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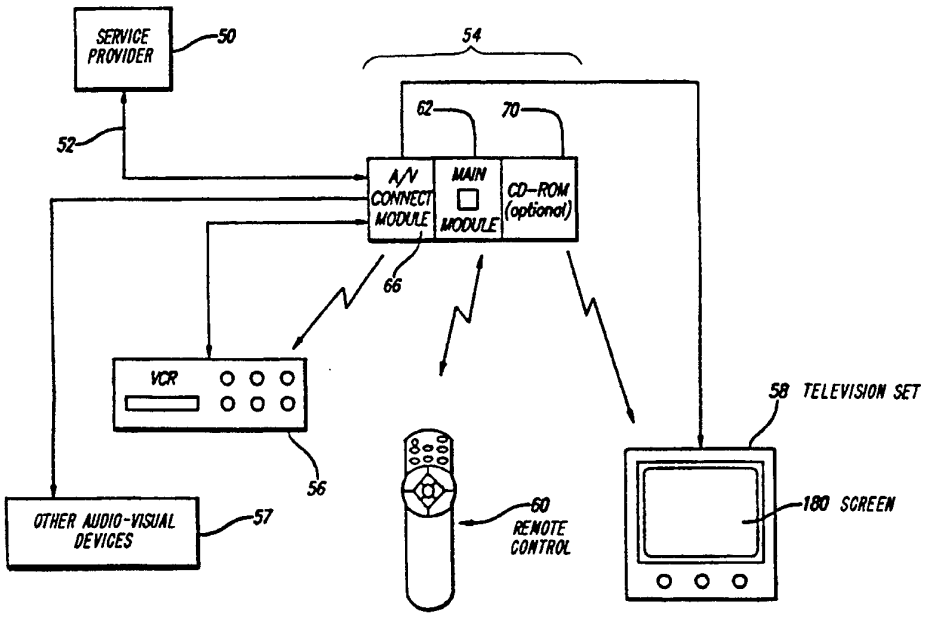
(54) Title: METHODS AND APPARATUS FOR MANAGING VIEWING OF AND INTERACTION WITH AUDIO-VISUAL PROGRAM AND SERVICE OFFERINGS

(57) Abstract

An interactive audio-visual (A/V) transceiver is advantageously coupled to a television and/or telephone (T/T) cable, a TV, a video recorder (VCR), and other A/V devices. The A/V transceiver switches data between a program/service provider and the connected A/V devices. In one embodiment, the transceiver includes three primary modules, a main module including a CPU, a system bus, system memory, an infra-red (IR) control unit, an audio-visual bus, an A/V decoder, an A/V processor, and an A/V encoder, an A/V connect module including a number of tuner/demodulators and a switch, and an optional CD ROM module. The A/V transceiver hardware is complemented with an operating system and software program which supports the functions provided in the A/V user interface. Additionally, a remote control device is provided to communicate with the A/V transceiver to interactively manage selection of program and service sources, selection program and service offerings from any selected source, viewing of selected program offerings, and interaction with selected service offerings. The remote control device is advantageously provided with a basic A/V control button group, an interactive control button group, an auxiliary control button group and a numeric key pad to facilitate control of the transceiver. The interactive control button group includes an info button, a list button, a categories button, a pix button, a mark button, a jump button, and a pointing device consisting of up, down, left, and right arrow buttons, and a center select button.



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METHODS AND APPARATUS FOR MANAGING VIEWING OF AND INTERACTION WITH AUDIO-VISUAL PROGRAM AND SERVICE OFFERINGS

RELATED APPLICATIONS

The present application is related to the following contemporaneously filed applications:

(a) Serial No. _____, entitled "An Audio-Visual System For Selectively Viewing And Interacting With Programs And Services From A Number of Program/Service Sources";

(b) Serial No. _____, entitled "Method And Apparatus For Controlling An Audio-Visual System For Selectively Viewing And Interacting With Programs And Services From A Number of Program/Service Sources";

(c) Serial No. _____, entitled "Methods And Apparatus For Managing Selection Of Audio-Visual Program And Service Offerings";

BACKGROUND OF THE INVENTION

1. Field of the Invention:

The present invention relates to the field of audio-visual systems. More specifically, the present invention relates to a system for selectively viewing and interacting with programs and services from a number of program/service sources, a control device for controlling the system, and the methods and apparatus incorporated in the system for managing selection, viewing, and interacting with the program/service offerings.

2. Art Background:

Over the past 40 years, television and motion pictures have become an important aspect of everyday life for people in the industrialized world. The development of advanced technology in the areas of digital and high definition television (HDTV), video recording systems, laser disks and compact disc (CD) entertainment systems, coupled with satellite, cable television and telephone services, have provided opportunities for viewers to store, retrieve and selectively display a variety of television and audio-visual or interactive programming on home entertainment systems. Over the past decade, improvements in personal computing systems have

provided a variety of powerful miniaturized personal computers which permit the storage of data and control of home appliances, such as entertainment systems, through the use of microprocessors. Additionally, a variety of graphic user interfaces have been developed to ease human interaction with these new personal computer systems.

The combination of computer technology with television (TV) and audio-visual (A/V) systems, has fostered the development of multi-media interactive entertainment systems. The combination of computer hardware and software with audio-visual systems has brought new forms of art and entertainment into being. CD read only memory (ROM) systems coupled to personal computers permit interactive video computer simulations, unique self-paced learning environments and interactive "movies", not possible in earlier television systems (See, *"The Revolution Starts Here"*, Newsweek, page 42 (January 18, 1993)). It is known that consumers desire interactive television and multi-media applications for home use. One of the biggest challenges for an interactive television service is the design of an interface that is easy and fun to use by average consumers.

In the computer industry, a variety of graphic user interfaces have been developed to facilitate human interaction with computer systems. Many display systems utilize metaphors in the

design of the interface as a way of maximizing human familiarity, and conveying information between the user and the computer. It is well known that designing around a familiar metaphor helps reduce human learning time (See for example, Patrick Chan, "Learning Considerations In User Interface Design: *The Room Model*", Report CS-84-16, University of Waterloo Computer Science Department, Ontario, Canada, July, 1984, and the references cited therein). Research in interface design using metaphors in man-machine interfaces may be applied to multi-media systems, and in particular, to interactive television systems.

The marriage of video and television technology with computer interface technology provides consumers with maximum flexibility in storing, retrieving and viewing television and other audio-visual programming. As will be described, the present invention provides methods and apparatus for presenting an improved audio-visual user interface, which includes various user-selectable features for viewing and controlling a television, video tape recorder (VCR) and other audio-visual devices. As will be disclosed, the present invention's user interface provides a user-friendly mechanism for consumers to view, record, and play back TV and A/V programs, as well as control other A/V home entertainment devices using a remote control device. Furthermore, information such as TV program listings and additional information related to programs as well as selecting and controlling categories of interactive

programs and services may be provided through the user interface of the present invention.

SUMMARY OF THE INVENTION

The present invention provides methods and apparatus for presenting an improved audio-visual user interface for selecting and displaying cable television or other audio-visual programs, as well as controlling various audio-visual devices and interactive services. The present invention assumes a service provider provides cable television and/or telephone (T/T) service to users via a T/T cable, including a digital channel of program/service listings, at least one digital back channel (from the user's home to a central file server), a number of analog TV channels, a number of digital pay-per-view channels, and other interactive services. transmitted from remote storage devices such as digital file servers. Under the present invention an interactive audio-visual (A/V) transceiver is advantageously coupled to a user's television, video tape recorder, and the T/T cable. In one embodiment, the transceiver includes three primary modules. A main module includes a central processing unit (CPU) coupled over a digital system bus to system memory and, preferably, an infra-red (IR) or similar wireless control unit. The main module is further coupled over an audio-visual bus to an A/V decoder, an A/V processor, an A/V encoder, a TV, an A/V connect module connected to the T/T cable, and to one or more VCRs and other A/V devices. The main module may also be coupled to an optional CD ROM module, to permit the playback of multi-media CD

ROM titles, audio CDs, and the like. Other optional modules or external devices (such as additional VCRs, CDs, hard disks, telephone, fax and answering machines) may be connected to this transceiver and controlled through the use of the audio-visual user interface of the present invention. The A/V transceiver hardware is complemented with an operating system software program which supports the functions provided in the present invention's audio-visual user interface.

In operation, the cable or telephone service provider transmits an interleaved data stream preferably including a television program listing, together with program titles, program times, categories, channel numbers and the like, from a central file server on the digital channel of program listings to the transceiver. The data is interleaved such that the current day's data is followed by other weekly data.

A remote control device is preferably provided for communicating with the transceiver, and includes a number of user selectable interactive functions such as: an info button, a list button, a categories button, a pix button, a mark button, a jump button, a select button, and a pointing device consisting of a set of cross-hair arrow buttons (up, down, left, right) or other pointing devices capable of providing the same functions (such as a mouse, thumb stick or touch pad). While viewing the TV, a user may obtain additional

information on a current program by depressing the info button, and obtaining more detailed information using the pointing device. By depressing the list button on the remote control device, the transceiver displays a program listing of the current programs available for viewing. Through the use of the pointing device, viewers can scroll up and down the program listing or view a highlighted program in full screen by pressing the select button. By pushing the right or left arrow buttons on the pointing device, program listings may also be viewed for different hours, days and up to several weeks in advance through the present invention's use of data interleaving. The depression of the categories button on the remote control device results in the display of a categories menu bar on the TV screen, which includes categories such as "all", "sports", "news" and "favorites". The selection of one of these categories results in the display of only programs within that category. Moreover, through the depressions of both the list button and the categories button, a program listing is displayed of the currently available programs within the selected category. Through the use of the arrow buttons on the pointing device, category listings for different times and dates up to several weeks in advance may also be viewed. The selection of the favorites category results in the display of currently available favorite programs, including programs that are frequently watched by a particular TV household, marked programs, or programs that match preselected user preferences.

The depression of the pix button results in the display of a "visual menu" of multiple picture-in-picture (PIP) windows along the perimeter of the TV screen. Each of the PIP windows displays one of the programs currently being received by the A/V transceiver in the last category selected by the viewer. The PIP windows are displayed at a variable frame rate (N) (depending on the number of windows), and are captured by one or more tuners in the transceiver. A center PIP window displays a larger video image (along with audio) of the currently highlighted PIP window. The other PIP windows can be similarly viewed by using the pointing device on the remote control. The depression of the mark button allows users to "bookmark" a particular program for later viewing. The depression of the jump button allows a user to jump between previously marked programs.

Additional features, functions, and interface screens are available to the viewer using the teachings of the present invention, including a menu button for controlling other devices connected to the A/V transceiver (such as CD, VCR, etc.), a record button for making copies of programs onto connected A/V recording devices (such as VCRs, hard disks, etc.), a plurality of control buttons for playing back, stopping, rewinding, or fast-forwarding audio-visual programs on connected A/V playback devices, a numeric keypad for dialing channel numbers, confirming financial transactions with personal identification numbers, an optional microphone with talk

button for supplementing the present user interface with direct voice commands through the use of voice recognition technology, a pay-per view interface, and a home shopping interface, as well as other features described herein.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1 is a functional block diagram of the audio-visual (A/V) system of the present invention.

FIGURE 2 is a functional block diagram illustrating the major components of the audio-visual transceiver of **Figure 1** in further detail.

FIGURE 3a diagramatically illustrates the electronic spectrum utilized by the present invention.

FIGURE 3b conceptually illustrates the present invention's use of an interleaving data stream to download program/service listings, and other information, to the present invention's A/V transceiver.

FIGURE 4a illustrates one embodiment of the remote control device of the present invention with the sliding panel in a closed position.

FIGURE 4b illustrates the first embodiment of the remote control device of the present invention shown in **Figure 4a** with the sliding panel in an open position.

FIGURES 5a and 5b illustrate a second embodiment of the remote control device of the present invention with no sliding panel and additional features.

FIGURE 6 illustrates the present invention's full screen viewing function as viewed by a user with a graphic overlay panel which includes the current channel number as well as the channel logo and identifier.

FIGURE 7 illustrates the present invention's info function showing the first page of the basic information track ("info-track").

FIGURE 8 illustrates the present invention's info function with a second page of basic information, obtained by using the right arrow button on the remote control device.

FIGURE 9 is an additional illustration of the info function of the present invention in which the user has requested a third page of information using the remote control device.

FIGURE 10 illustrates the present invention's use of the info function providing the user with additional tracks of

information (such as the "Tid Bits" information track), by using the down arrow button of the remote control device.

FIGURE 11 is a further illustration of additional information tracks ("info-tracks"), such as this "Info Mart", accessible to the user of the present invention using the down arrow button of the remote control device.

FIGURE 12 illustrates the present invention's use of the list function to display current program/service listings and to highlight a particular program. Viewers may scroll up or down that list by using the up or down arrow buttons on the remote control device.

FIGURE 13 illustrates the list function of the present invention in which the NTV programming during the hour of 8:00 to 9:00 p.m. includes two programs, one starting at 8:00 p.m., the other starting after the previous program has ended.

FIGURE 14 illustrates the list function of the present invention which allows the user to highlight the second program, which starts at 8:10 p.m., using the right arrow button of the remote control device.

FIGURE 15 is an additional feature of the list function of the present invention where the user marks the highlighted program with the mark button of the remote control device.

FIGURE 16 illustrates the selection of an alternate hourly time slot beginning at 9 p.m. using the right arrow button of the remote control device.

FIGURE 17 illustrates the selection of an alternate day for the program/service listing by depressing the right arrow button of the remote control device.

FIGURE 18 illustrates displaying of a record panel confirming the title and length of the program to be recorded, along with a confirmation of which VCR and tape to record on, by depressing a select button in the remote control device.

FIGURE 19 illustrates the present invention's use of the select button on the remote control device while the program/service listing is displayed to instruct the selected VCR or A/V recording device to make a copy of the highlighted program.

FIGURE 20 illustrates the present invention's "reminder" feature, which automatically displays a live picture-in-

picture (PIP) window of a previously marked program when the program is received by the A/V transceiver.

FIGURE 21 illustrates the present invention's jump function, wherein pressing a jump button one the remote control device permits a user to jump directly to a full screen view of a previously marked program, and wherein pressing the jump button again results in the display of another marked program.

FIGURE 22 illustrates the categories function of the present invention which is displayed by pressing the categories button on the remote control device.

FIGURE 23 further illustrates the categories function wherein the "favorites" category is highlighted by pressing the right arrow button on the remote control device.

FIGURE 24 further illustrates the categories function wherein the "sports" category is highlighted by depressing the right arrow button on the remote control device.

FIGURE 25 illustrates a representative television image in the case where the "sports" category has been selected by depressing the select button on the remote control device.

FIGURE 26 is a further illustration of a representative television image in which the "sports" category has been selected, and an alternate sports channel has been further selected by a user through the use of the up arrow button on the remote control device.

FIGURE 27 illustrates a sports program listing in which the list button has been depressed after the "sports" category has been selected.

FIGURE 28 illustrates the categories function in conjunction with the list function.

FIGURE 29 further illustrates the categories and list functions when the down arrow button is depressed on the remote control device, breaking down the "sports" category into sub-categories such as baseball or football.

FIGURE 30 is a further illustration of the categories and list functions in which the category "favorites" is highlighted and can now be selected by depressing the select button or broken down into sub-categories by depressing the down arrow button on the remote control device.

FIGURE 31 further illustrates the categories and list functions, where the "favorites" category has been broken down into a sub-category of "frequent" programs which are currently listed.

FIGURE 32 is a further illustration of the categories and list functions, where another "favorites" sub-category, "marked programs", is highlighted displaying a list of previously marked programs.

FIGURE 33 conceptually illustrates the pix function of the present invention wherein multiple PIP windows are displayed by pressing the pix button on the remote control device.

FIGURE 34 illustrates the pix function of the present invention in which a new PIP window has been highlighted and is displayed in a larger format in the center of the display screen.

FIGURE 35 is a further illustration of the present invention's pix function in which, through the use of the remote control device, a PIP window showing a pay-per-view program has been highlighted and is displayed in the center portion of the screen.

FIGURE 36 illustrates the menu function which permits users to press a menu button to switch the television display to other audio-visual devices coupled to the transceiver, such as VCR, CD, on-

line services, telephone, etc. For example, once VCR is selected, with the right arrow button, the TV displays an image from the videotape currently in the VCR and the user can press the play button on the remote to playback a previously recorded program on the video tape.

FIGURE 37 illustrates one embodiment of the present invention for selecting a pay-per-view channel offering entitled "Jeff's World" through the use of the select button of the remote control device.

FIGURE 38 illustrates a preview feature of pay-per-view under the above illustrated embodiment.

FIGURE 39 illustrates a credits feature of pay-per-view under the above illustrated embodiment.

FIGURE 40 illustrates an info feature of pay-per-view under the above illustrated embodiment.

FIGURE 41 illustrates a confirmation feature for ordering a pay-per-view offering through the use of the numeric keypad on the remote control device under the above illustrated embodiment.

FIGURE 42 illustrates the reminder feature advising the user that the selected offering of pay-per-view will begin in three minutes under the above illustrated embodiment.

FIGURE 43 illustrates one embodiment of the present invention for selecting and interacting with a home shopping service (TV Shop) offering.

FIGURE 44 illustrates a sample commercial shown to the user if the home shopping service is selected through the use of the select button on the remote control device under the above illustrated embodiment.

FIGURE 45 illustrates a menu permitting the user to select various shops available on the home shopping service using the select button on the remote control device under the above illustrated embodiment.

FIGURE 46 is a further illustration of the home shopping service in which a cookware product is highlighted under the above illustrated embodiment.

FIGURE 47 is a further illustration of the home shopping service in which a mini-espresso machine is highlighted,

and can be selected for ordering with the select button on the remote control device under the above illustrated embodiment.

FIGURE 48 is an information screen provided to the user after selecting a mini-espresso machine for ordering under the above illustrated embodiment.

FIGURE 49 is an order screen in which the user, using the numeric keypad on the remote control device, enters a personal identification number to order the mini-espresso machine under the above illustrated embodiment.

FIGURE 50 is a sample order confirmation provided to the user subsequent to ordering a product in the home shopping service under the above illustrated embodiment.

NOTATION AND NOMENCLATURE

The detailed descriptions which follow are presented largely in terms of interface display images, algorithms, and symbolic representations of operations of data bits within a computer memory. These algorithmic descriptions and representations are the means used by those skilled in the data processing arts to most effectively convey the substance of their work to others skilled in the art.

An algorithm is here, and generally, conceived to be a self consistent sequence of steps leading to a desired result. These steps are those requiring physical manipulations of physical quantities. Usually, though not necessarily, these quantities take the form of electrical or magnetic signals capable of being stored, transferred, combined, compared, displayed and otherwise manipulated. It proves convenient at times, principally for reasons of common usage, to refer to these signals as bits, values, elements, symbols, characters, images, terms, numbers, or the like. It should be borne in mind, however, that all of these and similar terms are to be associated with the appropriate physical quantities and are merely convenient labels applied to these quantities.

In the present case, the operations are machine operations performed in conjunction with a human operator. Useful

machines for performing the operations of the present invention include general purpose digital computers, digitally controlled displays or other similar devices. In all cases, there should be borne in mind the distinction between the method operations of operating a computer and/or display system, and the method of computation itself. The present invention relates to method steps for operating a computer and interactive display system, and processing electrical or other physical signals to generate other desired physical signals.

The present invention also relates to apparatus for performing these operations. This apparatus may be specially constructed for the required purposes or it may comprise a general purpose computer selectively activated or reconfigured by a computer program stored in the computer. The method steps presented herein are not inherently related to any particular computer or other apparatus. In particular, various general purpose machines may be used with programs in accordance with the teachings herein, or it may prove more convenient to construct more specialized apparatus to perform the required method steps. The required structure for a variety of these machines will appear from the description given below. Machines which may perform the functions of the present invention include those manufactured by the Assignee, Apple Computer, Inc., as well as other manufacturers of computer and computer controlled muti-media systems.

DETAILED DESCRIPTION OF THE INVENTION

The following detailed description will be divided into several sections. The first of these will describe a general system arrangement for receiving and generating the audio-visual user interface of the present invention. Subsequent sections will deal with the functional aspects such as the present invention's interactive functions, which includes the info, list, record, mark, jump, category, pix and menu functions, as well as the overall structure and operation of the present invention's user interface.

In addition, in the following description, numerous specific details are set forth such as functional blocks representing data processing devices, and metaphors such as screen, menu and other configurations to assist the user in navigating through the user interface, etc., to provide a thorough understanding of the present invention. However, it will be apparent to one skilled in the art that the present invention may be practiced without these specific details. In other instances, well known circuits and structures are not described in detail so as not to obscure the present invention unnecessarily. For the purpose of this application, the word "audio-visual" and its abbreviation, "A/V", will be used interchangeably and will have the same meaning.

General System Configuration

The multi-media interactive television system of the present invention is illustrated in schematic form in **Figure 1**. As shown in **Figure 1**, a cable or telephone service provider **50** provides cable television or telephone (T/T) services over a T/T cable **52** to a plurality of users coupled to the cable or telephone system, as is known. Although in this Specification reference is made to a cable television or telephone system, it will be appreciated by one skilled in the art that the present invention may be used in conjunction with a variety of other electronic transmission systems including satellite service systems, microwave systems, fiber optic, and radio frequency (RF) systems.

As illustrated in **Figure 1**, the T/T cable **52** is coupled to an audio-visual transceiver **54** which comprises a number of separately identifiable modules. The transceiver **54** is intended to be located in proximity to and coupled to a VCR **56**, a television (TV) **58**, as well as one or more optional audio-visual devices **57** such as additional VCRs, laser disc players, camcorders, stereos, various storage devices, telephones, faxes and answering machines, as shown. Moreover, it is contemplated that transceiver **54** may be directly incorporated into the VCR **56** , the TV **58**, or one the other A/V devices **57**. As will be described below, a remote control device **60** communicates with the transceiver **54** preferably through a wireless

transmission signal (for example, an infrared (IR) signal), or other mechanisms known in the art. Additionally, as illustrated in **Figure 1**, the transceiver **54** is further capable of communicating with the television **58**, the VCR **56** and the other A/V devices **57** through infrared or other means.

Referring now to **Figures 1** and **2**, the transceiver **54** comprises three primary modules: a main module **62**, an A/V connect module **66** and an optional compact disc read only memory (CD ROM) module **70**. The main module **62** includes a central processing unit (CPU) **63** coupled over a system bus **64** to a system memory **65** and an infra-red (IR) control unit **82**, which sends and receives wireless control signals to and from the remote control device **60**. The CPU **63** is further coupled through the system bus **64** to a memory and bus controller **80**, which is itself coupled through an A/V decoder **74** and an A/V encoder **78** to the A/V connect module **66**, as well as to an optional CD ROM module **70**. The CPU **63** is also coupled through the system bus **64**, the memory and bus controller **80** and an A/V bus **73** to an A/V processor **77** and an optional A/V memory **75**.

The A/V connect module **66** switches and receives analog audio-visual signals and digital data from a plurality of audio-visual sources including the T/T cable **52**, the video cassette recorder (VCR) **56**, or the other A/V devices **57**, and couples those signals and data to the main module **62** through the video decoder **74**. The A/V

connect module further switches audio-visual signals and data received from the main module **62** through the video encoder **78**, and sends them back out to the T/T cable **52**, the VCR **56**, the other A/V devices **57** and/or the TV **58**. The A/V connect module **66** includes a switcher **67** and one or more programmable tuners/demodulators **69**, wherein one tuner/demodulator reads and displays a current program from one of the channels received over the T/T cable **52**, and additional tuners/demodulators (or the same tuner/demodulator, used in alternation) are used to read and display data from the side-band channels in picture-in-picture (pip) windows. In addition, the A/V connect module **66** may include descrambling circuitry (not shown) to descramble premium programs received over the T/T cable **52**. It is further contemplated that the A/V connect module **66** provides a graphic overlay function that superimposes an A/V signal from the video encoder **78** against another A/V signal from the T/T cable **52**, the VCR **56**, or the other A/V devices **57** allowing both signals to be simultaneously displayed on the TV **58**, the VCR **56** or the other A/V devices **57**. Finally, the A/V connect module **66** can be used to transmit data such as order information to the cable (T/T) service provider **50** over a back channel **102** described below.

The A/V decoder **74** is used to decode data encoded in the vertical blanking interval or special side-band cable channels into digital data and couple them to the CPU **63** through the memory and bus controller **80** and the system bus **64**. Furthermore, the A/V

decoder **74** is used to convert analog audio-visual signals from the A/V connect module **66** into digital A/V data and couple them to the A/V processor **77** through the memory and bus controller **80** and the A/V bus **73**. Moreover, the A/V decoder **74** may be used to resize audio-visual signals from the A/V connect module **66** in order to create picture-in-picture windows and the like. It is also contemplated that the A/V decoder **74** may be used to decompress certain analog or digital signals (such as MPEG motion video and the like) and couple them to the A/V processor **77** through the memory and bus controller **80** and the A/V bus **73**.

The memory and bus controller **80** is used to route data and control signals between the system bus **64**, the A/V bus **73**, the A/V decoder **74**, the A/V encoder **78** and the optional CD ROM module **70**. The A/V bus **73** is a high-speed digital bus used to free up the system bus **64** during the transmission of large amount of audio-visual data between the A/V processor **77**, the optional A/V memory **75** and, through the memory and bus controller **80**, the A/V decoder **74**, the A/V encoder **78**, and the optional CD ROM module **70**. The A/V processor **77** coupled to the A/V bus **73** is used to manipulate, process, render, mix and otherwise re-arrange digital data into coherent audio-visual displays. An optional A/V memory module **75** also coupled to the A/V bus **73** can be used to store A/V data before or after processing by the A/V processor **77** (using components such as

video random access memory (VRAM) to hold, for example, a frame buffer equivalent to one 640 x 480 x 8-bit color image in memory).

The A/V encoder **78**, coupled to the A/V bus **73** through the memory and bus controller **80**, is used to convert digital A/V data from the A/V processor **77** or the optional A/V memory **75** into analog audio-visual signals which are routed to the TV **58**, the VCR **56** or the other A/V devices through the A/V connect module **66**. It is also contemplated that the A/V encoder **78** may be used to encode other data such as order information sent by the CPU **63** through the memory and bus controller **80** and the system bus **64** and transmit them to the service provider **50** through the A/V connect module **66** and a back channel **102** described below.

The CPU **63** is also coupled over the system bus **64** to a system memory **65** including both volatile and non-volatile memory components. The non-volatile part of system memory **65** includes read-only memory (such as ROM), which is used to store an operating system and playback software, fonts, sounds and the like used in the present invention. The non-volatile part of system memory **65** also includes rewritable memory (such as SRAM), which is used for persistent storage of mark or record indicators, listings of programs viewed or taped, and other user preferences. Additionally, the volatile part of system memory **65** includes sufficient random access memory (such as RAM or DRAM) for the temporary storage of data

received over the T/T cable **52** or from the other devices **56 - 58** connected to the transceiver **54**.

The transceiver **54** can also include an optional CD ROM module **70** coupled through the memory and bus controller **80** to the system bus **64** and the CPU **63**. This optional CD ROM module **70** constitutes a general purpose storage device to permit playback of optical compact discs (CDs), including multi-media CD ROM titles, audio CDs, photo CDs, and motion picture CDs on the TV **58**. It is contemplated that those transceivers which do not include an internal CD ROM module could instead include a CD ROM interface allowing users to connect an external CD ROM drive to the transceiver **54** at a later date. It is also contemplated that this CD ROM module **70** may in the future use different electronic, magnetic, optical or storage technologies other than the current CD ROM embodiment.

Additional modules may be added to the transceiver **54** including, for example, such options as a small computer system interface (SCSI) for accessing digital storage devices such as hard disks, a modem for exchanging digital data over telephone lines, or a serial port for controlling other devices over a wired connection. Another module presently being contemplated is a remote beeper button for locating the remote control device **60**. Many consumers often misplace their remote control devices, and it is contemplated that the present invention may provide a function wherein a speaker on

remote control **60** would beep while the beeper button is pressed until the user locates the remote control.

Referring now to **Figure 3a**, there is shown one possible electronic spectrum of signals provided by the cable T/T service provider **50** over the T/T cable **52** to the transceiver **54**. As illustrated in **Figure 3a**, the spectrum includes at least one digital program listing channel **100**, a plurality of back channels **102**, and a plurality of standard analog TV channels **103**. In addition, and as will be described more fully below, the spectrum includes pay-per-view digital channels **106**, and further additional definable digital channels **108** offering a variety of interactive services, in addition to the general purpose or special channels or services particular to the specific application of the present invention.

As illustrated in **Figure 3b**, the digital program listing channel **100** provides data representing daily and weekly program listings and related information from the service provider **50** to the transceiver **54**. As shown in **Figure 3b**, the listing channel **100** includes a repetitive data stream having data representing today's listing **110** interleaved with weekly listings. For example, there is shown today's data **110**, followed by Monday's data **112**, and then once again followed by today's data **110**. As seen in **Figure 3b**, Tuesday's data **114** is followed once again by today's data **110**, and thereafter by Wednesday's data **116**. Wednesday's data **116** is followed by today's

data **110**, and thereafter by Thursday's data **118**. Thursday's data **118** is followed once again by today's data **110**, and thereafter by Friday's data **119**. Finally, following today's data **110**, Monday's data **112** is once again transmitted along the data stream provided by the service provider **50**. For programming purposes, the data preferably will include titles of programs, show times, special captions, length information, categories, and key words, as well as channel numbers provided from the service provider **50** over the T/T cable **52**, and received by the transceiver **54**. The data stream is an interleaved data stream which repeats on a weekly basis as shown in **Figure 3b**. It is presently contemplated that there would be at least 100 different channels of programs and/or services. A weekly program/service listing with information relating to 100 channels of programs/services could require over 2 megabytes of information. This data stream of programs/services listing information (illustrated in **Figure 3b**) is received by the transceiver's main CPU module **62**, whereafter the sections that are most relevant to the users are stored in the system memory **65**. By interleaving the current day's data with the weekly data, the daily data, the CPU module **62** can update the system memory **65** periodically and still provides quick access to the viewer, without having to store all the received program/service information, thereby reducing the amount of system memory **65** required and the associated hardware cost.

Referring once again to **Figure 3a**, the back channels **102** are used to engage in a variety of transactions, such as ordering products, home banking services and pay-per-view movies, as will be described more fully below. In operation, any request by a user to view a pay-per-view movie or order a product is transmitted to the service provider **50** over at least one back channel **102** through the T/T cable **52**. It is contemplated that as channel capacity increases, so will the number of back channels, allowing for broader band two-way communications such as telephone conversations or interaction with on-line networks.

Referring now to **Figures 4a, 4b**, and **Figures 5a** and **5b**, two alternative embodiments of the remote control device **60** are shown in further detail. It is expected that the model shown in **Figures 5a** and **5b** would be more commonly used. As illustrated in the figures, both embodiments of the remote control device **60** are comprised of four control button groups **115, 134, 160** and **176**. These control button groups **115, 134, 160** and **176** will first be described briefly here, and their usage will be described in further detail below.

The first control button group is the basic control button group **115** which includes standard television control buttons such as power on/off button **120**, volume control button **122** and a mute button **125**. Moreover, channel up/down buttons **130** are provided to the embodiment illustrated in **Figures 4a** and **4b** to increment or

decrement the currently viewed channel on television 58, as is well known. For the embodiment illustrated in **Figures 5a** and **5b**, the channel control function is effectuated using the up and down arrow buttons **145** and **146**.

The second control button group is the interactive control button group **134** which includes an info button **136**, a list button **138**, a categories button **140**, and a mark button **142**. The info button **136** permits the user to obtain multiple levels of information on programs while the user is watching one of the program offerings on the TV **58** (or other A/V devices). The list button **138** permits the user to view listings for programs/services. In the presently preferred embodiment, when TV is selected, the list button **138** permits the user to view current and future TV listings up to one week in advance. The categories button **140** permits the viewer to select programs/services by category. For example, and as will be described below, the user may desire to watch only sports programs, only news programs, or the like. As will be disclosed, the categories button **140**, and the list button **138** operate in concert to provide listings of selected categories, such as sports or news programs, on the TV **58**. The mark button **142** permits the user to mark programs for reminders, later recall, or switching between programs which have been selected using the mark button **142**. A jump button **132** lets the user switch to the program that was last marked, then to the program that was marked before that, and so on, until all marked programs

have been shown, looping back to the last marked program again. As shown in **Figures 5a** and **5b**, the jump button **132** and the mark button **142** are placed side by side together on the dividing line between the first and second control button groups **115** and **134** to emphasize their interrelation.

Also provided with the interactive control button group **134** is a pointing device consisting of an up arrow button **145**, a down arrow button **146**, a left arrow button **148**, and a right arrow button **150**. For example, if the user is viewing a program/service listing through the use of list button **138**, and desires to scroll up or down within the listing, the up arrow button **145** and the down arrow button **146** are utilized. In addition, a center select button **155** is provided for permitting the user to select one of several choices, represented by words or icons in graphic menus or lists displayed on the TV **58**, for example a "bull's eye" as shown in **Figure 5a**. As will be described, the interactive control button group **134** may be used in a variety of applications, including selection of pay-per-view channels, home shopping services, and the like, as well as to display and control programs from other A/V devices connected to the transceiver **54**.

The third control button group is the auxiliary control button group **160** comprising various A/V control buttons for controlling the VCR **56** or the other A/V devices **57** connected to the transceiver **54**. As illustrated in **Figure 5a**, the auxiliary control

button group **160** includes a record button **162**, a rewind button **164**, a stop arrow button **166**, a play/pause button **168**, a fast forward button **170**, and a menu button **172**. In accordance with the teachings of the present invention, the user depresses the record button **162** while watching a television program on TV **58**, which brings up a record panel confirming the current program's title and length, along with a highlighted select icon and confirmation of which A/V device and type to use for recording. Once the center select button **155** is depressed, the VCR **56** or the other selected A/V device **57** begins to record the program currently being viewed by the user. Alternatively, if the user has pressed list button **138**, and a program listing is highlighted, pressing the record button **162**, and then the center select button **155** results in the VCR **56** being programmed to record the particular show highlighted in the program listing. Pressing the menu button **172** displays icons for all the A/V devices **57** currently connected to the transceiver **54** and allows users to select another device with the arrow buttons. Pressing the center select button **155** displays the output of that device and lets the user control that device.

The fourth control button group is the numeric keypad panel **176**, which permits the user to directly enter channel numbers to be viewed on the TV **58** by pressing a single, double or triple digit number, followed by the ok button **178** (**Fig. 5a**). For the remote control device **60** shown in in **Fig 4b**, the user would depress the select button **155** after entering values using the keypad **176**. In addition,

the numeric keypad **176** may be used by the user to enter a personal identification number ("PIN"), to be transmitted to the service provider **50** through the A/V connect module **66** for payment of pay-per-view movies, products and the like.

In addition to the control button groups, both embodiments comprise a transmitter (not shown) for transmitting signals to the audio-visual system. Additionally, the model illustrated in **Figures 5a - 5b** is further provided with a talk button **181**, a microphone **179**, a speaker **182** and a receiver (not shown). The talk button **181** when depressed allows the user to speak into the microphone **179**, thereby providing input to the A/V system through voice, and receive voice feedback from the A/V system through the speaker **182**.

Full Screen Viewing Function

Referring now to **Figure 6**, there is shown a representative full screen audio-visual program displayed on the screen **180** of the TV **58**. By depressing the channel up/down buttons **130** on the remote in **Figures 4a** and **4b**, (or by depressing the up and down arrow buttons **145** and **146** on the remote control device in **Figures 5a - 5b**), users can switch channels as is commonly done with regular TV remotes. As the user selects a channel to view using the remote control device **60**, a graphic overlay panel **185** is displayed in the lower right hand portion of screen **180**. As illustrated, the graphic overlay panel **185** includes the channel number currently being viewed **186** along with the channel logo and identifier **188**. Additionally, a marking identifier **189**, such as a check mark, is also displayed, as will be described, to indicate that the program has been marked through the use of the mark button **142** previously discussed with reference to the remote control device of **Figures 4a**, **4b**, and **Figures 5a** and **5b**.

Information Function

Referring now to **Figure 7**, there is shown the screen **180** in which the information (info) function **136** has been requested by the user. As the user is watching a particular television program on the TV **58**, he may depress the info button **136** to obtain information in the form of a graphic overlay panel **190** on the screen **180**. In operation, the transceiver **54** coupled with the main module **62** through the A/V connect module **66** superimposes the graphic overlay panel **190** against the currently displayed video image. This process is also used in other functions, such as the full screen viewing function, where the graphic overlay panel **185** is superimposed on the screen **180**. The overlay graphic panel **190** contains an "i" logo **192** indicating that the information button **136** has been depressed, and also displays the title of the currently viewed program **194** ("Showbits This Month" in this example), a category name **196** ("News" in this example), and the length of the overall program ("60 min" in this example). In addition, the channel number and network logo ("8" and "CMM" in this example) are also provided to the user. Also, as illustrated in **Figure 7**, the overall length of the currently viewed program is graphically illustrated, by a time bar **200** showing how much time remains before the program ends. A left arrow **201**, a right arrow **202**, and a down arrow **210** are displayed and highlighted to indicate that the left arrow button **148**, the right arrow button **150**, and the down arrow button **146**, of the remote control device **60** can be

depressed to cause additional information to be depressed. An up arrow **205** is also displayed, but is not highlighted, to indicate that no additional information will be displayed if the up arrow button **145** is depressed.

Referring now to **Figure 8**, which illustrates a new graphic overlay panel **190** displayed in response to the user having depressed the right arrow button **150** on the remote control device **60** while using the information function. The transceiver **54** provides additional information on the currently viewed program. As illustrated, an additional page of information on the program currently viewed is displayed. For example, additional guests on the show "Showbits This Month" include "Madeline, Harold Black and Harmer". Referring now to **Figure 9**, which illustrates another new graphic overlay panel **190** displayed in response to the user having depressed the right arrow button **150** again. A third page of information is displayed on the screen **180** relating to the currently viewed program "Showbits This Month". It will be noted that the currently viewed television program ("Showbits This Month" in this example) continues to be viewed in the main portion of the screen **180**, while different graphic overlay panels **190** are superimposed over the lower third portion of the screen **180**.

In the currently preferred embodiment, a user may selectively move between pages of information relating to the

currently viewed program by pressing the right arrow button **150** or the left arrow button **148** on the remote control device **60**, or alternatively, the main module **62** will automatically scroll through the various pages of information with a pre-determined amount of display time for each page of information.

Referring now to **Figure 10**, there is shown a currently viewed baseball game entitled "Saint Louis at San Francisco" displayed on the screen **180**. Assume now the user also depresses the info button **136** on the remote control device **60**. As previously described, information relating to the currently viewed program is displayed within the graphic overlay panel **190**. (n the present example, information relating to the baseball player, "John Smith", is provided within the overlay **190**. In the event the down arrow **210** is highlighted, an additional information track is available to the user. This additional information track may be displayed through the use of down arrow button **146** on the remote control device **60**, and is referred to here as "Tid Bits". As shown in **Figure 10**, the "Tid Bits" information track gives additional information relating to the particular subject currently being displayed on the screen **180**. In the example of **Figure 10**, the first baseman John Smith is currently being viewed on the screen **180**, and information relating to John Smith is provided in the graphic overlay panel **190**. It will also be noted that in **Figure 10**, the down arrow **210** is highlighted, indicating that yet another information track is available.

Still referring to **Figure 10**, it will be noted that a down arrow **210** is shown. By depressing the down arrow button **146** on the remote control device **60** once again, an Info Mart track information track as shown in **Figure 11** is displayed by CPU **63** in the graphic overlay panel **190**. As illustrated, the Info Mart information track provides the viewer with the opportunity to purchase products, services, programs and the like related to the program which is currently being viewed (in the present example, the baseball game "Saint Louis at San Francisco"). The information track disappears when the info button **136** is pressed again.

While the information has been described with the left and arrow arrow buttons **148** and **150** causing different pages of an information track to be displayed, and the up and down arrow buttons **145** and **146** causing different information tracks to be displayed, it is contemplated that the information displayed may be related to each other in other application dependent manners. It is further contemplated that this information function can also be used with audio-visual programs or services other than TV shows, in particular when the menu button **172** is used to display the output of the VCR **56**, the CD **70**, a hard disk, a telephone or another other A/V device **57** connected to the transceiver **54**.

The data comprising the information of the various information tracks shown in **Figures 7 - 11** are downloaded using the method illustrated in **Figure 3b**, i.e. the interleaved data stream transmitted from the service provider **50**, to the transceiver **54**. The data are stored in the system memory **65** and updated as new data are received over the digital program listing channel **100**. Alternatively, data displayed in the information tracks such as the exemplary Tid Bits or Info-Mart information tracks may be transmitted by the service provider **50** to the transceiver **54** using the vertical blanking intervals, which are inherently part of the analog TV channel **103** used to display the currently viewed program on the TV **58**. In another embodiment, data comprising the information tracks may be transmitted and downloaded through the use of separate info-track channels comprising additional channels in the electronic spectrum illustrated in **Figure 3a**.

List Function

Referring now to **Figure 12**, the list function of the present invention will be described. While viewing a television program displayed on the TV **58**, the user may depress the list button **138** on the remote control device **60** to obtain a program/service listing for the current date and time during which the user is watching television. As shown in **Figure 12**, upon depressing the list button **138**, a program/service listing **220** is displayed for the current date and time at which the viewer has depressed the list button **138**. As illustrated, programs/services currently available for viewing and interaction are identified by their channel numbers, channel name identifiers (for example, Channel 10, NTV), and by titles of the programs/services. In the event that the program/service listing includes two programs for a given time interval, then the names of both programs are displayed. For example, in **Figure 12**, Channel 10 is NTV which beginning at 8:00 p.m. is showing a program entitled "Rock Today", and beginning at 8:10 p.m. is showing a program called "Party Time". In addition, as shown in **Figure 12**, a picture-in-picture window **250** continues to display the currently viewed program which the user was last viewing. Accordingly, the user may continue to view the currently selected program, and the current program/service listing simultaneously. By pressing the select button **155** in the current time slot, the user can view the currently highlighted program in full screen, as long as that program is playing

live at the current time. For example, in the case of **Figure 13**, the pressing of the select button **155** would display NTV's "Rock Today" program in full screen. It will be noted that although the current implementation of the list function displays a list of programs/services on single lines for one hour time slots, the invention's user interface also supports other styles of display, for example, a grid showing programs on two lines, each line representing a two hour time slot.

It will also be noted that the currently selected program being displayed in the picture-in-picture window **250** is initially highlighted in the program/service listing to assist the user. In the example of **Figure 12**, Channel 11, PBS, a show entitled "Say Nay Billy" is highlighted. Moreover, channels may be selected by pressing the up arrow button **145** or the down arrow button **146** on the remote control device **60** to move the highlighting over to alternate program/service offerings. For example, if the user presses the down arrow button **146**, as shown in **Figure 13**, the NTV listing is then highlighted. Similarly, as shown in **Figure 14**, by continuing to depress the down arrow button **146**, the highlighting continues to move upward towards the lower channel numbers and once the highlighting reaches Channel 9, the entire program/service listing scrolls to display consecutively lower channel numbers previously not displayed. At the same time, the higher channel numbers previously displayed at the bottom part of the screen **180** will

consecutively disappear. As illustrated in **Figure 14**, Channels 7 and 8 are now displayed, and Channels 19 and 20 are no longer displayed to the user. If the up arrow button **145** is now pressed instead, the highlighting will move down towards the higher channel numbers as illustrated in **Figure 14**. Notably, movement of the program/service listing and the highlighting in the present invention are specifically calculated to conform with an average person's expectations in using a television remote control. While the list function has been described with the down arrow button **146** causing highlighting to move towards the lower channel numbers, and the up arrow button **145** causing highlighting to move towards the higher channel numbers, it will be appreciated that the correspondence between the arrow buttons **145** and **146** and the highlighting movement may be implemented in other ways as best suits the anticipated user of the interface system.

Skipping now to **Figure 16**, a further feature of the list function of the present invention is illustrated. In the event the user depresses the right arrow button **150**, the CPU **63** displays the next hourly time slot listing on the screen **180**. In the example of **Figure 16**, the time slot for 9:00 - 10:00 p.m. is illustrated. It will be appreciated that, had the user depressed the left arrow button **148** three times, then the program/service listing for 6:00 - 7:00 p.m. would have been displayed. Additionally, as illustrated in **Figure 17**, the continued depression of the right arrow button **150** for a

predetermined amount of time (in the present embodiment for more than 2 seconds) results in the display of program/service listings for subsequent days. In this case, the continued depression of the right arrow button **150** has resulted in a scanning of the program/service listings through to Saturday, October 17. It will be noted that in the currently preferred embodiment, a scanning of subsequent days results in the display of the program/service listing from the beginning of prime time, namely, 6:00 p.m. (or 7:00 p.m., at the service provider's option). It will also be noted that the info function can be used in conjunction with the list function to display program/service information about the currently highlighted program/service. It will further be noted that the listing display will disappear if the user depresses the list button **138** once again. It is also contemplated that this list function can be used with audio-visual programs or services other than TV programs, in particular when the menu button **172** is used to display the output of other A/V devices **57**. For example, if the VCR **56** is displayed on the TV **58**, pressing the list button **138** on the remote control device **60** would display a listing of all programs recorded by the user on the VCR **56**, highlighting the program now displayed from the VCR **56**. Similarly, the list function would display CD ROM or telephone listings when these A/V devices are selected through the menu function.

Record Function

Referring now to **Figure 18**, which illustrates a program/service listing displayed in response to the user having continuously depressed the right arrow button **150** on the remote control device **60**. The exemplary program/service listing displayed is for Saturday, October 17 beginning at prime time (6:00 p.m.). The up and down arrow buttons **145** and **146** on the remote control **60** are then used to highlight the program "Specials Tonight". Assume now the user desires to record the exemplary program "Specials Tonight". By pressing the record button **162** on the remote control device **60**, a record panel **259** is displayed by the CPU **63** on the screen **180**, confirming the title and length of the program to be recorded, along with a highlighted select ("bull's eye") icon as shown in **Figure 18**. It is contemplated that other functions can be included in the record panel **259**, such as a function for selecting different VCRs or other A/V recording devices, a function for selecting different tapes or reading media, and/or a function for selecting how often the recording is to take place (once, weekly, daily). Once the select button **155** is pressed, the program listing is redisplayed without the record panel **259**. A record icon **260** is displayed on the screen **180**, as shown in **Figure 19**. The "Specials Tonight" program which will begin on Saturday, October 17, will then be recorded automatically. In the event the viewer changes his mind and does not desire to record the program "Specials Tonight", by pressing the record button **162** again

and then pressing the select button **155** once more, the program listing will be redisplayed without the record icon **260** and no recording will take place.

Mark and Jump Functions

Skipping now to **Figure 15**, the mark function of the present invention and its operation will be described. Shown in **Figure 15** is a program listing reflecting Channel 10 (NTV) having been selected using the up and down arrow buttons **145** and **146** on the remote control device **60**. Assume now the current time is 8:08:30 p.m. In accordance with the teachings of the present invention as described earlier, the program "Rock Today" would be highlighted on the screen **180**. The program "Party Time" may be highlighted by the viewer by pressing the right arrow button **150**. The mark function may then be initiated by pressing the mark button **142** on the remote control device **160**. As illustrated in **Figure 15**, a mark identifier **252** is displayed adjacent to the selected program (in the present example, "Party Time"). Skipping again to **Figure 20**, a reminder box **254** is displayed on the screen **180** at the time the program "Party Time" begins (in the present example, 8:10 p.m.), regardless of what channel is currently being viewed then by the user on TV **58**. It should also be noted that programs playing live in a current time slot can be marked while displayed in full screen by depressing the mark button **142**. This causes a mark identifier **189** to be displayed in the graphic overlay panel **185**, as shown in **Figures 6** and **21**.

Referring now to **Figures 20** and **21**, depressing the jump button **132** while the reminder PIP window **254** is displayed switches

the program displayed in the main viewing area of the screen **180** to the program which the user has previously marked (see **Figure 21**). If more than one program has been marked, by repetitively depressing the jump button **132**, users can jump to the other previously marked programs displaying them in full screen in the main display area of the screen **180** one at a time. It will be appreciated that in an alternate embodiment, the picture-in-picture window **254** illustrated in **Figure 20** may be preceded by a reminder icon displayed automatically in the PIP window **254** a few minutes prior to the actual start of the program. It will also be noted that the mark and jump functions may be used with audio-visual programs other than TV shows, allowing a user to mark and subsequently jump between, for example, a VCR program, a CD ROM program, an on-line service or an answering machine message, in addition to the TV programs previously marked while viewing television channels.

Categories Function

Referring now to **Figures 22 - 32**, the categories function of the present invention will be described. To initiate the categories function of the present invention, the categories button **140** is depressed on the remote control device **60**. As illustrated in **Figure 22**, the CPU **63** displays a categories graphic overlay panel **300** which is superimposed over the currently viewed program on screen **180**. A plurality of categories are identified by representative icons. The first category which is selected by default is the "all" category **302**, and is highlighted around the border. The "all" category **302** refers to all currently available programs/services being transmitted by the service provider **50**. By depressing the right arrow button **150** or left arrow button **148** on the remote control device **60**, other categories may be highlighted. For example, by depressing the right arrow button **150**, the next category "favorites", as indicated by a star icon **305**, is highlighted (See **Figure 23**). Similarly, by depressing the right arrow button **150** again, a movies icon **310** is highlighted. By depressing the right arrow button **150** another time, a sports icon **315** is highlighted (see **Figure 24**), and so on. Additional categories may include a news icon **312** and a music video icon **313**. However, it will be appreciated that many other categories can be displayed. By repeatedly pressing the right arrow button **150**, the user can make category icons appear, scrolling from right to left against the category overlay panel **300**.

In **Figure 24**, the sports category has been highlighted by the user as indicated by the highlighted sports icon **315**. To select a category that is currently highlighted, the user can press the select button **155** and the category overlay panel **300** disappears while the currently viewed program displayed on the screen **180** is replaced by the nearest available program in the category just selected. The selection of the sports category results in the display of only sports related programs on the TV **58**. **Figure 25** illustrates an exemplary baseball game which is displayed after the user presses the select button **155**. As illustrated, the sports icon **330** is also displayed in the graphic overlay panel **185** along with the channel identifier **188**.

Assume now after the nearest sports program has been displayed on the screen **180**, the user desires to view additional sports category programs on the TV **58**. By depressing the up channel button **130** or the up arrow button **145** on the remote control device **60**, the transceiver **54** displays the next higher number channel which is currently showing a sports program. In the example of **Figure 26**, the sports program relates to a windsurfing event. As shown, the sports icon **330** continues to be displayed along with the numerical channel indicator and the channel identifier **188** (in the example of **Figure 26** "Sportstime") in the graphic overlay panel **185**.

Referring now to **Figure 27**, if the user has selected the category of sports (icon **315**), and depresses the list button **138**, a program/service listing **360** of currently available sports programs is displayed on screen **180**. It will also be noted that the currently viewed sports program will continue to be displayed in a picture-in-picture window **365**. As previously discussed, with respect to the list function, programs which are shown during half hour intervals (See **Figure 27** "Windsurfing" and "Basketball") are identified and may be individually selected using the remote control device **60**.

Referring now to **Figure 28**, which illustrates a program listing with the sports icon **330** in the category overlay panel highlighted, displayed in response to the user having pressed the list button **138**, and then presses the categories button **140**. Assume now the user desires to break down the main sports category into finer sub-categories such as baseball, football, basketball, hockey, etc. By depressing the down arrow button **146** on the remote control device **60**, the user causes the CPU **63** to select a default sport sub-category (baseball in this example) and display a plurality of sports sub-category icons against the categories overlay panel **300** as illustrated in **Figure 29**. The default sports sub-category icon **315** is also highlighted, and the program listing **361** comprises only programs of that sports sub-category, i.e. baseball in this example. By pressing the right arrow button **150** on the remote control device **60**, the user can highlight the football sub-category icon **317**, then press the select button **155** to cause

only football programs to be listed. Alternatively, the user can press the up arrow button **145** to display the main categories again, with the sports icon **315** highlighted as illustrated in **Figure 28**. The user can also press the categories button **140** once more to make the categories overlay panel **300** disappear.

Referring now to **Figure 30**, which illustrates a program listing **320** with the favorite icon **305** in the category overlay panel highlighted, displayed in response to the use having selected the "favorites" category using the left arrow button **148** on the remote control device **60**. The program listing **320** comprises favorite programs for the current time slot including frequently viewed programs, marked programs, and programs to be recorded, as well as programs that match specified user preferences. Assume now that the user desires to resolve the "favorites" category into finer sub-categories. By pressing the down arrow button **146** on the remote control device **60**, the user causes the CPU **63** to display a plurality of favorites sub-category icons against the categories overlay panel **300**, as illustrated in **Figure 31**. The CPU **63** highlights the "frequent" programs sub-category icon **318** and displays a program listing **362** of programs most frequently watched by the user as determined by the CPU **63** from previous monitoring of the user's viewing habits. In the normal course of operation, the CPU **63** monitors programs which are most frequently viewed and compiles a prioritized list of those frequent programs for each time slot, which list is stored in the

rewritable non-volatile part of the system random access memory (such as SRAM) **65**.

In the presently preferred embodiment, if a viewer views a television program for more than 10 minutes, the current program and channel identifiers are compared to frequent programs already stored in system memory **65** for that particular time slot, and an updated list of frequent programs is created by CPU **63** and stored in the system memory **65**. In the event there are no frequent programs stored in the system memory **65** for any particular time slot, then a general list of most frequently watched programs is retrieved from the system memory **65**. It is anticipated that the majority of frequent programs will be stored in time slots corresponding to prime time, or during daytime television hours.

By pressing the right arrow button **150**, the user can move the highlighting from the "frequent" programs sub-category icon **318** to the "marked programs" sub-category icon **319**, as shown on **Figure 32**. Accordingly, the CPU **63** highlights the "marked programs" icon **319** and displays a program listing **363** of only programs that have been previously marked. Other favorite sub-categories include a record sub-category of all programs selected for recording, and personalized favorites sub-categories such as "Mom" **321** and "Joe" **322**. It is contemplated that new preferences can be defined by individual users by selecting a special favorites sub-

category, represented by a "set-up" icon **323**, then marking preferred items from a list of programs and/or categories, as well as specifying an icon and/or a name for this new preference set. By first defining and subsequently selecting, for example, the "Mom" sub-category icon **321**, a user can view only programs that match the interests defined earlier by the mother of the household.

It is also contemplated that this category function can be used in combination with A/V programs or services other than TV programs, in particular when the menu button **172** is used to select the VCR **56**, or one of the other A/V devices **57**. For example, pressing the categories button **140** while viewing a VCR listing (**Fig. 36**, below) would enable users to find all previously recorded comedy programs. Similarly, the categories function could enable users to find phone listings in the "gardening" category, according to telephone directory information accessed from the provider **50** via the T/T cable **52**.

While the present invention has been described with the categories function having different effects on the displayed image when used during full screen display and when used in conjunction with list function, it will be appreciated that the present invention also may be practiced with the categories function having consistent effect on the displayed image in either situation, as desired.

Pix Function

Referring now to **Figures 33** and **34**, the present invention's picture-in-picture (or pix function) will now be described. The depression of the pix button **144** on the remote control device **60** results in the display of a pix display **381** as illustrated in **Figure 33**. As shown in the present embodiment, 12 picture-in-picture video windows are arranged within the screen **180**, along the perimeter of the pix display **381**, with a central picture-in-picture window **375** also displayed. Depressing the pix button **144** on the remote control device **60** results in the simultaneous display of multiple programs currently transmitted over the T/T cable **52**, the VCR **56**, the CD ROM **70** and/or the other A/V devices **57**. Moreover, one of the picture-in-picture windows displaying the last program viewed in full screen, such as, for example, picture-in-picture window **380**, is highlighted. As shown in **Figure 33**, the highlighted smaller screen is also displayed in larger size in the central picture-in-picture window **375**, with the audio track of the program also audible to the user. Accordingly, a user may watch a motion picture or television program, including the audio track, in window **375**, while viewing multiple other programs simultaneously. In the presently preferred embodiment, the A/V connect module **66** samples (or "grabs") a video frame from each of the 12 programs every pre-determined (N) number of frames. Accordingly, a user viewing the pix display **381** perceives each of the 12 small picture-in-picture windows as sequential representative

images of every N frames per window. However, the picture-in-picture window **375** represents a full motion display of the currently selected program, provided that a second TV tuner **67** is included within the A/V connect module **66**.

Additionally, in the preferred embodiment of the present invention, it is contemplated that the user is able to view the pix display **381** by category by pressing the categories button **140** and selecting a particular category, such as favorites or movies. For example, the pix display **381** illustrated in **Figure 33** is comprised of only favorite programs, as the user had previously selected the favorites category. Had the user selected the "marked" sub-category, only marked programs would be displayed on the pix display **381**, allowing users to easily add or delete programs in the pix display **381** by using the mark button **142**. If no categories have been selected (which is equivalent to selecting the "all programs" category), then the pix display **381** displays the 12 programs nearest to the last selected program. Similarly, pressing the info button **136** would display the graphic overlay panel **190** shown in **Figure 7** for program information.

Referring now to **Figure 34**, which illustrates the selection of a different pix program to be viewed in the central picture-in-picture window **375**. By depressing the left arrow button **148** on the remote control device **60**, the highlighting **380** is moved

one window to the left. In the example of **Figure 34**, a "Discover It" program is now highlighted and shown simultaneously in the central picture-in-picture window **375**. Similarly, through the use of the left arrow button **148** and the right arrow button **150** along with the up arrow button **145** and the down arrow button **146** on the remote control device **60**, each of the pix programs in the pix display **381** may be viewed within the central picture-in-picture window **375**, as desired. As in the list function, pressing the select button **155** displays the currently highlighted program in full screen. Alternatively, pressing the pix button **144** a second time causes the pix display **381** to disappear and the last highlighted program appears in full screen.

Referring to **Figure 35**, selection of pay-per-view movie currently shown in one of the picture-in-picture window **380** of the pix display **381** for viewing is illustrated. As described earlier, by depressing the left arrow button **148** on the remote control device **60**, the PIP window **380** becomes highlighted. In the example of **Figure 32**, the pay-per-view channel shows a preview trailer for the motion picture "Jeff's World", which is now displayed in the center PIP window **375** and the perimeter PIP window **380** simultaneously. To select the pay-per-view movie, the select button **155** is depressed on the remote control device **60**. It is contemplated that pressing a single, double or triple digit number on the numeric keypad **176** , followed by the ok button **178** of the remote control **60**, will display the corresponding pay-per-view channel, along with the 12 nearest

channels. It is also contemplated that this pix function can be used with audio-visual programs and services other than TV shows, in particular when the menu button **172** is used to display the output of the VCR **56**, the CD **70**, a hard disk or one of the other A/V devices **57** connected to the A/V transceiver **54**.

Menu Function

Referring now to **Figure 36**, the menu function will now be described. The menu function permits users to switch the television display to any A/V source connected to the transceiver **54**, such as the VCR **56**, the CD ROM module **70**, or one of the other A/V devices **57**, and lets users control those A/V sources directly. As shown in **Figure 36**, upon pressing the menu button **172** on the remote control device **60**, the CPU **63** displays on the screen **180** a graphic overlay panel **420** which is superimposed over the currently viewed audio-visual program. As further shown in **Figure 36**, a plurality of audio-visual sources connected to the transceiver **54** are identified by representative icons. The currently viewed A/V source icon is automatically highlighted, typically the TV icon **421**. By depressing the right arrow button **150**, or left arrow button **148** on the remote control 60, other A/V source icons may be highlighted and previewed. For example, by depressing the right arrow button **150**, the next A/V source icon, VCR **422**, is highlighted, as shown in **Figure 36**. Simultaneously, CPU **63** displays an audio-visual program derived from the highlighted source icon, in this case a videotape playing in the VCR **56** onto the screen **180**, as illustrated in **Figure 36**. To select and control any A/V source whose icon is currently highlighted, in this case the VCR **56**, the user can press the select button **155**, whereafter the graphic overlay panel **420** disappears while the currently viewed program sourced from the VCR **56** is displayed

in full screen. Thereafter, the user can press the play button **168** on the remote control device **60** to cause the CPU **63** to instruct the VCR **56** through the A/V connect module **66** or the IR control **82** to playback a previously recorded program on the VCR **56**. Similarly, the user can press the stop arrow button **166**, the rewind button **164**, and/or the fast-forward button **170** on the remote control device **60** to further control the program sourced from VCR **56**. It is contemplated that the CD ROM module **70** and some of the other A/V devices **57** including other CDs, VCRs, laser disc players, hard disks, telephones, answering machines, as well as transmitting devices connected to voice mail, electronic mail and various on-line services can be similarly selected and controlled through the use of the menu function, as illustrated in **Figure 36**.

Other Functions

Other functions may be realized with the present invention, including numeric data entry. As shown in **Figures 41** and **49**, by pressing one or more buttons on the numeric keypad **176** of the remote control device **60**, a user can confirm a financial transaction by entering his or her personal identification number (PIN) in a confirmation display field **425**. The numeric keypad **176** may also be used for dialing TV channel numbers, telephone numbers and other program source identifiers, as desired.

Yet another function which may be optionally realized by the present invention is a talk function, whereby a user can depress the talk button **181** on the remote control device **60**, and thereafter issue spoken commands into the microphone **179** located on the remote control device **60** in lieu of or in addition to pressing buttons on the remote control device **60**. Through the use of voice recognition hardware and software operating in conjunction with the CPU **63**, the present invention can be made to interpret the spoken commands requested by the user, and invoke the corresponding functions. For example, a user may speak the word "sports" while pressing talk button **181**, which is equivalent to invoking the category function and highlighting the sports category, as if the user had pressed the corresponding sequence of buttons, as described earlier. It is further contemplated that the remote control device **60** in

conjunction with the TV 58 and a camera can be used as a video telephone for video conferencing and the like, wherein having engaged a telephone line (via the menu function) the user speaks directly into the remote control device 60 as if it were a standard telephone.

Pay-Per-View Interface

The present invention includes one possible pay-per-view (PPV) interface which will now be described. Assume that the user has selected the TV source icon **421** using the menu function displayed in the graphic overlay panel **420**, and further selects a pay-per-view program using either the list or the pix function. This selection results in an initial title screen to be displayed, as illustrated in **Figure 37**, which may be static or animated. As shown in **Figure 38**, upon the selection of the PPV program and subsequent to the display of the title screen of **Figure 37**, a preview icon **382**, a credit icon **384**, an info icon **386**, and a ticket icon **388** are displayed, along with a preview trailer which is continuously looping and is displayed in a half-screen picture-in-picture window **390**. It will be noted that in **Figure 38**, the preview icon **382** has been highlighted by default, thereby corresponding to the trailer being shown in the window **390**.

Referring now to **Figure 39**, by depressing the right arrow button **150** of the remote control device **60**, the credit icon **384** may be highlighted. The credits for the pay-per-view movie are displayed on the screen **180** within the window **390**. By depressing the right arrow button **150** once again, the info icon **386** is highlighted. As shown in **Figure 40**, information related to the pay-per-view movie is then provided to the user, such as the title, the production company, a brief description of the movie, the rating and the total length. If the user

desires to watch the pay-per-view movie, he/she depresses the right arrow button **150** once again to highlight the ticket icon **388**, as illustrated in **Figure 41**.

As shown in **Figure 41**, upon the selection of the highlighted "ticket" icon **388**, the CPU **63** generates and displays on the screen **180** a request for the user to input a "movie pass" password using the numeric keypad **176** of the remote control device **60**. After entering the personal identification number (PIN) using the numeric keypad **176**, causing a confirmation sound to be played and confirmation symbols such as asterisks to fill in a blank confirmation display **425**, the user depresses the ok button **178** or the select button **155** on the remote control device **60** to order and view the pay-per-view movie. As shown in **Figure 42**, transceiver **54** then displays the ordered program if it is available, or displays a message informing the viewer that the pay-per-view movie will begin screening within X number of minutes. In operation, depressing the ok button **178** or the select button **155** subsequent to the entering of the movie pass personal identification number (PIN) results in the CPU **63** providing a signal to the cable service provider **50**, over the T/T cable **52** using one of the back channels **102** (See **Figure 3a**). It will further be appreciated that during the waiting period prior to the transmission of the pay-per-view movie, additional trailers and other previews may be displayed to the user on the screen **180**. It will also be noted that if the user incorrectly enters his/her movie pass PIN number,

pressing the clear button **177** on the numeric keypad **176** allows them to clear the confirmation display **425** and start over again. It will also be appreciated that other pay-per-view interfaces may be designed and implemented using the teachings of the present invention on general purpose audio-visual user interface.

Home Shopping Interface

The present invention includes one possible home shopping interface, which will now be described. In **Figure 43**, a channel identified as "SHP" or "TV Shop" represents a dedicated home shopping service within the electronic spectrum illustrated in **Figure 3a**. It will be noted that although in its present embodiment, TV Shop is presented as a television channel, it could also be presented as an on-line service through a transmitting device connected to the T/T cable **52**. In the current embodiment, the selection of the TV Shop service results in a continuous full-motion video display of various paid-for commercials or advertising messages. As shown in the representative screen of **Figure 44**, a TV Shop icon is displayed along with a blinking select icon (or right arrow icon) in a graphic overlay panel **400**, at the start and end of each advertisement, prompting users to press the select button **155** (or right arrow **150**).

Referring now to **Figure 45**, by pressing the select button **155** (or the right arrow button **150**), the user can view additional information relating to the advertisements shown in the full motion video section of the TV Shop. In the example of **Figure 45**, it will be noted that a listing of the advertisers is provided, in which the advertisers whose commercial was playing last is highlighted. Through the use of the up arrow button **145** or the down arrow

button **146**, the user may scroll through the advertisers, sequentially highlighting each of their advertising identifiers, along with a select icon **403** prompting a user to select that advertiser. Moreover, as shown in **Figure 45**, an "exit" icon **402**, a "stores" icon **404**, a "specials" icon **406**, an info icon (or "compare" icon) **408**, an "order" icon **409** and other icons may be presented to the viewer. As illustrated in **Figure 46** the selection of the "Attic at Casey's" advertiser with the select button **155** (or the right arrow button **150**) results in a display of the various specials available from that advertiser. In **Figure 46**, there is shown cookware highlighted in conjunction with a still image of the cookware for sale. By depressing the down arrow button **146** on remote control device **60**, the highlighted section on the display can be moved down such that the mini-espresso (see **Figure 47**) is selected. Simultaneously with the highlighting of the mini-espresso selection, a still image of the mini-espresso machine for sale is shown.

Referring to **Figure 48**, to obtain further information regarding the mini-espresso machine illustrated in **Figure 47**, the user depresses the select button **155** (or the right arrow button **150**) on the remote control device **60** to highlight the info icon **408**. As illustrated in **Figure 48**, information relating to the particular product (i.e. espresso machine) is shown on the screen **180**. To order the mini-espresso machine illustrated in **Figures 47** and **48**, the user depresses the select button **155** (or the right arrow button **150**) to highlight the

order icon **409**. As illustrated in **Figure 49**, a personal identification order number window **420** is displayed in which the user (using the numeric keypad **176**) inputs a personal identification number (PIN). After entering the personal identification number (PIN), the ok button **178** or select button **155** is depressed to order the product. In the presently preferred embodiment, once the personal identification number (PIN) of the user is entered into the system of the present invention and the ok button **178** or the select button **155** is depressed, a signal is provided by the CPU **63** to the service provider **50**, using one of the back channels **102** (See **Figure 3**)a. As illustrated in **Figure 50**, a confirmation of the order, along with a delivery time is displayed to the user. It will also be appreciated that other home shopping interface variants may be designed and implemented using the teachings of the present invention.

Summary

The present invention as described provides methods and apparatus for a unique audio-visual interface for television and other A/V programs and services. The present invention's functions and features provide a user interface which helps users find and view programs of interest, access related information, control various audio-visual devices and order products or services from their own homes. While the present invention has been described with references to the various figures , it will be appreciated that the figures are for illustration only, and do not limit the spirit and scope of the invention. For example, although the figures have, by necessity, used example screens having certain attributes, icons, criteria or functions, it will be appreciated that the invention is not limited by the specific examples provided. Rather, the present invention has application in any television and/or audio-visual display system. In addition, it will be noted that the present invention may be realized using a variety of computer hardware and computer software, and is not limited to any particular hardware or software systems.

Moreover, it will be appreciated that many of the functions and features of the present invention, such as graphic overlay panels, icons, and selection methods, are not static events and are perceived by the user as having motion, color, sound and/or animation. Specifically, it will be appreciated that the present audio-

visual user interface also includes an audio interface using a plurality of sound icons and backgrounds, which compliment the visual interface and are played almost every time a function of the present invention is used, and which cannot be illustrated graphically here, but are part of the present invention. Due to the limitations of a written specification, the reader is referred to a videotape entitled "EZTV" submitted by the Applicants concurrent with the filing of the application on which this patent is based.

WE CLAIM:

1. In an audio-visual (A/V) system comprising a visual display and an audio reproduction system, said A/V system further comprising a transceiver coupled to a plurality of A/V program and service offering sources and said display, and a control device coupled to said transceiver, a method for managing viewing of a plurality A/V program offerings and managing interaction with a plurality of service offerings provided by said A/V program and service offering sources, said method comprising the steps of:

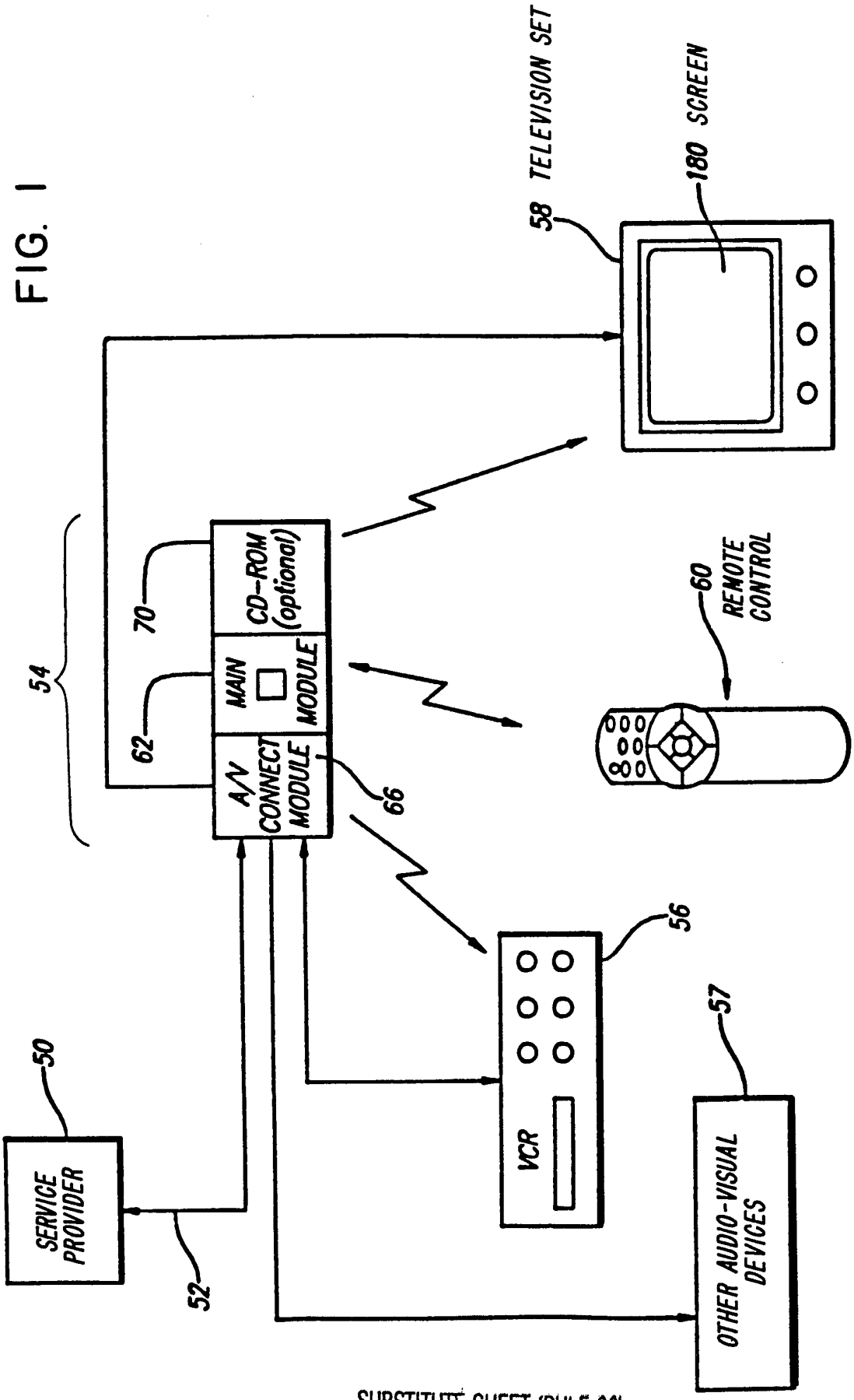
(a) receiving a plurality source control inputs and in response selecting at least one of said A/V program/service offering sources;

(b) receiving and storing offering information regarding A/V programs and services, if any, offered by said selected at least one A/V program and service offering source;

(c) displaying said received offering information on said visual display; and

(d) receiving a plurality of selection control inputs and in response selecting and displaying one of said A/V program/service offerings of said selected at least one program and service offering source on said visual display.

FIG. 1


58 TELEVISION SET
180 SCREEN
60 REMOTE CONTROL
54
70
CD-ROM (optional)
MAIN MODULE
62
A/V CONNECT MODULE
66
56
VCR
57
OTHER AUDIO-VISUAL DEVICES
50
SERVICE PROVIDER
52

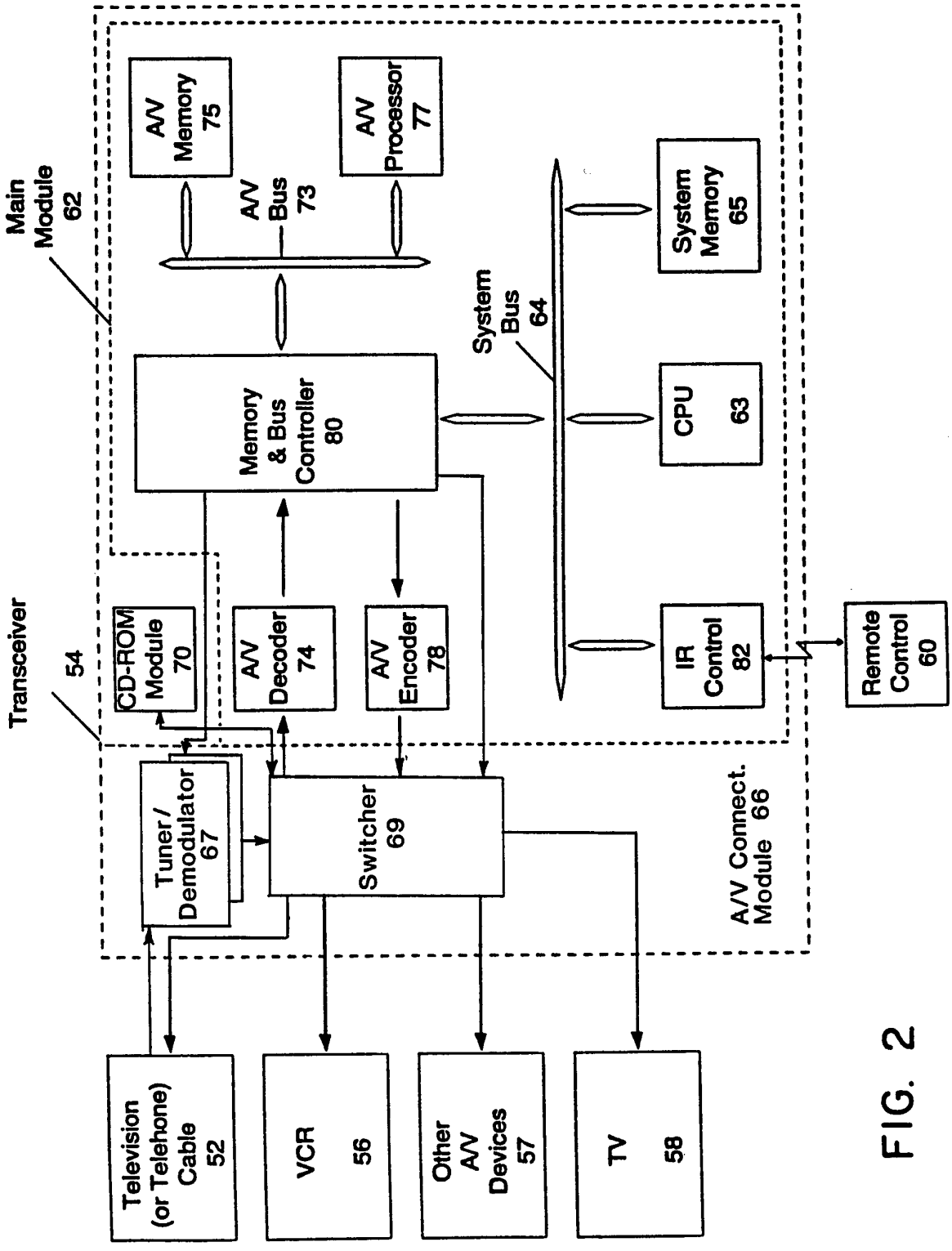

Main Module 62
A/V Memory 75
A/V Processor 77
A/V Bus 73
System Bus 64
System Memory 65
Memory & Bus Controller 80
CPU 63
Transceiver 54
CD-ROM Module 70
A/V Decoder 74
A/V Encoder 78
IR Control 82
Remote Control 60
Tuner / Demodulator 67
Switcher 69
A/V Connect. Module 66
Television (or Telehone) Cable 52
VCR 56
Other A/V Devices 57
TV 58

FIG. 2

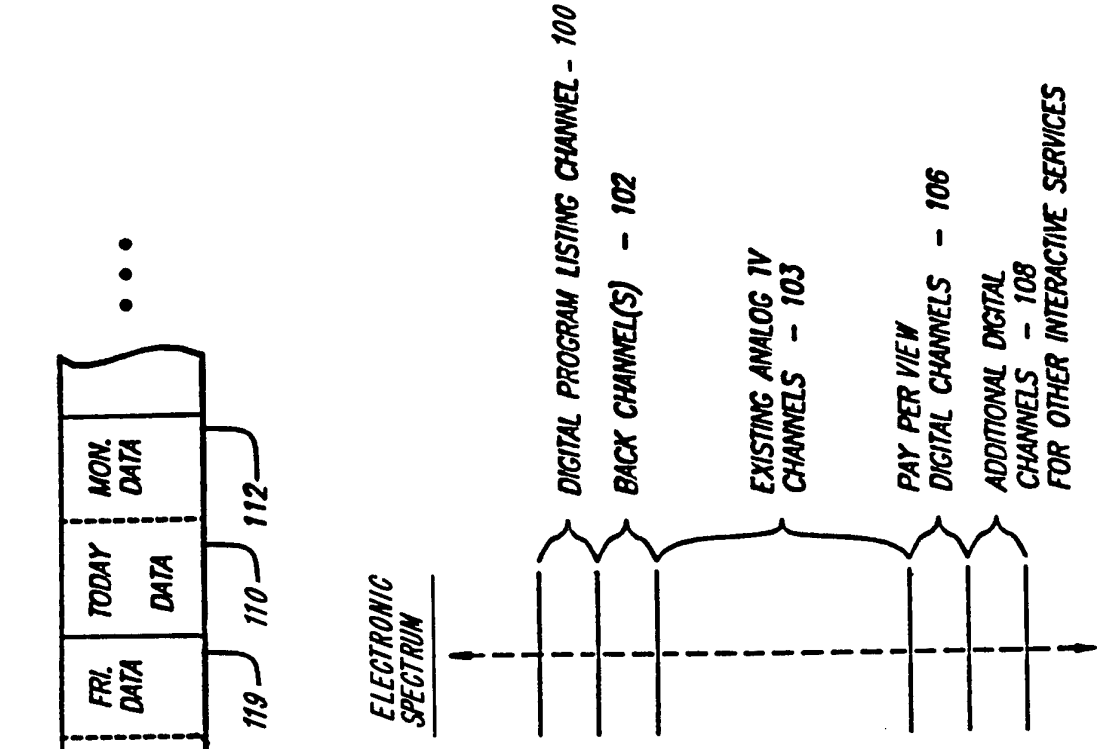

DIGITAL PROGRAM LISTING CHANNEL - 100
BACK CHANNEL(S) - 102
EXISTING ANALOG TV CHANNELS - 103
PAY PER VIEW DIGITAL CHANNELS - 106
ADDITIONAL DIGITAL CHANNELS - 108 FOR OTHER INTERACTIVE SERVICES
ELECTRONIC SPECTRUM

FIG. 3a

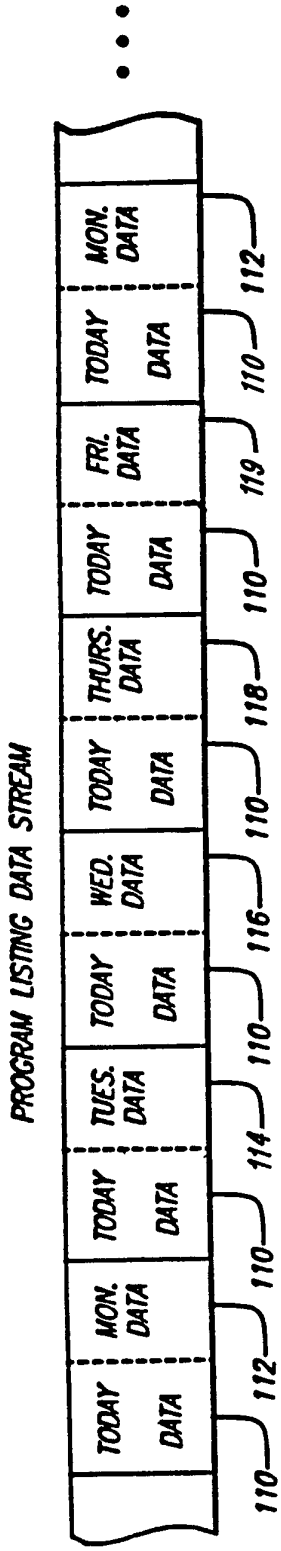

PROGRAM LISTING DATA STREAM
TODAY DATA
MON. DATA
TODAY DATA
TUES. DATA
TODAY DATA
WED. DATA
TODAY DATA
THURS. DATA
TODAY DATA
FRI. DATA
TODAY DATA
MON. DATA
110
112
110
114
110
116
110
118
110
119
110
112
• TITLES OF PROGRAMS
• SHOW TIMES
• CAPTIONS
• LENGTH
• CATEGORIES/KEYWORDS
• CHANNEL NUMBERS

FIG. 3b

FIG. 4a

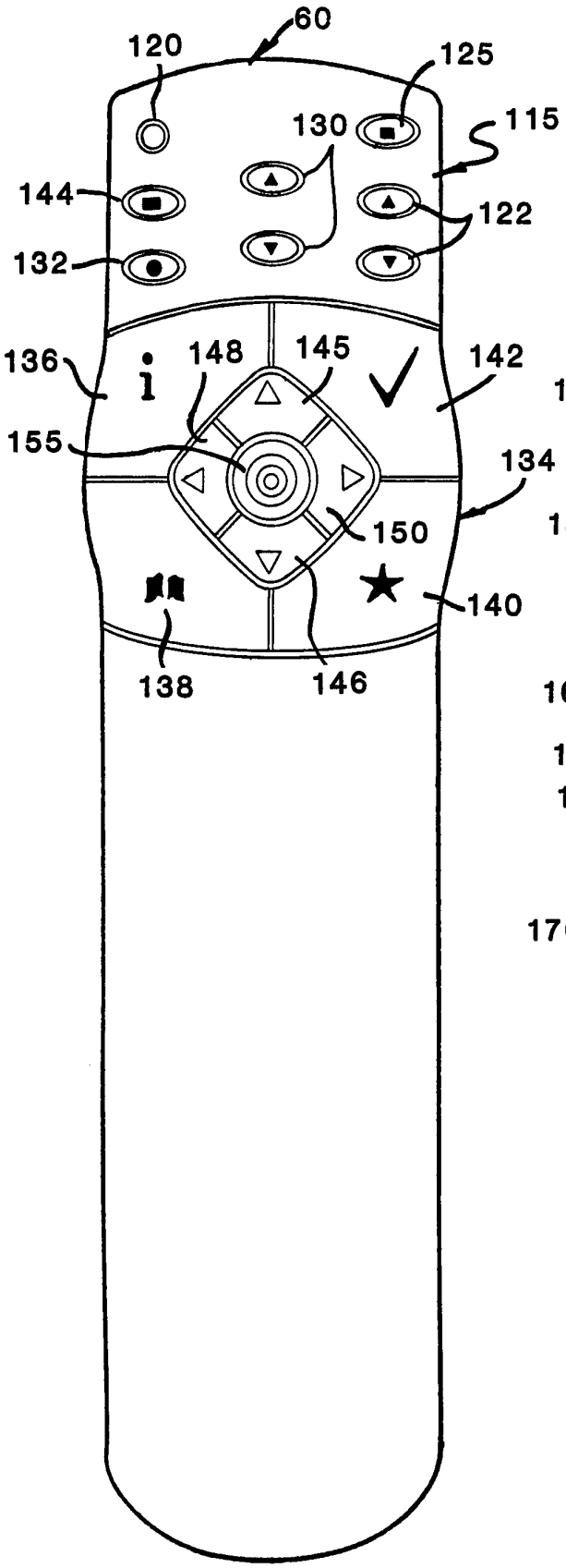

60
120
125
130
115
144
122
132
136
148
145
142
155
134
150
140
138
146

FIG. 4b

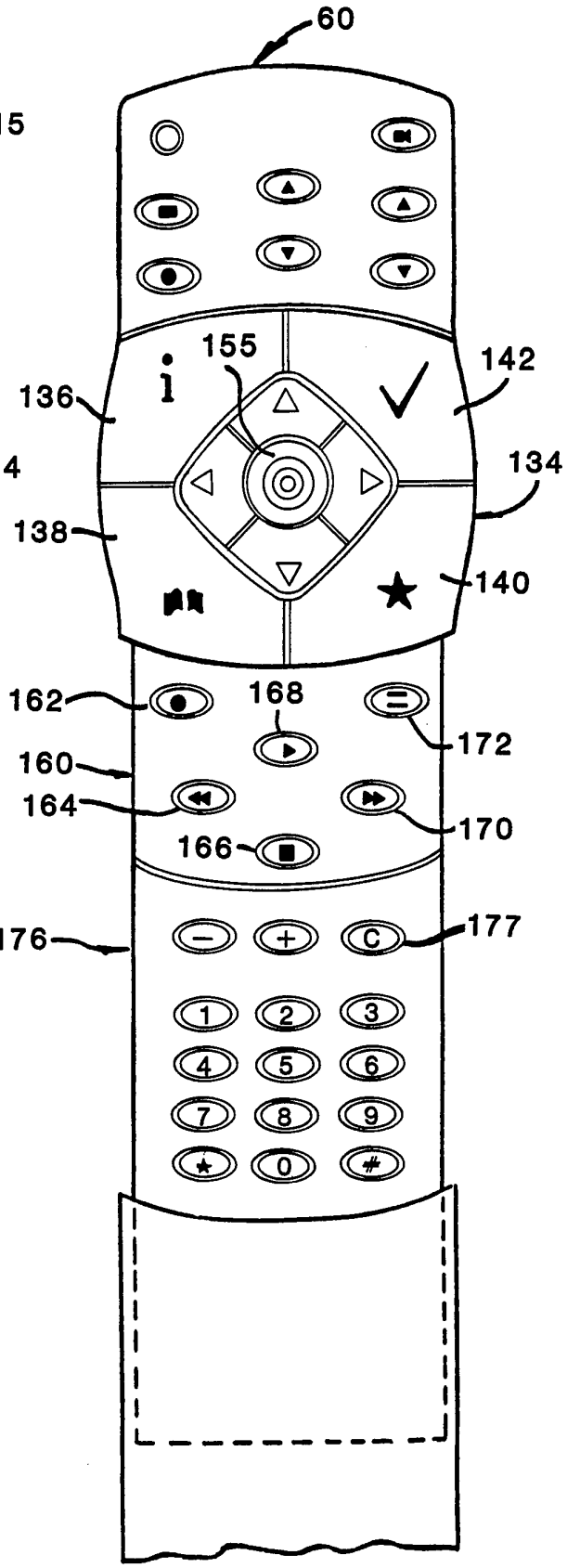

60
155
142
136
134
138
140
162
168
172
160
164
170
166
176
177
1
2
3
4
5
6
7
8
9
0

FIG. 5a

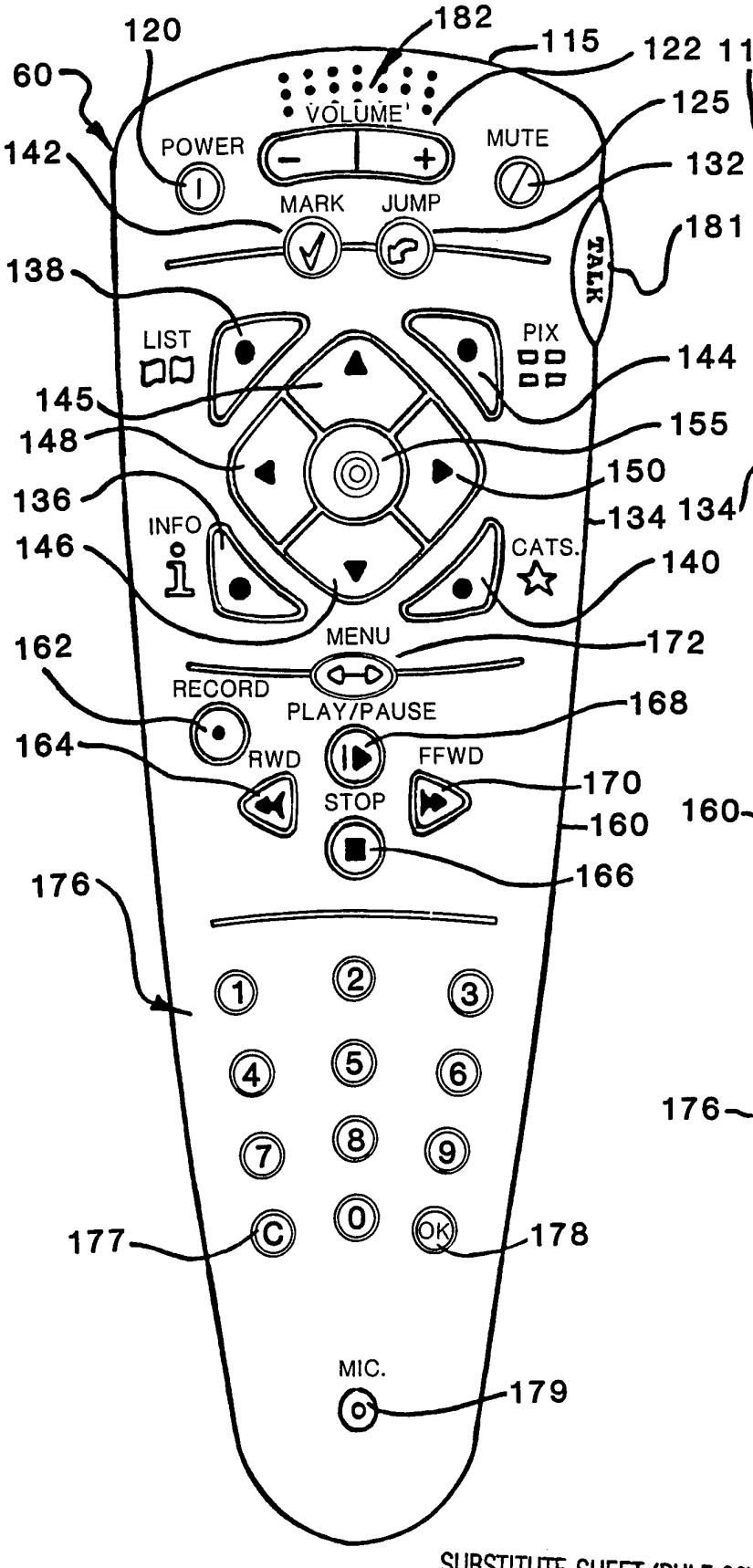
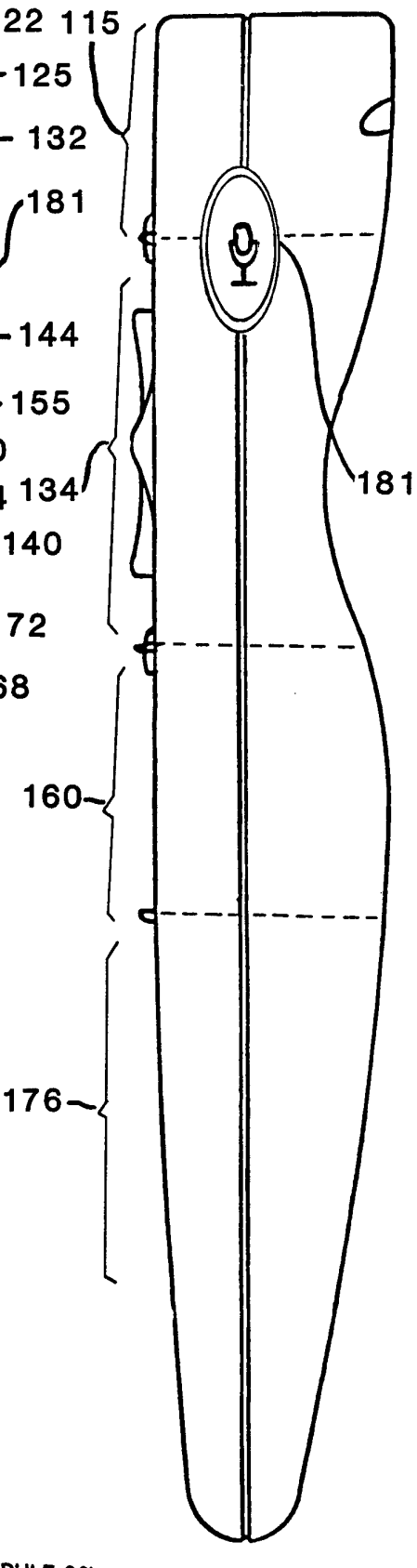

120
182
115
122
60
VOLUME
125
POWER
MUTE
142
132
MARK
JUMP
181
TALK
138
LIST
PIX
144
145
155
148
150
136
134
INFO
CATS.
146
140
MENU
172
162
RECORD
PLAY/PAUSE
168
164
RWD
FFWD
170
STOP
160
166
176
1
2
3
4
5
6
7
8
9
0
177
C
OK
178
MIC.
179

FIG. 5b


115
181
134
160
176

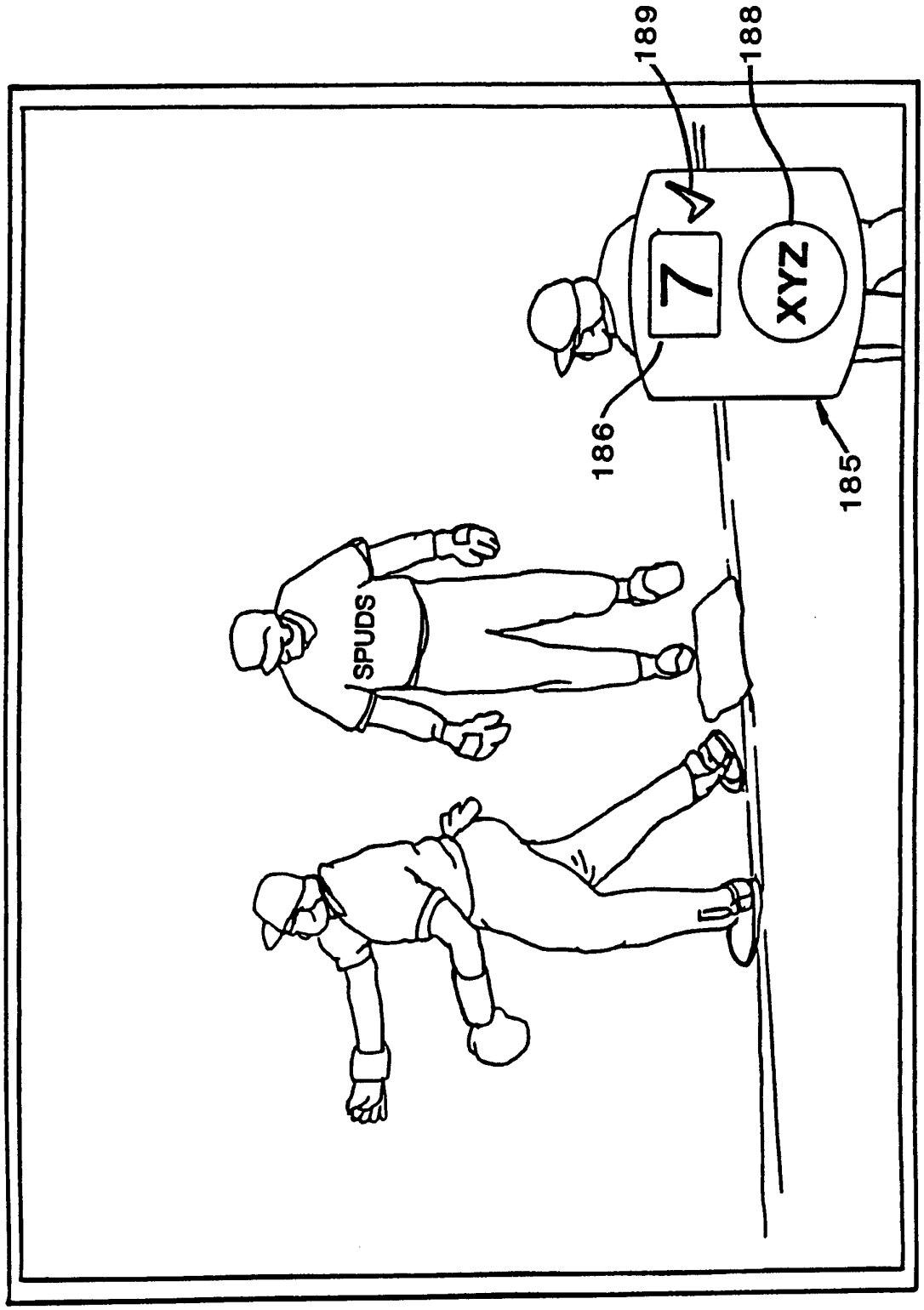


FIG. 6

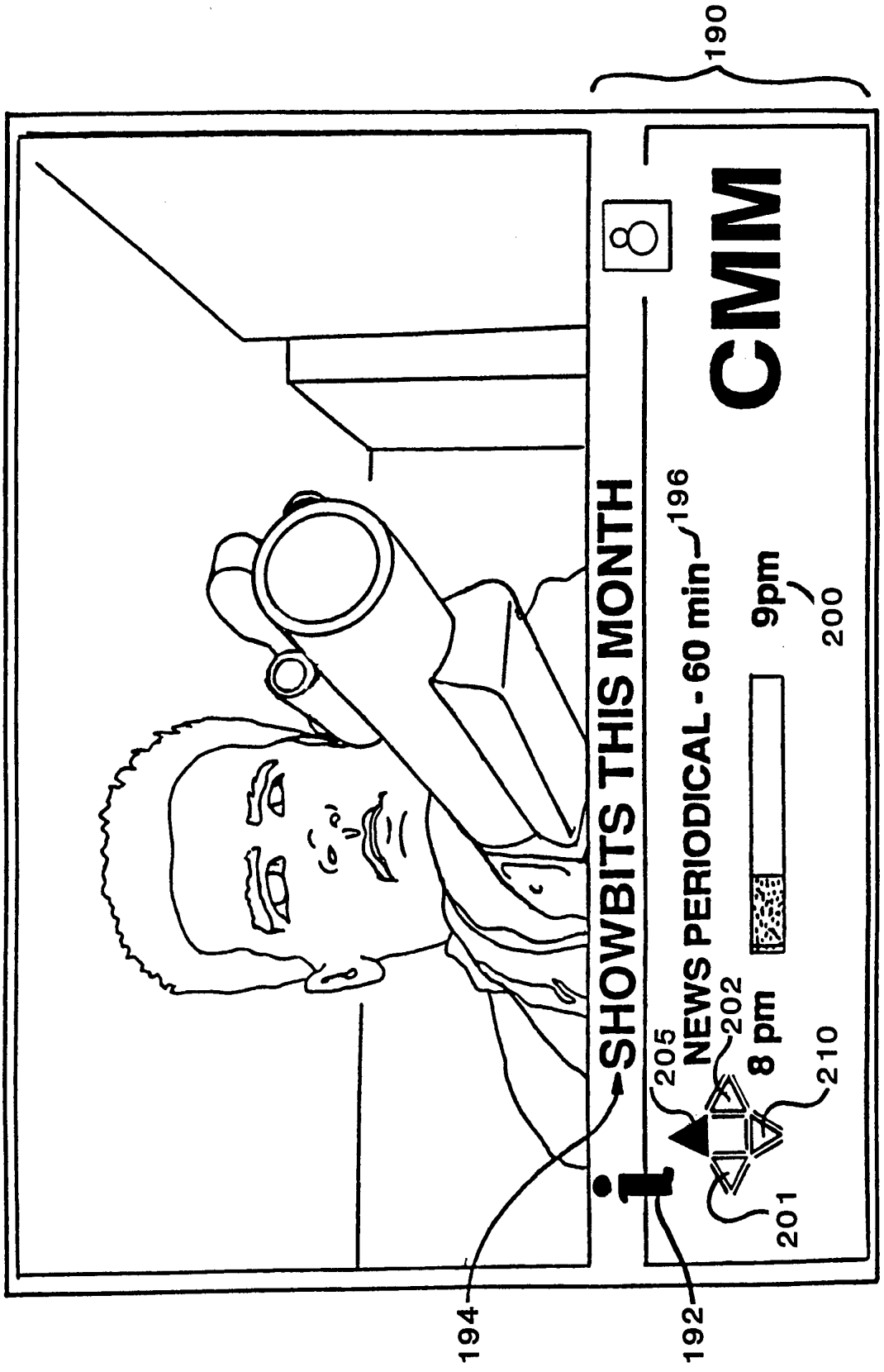

180
190
CMM
8
SHOWBITS THIS MONTH
196
NEWS PERIODICAL - 60 min
9pm
200
205
202
8 pm
210
201
194
192

FIG. 7

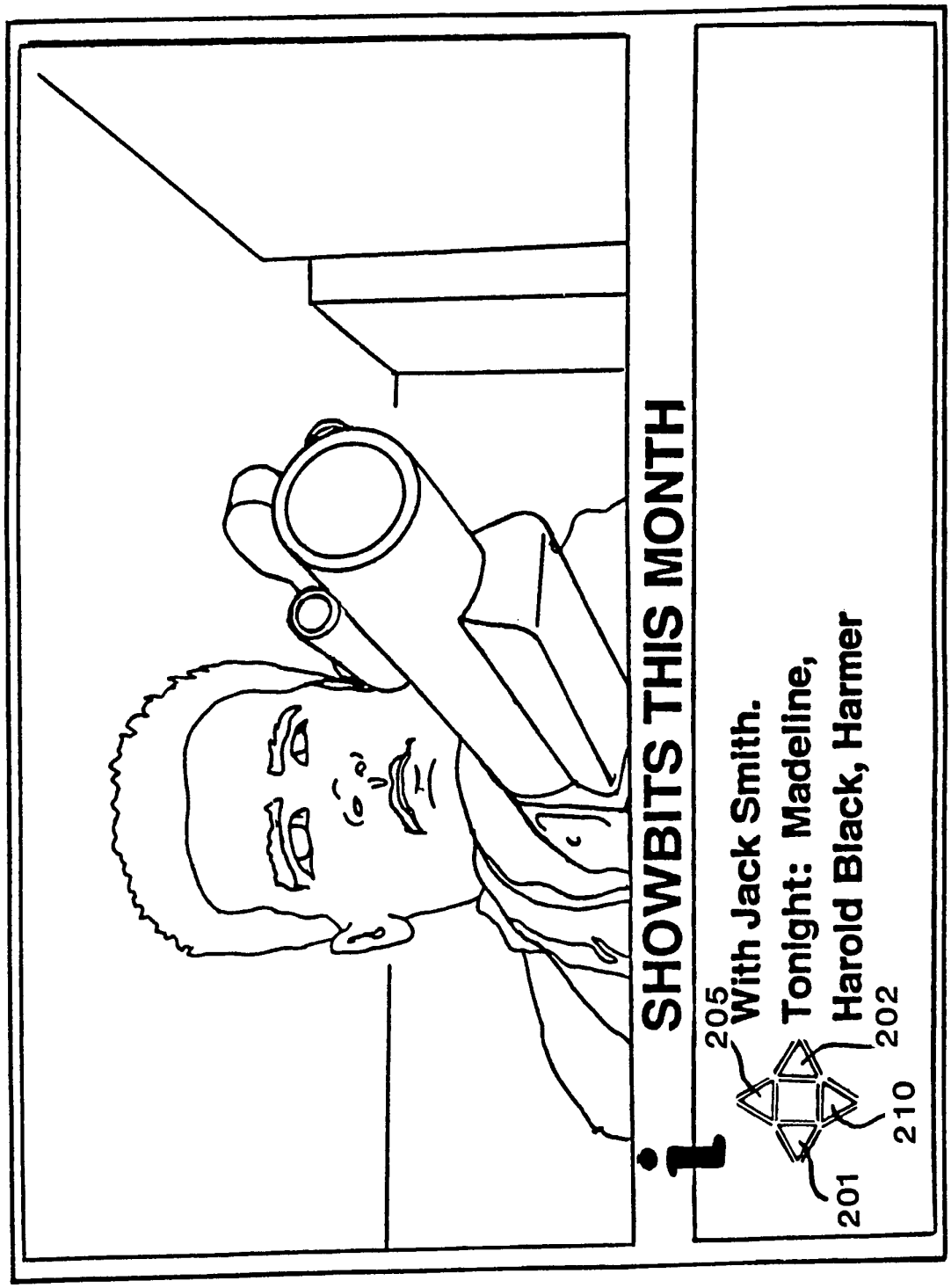

180
SHOWBITS THIS MONTH
205
With Jack Smith.
Tonight: Madeline,
Harold Black, Harmer
202
210
201

FIG. 8

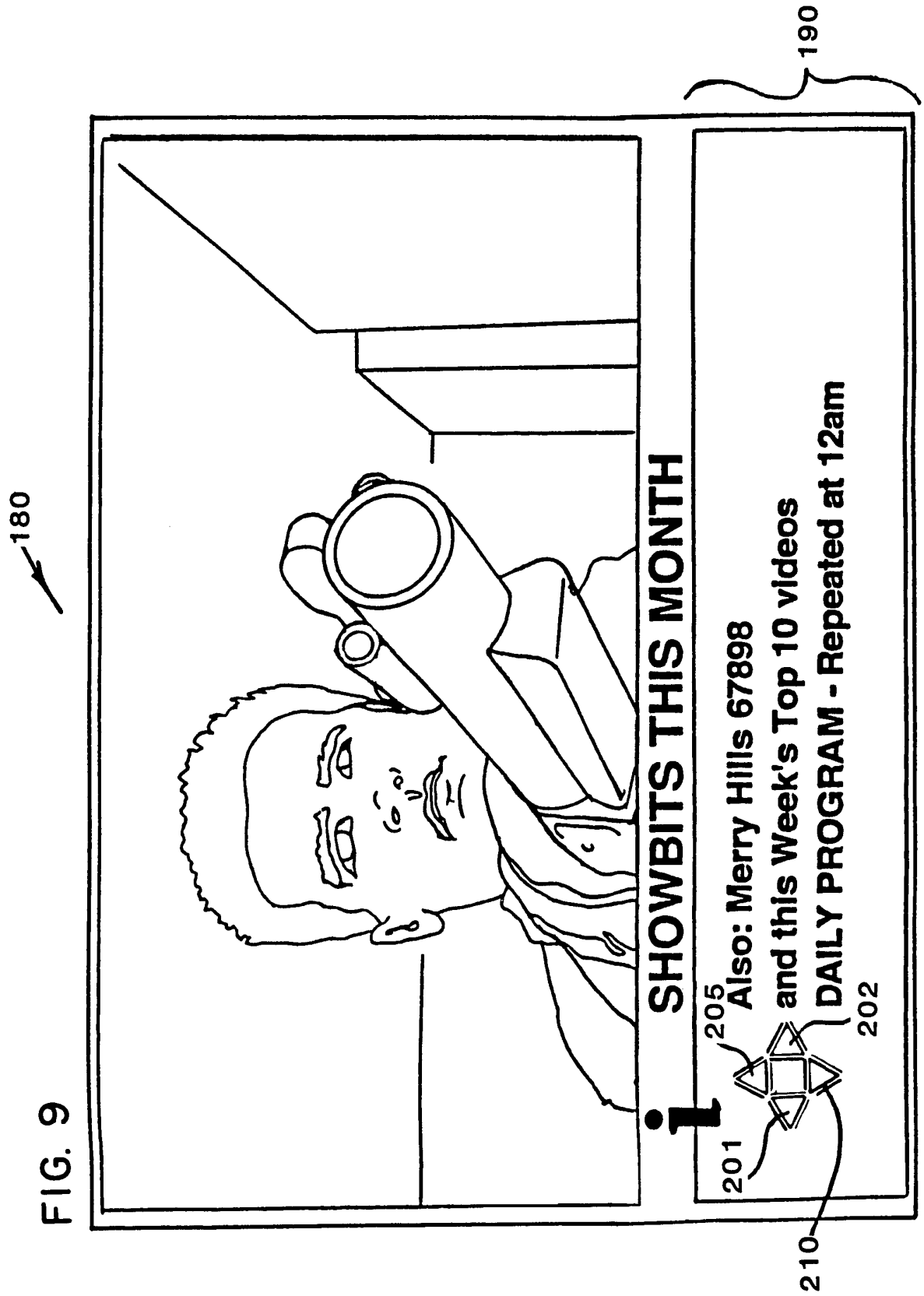

180
190
SHOWBITS THIS MONTH
Also: Merry Hills 67898
and this Week's Top 10 videos
DAILY PROGRAM - Repeated at 12am
205
202
201
210

FIG. 9

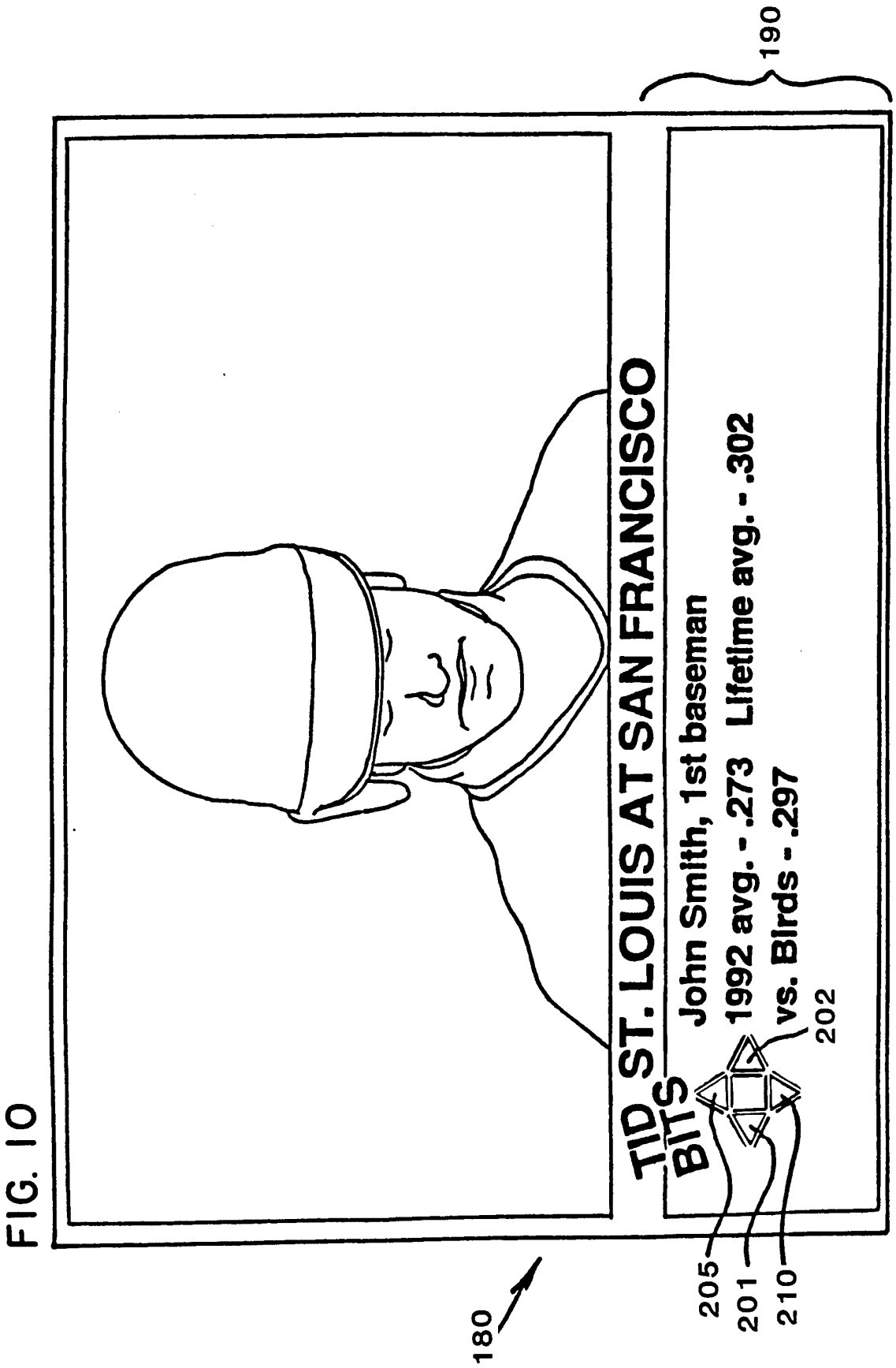

190
TID BITS
ST. LOUIS AT SAN FRANCISCO
John Smith, 1st baseman
1992 avg. - .273 Lifetime avg. - .302
vs. Birds - .297
202
205
201
210
180

FIG. 10

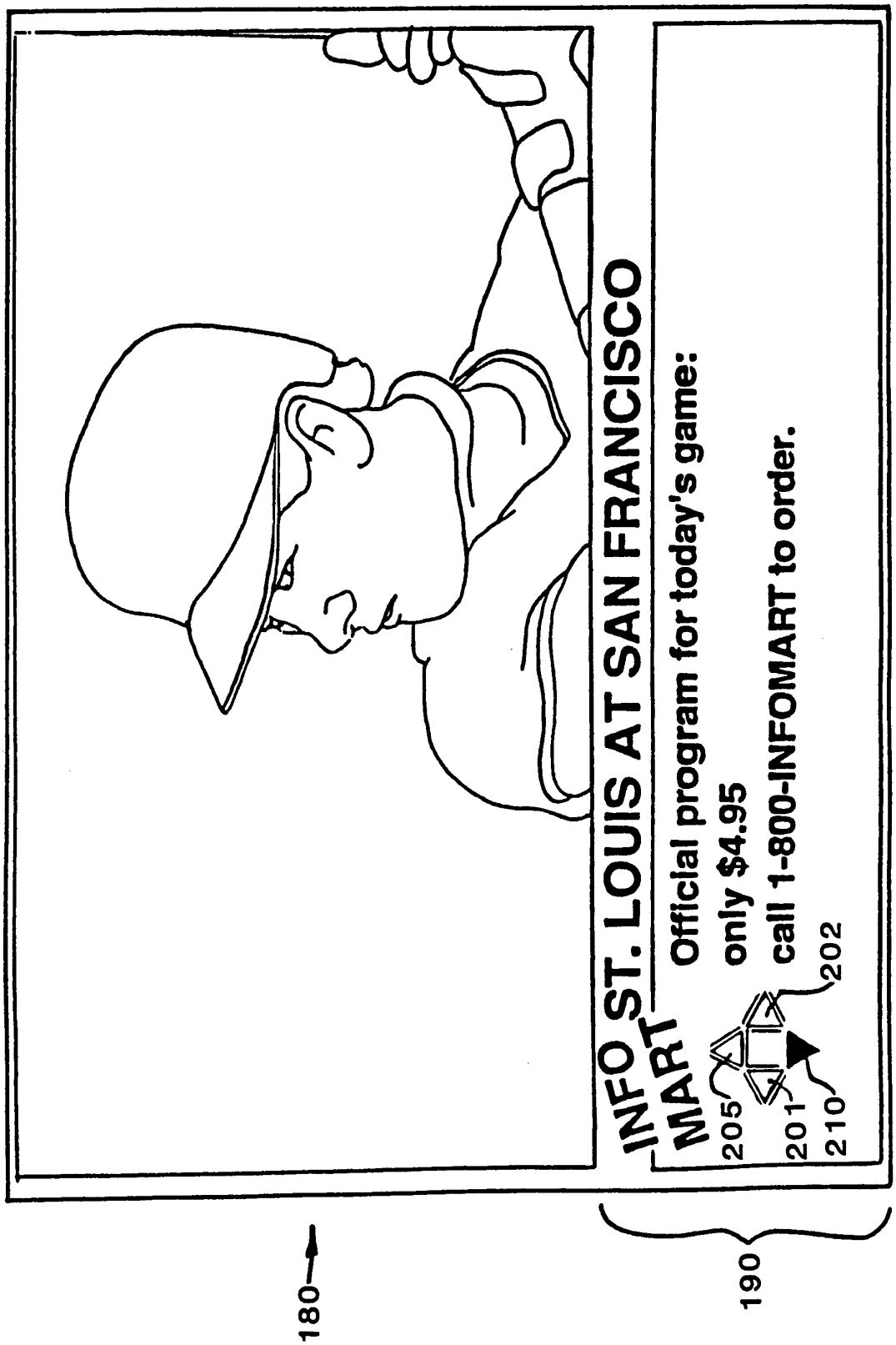

INFO MART
ST. LOUIS AT SAN FRANCISCO
Official program for today's game:
only $4.95
call 1-800-INFOMART to order.
205
201
210
202
180
190

FIG. 11

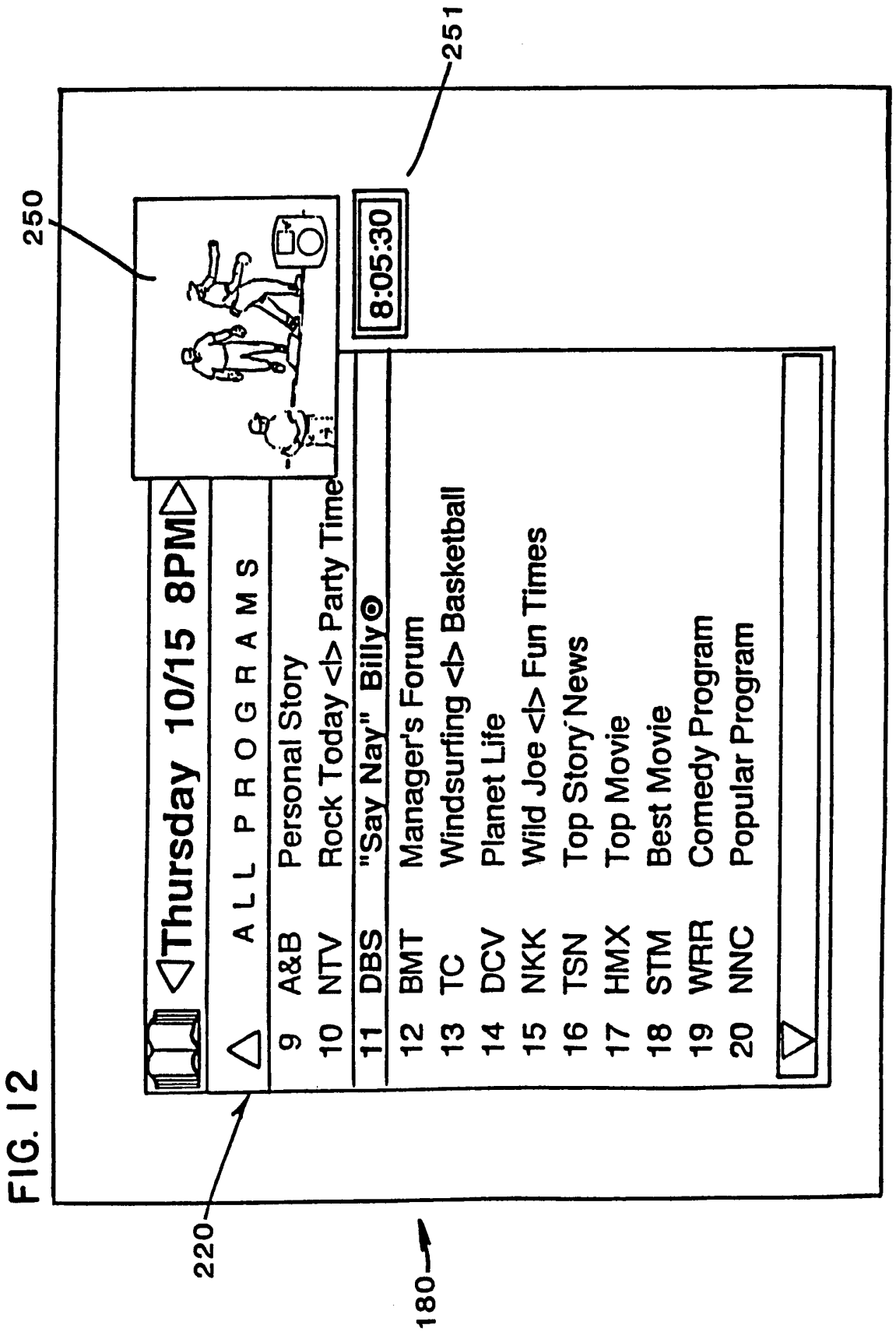

251
250
8:05:30
Thursday 10/15 8PM
ALL PROGRAMS
9 A&B Personal Story
10 NTV Rock Today <I> Party Time
11 DBS "Say Nay" Billy
12 BMT Manager's Forum
13 TC Windsurfing <I> Basketball
14 DCV Planet Life
15 NKK Wild Joe <I> Fun Times
16 TSN Top Story News
17 HMX Top Movie
18 STM Best Movie
19 WRR Comedy Program
20 NNC Popular Program
220
180

FIG. 12

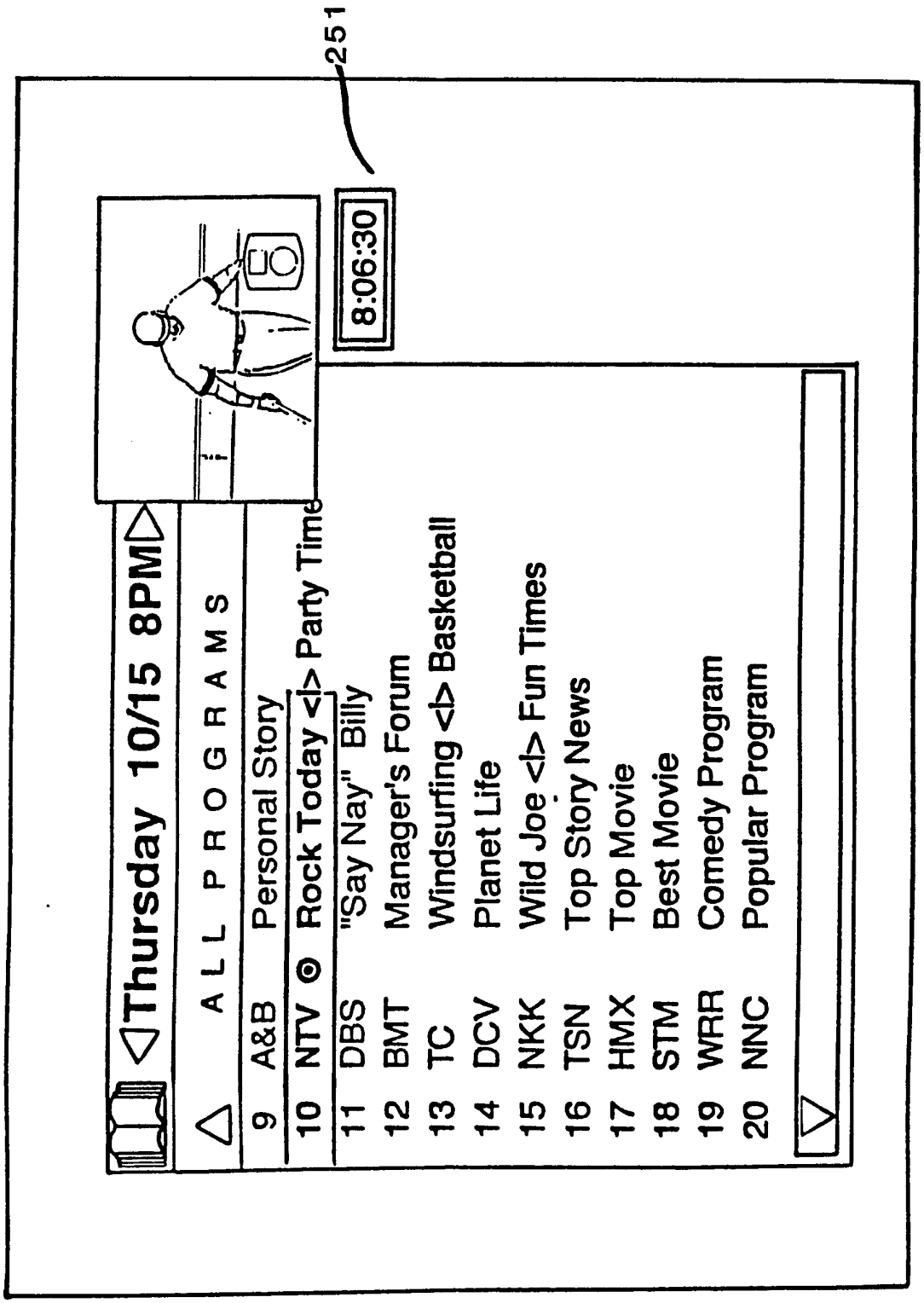

251
8:06:30
Thursday 10/15 8PM
ALL PROGRAMS
9 A&B Personal Story
10 NTV Rock Today <I> Party Time
11 DBS "Say Nay" Billy
12 BMT Manager's Forum
13 TC Windsurfing <I> Basketball
14 DCV Planet Life
15 NKK Wild Joe <I> Fun Times
16 TSN Top Story News
17 HMX Top Movie
18 STM Best Movie
19 WRR Comedy Program
20 NNC Popular Program
180

FIG. 13

FIG. 14

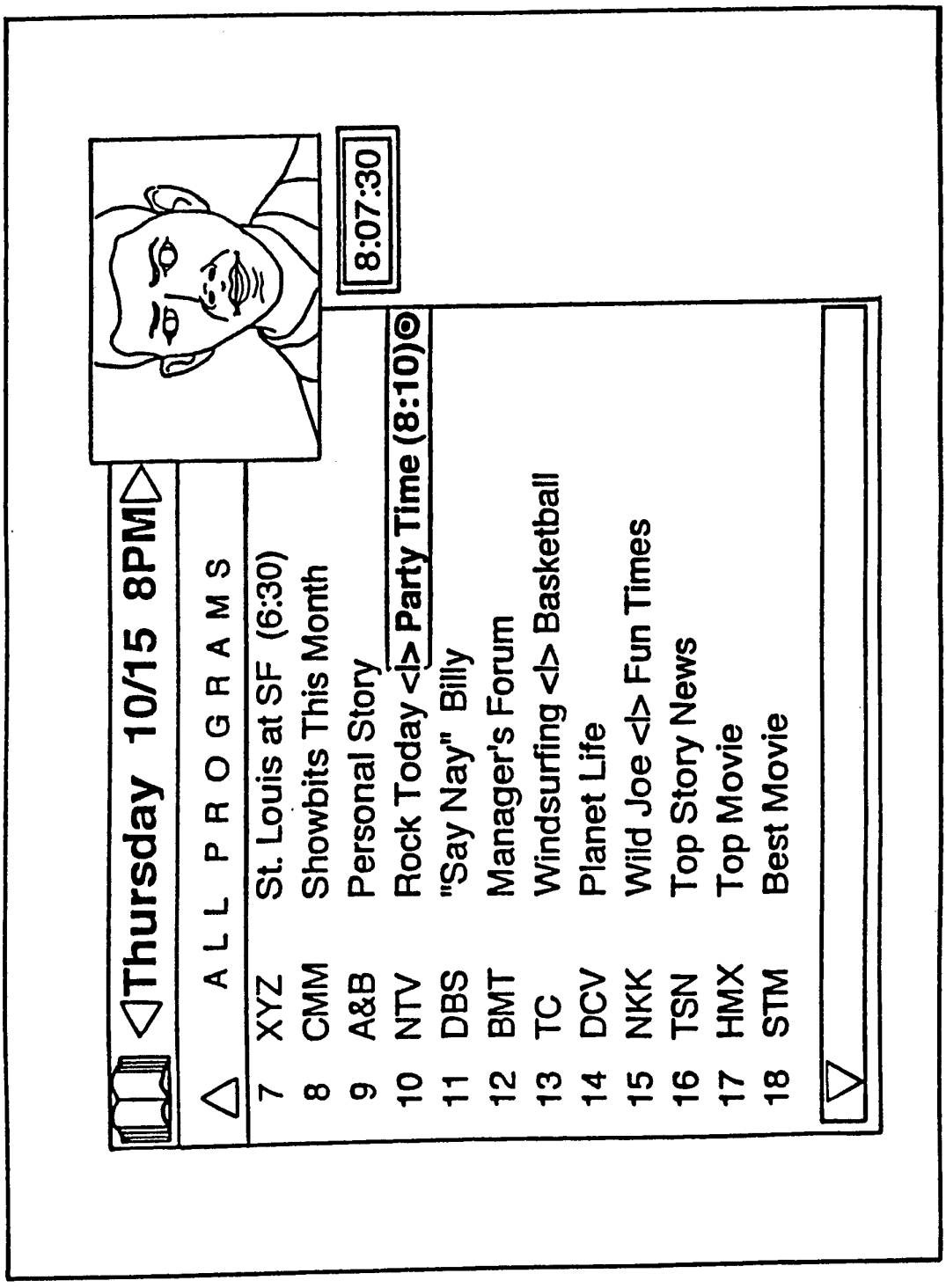

Thursday 10/15 8PM
8:07:30
ALL PROGRAMS
7 XYZ St. Louis at SF (6:30)
8 CMM Showbits This Month
9 A&B Personal Story
10 NTV Rock Today <i> Party Time (8:10)
11 DBS "Say Nay" Billy
12 BMT Manager's Forum
13 TC Windsurfing <i> Basketball
14 DCV Planet Life
15 NKK Wild Joe <i> Fun Times
16 TSN Top Story News
17 HMX Top Movie
18 STM Best Movie
180

FIG. 15

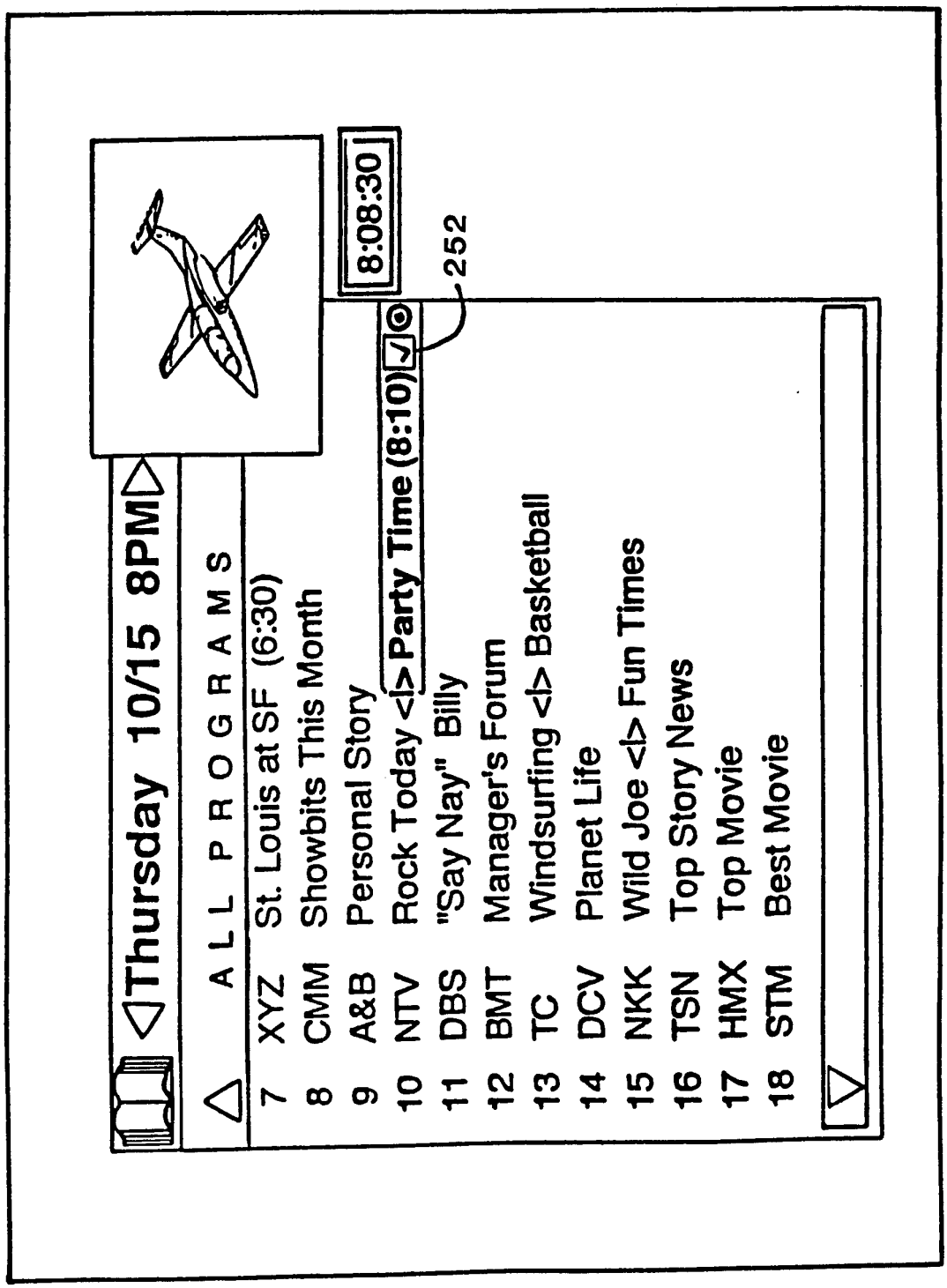

Thursday 10/15 8PM
ALL PROGRAMS
7 XYZ St. Louis at SF (6:30)
8 CMM Showbits This Month
9 A&B Personal Story
10 NTV Rock Today <I> Party Time (8:10)
11 DBS "Say Nay" Billy
12 BMT Manager's Forum
13 TC Windsurfing <I> Basketball
14 DCV Planet Life
15 NKK Wild Joe <I> Fun Times
16 TSN Top Story News
17 HMX Top Movie
18 STM Best Movie
8:08:30
252
180

FIG. 16

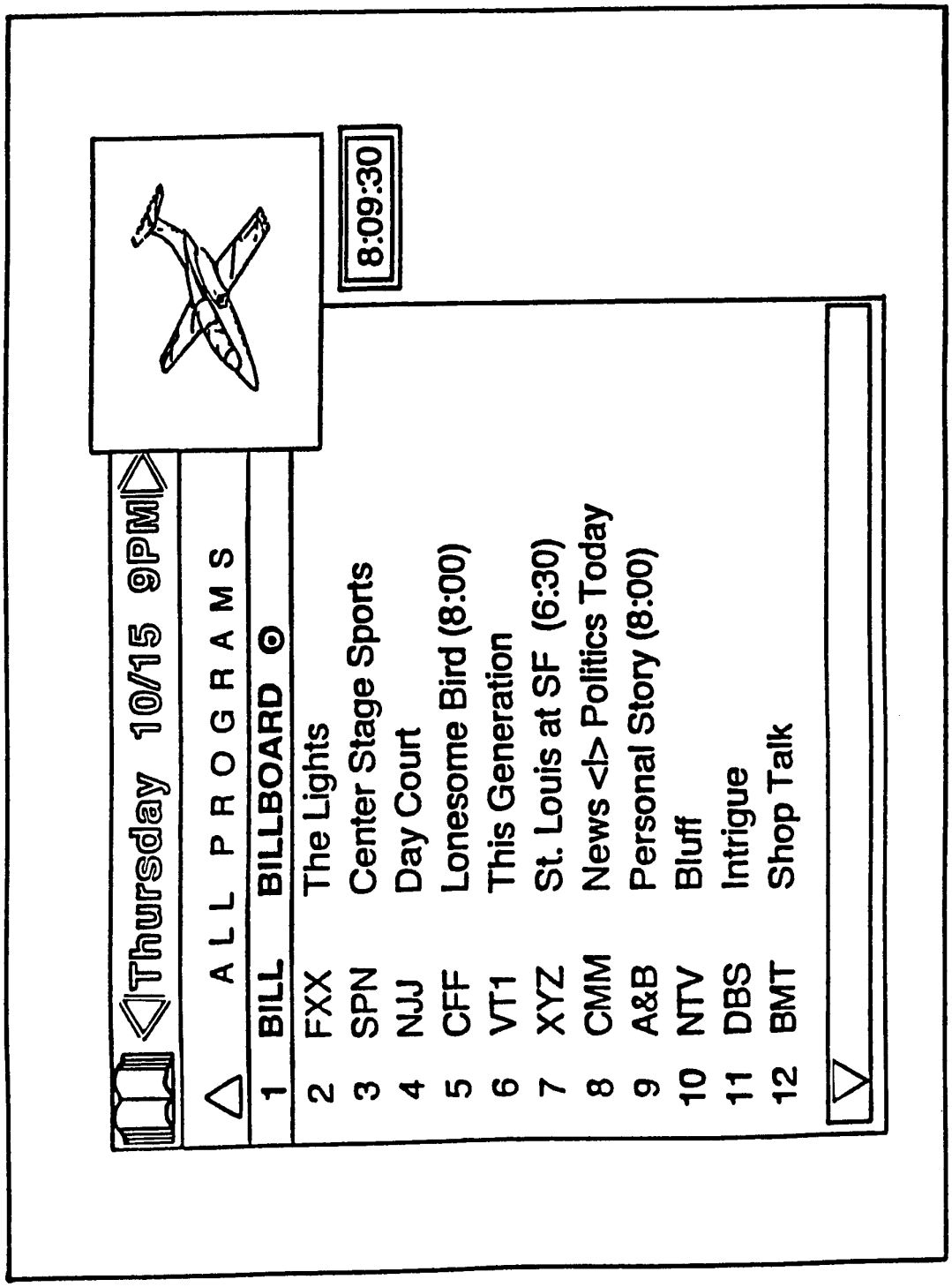
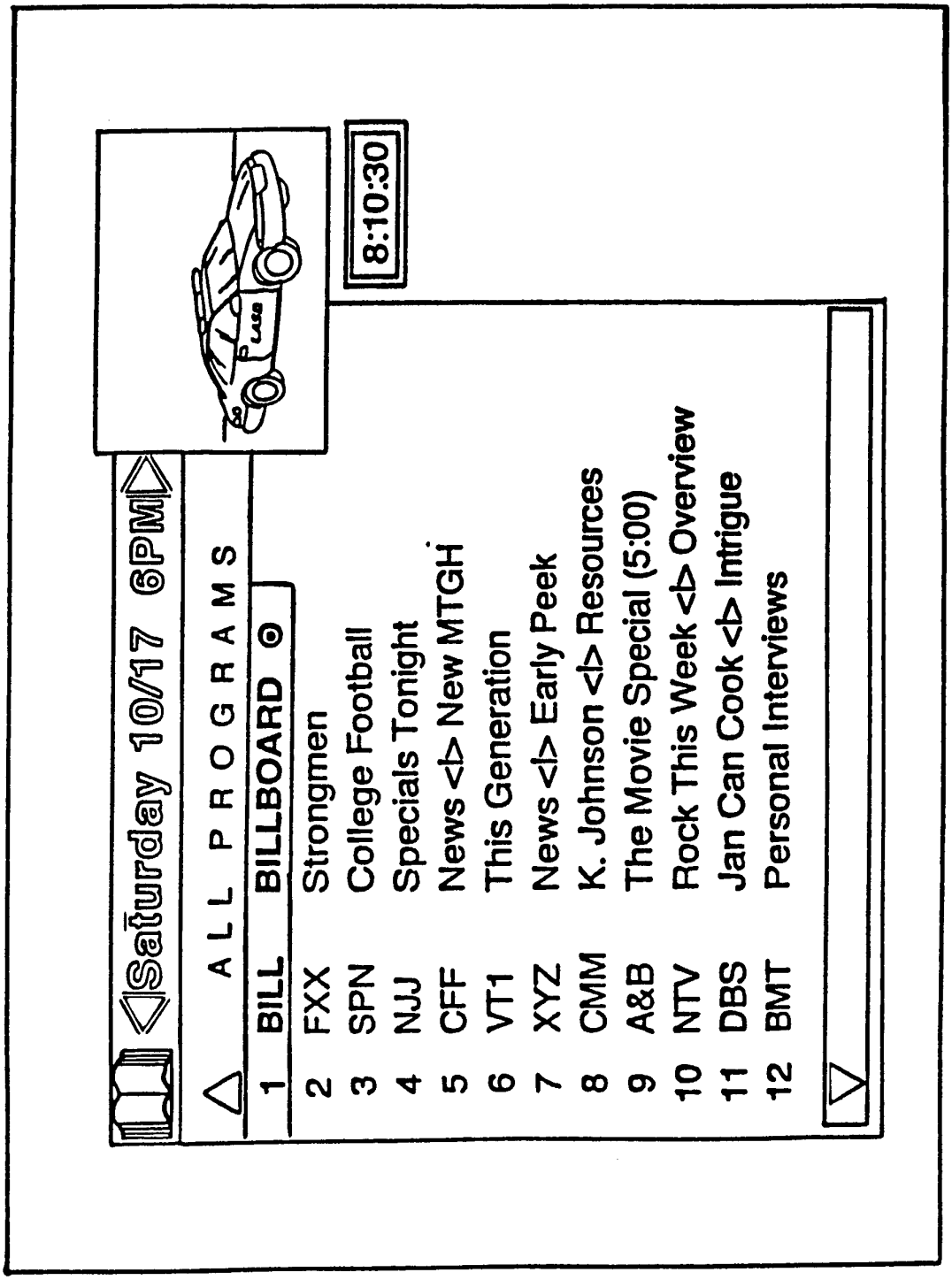

Thursday 10/15 9PM
8:09:30
ALL PROGRAMS
1 BILL BILLBOARD
2 FXX The Lights
3 SPN Center Stage Sports
4 NJJ Day Court
5 CFF Lonesome Bird (8:00)
6 VT1 This Generation
7 XYZ St. Louis at SF (6:30)
8 CMM News <I> Politics Today
9 A&B Personal Story (8:00)
10 NTV Bluff
11 DBS Intrigue
12 BMT Shop Talk
180

FIG. 17


Saturday 10/17 6PM
8:10:30
ALL PROGRAMS
1 BILL BILLBOARD ⊙
2 FXX Strongmen
3 SPN College Football
4 NJJ Specials Tonight
5 CFF News <b> New MTGH
6 VT1 This Generation
7 XYZ News <b> Early Peek
8 CMM K. Johnson <b> Resources
9 A&B The Movie Special (5:00)
10 NTV Rock This Week <b> Overview
11 DBS Jan Can Cook <b> Intrigue
12 BMT Personal Interviews

180

FIG. 18

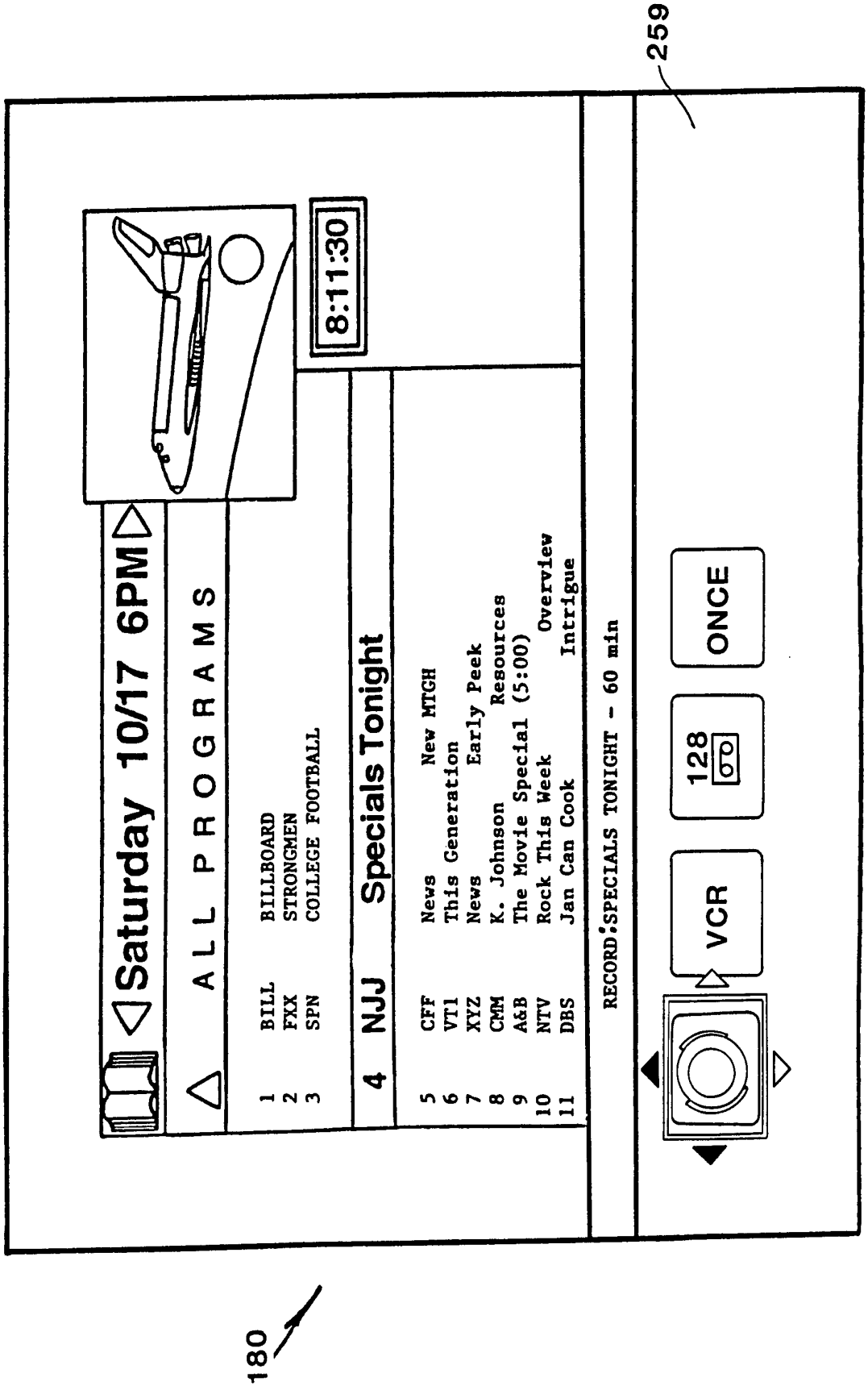
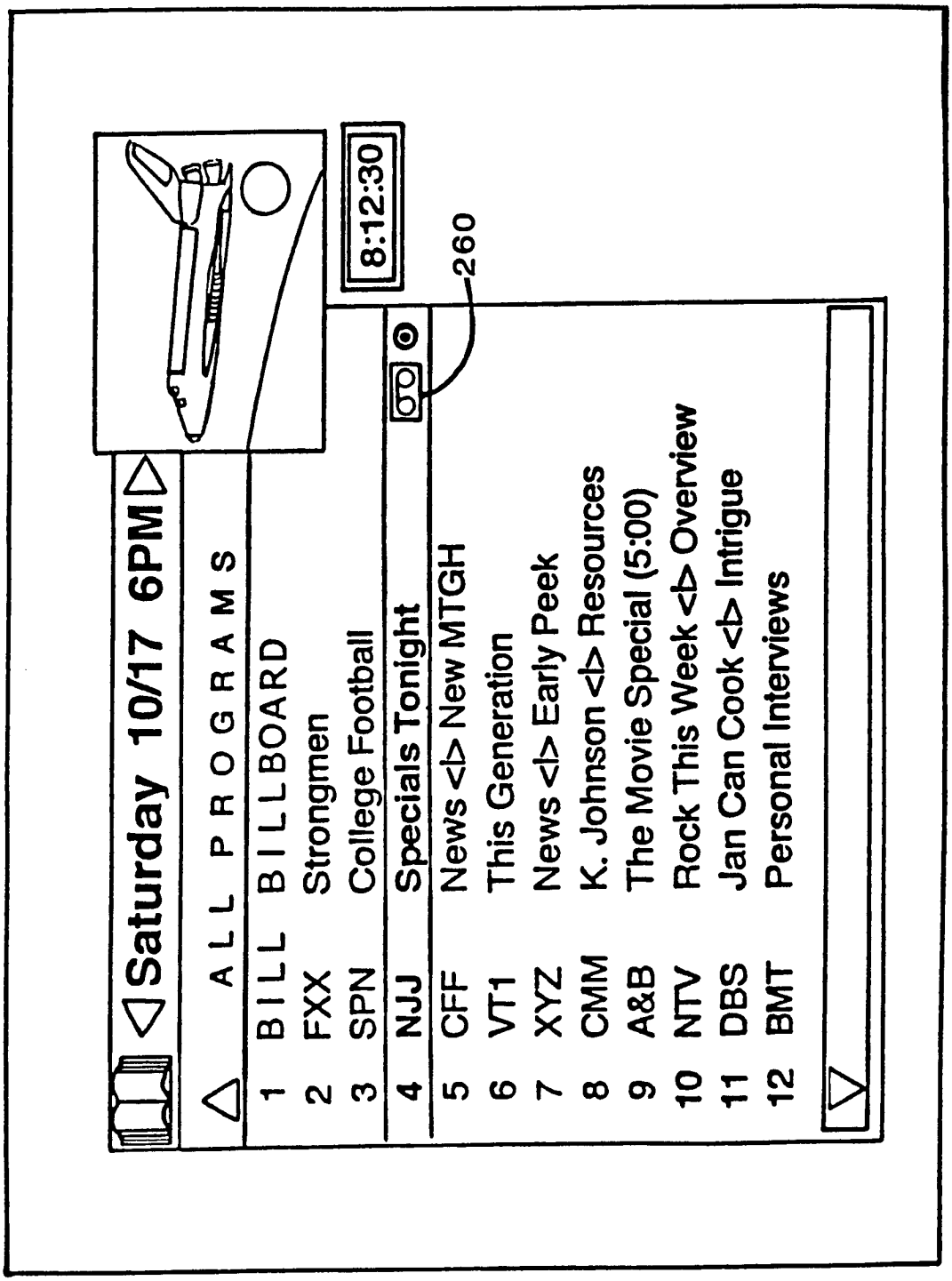

259
Saturday 10/17 6PM
8:11:30
ALL PROGRAMS
1 BILL BILLBOARD
2 FXX STRONGMEN
3 SPN COLLEGE FOOTBALL
4 NJJ Specials Tonight
5 CFF News New MTGH
6 VTI This Generation
7 XYZ News Early Peek
8 CMM K. Johnson Resources
9 A&B The Movie Special (5:00)
10 NTV Rock This Week Overview
11 DBS Jan Can Cook Intrigue
RECORD:SPECIALS TONIGHT - 60 min
VCR
128
ONCE
180

FIG. 19


Saturday 10/17 6PM
8:12:30
260
ALL PROGRAMS
1 BILL BILLBOARD
2 FXX Strongmen
3 SPN College Football
4 NJJ Specials Tonight
5 CFF News <b> New MTGH
6 VT1 This Generation
7 XYZ News <b> Early Peek
8 CMM K. Johnson <b> Resources
9 A&B The Movie Special (5:00)
10 NTV Rock This Week <b> Overview
11 DBS Jan Can Cook <b> Intrigue
12 BMT Personal Interviews
180

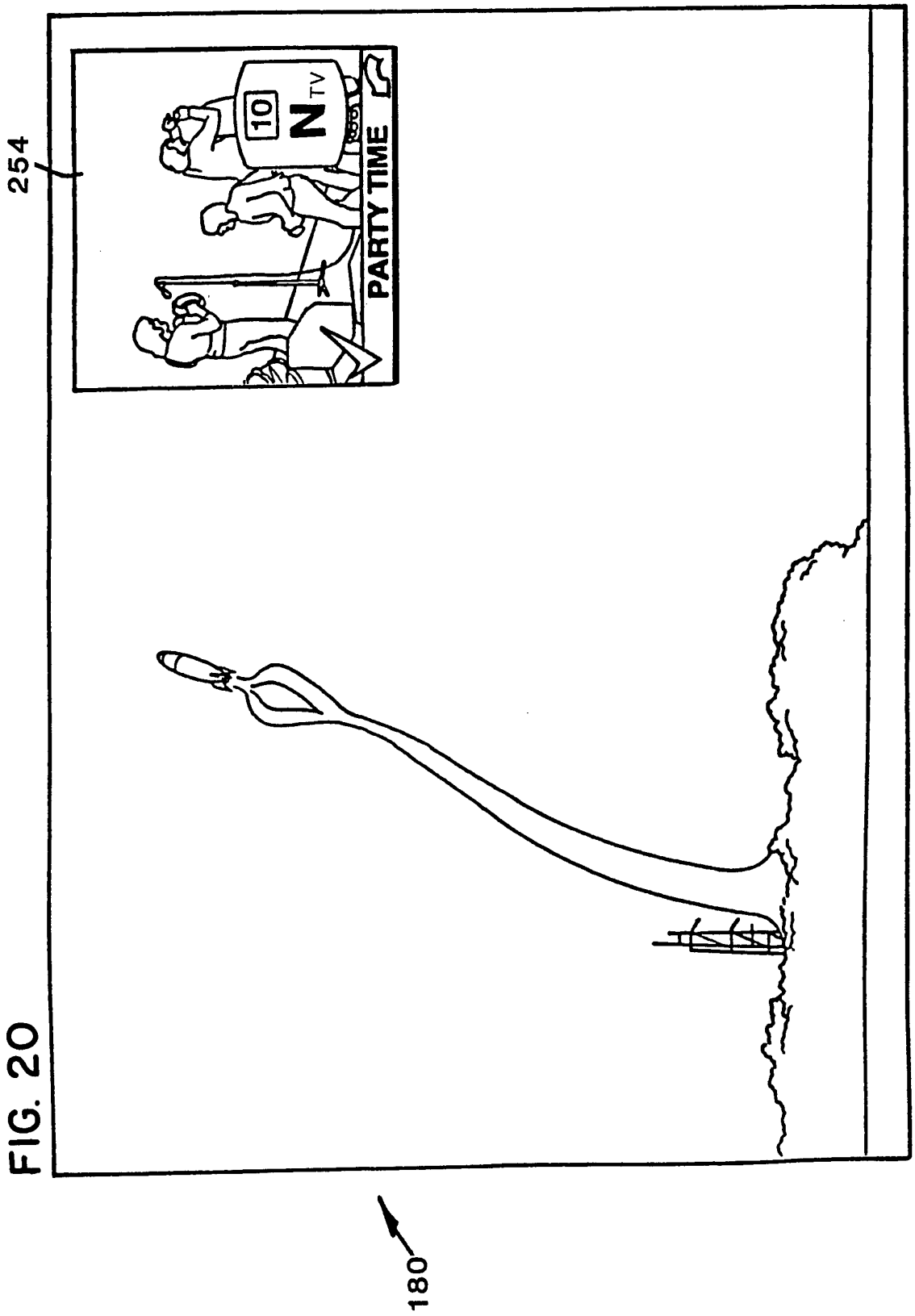


FIG. 20

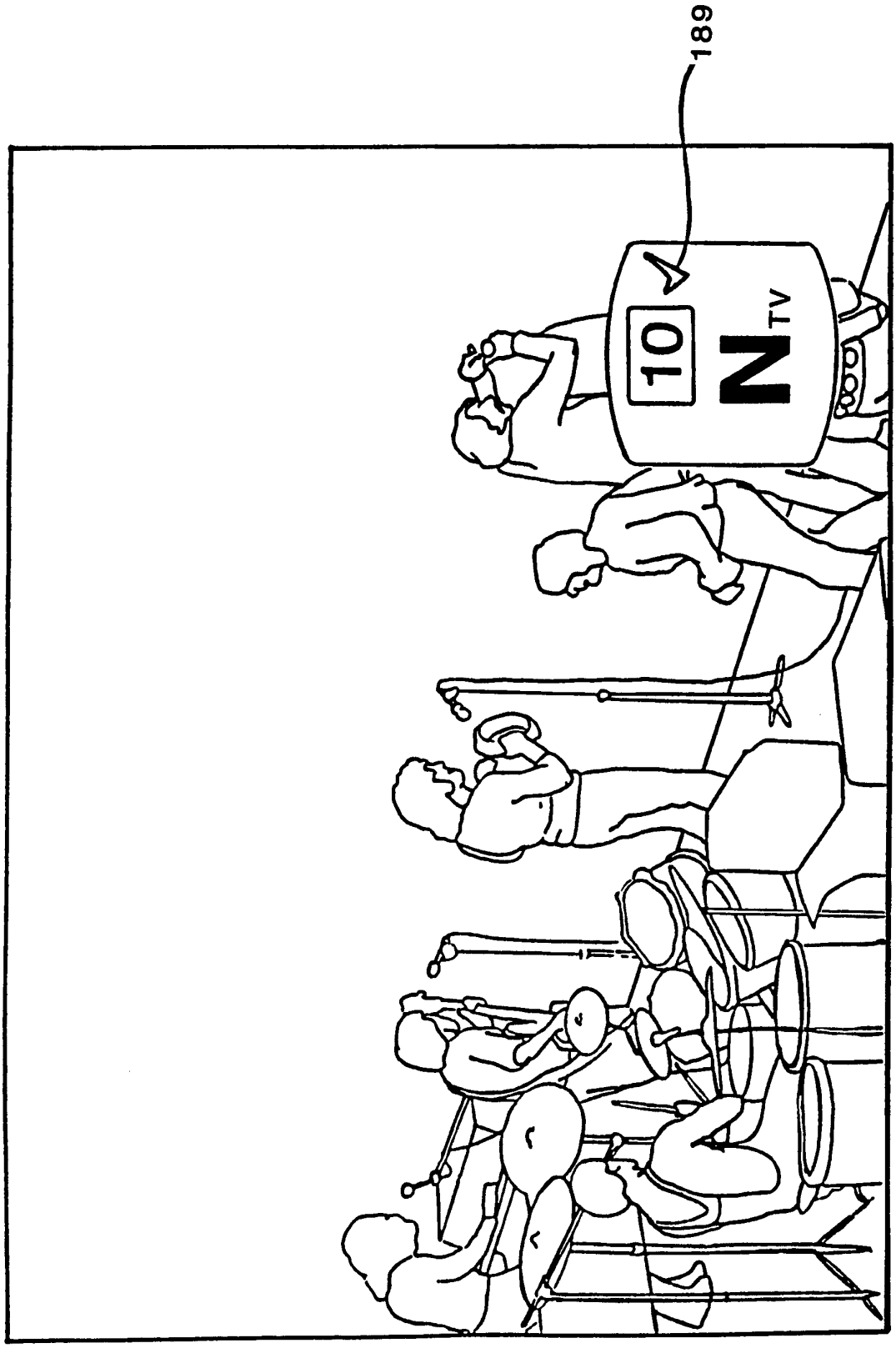


FIG. 21

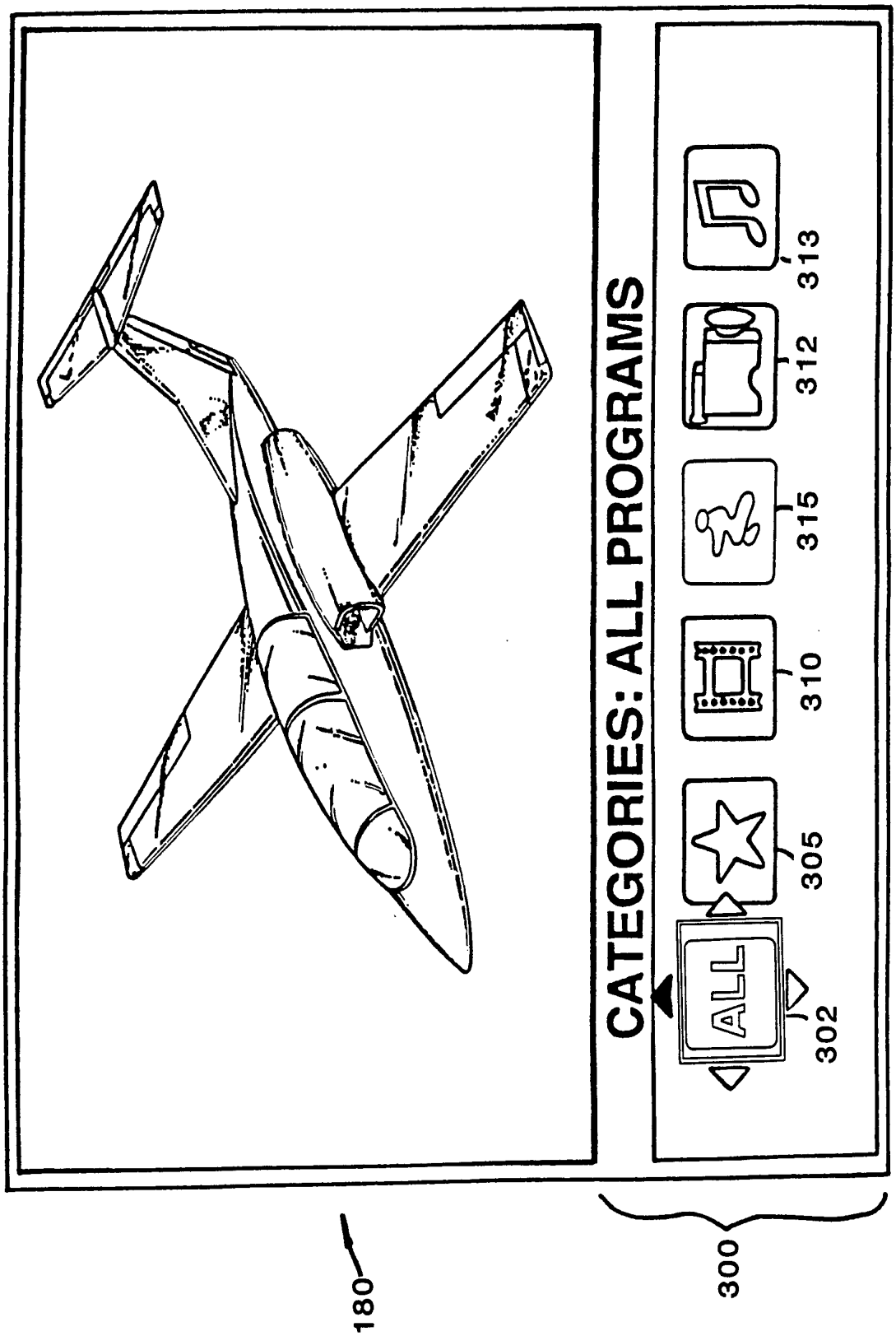


FIG. 22

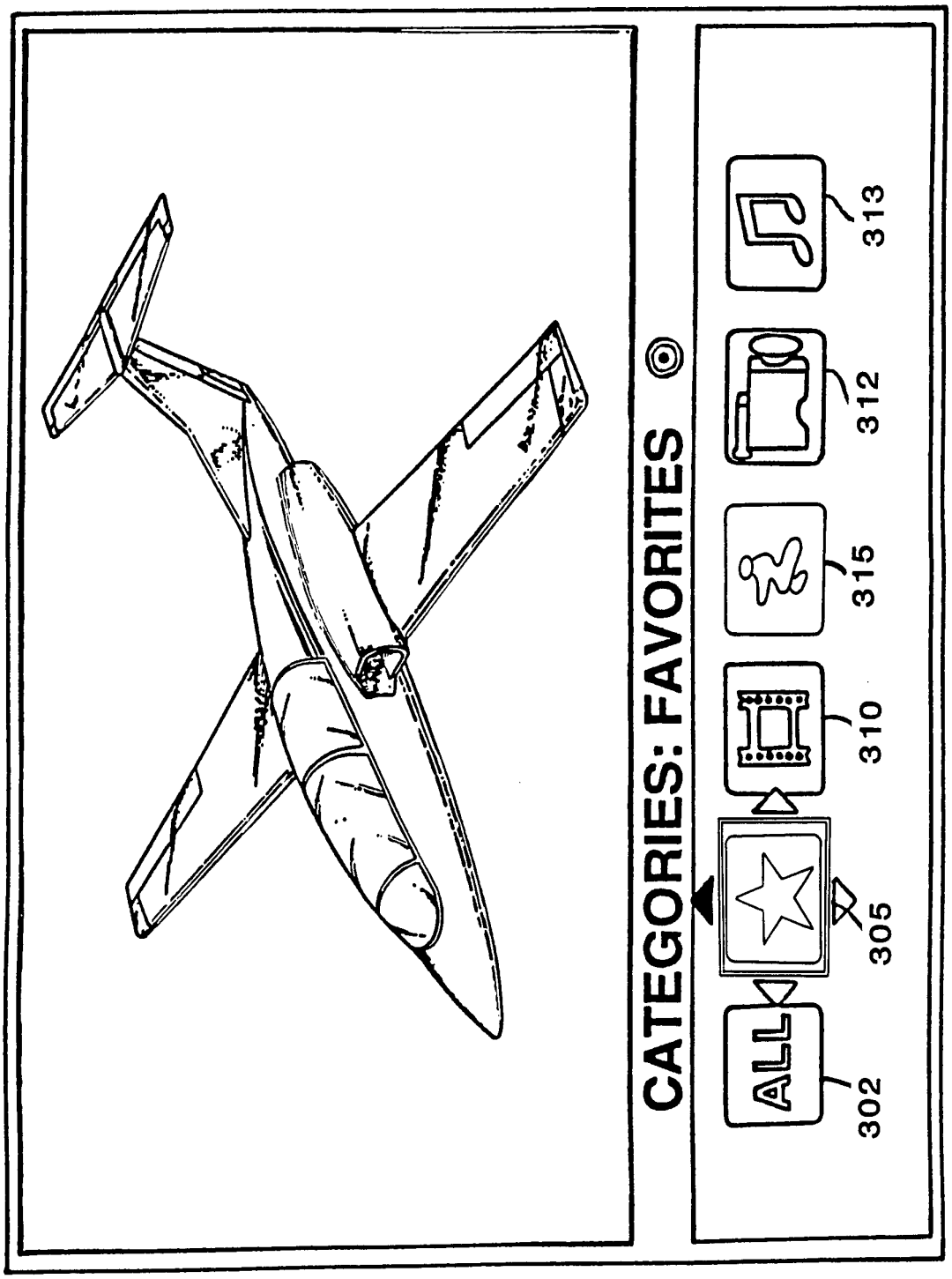


FIG. 23

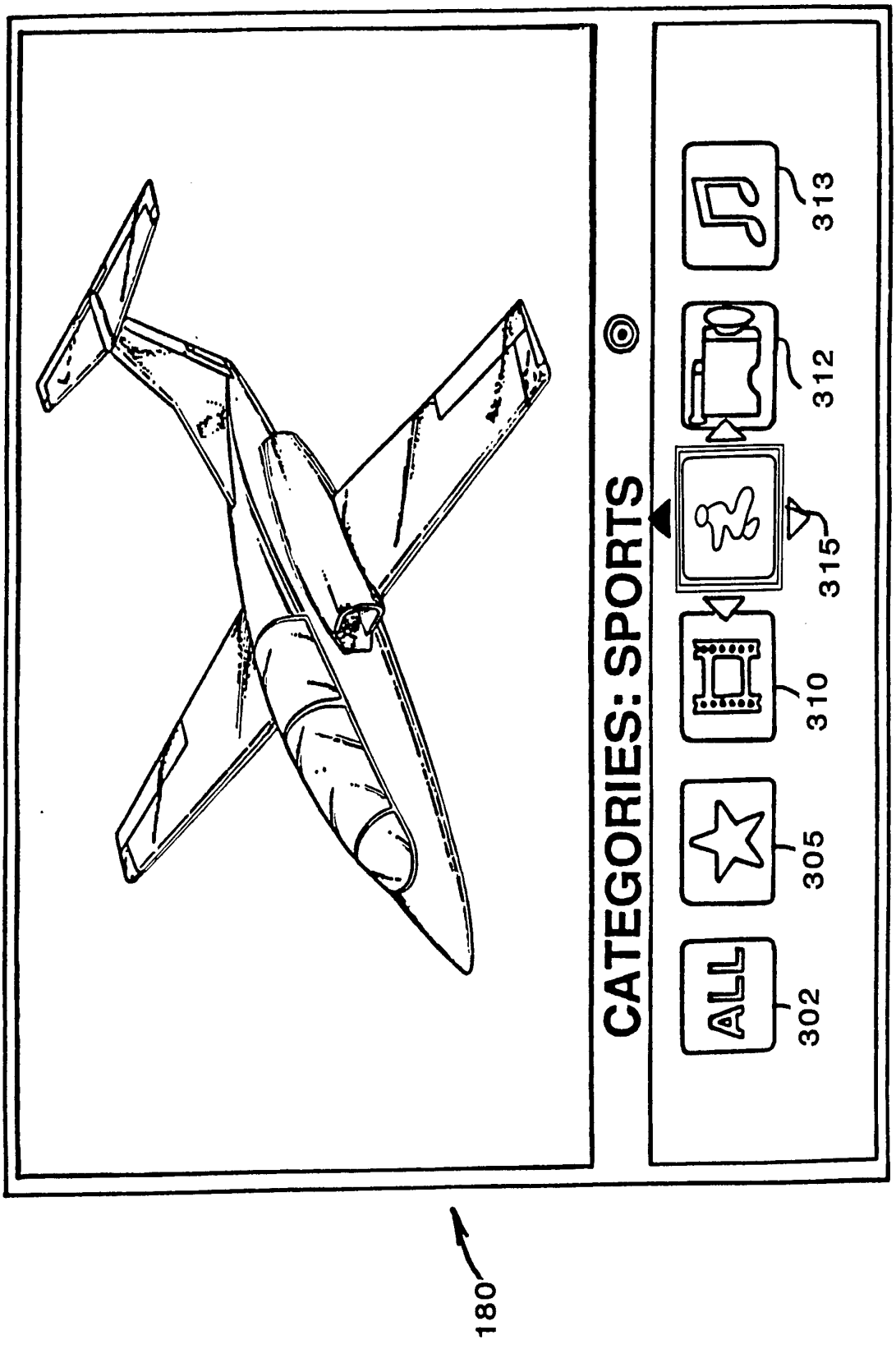


FIG. 24

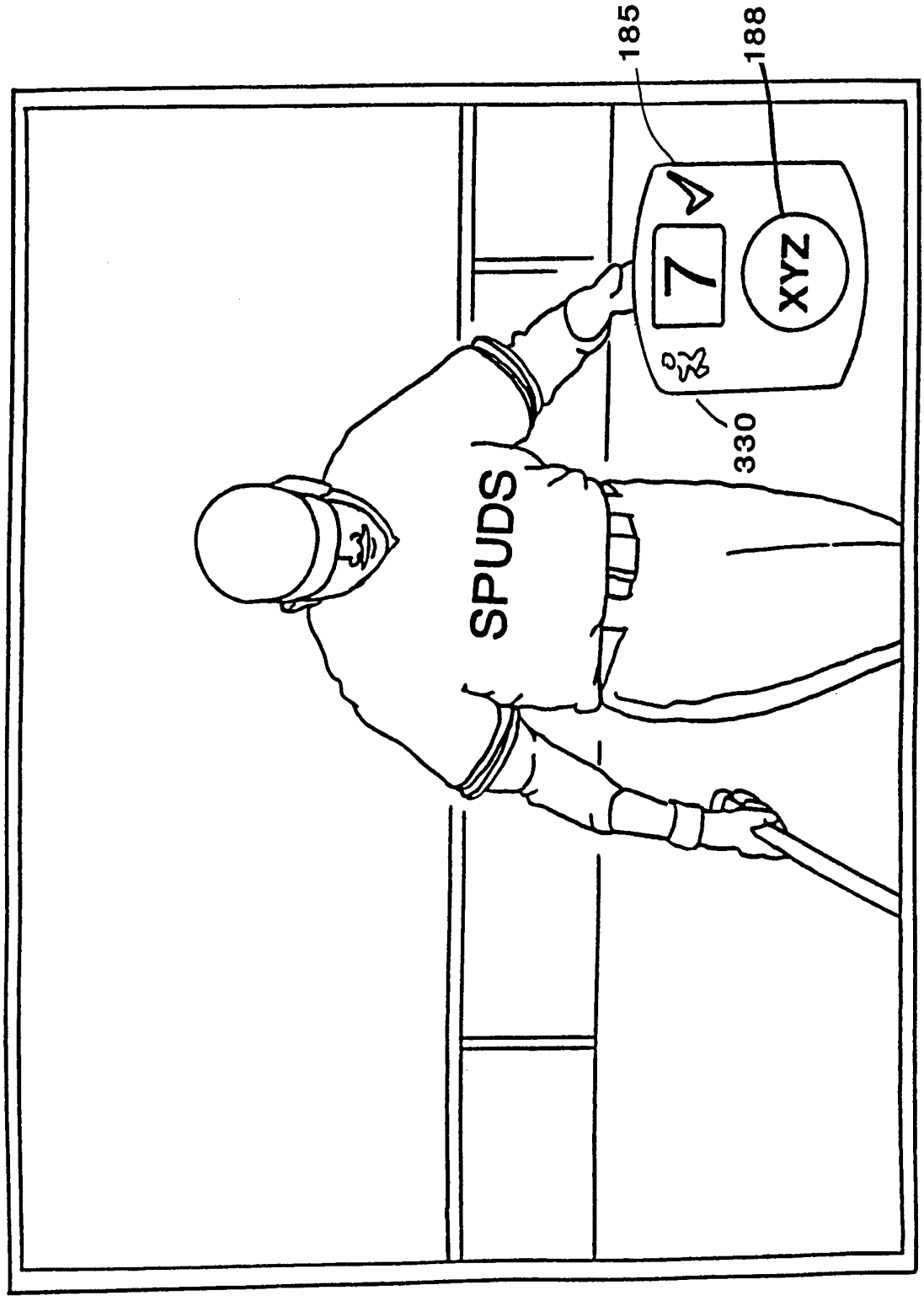


FIG. 25

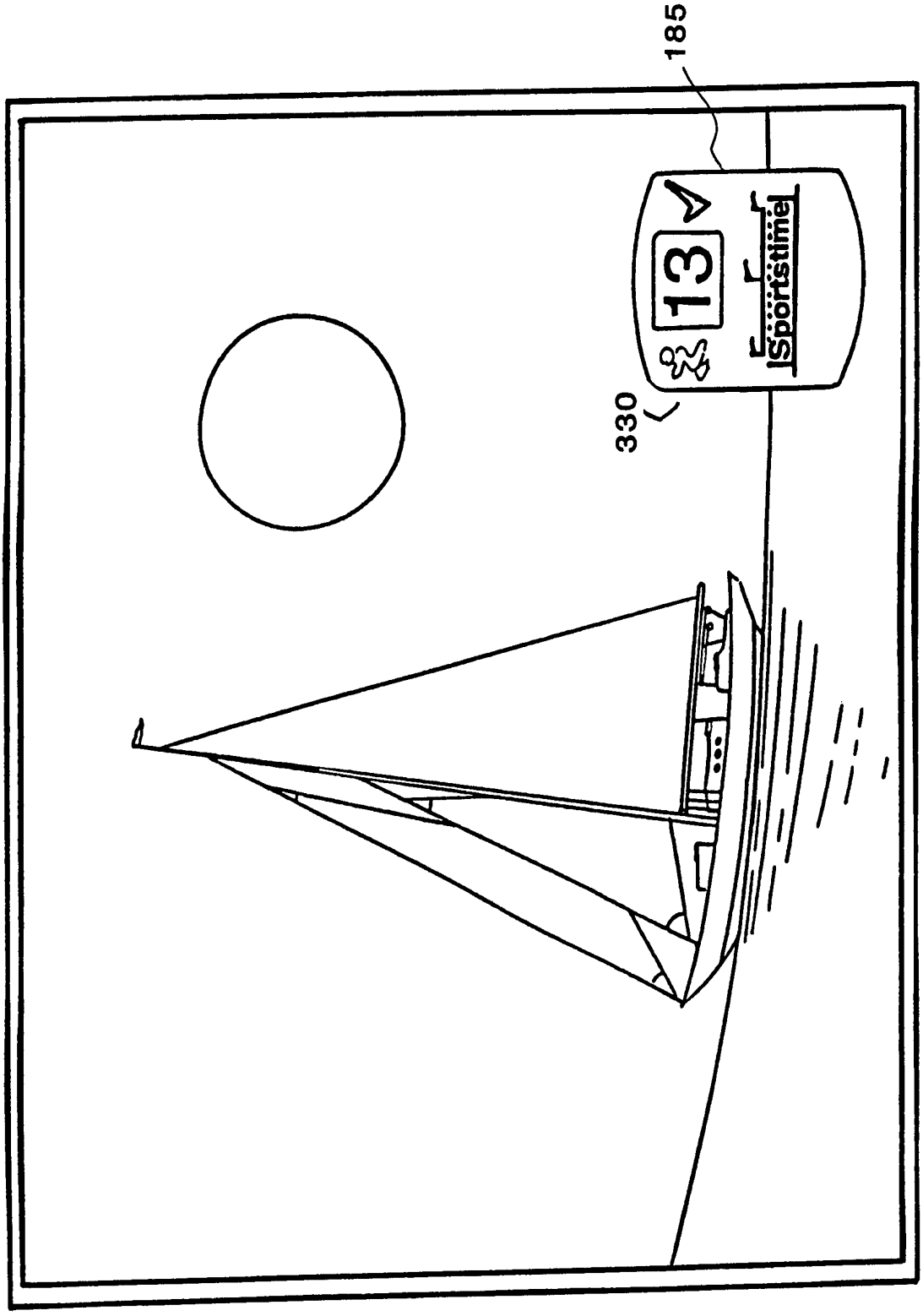


FIG. 26

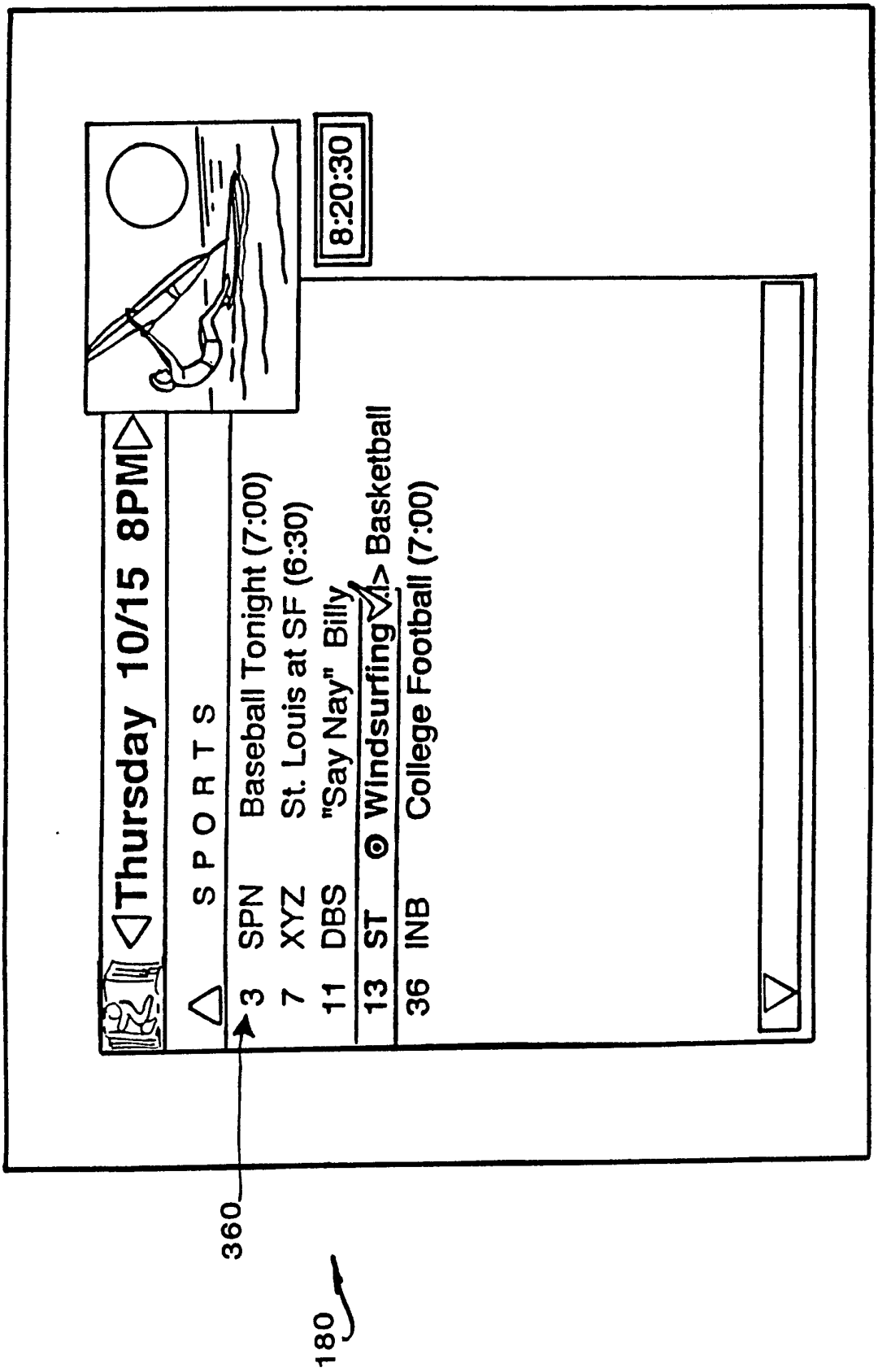

8:20:30
Thursday 10/15 8PM
SPORTS
3 SPN Baseball Tonight (7:00)
7 XYZ St. Louis at SF (6:30)
11 DBS "Say Nay" Billy
13 ST Windsurfing Basketball
36 INB College Football (7:00)
360
180

FIG. 27

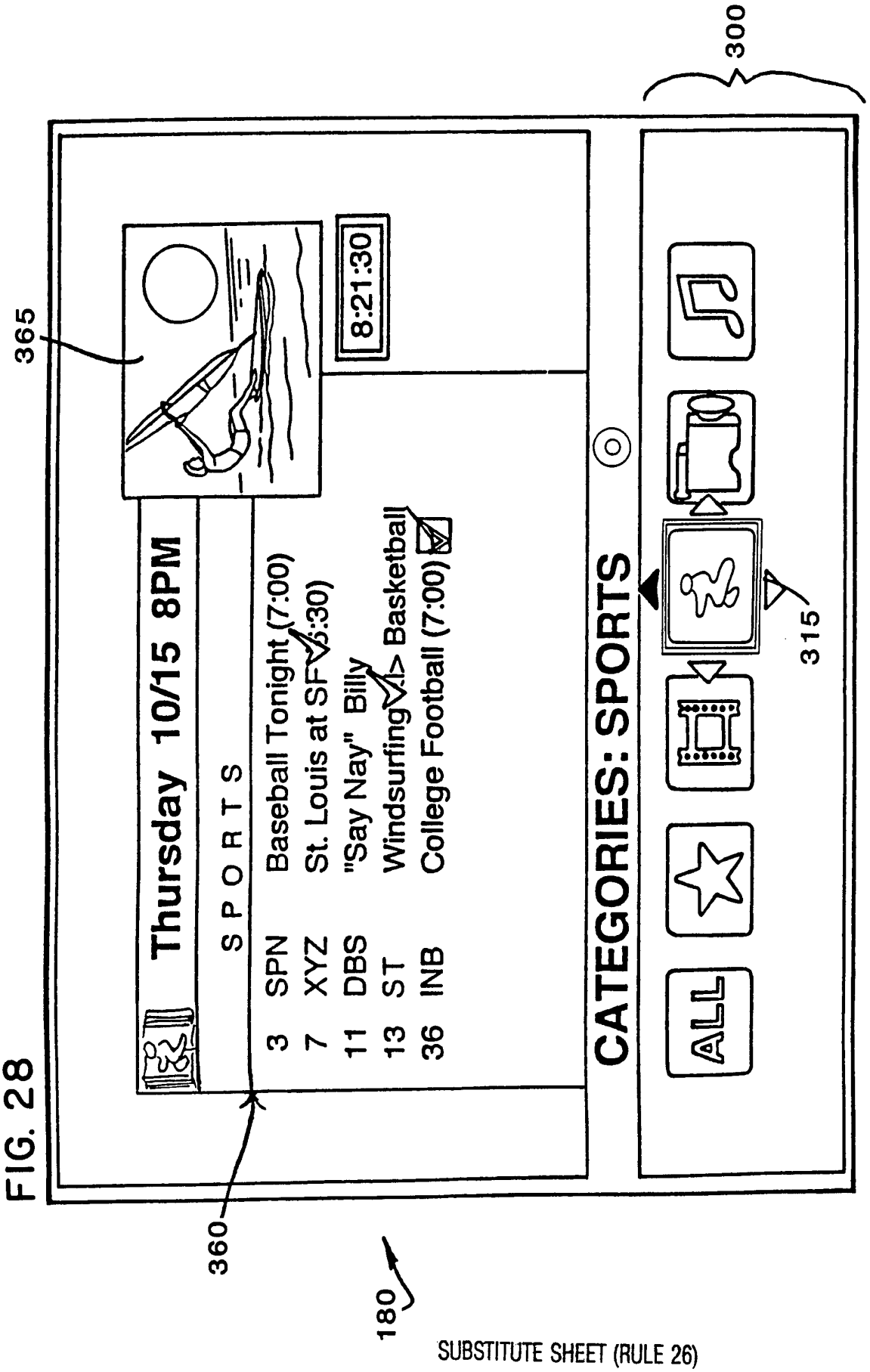

300
365
8:21:30
Thursday 10/15 8PM
SPORTS
3 SPN Baseball Tonight (7:00)
7 XYZ St. Louis at SF (5:30)
11 DBS "Say Nay" Billy
13 ST Windsurfing> Basketball
36 INB College Football (7:00)
CATEGORIES: SPORTS
ALL
315
360
180

FIG. 28

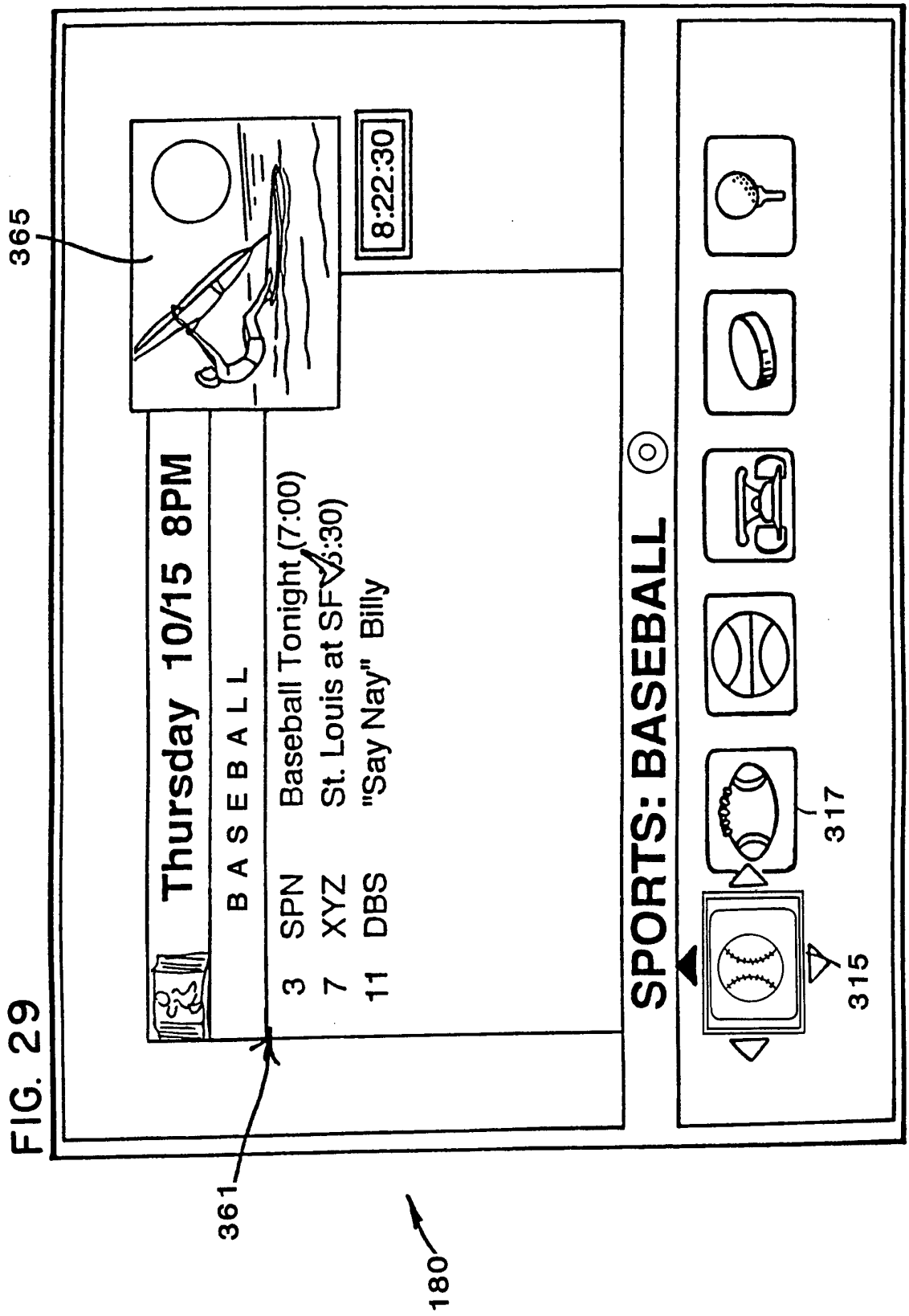

365
8:22:30
Thursday 10/15 8PM
BASEBALL
3 SPN Baseball Tonight (7:00)
7 XYZ St. Louis at SF (5:30)
11 DBS "Say Nay" Billy
SPORTS: BASEBALL
317
315
361
180

FIG. 29

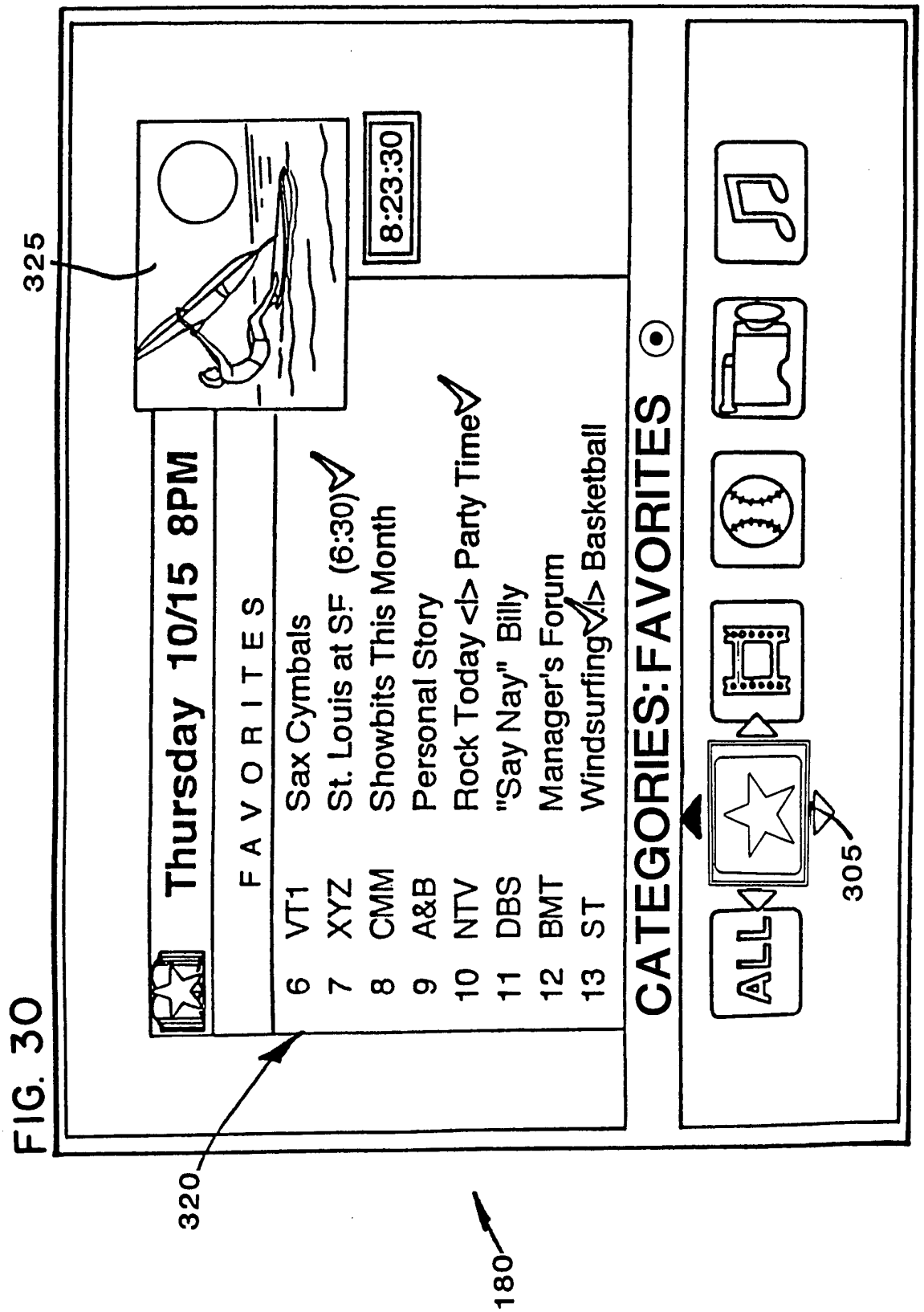

325
8:23:30
Thursday 10/15 8PM
FAVORITES
6 VT1 Sax Cymbals
7 XYZ St. Louis at SF (6:30)
8 CMM Showbits This Month
9 A&B Personal Story
10 NTV Rock Today </> Party Time
11 DBS "Say Nay" Billy
12 BMT Manager's Forum
13 ST Windsurfing </> Basketball
CATEGORIES: FAVORITES
ALL
305
320
180

FIG. 30

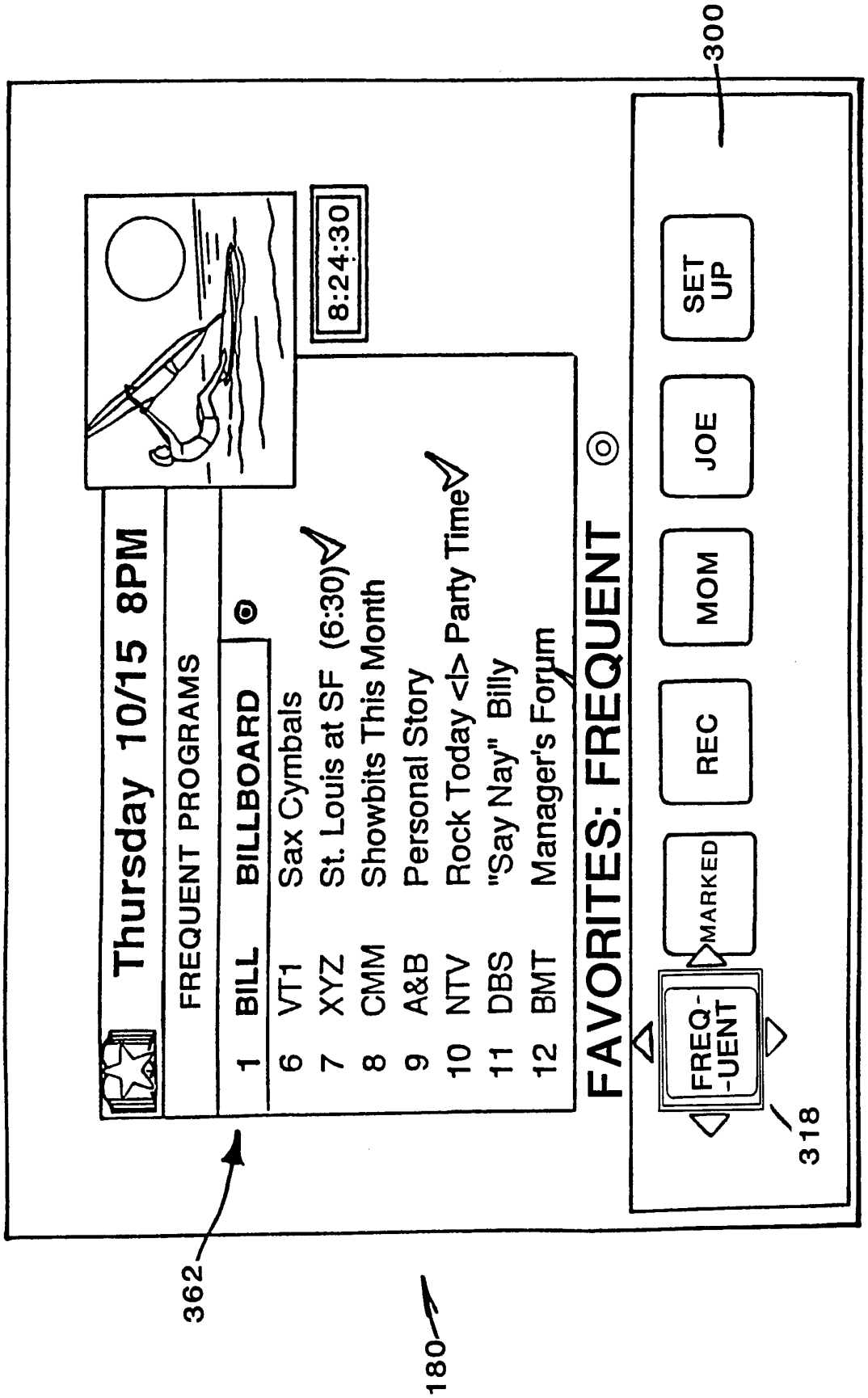

300
FAVORITES: FREQUENT
FREQ-UENT
MARKED
REC
MOM
JOE
SET UP
318
Thursday 10/15 8PM
FREQUENT PROGRAMS
8:24:30
1 BILL BILLBOARD
6 VT1 Sax Cymbals
7 XYZ St. Louis at SF (6:30)
8 CMM Showbits This Month
9 A&B Personal Story
10 NTV Rock Today <I> Party Time
11 DBS "Say Nay" Billy
12 BMT Manager's Forum
362
180

FIG. 31

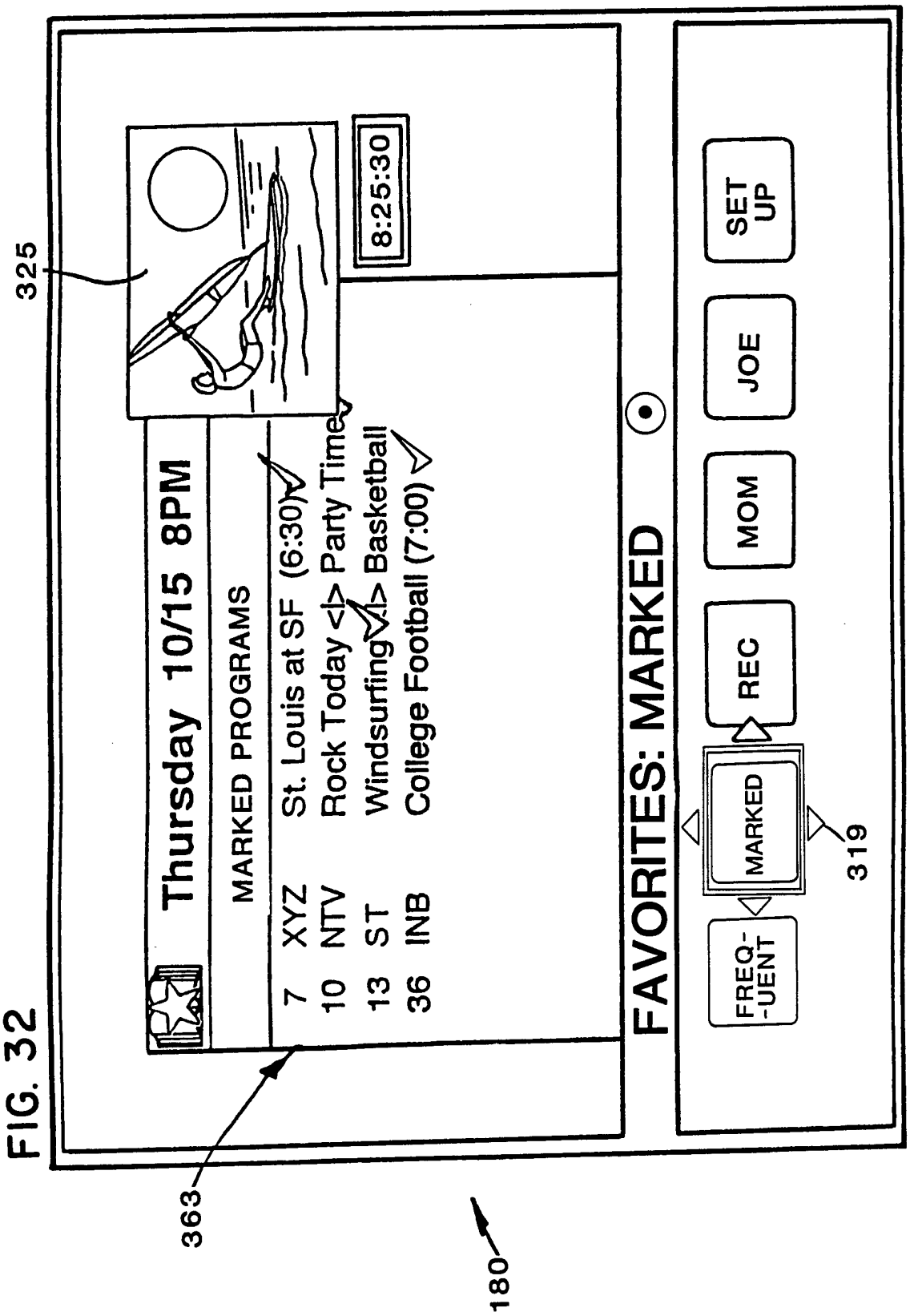


FIG. 32
325
8:25:30
Thursday 10/15 8PM
MARKED PROGRAMS
7 XYZ St. Louis at SF (6:30)
10 NTV Rock Today </> Party Time
13 ST Windsurfing </> Basketball
36 INB College Football (7:00)
FAVORITES: MARKED
SET UP
JOE
MOM
REC
MARKED
FREQ-UENT
319
363
180

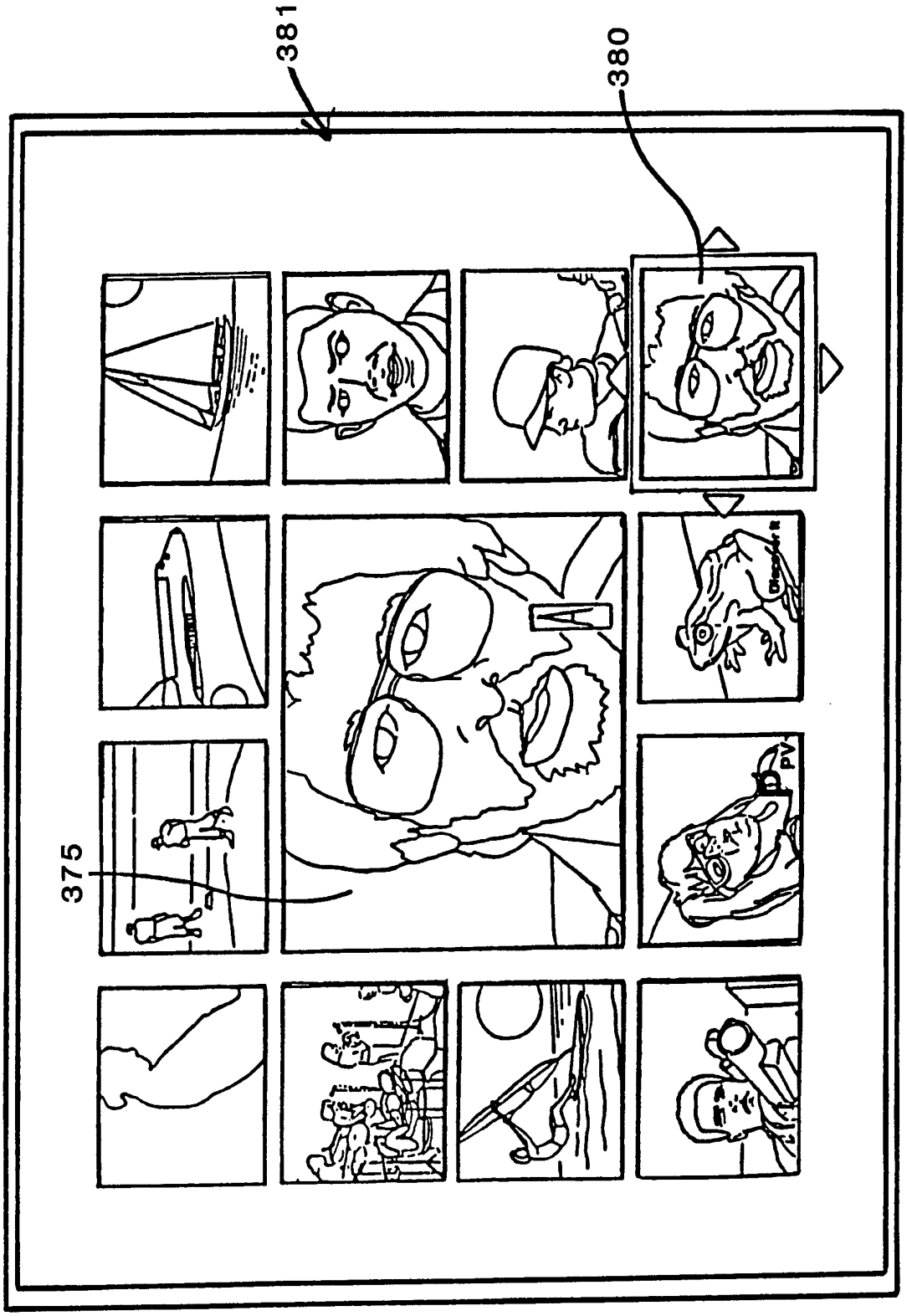


FIG. 33

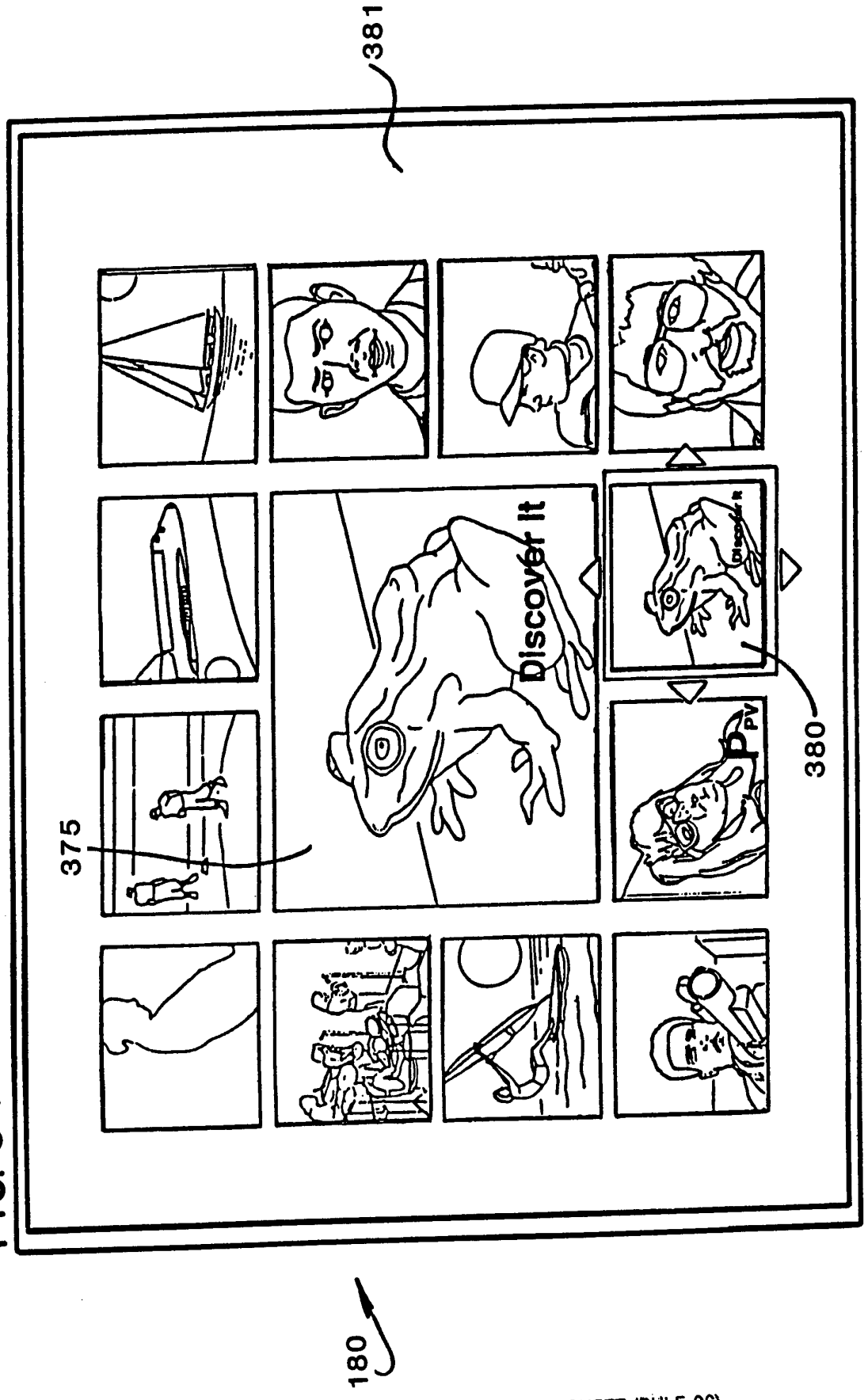


FIG. 34

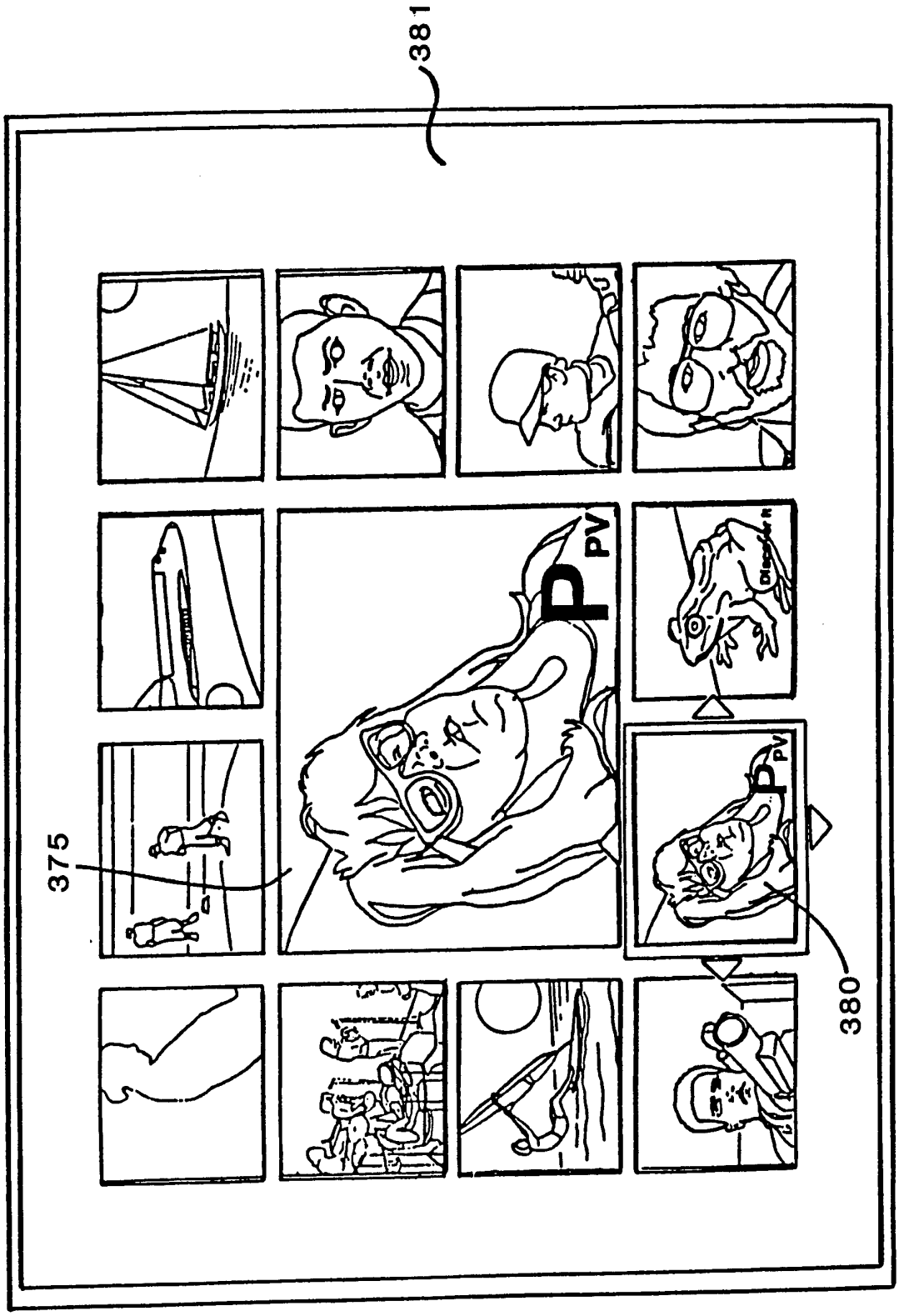


FIG. 35

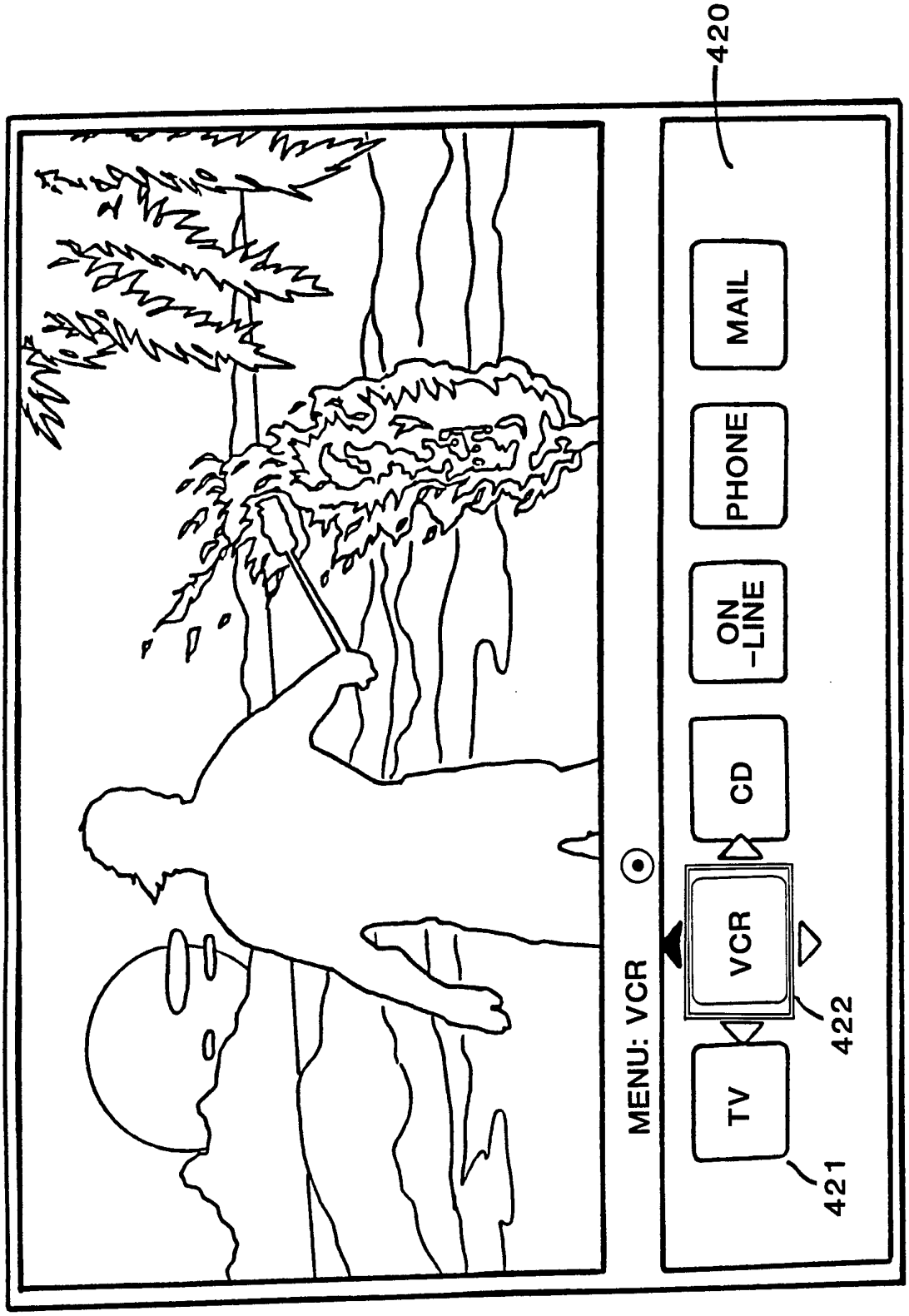


FIG. 36

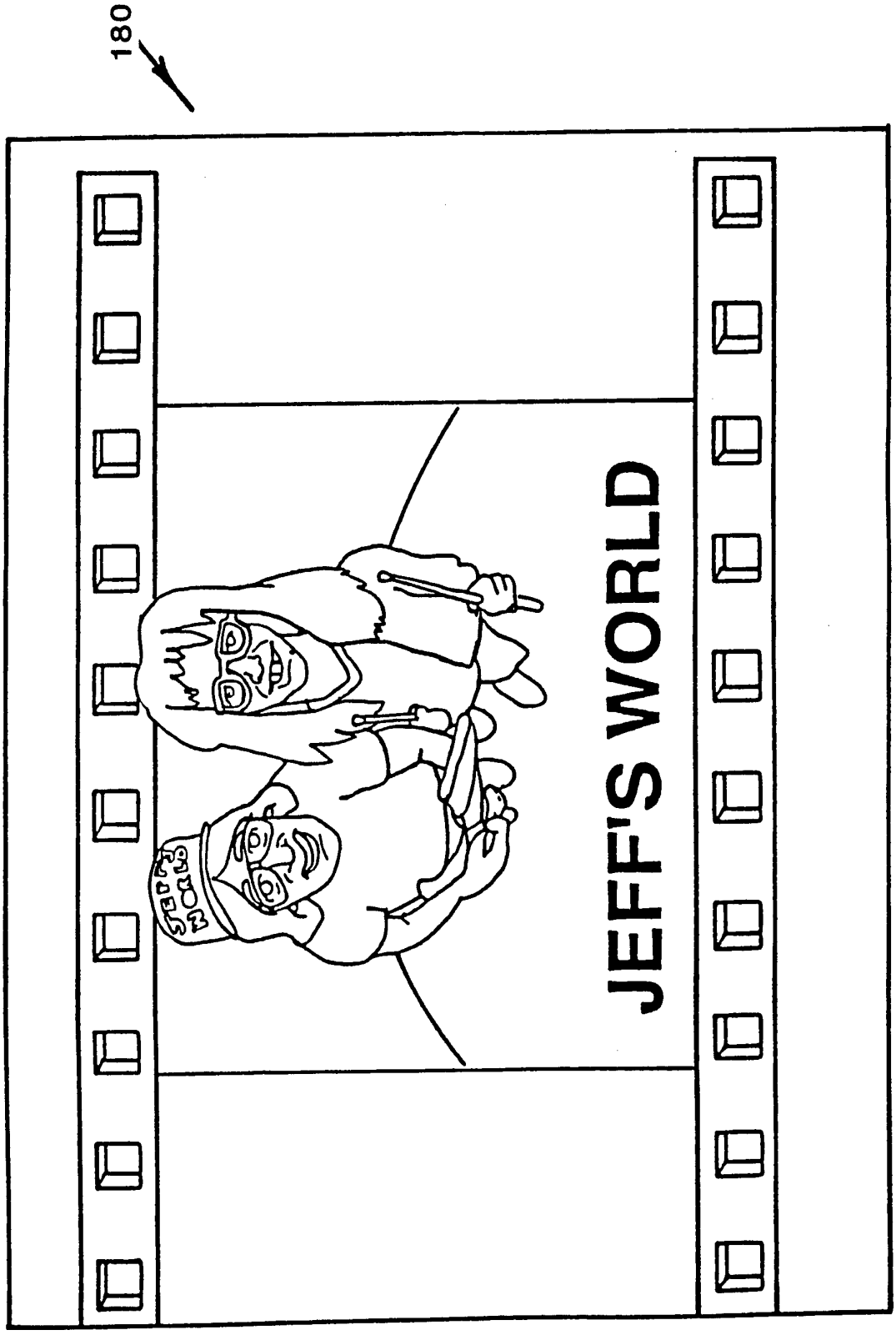


FIG. 37

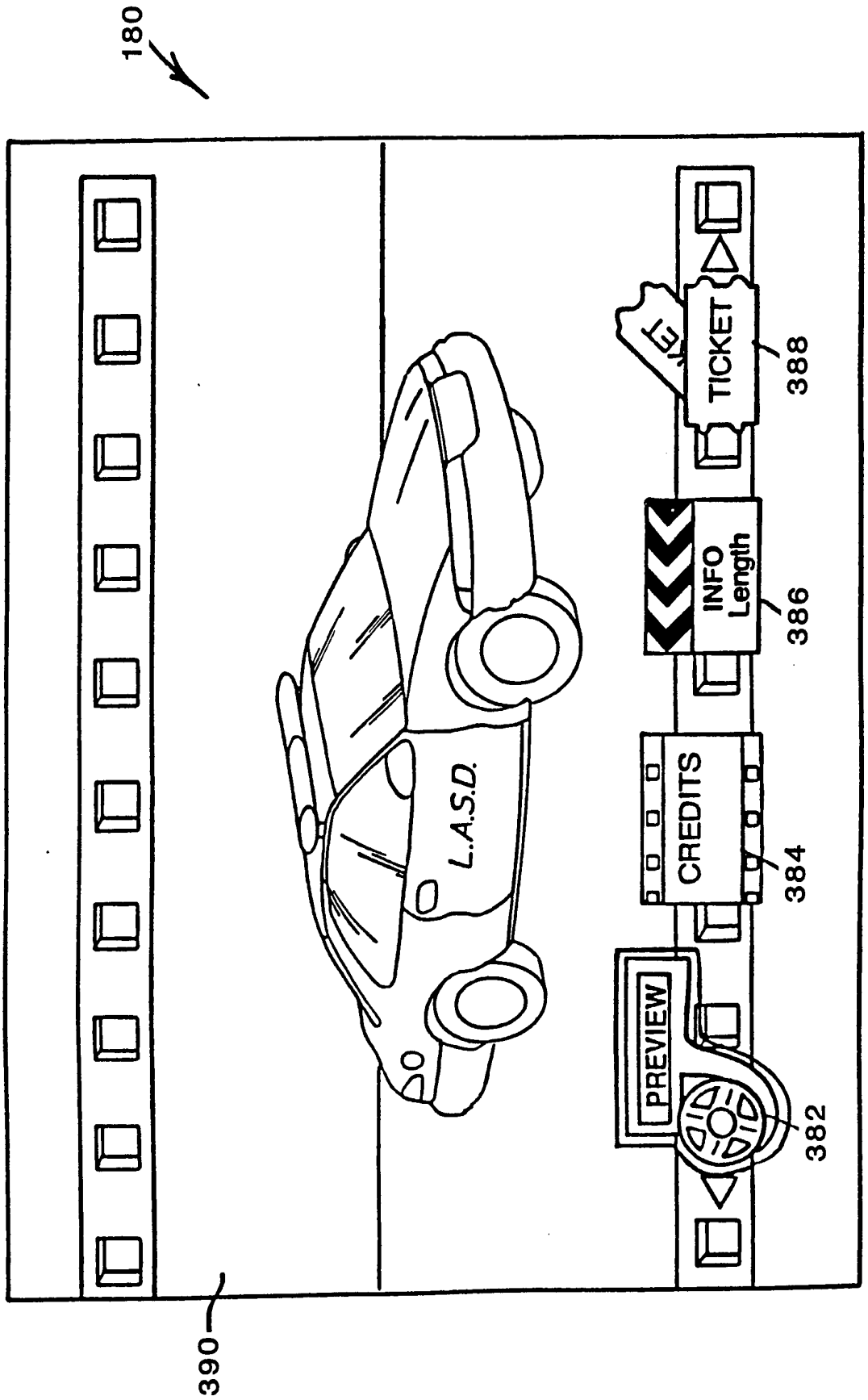

180
L.A.S.D.
TICKET
388
INFO Length
386
CREDITS
384
PREVIEW
382
390

FIG. 38

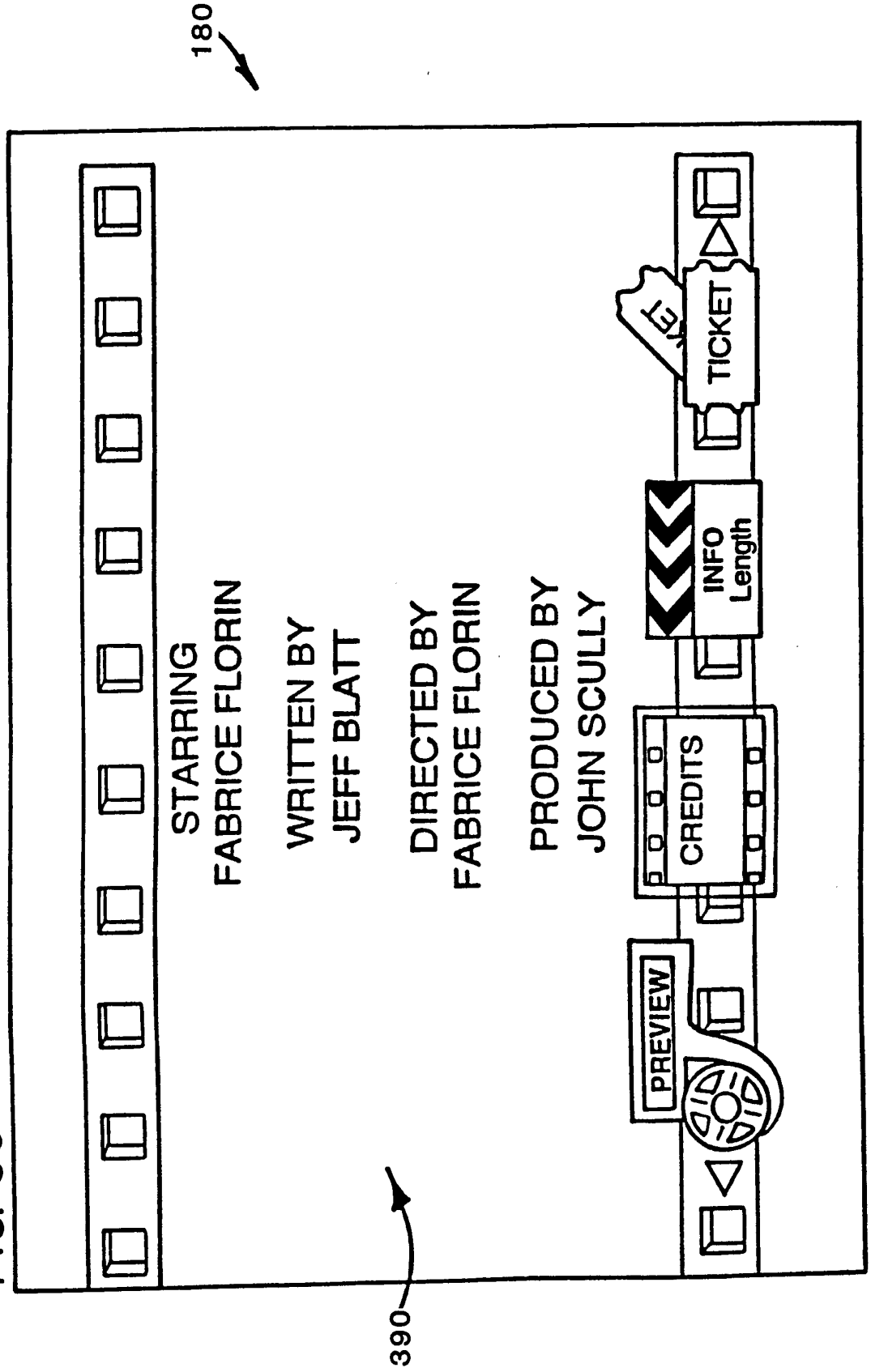
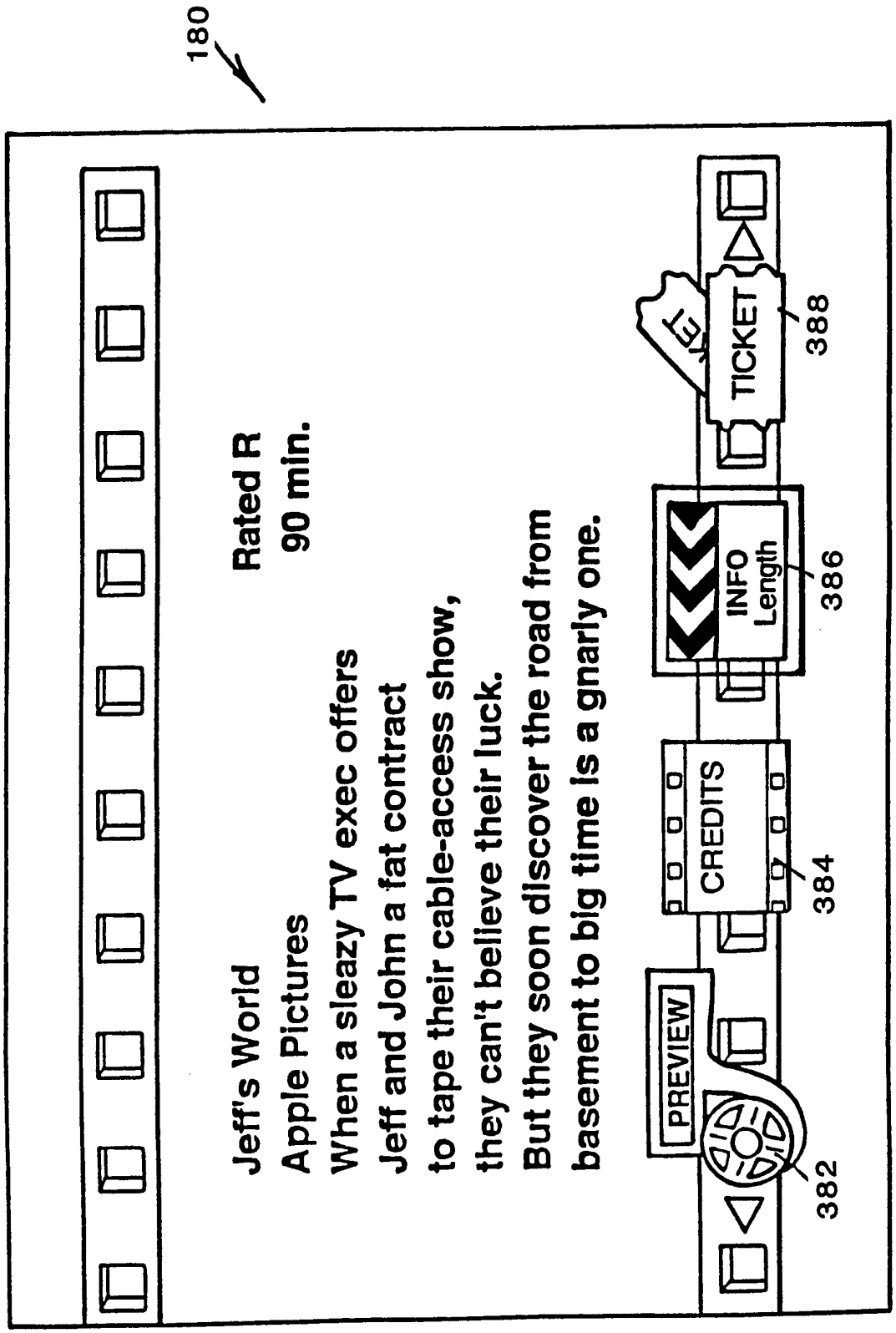

180
STARRING
FABRICE FLORIN
WRITTEN BY
JEFF BLATT
DIRECTED BY
FABRICE FLORIN
PRODUCED BY
JOHN SCULLY
TICKET
INFO
Length
CREDITS
PREVIEW
390

FIG. 39

FIG. 40


180
Jeff's World
Apple Pictures
Rated R
90 min.
When a sleazy TV exec offers
Jeff and John a fat contract
to tape their cable-access show,
they can't believe their luck.
But they soon discover the road from
basement to big time is a gnarly one.
PREVIEW
CREDITS
INFO
Length
TICKET
382
384
386
388

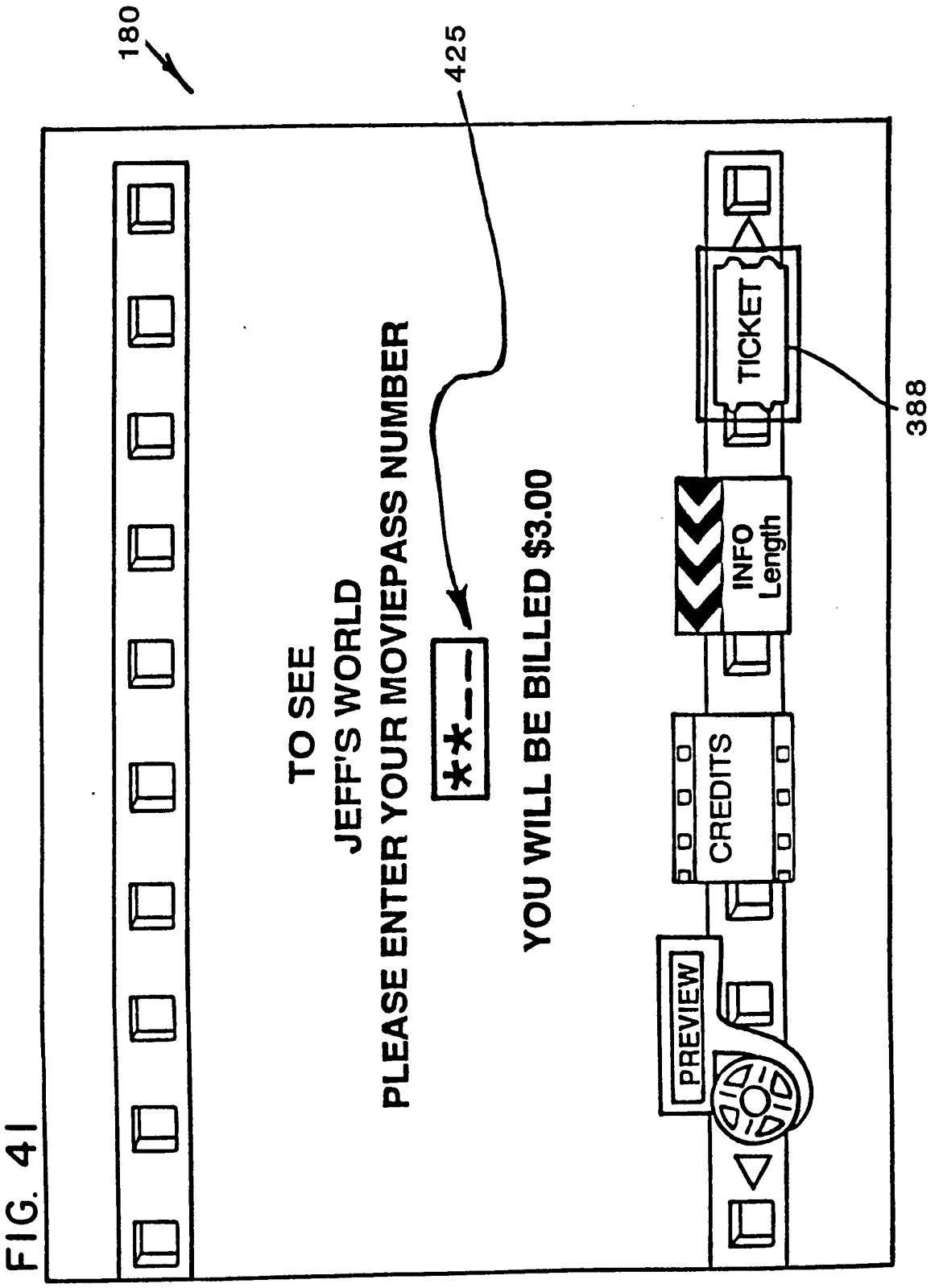

180
425
TO SEE
JEFF'S WORLD
PLEASE ENTER YOUR MOVIEPASS NUMBER
**__
YOU WILL BE BILLED $3.00
TICKET
388
INFO
Length
CREDITS
PREVIEW

FIG. 41

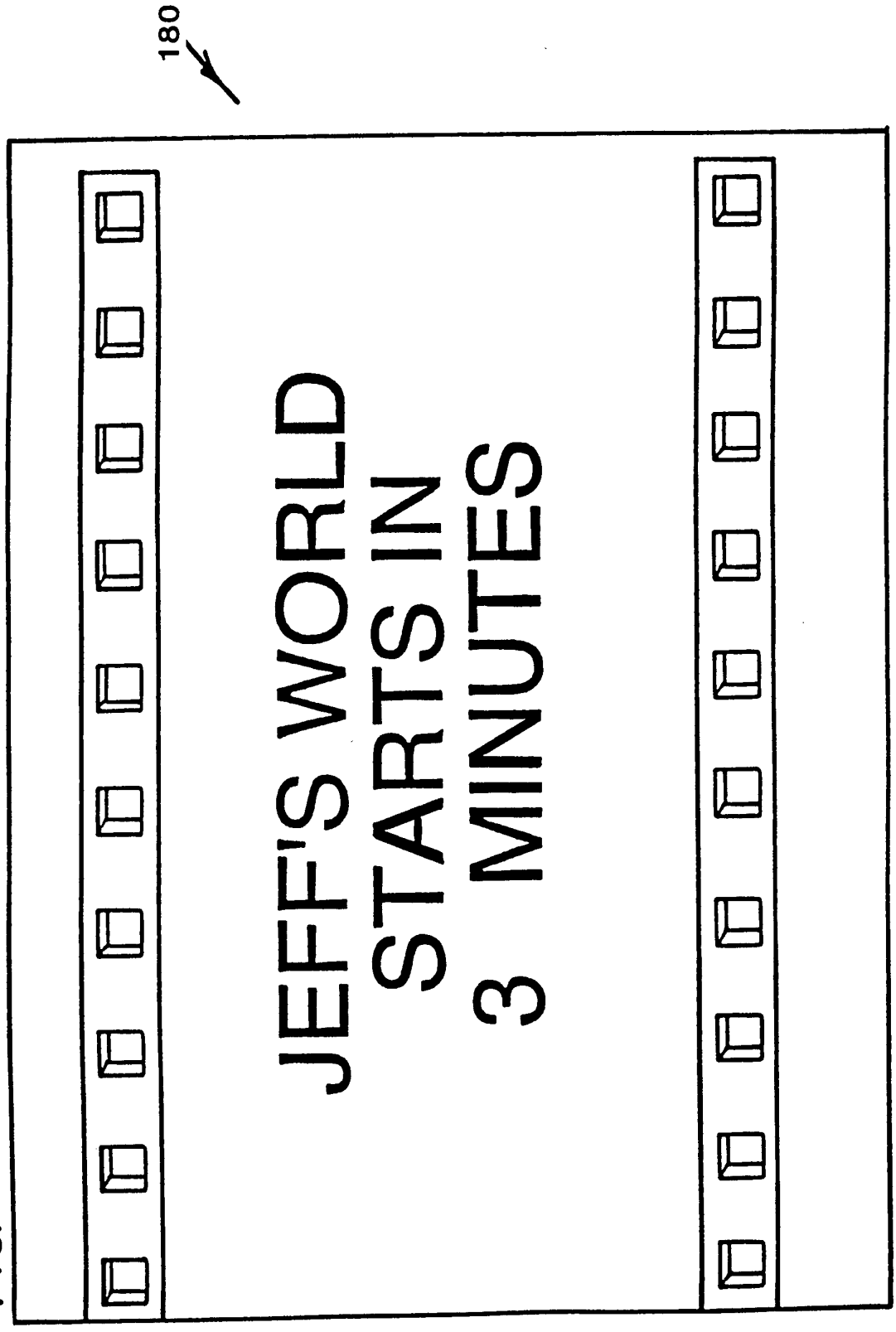
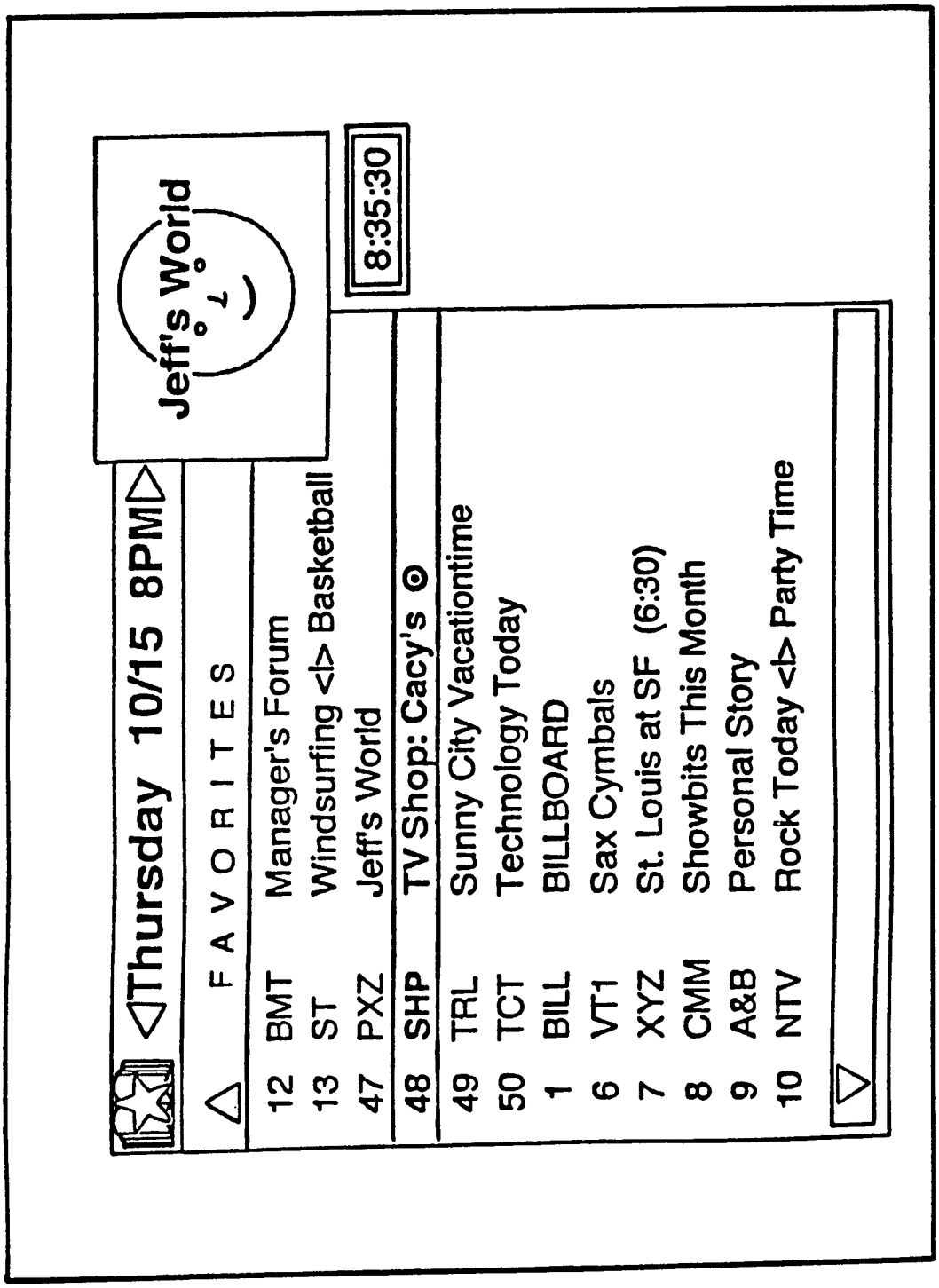


FIG. 42

FIG. 43


Jeff's World
8:35:30
Thursday 10/15 8PM
FAVORITES
12 BMT Manager's Forum
13 ST Windsurfing <I> Basketball
47 PXZ Jeff's World
48 SHP TV Shop: Cacy's
49 TRL Sunny City Vacationtime
50 TCT Technology Today
1 BILL BILLBOARD
6 VT1 Sax Cymbals
7 XYZ St. Louis at SF (6:30)
8 CMM Showbits This Month
9 A&B Personal Story
10 NTV Rock Today <I> Party Time
180

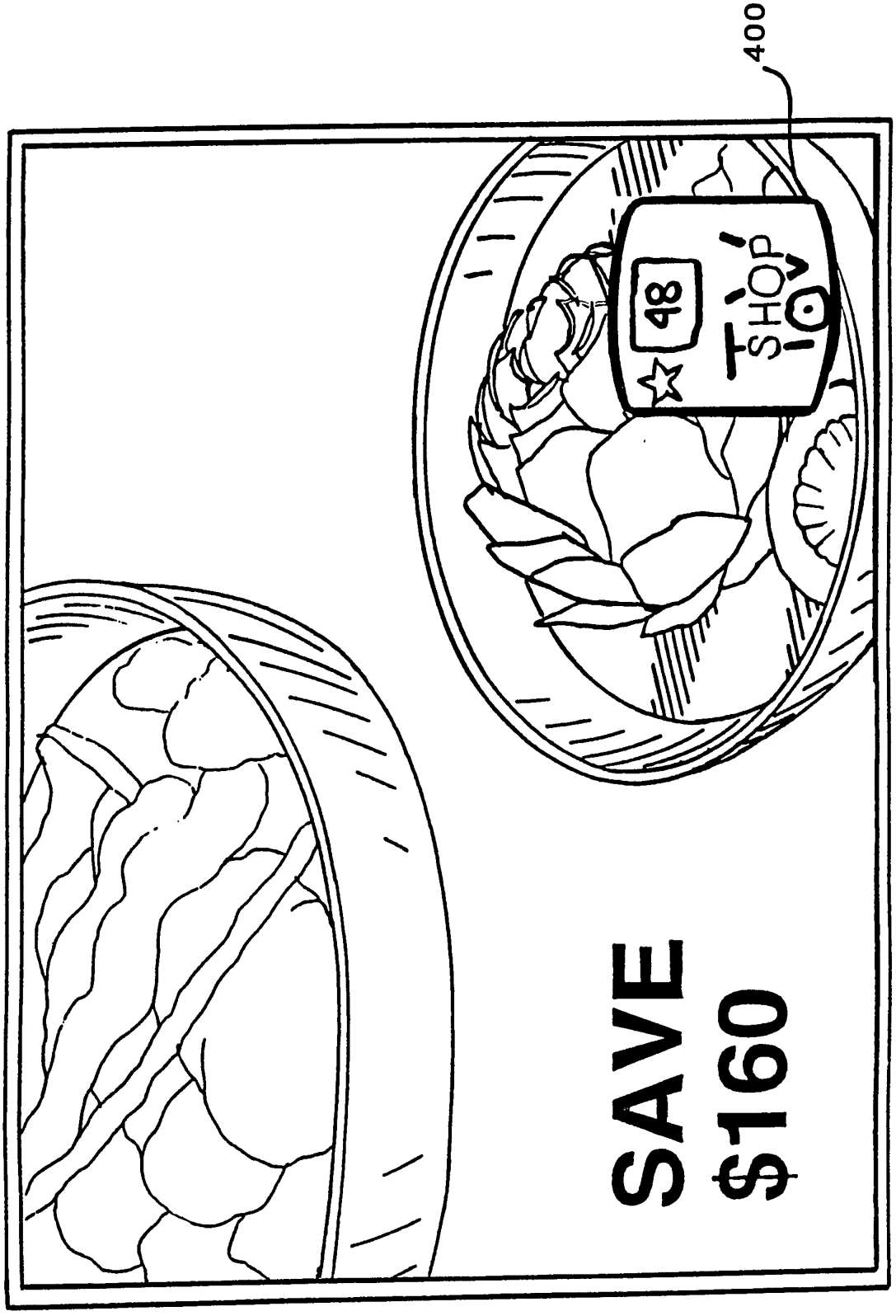


FIG. 44

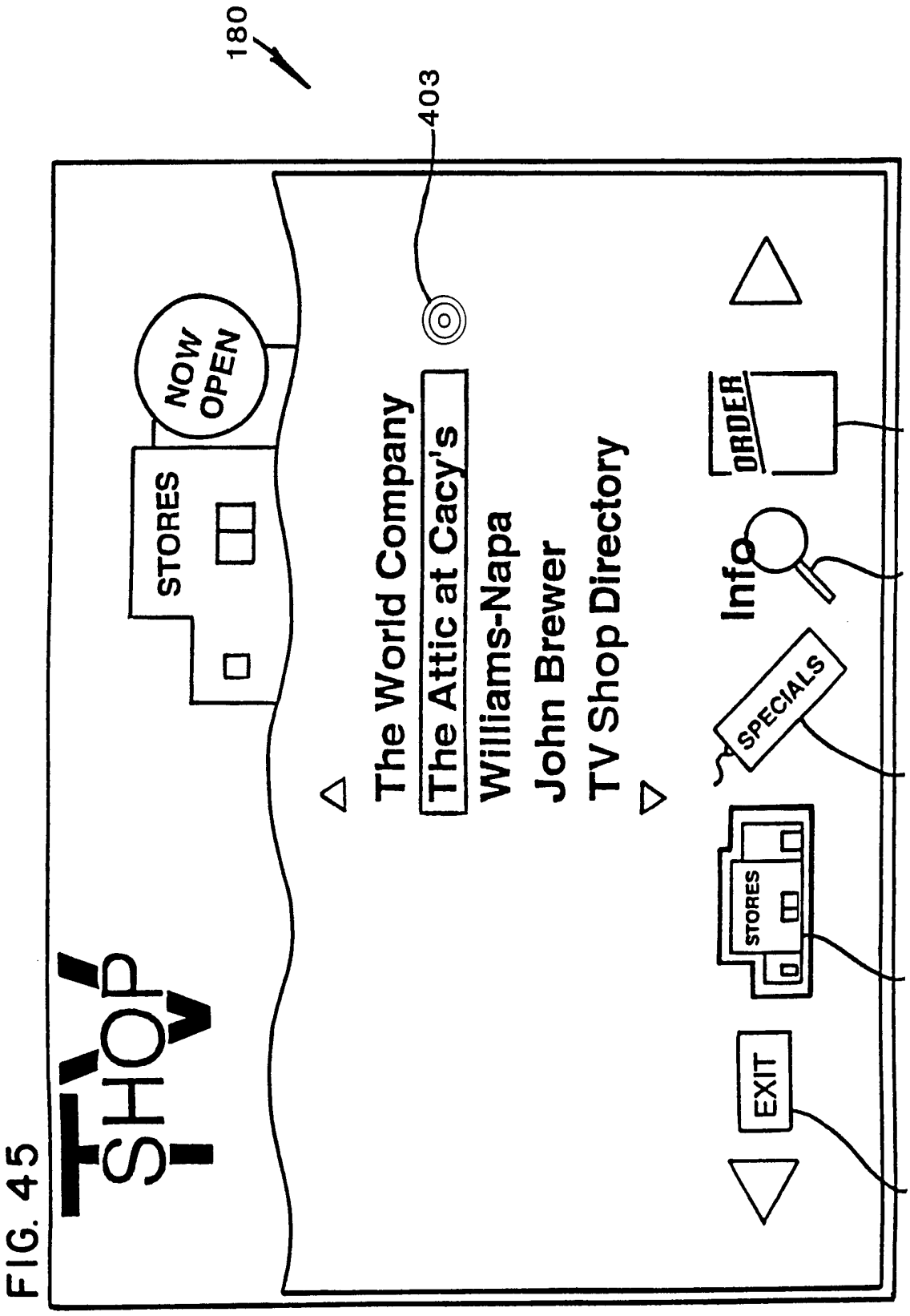

180
403
NOW OPEN
STORES
The World Company
The Attic at Cacy's
Williams-Napa
John Brewer
TV Shop Directory
ORDER
409
Info
408
SPECIALS
406
STORES
404
EXIT
402
TV SHOP

FIG. 45

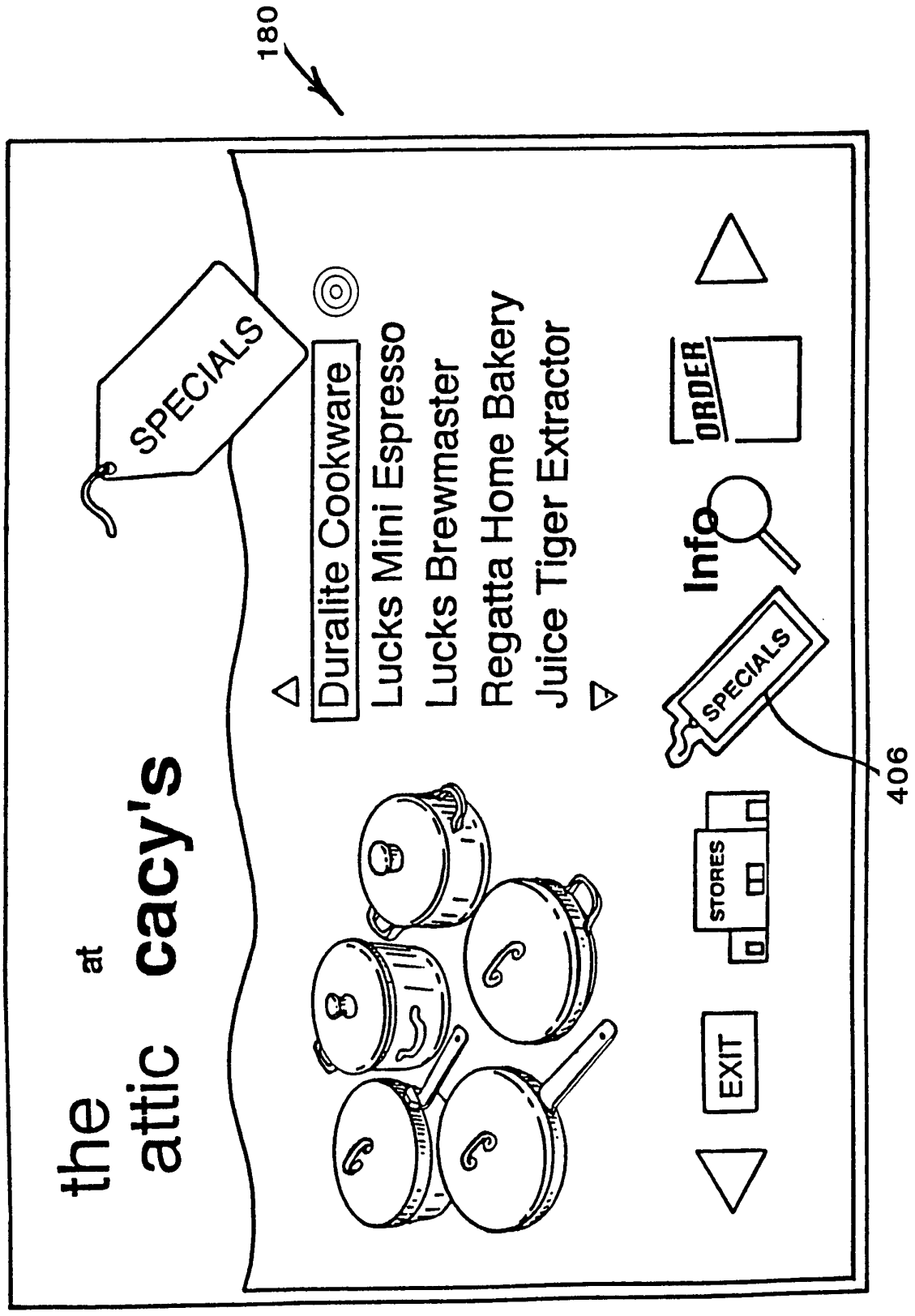

180
the attic at cacy's
SPECIALS
Duralite Cookware
Lucks Mini Espresso
Lucks Brewmaster
Regatta Home Bakery
Juice Tiger Extractor
ORDER
Info
SPECIALS
STORES
EXIT
406

FIG. 46

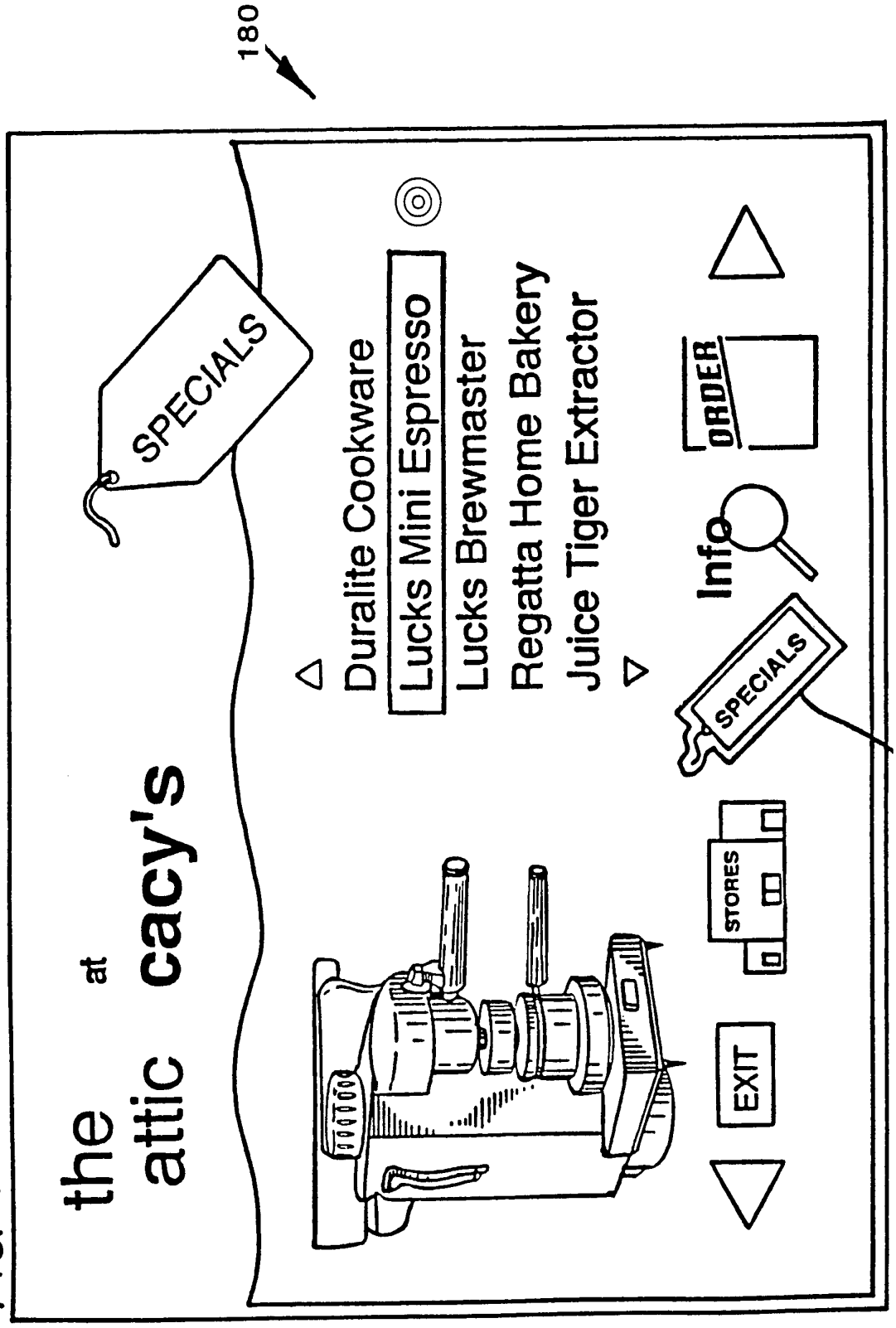

180
the at attic cacy's
SPECIALS
Duralite Cookware
Lucks Mini Espresso
Lucks Brewmaster
Regatta Home Bakery
Juice Tiger Extractor
ORDER
Info
SPECIALS
406
STORES
EXIT

FIG. 47

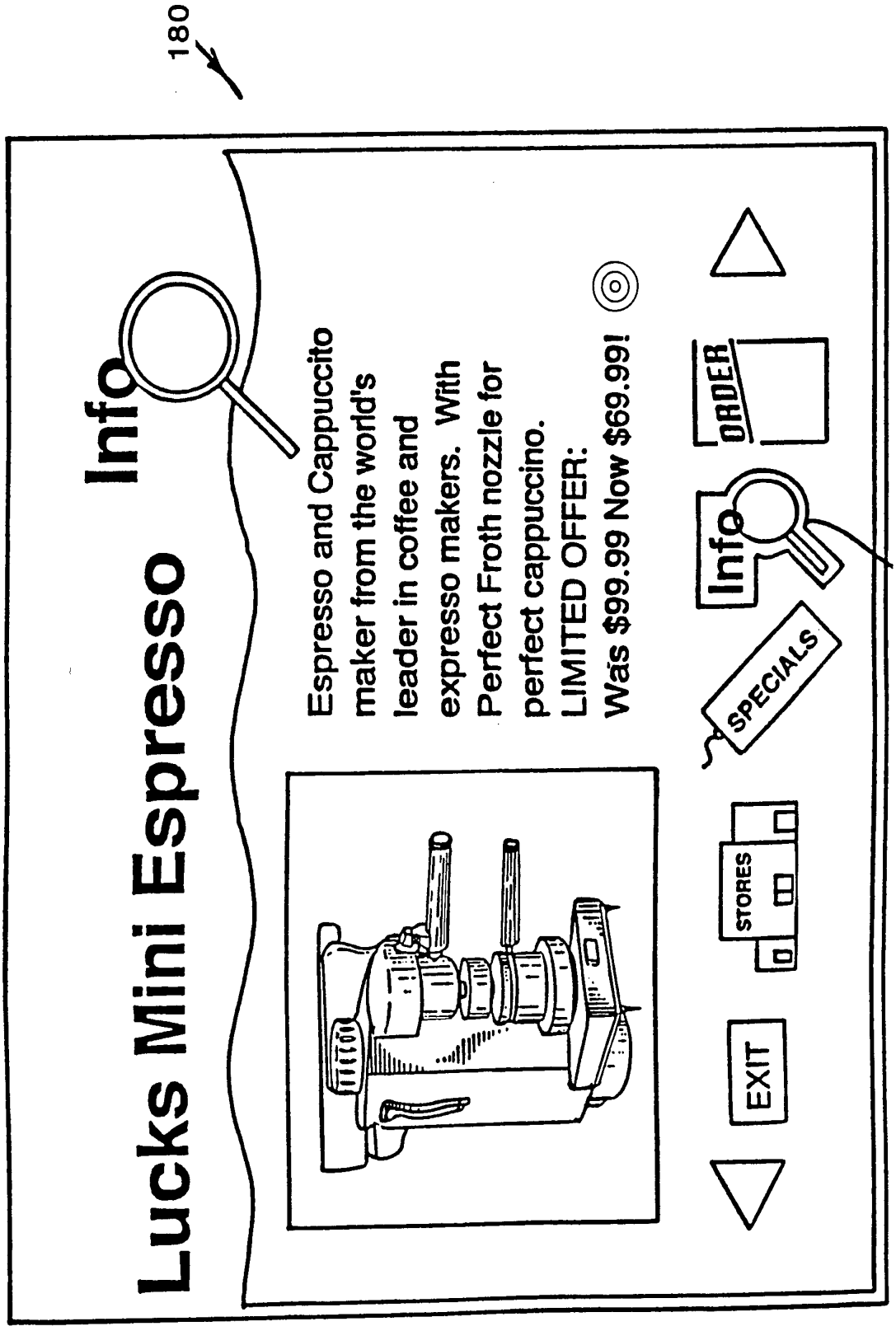

180
Lucks Mini Espresso
Info
Espresso and Cappuccito maker from the world's leader in coffee and expresso makers. With Perfect Froth nozzle for perfect cappuccino.
LIMITED OFFER:
Was $99.99 Now $69.99!
ORDER
Info
SPECIALS
STORES
EXIT
408

FIG. 48

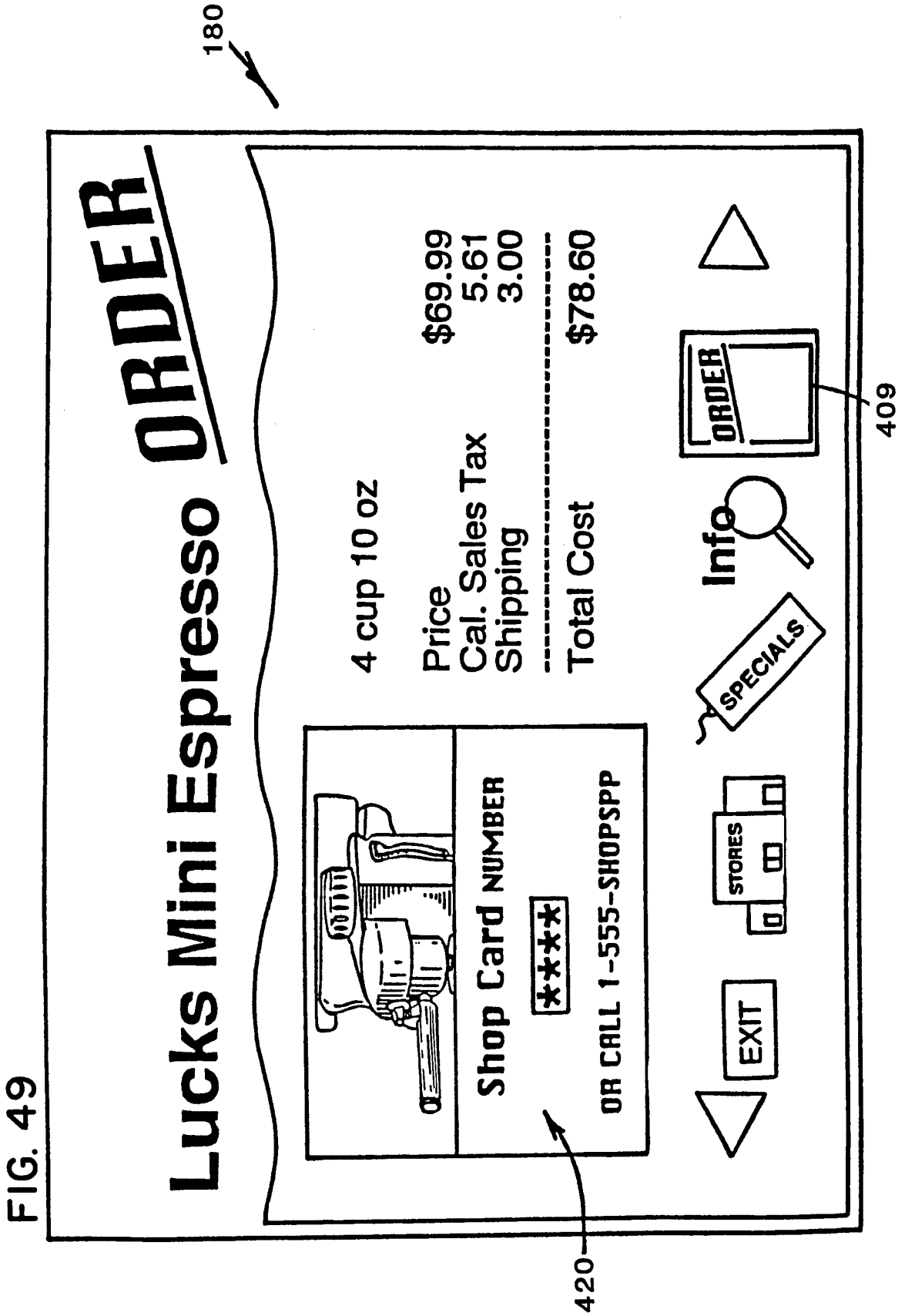

180
Lucks Mini Espresso ORDER
4 cup 10 oz
Price $69.99
Cal. Sales Tax 5.61
Shipping 3.00
Total Cost $78.60
Shop Card NUMBER
****
OR CALL 1-555-SHOPSPP
EXIT
STORES
SPECIALS
Info
ORDER
409
420

FIG. 49

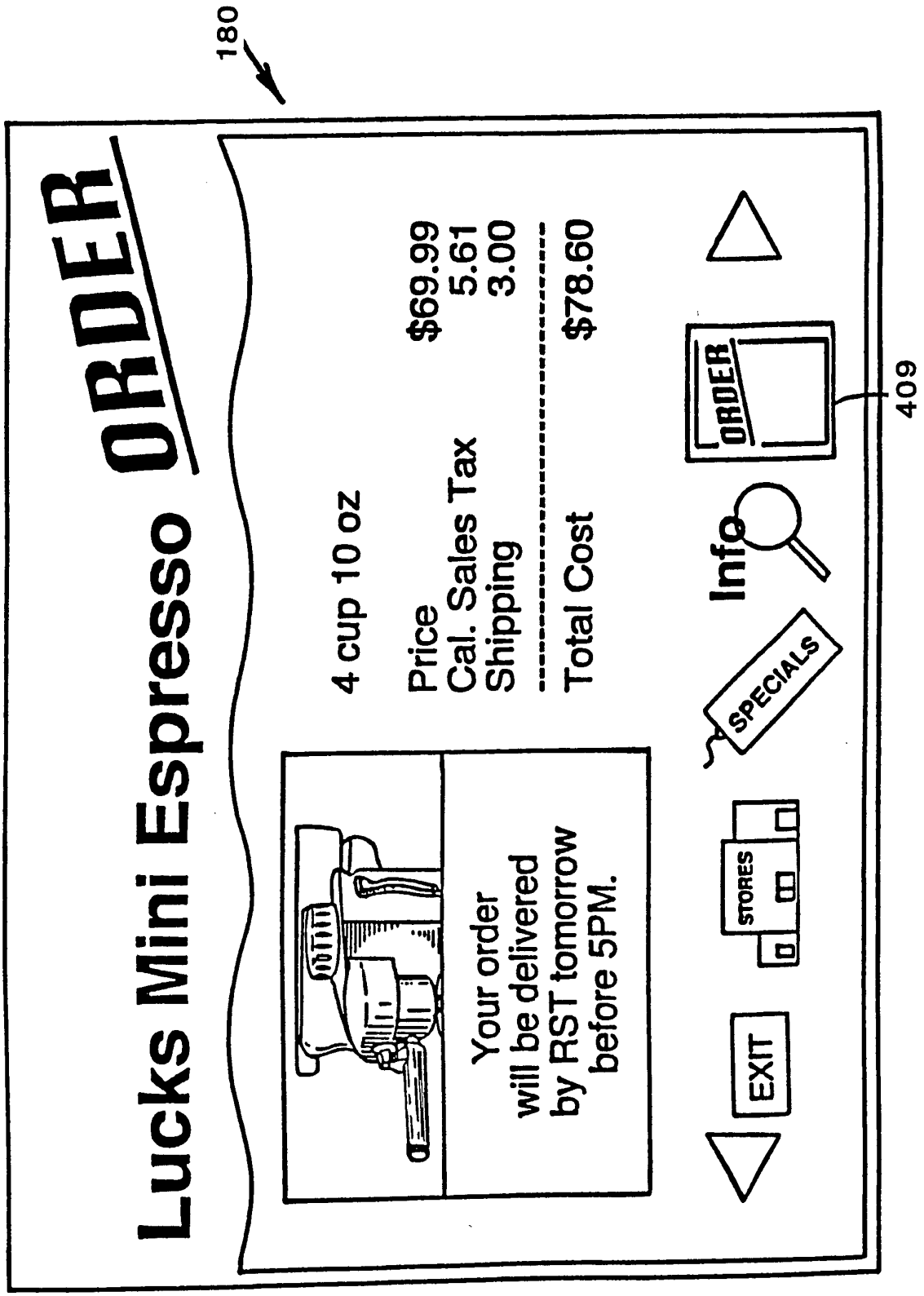

180
Lucks Mini Espresso ORDER
4 cup 10 oz
Price $69.99
Cal. Sales Tax 5.61
Shipping 3.00
Total Cost $78.60
Your order will be delivered by RST tomorrow before 5PM.
EXIT
STORES
SPECIALS
Info
ORDER
409

FIG. 50

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 94/06941

A. CLASSIFICATION OF SUBJECT MATTER
IPC 5 H04N7/16 H04N7/173 H04N7/15

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 5 H04N G09B

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

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO,A,93 11639 (SCIENTIFIC-ATLANTA) 10 June 1993 see the whole document ---	1
Y	WO,A,89 12370 (MONSLOW) 14 December 1989 see page 6, line 33 - page 11, line 11 ---	1
A	WO,A,93 11640 (SCIENTIFIC-ATLANTA) 10 June 1993 see page 1, line 12 - page 8, line 10 ---	1
A	US,A,4 381 522 (LAMBERT) 26 April 1983 see column 2, line 13 - column 3, line 37 --- -/--	1

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
8 September 1994	17. 10. 94

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+ 31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+ 31-70) 340-3016	Greve, M

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 94/06941

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A,P	IBM TECHNICAL DISCLOSURE BULLETIN, vol.36, no.07, July 1993, ARMONK, NY, US pages 53 - 54, XP000384181 'INTERFACE DEVICE FOR CONVENTIONAL TVS TO IMPROVE FUNCTIONALITY' -----	1

1

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/US 94/06941

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
WO-A-9311639	10-06-93	US-A-	5317391	31-05-94
		AU-A-	3146293	28-06-93
WO-A-8912370	14-12-89	US-A-	4890320	26-12-89
		AU-B-	636848	13-05-93
		AU-A-	3848189	05-01-90
		EP-A-	0422074	17-04-91
		JP-T-	3505956	19-12-91
		US-A-	4995078	19-02-91
WO-A-9311640	10-06-93	AU-A-	3146393	28-06-93
US-A-4381522	26-04-83	NONE		