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(56) Documents cited
US 4574651 A US 4552360 A US 4458238 A
US 4012014 A

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(54) **Computer input device**

(57) A computer input device such as a game controller is shaped to fit within a user's gripped hand. The user's thumb (92) rests on a top sloping wall (31) and can control buttons (1 to 3). The forefinger (93) and middle finger (94) are located in indentations (331, 332) in a front wall (32) and control buttons (4, 5). The thumb (92) may instead control a tracker ball (Fig. 7). The input device is compact, can be gripped by a single hand and requires no flat surface.

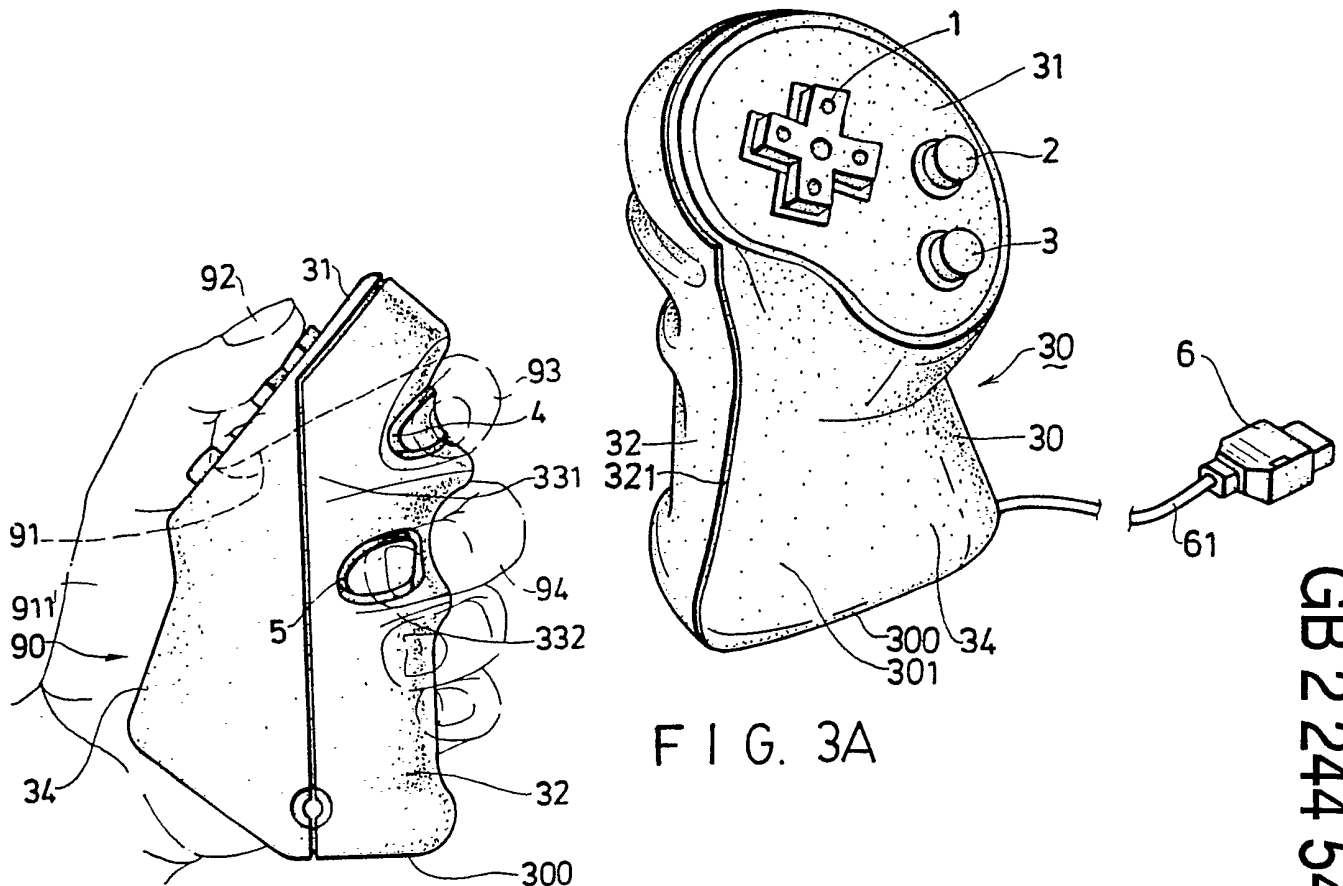


FIG. 4

FIG. 3A

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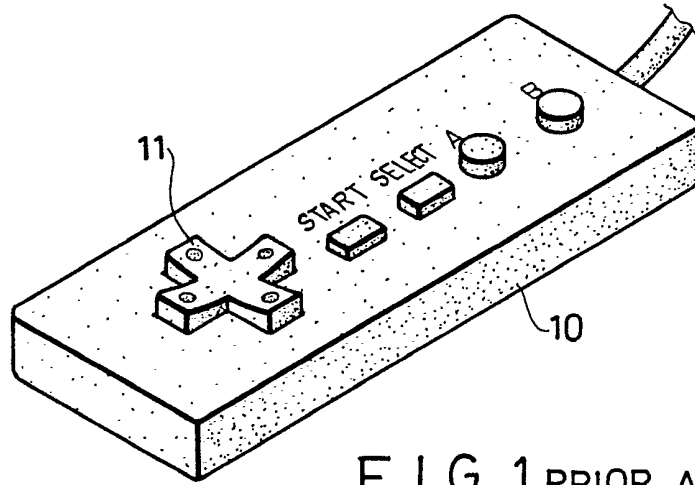


FIG. 1 PRIOR ART

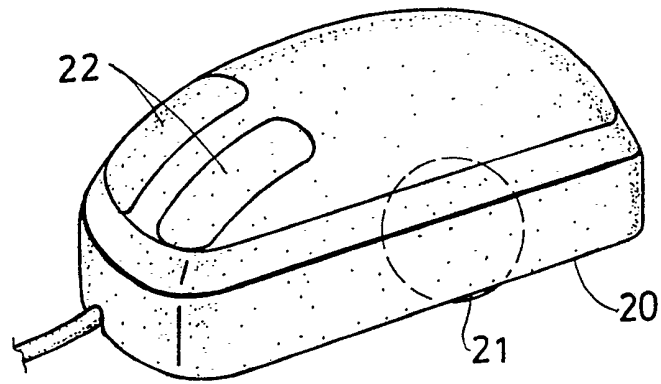


FIG. 2A PRIOR ART

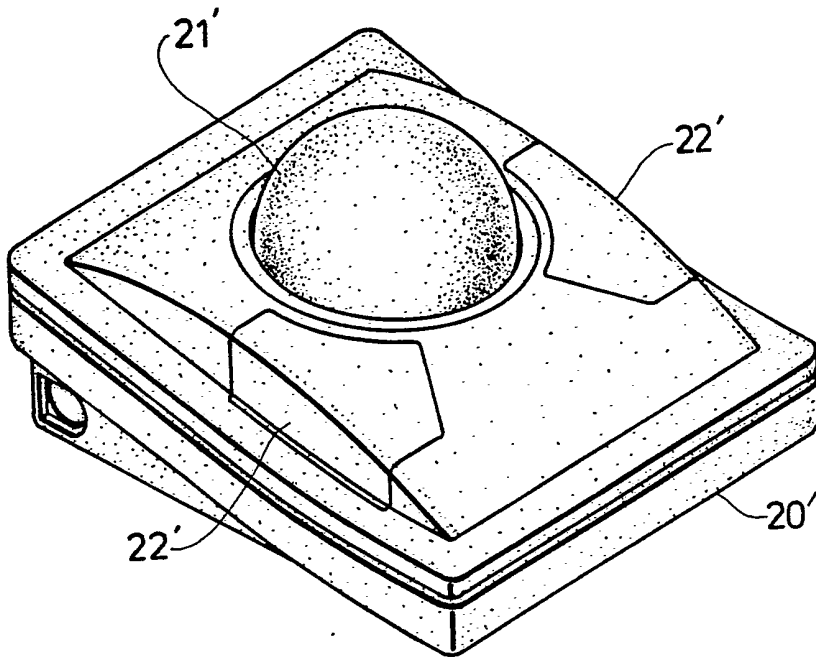


FIG. 2B PRIOR ART

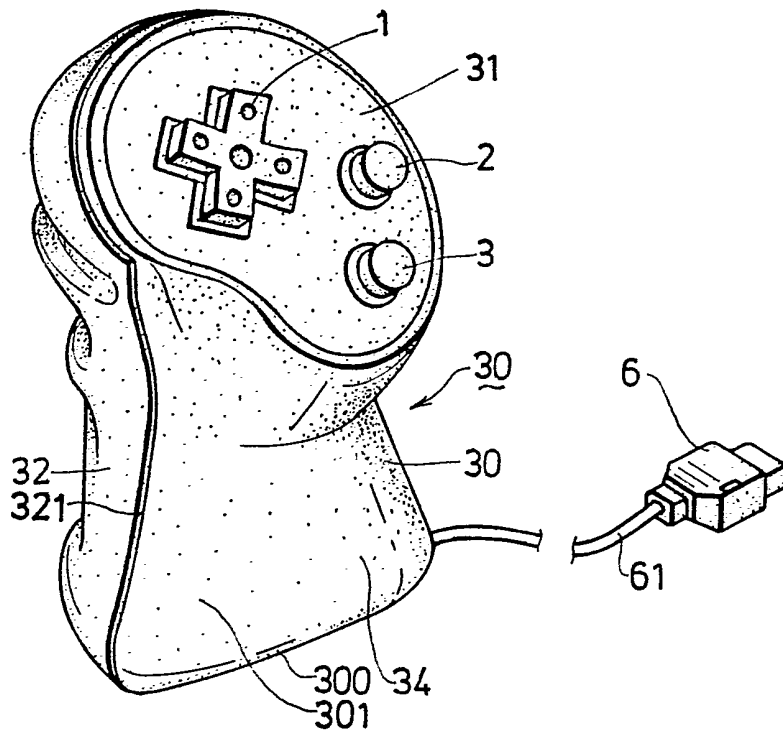


FIG. 3A

C

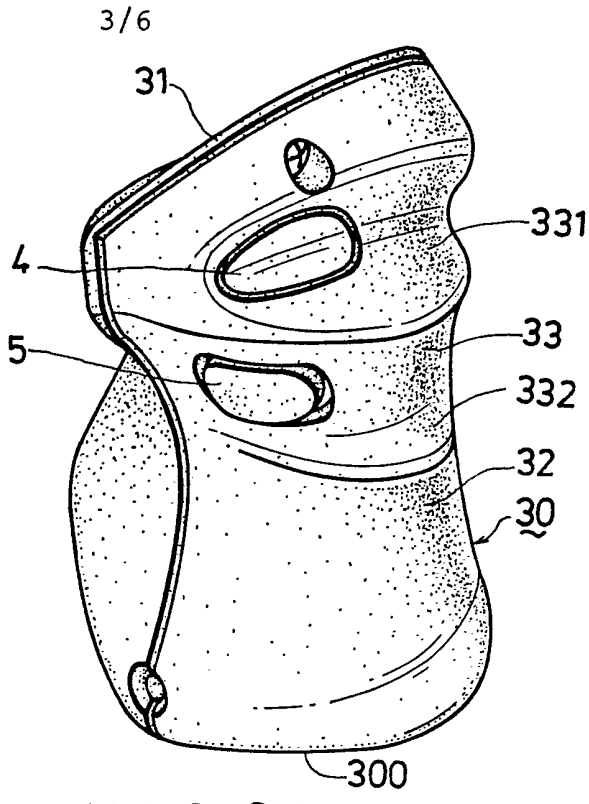


FIG. 3B

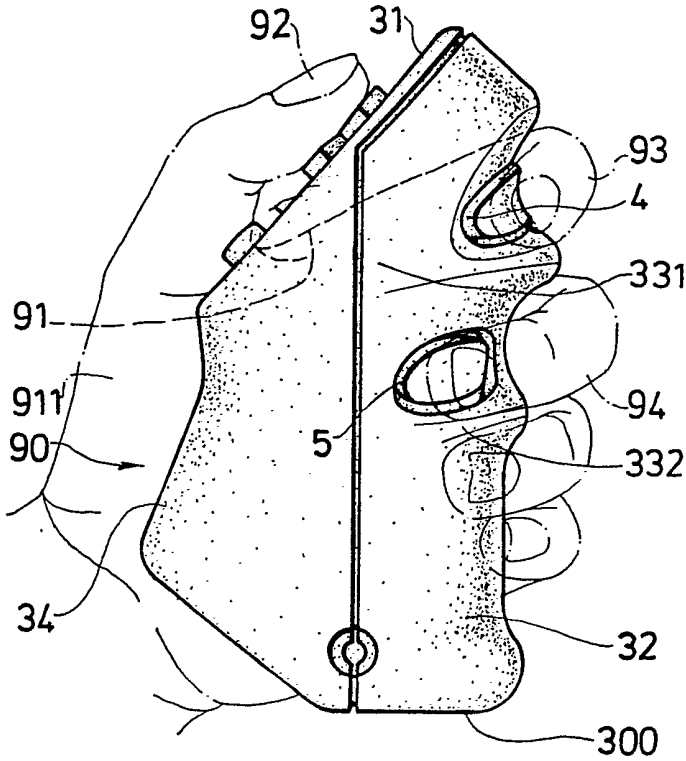


FIG. 4

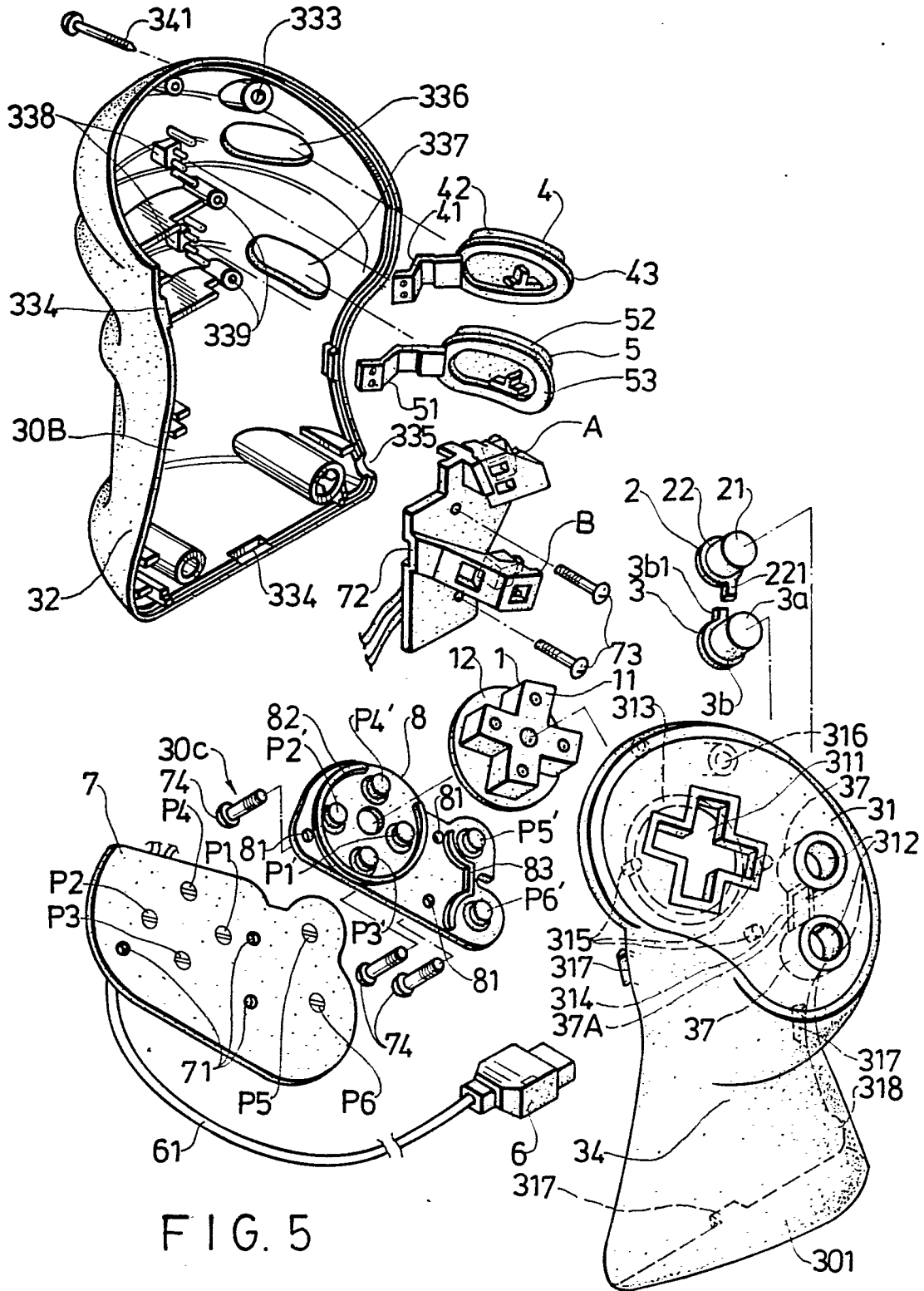


FIG. 5

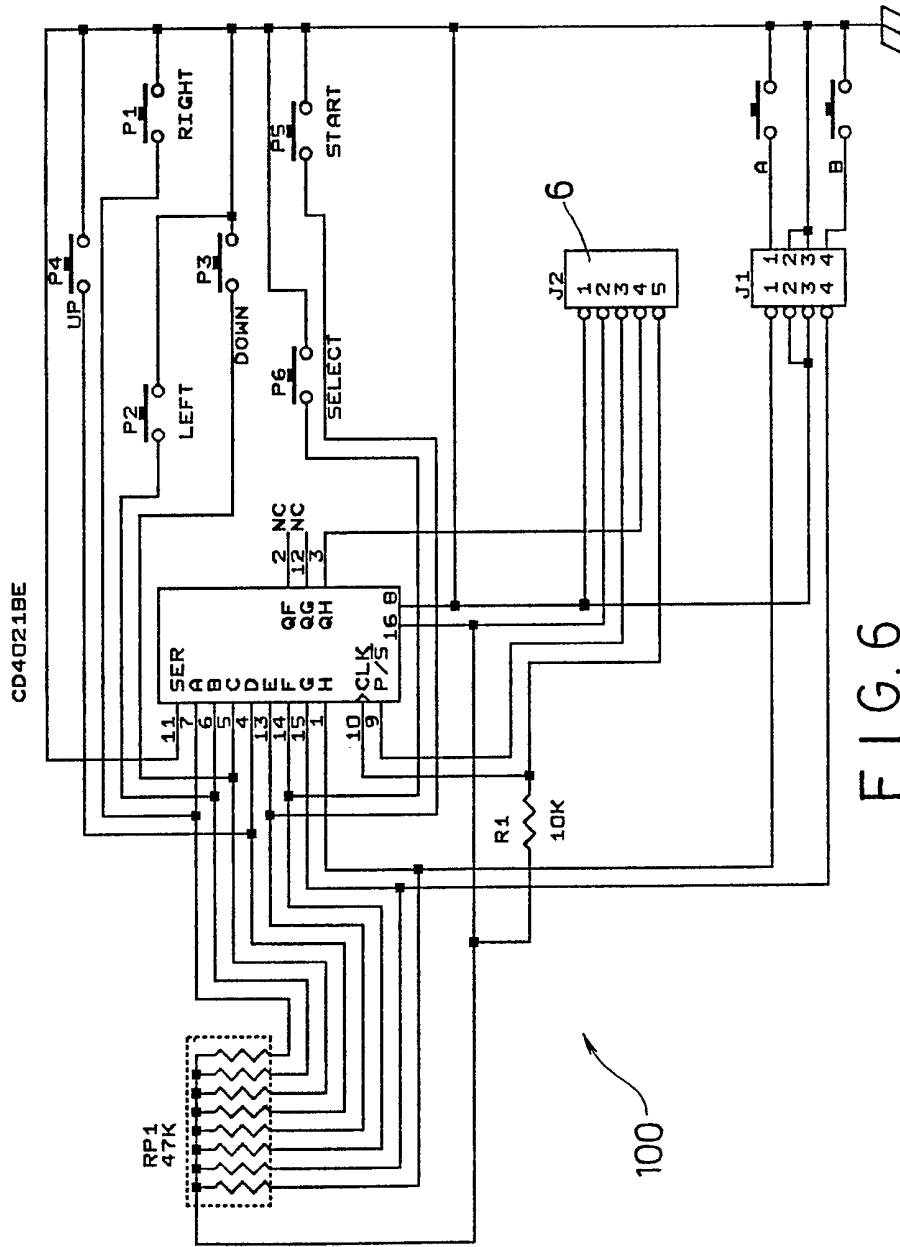


FIG. 6

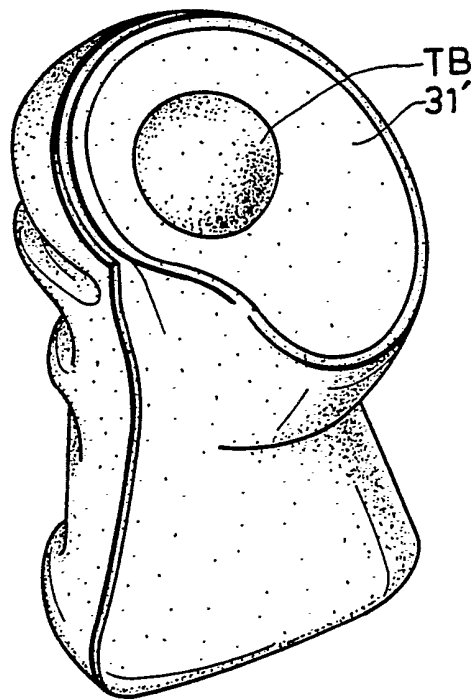


FIG. 7

COMPUTER INPUT DEVICE

The invention relates to a computer input device, such as ————— a game controller or a mouse input device which has a body casing adapted to be gripped by hand.

Figure 1 is an illustration of a conventional game controller for television computers. The game controller has a substantially rectangular casing body 10 with a cross-shaped operating piece 11, a start key, a select key, and a pair of actuating keys A and B. A plurality of rubber switches, not shown in the Figure, are disposed inside the casing body 10 and are actuated by pressing the above mentioned keys. During operation, the select key is pressed to choose between one or two players and the start key is pressed to begin playing the game. The left thumb of the user is positioned at and presses the operating piece 11 to control the direction of motion of a particular screen character. The right thumb is used to press one of the actuating keys, A or B, to control special actions of the screen character such as throwing of weapons, jumping actions, and the like. A main drawback of the above game controller is that it is operated with the use of both hands, making it very inconvenient for the user.

Figure 2A is an illustration of a first conventional type of a computer mouse. The computer mouse has a

substantially box-shaped body 20 with a wheel 21 installed on a bottom end and a pair of selective actuating keys 22 installed on a top end. When the computer mouse is moved over the surface of a table or a drawing in a fixed orientation, it generates X and Y coordinate signals to control the movement of a cursor on a computer screen. The above described computer mouse is inconvenient because it can be properly operated only on a flat surface.

Figure 2B is an illustration of a second conventional type of a computer mouse. The computer mouse has a similar substantially box-shaped body 20' but with a roller 21' and a pair of selective actuating keys 22' disposed on a top face. The user uses his hands to rotate the roller 21' to control the movement of a cursor on the computer screen. The main drawbacks of the second computer mouse are: (a) it cannot be separated from its table support; (b) it is not compact; and (c) it cannot be gripped by the user.

According to the present invention, there is provided a computer input device, comprising: a hollow body casing having a bottom wall, a generally convexly curved looped wall extending upwards from said bottom wall and having a top face periphery, and a top wall having a periphery coincident with said top face periphery of said looped wall, said looped wall having a contour substantially conforming to the contour of a user's hand in a gripping position, said looped wall including a curved front portion, a curved rear portion and a curved side portion interconnecting said front and said rear portions, said front portion having a first elongate indentation formed on an upper part of said front portion and a second elongate indentation formed below said first elongate indentation, said top face periphery sloping downwards from said front portion to said rear portion, and said top wall sloping upwards from said rear portion to said front portion to permit the thumb of the user's hand to comfortably rest thereupon; and an electrical control means including control circuit means mounted inside said body casing, an operating piece provided in said top wall, and first and second actuating keys located respectively in said first and said second elongate indentations; said first and said second elongate

indentations having a size and shape which permits the fingerpads of the forefinger and the middle finger of the user's hand to rest on said first and said second actuating keys whilst the ball of the thumb rests on said rear portion and the base of the forefinger adjacent to the thumb is adjacent to said side portion, when said computer input device is being gripped.

The computer input device may be used as a game controller that can be hand gripped and operated with the use of a single hand.

Also, the computer input device may be used as a computer mouse that is compact, adapted for hand gripping, and can be used even without the presence of flat surfaces.

Other features and advantages of this invention will become apparent in the following detailed description of the preferred embodiments with reference to the accompanying drawings, in which:-

Figure 1 is a perspective view of a conventional game controller for a television computer;

Figures 2A, 2B are illustrations of conventional computer mouse input devices;

Figures 3A, 3B are perspective views of a first preferred embodiment of a computer input device according to the present invention for use as a game controller;

Figure 4 illustrates the proper use of the computer input device of Figures 3A, 3B;

Figure 5 is an exploded view of the first preferred embodiment;

Figure 6 is a schematic circuit diagram of a control circuit means of the first preferred embodiment; and

Figure 7 is a perspective view of a second preferred embodiment of a computer input device according to the present invention for use as a computer mouse.

Figures 3A, 3B illustrate perspective views of the first preferred embodiment of a computer input device according to this invention. The first preferred embodiment is a game controller having a hollow casing body 30 which is designed for hand gripping. The casing body 30 has a bottom face 300 with a substantially round surrounding wall 301 extending upward from the bottom face 300. A first control panel 31 is formed as a flat wall with a substantially bean-shaped periphery which is coincident with a top end periphery of the surrounding wall 301. The first control panel 31 has a cross-shaped control key 1, a start key 2, and a select key 3. The casing body 30 shown in these Figures is designed to be gripped by the left hand. The surrounding wall 301 has a curved front portion 32, a curved rear portion 34 which extends downwards and inwards from the periphery of the first control panel 31 and then extends outward and downward towards the bottom face 300, and a curved side portion 321 which interconnects the front and rear portions 32, 34. Both the front and rear portions 32, 34 are adjacent to the periphery of the first control panel 31.

Referring to Figure 3B, a second control panel 33

is formed on an upper part of the front portion 32. The second control panel 33 has a first and a second elongated indentation 331, 332. The first indentation 331 has a substantially oval first actuating key 4 disposed on a rightmost end. The second indentation 332 is formed immediately below the first indentation 331 and has a substantially oval second actuating key 5 similarly disposed on a rightmost end. The game controller has a connector 6 with a cable 61 extending from a base portion of the same.

Referring to Figure 4, the ball of the thumb 91 of the left hand 90 of a user rests comfortably on the rear portion 34 of the casing body 30 when the game controller is gripped. The first control panel 31 inclines in such a manner that the thumb 92 of the left hand 90 can be comfortably seated on the control key 1. The base 91 of the forefinger adjacent to the thumb 91 of the left hand 90 is adjacent to and in contact with the side portion 321 of the casing body 30. The first and second indentations, 331 and 332, receive the forefinger 93 and the middle finger 94 of the left hand 90, respectively. The first and second indentations, 331 and 332, are of a size and shape which allow the fingerpads of the forefinger 93 and the middle finger 94 to easily and respectively contact with the first and second actuating keys 4 and 5. Thus, the control key 1 and the first and second actuating keys 4, 5 may be simultaneously pressed and

the game controller may be properly operated with the use of a single hand.

An exploded view of the first preferred embodiment is shown in Figure 5. The casing body 30 comprises a first hollow casing part 30A which includes the first control panel 31 and the rear portion 34, and a second hollow casing part 30B which includes the front portion 32. The first control panel 31 has a cross-shaped opening 311 and a pair of circular key openings 312 disposed to the right of the cross-shaped opening 311. A ring shaped projection 313 protrudes downwardly from a bottom face of the first control panel 31 and circumscribes the cross-shaped opening 311. A downwardly projecting annular wall 37 protrudes from the periphery of each key opening 312 at the bottom face of the first control panel 31. The annular walls 37 are interconnected via a rectangular passage 37A. The first casing part 30A further includes three first threaded screw sockets 315 projecting from the bottom face of the first control panel 31, a second threaded screw socket 316 similarly projecting from the bottom face of the first control panel 31 near a top edge of the same, three spaced hook members 317 extending outwards from the peripheral edge of the rear portion 34, and a semicircular notch 318 formed on the periphery of the rear portion 34 near and transverse to the bottom face 301 of the same. The control key 1 has

a circular plate 12 with an outwardly protruding cross-shaped projection 11. The cross-shaped projection 11 is received by the cross-shaped opening 311 of the first control panel 31. Each of the start and select keys, 2 and 3, has a circular base, 22 and 3b, with an outwardly projecting cylindrical central protrusion, 21 and 3a. Each of the circular bases 22 and 3b has a tongue projection 221 and 3b1. The start and select keys 2 and 3 are received in the key openings 312. The tongue projections, 221 and 3b1, extend inside the rectangular passage 37A and prevent any rotation of the select and start keys 2 and 3.

The second casing part 30B has a first threaded screw socket 333, three spaced hook sockets 334 and a semicircular notch 335, all of which respectively complement the threaded screw socket 316, the three spaced hook members 317 and the semicircular notch 318 of the first casing part 30A. The second casing part 30B further has a first and a second substantially oval opening 336 and 337, each for receiving a protruding press piece 42 and 52 of the first and second actuating keys 4 and 5, respectively. Each of the first and second actuating keys 4 and 5 has a resilient positioning piece, 41 and 51, which extends from an outwardly projecting flange base, 43 and 53, of the first and second actuating keys 4 and 5. The positioning pieces 41 and 51, are attached to a pair of

mounting projections 338 which protrude from a rear side of the second casing part 30B. A second threaded screw socket 339 is disposed beneath each mounting projection 338.

The game controller further comprises a control circuit means 30C which includes a control circuit board 7 and an elastic switch piece 8. Since the structure of the control circuit means 30c is in the area of conventional art, the operation and construction of the control circuit means 30c will not herein be described in great detail for the purpose of simplicity. The control circuit board 7 has an electric control circuit 100 mounted thereon. A schematic circuit diagram of the electric control circuit 100 is shown in Figure 6. The electric control circuit 100 includes a right key press P1, a left key press P2, a down key press P3, an up key press P4, a start key press P5, and a select key press P6. The electric control circuit 100 is electrically connected to the cable 61 of the connector 6 and to a pair of actuating switches A, B disposed on a seat 72. The control circuit board 7 also includes three spaced through holes 71. The elastic switch piece 8 is installed on top of the control circuit board 7 and comprises six rubber switches P1' through P6' adjacent to the key presses P1 through P6. The elastic switch piece 8 further comprises three spaced through holes 81 aligned

with the spaced screw holes 71 of the control circuit board 7, a substantially C-shaped confining projection 82 and a substantially curved projection 83. Both the confining projection 82 and the substantially curved projection 83 protrude from a top face of the elastic switch piece 8.

During assembly, the control key 1 and the start and select keys 2, 3 are respectively received by the cross-shaped opening 311 and the key openings 312. Three first screws 74 pass through the through holes 71 and 81 of the control circuit board 7 and the elastic switch piece 8 and are received by the first threaded screw sockets 315 of the first casing part 30A. The confining projection 82 and the substantially curved projection 83 of the elastic switch piece 8 abut with the outer surface of the ring-shaped projection 313 and the annular walls 37 of the first casing part 30A. The protruding press pieces, 42 and 52, of the first and second actuating keys, 4 and 5, project through the first and second oval openings, 336 and 337, of the second casing part 30B. A pair of second screws 73 mount the seat 72 to the second casing part 30B at the second screw sockets 339. The actuating switches A, B are actuated by pressing the first and second actuating keys 4, 5, respectively. The hook members 317 of the first casing part 30A are engaged in the hook sockets 334 of the second casing part 30B to join the first and

second casings 30A and 30B. The cable 61 of the connector 6 passes through an opening formed by the semicircular notches 318 and 335 of the first and second casings 30A and 30B. A third screw 341 passes through the screw sockets, 333 and 316, of the second and first casings, 30B and 30A, to fasten the first and second casings 30A and 30B together.

Referring to Figure 7, a second preferred embodiment of this invention has a first control panel 31' which utilizes a roller TB as its operating piece. The second preferred embodiment is used as a computer mouse and is compact and can be operated even without the presence of flat surfaces, unlike the conventional computer mouse of Figure 2A.

CLAIMS

1. A computer input device, comprising:

a hollow body casing having a bottom wall, a generally convexly curved looped wall extending upwards from said bottom wall and having a top face periphery, and a top wall having a periphery coincident with said top face periphery of said looped wall, said looped wall having a contour substantially conforming to the contour of a user's hand in a gripping position, said looped wall including a curved front portion, a curved rear portion and a curved side portion interconnecting said front and said rear portions, said front portion having a first elongate indentation formed on an upper part of said front portion and a second elongate indentation formed below said first elongate indentation, said top face periphery sloping downwards from said front portion to said rear portion, and said top wall sloping upwards from said rear portion to said front portion to permit the thumb of the user's hand to comfortably rest thereupon; and

an electrical control means including control circuit means mounted inside said body casing, an operating piece provided in said top wall, and first and second actuating keys located respectively in said first and said second elongate indentations;

said first and said second elongate indentations having a size and shape which permits the fingerpads of the forefinger and the middle finger of the user's hand to rest on said first and said second actuating keys whilst the ball of the thumb rests on said rear portion and the base of the forefinger adjacent to the thumb is adjacent to said side portion, when said computer input device is being gripped.

2. A computer input device as claimed in claim 1, wherein said body casing comprises a first casing part which includes said top wall and said rear portion, and a second casing part connectable to said first casing part and including said front portion.

3. A computer input device as claimed in claim 1 or claim 2, wherein said operating piece is a substantially cross-shaped control key, whereby said computer input device may be used as a game controller.
4. A computer input device as claimed in claim 1 or claim 2, wherein said operating piece is a roller, whereby said computer input device may be used as a computer mouse.
5. A computer input device as claimed in any one of claims 1 to 4, wherein said periphery of said top wall is substantially bean-shaped.
6. A computer input device as claimed in any one of claims 1 to 5, wherein said rear portion is convexly curved as it extends from said periphery of said top wall to said bottom wall.
7. A computer input device substantially as herein described with reference to Figures 3A to 6 or Figure 7 of the accompanying drawings.