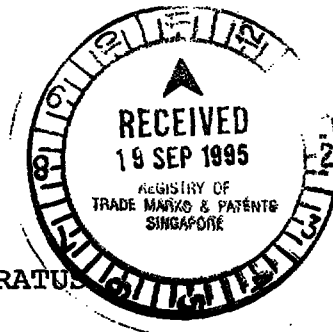




TELEPHONE CALL FORWARDING APPARATUS

BACKGROUND OF THE INVENTION

The present invention relates to a telephone call forwarding apparatus which accommodates a plurality of lines and is capable of connecting given lines thereof.

In general, in case where there is an incoming call from outside the office when the called party is not present therein, an office attendant who happens to answer the call takes procedures such as notifying the calling party that the called party is not present in the office and giving the calling party the telephone number of the place where the called party is present.

Therefore, the calling party who is thus notified must take another step of making a call to the place where the called party is present.

Otherwise, the individual who happens to answer the call and notifies the calling party that the called party is not present may offer to take a message to the called party to make a call back. In this case, the individual who happens to answer the call must take steps to make a call to said called party to tell him to call back to the calling party.

These procedures are burdensome both to the calling party and the called party in addition to doubly time consuming.

Further, in an establishment which is equipped with a

known telephone exchange with expert telephone operators being manned thereto, a telephone operator is required to put the incoming call once on hold before operating the telephone exchange to make a paging call to the place where the called party is present. Then, if the called party is successfully paged and ready to speak at the telephone end, said telephone operator connects the paging call and the incoming call on hold.

Also in this case, there is a limitation of having to install a large scale telephone exchange and keeping telephone operators directly manned thereto.

In a small establishment which is capable of accommodating only a few lines, there is proposed a telephone call forwarding apparatus in which an incoming call to an absent called party is maintained on hold while the called party is paged by use of another line before the thus paged called party is ready to speak when the incoming call and the paging call is connected (Japanese Pat. Appln. Kokai Pub. No. 62-16648).

In a situation in which a call is forwarded by use of said telephone call forwarding apparatus, it is often observed that once a forwarding operation has been performed by connecting the incoming call on hold and the paging call, a handset tends to be lifted to dial by mistake to the calling party or the called party while

their conversation is still not finished yet because the handset will not give off any tone. Naturally, such call cannot be not made as well as providing a problem that it is impossible to determine whether there is a trouble in the system or not.

Therefore, there is proposed a telephone call forwarding apparatus equipped with an indicator to show that the conversation on the forwarded call is still going on (Japanese Pat. Appln. Kokai Pub. No. 57-99069).

However, the cost of installing such apparatus as providing a plurality of indicators corresponding to the lines accommodated therein is too much while making mistakes in viewing the correct indicator is not unusual.

Even if indicators are installed, determination as to whether the speech on the forwarded call has terminated requires constant monitoring of the relevant indicator. Therefore, a telephone call forwarding apparatus which promises easy determination as to whether the speech on the forwarded call has terminated is hoped for. Furthermore, taking important messages which prove necessary during the speech on the forwarded call to be taken to the office attendant requires a troublesome procedure of having to first hanging up the forwarded call on the part of the called party's current station

and making a call to the office from said called party's current station. This procedure is not only troublesome but can also be dangerous if a cellular phone in an automobile is to receive the forwarded call because the driver is forced to take such a troublesome procedure while the car is in motion.

There is a further problem that the office where the forwarding operation is performed is needed to be equipped with at least two telephone sets for receiving an incoming call and for making a call to another station to which the incoming call is to be forwarded.

The present invention is made with the aforementioned problems in mind and has a first object of providing a telephone call forwarding apparatus which is capable of easily determining whether the speech on the forwarded call still continues or it is possible to make a call to any of the parties. The second object of the present invention is to provide a telephone call forwarding apparatus to definitely determine whether or not the speech on the forwarded call has terminated.

Further, the third object of the present invention is to provide a telephone call forwarding apparatus which is capable of taking important messages which has proved necessary during the speech on the forwarded call to be taken to the office attendant when the speech on the for-

warded call terminates by connecting the stations to which the call has been forwarded and the station which handles the forwarding operation.

The fourth object of the present invention is to provide a telephone call forwarding apparatus which is capable of conducting forwarding procedures for an incoming call by use of only one telephone set without installing a separate telephone set for making a call to the station to which the incoming call is forwarded in addition to the telephone set which received said incoming call.

SUMMARY OF THE INVENTION

In order to accomplish the first object, the telephone call forwarding apparatus of the present invention is characterized that in a telephone call forwarding apparatus comprising a receiving line switchover relay connected to a receiving line and adapted for alternatively performing a switchover operation between a receiving telephone set line and a forwarded call speech section, a forwarding line switchover relay connected to a forwarding line and adapted for alternatively performing a switchover operation between a forwarding telephone set line and said forwarded call speech section such

that an incoming call received at the receiving line is connected to the forwarding line by way of said receiving line switchover relay, said forwarded call speech section, and forwarding line switchover relay; an improvement is characterized by further comprising first and second tone generation switchover relays, said first tone generation switchover relay being provided between said receiving line switchover relay and said receiving telephone set line, said second tone generation switchover relay being provided between said forwarding line switchover relay and said forwarding telephone set line, said first and second tone generation switchover relays performing a switchover operation such that an audible signal from a tone signal generating section is supplied to the respective receiving telephone set line and forwarding telephone set line. Thus constructed, it is possible to determine whether the forwarded call speech continues or it is possible to use the phone by hooking off the handset during the forwarded call speech at any of the telephone sets including a telephone set which has received the coming call and an originating telephone set because a special audible signal is supplied from the tone signal generating section to the handset.

Further, in order to accomplish the second object, the telephone call forwarding apparatus according to the

present invention is characterized in that in a telephone call forwarding apparatus comprising a receiving line switchover relay connected to a receiving line and adapted for alternatively performing a switchover operation between a receiving telephone set line and a forwarded call speech section, a forwarding line switchover relay connected to a forwarding line and adapted for alternatively performing a switchover operation between a forwarding telephone set line and said forwarded call speech section such that an incoming call received at the receiving line is connected to the forwarding line by way of said receiving line switchover relay, said forwarded call speech section, and forwarding line switchover relay; there is provided an improvement characterized in that an engaged tone transmitted from telephone line network upon termination of the forwarded call speech is detected and that a bell signal switchover relay provided between said forwarding line switchover relay and said forwarding telephone set line is switched such that a bell signal from a bell signal generation section is supplied to said forwarding telephone set line.

Thus constructed, it is possible to easily determine that the forwarded call speech has terminated since a bell signal is supplied to the forwarding telephone set

upon termination of the forwarded call speech.

This structure contributes greatly to the improvement in the telephone's capability of determining that the forwarded call speech has terminated and the line so far used is then empty in an office telephone system in which a relatively limited number of lines are accommodated so that the lines otherwise becomes easily crowded.

Still further, in order to accomplish the third object, the telephone call forwarding apparatus according to the present invention is characterized in that in a telephone call forwarding apparatus comprising a receiving line switchover relay connected to a receiving line and adapted for alternatively performing a switchover operation between a receiving telephone set line and a forwarded call speech section, a forwarding line switchover relay connected to a forwarding line and adapted for alternatively performing a switchover operation between a forwarding telephone set line and said forwarded call speech section such that an incoming call received at the receiving line is connected to the forwarding line by way of said receiving line switchover relay, said forwarded call speech section, and forwarding line switchover relay; there is provided an improvement wherein a bell signal switchover relay provided

between said forwarding line switchover relay and said forwarding telephone set is adapted to detect an engaged tone transmitted upon termination of forwarded call speech from the telephone network and to be switched over such that a bell signal from a bell signal generating section to the forwarding telephone set line and wherein said receiving line switchover relay and said bell signal switchover relay are switched over upon detection of the offhook of the forwarding telephone set such that a speech line is formed between the destination telephone set connected to the forwarding line and the forwarding telephone set connected to the forwarding telephone set line.

Thus constructed, the destination telephone set and the forwarding telephone set is automatically connected to each other upon termination of the forwarded call such that the message which come up during the forwarded call speech can be taken to the office attendant.

Still further, in order to accomplish the fourth object, telephone call forwarding apparatus according to present invention is characterized that in a telephone call forwarding apparatus comprising a receiving line switchover relay connected to a receiving line and adapted for alternatively performing a switchover operation between a receiving telephone set line and a for-

warded call speech section, a forwarding line switchover relay connected to a forwarding line, said receiving line which receives an incoming call being connected to the forwarding line by way of said receiving line switchover relay, said forwarded call speech section, and said forwarding line switchover relay; an improvement wherein a PB signal receiving section is connected to said receiving telephone set line such that an incoming call which is received by said receiving line is connected to said forwarded call speech section and is put on hold upon reception of a PB signal by said PB signal receive section, said receiving telephone set line and said forwarding line being connected to each other such that a speech is enabled between the receiving telephone set connected to receiving telephone set line and the destination telephone set, said forwarded call speech section and said forwarding line being connected to each other upon an on-hook action at the receiving telephone set line being detected.

Thus constructed, it is possible to perform a forwarding action by use of a single telephone set without the need for a separate line for forwarding the incoming call to the destination telephone set in addition to the line which has received the incoming call.

BRIEF EXPLANATION OF THE DRAWINGS

Fig. 1 is a block diagram showing the wiring of the general telephone line network including the telephone call forwarding apparatus according to the present invention;

Fig. 2 shows the first embodiment of the telephone call forwarding apparatus of the present invention;

Fig. 3 is a block diagram showing the second embodiment of the present invention;

Fig. 4 is a block diagram showing the third embodiment of the present invention;

Fig. 5 is a block diagram showing the fourth embodiment of the present invention;

Fig. 6 is a block diagram showing another wiring of the general telephone network including the telephone call forwarding apparatus according to the present invention; and

Fig. 7 is a block diagram showing a further embodiment of the telephone call forwarding apparatus corresponding to the telephone network in Fig. 6.

Detailed Description of the Embodiments

Hereinafter, the telephone call forwarding apparatus of the present invention will be explained on the basis of the embodiments referring to the drawings. In order

to provide an explanation of the telephone call forwarding apparatus according to the present invention, the general wiring structure of connection of the telephone lines including a telephone line network will be explained.

Fig. 1 shows that a telephone line network 600 has a number of telephone sets 601, 602, --- connected thereto. For the convenience of explanation, the telephone set 601 is defined as the originating telephone set which the calling party uses while the telephone set 602 is defined as the destination telephone set which the called party uses. Between the telephone line network 600 and the telephone call forwarding apparatus 100 installed in the office 500, there are provided a receiving line 201 which receives the transmission from the originating telephone set 601 and a forwarding line 202 which is used for performing a forwarding operation toward the telephone line network 600 from the forwarding transmission side in the office 500. In the telephone call forwarding apparatus 100 in the office 500, a receiving telephone set 401 is connected by way of a receiving telephone set line 301 while a forwarding telephone set 402 is connected by way of a forwarding telephone set line 302.

Fig. 2 shows the first embodiment of the telephone

call forwarding apparatus 100 shown in Fig. 1, the construction and operation of which will be explained hereinafter.

Referring to Fig. 2, receiving line switchover relay 21 is provided in receiving line 201 for alternatively perform a switchover operation between receiving telephone set line 301 and forwarded call speech section 70. One of the contacts of said receiving line switchover relay 21 is connected to first tone generation switchover relay 31, which in turn is connected to the first hook detect section 41, which in turn is connected to said receiving telephone set line 301.

Further, forwarding line switchover relay 12 is provided in forwarding line 202 for alternatively performing a switchover operation between forwarding telephone set line 302 and forwarded call speech section 70. One of the contacts of said relay 12 is connected to second tone generation switchover relay 32, which in turn is connected to second hook detect section 42, which in turn is connected to PB (push-button) signal receiving section 52, which in turn is connected to said forwarding telephone set line 302.

On the other hand, said forwarded call speech section 70 is connected between the other contact of said receiving line switchover relay 21 for switching the

receiving line and the other contact of said forwarding line switchover relay 12 for switching the forwarding line. Said forwarded call speech section 70 is constructed of a matching transformer which is capable of forming a direct current closed circuit. Further, it is constructed such that when said first hook detect section 41 and said second hook detect section 42 detect the off-hook of the respective handsets on the relevant telephone set, said first and second hook detect sections 41 and 42 switch the said first and second tone generation switchover relays 31 and 32 over to the position opposite to the one drawn by solid line by way of respective control lines 41a and 42a such that audible signals are supplied from tone signal generating section 90 to receiving telephone set line 301 and forwarding telephone set line 302, respectively.

When said PB signal receiving section 52 receives a PB signal, said PB signal receiving section 52 is adapted to switch said receiving line switchover relay 21 and said forwarding line switchover relay 12 over to the side of forwarded call speech section 70 opposite to the position drawn by solid line.

Thus constructed, each relay shown in Fig. 2 normally takes a stand-by position to wait for a call as shown by the solid lines. In this case, if there is a call from

originating telephone set 601 by way of telephone line network 600 to receiving line 201, said call is received by receiving telephone set 401 to permit speech therebetween by way of relays 21, 31 and receiving telephone set line 301. On the other hand, if there is a call also to receiving line 202 by way of telephone line network 600, making a speech at the telephone set 402 is similarly possible.

If a message taken at receiving telephone set 401 is addressed to the called party absent in the office, an office attendant who happens to answer the call notifies the calling party that the call will be forwarded and puts the call on hold instead of hanging up to follow the procedure as described hereinafter.

First, a call is made to destination telephone set 602 by using forwarding telephone set 402. In case where the desired called party answers the call at destination telephone set 602, the called party is notified that the calling party's call will be forwarded and a special service code for the forwarding purpose is dialed at the forwarding telephone set 402. This way, forwarding telephone set 402 generates and transmits a PB signal to forwarding telephone set line 302 such that PB signal receiving section 52 identifies the PB signal. If the PB signal receiving section 52 identifies the PB signal,

said receiving line switchover relay 21 and forwarding line switchover relay 12 for are switched over to the respective positions by way of control line 52a and 52b opposite to those drawn in solid lines so as to be connected to forwarded call speech section 70.

Therefore, the call received at receiving line 201 is connected to forwarding line 202 by way of relay 21, forwarded call speech section 70, and relay 12, thus forwarding the call from originating telephone set 601 to destination telephone set 602. Then, the handset of the forwarding telephone set 402 is hooked on.

In the forwarded call speech, receiving line 201 and forwarding line 202 are both engaged and cannot be used. If the handset of receiving telephone set 401 or forwarding telephone set 402 is hooked off by mistake, first hook detect section 41 or second hook detect section 42 switches the relays 31 or 32 to the position opposite to the one drawn by solid line by way of respective control lines 41a or 42a. Thus, an audible signal from tone signal generating section 90 is supplied to the hooked-off telephone set by way of receiving telephone set line 301 or forwarding telephone set line 302 to indicate by means of the special audible signal that the forwarded call speech still continues.

Fig. 3 shows the second embodiment of the telephone

call forwarding apparatus 100 in Fig. 1, with its construction and operation being explained hereinafter.

Similar numerals as used in aforementioned Fig. 2 designate similar portions in Fig. 3 such that the explanation of their detailed construction and operation will be omitted.

In Fig. 3, BT (Busy Tone) detection section 71 for an engaged tone is connected in association with receiving line switchover relay 21 and forwarded call speech section 70. Said BT detection section 71 is constructed so as to control the switchover action of bell signal switch relay 36 through control line 71a. Further, one of said relay 36 is connected to tone signal switch signal 58, which is constructed to alternatively select an output from said bell signal generating section 60 or tone signal generating section 90. Further, control line 42a is connected to hook detect section 42 such that said tone signal switch relay 58 is controlled to be switched over to the side of tone signal generation section 90, said side being opposite to the position drawn by solid line, when hook detect section 42 detects the off-hook.

Thus constructed, the forwarded call speech is over and the handsets of originating telephone set 601 and destination telephone set 602 are placed on the hooks of

the respective telephone sets, when an engaged tone is supplied to receiving telephone line 201 and forwarding line 202 through telephone network 600. In response to said engaged tone, said BT detection section 71 controls bell signal switchover relay 36 through control line 71a to switch over to the position opposite to the one drawn by solid line while said BT detection section 71 controls tone signal switch relay 58 through control line 71b to stay on the side of bell signal generation station 60.

Thus, the bell signal of 16Hz generated from said bell signal generating section 60 is supplied by way of relays 58 and 36 to forwarding telephone set 302 with the result that said forwarding telephone set 302 gives off a ringing sound produced by a bell signal from the bell signal generation section 60. If an office attendant answers the ringing call by hooking off the handset, the hook detect section 42 detects the hook off to control the tone signal switch relay 58 through control line 42a over to the side of tone signal generating section 90 opposite the one drawn by solid line. Thus, forwarding telephone set 402 is supplied with a special audible signal from tone signal generating section 90, providing a forwarded call speech termination tone in the handset such that it is recognized that the for-

warded call speech has terminated.

While the information that the forwarded call speech is over is supplied to the forwarding telephone set 402 in the above embodiment, it is possible to provide the aforementioned circuit in the circuitry of receiving telephone set 401 such that it is recognized that the forwarded call speech is over.

Fig. 4 shows the third embodiment of the telephone call forwarding apparatus 100 in Fig. 1, with its construction and operation being explained. Similar numerals as used in the aforementioned Fig. 2 and Fig. 3 designate similar portions in Fig. 4 such that the explanation of their detailed construction and operation will be omitted.

In Fig. 4, there is connected second PB signal receiving section 72 in association with forwarding line switchover relay 12 and forwarded call speech section 70. Said PB signal receiving section 72 has control line 72a which is constructed to control bell signal switch relay 36 to perform a switchover operation.

Further, the control line 71a of BT detect section 71 to detect an engaged tone is also constructed to control bell signal switchover relay 36 to perform a switchover operation while control line 42a of second hook detect section 42 is constructed to control bell signal switch-

over relay 36 to perform a switchover operation.

Thus constructed, when the handsets of originating telephone set 601 and destination telephone set 602 are placed on the respective hooks thereof upon termination of the forwarded call speech, an engaged tone is supplied to receiving line 201 and forwarding line 202 through telephone network 600. In response to said engaged tone, said BT detect section 71 controls bell signal switchover relay 36 to switch over to the position opposite to the one drawn by solid line .

Thus, a bell signal of 16Hz generated from said bell signal generating section 60 is supplied by way of relays 36 and forwarding telephone set line 302 to forwarding telephone set 402 with the result that forwarding telephone set 402 gives off a ringing sound produced by the bell signal from bell signal generating section 60. When an office attendant answers the ringing call by hooking off the handset, hook detect section 42 detects to control tone signal switchover relay 36 by way of control line 42a to the position drawn by solid while control line 42b controls relay 12 for switching the forwarding lines to be switched over to the position drawn by solid line.

Thus, forwarding telephone set 402 is automatically connected to destination telephone set 602 to enable

mutual speech therebetween. In this way, the message created at the destination telephone set 602 can be taken to an office attendant.

In the above operation, it is often observed that the generation of the engaged tone through telephone network 600 delays even if the handset of destination telephone set 601 is placed on the hook.

In such a case, a PB signal is generated from destination telephone set 602 to be identified at PB signal receiving section 72 such that control line 72a controls the switchover of relay 36 to perform a similar paging operation.

Fig. 5 shows the fourth embodiment of the telephone call forwarding apparatus 100 in Fig. 1, with its construction and operation being explained. Similar numerals as used in the aforementioned Fig. 2 and Fig. 4 designate similar portions in Fig. 5 such that the explanation of their detailed construction and operation will be omitted.

In Fig. 5, there is provided first forwarding line switchover relay 11 between receiving line switchover relay 21 and receiving line 201 while there is provided second forwarding line switchover relay 12 between receiving line switchover relay 22 and forwarding line 202. Further, there is provided first extension switch-

over relay 81 between receiving line switchover relay 21 and receiving telephone set line 301 while there is provided second extension switchover relay 82 between receiving line switchover relay 22 and forwarding telephone set line 302.

Further, there is provided forwarding switchover relay 80, by which switchover operations are performed in association with the speech line of forwarded call speech section 70 and telephone set lines 301 and 302.

Further, PB signal receiving section 51 is connected to receiving telephone set line 301 such that control line 51a of said PB signal receiving section 51 is constructed to control the switchover operation of relay 21. Thereafter, control line 51b, 51c and 51d from PB signal receiving line 51 controls the switchover operation of first extension switchover relay 81, second transmission line switchover relay 12 and forwarding switchover relay 80, respectively.

Further, music-on-hold section 65 is connected to forwarded call speech section 70 such that said music-on-hold section 65 transmits on-hold music by means of the drive of control line 51e from PB signal receiving section 51 to be transmitted to receiving line switchover relays 21 and 22.

Thus constructed, each relay is normally set at a

stand-by position as shown by solid line in Fig. 5. In this situation, a call from originating telephone set 601 through telephone network 600 to receiving line 201 is received by receiving telephone set 401 to permit the speech by way of relays 11, 21 and 81 and receiving telephone set line 301. Similarly, a call to line 200 through telephone network 600 is received by telephone set 402 to permit the speech therebetween.

If the message transmitted to receiving telephone set 401 is addressed to the called party absent at the office, the office attendant who answers the call at the office shall notify the calling party that the call will be forwarded and dials a special service call at forwarding telephone set 401. In this way, a PB signal is transmitted to forwarding telephone set line 301 to be identified by PB signal receiving section 51. In case where PB signal receiving section 51 identifies the PB signal, receiving line switchover relay 21 is switched over to the side of forwarded call speech section 70 as opposed to the one drawn by solid line. In this way, the incoming call is held on hold.

Further, a music on-hold is transmitted to receiving line 201 from forwarded speech section 70 as a result of music on-hold section 65 being driven by the operation of control line 51e from PB signal receiving section 51.

Said relays 81, 12 and 80 are controlled by control line 51b through 51d from PB signal receiving section 51 such that receiving telephone set 401 is connected to forwarding line 202. Then, a call is made to destination telephone set 602 by means of forwarding telephone set 401 and in case where the desired called party answers the call at destination telephone set 602, he is notified that the incoming call is to be forwarded before the handset at forwarding telephone set 401 is hooked on.

The on-hook signal is detected by hook detect section 41 such that control line 41a of hook detect section 41 is switched over to the side of forwarded call speech section 70. Thus, the line of the incoming call received by the receiving line is connected to forwarding line 202 by way of relays 11 and 21, forwarded call speech section 70 and relays 80 and 12 such that the incoming call from originating telephone set 601 is forwarded to destination telephone set 602. At the same time, the operation of music on-hold section 65 is stopped by the operation of control line 41b from hook detect section 41.

Thus far, the situation in which there is an incoming call to receiving line 201 by way of telephone network 600 is explained. A similar operation can be performed

by providing the aforementioned lines to line 202 in the situation in which there is an incoming call to line 202 by way of telephone network 600.

In the fourth embodiment as shown in Fig. 5, it is possible to perform a forwarding operation by using a single telephone set at a receiving telephone set line.

As opposed to the structure in Fig. 1, Fig. 6 shows that four lines are provided between telephone network 600 and telephone call forwarding apparatus 100, allowing installment of four telephone sets. The fourth embodiment of the present invention to handle this situation is shown in Fig. 7, where similar numerals are used for similar parts while additional lines and additional relays are accorded with corresponding serial numerals.

In this case, an on-hook condition at hook detect sections 41 through 44 is detected to automatically select an empty line for use as a speech line.

As explained thus far, the telephone call forwarding apparatus according to the present invention enables it to facilitate discrimination as to whether the forwarded call speech continues or the line is engaged since a special audible signal from the tone signal generating section is supplied to the handset when the handset is hooked off at the telephone set receiving the incoming

call or at the forwarding telephone set once the incoming call is forwarded.

Therefore, it solves the problem that it is impossible to discriminate as to whether the handset is in trouble or not as described in the example of the prior art.

When the forwarded call speech terminates, a bell signal is supplied to the forwarding telephone set such that the termination of forwarded call speech is easily recognized. Therefore, if the lines are too busy to handle incoming calls by a relatively limited number of lines accommodated, the termination of forwarded call speech and the existence of an empty line as a result thereof is easily recognized to such an extent that availability of the apparatus is greatly improved.

Further, it is possible to take a message found important during the forwarded call speech to an office attendant since the originating telephone set and the destination telephone set are automatically connected upon termination of the forwarded call speech.

In this case, since there is no need to perform redialing at the destination telephone set, safety is assured for a cellular phone installed in an automobile if the incoming call is forwarded to the car in motion.



What is claimed is :

1. In a telephone call forwarding apparatus comprising a receiving line switchover relay connected to a receiving line and adapted for alternatively performing a switchover operation between a receiving telephone set line and a forwarded call speech section, a forwarding line switchover relay connected to a forwarding line and adapted for alternatively performing a switchover operation between a forwarding telephone set line and said forwarded call speech section such that an incoming call received at the receiving line is connected to the forwarding line by way of said receiving line switchover relay, said forwarded call speech section, and forwarding line switchover relay; an improvement characterized by further comprising first and second tone generation switchover relays, said first tone generation switchover relay being provided between said receiving line switchover relay and said receiving telephone set line, said second tone generation switchover relay being provided between said forwarding line switchover relay and said forwarding telephone set line, said first and second tone generation switchover relays performing a switchover operation such that an audible signal from a tone signal generating section is supplied to the respective receiving telephone set line and forwarding telephone



set line.

2. A telephone call forwarding apparatus according to claim 1, wherein a PB (push button) signal receiving section is connected to said forwarding telephone set line, said PB signal receiving section switching said receiving line switchover relay and said forwarding line switchover relay over to the forwarded call speech section upon receipt of said PB signal by the PB signal receiving section.

3. In a telephone call forwarding apparatus comprising a receiving line switchover relay connected to a receiving line and adapted for alternatively performing a switchover operation between a receiving telephone set line and a forwarded call speech section, a forwarding line switchover relay connected to a forwarding line and adapted for alternatively performing a switchover operation between a forwarding telephone set line and said forwarded call speech section such that an incoming call received at the receiving line is connected to the forwarding line by way of said receiving line switchover relay, said forwarded call speech section, and forwarding line switchover relay; an improvement characterized in that an engaged tone transmitted from telephone line



network upon termination of the forwarded call speech is detected and that a bell signal switchover relay provided between said forwarding line switchover relay and said forwarding telephone set line is switched such that a bell signal from a bell signal generation section is supplied to said forwarding telephone set line.

4. A telephone call forwarding apparatus according to claim 3, wherein a PB signal receiving section is connected to said forwarding telephone set line, said receiving line switchover relay and said forwarding line switchover relay being switched over to a forwarded call speech section side upon reception of a PB signal by said PB signal receiving section and wherein a tone signal switchover relay is provided between said bell signal switchover relay and said bell signal generation section, said tone signal switchover relay being switched over to supply an audible signal from a tone signal generating section to said forwarding telephone set line upon detection of the off-hook of the forwarding telephone set.

5. In a telephone call forwarding apparatus comprising a receiving line switchover relay connected to a receiving line and adapted for alternatively performing a



switchover operation between a receiving telephone set line and a forwarded call speech section, a forwarding line switchover relay connected to a forwarding line and adapted for alternatively performing a switchover operation between a forwarding telephone set line and said forwarded call speech section such that an incoming call received at the receiving line is connected to the forwarding line by way of said receiving line switchover relay, said forwarded call speech section, and forwarding line switchover relay; an improvement wherein a bell signal switchover relay provided between said forwarding line switchover relay and said forwarding telephone set is adapted to detect an engaged tone transmitted upon termination of forwarded call speech from the telephone network and to be switched over such that a bell signal from a bell signal generating section to the forwarding telephone set line and wherein said receiving line switchover relay and said bell signal switchover relay are switched over upon detection of the offhook of the forwarding telephone set such that a speech line is formed between the destination telephone set connected to the forwarding line and the forwarding telephone set connected to the forwarding telephone set line.

6. A telephone call forwarding apparatus according to



claim 5, wherein a PB signal receiving section is connected to said forwarding telephone set line, said PB signal receiving section being adapted to receive a PB signal to switch said receiving line switchover relay and said forwarding line switchover relay over to the position of the respective forwarded call speech section and wherein a second PB signal receiving section 72 is connected to said forwarded call speech section, said bell signal switchover relay being switched over even upon reception of the PB signal from the destination telephone set to supply a bell signal from the bell signal generation section to the forwarding telephone set line.

7. In a telephone call forwarding apparatus comprising a receiving line switchover relay connected to a receiving line and adapted for alternatively performing a switchover operation between a receiving telephone set line and a forwarded call speech section, a forwarding line switchover relay connected to a forwarding line, said receiving line which receives an incoming call being connected to the forwarding line by way of said receiving line switchover relay, said forwarded call speech section, and said forwarding line switchover relay; an improvement wherein a PB signal receiving



section is connected to said receiving telephone set line such that an incoming call which is received by said receiving line is connected to said forwarded call speech section and is put on hold upon reception of a PB signal by said PB signal receive section, said receiving telephone set line and said forwarding line being connected to each other such that a speech is enabled between the receiving telephone set connected to receiving telephone set line and the destination telephone set, said forwarded call speech section and said forwarding line being connected to each other upon an on-hook action at the receiving telephone set line being detected.

8. A telephone call forwarding apparatus according to claim 7, a music on-hold section is connected to said forwarded call speech section which starts the transmission of a music on-hold signal upon reception of the PB signal by the PB signal receiving section and stops the transmission of the music on-hold upon detection of the on-hook at the receiving telephone set line.