(12) UK Patent Application (19) GB (11) 2 328 109 (13) A

(43) Date of A Publication 10.02.1999

(21) Application No 9716297.8

(22) Date of Filing 02.08.1997

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(51) INT CL^6
H04M 19/04 1/64 1/65

(52) UK CL (Edition Q)
H4K KBHC KBHE

(56) Documents Cited
WO 91/12685 A1 **WO 91/07041 A1** **US 5598461 A**

(58) Field of Search
UK CL (Edition P) **H4K KBHC**
INT CL^6 **H04M 1/00 19/04**

(54) Abstract Title
A telephone apparatus comprising means for generating a unique ringing sound identifying the called party

(57) An apparatus 11 is disclosed for connection between a conventional telephone 12 and socket 13. The apparatus upon receipt of an incoming call plays a pre-recorded message to the caller requesting them to identify the intended recipient of the call by entering a number on their keypad. The apparatus responds by generating a unique ringing sound associated with the identified recipient wherein the ringing sound is generated by a combination of audible indicators 18-20 eg. a bell, piezo-electric transducer or electromagnetic vibrator. Alternatively, the audible indicators may be replaced by a tone generator. A visual indicator eg. a lamp 25-28 may also be provided. Switches 21-24 are provided which can be activated by individual subscribers to indicate their presence or absence. If the identified recipient is absent then an appropriate message is played to the caller inviting them to record a message.

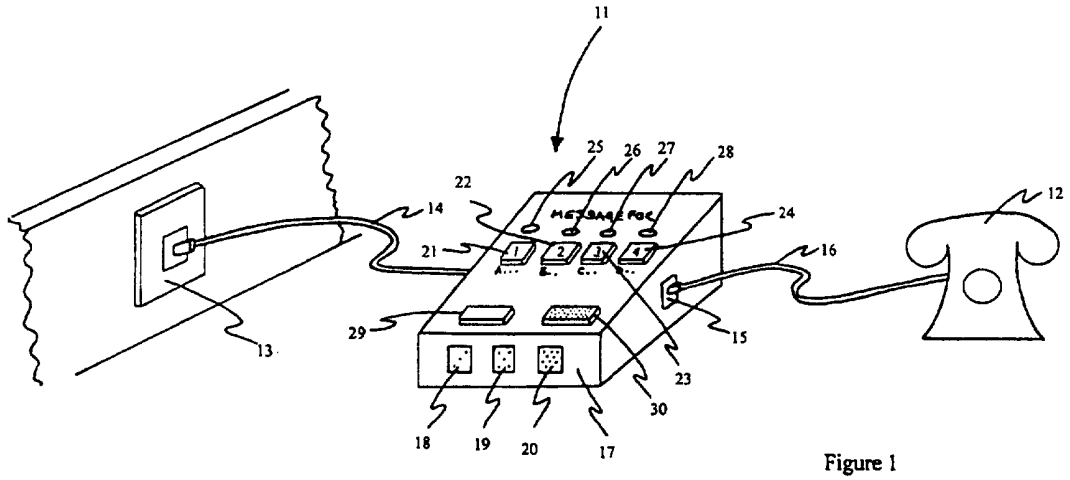
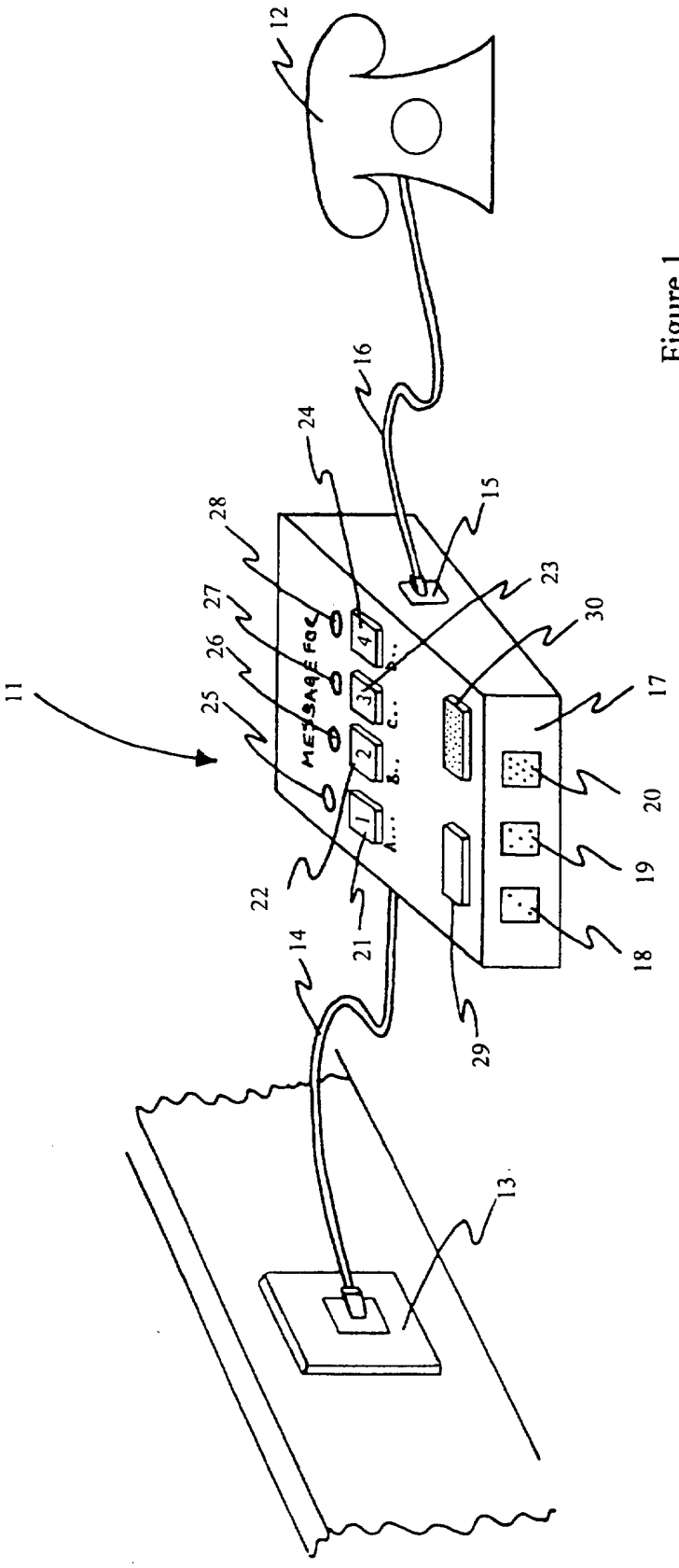


Figure 1

GB 2 328 109 A

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1995


11
12
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21
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23
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25
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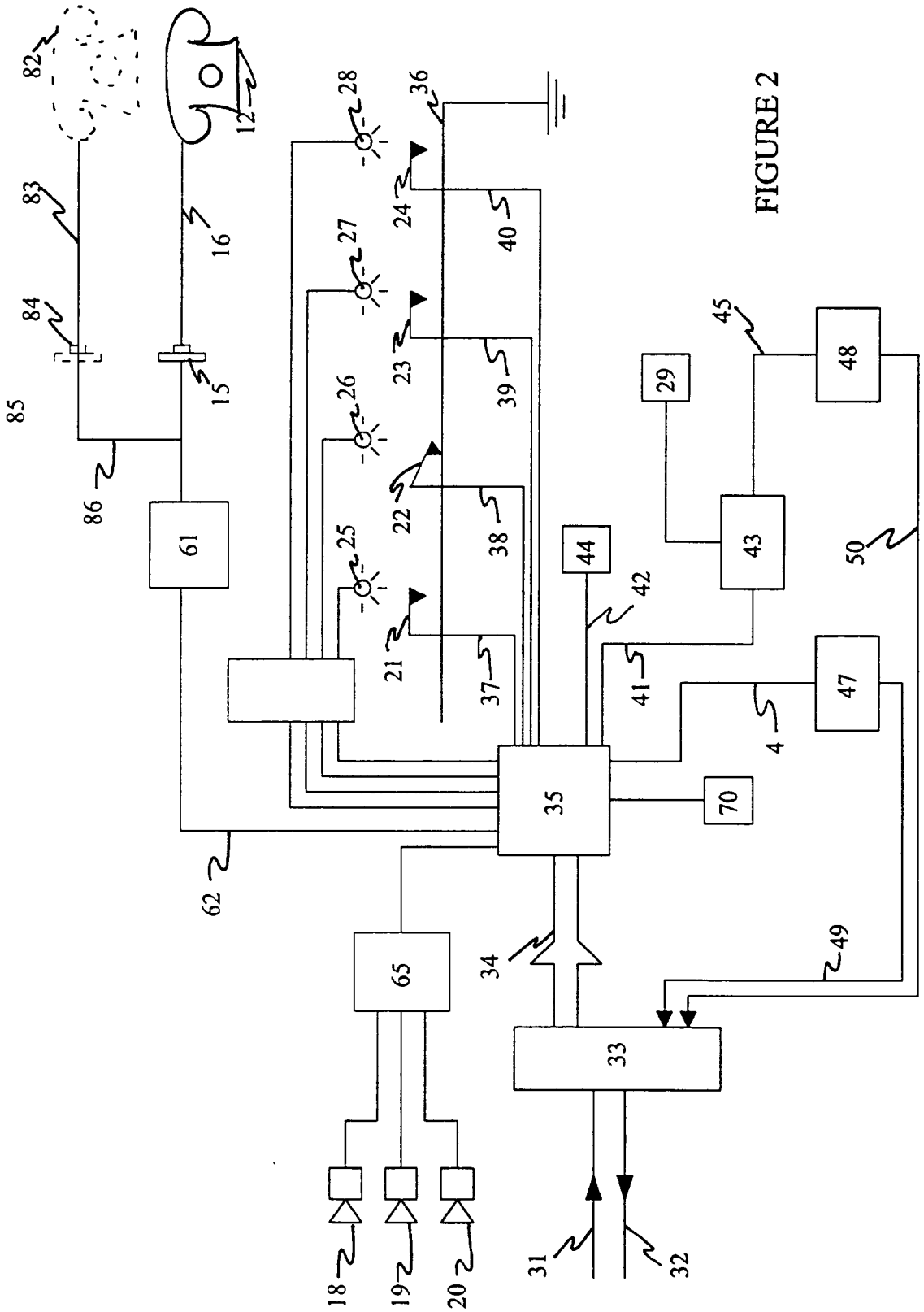
29
30
MESSAGE FOR
1
2
3
4

Figure 1


82
12
83
16
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62
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47
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35
70
65
34
49
33
18
19
20
31
32

FIGURE 2

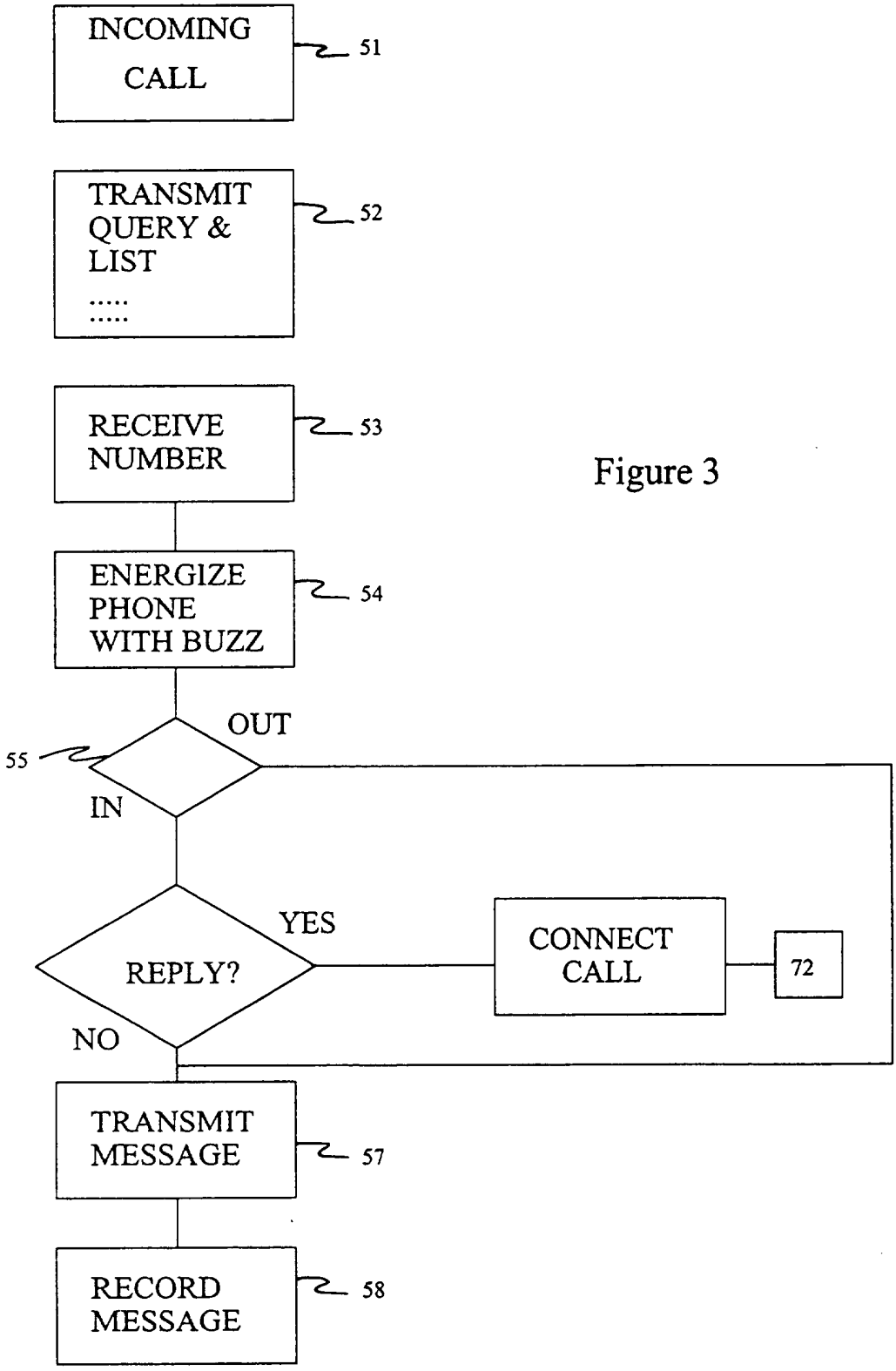
INCOMING CALL
51
TRANSMIT QUERY & LIST
.....
.....
52
RECEIVE NUMBER
53
ENERGIZE PHONE WITH BUZZ
54
55
OUT
IN
REPLY?
YES
NO
CONNECT CALL
72
TRANSMIT MESSAGE
57
RECORD MESSAGE
58

Figure 3

IMPROVED TELEPHONE APPARATUS

The present invention relates generally to improved telephone apparatus, and particularly to apparatus having additional features which are particularly useful in domestic situations.

In many, if not most, households the telephone represents an important communication link with other members of the family and/or social group of the individuals in the household. These social groups may overlap in the sense that they have some members in common, but in general are largely distinct from one another. When the telephone rings to alert the members of a household that a caller is trying to contact one of them, there is at present no way in which the members of the household can identify which of them the caller wishes to speak to until the telephone handset is lifted and direct speech communication is established. This results in the situation that, for the majority of the time (in households having more than two members), the person answering the telephone is in fact not the person to whom the caller wishes to speak and it then becomes necessary for the call-answering individual to communicate with other members of the household in order to locate and alert the intended recipient of the call. This can result in shouted conversations between individuals in different rooms or on different floors of the building, or may

involve the call-receiving individual in the necessity physically to go to another room or another floor in order to communicate with the intended recipient. Shouted conversations are disturbing to other members of the household who may be engaged in tasks from which they do not wish to be disturbed, and the inconvenience of having to search for an intended recipient frequently results in the household members having a certain reluctance to answer the telephone since the likelihood of that individual being the intended recipient is low. This is especially true in non-family households such as student hostels or houses where undergraduates from different families and backgrounds, and therefore having different social networks, live together for economy and convenience.

The present invention seeks to provide telephone apparatus in which it is possible for a caller, at least in some circumstances, to identify which member of a household is the intended recipient of the call before the handset is answered and voice communication is established. In this way it is easy for the members of the household, who are not the intended recipients of the telephone call, simply to ignore it, safe in the knowledge that the call is not for them. The intended recipient, however, can answer the telephone knowing that he or she will not be concerned with the troublesome task of finding another member of the household and

transferring the call.

According to one aspect of the present invention, therefore, there is provided automatic telephone apparatus having means for generating a plurality of different call sounds, in which there are provided means by which a caller may select which of the cal sounds is to be generated, whereby to identify as intended recipient of the call.

The selection of the call sound may be made in response to a pre-recorded information massage identifying the relationship between call sounds and recipients, which message is automatically transmitted to the caller immediately the telephone connection is made and before any call sound is emitted by the apparatus. This selection may be made by depressing an appropriate key of its caller's telephone keypad or, alternatively, by making use of voice recognition technology, the caller may simply speak the name of the intended recipient on the number or name of the associated call sound.

It is thus possible for telephone apparatus to produce a call sound which is uniquely identified with the intended recipient of the call from a group of potential recipients available from the telephone. Of course, it is recognised that it is already possible to select different ring tones from a given telephone. However,

although a whole range of tones and tunes can be set, only one is generated at any one time and, once set, remains set until changed by the user.

As a further refinement, which accommodates the fact that an intended recipient may not be present, the apparatus of the invention may further be provided with a plurality of previously-recorded individual messages in addition to the said invitation message and operable in response to an incoming call signal on the line to make a connection to the line and transmit to the caller the said invitation message, acting in response to the signals transmitted on the line by the caller to activate a selected one of the previously-recorded messages.

Associated with each of the previously-recorded messages may be means for recording a message from the caller allowing the apparatus to act as a telephone answering machine operating individually for each member of the household rather than collectively as in current known telephone answering machines.

The apparatus may further include means for storing a plurality of auxiliary signals representing the presence or absence of an individual (or his or her willingness to be reached by callers) whereby automatically to trigger the selected one of the said plurality of previously-recorded messages upon receipt of a selection signal from

the caller.

The automatic telephone answering apparatus of the present invention may be so adapted that the auxiliary signals automatically trigger the appropriate recorded message for initiating recording of a message from the caller. If the auxiliary signal is not present the apparatus will operate, in the manner described above, to generate a call signal identifying the individual intended recipient and will trigger the individual pre-recorded message if the telephone handset is not lifted after a predetermined time.

Preferably the individual call signals are acoustic signals although they may be visible signals and/or a combination of acoustic and visual signals. The individual signals may be generated by individual signal generators (acoustic indicators in the case of acoustic signals) selectively operated by the apparatus in response to the selection made by the caller when receiving the invitation message.

Alternatively the individual signals may be generated by a single signal generator (again an acoustic indicator in the case of acoustic signals) capable of varying its output in response to the selection made by the caller upon receiving the invitation message. Such devices are already known. Purely visual signals may be generated in

addition to the normal call sound or in place of this.

The telephone apparatus of the invention may also include one or a plurality of extension lines with associated extension handsets. As well as the sounds emitted by the telephone apparatus (or instead of these) the extension handsets may be adapted to emit one or all of the said plurality of call sounds.

Embodiments of the invention may be formed in which the or each extension handset is adapted to emit only one of the said call sounds, in response to the appropriate energising signal, but to emit no sound in response to an energising signal representing other of the call sounds. In this way individuals may have an extension in their own room (for example a parent's bedroom) which will not sound and disturbs them if a call for a teenager is received calls at night, with obvious advantages for all parties.

The present invention also comprehends a method of identifying a called person automatically by generating an invitation message when the telephone apparatus is addressed by an incoming call, and generating different visual and/or audible signals in dependence on the caller's response to the invitation message.

Embodiments of the present invention will now be more

particularly described by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a schematic perspective view of telephone apparatus formed as an embodiment of the present invention;

Figure 2 is a block schematic diagram illustrating the major functional components in the apparatus of Figure 1; and

Figure 3 is a flow chart representing the major steps in the operation of the apparatus illustrated in Figure 2, with various alternatives illustrated.

Referring first to Figure 1, the apparatus shown comprises a unit generally indicated 11 adapted to be fitted between a standard unmodified telephone 12 and a normal telephone line connector socket 13. For this purpose the telephone apparatus 11 is provided with a connecting lead 14 for connection to a telephone line via the socket 13, and with its own socket 15 for connection to the telephone 12 via the telephone line 16 with which the telephone is provided. The telephone apparatus of the invention can thus be interposed in a normal telephone system such as that with which most domestic households are provided. The apparatus 11 is housed within a casing 17 having a front wall with a number (three are shown) of individual acoustic indicators 18, 19, 20 each acting to emit a characteristic and different sound when energised.

By way of example (which is intended to be non-limitative) the acoustic indicator 18 may be a conventional metal bell generating a ringing sound; the indicator 19 may be a known piezo electric or other acoustic transducer generating a low pitched buzzing sound and the acoustic indicator 20 may be an electromagnetic vibrator generating a high pitched sound. The three audible indicators 18, 19, 20 can be used to identify more than three individuals in a household by the selective application of different sound patterns or by generating signals alternately to energise two of the indicators in sequence or one with a recognisable pattern. Thus, for example, the bell 18 alone may be used to identify two different individuals by generating a first ringing sound comprising a single short ring followed by a long space (for example with the bell sounding for half a second and the spaces between individual activations lasting for one to one and a half seconds) or a second sound comprising two successive activations in close succession followed by a long space. Alternatively, other embodiments (not shown) may be provided with a single tone generator capable of generating one of a plurality of different sounds when appropriately energised.

The casing 17 also carries a number of push buttons 21, 22, 23 and 24 identifying, in this example, four different sound signals which can be emitted by the

appropriate combination of activations of the acoustic indicators 18, 19, 20. Lamps 25, 26, 27, 28 are associated with each push button and illuminate when a call identifying a particular individual is being routed to the telephone handset 12.

The casing 17 also includes a "record" button 29 and a microphone 30 the operation and function of which will be discussed in more details below.

Referring now to Figure 2, the input line generally indicated 14 in Figure 1, comprises two conductors 31, 32, the first carrying incoming signals from an outside caller and the second carrying outgoing speech signals from the equipment. The lines 31, 32 lead to a buffer 33 which, among other things, converts the analogue speech signals arriving on line 31 into digital form for impression onto a data bus 34 leading to a micro-processor 35 which processes the signals. It is to be appreciated that the analogue signals arriving on line 31 comprise not only the speech information signals intended to be passed on via the socket 15 to the telephone handset 16, but also the tone command signals generated by the key for dialing and other purposes. The micro-processor 35 discriminates between the digitised speech signals and the tone signals, and on the basis of tone signals received transmits "interrogate" signals on lines 37, 38, 39 and 40 leading to electrical switches

connected to the push buttons 21, 22, 23, 24 previously mentioned (the switches being identified with the same reference numerals as the push buttons in Figure 1). These switches are normally-open and close onto a line 36 coupled to earth such that the interrogation signal on the lines 37, 38, 39, 40 can return a high (open circuit) value or a low (short circuit) value depending on whether the push button has been depressed or not. In Figure 2 the push button switches 21, 23, 24 are shown in their normal position and the push button 22 is shown depressed to connect the switch to the earth line 36.

On the basis of the signal returned from the interrogation of the lines 37-40 the micro processor 35 addresses a memory 43 or a memory 44 on lines 41, 42 respectively. The memory 44 is a read-only memory containing a data sequence representing a predetermined message or set of messages, whilst the memory 43 is a read/write memory which is enabled by depression of the "record" button 29 referred to in Figure 1. The memory 43 has a plurality of separate storage sections to store data representing a plurality of messages at different addresses. Output from the memory 43 is applied to line 45 which leads to a synthesiser 48 which synthesises speech signals from the data messages stored in the memory 43 and outputs them on a line 50 to the buffer 33 where they are converted into analogue form and applied to the transmission line 32.

In use of the apparatus described the users (that is members of the household) have individual buttons 21-24 allocated to them and , as shown in Figure 1, they may even have labels with their own names positioned adjacent the buttons for identification purposes. Each button is also identified with a unique number which is recognised by the micro-processor as identifying the individual allocated to that number.

Upon receipt of an incoming call on line 31 the buffer 33 does not make a connection direct to the telephone handset 12 on the line 16 via the relay 61 and the line 62, but rather transmits digital data along the data bus 34 to the micro-processor 35 which, identifying the data signals as a "ring" signal energises the read-only memory 44 on line 42 to generate an invitation message which it then feeds out on line 46 to the synthesiser 47 from where it is applied via line 49 to the buffer 33 and from there to the transmission line 32. The invitation message is pre-recorded in the ROM 44 as a preliminary measure in the setting up of the system by allocation of the identification numbers to the individuals in the household. The invitation message thus links the members of the household to the individual number and invites the caller to depress a key of the telephone keypad (or two keys if the system should exceed ten individuals in the household) whereupon the micro-processor sets itself to

a "wait" mode for the arrival of the tone on line 31 identifying the caller's intended recipient. In another embodiment (not shown) the microprocessor has associated voice recognition circuitry so that the caller need only speak the name or associated number of the intended recipient.

At the same time, whilst awaiting this response, the micro-processor 35 interrogates the switches 21-24 on lines 37-40 to establish which are in the "high" or open circuit condition and which are in the "low" or closed circuit condition. Upon arrival of the tone or voice signal from the caller the micro-processor compares these "status" signals with the caller's identifying call signal to establish whether the call signal represents an individual whose corresponding status button 21-24 is in the high or the low state. If the button is in the high state indicating that the push button has not been depressed, the micro-processor issues a "connect" command on line 62 to the relay 61 thereby connecting the telephone handset 12 to the lines 31, 32. At the same time the microprocessor generates an output signal to the driver 65 on line 64, commanding it to energise a selected one of the acoustic indicators 18, 19, 20. Up to this point the equipment has been entirely silent and there has been no indication of the fact that a caller is trying to make a connection. Immediately the connection

is made, however, the equipment issues a characteristic sound recognised by all individuals within the household as relating to one of the particular individuals. This individual may then answer the telephone (or not if he chooses) and the conversation will proceed normally.

If the identified individual is temporarily unavailable, or wishes not to answer the telephone, the other members of the household can safely ignore the call knowing that it is not for them. After a delay period set by a timer 70 connected to the micro-processor 35, the relay 61 is closed, disconnecting the telephone handset 12, and the micro-processor then addresses the second memory 43 with a signal identifying the called individual. This directs the energisation signal to a corresponding address in the memory 43 which therefore outputs a message relating to that identified individual. The message is transmitted on line 45 via synthesiser 48 to the buffer 19 and is transmitted on the telephone line. If the message requires a response the caller may announce his response which is transmitted via the buffer 33 and the digital data line 34 through the micro-processor 35 to a corresponding address in the memory 43, at the same time setting a flag in the micro-processor 35 to energise one of the lamps 25-28 associated with the selected individual.

Thereafter, at some later time, or upon return if the

individual was absent, the illumination of the message lamp alerts him to the fact that there is a message recorded in the memory address area allocated to him for that purpose and by touching the associated switch key 21, 22, 23 or 24 thereby causing a change of state from "high" to "low" or vice versa as will be described below, the micro-processor 35 is signaled to cause replay of the recorded message through an internal load speaker (not illustrated).

If the individual knows in advance that he or she will be absent from the premises, or otherwise unavailable for telephone calls, it is a simple matter to touch their associated button as they leave, or to indicate their unavailability. Then when the incoming call activates the micro-processor 35 to interrogate the switches 21-24, the return of a "low" signal indicates to the micro-processor that, instead of connecting the relay 61 and waiting for time out from the timer 70, it is to energise the appropriate address area in the memory 43 to generate the related previously-recorded message and, correspondingly, record a response message from the caller if appropriate.

A further possibility is shown if figure 2 by the extension telephone 82 shown in broken outline. Only one extension is illustrated in the drawing although it will be appreciated that several extensions may be provided within the usual constraints for telephone system

characterised by the REN (ringer equivalence number) of the systems.

The extension handset 82 is connected by a line 83 (in practice a conductor pair) terminating in a plug 84 fitted in a socket 85 connected by a permanent line 86 to the output of the relay 61 so that upon energisation of the relay 61 all the sockets 15, 85 and thus all the telephone handsets 12, 82 are energised.

In this case, because the extension handset 82 would be in location sufficiently remote from the telephone 12 that sounds from the units 18, 19, 20 cannot be heard , it is provided with its own sounder unit. This also has means for selecting which of a plurality of sounds will be generated in response to the appropriate signal so that the extension will ring only in response to energisation signals to which it is "programmed" by the choice of sound. Although, because all the extension are connected in parallel with one another, the energisation signals are applied to all of the handsets, only those having the appropriate choice of related sound will respond to any one signal, remaining silent upon the arrival of any other signal. In this way each telephone extension is effectively "tuned" to its related user and only issues a call sound when the caller has previously indicated that choice of intended recipients. Telephone extensions in the room of different people will therefore

not ring to disturb them if a telephone call is for a different person.

The sequence of process steps is illustrated in Figure 3. Step 51 represents an incoming call which, upon recognition by the micro-processor 35, causes the first transmission step 52, referred to hereinabove as the invitation message. The text of the message may, for example, be transmitted as ...." the Smith family have personal numbers as follows: John is 1, Jane is 2, Jack is 3 and Julie is 4. Please press one of keys 1 to 4 to identify the person to whom you wish to speak." If, for example, the caller wishes to speak to the individual identified by numeral 1 then upon depression of the "1" key on the key board the appropriate information will be transmitted to the micro-processor 35. This is represented in Figure 3 as step 53 "receive number". In response thereto the micro-processor operates at step 54 to energise the telephone equipment with the appropriate acoustic signal recognised by the family as identifying the person allocated numeral 1.

The system then moves on to the status check step 55 during which the switches 21-24 are interrogated. If the appropriate status switch is not depressed the system moves on to step 56 to check that the handset 12 is lifted and the telephone call commences. If the answer to

this query is "Yes" the timer 70 is disabled at step 72 and the telephone 12 remains connected to the outside line for as long as the conversation lasts, terminating only with replacement of the handset in the usual way.

If, on the other hand, the response to the query at step 56 is "No" that is if the telephone handset is not lifted, then at the end of the period set by the timer 70, the system moves on to step 57 with the message identified by the caller's response number being transmitted on the outside line 32. At the end of this message the system moves on to step 58 to allow a response message to be recorded in the area of the memory 43 allocated for this purpose.

If at step 55 the response to the status enquiry is that the switch is in its "low" state the system immediately moves on to step 57.

Various additional sophistications may be included in this system, for example the micro-processor may be programmed to reset the timer 70 when the telephone connection is made by the relay 61 with a limited time being allocated to certain of the numbers so that, for example, the conversations of teenage children can be limited to no more than thirty minutes or such other time as appears suitable to the parents.

Furthermore, should the caller have no preference for a particular individual, the micro-processor will detect the lack of response within a selected time period and act to energise an acoustic indicator 18, 19, 20 or combination of indicators (perhaps all of them) which will be recognised by the individual members of the family as indicating that the caller wishes to speak to anyone who will answer the telephone.

CLAIMS

1. Automatic telephone apparatus having means for generating a plurality of different call sounds to indicate to a user that there is a call waiting to be answered, and having means responsive to an incoming call signal on the line and operable to complete the line connection and to transmit to the caller a previously-recorded information message identifying a choice of intended recipient and inviting the caller to make a choice by transmitting a signal by selection of a key on the caller's telephone keypad, whereby to select which of the call sounds is to be generated at the called apparatus.

2. Automatic telephone answering apparatus having means for storing a plurality of previously-recorded individual messages and an invitation message, and operable in response to an incoming call signal on the line to make a connection to the line and transmit to the caller the said invitation message, and in response to signals transmitted on the line by the caller operable to activate a selected one of the previously-recorded messages.

3. Automatic telephone answering apparatus as claimed in Claim 1 or Claim 2, in which the apparatus has means for storing a plurality of auxiliary signals representing

the presence or absence of an individual (or his or her willingness to be reached by callers).

4. Automatic telephone answering apparatus as claimed in Claim 3, in which the auxiliary signals automatically trigger the appropriate recorded message for inviting recording of the message from the caller.

5. Automatic telephone answering apparatus as claimed in any preceding claim, in which the individual sounds are generated by individual acoustic indicators selectively operated by the apparatus in response to the selection made by the caller when responding to the invitation message.

6. Automatic telephone answering apparatus as claimed in any of Claims 1 to 4, in which the individual sounds are generated by a single acoustic indicator capable of varying its acoustic output, such indicator output being varied in response to the selection made by the caller in response to the invitation message.

7. A method of identifying a called person automatically by generating an invitation message when telephone apparatus is addressed by an incoming call and generating different visual and/or audible signals in dependence on the caller's response to the invitation message.

8. Automatic telephone answering apparatus substantially as hereinbefore described with reference to, and as shown, in the accompanying drawings.

9. A method of identifying a called person automatically substantially as hereinbefore described, with reference to, and as shown in, the accompanying drawings.

The Patent Office

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Application No: GB 9716297.8 **Examiner:** Peter Slater
Claims searched: 1 & 7 **Date of search:** 27 November 1998

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.P): H4K (KBHC)

Int Cl (Ed.6): H04M 1/00 , 19/04

Other:

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	WO 91/12685 A1 (LEE) - see page 15, line 4 to page 18, line 25	1,3,6,7 & 9
X	WO 91/07041 A1 (ANDERSON) - see abstract	1 & 7 at least
X	US 5598461 A (GREENBERG) - see whole document	1,6,7 & 9

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.