

starts at 70 and progresses to a step 71 which displays a root level screen. The root level screen is like that illustrated in FIG. 4A which shows all of the selections which are available at the root level. When a keystroke is detected by the keystroke encoder, and an encoded keystroke signal is passed to the keyboard driver, after passing through the BIOS system, it is presented to the application software as a data word indicating the identity of the pushbutton which had been depressed. This operation is generally indicated in the block identified as 72 in FIG. 5. A test 73 is performed to determine if the pushbutton which had been depressed is one of the multi-function buttons. This is for the case where a number of the pushbuttons are assigned dedicated functions, such as the escape function. If the pushbutton actuation is not a multi-function button, the program branches to a step 74 to service the dedicated function key, such as escape. An escape will exit the application program and return to the basic screen at power up, which in some applications may, for example, be the first screen of the day where the restaurant operator enters the initial information, assigns waiters, and the like.

In normal operation, the step 73 will test positive, and the program will be routed to a step 75 which determines the function for the actuated pushbutton at the existing level of the application program. Assuming that the program is at the root level, and one of the buttons is actuated, the step 75 determines the function at that level, such as by reference to a look-up table. A step 76 is then performed by the standard microprocessor software operating according to the application which is operating in the microprocessor to execute the function. The function may or may not require a change in levels for the displayed function. A test is performed in the step 77 to determine if such a change is required. If it is not, the program branches back to the step 72 to detect the next keystroke. If a level change is required, a step 78 is performed to update the level flag. The step 78 is operated according to the particular requirements of the application software to progress through the menu tree according to the particular selection which has been made. A step 79 is then performed to display the screen for the new level, and the program branches back to the step 72 to detect the next keystroke for next selection. The input/output program continues to cycle in the loop illustrated in FIG. 5 until an enter button is depressed. The actuation of the enter button will typically be detected in the step 73 and will cause a branch to the step 74 which will enter the information which had been input thus far into the portion of the application which will cause the ordered meal or meals to be prepared in the kitchen, bills to be prepared, and the like. Insofar as in the input/output aspects of the program are concerned, however, step 99 indicates that they are at an end.

As a significant but subsidiary feature of the invention, it will sometimes be useful to enter free form alphanumeric information into a special purpose terminal such as that illustrated in FIGS. 1 and 2. Accordingly, for simple entry of free form alphanumeric information, means are provided for dedicating the pushbuttons in level-by-level fashion to portions of the standard alphanumeric character set to allow a user to select and input individual letters or numbers. This entry is accomplished much like making selections in a menu as described above.

When configuring a special purpose terminal to be adaptable to free form alphanumeric display, it is currently preferred to use 16 pushbuttons in the user interface. This allows three buttons to be dedicated to particular functions, such as escape, enter and backspace. That retains the remaining thirteen buttons for multi-function use. One of the thirteen

buttons is preferably dedicated to a paging function which allows the user to control movement from one panel to another. The remaining twelve buttons are utilized for the alphanumeric character set, preferably arranged in three levels. The twenty-six letters of the alphabet and the ten numerals can thus be accommodated in only three panels of the display. The first panel will comprise letters A-L, the second panel will comprise letters M-X and the third panel will comprise letters Y-Z and the numerals 0-9.

The entry of free form alphanumeric information utilizing a system such as that just described will be better understood with reference to the flow chart of FIG. 6. The process begins at a step 80. After selection of the alphanumeric mode, a step 81 is performed which displays the first level of the alphanumeric panel. Thus, the first twelve multi-function buttons will have displays projected on the display screen which show the letters A-L, the thirteenth button will show the page function, and the fourteenth through sixteenth buttons will have the dedicated functions of enter, backspace and escape.

When a pushbutton is actuated, the keyboard encoder will detect the actuation and produce a binary code which identifies the particular button which had been actuated. That signal is passed through the standard keyboard port through the standard keyboard drivers and the BIOS to the application which perform certain tests. First of all, the tests 83, 84 and 85 are performed to determine if any of the dedicated function pushbuttons have been actuated. If they have not, the program branches to a test 86 which determines if the multi-function page pushbutton has been depressed. Assuming that it has not, the program proceeds to a step 87 which interprets the keystroke signal to determine the character which has been entered. A step 88 is then performed to display the character which has been selected, preferably in the central portion of the screen. The program then returns to the step 82 to wait for the next keystroke without altering the display of the first level panel of the alphanumeric characters.

The operator is then free to select another character, or to change panels. Assuming he decides to change panels, the page pushbutton is actuated. The progress of the program proceeds as before, except that the test 86 will test positive following which a step 89 will be performed to display the next level of alphanumeric characters. The user then has a complete set of new functions for the pushbuttons comprising the second level of the alphabet, and can select one of the letters from that panel. He then either selects a particular letter and the program will proceed as first described, or will enter a page command again, following which the third panel will be displayed. The user proceeds as outlined here until a character string is presented on the display which is intended for input into the application program. If the user has made a mistake, the dedicated function backspace key is actuated, and the test 84 will branch to a step 90 which will delete the previous character, return to the panel being displayed and allow the user to enter a new character. When the entry is complete, the user will actuate the enter pushbutton and the test 83 will produce a positive result. A step 91 will then indicate that the alphanumeric input is at an end and will progress to a step 92 which will enter the data word into the application. The manner in which the application uses the data word is not important to an understanding of the present invention. What is the important is the ability to use to a limited extent the special purpose, highly customized and generally foolproof special purpose user interface of the present invention in a free form alphanumeric mode.

To facilitate the entry of alphanumeric information, the interface module of the present invention can be configured

to allow a standard keyboard to be connected to the keyboard port 12 (FIG. 1) through the interface module. For example, the interface module can be provided with a switching circuit and a connector for connecting a standard alphanumeric keyboard. The switching circuit performs the function of connecting the bus 22 (FIG. 1) to either the encoder 16 (FIG. 3) or the standard keyboard. Once the keyboard is connected to the bus 22 (FIG. 1), it can be used to enter alphanumeric information into an application program. The interface module can also be made to share the bus full time with a standard keyboard. In that case the program in the microcomputer will respond to both a keystroke on the keyboard and the actuation of a pushbutton on the interface module.

It was noted at the outset that the program is preferably divided into an input/output module and an application module. It will be appreciated by those skilled in the art, that this division is used primarily as an aid in understanding the invention, and that the software which implements the input/output modules and the application modules can be and often will be prepared as a single module. What is important is not the fact that separate modules are available, but that the different functions are being performed, and the use of separate modules in describing the invention herein is primarily a tool to aid understanding the different functions, rather than a requirement in how the application program should be segregated.

The mounting of pushbuttons on the bezel of the enclosure which houses the display is preferred, for providing the most ruggedized and professional looking finished product. However, the invention will have application to less permanent arrangements, such as retrofits. In those embodiments, the pushbuttons are arranged in a separate module which is positioned on the exterior of a conventional display. The module can provide a single line of pushbuttons, or can be L-shaped or U-shaped for multiple lines. It will be clear that achieving the positional relationship between buttons and indicators of the invention, does not require the permanency of mounting of the illustrated embodiment.

It will now be appreciated that what has been provided is a special purpose terminal which provides a simple and intuitive way of interactive user interface with simplified hardware requirements. The terminal uses an interface module which has pushbuttons along the sides of a display screen. The signal generated by actuating the buttons can be handled by the keyboard driver in the microcomputer, therefore no special driver is needed. The buttons can be used to select functions presented on the display screen as selection indicators, and by pressing the buttons a user can select a path through a hierarchal menu tree of functions.

What is claimed:

1. A special purpose microcomputer-based terminal for interactive user interface and comprising the combination of:

- a general purpose microcomputer having a display port and a keyboard port, the keyboard port being interfaced to a microcomputer keyboard driver of the type responsive to interpret keystroke signals in a standard format transmitted from a standard alphanumerical keyboard;
- an interactive interface module comprising a general purpose display screen connected to and driven from the display port of the microcomputer, and a user input module including a plurality of electrical pushbuttons arranged along at least one side of the display;
- the user input module including an encoder circuit for detecting the actuation of each pushbutton and produc-

ing a keystroke signal identifying the actuated pushbutton and compatible with the standard format of the keyboard driver;

the user input module being coupled to the keyboard port so that the keystroke signals produced by the encoder circuit are transmitted to and processed by the keyboard driver;

a program memory in the microcomputer for assigning level specific functions to individual ones of the pushbuttons and containing instructions which:

- (a) assign level-specific input functions to the pushbuttons, and display pushbutton function assignments for a specified level on the display screen in positions coordinated to the positions of the pushbuttons; and
- (b) respond to signals received from the keyboard driver circuit initiated by actuation of a pushbutton by determining the function specified by the pushbutton actuation for the specified level and executing the determined function.

2. The terminal as set forth in claim 1 wherein the program memory establishes multiple levels arranged in hierarchal menu tree fashion for receiving inputs from the pushbuttons;

the instructions in the program memory are arranged to assign multiple functions to the pushbuttons corresponding to the multiple levels; and

the instructions in the program memory are arranged to respond to actuation of a pushbutton by executing the function assigned thereto for the level in effect at the time of actuation of the pushbutton.

3. The terminal as set forth in claim 2, wherein the hierarchal menu tree of options contains options available from a restaurant menu, and the multiple levels correspond to respective meal courses and options.

4. The terminal as set forth in claim 3, including a second menu tree of options containing a plurality of levels together making up an alphanumeric character set, the multiple levels presenting sub-sets of the alphanumeric character set, and page means for changing from level to level and sub-set to sub-set.

5. A special purpose microcomputer-based terminal for interactive user interface and comprising the combination of:

- a general purpose microcomputer having a display port and a keyboard port, the keyboard port being interfaced to a keyboard driver in the microcomputer of the type responsive to interpret keystroke signals in a standard format transmitted from a standard alphanumerical keyboard;

an interactive interface module comprising a general purpose display screen connected to and driven from the display port of the microcomputer, and a user input module including a plurality of electrical pushbuttons arranged along at least one side of the display;

the user input module including an encoder circuit for detecting the actuation of each pushbutton and producing a keystroke signal identifying the actuated pushbutton and compatible with the standard format of the keyboard driver;

the user input module being coupled to the keyboard port so that the keystroke signals produced by the encoder circuit are transmitted to the keyboard driver;

a program memory in the microcomputer containing:

- (a) an input/output module having multiple levels for assigning level-specific functions to the pushbuttons and including:

- (i) a display module for displaying on the screen representations of the pushbuttons and the functions assigned to the pushbuttons at each level;
- (ii) an interpreter for interpreting a keystroke signal resulting from a pushbutton actuation in accordance with the function assigned to the actuated pushbutton at the associated level; and
- (b) an application module for executing the interpreted function assigned to the pushbutton at the interpreted level.

6. The terminal as set forth in claim 5 wherein the execution by the application module of at least some of the functions causes the input/output module to switch levels.

7. The terminal as set forth in claim 5 further including means in the input/output module for paging from level to level and coordinating the display of pushbutton functions and interpretation of keystrokes in accordance with the current level.

8. The terminal as set forth in claim 7 wherein the means for paging includes:

- (a) one of the pushbuttons; and
- (b) the input/output modules assigns a page up/page down function to said one of the pushbuttons.

9. The terminal as set forth in claim 5 in which the user input module includes an inverted "L" shaped array of pushbuttons arranged in lines along the top and one side of the display, the display module displaying the on-screen representation in locations along the top and one side of the screen positionally corresponding to the positions of the pushbuttons, so that the center of the screen is free for display of application information.

10. The terminal as set forth in claim 5 wherein the multiple levels of the input/output module include a first said level assigning a first portion of an alphanumeric character set to the pushbuttons, second and third said levels assigning second and third portions of the alphanumeric character set to the pushbutton so that the plurality of levels make up a complete alphanumeric character set, and means are provided for paging between the levels to allow formation and entry of free form alphanumeric commands.

11. The terminal as set forth in claim 5 wherein at least one of the pushbuttons has a permanent function which is not altered by the input/output module.

12. The terminal as set forth in claim 11 wherein the plurality of electrical pushbuttons include an enter pushbutton and an escape pushbutton having permanent functions assigned thereto and which are not altered by the input/output module, so as to provide the ability to enter data or escape an application at any time during operation of the terminal.

13. The terminal as set forth in claim 5 in which the special purpose terminal is a waiter's terminal for a restaurant and in which:

the multiple levels of the input/output module include a stored series of nested menus including root level menus branching to elemental level menus, a root level menu being adapted to assign the courses of a meal to the function keys, a mid-level menu being adapted to assign selections to the courses specified in the root level menu, and sub-level menus being adapted to refine the selections in the mid-level menus;

the application module being adapted to guide the user through the menus in completing a selection of a meal, and to produce, at a printout station, an itemized check.

14. The terminal as set forth in claim 13, including a second menu tree of options containing a plurality of levels together making up an alphanumeric character set, the multiple levels presenting sub-sets of the alphanumeric character set, and page means for changing from level to level and sub-set to sub-set.

15. A method of simplifying the input/output operation in a special purpose terminal, the method comprising the steps of:

providing a general purpose microcomputer having a display connected to the display port and having a keyboard port of the type responsive to interpret keystroke signals in a standard format when transmitted from a standard alphanumeric keyboard;

providing an array of input pushbuttons, comprising the only input means for the terminal, and connecting said input pushbuttons through a keyboard encoder to the keyboard port, the number of pushbuttons being substantially less than the number of characters in a standard alphanumeric character set;

operating the terminal at a plurality of program levels each assigning different functions to at least some of the pushbuttons;

operating the keyboard encoder to assign particular key-stroke signals to each pushbutton irrespective of the program level at which the terminal is operating;

assigning variable functions to the pushbuttons dependent on the program level at which the terminal is operating, as part of the assigning step displaying on the display a set of indicators for the functions assigned to the pushbuttons in positional relationship with the physical locations of the pushbuttons; and

interpreting a keystroke signal received from an actuated pushbutton in accordance with the program level then in effect to cause the function displayed for the pushbutton to be performed upon actuation thereof.

16. The method as set forth in claim 15 including the further step of switching program levels to assign different functions to the pushbuttons, and interpreting the pushbutton actuations according to the different levels.

17. The method as set forth in claim 16 wherein the special purpose terminal is a waiter's terminal for a restaurant, and in which the step of assigning variable functions to the pushbuttons dependent on the program level includes sequentially displaying a stored series of nested menus including root level menus branching to elemental level menus, a root level menu assigning the courses of a meal to the function keys, a mid-level menu assigning selections to the courses specified in the root level menu, and sub-level menus refining the selections in the mid-level menus;

and the step of switching levels is nested to guide the user through the menus in completing a selection of a meal.

18. The method as set forth in claim 17 in which the step of assigning variable functions includes assigning a second set of functions to the pushbuttons comprising characters of an alphanumeric character set, segregating the characters of the alphanumeric character set into at least three groups, and the step of interpreting a keystroke signal includes identifying the pushbutton and the level to enter an alphanumeric character on the display corresponding to the function of the pushbutton at the current level.

* * * * *



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United States Patent [19]

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Cupps et al.

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[54] INTERNET ONLINE ORDER METHOD AND APPARATUS

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[21] Appl. No.: **08/976,793**

[22] Filed: **Nov. 24, 1997**

[51] Int. Cl.⁶ **G06F 17/60**

[52] U.S. Cl. **705/26; 705/26; 705/37; 705/27**

[58] Field of Search **705/26; 340/994; 379/201**

Primary Examiner—Kevin J. Teska
Assistant Examiner—Mark J. Fink
Attorney, Agent, or Firm—Flehr Hohbach Test Albritton & Herbert; Steven F. Caserza

[57] ABSTRACT

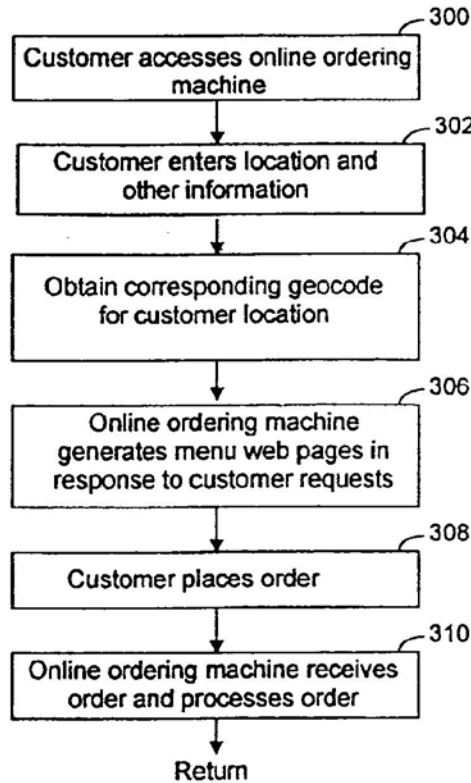
A system and method for providing an online ordering machine that manages the distribution of home delivered products over a distributed computer system is herein disclosed. The distributed computer system includes a group of customers connected to client computers and at least one server computer system that executes the online ordering machine. The online ordering machine provides the customers with product information from various vendors whose delivery range is within the customer's location or with product information from vendors having take out service within a specified range from the customer's location. The vendor's and customer's location is associated with a geocode representing the latitude and longitude coordinates of the location. The search for the vendors servicing the customer's location is done using the geocodes. The online ordering machine accepts orders from the customer for a particular product from a selected vendor. The order is converted into voice instructions which are transmitted to the vendor through a telephone call. The vendor receives the telephonic order and responds to voice-prompted instructions used to confirm the order.

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40 Claims, 20 Drawing Sheets



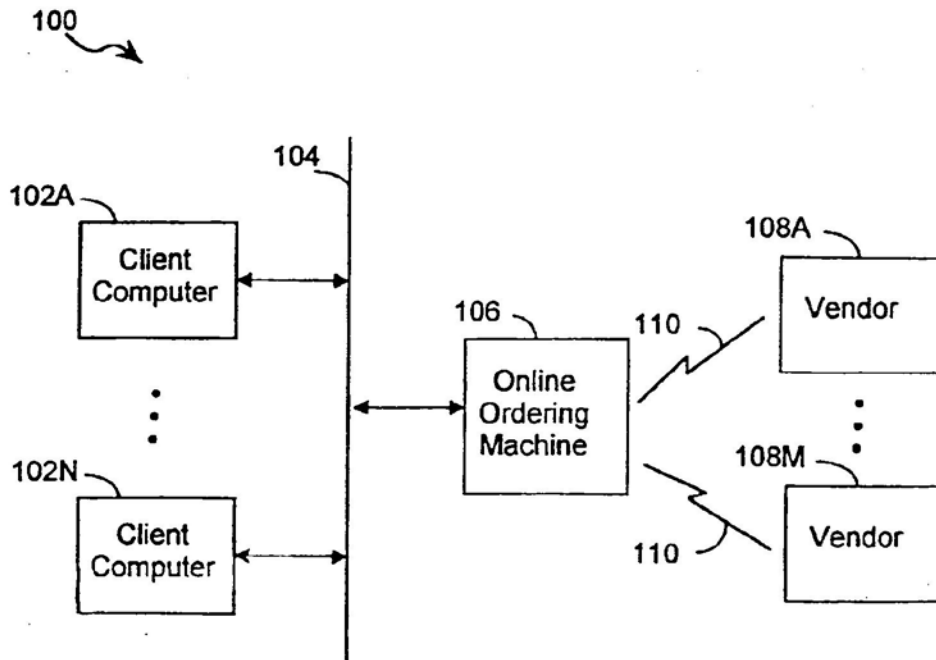


FIG. 1

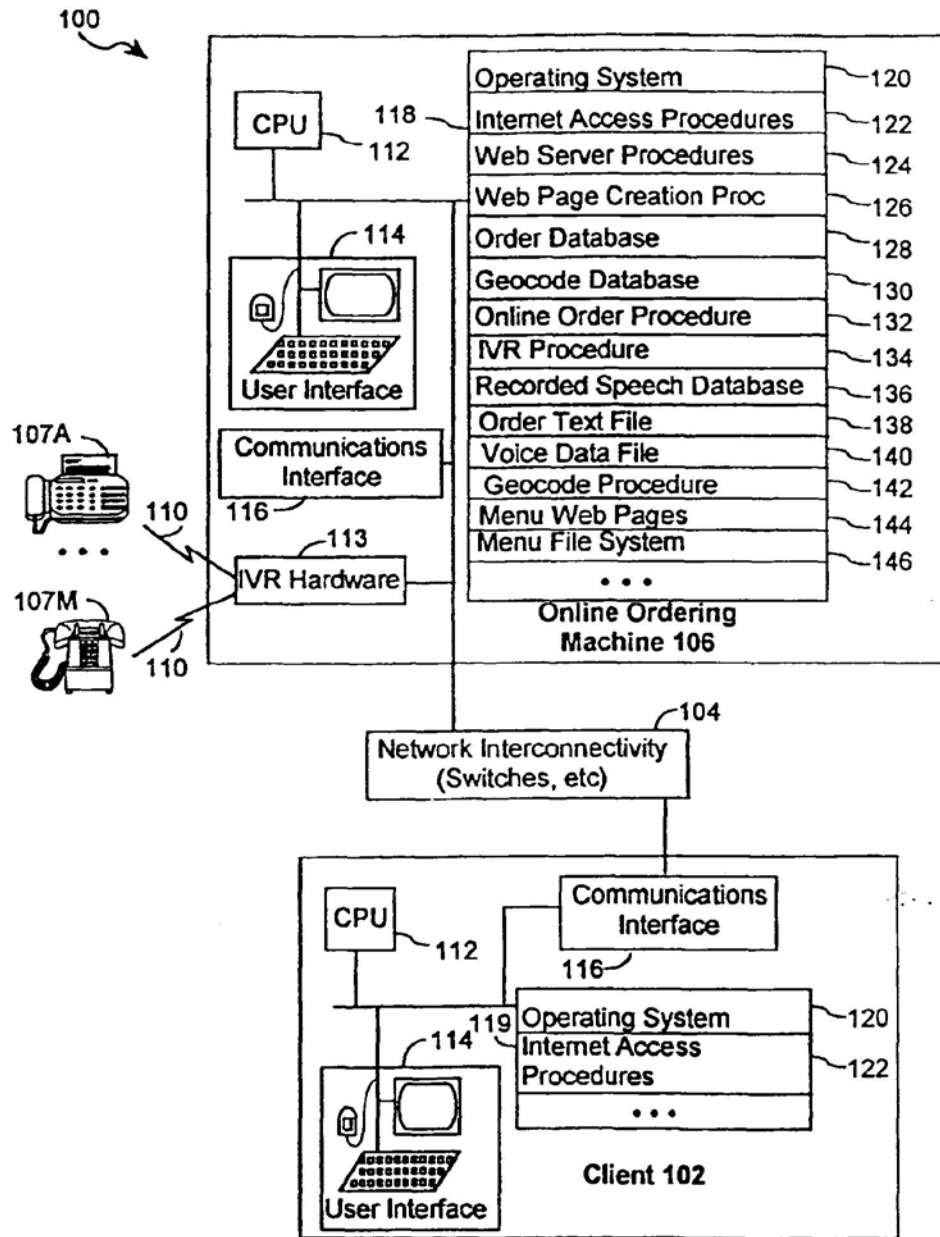


FIG. 2

FIG. 3A	FIG. 3B
FIG. 3C	FIG. 3D
FIG. 3E	FIG. 3F

KEY TO FIG. 3

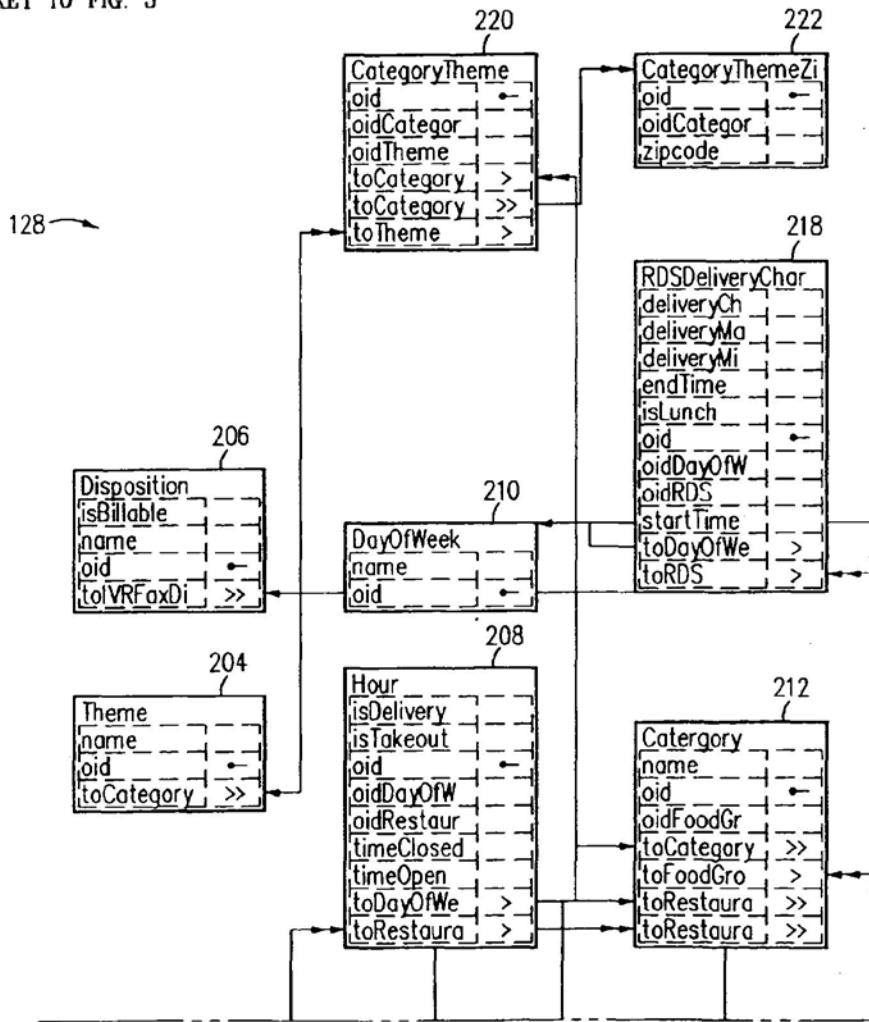


FIG. 3A

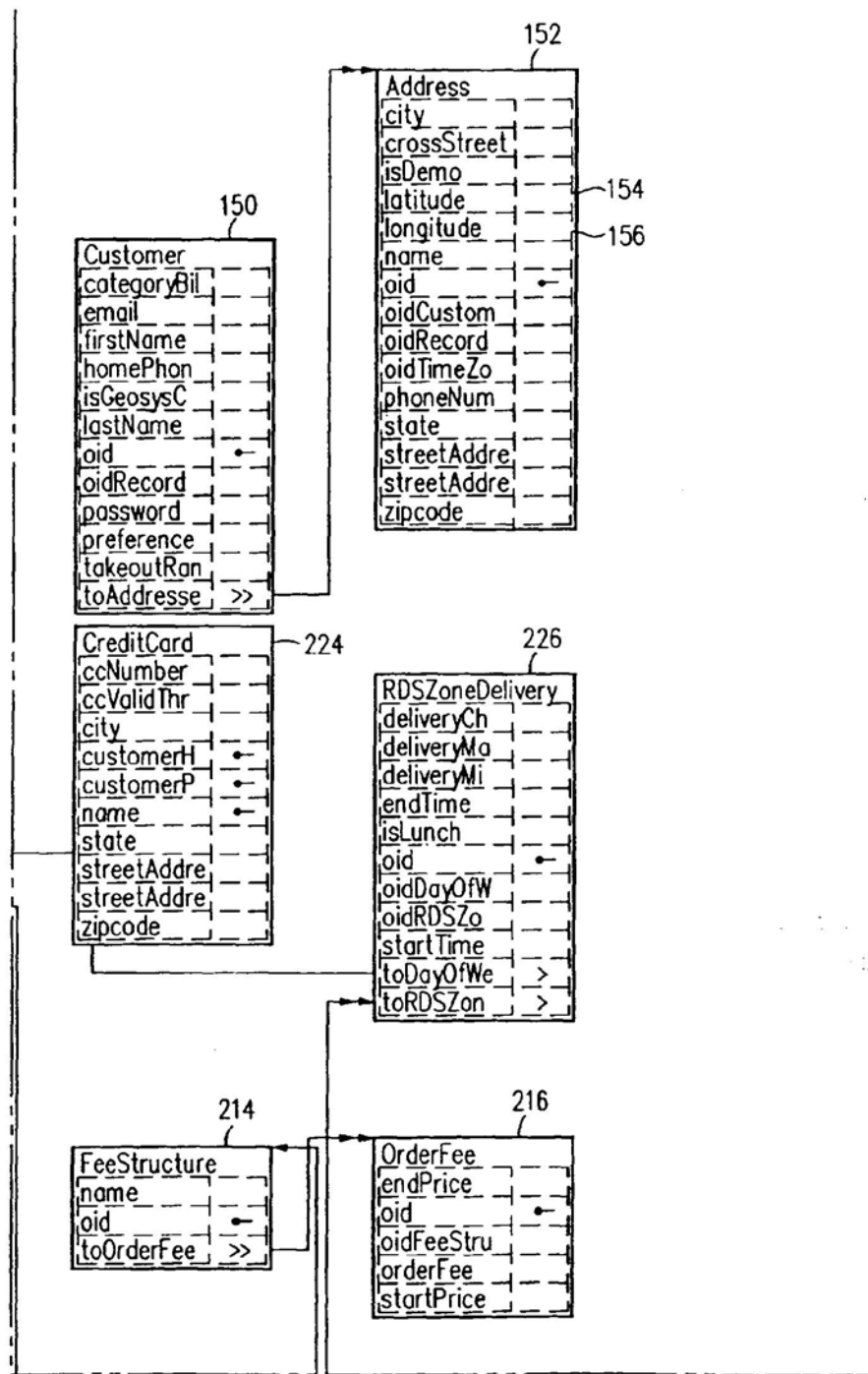


FIG. 3B

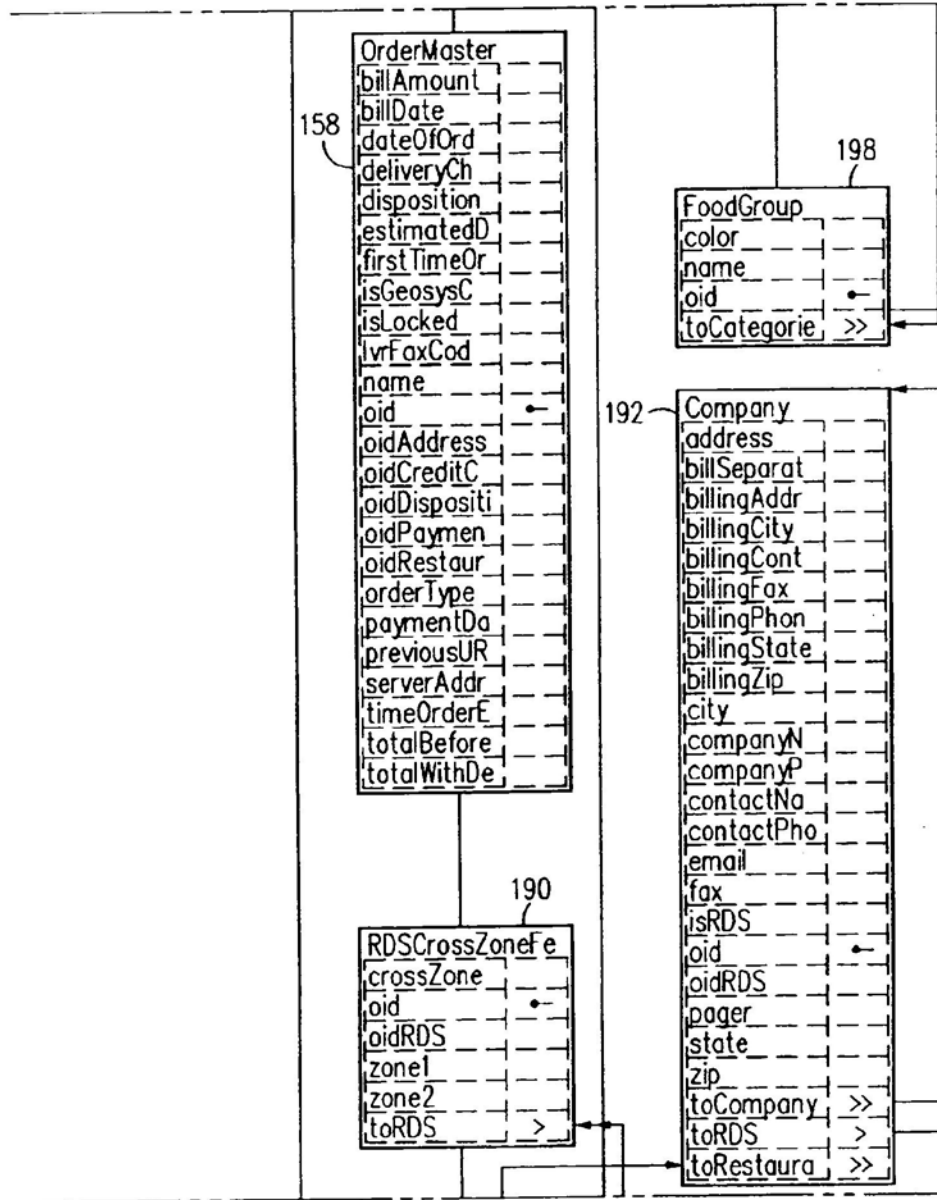


FIG. 3C

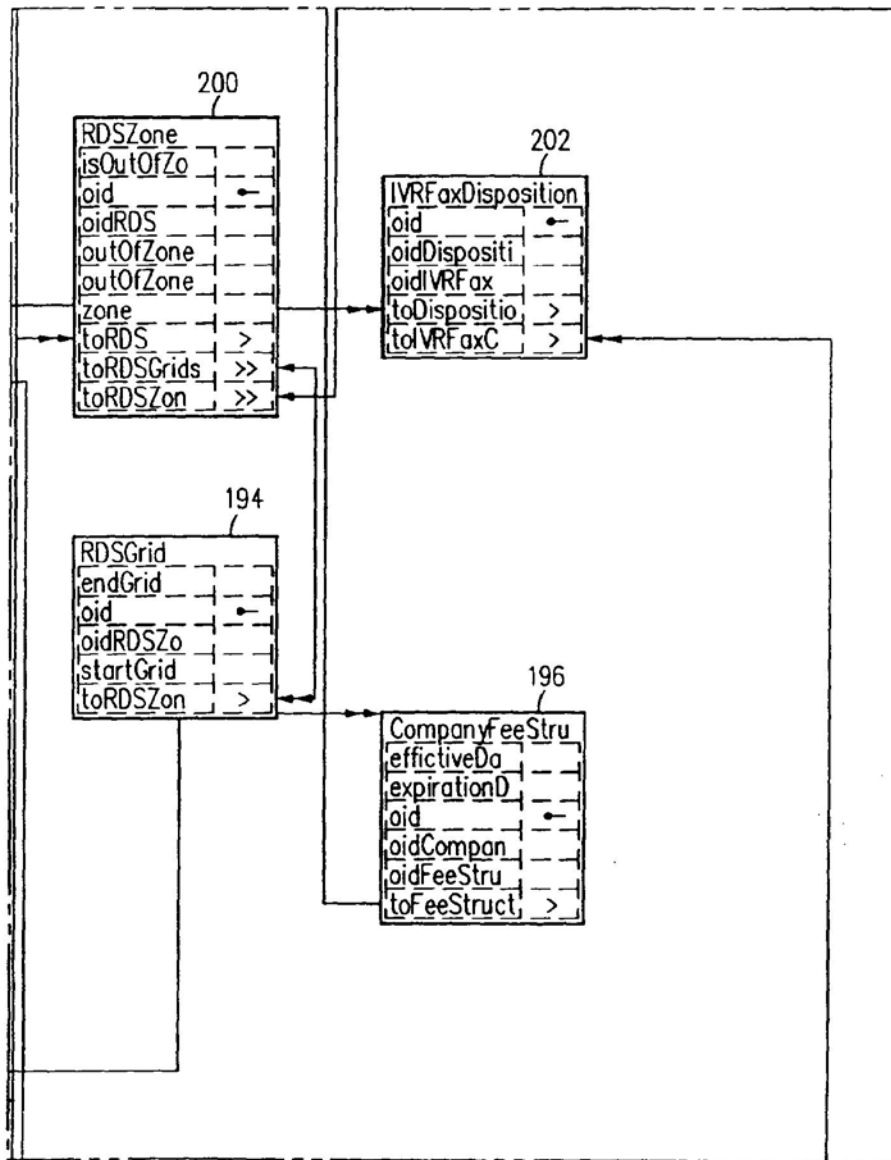


FIG. 3D

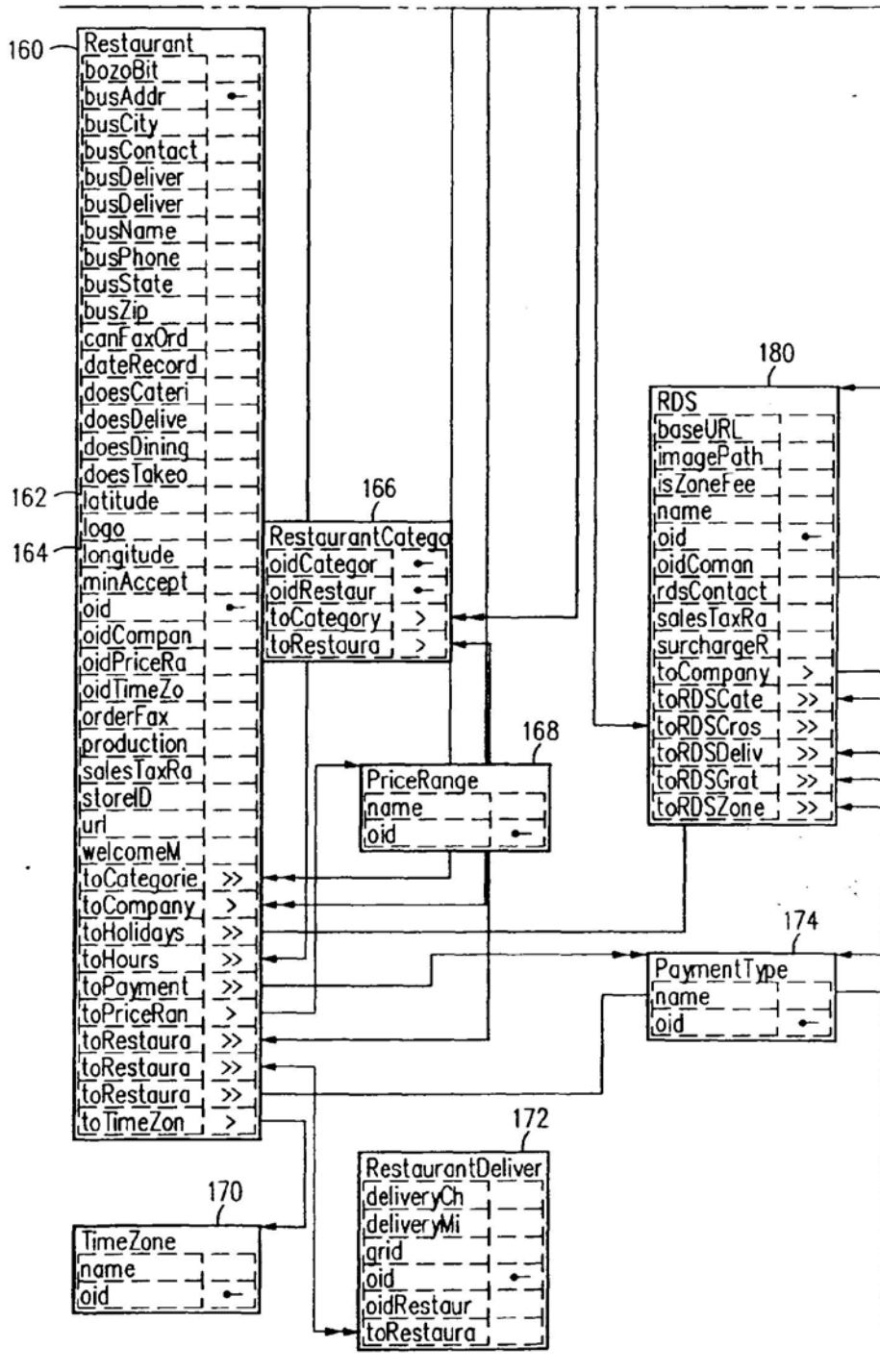


FIG. 3E

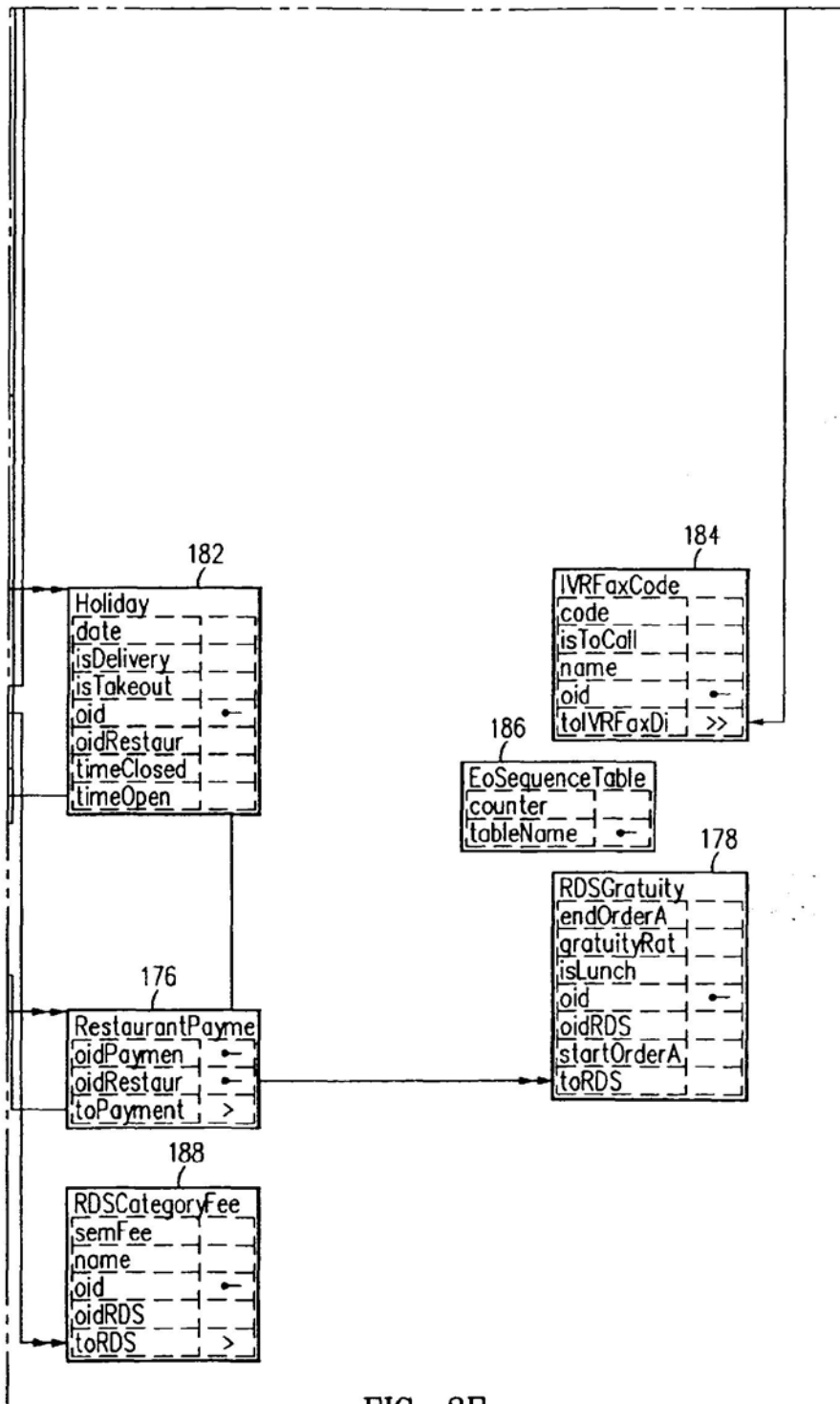


FIG. 3F

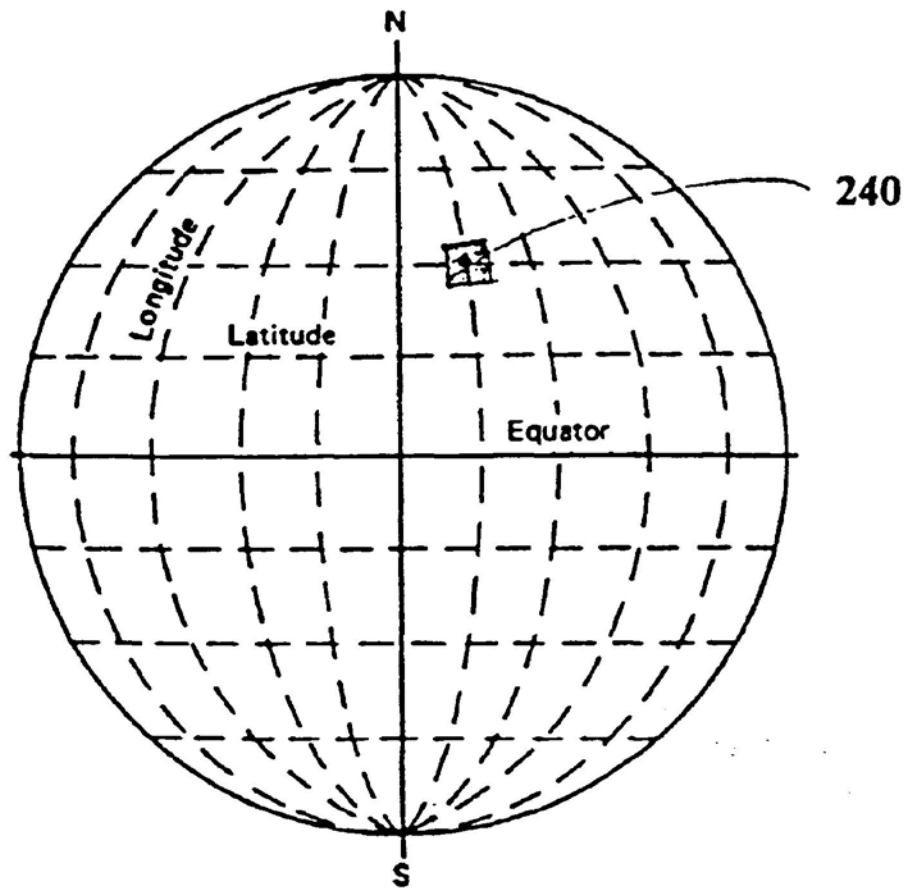


FIG. 4

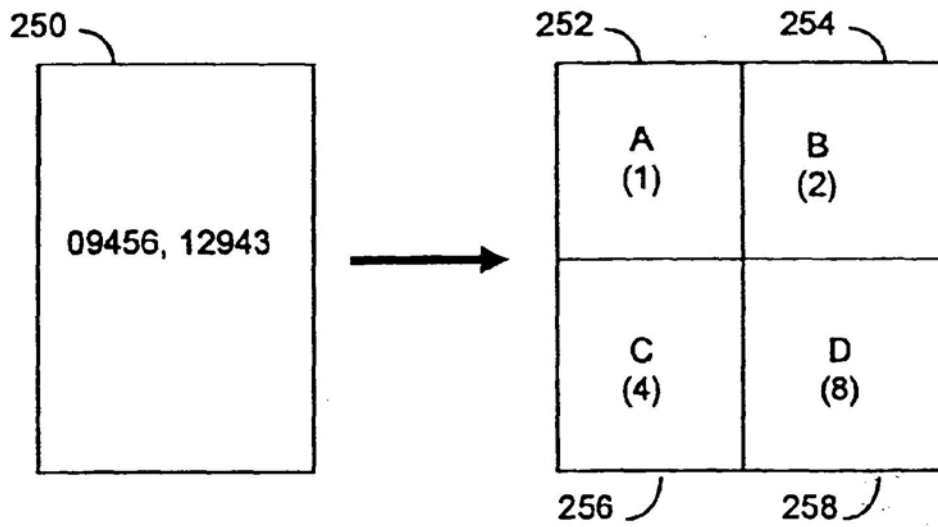


FIG. 5

Header:

Order Number
Order Type
First Time Customer
Delivery
Special Instructions
RDS Number
Restaurant Name
Restaurant Phone
Restaurant Fax
Customer Name
Customer Email
Customer Address1
Customer Address2
Customer Cross St.
Customer City
Customer Phone
Total
Payment Type
Special Count
Item Count

Special:

ID
Description of Item
Price
Item Count

Special Item:

ID
Description of Item
Price
Item Count

Item:

ID
Description of Item
Quantity
Price

Return Information:

Return Code
Delivery Time

FIG. 6

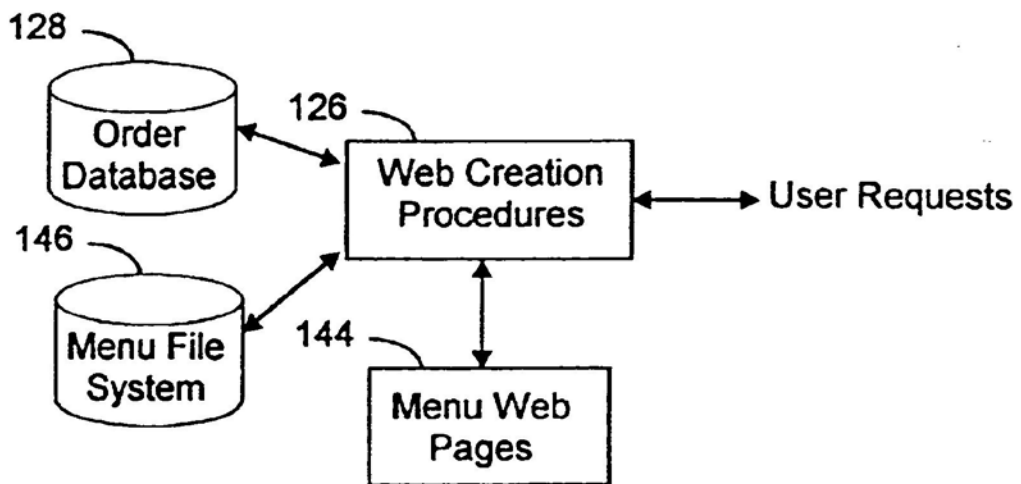


FIG. 7



Pizza


Delivery Restaurants


The following restaurants were found in your area. To see a restaurant's menu, click the Logo, Restaurant Name, or Menu Button.

- [Home](#)
- [Repeat Customer](#)
- [Cuisines](#)
- [Restaurants](#)


1-5	6-10	11-11
Ba-Ga	Go-Pi	Ro-Ro


- [User Profile](#)
- [Opportunities](#)
- [Help](#)
- [About Us](#)
- [Nominate Restaurants](#)

[Click here to see](#)  **Special Savings**

 **Ballard Firehouse**
 5429 Russell Ave NW Seattle, WA
 Relax we'll bring it to you

Cucina! Cucina!
 901 Fairview N Seattle, WA
 Where you will receive the finest food in town. Additional 3% charge on Visa, Master Card and American Express.

 **Elliott Bay Pizza Company**
 2115 Queen Anne Ave. N. Seattle, WA
 Queen Anne's newest pizzeria owned and operated by Wayne & Kelly Glass. The Gourmet Pizza is known for its distinctive marinara sauce.

 **Enzo's**
 605 Queen Anne Ave N Seattle, WA
 Relax we'll bring it to you

[Menu & Ordering](#)

 **Gardelli's Pizza & Pasta**
 2422 1st Ave. Seattle, WA
 Taste the difference! Everything is home-made: Dough, pizza sauce, Italian sausage, dressings and clam sauce. We use low-fat cheese and no oil in any of our sauces.

1-5	6-10	11-11
Ba-Ga	Go-Pi	Ro-Ro

FIG. 8



Enzo's Delivery - Menu
605 Queen Anne Ave N Seattle, WA

- [Home](#)
 - [Repeat Customer](#)
 - [Cuisines](#)
 - [Restaurants](#)
 - [Menu](#)
-
- [User Profile](#)
 - [Opportunities](#)
 - [Help](#)
 - [About Us](#)
 - [Nominate Restaurants](#)

Categories

Order Summary

- Pizza**
- Specialty Pizza**
- Antipasti**
- Salad**
- Pesce Fresco**
- For The Love Of Pasta**
- Enzos Favorite Pastas**
- Carne E Pollo**
- Enzos Classic Pastas**
- Enzos Classic Pasta Side**
- Orders**
- Desserts**
- Beverages**

Nothing Yet

Click Here!
To Proceed

Pizza Every Enzos Pizza Begins With Fresh, Hand Tossed Dough, Then Covered Generously With Our Rich Pizza Sauce And Real Mozzarella

<u>Cheese Pizza</u>	Small 10" - 7.35, Medium 12" - 8.35, Large 14" - 9.35, Extra Large 16" - 10.35
<u>One Item Pizza</u>	Small 10" - 8.85, Medium 12" - 9.85, Large 14" - 11.10, Extra Large 16" - 12.10
<u>Two Item Pizza</u>	Small 10" - 10.35, Medium 12" - 11.35, Large 14" - 12.85, Extra Large 16" - 13.85
<u>Three Item Pizza</u>	Small 10" - 11.85, Medium 12" - 12.85, Large 14" - 14.60, Extra Large 16" - 15.60
<u>Four Item Pizza</u>	Small 10" - 13.35, Medium 12" - 14.35, Large 14" - 16.35, Extra Large 16" - 17.35
<u>Five Item Pizza</u>	Small 10" - 14.85, Medium 12" - 15.85, Large 14" - 18.10, Extra Large 16" - 19.10

FIG. 9



[Home](#)
[Repeat Customer](#)
[Cuisines](#)
[Restaurants](#)
 [Menu](#)

[User Profile](#)
[Opportunities](#)
[Help](#)
[About Us](#)
[Nominate Restaurants](#)

Enzo's Delivery - Menu
605 Queen Anne Ave N Seattle, WA

Categories

Order Summary

- [Pizza](#)
- [Specialty Pizza](#)
- [Antipasti](#)
- [Salad](#)
- [Pesce Fresco](#)
- [For The Love Of Pasta](#)
- [Enzos Favorite Pastas](#)
- [Carne E Pollo](#)
- [Enzos Classic Pastas](#)
- [Enzos Classic Pasta Side](#)
- [Orders](#)
- [Desserts](#)
- [Beverages](#)

Nothing Yet

To Proceed

Pesce Fresco All dinners served with tossed salad and bread.

#21 Bistecca Di Halibut Alla Griglia	Tender moist halibut steak smothered in lemon butter sauce with mushrooms or our homemade pesto sauce and pasta side.	Serving - 14.85
#22 Gamberoni Bianchi	Prawns sauteed in garlic and lemon with mushrooms and broccoli. Includes a side of pasta.	Serving - 14.85
#23 Gamberoni Rossi	Prawns in spicy tomato basil sauce with mushrooms. Includes a side of pasta.	Serving - 14.85
#24 Gamberoni Con Spinaci	Prawns sauteed in lemon butter sauce and tossed with fresh spinach and tomatoes. Served over a hot bed of linguine.	Serving - 14.85
#25 Pesce Del Pescatore	Halibut, prawns and fresh clams delicately simmered in a spicy red sauce and served over a bed of linguine.	Serving - 14.85

FIG. 10

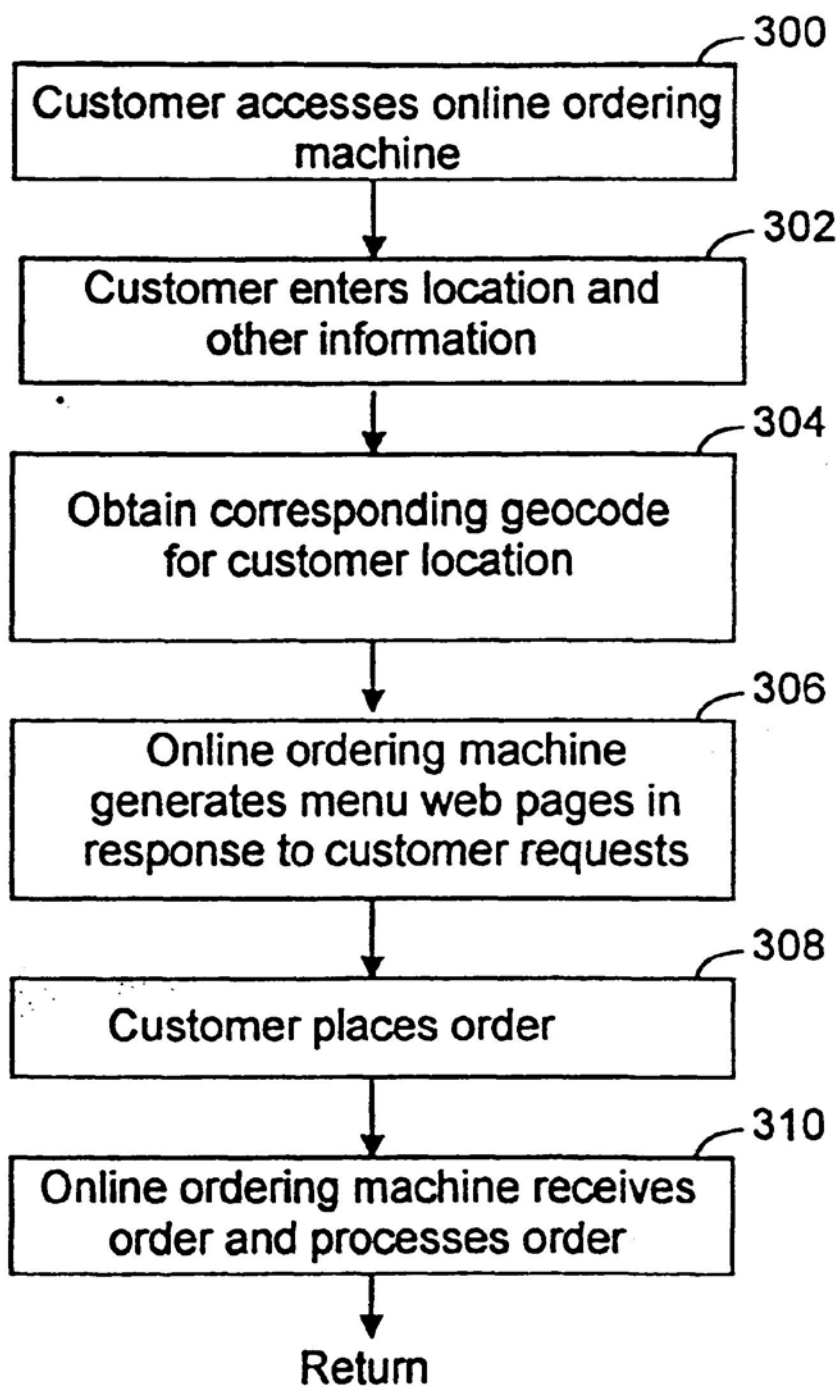


FIG. 11

cybermeals™

The World's Largest Take-Out and Delivery Service!

Order from your local restaurants.



Demo cybermeals

Visit cybermeals

Click Here!



Repeat Customer

Enter login name and password below.

LOGIN NAME

PASSWORD

Click Here!



New Customer

Register now to begin ordering.

Click Here!

[HELP](#) | [ABOUT CYBERMEALS](#) | [SUPPORT CENTER](#) | [FORMULATE YOUR FAVORITE RESTAURANT](#)

[Switch to Text Version](#)

© 1997 cybermeals

FIG. 12A

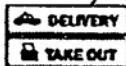


Home
● Welcome Back

[User Profile](#)
[Opportunities](#)
[Help](#)
[About Us](#)
[Nominate Restaurants](#)



254



[Switch to Text Version](#)
© 1997 cybermeals

252

Repeat Customer



Welcome to cybermeals, c hart!
To add or change an address [click here](#).



● work

850 hansen way , palo alto, ca 94304

[Use a Saved Order](#)

[Plan An Advance Or](#)

FIG. 12B



Cuisines

- [Home](#)
- [Demo](#)
- [Cuisines](#)

- [Opportunities](#)
- [Help](#)
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Cravings (31)	Asian (17)	European (13)	American (16)	Exotic (1)
<ul style="list-style-type: none"> Pizza (11) Deli (3) Sandwiches (18) Coffee Shop (3) Hamburgers (9) Salads (19) Breakfast (5) Seafood (10) Wraps Chicken (8) 	<ul style="list-style-type: none"> Chinese (8) Thai (3) Japanese (4) Indian (2) Korean (2) 	<ul style="list-style-type: none"> Italian (11) French Mediterranean Greek Bistro (2) German English 	<ul style="list-style-type: none"> Mexican (4) Fast Food (1) Health American (7) Bar-B-Que (4) Soul Food (2) Southwestern Tex-Mex (1) 	<ul style="list-style-type: none"> Caribbean South American Persian North African Lebanese (1)

FIG. 12C

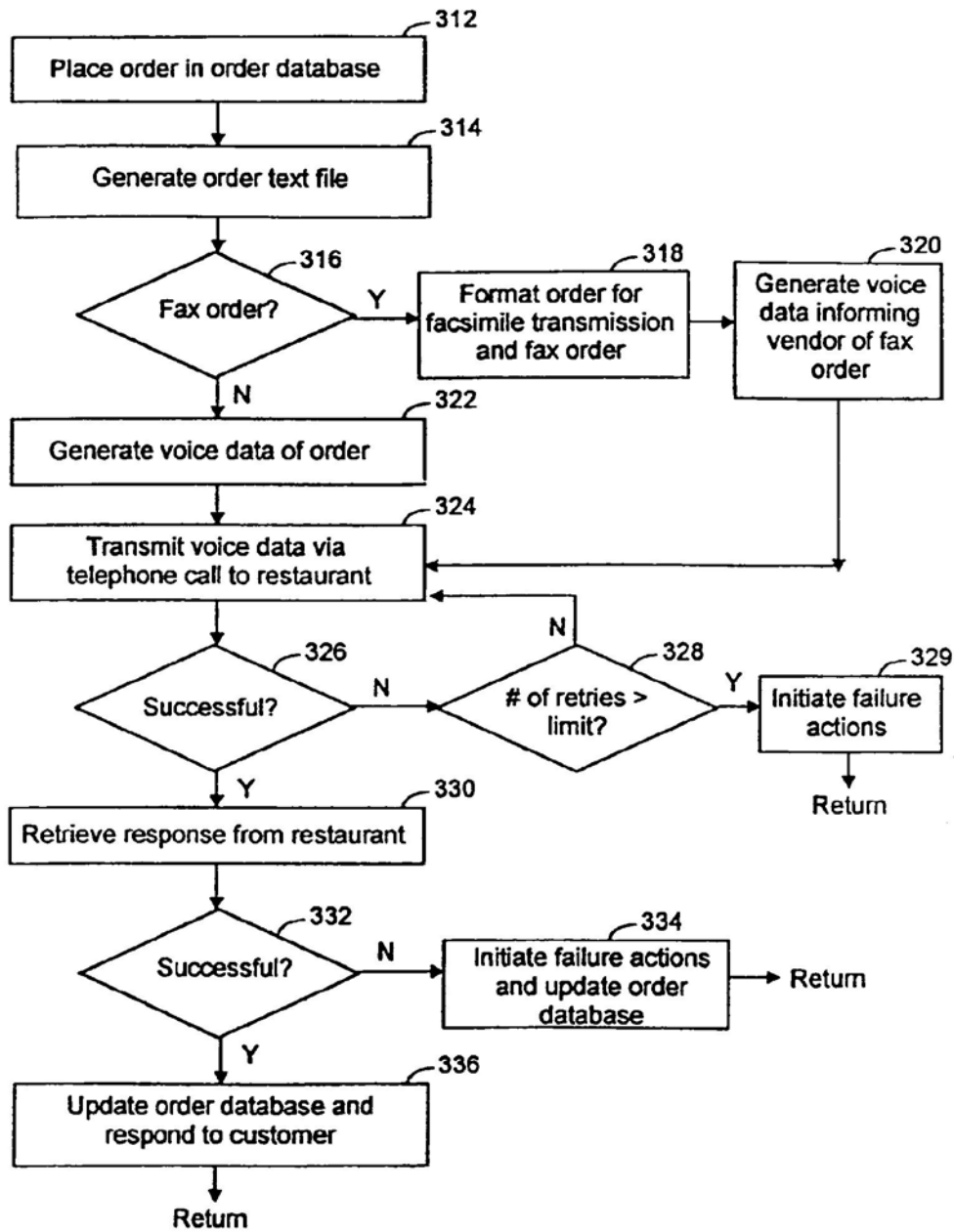


FIG. 13

INTERNET ONLINE ORDER METHOD AND APPARATUS

The present invention relates to systems and methods for electronic commerce and particularly to an Internet self-ordering mechanism.

BACKGROUND OF THE INVENTION

The Internet has provided consumers with a new medium for electronic commerce. Currently, there exist several Internet services that provide consumers with access to menus for food products that can be ordered online.

World Wide Waiters is one such service in which each consumer and participating restaurants are linked via the Internet to the World Wide Waiter server. The World Wide Waiter server provides a web site that includes web pages having menus of several participating restaurants with home delivery and/or take-out service. The consumer can search for a menu either using a restaurant's name or a city.

The consumer can then place an order from the menu of a selected restaurant which is transferred to the World Wide Waiter server. The World Wide Waiter server then emails the order over the Internet to the restaurant. The restaurant confirms the order to the World Wide Waiter server. Upon receiving the restaurant's confirmation, the World Wide Waiter server transmits to the consumer a confirming email that the restaurant has received the order and will deliver the order.

In addition, World Wide Waiters allows a customer to fax the order directly to the World Wide Waiters office. Personnel at the World Wide Waiters office contacts the restaurant in order to process the order.

There are several shortcomings to this system. First, each participating restaurant needs to have Internet access to the World Wide Waiter server. This additional expense can deter restaurant proprietors from utilizing this type of home delivery service.

Second, the World Wide Waiter server downloads to the customer statically created HTML pages representing the menus of each participating restaurant. These menu web pages are preconfigured and stored in the server. The use of these statically configured menu web pages becomes a burden since it hampers the maintainability and scalability of the server to take on additional restaurants.

Waiters on Wheels is another Internet online ordering service that provides Internet consumers with a web site to advertise menus of participating restaurants and that accepts consumer orders. It faxes an order to a participating restaurant. It provides its own waiters which pick up the take-out order from a participating restaurant and deliver it to the consumer's location.

The menus are stored by the geographic location of a Waiters on Wheels office. A consumer searches those menus associated with the Waiters on Wheels office within their delivery location. A consumer can order online from the menu. The Waiters on Wheels server confirms receipt of the consumer's order by telephone. If the restaurant cannot deliver the order to the Internet consumer, the restaurant telephones the Waiters on Wheels office. The office in turn calls the consumer to inform them of the problem.

PizzaNet is another prior art online ordering system that provides Internet consumers with a web site including menus of participating pizza restaurants. To place an order, consumers enter their zip code, telephone area code, and the first three digits of their phone number. A list of participating

pizza restaurants within the consumer's location is provided along with their menus. The consumer can then select the restaurant of his or her choice and order from its menu. PizzaNet receives the order from the Internet and faxes to the restaurant a copy of the order. In some instances, PizzaNet verifies the order by a return phone call and in other cases the pizza restaurant verifies the order by return phone call.

A shortcoming of the Waiter on Wheels and PizzaNet systems is in its method of communicating with the restaurant through a facsimile machine. The additional expense incurred in installing a facsimile machine can deter prospective restaurants from participating in this system. Further, once an order is received, all subsequent communications between the customer and the delivery system are performed via telephone calls which requires manual intervention.

SUMMARY OF THE INVENTION

The present invention pertains to an online ordering machine that manages the distribution of home delivered products over a distributed computer system. The distributed computer system includes a group of customers connected to client computers and at least one server computer system that executes the online ordering machine. The online ordering machine provides the customers with product information from various vendors whose delivery range is within the customer's location or with product information from vendors having take out service within a specified range from the customer's location. The online ordering machine accepts orders from the customer for a particular product from a selected vendor. The order is converted into voice instructions which are transmitted to the vendor through a telephone call. Alternatively, the order can be transmitted via facsimile transmission with follow up voice instructions transmitted via a telephone call seeking a response. The vendor responds to the voice-prompted instructions which are then used to confirm the order.

In an embodiment of the present invention, the online ordering machine enables Internet customers to order food products from various participating restaurants. The online ordering machine is a Web server including a web creation procedure that dynamically generates menu web pages in response to a customer's request. The menu web pages list the various products for delivery or takeout service. An Internet customer is provided with a menu web page listing those vendors or restaurants that service the customer's location. In addition, the online ordering machine indicates which restaurants are open at the time the customer makes the request.

The online ordering machine categorizes the location of each participating restaurant by a set of longitude and latitude coordinates. Each customer's delivery location is also categorized by a set of longitude and latitude coordinates. The online ordering machine searches for those restaurants whose delivery area lies within the customer's location based on the restaurant's and customer's longitude and latitude coordinates. Likewise, the online ordering machine searches for those restaurants having takeout service within the customer's location based on the restaurant's and customer's longitude and latitude coordinates.

Once an Internet customer places an order, the order is converted into voice data. An interactive voice recognition (IVR) procedure receives the order as an order text file and converts the order into a voice file of recorded speech segments. The IVR procedure automatically places a call to the restaurant and transmits the voice file which is played

when the call is received. In addition, the IVR procedure can transmit the order as a facsimile transmission and follow up with an automated telephone call. In either case, voice prompts are used to obtain a response from the restaurant in the form of one or more DTMF tones. The online ordering machine then relays a status response to the customer.

BRIEF DESCRIPTION OF THE DRAWINGS

Additional objects and features of the invention will be more readily apparent from the following detailed description and appended claims when taken in conjunction with the drawings, in which:

FIG. 1 is a block diagram of an embodiment of a distributed computer system incorporating the present invention.

FIG. 2 is a block diagram of the client computer and online ordering machine as shown in FIG. 1.

FIG. 3 illustrates the order database schema in a preferred embodiment of the present invention.

FIG. 4 illustrates the geocodes in a preferred embodiment of the present invention.

FIG. 5 is a block diagram illustrating the partitioning of a grid area into smaller areas in a preferred embodiment of the present invention.

FIG. 6 is an exemplary format of the order text file in a preferred embodiment of the present invention.

FIG. 7 is a block diagram illustrating the menu web page creation in a preferred embodiment of the present invention.

FIGS. 8-10 are schematic representations of exemplary menu web pages that are dynamically created in response to a customer's response.

FIG. 11 is a flow chart illustrating the steps used to process an order in a preferred embodiment of the present invention.

FIGS. 12A-12C are schematic representations of exemplary menu web pages used to receive an order in a preferred embodiment of the present invention.

FIG. 13 is a flow chart illustrating the steps used to process an order in a preferred embodiment of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Computer Architecture

FIG. 1 illustrates a system 100 representing an embodiment of the present invention including a number of client computers 102A-102N and one or more online ordering machines 106 in communication via a communications link 104. In a preferred embodiment, an online ordering machine 106 is a server computer. An online ordering machine 106 is in communication with one or more vendors 108A-108M through one or more telephone links 110.

The communication link 104 generically refers to any type of wire or wireless link between computers, such as but not limited to a local area network, a wide area network, or a combination of networks. In a preferred embodiment of the present invention, the communications link 104 can be a network such as the Internet.

A client computer 102 can be any type of computing device, such as but not limited to, desktop computers, workstations, laptops, and/or mainframe computers. One or more users (not shown) can be associated with each client computer 102.

FIG. 2 illustrates the client computer 102 which includes a CPU 112, a user interface 114, a memory 119, and a communication interface 116. The communications interface 116 is used to communicate with the server computer 106 as well as other system resources not shown. The memory 119 of the client computer 102 may be implemented as RAM (random access memory) or a combination of RAM and non-volatile memory such as magnetic disk storage. The memory 119 can contain the following:

- an operating system 120;
- Internet access procedures 122;
- as well as other procedures and files.

FIG. 2 also illustrates the online ordering machine 106 which includes a central processing unit (CPU) 112, Interactive Voice Recognition (IVR) hardware 113, a user interface 114, a memory 118, a communications interface 116. The online ordering machine 106 can be any type of computing device, such as but not limited to, desktop computers, workstations, laptops, and/or mainframe computers. The communications interface 116 is used to communicate with the client computers 102 as well as other system resources not shown.

The IVR hardware 113 connects the online ordering machine 106 to a telephonic link 110 coupled to one or more telephonic devices, such as but not limited to a facsimile machine 107A and/or a telephone 107M. Each telephonic device 107 can be associated with a particular vendor 108. The IVR hardware 113 provides interactive voice recognition capabilities including voice processing, speech recognition, and text-to-speech processing.

In a preferred embodiment of the present invention, the IVR hardware 113 consists of three types of devices: (1) one or more Dialogic™ CP/12SC™ facsimile boards that provide the online ordering machine 106 with 60 or more facsimile channels, the facsimile board enables communication between the online ordering machine 106 and a facsimile machine 107 associated with a vendor 108; (2) one or more Dialogic™ D/240SC-T1™ boards that provide 24 digital signal processor (DSP)-based ports to an on-board T-1 telephone interface; and (3) one or more Dialogic™ D/41 ESC™ boards that provide four DSP-based voice ports to an on-board analog telephone interface. The facsimile board enables communication between the online ordering machine 106 and a facsimile machine 107A associated with a vendor 108. The D/240SC-T1™ board enables interactive voice recognition capabilities between the online ordering machine 106 and a vendor 108 having an analog telephonic interface, and the D/41 ESC™ board enables interactive speech recognition capabilities between the online ordering machine 106 and a vendor 108 or customer having an analog telephone interface. A more detailed description of these devices can be found in the product literature for each of these products located at <http://www.dialogic.com> which is hereby incorporated by reference as background information.

It should be noted that the present invention is not constrained to the preferred IVR hardware and that other such hardware devices can be used that provide a similar capability.

The memory 118 of the online ordering machine 106 may be implemented as RAM (random access memory) or a combination of RAM and non-volatile memory such as magnetic disk storage. The memory 118 can contain the following:

- an operating system 120;
- Internet access procedures 122;
- web server procedures 124;

web page creation procedures 126 that dynamically generate menu web pages in response to a customer's request;
 an order database 128 that includes information on each of the customers, vendors, and received orders;
 a geocode database 130 that is used to convert a geographic location such as a street address into longitude and latitude coordinates;
 an online ordering procedure 132;
 an interactive voice recognition (IVR) procedure 134 that is used to deliver a voice message and obtain a response to the voice message;
 a recorded speech database 136 including one or more recorded speech segments;
 an order text file 138 that is an ASCII representation of the order in a preferred format;
 a voice data file 140;
 a geocode procedure 142 that is used to convert a geographic location into its corresponding longitude and latitude coordinates;
 one or more menu web pages 144 that are dynamically created by the web creation procedure 126;
 a menu file system 146 including one or more menu files representing menu data associated with a particular vendor, preferably, the menu files are binary files stored in a NS encoded format; and
 other procedures and data structures.

FIG. 3 illustrates the schema of the order database 128. The order database 128 can include the following tables:
 a customer table 150 having an entry for each customer that tenders an order to the online ordering machine 106, the customer entry including information that characterizes a particular customer;
 an address table 152 having an entry for each customer and including the latitude 154 and longitude 156 coordinates associated with a customer's address;
 an order master table 158 having an entry for each order;
 a restaurant table 160 having an entry for each restaurant containing information that describes the restaurant, its services and products, each entry including the latitude 162 and longitude 164 coordinates associated with a restaurant;
 a restaurant category table 162 associated with the restaurant table 160 that is used to identify a category associated with a restaurant;
 a price range table 168 associated with the restaurant table 160 identifying the price ranges for products offered by a restaurant;
 a time zone table 170 associated with the restaurant table 160 indicating the time zone corresponding to a restaurant;
 a restaurant delivery table 172;
 a payment type table 174;
 a restaurant payment table 176;
 a restaurant delivery service (RDS) gratuity table 178;
 a RDS table 180;
 a holiday table 182 associated with the restaurant table and indicating the restaurant's holidays;
 an IVR fax code table 184;
 an EoSequence table 186;
 a RDS Category Fee table 188;
 a RDS Cross Zone Fee table 190;
 a company table 192;
 a RDS grid table 194;
 a company fee structure table 196;
 a food group table 198;
 a RDS zone table 200;
 an IVR fax disposition table 202;

a theme table 204;
 a disposition table 206;
 an hour table 208;
 a day of week table 210;
 a category table 212;
 a fee structure table 214;
 an order fee table 216;
 a RDS delivery table 218;
 a first category theme table 220 and a second category theme table 222;
 a credit card table 224; and
 a RDS zone delivery table 226.

It should be noted that the present invention is not limited to the database schema shown in FIG. 3. Other schemas can be utilized and other types of databases, other than the relational database shown in FIG. 3 can be utilized as well.

Geocodes

The present invention uses geocodes to determine whether a customer is within a specified geographic area of a restaurant's delivery area or whether a restaurant is within a specified geographic area of the customer's takeout range. The use of geocodes has the advantage of producing more accurate search results. The prior art use of zip codes, cities, or telephone prefixes generally produces unsatisfactory results listing restaurants that do not deliver to the customer's location. In addition, the geocodes can be used to specify a geographic location anywhere within the globe, thereby enabling the online ordering machine to accommodate international locations as well as the United States.

A geocode represents a particular geographic area or grid defined by longitude and latitude coordinates. Longitude and latitude coordinates are used to define a geographic location relative to the surface of the earth. The earth's reference system is composed of surface divisions denoted by geographic lines of latitude and longitude. A specific geographic location can be defined in this system by its respective longitude and latitude coordinates.

FIG. 4 illustrates the earth with latitude and longitude lines. The area 240 is represented by a geocode associated with a latitude and a longitude coordinate. Typically, a latitude coordinate is specified in latitude degrees and a longitude coordinate is specified in longitude degrees.

The technology of the present invention uses the geocodes to identify each customer and vendor in order to determine whether a customer is within a specified geographic area or grid of a restaurant's delivery area or whether a restaurant is within a specified geographic area or grid of the customer's takeout range. A geocode procedure 142 is used that converts the address of each customer and vendor into its respective latitude and longitude coordinates. The latitude and longitude coordinates then become the geocode which represents a particular grid. Next, the online order procedure 132 uses the geocode to search the order database 142 to make the appropriate selections.

In a preferred embodiment, the grid size for the United States was selected between 0.25 and 0.3 miles. For example, a 0.3 mile grid equates to 0.0054 longitude degrees and 0.0043 latitude degrees. Thus, in order to convert the latitude and longitude coordinates of a customer or restaurant location into a geocode, the following mathematical equations can be used:

$$\begin{aligned} \text{Latitude Id} &= \text{trunc}[(\text{latitude in degrees} * 10^6) / 4300] + 1, \\ \text{Longitude Id} &= \text{abs}(\text{trunc}\{-(\text{longitude in degrees} * 10^6) / 5400\} + 1), \\ \text{Geocode} &= \text{Latitude Id, Longitude Id} \end{aligned}$$

The geocodes can then be used to determine whether a customer is within a specified geographic area of a restaurant's delivery area or whether a restaurant is within a specified geographic area of the customer's take-out range. To determine whether a customer is within a specified geographic area of a restaurant's delivery area, the customer's geocode is used to search the order database 128 for those restaurants having the same geocode.

The following mathematical relation is used to select restaurants that are within a customer's takeout range:

```

IF the Latitude Id of the restaurant > Latitude Id customer's location
- Takeout Range and
the Latitude Id of the restaurant < Latitude Id of the customer's location
+ Takeout Range and
Longitude Id of the restaurant > Longitude Id of the customer's location
- Takeout Range and
Longitude Id of the restaurant < Longitude Id of the customer's location
+ Takeout Range.
THEN
    Restaurant is within the Takeout Range.
    
```

In certain geographic areas, a grid size between 0.25 and 0.3 miles may be too large for a delivery or takeout range. In such cases, the grid can be partitioned into smaller grid sizes. The larger grid is referred to as the parent grid and the smaller grids are referred to as the child grids.

FIG. 5 illustrates one such example of this partitioning. A parent grid 250 having a grid size between 0.25-0.3 miles is associated with a geocode 09456, 12943. The parent grid 250 is partitioned into four child grids 252-258 having a grid size between 0.06-0.075 miles. Each child grid 252 is associated with a subgrid identifier such as A, B, C, or D that represents an associated geographic region.

A vendor can service one or more of the child grids. For example, vendor X can service child grid A, vendor Y can service child grids A and B, and vendor Z can service child grids A and D. As such, a coding scheme was developed to identify all the possible combinations that can occur. A numeric value is associated with each child grid. For example, child grid A is associated with the value 1, child grid B with the value 2, child grid C with the value 4, and child grid D with the value 8. The sum of these values represent a particular combination of delivery areas. For example, the combination of child grid A and B is identified by a value of 3. Table 1 below shows the encoding scheme for all possible combinations in the child grid scheme shown in FIG. 5.

TABLE 1

VALUE	COMBINATION
1	A
2	B
3	A,B
4	C
5	A,C
6	B,C
7	A,B,C
8	D
9	A,D
10	B,D
11	A,B,D
12	C,D
13	A,C,D
14	B,C,D
15	A,B,C,D

When searching for a matching vendor, the geocode procedure 142 determines the appropriate subgrid identifier

associated with the customer's location. For example, customer X can be associated with the geocode 09456, 2943A. The online order procedure 132 then searches for those vendors servicing child grid A associated with parent grid 09456, 12943. In the above example, that would encompass searching for all the odd values: 1, 3, 5, 7, 9, 11, 13, and 15.

It should be noted that the technology of the present invention can be practiced with other partitioning or encoding schemes. One skilled in the art can easily modify the present invention to accommodate other subgrid sizes and to even partition the subgrids further. Other encoding schemes can be used to identify the various possible delivery combinations associated with a particular parent grid. In addition, one can combine one or more adjacent grids to formulate a larger delivery or takeout range for a particular geographic area.

Interactive Voice Recognition (IVR) System

The Interactive Voice Recognition (IVR) procedure 134 is used to convert a customer's text order into voice data that is transmitted to the vendor 108. Alternatively, the IVR procedure 134 can convert a customer's order into a format suitable for facsimile transmission.

When a customer's order is received by the online order machine 106, it is converted into an order text file 138 having a prescribed format as shown in FIG. 6. The order text file 138 is then transmitted to the IVR procedure 134. If the order is to be transmitted to the vendor by facsimile transmission, then the IVR procedure 134 formats the order text file 138 into a format that is suitable for facsimile transmission (e.g., postscript format) and transmits the order to the IVR hardware 113. The IVR hardware 113 is used to transmit the order to the vendor 108.

When the order is to be transmitted to the vendor 108 by telephone transmission, the IVR procedure 134 then translates the order text file 138 into a voice data file 140 using the recorded speech database 136. The voice data file 140 is then transmitted to the IVR hardware 113 which transmits the voice data to the vendor 108.

Dynamically Created Menu Web Pages

The online ordering machine 106 generates menu web pages 144 that are specific to a particular customer's request. The creation of the menu web pages 144 is done dynamically at runtime in order to provide data that accommodates a customer's request. The creation of the menu web pages 144 in this manner differs from the prior art online order systems. In the prior art online order systems, the menu web pages are preconfigured and displayed upon request. This becomes a burden to maintain and limits scalability. In the present technology, each menu web page 144 is configured at runtime and customized for a particular customer's request. Thus, each menu web page 144 differs since each customer's request is different as is the customer's location.

FIG. 7 illustrates the components used to dynamically generate a menu web page 144. A web page creation procedure 126 is provided that receives as input one or more customer requests and is linked to the order database 128 and the menu file system 146. The web page creation procedure 126 generates a menu web page 144 based on the input received from the user. The data included in the menu web page 144 is retrieved from the order database 128 and the menu file system 146. The order database 128 contains information such as the operational time of a vendor, the restaurant's logo, the categories of the food products served, and the like. The menu file system 146 includes menu data

associated with each vendor. The menu file system 146 includes a number of menu files stored in an encoded binary format for faster retrieval purposes. The web page creation procedure 126 uses the data in the order database 128 and the menu file system 146 to dynamically generate one or more menu web pages 144 that are customized to a customer's request.

In a preferred embodiment, the web page creation procedure 126 utilizes the WebObjects technology provided by Apple Software. WebObjects is a server technology that links the order database 128 directly to the web server procedures 124 and generates HTML web menu pages 144 based on a customer's request. More detailed information on WebObjects can be found at <http://software.apple.com/webobjects> which is hereby incorporated by reference as background information.

FIGS. 8-10 are exemplary menu web pages 144. FIG. 8 is a menu web page 144 showing the first five pizza restaurants that deliver within a particular customer's location. The restaurants shown are selected based on the customer's location and the restaurant's delivery area. As such, this menu web page 144 is dynamically created for this particular customer.

Likewise, FIG. 9 is a menu web page 144 showing the various types of food items that a particular restaurant offers for delivery service within a particular customer's location. This menu web page 144 was created in response to the customer's request for pizza selections. FIG. 10 is a menu web page 144 showing the various types of "pesce fresco" items that a particular restaurant offers for delivery service within a particular customer's location. This menu web page 144 was created in response to the customer's request for "pesce fresco" selections.

Ordering Process

FIG. 11 illustrates the steps used by the online ordering machine 106 to process an online order. A customer accesses the online ordering machine 106 through a client computer 102 that is connected to the Internet 104. The customer enters the appropriate web address or universal resource locator (URL) for the online ordering machine 106 (step 300). The online order procedure 132 interacts with the client computer 102 by providing access to a series of web pages that can be downloaded to the client computer 102 for the customer's use (step 300). Initially, a home web page is provided to the client computer 102 which is shown in FIG. 12A.

The customer can register with the online ordering machine 106 which is accomplished by filling out information requested through one or more web pages. The customer is then provided with a web page that prompts the customer for his location as shown in the exemplary web page illustrated in FIG. 12B (step 302). This web page can also obtain the current time at the customer's location which is returned to the online order procedure 132 (step 302). The current time is used to determine which restaurants meeting the customer's criteria are currently open. In addition, the web page obtains the type of service that the customer seeks, such as but not limited to take-out service 252 or delivery service 254. If takeout service is requested, the web page requests the range of miles that the customer is willing to drive. If none is indicated, a default value is provided.

Once the customer's location is provided, the online order procedure 132 converts the customer's location into the appropriate geocode as described above (step 304).

The online order procedure 132 then searches the order database 128 for those restaurants that deliver to the cus-

tomers location or are within the customer's desired takeout range (step 306). This search is performed as described above with respect to the geocode procedure 142. A menu web page 144 including a list of these restaurants is dynamically created by the web creation procedure 126 and provided to the customer as shown in FIG. 12C.

The customer can then select a particular vendor or restaurant and one or more menu web pages 144 including the selected information that is dynamically created by the web creation procedure 126 and provided to the customer's client computer 102. The customer can then browse through the menu web pages 144 and select items of interest. The user's selection or requests are used by the web creation procedure 126 to generate one or more menu web pages 144 that are displayed to the customer (step 306). FIGS. 8-10 illustrate such exemplary menu web pages 144.

The customer places an order by selecting the appropriate items from the menu web pages 144 (step 308) which are then transmitted to the online ordering machine 106 (step 310). The online ordering machine 106 receives the order and processes it as shown in FIG. 13 (step 310).

Referring to FIG. 13, an entry is generated for the order in the order database 128 (step 312). An order text file 138 is generated representing the order in accordance with a prescribed format as shown in FIG. 6 (step 314).

In the case where the order is transmitted by facsimile transmission to the vendor (step 316-Y), the order text file 138 is then formatted for facsimile transmission and transmitted to the vendor as described above (step 318). A voice data file 140 is then generated that informs the vendor 108 of the transmitted fax order (step 320).

In the case where the order is transmitted by a telephone call, the IVR procedure 134 is used to convert the order text file 138 into voice data (step 322). The IVR procedure 134 performs the conversion by finding prerecorded speech segments stored in the recorded speech database 136 that match the words contained in the order text file 138. The speech segments are then concatenated into a voice data file 140 that is then transmitted to the IVR hardware 113 (step 324). The IVR hardware 113 then establishes telephonic communication with the vendor 108 and transmits the voice data to the vendor 108 (step 324).

In some instances, one or more calls may be made to the vendor 108 before communication is established (step 326-N). After a predetermined number of unsuccessful attempts have been made that have failed to establish communication to the vendor 108 (step 328-Y), the online ordering procedure 132 may initiate failure actions. These failure actions can include calling the vendor directly to place the order or to determine the nature of the problem (step 329). Based on the nature of the problem, in some cases, the customer can be notified of the failed communication and asked to select another vendor 108 (step 329). In addition, the online order procedure 132 updates the order database 128 to reflect the status of the order (step 329).

In the case where the online ordering procedure 132 is successful in communicating with the vendor 108 (step 326-Y), the vendor 108 hears a recorded message including voice prompts for responses from the vendor 108. An exemplary transcript of such a recorded message can be as follows:

This is cybermeals with (an/a repeat) order for (delivery/ carry out). Press 1 when you are ready to take this order.

When the employee presses 1, the voice continues with the following: The customer's phone number is . The

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customer's name is . The address is (only if the order is for delivery). The order is . Total prices excluding tax and coupons is .

The employee is then given the option of pressing further keys: 5 to accept the order, 6 to decline the order, 2 to pause the order, 3 to repeat the order, 4 to hear only the address repeated, 7 to repeat the food items, total price, and payment method, 8 to repeat the phone number, and * to just repeat the last segment you were listening to.

Finally, the voice requests that the vendor press keys to indicate how long the order will take to deliver.

If the IVR procedure 134 encounters any failures in retrieving the vendor's response (step 332-N), the online order procedure 132 initiates one or more failure recovery actions to rectify the failure. For example, if the vendor 108 does not respond to a telephonic order, a manual telephone call can be made to the vendor 108 in order to ascertain the nature of the problem or to obtain the response.

If the IVR procedure 134 receives a response from the vendor 108 (step 332-Y), the online order procedure 132 transmits a notification to the customer indicating the status of an order and updates the order database 128 with the status thereby completing the order (step 336). Notification to the customer can be by an email message, or other communication medium, and can include an expected delivery time.

In addition to the aforementioned steps, the online order procedure 132 can also transmit to the vendor 108 directions to the customer's location either as a facsimile transmission, as a telephone call, email message, and the like. Likewise, the online order procedure 132 can transmit through any medium directions to a vendor's location to a customer requesting takeout service.

Alternate Embodiments

The foregoing description, for purposes of explanation, used specific nomenclature to provide a thorough understanding of the invention. However, it will be apparent to one skilled in the art that the specific details are not required in order to practice the invention. In other instances, well known circuits and devices are shown in block diagram form in order to avoid unnecessary distraction from the underlying invention. Thus, the foregoing descriptions of specific embodiments of the present invention are presented for purposes of illustration and description. They are not intended to be exhaustive or to limit the invention to the precise forms disclosed, obviously many modifications and variations are possible in view of the above teachings. The embodiments were chosen and described in order to best explain the principles of the invention and its practical applications, to thereby enable others skilled in the art to best utilize the invention and various embodiments with various modifications as are suited to the particular use contemplated. It is intended that the scope of the invention be defined by the following claims and their equivalents.

Further, the method and system described hereinabove is amenable for execution on various types of executable mediums other than a memory device such as a random access memory. Other types of executable mediums can be used, such as but not limited to, a computer readable storage medium which can be any memory device, compact disc, or floppy disk.

Although the present invention has been described with reference to ordering food products from restaurants, it is not limited to this particular product or vendor. The present

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invention can be used for other electronic commerce purposes, other commodities, other types of vendors, and other types of services other than delivery or takeout.

In addition, the present invention is not constrained to transmitting a customer's order to the vendor through the interactive voice recognition system as described above. A modem connection can be established which will enable communication between the online ordering machine and the vendor through the Internet thereby allowing email communication, web communication, and the like.

What is claimed is:

1. A method for exchanging data in a distributed computer system comprising a plurality of client computers and at least one server computer connected by a communications link to the client computers, the server computer capable of connecting by one or more communications links to a plurality of vendors, said method comprising the steps of:

storing vendor data associated with the vendors;

associating with each vendor at least one geocode representing a geographic location associated with a particular vendor;

receiving a request for vendor data from one of the client computers, the request including a geographic location associated with the requesting client computer;

converting the requesting client computer's associated geographic location into a corresponding geocode;

selecting vendor data that is associated with zero or more vendors having a geocode that is compatible with the requesting client computer's geocode; and

providing the selected vendor data to the requesting client computer.

2. The method of claim 1,

wherein said providing step further comprises the step of: dynamically creating one or more menu web pages including the selected vendor data in response to the request; and

transmitting the menu web pages to the requesting client computer.

3. The method of claim 1,

wherein each geocode includes a latitude coordinate and a longitude coordinate.

4. The method of claim 1,

wherein the vendor geocode represents a delivery range; said selecting step further comprises the step of: finding one or more vendors whose geocode matches the requesting client computer's geocode.

5. The method of claim 4,

said selecting step further comprises the steps of: associating an operational time with each vendor; obtaining a current time from the requesting client computer; and indicating which of the found vendors are operational when the request is made.

6. The method of claim 1,

said selecting step further comprises the steps of: obtaining a takeout range from the requesting client computer; and

selecting those vendors whose geocode is within the takeout range of the requesting client computer's geocode.

7. The method of claim 1 further comprising the steps of: obtaining an order from the requesting client computer for a vendor product from a select vendor; and representing the order as voice data; and

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transmitting the voice data to the select vendor through a telephonic link.

8. The method of claim 7, further comprising the steps of: receiving a reply from the select vendor; and

transmitting a response to the requesting client computer. 5

9. The method of claim 1 further comprising the steps of: obtaining an order from the requesting client computer for a vendor product from a select vendor; and

transmitting the order to the select vendor as a facsimile transmission. 10

10. The method of claim 9 further comprising the steps of: transmitting to the select vendor a telephonic communication indicating the facsimile transmission;

obtaining a reply from the vendor; and 15

forwarding a response to the requesting client computer indicating the reply.

11. An order entry apparatus for managing the procurement of orders for vendor products on a computer network, said computer network comprising a plurality of client computers in communication with the order entry apparatus by a first communication link, the order entry apparatus capable of being connected by one or more communications links to a plurality of vendors, said apparatus comprising:

a plurality of vendors, each vendor associated with a vendor geocode representing a location associated with the vendor; 25

a plurality of users, each user associated with a particular client computer, each user associated with a user geocode representing a geographic location associated with the user; 30

a plurality of vendor data; and

an online ordering procedure having a capability to receive a request for vendor data from a requesting user and to select vendor data associated with vendors having a geocode compatible with the geocode of the requesting user. 35

12. The apparatus of claim 11,

wherein each geocode includes a latitude and a longitude coordinate. 40

13. The apparatus of claim 11, comprising:

a web page creation procedure having a capability to dynamically generate one or more menu web pages including the select vendor data in response to the request received from the requesting user. 45

14. The apparatus of claim 11,

wherein the online order procedure further includes the capability to select vendor data associated with one or more vendors having a vendor geocode that matches the requesting user geocode. 50

15. The apparatus of claim 11,

wherein the online order procedure further includes the capability to select vendor data within a takeout range of the requesting user geocode. 55

16. The apparatus of claim 11, comprising:

a geocode procedure having the capability to map a geographic location into a geocode.

17. The apparatus of claim 11:

wherein the online order procedure includes the capability to receive an order for one or more vendor products; and 60

further comprising an interactive voice recognition (IVR) procedure having the capability to convert the order into voice data and to transmit the voice data through a communication link to a particular vendor. 65

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18. The apparatus of claim 17:

wherein the IVR procedure includes the capability to receive a reply from the vendor through a communication link; and

wherein the online order procedure includes the capability to transmit a response to the requesting user indicating the reply.

19. The apparatus of claim 17:

wherein the IVR procedure includes the capability to transmit the order through a communication link to a particular vendor.

20. The apparatus of claim 19:

wherein the IVR procedure includes the capability to receive a reply from the vendor through a communication link; and

wherein the online order procedure includes the capability to transmit a response to the requesting user indicating the reply.

21. A computer readable storage medium that directs a computer to function in a specified manner, comprising:

a plurality of vendors, each vendor associated with a vendor geocode representing a location associated with the vendor;

a plurality of users, each user associated with a particular client computer, each user associated with a user geocode representing a geographic location associated with the user;

a plurality of vendor data; and

an online ordering procedure having a capability to receive a request for vendor data from a requesting user and to select vendor data associated with vendors having a geocode compatible with the geocode of the requesting user. 70

22. The apparatus of claim 21,

wherein each geocode includes a latitude and a longitude coordinate.

23. The apparatus of claim 21, comprising:

a web page creation procedure having a capability to dynamically generate one or more menu web pages including the select vendor data in response to the request received from the requesting user. 75

24. The apparatus of claim 21,

wherein the online order procedure further includes the capability to select vendor data associated with one or more vendors having a vendor geocode that matches the requesting user geocode.

25. The apparatus of claim 21,

wherein the online order procedure further includes the capability to select vendor data within a takeout range of the requesting user geocode.

26. The apparatus of claim 21, comprising:

a geocode procedure having the capability to map a geographic location into a geocode.

27. The apparatus of claim 21:

wherein the online order procedure includes the capability to receive an order for one or more vendor products; and

further comprising an interactive voice recognition (IVR) procedure having the capability to convert the order into voice data and to transmit the voice data through a communication link to a particular vendor. 80

28. The apparatus of claim 27:

wherein the IVR procedure includes the capability to receive a reply from the vendor through a communication link; and

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wherein the online order procedure includes the capability to transmit a response to the response to the requesting user indicating the reply.

29. The apparatus of claim 27:
 wherein the IVR procedure includes the capability to transmit the order through a communication link to a particular vendor.

30. The apparatus of claim 29:
 wherein the IVR procedure includes the capability to receive a reply from the vendor through a communication link; and
 wherein the online order procedure includes the capability to transmit a response to the response to the requesting user indicating the reply.

31. The method of claim 1,
 wherein one or more of said communications links to said vendors comprise a computer network link.

32. The method of claim 1,
 wherein one or more of said communications links to said vendors comprise the internet.

33. The method of claim 11,
 wherein one or more of said communications links to said vendors comprise a computer network link.

34. The method of claim 11,
 wherein one or more of said communications links to said vendors comprise the internet.

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35. The apparatus of claim 21:
 wherein the online order procedure includes the capability to receive an order for one or more vendor products; and
 further comprising a procedure to transmit the order information through a communication link to a particular vendor.

36. The apparatus of claim 35:
 wherein the procedure includes the capability to receive a reply from the vendor through a communication link; and
 wherein the online order procedure includes the capability to transmit a response to the response to the requesting user indicating the reply.

37. The method of claim 35,
 wherein said communication link to a particular vendor comprises a computer network link.

38. The method of claim 35,
 wherein said communication link to a particular vendor comprises the internet.

39. The method of claim 36,
 wherein said communication link to a particular vendor comprises a computer network link.

40. The method of claim 36,
 wherein said communication link to a particular vendor comprises the internet.

* * * * *



US005912743A

United States Patent [19]
Kinebuchi et al.

[11] **Patent Number:** **5,912,743**
[45] **Date of Patent:** **Jun. 15, 1999**

[54] **TERMINAL DEVICE**

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[73] **Assignee:** **Seiko Epson Corporation, Tokyo, Japan**

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[21] **Appl. No.:** **08/664,463**

[22] **Filed:** **Jun. 14, 1996**

[30] **Foreign Application Priority Data**

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Jul. 27, 1995 [JP] Japan 7-192289
Sep. 22, 1995 [JP] Japan 7-269354

[51] **Int. Cl.⁶** **H04N 1/32**

[52] **U.S. Cl.** **358/442; 358/468; 345/348; 434/428**

[58] **Field of Search** **358/400, 434, 358/442, 468; 395/114-116, 967; 345/173, 145, 146, 400, 441, 348, 349; 434/428, 429; H04N 1/32**

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Primary Examiner—Kim Yen Vu
Attorney, Agent, or Firm—Mark P. Watson

[57] **ABSTRACT**

An order-taking terminal device enables a customer to order food, but can respond rapidly to changes and additions to the menu. When this terminal device starts up, it receives an operating program and image data from main management equipment. The order-taking terminal device stores the thus received operating program and image data and displays a menu screen on a display screen on the basis of the thus stored operating program and image data.

32 Claims, 26 Drawing Sheets

FIG. 1

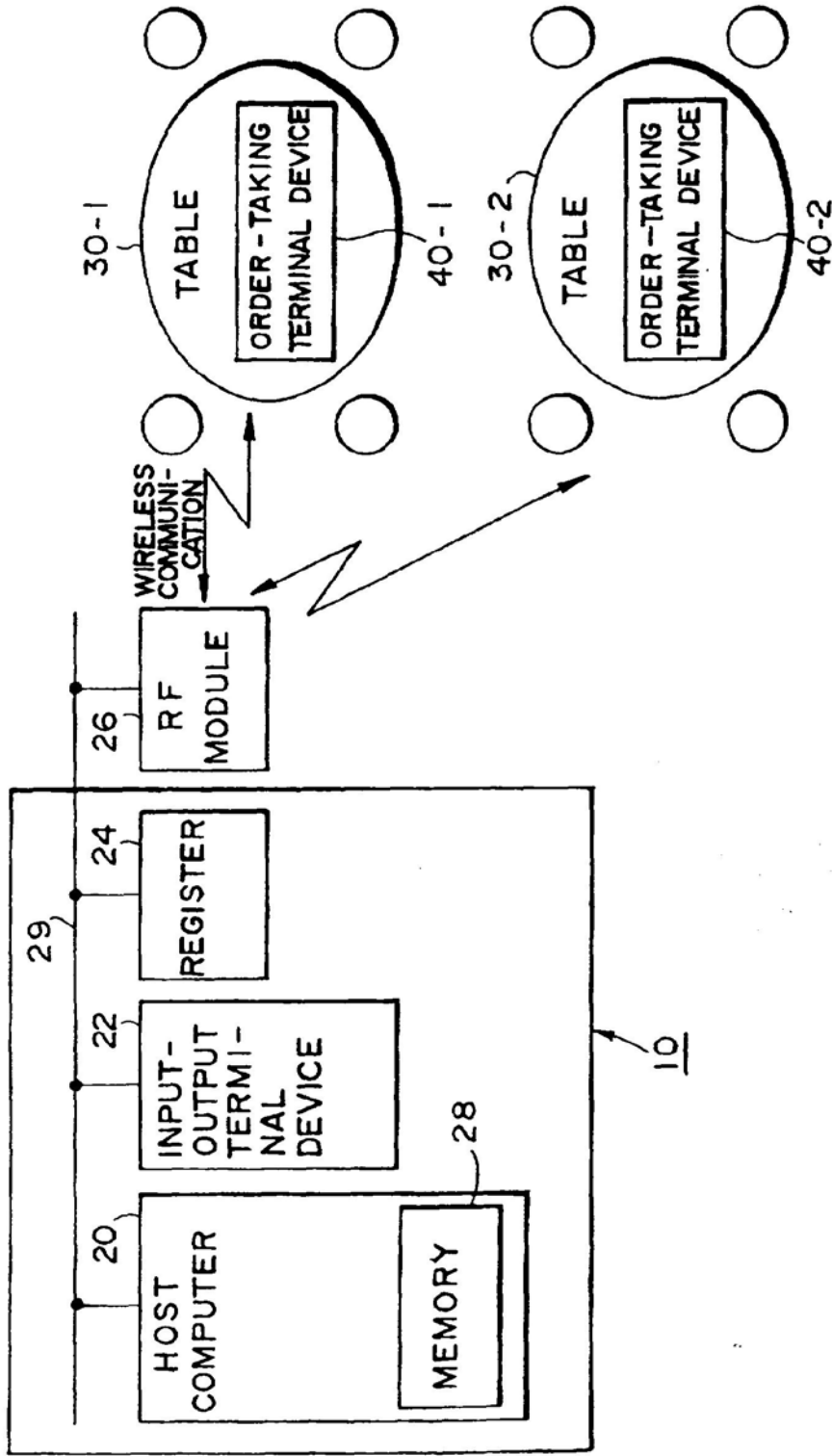


FIG. 2

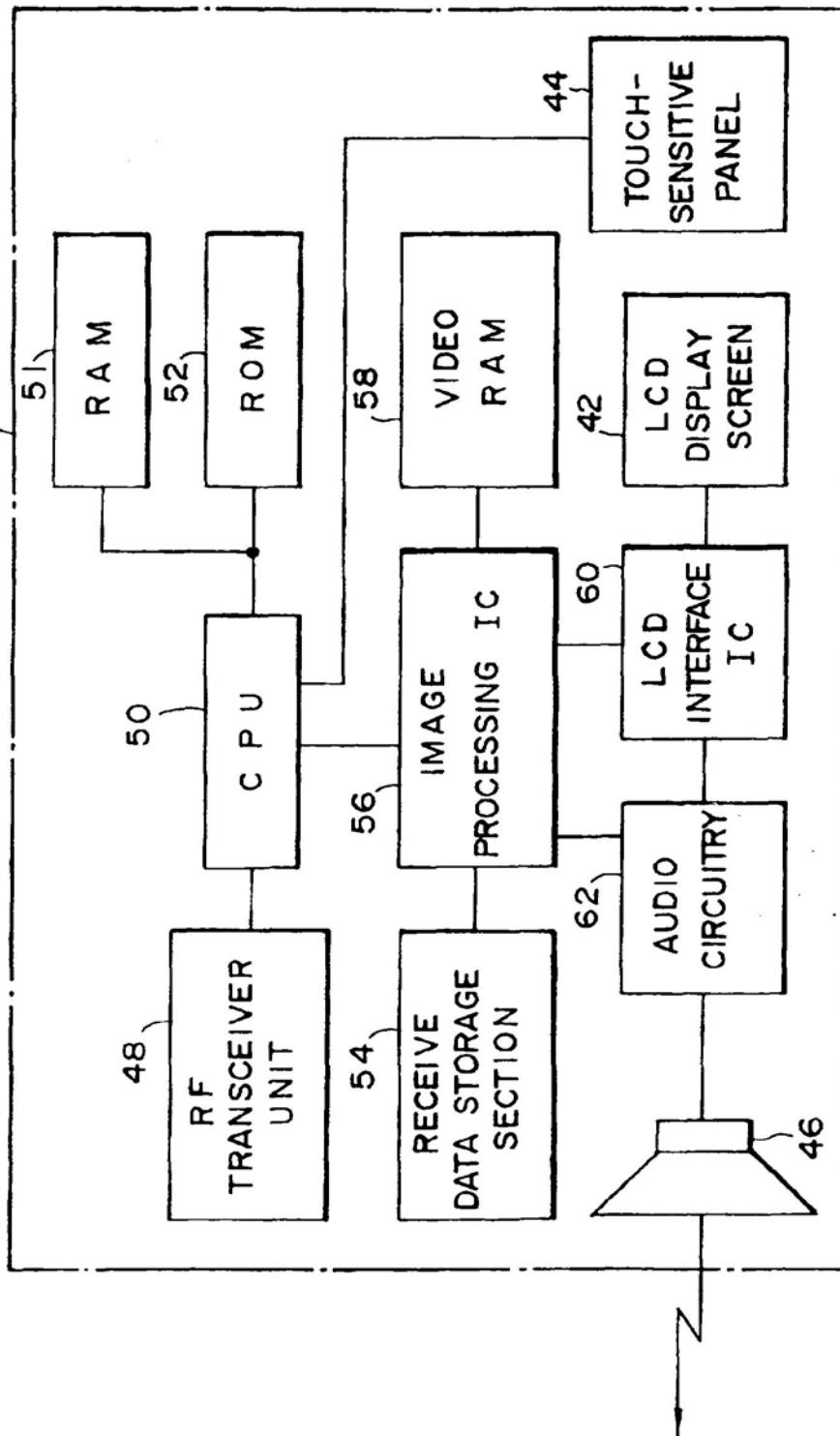
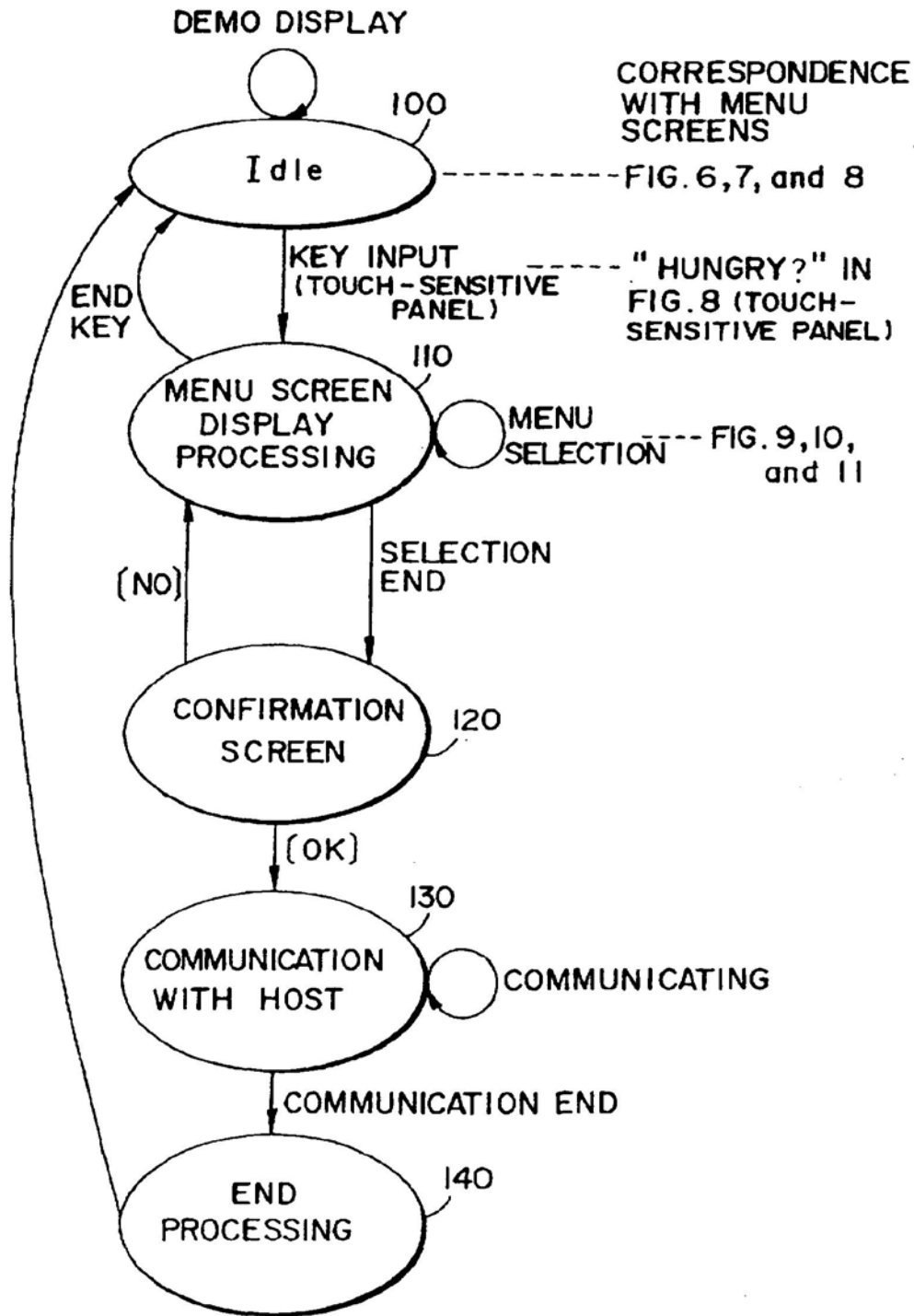
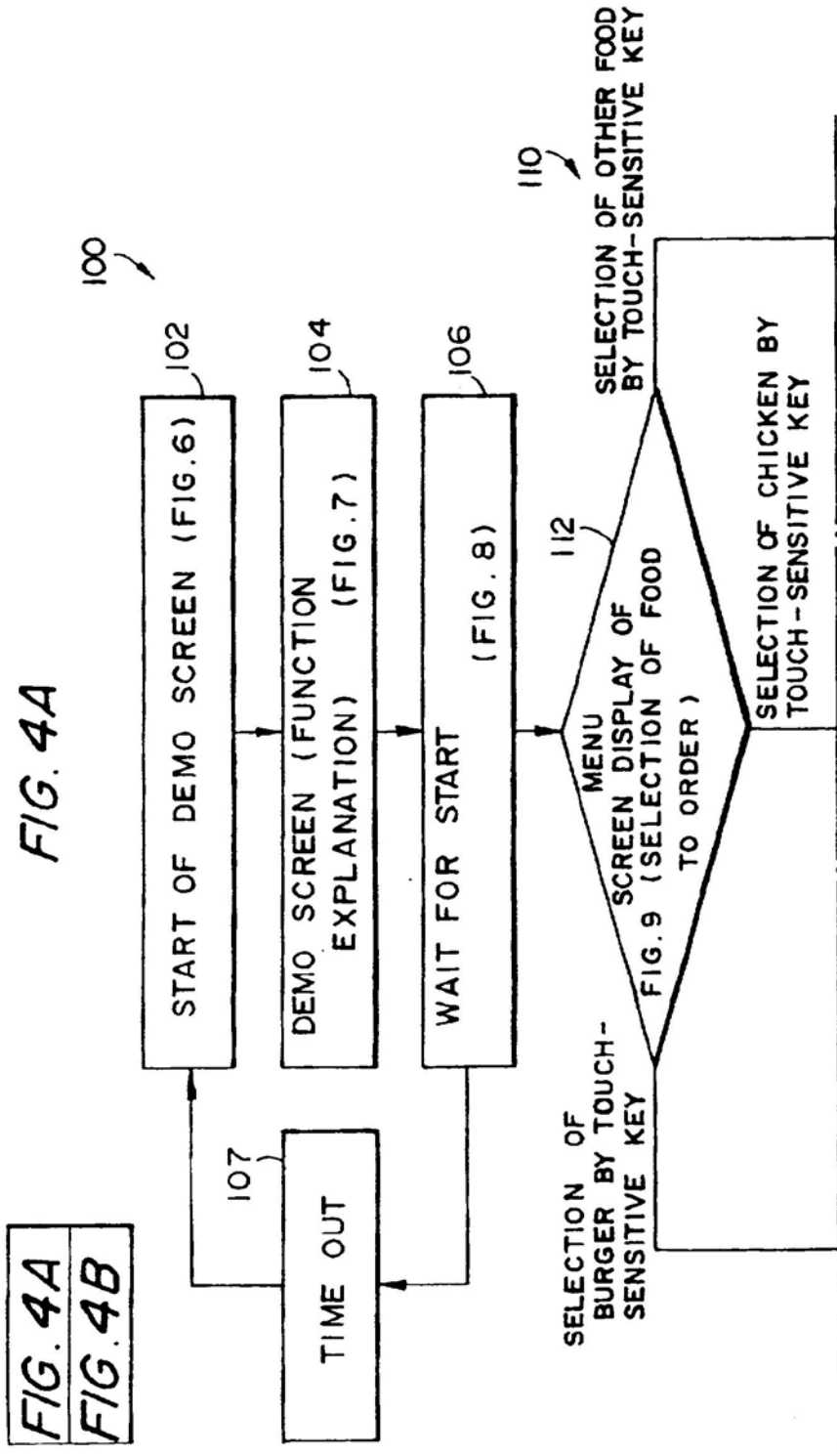


FIG. 3





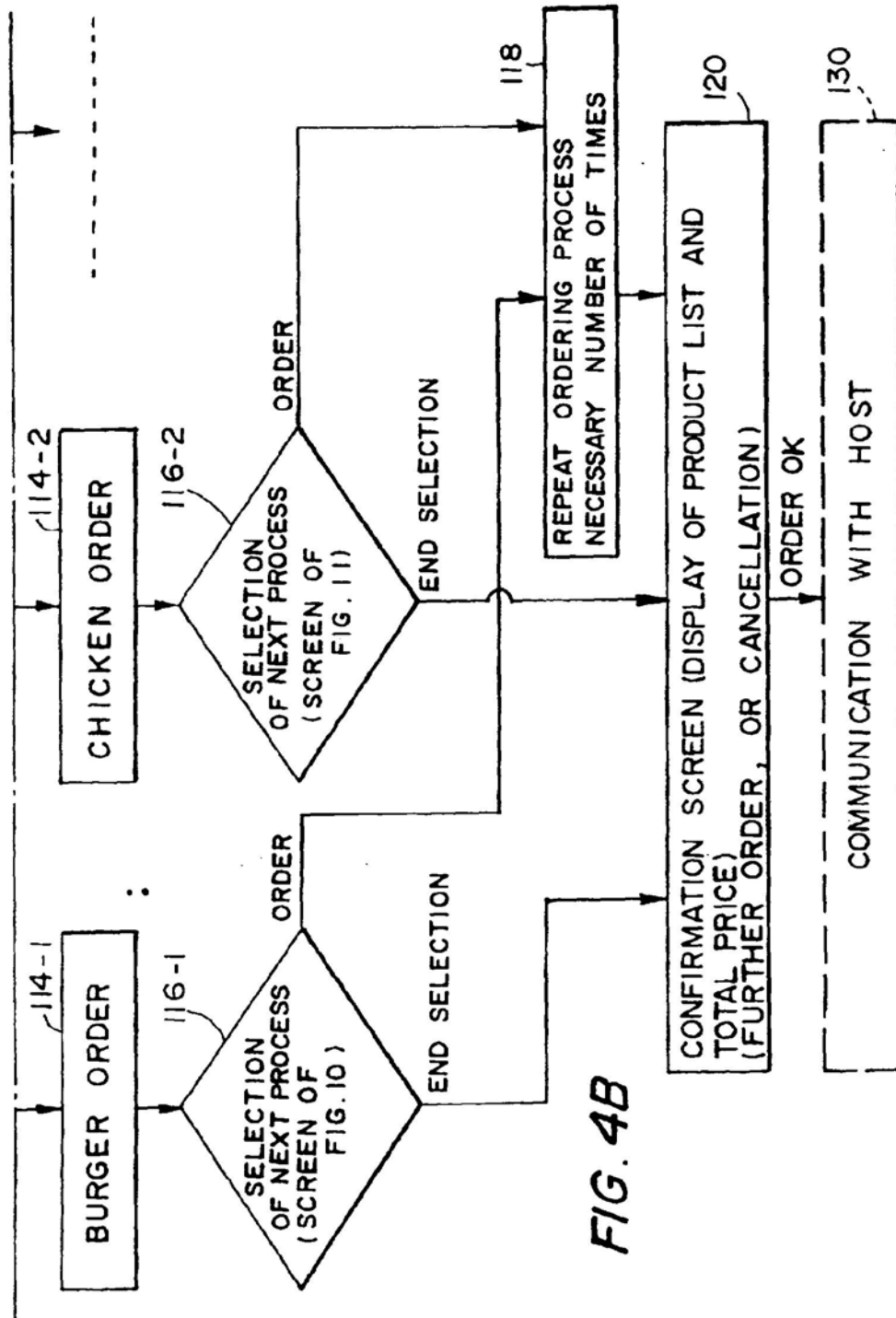


FIG. 4B

FIG. 5

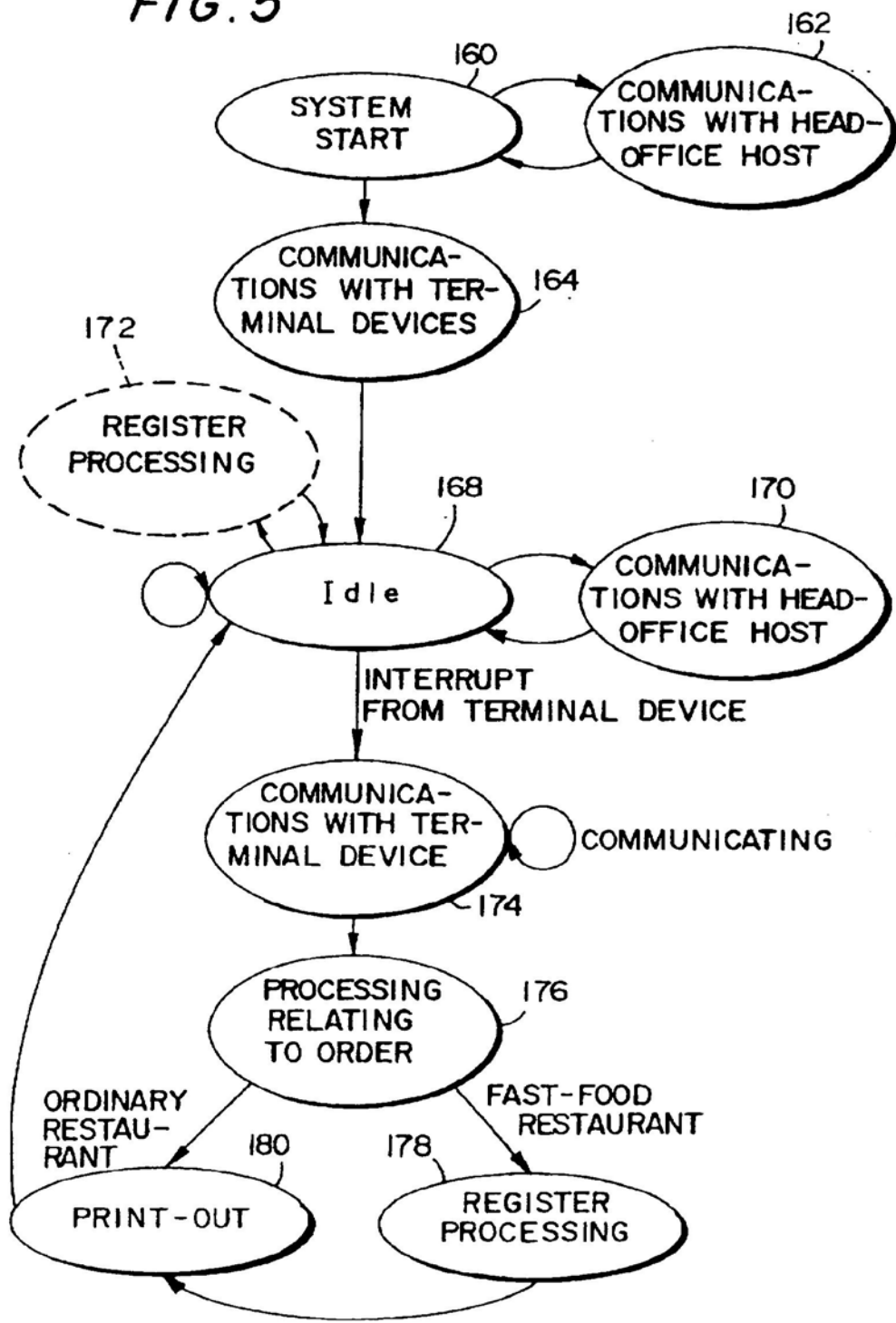


FIG. 6

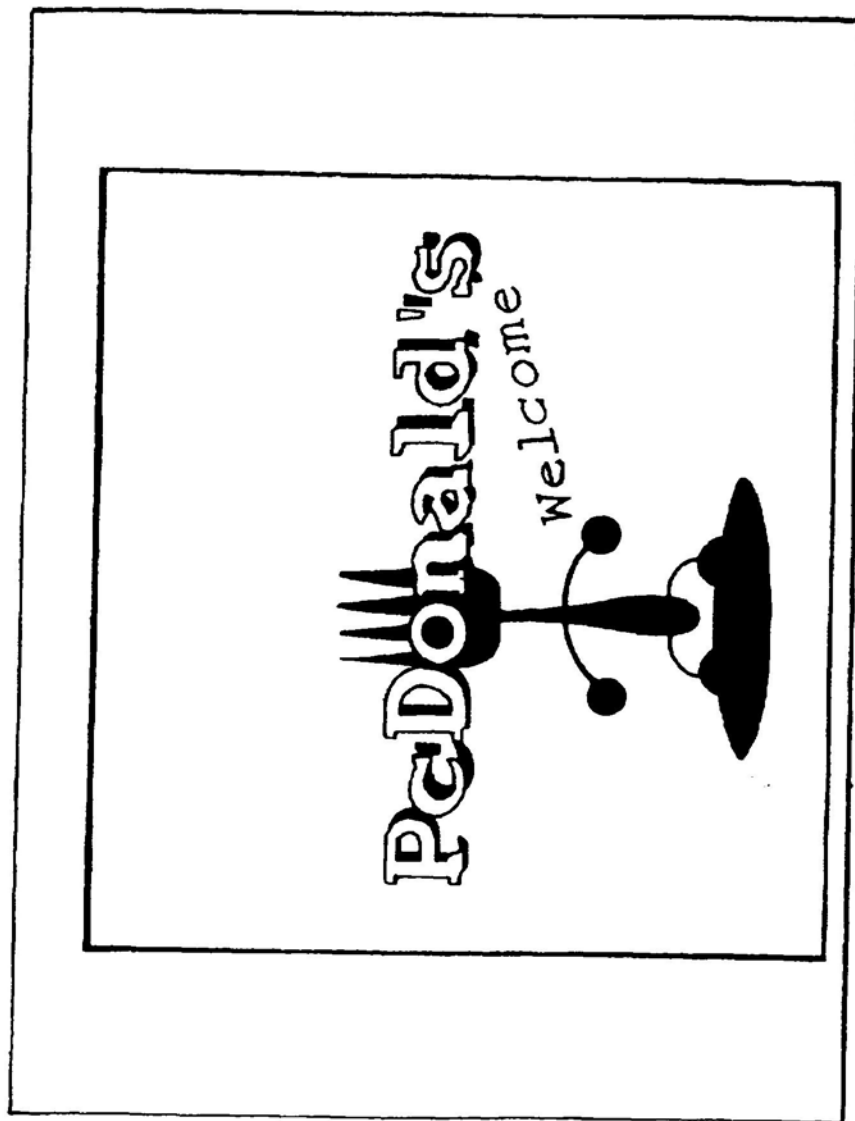


FIG. 7

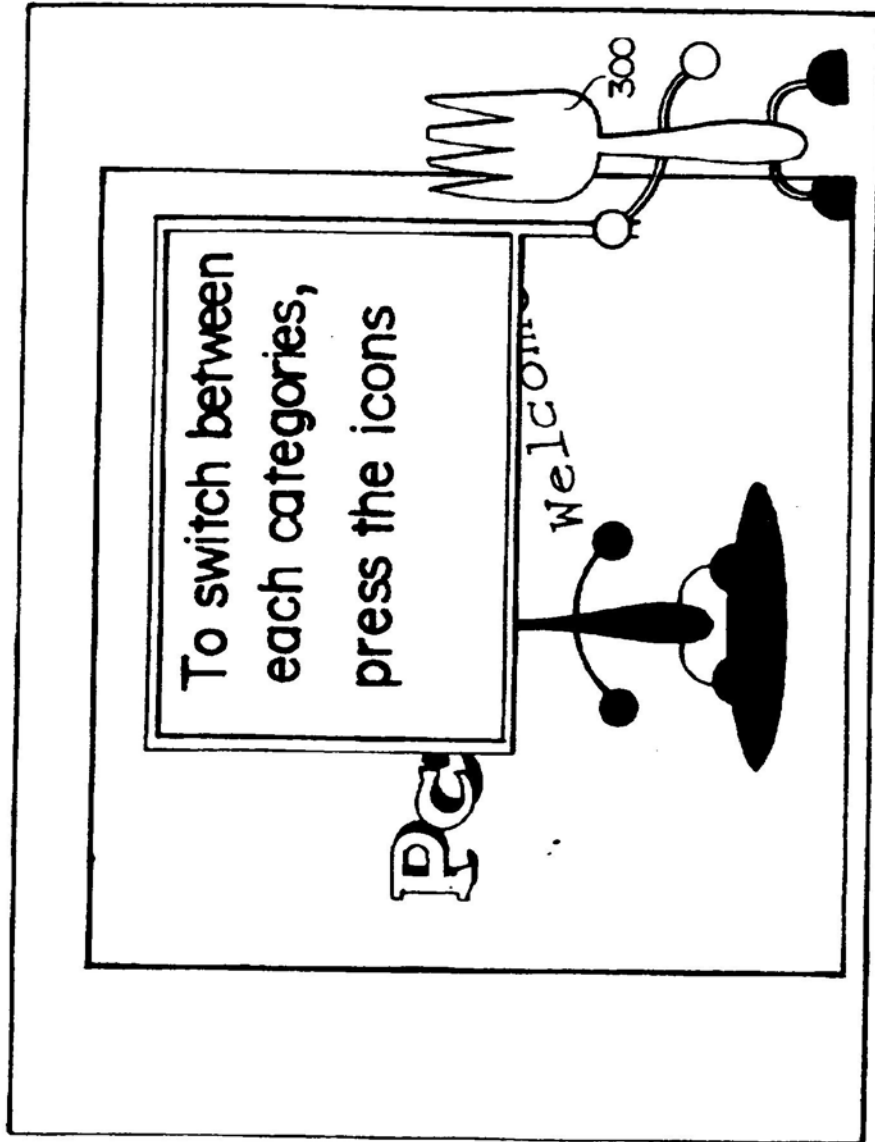


FIG. 8

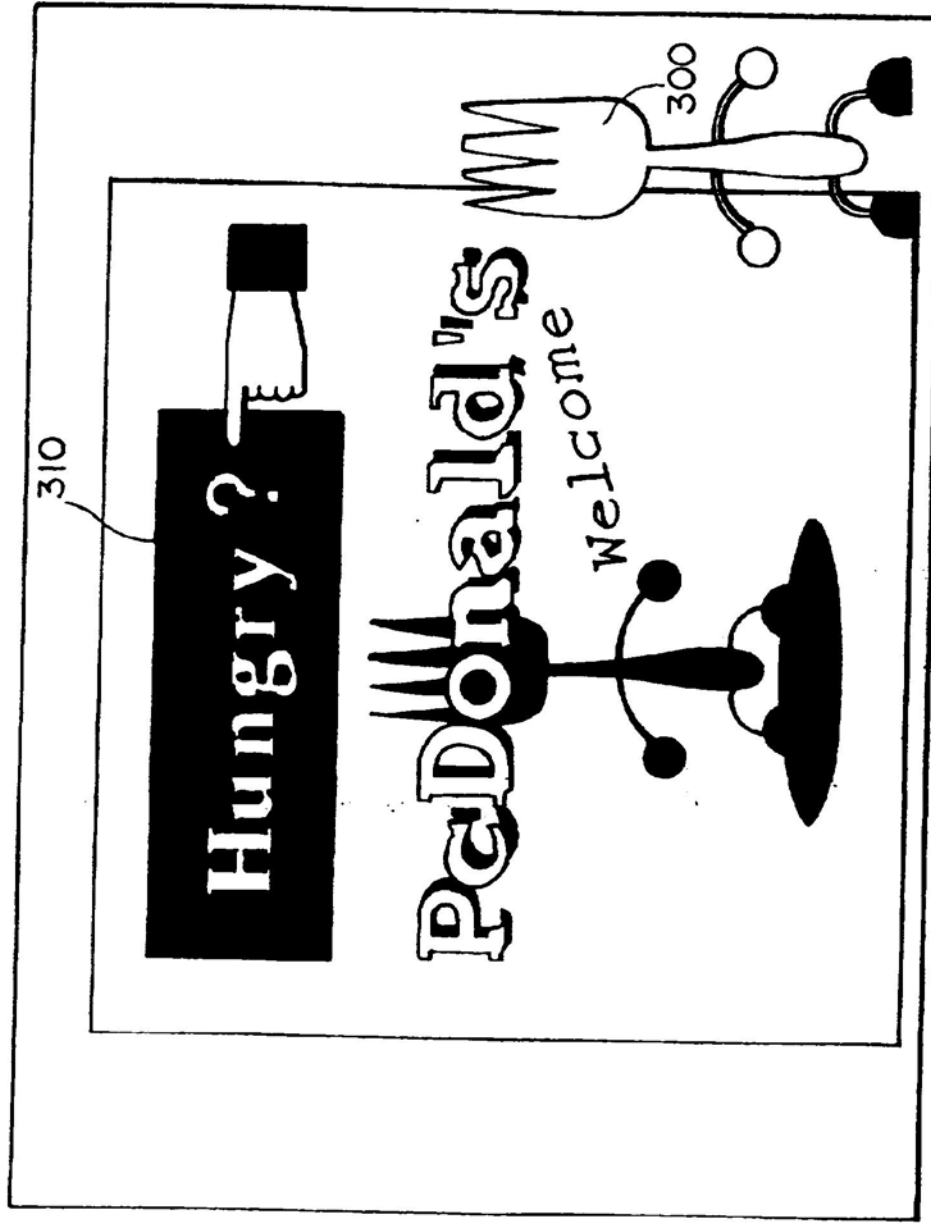


FIG. 9

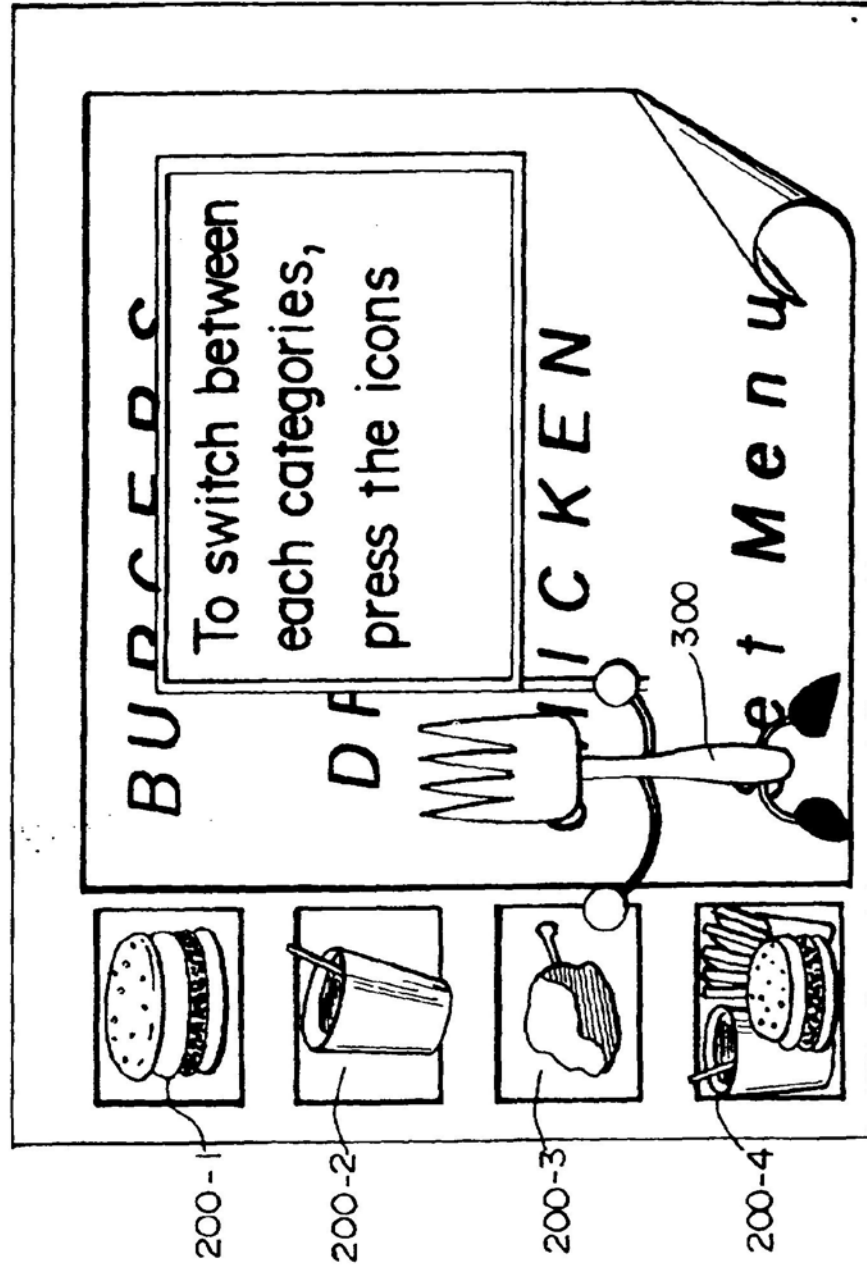


FIG. 10

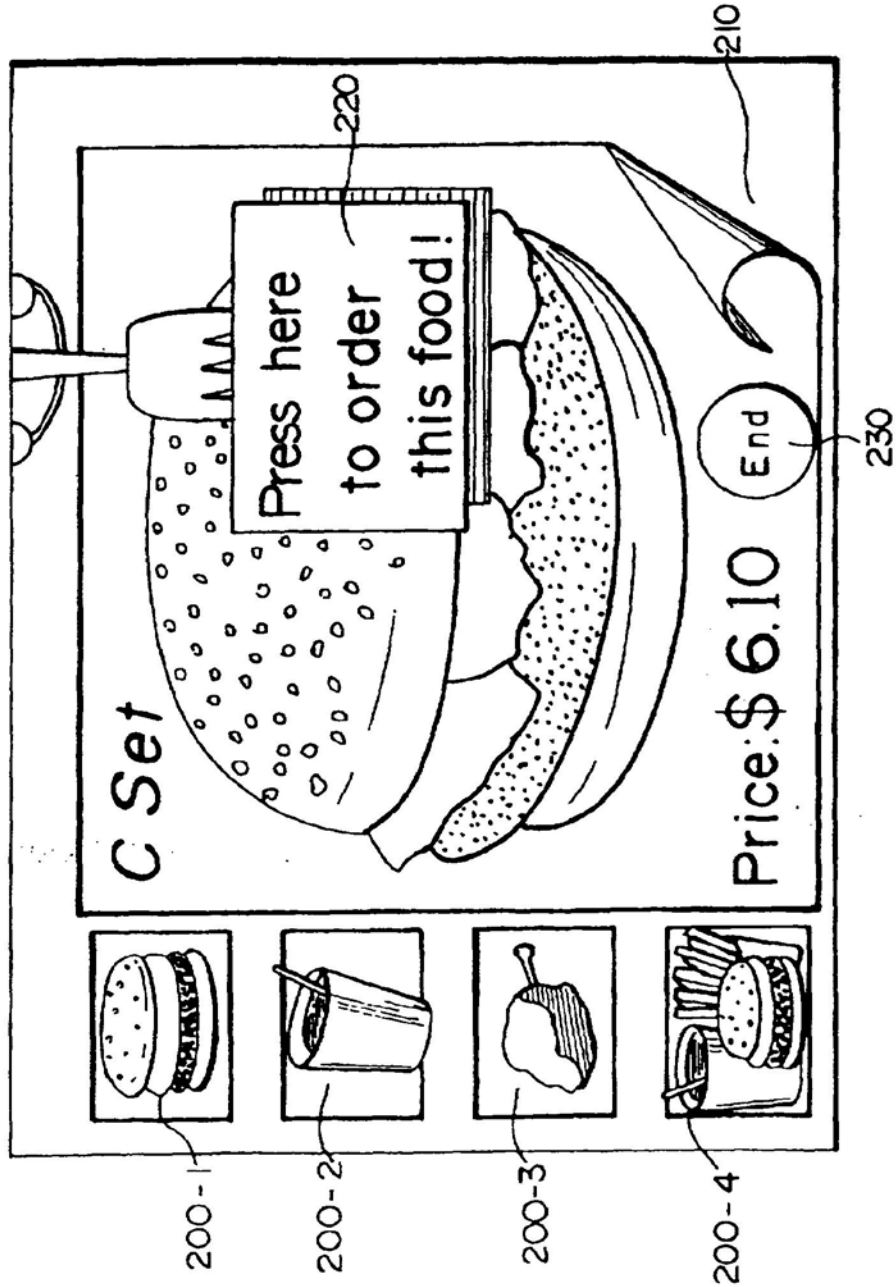


FIG. 11

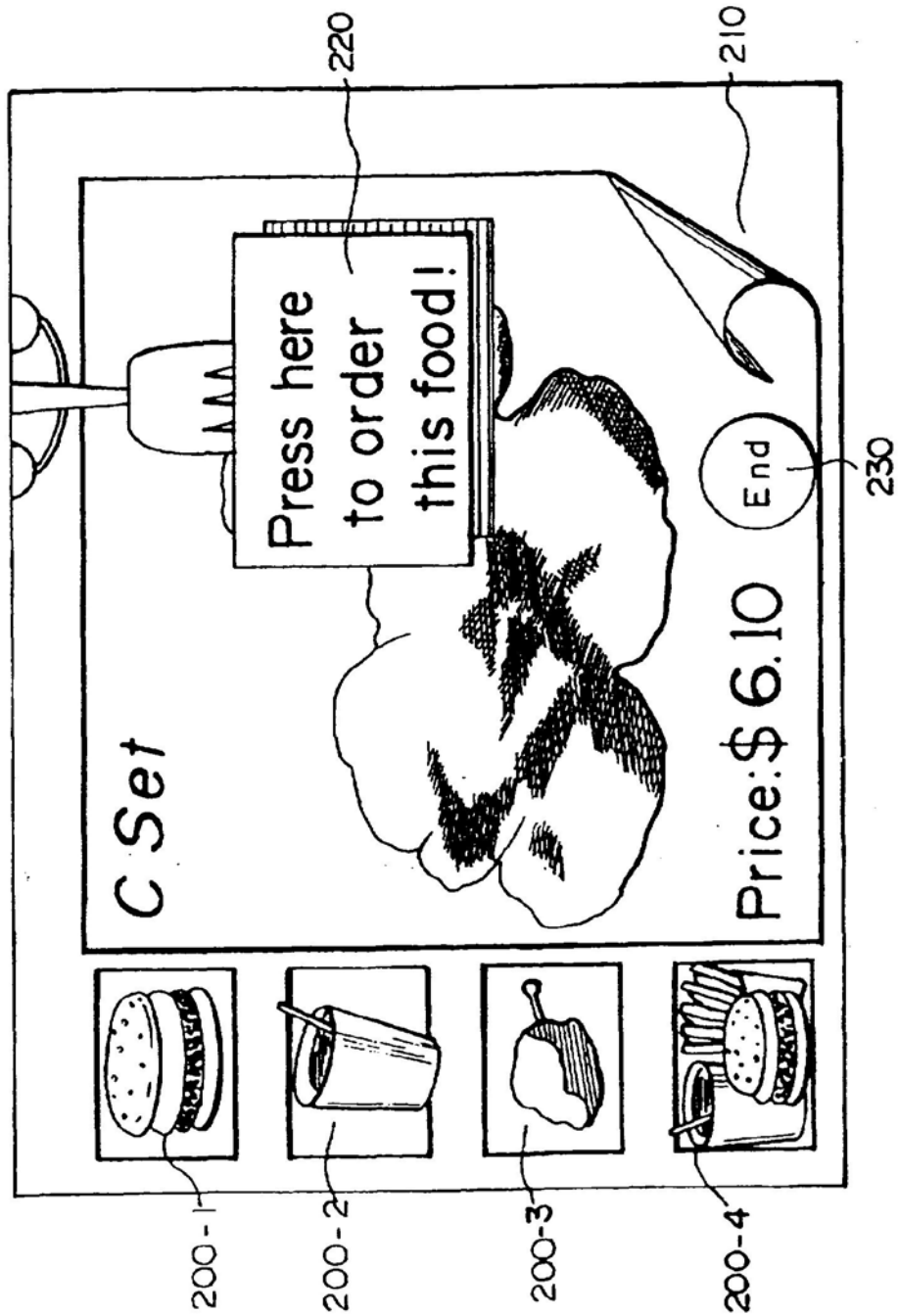


FIG. 12

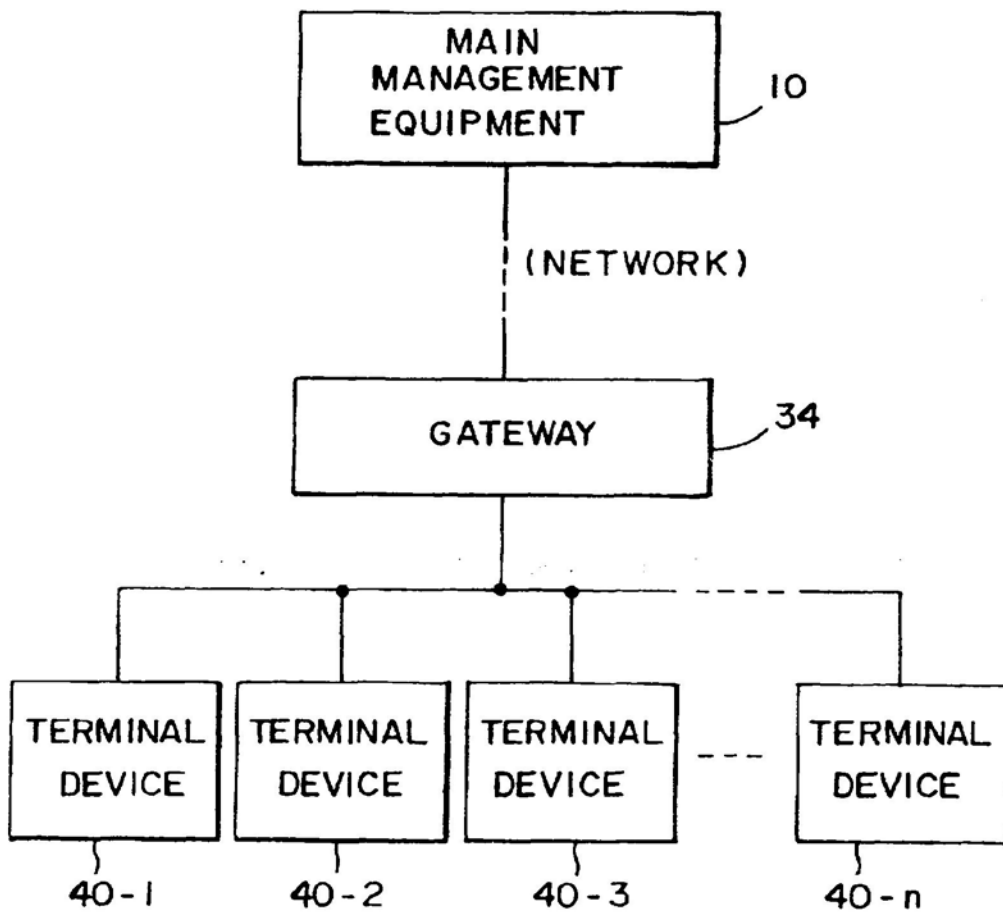


FIG. 13

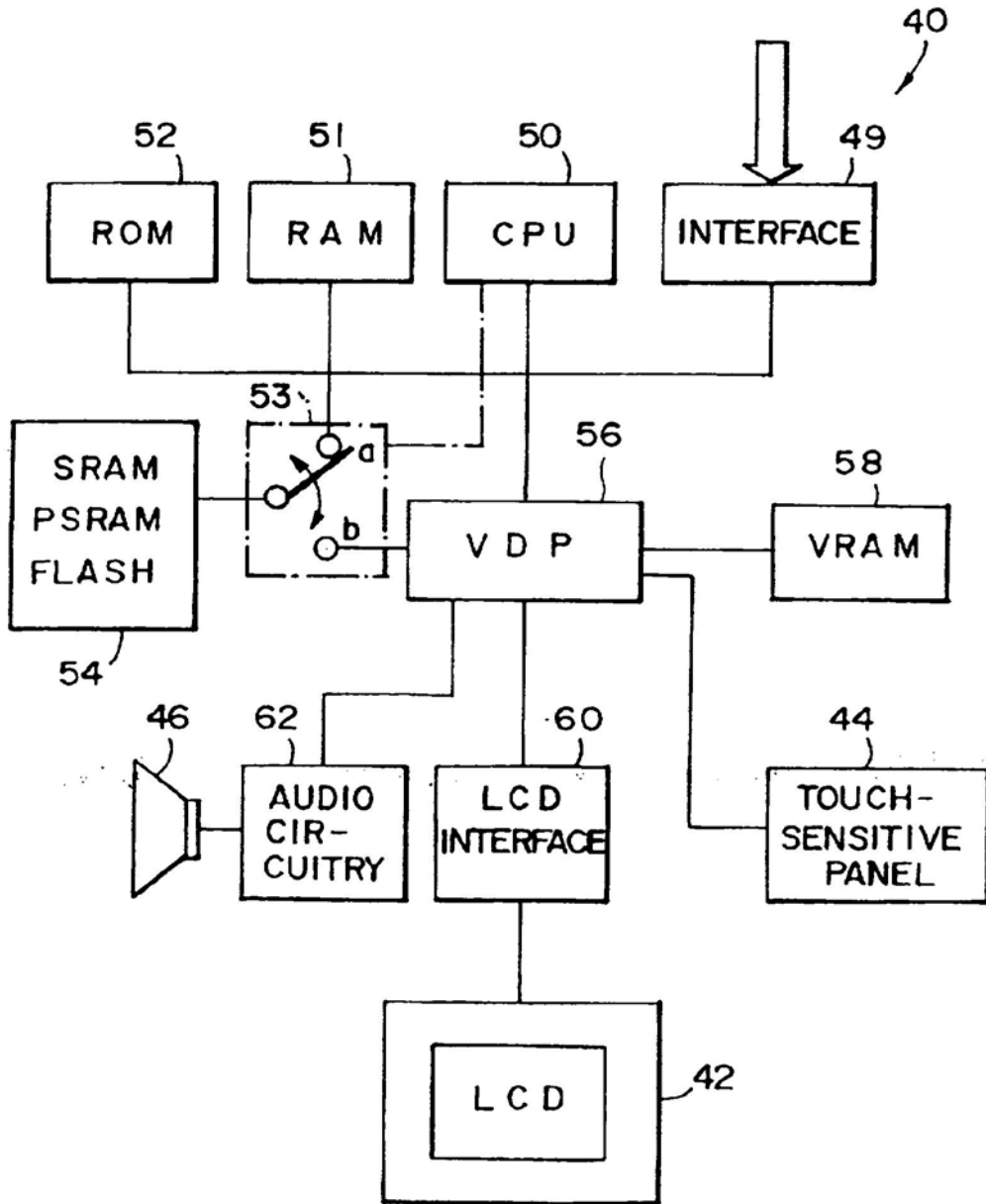
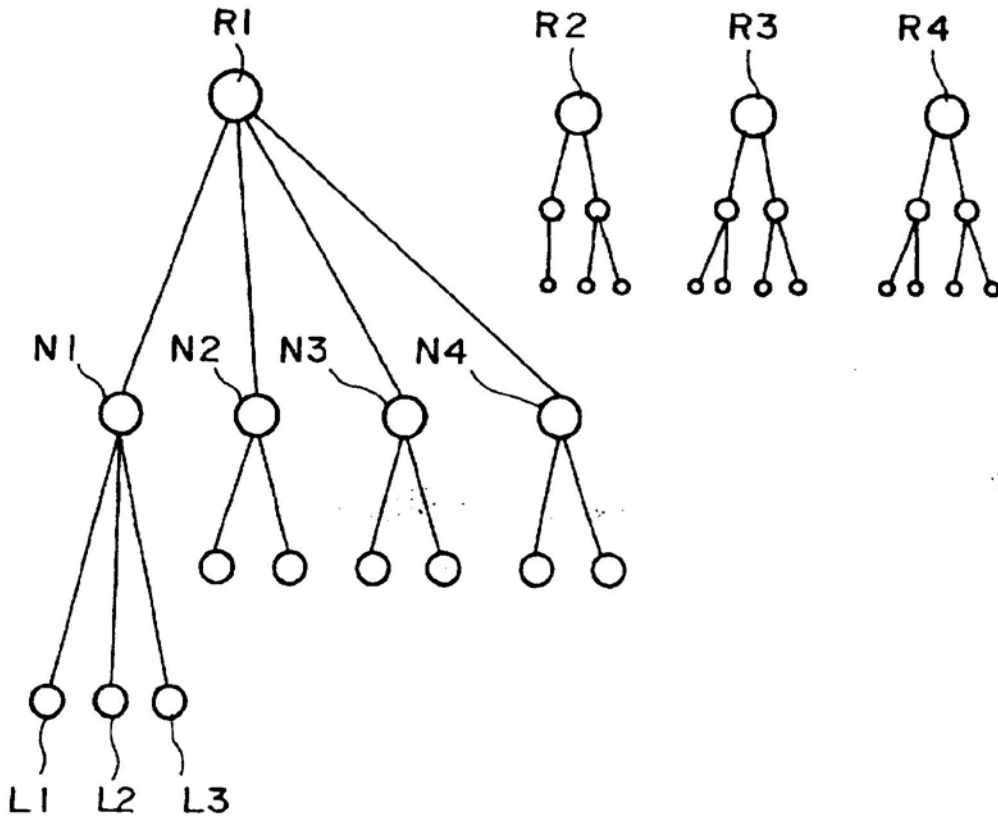


FIG. 14



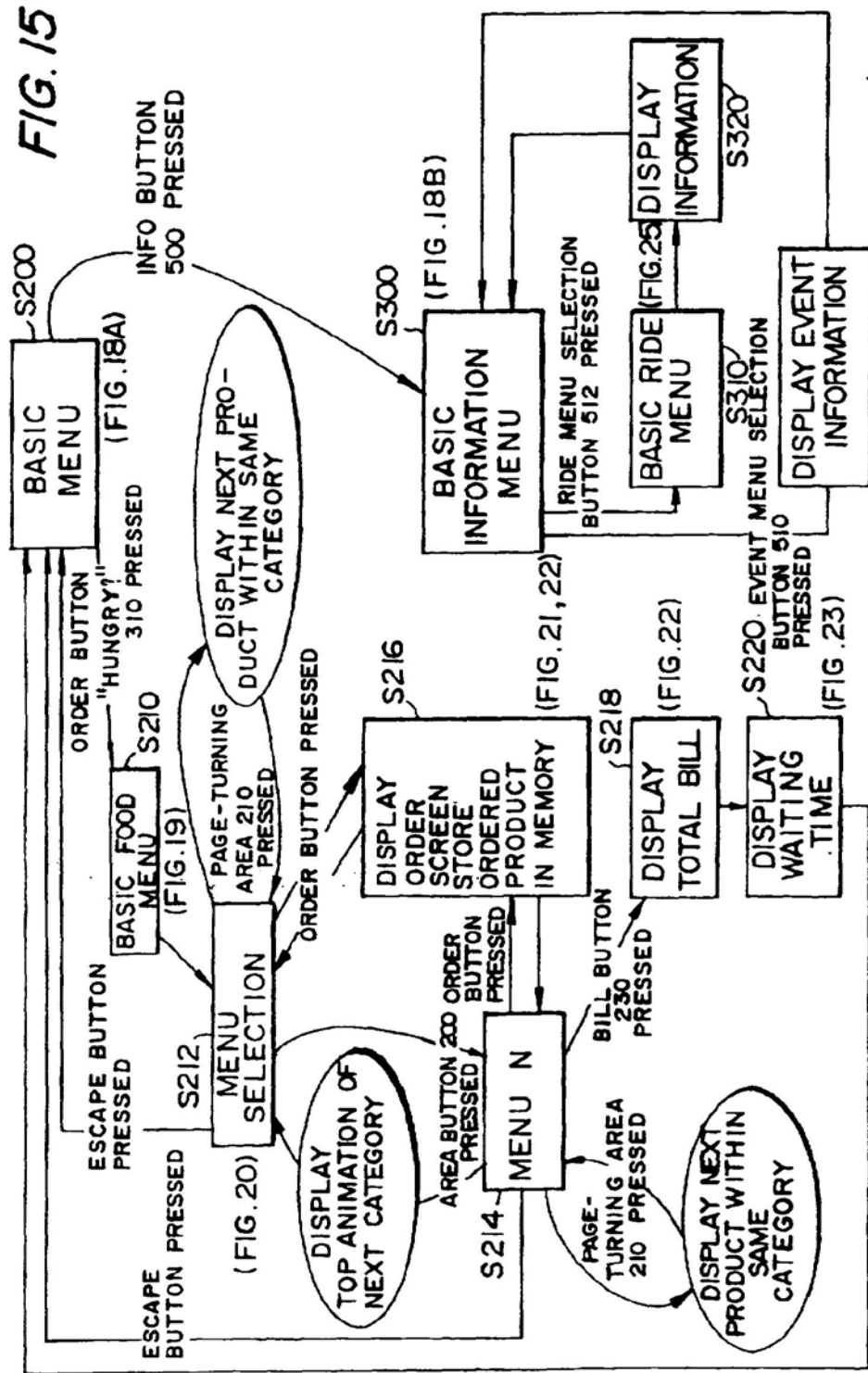


FIG. 16

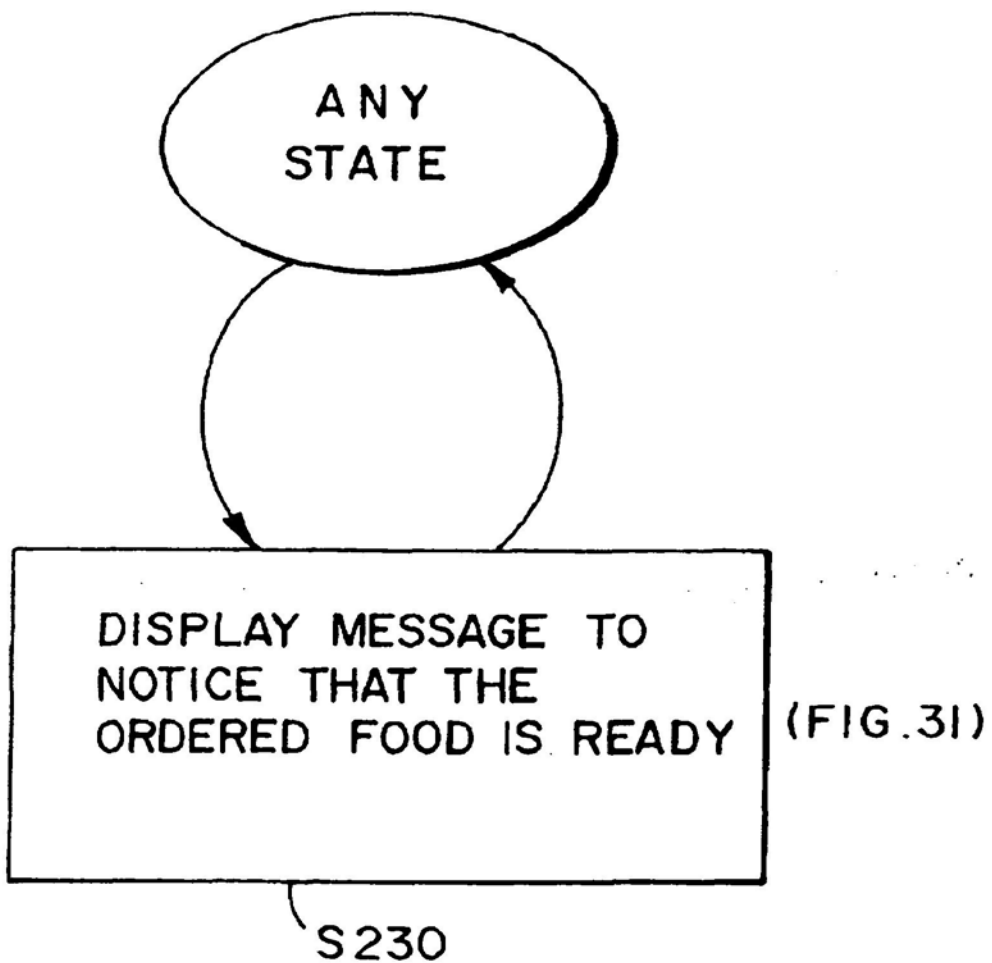


FIG. 17

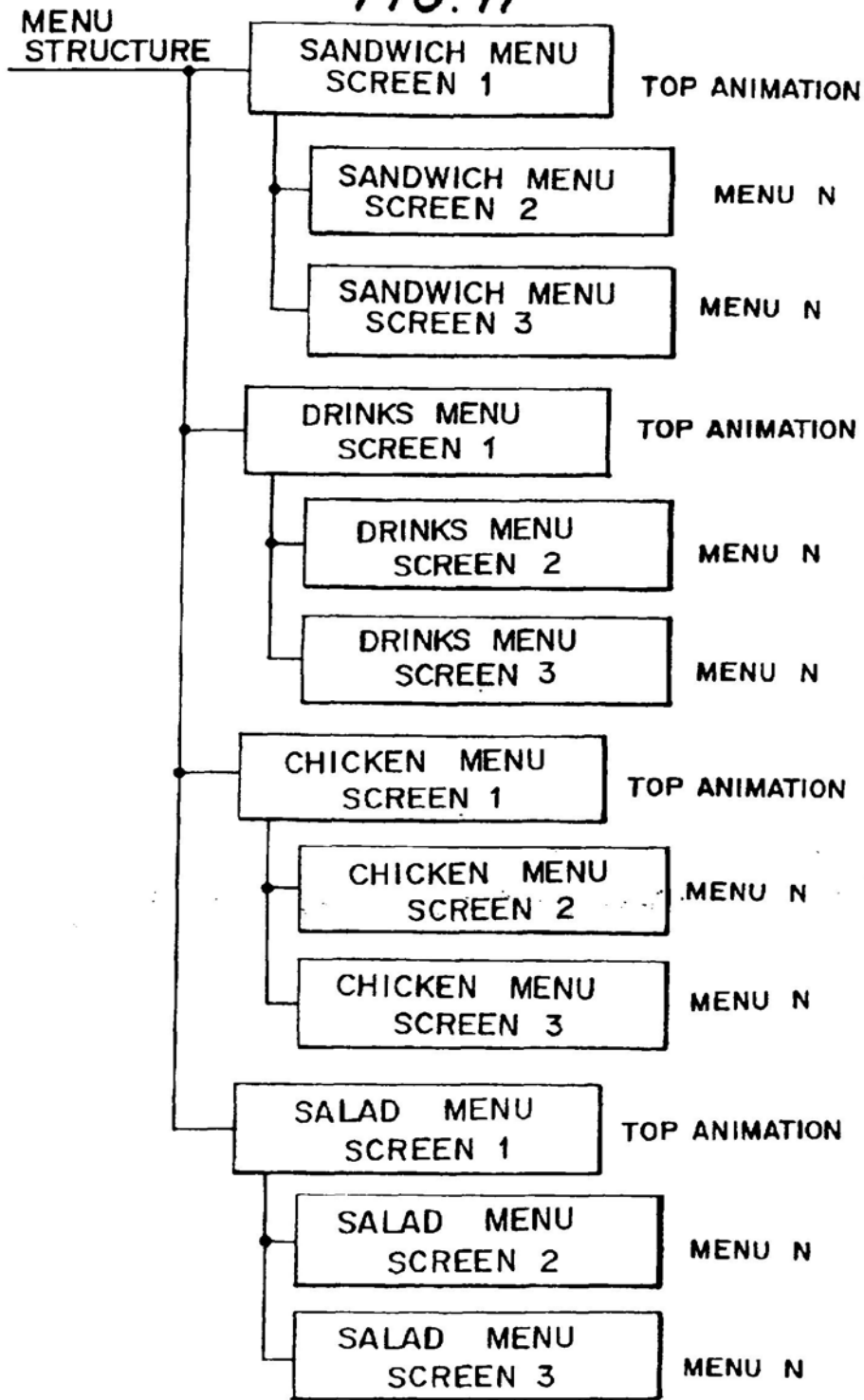


FIG. 18A

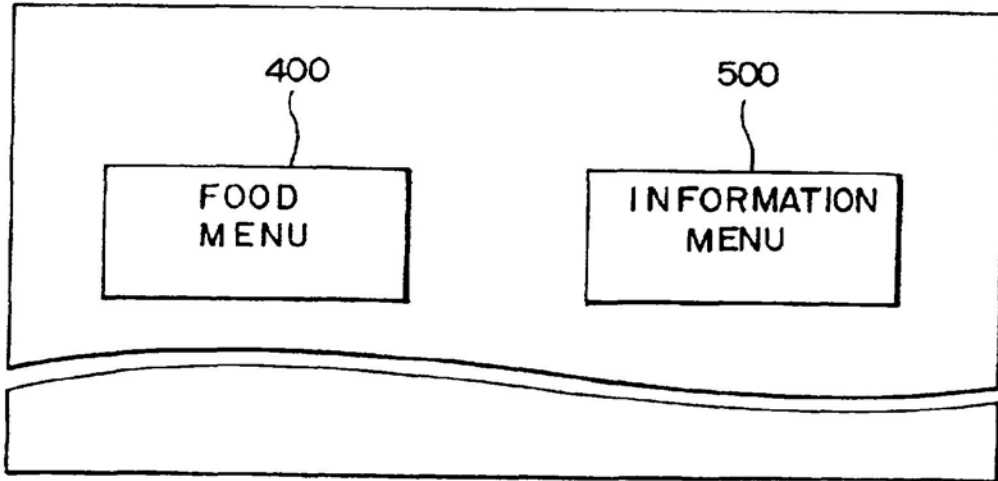


FIG. 18B

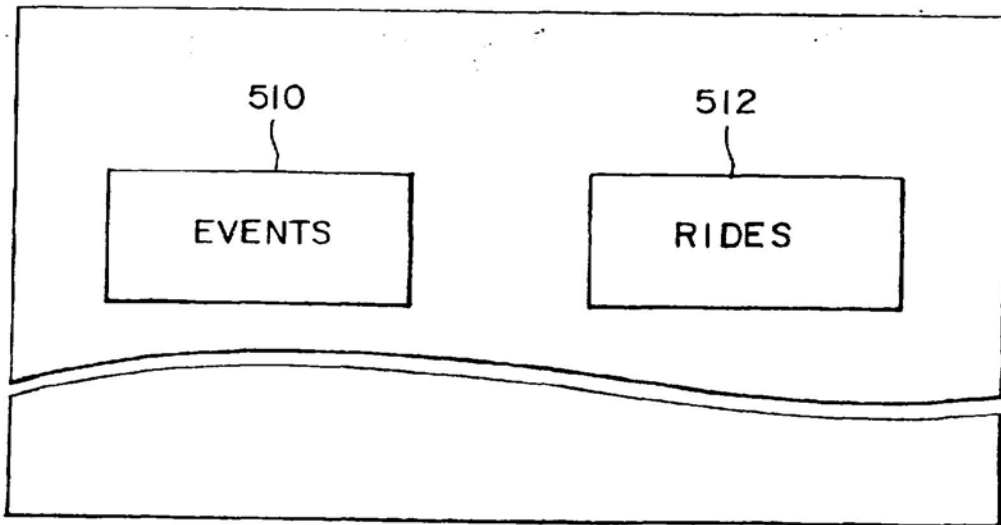


FIG. 19

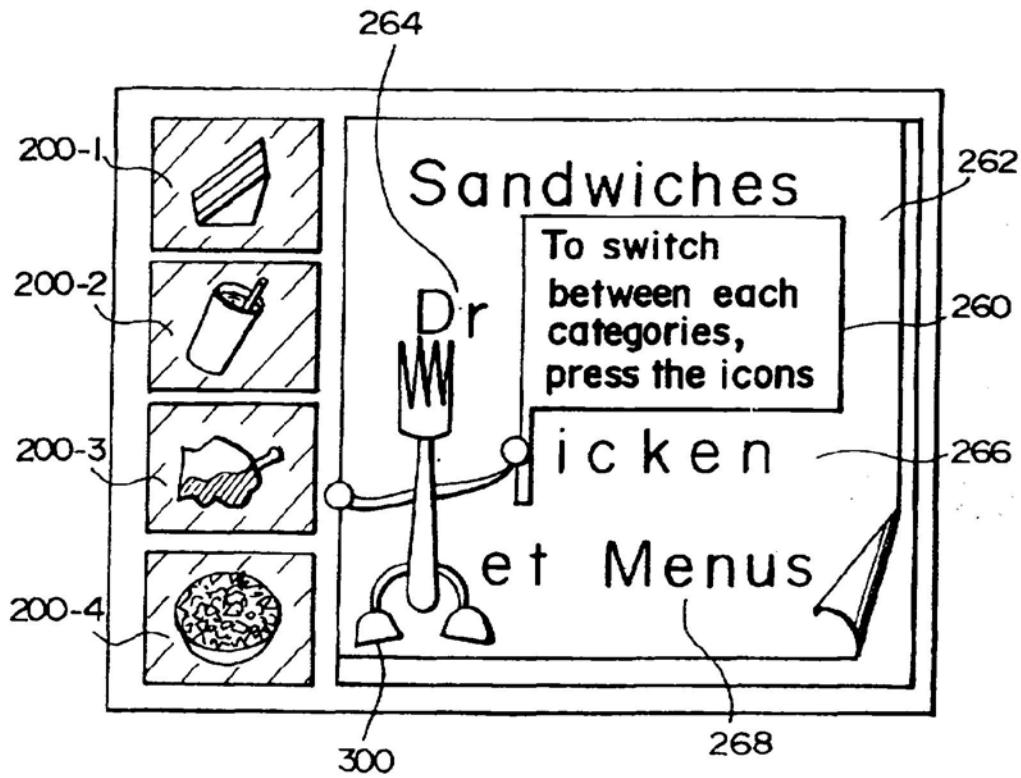


FIG. 20

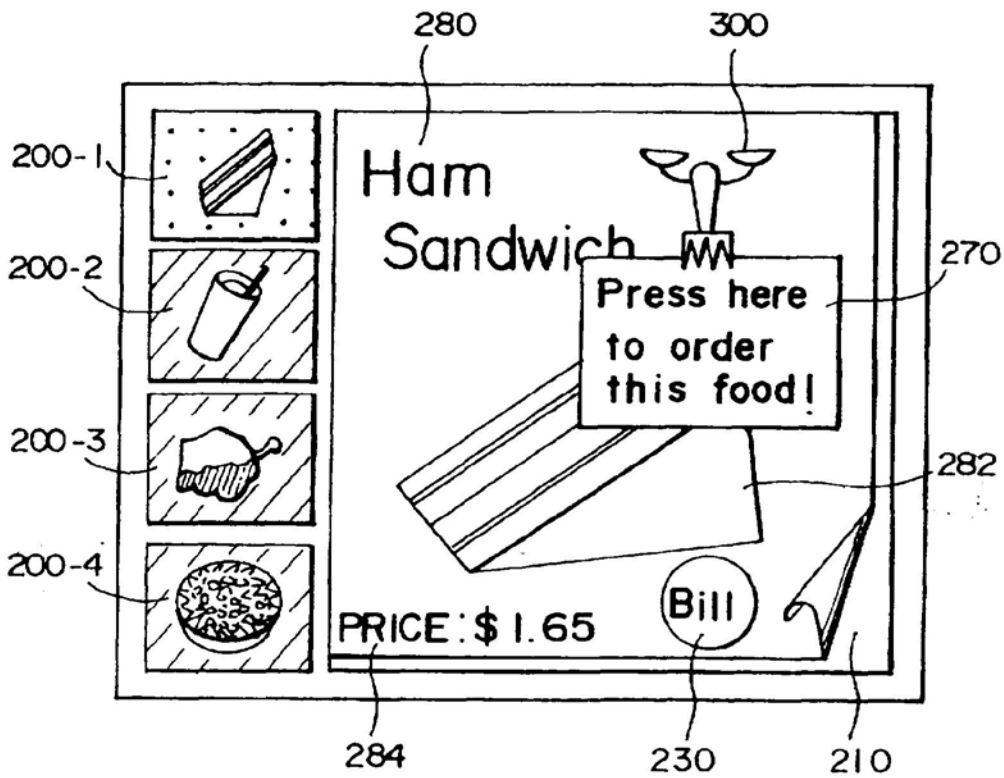


FIG. 21

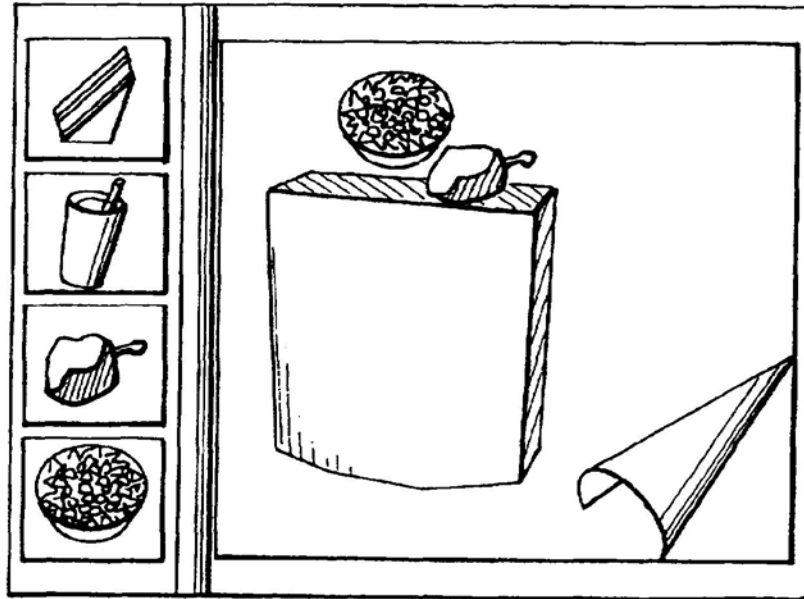


FIG. 22

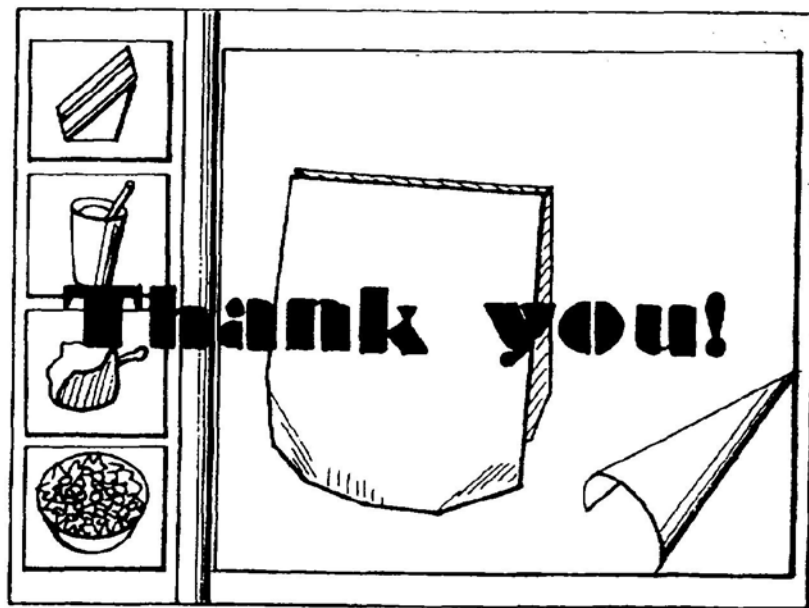


FIG. 23A

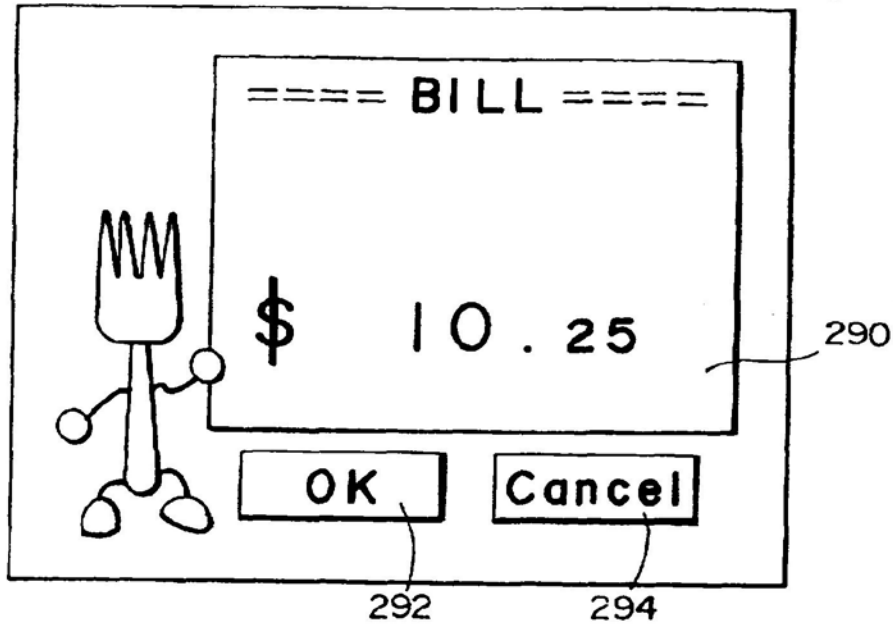


FIG. 23B

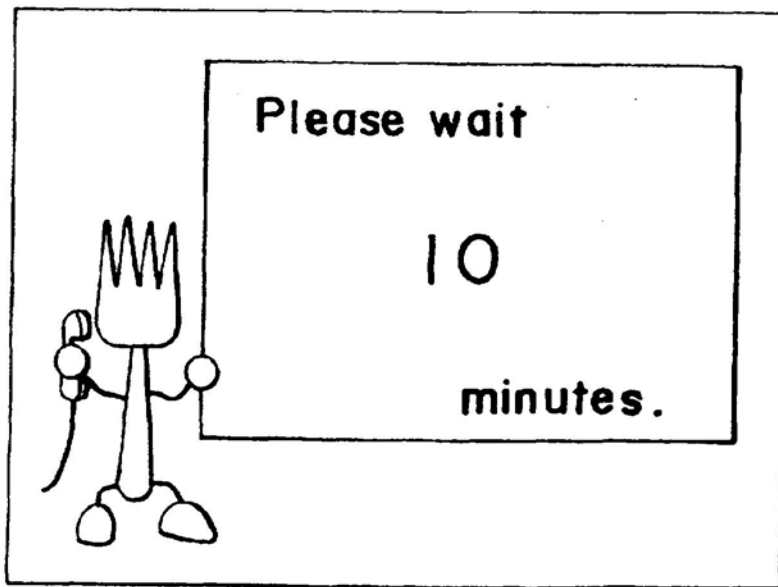


FIG. 24

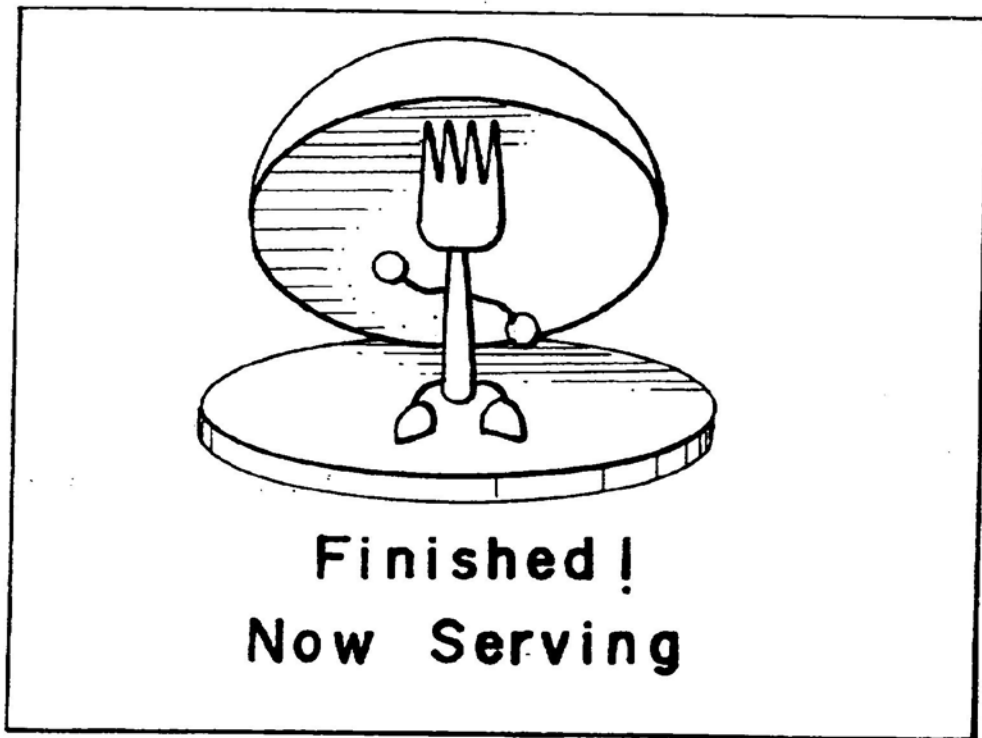


FIG. 25

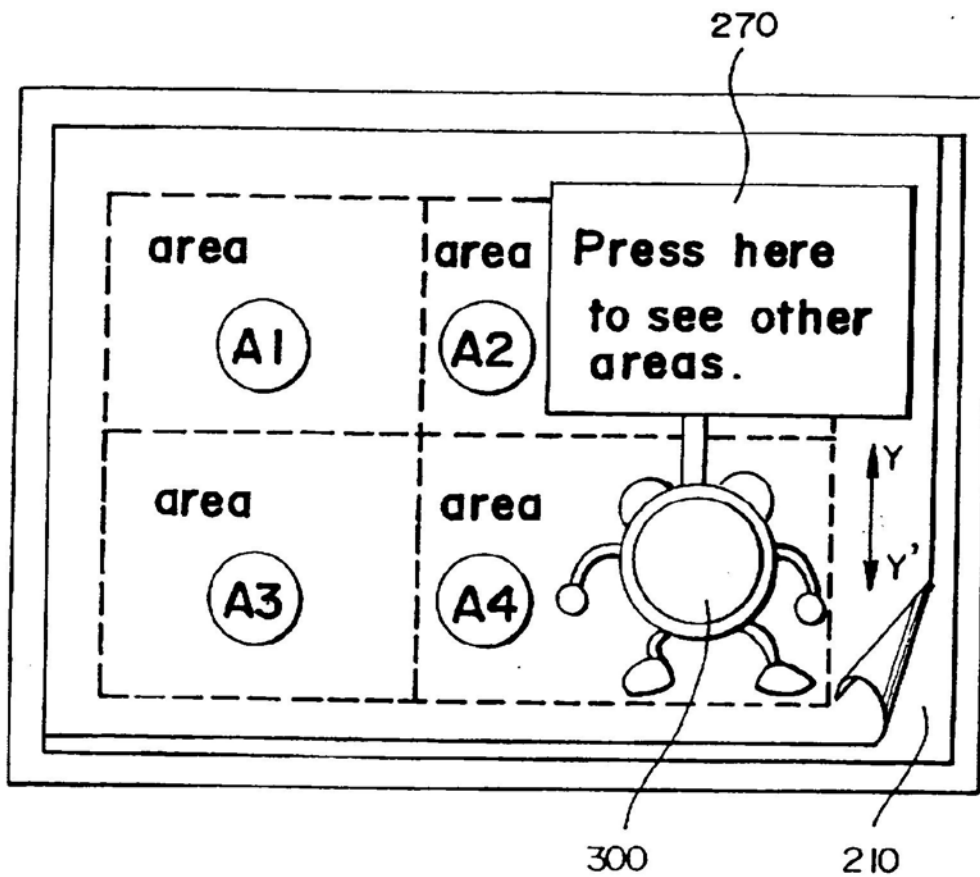
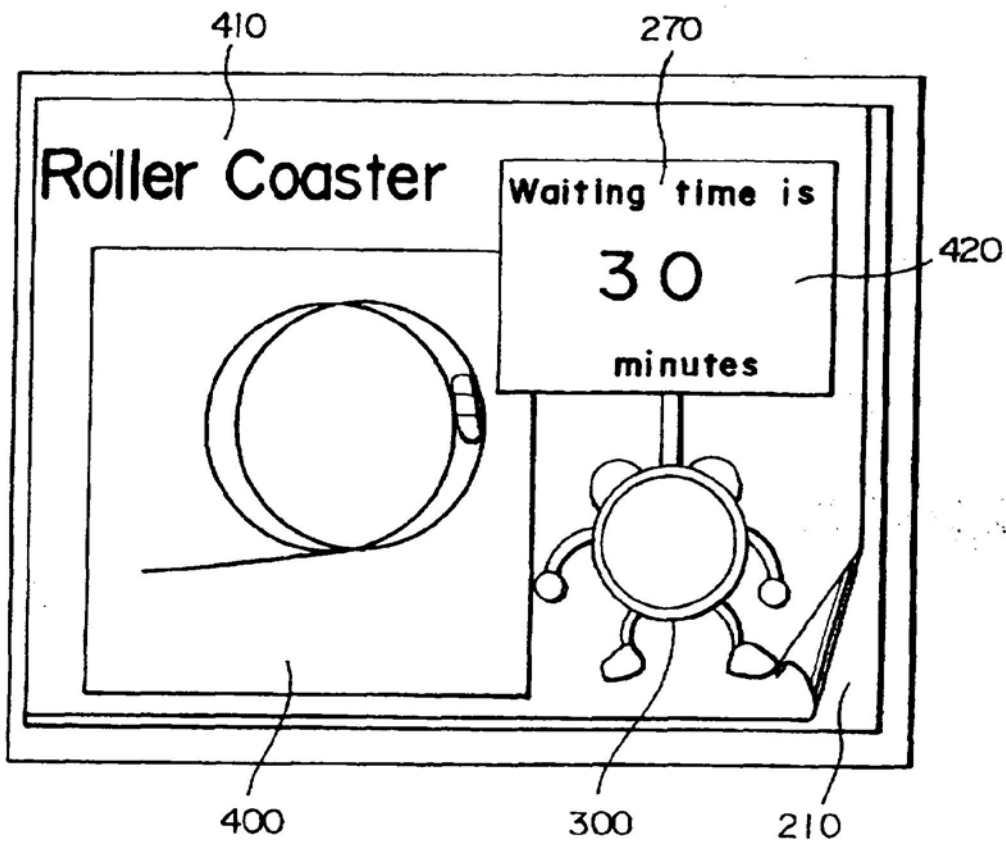


FIG. 26



TERMINAL DEVICE

BACKGROUND OF THE INVENTION

The present invention relates to a terminal device, in particular, to a terminal device by which a user can transmit data while viewing a screen on the terminal device.

DESCRIPTION OF THE PRIOR ART

The system generally used for administering orders in a restaurant or the like is such that a waiter or waitress takes each customer's order and conveys it to the kitchen. However, an order management system of this type has a problem in that the expenses involved in employing waiting staff increases the unit price of the food.

In establishments such as fast-food restaurants that have recently become common, a system is used in which the customer has to approach a counter to order and again to pick up the ordered food.

However, an order management system of that type has a problem in that it places a large burden on customers because they have to return to the counter every time they order, and they have to wait in line at the counter if the restaurant is busy.

In order to solve these problems, the use of an order management system has been considered in which a main piece of management equipment for order management (a host computer) is combined with a plurality of terminal devices for ordering that are provided at the customers' tables. Since this order management system makes it possible for a customer to make an order while viewing image data for ordering that is displayed on a terminal device, and the resultant order can be processed by the main management equipment, it can solve both of the previously mentioned problems concerning staff expenses and the load on the customers.

Unfortunately, it is not possible for a customer to obtain a good visualization of the dishes available for order, simply from an order list displayed on a terminal device. In such a case, a problem occurs in that customers become reluctant to use this system to order food.

SUMMARY OF THE INVENTION

In the light of the above described problems, a first objective of the present invention is to provide a terminal device which can manage with only a small quantity of data to transfer, and which enables a user to input data to be transferred in an easy-to-understand fashion.

Another objective of the present invention is to provide a terminal device which is capable of transferring interactive data to and from another device, wherein this data is easy for a user to understand and is also small in quantity.

A further objective of the present invention is to provide a terminal device which is capable of responding flexibly to changes in the image data used for data transfer management.

In order to achieve the above objectives, a first aspect of the present invention relates to a terminal device for transmitting data to another device, comprising:

input means;

display means;

storage means for storing image data for a data transmission management screen wherein at least part of the image data is presented as a dynamic image, and an operating program for reproducing the image data in

accordance with predetermined rules and managing data transmission; and

computation control means for managing data transmission;

wherein the computation control means, comprises:

image displaying means for reading the image data and displaying a data transmission management screen on the display means based on the operating program; and

control means for generating transfer data based on the operating program and input from the input means in response to the data transmission management screen, and managing the transmission of data to the other device.

In accordance with the terminal device of the present invention, a data transmission management screen is displayed on the display means to enable a user to visually verify the details of data to be transmitted to another device and the procedure required for transmitting this data.

In particular, since part of the data for these management screens is presented as a dynamic image, this aspect of the invention makes it possible to use dynamic animations and cartoon characters to express the data transmission procedure and details of this data in a visual form that is easy for a user to understand.

The user can easily input data from the input means in response to this data transmission management screen, while receiving visual confirmation of this data to be transmitted. The thus-input data is sent as transmit data to the other device.

From the above description, it is clear that the terminal device in accordance with this aspect of the invention displays the relationship between the displayed screens and the data to be transmitted, so that the user can check the details of the data to be sent and the operating sequence for sending this data in a visual, easy-to-understand manner, and thus the terminal device is extremely convenient to use.

Moreover, since the basic concept of this terminal device is such that the image data itself is not transmitted during data transfer, only data relating to that image data is transmitted, the quantity of data transferred is small and thus the data can be transmitted rapidly.

A second aspect of the present invention relates to a terminal device for transferring interactive data to and from another device, comprising:

input means;

display means;

storage means for storing image data for a data transmission management screen wherein at least part of the image data is presented as a dynamic image, and an operating program for reproducing the image data in accordance with predetermined rules and managing data transmission; and

computation control means for managing data transmission;

wherein the computation control means, comprises:

image displaying means for reading the image data and displaying a data transmission management screen on the display means based on the operating program; and

control means for generating first order data based on the operating program and an input from the input means in response to the data transmission management screen, transmitting the first data to the other device, and managing to display a screen with details corresponding to interactive second data on the

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image displaying means based on the second data received from the other device.

The terminal device of this aspect of the invention enables the interactive transfer of data to and from another device, in a manner that is easy for the user to understand and requires little data.

This terminal device is particularly characterized in that at least part of a data transfer management screen is presented as a dynamic image such as an animation. This makes it possible to manage the transfer of data that is visually easy for the user to understand, and thus enable the implementation of a terminal device that is extremely easy for the user to understand and use.

In a third aspect of the present invention:

the image data is image data for an order management screen;

the operating program reproduces image data for order management in accordance with predetermined rules and manages data transmission for order management; the image displaying means reads out the image data based on the operating program and displays the order management screen on the display means; and

the control means generates order management data based on the operating program and an order input from the input means in response to the order management screen, and controls the transmission of the order to the other device.

In a fourth aspect of the present invention:

the image data is image data for an order management screen;

the operating program reproduces image data for order management in accordance with predetermined rules and manages data transmission for order management; the image displaying means reads out the image data based on the operating program and displays the order management screen on the display means; and

the control means generates first order management data based on the operating program and an order input from the input means in response to the order management screen, transmits the first order management data to the other device, and manages to display an order management screen with details corresponding to interactive second data on the image displaying means based on the second data received from the other device.

In accordance with this aspect of the invention, since the user can input an order while viewing an order management screen wherein at least part is presented as a dynamic image, an order-taking terminal device can be implemented that is extremely easy to understand and convenient to use.

In particular, this aspect of the invention makes it possible to transfer data for order management in an interactive form to and from another device. Thus, when food has been ordered, for example, data communications can be used to inform the user that the ordered food is ready. In addition, if the user orders the fetching of predetermined data, the thus ordered data can be received from the other end of the system.

In a fifth aspect of the present invention:

the input means is a touch-sensitive panel disposed on the display means in a predetermined mutual relationship with the management screen.

Disposing a touch-sensitive panel on the display means in a predetermined mutual relationship with the management screen in this manner enables the user to input order data easily, merely by touching a predetermined position on the displayed order management screen. This makes it possible to implement a terminal device that is convenient for a user to use.

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In a sixth aspect of the present invention:

the image data displays a menu screen representing a plurality of management categories as the management screen.

Displaying the management screen as a menu screen in this manner makes it possible to implement a terminal device that is even more convenient to use.

In this regard, it is preferable that management details, such as details of the data to be sent, are displayed on the menu screen by using readily understandable animations or photographs.

In a seventh aspect of the present invention:

the storage means stores image data for an order menu screen representing a plurality of ordering categories as the management screen; and

the control means converts an ordering category selected by the input means into code data and transmits the code data as the first data, and displays an order management screen with details which are code data received as the second data from the other device on the image displaying means.

The terminal device of this aspect of the present invention enables the input of data to be transmitted by simply selecting a desired ordering category, thus making it possible to implement a terminal device that is extremely convenient to use.

In particular, since the transmitted data is transferred to and from the other device in a converted form as code data, the terminal device of this aspect of the invention has the advantage of managing with an extremely small quantity of data to be transferred.

In an eighth aspect of the present invention:

the storage means stores a plurality of sets of the image data and operating programs; and

the control means manages data transmission based on remaining sets of image data and operating program during a waiting time during which data transmission is being managed based on a predetermined set of image data and operating program.

In accordance with this aspect of the terminal device of the present invention, another data transfer management operation can be performed during the waiting time of a predetermined data transfer management operation, so that the user can make use of the waiting time to transfer other data effectively.

In a ninth aspect of the present invention:

the storage means stores a plurality of sets of the image data and associated display operating programs for product ordering and information ordering; and

the control means performs ordering control based on image data for information ordering and an associated display operating program from a time at which the first code data is transmitted until when the second code data is received, during ordering control based on image data for product ordering and an associated operating program.

It often happens that the time required to transfer an order for information through a circuit and receive that information is shorter than the time taken between placing the order for a dish until the food is ready. This aspect of the invention makes use of the waiting time that occurs when a product such as a food dish is being ordered, between the ordering of the dish and the time that the food is ready, to provide ordering control for information. This ensures that the user does not waste this waiting time, and can use it efficiently to obtain other information.

In a tenth aspect of the present invention: the control means comprises means for writing into the storage means the image data and an associated display operating program which are received from the other device.

The terminal device in accordance with this aspect of the present invention receives image data and an associated operating program for a screen to be displayed from an external apparatus, and controls the writing of this data into the storage means. In other words, the image data and operating program that arrive from the external apparatus are in an over-writable form.

Since the present invention makes it possible to respond rapidly to changes in the images to be displayed, it enables the implementation of a terminal device that is extremely applicable to a wide range of applications and is convenient to use.

It is preferable that this transfer and writing of the image data and operating program is performed during a time band in which the terminal device is not usually in use.

In a eleventh aspect of the present invention: the image data displays hierarchical menu screens representing a plurality of management items as the management screen.

The use of hierarchical menus in this manner makes it possible to utilize a limited display space efficiently and display screens that are easy for the user to understand.

In a twelfth aspect of the present invention: the image data includes transmission items divided into a number of major categories according to type, items belonging to each of the major categories further divided into a tree structure within that major category, so as to display order management menu screens are displayed in a hierarchy; and

the operating program displays a menu screen representing items in a level next to a hierarchical level corresponding to one of root and node portions of the displayed tree structure, the next level belonging to a category selected by a user from categories of the hierarchical level, and the operating program switches menu screens representing each of items belonging to a same leaf portion of the tree structure to display a menu screen based on screen changing order from the second control means.

In a thirteenth aspect of the present invention: display contents of each item belonging to a hierarchical level corresponding to the one of root and node portions is an image acting as an index representing the contents of the item, at least parts of the index data function as icons; and

the image displaying means displays a menu containing the item corresponding thereto when one of the icons is selected by means of the input means.

Displaying parts of the menu screen as icons in this manner makes it possible to provide an input operation that is even more convenient for the user to use.

In a fourteenth aspect of the present invention:

the image displaying means identifies and displays a selected icon and a non-selected icon.

Displaying highly recognizable icons in this manner makes it possible to provide the user with an accurate input operation.

In a fifteenth aspect of the present invention:

the image displaying means displays a display change area on a screen and switches the image which is displayed when the display change area is selected by

the input means so as to display plurality of items corresponding to a leaf portion of the tree structure.

This makes it possible to switch smoothly between hierarchical menu screens.

In a sixteenth aspect of the present invention:

the image displaying means displays explanatory information for explaining details of information displayed on a display screen so as to overlay the display information with the explanatory information, and causes the explanatory information to move so that the contents of the display information in the overlaid area are recognizable.

In other words, at least part of a data transmission management screen in the terminal device of the present invention is presented as a dynamic image. When explanatory information for explaining details of information displayed on the display screen is presented as a dynamic image that overlays the information on the display screen in this manner, it is preferable that the explanatory information is made to move to ensure that the display information in the overlaid area can be seen. This makes it possible to provide an image display that is even easier for the user to understand.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an explanatory view of the order management system of a preferred first embodiment of the present invention;

FIG. 2 is a functional block diagram showing the specific configuration of the order-taking terminal device in the system of FIG. 1;

FIG. 3 is a flowchart of the operation of the order-taking terminal device;

FIG. 4 is a detailed flowchart of the operation of the order-taking terminal device FIG. 4 consist of FIGS. 4A and 4B;

FIG. 5 is a flowchart of the operation of the on-site POS system;

FIG. 6 is an explanatory view of the display screen of the order-taking terminal device;

FIG. 7 is another explanatory view of the display screen of the order-taking terminal device;

FIG. 8 is yet another explanatory view of the display screen of the order-taking terminal device;

FIG. 9 is an explanatory view of the order screen of the order-taking terminal device;

FIG. 10 is another explanatory view of the order screen of the order-taking terminal device;

FIG. 11 is yet another explanatory view of the order screen of the order-taking terminal device;

FIG. 12 is an explanatory view of the order management system of another embodiment of the present invention;

FIG. 13 is a functional block diagram of the terminal device used in the order management system of FIG. 12;

FIG. 14 is an explanatory view of the operation of the tree structure of hierarchical menu screens used in the system;

FIG. 15 is a flowchart of the operation of the order management system of the second embodiment of the present invention;

FIG. 16 is another flowchart of the operation of the second embodiment;

FIG. 17 is an explanatory view of the menu structure of the second embodiment;

FIGS. 18A and 18B are explanatory views of a basic menu screen and a basic information menu screen of the second embodiment respectively;

FIG. 19 is an explanatory view of a basic food menu screen;

FIG. 20 is an explanatory view of a menu selection screen;

FIG. 21 is an explanatory view of an order screen;

FIG. 22 is another explanatory view of an order screen;

FIGS. 23A and 23B are explanatory views of a total charge screen and waiting time display screen respectively;

FIG. 24 is an explanatory view of an order-ready message screen;

FIG. 25 is an explanatory view of a basic ride menu screen; and

FIG. 26 is an explanatory view of a display screen for ride information.

DESCRIPTION OF PREFERRED EMBODIMENTS

Preferred embodiments of the present invention will now be described with reference to the accompanying drawings.

First Embodiment

A first preferred embodiment of the present invention is shown in FIG. 1. This order management system controls orders at a restaurant located at a site such as an amusement park. Specifically, it is configured to comprise an on-site (i.e., installed at the restaurant) point-of-sales (POS) system 10 that functions as a main piece of management equipment for order management and a plurality of order-taking terminal devices 40-1, 40-2 . . . located on each of the tables 30-1, 30-2 . . . of the restaurant.

This on-site POS system 10 is connected by a line 29 to a host computer (not shown in the figure) at the head office of the restaurant chain that handles all of the restaurants. A network is configured of the head-office host computer and a host computer 20 at each restaurant.

The POS system 10 is configured to comprise the host computer 20, an input-output terminal device 22 that functions as an input-output means, and a register 24 that keeps track of all money transactions. This POS system 10 uses an RF module 26 as a relay terminal to keep in contact with the order-taking terminal devices 40-1, 40-2 . . . on the tables 30 within the restaurant.

The host computer 20 is configured to comprise a memory 28. Programs that enable the on-site host computer 20 to function as a main piece of management equipment for order management are stored in this memory 28.

In addition, an operating program and image data for order screens are stored in the memory 28 for the order-taking terminal devices 40. That is to say, this memory 28 also functions as storage means for data to be transferred to the terminal devices 40.

In this case, the operating program and image data are generated to enable order management of the food served at this restaurant.

The operating program and image data for order screens that are stored in the memory 28 for the terminal devices are read out when the system starts up, then are transferred to each of the order-taking terminal devices 40-1, 40-2 . . . via the RF module 26.

When an order is placed from one of the order-taking terminal devices 40, the on-site POS system 10 temporarily stores details of that order in the memory 28 and also outputs a printout of the order from the input-output terminal device 22. If this restaurant is a fast-food restaurant, when an order

is received, details of that order are processed at the register 24 to compute the bill, then those details are output as a printout from the input-output terminal device 22.

When the ordered food has been prepared, the restaurant staff inputs notice data that the ordered food is ready to the on-site POS system 10 by means of the input-output terminal device 22. When this input is performed, the host computer 20 sends an order-ready message to the order-taking terminal device 40 on the corresponding table 30, as second data.

When an order for information is input from one of the order-taking terminal device 40, as will be described later with reference to a second embodiment of the present invention, the on-site POS system 10 temporarily stores the contents of that order in the memory 28. If the thus-ordered information is already in the memory 28, that information is transferred as second data to the appropriate order-taking terminal device 40. If the thus-ordered information is not already in the memory 28, the POS system 10 asks the head-office host computer (not shown in the figure) for the required information, and that information is transferred as second data to the appropriate order-taking terminal device 40.

The configuration of the order-taking terminal device 40 that is placed on each table is shown in FIG. 2. This order-taking terminal device 40 comprises a liquid crystal display screen 42 and a transparent touch-sensitive panel 44 placed on this display screen 42, and is configured in such a manner that a customer can operate the touch-sensitive panel 44 while viewing order screens displayed on the display screen 42. This order-taking terminal device 40 is also provided with a speaker 46 configured in such a manner that messages such as those relating to the operating sequence and order confirmation messages can be output audibly therefrom.

The configuration is such that the inputting of an order is facilitated by the touch-sensitive panel 44, whereby touch sensors are arranged in a predetermined mutual relationship with the products that can be ordered on the order menu screen that is displayed on the screen 42.

This order-taking terminal device 40 is configured to comprise an RF transceiver unit 48, a CPU 50, RAM 51, ROM 52, a receive data storage section 54, an image processing IC 56, and video RAM 58. The image processing IC 56 is configured to display an order screen on the display screen 42 via the LCD interface IC 60 and also to output audio signals from the speaker 46 via audio circuitry 62.

This order-taking terminal device 40 is also configured to transmit and receive data through a wireless communications circuit formed between the RF transceiver unit 48 and the RF module 26 of FIG. 1.

A basic operating program is stored as firmware in the ROM 52 to provide basic control over the entire apparatus.

This basic operating program is configured to control the entire apparatus on the basis of data such as inputs from the touch-sensitive panel 44, and also control functions such as the transfer of data to and from the POS system 10. This basic operating program also comprises a program for writing the image data and operating program received from the host computer 20 into the receive data storage section 54.

When the order-taking terminal device 40 receives the operating program and image data for order screens from the on-site POS system 10 at start-up, the CPU 50 writes the thus received operating program and image data into the receive data storage section 54 on the basis of this basic operating program. In other words, the CPU 50 functions as a data write means.

In this case, the receive data storage section 54 could be configured by using various different types of writable memory. For example, it could be configured by using graphics memory, SRAM, PSRAM, flash memory, or a hard disk, as required.

The operating program stored in the receive data storage section 54 is basically configured as programs that display this image data in accordance with predetermined rules and also send and receive data for order management.

The image data of this embodiment is configured of data for a plurality of menu screens in a hierarchical structure, with data for each of these menu screens being stored beforehand at predetermined addresses. In order to display the contents of the menus in an easy-to-understand form on the menu screens, the configuration is such that a cartoon character (a certain "Mr. Fork" 300, as will be described later) appears as a dynamic image on each screen. Data for this cartoon character information is also stored at predetermined addresses. Note that the receive data storage section 54 is used actively as a character generator. In order to enable several cartoon characters to move freely on the screen, data for a plurality of cartoon characters could be pre-stored in the storage section 54 as part of the image data.

It should also be noted that each of these menu screens and the cartoon character data comprises both written captions and audio data.

The image processing IC 56 reads out image data from the receive data storage section 54 in accordance with control commands from the CPU 50 and the operating program stored in the receive data storage section 54. It then puts together screen data for the menu screen and writes it to the video RAM 58, and also displays the screen data stored in the video RAM 58 on the screen 42, via the interface IC 60.

In other words, in the terminal device of this embodiment, the CPU 50 performs predetermined computations for control on the basis of the basic operating program and the operating program stored in the receive data storage section 54, then outputs the thus computed control codes to the image processing IC 56.

If, for example, a user doesn't input anything through the touch-sensitive panel 44, a control code representing that fact is input to the image processing IC 56. This causes the image processing IC 56 to put together a first-level menu screen from amongst the plurality of menu screens in the hierarchy and display it on the screen 42.

If the user does input something through the touch-sensitive panel 44, the CPU 50 outputs the corresponding instruction as a control configuration to the image processing IC 56. This causes the image processing IC 56 to put together image data that is stored in the receive data storage section 54 in accordance with the operating program and display it on the screen 42.

That is to say, when a user selects certain information from the touch-sensitive panel 44, the CPU 50 outputs a control signal to the image processing IC 56 on the basis of the resultant signal from the touch-sensitive panel 44. The image processing IC 56 reads out information from in the receive data storage section 54 on the control signal, and displays the thus read-out contents on the screen 42. If there is audio data available, it also outputs this audio data from the speaker 46 via the audio circuitry 62. Thus a display and audio output is performed to correspond to the order selected by the user through the touch-sensitive panel 44.

The distinctive characteristic of this embodiment lies in the manner in which an operating program and image data that is stored in the receive data storage section 54 of the

order-taking terminal device 40 is sent from the on-site POS system 10 when the order management system starts up. This ensures that the order management system can respond rapidly to variations such as changes and additions to the menu.

Note that, although the on-site POS system 10 that configures the main management equipment and the order-taking terminal devices 40-1, 40-2 . . . in the system shown in FIGS. 1 and 2 were described by way of example as being connected by wireless communications circuitry, other configurations could be considered such as one in which the on-site POS system 10 and the order-taking terminal devices 40-1, 40-2 . . . are connected via a gateway 34 provided on a network, as shown in FIG. 12. In such a case, this gateway 34 acts as an interface between the terminal devices 40, the network, and the main management equipment (host computer) 10.

An example of a terminal device 40 used in this case is shown in FIG. 13. Note that components corresponding to those in the terminal device of FIG. 2 are given the same reference numbers and further description thereof is omitted.

As will be described later, the CPU 50 functions as a data write means. When image data and operating program that is sent from the on-site POS system 10 is received through an interface 49, a switching means 53 is controlled to a side a for a write mode and the thus received data is written to the receive data storage section 54 for storage therein.

The configuration is such that, when this write ends, the switching means 53 is controlled to switch to a side b for a read mode, and a sequence of order management actions occurs on the basis of the thus written image data and operating program.

Flowcharts of the detailed operation of the order-taking terminal device 40 are shown in FIGS. 3 and 4. FIG. 4 consists of FIGS. 4A and 4B.

The order-taking terminal device 40 is always set to an idle state when the system starts up, as shown in FIG. 3 (step 100). During this idle state (step 100), the operation cycles through steps 102, 104, 106, and 107 shown in FIG. 4 at fixed intervals.

In step 102, a demo screen such as that of the restaurant's logo is shown on the display screen 42 for a fixed time, as shown in FIG. 6.

In step 104, a demo screen used for explaining the functions of the system is displayed as shown in FIG. 7. At this point, a cartoon character called Mr. Fork 300 appears. This Mr. Fork 300 moves around the screen and describes the operation of the various screens both in writing and audibly.

Next, in step 106, an order-taking demo screen appears as shown in FIG. 8. Mr. Fork describes the customer to press the "Hungry?" display area (or rather, a touch sensor provided over the "Hungry?" display area) 310. If the "Hungry?" display area 310 is not pressed within a fixed time, a time-out occurs (step 107) and the sequence of steps 102 to 106 is repeated.

If the customer did touch the "Hungry?" display area 310 during step 106, the flow proceeds from the idle state of step 100 to a menu screen display processing state of a step 110. This step 110 comprises steps 112, 114, 116, and 118 of FIG. 4.

First of all, in step 112, the menu screen shown in FIG. 9 appears on the display screen 42. In this menu screen, Mr. Fork 300 describes lists 200-1, 200-2, 200-3, and 200-4 of four types of food that can be ordered. If the customer

presses one of the display areas of these lists 200-1 to 200-4, a selection signal for that type of food is input from a touch sensor provided over that portion (step 112).

Assume that the display area over the burger food list 200-1 has been touched. In that case, a menu screen for ordering burgers appears on the display screen 42, as shown in FIG. 10. Of the frames around the food display areas 200-1 to 200-4 down the left side of this screen, only the area 200-1 changes color to identify it, to indicate that the burger menu screen is currently displayed (step 114-1).

If a number of types of burger are available for ordering, a page-turning area 210 is also displayed at the bottom right corner of the screen to enable the customer to see the next burger menu screen by touching this area 210.

In each of these menu screens, a price is displayed along the bottom of the screen. When a burger appears that the customer would like to order, he or she can touch an order area 220 on the screen. This ensures that a burger selection signal corresponding to a touch sensor provided at a position over this area 220 is input to the CPU 50 (step 116-1).

If the customer orders chicken in step 112, the menu shown in FIG. 11 appears on the display screen 42 (step 114-2) so that the customer can select a desired chicken dish from a number of chicken menu screens in a similar manner to that described above.

In this manner, a food such as a burger or chicken is selected and ordered. To make a further order at the same time, such as that of a beverage such as coffee or another item, the customer can touch another order area 200 on the menu screen shown in FIG. 10 or 11 to select it. This enables the customer to combine a number of orders (step 118).

Once a sequence of orders has been completed in this manner, the customer touches a computation button display area 230 that is displayed on each menu screen as shown in FIGS. 10 and 11.

This changes the flow in FIG. 3 from the menu screen display processing step 110 to a confirmation screen display step 120, and a list of the products ordered and the total bill appears on the screen together with selection buttons for additional orders, cancellation, and order-confirmation.

Once the customer has checked that this order is correct, by looking at this confirmation screen, he or she touches the order-confirmation (OK) button.

This causes the order data to be sent from this order-taking terminal device 40 via the RF transceiver unit 48 to the on-site POS system 10, where it is written to the memory 28 in the host computer 20 (step 130).

When this data transfer has ended (step 140), the order-taking terminal device 40 returns to the idle state (step 100) of FIG. 3 and starts the previously described process of inducing orders.

A flowchart of the operations of the on-site POS system 10 is shown in FIG. 5.

When the order management system starts up (step 160), it communicates with the head-office host computer (step 162) to receive various items of data relating to the day's menu, and it also receives an operating program and image data for order screens for use by the order-taking terminal devices 40 and writes them to the memory 28 in the on-site POS system.

Subsequently, the on-site POS system 10 sets and stores the new operating program and image data in the order-taking terminal devices 40-1, 40-2 . . . on the tables 30-1, 30-2 . . . within the restaurant, by sending the operating program and image data for order screens that are stored in the memory 28 to the terminal devices 40-1, 40-2 . . . (step 164).

This enables the order management system of the present invention to respond flexibly to additions and modifications to the menu, since the operating program and image data are distributed to the order-taking terminal devices 40 as appropriate when the system starts up.

Subsequently, the on-site POS system 10 is controlled in the idle state (step 168), it can communicate with the head-office host if necessary (step 170), and it can also perform register processing such as sales management with the register 24 (step 172).

While the system is in this idle state (step 168), if order data is received from any order-taking terminal device 40 (step 174) in the manner described above, the flow proceeds to the step of processing that order (step 176). If this is a fast-food restaurant, register processing (step 178) is performed immediately after the processing of step 176, then a list of the products ordered together with the total price is printed out (step 180). If this is an ordinary restaurant, this printout is processed (step 180) after the order has been processed (step 176).

In this manner, the on-site POS system 10 is designed to accept orders from the order-taking terminal devices 40 within the restaurant and also perform the appropriate register processing.

When the products that have been ordered have been prepared, the restaurant staff use the input-output terminal device 22 to input an order-ready message, whereupon that message is sent by wireless means from the on-site POS system 10 to the appropriate order-taking terminal device 40, causing an indication to appear on the screen of that order-taking terminal device 40. This enables the customer to determine immediately that the ordered food is ready and can be picked up. Therefore, an order management system can be implemented in such a manner that both customers and staff find it extremely convenient to use, since customers can relax in their own seats during the time between the placing of each order and when the food is ready, and thus do not have to wait in line to order and pick up their food.

A particularly preferable configuration of the system of this embodiment is such that data transferred interactively between the order-taking terminal devices 40 and the on-site POS system 10 (such as ordering data sent from a terminal device 40 to the POS system 10 and message-display data sent from the POS system 10 to each of the terminal devices 40) is transferred as coded data. This makes it possible to reduce the amount of interactive data that is transferred and thus enable efficient data transfer.

The system of this embodiment also causes a cartoon character such as Mr. Fork 300 to appear within each menu screen so that information necessary to the user can be conveyed in an easy-to-understand form. In other words, the provision of this animated cartoon character makes it possible to convey to the user details such as the contents of each item in the menu screens and how to operate these menu screens, in a visually comprehensible form.

Second Embodiment

A second embodiment of the present invention will now be described in detail.

The first embodiment of the present invention was described by way of example as being applied only to the order management of a food menu in a restaurant. This second embodiment, however, is characterized in that it is configured to provide order management of information, not just of the food menu in the restaurant.

In other words, the system of this embodiment is characterized in that image data and an associated operating

system for the order management of a food menu are stored in the memory 28 of the on-site POS system 10 of FIG. 1 together with image data and an associated operating system for the order management of information. When this system starts up, a plurality of sets of image data and operating programs are sent from the on-site POS system 10 to the terminal devices 40-1, 40-2 . . . , and the thus-transferred data is written into and stored in the receive data storage section 54 of each of the order-taking terminal devices 40.

An outline of the operation of each terminal device 40 is shown in the flowchart of FIG. 15.

First of all, when the system has started up and the transfer and writing of the image data and operating programs from the POS system 10 to the order-taking terminal devices 40-1, 40-2 . . . has ended, a basic menu screen such as that shown in FIG. 18A appears on the display screen 42 of each of the order-taking terminal devices 40 (step S200).

A food menu selection button 400 and an information menu selection button 500 are displayed on this basic menu screen, with a transparent touch-sensitive panel 44 positioned over each display area.

If a customer sitting at one of the seats in the restaurant views the display screen of the terminal device 40 provided at that table and touches the food menu selection button 400 with a finger, a corresponding input signal is input to the CPU 50 from the touch-sensitive panel 44. This causes a predetermined instruction to be sent from the CPU 50 to the image processing IC 56, the image processing IC 56 calls up image data from the receive data storage section 54 on the basis of this instruction, and the basic menu screen for food is displayed as shown in FIG. 19 (step S210).

A row of major list categories 200-1 to 200-4 of products that can be ordered from the food menu is displayed on the left side of this basic menu screen. Icons are displayed as animated or photographic images in the display areas for these categories 200-1 to 200-4, to act as an instantly recognizable index to the contents of these categories (such as sandwiches, beverages, chicken dishes, and salads).

Written captions 262, 264, 266, and 268 of each of the categories are displayed beside each category in main part of the screen to the right of these categories 200-1 to 200-4. These written captions 262 to 268 are arranged in such a manner that "Sandwiches" is displayed for category 200-1, "Drinks" for category 200-2, "Chicken" for category 200-3, and "Salads" for category 200-4.

A dynamic cartoon character 300 is also displayed in such a manner as to partially overlay the written captions 262 to 268, and a sign 260 held by this cartoon character 300 bears the written notice: "To switch between each category, press the icons."

To request menus that are not currently displayed, the customer can touch the area of the sign 260 to display the next page of the menu which is a screen of the same configuration as that of FIG. 19.

It should be noted that parts of the written captions 262 to 268 that are overlaid by the cartoon character 300 and the sign 260 ("Drinks" and "Chicken" in this figure) will be obscured if the character stays in a fixed position without moving. Therefore, the cartoon character 300 and the sign 260 are made to move in a circuit up and down the screen, to make hidden captions visible. This enables efficient use of a limited display area.

From consideration of the size of the display screen and size of area that a user can be expected to touch easily, it is preferable to display about four items per screen as the major

categories 200-1 to 200-4 of the food menu. Each of these categories 200-1 to 200-4 also functions as an icon, and information relating to a category is displayed on the screen when the user touches the associated icon.

For example, if the user touches the sandwich category 200-1, a menu screen similar to that of FIG. 20 is displayed.

Note that the category 200-1 that is currently selected is displayed with a different background color within its frame, to distinguish it from the other categories 200-2 to 200-4.

More specifically, all of the categories 200-1 to 200-4 have the same background color (represented by hatching in this figure) before any selection is made (the state shown in FIG. 19). However, if category 200-1 is touched, the color of that category 200-1 changes (represented by a dotted pattern in FIG. 20) while the color of the other categories 200-2 to 200-4 remain the same. This process of having a different color within the frame of a specified category can equally well be reversed so that the selected category 200-1 remains the same color, but the color of the other categories 200-2 to 200-4 is changed.

Note that FIG. 20 shows the display that appears when the sandwich category 200-1 is specified, in which case an animated image 282 of a ham sandwich that is representative of the selected category 200-1 is displayed in the area to the right of the figure. At the same time, a written caption 280 giving the product name "Ham Sandwich" and another written caption 284 giving the price are also displayed in addition to the animated image 282 of the ham sandwich. The cartoon character 300 is also displayed on this screen, together with a sign 270 on which is written "Press here to order this food." A computation button 230 on which is written "Bill" is also displayed on the screen, to prompt computation of the bill. If the user wishes to order, he or she touches the area of the sign 270 and then touches the computation button 230.

The menu structure of these categories 200-1 to 200-4 is shown in FIG. 17. Taking the sandwich menu as an example, the configuration is such that there are three menu screens, one for each of three different types of sandwich. The first menu screen could display a salad sandwich; the second menu screen, a ham sandwich; and the third menu screen, an egg sandwich, for example. Similarly, a number of menu screens are configured to display details of each of a number of different choices in the other categories, such as drinks, chicken dishes, and salads.

If the sandwich category 200-1 has been selected and the user then touches the sign 270 shown in FIG. 20, a display screen for selecting a number of orders (not shown in these figures) appears so that the user can input a number of orders while viewing this screen. More specifically, if the user presses the specified portion 270 in accordance with the instruction "Press here to order this food," the written caption "Press here to order this food" within the sign 270 could change to show numeric keys 0 to 9 that the customer could use to input a number of orders.

If the customer uses this function to order a predetermined number of ham sandwiches, for example, a series of animations could appear to show the products that have been ordered in a package to go, as shown in FIGS. 21 and 22 (step S216). This enables the user to verify the details of the order visually.

At the point at which the products that have been ordered are shown accommodated within a package, as shown in FIG. 22, a "Thank you" message appears on the screen, then the display returns to the menu selection screen of FIG. 20 (steps S212 and 214).

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A user that does not want a ham sandwich could press the page-turning area 210 provided at the bottom right corner of the display screen, whereupon an animated image of a salad sandwich, for example, is displayed instead of the currently displayed ham sandwich. If the page-turning area 210 is pressed again while the salad sandwich is being displayed, another type of sandwich is displayed in sequence, such as an egg sandwich.

In a similar manner, if the category 200-2 was selected, an animated image of a beverage such as orange juice appears first, together with an appropriate written caption, (step S214). If the user doesn't want orange juice and presses the page-turning area 210 provided at the bottom right of the display screen, an animated image of a different type of juice is displayed as second information. Pressing the page-turning area 210 again when this image is displayed causes the next beverage to be displayed, and thus a number of beverages can be displayed one-by-one in sequence.

In this way, the user orders the desired items of food (steps S212, S214, and S216). Once this sequence of orders is completed, the user touches the computation button 230 that is displayed in a manner such as that shown in FIG. 20. This causes a total charge screen such as that shown in FIG. 23A to appear on the display screen 42 (step S218). A written caption 290 indicating the total bill for the products that the user has ordered, an OK button 292, and a cancel button 294 are displayed on this final-total screen. The user then touches the OK button 292 to agree to the bill for this order, or the cancel button 294 to correct the order.

If the OK button 292 is touched, the ordering sequence ends and details of the order (information such as the food name, number of items, total bill, and table number) are sent as code data from the terminal device 40 to the host computer 20 of the POS system 10. The waiting time required until the ordered products will be ready is sent back to that terminal device 40 from the host computer 20 as code data. The time until the ordered food is ready is displayed on the display screen 42 of the terminal device 40 as shown in FIG. 23B (step S220).

When this sequence of processing ends, the flow returns to step S200 and the basic menu screen reappears on the display.

When the food that the user has ordered is ready, an interrupt is sent from the on-site POS system 10 to the user's order-taking terminal device 40, as shown in FIG. 16, and a message saying that the ordered food is ready is sent as code data. When it receives this code data, the terminal device 40 displays a food-ready message such as that of FIG. 24 on the display screen 42 (step S230). This sends an interrupt to the display screen 42 to display a food-ready message, making it possible for the user to be informed accurately that the ordered food is ready, even if the user has selected another screen and the associated operations are being performed, as will be described later.

Note that if the cancel button 294 is touched in step S218, the menu selection screen of FIG. 19 returns to the screen, enabling the user to start the ordering process from the beginning.

Note also that the system of this embodiment is configured in such a manner that, once the ordering from the food menu has ended, the waiting time required until the food is ready can be used to present various items of information about the amusement park, from the basic menu screen displayed on the display screen 42 (step S200). To see this information in such a case, the user touches an information menu selection button 500 from the basic menu screen shown in FIG. 18A.

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This causes a basic information menu screen to appear on the display screen 42, as shown in FIG. 18B, and also causes aural instructions for operating this basic menu screen to be output from the speaker 46 (step S300).

An event menu selection button 510 and a ride menu selection button 512 are displayed on this basic menu screen.

If the user touches the ride menu selection button 512, a basic ride menu screen appears on the display screen 42, as shown in FIG. 25 (step S310).

This basic ride menu screen displays four areas, a first area A1 to a fourth area A4, to represent areas A1 to A4 within the amusement park. In this case, each of the areas displays a simple animated image of a typical ride within that part of the amusement park, such as a roller coaster in area A1 and a Ferris wheel in area A2 (however, these animated images are omitted from the figure). In addition, a cartoon character 300 appears in such a manner as to overlay this area information. A sign 270 held by this cartoon character 300 has a written caption saying "Press here to see other areas," in a similar manner to that of the food menu. To see an area that is not displayed on this screen, the user touches the sign 270 and the next page of information (on four areas from A5 onward) is displayed with the same screen structure. Note that parts of the displayed information that is overlaid by the cartoon character 300 and the sign 270 will be obscured if the character stays in a fixed position without moving, so the cartoon character 300 and the sign 270 are made to move in a circuit along the path Y-Y', to make hidden captions visible. This enables efficient use of a limited display area.

In the same manner as with the food menu, the amount of area information displayed at a time is preferably enough for four areas within one display screen, as shown in FIG. 25, from consideration of the size of the display screen and size of area that a user can be expected to touch easily. Since each of these areas A1 to A4 also functions as an icon, details associated with an area are displayed on the screen if the region of that area is touched. For example, if the region of area A1 is touched, the display shown in FIG. 26 could appear (step S320). Note that the color of the background portion within the frame of the specified item (area A1, in this case) could be made to be different from the color of other items, in the same manner as with the food menu.

Note that FIG. 26 shows the display that appears when area A1 is specified, in which case an animated image that expresses the concept of a roller coaster is shown on the screen in an easy-to-understand form. In addition to an animated image 400 of a roller coaster, the screen also shows a written caption 410 saying "Roller coaster" and another written caption 420 expressing the waiting time as "Waiting time is 30 minutes," together with the cartoon character 300. If the user presses the page-turning area 210 provided at the bottom right of the display screen, an animated image of another ride within the same area A1 is displayed instead of the currently displayed roller coaster. Every time the user presses the page-turning area 210 of the animated image representing a newly displayed ride, animated images of other rides within the same area are displayed one at a time in sequence.

The above description concerned a case in which information relating to the food menu and attractions at an amusement park are displayed, but the present invention can equally well be applied to a case in which a similar method is used to display "Event information" and "Other information" (not shown in the figure). If a user touches a major category such as "Event information" or "Other informa-

tion" in such a configuration, animated images relating to about four items are first displayed to act as an index of the information belonging to that major category. If any one of those four categories is pressed, a first animated image belonging thereto is displayed. If there is another item available within this category, pressing the page-turning area 210 causes a similar second animated image to be displayed, pressing the page-turning area 210 again causes a similar third animated image to be displayed, and so on until all the images have been displayed in sequence by screen switching. Note that the display method in this case is substantially the same as that of the display of the food menu or attractions, so further description thereof is omitted.

In this manner, this embodiment of the invention makes it possible for an order entry system at a restaurant or similar site to display large quantities of multimedia information efficiently within a limited display space, and also display that information in a form that is easy for a user to understand. It also enables the user to perform the input operation easily, based on displayed information.

An example of the structure of hierarchical menu screens that are displayed in this manner is shown in FIG. 14.

In this structure, a plurality of items of multimedia information to be displayed is divided into a number of major categories, one for each type of information, and information within each of these categories is arranged in a tree structure belonging to that category. If one item of information in a hierarchical level corresponding to a root or node of this tree structure is selected, information in the next level belonging to the thus selected information is displayed. If there is a plurality of items of information to be displayed, the selection of one item of this information ensures that the display of information in the next level belonging to the selected information is processed in sequence. At the leaf level of the tree structure, a plurality of items of information corresponding to the selected leaf are switched to display one at a time.

If, for example, roots R1, R2, R3, and R4 in the tree structure of FIG. 14 are made to correspond to the above described second embodiment, root R1 would correspond to "Food menu selection", root R2 to "Event information", root R3 to "Attraction information", and root R4 to "Other information." Note that, in order to simplify the description below, only "Food menu selection" is discussed. Nodes N1, N2, N3, and N4 belonging to root R1 "Food menu selection" correspond to major categories 200-1 to 200-4 of the food menu in this case, as shown in FIG. 19. Similarly, leaves L1, L2, . . . belonging to node N1 of category 200-1, for example, correspond to different types of sandwich in this case, such as ham sandwich and salad sandwich.

The use of a display method of this type makes it possible to display a large quantity of varied information in an easily recognizable form, even if the screen can only display a small amount of space at a time. Since the image information that is displayed is animation information (mainly dynamic images, but a static image could also be used), information that the management particularly wants to attract the user's attention could be made more noticeable by making only the attention-attracting portion a dynamic image, or it could be made even more recognizable by various other contrivances. From the recognizability point of view, it is also preferable that the entire screen is used to display each type one-by-one, to make the images seem bigger. Note that a plurality of images could equally well be displayed simultaneously, within a range in which recognizability is not affected.

With this embodiment, the configuration is such that various types of animation information (image data) to be displayed are stored in the receive data storage section 54 provided in the terminal device 40, the user requests information from the touch-sensitive panel 44, and animation information is read out from an address corresponding to the input from the touch-sensitive panel 44. However, the configuration could be such that information other than this preset animation information is sent from the host computer 20 to each terminal device 40 at fixed intervals. This information could relate to the waiting times for rides or the starting times of events, or it could be information that changes with time such as news about lost property or straying children. The CPU 50 could accumulate the information sent from a central location as latest information in the memory 54 and display it as required.

In this manner, the system of this embodiment is configured in such a manner that animation image data that involves a large quantity of data that would require a long wait to transfer is held within the terminal device, and only information such as that which requires a short wait to transfer or numeric information is transferred to and from the host computer. Moreover, accumulating data from the host computer in the memory of the terminal device ensures that there is normally no need to receive data from the host computer. Thus the system of this embodiment is characterized in that it can be implemented even with an inexpensive network that can transfer only a small quantity of data.

It should be obvious to those skilled in the art that the above described embodiments are merely examples of the application of the present invention, and should not be taken as being limiting. For example, the major categories of this embodiment were specified as being "Food menu selection," "Event information," "Ride information," and "Other information." However, software such as various games could also be incorporated into the system. If the user touches a category of "Games," major categories of a number of games appear and the user can then select a preferred game from amongst these options.

In addition, although the above embodiments concerned examples in which the present invention was applied to order management in a restaurant, it should be obvious that the present invention is not limited thereto and various other embodiments can equally well be applied to other environments.

For example, the order-taking terminal devices 40 shown in FIG. 1 could be disposed at customers' seats at a sports ground such as a baseball stadium or soccer stadium, with the POS system 10 being located at a central product distribution center. The configuration could be such that, when an order is received from one of the order-taking terminal devices 40, the operator of the POS system 10 instructs the nearest vendor to that customer's seat to deliver the ordered products.

The order management system of the present invention is not necessarily applicable to a baseball stadium as described above; it can equally well be applied to another place of entertainment such as a theater. In such a case, the ordering of products from customers' seats in the theater can be facilitated by the provision of an order-taking terminal device at each of the customer's seats.

The order management system of the present invention is not limited to food and beverages in a restaurant as was described above, it can equally well be applied to the ordering of data relating to a popular player or actor in an entertainment site such as a sports ground, baseball stadium, or theater.

In such a case, the ordered data is preferably transmitted by radio from the POS system 10 to the corresponding terminal device 40, and it displayed on the display screen 42 of the terminal device 40.

In addition, if the present invention is applied to an entertainment site such as a baseball stadium or theater, it is not essential to display a menu screen when the system starts up. Advertising images could be displayed on each of the order-taking terminal devices by configuring the system in such a manner that data such as image data for predetermined advertisements is transmitted from the main management equipment to the order-taking terminal devices. This enables the system to respond rapidly to changes and additions to advertisements from sponsors, as well as to changes in the ordering menu.

The above embodiments were also described by way of example as relating to a system in which the on-site pos system and the order-taking terminal devices were connected by wireless circuitry, but they could equally well be connected by cables if necessary.

What is claimed is:

1. A terminal device for transferring interactive data to and from another device, comprising:

input means;

display means;

storage means for storing image data for a data transmission management screen wherein at least part of said image data is presented as a dynamic image, and an operating program for reproducing said image data in accordance with predetermined rules and managing data transmission; and

computation control means for managing data transmission; wherein said computation control means, comprises:

image displaying means for reading said image data and displaying a data transmission management screen on said display means based on said operating program; and

control means for generating first order data based on said operating program and an input from said input means in response to said data transmission management screen, transmitting said first order data to said other device, and managing display of a screen with details corresponding to interactive second data on said image displaying means based on said second data received from said other device; and

wherein said image data is image data for an order management screen;

said operating program reproduces image data for order management in accordance with predetermined rules and manages data transmission for order management;

said image displaying means reads out said image data based on said operating program and displays said order management screen on said display means; and said control means generates first order management data based on said operating program and an order input from said input means in response to said order management screen, transmits said first order management data to said other device, and manages display of an order management screen with details corresponding to interactive second data on said image displaying means based on said second data received from said other device.

2. The terminal device as defined in claim 1, wherein said input means is a touch-sensitive panel disposed on said

display means in a predetermined mutual relationship with said management screen.

3. The terminal device as defined in claim 1, wherein said image data displays a menu screen representing a plurality of management categories as said management screen.

4. The terminal device as defined in claim 1, wherein said storage means stores image data for an order menu screen representing a plurality of ordering categories as said management screen; and

said control means converts an ordering category selected by said input means into code data and transmits said code data as said first order data, and displays an order management screen with details which are code data received as said second data from said other device on said image displaying means.

5. The terminal device as defined in claim 1, wherein said storage means stores a plurality of sets of said image data and operating programs; and

said control means manages data transmission based on remaining sets of image data and operating program during a waiting time during which data transmission is being managed based on a predetermined set of image data and operating program.

6. The terminal device as defined in claim 5, wherein said storage means stores a plurality of sets of said image data and associated display operating programs for product ordering and information ordering, and

said control means performs ordering control based on image data for information ordering and an associated display operating program from a time at which said first order data is transmitted until when said second data is received, during ordering control based on image data for produce ordering and an associated operating program.

7. The terminal device as defined in claim 6, wherein said control means comprises means for writing into said storage means said image data and an associated display operating program which are received from said other device.

8. The terminal device as defined in claim 1, wherein said control means comprises means for writing into said storage means said image data and an associated display operating program which are received from said other device.

9. The terminal device as defined in claim 1, wherein said image data displays hierarchical menu screens representing a plurality of management items as said management screen.

10. The terminal device as defined in claim 9, wherein said image data includes transmission items divided into a number of major categories according to type, items belonging to each of said major categories further divided into a tree structure within that major category, so as to display order management menu screens in a hierarchy; and

said operating program displays a menu screen representing items in a level next to a hierarchical level corresponding to one of root and node portions of the displayed tree structure, said next level belonging to a category selected by a user from categories of the hierarchical level, and said operating program switches menu screens representing each of items belonging to a same leaf portion of said tree structure to display a menu screen based on screen changing order from said control means.

11. The terminal device as defined in claim 10, wherein display contents of each item belonging to a hierarchical level corresponding to said one of root and node portions is an image acting as an index representing the contents of said item, at least parts of said image function as icons; and

said image displaying means displays a menu containing the item corresponding thereto when one of said icons is selected by said input means.

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12. The terminal device as defined in claim 11, wherein said image displaying means identifies and displays a selected icon and a non-selected icon.

13. The terminal device as defined in claim 12, wherein said image displaying means displays a display change area on a screen and switches the image which is displayed when said display change area is selected by said input means so as to display plurality of items corresponding to a leaf portion of said tree structure.

14. The terminal device as defined in claim 13, wherein said image displaying means displays explanatory information for explaining details of information displayed on a display screen so as to overlay said display information with said explanatory information, and causes said explanatory information to move so that the contents of said display information in the overlaid area are recognizable.

15. A terminal device for transmitting data to another device, comprising:

input means;

display means;

storage means for storing image data for a data transmission management screen wherein at least part of said image data is presented as a dynamic image, and an operating program for reproducing said image data in accordance with predetermined rules and managing data transmission; and

computation control means for managing data transmission;

wherein said computation control means, comprises:

image displaying means for reading said image data and displaying a data transmission management screen on said display means based on said operating program; and

control means for generating transfer data based on said operating program and input from said input means in response to said data transmission management screen, and managing the transmission of data to said other device; and

wherein said image data is image data for an order management screen;

said operating program reproduces image data for order management in accordance with predetermined rules and manages data transmission for order management;

said image displaying means reads out said image data based on said operating program and displays said order management screen on said display means; and said control means generates order management data based on said operating program and an order input from said input means in response to said order management screen, and controls the transmission of said order to said other device.

16. The terminal device as defined in claim 15, wherein said input means is a touch-sensitive panel disposed on said display means in a predetermined mutual relationship with said management screen.

17. The terminal device as defined in claim 15, wherein said image data displays a menu screen representing a plurality of management categories as said management screen.

18. The terminal device as defined in claim 15, wherein said image data displays hierarchical menu screens representing a plurality of management items as said management screen.

19. The terminal device as defined in claim 18, wherein said image data includes transmission items divided into a

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number of major categories according to type, items belonging to each of said major categories further divided into a tree structure within that major category, so as to display order management menu screens in a hierarchy; and

said operating program displays a menu screen representing items in a level next to a hierarchical level corresponding to one of root and node portions of the displayed tree structure, said next level belonging to a category selected by a user from categories of the hierarchical level, and said operating program switches menu screens representing each of items belonging to a same leaf portion of said tree structure to display a menu screen based on screen changing order from said second control means.

20. The terminal device as defined in claim 19, wherein display contents of each item belonging to a hierarchical level corresponding to said one of root and node portions is an image acting as an index representing the contents of said item, at least parts of said index data function as icons; and

said image displaying means displays a menu containing the item corresponding thereto when one of said icons is selected by means of said input means.

21. The terminal device as defined in claim 20, wherein said image displaying means identifies and displays a selected icon and a non-selected icon.

22. The terminal device as defined in claim 21, wherein said image displaying means displays a display change area on a screen and switches the image which is displayed when said display change area is selected by said input means so as to display plurality of items corresponding to a leaf portion of said tree structure.

23. The terminal device as defined in claim 22, wherein said image displaying means displays explanatory information for explaining details of information displayed on a display screen so as to overlay said display information with said explanatory information, and causes said explanatory information to move so that the contents of said display information in the overlaid area are recognizable.

24. A terminal device for transmitting data to another device, comprising:

input means;

display means;

storage means for storing image data for a data transmission management screen wherein at least part of said image data is presented as a dynamic image, and an operating program for reproducing said image data in accordance with predetermined rules and managing data transmission; and

computation control means for managing data transmission; wherein said computation control means comprises:

image displaying means for reading said image data and displaying a data transmission management screen on said display means based on said operating program;

control means for generating transfer data based on said operating program and input from said input means in response to said data transmission management screen, and managing the transmission of data to said other device;

wherein said other device comprises a host computer for down-loading said image data and associated display operating program to said terminal upon start-up;

wherein said image data is image data for an order management screen;

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said operating program reproduces image data for order management in accordance with predetermined rules and manages data transmission for order management;

said image displaying means reads out said image data based on said operating program and displays said order management screen on said display means; and said control means generates first order management data based on said operating program and an order input from said input means in response to said order management screen, transmits said first order management data to said other device, and manages display of an order management screen with details corresponding to interactive second data on said image displaying screen means based on said second data received from said other device.

25. A terminal device for transmitting data to another device, comprising:

input means;

display means;

storage means for storing image data for a data transmission management screen wherein at least part of said image data is presented as a dynamic image, and an operating program for reproducing said image data in accordance with predetermined rules and managing data transmission; and

computation control means for managing data transmission; wherein said computation control means comprises:

image displaying means for reading said image data and displaying a data transmission management screen on said display means based on said operating program;

control means for generating transfer data based on said operating program and input from said input means in response to said data transmission management screen, and managing the transmission of data to said other device;

wherein said other device comprises a host computer for down-loading said image data and associated display operating program to said terminal upon start-up;

wherein said image data displays hierarchical menu screens representing a plurality of management items as said management screen;

wherein said image data includes transmission items divided into a number of major categories according to type, items belonging to each of said major categories further divided into a tree structure within that major category, so as to display order management menu screens in a hierarchy; and

said operating program displays a menu screen representing items in a level next to a hierarchical level corresponding to one of root and node portions of the displayed tree structure, said next level belonging to a category selected by a user from categories of the hierarchical level, and said operating program switches menu screens representing each of items belonging to a same leaf portion of said tree structure to display a menu screen based on screen changing order from said control means.

26. A terminal device for transferring interactive data to and from another device, comprising:

input means;

display means;

storage means for storing image data for a data transmission management screen wherein at least part of said

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image data is presented as a dynamic image, and an operating program for reproducing said image data in accordance with predetermined rules and managing data transmission; and

computation control means for managing data transmission; wherein said computation control means, comprises:

image displaying means for reading said image data and displaying a data transmission management screen on said display means based on said operating program; and

control means for generating first order data based on said operating program and an input from said input means in response to said data transmission management screen transmitting said first order data to said other device, and managing display of a screen with details corresponding to interactive second data on said image displaying means based on said second data received from said other device; and

wherein said other device comprises a host computer for down-loading said image data and associated display operating program to said terminal upon start-up.

27. The terminal device as defined in claim 26, wherein said image data is image data for an order management screen;

said operating program reproduces image data for order management in accordance with predetermined rules and manages data transmission for order management;

said image displaying means reads out said image data based on said operating program and displays said order management screen on said display means; and

said control means generates first order management data based on said operating program and an order input from said input means in response to said order management screen, transmits said first order management data to said other device, and manages display of an order management screen with details corresponding to interactive second data on said image displaying means based on said second data received from said other device.

28. The terminal device as defined in claim 26, wherein said image data displays hierarchical menu screens representing a plurality of management items as said management screen.

29. The terminal device as defined in claim 28, wherein said image data includes transmission items divided into a number of major categories according to type, items belonging to each of said major categories further divided into a tree structure within that major category, so as to display order management menu screens in a hierarchy; and

said operating program displays a menu screen representing items in a level next to a hierarchical level corresponding to one of root and node portions of the displayed tree structure, said next level belonging to a category selected by a user from categories of the hierarchical level, and said operating program switches menu screens representing each of items belonging to a same leaf portion of said tree structure to display a menu screen based on screen changing order from said control means.

30. A method of operating a terminal device for transmitting data to another device, comprising:

storing image data for a data transmission management screen wherein at least part of said image data is presented as a dynamic image, and storing an operating

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program for reproducing said image data in accordance with predetermined rules and managing data transmission; and

managing data transmission;

wherein said managing data transmission step comprises:

reading said image data and displaying a data transmission management screen on a display based on said operating program; and

generating transfer data based on said operating program and input from an input means in response to said data transmission management screen, and managing the transmission of data to said other device; and

wherein said image data is image data for an order management screen; and further comprising:

reading out said image data based on said operating program and displaying said order management screen on said display; and

generating order management data based on said operating program and an order input from said input means in response to said order management screen, and controlling the transmission of said order to said other device.

31. A method of operating a terminal device for transferring interactive data to and from another device, comprising:

storing image data for a data transmission management screen wherein at least part of said image data is presented as a dynamic image, and storing an operating program for reproducing said image data in accordance with predetermined rules and managing data transmission; and

managing data transmission; wherein said managing data transmission step comprises:

reading said image data and displaying a data transmission management screen on a display based on said operating program; and

generating first order data based on said operating program and an input from an input means in response to said data transmission management screen, transmitting said first order data to said other device, and managing display of a screen with details corresponding to interactive second data on said display based on said second data received from said other device; and

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wherein said image data is image data for an order management screen; and further comprising:

reproducing image data for order management in accordance with predetermined rules and managing data transmission for order management;

reading out said image data based on said operating program and displaying said order management screen on said display; and

generating first order management data based on said operating program and an order input from said input means in response to said order management screen, transmitting said first order management data to said other device, and managing display of an order management screen with details corresponding to interactive second data on said display based on said second data received from said other device.

32. A method of operating a terminal device for transferring interactive data to and from another device, comprising:

storing image data for a data transmission management screen wherein at least part of said image data is presented as a dynamic image, and storing an operating program for reproducing said image data in accordance with predetermined rules and managing data transmission; and

managing data transmission; wherein said managing data transmission step comprises:

reading said image data and displaying a data transmission management screen on a display based on said operating program; and

generating first order data based on said operating program and an input from an input means in response to said data transmission management screen, transmitting said first order data to said other device, and managing display of a screen with details corresponding to interactive second data on said display based on said second data received from said other device; and

wherein said other device comprises a host computer and further comprising down-loading said image data and associated display operating program from said host computer to said terminal upon start-up.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 5,912,743
DATED : June 15, 1999
INVENTOR(S) : Tadashi Kinebuchi, et al.

It is certified that an error appears in the above identified patent and that said Letters Patent is hereby corrected as shown below:

Column 23, line 14, delete "screen".

Signed and Sealed this
Seventh Day of December, 1999

Attest:



Q. TODD DICKINSON

Attesting Officer

Acting Commissioner of Patents and Trademarks



US005802526A

United States Patent [19]

[11] Patent Number: 5,802,526

Fawcett et al.

[45] Date of Patent: Sep. 1, 1998

[54] SYSTEM AND METHOD FOR GRAPHICALLY DISPLAYING AND NAVIGATING THROUGH AN INTERACTIVE VOICE RESPONSE MENU

[75] Inventors: Philip E. Fawcett, Duvall; Christopher Bloomfield-Brown, Seattle; Clifford P. Strom, Maple Valley, all of Wash.

[73] Assignee: Microsoft Corporation, Redmond, Wash.

[21] Appl. No.: 634,577

[22] Filed: Apr. 18, 1996

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 558,322, Nov. 15, 1995, abandoned.

[51] Int. Cl.⁶ G06F 17/30

[52] U.S. CL. 707/104; 707/10; 379/67; 379/88; 348/14

[58] Field of Search 395/610, 615; 379/67, 88; 348/14; 707/10, 104

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Primary Examiner—Paul R. Lintz

Attorney, Agent, or Firm—Klarquist Sparkman Campbell Leigh & Whinton

[57] ABSTRACT

Interactive voice response systems (IVRS) are used as interfaces at a wide variety of support and information retrieval centers. A caller who contacts in IVRS-equipped support center can choose to have the voice information contained in the IVRS menus displayed graphically on the caller's communications terminal. The graphical display allows a caller to navigate up and down in the IVRS menus, skipping intermediate steps that would be required making responses to voice queries. In one embodiment the Hyper Text Markup Language (HTML) is used to produce the graphical display. The HTML data also contains a predefined protocol used to display IVRS menus. The graphical display of IVRS menus saves callers time, and displays IVRS information more quickly and thoroughly than could be done with voice. Graphical display of IVRS menus also saves support costs since a caller may find desired information without interaction with support center personal.

58 Claims, 8 Drawing Sheets

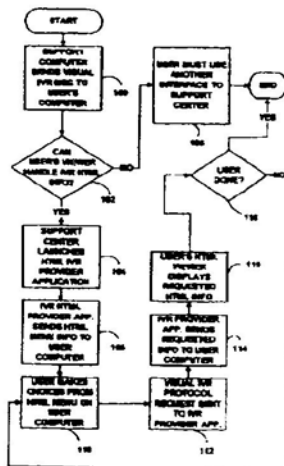


FIG. 1

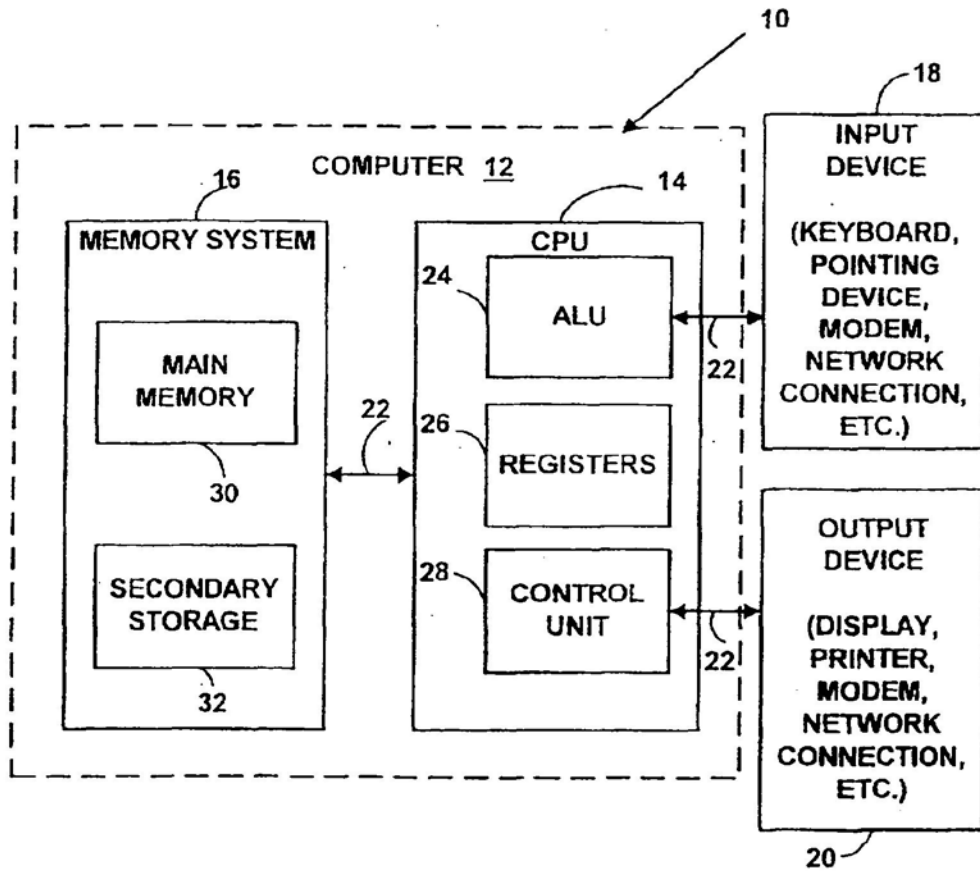


FIG. 2

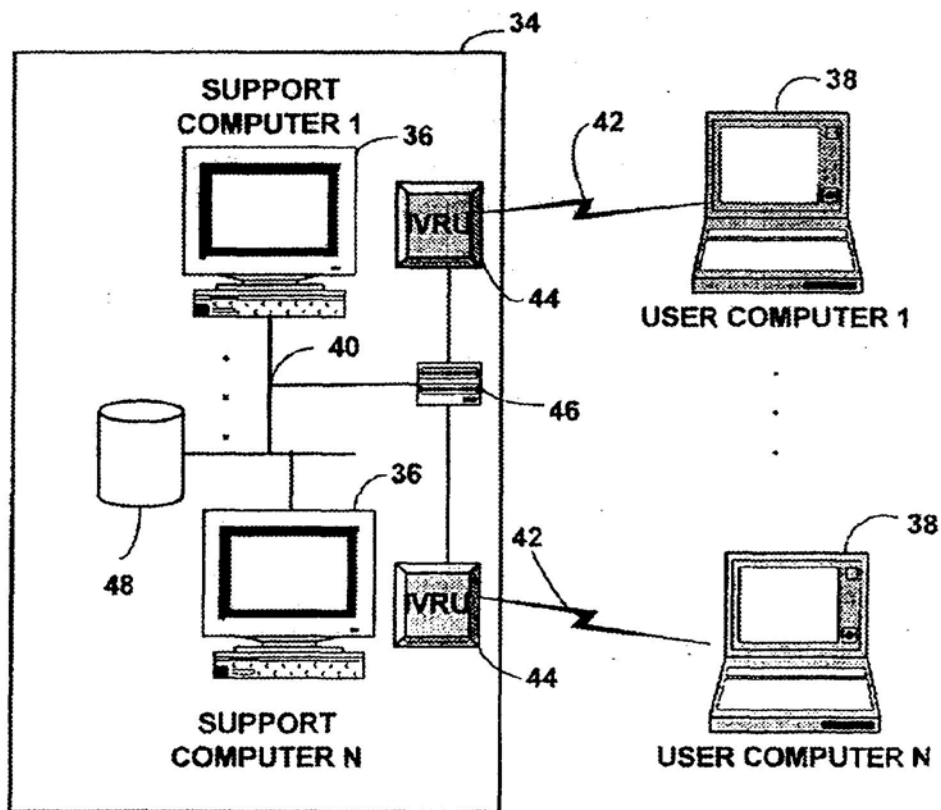


FIG. 3

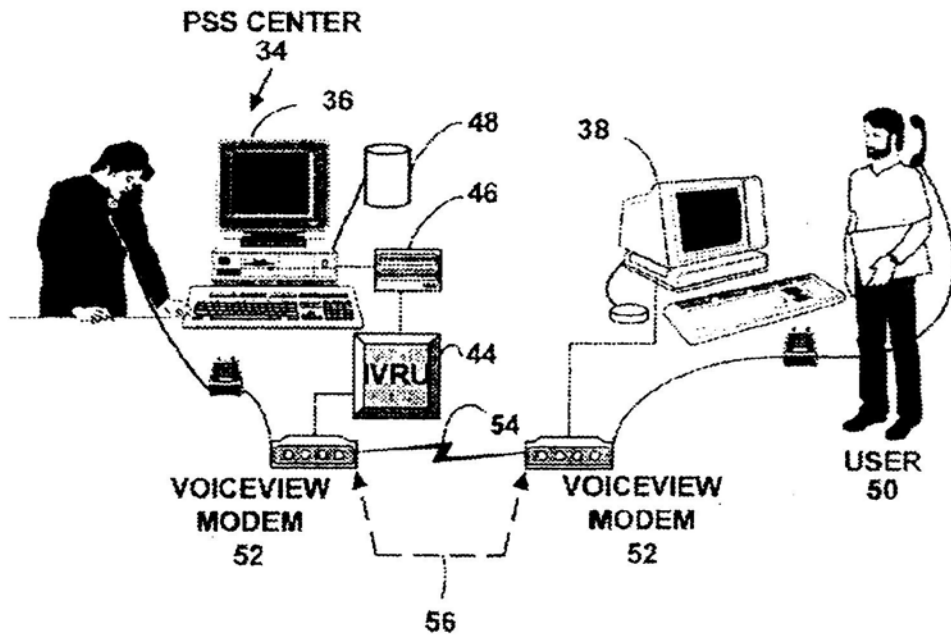


FIG. 4

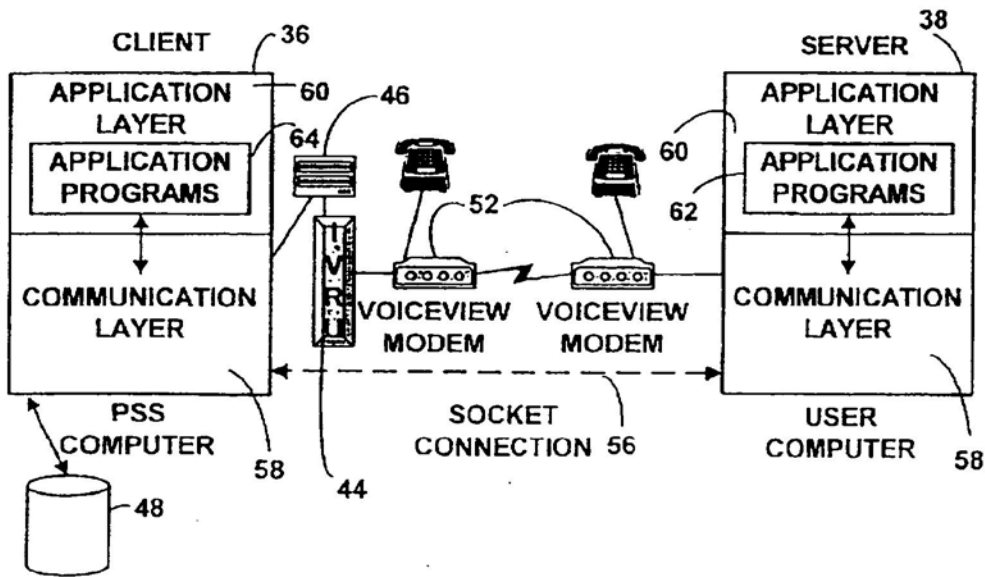


FIG. 5

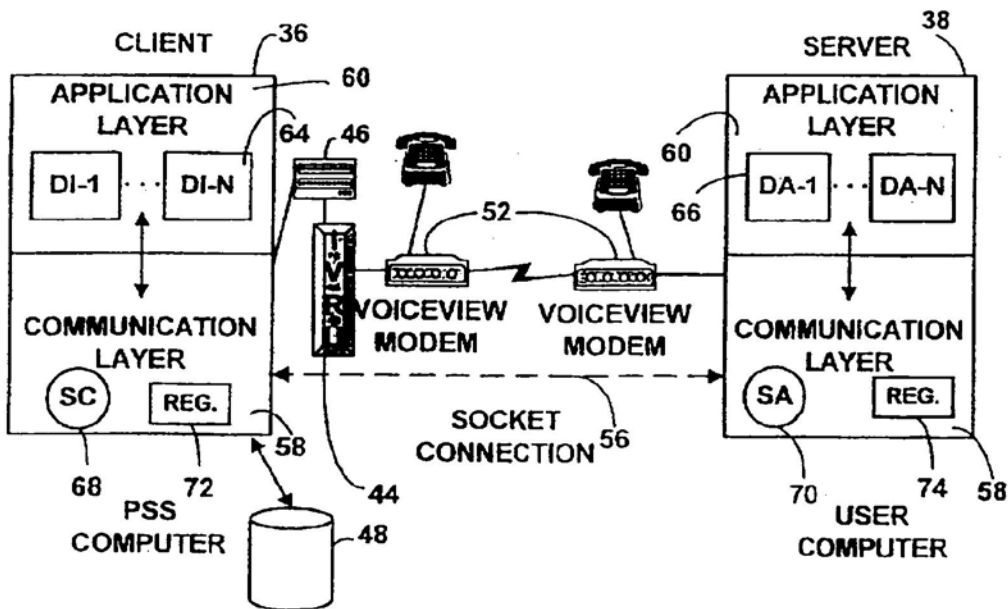


FIG. 6A

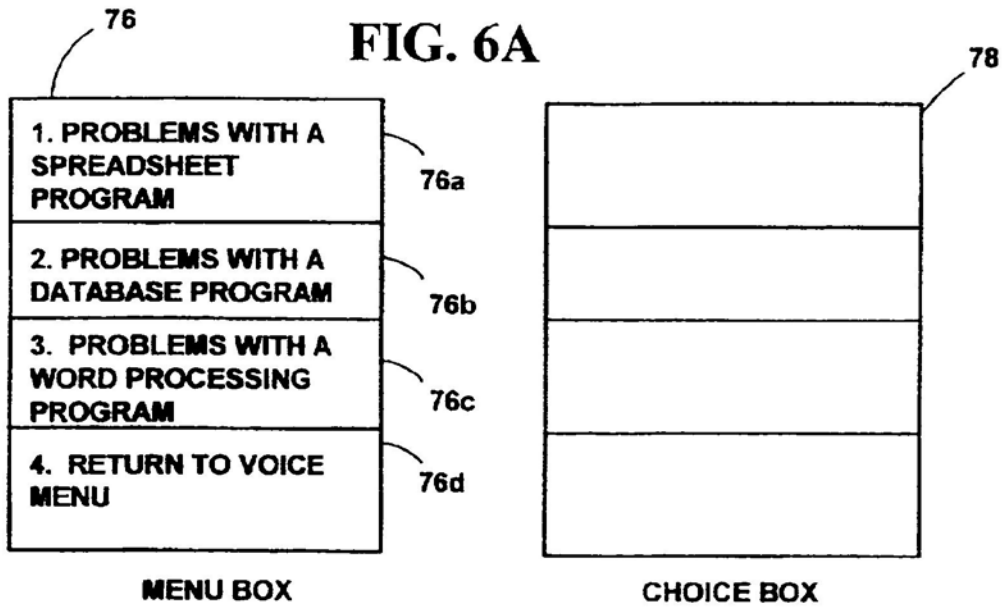


FIG. 6B

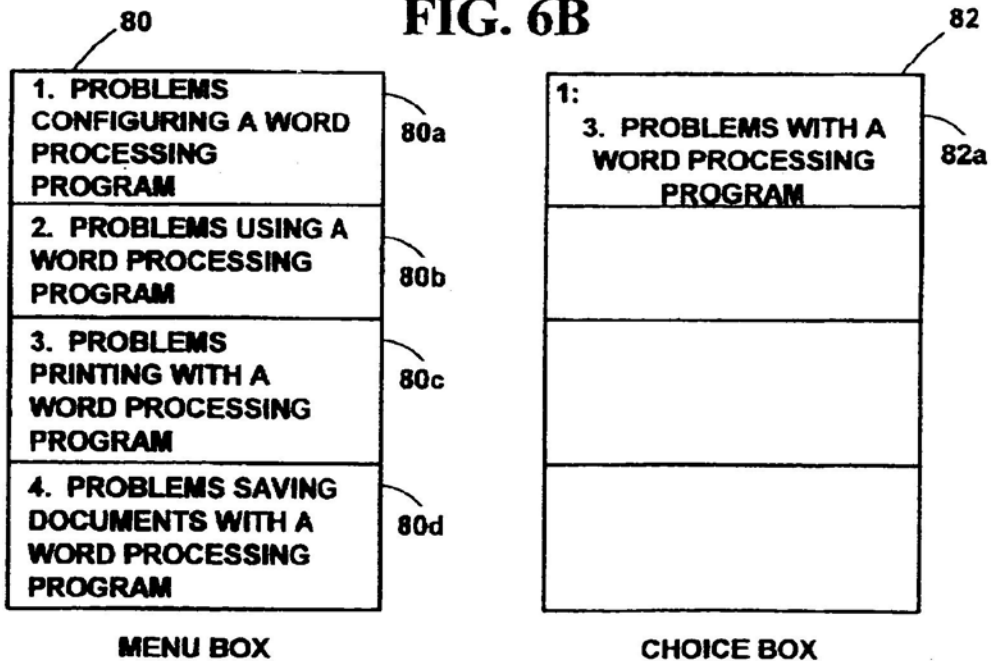


FIG. 7

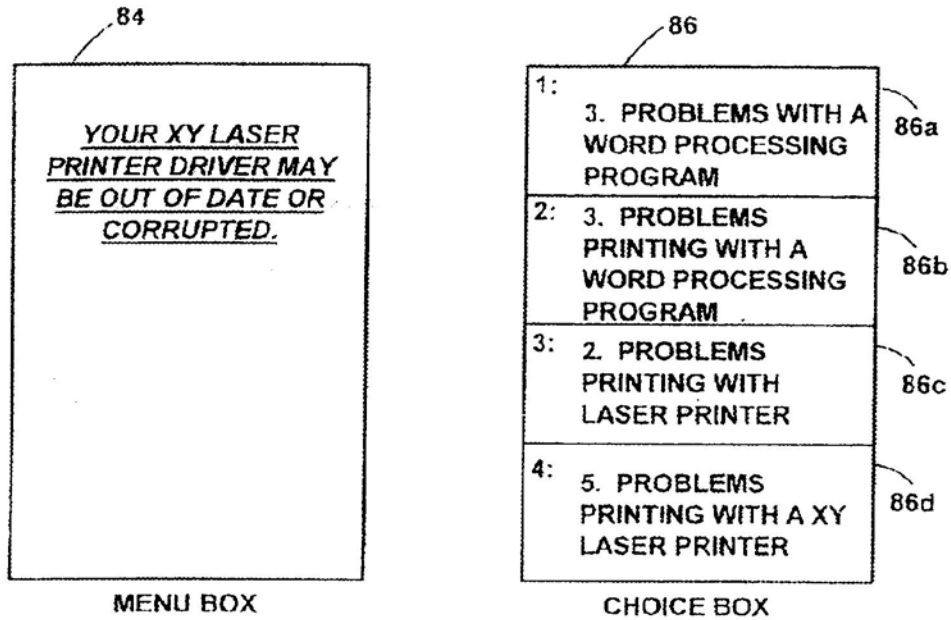


FIG. 8

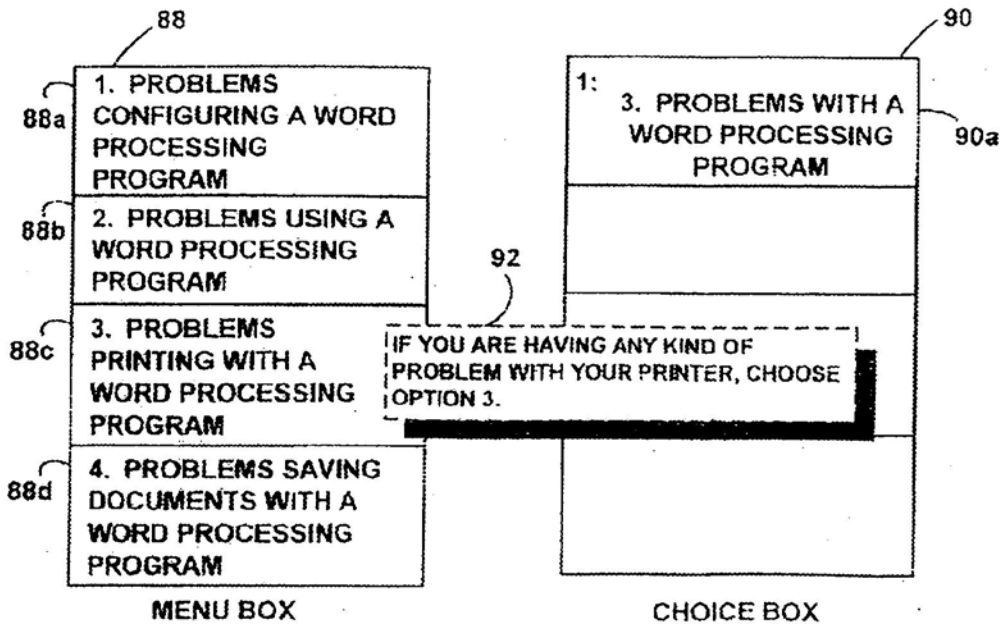


FIG. 9

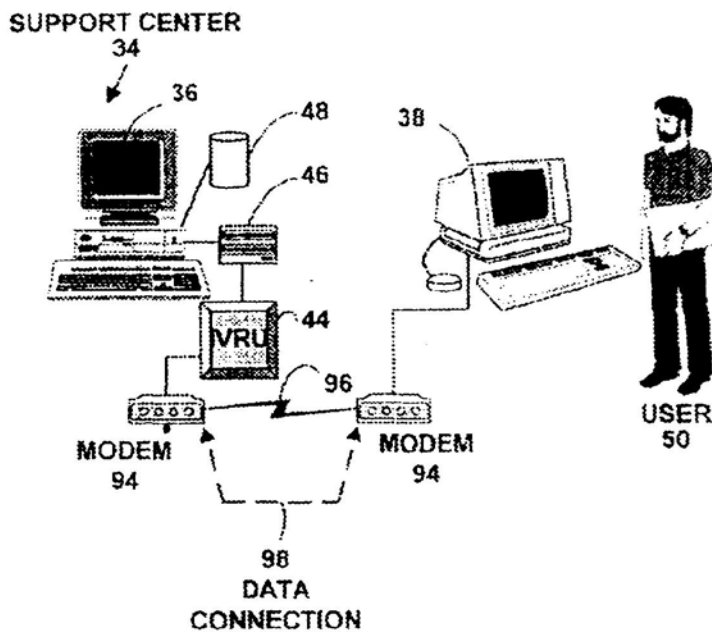
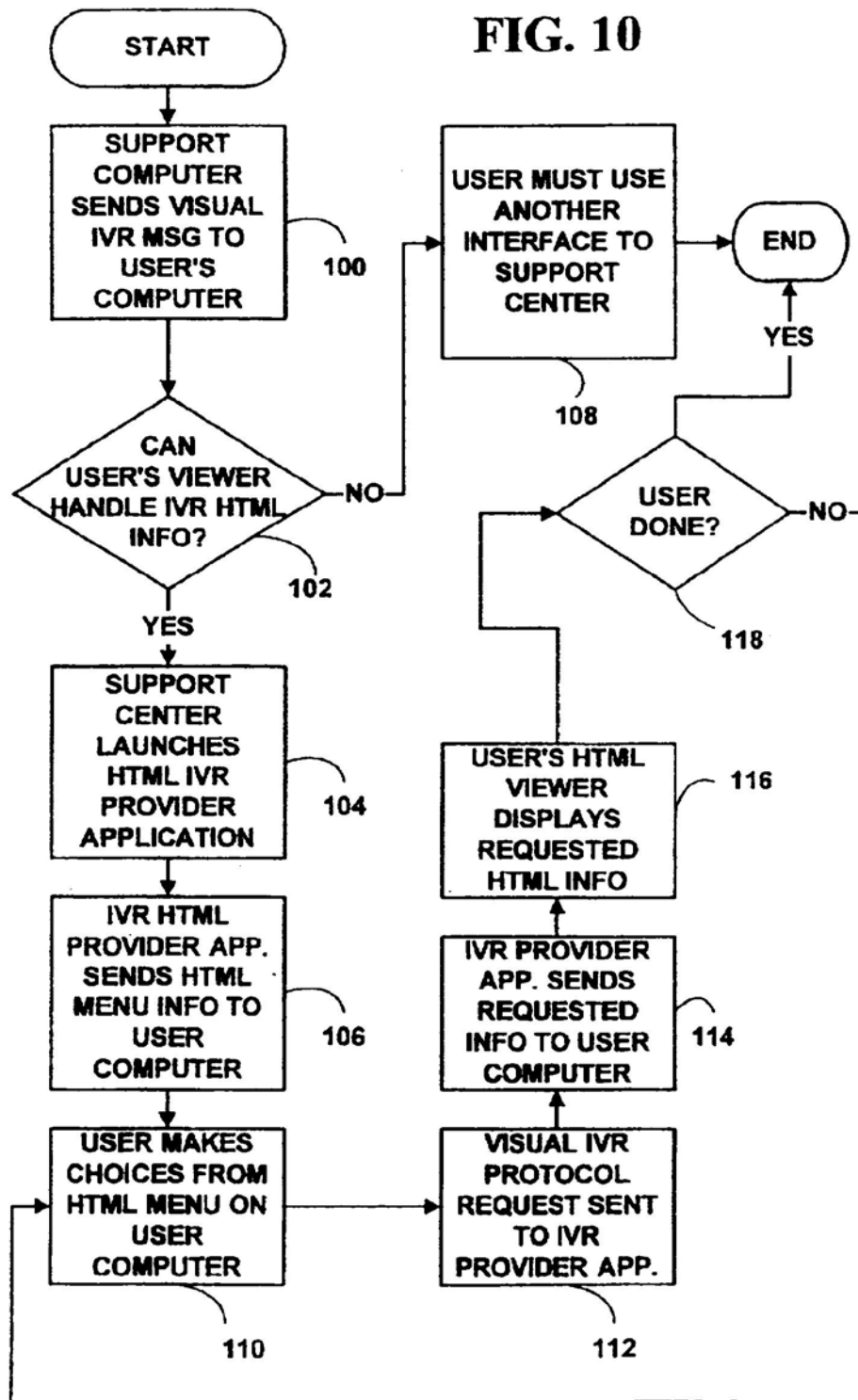


FIG. 10



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**SYSTEM AND METHOD FOR
GRAPHICALLY DISPLAYING AND
NAVIGATING THROUGH AN INTERACTIVE
VOICE RESPONSE MENU**

RELATED APPLICATION DATA

This application is a continuation-in-part of application Ser. No. 08/558,322, abandoned, entitled METHOD AND SYSTEM FOR GRAPHICALLY DISPLAYING AND NAVIGATING THROUGH AN INTERACTIVE VOICE RESPONSE MENU, filed Nov. 15, 1995.

FIELD OF INVENTION

The present invention relates to the graphical and textual display of interactive voice response information. More specifically, it relates to a method of graphically displaying and navigating through an interactive voice response menu of queries.

**BACKGROUND AND SUMMARY OF THE
INVENTION**

Interactive voice response systems (IVRS) are currently used in abundance as interfaces at a wide variety of support centers, call centers and other information retrieval centers. When a support center with an IVRS is contacted by a caller, the caller is typically first presented with voice information from an interactive voice response unit (IVRU). The interactive voice response unit poses voice queries to the caller. The caller inputs responses (e.g., with a touch tone telephone and DTMF tones) to the voice queries, and then is presented additional voice queries based on the responses. The caller responses to the voice queries are typically used to route the caller to a desired destination, dispense information for the caller, and/or collect information from the caller.

The interactive voice response unit typically presents a caller with voice queries based on some hierarchical scheme (e.g., a decision tree). General voice queries are presented first, and then, based on caller responses, more specific queries are presented to help narrow and/or focus the caller's requests. For example, if the interactive voice response unit uses a decision tree, a caller would be presented first with queries from the "root" (i.e., the top or most general level) of the decision tree. Then based on caller responses, the caller is presented with more and more specific voice queries (i.e., intermediate level queries). Finally, the caller would reach the lowest level in the IVRU decision tree. At the lowest level in the IVRU decision tree, the "leaf" level, the caller is presented with the most specific voice information available. If the specific voice information at the lowest or "leaf" level is not helpful to the caller, the caller may be placed in a voice queue to speak with the next available caller assistance agent.

As an example, consider an IVRS at a support center called by users having problems with a computer software product. When a user calls, he or she is connected to an IVRU. If the interactive voice response unit is set up as a decision tree, the interactive voice response at the root level might be, "Press '1' for network problems, Press '2' for operating system problems, Press '3' for printer problems, Press '4' for spreadsheet problems," etc. If the user was having printer problems, after pressing '3' at the root level, the interactive voice response unit would respond with a second level (intermediate level) of query choices such as "Press '1' if your printer won't print at all, Press '2' if your printer is printing unrecognizable characters, Press '3' if

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your printer is not printing all the information on one page," etc. This process would be repeated until the user reaches a leaf level of the decision tree. At the leaf level, a user is given additional information that may solve the problem (e.g., your printer driver seems to be out-of-date), or is told to stay on the line to receive help from a support engineer. Which leaf node a user reaches determines which support engineer the user will speak with. The user responses to the voice queries are also used to make a preliminary diagnosis of the user problem.

Interactive voice response systems are also used by a wide variety of other types of call centers to route calls, provide audio information, and collect information from callers. For example, VoiceMail is an enhanced version of an interactive voice response system. For example, an IVRS may be used by a mail order company to list current product information, and then allow a caller to order a product; by a theater to list upcoming or current events, and then allow a caller to order tickets to an event; by a bank to allow a caller to obtain balance information, make an electronic payment, etc.

Consider a theater which uses an IVRS to provide information on upcoming or current events. When a caller contacts the theater, IVRU typically uses some hierarchical scheme to present the caller with an audio menu for the categories of events taking place (e.g., movies, sporting events, plays, etc.). The caller then inputs responses to navigate through the hierarchical scheme to hear audio information on a particular event the caller may be interested in attending. At the lowest, or leaf level, the caller may be asked if they wish to order tickets for an event. The caller may be asked to hold to speak with a "live" ticket agent. In addition, the same IVRU may also be used to collect payment information directly from the caller without the help of a live ticket agent, keeping the process fully automated.

There are several problems associated with using an interactive voice unit to present information to a caller. For example, a caller may have to listen to all of the general voice queries before making even a first selection. This is a time consuming process, and the caller may have to repeat the general level voice query messages several times before a choice is made. At levels below the top level (intermediate levels), the caller is faced with a number of decisions and may not know which choice is appropriate based on the brief voice menu description. If the caller makes several choices based on the voice queries and ends up at the wrong place, then the caller must "unwind" the choices, typically by starting over at some level (e.g., the top level), and then start again, by making new choices. This wastes a considerable amount of the caller's time and leads to caller dissatisfaction.

Interactive voice response units are also typically set up to contain very general information to serve a large number of potential callers. Many times the voice queries presented are not specific enough to allow a caller to obtain the information desired. If the IVRU menu information is too general, the caller will waste a significant amount of time navigating in the IVRU menu, and still not find the information the caller was trying to obtain.

In accordance with the illustrated embodiment of the present invention some of the problems associated with use of an interactive voice response unit to present and collect information at a support center are solved. In one embodiment of the present invention, a caller contacts an IVRU-equipped support center via a voice/data connection (e.g., with an Alternating Voice and Data (AVD) modem, a Simul-

aneous Voice and Data Modem (SVD), an ISDN device, a network voice device such as Internet Phone, etc.) As one of the first voice queries presented in the interactive voice response menu, a caller is presented with a voice option to create a graphical display of the interactive voice response queries on the caller computer. In another embodiment of the present invention, if the caller contacts an IVRU-equipped call center with a voice/data connection (e.g., an ISDN line) then the graphical display is displayed automatically. However, the user may also be prompted before automatically presenting the graphical display. If this option is chosen by the caller, the caller is presented with a graphical display of the information contained in the interactive voice response menu. The caller responses to the graphical IVR menu items can thereafter be made from the caller computer.

In another embodiment of the present invention, a caller contacts an IVRU-equipped support center via a data-only connection (e.g., using a standard modem, a network or Internet connection, a wireless connection, etc.). The caller is automatically presented with a hierarchical display of the menu information contained in the IVRU menu without any voice messages. The caller responses to choices in the IVR menu items are thereafter made from the caller computer. (In some respects, the term IVRU is somewhat misleading since, in some embodiments of the present invention, there is no "voice." However, this term is nonetheless used hereafter as a convenient monicker.)

In the preferred embodiment of the present invention, the graphical display presented by the interactive voice response information uses a hierarchical paradigm which is similar to a decision tree. However, unlike most interactive voice response decision trees, this hierarchical scheme is based on data collected from previous callers and is continually and incrementally updated with new information. Further, the queries presented to a user are determined using a probabilistic scheme which directs the caller to the information that a caller is most likely to want or need based on the system's experience with prior callers.

The graphical display allows a caller to navigate up and down in the hierarchical paradigm scheme quickly and easily with inputs from the caller computer. The caller can also "zoom in" and "zoom out" on part of the hierarchical scheme, skipping intermediate steps that would be required making responses to voice queries. If the caller becomes confused as to which query to choose next, there is also a decision advisor available with information to help the caller make the proper choice. The caller may also have the option at any time to switch back to a voice mode to listen to the voice queries (i.e., if the caller contacted the support center via a voice/data connection).

In one embodiment of the invention, the graphical display is produced using Hyper Text Markup Language (HTML). HTML is one standard for viewing information over the Internet. However, using HTML to create the graphical display of IVRU menus has numerous advantages. A support center can easily and inexpensively construct a graphical menu system using a standard, well accepted, well recognized language. The HTML IVRU menus can then be viewed using a modified or extended HTML viewer. Callers are presented with a familiar, comfortable interface to quickly navigate through the IVRU menu information. HTML can easily be sent over a wide variety of transports, and convey huge amounts of information using HTML links (i.e., links to other information which could be stored on computer systems remote to a support center), that could not be accomplished with a voice IVRU. In addition, HTML has

the capability of sending embedded audio and video information which could provide a "multi-media" menu of IVRU information, and can also provide multi-lingual menus.

Graphical display of the interactive voice response decision information can save the caller a substantial amount of time. Since the voice menu choices are graphically displayed, the caller can step immediately to any level in the hierarchical scheme without having to listen to a number of intermediate voice queries, or can visit intermediate graphically displayed information. If the user makes an incorrect choice, the user can easily undo the incorrect choice by choosing a new level in the hierarchical scheme, without having to visit intermediate levels. Thus, by using a graphical display of the interactive voice menu, desired information can be displayed more quickly and thoroughly than it could be by using other methods such as voice information from an IVRU, or voice interaction with caller assistance agent.

The graphical display of the IVRS may also save the support center, call center, information retrieval center, etc., employing the IVRS significant support costs. The graphical queries are kept up to date based on caller inputs. As a result, desirably callers will typically find the desired information, and not want, or need, to talk with caller assistance agents.

The foregoing and other features and advantages of the illustrated embodiment of the present invention will be more readily apparent from the following detailed description, which proceeds with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a block diagram of a computer system used to implement an illustrated embodiment of the present invention.

FIG. 2 is a block diagram showing a support center and user computers.

FIG. 3 is a picture diagram showing how a user and a support engineer would interact.

FIG. 4 is a block diagram showing a layered software support messaging architecture used to produce a graphical display.

FIG. 5 is a block diagram showing greater detail within the of the software messaging architecture used to produce the graphical display.

FIGS. 6A-6B are block diagrams showing the menu boxes and the choice boxes of a graphical display of a interactive voice response menu.

FIG. 7 is a block diagram showing the menu box and the choice box at one of the lowest level in the hierarchical scheme of a graphical display of a interactive voice response menu.

FIG. 8 is a block diagram showing the decision advisor for the display information shown in FIG. 5B.

FIG. 9 is a picture diagram showing a user and a support center using an interactive voice response system.

FIG. 10 is a flow diagram showing a user can display interactive voice response menus graphically with a HTML viewer.

DETAILED DESCRIPTION OF AN ILLUSTRATED EMBODIMENT

Referring to FIG. 1, an operating environment for the preferred embodiment of the present invention is a computer system 10 with a computer 12 that comprises at least one

high speed processing unit (CPU) 14, in conjunction with a memory system 16, an input device 18, and an output device 20. These elements are interconnected by a bus structure 22.

The illustrated CPU 14 is of familiar design and includes an ALU 24 for performing computations, a collection of registers 26 for temporary storage of data and instructions, and a control unit 28 for controlling operation of the system 10.

Any of a variety of processors, including those from Digital Equipment, Sun, MIPS, IBM, Motorola, NEC, Intel, Cyrix, AMD, Nexgen and others are equally preferred for CPU 14. Although shown with one CPU 14, computer system 10 may alternatively include multiple processing units.

The memory system 16 includes main memory 30 and secondary storage 32. Illustrated main memory 30 is high speed random access memory (RAM) and read only memory (ROM). Main memory 30 can include any additional or alternative high speed memory device or memory circuitry. Secondary storage 32 takes the form of long term storage, such as ROM, optical or magnetic disks, organic memory or any other volatile or non-volatile mass storage system. Those skilled in the art will recognize that memory 16 can comprise a variety and/or combination of alternative components.

The input and output devices 18, 20 are also familiar. The input device 18 can comprise a keyboard, mouse, pointing device, audio device (e.g., a microphone, etc.), or any other device providing input to the computer system 10. The output device 20 can comprise a display, a printer, an audio device (e.g., a speaker, etc.), or other device providing output to the computer system 10. The input/output devices 18, 20 can also include network connections, modems, or other devices used for communications with other computer systems or devices.

As is familiar to those skilled in the art, the computer system 10 further includes an operating system and at least one application program. The operating system is a set of software which controls the computer system's operation and the allocation of resources. The application program is a set of software that performs a task desired by the user, making use of computer resources made available through the operating system. Both are resident in the illustrated memory system 16.

In accordance with the practices of persons skilled in the art of computer programming, the present invention is described below with reference to acts and symbolic representations of operations that are performed by computer system 10, unless indicated otherwise. Such acts and operations are sometimes referred to as being computer-executed. It will be appreciated that the acts and symbolically represented operations include the manipulation by the CPU 14 of electrical signals representing data bits which causes a resulting transformation or reduction of the electrical signal representation, and the maintenance of data bits at memory locations in memory system 16 to thereby reconfigure or otherwise alter the computer system's operation, as well as other processing of signals. The memory locations where data bits are maintained are physical locations that have particular electrical, magnetic, optical, or organic properties corresponding to the data bits.

A communications terminal, that comprises at least a CPU 14, a memory system 16, and an input/output device (18,20) is used for the preferred embodiment of the present invention. For example, the communications terminal may be a smart modem (i.e., a modem with a CPU and memory

system), smart network card, a computer workstation with a network connector or a modem, a personal computer with a network connector or a modem, etc. However, the communications terminal is not limited to this list, and can comprise a variety and/or combination of alternative components.

As is shown in FIG. 2, the illustrated embodiment of the invention consists of a support center 34 with one or more support computer systems 36 (e.g., the computer system that was described in FIG. 1) and a plurality of user computer systems 38. If a plurality of support computers are used, then the support computers may be connected by a local area network (LAN) 40 or any other similar connection technology. However, it is also possible for a support center to have other configurations. For example, a smaller number of larger computers (i.e., a few mainframe, mini, etc. computers) with a number of internal programs or processes running on the larger computers capable of establishing communications links to the user computers. The support center provides a plurality of communications links 42, such as telecommunications connections, (e.g., modem connections, ISDN connections, ATM connections, frame relay connections, etc.), network connections, (e.g., Internet, etc.), satellite connections (e.g., Digital Satellite Services, etc.), wireless connections, two way paging connections, etc. to allow one or more user computers to simultaneously connect to the support computer(s). The communications links are each connected to one or more interactive voice response units (IVRU) 44 that can be accessed by user computers.

The individual IVRUs 44 are connected to an IVRU server 46. The IVRU server 46 manages the IVRUs and also permits a user to bypass the IVRU menu and directly access one or more databases 48 maintained at the support center. These databases 48 store entries consisting of informational queries made by previous callers (e.g., information queries for problems previously encountered by other users for the computer software supported by the support center). When a user chooses to bypass the IVRU, the IVRU server 46 permits the user to query the support center databases to find information (e.g., for a problem the user is encountering) that may not be mentioned in the IVRU menu presented to users.

In addition, a subset of the database entries, consisting of information queries requested by other users (e.g., for problems encountered) are used to continually and incrementally update the menus in the IVRU. The same database entries are also used to create a graphical display of the IVRU audio menus.

The illustrated embodiment of the invention is implemented in the Windows® 95 operating system by Microsoft Corporation of Redmond, Wash. using VoiceView™ data transfer technology by Radish Communications Systems of Boulder, Colo. Under VoiceView™, only voice OR data is transmitted at any one (i.e., VoiceView™ modems are alternating voice and data (AVD) modems). The invention can likewise be practiced with operating systems and other technologies that allow simultaneous voice AND data transfer, such as simultaneous voice and data (SVD) modems, ISDN devices, etc. or with network or other connections. The VoiceView™ data protocol technology has been enhanced to provide functionality not available in the standard VoiceView™ data protocol as will be explained below.

In the preferred embodiment of the present invention, graphical display of IVRU voice information is used by a support center called by users after encountering problems

with a computer software product. However, the invention is not limited to computer software product support centers, but can be used by a wide variety of other types of customer assistance and information retrieval centers.

As is shown in FIG. 3, a user 50, using a user computer 38, calls a support center 34 (hereinafter referred to as a product support service (PSS) center) with a VoiceView™ modem 52 (or other appropriate communications device) and needs help with a particular computer software problem. A communications path 54 for data transfer is set up over the same voice line which carries the user's voice signals. The communications path is routed through an interactive voice response unit (IVRU) 44 in the support center. The IVRU is connected to an IVRU server 46. A VoiceView™ modem allows the user to make a voice connection with a support center, and allows the support center to send/receive data to/from the user's computer over the same telephone line as the voice connection.

As is shown in FIG. 4, the PSS system implements a two-layer protocol stack: the communication layer 58 and the application layer 60. The two layer protocol stack provides a common network protocol for passing data and issuing commands between the client 36 and server 38.

The communication layer's 58 primary responsibility is to transfer data between the client 36 (the PSS computer) and the server 38 (the user's computer). The application layer's 60 primary purpose is to utilize the communication layer's network services while maintaining ignorance of the networks underlying protocol and hardware. The PSS's application programs 62 reside in the application layer 60.

The two-layered protocol approach frees the application program 62 from the communication protocol complexity and implementation. The two-layer protocol stack operates over a socket connection 56. As is well known in the art, a socket is a communication object from which messages are sent and received. Sockets are common inter-process communication objects in many operating systems (e.g., BSD UNIX®, Windows® 95, etc.).

Whether the messaging system is based on VoiceView™ sockets, UNIX® sockets, or datagrams, TCP/IP sockets, IPX or other sockets, the protocol details are entirely hidden from the application layer 60. Therefore, the PSS application programs 62 need not be rewritten if the underlying communication protocol is changed. Also, socket management code need not be replicated in each of the application programs 62. Another benefit of this architecture is that any number of client programs (on the PSS computers) can communicate with their corresponding server programs (on the user computers) through this common protocol. Client and server applications do not communicate directly with each other because replacement of the network platform and/or network protocol would make the applications obsolete.

The PSS messaging system applications have two components: interpreters (INs) 64 and agents (ANs) 66 as is shown in FIG. 5. The interpreter 64 is client software which initiates commands and interprets their results for the PSS. The agent 66 is server software which executes commands issued by the interpreter and then returns results to the PSS.

The PSS messaging system has both client and server components in the communications layer 58 that are used for message transfer. The support client (SC) 68 is a client messaging process which sends and receives messages on behalf of interpreters 64. The support agent (SA) 70 is a server messaging process which sends and receives messages on behalf of agents 66. Also included in the commu-

nications layer 58 of both the client and the server are registries 72 and 74, respectively, used to keep track of which client/server processes are sending/receiving messages. Communication between a particular interpreter and agent occurs via a socket identifier allocated to the pair. Socket setup (create(), bind(), listen()), connection (connect(), accept()), and communication (send() receive()) are well known and will be understood by those skilled in the art.

After a socket connection 56 is established, a user is presented with interactive voice response menu queries from the IVRU 44. The interactive voice response system is built using a hierarchical paradigm similar to a decision tree from the information contained in a support center database 48. The hierarchical paradigm is based on data collected from problems previously encountered by users and is continually and incrementally updated as users encounter new or previously unknown problems with computer software. Further, the queries presented to a user are determined using a probabilistic scheme which directs the user to solutions for problems which are most likely to be encountered using a particular set of computer software.

As an example, if a defect has been discovered with printer driver that will cause every user with a particular printer to experience the same problem, it is highly probable that a majority of the calls a support center receives for problems with that printer will relate directly to the defective driver. As a result, the interactive voice response unit presents voice queries that point a user directly to the defective driver problem. Thus, intermediate steps a user would normally go through are skipped. Other potential problems, such as network problems, application problems, etc. are presented to the user in a similar fashion.

In the illustrated embodiment of the present invention, the first voice query presented by the interactive voice response unit to a user is a query allowing a user to graphically display the interactive voice response menu queries. Since the user has established a two-way voice/data connection between the user computer and the PSS computer, (e.g., via a socket connection 56), the PSS computer will launch a Windows® 95 interpreter 64 (FIG. 5) (e.g., called the Voice Menu Graphical Interpreter) to help create a graphical display of the interactive voice response information. The interpreter downloads, registers, and executes the agent, (e.g., called the Voice Menu Graphical Agent), which creates the graphical display on the user computer from the interactive voice response menu information. Those skilled in the art will understand the downloading, registering, and execution of a software application in a client/server environment.

When the Voice Menu Graphical Agent is executed, it creates a graphical display of the interactive voice response menu hierarchical paradigm, an example of which is shown in FIG. 6A. However, the interactive voice response menu queries can be displayed with text, graphics, and/or a combination of text and graphics depending on user preference. The IVR menus can also be displayed without the graphical agent/interpreter as will be explained below.

As an example, suppose a user is using a word processing program and has a problem printing a document. FIG. 6A shows a representation of the graphical display that could be presented to a user's computer. The interactive voice response menu queries are presented on the left side of the screen in a menu box 76, and any choices (e.g., with a mouse, keyboard, etc. connected to the user computer) a user makes are presented on the right side of the screen in a choice box 78. Since the user is having problems using a

word processing program, option 3 from the menu 76c is chosen from the menu box 76. As a user makes choices, the choices are displayed in the choice box 78. Since the user is at the top or most general level of the text menu in the hierarchical paradigm scheme, and no choices have yet been made, the choice box 78 is currently empty.

FIG. 6B shows the display after a user has chosen option 3 ("3. problems with a word processing program") 76c from FIG. 6A. A new level of queries is presented in the menu box 80 (80a-80d) on the left side of the screen, and the choice box 82 on right side of the screen displays the user choice 82a. The choice box 82 has only one entry 82a since the user has only made one choice. The number one (1:) in the upper left hand corner of box 82a indicates that this entry was chosen from level one in the interactive voice response menu hierarchical scheme. Query number three ("3. Problems with a word processing program") was the actual choice made at level one, (76c of FIG. 6a) as is shown in box 82a.

This scenario continues with user choices, new queries in the menu box, and new entries in the choice box until a user reaches the lowest possible level based on their choices in the hierarchical scheme. As a user moves "down" in the hierarchical scheme, entries are added to the choice box. As a user moves "up" in the hierarchical scheme, entries are removed from the choice box. As a result, the user always knows what choices have been made, and can immediately "zoom in" or "zoom out" to any level in the hierarchical scheme.

FIG. 7 shows the display after a user has reached one of the lowest levels in the hierarchical scheme. The menu box 84 does not contain any further queries, but now contains information which provides a potential solution to the user problem. (In the actual implementation, the information at the lowest level in the hierarchical scheme may be much more extensive than is shown in the example in box 84.) The choice box 86 is filled with choices (86a-86d) the user has made at each level (e.g., box 86c shows on level three ("3:"), the user chose the second option "2. Problems printing with a laser printer").

If the user wishes to change levels in the hierarchical scheme at any time, all the user needs to do is to choose the appropriate entry in the choice box. For example, if the user has the display shown in FIG. 7, and wishes to reach the general menu (highest level) in the hierarchical scheme, the user would simply choose (e.g., with a mouse or keyboard, etc.) the entry labeled one (i.e., "1:") containing the text "3. problems with a word processing program" 86a in the choice box. The user would then jump back to the display shown in FIG. 6A, skipping all levels in between. The menu box 74 (FIG. 6A) would be re-displayed, and the choice box 76 (FIG. 6A) would be empty again since the user has returned to the highest level in the hierarchical scheme.

Jumping to intermediate levels in the hierarchical scheme produces similar results, with the menu box displaying possible choices and the choice box partially filled with choices the user has made to get to the intermediate levels. The user can skip any or all of the intermediate steps that would require visiting when using the voice mode of an IVRU. For example, if the user made seven choices, the user would be down at least seven levels in the hierarchical paradigm. If the user then wished to return to level three the user could jump immediately back to level three, by selecting "3:" from the choice box and then make new choices from level three. Using the IVRU in voice mode, the user would most likely be required to return to level one, make

the same choices as made previously to return to level three, and then make new or additional choices, which would waste a considerable amount of time.

In addition, the user can jump out of the IVRU graphical menu at any time, and with the help of the IVRU server, access the support center data base to obtain additional information not displayed on the IVRU graphical menus to help solve a particular problem.

FIGS. 6A, 6B, and 7 show an example of a textual display of the interactive voice response menu. However, any other display layout that would convey the information from the interactive voice menu hierarchical scheme could also be used.

A graphical/text combination on a graphical display can also be used. For example, the hierarchical display can be represented by a graphical "tree" structure containing many nodes. The user would then choose a "node" in the tree (analogous to choosing an item from the menu box). The tree node would then be expanded to present the "subtree" below the chosen node (analogous to a new menu box). After each user choice, a smaller scale display tree (analogous to the choice box) graphically shows the user path (e.g., in a color different from the rest of the tree) and present location in the tree. The node choosing is repeated until a "leaf" node is reached, where information is presented to potentially solve the user problem as described above (and shown in FIG. 7). Any number of other graphics/text schemes could also be used to display the interactive voice menu hierarchical scheme for the user.

If a user should be confused about which path in the hierarchical scheme to choose, a decision advisor associated with each level gives a more detailed explanation to aid the user in making a correct decision. The decision advisor is more than a generic help function. The decision advisor knows what choices the user has made. Based on these choices, the decision advisor queries the support center databases and directs the user to make additional choices that, based on previously encountered problems, are most likely to solve the current user's problem. Decision advisor text is shown in FIG. 8.

Suppose a user was having trouble printing a document from a word processing program. If the user had trouble deciding whether to choose option 2 88b, or option 3 88c, (i.e., trouble deciding whether their problem falls within "problems using a word processing program" or "problems printing with a word processing program") the decision advisor is used to help the user make the decision. The decision advisor "knew" the user was having problems with a word processing program 80a. After a query to the PSS database, the decision advisor would direct the user to the proper choice 92.

If the user invokes the decision advisor for option 3 88c, an advisor box 92 is displayed with additional information to aid the user in making a decision based on the user's problem. In the actual implementation, the help information displayed by the decision advisor may be more extensive than is shown in 92.

In the worst case scenario, the user would reach the lowest level in the hierarchical paradigm and not be able to solve their problem. In this case, the IVRU server can take one of a number of actions. The IVRU server may connect the user to another network (e.g., the Internet) to search for more information; the user might be put into a voice queue to talk with the next available support engineer to obtain "live" help for their problem; or the user may be allowed to further query the support center databases.

When a user reaches the lowest level 84 (e.g., as is shown in FIG. 7) and other selective intermediate levels in the hierarchical scheme, the IVRU server may download, register, and execute additional applications. Each level in the hierarchical scheme represents a particular type of problem a user may commonly encounter. The additional applications are downloaded and launched to collect additional information from the user computer and return it to the PSS computer. The additional information collected may be used to further direct graphical information to the user, or be sent to a support engineer who will provide "live" help if the user is placed in a voice queue to talk with the next available support engineer.

As one specific example, using the word processing printer problem example described above, when the user arrives at the lowest level in the hierarchical scheme 84 (FIG. 7), a diagnostic interpreter (e.g., a Printer Control Diagnostic Interpreter) on the PSS computer is launched. The Printer Control Diagnostic Interpreter would then download (i.e., if the Printer Control Diagnostic Agent did not already exist on the user computer) and execute a diagnostic agent (e.g., a Printer Control Diagnostic Agent) on the user's computer. The Printer Control Diagnostic Agent would then run diagnostics on the user's printer, check the printer-related software on the user computer, etc. using other pairs of specific diagnostic agents and diagnostic interpreters.

The diagnostic information collected by the Printer Control Diagnostic Agent on the user computer is then sent back to the Printer Control Diagnostic Interpreter on the PSS computer. The Printer Control Diagnostic Interpreter saves the information for later display and interpretation by a support engineer. A similar sequence takes place for network problems, application problems, etc., using the appropriate interpreter/agent pairs.

In many cases, the user may solve the problem by navigation through the graphical representation of the interactive voice response menu. As a result, the user may terminate the connection before talking to a support engineer. This saves the support center significant support costs. However, if the user cannot solve the problem based on navigation through the graphical interactive voice response menu, or with additional queries to PSS databases, the user is presented with a message that instructs the user to stay on the line to talk with a support engineer. The user is then added to a voice queue.

When a support engineer becomes available, data collected by agent(s) launched during the user's navigation through the hierarchical scheme, if any, is displayed for the support engineer (as was described above for the printer problem example).

The support engineer can quickly examine the data and discuss the results with user. If additional information is required, the support engineer can download and execute additional applications to collect the information from the user computer. As a result, the user's problem may be diagnosed more quickly and thoroughly than it could by using other methods such as an interactive voice response menu or voice interaction with a support engineer.

In another embodiment of the present invention, a user can connect to the support center by making a data connection. If a data connection is made (e.g., with a generic modem, Internet connection, etc.), no voice communications are available. This allows a wide variety of users without a VoiceView™ modem (or other AVD or SVD modem, ISDN device, etc.) to also interact with the support center using a

standard (i.e., data-only) modem. In yet another embodiment of the present invention, a user can connect to the support center by making a data connection with a voice/data connection (e.g., ISDN, etc.).

As is shown in FIG. 9, when a user 50, using a computer 38, calls a support center 34 (PSS center) with a standard modem 94 (or other appropriate data communications device) and wants information, a communications path 96 (via a data connection 98) for data transfer is set up over the caller's telephone line. However, no voice traffic is available with this data connection. A standard modem 94 at the support (PSS) center 34 allows the user 50 to make a data connection 98 with the support center, and allows the support center computer 36 to send/receive data to/from a user's computer 38. The communications path is routed through an interactive voice response unit (IVRU) 44 at the support center. The IVRU is connected to an IVRU server 46 which permits access to one or more databases 48 at the support center. As was described above, the IVRU server 46 can be used to bypass the IVRU and permit a user to directly query a database 48 at the support center to obtain information not displayed in the graphical IVRU menu.

In this embodiment, the voice interactive response menu decision tree is automatically displayed on the user's computer 38 in a graphical format as the default option (e.g., with an ISDN data connection). The user navigates through the graphical interactive voice response menu as described above. This embodiment may also include having the PSS computer launch diagnostic applications on the user computer when the user visits selected levels in the hierarchical scheme. However, the ability to launch diagnostic applications on the user computer depends on the specific type of data connection that has been established between the user computer and the PSS computer.

Since the user may not have a voice connection to talk to a support engineer for further assistance, if further assistance is required, the user would have to establish a voice connection or voice/data connection with the support center (or rely on a "chat" mode of data communication). However, even without a voice connection, the user can still receive the diagnostic benefits associated with navigation through the graphical interactive voice response menu described above.

In yet another embodiment of the invention, Hyper Text Markup Language (HTML) is used to create the graphical menus which are displayed on the user computer. HTML is a standard for viewing information over the Internet. However, HTML can be used for non-Internet applications. HTML can be used to create graphical menus for any connections (e.g., voice/data, data satellite, wireless, network, etc.) a caller can make to a support or call center, or a remote information server.

When HTML is used to create a graphical display of IVRU menus, an HTML viewer parses the HTML information and displays text and/or graphics on the display device connected to the user computer.

To use HTML to display IVRU menus, a new protocol called the "Visual HTML IVR protocol" is used. The Visual HTML IVR protocol acts very similar to the existing HTML file transfer protocol.

In a preferred embodiment of the present invention using HTML for graphical display of IVRU menu information, the Visual IVR protocol is implemented by modifying or extending the Microsoft® Internet Explorer™, an HTML viewer, which runs under the Windows® 95 operating system by Microsoft® Corporation of Redmond, Wash.

However, other HTML viewers (e.g., Netscape™, Mosaic™, NetCrusier™, etc.) running under other operating systems could also be modified or extended to accept the HTML Visual IVR protocol.

When HTML is used to display IVR information from an IVRU, HTML Visual protocol information is automatically added to the beginning of all Uniform Resource Locators (URLs)(local and remote) that will obtain HTML files from the remote support center by the support center computer. For example a menu item which contains a local URL in "normal" HTML syntax would have the format:

```
<A HREF="linkfile.html"></A>
```

where HREF provides an address to another location to jump to, '<A "string" ' represents HTML syntax to enclose a HTML file name for a URL (i.e., a link), and 'NAME=' is the name of the HTML file to use for the link. When a user selects this HTML link from the HTML menu items, the HTML viewer looks for the file "linkfile.html", on the local machine.

However, when the HTML Visual Protocol is used to display IVR information, the same HTML local URL syntax becomes:

```
<A HREF="ivr:linkfile.html"></A>
```

The string "ivr:" is prepended to all URL links which require HTML IVR files from the remote support center.

Remote URLs are treated in a similar manner. For example, a menu item which contains a remote link in "normal" HTML syntax would have the format:

```
<A HREF="http://machineaddress/path/linkfile.html"></A>
```

The HTML viewer will attempt to make a hyper text transfer protocol (http) connection to "machine-address" and obtain "linkfile.html" from "machine-address/path."

However, in another embodiment of the present invention, when the HTML Visual Protocol is used, the same HTML remote URL syntax becomes:

```
<A HREF="ivr:http://machineaddress/path/linkfile.html"></A>
```

The string "ivr:" is prepended to all such remote HTML URLs on the support center computer.

In this case (i.e., "ivr:http"), the remote support computer must then make a hyper text transfer protocol connection to a third remote computer (i.e., remote to both the support center computer and the user computer) to obtain the desired HTML file. The desired HTML file is then transferred from the third remote machine to the remote support center computer, and then from the remote support center computer to the user computer. Only remote URLs which require files from the remote support center computer will have the "ivr:" string prepended. This allows the HTML viewer to continue to make hyper text transfer protocol connections from the user computer to a remote computers (other than the remote support center computer) directly as desired.

A remote URL can also be a Gopher request (e.g., gopher://gopher-machine-address), ftp request (e.g., ftp://machine-address), or other remote linkups which are known in the art. When HTML Visual IVR protocol is used, these remote URL requests would also have the "ivr:" string prepended (e.g., ivr:ftp://machine-address).

The HTML Visual IVR protocol is added to all appropriate HTML URLs by the support center before the IVR information is sent in HTML format to the user computer. To take advantage of the Visual HTML IVR protocol, a user

must have a modified HTML viewer. The following pseudocode shows how the HTML viewer can be modified to support the Visual HTML IVR protocol:

```

5  for (every URL request made by a user)
  {
    //examine the URL prefix
    if (the URL prefix contains the string "ivr:") // special
      Visual HTML IVR protocol request
    {
      strip the "ivr:" prefix from the URL;
      send remaining URL to remote support center computer;
      wait for HTML file transfer to complete;
      //check the HTML file pointer returned
      if (the HTML file pointer returned == NULL)
      {
15      //problem retrieving the remote HTML file
        cleanup;
        send error sequence;
        return;
      }
      else
20      //file was successfully retrieved from remote machine
        display HTML IVR file information;
    }
    else //Normal Local or remote URL Request
      process "Normal" URL request;
  }
25

```

As is shown in the flowchart in FIG. 10, when a user contacts a support center with an IVRS, the support center computer will send a data packet to the user's HTML viewer indicating that it is capable of receiving HTML information using the HTML Visual IVR protocol 100. If the user's HTML viewer is capable of receiving HTML information 102, the support center will launch an IVR provider application 104. The IVR provider application queries the support center database, and provides IVRU menu information as HTML information using the pre-defined HTML Visual IVR protocol 106. If the user's HTML viewer is not capable of sending HTML information, the user cannot use the HTML viewer to display HTML IVR menu information. As a result, the user may re-contact to the support center using another interface 108 (e.g., the agent/interpreter pairs described earlier). If IVRU menu information is sent as graphical/text data (i.e., non-HTML data), there must be an application on the user computer capable of understanding and displaying the graphical/text data stream, and an application capable of sending the graphical/text data stream (e.g., voice graphical menu agent/interpreter pair described above), or some other method of sending two-way graphical text data.

After the IVRU menu information is displayed, a user can make choices on the HTML menus to obtain additional information from the support center 110. When a user choice is made, on a URL using HTML Visual IVR protocol (i.e., has an "IVR:" prefix), a request is then sent from the modified or extended HTML viewer on the user computer to the IVR provider application on the support center computer 112. The IVR provider application finds the desired information, and then sends it back to the user's HTML viewer 114. In the preferred embodiment, the HTML file data is sent as a file by the Windows® 95 File Transfer Engine. However, other file transfer mechanisms could also be used. Once the user's HTML viewer receives the HTML information, it is displayed using standard HTML parsing 116.

If a user chooses a HTML menu item which is an HTML URL link containing the HTML Visual IVR protocol, then steps 110-116 would be repeated to display the HTML link information. The user repeats steps (110-166) until they have obtained the desired information from the support

center 118. As was described above, a user can also access information with a URL pointing to information on the local computer, and a remote computer (e.g., "http:" with no "IVR:" prefix) other than the support center computer.

The Visual IVR protocol can be used over a number of data transports to display IVRU menu information. For example, over sockets using a VoiceView™ modem as described above (and shown in FIG. 5), over a data connection on a standard modem, over an voice/data connection (e.g., AVD, SVD modem, ISDN devices, etc.) over a network connection (e.g., PPP, SLIP, TCP/IP, etc.), etc. The HTML information can also contain embedded audio (e.g., *.WAV files), video (e.g., MPEG encoded video, etc.) and pictures (e.g., JPEG encoded still images, .GIF files, etc.) to further enhance the IVRU menu information. The capabilities of the HTML viewer are used to display this embedded audio, video, and pictorial information.

The HTML Visual IVR protocol information can be added quickly and automatically by the support center computer to HTML data sent to remote computers. This provides a very flexible way to use the HTML format to display the IVR menu information.

An additional benefit of using HTML to graphically display IVRU menu information is that multi-lingual menus can be produced quickly and easily (which is not the case with a graphics/text information stream). This provides great flexibility for users who prefer another language (e.g., their own native language) over English.

Having illustrated and described the principles of the present invention in a preferred embodiment, it should be apparent to those skilled in the art that the embodiment can be modified in arrangement and detail without departing from such principles. Accordingly, we claim as our invention all such embodiments as come within the scope and spirit of the following claims and equivalents thereto.

We claim:

1. In a system having a first communications terminal coupled to a remote second communications terminal by a communications circuit, each communications terminal having a central processing unit coupled to a memory, the first communications terminal having one or more interactive voice response units, the second communications terminal having a display for visually outputting data signals, and an audio input/output device for inputting/outputting audio signals, a method of switching to use of visual data queries, comprising the steps of:

45 sending a first query from the first communications terminal to the remote second communications terminal, the first query comprising an audio signal allowing a user of the second communications terminal to receive subsequent queries as visual displays on the second communications terminal, or to proceed using audio queries alone;

outputting the first query on the second communications terminal using the audio input/output device;

monitoring the communications circuit from the first communications terminal to detect whether the user elects to employ visual display of queries; and, if so,

outputting a subsequent set of queries in the form of a visual display on the second communications terminal, said visual display permitting the user to skip one or more intermediate levels of queries and thereby more quickly reach a desired result.

2. The method of claim 1 where sending a first query includes sending the first query using an interactive voice response unit.

3. The method of claim 1 where the monitoring step includes monitoring the communications circuit for both audio and data signals.

4. The method of claim 1 wherein the specific response is a telecommunications signal including DTMF tones.

5. The method of claim 1 where the outputting the subsequent set of queries step includes outputting query data using a hierarchical paradigm.

6. The method of claim 5 where the hierarchical paradigm is a decision tree.

7. The method of claim 5 which includes allowing a user of the second communications terminal to selectively respond to any of the outputted subset of interactive voice response queries at any level in the hierarchical paradigm, thereby skipping intermediate levels.

8. In a system having a first communications terminal coupled to a remote second communications terminal by a communications circuit, each communications terminal having a central processing unit coupled to a memory, the first communications terminal having one or more interactive voice response units, the second remote communications terminal having a display for visually outputting data signals, an audio input/output device for outputting audio signals, a method of choosing from a plurality of interactive voice response queries:

storing on the first communications terminal a set of interactive voice response queries;

25 sending a first subset of said plurality of interactive voice response queries to the second communications terminal;

outputting said subset of interactive voice response queries on the second communications terminal using a hierarchical paradigm;

allowing a user to selectively respond to any of the outputted subset of interactive voice response queries at any level in the hierarchical paradigm, thereby skipping intermediate levels;

monitoring the communications circuit to detect a response to the subset of interactive voice queries from the second communications terminal; and

upon detecting a response, sending a subsequent subset of the plurality of interactive voice response queries to the second communications terminal for display, based on the user responses to said first subset of queries;

wherein the system determines which queries to present to a user based on a probabilistic scheme that directs the user to information most likely wanted or needed based on the system's experience with prior users.

9. The method of claim 7 where the sending steps include sending the subset of interactive voice response queries as data signals.

10. The method of claim 7 where the sending steps include sending the subset of interactive voice queries as audio and data signals.

11. The method of claim 7 where the hierarchical paradigm is a decision tree.

12. The method of claim 7 where the outputting step includes outputting the interactive voice queries as data on the display.

13. The method of claim 8 where the monitoring step includes monitoring the communications circuit for both audio and data signals.

14. In a system having a first communications terminal coupled to a remote second communications terminal by a communications circuit, each communications terminal having a central processing unit coupled to a memory, the first communications terminal having one or more interactive voice response units, the second remote communications terminal having a display for visually outputting data

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signals, an audio input/output device for outputting audio signals, a method of choosing from a plurality of interactive voice response queries:

storing in a database on the first communications terminal a set of interactive voice response queries;

sending a first subset of said plurality of interactive voice response queries to the second communications terminal;

outputting said subset of interactive voice response queries on the second communications terminal using a hierarchical paradigm;

allowing a user to selectively respond to any of the outputted subset of interactive voice response queries at any level in the hierarchical paradigm, thereby skipping intermediate levels;

monitoring the communications circuit to detect a response to the subset of interactive voice queries from the second communications terminal; and

upon detecting a response, sending a subsequent subset of the plurality of interactive voice response queries to the second communications terminal for display, based on the user responses to said first subset of queries

wherein the allowing step includes allowing a user using the second remote communications terminal to directly consult the database on the first communications terminal to obtain interactive voice response information not sent as default queries to the second communications terminal.

15. In a system having a first communications terminal coupled to a remote second communications terminal by a communications circuit, each communications terminal having a central processing unit coupled to a memory, the first communications terminal having one or more interactive voice response units, the second remote communications terminal having a display for visually outputting data signals, an audio input/output device for outputting audio signals, a method of choosing from a plurality of interactive voice response queries:

storing on the first communications terminal a set of interactive voice response queries;

sending a first subset of said plurality of interactive voice response queries to the second communications terminal;

outputting said subset of interactive voice response queries on the second communications terminal using a hierarchical paradigm;

allowing a user to selectively respond to any of the outputted subset of interactive voice response queries at any level in the hierarchical paradigm, thereby skipping intermediate levels;

monitoring the communications circuit to detect a response to the subset of interactive voice queries from the second communications terminal; and

upon detecting a response, sending a subsequent subset of the plurality of interactive voice response queries to the second communications terminal for display, based on the user responses to said first subset of queries;

wherein the sending step includes sending the first subset and subsequent subsets of said current plurality of interactive voice response queries as hyper text markup language data, and the outputting step includes using a hyper text markup language viewer to output the subset of queries on the second communications terminal.

16. In a system having a first communications terminal coupled to a remote second communications terminal by a

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communications circuit, each communications terminal having a central processing unit coupled to a memory, the first remote communications terminal having one or more interactive voice response units, the second remote communications terminal having a display for visually outputting data signals, an audio input/output device, a method of completing automatic remote diagnosis of communications terminal problems comprising the steps of:

storing on the first communications terminal a set of interactive voice response queries;

sending a subset of said plurality of interactive voice response queries from the first communications terminal to the second communications terminal for display; outputting the subset of interactive voice response queries on the second communications terminal using the display as a hierarchical paradigm;

allowing a user of the second communications terminal to selectively respond to any of the outputted subset of interactive voice response queries at any level in the hierarchical paradigm, thereby skipping intermediate levels;

monitoring the communications circuit to detect responses to the subset of interactive voice response queries from the second communications terminal;

launching a selected diagnostic application on the second communications terminal, the diagnostic application selected from a plurality of diagnostic applications based on the response obtained from the second communications terminal;

collecting diagnostic information from the second communications terminal using said diagnostic application; sending said collected diagnostic information from the second communications terminal to the first communications terminal; and

analyzing said collected diagnostic information from the second communications terminal on the first communications terminal.

17. The method of claim 16 where the launching step includes downloading a diagnostic application from the first communications terminal to the second communications terminal and executing said diagnostic application on the second communications terminal.

18. The method of claim 16 where the launching step includes executing resident a diagnostic application on the second communications terminal.

19. In a system having a first communications terminal coupled to a remote second communications terminal by a communications circuit, each communications terminal having a central processing unit coupled to a memory, the first communications terminal having one or more interactive voice response units, the second remote computer having a display for visually outputting data signals, a method of graphically displaying a plurality of interactive voice response queries comprising:

storing on the first communications terminal a set of interactive voice response queries;

sending a first subset of said plurality of queries to the second communications terminal as hyper text markup language data containing a pre-defined protocol;

outputting said first subset of queries of hyper text markup language data graphically on the second communications terminal;

allowing a user to selectively respond to any of the outputted subset of queries; and

monitoring the communications circuit on the first communications terminal to detect a response from the from the second communications terminal.

20. The method of claim 19 further comprising:

upon detecting a response on the communications circuit on the first communications terminal, determining whether the response requests information stored on the first communications terminal using the pre-defined protocol, and

if so, sending the requested information as hyper text markup language data containing the pre-defined protocol to the second communications terminal; and

if not, the steps comprising:

determining from the response from the first communications terminal the address of a third remote communications terminal on which the information requested by the first communications terminal resides;

establishing a communications link to the third remote communications terminal;

sending the information request from the first communications terminal to the third communications terminal; and

upon receiving a response from the third communications terminal on the first communications terminal, sending the information obtained from the third communications terminal as hyper text markup language data containing the pre-defined protocol to the second communications terminal.

21. The method of claim 19 further comprising:

allowing a user using the second communications terminal to selectively respond to any of the outputted subset of queries;

upon detecting a response, determining whether the response requests information stored on the second communications terminal using the pre-defined protocol, and if so,

retrieving said information as hyper text markup language data from memory on the second communications terminal, and

outputting said hyper text markup language data graphically on the second communications terminal.

22. The method of claim 19 wherein the hypertext markup language pre-defined protocol includes at least one reference to information on the first communications terminal, the second communications terminal, and at least one additional third communications terminal which is remote to both the first and second communications terminal.

23. The method of claim 19 wherein the hypertext markup language pre-defined protocol includes at least one reference to information on the first communications terminal.

24. The method of claim 19 wherein the hypertext markup language pre-defined protocol includes at least one reference to information on both the first and second communications terminal.

25. The method of claim 19 wherein the hypertext markup language data includes embedded audio and video data.

26. The method of claim 19 wherein the pre-defined protocol used in the hyper text markup language is a visual interactive voice response hypertext markup language protocol.

27. The method of claim 19 wherein the hypertext markup language data includes embedded graphical image data.

28. In a system having a first computer coupled to a remote second computer by a communications circuit, each computer having a central processing unit coupled to a memory, a display for visually outputting data signals, a speaker for outputting audio signals, the remote first computer having one or more interactive voice response units,

the communication circuit allowing the transfer of both audio signals and data signals, a method of obtaining responses to a set of queries comprising the steps of:

5 sending a first set of queries from one or more of the interactive voice response units on the first computer to the second computer, the first set of queries comprising an audio signal allowing a user of the second computer to select display of subsequent queries on the second computer display;

10 outputting the first set of queries on the second computer using the speaker;

monitoring the communications circuit from the first computer to detect a specific response to the first set of queries from the second computer; and

15 in response to the detection of said specific response, sending a subsequent set of queries comprising data signals to the second computer, and outputting the subsequent set of queries using the display on the second computer.

29. The method of claim 28 where sending a first set of queries includes sending the first set of queries using an interactive voice response unit.

30. The method of claim 28 where the monitoring step includes monitoring the communications circuit for both audio and data signals.

31. The method of claim 28 wherein the specific response is a telecommunications signal including DTMF tones.

32. The method of claim 28 where the outputting the subsequent set of queries step includes outputting query data from one or more of the interactive voice response units using a hierarchical paradigm.

33. The method of claim 32 where the hierarchical paradigm is a decision tree based on data collected from problems previously encountered by users.

34. The method of claim 28 further comprising: updating the interactive voice response units with a set of queries relating to problems most recently encountered by users.

35. The method of claim 28 further comprising: monitoring the communications circuit from the first computer to detect a second specific response to the subsequent set of queries outputted as data signals using the display on the second computer;

35 sending a third set of queries from one of the interactive voice response units as audio signals to the second computer; and

outputting the third set of computers on the second computer using the speaker.

36. In a system having a first computer coupled to a remote second computer by a communications circuit, each computer having a central processing unit coupled to a memory, a display for visually outputting data signals, a speaker for outputting audio signals, the remote first computer having one or more interactive voice response units, the communications circuit allowing the transfer of both audio signals and data signals over said communications circuit, a method of displaying a plurality of queries:

maintaining a database on the first computer containing database entries listing a plurality of interactive voice response queries;

consulting the database on the first computer to obtain a current plurality of interactive voice response queries to display on the second computer, wherein the current plurality of interactive voice response queries is based on data collected from problems previously encountered by users;

sending a first subset of said current plurality of interactive voice response queries to the second computer, wherein the current subset of interactive voice response queries includes at least one problem encountered by more than one user;
 outputting said subset of interactive voice response queries on the second computer;
 allowing a user to selectively respond to any of the outputted subset of interactive voice response queries;
 monitoring the communications circuit to detect a response to the subset of interactive voice queries from the second computer; and
 upon detecting a response, sending a subsequent subset of the plurality of interactive voice response queries to the second computer for display based on the user responses to said first subset of queries.

37. The method of claim 36 where the consulting step includes using data obtained from previous interactions by users who have had computer software problems.

38. The method of claim 36 where the sending steps include sending the subset of interactive voice response queries as data signals.

39. The method of claim 36 where the sending steps include sending the subset of interactive voice queries as audio and data signals.

40. The method of claim 36 where the outputting the subset of queries step includes outputting said interactive voice response queries using a hierarchical paradigm based on data collected from problems previously encountered by users.

41. The method of claim 40 where the hierarchical paradigm is a decision tree based on data collected from problems previously encountered by users.

42. The method of claim 36 where the outputting step includes outputting the interactive voice queries on the display from the one or more interactive voice response units.

43. The method of claim 36 where the allowing step includes allowing a user to jump directly to any subset of interactive voice response queries which are displayed, thereby skipping intermediate subsets.

44. The method of claim 36 where the monitoring step includes monitoring the communications circuit for both audio and data signals.

45. The method of claim 36 further comprising:
 updating the interactive voice response units with a set of queries relating to problems most recently encountered by users.

46. The method of claim 36 wherein the step of maintaining a database on the first computer includes:
 maintaining a hierarchical paradigm of database entries based on data collected from problems encountered by users; and
 updating the hierarchical paradigm of database entries as users encounter new or previously unknown problems.

47. The method of claim 36 wherein the step of consulting the database on the first computer to obtain a current plurality of interactive voice response queries includes using a probabilistic scheme which directs the user to solutions for problems that are most likely to be encountered for a particular set of software.

48. The method of claim 36 further comprising:
 updating the interactive voice response units with a set of interactive voice response queries relating to problems most recently encountered by users.

49. In a system having a first computer coupled to a remote second computer by a communications circuit, each

computer having a central processing unit coupled to a memory, a display for visually outputting data signals, a speaker for outputting audio signals, the remote first computer having one or more interactive voice response units, the communications circuit allowing the transfer of both audio signals and data signals over said communications circuit, a method of completing automatic remote diagnosis of computer problems comprising the steps of:
 maintaining a database on the first computer containing database entries listing a plurality of interactive voice response queries, wherein the list of interactive voice response queries is based on data collected from problems previously encountered by users;
 consulting the database on the first computer to obtain a current subset of the plurality of interactive voice response queries to display, wherein the current subset of interactive voice response queries includes at least one problem encountered by more than one user;
 sending the subset of said plurality of interactive voice response queries from the first computer to the second computer for display;
 outputting the subset of interactive voice response queries on the second computer using the display;
 monitoring the communications circuit to detect response to the subset of interactive voice response queries from the second computer; and
 launching a selected diagnostic application on the second computer, the diagnostic application selected from a plurality of diagnostic application based on the response obtained to the subset of interactive voice response queries from the second computer.

50. The method of claim 49 further comprising:
 updating the database on the first computer containing database entries listing a plurality of interactive voice response queries using the detected response to the subset of interactive voice queries from the second computer.

51. The method of claim 49 wherein the step of sending a subset of said plurality of interactive voice response queries from the first computer includes sending a set of queries relating to problems most recently encountered by users.

52. The method of claim 49 wherein the step of maintaining a database on the first computer includes:
 maintaining a hierarchical paradigm of database entries based on data collected from problems encountered by users; and
 updating the hierarchical paradigm of database entries as users encounter new or previously unknown problems.

53. The method of claim 49 wherein the step of consulting the database on the first computer includes using a probabilistic scheme to obtain a current subset of the plurality of interactive voice response queries which directs the user to solutions for problems that are most likely to be encountered for a particular set of software.

54. The method of claim 49 further comprising:
 updating the interactive voice response units with a set of interactive voice response queries relating to problems most recently encountered by users.

55. The method of claim 49 further comprising:
 outputting the subset of interactive voice response queries in a hierarchical paradigm containing a plurality of levels, wherein upper levels in the hierarchical paradigm represent a description of problems that are most likely to be encountered for a particular set of software problems; and

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launching automatically a selected diagnostic program on the second computer whenever selected levels in the hierarchical paradigm are accessed based on the detected response.

56. A computer readable medium having stored therein instructions for causing a first computer to execute the following method:

5 sending a first set of queries from one or more interactive voice response units on the first computer to a second computer, the first set of queries comprising an audio signal allowing a user of the second computer to select display of subsequent queries on the second computer; monitoring a communications circuit linking the second and first computers to detect a specific response to the first set of queries from the second computer; and 15 in response to detection of said specific response, sending a subsequent set of queries comprising data signals to the second computer for display thereon.

57. A computer readable medium having stored therein instructions for causing a first computer to execute the following method:

maintaining a database containing database entries listing a plurality of interactive voice response queries; consulting the database to obtain a current plurality of interactive voice response queries to display on a second computer, wherein the current plurality of interactive voice response queries is based on data collected from problems previously encountered by users; sending a first subset of said current plurality of interactive voice response queries to the second computer, wherein the current subset of interactive voice response queries includes at least one problem encountered by more than one user; 30 monitoring a communications circuit linking the second and first computers to detect a user response to the 35

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subset of interactive voice queries from the second computer; and

upon detecting a response, sending a subsequent subset of the plurality of interactive voice response queries to the second computer for display based on said user response to said first subset of queries.

58. A computer readable medium having stored therein instructions for causing a first computer to execute the following method:

maintaining a database containing database entries listing a plurality of interactive voice response queries, wherein the list of interactive voice response queries is based on data collected from problems previously encountered by users;

consulting the database to obtain a current subset of the plurality of interactive voice response queries to display, wherein the current subset of interactive voice response queries includes at least one problem encountered by more than one user;

sending the subset of said plurality of interactive voice response queries from the first computer to a second computer for display;

monitoring a communications circuit linking the second and first computers to detect a response to the subset of interactive voice response queries from the second computer; and launching a selected diagnostic application on the second computer, the diagnostic application selected from a plurality of diagnostic applications based on the response obtained to the subset of interactive voice response queries from the second computer.

* * * * *

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NOTICE OF DRAFTSPERSON'S PATENT DRAWING REVIEW

The drawing(s) filed (insert date) 9/2/99

A. approved by the Draftsperson under 37 CFR 1.84 or 1.152.

B. objected to by the Draftsperson under 37 CFR 1.84 or 1.152 for the reasons indicated below. The Examiner will require submission of new, corrected drawings when necessary. Corrected drawing must be submitted according to the instructions on the back of this notice.

<p>1. DRAWINGS. 37 CFR 1.84(a): Acceptable categories of drawings: Black ink. Color. ___ Color drawings are not acceptable until petition is granted. Fig(s) _____ ___ Pencil and non black ink not permitted. Fig(s) _____</p> <p>2. PHOTOGRAPHS. 37 CFR 1.84 (b) ___ 1 full-tone set is required. Fig(s) _____ ___ Photographs not properly mounted (must use bristol board or photographic double-weight paper). Fig(s) _____ ___ Poor quality (half-tone). Fig(s) _____</p> <p>3. TYPE OF PAPER. 37 CFR 1.84(c) ___ Paper not flexible, strong, white, and durable. Fig(s) _____ ___ Erasures, alterations, overwritings, interlineations, folds, copy machine marks not accepted. Fig(s) _____ ___ Mylar, velum paper is not acceptable (too thin). Fig(s) _____</p> <p>4. SIZE OF PAPER. 37 CFR 1.84(f): Acceptable sizes: ___ 21.0 cm by 29.7 cm (DIN size A4) ___ 21.6 cm by 27.9 cm (8 1/2 x 11 inches) ___ All drawing sheets not the same size. Sheet(s) _____ ___ Drawings sheets not an acceptable size. Fig(s) _____</p> <p>5. MARGINS. 37 CFR 1.84(g): Acceptable margins: Top 2.5 cm Left 2.5cm Right 1.5 cm Bottom 1.0 cm SIZE: A4 Size Top 2.5 cm Left 2.5 cm Right 1.5 cm Bottom 1.0 cm SIZE: 8 1/2 x 11 Margins not acceptable. Fig(s) _____ Top (T) _____ Left (L) _____ Right (R) _____ Bottom (B) _____</p> <p>6. VIEWS. 37 CFR 1.84(h) REMINDER: Specification may require revision to correspond to drawing changes. Partial views. 37 CFR 1.84(h)(2) ___ Brackets needed to show figure as one entity. Fig(s) _____ ___ Views not labeled separately or properly. Fig(s) _____ ___ Enlarged view not labeled separately or properly. Fig(s) _____</p> <p>7. SECTIONAL VIEWS. 37 CFR 1.84 (h)(3) ___ Hatching not indicated for sectional portions of an object. Fig(s) _____ ___ Sectional designation should be noted with Arabic or Roman numbers. Fig(s) _____</p>	<p>8. ARRANGEMENT OF VIEWS. 37 CFR 1.84(i) ___ Words do not appear on a horizontal, left-to-right fashion when page is either upright or turned so that the top becomes the right side, except for graphs. Fig(s) _____</p> <p>9. SCALE. 37 CFR 1.84(k) ___ Scale not large enough to show mechanism without crowding when drawing is reduced in size to two-thirds in reproduction. Fig(s) _____</p> <p>10. CHARACTER OF LINES, NUMBERS, & LETTERS. 37 CFR 1.84(i) ___ Lines, numbers & letters not uniformly thick and well defined, clear, double, and black (poor line quality). Fig(s) _____</p> <p>11. SHADING. 37 CFR 1.84(m) ___ Solid black areas pale. Fig(s) _____ ___ Solid black shading not permitted. Fig(s) _____ ___ Shade lines, pale, rough and blurred. Fig(s) _____</p> <p>12. NUMBERS, LETTERS, & REFERENCE CHARACTERS. 37 CFR 1.84(p) ___ Numbers and reference characters not plain and legible. Fig(s) _____ ___ Figure legends are poor. Fig(s) _____ ___ Numbers and reference characters not oriented in the same direction as the view. 37 CFR 1.84(p)(1) Fig(s) _____ ___ English alphabet not used. 37 CFR 1.84(p)(2) Figs _____ ___ Numbers, letters and reference characters must be at least .32 cm (1/8 inch) in height. 37 CFR 1.84(p)(3) Fig(s) _____</p> <p>13. LEAD LINES. 37 CFR 1.84(q) ___ Lead lines cross each other. Fig(s) _____ ___ Lead lines missing. Fig(s) _____</p> <p>14. NUMBERING OF SHEETS OF DRAWINGS. 37 CFR 1.84(i) ___ Sheets not numbered consecutively, and in Arabic numerals beginning with number 1. Sheet(s) _____</p> <p>15. NUMBERING OF VIEWS. 37 CFR 1.84(u) ___ Views not numbered consecutively, and in Arabic numerals, beginning with number 1. Fig(s) _____</p> <p>16. CORRECTIONS. 37 CFR 1.84(w) ___ Corrections not made from prior PTO-948 dated _____</p> <p>17. DESIGN DRAWINGS. 37 CFR 1.152 ___ Surface shading shown not appropriate. Fig(s) _____ ___ Solid black shading not used for color contrast. Fig(s) _____</p>
<p>COMMENTS</p>	

REVIEWER AD DATE 2/7/00 TELEPHONE NO. _____

ATTACHMENT TO PAPER NO. _____

INFORMATION ON HOW TO EFFECT DRAWING CHANGES

1. Correction of Informalities--37 CFR 1.85

File new drawings with the changes incorporated therein. The application number or the title of the invention, inventor's name, docket number (if any), and the name and telephone number of a person to call if the Office is unable to match the drawings to the proper application, should be placed on the back of each sheet of drawings in accordance with 37 CFR 1.84(c). Applicant may delay filing of the new drawings until receipt of the Notice of Allowability (PTOL-37). Extensions of time may be obtained under the provisions of 37 CFR 1.136. The drawing should be filed as a separate paper with a transmittal letter addressed to the Drawing Processing Branch.

2. Timing for Corrections

Applicant is required to submit **acceptable** corrected drawings within the three-month shortened statutory period set in the Notice of Allowability (PTOL-37). If a correction is determined to be unacceptable by the Office, applicant must arrange to have acceptable corrections resubmitted within the original three-month period to avoid the necessity of obtaining an extension of time and paying the extension fee. Therefore, applicant should file corrected drawings as soon as possible.

Failure to take corrective action within set (or extended) period will result in **ABANDONMENT** of the Application.

3. Corrections other than Informalities Noted by the Drawing Review Branch on the Form PTO-948

All changes to the drawings, other than informalities noted by the Drawing Review Branch, **MUST** be approved by the examiner before the application will be allowed. No changes will be permitted to be made, other than correction of informalities, unless the examiner has approved the proposed changes.

#6/A
W Meredith
3/14/8

ATTORNEY JACKET NO.: 3125-4002US1



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : McNally et al. Group Art Unit: 2173
Serial No. : 09/400,413 Examiner : Cao Nguyen
Filed : September 21, 1999
For : INFORMATION MANAGEMENT AND SYNCHRONOUS COMMUNICATIONS SYSTEM WITH MENU GENERATION

AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

In response to the Office Action dated November 29, 2000, please amend the above-identified application as follows:

IN THE CLAIMS

Please amend claims 1, 12 and 31 and add new claims 44-57 as follows:

1 (amended) An information management and synchronous communications system for generating menus comprising:

- a. a central processing unit,
- b. a data storage device connected to said central processing unit,
- c. an operating system including a graphical user interface,
- d. a first menu stored on said data storage device,
- e. application software for generating a second menu from said first menu,

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01 FC:203	126.00 DP
02 FC:202	120.00 DP

A1 wherein the application software facilitates the generation of the second menu by allowing selection of items from the first menu, addition of items to the second menu and assignment of parameters to items in the second menu using the graphical user interface of said operating system and wherein data comprising the second menu is synchronized between the data storage device connected to the central processing unit and at least one other computing device.

A2 12. (amended) An information management and synchronous communications system for generating menus comprising:

- a. a microprocessor,
- b. a display device,
- c. a data and instruction input device,
- d. a data storage device for storing information and instructions entered through said data and instruction input means or information generated by said microprocessor,
- e. an operating system, *B*
- f. a master menu stored on said data storage device for generating a modified menu, and
- g. application software.

wherein said microprocessor, operating system and application software are operative to display the master menu on the display device in response to instructions programmed into said microprocessor, operating system, application software and information and instructions entered through said data input device, and wherein said microprocessor, operating system and application software are operative to create the modified menu from said master menu in response to information and instructions entered through said data and instruction input device and wherein data comprising the modified menu is synchronized between the data storage device and at least one other computing device.

31. (amended) In a computer system having an input device, a storage device, a video display, an operating system including a graphical user interface and application software, an information management and synchronous communications method comprising the steps of:

A3

- a. outputting at least one window on the video display;
- b. outputting a first menu in a window on the video display;
- c. displaying a cursor on the video display;
- d. selecting items from the first menu with the input device or the graphical user interface;
- e. inserting the items selected from the first menu into a second menu, the second menu being output in a window;
- f. optionally adding additional items not included in the first menu to the second menu using the input device or the graphical user interface; [and]
- g. storing the second menu on the storage device; and
- h. synchronizing the data comprising the second menu between the storage device and at least one other data storage medium, wherein the other data storage medium is connected to or is part of a different computing device.

B

44. (new) An information management and synchronous communications system for use with wireless handheld computing devices and hospitality computing systems comprising:

A4

- a. a central database containing hospitality applications and data,
- b. at least one wireless handheld computing device on which hospitality applications and data are stored or displayed,
- c. an application program interface, and
- d. a communications control module;

B

wherein applications or data are synchronized wirelessly between the central database and at least one wireless handheld computing device and wherein the applications program interface and communications control module establish a seamless link between the data in the central database and the data on the wireless handheld computing device.

45. (new) The information management and synchronous communications system of claim 44 wherein the communications control module and the application program interface enable the automatic generation of and updating of operator menus or screens on the handheld computer based on data from the central hospitality database.

AH 46. (new) The information management and synchronous communications system of claim 45 wherein messaging formats are used which are in conformity with HTML or XML messaging formats.

B 47. (new) An information management and synchronous communications system for use with wireless handheld computing devices and hospitality applications comprising:

- a. a central database containing hospitality applications and data,
- b. at least one wireless computing device,
- c. at least one wireless paging or beeper device,
- d. an applications program interface, and
- e. a communications control module;

wherein hospitality applications or data are synchronized between the central database, at least one wireless computing device and at least one wireless paging or beeper device and wherein messaging to the wireless paging or beeper device is enabled directly from the operator interface of the wireless computing device.