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(54) Verbal remote control device

(57) A verbal remote control device receives requests, such as for elevator service, unlocking vehicles, controlling alarms, by using voice recognition to decode spoken requests of the user, the device using speech synthesis to respond to the user with information, or to request information from the user. The device may be one that normally has a low power consumption dormant mode and is awakened in the proximity of apparatus to be controlled thereby either by beacons or by a user activated switch. In an elevator system, the device is used to enter, cancel and change destination-type requests for elevator service.

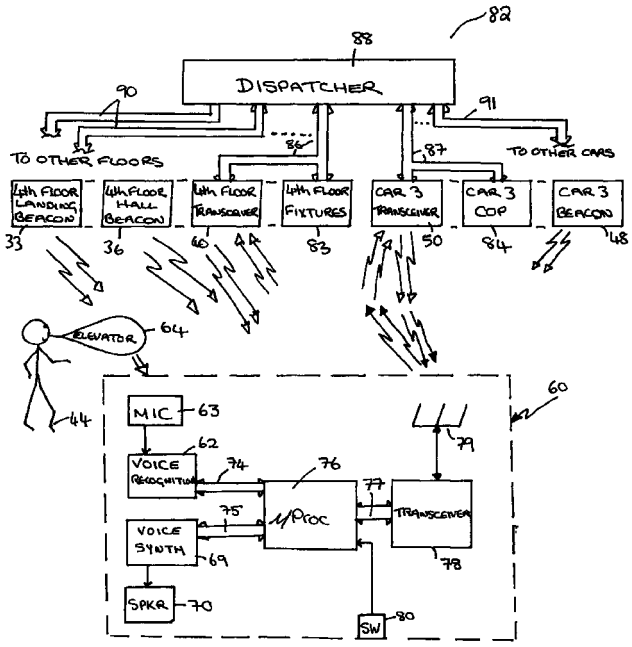

Fig. 9

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Description

[0001] This invention relates to controlling apparatus, such as. elevators, and access to buildings and automobiles, in response to messages transmitted by electromagnetic radiation between such apparatus and a portable device borne by a user, such device being in verbal communication with the user.

[0002] In the automotive art, it is common to employ key fob type devices to lock and unlock the car by pressing a corresponding button, encrypted electromagnetic radiation transferring the command to the car locks. Typically, pressing both the lock and the unlock button at the same time can cause a "panic" alarm, which may include sounding the horn and flashing the headlights. In certain circumstances, such as when carrying bags of groceries and a baby during a rainstorm, fumbling of the fob when trying to press the unlock button might press both buttons and start the panic alarm, which can be very unnerving, and which in some instances can only be turned off by inserting the key in the ignition. Or, the lock button may be pressed by mistake, causing the doors to still be in the locked state when the car is reached. Security has been made essentially perfect insofar as only a single key fob is able to open a particular lock, with essentially no possibility of thieves determining the code, due to the nature of the codes. However, if the key fob falls into the hands of thieves, all that is required is that the related vehicle be found. Remote control of access to buildings, including personal and public garages, homes and offices, and control of alarms upon entry, also usually require hand operation and will provide access to anyone.

[0003] Elevator systems have recently been provided with two features which are thought to save considerable passenger time and increase the carrying capacity of a given elevator installation. The first of these is utilizing destination calls, by which the passenger does not simply call an elevator to his floor, but at the same time informs the elevator of the intended destination floor. This allows the dispatcher (typically a suitably programmed computer) to allocate the call to the most appropriate car, taking into account not only the origin, but also the destination of the passenger.

[0004] A second feature causes passengers to enter their calls while still at some distance (equivalent to about ten seconds, in one case) from the elevator, whereby the dispatcher can attempt to cause the elevator to arrive at nearly the same time that the passenger reaches the elevator. In one case, the advance calls are entered by destination call buttons disposed remotely from the elevator in the passageways leading to the elevator. In other cases, the calls are entered either automatically by, or in response to pressing keys on personal radio transmitters which transmit an identification (ID) number utilized to automatically enter a prearranged destination call or a key-selected call. In one case, the personal transmitter has a display thereon, and receives a transmission from apparatus responsive to the dispatcher to display the number of the elevator car to which the call has been assigned. In another case, the passenger's name or ID number and his assigned elevator car number are called out from a hallway voice fixture. In still other cases, passengers must seek out the appropriate elevator by floor numbers illuminated near the elevator indicative of each elevator's current destination.

[0005] Typical problems with these systems include numerous false calls. Some of the false calls are caused by human error, particularly when ten-key entry panels are utilized, which is common in buildings having more than ten or twenty floors. Other false calls are registered as a consequence of pranks or vandalism. Still other false calls are caused by the person desiring to go to a destination other than his passively-entered, prearranged destination, or simply deciding not to enter the elevator yet (such as to purchase a newspaper on the way in). Such systems have not had any adequate way to change calls, since there is a need to associate pressing of buttons on a destination call device with the ID number of a badge, the two of which are normally mutually exclusive ways of making calls. The use of destination call buttons, particularly in the landing during the morning rush, has been found to cause great delay in moving passengers onto the elevators, since typically lines are formed at each call entry panel. Because of the confusion and delay, passengers enter cars without having registered a call. In elevator systems utilizing destination hall calls, there typically is no car operating panel within each car, thereby providing no way to enter a car call once the passenger is in the car. Even if a car call could be entered in the elevator, the system would not know what previous destination call should be cancelled, since there is no way to associate the two.

[0006] Objects of the invention include improvements in user related commands for controlling apparatus and service provided thereby; improved remote control of access to vehicles, buildings and services; improved remote control of alarm systems; improved remote entry of elevator calls; improved automatic entry of elevator calls; improved revision of elevator calls; improved revision of automatically entered elevator calls; reducing false calls in an elevator system responding to destination calls; reducing the entry of false calls in an elevator system employing automatic destination calls; providing increased ease of use of personal remote control devices; providing additional security in use of remote control devices; preventing use of a remote control device by a thief; providing improvements in elevator system operation; and reduced elevator service time.

[0007] According to the present invention, a personal remote control device responds to the voice of the user. In accordance with the invention, voice recognition is used to recognize verbal commands and convert those commands to appropriate electromagnetic transmis-

sions so as to cause the desired response in a related apparatus, such as a car, a building, an elevator or other apparatus. According to the preferred embodiment, voice authentication can be employed with voice recognition so as to limit response of the device to the authorized user. In still further accord with the preferred embodiment, verbal expression of simple commands, such as "elevator and "door can be recognized in a variety of common languages, thereby enhancing use for calling elevators to deliver passengers to the correct floor and selectively opening the door to a correct room.

[0008] According to the present invention, a personal remote control device issues requests for information and provides information and confirmation to the user by means of voice synthesis. In accordance with the preferred embodiment, electromagnetic transmissions which are received by the remote control device are converted into corresponding voice requests or statements for verbal communication to the bearer of the device.

[0009] According to the preferred enbodiment, a verbal remote control device communicates by means of electromagnetic transmissions with a building, vehicle or other structure containing an object which is to be controlled thereby. The verbal remote control device in turn communicates with the bearer of the device verbally, prompting the bearer by means of voice synthesis, or informing the bearer of facts by means of voice synthesis, while the bearer communicates to the device verbally, the communications being interpreted by voice recognition apparatus.

[0010] The invention allows improved security through voice authentication, direct communication to selected individual users of multi-user systems, and hands-off remote control of various kinds of apparatus.

[0011] As used herein, the term "phrase" includes one or more words, which can be a statement, a question, or otherwise. The terms "word" and "phrase" are used interchangeably herein.

[0012] Other objects, features and advantages of the present invention will become more apparent in the light of the following detailed description of exemplary embodiments thereof, as illustrated in the accompanying drawing.

Figs. 1-4 are partial, partially sectioned, perspective views of three floors of a building, illustrating a sequence of operation of the present invention as various persons approach elevator lobbies.

Figs. 5-8 are partial, partially sectioned side elevation views of the elevator lobbies of Figs. 1-4 illustrating additional sequences in accordance with the present invention.

Fig. 9 is a simplified schematic block diagram of a remote control device and an elevator system in accordance with the present invention.

[0013] Referring now to Fig. 1, three floors of a building 20-22, each include an elevator landing 23-25, corresponding entrance corridors 26-28, and other corridors 29-31. Each of the corridors 26-28 has corresponding prompt beacons 32-37 that periodically (several times per second) transmit a prompt to alert devices of the invention (not shown in Fig. 1) that the general proximity of the elevators has been reached. The prompt is electromagnetic radiation, which may be selected from various available bands, such as 125 KHz or 315 MHz. Each of the elevator landings 23-25 has an electromagnetic transceiver 39-41 which can both transmit and receive messages by means of electromagnetic radiation. In Fig. 1, three persons 43-45 are shown entering corresponding corridors 26-28 at a time when each prompt transmitter 35-37 is transmitting an electromagnetic signal which comprises a beacon type prompt. Each person 43-45 is bearing a verbal remote control device according to the present invention, not shown in Figs. 1-8 for clarity. In response to the beacon prompt, each verbal remote control device will issue an audible prompt, such as a beep (Fig. 1), for the person bearing the device to hear. In response to the audible prompt, as is shown in Fig. 2, the persons 43 and 44 desirous of entering an elevator will respond verbally. On the fourth floor, the person 44 simply says "elevator", which causes the verbal remote control device borne by him to transmit, electromagnetically, a message which includes information such as "elevator requested", the identification number of the device (either k or j in the example of Fig. 2), and whether or not the bearer has indicated a desire to go to a floor other than the floor that the bearer normally goes to, referred to as the default floor herein. As seen in Fig. 2, it is assumed that the person 43 has requested the elevator to take him to the ninth floor, whereas the person 44 has requested the elevator, and decides to go to his default floor. In Fig. 2, the person 45 has said nothing, thereby indicating that he is not heading for the elevator. Alternatively, when prompted by the transceivers 34-36, the verbal remote control devices borne by the persons 43-45 might have synthesized the question "Elevator?", instead of using "beep" as a prompt. In reply to the request, the person 43 could have replied "yes...9" or simply "9", and the person 44 could have simply replied "yes". In a system so devised, the person 45 might either remain silent or answer with the word "no". Optionally, the persons might use functional words to enter a specific call, such as "gym", "office" or "cafeteria". If desired, any human-discernable prompt, such as vibration (as in conventional paging units) may be used instead of audible prompts.

[0014] When the verbal remote control device on each person has received a verbal reply, it will transmit a corresponding message to a landing transceiver 39, 40, 41 (or a receiver positioned in any other suitable way), which includes the ID number of the device (person) and any request for a destination floor different from the default floor. In Fig. 2, the device borne by person 43

transmits a message identifying the person as that person having an assigned ID = k and requesting service to the 9th floor; the device borne by person 44 transmits a message that simply identifies the bearer as ID = j. The device on person 45 does not transmit any response, in this example.

[0015] Once the transceivers 34, 35 have received messages indicative of the bearer's verbal response, the dispatcher of the elevator system, which may be any conventional dispatcher, enters a hall call for the corresponding floor (that is, floor 3 for person 43 and floor 4 for person 44), and also enters a destination request for the indicated floor (floor 9 for person 43) or the default floor if no request were made (for instance, floor 14 for person 44). The destination request is used in the dispatcher for making call allocations, but is not entered as a car call until the car stops at the origin floor, or optionally, until the related passenger enters the cab. The dispatcher then selects which of the elevators (car 1-car 4) is the most appropriate to respond to the combined hall call/car call. Once the assignment is made, it is communicated to the transceiver 39, 40 of the floor corresponding to the hall call (floor 3 and floor 4, respectively). In turn, each transceiver 39, 40 electromagnetically transmits a corresponding message which identifies the ID of the device entering the call request. Thus, the transceiver 39 transmits a message including the information: the ID of the device requesting the call is k, and the call has been assigned to car four. Similarly, the transceiver 40 transmits a message including that the ID is j, and the call has been assigned to car 3. In response, the verbal remote control device of the present invention utilizes voice synthesis to announce the car assignment for the call through a loudspeaker to the bearer thereof as shown in Fig. 3. Thus, the verbal remote control device borne by the person 43 announces "car 4", and the verbal remote control device borne by the person 44 announces "car 3". Of course, no announcement is made to the person 45 who begins to turn the corner into the additional corridor 31.

[0016] At this point in the sequence, the hall calls are all entered in cars for the pick up floors, the destination floors are noted, and the dispatcher knows the identification number of the persons (devices) who have requested those calls. As seen in Fig. 4, by the time an intended passenger reaches a corresponding one of the elevator landings 23-25, the verbal remote control device will be in range of a corresponding prompt beacon 32-34. Before or after reaching the landing 23, if the person 43 said "cancel", the verbal remote control device borne by him would transmit a message cancelling the hall call and destination call assigned to car 4 requested on floor 3 for the person whose device ID number is k. On the other hand, instead of cancelling the call, the person 43 could have said "19" or "office" to change the call. An important aspect of the invention is that voice reception by a unique device allows matching each new request with a specific previous request which must be concomitantly changed. Changing calls is the subject of co-pending application Serial No. OT-4359.

[0017] Referring now to Fig. 5, the person 44 is standing at the landing 24 waiting to enter elevator 3, the hoistway doors 46 and elevator doors 47 of which have just opened. A beacon 48 may cause response from each device in the car. A transceiver 50 within the cab 52 of elevator 3 is directional, as indicated by the dotted lines 53. This is to prevent the transceiver 50 from recognizing the transmissions from the verbal remote control device on the person 44, prior to the person 44 entering the cab 52, as illustrated in Fig. 6. Once the transceiver 50 receives transmissions from the verbal remote control device borne by the person 44, it is known that the person is within the cab 52.

[0018] Referring to Fig. 7, if another person 54 who has been assigned to a different elevator at the fourth floor landing 24, nonetheless enters car 3, the verbal remote control borne by the person 54 will respond to a prompt from the beacon 48 to inform the transceiver 50 of that fact by means of an electromagnetically transmitted message including that the ID equals m. The ID number allows the dispatcher to cancel a call within another car unless that call was also requested by another ID number; and the destination request may either be cancelled or retained. Either way, the dispatcher can inquire of the person's intentions, if desired. In such case, the dispatcher will cause the transceiver 50 to send an electromagnetic message to the verbal remote control device being borne by the person 54 having the ID number m, requesting which floor is desired by that person, as shown in Fig. 8. In response, the verbal remote control device borne by the person 54 will, by speech synthesis, express the command "floor please". Thus, the specific person can have the question addressed to her by her own verbal remote control device, rather than having a loudspeaker within the cab address the question to all of the passengers. As is true in common personal computers, the actual voice synthesis can have a very wide variety of sounds - high pitch, low pitch, young, old, male, female, and so forth - so that persons generally will be able to distinguish the voice synthesized words of their devices from those of other voice synthesizers in the vicinity. (Note that checkout persons can tell when the UPC sensor at their station has sounded, even though an identical sound is used at adjacent UPC stations.) After the verbal request is made of the person 54 by the voice synthesizer of the verbal remote control device borne thereby, the person 54 may state a floor number, which will then be transmitted electromagnetically from the verbal remote control device borne by the person 53 to the transducer 50 and thence by wire or other suitable communication modality to the dispatcher, so as to enter a call for the destination floor stated by the person 54. Notice that a required entry of a call while the passenger is in an elevator cab is accomplished without having to reach the car operating panel (for normal car call buttons), without having to

reach into a pocket to withdraw a device to enter a floor number by pushing keys, or in any other inconvenient way. If person 54 does not state any floor information, of if in any embodiment no request is made of the person 54, the dispatcher could react to the previously recorded destination call requested for ID = m.

[0019] Referring now to Fig. 9, a verbal remote control device 60 according to the present invention may include either a voice recognition function 62 which is connected to an acoustoelectric transducer such as a microphone 63 with which it can receive the words 64 of a person, such as the person 44, or it may include a voice synthesizer 69 which feeds an electroacoustic transducer such as a loudspeaker 70 so as to issue verbal information 71 to a person such as the person 44, or it may include both the apparatus 62, 63 and the apparatus 69, 70. The recognition 62 and the synthesis 69 will have appropriate connections 74, 75 to a microprocessor 76 which in turn has connections 77 to a transceiver 78. The transceiver 78 is connected to an antenna 79. The electromagnetic radiation used for message transmission is preferably at radio frequencies, rather than optical or near optical frequencies since it will pass through clothing easily and is not as easily blocked by other persons or objects. The transceiver 78 may be designed to be able to receive signals on only one frequency, to transmit signals on only one frequency, or to receive signals on two or more frequencies and to transmit signals on two or more frequencies. Signals may be received on one more frequencies different from frequencies on which signals are transmitted. Specifically, the received beacon frequencies may differ from the message frequencies. If desired, a separate beacon receiver, or receiving channel, may be provided. All of this is conventional, well within the skill of the art, and forms no part of the present invention. In Fig. 9, an elevator system 82 with which the verbal remote control devices of the present invention may communicate includes at least one hall beacon for each hall (perhaps several per floor), such as the hall beacon 36 on the fourth floor corridor 27, a transceiver and a landing beacon for each landing, such as the transceiver 40 and beacon 33 for the fourth floor landing 24, and a car transceiver and beacon for each elevator car, such as the transceiver 50 and the beacon 48 on car 3. The present invention is designed to eliminate the need for conventional hall fixtures, such as fixtures 83 for the fourth floor landing 24, and is designed to eliminate the need for car call buttons provided on a car operating panel (COP), such as the COP 84 for car 3. However, to permit broadest utilization of the elevator system, including usage by persons not having access to a suitable remote control device, the fixtures 83 and COPs 84, including car call buttons, may be provided in any utilization of the present invention, if desired. The transceivers 40, 50, hall fixtures 83 and car operating panel 84 have normal connections 86, 87 to a dispatcher 88, which may be wires or other suitable communication modality. The dispatcher 88 is provided with suitable connections 90 to other floors, and suitable connections 91 to other cars.

[0020] The voice recognition function 62 and voice synthesis function 69 may take any suitable form, such as an RSC-164 voice recognition chip provided by Sensory Inc., Sunnyvale, CA, which includes both voice recognition and synthesis. The microprocessor 76 may be any suitable microprocessor, and may preferably be one which can enter into an inactive or sleep mode, and be responsive only to receipt of a beacon prompt command through the antenna 79 and the transceiver 78 to wake it up and initialize it for enabling the voice recognition 62 and the voice synthesis 69. Alternatively, if beacons are not used, the bearer may wake the device up with a switch, which may respond to the device being shaken or slapped, or to pressing a push button switch 80. Such a microprocessor may be formulated with a PIC 16C84 for example, or any other suitable microprocessor. The transceiver 78 is conventional, regardless of the particular design chosen in any implementation of the present invention. For reduced weight and cost, it is deemed preferable to perform the voice recognition and voice synthesis functions, along with the control functions, in a single microprocessor.

[0021] The voice recognition function 62 is readily programmable by adjustment of parameters for discrete voice recognition (in contrast with continuous voice recognition) at three different levels: speaker-independent, such as is used in phone answering systems and which recognizes words spoken by anyone in a given dialect; speaker-dependent, which responds best to a single person, with minimum failures to recognize words and minimum erroneous word selection; and speaker-authentication, which accepts only one voice, and never recognizes words stated by another voice. When the voice recognition 62 is programmed with tight parameters so as to achieve speaker authentication, the device of the present invention is extremely well suited to provide secure access in apartment buildings, or in limited office buildings, research buildings and the like. Similarly, the device of the invention, when programmed to achieve speaker authentication, is well suited for use as a hands-off remote access for vehicles, since it will respond only to the proper voice saying words such as "door" and "trunk" to unlock the door or trunk, or "slider" to activate an automatic slider in a van. Of course, such a device would also respond to words like "lock" and "panic". This would permit gaining access to a vehicle while carrying children, bundles, and the like. The device may be used to open a private or commercial garage, or unlock or light a home, or arm and disarm an alarm system, with proper choice of words. The device may recognize spoken personal ID numbers or code words, for security. Programming the device for speaker independent recognition, the device becomes well suited for use in hotels and boats; the words for "elevator" and "door in several common languages can be

programmed into the device (both recognition and synthesis), so it will speak in several languages, one after the other, and respond to any of them, making it universally useful to automatically provide access to only the correct floor and only the correct room.

[0022] The foregoing application, and the details thereof, are by way of example only. The invention may as well be used to control other domestic, commercial and industrial apparatus.

Claims

1. A verbal remote control device (60) adapted to be borne by a user thereof comprising:

a transmitter (78) for transmitting messages by means of electromagnetic radiation;
an acoustoelectric transducer (63) for receiving verbal messages spoken by a person in the immediate proximity of said device; and
signal processing means (62, 69) responsive to said acoustoelectric transducer for recognizing one of a set of phrases in at least one common language, for providing related signals indicative of the meaning of any phrase so recognized, for providing, to said transmitter, signals representing a predetermined corresponding message determined at least in part in response to said related signals, and for causing said transmitter to transmit said corresponding message.

2. A device according to claim 1 wherein said signal processing means recognizes any one of a plurality of phrases in different languages which mean the same thing of a set of phrases in said different languages and provides said related signals indicative of the meaning of said any phrase so recognized, regardless of the one of said different languages in which said phrase is spoken.

3. A device according to claim 1 wherein said signal processing means comprises means for recognizing said any one of said plurality of phrases when spoken by any person of a dialect group.

4. A device according to claim 1 wherein said signal processing means comprises means for recognizing said any one of said plurality of phrases only when spoken by a particular individual person, thereby providing voice authentication.

5. A device according to any preceding claim further comprising:

a switch (80) which may be selectively operated by said user; and wherein
said signal processing means has a fully operational mode, and has a low power consumption dormant mode in which its only function is to respond to operation of said switch to enter into said fully operational mode in which it provides said functions of recognizing, providing related signals, providing message representing signals, and causing said transmission to transmit said corresponding message.

6. A device according any preceding claim wherein said apparatus is an elevator system and said phrase is selected from a set of phrases including floor numbers, the names of functional spaces on specific floors, phrases of affirmation, phrases of denial, and phrases indicating an intent to use elevator service.

7. A device according to any of claims 1 to 5 wherein said structure is a vehicle and said set of phrases is selected from a group of phrases including "door", "trunk", "unlock", "open", "lock", "close", "panic", phrases of affirmation, words of denial and phrases relating to arming and disarming an alarm.

8. A device according to any of claims 1 to 5 wherein said structure is a building and said set of phrases is selected from a group of phrases including phrases relating to access to said building and phrases relating to arming and disarming an alarm associated with said building.

9. A device according to any of claims 1 to 5 wherein said set of phrases is selected from a group of phrases including phrases relating to a personal identification number and authentication code words.

10. A system including a verbal remote control device adapted to be borne by a user thereof, comprising:

a transmitter (39-41) for transmitting messages by means of electromagnetic radiation;
an acoustoelectric transducer (63,70) for receiving verbal messages spoken by a person in the immediate proximity of said device; and
signal processing means responsive to said acoustoelectric transducer for recognizing one of a set of phrases in at least one common language, for providing related signals indicative of the meaning of any phrase so recognized, for providing, to said transmitter, signals representing a predetermined corresponding message determined at least in part in response to said related signals, and for causing said transmitter to transmit said corresponding message;
said system further comprising:
a prompt transmitting beacon (32-37); and
wherein

said signal processing means has a fully operational mode, and has a low power consumption dormant mode in which its only function is to respond to a prompt transmitted by said beacon to enter into said fully operational mode in which it provides said functions of recognizing, providing related signals, providing message representing signals, and causing said transmitter to transmit said corresponding message.

11. A system according to claim 10 wherein:

said signal processing means, in response to entering into said fully operational mode, provides a human-discernable prompt to said user.

12. A system including a verbal remote control device adapted to be borne by a user thereof, comprising:

a transmitter (39-41) for transmitting messages by means of electromagnetic radiation;
an acoustoelectric transducer (63,70) for receiving verbal messages spoken by a person in the immediate proximity of said device; and
signal processing means (69, 76) responsive to said acoustoelectric transducer for recognizing one of a set of phrases in at least one common language, for providing related signals indicative of the meaning of any phrase so recognized, for providing, to said transmitter, signals representing a predetermined corresponding message determined at least in part in response to said related signals, and for causing said transmitter to transmit said corresponding message;
said system also including a structure comprising: apparatus (1,2,3,4) to be controlled by said verbal remote control device;
a receiver for receiving electromagnetic radiation transmitted by said transmitter and for providing second signals indicative of said corresponding message; and
second signal processing means responsive to said second signals for providing a command manifestation to said apparatus to cause said apparatus to respond in a predetermined corresponding fashion.

13. A system according to claim 12 additionally comprising:

a prompt transmitting beacon (32-37) disposed on said structure; and wherein:
said signal processing means has a fully operational mode, and has a low power consumption dormant mode in which its only function is to respond to a prompt transmitted by said beacon to enter into said fully operational mode in which it provides said functions of recognizing, providing related signals, providing message representing signals, and causing.

14. A system according to claim 13 wherein:

said signal processing means, in response to entering into said fully operational mode, provides a human-discernable prompt to said user.

15. A system according to claim 12 additionally comprising:

a prompt transmitting beacon (32-37) on said structure;
a switch (80) on said device which may selectively be operated. by said user; and wherein
said signal processing means has a fully operational mode, and has a low power consumption dormant mode in which its only function is to respond either to operation of said switch or to a prompt transmitted by said beacon to enter into said fully operational mode in which it provides said functions of recognizing, providing related signals, providing message representing signals and causing.

16. A verbal remote control device adapted to be borne by a user thereof, comprising:

a receiver (78) for receiving electromagnetic radiation representing messages relating to an apparatus to be controlled by said device and for providing message signals indicative thereof;
signal processing means (69) responsive to said message signals for providing voice synthesis signals representing a predetermined phrase of a set of spoken phrases, said phrase corresponding to a message indicated by said message signals; and
an electroacoustic transducer (70) responsive to said voice synthesis signals for acoustically transmitting the spoken phrase corresponding thereto in a manner audible to a person in the immediate proximity of said device.

17. A device according to claim 16 wherein:

one message which said receiver may receive is a beacon prompt indicating that said device is within proximity of said apparatus to be controlled thereby; and
said signal processing means has a fully operational mode, and has a low power consumption dormant mode in which its only function is

to respond to said beacon prompt message to enter into said fully operational mode and to provide signals to said transducer to audibly prompt said user of the fact that said device is in proximity of said user.

18. A device according to claim 17 wherein said signals provided to said transducer to audibly prompt said user cause said transducer to transmit a non-verbal sound.

19. A device according to claim 17 wherein said signals provided to said transducer to audibly prompt said user cause said transducer to transmit a phrase related to interaction possible between said user and said apparatus.

20. A device according to claim 19 wherein said phrase is included in an inquiry of whether or not said user requests interaction with said apparatus.

21. A device according to claim 20 wherein said phrase relates to one of a set of predetermined interactions which said user may have with said apparatus.

22. A device according to claim 17 wherein said signals provided to said transducer to audibly prompt said user cause said transducer to transmit a phrase related to a specific one of a set of predetermined functions which said apparatus may perform.

23. A device according to claim 22 wherein said set of predetermined functions relate to access to a secure space.

24. A device according to claim 22 wherein said set of predetermined functions relate to use of an elevator.

25. A device according to any of claims 16 to 24 wherein said signal processing means provide voice synthesis signals to cause said transducer to acoustically transmit the spoken phrase corresponding thereto in each of a group of different languages, serially.

26. A system including a structure comprising:

an apparatus (1,2,3,4) to be controlled remotely;
a transmitter (39-41) for transmitting messages by means of electromagnetic radiation;
signal processing means (69,76) for providing to said transmitter information signals relating to the control of said apparatus and for causing said transmitter to transmit electromagnetic radiation corresponding to said information signals;
said system also including a verbal remote control device adapted to be borne by a user thereof, comprising:
a receiver (78) for receiving electromagnetic radiation transmitted by said transmitter representing messages relating to said apparatus and for providing message signals indicative thereof:
signal processing means (69) responsive to said message signals for providing voice synthesis signals representing a predetermined phrase of a set of spoken phrases, said phrase corresponding to a message indicated by said message signals; and
an electroacoustic transducer (70) responsive to said voice synthesis signals for acoustically transmitting the spoken phrase corresponding thereto in a manner audible to a person in the immediate proximity of said device.

27. A system according to claim 26 additionally comprising:

a prompt transmitting beacon (32-37) disposed on said structure; and wherein:
said signal processing means has a fully operational mode, and has a low power consumption dormant mode in which its only function is to respond to a prompt transmitted by said beacon to enter into said fully operational mode.

28. A device according to claim 27 wherein:

said signal processing means, in response to entering into said fully operational mode, provides a human-discernable prompt to said user.

29. A system according to claim 26 additionally comprising:

a prompt transmitting beacon (32-37) disposed on said structure;
a switch (80) which may selectively be operated by said user; and wherein
said signal processing means has a fully operational mode, and has a low power consumption dormant mode in which its only function is to respond to operation of said switch or to a prompt transmitted by said beacon to enter into said fully operational mode.

30. A verbal remote control device adapted to be borne by a user thereof, comprising:

a transmitter for transmitting messages by means of electromagnetic radiation;
an acoustoelectric transducer for receiving ver-

bal messages spoken by a person in the immediate proximity of said device;

signal processing means responsive to said acoustoelectric transducer for recognizing a first phrase of a first set of phrases in at least one common language, for providing related signals indicative of the meaning of any phrase so recognized, for providing, to said transmitter, signals representing a predetermined corresponding message determined at least in part in response to said related signals, and for causing said transmitter to transmit said corresponding message;

a receiver for receiving electromagnetic radiation representing received messages relating to an apparatus to be controlled by said device and for providing received message signals indicative thereof;

said signal processing means responsive to said received message signals for providing voice synthesis signals representing a predetermined second phrase of a set of spoken phrases, said second phrase corresponding to a message indicated by said received message signals; and

an electroacoustic transducer responsive to said voice synthesis signals for acoustically transmitting the spoken phrase corresponding thereto in a manner audible to a person in the immediate proximity of said device.

31. A device according to claim 30 further comprising:

a switch which may selectively be operated by said user; and wherein

said signal processing means has a fully operational mode, and has a low power consumption dormant mode in which its only function is to respond to operation of said switch to enter into said fully operational mode in which said device provides said functions of recognizing, providing related signals, providing message representing signals, causing, receiving, providing noise synthesis signals, and acoustically transmitting.

32. A system including a structure comprising:

an apparatus to be controlled remotely;

a first transmitter for transmitting messages by means of electromagnetic radiation;

first signal processing means for providing, to said first transmitter, information signals relating to the control of said apparatus and for causing said first transmitter to transmit electromagnetic radiation corresponding to said information signals;

said system also including a verbal remote control device adapted to be borne by a user thereof, comprising:

a first receiver for receiving electromagnetic radiation transmitted by said first transmitter representing messages relating to said apparatus and for providing message signals indicative thereof:

second signal processing means responsive to said message signals for providing voice synthesis signals representing a predetermined phrase of a set of spoken phrases, said phrase corresponding to a message indicated by said message signals;

an electroacoustic transducer responsive to said voice synthesis signals for acoustically transmitting the spoken phrase corresponding thereto in a manner audible to a person in the immediate proximity of said device;

a second transmitter for transmitting messages by means of electromagnetic radiation;

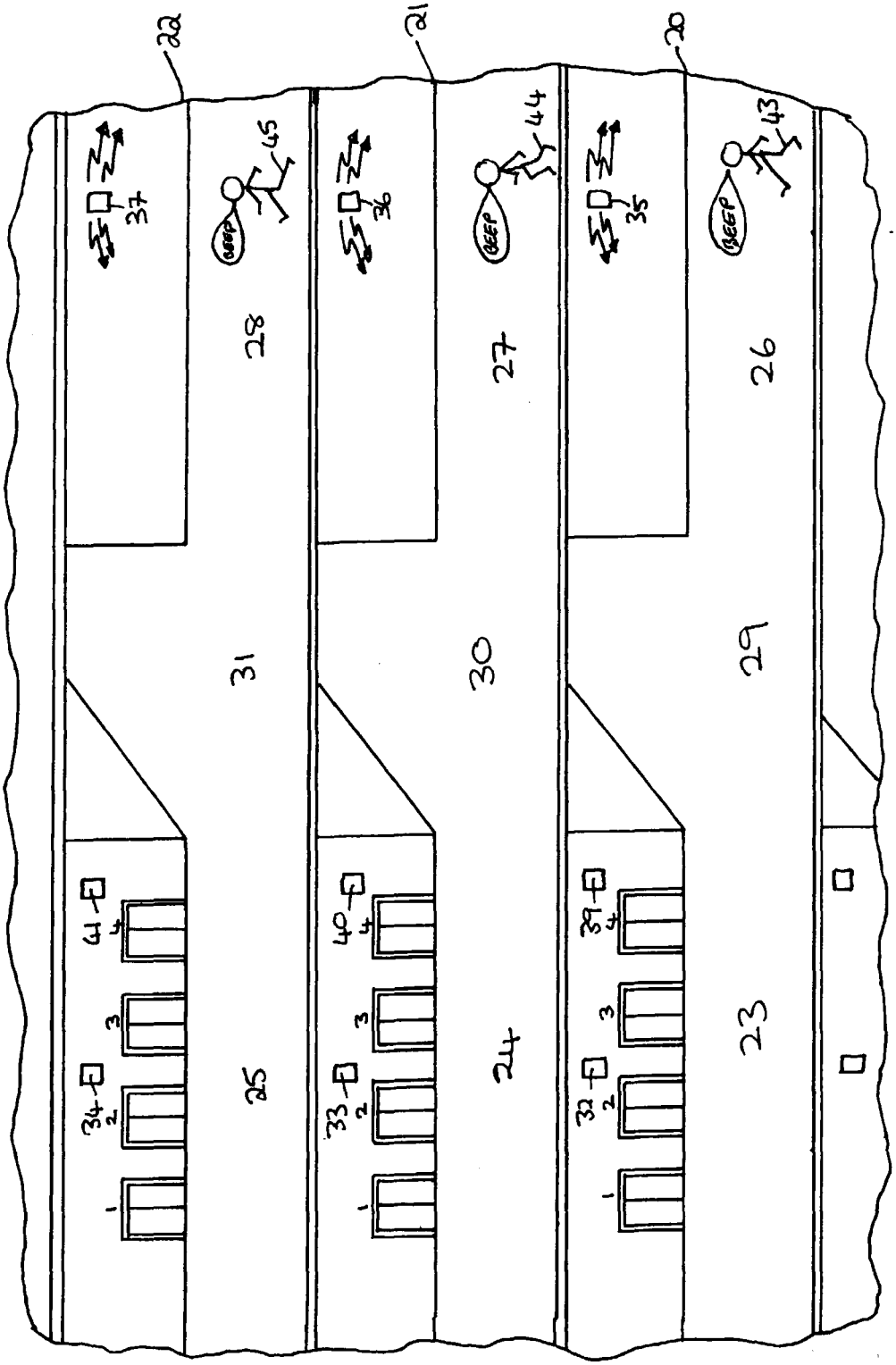
an acoustoelectric transducer for receiving verbal messages spoken by a person in the immediate proximity of said device;

said second signal processing means responsive to said acoustoelectric transducer for recognizing one of a set of phrases in at least one common language, for providing related signals indicative of the meaning of any phrase so recognized, for providing, to said second transmitter, signals representing a predetermined corresponding message determined at least in part in response to said related signals, and for causing said second transmitter to transmit said corresponding message;

said structure further comprising:

a second receiver for receiving electromagnetic radiation transmitted by said second transmitter and for providing second signals indicative of said corresponding message; and

said first signal processing means comprising means responsive to said second signals for providing a command manifestation to said apparatus to cause said apparatus to respond in a predetermined corresponding fashion.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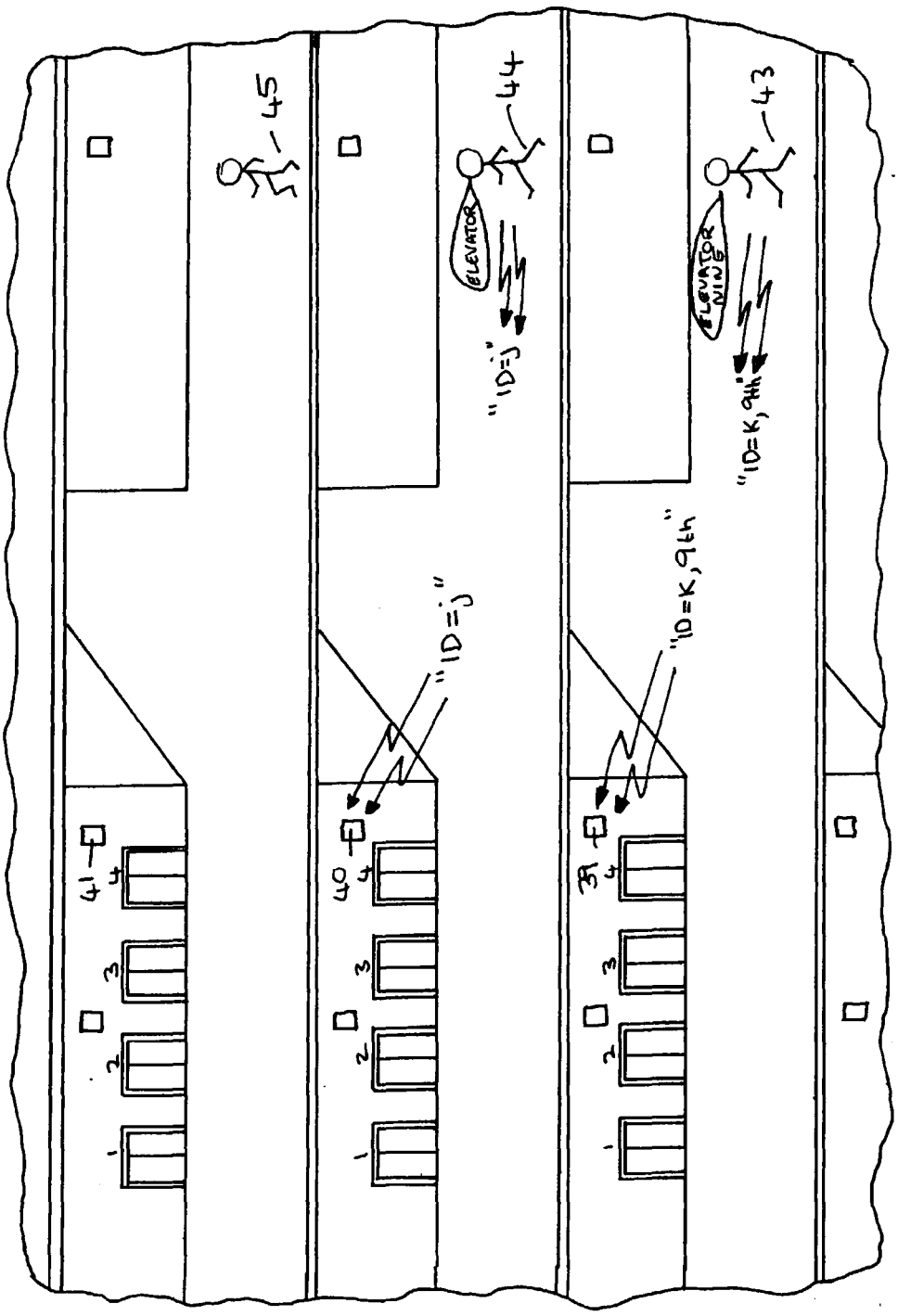
BEEP

Fig. 1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ELEVATOR
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"ID=K, 9th"
"ID=j"
"ID=K, 9th"
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40
42
4
3
2
1

Fig. 2

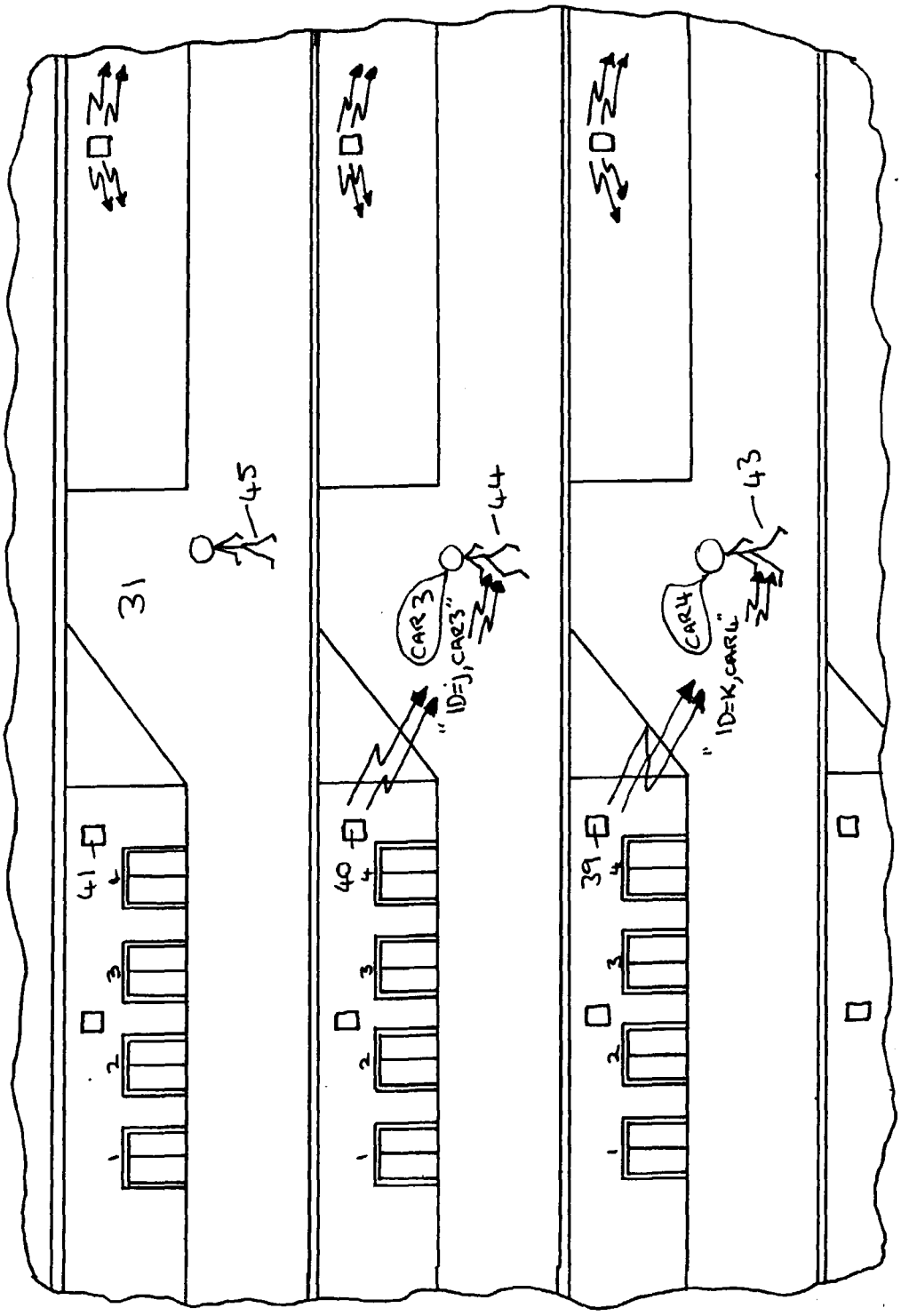


Fig. 3

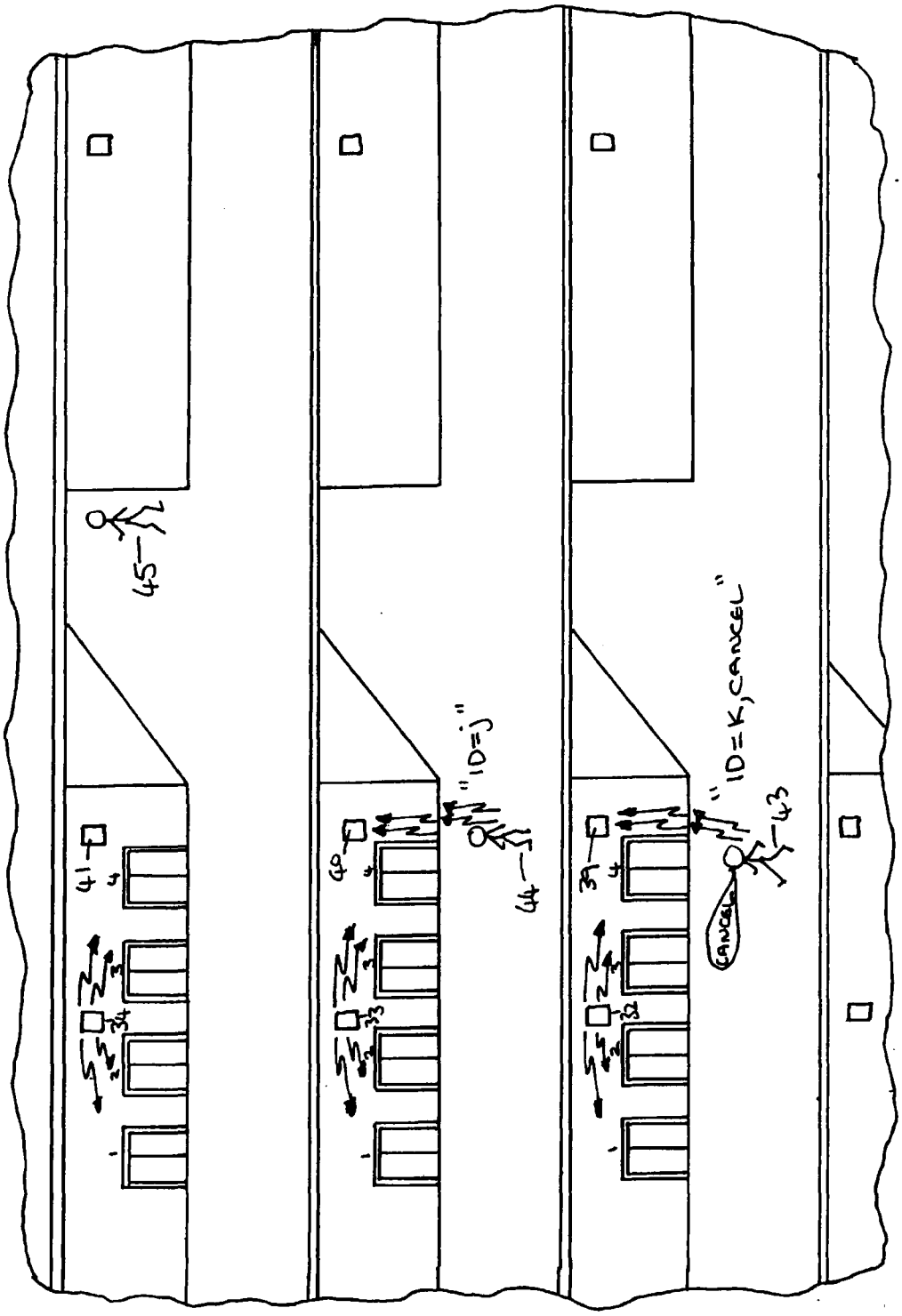


Fig. 4

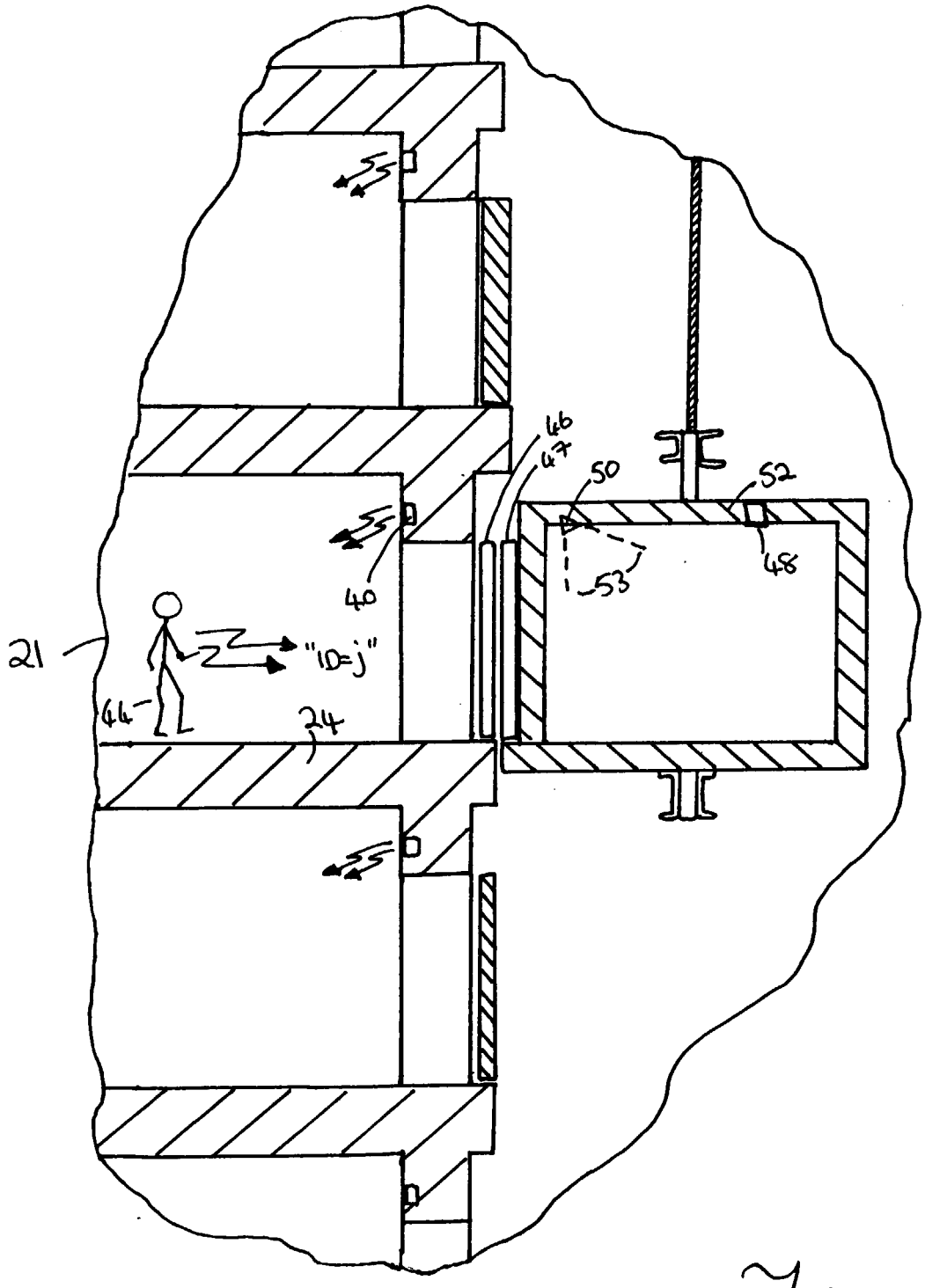


Fig.5

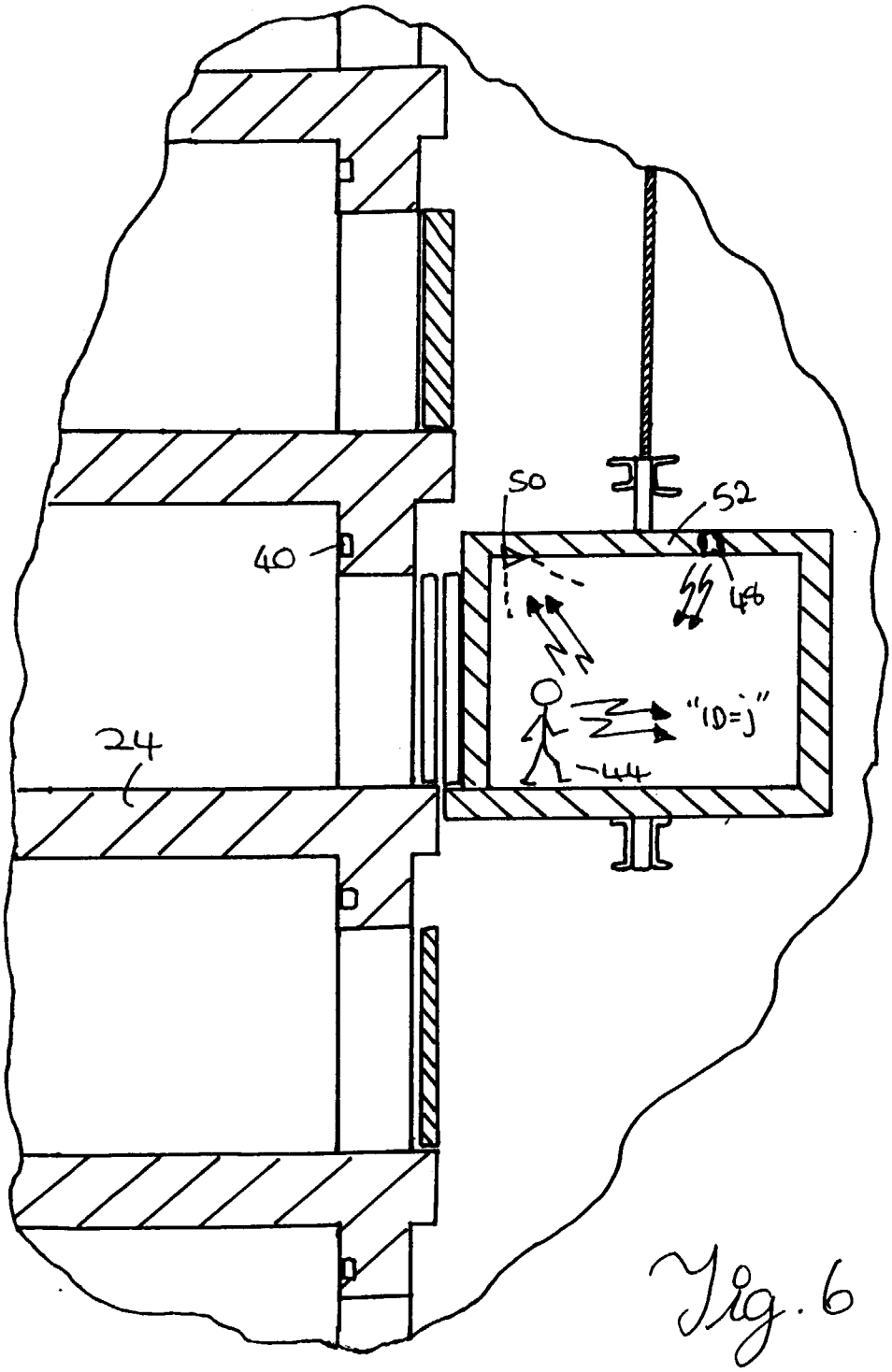


Fig. 6

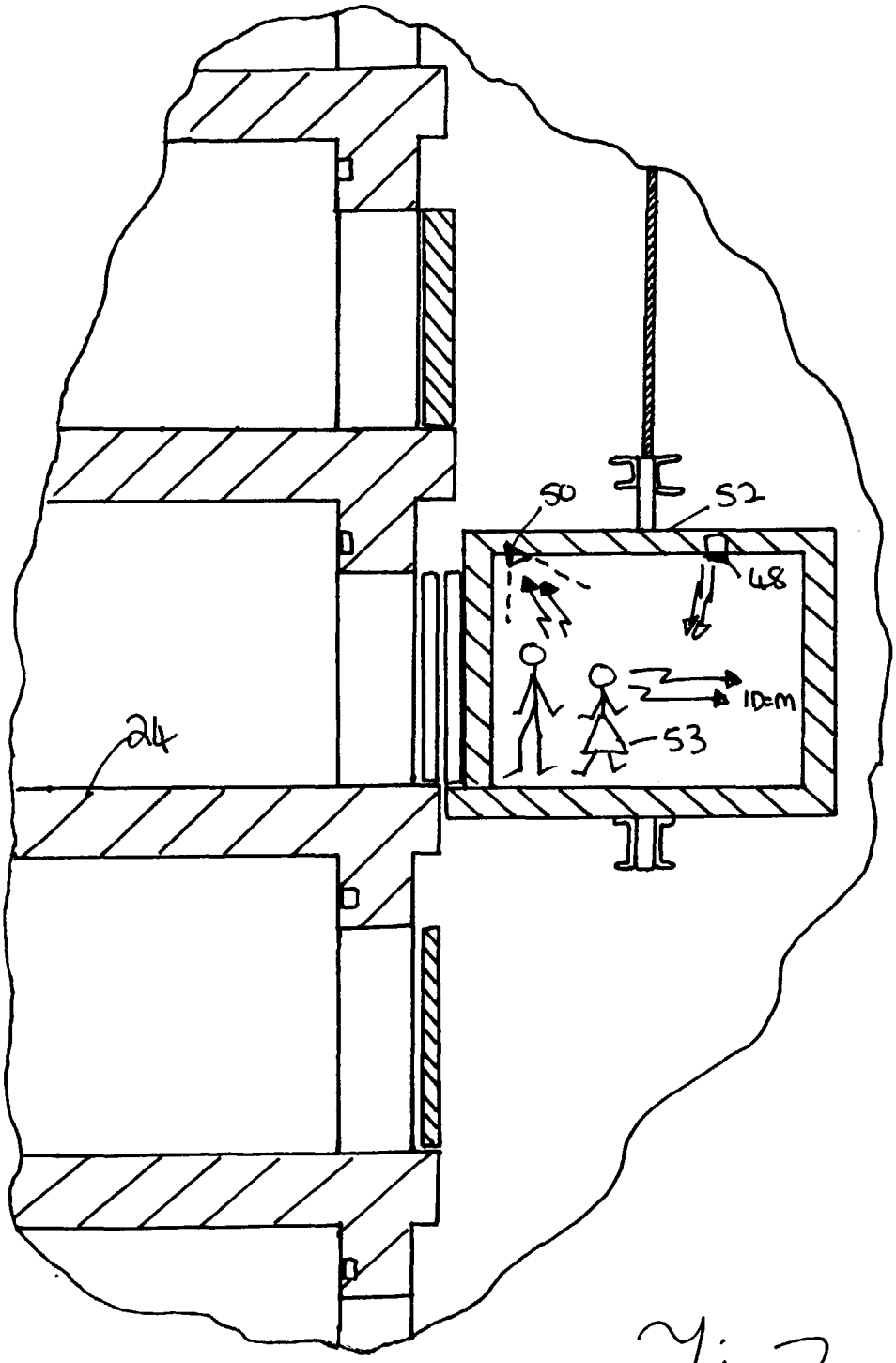


Fig 7

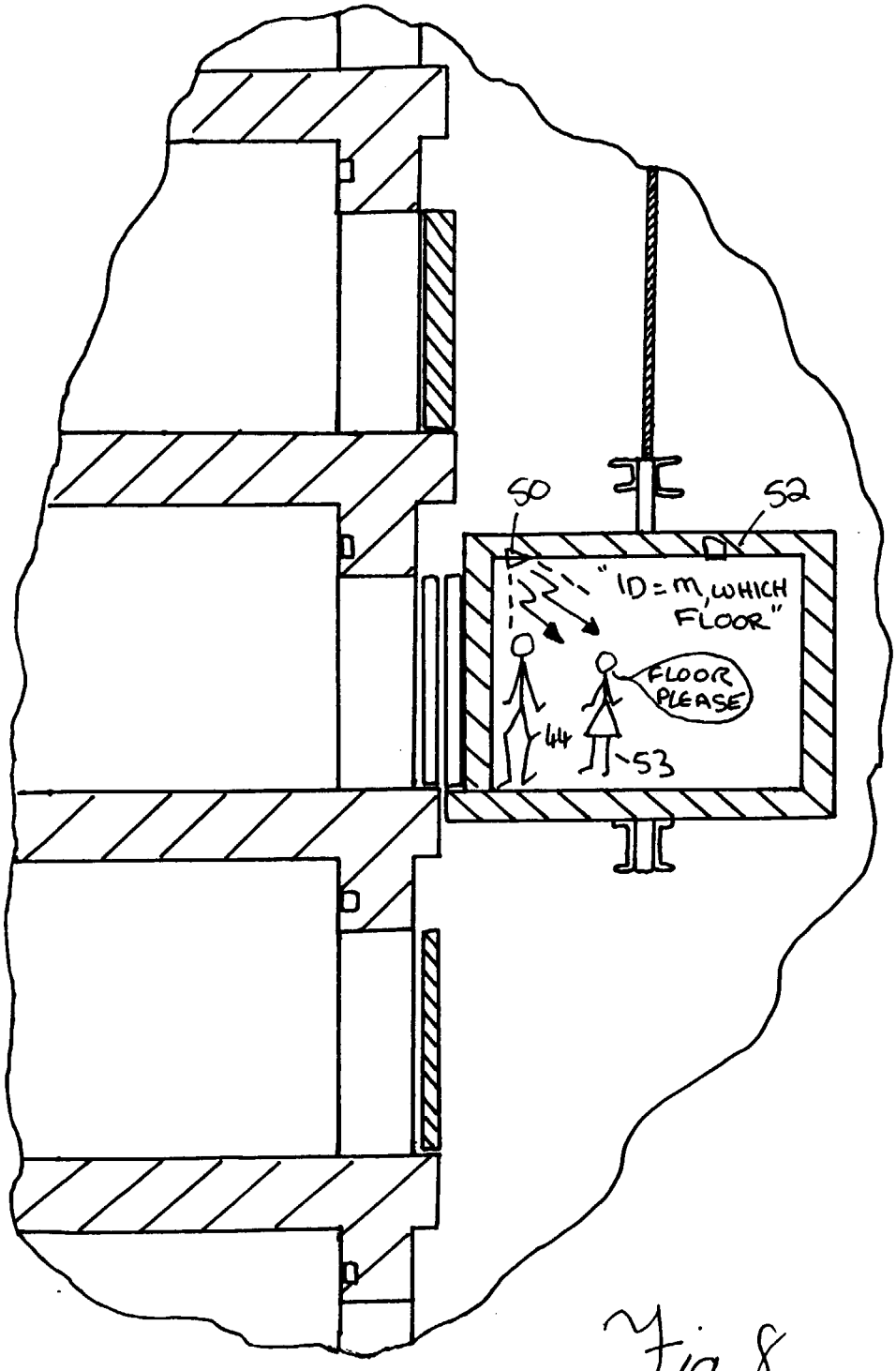
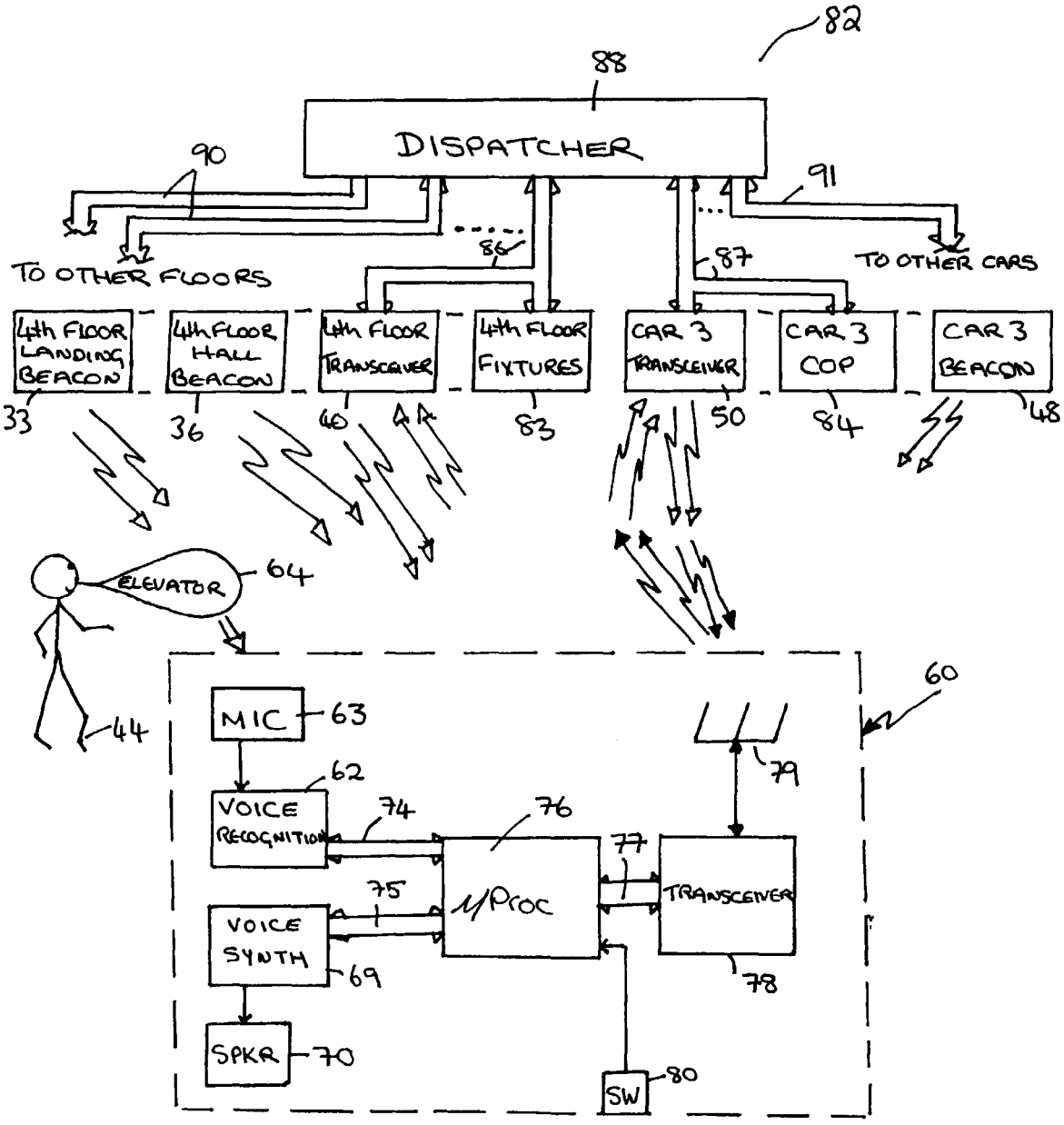


Fig. 8


82
88
DISPATCHER
90
91
TO OTHER FLOORS
86
87
TO OTHER CARS
4th FLOOR LANDING BEACON
4th FLOOR HALL BEACON
4th FLOOR TRANSCEIVER
4th FLOOR FIXTURES
CAR 3 TRANSCEIVER
CAR 3 COP
CAR 3 BEACON
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84
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ELEVATOR
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MIC
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VOICE RECOGNITION
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µProc
TRANSCEIVER
VOICE SYNTH
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Fig. 9

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	21 September 1999	Wanzeele, R

CATEGORY OF CITED DOCUMENTS

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EUROPEAN SEARCH REPORT

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