

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
31 January 2002 (31.01.2002)

PCT

(10) International Publication Number
WO 02/09283 A1

(51) International Patent Classification⁷: **H03K 17/94**,
H03M 11/00, G08C 19/12, 19/00, H04L 17/02, B41J 5/08,
5/10, 5/12, 5/14, 5/16, 5/26, 5/28

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(21) International Application Number: PCT/US00/40468

(81) Designated States (*national*): JP, US.

(22) International Filing Date: 24 July 2000 (24.07.2000)

(84) Designated States (*regional*): European patent (AT, BE,
CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC,
NL, PT, SE).

(25) Filing Language: English

(26) Publication Language: English

(63) Related by continuation (CON) or continuation-in-part
(CIP) to earlier applications:

US 09/065,709 (CIP)

Filed on 24 April 1998 (24.04.1998)

US 09/571,710 (CIP)

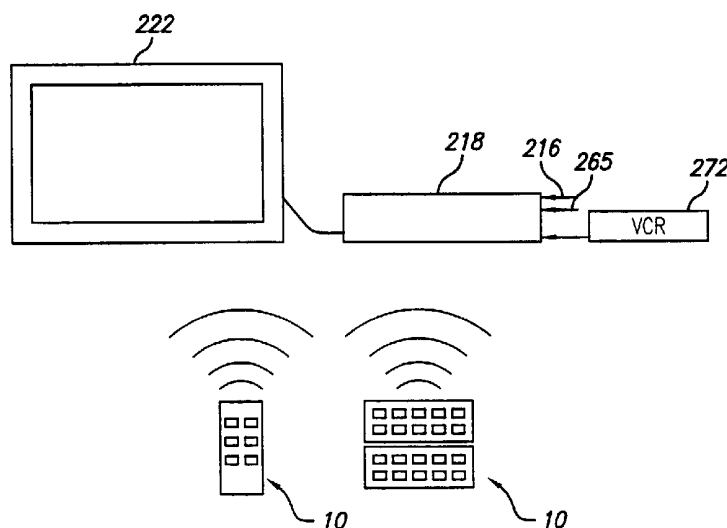
Filed on 15 May 2000 (15.05.2000)

Published:

— with international search report

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

(54) Title: REMOTE CONTROL METHOD USING REMOTE CONTROL DEVICE WITH KEYBOARD



(57) Abstract: A remote control method and system employ remote controller (10) which is adapted for use with an entertainment system of a type including a display (222) as well as providing functions such as Internet access or other functions requiring a keyboard and/or a mouse. The remote controller includes a folding housing and may be operated in a closed or opened configuration. A first set of control inputs (12) are provided on the outer surface of the housing. The housing may be opened, thereby doubling the surface area of the remote controller, to expose a keyboard (56). One or more wireless transmitters are operable with the housing in either of two configurations oriented at 90 degrees to each other and controlled by the first set of control inputs and the keyboard. The remote controller may be conveniently held in one hand of a user when in the folded or closed position and conveniently rested on the lap of the user or a support surface when in the opened position and used as a keyboard.



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REMOTE CONTROL METHOD USING REMOTE CONTROL DEVICE WITH KEYBOARD

RELATED APPLICATION INFORMATION

The present application is a continuation of serial no. 09/065,709 filed April 24, 1998 and of serial no. 09/571,710 filed May 15, 2000.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to remote control systems for controlling entertainment systems, such as multimedia systems, Internet access systems and browsers, and related methods.

2. Description of the Prior Art and Related Information

Remote control systems are ubiquitous in entertainment systems and multimedia systems of a wide variety, including TVs, game systems, VCRs and many other well-known entertainment devices. At the same time, the need has arisen for providing computer related control capabilities in the living room along with the control of the more conventional entertainment devices typically present in the living room. For example, combined PC and TV systems have been introduced which integrate the capabilities of the personal computer with the television. Also, set top Internet access devices have been introduced which integrate Internet access capabilities with conventional televisions. The ability to provide full control of a PC or an Internet browser typically requires the use of a keyboard as well as a mouse. A conventional remote control is therefore inadequate for control of such combined entertainment systems.

Wireless keyboards have been introduced to meet this need which allow the user of a combined PC and TV system or a user of a TV Internet access device to control such systems more conveniently. Such wireless keyboards may often include an integrated mouse or other pointing device to provide full control of the PC or Internet functions. Also, wireless keyboards

specifically designed for combined PC and TV or TV and Internet device control have been designed with function keys which may be used for control of the TV to provide complete control in a single remote device.

Although such wireless keyboard control devices can provide full control capabilities the wireless keyboards are typically similar in size to a conventional keyboard and are thus somewhat cumbersome for use in living room environment. To substantially reduce the size of the keyboard however, would result in the keys being too small for easy use, particularly in a dimly lit environment such as a living room. Also, the multiple functions provided by such a wireless keyboard adapted for control of both a PC or Internet access device and a TV require a larger keyboard layout. This relatively large size of a wireless keyboard also makes balancing the keyboard on the lap of the user somewhat difficult. Also, such wireless keyboards are somewhat obtrusive when not being used, whether when the TV/PC is not being used or when a TV program or video is being viewed. For this reason, a user of such a combined entertainment system incorporating a TV/PC or TV/Internet device will want to also have a hand held remote control to avoid having to use a cumbersome wireless keyboard at all times. This approach is described in U.S. Patent No. 5,675,390 which describes the use of two remote controls, one a hand-held remote control and the other a wireless keyboard to control a PC/TV entertainment system. This of course does not solve the problem of the obtrusive nature of the wireless keyboard in the living room during the times when it is not being used.

Accordingly, the addition of PC and/or Internet access capabilities to the conventional TV based entertainment system has introduced the problem of controlling such systems with a convenient yet full function remote control system.

SUMMARY OF THE INVENTION

The present invention provides a full function remote control system for an entertainment system which may include a TV and a PC or Internet access device. In addition, the present invention provides such a full function remote control system which is not cumbersome nor intrusive on the living room environment.

The present invention provides a remote control system configured in a folding housing which when in a closed position can be conveniently held in one hand and operated in a similar manner to a conventional TV remote control. That is, common functions such as channel up, channel down, volume up, volume down, power, and a 10 key input may be provided.

Transmission of the control signals to the entertainment system may be via a wireless RF or LED transmission as in a conventional remote control. When additional functions are required to control a PC, Internet access device, or other device requiring keyboard input, the housing may be opened and folded into a double width configuration exposing a keyboard and mouse type controller on the inner portion of the housing. In this configuration the remote control system operates as a wireless keyboard and may easily accommodate the necessary keys for such a keyboard. When the keyboard is activated a second LED transmitter or wireless RF transmitter can be used to transmit the keyboard information to the PC or Internet access device. Opening the housing to expose the inner keyboard automatically disables the first wireless transmitter so that resting the remote control on the users lap or a support surface will not inadvertently activate the remote controls on the outer surface of the remote control housing.

To facilitate a compact configuration for the remote control, a double sided circuit board may be employed having the remote control buttons and circuitry for the remote control buttons configured on the outside of the housing on one side of the circuit board and one-half of the keyboard buttons on the inside of the housing on the other side of the circuit board. Also, in one embodiment a multi-directional controller such as a trackball may be provided among the outside

controls and also shared with the inside portion of the controls. Alternatively, two different types of multi-directional controllers may be provided, one on the inside of the housing and the other on the outside of the housing. For example, a force sensitive controller may be provided on the outside of the housing and a trackball or glide pad controller provided on the inside of the housing.

Further features and advantages of the present invention will be appreciated by review of the following detailed description of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

Figures 1A, 1B and 1C are top and respective side views of a preferred embodiment of the remote controller of the present invention with the housing in a folded or closed position.

Figures 2A and 2B are top in side views respectively of the remote controller of the present invention with the housing in an open configuration.

Figure 3 is a block schematic growing illustrating control circuitry of the remote controller of the present invention.

Figure 4 is a side sectional view of one section of the housing of the remote controller showing a circuit board shared between first and second sets of remote control inputs.

Figures 5A and 5B are top views of the remote controller in a closed and opened position, respectively, showing an alternate embodiment employing a glide pad multi-directional controller.

Figures 6A, 6B and 6C are two side and a top view respectively of an alternate embodiment of the remote controller employing a sliding multi- directional controller.

Figure 7 is the top view of another alternate embodiment of the remote controller of the present invention in an opened configuration.

Figure 8 is a schematic drawing of an improved entertainment system in accordance with the present invention.

Figure 9A and 9B are front perspective views of a compact internet access device in accordance with the present invention.

Figures 10A and 10B are side and bottom views, respectively, of the folding remote controller in an embodiment adapted for the internet access device of Figure 9A and 9B.

DETAILED DESCRIPTION OF THE INVENTION

In figures 1A, 1B and 1C the present invention is illustrated in top and respective side views in a presently preferred embodiment. The present invention provides a remote control system adapted for use with an entertainment system requiring keyboard control as well as conventional TV type controls. Such systems are known and will not be described in detail herein. For example, such a system is disclosed in the above noted '390 patent, the disclosure of which is incorporated by reference.

The remote control system of the present invention is configured in a housing 10 which is adapted to be opened and closed in a folding manner, preferably along one edge of the housing. Figures 1 A, 1B, and 1C show the housing in a closed configuration whereas figure 2A shows the housing in an open configuration. The housing has a generally rectangular configuration viewed from above with a length L and a width W. The length and width are preferably selected so as to allow the remote control to be held comfortably in one hand when the housing is closed. Also, the dimensions are preferably selected to allow the provision of a keyboard when the housing is in the open configuration. Therefore, to provide a convenient size to be hand-held while closed and provide a keyboard when opened, the dimensions of the housing are preferably about 2.5 inches in width and about nine inches in length. This width is approximately that commonly found in conventional remote controls and provides a comfortable width while providing a 5 inch by a nine inch open configuration which easily accommodates the major keys in a full keyboard layout. However, more generally, the width may be from about two inches to about three inches also providing the necessary room for a keyboard in the open configuration while remaining comfortable for being held in one hand. The length in turn may range from about six inches to about 10 inches.

Referring to figure 1A, the top surface of the housing 10 includes a number of remote control inputs indicated generally at 12. This first set of control inputs 12 may correspond to conventional remote control functions typically found in hand-held TV remote controls or universal

remote controls adapted to control multiple entertainment devices such as TVs, VCRs, CD players, DVD players, etc. Therefore the first set of remote control inputs include the volume up and down set of controls 14, a channel up and down set of controls 16, a power button 18 and a set of numeric inputs 20. Also, a number of programmable or special purpose control buttons may be provided these are indicated generally as buttons 22. Optionally, a microphone 23 is provided which may provide a telephone or videophone functionality or which may be used for voice recognition control of the system. A speaker 25 is also illustrated which may be employed for the above noted telephone or videophone features of the remote controller. Also, a multi-directional controller 24 is preferably provided. The multi-directional controller 24 is illustrated as a top, down, left, right type controller typically found controlling menu type functions, for example, in satellite broadcast television systems. Former, as will be discussed below the multi-directional controller 24 may also be a trackball which may provide mouse type control. As will be discussed below, such house type controllers may require careful consideration in for depth requirements to not impact on the space available on the inside portion of the controller for the keyboard controls. Alternatively, multi-directional controller 24 may be any of variety of other well-known controller types such as a force sensitive controller or for a glide pad controller of the type commonly employed in notebook computers. Depending on the depth garments of such controllers be limitations introduced by the internal set of remote controls may or may not limit the suitability of such controllers. The first set of controls 12 activate a first wireless transmitter 30 which may preferably be an LED or RF transmitter configured at one end of the housing 10.

Referring to figures 1B and 1C , first and second side views of the remote control are illustrated. In these respective side views the division of the housing into two sections 1 and 2 which may be opened and closed in a folding manner about hinges 32 and 34 is clearly shown. The first side of the bottom section 2, corresponding to the front of the keyboard when the housing is an opened configuration, includes a second wireless transmitter 36 which also is preferably a wireless RF or LED transmitter. Bottom section 2 also includes a catch release 38 which releases the top section 1 to be opened and also deactivates the first wireless transmitter 30 and activates the second wireless transmitter 36. The bottom section 2 also accommodates

batteries indicated by dashed lines 40 which may, for example, be two or more AA type batteries. The shape of the bottom section 2 is illustrated having a varying thickness T with thickened end portions 42,44 and a thinner middle portion 46 having a length S sufficient to accommodate the width of a users hand. For example, S may be about four inches with the overall thickness of the housing 10 in this region being about 1.5 inches or less to allow the comfortable holding of the housing in the closed position in one hand of the user in this region. The configuration of the bottom section 2 illustrated in figures 1B and 1C not only provides additional space in the end portions 42,44 for the batteries, but also provides a curved lower surface which may comfortably sit on one leg of a user or on one arm of a sofa or chair of a type typically found in a living room. This is shown generally in figure 2B with the housing shown in an opened configuration positioned on the leg of a user or arm of sofa, shown by general outline 50.

Referring to figure 2A, the layout of the keyboard remote controller on the inside surfaces of the first section 1 and second section 2 is shown with the housing in an opened configuration exposing a second set of remote control inputs 48. As shown, the housing in an opened configuration provides a width 2W which can accommodate the main keys of a full function keyboard in a relatively uncrowded layout. More specifically, the layout includes a conventional QWERTY set of keys 56 split on the two sections 1,2 of the two-piece housing. Also a full set of 10 numeric keys 50 are provided along with 12 function keys 52 and conventional standardized directional keys 54. Also, a multi-directional controller 60 is provided to provide mouse control functions and associated left and right mouse type select buttons 62, 64 are also provided as shown. Multi-directional controller 60 may be a trackball, glide pad, force sensitive controller or other multi-directional controller design known in the art. Each type of multi-directional controller may involve different considerations for the space constraints of the remote controller. A trackball type controller occupies less surface area than a glide pad controller but requires additional depth. Therefore, the different types of controllers may be characterized as three-dimensional in nature, for example, trackball and typical force sensitive controllers, and two-dimensional such as glide pads. The present invention allows three-dimensional multi-directional controllers to be employed by configuring them over the thickened portions 42, or 44, of the bottom section 2 of

the remote controller. As discussed below, in hand alternate embodiment two-dimensional controllers may also be accommodated without sacrificing area of the inside surface devoted to the alphanumeric keyboard layout.

Referring to figure 3, a block schematic diagram is illustrated showing the circuitry of the remote controller and a switch for the selective activation of the first and second transmitters depending upon the closed or opened state of the housing. As shown, the first transmitter 30 is connected to a first set of remote control circuitry 100 and the second transmitter 36 is connected to a second set of remote control circuitry 102 which circuitry is respectively activated by the corresponding outer and inner sets of remote controls. The CPU 104 controls both sets of circuitry and selectively activates one or the other of the first and second transmitters in response to switch 106 which is activated by button 38. As noted above button 38 releases the housing to be opened. Switch 106 is reset when the housing is closed. Alternatively, the switch 106 may be activated automatically by the action of the hinges 32, 34 which incorporate a mechanical switch therein which is activated as the housing is open and closed.

Referring to figure 4, a cross section through the first section 1 of the housing is illustrated in an embodiment employing a compact double sided printed circuit board 110. As shown, printed circuit board 110 includes the first set of remote controls 12 mounted on one side of the printed circuit board and the second set of remote controls 48 configured on the other side of the circuit board. Also, figure 4 shows an embodiment of the multi-directional controller comprising a shared trackball 112. This shared multi-directional controller allows a relatively large trackball to be employed as part of the first set of remote controls 12. In this embodiment, it will be appreciated that the portion of the circuitry which is shared for shared use of the trackball 112 will not be disabled by the switch 106 shown in figure 3. Also, it will be appreciated that other multi-directional controllers may also be shared in whole or in part between the first and second set of controls. For example a glide pad having two active surfaces could advantageously be shared. The printed circuit board 110 also includes an attached flex circuit 111 (partially shown) which is routed through the hinge of the housing and is attached to the printed circuit board 113 in the second section 2 of the housing. The printed circuit board in the second section 2 of the

housing may in a preferred embodiment include a microprocessor chip corresponding to CPU 104 which is shared between the first and second remote control circuitry.

Referring to figures 5A and 5B, an alternate embodiment of the remote controller is illustrated. In the alternate embodiment illustrated in figure 5 a glide pad is employed as the multi-directional controller in the first set of remote controls 12 and in the second set of remote controls 48. This allows a portion of the glide pad circuitry to be shared as discussed above but has the disadvantage of using considerable surface area. It will of course be appreciated that a glide pad may be employed for multi-directional controller 24 or 60 in combination with another type of multi-directional controller in the other set of remote controls and the circuitry need not be shared.

Referring to figures 6A, 6B and 6C an alternate embodiment of the remote controller is illustrated. In the illustrated embodiment, a pullout multi-directional controller 120 is employed. The multi-directional controller 120 is configured on a sliding tray 122 which when not in use is recessed in a matching size recess 124 which is preferably configured in base section 2 of the two-piece housing in one of the enlarged sections 42, 44. The sliding tray 122 is thus positioned in place of one of the battery storage compartments described above in the previously illustrated embodiment. As shown in the top view of the remote controller in the open position in figure 6B multi-directional controller 120 may comprise a glide pad 126 and first and second selection buttons 128, 130. It will of course be appreciated that other types of controllers may be employed in place of glide pad 126, for example, a force sensitive controller or trackball may also be employed. It will be appreciated that this allows the full-length of the remote controller to be exploited for the keys of the keyboard. In another alternate embodiment, not shown, the multi-directional controller, for example a trackball, may be configured in the side of the thickened portion of the housing 42 adapted to be conveniently operated by one hand of the user when holding the remote controller in the open position and operating as a keyboard.

In yet another alternate embodiment illustrated in figure 7, the folding housing may be adapted to fold along the width direction along hinge 150 as opposed to the length direction as in the previously described embodiment. The top set of remote control inputs 12 and first wireless

transmitter 30 may be provided in the same general orientation as described previously , and are therefore not shown in figure 7, but the second inner set of remote control inputs will now be provided in an expanded configuration over the inner surfaces having a length 2L. The second wireless transmitter 36 is configured on one of the two sections facing perpendicular to the length direction, as shown. Although this layout will not readily correspond to a conventional keyboard layout, since the function keys 52 normally provided on the top of a conventional keyboard are configured on the side as shown whereas the alphanumeric keys are split in a side-by-side manner on the two sections 1,2, it will allow additional freedom for the hands of the user to operate the keyboard in a side-by-side manner and may also sit more comfortably across both legs of the user. Therefore, this alternate folding approach to the housing may be preferred for some situations.

Referring to Figure 8 an improved entertainment system in accordance with the present invention is illustrated. As shown, the entertainment system includes a TV monitor 222 which is coupled to a data processing device 218 of the type which receives text input control signals, such as a PC or internet access device. Also, additional devices or inputs may be provided to the entertainment system, e.g., a VCR 272, and other video and data inputs indicated generally by inputs 216 and 265 in Figure 8. Also shown is remote 10, illustrated in both the first (open) and second (closed) configurations as described above. Remote 10 provides typical TV type control signals to the entertainment system in the second (closed) position, such as volume up/down and power, and text input control signals in the first (open) position.

Referring to Figure 9A and 9B a compact internet access device 300 is illustrated in accordance with a further aspect of the present invention. For reasons of cost or space, in many applications it is desirable to provide internet access in a relatively compact device. Such devices are sometimes referred to as internet appliances. The folding remote keyboard described previously is ideally suited for such applications due to its compact size and due to the cost savings associated with providing multiple functions in a single package. Figure 9A and 9B illustrate the controller 10 described previously incorporated in a system comprising such an internet access device 300.

More specifically, internet access device 300 includes a display 310, which may be an LCD or other known display. A display housing 320 may incorporate the electronics for the device and/or such electronics may be incorporated in base 330. Video telephone capability may be provided and a small video camera 340 may be integrated into the device 300. The electronics for enabling internet access, and other functionality described below are known in the art and are also described in the '390 patent described previously and which functions described therein may also be provided by device 300 in whole or in part. The device 300 may be coupled to the internet through either wired or wireless connection and the suitable modem or other internet connection device may be provided within housing 320 or base 330. A local network connection may also be provided, e.g., to plural devices 300 (not shown but multiple copies of the illustrated device 300 are implied herein for such an embodiment) configured in a home or business, and such local network connection may also be wired or wireless.

Figure 9A illustrates the remote controller 10 in a recessed cradle in base 330. This may provide a compact storage location for remote 10 and may also allow recharging of the remote from the base 330 if a rechargeable battery is employed for the remote. An alternative cradle location is also illustrated in dashed lines in Figure 9A on the side of housing 320. Alternatively, the system may be provided without a cradle for remote 10.

In Figure 9B the system is illustrated with remote 10 in both the open and closed configurations. In the closed configuration convenient control may be provided over a number of commonly used functions of the device 300 using the outer or first control inputs described previously. For example, the multi-function control input and/or buttons described previously may select commonly used functions such as on/off, read e-mail, select website favorites, retrieve audio file, activate videophone or telephone (telephony over IP or analog), play phone messages, etc. Also, an input such as a mouse input or glide pad described previously may be used to control such functions in the closed position as well as other more complicated mouse type control functions available in internet browsers. In the open configuration in turn full text entry capability is provided and may be used for preparation of e-mails or other tasks requiring text input. Web browsing and mouse control type tasks may also be provided in this configuration.

Additional functions described in the above noted '390 patent may also be provided by the remote in its two configurations, which various functions are incorporated herein by reference.

In Figures 10A and 10B, an embodiment of the remote 10 is illustrated with inputs 12 on the lower surface of the housing. Such configuration may be desirable where the remote 10 is employed for use with telephone or videophone functions of device 300 and as illustrated microphone 23 and speaker 25 may be configured on the bottom surface as well. Additional outer inputs may be provided on the top surface as well, which are shown in other views and not repeated for convenience of illustration. Preferably such top inputs will be configured away from the thinner central region of the remote which is conveniently grasped by one hand.

It will be appreciated by those skilled in the art that the foregoing is merely an illustration of the present invention in currently preferred implementations. A wide variety modifications to the illustrated embodiments are possible while remaining within the scope of the present convention. Therefore, the above description should not be viewed as limiting but merely exemplary in nature.

What Is Claimed Is:

1. A method for remotely controlling a device comprising a display or a device coupled to a display device, the method employing a remote control device having at least two sections *movable relative to each other* and a first plurality of inputs and a second plurality of inputs, the remote control device being reconfigurable between a closed configuration wherein first inputs are exposed and the second inputs are inaccessible and an open configuration wherein the second inputs are exposed, the method comprising:

wirelessly transmitting a first set of control signals to the display device or a device coupled thereto, in response to operation of the first inputs when the remote control device is in the closed configuration; and

wirelessly transmitting a second set of control signals to the display device or a device coupled thereto in response to operation of the second inputs when the remote control device is in the open configuration, the second set of control signals corresponding to text input responsive to activation of the second inputs.

2. A method as set out in claim 1, wherein the acts of wirelessly transmitting comprise using RF transmission.

3. A method as set out in claim 1, wherein the acts of wirelessly transmitting comprise using infrared transmission.

4. A method as set out in claim 1, wherein the second inputs comprise a keyboard having separate keys for each letter of the alphabet.

5. A method as set out claim 4, wherein the keyboard is split across the two sections of the remote control device.

6. A method as set out in claim 1, wherein the first set of control signals comprise an on/off control signal.

7. A method as set out claim 1, wherein the first set of control signals comprise a volume control signal.
8. A method as set out in claim 1, further comprising disabling the first inputs when the remote control device is changed from a closed to open position.
9. A method as set out in claim 1, wherein the second control signals are transmitted with the remote control device oriented about 90 degrees from the orientation when the first signals are transmitted.
10. A method as set out in claim 1, wherein the first or second plurality of inputs includes a multi-directional controller.
11. A method as set out in claim 10, wherein the acts of transmitting the first and second control signals employ different short range transmitters.
12. A method for short range remote control of a digital device responsive to text input commands and having an associated display, the method comprising:
 - providing a remote control device having at least two sections foldable relative to each other, a first plurality of inputs on at least one of the sections and a keyboard on both of the sections, the remote control device being reconfigurable between a closed configuration wherein first inputs are exposed and the keyboard is inaccessible and an open configuration wherein the keyboard is exposed;
 - wirelessly transmitting a first set of control signals to the digital device, in response to operation of the first inputs when the remote control device is in the closed configuration; and
 - wirelessly transmitting a second set of control signals to the digital device thereto in response to operation of the keyboard when the remote control device is in the open configuration, the second set of control signals including text based commands responsive to activation of keyboard keys on both of said at least two sections.
13. A method as set out in claim 12, wherein the first set of control signals comprise an on/off control signal.
14. A method as set out claim 12, wherein the first set of control signals comprise a volume

control signal.

15. A method as set out in claim 12, wherein the digital device comprises an internet access device.

16. A method as set out in claim 12, further comprising disabling the first inputs when the remote control device is changed from a closed to open position.

17. A method as set out in claim 12, wherein the second control signals are transmitted with the remote control device oriented about 90 degrees from the orientation when the first control signals are transmitted.

18. An information display system, comprising

a display;

an information processing device associated with the display and employing the display as an information display device, the device responsive to remote control signals including text input commands;

a remote control, having a housing with at least two sections connected together so as to be reconfigurable between an open configuration and a closed configuration, the remote control further having one or more first inputs on the outside surface of the housing for inputting first commands to the information processing device and a keyboard comprising a plurality of keys configured on inner surfaces of said at least two sections; and at least one short range wireless transmitter for transmitting commands to the information processing device.

19. An information display system as set out in claim 18, wherein the information processing device provides internet access.

20. An information display system as set out in claim 18, wherein the information processing device and the display are provided in a single housing.

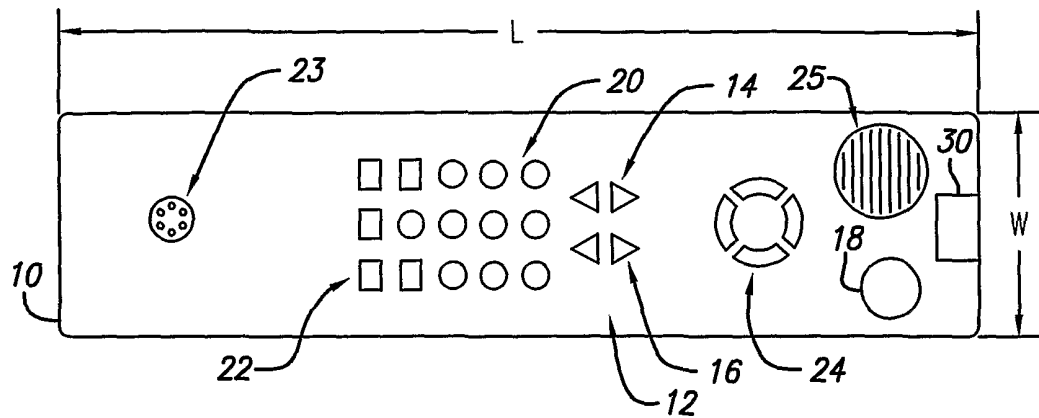
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FIG. 1A

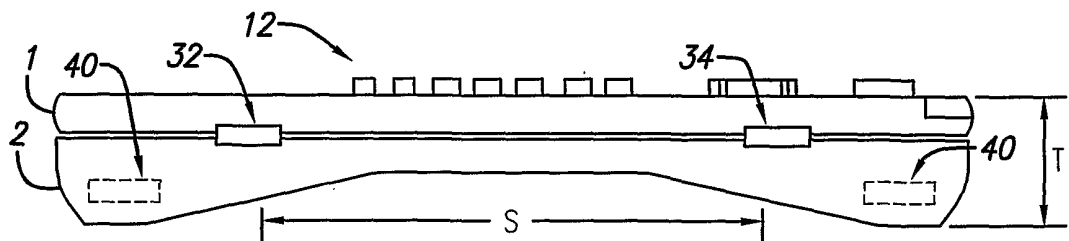


FIG. 1B

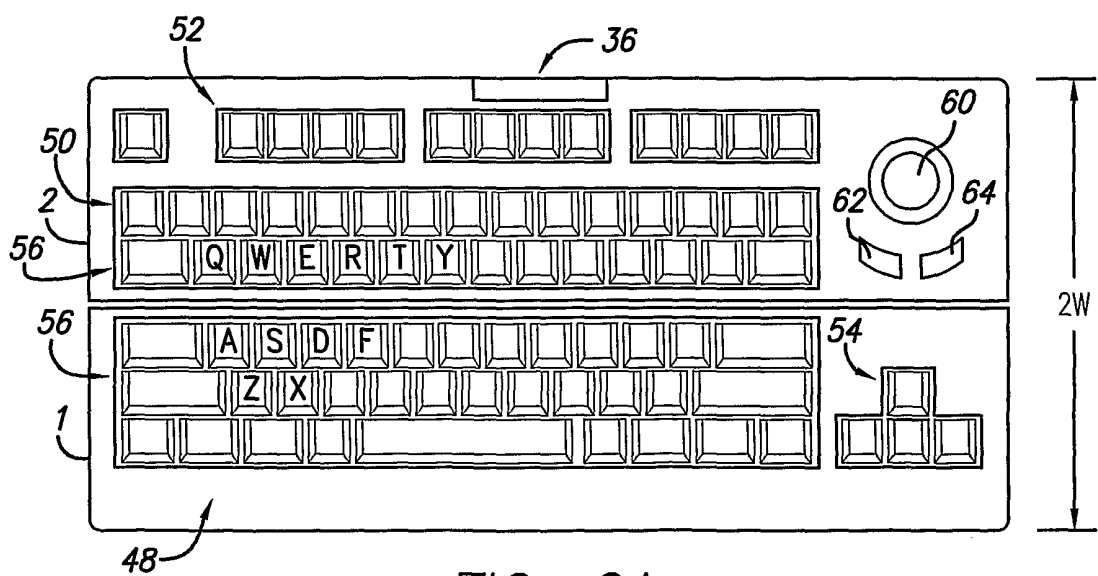
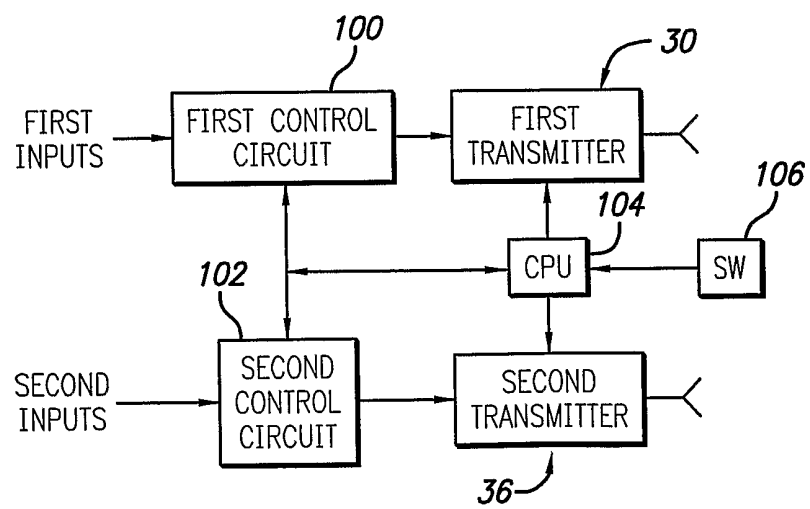
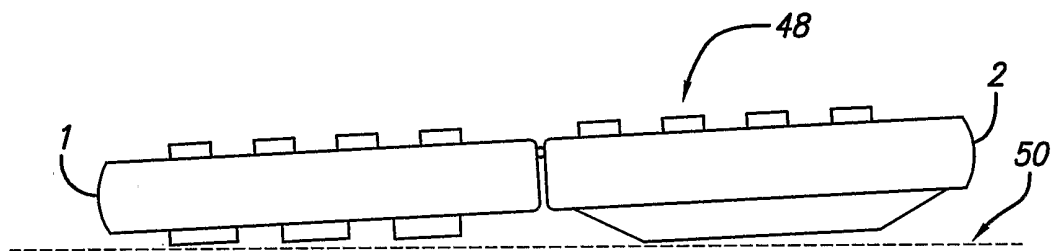
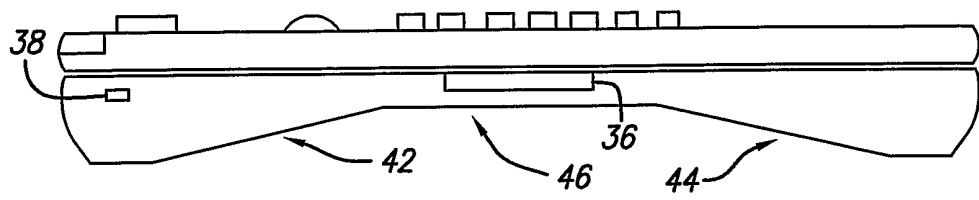


FIG. 2A

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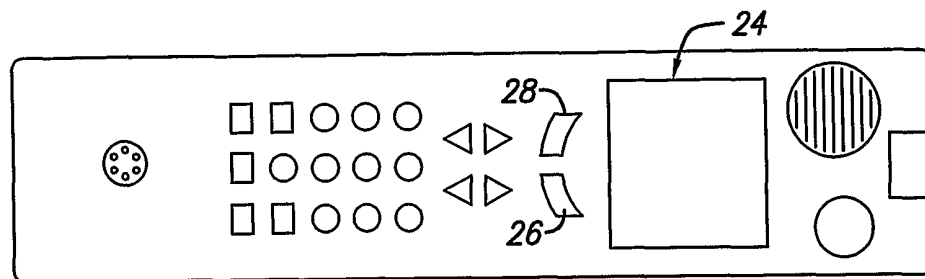


FIG. 5A

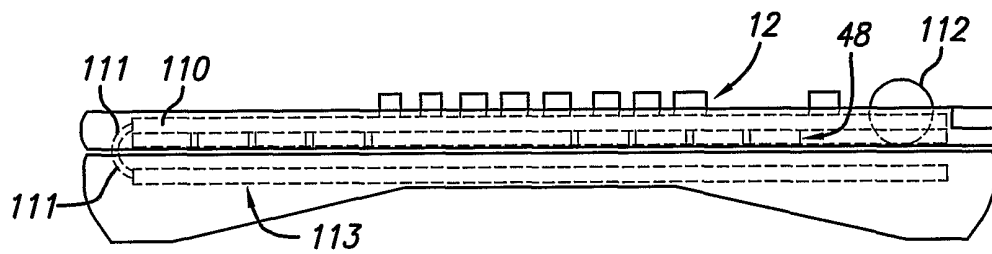


FIG. 4

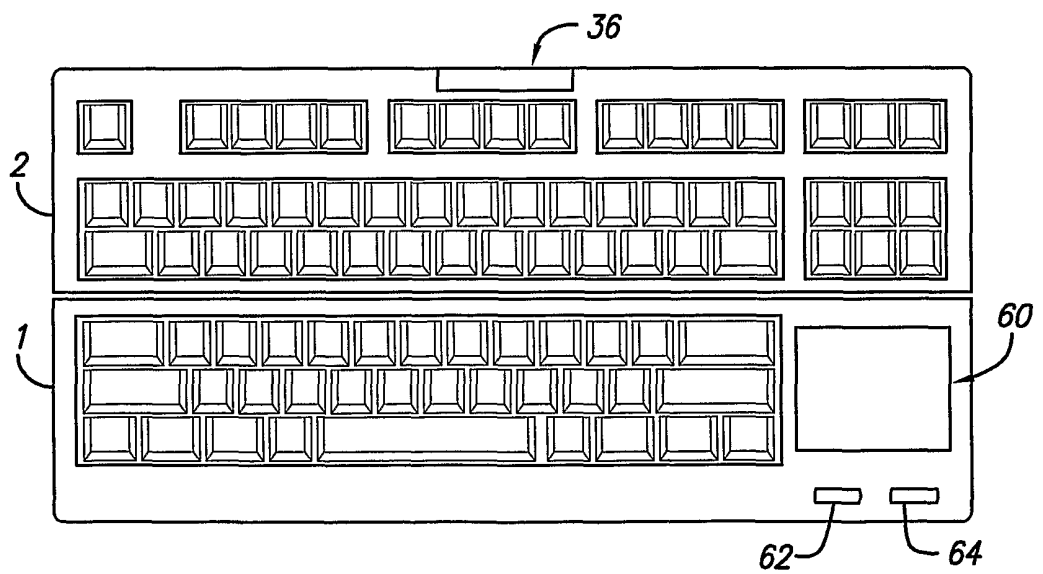
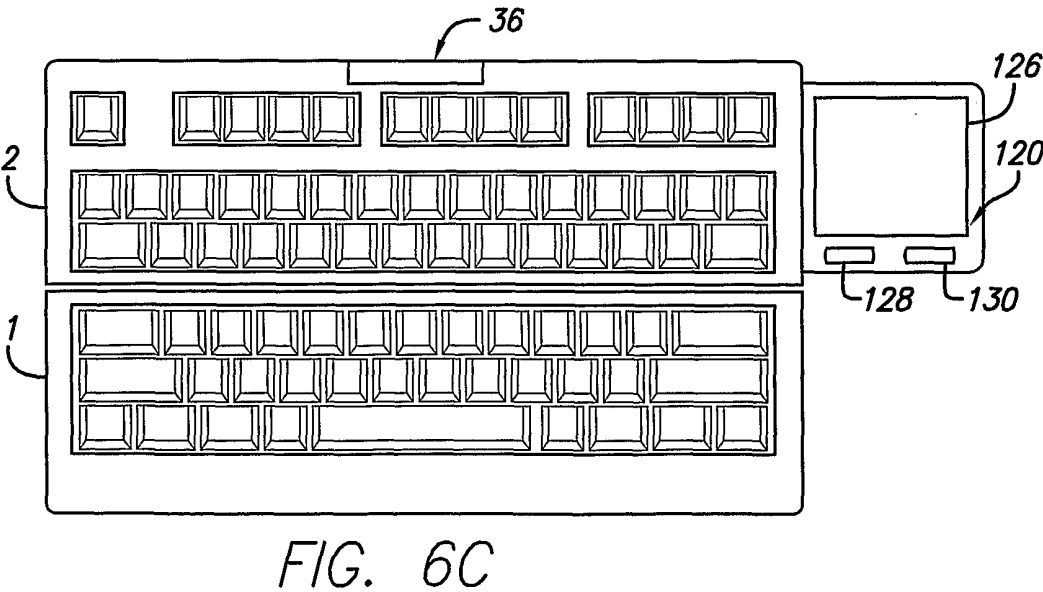
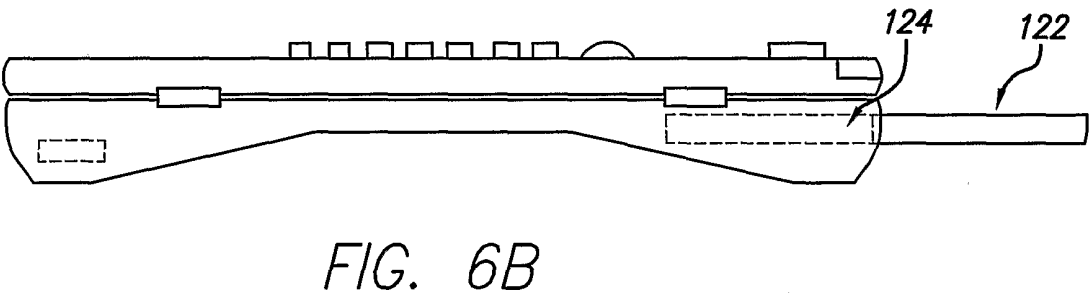
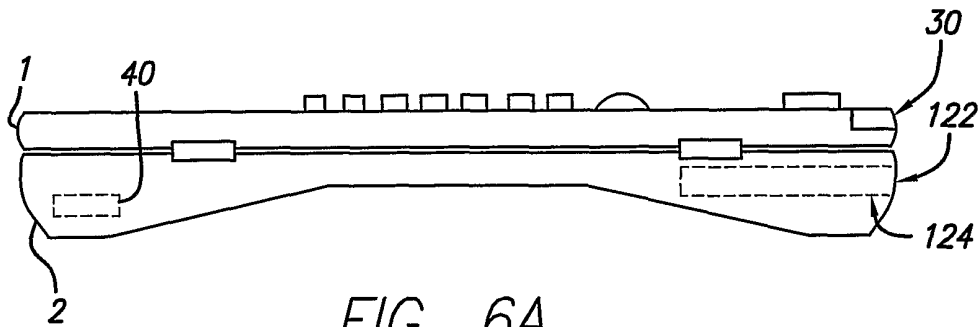


FIG. 5B



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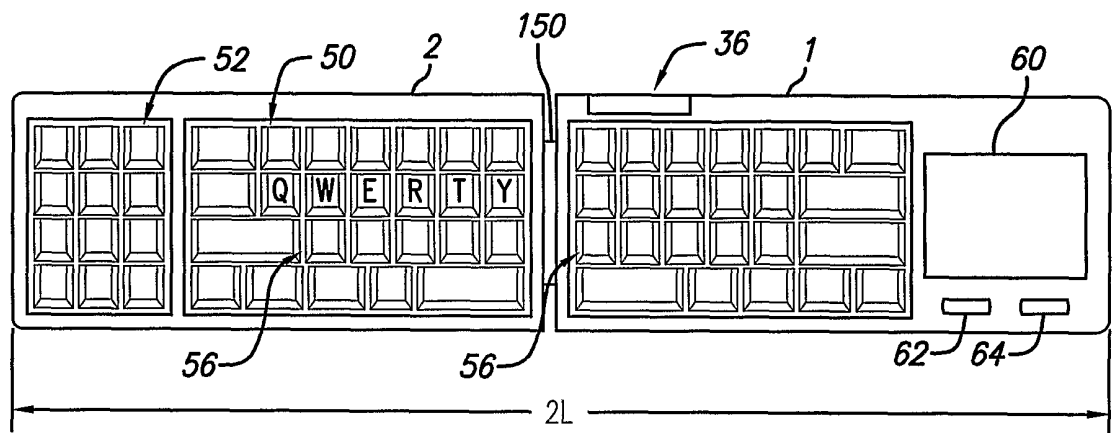


FIG. 7

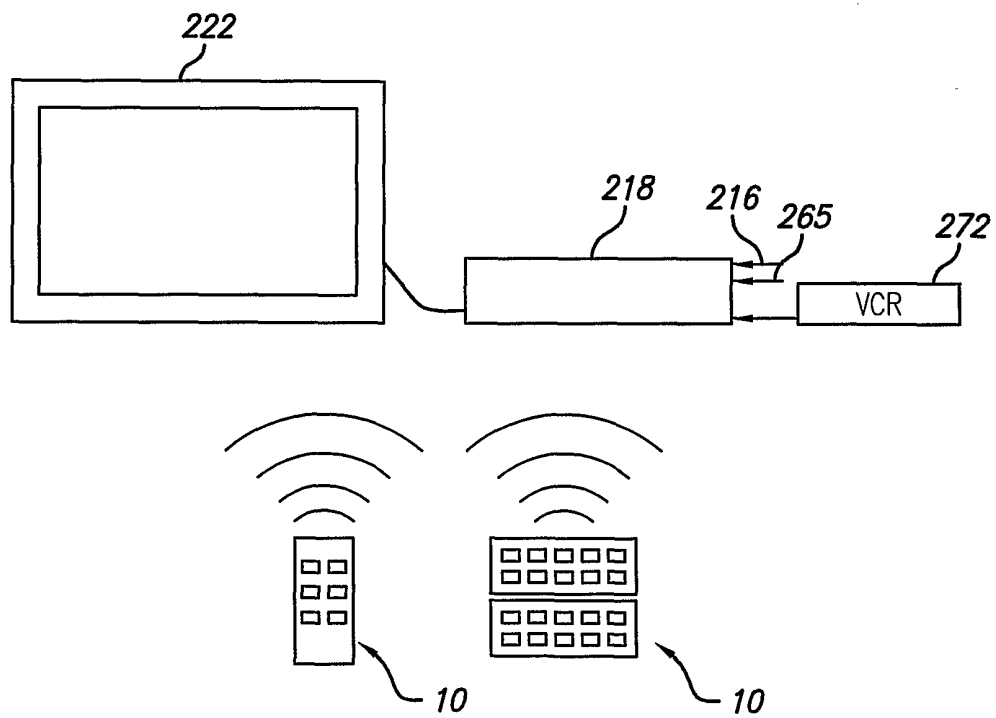
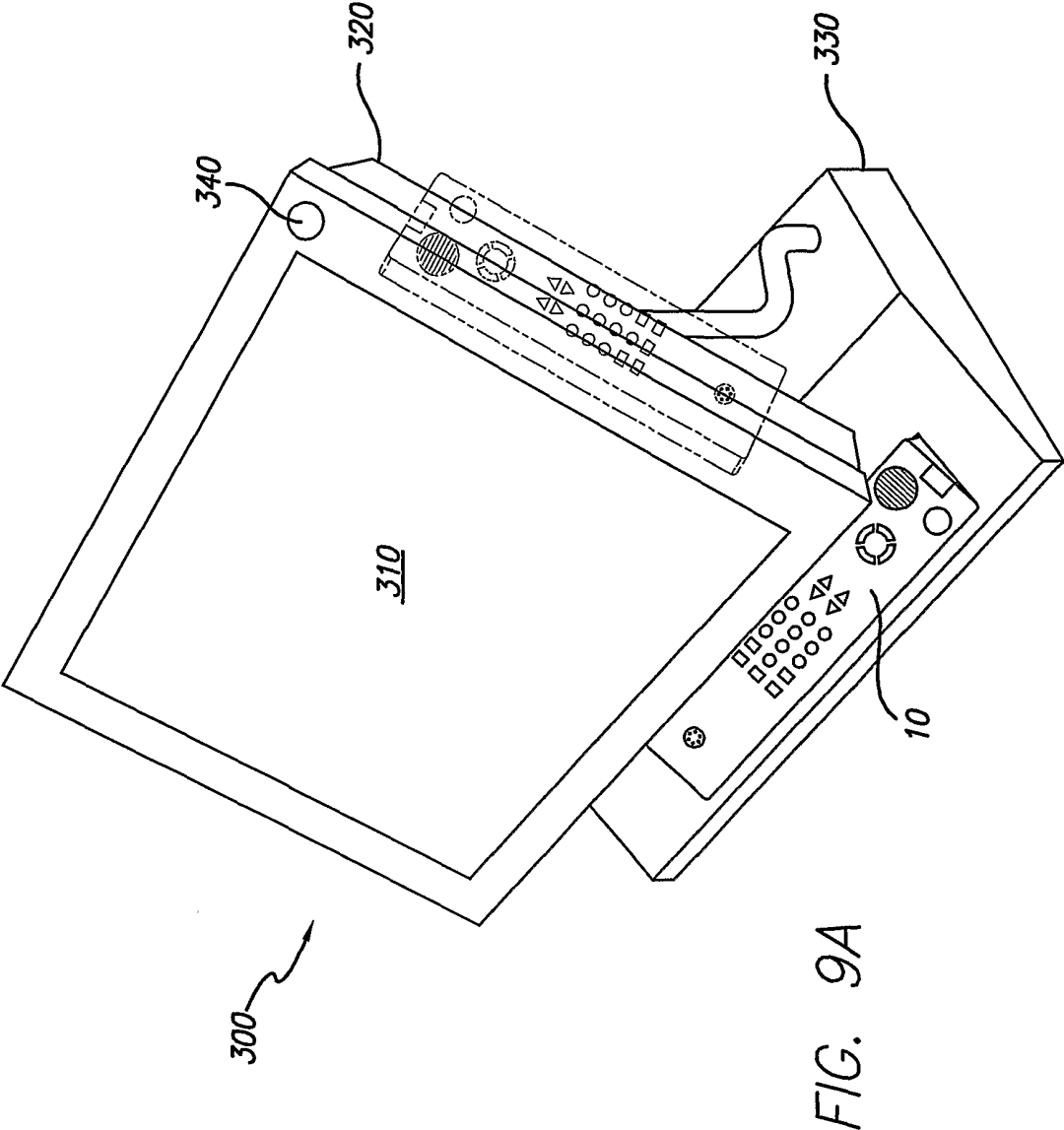
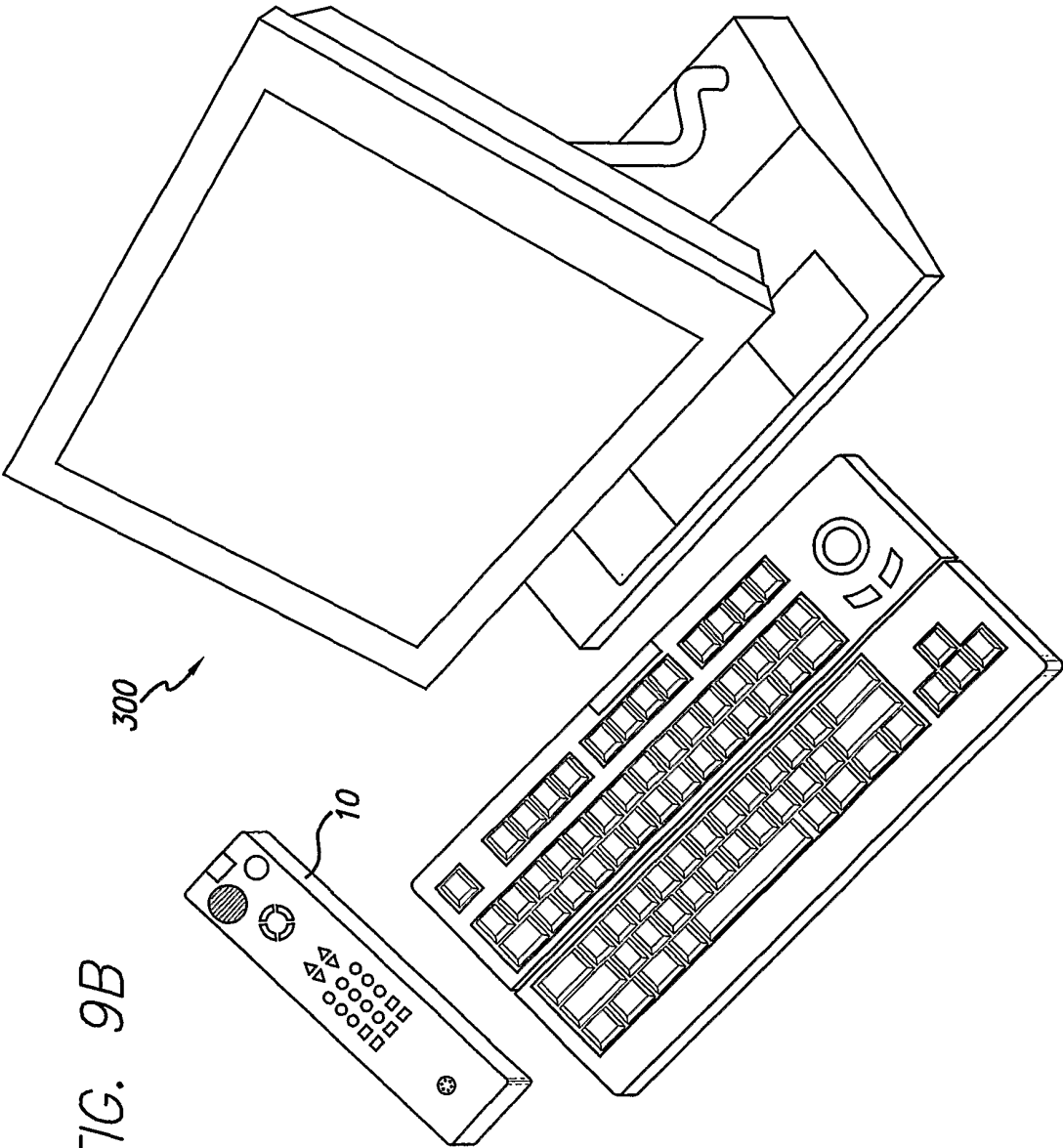


FIG. 8





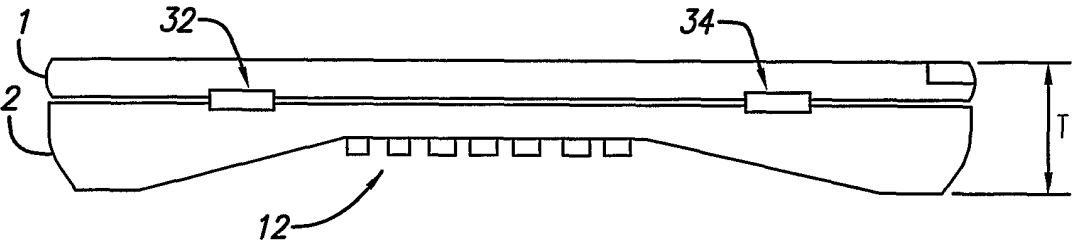


FIG. 10A

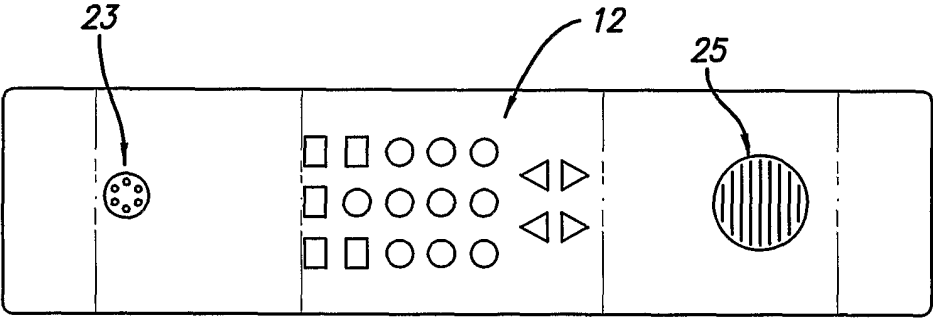


FIG. 10B

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US00/40468

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : Please See Extra Sheet.

US CL : 341/176, 173, 20, 22; 340/825.69, 825.72; 400/489

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)

U.S. : 341/176, 173, 20, 22; 340/825.69, 825.72; 400/489

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 practicable, search terms used)

EAST

search terms: fold, folding, foldable, remote control, cover

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X,E	US 6,094,156 A (HENTY) 25 JULY 2000, entire document	1-20
X	US 5,436,625 A (KUBO) 25 JULY 1995, entire document	1-20
X	US 5,831,555 A (YU et al) 03 NOVEMBER 1998, entire document	1-20
A	US DES.381,992 A (NAKAMURA et al) 05 AUGUST 1997, ALL	1-20
A	US DES.389,838 A (BRUNNER et al) 27 JANUARY 1998, ALL	1-20
A	US DES.417,670 A (CAPPS et al) 14 DECEMBER 1999, ALL	1-20



Further documents are listed in the continuation of Box C.



See patent family annex.

"A"	document defining the general state of the art which is not considered to be of particular relevance	"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
"E"	earlier document published on or after the international filing date	"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
"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)	"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
"O"	document referring to an oral disclosure, use, exhibition or other means	"&"	document member of the same patent family
"P"	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search

14 OCTOBER 2000

Date of mailing of the international search report

14 NOV 2000

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US00/40468

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US DES.417,219 A (BARRETTE et al) 30 NOVEMBER 1999, ALL	1-20
A	US DES.416,560 A (TONINO) 16 NOVEMBER 1999, ALL	1-20
Y	US 5,534,865 A (KRIEGSMAN) 09 JULY 1996, figure 1	1-20

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US00/40468

A. CLASSIFICATION OF SUBJECT MATTER:

IPC (7):

H03K 17/94; H03M 11/00; G08C 19/12, 19/00; H04L 17/02; B41J 5/08, 5/10, 5/12, 5/14, 5/16, 5/26, 5/28