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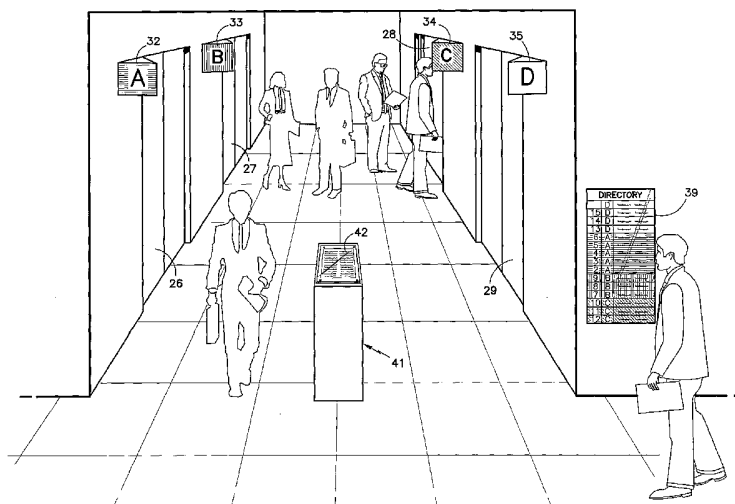
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[Continued on next page]

(54) Title: CORRELATING ELEVATORS DESTINATION FLOORS WITH ELEVATORS SERVING THOSE FLOORS BY MEANS OF COLOR



(57) Abstract: Near or at each elevator lobby related to a group of floors serving a building, a floor identifier (39, 42, 52, 60) identifies with color, and optionally a symbol such as letter, each floor which is served by the group of elevators related to that lobby. At each elevator (26-29; 46-49) there is an elevator indicator (32-35; 32a-35a) which displays the same color, and optionally the same symbol, as displayed for any floor which the respective elevator is currently assigned to serve. With permanent sector assignments, colors are permanently assigned to each sector, so tenants seek out an elevator of the same color each morning to see which elevator is assigned to their floor at that particular point in time. During dynamic channeling, floors that are reassigned by a group dispatcher (58) into different sectors bear the colors of the new sector, making it easy for passengers to locate the correct car for their destination floors.



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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Correlating Elevator Destination Floors with Elevators Serving
Those Floors By Means of Color

Technical Field

5 This invention relates to identifying with at least color which elevator is to serve one or more contiguous floors also identified with the same color, optionally also having a symbol to assist the color blind.

Background Art

10 A wide variety of techniques for interfacing passengers with suitable elevators are known in the art. One class of devices call an elevator to a floor to pick up a passenger. This class of devices may be as simple as the well-known up/down call buttons. More recent call destination systems might display a large number of floors or might consist of ten key destination floor call devices. Still other devices include card readers as well as hand-held call
15 devices and smart badges which operate in a wireless fashion, such as using electromagnetic radiation (RF, IR), to indicate the desire to be picked up on a certain floor, the desired destination floor, and possibly the security access for the destination floor.

 To inform passengers which elevators will serve them, the technique might be as simple as up/down directional lanterns which light as an elevator approaches a floor, or which
20 light immediately (or fairly soon) after a call is placed. For remote call devices and certain of the destination call devices, an indication may appear on the device itself, such indication comprising a letter indicative of the elevator which will respond to that call.

 During morning rush hour, up peak elevator traffic may be handled without any call devices in the simplest of techniques, passengers simply walking in and observing on a panel
25 above the elevator the floor numbers of the group of floors being served by any particular elevator which is, or is about to be, standing at the landing. An example of such a system is disclosed in U.S. Patent No. 4,804,069, entitled "Contiguous Floor Channeling Elevator Dispatching". The problem with these devices is that they can only be observed within a relatively small area in the immediate vicinity of each elevator, so passengers must hunt for the
30 elevator assigned to a group of floors that includes the destination floor of the passenger. This tends to cause milling around and confusion, which is counterproductive to a smooth upflow of passengers.

A preferred manner of handling morning rush hour, up peak elevator traffic is sometimes referred to as "channeling", as is disclosed in the aforementioned U.S. Patent No. 4,804,069 and U.S. Patent No. 4,846,311, entitled "Optimized 'Up-Peak' Elevator Channeling System with Predicted Traffic Volume Equalized Sector Assignments". Therein, during the morning rush, floors are assigned to various groupings called "sectors". In the latter case, the assignment of floors to sectors is altered as the predicted volume of traffic to particular floors changes, in small time intervals (every few minutes), so that a floor may be served with the floors above it on one trip and be served with the floors below it on the next trip. Furthermore, although a given sector, for instance the highest sector in the building, may be relatively stable so that the person on the highest floor can depend upon it being the highest sector, nonetheless that sector may be assigned to a different elevator each time the trip is made. Assigning sectors to different elevators is one of the ways that traffic flow is increased. This of course makes it more difficult for passengers to determine which elevator to take.

In systems having destination call panels, it has been known to provide, typically by means of a letter, the indication of the elevator which is to serve a group of floors including the floor of the destination which has just been entered on the call device. However, the use of the destination call device itself slows down the flow of rush hour traffic, and the letters do not themselves provide the best correlation, particularly in view of the fact that the building tenants must remember the letter from some place in a corridor well in advance of the elevator lobby, and typically being a different letter every day.

Disclosure of Invention

Objects of the invention include: improvements in handling rush hour, up peak elevator traffic; improved correlation between desired destination floor and elevator serving that floor; a correlation between desired destination floor and elevators serving the desired floor which can respond to any type of destination call entry, tenant identification, or no entry whatsoever; an easily rememberable correlation between destination floor and elevator serving such floor; and smooth passenger traffic in an elevator system employing variable assignments of elevators to sectors or employing dynamic channeling, without registering any calls, during rush hour up peak elevator traffic.

This invention is predicated on our discovery that the easiest impression to remember of an indication of the elevator which is to serve the passenger's desired destination floor is

one which does not involve mental verbalization; and that impression should be color for the vast majority of elevator passengers.

According to the invention, a passenger's destination floor is identified with a color, and the elevator serving that floor at that time is identified with the same color, in a manner which is readily observed from any entrance to or any position within a corresponding elevator lobby. According to the invention, to serve those who are color blind, the display may also have a symbol which is readily observed from any entry to or any position within an elevator lobby. Special handicap cars may also be called and identified at the call-input device by the color (and optional symbol) of the responding car.

In a preferred form, floor assignments to sectors are permanent and the various colors (and optional symbols) are permanently assigned to respective sectors, whether or not the sectors are permanently assigned to respective cars.

Whenever destination floor entry devices, such as N-key or 10-key panels, hand held devices, card readers, or smart cards, are utilized, a color indicator will appear thereon identifying the elevator which will respond to that call immediately or soon after the call is registered. For ordinary rush hour up peak elevator traffic in which no call entries are utilized, panels display the groups of floors being served by individual elevators by means of color, the elevator providing that service also being identified, in a manner which can be readily observed from any entrance to or any position within the elevator lobby, by means of the same color.

The invention thus takes advantage of an impression, rather than the memory of verbalized information, to correlate a floor indication determined remotely from the elevator lobby with an elevator thereafter encountered within an elevator lobby.

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.

Brief Description of the Drawings

Fig. 1 is a simplified perspective view of an elevator lobby having a hallway floor indicator panel identifying groups of floors to be served by various elevators during rush hour up peak elevator traffic, a kiosk to identify tenants by means of which one or more floors relating to a tenant can be identified and calls entered as potential destination floors, and

elevator indicators, indicating by color (as well as symbols) the otherwise identified destination floors which are to be serviced by the elevator.

Fig. 2 is a perspective view of an elevator lobby with a panel disposed in the lobby indicating correlation of colors with destination floors, and elevator indicators comprising large panels that can be easily viewed at any approach to or from any position within the elevator lobby which correlate with colors to the floors to be served thereby with colors.

Fig. 3 is a perspective view of a hand-held elevator call device.

Fig. 4 is a simplified schematic block diagram of an elevator control system including floor identifiers, destination call panels, card readers, hand-held devices, a kiosk, and elevator identifiers, all interrelated by a group controller that controls dispatching of the elevators, including morning rush hour up peak dynamic channeling.

Mode(s) for Carrying Out the Invention

In Fig. 1, an elevator lobby 25 includes a plurality of elevators 26-29, each having an elevator indicator 32-35 disposed adjacent thereto. Each indicator is capable of displaying a color (the difference in colors being indicated by cross hatching) and a symbol, such as a letter or other symbol. In any given implementation of the present invention, the symbol may be letters such as those illustrated in Figs. 1 and 2, or they may be some other type of symbol which has an easily-rememberable impression, such as geometrical shapes, flowers vs. lightening bolts or any other differentiating and easily remembered set of symbols. For instance, elevator indicator 32 may be displaying the letter A and the color blue. Elevator indicator 33 may be displaying the letter B and the color red, elevator indicator 34 may be displaying the letter C and the color green, elevator indicator 35 may be yellow, with the letter D. The indicator 35 may be yellow, but it is not currently lit and is displaying no color since it is not assigned to any sector of floors for its next trip, at the particular moment; or elevator 35 may be assigned to interfloor traffic, which is common in systems employing channeling.

In a hallway leading to the elevator lobby, there is disposed a floor indicator panel 39. All of the floors served by the group at the elevator lobby 25 are indicated on that panel, either simply by floor number, or perhaps by floor number and principal tenants. The important thing is, however, that groups of floors being served by a single elevator are identified with the same color displayed by the elevator indicators 32-35 corresponding to the respective elevator currently assigned to serve the related group of floors. Note that the coloring of some floors in the panel 39 (such as yellow) finds no counterpart among the elevators 32-35 simply because

the elevator 35 has left to serve those floors, and those floors or some of them are not yet reassigned into a different channeling sector, nor has a sector including such floors been assigned to an elevator that will arrive at the lobby 25 to pick up passengers for a next trip. If desired, such floors could be unilluminated at this time (as shown in Fig. 1), such being a choice of detail made in any given implementation of the present invention and irrelevant to the invention.

In one embodiment, each floor is permanently assigned to a sector and each sector has a color permanently assigned to it. In such case, building tenants need not look at the floor identifier panel during morning up peak; tenants need only look to see which elevator (if any) is displaying their regular, every-day color.

In the case of dynamic channeling, the channeling dispatcher next makes floor groupings to form sectors of contiguous floors, some floors may be assigned to a new sector, and their colors in the panel 39 will change. The color of a floor in the panel 39 will not change from the time the elevator is assigned until the assigned car has left on a trip. Then any floor in the sector being served may be transferred to a contiguous sector and the color of that floor on the panel 39 will change to the color of the new sector, when it is assigned to a car. The coloration of floors in the panel 39, and the corresponding letters (A/blue; B/red, C/green; D/yellow) will therefor reflect the sector assignment of each floor, as the assignments of some floors are moved into other sectors, as the rush hour progresses.

In Fig. 1, elevators A and B are at upper floors, either delivering passengers to their destinations, or returning toward the lobby. These elevators have, however, been assigned to groups of floors, elevator A having been assigned to the sector including floors 2-6 and elevator B having been assigned floors 7-9. Elevator C, assigned to floors 10-12, is currently boarding passengers.

In Fig. 1, a kiosk 41 may contain a tenant list 42. Although not shown, for clarity, the tenant list would have colors to identify elevators assigned to serve various tenant floors. Visiting passengers may view the tenant list to determine colors, and thereby know which elevator is assigned (if any) to service the floor or floors upon which the desired tenant resides. So long as the elevator is assigned to include all the floors of that tenant, the particular one of such floors can be selected once in the elevator by means of a more detailed listing on the car operating panel, without any degradation in service. The tenant list 42 on the kiosk 41 may also comprise a key pad such that touching the indicia of the desired tenant will cause a destination call to be entered to the one or more floors of that tenant and upon which a color

would appear to identify the assigned elevator. In a similar fashion, panel 39 may also comprise an entry device: touching one of the floor indications during non-rush hour will enter a destination call and cause an elevator to serve the passenger.

In Fig. 2, the elevators 46-49 each have a large color panel 32a-35a, which may, if
5 desired, also display a symbol, such as a letter, to assist those that are color blind.

In Fig. 2, a floor identification panel 52 is illustrated as being a stand-alone panel within the lobby itself. This panel functions the same as the panel 39 of Fig. 1 to illustrate the color and symbol correlation between the floors and the elevators assigned to serve those floors, with or without the capability to also be destination service call buttons for use during
10 non-up peak elevator traffic. The panel may be mounted wherever is best suited, depending on the lobby configuration.

In Fig. 2, the elevator indicators 32a-32d may have the same colors and letters as described with respect to Fig. 1 (of course other colors and symbols may be used within the invention). These panels are large, sufficiently high to be readily seen, and may typically be
15 on the opposite side of the elevator doorway from the entrance to the elevator lobby, in cases where there is a single entrance to the elevator lobby as illustrated in Figs. 1 and 2. If there are two entrances to the elevator lobby (such as behind the floor indicator 52 in Fig. 2), then devices 32a-32d will appear on both sides of the elevator door frame. Of course, the panels may be mounted on the wall of the lobby, rather than integrated with the door frame, if desired.

Fig. 3 is a simple illustration of a hand-held device 53 which may, for example, have a ten-key pad 54 for destination call entry as well as a color panel 55 to indicate the color correlated with the elevator which has been assigned to respond to a call that has just been entered on the remote device 53. The device 53 may have a wide variety of other functions, with different call entry buttons, tailored, perhaps, for each of the tenants. Instead of being a device with buttons, the remote device may comprise a smart badge or other portable device
25 which enters calls automatically. In such a case, the device would receive a signal indicative of a color to be lit on the device, thereby indicating the elevator serving the floor for which a call has been automatically entered. All of this is irrelevant to the present invention, so long as the device will display color indicative of the elevator currently assigned to serve the
30 corresponding call.

Fig. 4 illustrates a system which may employ the present invention, including a group controller 58 which may receive inputs from, for example, the kiosk 41, hand-held devices 53, destination call devices 60, which may for instance be destination call panels mounted in

hallways approaching the elevator, or call buttons integrated into the floor identifier panels 39, 52, or card reader 62.

During non-peak hours particularly, the group controller 58 will respond to calls which are entered from the devices 53, 59, 60 and assign the calls indicated thereby to particular elevators. In response thereto, the floor indicator, such as on the panel 55 on the hand-held device, the tenant indicator on the kiosk 41, will be lit up in a particular color by the group controller 58 to indicate the elevator assigned to the call. In addition, the group controller will provide information to one or more floor identifiers 39, 52 so that any passenger, even a random passenger having not entered a call, can choose an elevator assigned to the desired destination of such passenger.

The group controller 58 will also provide signals on line 62 to cause the elevator identifier panels 32-35 or 32a-35a, to light up with the correct color for a group of floors. The group controller may also provide symbol signals, wherever symbols are also used and are not permanently displayed, on lines 64 to cause a correct symbol, such as the letters A-D in Fig. 4, to appear on the display to aid color blind people.

As described hereinbefore, the invention may preferably be operated with fixed floor assignments to sectors, and fixed color assignment to sectors. If each car is permanently assigned to a given sector, then up peak passengers can walk to the same elevator each day. If the dispatcher assigns different cars to the sectors to maximize capacity, the invention requires operation in such a way as to select the color and/or the symbol for each elevator identifier to display, at any given point in time, depending on which elevator has just been assigned to serve a sector.

However, if dynamic channeling is used, it is more practical to permanently assign a color and a symbol to a given elevator, not only because that is technologically much simpler, but also because the regular occupants of the building will know in a flash which elevator to go to when they observe the floor identifier panel on the way toward the elevator lobby. Furthermore, in dynamic channeling dispatching, the number of contiguous floors which may be grouped together as a sector changes from time to time, even during each day, so at least some passengers' destination floors cannot possibly have the same color all of the time, since at least some floors will be in different sectors at different times of the day and in different days. In addition, if there is a varying number of elevators available to serve up peak traffic dispatching, such as due to an elevator malfunction, even the number of sectors will change, and the average number of floors in each sector will also change.

Thus, with dynamic channeling, it is probably preferable to assign symbols and colors permanently to the cars, and vary the colors used to display the floors in the floor identifier panel in dependence upon the car which will serve those floors. But with permanent sectors, the colors should be permanently assigned thereto.

Claims

1. An elevator system, comprising:

a group of elevators (26-29; 46-49) serving a selected plurality of floors of a building, which may be (d) all or (e) less than all of the floors of the building, from a plurality of corresponding elevator lobbies around which the elevators are disposed;

characterized by:

at least one floor identifier on each floor at one or more positions which may be (a) fixed (39, 42, 52) or (b) variable (53) or (c) both, (f) at (42) or (g) near (39) an entrance to an elevator lobby, or (h) within (52) an elevator lobby, for indicating a relationship between (A) either (I) one floor, (j) a set of related floors, or (k) all floors served by the group of elevators and (B) a first indicium indicative of which one or more elevators of the group are currently assigned to serve respective floors of the building, said first indicium including one or more distinctive colors, each color related, at any given time, to a selected one or more floors and a corresponding elevator currently assigned to serve said selected one or more floors from said lobby; and

an elevator identifier disposed adjacent each elevator of the group on each floor, said elevator identifiers displaying a second indicium, corresponding to said first indicium and including the same color as used to indicate the floors which each elevator is currently assigned to serve from said lobby, if any.

2. A system according to claim 1 wherein:

said elevator identifier is clearly visible from (l) any entrance to the lobby and (m) from any position within the lobby.

3. A system according to claim 1 wherein:

said first and second indicia include at least one symbol (A-D) uniquely related at any given time to one of said colors.

4. A system according to claim 3 wherein:

each said symbol (A-D) is always related to the same corresponding color.

5. A system according to claim 1 wherein:

said specific one or more floors permanently displays in said at least one floor identifier the same first indicium, each said elevator identifier (32-35; 32a-35a) whenever it is

assigned to serve any specific one or more floors, being identified by a second indicium of the same color as said first indicium.

6. A system according to claim 1 wherein:

the floors of said group are permanently assigned in contiguous groups to form sectors by a dispatcher (58), the first indicium of each floor in any said floor identifier related to any lobby always being the same, the second indicium of the elevator identifier of the elevator assigned to serve each from said any lobby being of the same color as the sector to which the elevator is assigned.

7. A system according to claim 1 wherein:

each said elevator identifier (32-35; 32a-35a) permanently displays the same second indicium whenever it is assigned to serve any specific one or more floors, said specific one or more floors being identified in said at least one floor identifier by a first indicium of the same color as said second indicium.

8. A system according to claim 1 wherein:

the floors of said group are assigned in contiguous groups to form sectors by a dispatcher (58) employing dynamic channeling, the sector assignment of each floor being changed periodically, the first indicium of each floor in any said floor identifier related to any lobby being the same as the second indicium of the elevator identifier of the elevator assigned to serve from said any lobby, the sector to which the floor is assigned.

9. A system according to claim 1 wherein:

said floor identifier is a panel (39) affixed to a wall.

10. A system according to claim 1 wherein:

said floor identifier is a kiosk (41).

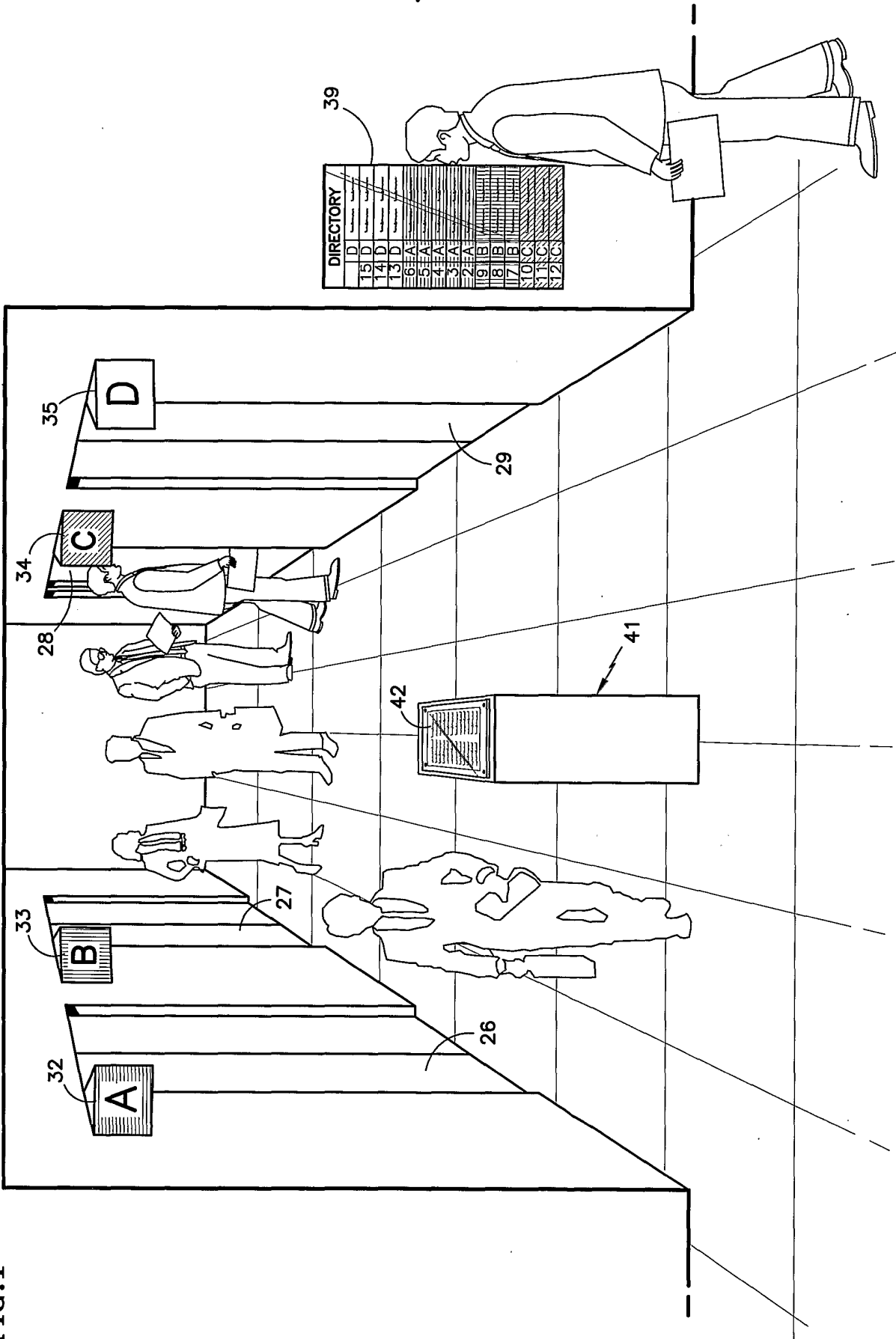
11. A system according to claim 1 wherein:

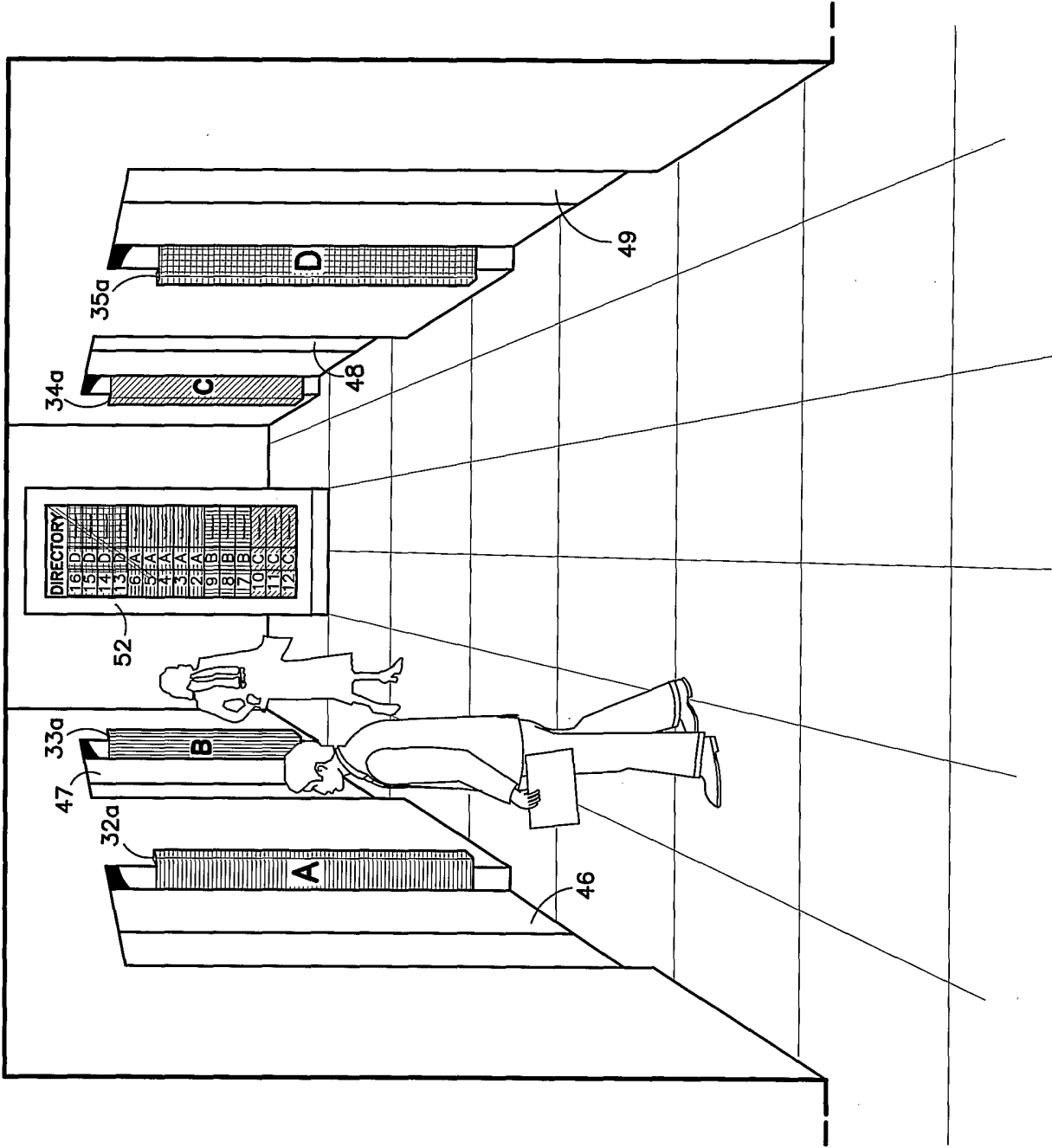
said floor identifier is a stand-alone panel (52).

12. A system according to claim 1 wherein:

said floor identifier is a hand-held device (53).

FIG.1





3/3

FIG.3

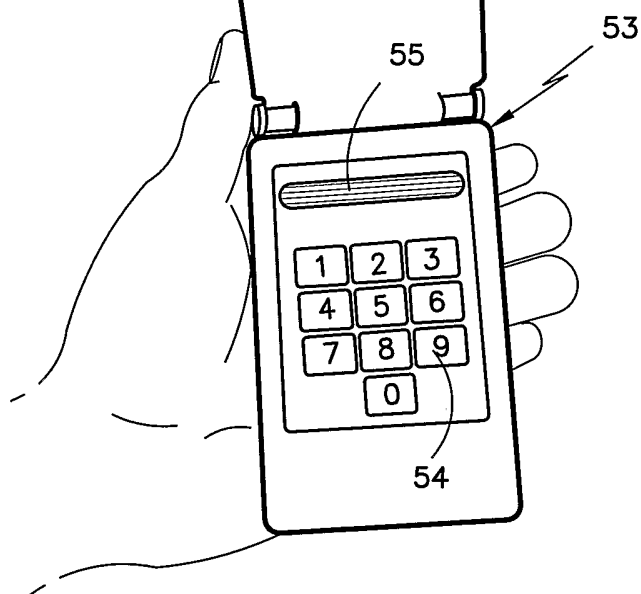
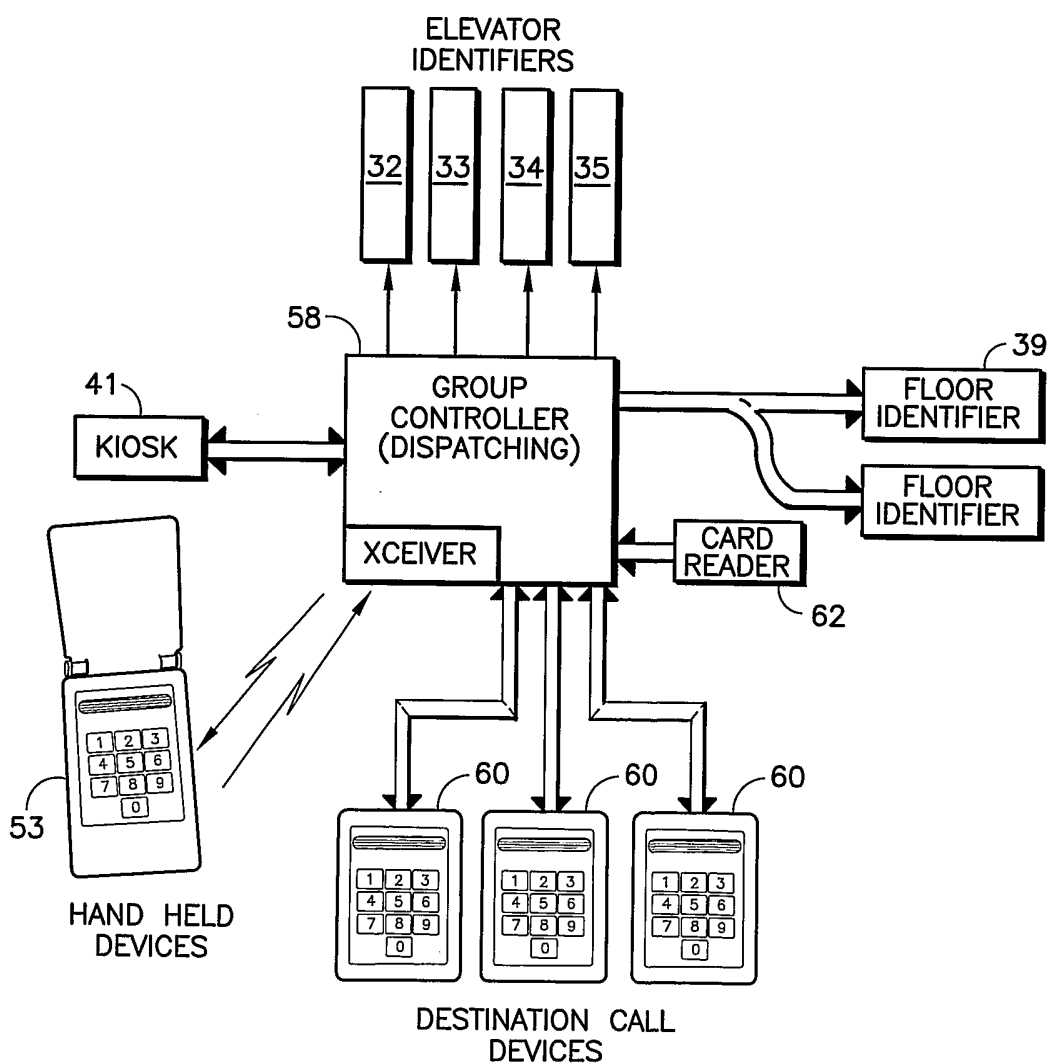


FIG.4



INTERNATIONAL SEARCH REPORT

International application No.

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A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : B66B 1/34, 3/00
US CL : 187/396, 391

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B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 187/396, 391, 395, 399, 393, 382, 383

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
NONE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
NONE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6,062,346 A (FRIEDLI et al) 16 May 2000 (16.05.2000), see entire document.	1-12
A	US 6,550,587 B1 (YUASA et al) 22 April 2003 (22.04.2003), see entire document.	1-12
A	US 6,058,334 B1 (MATSUDA et al) 21 January 2003 (21.01.2003), see entire document.	1-12
A	US 6,065,570 A (FRIEDLI et al) 23 May 2000 (23.05.2000), see figure s 1,4.	1-12
A	US 5,382,761 A (AMANO) 17 January 1995 (17.01.1995), see figures 1,2,8,9.	1-12

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

* Special categories of cited documents:

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

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