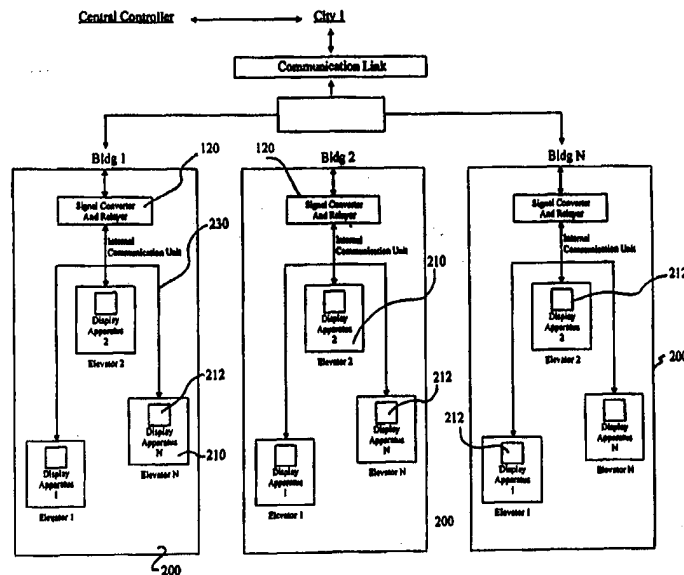




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<p>(21) International Application Number: PCT/CA98/00194 (22) International Filing Date: 12 March 1998 (12.03.98) (30) Priority Data: 2,199,757 12 March 1997 (12.03.97) CA (71) Applicant: VERTICORE COMMUNICATIONS LTD. [CA/CA]; Suite 1120, 44 Victoria Street, Toronto, Ontario M5C 1Y2 (CA). (72) Inventors: AMO, Stephen, D.; 1147 Forest Trail Place, Oakville, Ontario L6M 3H7 (CA). LACHEUR, Dean, L.; 60 Mann Avenue, Toronto, Ontario M4S 2Y3 (CA). LACHEUR, Neil, S.; #311-130 Oriole Parkway, Toronto, Ontario M5P 2G8 (CA). (74) Agents: PILLAY, Kevin et al.; Orange &amp; Associates, Toronto Dominion Bank Tower, Suite 3600, Toronto-Dominion Centre, P.O. Box 190, Toronto, Ontario M5K 1H6 (CA).</p>	<p>(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).</p> <p><b>Published</b> <i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i></p>	

(54) Title: INFORMATION DISPLAY SYSTEM FOR ELEVATORS



(57) Abstract

A display apparatus within elevator cabs or elevator waiting areas that facilitates the simultaneous display of advertising and general news information is described. Broadcast from a remote control center, advertising and general news information updates are transmitted to, and stored in a server located within a building and then forwarded to a display memory and subsequently displayed on a monitor according to a remotely modifiable program schedule. The display is updated such that it contains a copy of the latest broadcast schedule, as well as the advertisement and information programming, and automatically displays a days program according to the most current broadcast schedule. The display units as well as the building server are each individually addressable thus allowing groups of displays to be simultaneously updated from a remote centralized location with information such as news updates, customized advertising information and the like.

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## INFORMATION DISPLAY SYSTEM FOR ELEVATORS

This invention relates to an information transmission and display system and in particular to an information display system for displaying advertising and general news information in elevators and the like.

**BACKGROUND OF THE INVENTION**

In most urban centers, exposure to information such as advertising information and current news information has become an accepted part of everyday life. Apart from newspapers, magazines and television, mass advertising information is presented by way of billboards and more recently pixelboards™, which are capable of displaying relatively simple animated pictures and textual information. However as with most information and in particular with respect to advertising information, it is more effective to have both a captive audience and a well-targeted group in order to maximize the effectiveness and impact of the information conveyed. Most urban centers have a large number of major office complexes. These office complexes include multi-storied buildings serviced by elevators and large common areas providing a heretofore unexploited environment for presentation of advertising and news information. Display systems for these environments should amongst others have the ability to target specific audiences with the information they present, respond quickly and easily to information changes, and provide a consistent high quality image and information content.

To date, information display systems for elevators are capable of presenting at most the floor number, a floor directory of tenants and in some cases simple text based news information. For example, United States patent no. 4,995,479 to Fujiwara, describes a display apparatus for an elevator in which information regarding the operating conditions of the elevator is displayed along with "general" information, such as news and weather. A display unit is provided within the elevator cab and includes a display area for displaying text along side a picture display area for displaying predetermined graphic images. Predetermined pieces of information are assembled and assigned a number indicative of a priority for that piece of information. The information is selected to be displayed according to the priorities assigned. Limitations of this system are that the messages are not easily updateable and information is restricted to basic text and primitive graphic data. Furthermore, the system does not provide for an easily updateable real time information delivery and display system.

In United States patent no. 5,056,629 to Tsuji, et al., a display apparatus for an elevator is described, in which information concerning news, weather, etc., is displayed on a display screen located within the elevator cab. The information is selected to be displayed at predetermined times. The device described in this patent allows for the information  
5 displayed to be corrected (i.e. other information displayed) through inputs made remotely from the elevator cab, for example, from a caretakers room or a portable computer. Once again this patent discloses a simple scrolling message display system, which although updateable via a remote computer, requires extensive user intervention to constantly update the displayed messages. Furthermore, the display of the information is dependent to some  
10 extent on the operational parameters of the elevator.

In United States patent no. 5,485,897 to Matsumoto, et al., an elevator display system is disclosed in which the operational information of the elevator, in particular a floor indicator, is superimposed on a background image on a display screen. The background image is described as being a plurality of still pictures assigned to the different floors at  
15 which the elevator stops or different kinds of animations assigned to the different floors. Once again, this patent does not disclose a method of simultaneously altering the information in a series of elevators independent of a particular elevator operational state.

Thus, based on the current state of the art regarding elevator and foyer display systems, there is a need for a system for displaying real time information content targeted to a  
20 specific audience and which provides that the information is centrally coordinated and disseminated. Furthermore, currently available systems do not provide a system that is completely site addressable with the potential for a building, including multiple elevator banks within a building, to have its own unique daily program. Furthermore, there is a need for a system that is capable of communicating on a daily basis new information relevant to  
25 tenants or users of the building and which is capable of replacing the relatively ineffective paper and poster notification methods currently in use along with the associated manpower costs. Furthermore there is a need for a system that makes use of display technology that offers highly legible, easily understandable stills, animated graphics, pictures and videos.

There is also a need for a display system that is both flexible that can be installed in  
30 existing elevator banks and can provide an advertiser impact close to the point of purchase and can effectively target an extremely attractive market place and which does not necessarily require extensive government regulatory approval.

## SUMMARY OF THE INVENTION

This invention seeks to provide in an information display system an information display apparatus and a method for easily updating displays in the system such that information composed at a centralized location may be easily presented at the displays.

5 It is an object of the present invention to provide general information display units which may be located in elevator cabs and waiting areas.

A further object of the invention is to facilitate remote control and automated information updates, simultaneously, to a number of display units located in elevator cabs and waiting areas.

10 A further object of the invention is to provide time sensitive information to the display units, and to provide such information independent of elevator operation.

A further object of the invention is to provide an information and advertising presentation in a relatively easily understandable manner utilizing a relatively high-resolution display capable of displaying amongst others, picture quality advertising and information graphics and all manner of information display including still images, 2-D and 3\_d computer  
15 animations and full motion video and which may be easily integrated into existing elevator cabs and waiting areas.

In accordance with this invention there is provided a device for displaying information in at least one elevator cab, the device comprising:

20 a display means including a display screen located in each elevator cab said display adapted to receive and display information on said screen;

a building server located in the building in which each elevator cab is located, the building server being adapted to communicate information to each display means; and

a central server remotely located from the building servers,

25 wherein the information to be displayed is transmitted from the central server to the building servers and then to the display means.

## BRIEF DESCRIPTION OF THE DRAWINGS

30 These and other advantages of the present invention will become more apparent from the following discussion of preferred embodiments of the invention and which are described by way of example only with reference to the accompanying drawings in which like elements have been assigned like numerals and wherein:

Figure 1 is a block diagram showing a network configuration of an information display system according to an embodiment of the invention;

Figure 2 shows a network configuration for a specific aspect of the general network configuration;

5 Figure 3 is a schematic block diagram of a display unit;

Figure 4 is a schematic diagram of the information flow from a central control to a display;

Figure 5 is a flow chart showing the operation including updated and control of the display;

10 Figure 6 shows a front view of an information display monitor;

Figure 7 is a flow diagram showing the update of advertising information to the display; and

Figure 8 is a further flow diagram showing the update of information to the display.

## 15 **DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT**

Referring to figure 1, a schematic network architecture is shown generally by numeral 100. The network includes a centralized control center or system server 110 which communicates via suitable communication links 112, with city control center servers 114. Each city may include one or more servers 114, however each server 114 has associated, 20 therewith, a number of buildings in a given city. The group of buildings serviced by the city server 114 is identified by reference numeral 116. Although a single city server 114 is shown per city group, this may include more than one city server within a given city.

The city servers 114 then communicate in turn with individual buildings within its group 116 via a communication links, for example via a telephone line, a wireless 25 communication, infrared or any suitable communication link. Within each building, for convenience is located a further server denoted a building server 120 which is then responsible for communicating with the individual elevator banks within the building. A display unit 210 is located within each elevator bank for displaying the information communicated thereto. In a further embodiment of the invention, the central server may be 30 configured to communicate directly with the building servers and not necessarily via the city servers.

The architecture of the network within a building is shown in greater detail with reference to figure 2. Referring to figure 2, an office complex includes one or more buildings

200. The buildings 200 are serviced by one or more elevator cabs 210. Within each elevator cab is located a display means 212 which is a self contained unit including a flat screen display 310, typically a liquid crystal display, a microprocessor 312, a mass storage device 314, a memory(RAM) 315 and a power supply 316 as shown in figure 3. The building server 220 is connected to each display means 212 within each elevator cab via a cable 230 which may be included within the bundle of cables already provided to the elevator cab. In a further embodiment, however, the display and the building may include wireless communication devices. As it is anticipated the present system will be retrofitted into existing elevators, the use of a wireless communication link between the display and the building server is desirable as the existing wiring to the elevator may be difficult to access. Furthermore, by providing a display which is separate to the existing elevator control system obviates the need to obtain authorization from elevator service companies to perform maintenance or updates on the information display system.

By providing individual servers 220 within a building which are individually and uniquely addressable allows in addition to common information to be received by all other buildings, but the ability to add additional individualized information pertaining to a specific building to the general information content. For example, a building landlord might include with the regular programming information, information on interruptions due to maintenance, emergency procedures, vacancies, etc. Also, with the proliferation of shops within building complexes, advertising information for these businesses may also be easily included with the building specific information. However, it may be seen that because the buildings are serviced by centralized city server 114, the bulk of the information displayed is synchronized with each building and the building specific information will not interrupt the information transmitted to other buildings within the network, while still maintaining centralized control and delivery of generalized information to the other elevator display units within the city.

In figure 3, a detailed block diagram of the display device is shown generally by numeral 300. The display device includes an electronic communication means 318 such as an Ethernet card or other suitable network protocol card. The communication means 318 may also support RF, or infrared signals. The display also includes a computer 312, memory 315, mass storage device 314 (such as a hard disk drive) and a suitable power supply 316. A display screen 310 is also provided for displaying relevant information, most typically this is a color liquid crystal display as used for example in laptops. The display unit components are

encased in a suitable housing (not shown) which may be customized to be esthetically integrated with the elevator cab interior.

In a further embodiment of the invention, information to be displayed on the display screen is transmitted to the building servers 220 and then transmitted in real time according to a schedule stored on the building servers 220 to the displays. This embodiment provides for a relatively less expensive display within each elevator cab as it is not required that the displays include a processor or storage device. Furthermore, in some instances where space in a elevator cab is at a premium it is more advantageous to implement this embodiment.

Referring to figure 4, the flow of information from the centralized control center 110 to the individual displays within the elevator cab is shown generally by numeral 400. The control center referred to previously in figure 4 includes a system server computer 410 which gathers information pages for transmission to the various building servers. These information pages may include amongst other, traffic reports, subway or train schedule updates, news clippings such as business and financial news, stock market updates, sports, weather and any other information of relevance to all or specific cities. In addition, the information may include building updates which is information specific to a specific building or groups of buildings within a city or across cities.

For example, in North America, it is not unusual of for a single real estate company to own various office complexes in different cities. Should it be desired that building information is to be provided to all their buildings, this information may be compiled at the system server site and appended to the existing general information. Because all building servers are individually addressable from the system server, the specific information destined for the requisite buildings may be communicated to their respective displays without effecting the information being displayed in other buildings. Once delivered to the building server, the information is relayed to the appropriate displays via the internal communication links of the building that as mentioned earlier may include wired, wireless or infrared links. In this manner, a display unit in any location can be reached from a central control point and information provided thereto in a consistent and timely manner. Furthermore, since the displays are individually addressable, advertising, information and scheduling updates are addressed to specific displays only when and where appropriate.

Once the relevant information has been communicated to the appropriate display apparatus in the elevator cabs, the information is processed by the computer within the display apparatus and then forwarded to the display screen. Referring to figure 6, the display



screen may be divided into two general areas, namely an information display area and an advertisement display area. Thus, both types of information may be simultaneously displayed. A different number of display areas within a given screen may also be implemented.

5 Referring to figure 5, information to be displayed on the screen is transmitted to the display apparatus as described earlier along with a broadcast schedule. The broadcast schedule determines when the next information or advertisement information is to be displayed and in what sequence they are to be displayed. As may be seen in figure 8, the processor within the display apparatus checks the broadcast schedule and based thereon,  
10 directs the appropriate information from the mass storage device to the display screen which then displays the information in the appropriate area of the screen. While the appropriate information is being displayed on the screen, the processor performs a constant check of the date and time and then performs a check for any changes in the broadcast schedule. Changes in the broadcast schedule may include changes in content of information to be displayed or  
15 times at which the information is to be displayed or both. If there has been a change in any of the information content or the scheduled times of display of the information, the appropriate information is loaded as per the revised schedule and displayed on the screen with reference to the sequence in figure 5.

A similar check for changes in the content and time sequence display of the  
20 advertising information is performed as indicated in figure 7. Thus, it may be seen that concurrent to the display of current advertising and current information, the display apparatus checks for updates to the advertising or the information content and schedule and loads the next appropriate advertising or information content for display. When the currently displayed advertisement or general information content has completed displaying the next scheduled  
25 advertisement or information is thus displayed. This sequence of events thus provides for seamless change of information and advertising.

Further, there can be an unlimited number of information screens scheduled for display which may be further displayed in any combination and for any predetermined length of time. The information displayed may include high quality computer generated graphics or  
30 picture quality static images displayed for a predetermined period of time, videos, animations or any combination of information. Furthermore, there is also provided in an alternative embodiment the facility for including sound with the images.

In the above embodiment, the information to be displayed on the screens is uploaded from the building server computer to the individual display units in the elevator cab, where the information is then processed according to the schedule included with the information. In another embodiment, the information may be fed in real time from the building server to the display unit and where the display apparatus does not store any significant amount of information thereon. Furthermore, the display apparatus may also provide for the return of diagnostic or maintenance information back to the server in order that the display unit may be monitored remotely without the need for maintenance personnel intervention, thus further reducing the overall cost of the system.

Thus it may be seen that the information display system of the subject invention may be implemented in various forms. Although the embodiments are shown with reference to specific examples, other modifications may be possible. For example, an embodiment of the present invention may equally well be utilized in subway cars, hospitals, trains or other similar places. These and other modifications to the variations upon the preferred embodiments are provided for by the present invention, the scope of which is limited only by the following claims.

**We Claim:**

1. A device for displaying information in at least one elevator cab, the device comprising:
  - 5 (a) a display means including a display screen located in each elevator cab said display means being adapted to receive and display information on said screen;
  - (b) a building server located in the building in which each elevator cab is located, the building server being adapted to communicate information to each display means; and
  - (c) a central server remotely located from the building servers,wherein the information to be displayed is transmitted from the central server to the  
10 building servers and then to the display means so as to provide said information simultaneously to each said display means located in said elevator cabs.
2. A device as defined in claim 1, said display means each having a unique address.
- 15 3. A device as defined in claim 1, said building servers having a unique address.
4. A device as defined in claim 2, said display screen being divided into areas for displaying advertising and general information thereon respectively.
- 20 5. A device as defined in claim 4, said display means including means for independently updating each of said display areas.
6. A device as defined in claim 1, said information including scheduling information.
- 25 7. A device as defined in claim 1, said display means being electrically connected to said building server for communication of information therebetween.
8. A device as defined in claim 1, said display means and said building server being adapted for wireless communication therebetween.
- 30 9. A device as defined in claim 1, said building server and said central server being adapted for wireless communication therebetween.

10. A device as defined in claim 1, said display means including a processor and a mass storage device.
11. A device as claimed in claim 9, said mass storage device being a hard disk.
- 5
12. A method of displaying information in one or more elevator cabs located in a building, said method comprising the steps of:
- (a) compiling information including scheduling information to be displayed on a central computer remote from said building;
- 10 (b) transmitting said information to a builder server computer located in said building;
- (c) transmitting said information from said building server to display means located in each of said elevator cabs;
- (d) receiving said information at said display means; and
- 15 (e) displaying said information on a display screen located at said display means according to said scheduling information.
13. A method as defined in claim 12, said display means being electrically connected to said building server for communication of information therebetween.
- 20
14. A method as defined in claim 12, said display means and said building server being adapted for wireless communication therebetween.
15. A device as defined in claim 12, said display means each having a unique address.
- 25
16. In an information display system for buildings or the like, an apparatus for displaying information in at least one elevator cab, said apparatus comprising:
- (a) a display means including a screen, said display means being adapted to be installed in each elevator cab;
- 30 (b) a memory means;
- (c) a processing means, said memory means and processing means being associated with said display means;

(d) a communication means, associated with said display means adapted to receive information according to a predetermined protocol, and having a predetermined address;

(e) a building server located in the building in which each elevator cab is located, the building server being electrically connected to each display means; and

(f) a central server remotely located from the building servers,

wherein said information to be displayed on said screens is compiled at said central server and transmitted from said central server to said building servers and then to

said display means so as to provide said information simultaneously to each said display means located in said elevator cabs, and whereby information received via

said communication means is stored in said memory and processed by said processing means to be displayed on said screen according to a predetermined schedule.

17. A system as defined in claim 16, wherein said information includes scheduling information.

18. A system as defined in claim 17, wherein said scheduling information is updated independently of said display information.

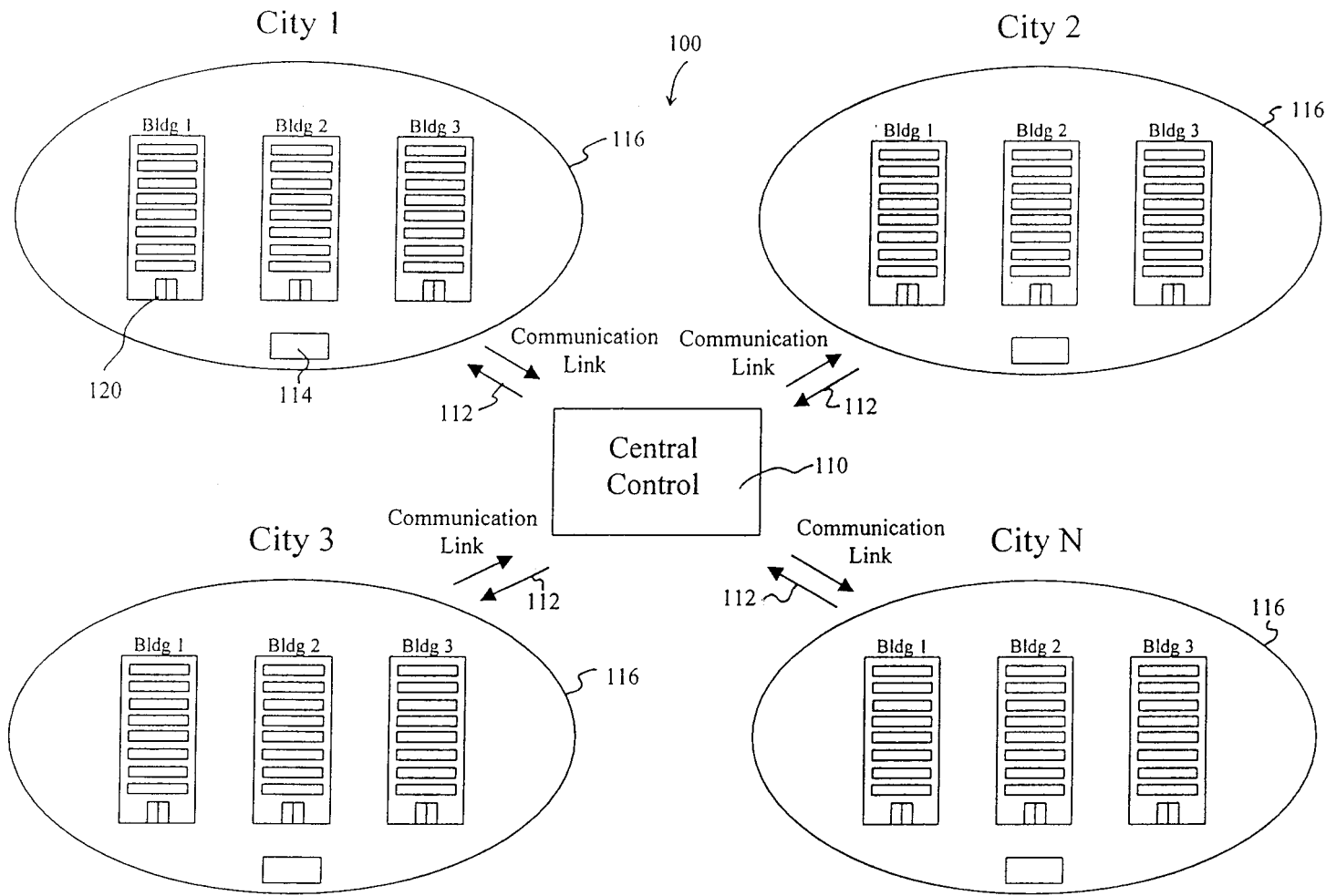


Figure 1

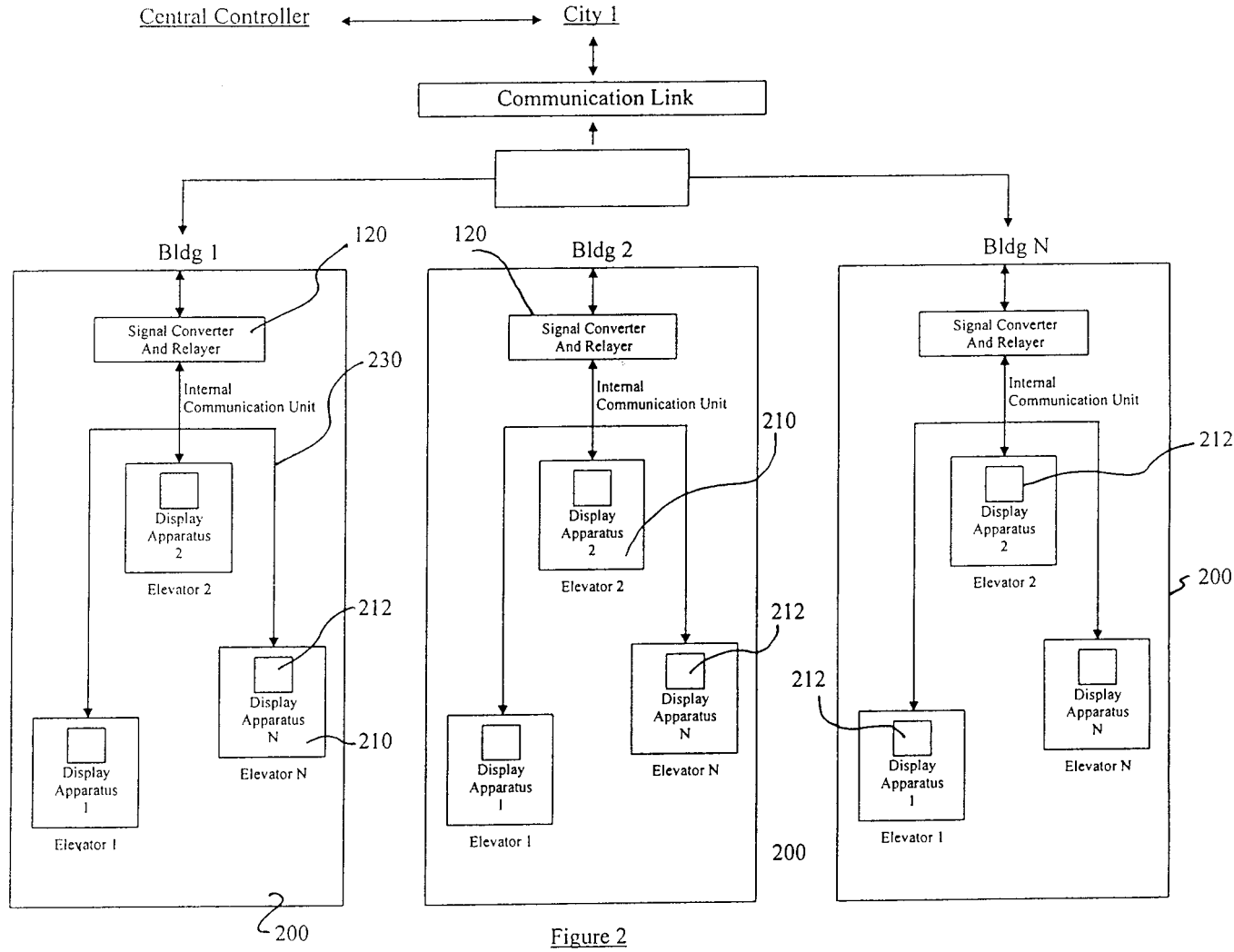


Figure 2

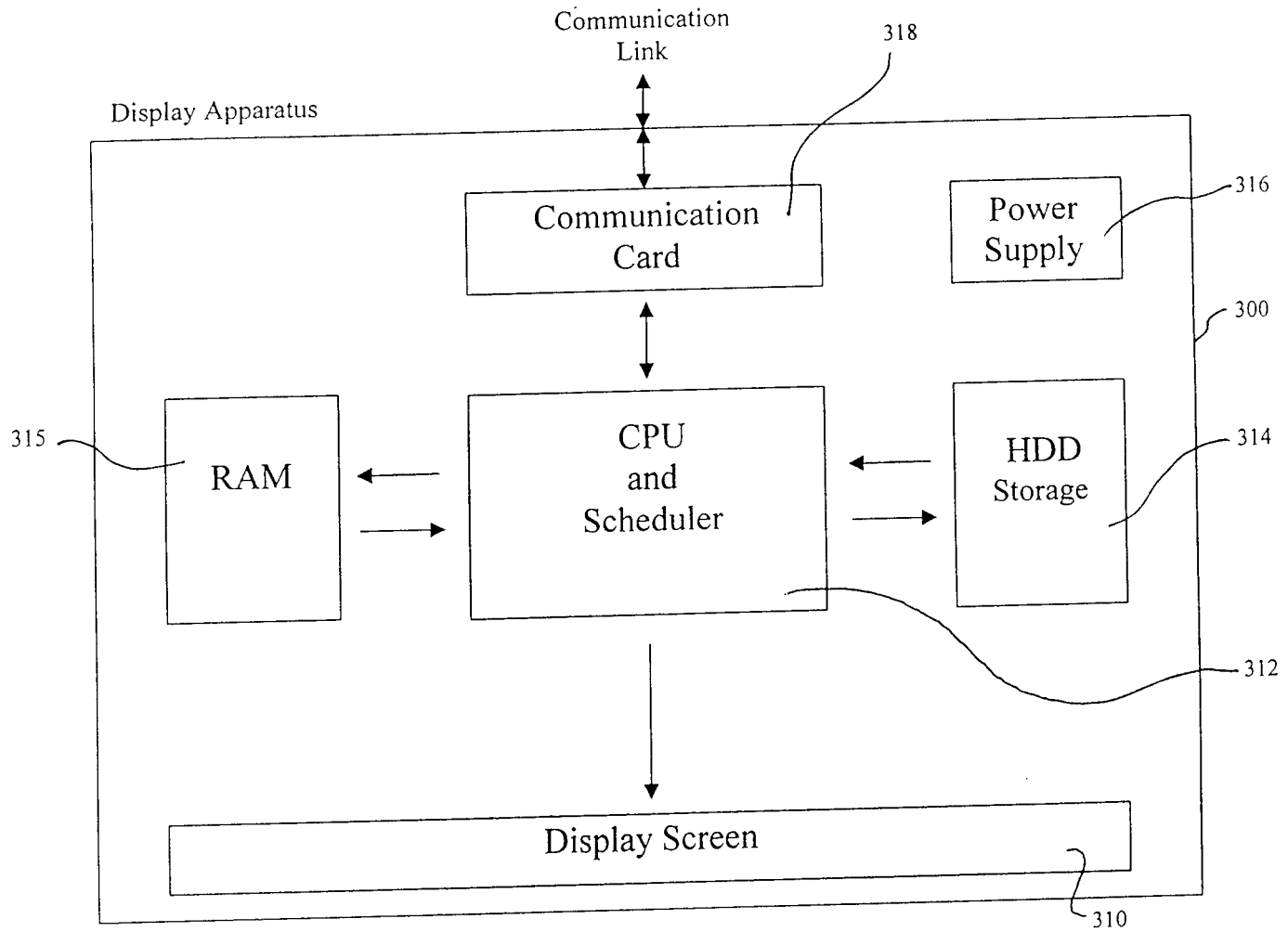


Figure 3



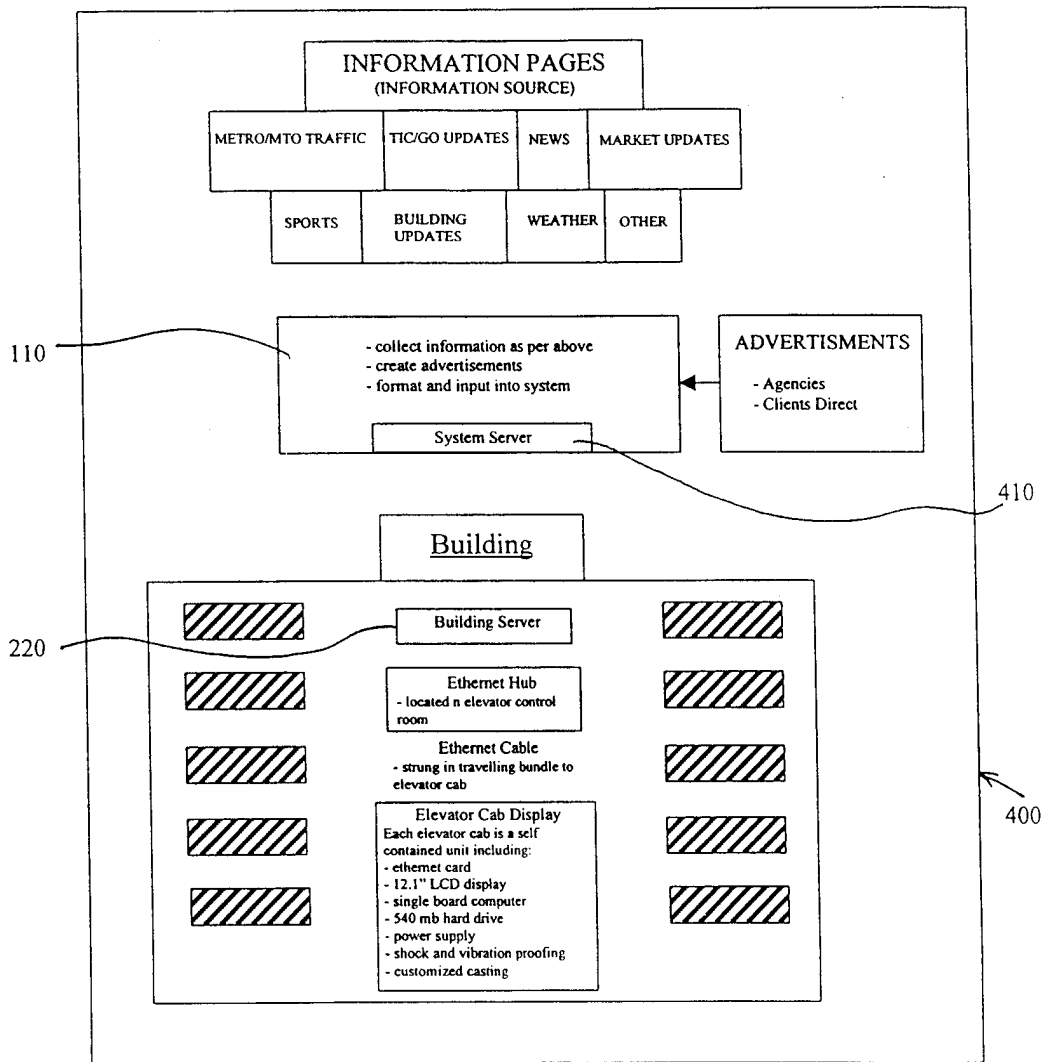


Figure 4

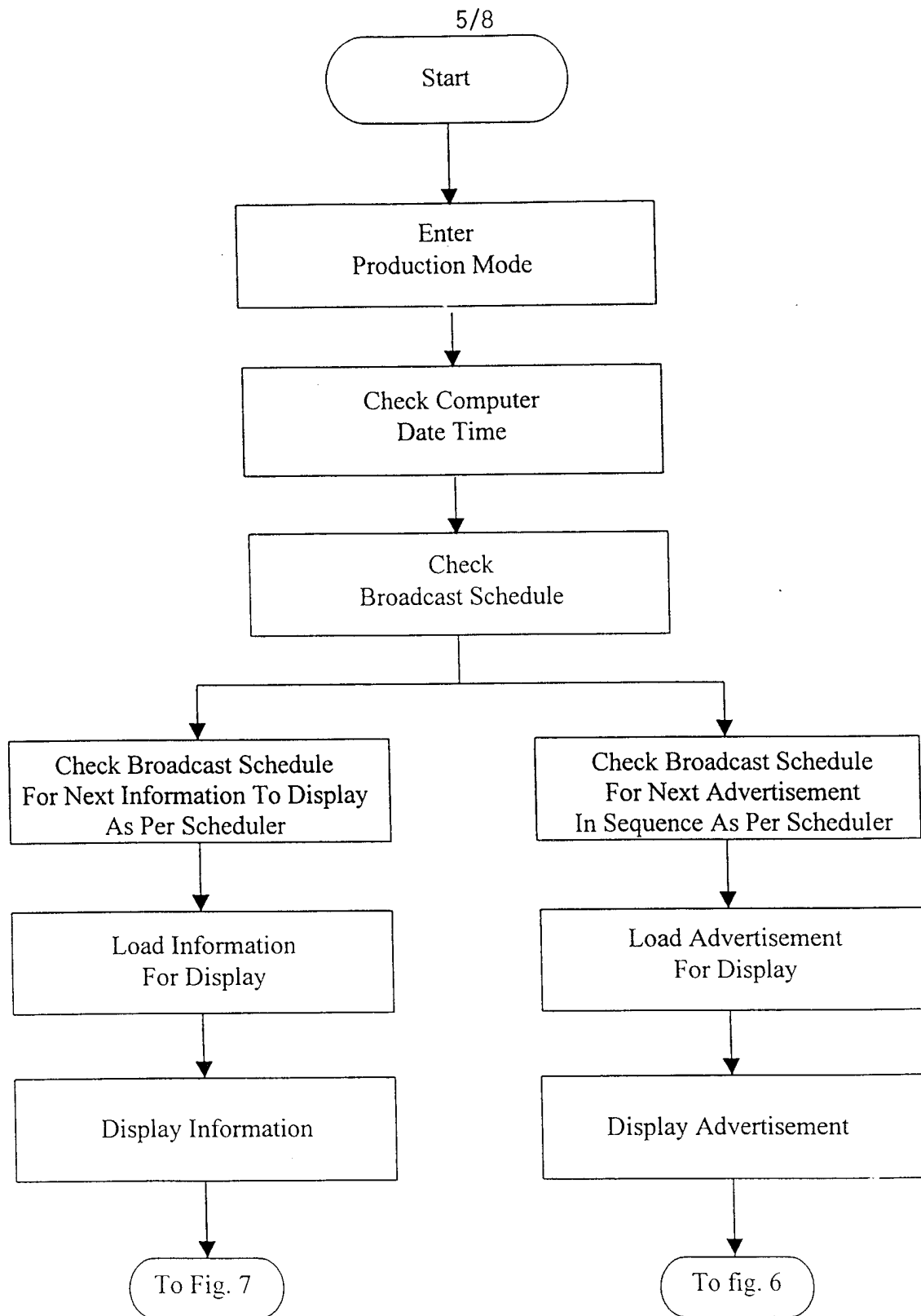


Figure 5

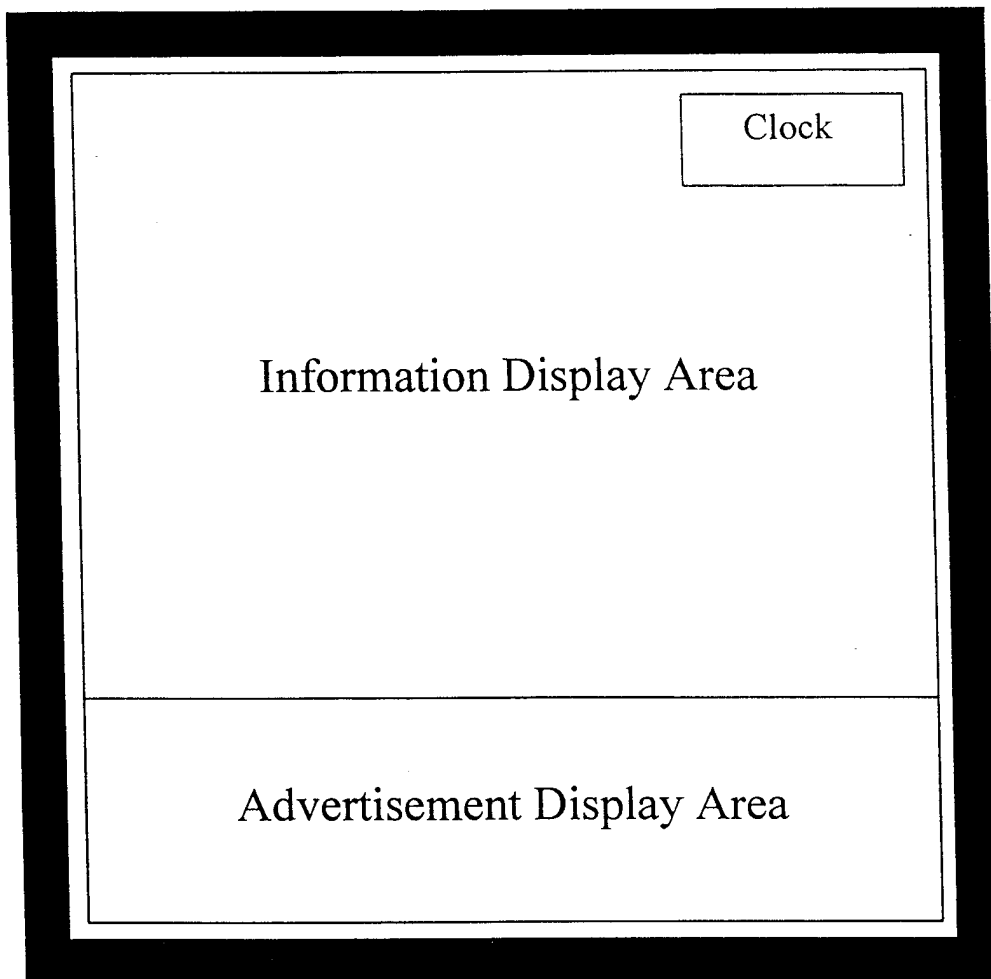


Figure 6

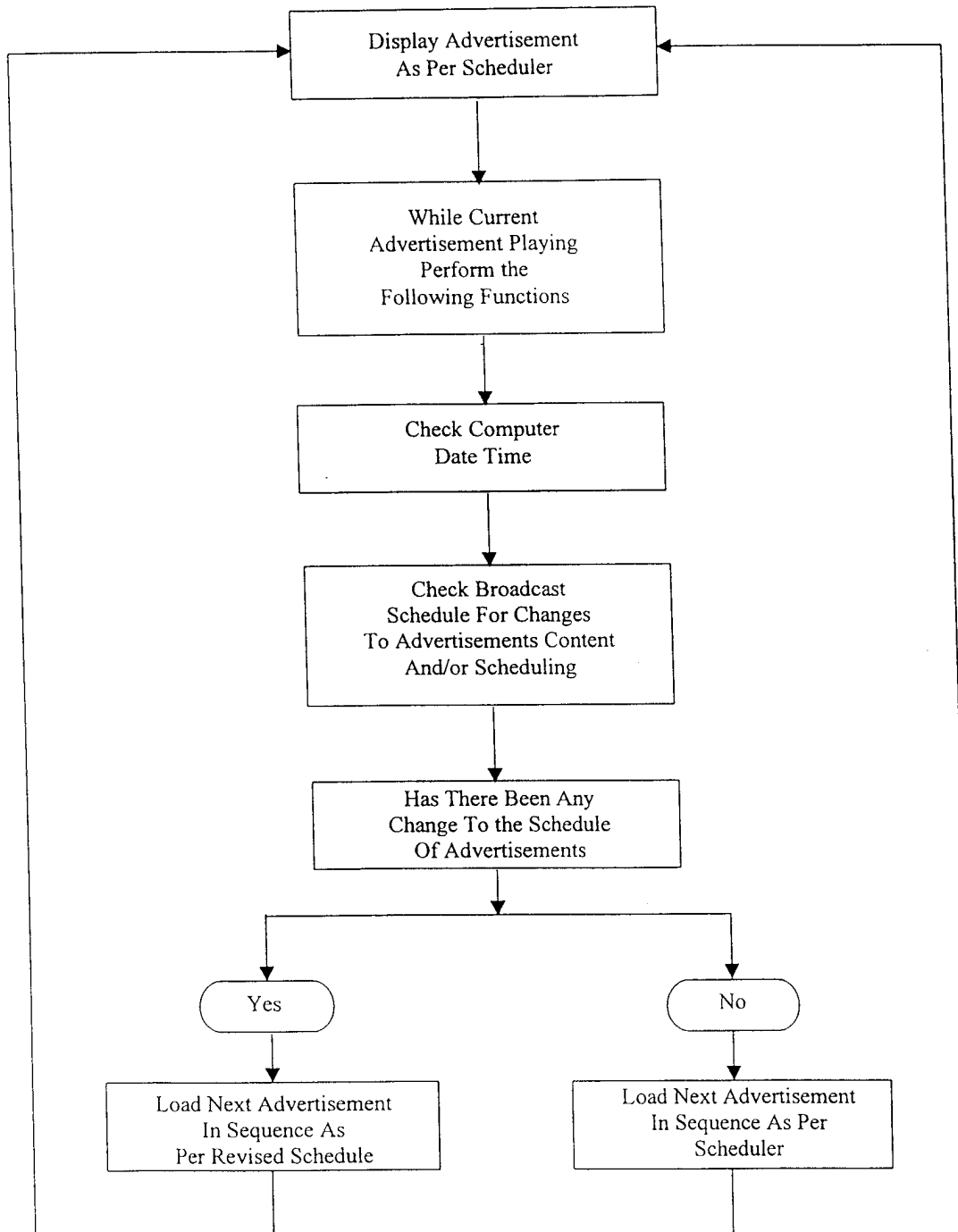


Figure 7

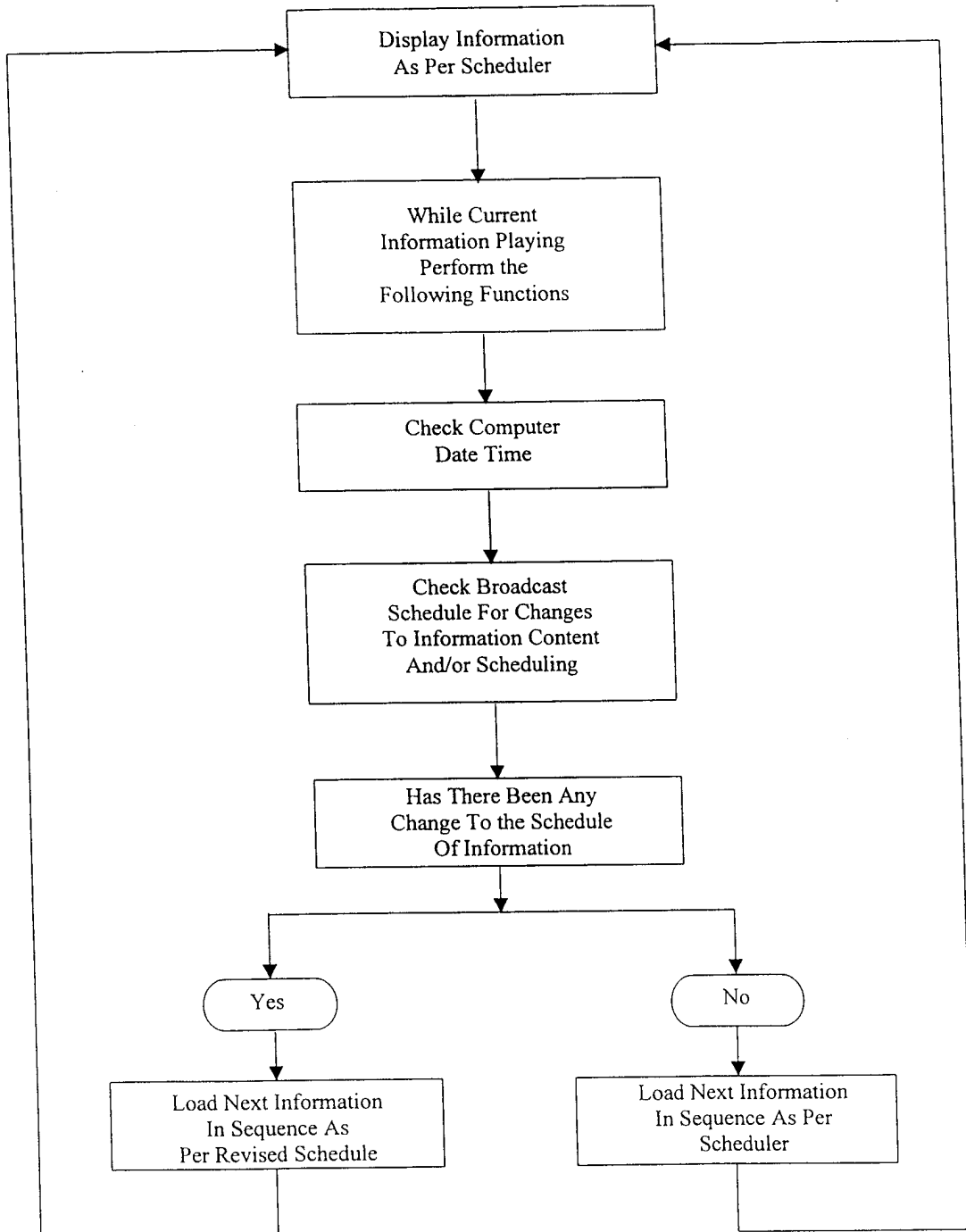


Figure 8

# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/CA 98/00194

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 6 G06F3/14 B66B3/00

According to International Patent Classification(IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
IPC 6 G06F B66B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	WO 92 05499 A (JENSEN KARL P) 2 April 1992  see page 3, line 13 - page 4, line 14 see page 11, line 31 - page 13, line 11 see page 15, line 12 - line 20 see figures 1,2 ---	1,2,8 4,5,7,16
Y	EP 0 403 232 A (OTIS ELEVATOR CO) 19 December 1990 see column 1, line 1 - line 6 see column 2, line 28 - line 37 see column 8, line 26 - line 37 see figures 1-6A --- -/--	4,5,7

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

° Special categories of cited documents :

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Date of the actual completion of the international search

2 July 1998

Date of mailing of the international search report

16/07/1998

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# INTERNATIONAL SEARCH REPORT

International Application No

PCT/CA 98/00194

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 4 995 479 A (FUJIWARA MICHIO ET AL) 26 February 1991 cited in the application see column 4, line 66 - column 5, line 28 see column 8, line 44 - line 60 see figure 13 -----	16
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