(12) UK Patent Application (19) GB (11) 2 342 005 (13) A

(43) Date of A Publication 29.03.2000

(21) Application No 9827230.5

(22) Date of Filing 10.12.1998

(30) Priority Data
(31) 9820527 (32) 21.09.1998 (33) GB

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(51) INT CL[7]
H04M 1/57 11/02

(52) UK CL (Edition R)
H4K KOX

(56) Documents Cited
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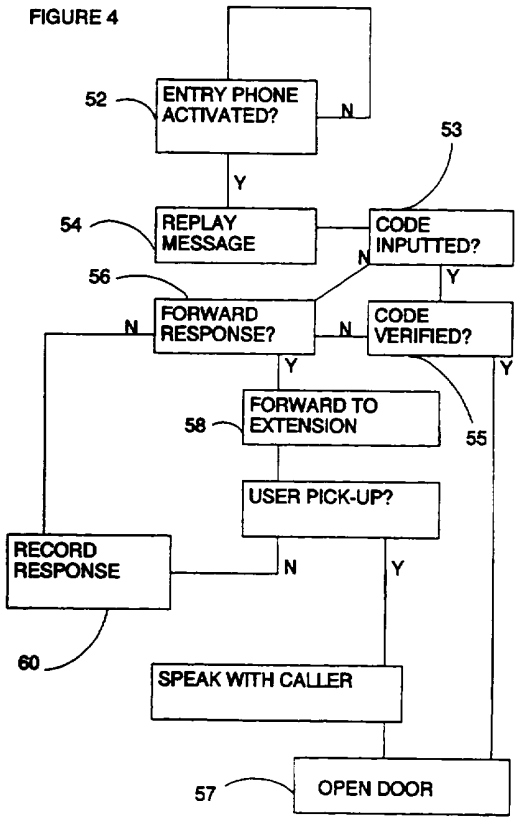
(58) Field of Search
INT CL[6] H04M 1/57 11/02
On-Line - WPI

(54) Abstract Title
Telephone apparatus for unlocking entry phone door

(57) A telecommunications apparatus includes a controller which is operable to modify the operation of the apparatus upon receipt of an incoming call that includes an embedded signal indicating that caller line identifier (CLI) information identifying the calling party is not available. The apparatus may be programmed to respond in different ways of which figs 2 and 3 are two different examples. A door entry phone may be connected to the apparatus which when activated prompts 54 the user to input a code 53. Verification of the code causes the apparatus to operate a lock, thereby unlocking the door 57. Failure to verify the code results in the caller being diverted either to a message recording means 60, where they may leave a message, or, if the code is one of a set of prestored, recognised codes, diversion 58 to a telephone extension of the apparatus, thereby allowing conversation between the caller and a person on that extension.

FIGURE 4



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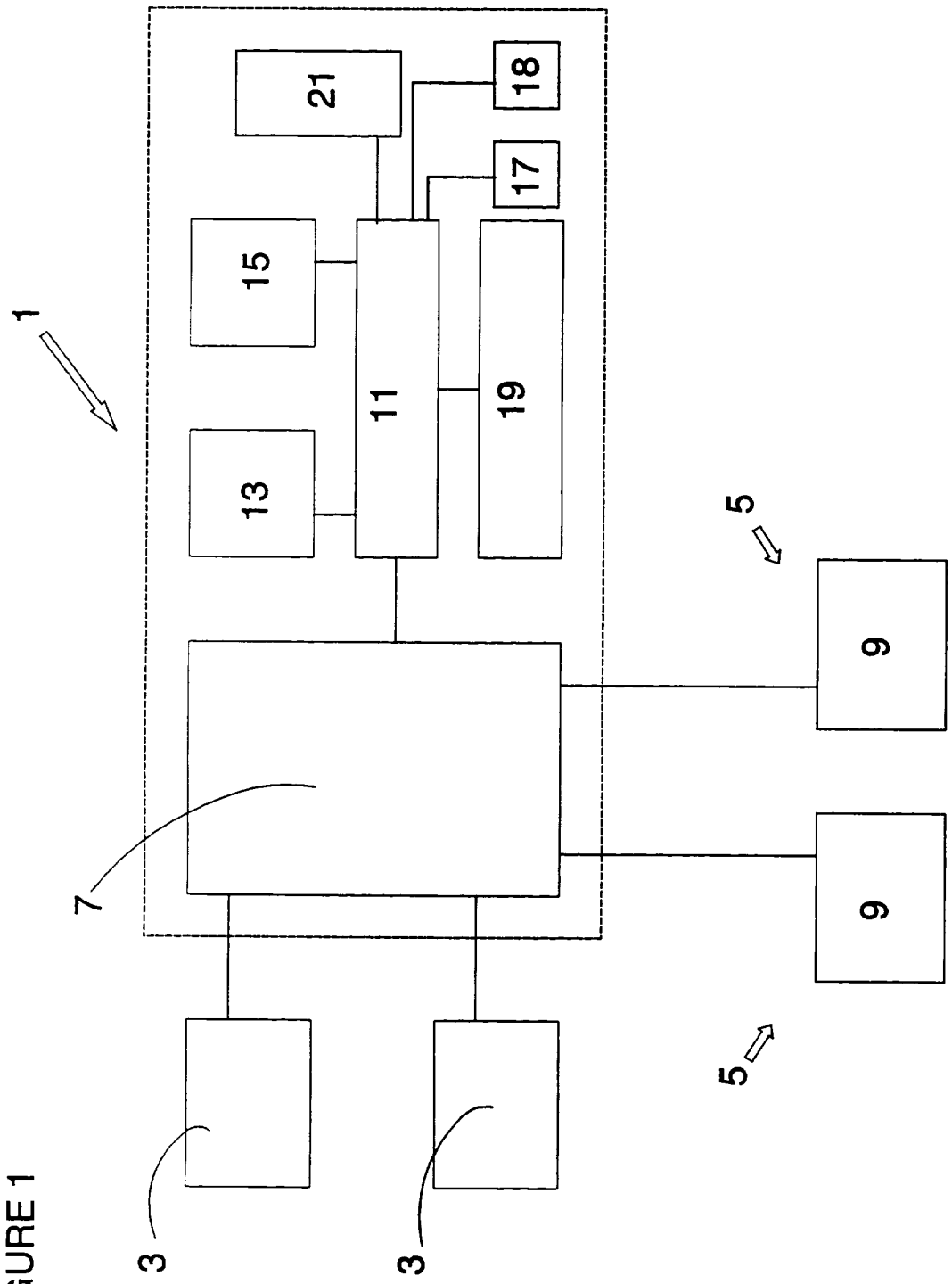


FIGURE 1

FIGURE 2

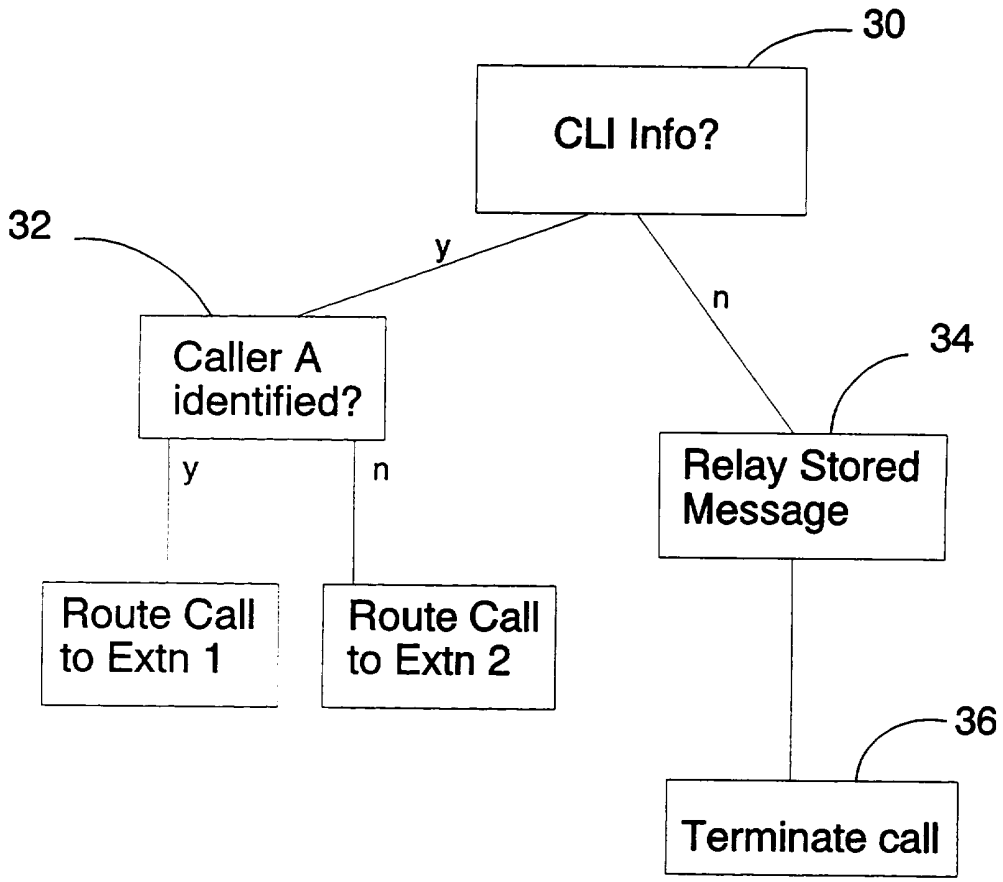

30
CLI Info?
32
y
n
Caller A identified?
34
y
n
Relay Stored Message
Route Call to Extn 1
Route Call to Extn 2
36
Terminate call

FIGURE 3

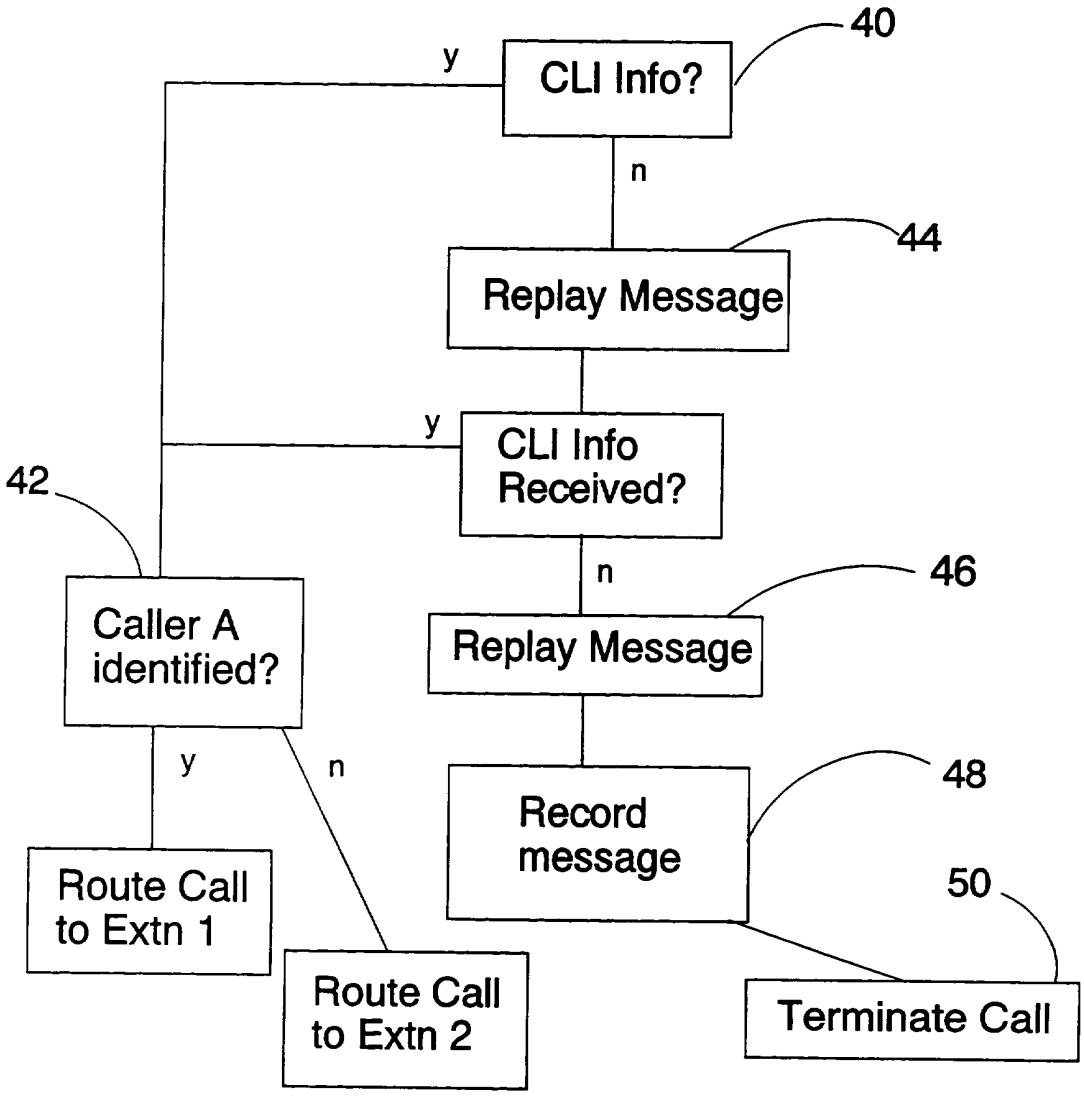
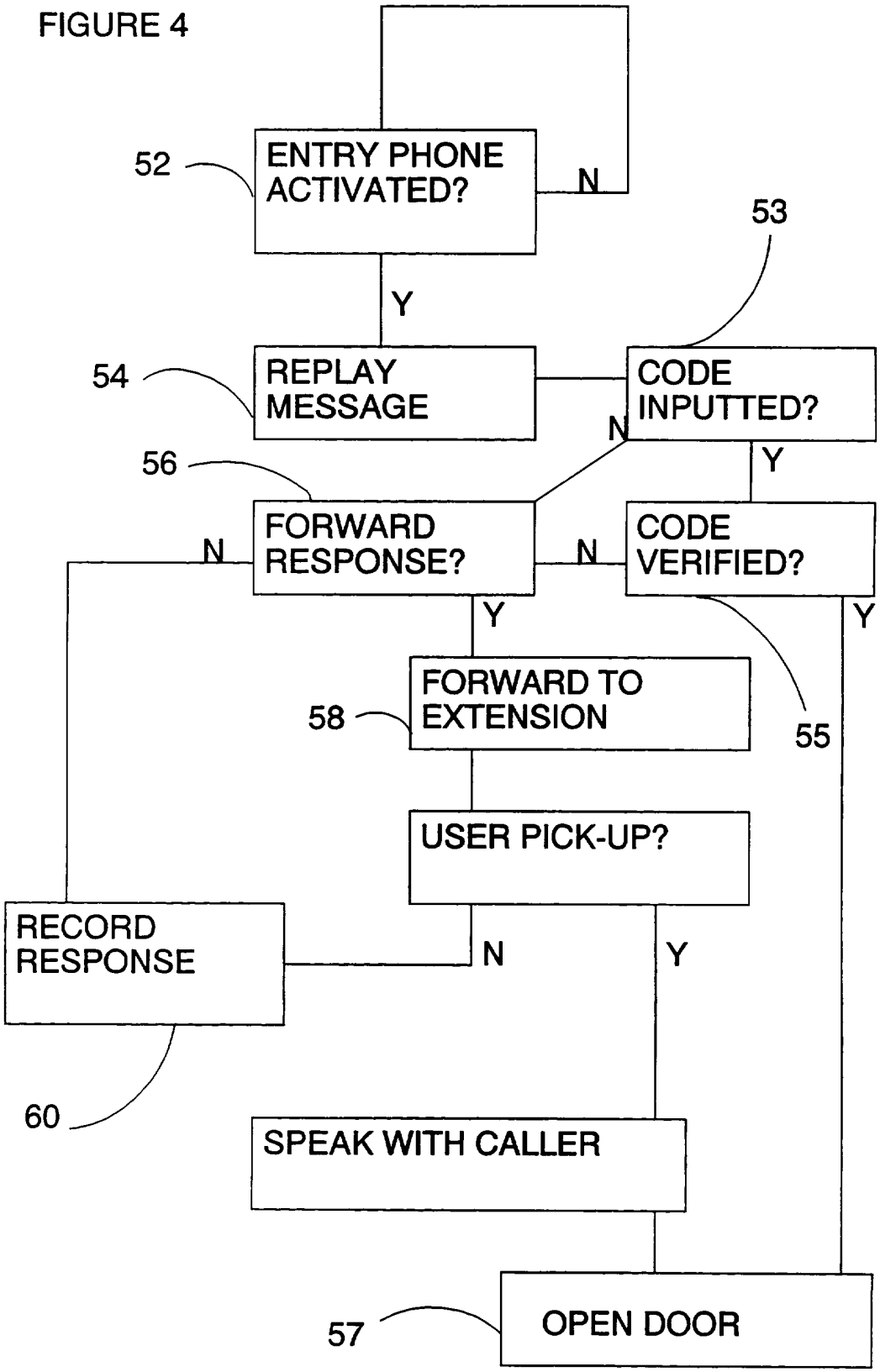

40
CLI Info?
y
n
44
Replay Message
y
CLI Info Received?
42
n
46
Caller A identified?
Replay Message
y
n
48
Record message
Route Call to Extn 1
50
Route Call to Extn 2
Terminate Call

FIGURE 4


52
ENTRY PHONE ACTIVATED?
N
Y
53
54
REPLAY MESSAGE
CODE INPUTTED?
N
Y
56
FORWARD RESPONSE?
N
CODE VERIFIED?
N
Y
Y
58
FORWARD TO EXTENSION
55
USER PICK-UP?
RECORD RESPONSE
N
Y
60
SPEAK WITH CALLER
57
OPEN DOOR

TELECOMMUNICATIONS APPARATUS

This invention relates to telecommunications apparatus.

A number of modern telecommunications networks have, for the last few years, employed Caller Line Identifier (CLI) information to advise a recipient of a telephone call (a receiving party) of the source of that call. The structure and format of CLI information is well known and will not be further described herein.

Various items of telecommunications equipment have been previously proposed that are operable to display this CLI information, such as the telephone number of a caller, that is embedded in the incoming telecommunications signal.

It has also been proposed to provide telephones, and other items of telecommunications equipment, with a memory within which typically a plurality of numbers and associated alphanumeric characters may be stored. These items of equipment can match detected CLI information in incoming calls with numbers stored in the memory, and then display the alphanumeric characters associated with that stored number to provide a more user-friendly display for the receiving party.

Some of these previously proposed telephones are also user-programmable to respond in a particular manner to selected incoming calls. For example, European Patent Specification No. 0 494 525 discloses a telephone that includes a memory which is programmable with a plurality of telephone numbers and associated alphanumeric characters. The user of the phone is then able to program the phone to issue a particular response to selected callers who have their number stored in the phone. In the system described in the specification, the user is able to block incoming calls from selected callers who have had their numbers programmed in the phone by controlling the phone to automatically respond to the selected calling party with a message indicating that the telephone that they are calling is currently in use.

A brief synopsis of the manner in which CLI operates will now be provided. The particular example to be described relates to the United Kingdom, but it will be appreciated that different national telecommunications networks may use CLI information in slightly different ways. In the United Kingdom, for example, a user of

a phone can dial "1471" and be presented with a message advising them of the telephone number of the last caller (the calling party), and the time that that last call was made. Various add-on units are also available to enable the storage and display of CLI information relating to more than just the last call.

In the United Kingdom, all outgoing 'phone calls made via the public switched telephone network (PSTN), for example, and various other networks are adapted to include CLI information - unless this function is disabled. One commonly used way to disable the transmission of CLI information is enabled by the calling party dialling "141" before the number of the call that they wish to make. The network operator can also remotely switch off the transmission of CLI information for a given line should the user of that line request it. Various other networks, such as ISDN networks, also support the provision, transmission and reception of CLI information.

If the receiving party of a CLI-disabled call should dial "1471" to attempt to access CLI information relating to the last received call, then they will be presented with a message advising them either that the number of the caller has been withheld (if the caller has prefixed the number dialled with "141"), or that the number of the caller is not available.

The receipt of phone calls having no embedded CLI information, or deliberately withheld CLI information, can cause distress and anxiety to the person receiving the call. This is particularly true if the recipient of the call is presented with a message advising them that the number of the caller has been deliberately withheld.

In addition, it has become commonplace, in the United Kingdom at least, for certain types of businesses to instruct the network operator to routinely withhold CLI information from outgoing calls so that the business in question can cold-call potential customers (who typically have had no previous contact with that business) without the recipient of the call being able to find out the telephone number of the business. The recipient of the call then has no way of contacting the company in question if they should want to try and stop these unsolicited calls.

It is currently difficult for an individual to avoid CLI-withheld calls as there are no simple mechanisms for screening incoming calls. One way to screen incoming

calls is to route the calls via an answerphone and then to use the in-built audio speaker to determine whether or not they wish to speak to the caller. Another way requires the individual to purchase an add-on unit that stores and displays CLI information relating to incoming calls. The user may then inspect the display of the unit upon receipt of an incoming call to determine whether or not they wish to speak to the calling party. However, both of these approaches are unsatisfactory for a number of reasons. For example, the use of an answerphone for call screening can cause problems as it is not uncommon for callers to hang up if they should encounter an answerphone, particularly as a surprisingly large proportion of phone users dislike talking to a machine. The receiving party would then not be able to identify the calling party without manually dialling "1471", for example, to see if any CLI information about the last call was available. The other alternative (the use of an add-on unit) is particularly inconvenient as the owner of the phone must look for CLI information on the unit's display before answering a call. Thus, if the user should be upstairs at home, for example, and the add-on unit is located downstairs in the lounge then the user must go downstairs to inspect the add-on unit every time that a call is received.

A further problem associated with these previously proposed call screening procedures is that in all cases it is not possible to stop the phone from ringing. Thus, the receiving party is always disturbed by the phone even if they do not want to speak to the calling party.

It is an object of aspects of the invention to alleviate these and/or other problems associated with the prior art.

In accordance with an aspect of the invention, there is provided telecommunications apparatus comprising a controller that is operable to modify the operation of said apparatus upon the receipt of an incoming call from a calling party that includes an embedded signal indicating that information identifying said calling party is not available.

Preferably, said controller controls the apparatus to respond to said incoming call. The controller may control the apparatus to respond to said incoming call by terminating said incoming call. Termination of the incoming call may comprise

controlling the apparatus to accept the call (or "pick up" the call), and then controlling the apparatus to terminate the call (or "hang up" the call) without routing it to an extension (or storage device). Alternatively, termination of the incoming call may comprise controlling the apparatus to accept the call (or "pick up" the call), and then route the call to one of the storage devices to record a message. In either of these alternatives, the controller may also control the apparatus to replay a message to the calling party before terminating the call (i.e. before hanging up). As a further alternative, termination of the call may simply comprise controlling the apparatus not to accept the incoming call. Generally speaking, it can therefore be seen that termination of the incoming call comprises controlling the apparatus to respond to the incoming call with a response generated by the apparatus, and that preferably does not require the receiving party to be disturbed.

Alternatively, the controller may control the apparatus to respond to the calling party with a request for the calling party to input said identifying information. The request for identifying information may be recorded on a recording medium and may be replayable to the calling party.

Preferably, said controller terminates said call if said identifying information is not inputted within a predetermined period of time.

Preferably, said controller controls the apparatus to record a message from the calling party if said identifying information is not inputted within a predetermined period of time. The controller may control the apparatus to respond to said incoming call by diverting said incoming call. The controller may control said apparatus to divert said incoming call to a recording means.

Preferably, the recording means is provided within said apparatus. Alternatively, said recording means may be external to said apparatus and connectable thereto.

Preferably, the controller is operable to control said apparatus to divert said incoming call to telecommunications equipment connected to said apparatus.

Preferably, the apparatus comprises a memory that is capable of storing a plurality of telephone numbers. Preferably, said memory is also capable of storing

alphanumeric characters associated with said telephone numbers.

Preferably, said embedded signal includes the calling parties' telephone number. Preferably, said controller is operable to compare the calling parties' telephone number with said telephone numbers stored in said memory.

Preferably, said controller is operable to cause the apparatus to respond to the calling party with a predetermined message if the calling parties' telephone number should match one of the telephone numbers stored in the memory.

The message may be recorded by a user onto recording means of said apparatus. The controller may be operable to replay a second predetermined message associated with the calling parties' telephone number to telecommunications equipment connected to said apparatus.

The controller may be programmable to divert said incoming call if the calling parties' telephone number should match one of said stored telephone numbers.

Preferably, the information identifying said calling party comprises CLI. The embedded signal may indicate either that said CLI information is not available, or that said CLI information has been withheld.

Preferably, the apparatus comprises an interface for connection to one or more telephone lines of a telecommunications network; an interface for connection to one or more local telephone lines, and a switching matrix for connecting one or more of said telecommunications network lines to one or more of said local telephone lines, said controller being operable to control interconnection of said telecommunications network lines and said local lines.

In accordance with a further aspect of the invention, there is provided a telephone exchange comprising: an interface for connection to a telecommunications network; an interface for connection to one or more local lines; a switching matrix operable to connect said local lines to said telecommunications network, and a controller for controlling said switching matrix, and for modifying the operation of the exchange upon the receipt of an incoming call from a calling party that includes an embedded signal indicating that information identifying said calling party is not available.

A further aspect of the invention provides a method of controlling telecommunications apparatus, the method comprising the steps of: receiving an incoming call from a calling party; determining whether said incoming call includes an embedded signal indicating that information identifying the calling party is not available; and modifying the operation of said apparatus if it is determined that said incoming call includes said embedded signal.

A further aspect of the invention provides telecommunications apparatus comprising: a controller that is operable to detect an embedded signal in an incoming call, said controller being operable to control the apparatus to perform one or more of a first set of predetermined tasks upon detection of said embedded signal or to perform one or more of a second set of predetermined tasks if said embedded signal is not detected, wherein said embedded signal indicates that information relating to the identity of a party making said incoming call is not available.

A further aspect of the invention provides telecommunications apparatus for use in a system in which CLI information preceding or proceeding the ringing tone is provided but may be withheld by the calling party, the apparatus including a controller which detects the CLI data and if the CLI data is present initiates a first action, and if the CLI data is absent initiates a second action, wherein the second action includes terminating the call without allowing ringing to occur in response to the ringing tone.

Embodiments of the invention may be particularly useful for so-called SOHO (small-office, home-office) users.

Embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is a schematic representation of an aspect of the invention as embodied in a Private Branch Exchange (PBX); and

Figures 2, 3 and 4 are flow diagrams representing operating mechanisms for the PBX of Figure 1.

Whilst the following description will relate to a PBX it should be remembered that the invention can be embodied in a variety of different ways. For example, the invention could be embodied entirely in software (i.e. a memory resident computer

program), in one or more Application Specific Integrated Circuits (ASIC's) or in a combination of ASIC's and software. The invention could, in an alternative example, be embodied in a combination of software and standard off-the-shelf components. The invention should thus not be limited to the particular components described hereinafter or to a PBX. Similarly, the invention is not limited to telecommunications apparatus for connection to an analogue PSTN, as the apparatus may be connected to any type of telecommunications network such as a digital ISDN network, a cable network, a satellite network or a wireless network.

Figure 1 shows an illustrative representation of a PBX 1. As shown, the PBX 1 of this embodiment is connected to an array of PSTN lines 3 and an array of local extensions 5 via a switching matrix 7. The local extensions 5, in this embodiment, each comprise a telecommunications apparatus 9 (typically a telephone) wired to the PBX 1. In an alternative arrangement, wireless connections (such as a cellular connection) could be provided between the switching matrix 7 and any one or more local extensions 5. In a further alternative, the local extensions may comprise cordless phones such as those employing the DECT cordless phone standard, for example. In another embodiment, one of the local extensions comprises an entry phone associated with a door of a building, and the PBX 1 is connected to an electronic door lock (not shown).

The switching matrix 7 is connected to a controller 11 that controls the matrix 7 to route calls from any one or more of the PSTN lines 3 to any one or more of the local extensions 5, and from any one or more of the local extensions 5 to any one or more of the PSTN lines 3. The matrix 7 and controller 11 may be manually operated by an operator to route calls, or may be pre-programmed (as will be later described) to automatically route calls. It should be noted that the matrix 7 may be expanded for connection to any number of trunk lines 3, and to any number of local extensions 5. Accordingly, the invention is not to be limited to a pair of trunk lines and a pair of extensions.

The controller 11 is connected, in this particular embodiment, to a pair of message storage devices 13 and 15 which are preferably both capable of having

greetings messages recorded thereon by a user, and which are preferably both able to record messages from calling parties. By adopting this arrangement, it is possible to record a message received on one trunk line even if a message is currently being recorded from or being replayed to the other trunk line, and vice versa.

It can be seen, therefore that it is preferable to provide a storage device for each trunk line to which the matrix 7 is to be connected. However, it will be appreciated that it may not be necessary to keep to this because as the number of trunk lines and storage devices increases so the likelihood of all of the incoming calls being routed for message storage decreases. It may therefore be sufficient to provide only two storage devices for three trunk lines, or three storage devices for four or five trunk lines, for example. In either case, further storage devices may easily be added at a later date should they be required. It is even possible to provide more storage devices than trunk lines. Accordingly, whilst the particular embodiment described herein provides two trunk lines and two storage devices, it should be noted that the invention is not limited to this particular arrangement.

In the preferred embodiment, the message storage devices 13, 15 each comprise recording/reproducing apparatus that is operable to record and/or reproduce signals on and from an associated storage medium. The storage devices and associated recording and/ or reproducing apparatus may be analogue or digital devices. One or both of the storage devices could be operable only to replay a greetings message stored by the receiving party. However it is preferred that at least one storage device 13, 15 is operable to store messages from calling parties. If all storage devices are only capable of replaying messages stored by the receiving party, then one or more further storage devices (such as an answerphone) would have to be connected to the matrix 7 in order to record calling party messages.

In the preferred embodiment, the controller is connected to a microphone 17 by means of which a user can record a message on either storage device. The controller is also connected to an audio speaker 18 so that the user can listen to messages left by calling parties or to recorded greetings messages.

The controller is also connected to a memory 19 in which a plurality of

telephone numbers and optionally, associated alphanumeric characters, may be stored. User input means (not shown), such as a numberpad or keyboard, is provided to allow the user to input information into the memory 19. The memory 19 is also preferably able to store information relating to each received call thereby allowing the user to see which calls have been received.

Preferably, the PBX is also provided with a display (not shown) by means of which information may be displayed to the user. The controller 11 may also be connected to an interface 21 by means of which the PBX may be connected to a personal computer. The interface could be an RS232 interface, a USB (Universal Serial Bus) interface or any other suitable interface.

The operation of the PBX will now be described with reference to Figures 2 and 3. It should be noted that the following description relates to two illustrative operating modes for the apparatus, and that a variety of different operating modes may be programmed by the user. Accordingly, the invention is not to be limited to the particular operating modes described below.

To illustrate the operation of the apparatus, it is assumed that the PBX 1 has been programmed by the user to divert calls from Individual A to a first extension, to divert other calls with embedded CLI information to a second extension, and to terminate calls without CLI information.

As mentioned above, termination of the incoming call may comprise controlling the apparatus to accept the call (or "pick up" the call), and then controlling the apparatus to terminate the call (or "hang up" the call) without routing it to an extension (or storage device). Alternatively, termination of the incoming call may comprise controlling the apparatus to accept the call (or "pick up" the call), and then route the call to one of the storage devices to record a message. As a further alternative, termination of the call may simply comprise controlling the apparatus not to accept the incoming call. Generally speaking, termination of the incoming call comprises controlling the apparatus to respond to the incoming call with a non-response, or in other words by controlling the apparatus to respond to the incoming call with a response generated by the apparatus, and that preferably does not require

the receiving party to be disturbed. In this particular example, the apparatus is controlled to replay a message to the calling party before the incoming call is terminated.

As shown in Figure 2, the controller 11 first determines, in step 30, whether or not the incoming call includes CLI information identifying the calling party. If the call does include CLI information, then the controller 11 compares the received calling parties' phone number with the numbers stored in the memory 19 to determine, in step 32, whether the source of the incoming call is individual A. If the embedded CLI information indicates that the source of the call is A (i.e. if the number embodied in the received CLI information matches the number for A stored in the memory 19), then the call is diverted to the first extension as pre-programmed by the user. If the embedded CLI information indicates that the source of the call is not A, then the call is routed to the second extension. In this example, the first extension could comprise a mobile phone wirelessly connectable to the matrix 7 and the second extension could be an answerphone connected to the PBX (as an alternative, the user could have chosen to record calls from calling parties other than A on one or both of the storage devices). In this way, the owner of the PBX would be able to receive calls from A, whilst other callers would be invited to leave a message.

If the controller 11 detects, in step 30, that the incoming call does not include CLI information or that the CLI information has been withheld, then the controller 11 controls, in step 34, either of the storage devices 13, 15 to replay a message to the calling party notifying them their phone number has not been received, and asking them to redial either without withholding their number (i.e. without prefixing the number called with "141") or by prefixing the number with "1470". Prefixing the dialled number with "1470" can manually disable a CLI block that has been remotely applied by a network operator, for example, and allows CLI information relating to the calling party to be transmitted. The controller then terminates, in step 36, the call and the calling party is forced to redial. This arrangement is not always satisfactory, however, as some CLI blocks cannot selectively be removed by prefixing a dialled number with "1470".

As a further alternative, selected users could be provided with unique access codes for use if the telecommunications network from which they are calling does not provide CLI information with calls, or if the CLI information cannot be revealed by prefixing the dialled number with "1470". Inputting the code number when the PBX replays the message stating that the calling parties' phone number has not been received would then allow the call to be completed (by routing it to an extension, for example) - assuming of course that the code is recognised by the controller 11. If the code is not recognised, then the call would be terminated.

Advantageously, CLI information relating to a calling party usually precedes an instruction embedded in the incoming call that sets the phone of the receiving party ringing. Thus, in the above example incoming calls with withheld (or not including) CLI information usually will not cause the phones or other devices connected to the PBX to ring and thus the incoming call can be dealt with without disturbing the receiving party. In the United Kingdom, for example, CLI information precedes the ringing instruction.

Figure 3 illustrates another operating mode of the PBX 1. In this example, it is assumed that the PBX 1 has again been programmed by the user to divert calls from Individual A to a first extension, to divert other calls with embedded CLI information to a second extension, and to request further information for calls without CLI information. As shown in Figure 3, the controller 11 first determines, in step 40, whether or not the incoming call includes CLI information identifying the calling party. If the call does include CLI information, then the controller 11 compares the received calling parties' phone number with the numbers stored in the memory 19 to determine, in step 42, whether the source of the incoming call is individual A. If the embedded CLI information indicates that the source of the call is A (i.e. if the number embodied in the received CLI information matches the number for A stored in the memory 19), then the call is diverted to the first extension as pre-programmed by the user. If the embedded CLI information indicates that the source of the call is not A, then the call is routed to the second extension. In this example, the first extension could comprise a mobile phone wirelessly connectable to the matrix 7 and the second

extension could be an answerphone connected to the PBX (as an alternative, the user could have chosen to record calls from calling parties other than A on one or both of the storage devices rather than on an answerphone connected to the matrix). In this way, the owner of the PBX would be able to receive calls from A, whilst other callers would be invited to leave a message.

If the controller 11 detects, in step 40, that the incoming call does not include CLI information or that the CLI information has been withheld, then the controller 11 controls, in step 44, either of the storage devices 13, 15 to replay a message to the calling party notifying them that their phone number has not been received, and asking them to input their phone number after the tone. Once the phone number has been received, the controller 11 compares the received number with the numbers stored in the memory 19 to determine, in step 42, whether the caller is A. If the caller is A, then the call is routed to the first extension as pre-programmed by the user. If the caller is not A, then the call is routed to the second extension. If the calling party does not input their phone number within an allotted time period, then the controller 11 controls a storage device 13, 15 to replay, in step 46, a further message inviting the calling party to leave a message. The controller then controls a storage device 13, 15, in step 48, to record the message from the calling party and then terminates, in step 50, the call.

Once again, as the CLI information usually precedes the ringing instruction in the incoming call, it can be possible for the above process to be accomplished without ringing any of the phones attached to the PBX 1 and thus without disturbing the receiving party.

The PBX may also be provided with a large number of other functions. For example, the controller could be programmed to play different greetings messages in dependence upon the identity of the calling party. This would enable the user of the PBX to leave a message for a specific individual (such as "Mum, I'm out at the moment but I'll be back later tonight") without other calling parties being able to listen to that message. The PBX may also be programmed to ring extensions using ring tones that vary in dependence upon the identity of the calling party. In this way, it

would be possible for the receiving party to identify the calling party simply by listening to the extension's ring tone.

The PBX may also be programmed to acknowledge incoming calls and/or to ring extensions using a digitised voice. To implement this feature, a user of the PBX would first of all store a telephone number in the memory 19 and then record a name on one of the storage devices for association with the number stored. This process could be repeated to build a database of telephone numbers and associated recorded names.

Upon receipt of a call that includes CLI, the controller 11 could search through the memory 19 and if the number embodied in the CLI information matched one of the numbers stored in the memory (and if that number has a recorded name associated with it), then the controller could retrieve the name associated with that number, and replay the name at an appropriate point in a greetings message to the calling party. The controller could also replay the stored name with another suitable message through a speaker of a phone, for example, that comprises one of the extensions 5 connected to the matrix 7 so that the receiving party would know who was calling. In this way, if a calling party, Bill Smith, who has his number stored in the PBX together with a recorded name calls the PBX he may receive a message saying, for example, "Hello Bill, please wait while we try to connect you". Simultaneously, another message - for example: "Bill Smith is calling" - could be replayed through a loud speaker of a phone, for example, comprising one of the extensions so that the receiving party knows who is on the phone.

The PBX may also be programmed to recognise incoming international calls, and to take appropriate action (for example to mark them as being of high priority), as CLI information also indicates whether the call is a national or international call.

In one embodiment of the invention, the PBX is also be connected to other articles for the control thereof. In a preferred example, the PBX is connected to an electronic door lock (for example on an entry door of a user's house or place of business) and is capable of unlocking the door to allow access to the building. The door is provided with an entry phone that is connected to the PBX and effectively

functions as one of the extensions.

Persons arriving at the door are able to leave messages, for example, on the PBX by operating the entry phone. In addition, the PBX is programmable to forward calls from the door entry phone to any of the other extensions connected to the PBX. In this way, it is possible for persons within the building to interrogate the caller at the door without having to first open the door, and without having to move to a particular fixed extension.

The PBX can also be programmed to replay an interrogating message to persons calling at the door, answers to which can be stored on the PBX so that they can be listened at a later point in time by the occupier of the building. In other words, the PBX can be programmed to operate as an answering machine for the door so that the occupier can screen callers, or can retrieve messages from persons who have called when the occupier is not available to open the door. When the PBX routes a call from the entry phone to an extension, it is preferred that the PBX modifies the ring tone of the extension to identify to the user of the extension that the call originates at the door of the building.

To screen callers, persons resident in the house can listen, from any selected extension, to the interrogation process without revealing that they are inside the building. If the resident decides that they do not want to speak to the caller, then they can simply let the PBX record a message from the caller. On the other hand, if the resident wishes to speak with the caller, then they can interrupt the interrogation process, and speak directly with the caller.

The PBX may also be programmed to recognise certain number combinations dialed from the entry phone, and to control the lock accordingly. For example, a resident's cleaner may be given a numerical code which, when entered at the entry phone, identifies the cleaner to the PBX. The PBX then opens the door to allow the cleaner access to the building. The code may also be associated with a time range or a date range to restrict access of the cleaner, in this example, to the building. For example, the cleaner could be restricted to access between the hours of 9.00am and 10.00am on Mondays, Wednesdays and Fridays. Any attempt by the cleaner to use the

code to access the building outside of these hours or on other days would not cause the door to be opened by the PBX. It is also conceivable that apparatus for confirming the identity of the caller, for example by comparing the callers fingerprint or retinal plan with a stored print or retinal plan, could also be provided so that the caller may only gain access to the building if they know the code, and if they pass scrutiny by the identity confirming apparatus.

The PBX could be programmed to ring a given extension with a ring tone particular to the code allocated to a given person. In this way the user will be able to identify aurally who it is that is controlling the PBX to let themselves into the building. The PBX could also be programmed to relay a particular message to a caller identified by way of an allocated code. Alternatively, the PBX could be programmed to relay a particular message to all callers. The PBX could also be connected to other types of equipment to allow a user calling into the PBX to control that equipment.

Figure 4 shows a schematic representation of an operating mode of the PBX 1 such as that described above. In step 52, the PBX 1 peridoically determines whether or not the entry phone (not shown) has been activated. If the entry phone has been activated, then a precorded message is replayed to the user of the entry phone in Step 54.

The PBX 1 then determines - in Step 53 - whether or not a code has been inputted into the entry phone. If a code has been inputted, the controller compares in Step 55 the inputted code with prerecorded codes stored in the PBX and, if the code is verified, opens the door (step 57).

If a code is not inputted, the PBX waits for a response from the user of the entry phone, and if preprogrammed appropriately (step 56), routes the response in step 58 to a selected extension where the resident is notified by a special ring tone that the entry phone has been activated. The resident is then able to listen into the caller's response to determine whether or not they wish to let the caller into the building. If the resident does not wish to speak with the caller, then the caller is invited in step 60 to leave a message for the resident. On the other hand, if the resident does wish to speak to the caller, then they can now do so by using the extension appropriately, and can if

desired open the door.

If no forwarding instructions have been preprogrammed, then the caller is invited, in step 60, to leave a message.

It can be seen from the above that the PBX 1 can provide a useful means of monitoring callers, and for avoiding those callers that the resident does not wish to speak to. The PBX according to the above embodiment could also be used effectively in a business environment, for example to unlock a door during business hours and to lock the door outside of business hours. It is even conceivable that the PBX could be programmed to lock a door when supplied with a remote telephonic instruction, so that a resident who has left without locking the door can call the PBX and instruct it to lock the door without having to return.

It will be understood that aspects of the invention have been described herein by way of example only, and that modifications may be made within the scope thereof. For example, whilst the foregoing illustrative embodiments employ various discrete components, it will be appreciated that embodiments of the invention could be implemented in any one of a number of different ways. For example, an embodiment of the invention could be implemented by one or more Application Specific Integrated Circuits (ASIC's) or entirely by software, or by a combination of ASIC's and software.

One particularly advantageous embodiment of the invention would be a mobile phone. Most modern mobile phones are almost entirely software-driven and thus the invention could be implemented simply by adapting the software of the phone. A user would then be able to turn the features of the invention on and off at will simply by selecting an option from a menu displayed on the phone.

In addition, whilst the embodiment described herein relates to a PBX, it will be appreciated that the teachings of the invention are equally applicable to a telephone, for example, that is directly connected (or indirectly connected by a wireless interface) to the telecommunications network.

Generally speaking, the teachings of the invention may be implemented in any item of telecommunications apparatus. References herein to "telecommunications apparatus" being intended to encompass any and/or all items of communications

apparatus such as telephones (wired or wireless), mobile phones, answerphones, pagers, facsimile machines (or fax modems), and telephone exchanges (either public or private).

In a further simplified aspect of the invention, there is provided a PBX (not necessarily one that acts on CLI data) that includes means for unlocking a door in response to a code received by the PBX. The code may be inputted manually or automatically into the PBX from a door entry phone, a local extension connected to the PBX, remote telecommunications apparatus connectable to the PBX or from any other means.

CLAIMS

1. Telecommunications apparatus comprising a controller that is operable to modify the operation of said apparatus upon the receipt of an incoming call from a calling party that includes an embedded signal indicating that information identifying said calling party is not available.

2. Apparatus according to Claim 1, wherein said controller controls the apparatus to respond to said incoming call.

3. Apparatus according to Claim 2, wherein said controller controls the apparatus to respond to said incoming call by terminating said incoming call.

4. Apparatus according to Claim 3, wherein said apparatus terminates said call by accepting (i.e. by picking up) the call, and then terminating (i.e. by then hanging up) the call.

5. Apparatus according to Claim 4, wherein said apparatus is controlled to replay a message to the calling party prior to terminating the call.

6. Apparatus according to Claim 2, wherein said apparatus terminates said call by not accepting (i.e. by not picking up) the call.

7. Apparatus according to Claim 2, wherein said controller controls the apparatus to respond to the calling party with a request for the calling party to input said identifying information.

8. Apparatus according to Claim 7, wherein said request for identifying information is recorded on a recording medium and is replayable to the calling party.

9. Apparatus according to Claim 7 or Claim 8, wherein said controller terminates (i.e. "hangs up") said call if said identifying information is not inputted within a predetermined period of time.

10. Apparatus according to Claim 7 or Claim 8, wherein said controller controls the apparatus to record a message from the calling party if said identifying information is not inputted within a predetermined period of time.

11. Apparatus according to Claim 2, wherein said controller controls the apparatus to respond to said incoming call by diverting said incoming call.

12. Apparatus according to Claim 11, wherein said controller controls said apparatus to divert said incoming call to a recording means.

13. Apparatus according to Claim 12, wherein said recording means is provided within said apparatus.

14. Apparatus according to Claim 12, wherein said recording means is external to said apparatus and connectable thereto.

15. Apparatus according to Claim 12, wherein said controller is operable to control said apparatus to divert said incoming call to telecommunications equipment connected to said apparatus.

16. Apparatus according to any preceding claim, comprising a memory that is capable of storing a plurality of telephone numbers.

17. Apparatus according to Claim 16, wherein said memory is also capable of storing alphanumeric characters associated with said telephone numbers.

18. Apparatus according to any preceding claim, wherein said embedded signal includes the calling parties' telephone number.

19. Apparatus according to Claim 18 and Claim 16 or Claim 17, wherein said controller is operable to compare the calling parties' telephone number with said telephone numbers stored in said memory.

20. Apparatus according to Claim 19, wherein said controller is operable to cause the apparatus to respond to the calling party with a predetermined message if the calling parties' telephone number should match one of the telephone numbers stored in the memory.

21. Apparatus according to Claim 20, wherein said message is recorded by a user onto recording means of said apparatus.

22. Apparatus according to Claim 20 or 21, wherein said controller is operable to replay a second predetermined message associated with the calling parties' telephone number to telecommunications equipment connected to said apparatus.

23. Apparatus according to any of Claims 19 to 22, wherein said controller is programmable to divert said incoming call if the calling parties' telephone number should match one of said stored telephone numbers.

24. Apparatus according to any preceding claim, wherein said information identifying said calling party comprises CLI.

25. Apparatus according to Claim 24, wherein said embedded signal indicates either that said CLI information is not available, or that said CLI information has been withheld.

26. Apparatus according to any preceding claim, comprising an interface for connection to one or more telephone lines of a telecommunications network, an interface for connection to one or more local telephone lines, and a switching matrix for connecting one or more of said telecommunications network lines to one or more of said local telephone lines, said controller being operable to control interconnection of said telecommunications network lines and said local lines.

27. Apparatus according to any preceding claim, wherein said controller is programmable.

28. Apparatus according to any preceding claim, wherein said telecommunications apparatus is connectable to an electronic lock and said controller is operable to lock and/or to unlock said lock.

29. Apparatus according to Claim 28, wherein said lock is mounted on a door and said controller is operable to lock and/or to unlock said door.

30. Apparatus according to Claim 28 or 29, wherein said apparatus is connectable to an entry phone and is capable of recording messages from a calling party and/or replaying prerecorded messages to said calling party via said entry phone.

31. Apparatus according to Claim 30, wherein said controller is operable to route a call from said entry phone to another item of telecommunications apparatus connected to said apparatus.

32. Apparatus according to Claim 30 or 31, wherein said controller is operable to unlock said lock when said controller senses that a code has been inputted into said entry phone and detects that said code satisfies a predetermined condition.

33. A telephone exchange comprising:

an interface for connection to a telecommunications network;

an interface for connection to one or more local lines;

a switching matrix operable to selectively connect said local lines to said telecommunications network, and

a controller for controlling said switching matrix, and for modifying the operation of the exchange upon the receipt of an incoming call from a calling party that includes an embedded signal indicating that information identifying said calling party is not available.

34. A method of controlling telecommunications apparatus, the method comprising the steps of:

receiving an incoming call from a calling party;

determining whether said incoming call includes an embedded signal indicating that information identifying the calling party is not available; and

modifying the operation of said apparatus if it is determined that said incoming call includes said embedded signal.

35. Telecommunications apparatus comprising:

a controller that is operable to detect an embedded signal in an incoming call, said controller being operable to control the apparatus to perform one or more of a first set of predetermined tasks upon detection of said embedded signal or to perform one or more of a second set of predetermined tasks if said embedded signal is not detected, wherein said embedded signal indicates that information relating to the identity of a party making said incoming call is not available.

36. Telecommunications apparatus for use in a system in which CLI information preceding or proceeding the ringing tone is provided but may be withheld by the calling party, the apparatus including a controller which detects the CLI data and if the CLI data is present initiates a first action, and if the CLI data is absent initiates a second action, wherein the second action includes terminating the call without allowing ringing to occur in response to the ringing tone.

37. Telecommunications apparatus substantially as hereinbefore described with reference to the accompanying drawings.

38. A telephone exchange substantially as hereinbefore described with reference to the accompanying drawings.

The Patent Office
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Application No: GB 9820527.1
Claims searched: 1 to 38

Examiner: Jared Stokes
Date of search: 22 January 1999

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.Q):

Int Cl (Ed.6): H04M (1/57, 11/02)

Other: On-Line - WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
Y	EP 0 498 997 A2	(Technophone) See abstract	17
X	EP 0 439 927 A2	(AT&T) See abstract, whole document	1-9,16-19,24-27,33-36
X	WO 98/30005 A1	(Ericsson) See whole document	1,2,18,24,25,33-36
X,Y	WO 98/27707 A1	(Ericsson) See abstract, whole document	X: 1-9,16,18,24-26,33-36 Y: 17
A	WO 97/36416 A1	(Lee) See abstract, whole document	28-32
X	WO 96/18258 A2	(Voice) See page 8 line 21-page 9 line 6, page 10 line 12-page 12 line 20	1-6,10-16,18-27,33-36
X	US 5 533 106	(Blumhardt) See figure 5	1-9,16,18,19,24-27,33-36

X Document indicating lack of novelty or inventive step
Y Document indicating lack of inventive step if combined with one or more other documents of same category.
& Member of the same patent family

A Document indicating technological background and/or state of the art.
P Document published on or after the declared priority date but before the filing date of this invention.
E Patent document published on or after, but with priority date earlier than, the filing date of this application.

Application No: GB 9820527.1 **Examiner:** Jared Stokes
Claims searched: 1 to 38 **Date of search:** 22 January 1999

Category	Identity of document and relevant passage		Relevant to claims
X	US 5 206 900	(Callele) See column 3 lines 6-33	1-9,11-21, 23-27, 33-36
A	US 4 937 855	(McNab et al.) See abstract	28-32
A	US 4 764 953	(Chern) See whole document, column 4 lines 46-51, column 8 lines 29-30	28-32

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.