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(54) Title: REMOTE CONTROL DEVICE HAVING DUAL KEY OPERATION

(57) Abstract: An integrated remote control device (figure 1) is provided. The device comprises a front upper housing member including an outer surface with keys (110) and an inner surface and, a second lower housing member including an upper surface with trackball (210) and a lower surface. At least one plunger associated with a control input on the upper housing and a control input on the lower housing. A continuous signal is generated when a key on a surface is depressed.

Remote Control Device Having Dual Key Operation

Related Applications

The present Application is a continuation in part of United States provisional patent application serial number 60/229,867, filed August 30, 2000.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates generally to electronic control apparatus, and more particularly to a remote control device which has a dual key capability.

2. Prior Art

It is well known in the prior art that various different electronic systems and products can be operated using a remote control device. For example, it is known that remote control devices are commonly used with entertainment systems and multimedia systems of a wide variety, including televisions, game systems, VCRs and many other well-known entertainment devices which have been typically used by consumers in residential settings. At the same time, the need has arisen for providing computer-related control capabilities along with the control of the more conventional entertainment devices typically present in a consumer household.

Recent advancements in the field of computers and Internet access devices has resulted in the need for a remote control device which is able to be used both with traditional electronic devices and with more advanced computer equipment. For example, products which combine the functionality of a television with a computer system for permitting access to the Internet are now commercially available. Such systems integrate the capabilities of the personal computer with that of a television. One such device is described in United States Patent Application Serial No. 60/227452.

The ability to provide full control of a personal computer or an Internet access device typically requires the use of more controls than is usually found on a remote control unit for an entertainment device. For example, a user of an Internet access device or computer will typically require 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 in the prior art 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 presently known in the art have inherent limitations. For example, the prior art keyboards are typically similar in size to a conventional keyboard and are thus somewhat cumbersome for use in typical home 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. Pat. 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. One such integrated remote control device is described in United States Patent No. 6,094,156. The device described therein, however, has inherent limitations. It is costly to manufacture because it requires the use of additional circuitry and electronic components. The device described requires a specially designed double-sided circuit board to facilitate the keyboard and remote control functions respectively. The circuit board in this prior art is equivalent to that used in a full size keyboard. The remote control side of the circuit board uses the same logic function as a conventional remote control unit. The dual function keyboard-remote control can be mechanical folded in half to reduce the conventional keyboard size in half when the keyboard is not in used. The mechanical folding design allows the keyboard to become half size which limits further reduction in size of the remote control unit and the combined keyboard-remote control unit. The use of conventional circuit boards in the prior art limits further reduction in size and make it more costly to produce. Moreover, in the remote control devices of the prior art, the keyboard typically communicates with the base

unit using a communications protocol which is different from the conventional keyboard protocol. In some instances,, the remote control device may use one protocol when transmitting information from the keyboard, and a second when transmitting information to a television device. Having two different protocols in the same keyboard-remote control unit makes the device inherently more difficult to manufacture and use.

The prior art suggests that 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. Prior art remote control devices, however, typically do not include pointing device which have a full directional range. Instead, they are limited to a few (typically four or eight) directions in which a pointing device can operate. The incorporation of multidirectional controllers in a reduced size dual function control unit is desirable to provide full range control of the pointing function required to operate a conventional personal computer in a graphic interface environment. A remote control unit which improves upon the multi-direction pointing of the prior art, uses a single protocol for different functions and further reduces size, would thus be helpful to the consumers who seek a convenient way to use a monitor for combined audio, video and personal computer applications through a single remote control unit.

SUMMARY OF THE INVENTION

The present invention incorporates a novel approach to reduce size further by using a punch through connection to allow the remote control keys to stack over a standard keyboard. This punch through function is a mechanical link that is designed to take advantage of the Scan Code assign to each key on the personal computer keyboard to command the controls over a TV or video function. The communications protocol for the information to be transmitted from the keyboard is the same as is found in full-size devices.

In one of the preferred embodiment of the present invention, a 360 degree trackball pointing device is used to enhance the graphic interface of a personal computer application. A graphic interface is a standard for popular personal computer application such as Windows, Microsoft Office and other Windows based software. Conventionally, this is achieved by using a trackball of 90-degree movement in each direction by moving the ball which comes in touch with sensors in four corners of a trackball device. Sometimes this is accomplished in the prior art by utilizing a multi-directional pad which uses additional similar principle but with different user interface. Both of the devices may need additional electronic circuitry and increase the size of a remote control unit. The present invention has a pointing device with 360-degree movement to reduce the size of a remote control unit making the package more compact and easier to make.

It is therefore an object of the present invention to provide a integrated remote control device which can be used to control a television and an Internet access device, which is easy to operate, and which is of a low cost to manufacture.

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

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

Figure 1 is a perspective view of a remote control device including an upper housing member and a lower housing member.

Figure 2 illustrates a typical set of control keys used on the remote control device.

Figure 3 illustrates a plan view of the top surface of the lower housing member illustrating a set of keys that are typically used to control an Internet access device.

Figure 4 is a cut-away view of the lower housing member.

Figure 5 is a cross sectional view of the upper housing member taken along the line LL in Figure 3.

DETAILED DESCRIPTION OF THE INVENTION

A novel remote control device having a dual key capability will be described. In the following description, for the purposes of explanation, specific devices, component arrangements and construction details are set forth in order to provide a more thorough understanding of the invention. It will be apparent to those skilled in the art, however, that the present invention may be practiced without these specific details. In other instances, well known structures and manufacturing methods have not been described in detail so as not to obscure the present invention unnecessarily.

Referring first to Figure 1, a perspective view of a remote control device utilizing the present invention is illustrated. As shown in Figure 1, the remote control device in the present invention includes a upper housing member and a lower housing member. The upper and lower housing members are joined at a hinge. The hinge allows the upper and lower housing members to open like a book. The housing members are formed in the preferred embodiment so that when they are closed, they fit snugly together without any significant gap between the two elements.

The preferred embodiment of the present invention is intended to be used in connection with an electronic device which combines the functions of a television set and an Internet access device. It will be apparent to those skilled in the art,

however, from the following description that the present invention can be used with equal effectiveness in controlling different types of electronic devices. The present invention is not intended to be limited only to control the devices used in conjunction with the preferred embodiment. It will be apparent to those of skill in the art that the preferred embodiment can be modified so as to provide the capability for the remote control to operate with other devices.

Referring next to Figure 2, a plan view of the top surface of the upper housing member is shown. Figure 2 illustrates a typical arrangement of the control keys that are used to operate a standard television set. In Figure 2, the control keys are referred to in a group with reference numeral 110. As shown in Figure 2, a typical set of control keys can include volume up, volume down, channel up, channel down, mute, number keys, enter and other common keys. Figure 2 illustrates the control key arrangement which is used in the preferred embodiment of the present invention. It will be apparent to those skilled in the art, however, that other key arrangements can be used. For example, the specific arrangement and location of the control keys for the television set can be varied without departing from the overall spirit and scope of the present invention. It is also not necessary that the specific keys which are illustrated in Figure 2 must be included in all alternative embodiments of the invention. Specific keys can be omitted and additional keys

added to perform different functions can be added, if desired. As discussed above, the present invention can be used in connection with electronic devices which are not the television, or Internet access device of the preferred embodiment. In such cases, the control keys may be used to perform different functions, and may be arranged differently than illustrated in Figure 2.

Referring next to Figure 3, a plan view of the top surface of the lower housing member is shown. Figure 3 illustrates a set of keys that are typically used to control an Internet access device. The preferred embodiment of the present invention includes a keyboard and a pointing device.

Figure 1a shows the remote control device with the upper member in the closed position. With the upper member in the closed position, a first set of control keys are visible on the top surface of the device. Figure 1b shows the remote control device with the upper member in the open position. With the upper member in the open position, a second set of control keys are visible on the top surface of the lower housing member.

Figure 4 is a cut-away view of the lower housing member. As shown in Figure 2, the lower housing has disposed within it a circuit board and other electronic components used to operate the remote control device. The exact type of circuitry necessary will be apparent to those of skill in the art. When the user presses a key on the lower housing member, an electronic signal is generated, which causes a signal to be transmitted from the

remote control device. Transmission of the control signals may be via a wireless RF or LED transmission as in a conventional remote control.

The upper housing member does not include a circuit board, or any other electronic circuitry. When the upper and lower housing members are closed, the keys on the upper housing member are disposed directly above certain keys located in the lower housing member. Figure 5 is a cross sectional view of the upper housing member taken along the line LL in Figure 3. As can be seen in Figure 5, a plunger is located within the upper housing member. There is one plunger disposed beneath each key on the upper housing member. The plunger is held in place by a spring element.

When a user presses on a key in the upper housing member, the key contacts the plunger and forces the plunger downward. As can be seen in Figure 5, there is an opening on the lower surface of the upper housing member. The plunger, when depressed, protrudes out slightly from the opening. This causes the bottom surface of the plunger to contact the corresponding key on the upper surface of the lower housing member.

As noted above, the remote control device includes a switch which senses when the two housing members are in the open and closed positions. The switch sends a signal to the circuit board and electronic circuits located in the lower housing member. In this manner, the remote control device can generate a first type

of signal when the housing is open, and a second type of signal when the housing is closed.

The present invention uses communications protocol which is different from that used in prior art devices. In the prior art, typically when a key is pressed, a single signal pulse is generated and sent to the base unit. This single signal informs the base unit that a key on the remote has been pressed. The base unit uses that information to perform whatever function is associated with the key that has been depressed. The present invention, in contrast, employees a communications protocol, known as a "make or break" protocol. With this protocol, a signal is sent continuously while the key is depressed. This operation is similar to a conventional keyboard interface which sends scan codes to a computer.

The exact electrical circuits which implement the make-or-break protocol will be apparent to those skilled in the art, and are not discussed in detail herein. An example of the operation of the keyboard, however, is helpful to discuss. Consider for example, what occurs when the "A" key on the keyboard is pressed. The A key is typically assigned a standard value of 1C (hex). When a user presses the A key, the circuit board in the remote control device will generate a signal having a value of 1C. This signal will be transmitted to the base unit using the communications method employed by the remote control device (e.g., IR or RF signaling).

If the A key is held down for longer than some predetermined period of time, another signal having a value of 1C will be sent. This process continues until the A key has been released. However, the keyboard will send a different code when the key has been released. For example, when the A key is released, the keyboard will send a signal that typically has the value of F0 (hex) to tell the base unit that the key with the proceeding scan code has been released. It will then send 1C, so the base unit knows which key has been released. This protocol is known, as noted above, as a make-or-break protocol. While a keyboard uses this protocol, most remote control keys send only a single scan code when pressed. A second scan code will not be sent until the next key is released. The plunger in the current invention links the two different operations to allow the two sets of control keys at upper and lower housing to share the same set of protocol.

Referring to Figure 3, trackball 210 is incorporated as a multi-directional pointing device. The trackball can operate as a 360 degree pointing device with sensors incorporated to send a signal to the monitor when it is moved in any direction. As shown in Figure 1a, such a trackball device eliminates the mechanical moving ball and sensor interface requirement at the bottom of the control unit allowing the customers to freely pointing the cursor on the monitor without physically moving the control unit as required in a mouse operation. The trackball in

the current invention reduces the space requirement in the remote control unit. The trackball is only one of the preferred embodiments of the present invention intended to be used in connection with a remote control device. It will be apparent to those skilled in the art, however, from the above description that the present invention can be used with equal effectiveness in controlling a monitor set with any 360-degree capable multi-directional pointing devices. The present invention is not intended to be limited only to a trackball used in conjunction with the preferred embodiment. It will be apparent to those of skill in the art that the preferred embodiment can be modified so as to provide the capability for the remote control to operate with other devices.

The description of the present invention has been made with respect to specific arrangements and constructions of an remote control device having dual key capability. It will be apparent to those skilled in the art that the foregoing description is for illustrative purposes only, and that various changes and modifications can be made to the present invention without departing from the overall spirit and scope of the present invention. The full extent of the present invention is defined and limited only by the following claims.

CLAIMS

What is claimed is:

1. A remote control device comprising:

an upper housing having a outer surface and an inner surface;

a lower housing having a upper surface and a lower surface, said lower housing being joined to the said upper housing by a hinge;

a first plurality of control inputs configured on said outer surface of said upper housing and a second plurality of control inputs configured on said upper surface of said lower housing;

at least one plunger associated with a control input on said upper housing and a control input on said lower housing;

pointing indicator means coupled to said lower housing;

communication means disposed within said lower housing and coupled to said pointing indicator means and said keys disposed on said lower housing;

wherein said communications means generates a substantially continuous signal during such time as one of said keys is depressed.

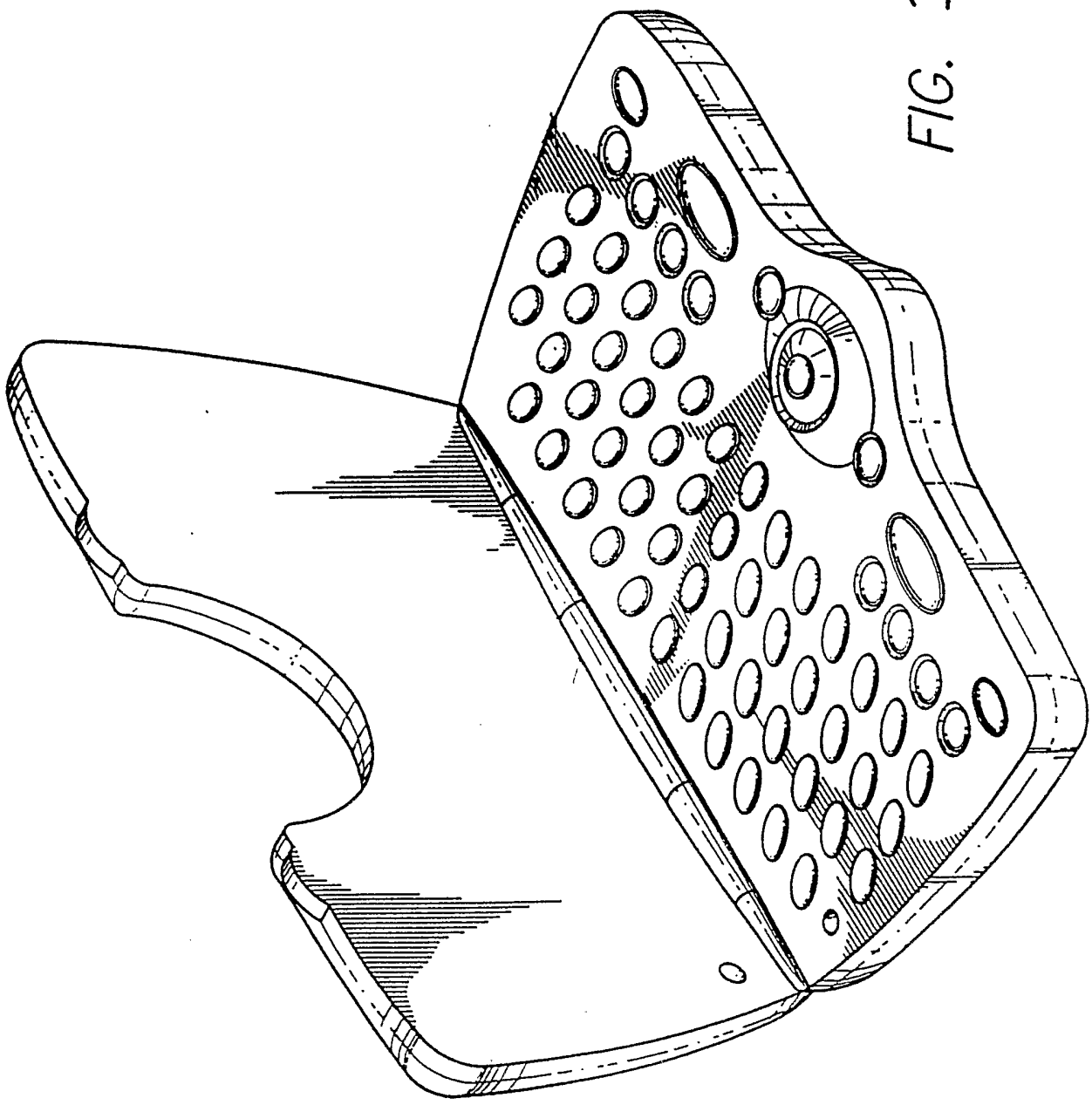

FIG. 1

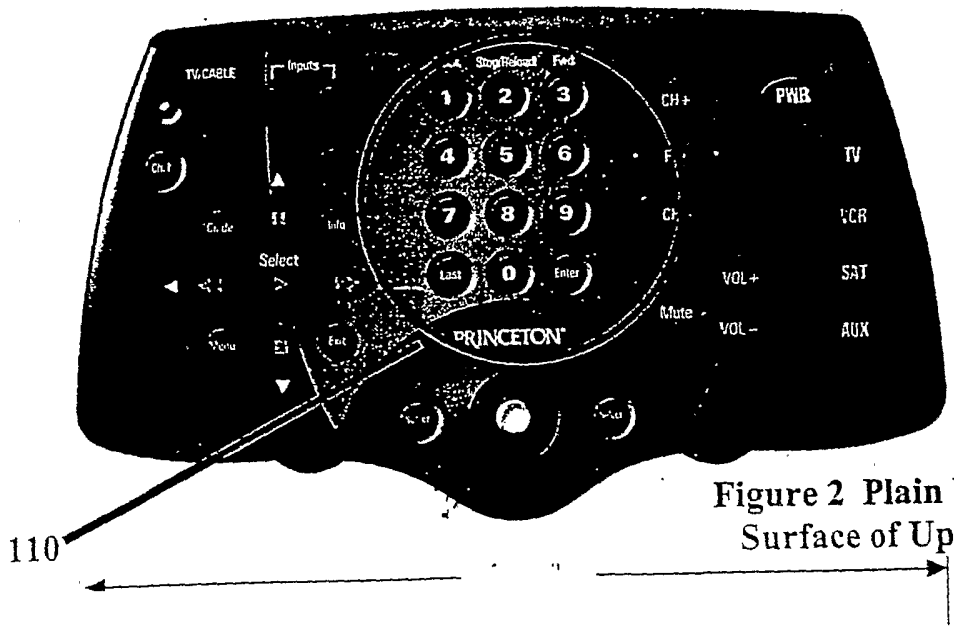

Figure 2 Plain View of Outer Surface of Upper Housing

Figure 3 Plain View of Top Surface of Lower Housing

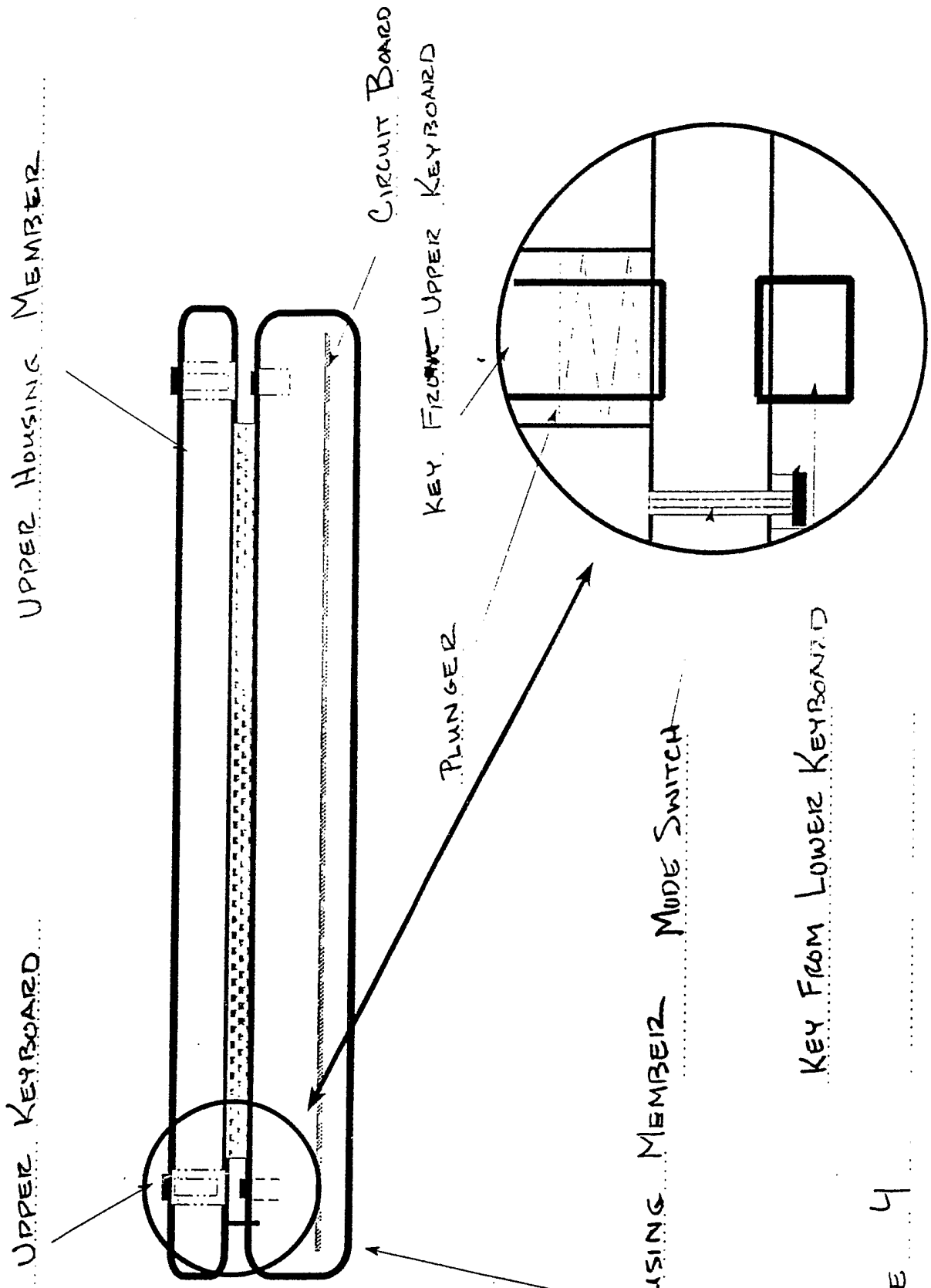
Upper Housing Member
Circuit Board
Key From Upper Keyboard
Key From Upper Keyboard
Plunger
Lower Housing Member
Mode Switch
Key From Lower Keyboard

Figure 4

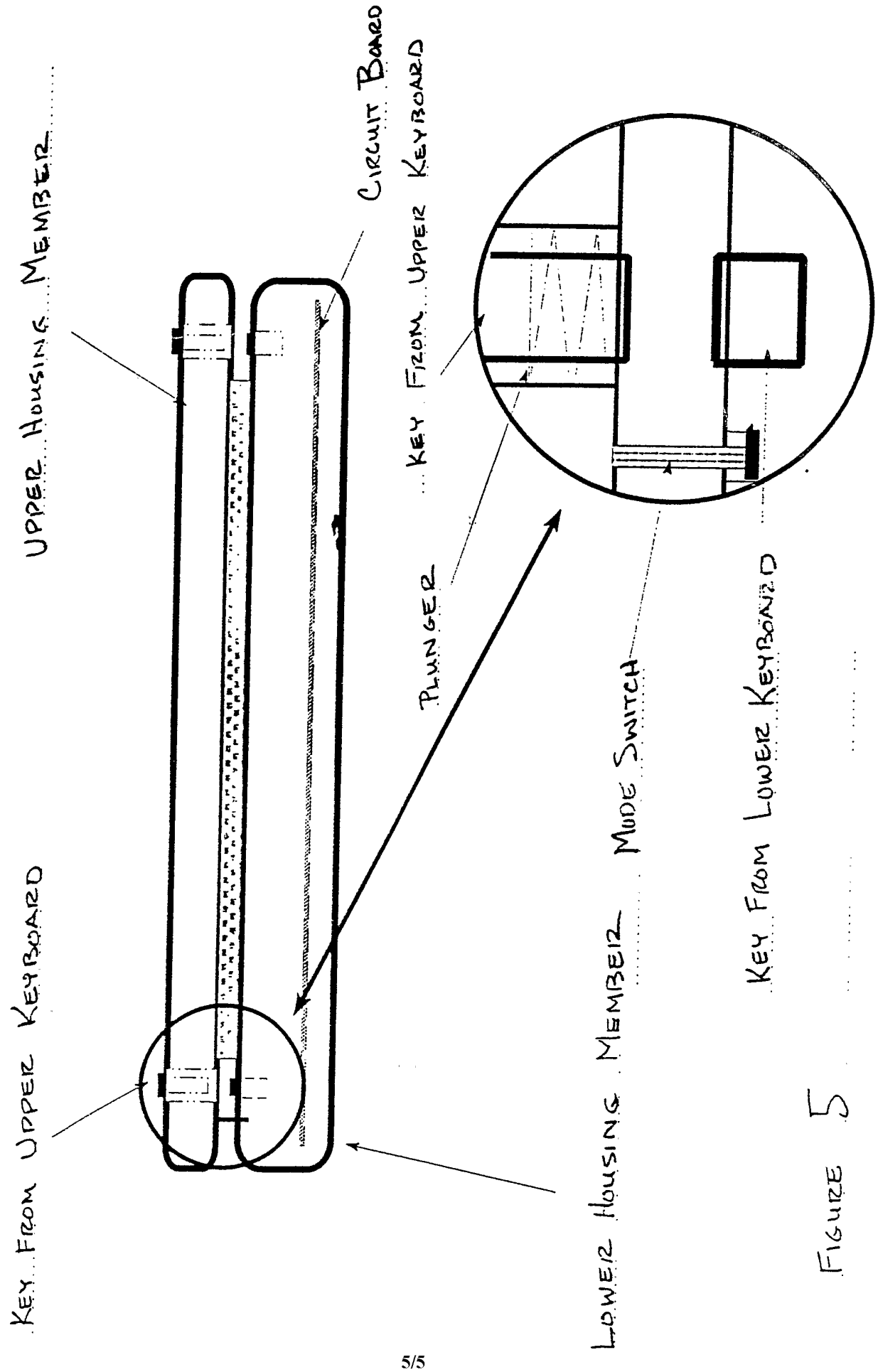
UPPER HOUSING MEMBER
CIRCUIT BOARD
KEY FROM UPPER KEYBOARD
PLUNGER
KEY FROM UPPER KEYBOARD
MODE SWITCH
LOWER HOUSING MEMBER
KEY FROM LOWER KEYBOARD

FIGURE 5

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US02/01928

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) :G09G 5/00
US CL :345/158, 168, 169
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. : 345/158, 168, 169

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)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,926,170 A (OBA) 20 July 1999, col. 13, lines 8-16, col. 7, lines 36-41, col. 2, lines 45 through col. 3, line 15, figures 5-7.	1
Y	US 5,831,555 A (YU et al.) 03 November 1998, col. 8, lines 57 through col. 9, line 10.	1

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

*	Special categories of cited documents:	"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
"A"	document defining the general state of the art which is not considered to be of particular relevance	"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
"E"	earlier document published on or after the international filing date	"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
"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)	"&"	document member of the same patent family
"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		

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