook switches 104, 204 and 304, buzzers 105, 205 and 305, and relays 106, 206, and 306. They also each respectively include a set of selector switches 107—109, 207—209 and 307—309 for selectively calling a desired respective interphone. Each of them also includes a line 110, 210 and 310 connected to a corresponding one of speaking circuits 11, 21 and 31. Line 110 of interphone 101 is connected to communication circuit 11, line 210 of interphone 201 is connected to communication circuit 21, and line 310 of interphone 301 is connected to communication circuit 31. In addition to interphone DC current source feed lines 1 and speaking lines 11, 21 and 31, there is provided a pair of DC lamp source feed lines 2 having opposite polarities and to each interphone is provided a circuit of the following construction. By way of example, for interphone 101 there is provided a lamp switching circuit consisting of a series connection of a resistor 111, a choking coil for crosstalk prevention 112 and a switch 113 and connected at one end to the positive one of said lamp source feed lines 2 through a terminal board 114 and at the other end to line 110. For the interphone 201 there are provided a series connection of a resistor 211, a choking coil 212 and a switch 213, and a terminal board 214. For the interphone 301, there are similarly provided a series connection of a resistor 311, a choking coil 312, a switch 313, and a terminal board 314.

To the negative one of said lamp source feed lines 2 is connected a circuit comprising a plurality of parallel branches

respectively consisting of a series connection of one of lamps 115, 116 and 117 and an associated one of lamp protection resistors 118, and 119 and 120, said branches being respectively connected to corresponding speaking lines 11, 21 and 31 at one end. The other ends are connected to a common lead which is connected to said negative line. Lamps 215, 216 and 217 and lamps 315, 316 and 317 are similarly connected to resistors 218, 219 and 220 and resistors 318, 319 and 320 respectively. The individual neon lamps 115, 116 and 117 are connected such that they are lit when lamp switches of corresponding interphones are turned on through respective speaking lines, lamps 115, 215 and 315 indicate the presence or absence of personnel by interphone 101 through speaking line 11 and lamps 116, 216 and 316 indicate the presence or absence of personnel by interphone 201, etc.

The lamp-switching circuit and the high impedance lamp circuit constitute the presence indicator. When switch 113 of interphone 101 is turned on by a person present by the side thereof, neon lamps 215, 315 of the other interphones 201, 301, are lit through the positive side of lamp source feed lines 2, resistor 111 of interphone 101, choking coil 112, switch 113, line 110, speaking line 11, neon lamps 215, 315 and lamp protection resistors 218, 318 of interphones 201, 301 and negative side of lamp source feed lines 2 in the mentioned order, thus indicating the presence of personnel at a place where interphone 101 is located. On the other hand, when switch 113 of interphone 101 is turned off while the other switches 213, 313 of the other interphones are turned on, only neon lamps 115, 215 and 315 are not lit thereby indicating the absence of personnel by the side of interphone 101. When calling interphone 101 from interphone 301, switch 307 of the set selector switches 307, 308 and 309 of interphone 301 is turned on, hook switch 304 is switched to contact 321 and calling switch 330 is pushed whereby buzzer 105 rings by virtue of energy supply through the positive side of the DC power supply lines 1, positive side of interphone 101, buzzer 105, contact 122 of hook switch 104, contact 124 of relay 106, line 110, speaking line 11, selector switch 307 of interphone 301, calling switch 330, coil of relay 306, contact 321 of hook switch 304 and negative side of DC power supply lines 2. At this time relay 306 of interphone 301 is switched to contact 325 and simultaneously the self-maintaining contact 331 of relay 306 is switched. On the side of the interphone 101, hook switch 104 is switched to contact 121 to start the conversation. Speaking from interphone 101 to interphone 301 is effected over the communication path from transmitter 102 of interphone 101 through capacitor 129, contact 123 of hook switch 104, contact 124 of relay 106, line 110, speaking line 11, selector switch 307 of interphone 301, contact 325 of relay 306 contact 323 of hook switch 304 and capacitor 329 to receiver 303. Message transmission from interphone 301 to interphone 101 takes the reverse path.

At this juncture there exists a problem of cross talk. As is apparent from the foregoing description, to the speaking line 11 between interphone 101 and interphone 301 there are connected three series circuits respectively consisting of neon lamps 115, 215 and 315 and lamp protection resistors 118, 218 and 318. These series circuits are in turn connected through parallel branches respectively consisting of one of other lamps 116, 117 and 216, 217 and 316, 317 and one of associated lamp protection resistors 119, 120 and 219, 220 and 319, 320 to respective speaking lines 21, 31. As result, the message transmission between two interphones 101 and 301 leaks to the other interphone 201. Also, the series circuit consisting of resistor 111, choking coil 112 and switch 113 and connected to the line 110 of interphone 101 is in connection to similar series circuits of the other interphones through the positive side of the lamp source supply lines 2. Consequently, crosstalk takes place, for instance, from the series circuit of interphone 101 through the positive side of the lamp source supply line to another series circuit of the corresponding interphone 201.

Referring now to FIG. 2 which illustrates, by way of example, the occurrence of crosstalk of message transmission between interphones 101 and 301 to interphone 201, the audio signal from interphone 101 is transmitted to interphone 301 through hybrid circuit 130, capacitor 129, contact 123 of hook switch 104, contact 124 of relay 106, line 110, speaking line 11, selector switch 307 of interphone 301, contact 325 of relay 306, contact 323 of hook switch 304, capacitor 329, and hybrid circuit 340. At this time, the conversation between interphones 101 and 301 leaks to interphone 201 through neon lamp 115 of interphone 101, the associated lamp protection resistor 118, negative side of the lamp source supply lines 2, lamp protection resistor 219 of interphone 201, neon lamp 216, speaking line 21, line 210 of interphone 201, contact 224 of relay 206, contact 223 of hook switch 204, capacitor 229 and hybrid circuit 240 in described order.

The crosstalk also takes place prior to the passage of the message signal from interphone 101 to the line 110 thereof through a bypass consisting of contact 124 of relay 106 of interphone 101, switch 113, choking coil 112, resistor 111, positive side of lamp source supply lines 2 resistor 211 of interphone 201, switch coil 212, switch 213, contact 224 of relay 206, contact 223 of hook switch 204 to hybrid circuit 240. The message transmission from 301 also leaks to interphone 201 through the path as described above. Of course, the crosstalk occurs not only from the message transmission between interphones 101 and 301 but also from message other between other interphones, in case the number of interphones is more than three.

In order to eliminate crosstalk through the former of the aforementioned two paths, high impedance lamps such as neon lamps may be used. It is for these reasons that neon lamps are used in the present embodiment.

The crosstalk occurring through the other path through the positive side of lamp source supply lines 2 can be eliminated by inserting a capacitor 50 between the positive side of lamp source supply lines 2 and the negative side of interphone source supply lines 1. The capacitor 50 can commonly eliminate crosstalk among all of the interphones in the system, when it is provided on the source side.

The aforementioned explanation has been made for the case of three interphones. However, the number of interphones is not restricted to three and more than three interphones are likewise available for use in a similar manner.

As has been described in detail in the foregoing, according to the invention individual interphones are respectively provided with a set of high impedance lamps, for instance, neon lamps, which respectively represent individual interphones to indicate the presence of personnel by these interphones as

they are lit, so as to minimize power loss of the interphone DC source and to increase working efficiency of the system. As speaking lines are also utilized as lamp circuits, only two of lamp source supply lines suffice and the crosstalk resulting therein is eliminated by using high impedance lamps such as neon lamps and providing a capacitor connected between one of other lamp source supply lines and one of the interphone DC source supply lines.

We claim:

1. In an interphone apparatus comprising:

a plurality of mutual speaking-type interphones; interphone source supply lines coupled to said interphones; speaking lines, the number of which corresponds to the number of said interphones, connected to said interphones;

lamp source supply lines provided separately from said interphone source lines and said speaking lines and connected to said interphones; and

the improvement wherein each interphone has presence indication means including:

a high impedance lamp circuit which is connected at one end to the negative side of said lamp source supply lines and at the other end to said speaking lines;

a lamp-switching circuit which is connected at one end to the negative side of said lamp source supply lines and at the other end to the lamps of at least another interphone through a corresponding speaking line for indicating the presence of personnel, operation of said lamp switching circuit at one interphone causing the lamp circuit of said another interphone to turn on, thereby indicating at said another interphone the presence of personnel at said one interphone; and

a capacitor for crosstalk prevention connected between said interphone source lines and said lamp source supply lines.

2. The interphone apparatus according to claim 1 in which said high impedance lamp circuit comprises a group of series circuits each of which includes a neon lamp connected to respective speaking lines and a lamp protection resistance connected to the negative side of the lamp source supply lines.

3. The interphone apparatus according to claim 5 in which said lamp-switching circuit comprises a series circuit which includes a resistor connected to the positive side of said lamp source feed lines, a choke coil and a switch connected to a speaking line corresponding to said interphone.

4. The interphone apparatus according to claim 2 in which the number of said series circuits forming said high impedance lamp circuit corresponds to the number of said speaking lines.

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