IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
LUFKIN DIVISION

ANASCAPE, LTD.	§	
	§	Hon. Ron Clark
Plaintiff,	§	
	§	Civil Action No. 9:06-CV-00158-RC
v.	§	
	§	
MICROSOFT CORPORATION, and	§	
NINTENDO OF AMERICA, INC.,	§	Oral Argument Requested
	§	
Defendants.	§	

DEFENDANTS' JOINT MOTION FOR PARTIAL SUMMARY JUDGMENT OF INVALIDITY OF CLAIMS 19-20, 22-23 OF THE '700 PATENT

APPENDIX – VOLUME 2 OF 4

A126-A150	European Patent Application EP 0 867 212 A1, dated (publication) September 30, 1998.
A151-A152	Press Release: "PlayStation2 Accessories; New Digital Analog Controller 'Dual Shock' 2; Large Capacity Memory Card Unveiled," dated September 13, 1999.
A153-A155	Cover and Article from November 1999 *US Official PlayStation Magazine* "Two-rific: After months of speculation and eager anticipation, PlayStation 2 is finally here."
A156	Copyright Registration form for *PSM 100% Independent Play Station Magazine*.
A157-A159	Excerpts from Anascape's Objections and Responses to Microsoft's First Set of Interrogatories.
A160-A162	Excerpts from Anascape's Objection and Responses to Microsoft's Third Set of Interrogatories.
A163-A175	Excerpts from the October 4, 2001 deposition of Mr. Brian Carlson, in this action.
A176	Letter from McKool Smith dated November 20, 2007.
A177-A217	Excerpts form the Expert Witness Report of Steven Bristow, dated February 11, 2008.

A218-A223	Excerpted claim charts submitted in Microsoft's Request for Reexamination of US Patent 6,906,700, dated May 4, 2007.

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(54) OPERATING DEVICE FOR GAME MACHINES

(57) An operating device used in a game machine for playing a television game includes a main body portion of the operating device and first and second grip portions protruded from one sides on respective end parts of the main body portion. A first operating unit is mounted on one end of the main body portion and a second operating unit is mounted on the opposite end of the main body portion. The first and second operating units are provided with a plurality of thrusting operators protruded from the upper surface of the main body portion and a plurality of signal input elements thrust by the thrusting operators. A third operating unit and a fourth operating unit are arranged facing each other on the proximal ends of the first and second grip portions. Each of the third and fourth operating units has a rotation member and a plurality of signal input devices thrust by the rotation member. When the first and second grip portions are gripped, the third and fourth grip portions can be manipulated by a thumb finger of a hand gripping the first or second gripping portion. A vibration imparting mechanism for imparting vibrations in meeting with the progress of the game is provided in the main body portion of the operating device.

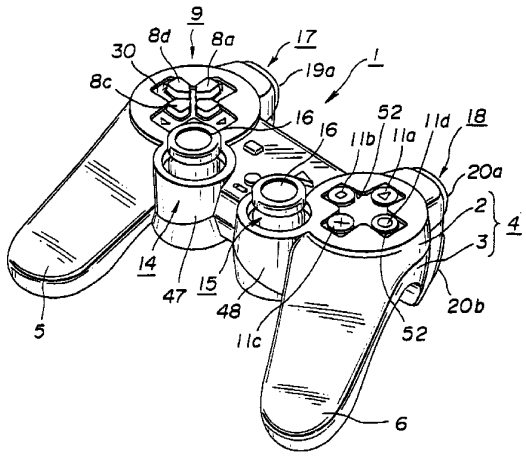


FIG.1

EP 0 867 212 A1

Description

Technical Field

This invention relates to an operating device used in a game machine employing a display device for, for example, a television receiver. More particularly, it relates to an operating device controlling the operation of rotating a display character displayed on a display screen, continuously changing its speed of movement or deforming the display character.

Background Art

Heretofore, a game machine employing a television receiver has a main body portion connected to the television receiver used as a display device, and an operating device connected to this main body portion of the game machine over a connection cable for controlling the display character displayed on the display screen of the television receiver.

The main body portion of the game machine has enclosed therein a disc driving unit for reproducing an optical disc as a recording medium carrying a recorded game program and a picture processing device for displaying the display character along with a background scene on the screen of the television receiver in accordance with the game program recorded on the optical disc.

Plural operating buttons are arranged in the operating device connected to the main body portion of the game machine. The user operates these operating buttons provided on the operating device for entering to the picture processing device the command information concerning the movement of the display character displayed on the display screen of the television receiver for controlling the direction of movement of the display character in accordance with the command information for carrying out the game.

The operating device used in this sort of the game machine is used by being gripped with hand or finger. That is, such operating device is used which has, on its one side, a direction command operating unit including a cross-shaped or circular direction command operating button and which also has, on its other side, a function setting unit including plural function setting/executing buttons for setting or executing the operating functions of the display characters. The direction command operator includes four switches arranged at right angles to one another and having operating units adapted for being contacted with or moved away from associated contacts. These switches are selectively turned on and off by the cross-shaped or circular direction command operating buttons for moving the display characters. For example, the display character is moved in a direction along which is arrayed the one of the four switches that has been turned on. The function setting/executing unit has switches arranged in association with the plural function setting/executing buttons. By turning on the switch associated with the function setting/executing button, the function of the display character allocated to the button is set or the function proper to the display character is executed.

Since the direction command operating unit of the operating device simply affords a command signal for moving the display character in a direction along which is arrayed the one of the four switches arranged at right angle to each other, the operating unit cannot issue the command information of rotating the display character as it is advanced, or of changing the line of sight of the display character. The result is that difficulties are encountered in constructing the game program employing a display character performing variegated movements.

On the other hand, since the switches making up the direction command operating unit merely issues the command information of controlling the movement of the display character by being turned on and off by actuation of the direction command operating buttons, the display character performs intermittent movements, while being unable to perform a series of continuous movements.

Thus, such an operating device has been proposed having an operating unit to which can be entered a command signal enabling the display character to be moved as it rotates or as it changes its speed or enabling the display character to change its form or configuration.

An operating device of this type has been disclosed in Japanese Laid-Open Patent Application 7-88252.

However, if a large number of operating units are provided in the operating device, it becomes difficult to smoothly select the operating units.

Disclosure of the Invention

It is therefore an object of the present invention to provide an operating device for a game machine capable of smoothly operating a large number of operating units.

It is another object of the present invention to provide an operating device for a game machine designed for facilitating the operation of the operating unit issuing the command information for moving the display character as it rotates or as it changes its speed or enabling the display character to change its form or configuration.

It is still another object of the present invention to provide an operating device for a game machine enabling the use of a game program having a display character capable of executing variegated movements or operations.

It is yet another object of the present invention to provide an operating device for a game machine enabling execution of a game having excellent simulated reality feeling.

An operating device used in a game machine for playing a television game includes a main body portion

of the operating device and first and second grip portions protruded from one sides on respective end parts of the main body portion. A first operating unit is mounted on one end of the main body portion and a second operating unit is mounted on the opposite end of the main body portion. The first and second operating units are provided with a plurality of thrusting operators protruded from the upper surface of the main body portion and a plurality of signal input elements thrust by the thrusting operators. A third operating unit and a fourth operating unit are arranged facing each other on the proximal ends of the first and second grip portions. Each of the third and fourth operating units has a rotation member and a plurality of signal input devices thrust by the rotation member. When the first and second grip portions are gripped, the third and fourth grip portions can be manipulated by a thumb finger of a hand gripping the first or second gripping portion.

The third and fourth operating units, provided with signal input elements manipulated by the rotation member, can execute movements of a display character on a screen, such as simultaneously rotating and moving the display character, moving it with variable speed or changing its configuration, while entering a command signal to the main body portion of the game machine.

Since the first and second grip portions, protruded from the end portions of the main body portion, are spaced apart from each other towards the distal ends thereof while being formed for extending downwardly of the main body portion, the index finger can be extended over the operators of the first and second operating units protruded over the upper surface of the main body portion when the user is gripping the first or second gripping portion.

In the lower surface of the main body portion is formed an engagement recess engaged by a portion of the hand or finger when the first and/or second gripping portion is gripped by the hand or finger. With the engagement recess engaged by the hand or finger, the operating device can be gripped reliably in stable states.

Moreover, a finger support is provided in register with the engagement recess formed on the front side of the main body portion.

On the respective ends on the front surface of the main body portion are mounted fifth and sixth operating portions.

A vibration imparting mechanism is enclosed within the operating device of the present invention for imparting vibrations to the user during operation for executing the game with excellent simulated reality feeling. The vibration imparting mechanism is arranged in at least one of the grip portions and includes a driving motor and an offset member mounted on a driving shaft of the driving motor.

Brief Description of the Drawings

Fig.1 is a perspective view showing an operating device for a game machine according to the present invention.

Fig.2 is a plan view of the operating device for a game machine shown in Fig. 1.

Fig .3 is a back side view of the operating device for the game machine shown in Fig. 1.

Fig.4 is a front view of the operating device for the game machine shown in Fig. 1.

Fig.5 is a right-hand side view of the operating device for the game machine shown in Fig. 1.

Fig.6 is a left-hand side view of the operating device for the game machine shown in Fig. 1.

Fig .7 is a perspective view showing the state of use of the operating device for the game machine shown in Fig. 1.

Fig.8 is a side view showing the state of use of the operating device for the game machine shown in Fig. 1, with the operating device being mounted on a mounting surface.

Fig.9 is a perspective view showing essential portions of the first operating unit.

Fig. 10 is a partial cross-sectional view showing the first operating unit.

Fig. 11 is a cross-sectional view showing the inoperative state of first to fourth thrusting operators making up the first operating unit.

Fig. 12 is a cross-sectional view showing the state of the second thrusting operator of the first operating unit being thrust.

Fig. 13 is a cross-sectional view showing the state of the second thrusting operator of the first operating unit having been thrust.

Fig. 14 is an exploded perspective view showing a multi-directional input device making up third and fourth operating units.

Fig. 15 is a cross-sectional view showing the multi-directional input device with an operating shaft in its initial state.

Fig. 16 is a cross-sectional view showing the multi-directional input device with the operating shaft having been rotated.

Fig. 17 is a cross-sectional view showing the multi-directional input device showing the state of operating a thrusting type switch element.

Fig. 18 is a cross-sectional view showing the multi-directional input device showing the state of the thrusting type switch element having been operated.

Fig. 19 is an exploded perspective view showing a vibration imparting mechanism.

Fig. 20 is a perspective view showing the state in which the vibrating imparting mechanism has been built in the main body portion of the game machine.

Fig. 21 is a plan view showing the state in which the operating device for the game machine according to the present invention has been connected to the main body portion of the game machine.

Best Mode for Carrying Out the Invention

Referring to the drawings, an operating device for a game machine according to the present invention will be explained in detail.

The operating device for the game machine is connected to a main body portion of the game machine for controlling the operation of the present game machine for executing the game software recorded on an optical disc. The main body portion of the game machine has enclosed therein a disc driving unit for reproducing an optical disc as a recording medium having a game program recorded thereon and a picture processing unit for displaying a display character along with a background picture on the screen of a television receiver in accordance with a game program recorded on the optical disc.

The operating device 1 for the game machine according to the present invention includes a main body portion 4 made up of an upper half 2 and a lower half 3 abutted and secured to each other such as with setscrews, as shown in Fig. 1. Referring to Figs.1 and 2, a first grip portion 5 and a second grip portion 6 are protuberantly formed on lateral surface on both ends of the main body portion 4 so that, when the device 1 is connected to the main body portion of the game machine for playing the game, the grip portions 5, 6 will be gripped by being held in their entirety with the userÆs palms. These first and second grip portions are progressively spaced apart from each other towards the distal ends while being directed downwardly of the main body portion 4, as shown in Figs.2, 3 and 4. For enabling the gripping over an extended time, the first and second grip portions 5, 6 are tapered from the connecting portions to the main body portion 4, while being arcuately shaped on the peripheral surfaces and on the distal ends thereof, as shown in Figs.2, 5 and 6.

On one end side of the main body portion 4 is mounted a first operating unit 9 having first to fourth thrusting operators 8a, 8b, 8c and 8d protruded on the upper surface of the main body portion 4 at right angles to each other, as shown in Figs .1 and 2. The first to fourth thrusting operators 8a, 8b, 8c and 8d making up the first operating unit 9 are unified to a rotation actuating member 10 having its center portion supported for rotation and are arrayed at right angles to one another about the center of rotation of the rotation actuating member 10 as the center of rotation. That is, the first to fourth thrusting operators 8a, 8b, 8c and 8d making up the first operating unit 9 are connected as one to one another. The first operator 9 is provided with switch devices, as signal input devices, in association with the first to fourth thrusting operators 8a, 8b, 8c and 8d. The first operator 9 operates as a direction command controller controlling the movement of the display character, such that, by selectively thrusting the first to fourth thrusting operators 8a, 8b, 8c and 8d and by selectively turning on/off the switch devices associated with the thrusting operators, the display character is moved in the arraying direction of the thrust operator 8a, 8b, 8c or 8d.

On the opposite side of the main body portion 4 is mounted a second operating unit 12 having protuberant first to fourth thrusting operators 11a, 11b, 11c and 11d of the main body portion 4 arrayed at right angles to one another. These first to fourth thrusting operators 11a, 11b, 11c and 11d are formed as independent members and switch devices as signal input devices are mounted in association with these thrusting operators 11a, 11b, 11c and 11d. By turning on the switch devices associated with the first to fourth thrusting operators 11a, 11b, 11c and 11d, the second operating unit 12 sets the functions of the display character allocated to the thrusting operators 11a, 11b, 11c and 11d or executes the functions of the display character, the second operating unit 12 thus operating as a function setting or executing section.

The operating device 1 of the present invention has third and fourth operating units 14, 15 at corner portions on its connecting side to the main body portion 4 on the proximal sides of the first and second grip portions 5, 6. Each of these third and fourth operating devices 14, 15 includes a rotation member 16 rotatable in a 360° direction about a pivot 16a as the center of rotation and a signal input element, such as a variable resistance element, operated by this rotation member 16. Specifically, the rotation member 16 is mounted towards the distal end of a pivot 16a mounted so as to be reset to its neutral position by a biasing member and is rotated in a 360° direction about the pivot point of the pivot 16a as center of rotation. These third and fourth operating units 14, 15 are used for enabling inputting of a command signal for enabling analogical movements such as combined rotation and linear movement, linear movement with a variable speed or change of the configuration of the display character by rotational operation of the rotation member 16.

On the left and right ends towards the front side of the main body portion 4 opposite to its back side from which are protruded the first and second grip portions 5, 6 are arranged fifth and sixth operating units 17, 18. These fifth and sixth operating units 17, 18 include first and second thrusting operators 19a, 19b and 20a, 20b, respectively. These thrusting operators 19a, 19b and 20a, 20b are associated with switch devices. By turning on the switched associated with the first and second thrusting operators 19a, 19b and 20a, 20b, the fifth and sixth operating units 17, 18 set the function of the display character allocated to the thrusting operators 19a, 19b and 20a, 20b or execute the functions owned by the display character, the fifth and sixth operating units 17, 18 thus operating as function setting and executing sections.

Between the first operating unit 9 and the second operating unit 12 on the upper surface of the main body portion 4 are mounted, side-by-side, a start switch 22 for commanding start of a game and a selection switch

23 for selecting, at the time of starting the game, the degree of ease or difficulties with which the game is played. Between the third and fourth operating units 14, 15 on the upper surface of the main body portion 4 are mounted a mode selecton switch 24 for selecting the operating mode of the third and fourth operating units 14, 15 and a display unit 25 for displaying the state of the operating mode of the third and fourth operating units 14, 15. This display unit 25 is constituted by a light emitting device, such as light emitting diode. By switching the mode selecton switch 24, an operating mode enabling the inputting of a command signal from the third and fourth operating units 14, 15 or an operating mode inhibiting the inputting of the command signal from the third and fourth operating units 14, 15 is selected. In addition, an operating mode is selected which enables inputting of a command signal from the third and fourth operating units 14, 15 and which has switched the functions of the first to fourth thrusting operators 11a to 11d and the functions of the first and second thrusting operators 19a, 19b, 20a, 20b of the fifth and sixth operating units 17, 18. Depending on the states of the operating modes, the display unit 25 is turned on and off, with switching of the display light.

In the lower surface of the main body portion 4 are formed engagement recesses 26, 27 engaged by a portion of left and right fingers Rf, Lf when the first and/or second grip portions 5, 6 are gripped by these fingers, as shown in Fig. 7. These engagement recesses 26, 27 are formed as smoothly curved reentrant portions, as shown in Figs.5 and 6.

In register with the engagement recesses 26, 27 on the front side of the main body portion 4 are formed depending finger supports 28, 29, as also shown in Figs .5 and 6. Specifically, the finger supports 28, 29 are protruded from the lower ends of protuberant portions 31, 32 on both ends on the front side of the main body portion 4 carrying the fifth and sixth operating units 17, 18.

With the above-described operating device of the present invention, in which the first and second grip portions 5, 6 are protuberantly formed on the main body portion 4, since the first and second grip portions 5, 6 are held by being entirely wrapped with both palms, there is no necessity of supporting the main body portion 4 with fingers, such that the operating device can be gripped in such a state that ten at the maximum and six in the least of both hands can be moved freely. If, for example, the first and second grip portions 5, 6 are gripped as they are wrapped entirely with both palms, both thumb fingers Rf1, Lf1 of left and right hands can be extended over rotation members 16 of the third and fourth operating units 14, 15, first to fourth thrusting operators 8a to 8d of the first operating unit 9 and over the first to fourth thrusting operators 11a to 11d of the second operating unit 2 to enable selective thrusting of the rotation member 16, thrusting operators 8a to 8d and the thrusting operators 11a to 11d. In particular, since the rotation members 16 of the third and fourth operating units 14, 15 are arranged facing the proximal ends which are coupling sides to the main body portion 4 of the first and second grip portions 5, 6 gripped by being entirely enclosed by both palms, the rotation members 16 lie closest to the thumb fingers Rf1, Lf1 when the first and second grip portions 5, 6 are gripped by left and right hands. Thus, the rotation members 16 can be turned easily with the thumb fingers Rf1, Lf1.

Also, when the first and second grip portions 5, 6 are gripped by being entirely enclosed by both palms, as shown in Fig.7, the index fingers Rf2, Lf2 and second fingers Rf3, Lf3 of both hands can be extended to positions enabling selective thrusting of the first and second thrusting operators 19a, 19b and 20a, 20b of the fifth and sixth operating units 17, 18.

Thus, when the operating device 1 is gripped by both hands, the first and second grip portions 5, 6 are enclosed with both palms and both third fingers Rf4, Lf4 and/or little fingers Rf5, Lf5 of left and right hands can be engaged in the engagement recesses 26, 27 and set on the finger supports 28, 29, so that the main body portion 4 can be gripped in position. Since the fingers can be set in position on the first to sixth grip portions 9, 12, 14, 15, 17 and 18 thus realizing correct operations.

Instead of being gripped by hand and fingers, the operating device 1 can also be set on a planar setting surface S, such as a table, as shown in Fig.5. The operating device 1 is designed so that, if the device 1 is set on the setting surface S with the distal ends of the first and second grip portions 5, 6 and the distal ends of the finger supports 28, 29 as supports, the operating surfaces of the first to fourth thrusting operators 8a to 8d of the first operating unit 9 and the first to fourth operators 11a to 11d of the operating unit 12 will be substantially parallel to the setting surface S. Thus the operating device 1 can be set on the planar setting surface S and, with the palms set on the first and second grip portions 5, 6, the first to sixth operators 9, 12, 14, 15, 17 and 18 can be manipulated with free fingers.

The first operating unit 9 of the operating device 1 is explained in further detail. Referring to Figs. 1, 9 and 10, the first operating unit 9 is designed so that the first to fourth thrusting operators 8a to 8d formed on a rotation actuating member 10 are protruded into a substantially cross-shaped recess 30 towards one end of the upper surface of the main body portion 4. On upper, lower, left and right ends of the cross-shaped recess 30 are formed bearing indicators 31a, 31b, 31c and 31d on the inner sides of which are formed four apertures 32 at right angles to one another for allowing the first to fourth thrusting operators 8a to 8d to be protruded towards the upper side of the main body portion 4. At a mid portion surrounded by these apertures 32 is formed a center support boss 33 for supporting the center of the upper surface of the rotation actuating member 10. This center support boss 33 is formed as-one with the inner upper surface of the main body portion 4. Facing the rotation actuating member 10 is mounted an elastic member 35

having four movable contacts 34 thrust by the first to fourth thrusting operators 8a to 8d. At the center of the elastic member 35 is held a spherically-shaped fulcrum element 36, such as a stainless steel ball, for supporting the center on the lower surface of the rotation actuating member 10. Facing the elastic member 35 is arranged a circuit board 38 having four fixed contacts 37 associated with movable contacts 34.

Referring to Figs.9 and 10, the rotation actuating member 10 constituting the first operating unit 9 includes a circular-shaped base portion 39, first to fourth thrusting operators 8a to 8d formed as-one on an upper portion of the base portion 39, a spherically-shaped first recess 41, a spherically-shaped second recess 42 and a contact guide 43. The first recess 41 is formed on the lower side of the center portion of the base portion 39 for engaging with the spherical surface of the fulcrum element 36, while the second recess 42 is formed on the upper side of the center portion of the base portion 39 for engaging with the center support boss 33. The contact guide 43 is protuberantly formed on the lower side of the base portion 39 for thrusting the back side of the movable contacts 34 of the elastic member 35. Referring to Fig. 9, the four first to fourth thrusting operators 8a to 8d, formed as-one with the rotation actuating member 10, are formed on the upper side of the base portion 39 so as to have facing ends tapered and so as to be thicker from the center towards outer sides, and are protruded on the upper surface side of the main body portion 4 via the respective apertures 32.

The elastic member 35 is sandwiched between the circuit board 38 and the rotation actuating member 10 and includes four movable rubber contacts 34 in association with the first to fourth thrusting operators 8a to 8d.

The fulcrum element 36 is spherically-shaped and is arranged at a mid portion of the rotation actuating member 10 in register with the center support boss 33 so as to be engaged in the first recess 41 formed at a mid portion of the rotation actuating member 10.

When the rotation actuating member 10 is set on the main body portion 4, the first to fourth thrusting operators 8a to 8d are arranged radially with the center support boss 33 as a center and are gradually increased in height from the facing ends towards the opposite outer ends. Thus, when the finger end is set on the mid portion of the recess 30 surrounded by the first to fourth thrusting operators 8a to 8d, the relative position of the latter can be easily discerned, by the tactile feel at the finger end and by the step difference between the mid portion and the first to fourth thrusting operators 8a to 8d. Moreover, if the finger end is shifted during the switch operation from the mid portion towards the outer side of the recess 30, it can be easily discerned by the tactile feel at the finger end which of the first to fourth thrusting operators 8a to 8d is being thrust.

In the above-described structure of the first operating unit 9, if none of the first to fourth thrusting operators 8a to 8d is thrust, the rotation actuating member 10 is raised via the contact guide 43, under the bias of the elastic member 35, with the center support boss 33 becoming engaged in the spherically-shaped second recess 42 of the rotation actuating member 10. Simultaneously, the peripheral portion of the circular-shaped base portion 39 is retained by the ends of the apertures 32, so that the rotation actuating member 10 is retained in an initial position in which the first to fourth thrusting operators 8a to 8d are protruded to outside of the upper surface of the main body portion 4.

If, with the first to fourth thrusting operators 8a to 8d in the initial position, the third thrusting operator 8c is thrust in the direction of arrows A or B in Fig.12, the rotation actuating member 10 is turned in a direction indicated by arrow R1 or towards right in Fig.12, as the first recess 41 is rotated on the spherical surface of the fulcrum element 36, with the elastic member 35 being thrust downwards by the third thrusting operator 8c. If the third thrusting operator 8c is thrust further, the rotation actuating member 10 is further turned in the direction of arrow R1, with the fulcrum element 36 as the center, as shown in Fig. 13, for establishing electrical connection by the movable contact 34 being contacted with the fixed contact 37.

If the thrusting on the third thrusting operator 8c is released, the first recess 41 is moved in a direction away from the fulcrum element 36, with which it has so far been in contact, under the bas of the elastic member 36. That is, the third thrusting operator 8c is turned in the direction of arrow R2 in Fig. 13 for spacing the movable contact 34 away from the fixed contact 37. If the third thrusting operator 8c is turned further in the direction indicated by arrow R2 in Fig. 13, until the center support boss 33 is engaged with the second recess 42, the rotation actuating member 10 is reset to the initial position shown in Fig. 11.

On the other hand, if the first thrusting operator 8a is thrust towards the front side of the main body portion 14 as indicated by arrow C in Fig. 10, the elastic member 35a is deformed under its own elasticity so that, as the first recess 41 is rotated on the spherical surface of the fulcrum element 36, the first thrusting operator 8a is moved in a direction indicated by arrow C in Fig. 10 for realizing a switching operation by the movable contact 34 contacting with the fixed contact 37.

The movable contact 34 and the fixed contact 37 make up a switch device and the switch on/off operation takes place by the movable contact 34 being contacted with or displaced away from the fixed contact 37 to permit inputting of a command signal of, for example, moving the display character.

In the operation of the first to fourth thrusting operators 8a to 8d of the first operating unit 9, since the fulcrum point is formed by relative engagement of the spherically-shaped fulcrum element 36 and the spherically-shaped first recess 41, the contact between the spherically-shaped surfaces is exploited for varying the

stroke of the rotation actuating member 10 for realizing the switching operation. Moreover, the thrusting operators 8a to 8d are arranged in a segmented manner on the main body portion 4, the direction of thrusting the first to fourth thrusting operators 8a to 8d is not limited in a fixed direction but the smooth switching operation may be realized by actuation from any arbitrary direction to prevent vibrations of the rotation actuating member 10 or shifting or distortion of the center position for improving operating characteristics.

The second operating unit 12 of the operating device 1 will be explained in further detail. Referring to Figs .1 and 2, the second operating unit 12 has a substantially cross-shaped recess 51 on the opposite side end on the upper surface of the main body portion 4 and apertures 52 are formed at upper, lower, left and right ends of the recess 51. The first to fourth thrusting operators 11a to 11d making up the second operating unit 12 are arranged on the main body portion 4 so that the distal ends thereof are protruded on the upper surface of the main body portion 4. Within the inside of the main body portion 4 are arranged switch devices thrust by the first to fourth thrusting operators 11a to 11d. These switch devices are turned on or off by thrusting the first to fourth thrusting operators 11a to 11d for entering a command signal for setting the functions or executing the operations of the display character.

On the distal end faces of the first to fourth thrusting operators 11a to 11d are inscribed symbols indicating the functions of the thrusting operators 11a to 11d, such as □, X, ◯ or △. In the present embodiment, the first thrusting operator 11a, second thrusting operator 11b, third thrusting operator 11c and the fourth thrusting operator 11d are affixed with the symbols △, □, X and ◯, respectively. Specifically, the third thrusting operator 11c and the fourth thrusting operator 11d, disposed towards the second grip portion 6 for facilitating the manipulation by the thumb finger, are reserved for entering command signals, such as "YES" or "NO", frequently used in playing the game, so that these third thrusting operator 11c and the fourth thrusting operator 11d are affixed with marks ◯ and X corresponding to the commands of "YES" and "NO", respectively. Thus, in the operating device 1 designed to have a large number of operating units, these third and fourth thrusting operator 11c and 11d are placed at such positions as to permit facilitated manipulation to improve operability of the smallest number of thrusting operators required in playing the game.

The first to fourth thrusting operators 11a to 11d may be designed to display the respective functions by colors. That is, these first to fourth thrusting operators 11a to 11d may be of different colors for displaying their functions.

The third and fourth operating units 13 and 14 are explained. Referring to Fig. 1, these third and fourth operating units 13 and 14 are arranged on substantially cylindrically-shaped mounting portions 47, 48 at corner portions of the connecting portions of the proximal ends of the first and second grip portions 5, 6 to the main body portion 4.

Since the third and fourth operating units 14 and15 are of the same structure, the third operating unit 14 only is explained.

The third operating unit 14 has a multi-directional input device 50 as shown in Fig. 14. This multi-directional input device 50 has a box-shaped upper frame 50 and an arched first interlock member 51, as shown in Fig. 14. This interlock member 51 has its warped end 52 engaged by a rotational shaft 54 of a first variable resistor 53a constituting a rotary detector secured to a lateral side 50a of the upper frame 50. The interlock member 51 has on its opposite warped end 52 a boss 55 loosely fitted in an opening 56 formed in a lateral side 50b facing the lateral side 50a of the frame 50 for rotatably supporting the first interlock member 51 on the upper frame 50.

An operating shaft 57 is mounted at the center of the upper frame 50. This operating shaft 57 has a saucer-shaped operating member 58 and a disk 59 at its mod portion. This disk 59 has an orifice 60 and a rotation member 16 is mounted on the upper edge of the operating shaft 57.

Within the upper frame 50 is arranged a second interlock member 62 for extending at right angles to the operating shaft 57. The second interlock member 62 has a center ball 63 from which are transversely extended a pair of arms 64a, 64b. An elongated slot 65 is formed for extending from the upper surface to the lower surface of the ball 63. The operating shaft 57 and the disk 59 are inserted into the elongated slot 65. After registration of the orifice 60 in the disk 59 relative to a lateral side opening 66 of the ball 63, the pin 67 is inserted int the opening 66 and the orifice 60. The operating shaft 57 is mounted on the second interlock member 62 for rotation along the elongated slot 65 about the pin 67 as center.

The end of the arm 64a of the second interlock member 62 is engaged with the rotary shaft 54 of the second variable resistor 53b secured to a lateral side 50c of the upper frame 50, while the end of the opposite side arm 64b is fitted in an elongated opening 70 formed in the lateral surface 50d of the upper frame 50 for being protruded outwards from the lateral side 50d of the upper frame 50. The operating shaft 57 is passed through the elongated slot 71 in the first interlock member 51 so as to be protruded outwards via an opening 72 in the upper surface of the upper frame 50.

The operating shaft 57 is supported on a restoration member 73 having on its upper surface a recess 74 in which is rotatably housed the saucer-shaped operating member 58.

On the lower end side of the upper frame 50 is mounted a lower frame 57. The upper surface of the lower frame 75 is formed with a supporting wall section 77 for vertically movably housing a flange 76 of the res-

toration member 73. Between the bottom surface of the lower frame 75 and an outer peripheral edge 78 of the restoration member 75 is housed a spirally extending return spring 79. The restoration member 73 is biased upwards by this return spring 79. The end of the opposite side arm 64b of the second interlock member 62 is pressed against the upper edge of the elongated opening 70 on the lateral surface 50d of the upper frame 50. The second interlock member 62 is rotatably mounted on the upper frame 50 in a direction perpendicular to the first interlock member 51 below the first interlock member 51.

On the lateral side 50d of the upper frame 50 is mounted a thrust type switch device 80 which has its state changed over by pressing a spring-biased thrusting operator 81 against the spring bias. The switch device 80 has a thrusting operator facing an end 82 of an arm 64b of the second interlock member 62. This end 82 is protruded in the same direction as a mounting leg 83 mounted on the lower edge of the upper frame 50 and terminals 84 of first and second variable resistors 53a, 53b.

The operating states of the multi-directional inputting device are as follows:

If the user grips the rotation member 16 for rotating the operating shaft 57 in an arbitrary direction, the operating shaft 57 is rotated about the point of intersection of the second interlock member 62 and the pin 67 as the center of rotation. With rotation of the operating shaft 57, the first interlock member 51 and the second interlock member 62 are rotated and further the rotational shafts 54 of the first and second variable resistors 53a, 53b are rotated for adjusting the resistance values.

The automatic restoration operation of the operating shaft 57 is as follows:

In a neutral state in which the operating shaft 57 is not in operation, the operating shaft 57 is upstanding via opening 72 in the upper surface of the upper frame 50. The bottom surface of the operating member 58 and the inner bottom surface of the restoration member 75 are acted upon by the return spring 79. If the operating shaft 57 is tilted from this state in the clockwise direction, as shown in Fig. 16, the flange 85, having an arcuate portion with a progressively increasing radius of curvature towards an outer side of the operating member 58, thrusts the restoration member 75 so that the restoration member 75 is moved downwards along the supporting wall section 77 of the lower frame 75 against the force of the return spring 79. If the operating force on the operating shaft 57 is released, the operating shaft 57 is reset to the neutral state shown in Fig. 15, that is to an upstanding position, under the bias of the return spring 79.

The operation of the switch device 80 is explained by referring to Figs. 17 and 18.

In the non-operating state, the operating shaft 57 is in the position shown in Fig. 17 in which the end of the arm 64b of the second interlock member 62 is spaced apart from the thrusting operator 81 of the switch device 80, with the end of the arm 64b being pressured against the upper edge of the elongated opening 70 in the lateral surface 50d of the frame 50. If the operating shaft 57 is pressed downwards from this state, the end of the arm 64b of the second interlock member 62 is moved downwards along the elongated opening 70, against the force of the return spring 79, with the engagement point of the arm 64a with the rotary shaft 54 of the variable resistor 53a as a fulcrum, until the end of the arm 64b is retained by the lower edge of the elongated opening 70 operating as a stop. In the interim, the end of the arm 64b thrusts the thrusting operator 81 of the switch device 80 downwards for changing over the state of the switch device 80. If the thrusting on the operating shaft 57 ceases, the end of the arm 64b is reset to the state shown in Fig. 17, under the force of repulsion of the return spring 79, with the end of the arm 64b being reset to the state of Fig. 18 in which it is abutted against the upper edge of the elongated slot 30. Meanwhile, the switch device 80 is operated if the operating shaft 57 is thrust downwards from the state in which it has been turned in an optional direction.

Thus, by rotating the rotation member 16 for actuating the first and second variable resistors 53a, 53b, the third and fourth operators14, 15 can issue the command information of continuously moving the display character with an accelerated movement, rotating the display character as it is advanced or varying the line of sight of the display character.

The fifth and sixth operating units 17, 18 arranged on the front side of the main body portion 4 are explained.

The fifth and sixth operators 17, 18 are designed so that the first and second thrusting operators 19a, 19b, 20a, 20b arranged on both sides on the front side of the main body portion 4 are protruded at the distal ends thereof from the front surface of the main body portion 4 via upper and lower pairs of apertures 91 arranged parallel to each other. Within the main body portion 4 are arranged switch devices in association with these thrusting operators 19a, 19b and 20a, 20b.

The operating device 1 of the present invention is provided with a vibration imparting mechanism 92 for imparting vibrations to the user so that the game will be played with a higher simulated reality feeling. This vibration imparting mechanism 92 is provided on the proximal end of the first grip portion 5 held by the left hand when the user grips the operating device 1. This vibration imparting mechanism 92 is made up of a driving motor 93 driven by a driving command signal supplied from the main body portion of the game machine and an offset member 95 mounted on a driving shaft 94 of the driving motor 93. The offset member 95 is formed by a metallic member of a larger weight mass to constitute a semi-circular weight 95a offset with respect to a fitting hole 96 into which is fitted the driving shaft 94 and which operates as a center of rotation. The driving motor 93,

having the offset member 95 mounted on the driving shaft 94, is mounted by fitting the motor housing 98 in a fitting recess 97 in the form of a rectangular tube on the inner side of the first grip portion 5.

With the vibration imparting mechanism 92, constructed as described above, the driving motor 93 is driven for rotating the offset member 95, so that the driving motor 93 undergoes vibrations. These vibrations are transmitted via a peripheral wall section 97a constituting the fitting recess 97 to the first grip portion 5 and thence transmitted to the hands and fingers gripping the grip portion 5.

The vibration imparting mechanism 92 may also be provided on the second grip portion 6.

The above-described operating device 1 for the game machine according to the present invention is connected to a main body portion 101 of the game machine, as shown in Fig. 21.

The operating device 1 is connected to the main body portion 101 of the game machine by a connection cord 102 derived from the mid portion on the front side of the main body portion 4. This connection cord 102 has an end connector 103 which connects the operating device 1 to the main body portion 101 of the game machine by connecting the connector 103 to a jack 104 provided on a lateral surface of the main body portion 101 of the game machine.

The main body portion 101 of the game machine is provided with plural jacks 104 for connection to plural operating devices 1.

The main body portion 101 of the game machine is provided with a disc driving unit 105 for reproducing an optical disc having recorded thereon game programs and a picture processing device for displaying the display character along with the background picture on a screen of a television receiver in accordance with the game program recorded on the optical disc. The main body portion 101 of the game machine is also provided with a reset switch 106 for resetting the game then going on, a power switch 107 and a lid opening button 109 for opening a lid 108 adapted for opening/closing a disc mounting portion of the disc driving unit.

The main body portion 101 of the game machine is connected to a television receiver as a display device for displaying the display character along with a background picture for the game.

With the above-described operating device 1 for the game machine according to the present invention, the user can operate the first to sixth operating units 9, 2, 14, 15, 17 or 18, using ten fingers at the maximum, with the first and second grip portions 5, 6 with both hands. The operating device for the game machine can also be operated with only one of the first and second grip portions 5, 6 gripped. That is, by properly actuating the first to sixth operating units 9, 2, 14, 15, 17 or 18, not only can the display character be moved horizontally, but also the display character bee rotated or moved by accelerated movements in meeting with the game with the three-dimensional spatial picture. Moreover, since vibrations can be imparted to the user, the game can be played with excellent simulated reality feeling.

Thus, by using the operating device 1 for the game machine according to the present invention, the display character can perform complex movements to carry out a game program with improved simulated reality feeling. For example, such a game can be played in which an airplane ora submarine is moved through a three-dimensional spacing.

Industrial Applicability

With the operating device for a game machine according to the present invention, the third and fourth operating units provided with signal input elements manipulated by rotation members are provided facing each other on the proximal ends of the first and second grip portions, so that a game program can be easily executed which has a display character capable of executing variegated movements. In addition, a vibration imparting mechanism is provided in the operating device for the game machine so that vibrations can be imparted to the user during the game for enabling the game to be played with improved simulated reality feeling.

Claims

1. An operating device for a game machine comprising:

   a main body portion of the operating device;
   first and second grip portions protruded from one sides on respective end parts of said main body portion;
   a first operating unit mounted on one end of said main body portion and having a plurality of thrusting operators protruded from the upper surface of said main body portion and a plurality of signal input elements thrust by said thrusting operators;
   a second operating unit mounted on the opposite end of said main body portion and having a plurality of thrusting operators protruded from the upper surface of said main body portion and a plurality of signal input elements thrust by said thrusting operators; and
   third and fourth operating units arranged facing each other on the proximal ends of said first and second grip portions and each having a rotation member and a plurality of signal input devices thrust by said rotation member.

2. The operating device for a game machine as claimed in claim 1 wherein said first and second grip portions are protruded from ne sides of respective end parts of said main body portion so as to be

spaced apart from each other towards distal end sides and so as to be directed downwardly of said main body portion.

3. The operating device for a game machine as claimed in claim 1 wherein said operators of said first operating unit are interconnected at right angles to one another and may be rotated about a mid point of interconnection as a fulcrum point.

4. The operating device for a game machine as claimed in claim 1 wherein engagement recesses engaged by part of the hand or finger when the first and second grip portions are gripped by the hand or finger are formed in the lower surface of the main body portion.

5. The operating device for a game machine as claimed in claim 4 wherein finger supports are protuberantly formed in register with said engagement recesses.

6. The operating device for a game machine as claimed in claim 1 wherein fifth and sixth operating units are arranged on respective end sides on the front surface of said main body portion.

7. The operating device for a game machine as claimed in claim 1 wherein a switching unit for switching the operating modes of said third and fourth operating units is provided on said main body portion.

8. The operating device for a game machine as claimed in claim 1 further comprising:

a vibration imparting mechanism enclosed therein.

9. The operating device for a game machine as claimed in claim 8 wherein

said vibration imparting mechanism is arranged in at least one of the grip portions.

10. The operating device for a game machine as claimed in claim 8 wherein said vibration imparting mechanism includes a driving motor and an offset member mounted on a driving shaft thereof.

Amended claims under Art. 19.1 PCT

1. (amended) An operating device for a game machine comprising:

first and second grip portions protruded from one sides on respective end parts of a main body portion of the device;

a first operating unit mounted on one end of said main body portion and having a plurality of thrusting operators protruded from the upper surface of said main body portion and a plurality of signal input elements thrust by said thrusting operators;

a second operating unit mounted on the opposite end of said main body portion and having a plurality of thrusting operators protruded from the upper surface of said main body portion and a plurality of signal input elements thrust by said thrusting operators; and

third and fourth operating units arranged facing each other on the proximal ends of said first and second grip portions and each having a rotation member and a plurality of signal input devices thrust by said rotation member.

2. The operating device for a game machine as claimed in claim 1 wherein said first and second grip portions are protruded from ne sides of respective end parts of said main body portion so as to be spaced apart from each other towards distal end sides and so as to be directed downwardly of said main body portion.

3. The operating device for a game machine as claimed in claim 1 wherein said operators of said first operating unit are interconnected at right angles to one another and may be rotated about a mid point of interconnection as a fulcrum point.

4. The operating device for a game machine as claimed in claim 1 wherein engagement recesses engaged by part of the hand or finger when the first and second grip portions are gripped by the hand or finger are formed in the lower surface of the main body portion.

5. The operating device for a game machine as claimed in claim 4 wherein finger supports are protuberantly formed in register with said engagement recesses.

6. The operating device for a game machine as claimed in claim 1 wherein fifth and sixth operating units are arranged on respective end sides on the front surface of said main body portion.

7. The operating device for a game machine as claimed in claim 1 wherein a switching unit for switching the operating modes of said third and fourth operating units is provided on said main body portion.

8. (amended) The operating device for a game machine as claimed in claim 1 further comprising:

a vibration imparting mechanism enclosed in the main body portion of the device.

9. The operating device for a game machine as claimed in claim 8 wherein

said vibration imparting mechanism is arranged in at least one of the grip portions.

10. The operating device for a game machine as claimed in claim 8 wherein said vibration imparting mechanism includes a driving motor and an offset member mounted on a driving shaft thereof.

11. (added) A game machine comprising an operating device for the game machine having

a main body portion of the operating device;
first and second grip portions protruded from one sides on respective end parts of said main body portion;
a first operating unit mounted on one end of said main body portion and having a plurality of thrusting operators protruded from the upper surface of said main body portion and a plurality of signal input elements thrust by said thrusting operators;
a second operating unit mounted on the opposite end of said main body portion and having a plurality of thrusting operators protruded from the upper surface of said main body portion and a plurality of signal input elements thrust by said thrusting operators; and
third and fourth operating units arranged facing each other on the proximal ends of said first and second grip portions and each having a rotation member and a plurality of signal input devices thrust by said rotation member.

12. (added) The game machine as claimed in claim 11 wherein said first and second grip portions are protruded from one sides of respective end parts of said main body portion so as to be spaced apart from each other towards distal end sides and so as to be directed downwardly of said main body portion.

13. (added) The game machine as claimed in claim 11 wherein said operators of said first operating unit are interconnected at right angles to one another and may be rotated about a mid point of interconnection as a fulcrum point.

14. (added) The game machine as claimed in claim 11 wherein engagement recesses engaged by part of the hand or finger when the first and second grip portions are gripped by the hand or finger are formed in the lower surface of the main body portion.

15. (added) The game machine as claimed in claim 14 wherein finger supports are protuberantly formed in register with said engagement recesses.

16. (added) The game machine as claimed in claim 11 wherein fifth and sixth operating units are arranged on respective end sides on the front surface of said main body portion.

17. (added) The game machine as claimed in claim 11 wherein a switching unit for switching the operating modes of said third and fourth operating units is provided on said main body portion.

18. (amended) The game machine as claimed in claim 11 further comprising:

a vibration imparting mechanism enclosed in said main body portion.

19. (amended) The game machine as claimed in claim 18 wherein

said vibration imparting mechanism is arranged in at least one of the grip portions.

20. (amended) The game machine as claimed in claim 18 wherein said vibration imparting mechanism includes a driving motor and an offset member mounted on a driving shaft thereof.

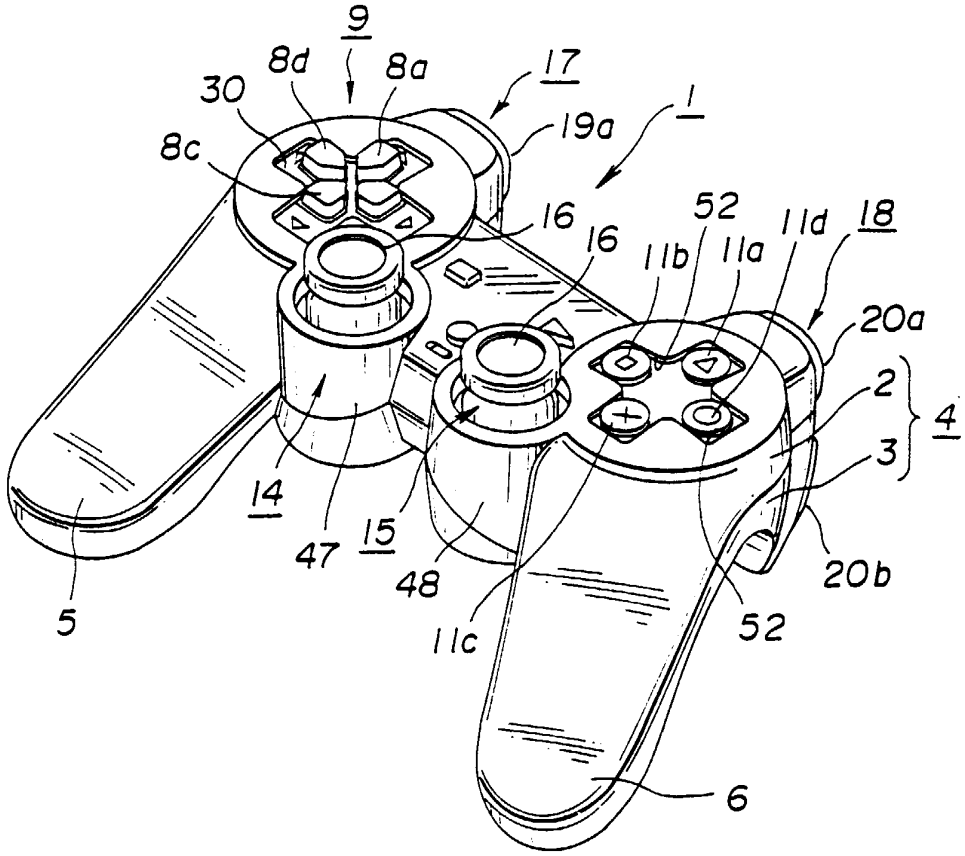

9
8d
8a
17
30
19a
1
8c
16
16
52
11d
18
11b
11a
20a
2
4
3
14
47
15
48
20b
5
11c
52
6

FIG.1

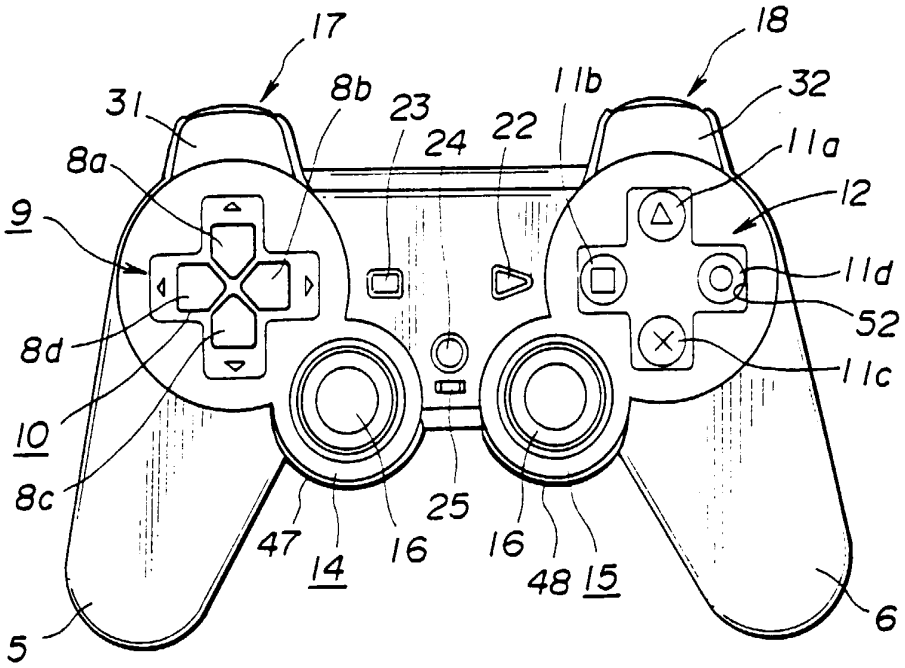

17
18
8b
11b
31
23
24
22
32
8a
11a
9
12
11d
52
8d
11c
10
8c
25
47
14
16
16
48
15
5
6

FIG.2

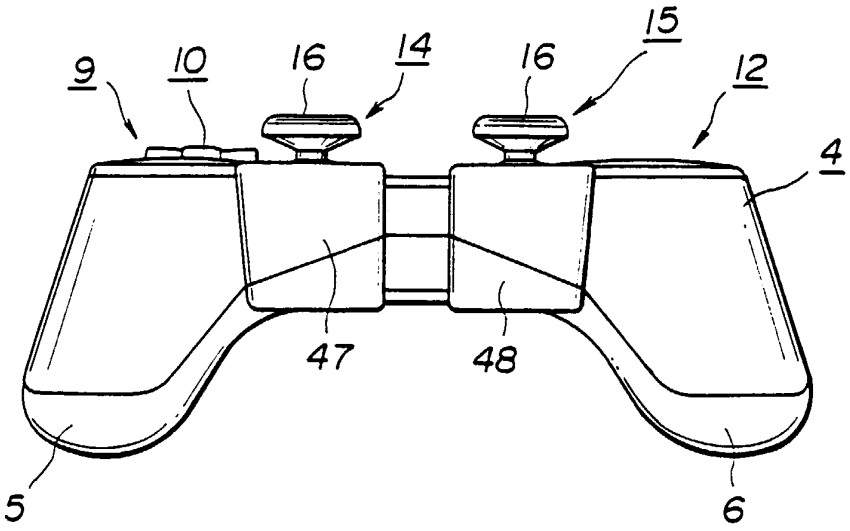

9
10
16
14
16
15
12
4
47
48
5
6

FIG.3

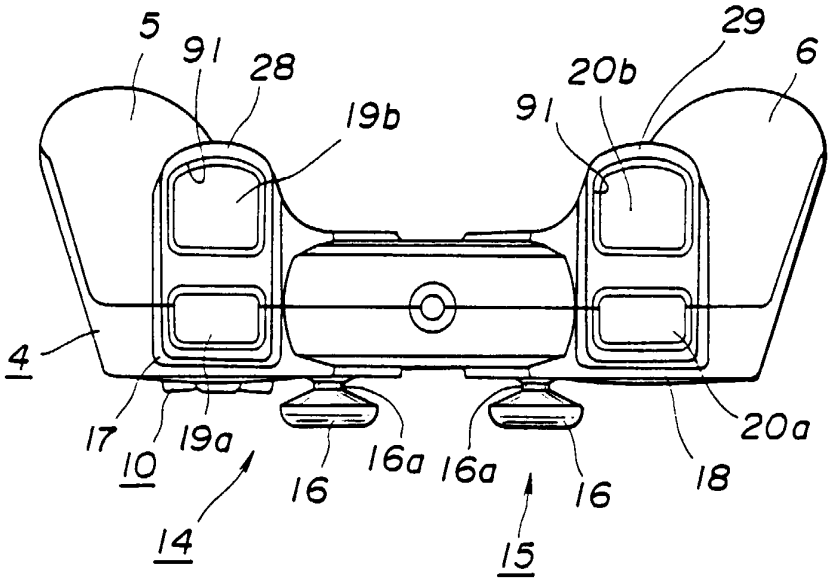

5
91
28
19b
91
20b
29
6
4
17
10
19a
14
16
16a
16a
15
16
18
20a

FIG.4

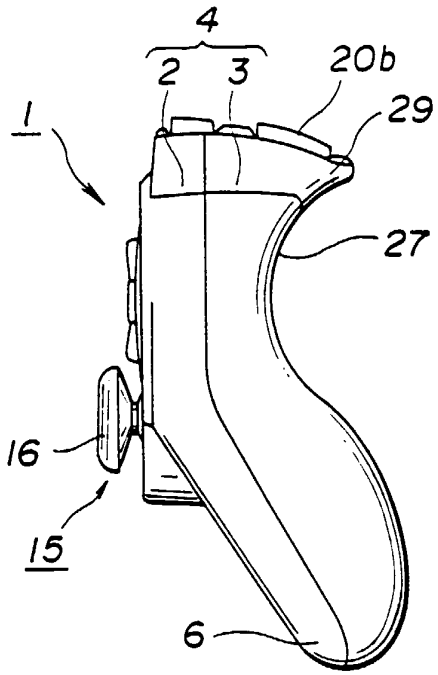


FIG.5

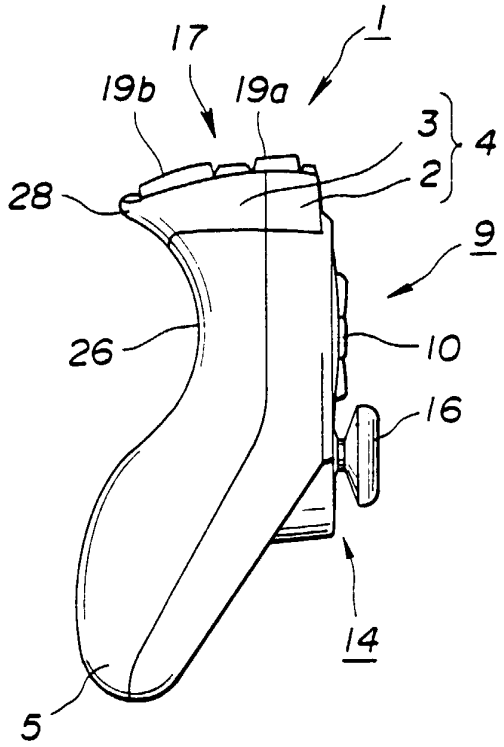
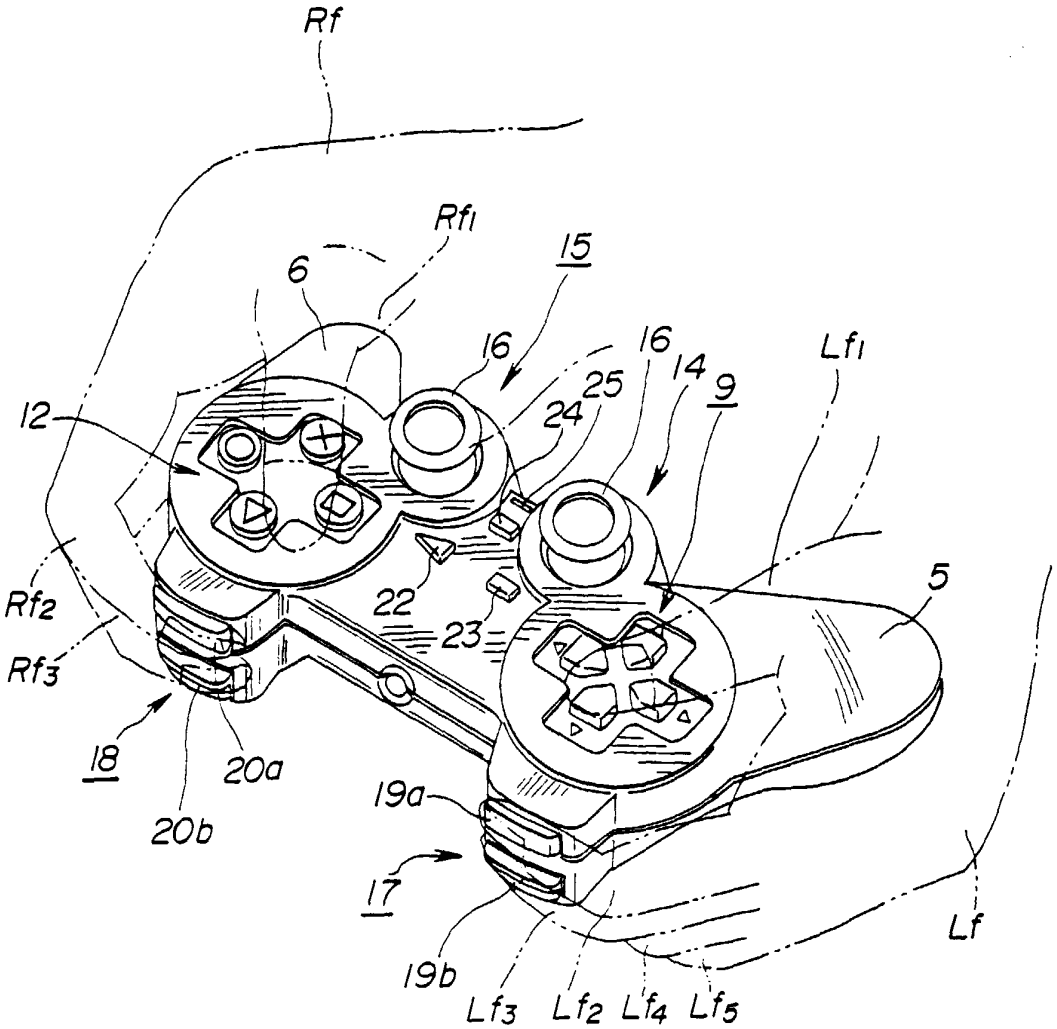


FIG.6


Rf
Rf1
6
15
16
16
14
9
Lf1
12
25
24
Rf2
Rf3
22
23
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18
20a
20b
19a
17
19b
Lf3
Lf2
Lf4
Lf5
Lf

FIG.7

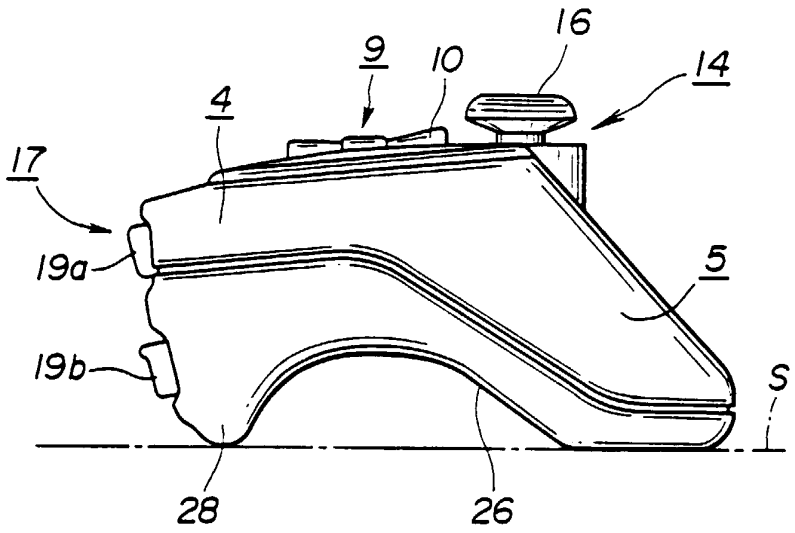

16
9
10
14
4
17
19a
5
19b
S
28
26

FIG.8

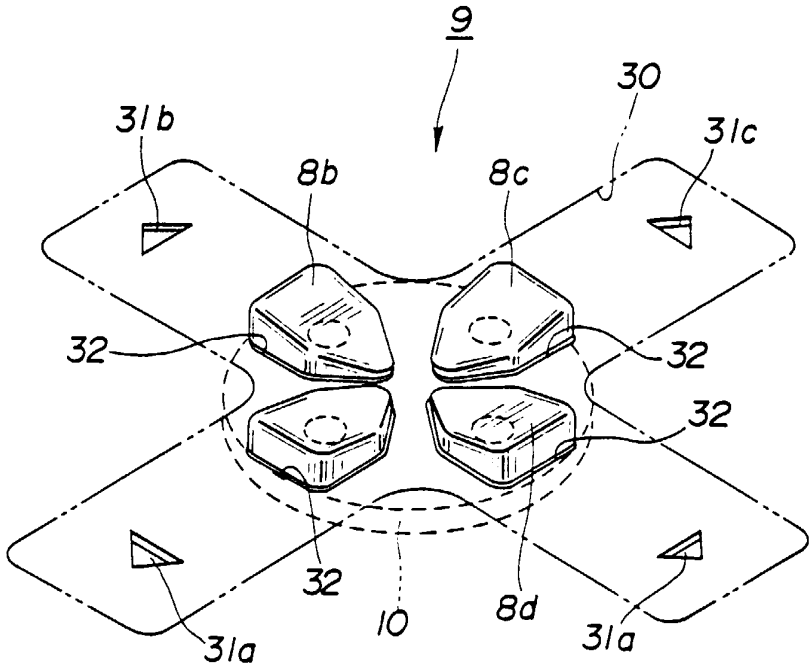

9
30
31b
31c
8b
8c
32
32
32
32
10
8d
31a
31a

FIG.9

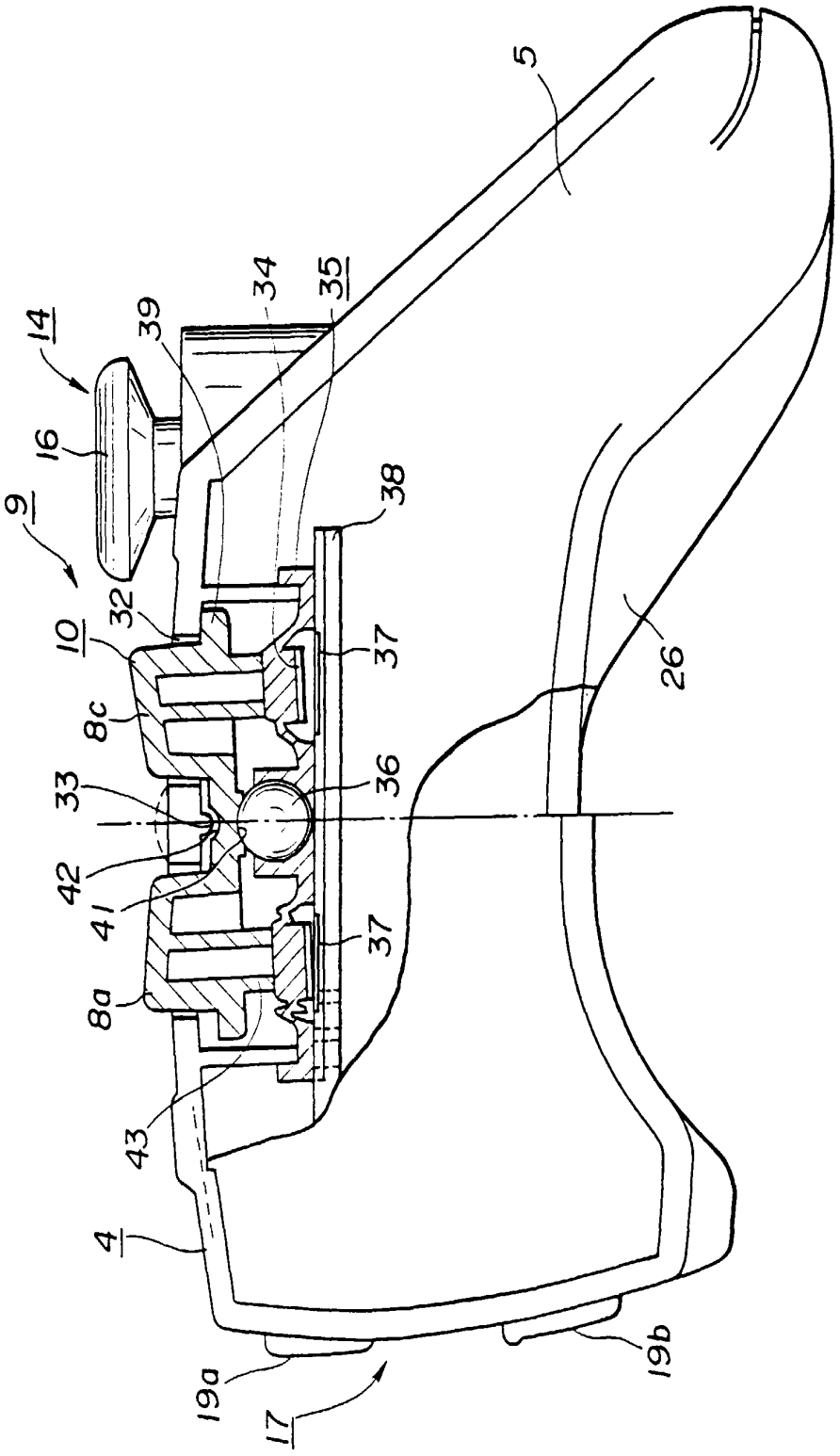
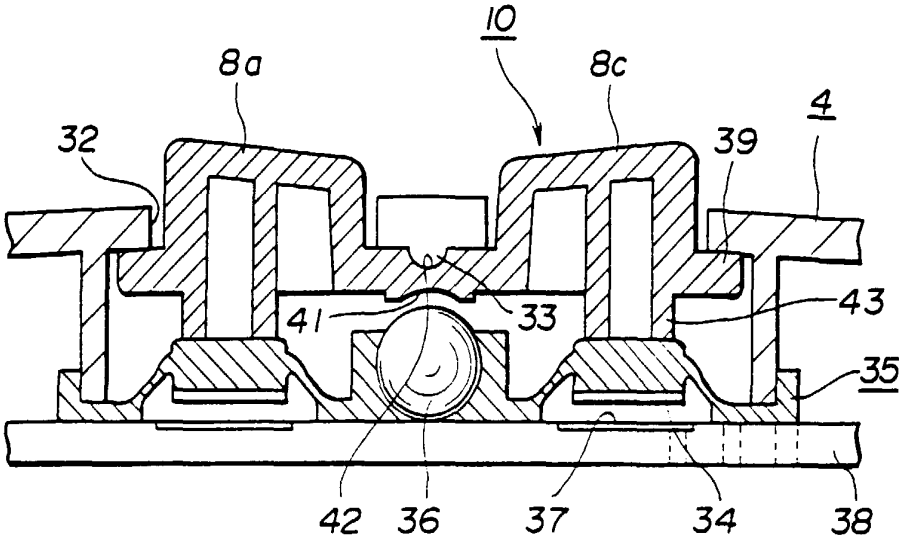


FIG.10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8a
8c
4
32
39
43
41
33
35
42
36
37
34
38

FIG.11

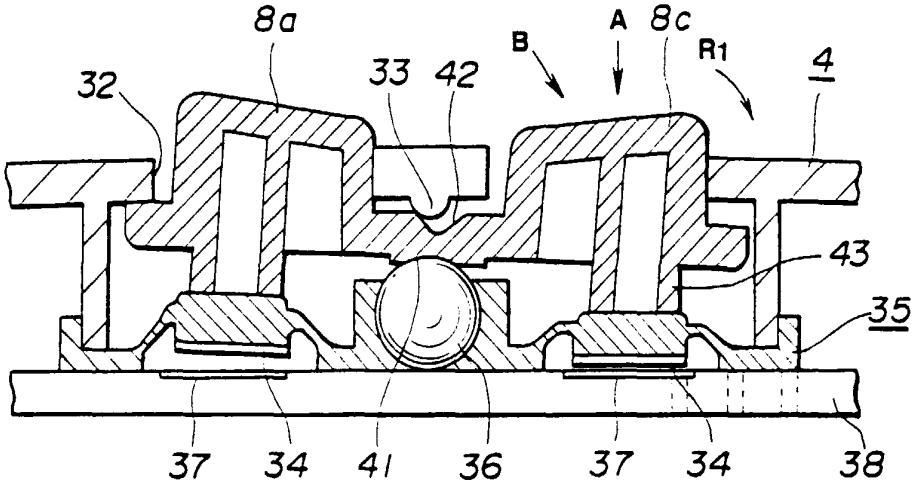

8a
A
8c
B
R1
4
32
33
42
43
35
37
34
41
36
37
34
38

FIG.12

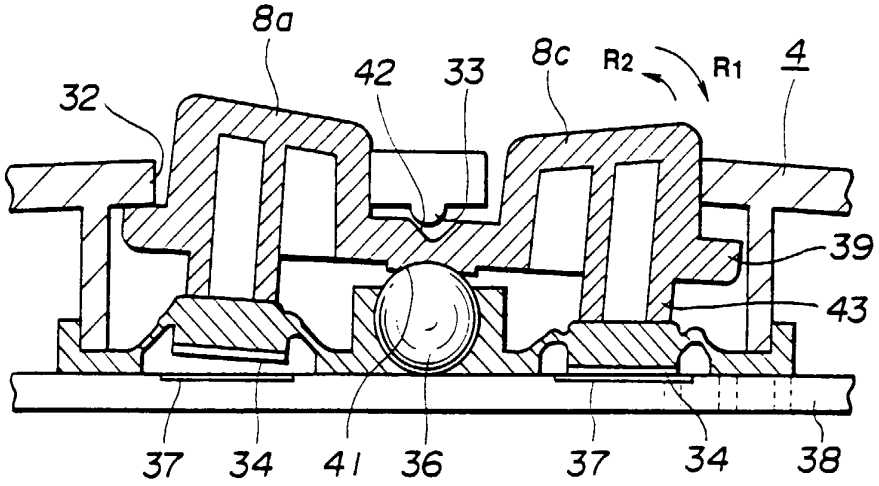


FIG.13

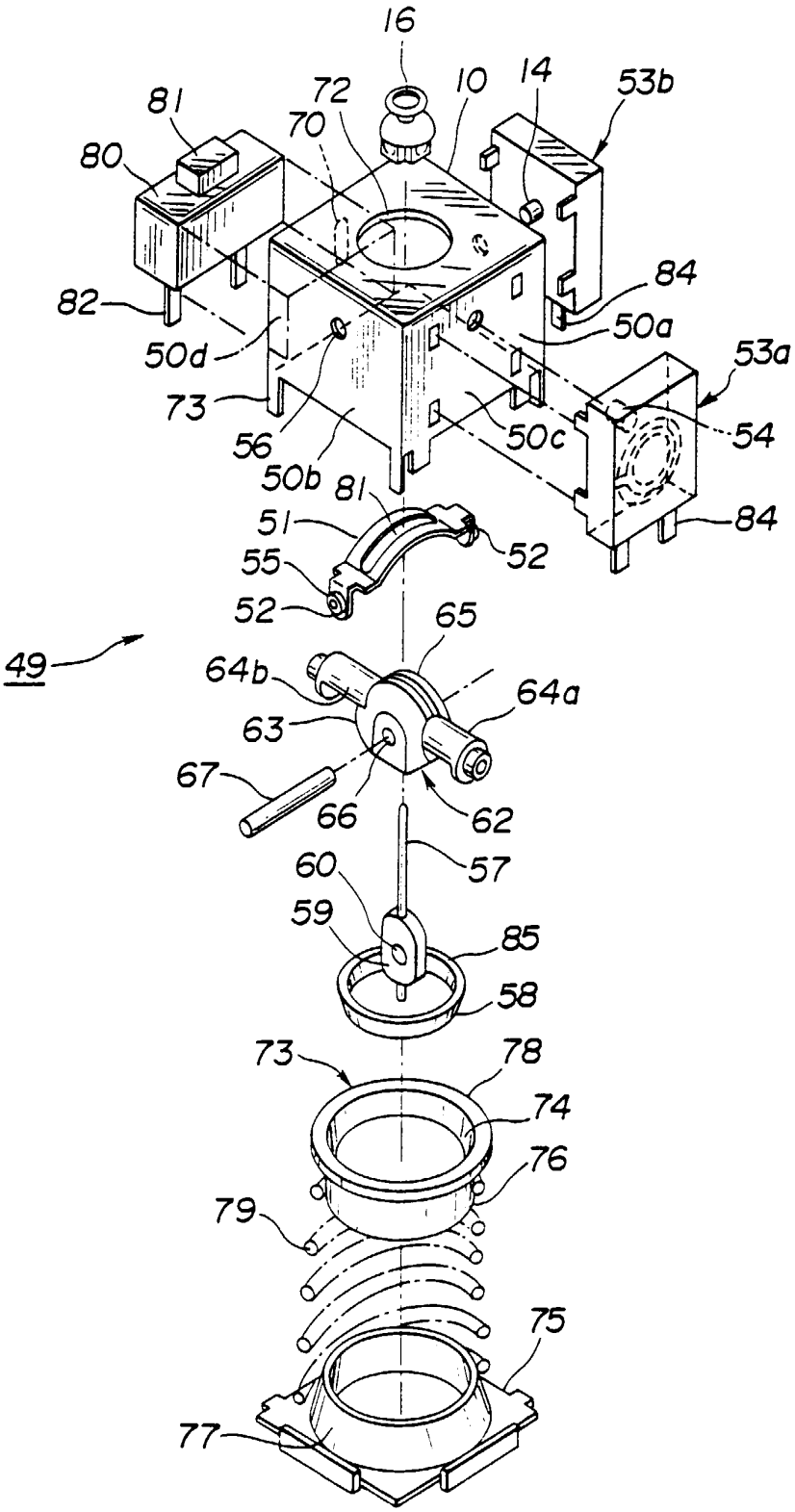

16
81
72
70
10
14
53b
80
84
82
50a
50d
53a
73
54
56
50c
50b
81
84
51
52
55
52
65
49
64b
64a
63
67
66
62
57
60
59
85
58
73
78
74
76
79
75
77

FIG.14

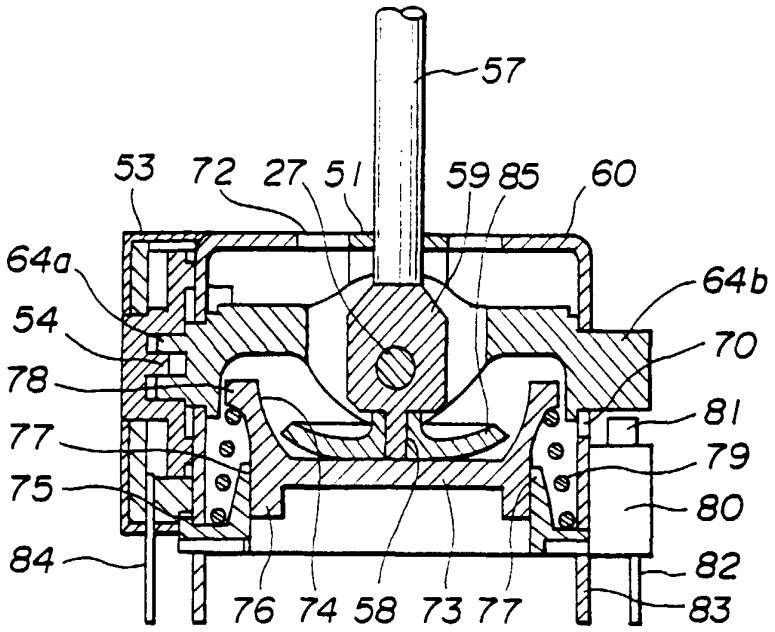
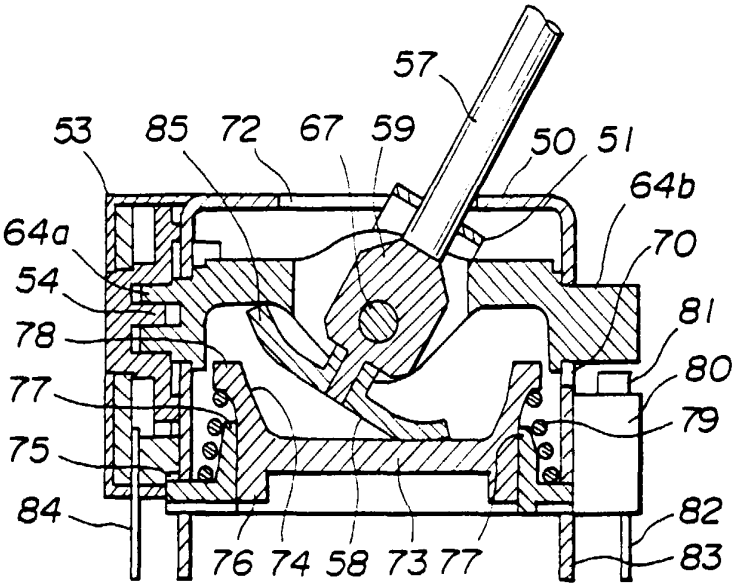

57
53
72
27
51
59
85
60
64a
64b
54
70
78
81
77
79
75
80
84
82
76
74
58
73
77
83

FIG.15


57
53
85
72
67
59
50
51
64b
64a
70
54
81
78
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77
79
75
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82
76
74
58
73
77
83

FIG.16

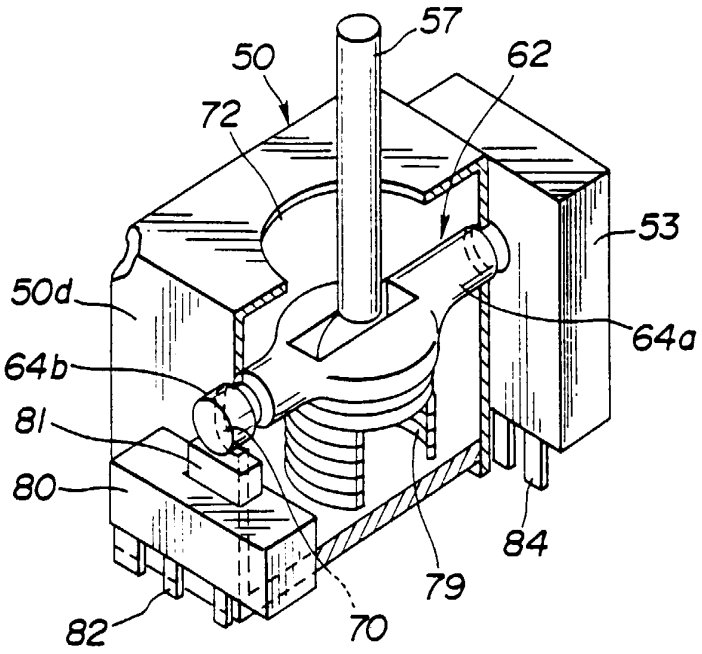
57
50
62
72
53
50d
64a
64b
81
80
84
79
82
70

FIG.17

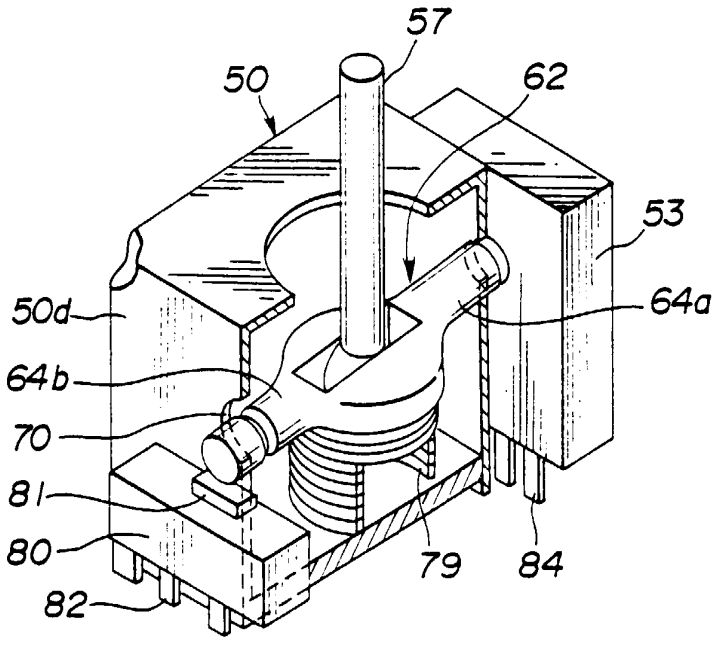
57
50
62
53
50d
64a
64b
70
81
80
79
84
82

FIG.18

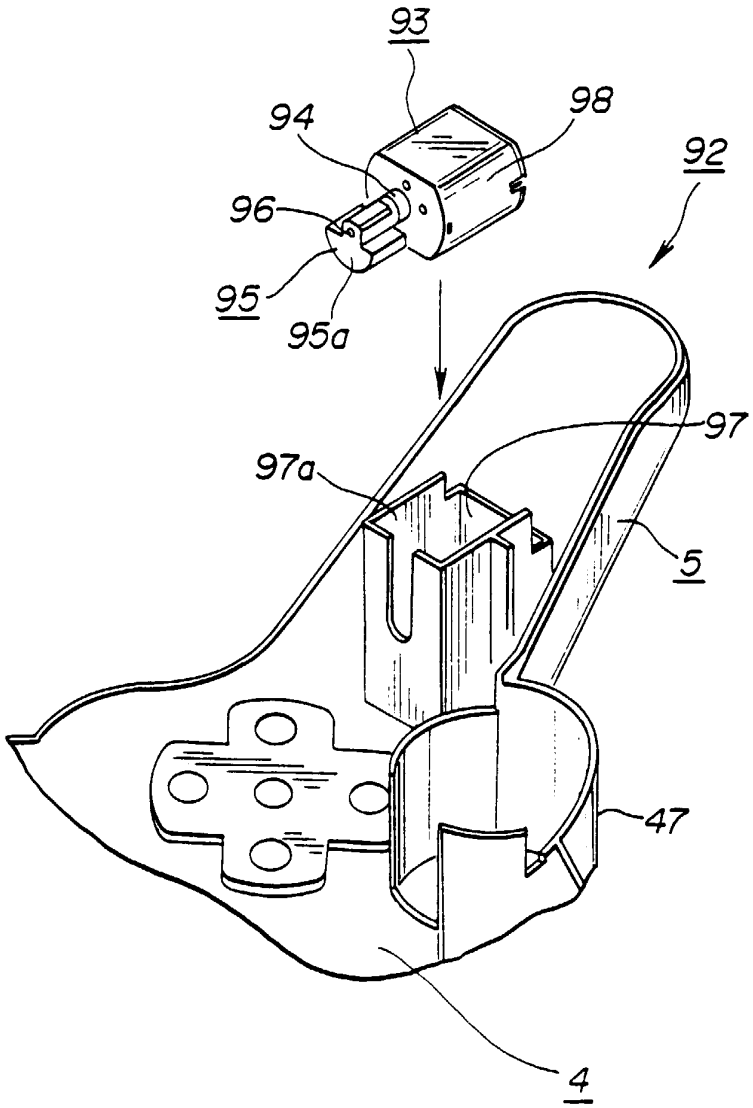

FIG.19

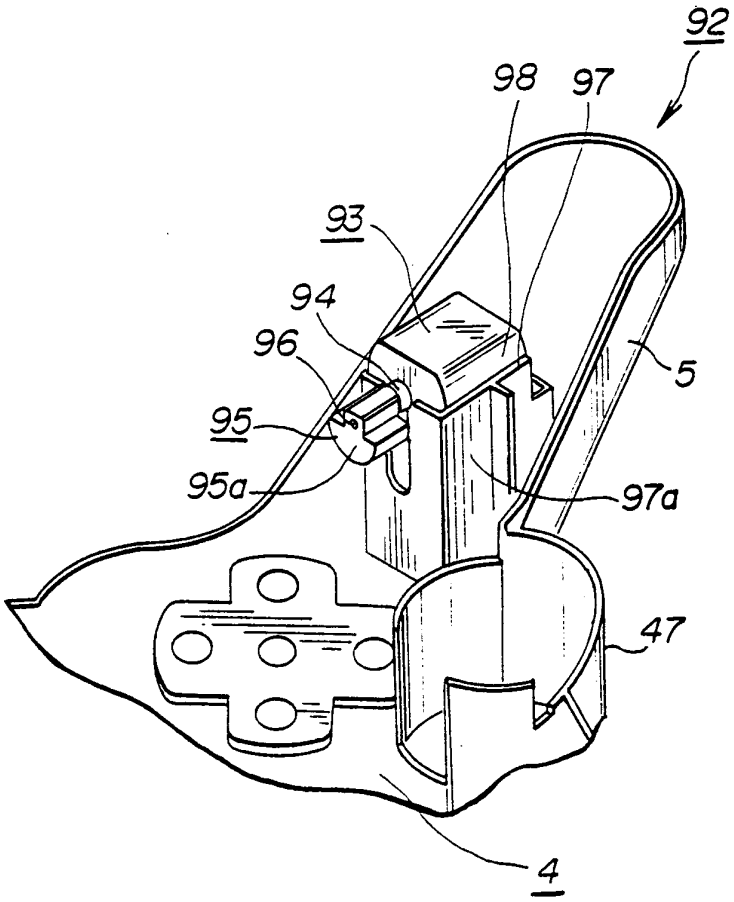

FIG.20

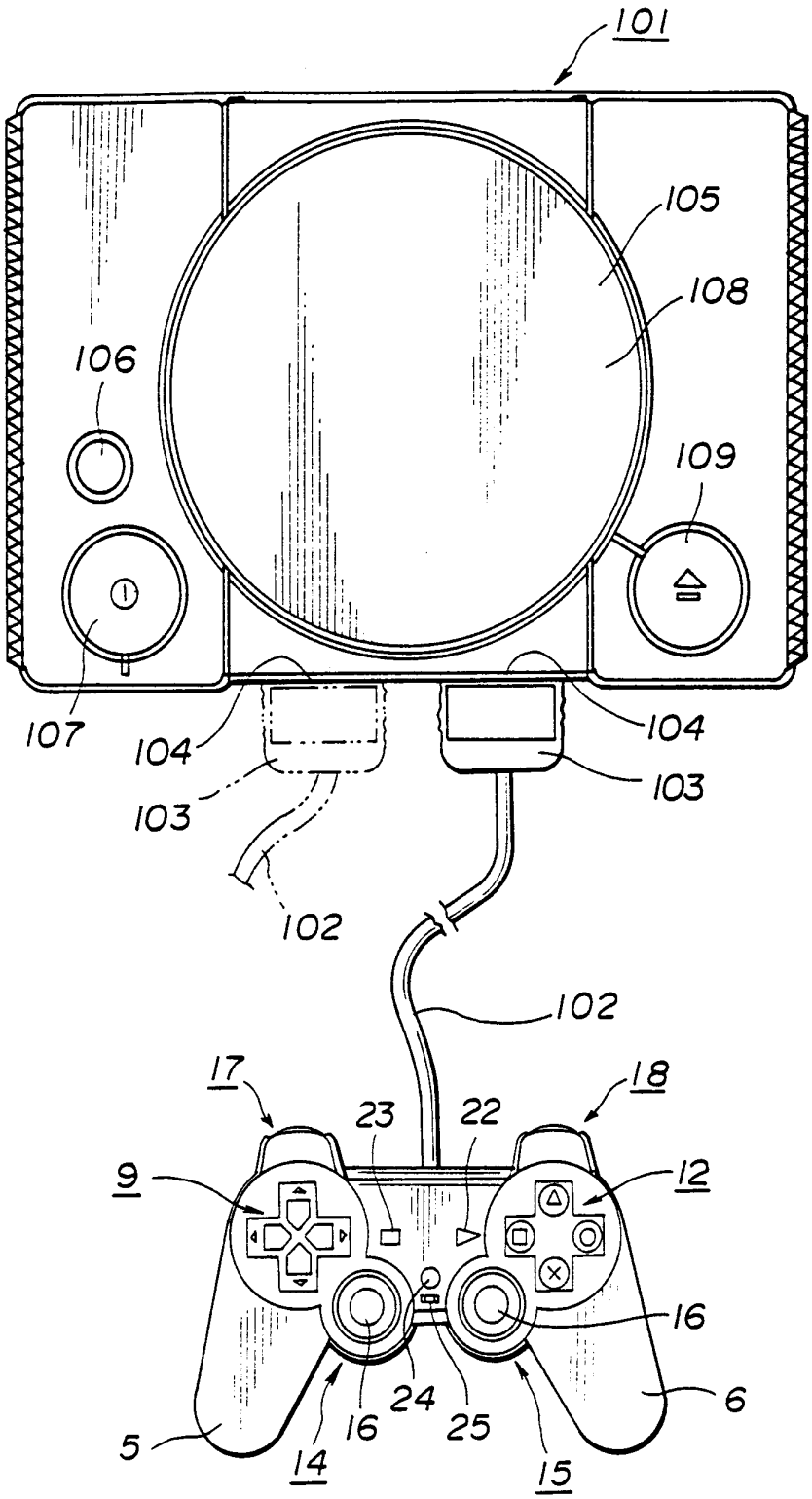

FIG.21

72 of 185 DOCUMENTS

Business Wire

September 13, 1999, Monday

DISTRIBUTION: Entertainment Editors/High-Tech Writers

LENGTH: 442 words

HEADLINE: PlayStation2 Accessories; New Digital Analog Controller 'Dual Shock'2; Large Capacity Memory Card Unveiled

DATELINE: TOKYO

BODY:

NOTE TO MEDIA: Photo available on BW PhotoWire/AP PhotoExpress, PressLink and on Business Wire's Web site at www.businesswire.com

Sept. 13, 1999--Sony Computer Entertainment Inc. announced the release of two new accessories for its revolutionary computer entertainment system, PlayStation(R)2.

Product Name:	"Dual Shock"2 Analog Controller
	SCPH - 10020
Suggest Retail Price:	3,500 Yen (tax not included)
Available:	March 4, 2000
Product Name:	Memory Card (8MB)
	SCPH - 10010
Suggested Retail Price:	3,500 Yen (tax not included)
Available:	March 4, 2000

With the exception of the "start" and "select" buttons, all the functions of the "Dual Shock"2 are analog, making for a wider variety of user operations and a more compelling interactive experience. The "Dual Shock"2 is also backward compatible with all PlayStation software supporting the original "Dual Shock" analog controller.

The new memory card has a storage capacity of 8MB of data, and a data transfer rate up to 250 times faster than the current memory card. In the interests of data security for potential future network applications, the memory card incorporates the authentication and encryption security system, "MagicGate."

Sony Computer Entertainment America, a division of Sony Computer Entertainment America Inc., markets the PlayStation game console for distribution in North America, develops and publishes software for the PlayStation game console, and manages the U.S. third party licensing program. Based in Foster City, Calif., Sony Computer Entertainment America Inc. is a wholly-owned subsidiary of Sony Computer Entertainment Inc.

Visit us on the Web at http://www.playstation.com

Note to Editors: Two PlayStation(R)2 hardware photos (both vertical and horizontal views), are available at URL: http://www.businesswire.com/cgi-bin/photo.cgi?pw.091399/bw2 Please contact Samantha Sackin at 213/489-8246 to secure high resolution photos.

CONTACT: Sony Computer Entertainment
Molly Smith, 650/655-6044
molly_smith@playstation.sony.com
or
Fleishman-Hillard
Samantha Sackin, 213/489-8246
sackins@fleishman.com

LOAD-DATE: September 14, 1999

ZIFF-DAVIS
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VOLUME 3
ISSUE 2

Official U.S. PlayStation Magazine

Crash Team Racing

PlayStation 2

PS2 TEST DRIVE

November 1999
$7.99 U.S.
$9.99 Canada

0 14024 06968 4 11>

Two-rific

After months of speculation and eager anticipation, PlayStation2 is finally here

DUAL SHOCK 2

Similar to the current Dual Shock in almost all ways except for one crucial feature–all the buttons (besides Start and Select) are analog, including the D-pad and the shoulder buttons. Amazingly, Sony was able to implement this feature without changing the feel of the buttons. Additional Dual Shock 2 controllers will sell for 3,500 yen (roughly $33).

CONTROLLER PORTS

Only two? Sure, it seems an oversight, but don't worry–Sony will have a multitap peripheral out for the system.

MEMORY CARD SLOTS

NEW PACKAGING

In order to differentiate between current and next-generation titles, Sony has opted for a DVD-style package for PS2 games. Also, PS2 CD-ROM discs will have a blue tint, replacing the infamous black CDs of the current PS. However, DVD PlayStation2 software will appear in the more traditional silver.

MEMORY CARD

Boasting a beefy 8 megabyte capacity, the new Memory Card can transfer data at 250 times the speed of the current card (which has only 256K of memory). Additional Memory Cards will sell for 3,500 yen (roughly $33).

I.LINK PORT

Often referred to as "Firewire," this port allows for very high-speed transfers of data. Can also be used as an input for components like digital video cameras and audio devices.

USB PORTS

These could be used for anything from joysticks and other peripherals to Zip drives and other storage devices; many recent PCs are equipped with these same ports.

ic!

here

On Sept. 13, at a press event in Tokyo, Sony finally took the wraps off its next-generation game console. But as we learned, the PlayStation2 is much more than just a console. With the ability to play DVD movies out of the box, as well as numerous connectivity options, the PS2 looks to be a true centerpiece of a home entertainment system—a "computer entertainment system" for the next millennium.

In line with this expanded role, Sony has radically reinvented the look of the PlayStation2. The design—spearheaded by Teiyu Goto, who was also responsible for Sony's innovative Viao line of computers—is sleek yet subdued, familiar yet unlike any current console or PC. Gone is the gray box, replaced by a streamlined "Space Black" supermachine, the color of which is meant to evoke the infinite possibilities of space. You'll also notice the rich blue in the logo and the vertical stand, symbolic of water and Earth.

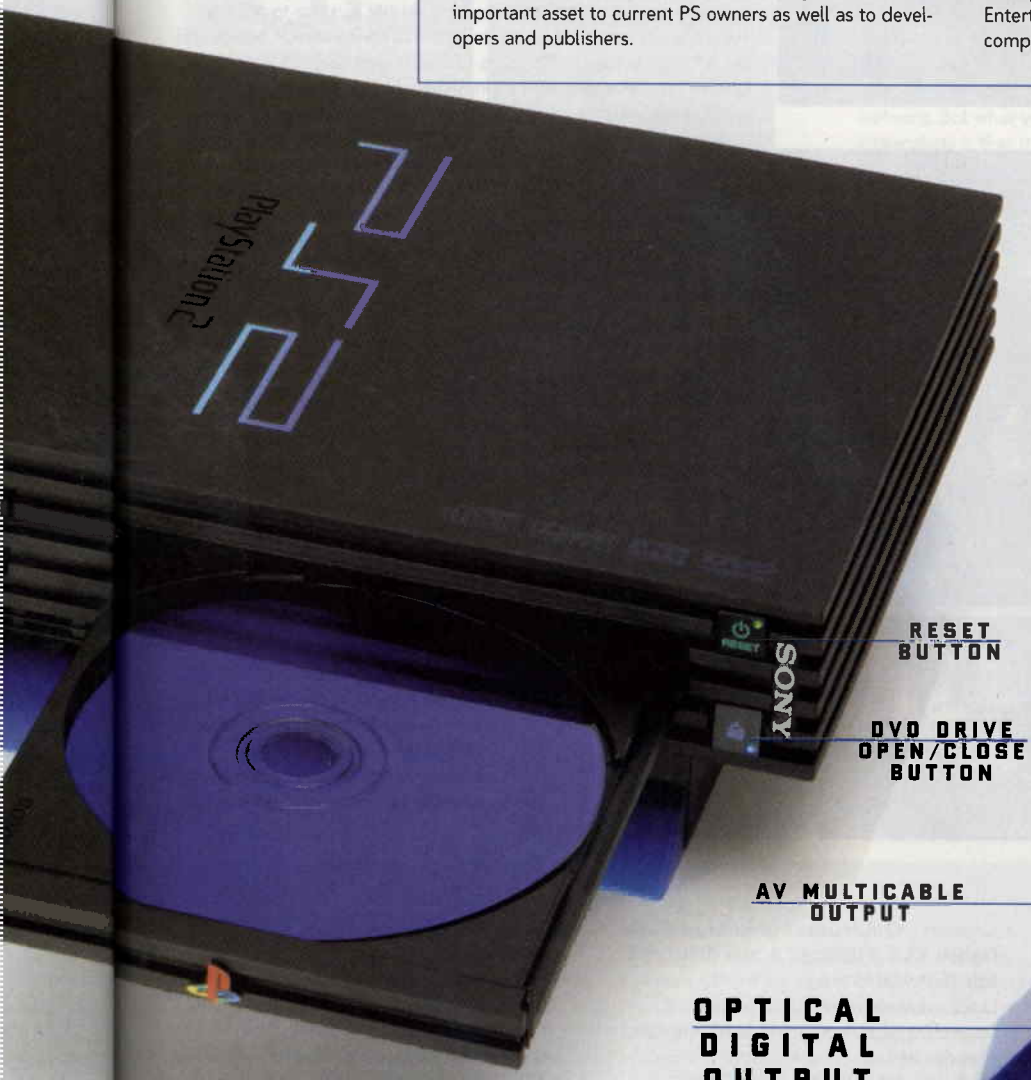
Once again, Sony stressed the backward compatibility of the PS2. With 60 million PlayStation owners and 3,000 PS titles available throughout the world, Sony sees this as an important asset to current PS owners as well as to developers and publishers.

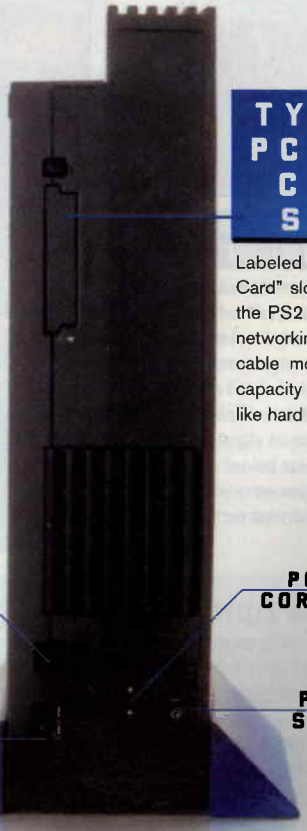
The system will go on sale on March 4, 2000, in Japan for 39,800 yen (roughly $370)—which is the exact same price the original system launched at. The box will include the PS2 hardware, power cables, a PS2 demo CD, and a new Memory Card and Dual Shock 2 controller. The PS2 is scheduled to launch in North America in the fall of 2000, but more details of the U.S. launch aren't expected until next year's E3 show.

By the year 2001 Sony plans on expanding the capabilities of the PS2, including mass storage devices and cable modems. In the next two years Sony will devote a lot of time and resources to developing encryption techniques to protect intellectual properties. Sony will also focus on creating interfaces and environment ideas that will drive the new technology.

In the more immediate future, the next major PS2 event should be just before the system goes on sale in March; Sony is planning an event in February, when they'll release more details of their software lineup.

Prepare yourself for (in the words of Sony Computer Entertainment CEO Kaz Hirai) "the most advanced computer entertainment system ever created."





DVD DRIVE

Sony opted for a motorized front-loading DVD drive rather than a lid, largely because of the very high spin speed of the disc inside the drive. "It would not be possible to make a lid ... because of the enormous spin speed related to 24-times CD-ROM," said Phil Harrison. Plus, it just looks real snazzy.

OPTICAL DIGITAL OUTPUT

Designed specifically to allow for decoding of Dolby Digital and DTX surround sound, allowing you to effortlessly plug your PS2 into your home theater system.

TYPE 3 PCMCIA CARD SLOT

Labeled as the "PC Card" slot, this is where the PS2 can hook up to networking devices (like cable modems) or high capacity storage devices like hard drives.

VERTICAL STAND

Sold separately, these two wedges allow the PS2 to stand on its end to save space, much like tower PCs and graphics workstations.

FORM SE/GROUP

UNITED STATES COPYRIGHT OFFICE

099485857

REGISTRATION NUMBER

TX 5-029-021

01 Month 06 Day 2000 Year

APPLICATION RECEIVED
JAN 06 2000

ONE DEPOSIT RECEIVED
JAN 06 2000

EXAMINED BY CORRESPONDENCE ☐

DO NOT WRITE ABOVE THIS LINE.

1 TITLE ▼

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ISSN ▼ 1095-4163

List in order of publication

No previous registration under identical title ☐

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Signature (X) Charles Schug Typed or printed name Charles Schug, Secretary

PERSON TO CONTACT FOR CORRESPONDENCE ABOUT THIS CLAIM

Name ▶ Charles Schug

Daytime telephone number ▶ (415) 468-4684, ext 448

Address (if other than given below) ▶

DEPOSIT ACCOUNT

Account number ▶ DA064254

Name of account ▶ Imagine Media, Inc.

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April 1991—100,000

• U.S. GOVERNMENT PRINTING OFFICE: 1991-282-170/20,016

INTERROGATORY NO. 16:

Identify each Asserted Patent that Anascape contends does not include at least one claim covering the Sony DUALSHOCK 2 Controller or use thereof.

RESPONSE:

In addition to the foregoing General Objections, Anascape objects to this interrogatory on the ground that it seeks information protected by the attorney-client privilege, the work product doctrine, or any other applicable privilege or protective doctrine. Anascape further objects to this Interrogatory to the extent that Anascape does not have sufficient information or knowledge to respond to this Interrogatory. Anascape objects to this Interrogatory as premature as the Court has not yet issued its Claim Construction Order.

Subject to and without waiving these specific objections and its general objections, Anascape responds as follows: During licensing negotiations with Sony, Anascape asserted that the DUALSHOCK 2 controller was covered by at least one claim of the '084, '802, '886, '525, and '991 patents.

SUPPLEMENTAL RESPONSE:

Subject to and without waiving the specific objections and its general objections, Anascape responds as follows: The Sony DUALSHOCK 2 controller is covered by at least one claim of each of the '084, '802, '886, '525, '991, and '700 patents.

INTERROGATORY NO. 17:

For each product identified in Anascape's responses to Nintendo's Interrogatory No. 5, identify the dates such product was made, sold, licensed, offered for sale, and/or offered for license in the United States and the persons or entities to whom such product or service was

RESPONSE:

Anascape objects to this Request as premature because the Court has not yet issued its Claim Construction Order. One or more claim construction issues to be decided by the Court may affect Anascape's response to this Request. Anascape further objects to the term "Sony" as overly broad and encompassing third-party products, such that Anascape does not have sufficient information to admit or deny the request. Subject to the foregoing general and specific objections, Anascape responds as follows: Anascape admits that, during licensing negotiations with Sony, it asserted that the DUALSHOCK 2 controller was covered by at least one claim of the '525 patent.

SUPPLEMENTAL RESPONSE:

Subject to the foregoing general and specific objections, Anascape responds as follows: Admitted.

REQUEST FOR ADMISSION NO. 26

Admit that Sony has made, sold, or offered for sale a product that is covered, or use of which is covered, by at least one claim of the '700 patent.

RESPONSE:

Anascape objects to this Request as premature because the Court has not yet issued its Claim Construction Order. One or more claim construction issues to be decided by the Court may affect Anascape's response to this Request. Anascape further objects to the term "Sony" as overly broad and encompassing third-party products, such that Anascape does not have sufficient information to admit or deny the request. Subject to the foregoing general and specific

objections, Anascape responds as follows: Anascape does not have sufficient information to admit or deny this Request.

SUPPLEMENTAL RESPONSE:

Subject to the foregoing general and specific objections, Anascape responds as follows: Admitted.

II.

OBJECTIONS AND RESPONSES

INTERROGATORY NO. 28:

Please identify, on a claim-by-claim basis, any and all controllers made, developed or modified by or on behalf of Brad Armstrong, Global Devices, Extreme 6DOF Controllers, Anascape, or any other Anascape-Related Company that practices any claimed invention of the Asserted Patents or any Related Patent. Please include in your response, on a claim-by-claim basis, the identity of such controller, its model number or other unique identifier(s), its date of development and first manufacture, as well as the first dates for any public use, disclosure (including, but not limited to, the alleged 1997 disclosures to Nintendo, Mitsumi, and Alps, and the alleged 1999 disclosure to Microsoft set forth in Anascape's response to Nintendo of America Inc.'s First Set of Interrogatories, Interrogatory No. 3), commercial use, offer for sale, or sale, as well as the identity of all persons involved in such public use, disclosure, commercial use, offer for sale, or sale. If for any individual claim of the Asserted Patents or any Related Patent, no such controller(s) exist, please so state.

RESPONSE:

In addition to the foregoing General Objections, Anascape objects to this Interrogatory as overly broad, unduly burdensome, oppressive, and/or seek information that is not relevant to the issues in this lawsuit or reasonably calculated to lead to the discovery of admissible evidence. Anascape further objects to this interrogatory on the ground that it seeks information protected by the attorney-client privilege, the work product doctrine, or any other applicable privilege or protective doctrine. Anascape also objects to this interrogatory as a premature contention interrogatory. To the extent this interrogatory calls for information that is the proper subject of

expert testimony, Anascape objects that the interrogatory is premature.

Subject to and without waiving these specific objections and its general objections, Anascape responds as follows: See Anascape's Preliminary Infringement Contentions. Two of the prototypes that Anascape has made available for inspection – and have been inspected by counsel for Microsoft and Nintendo – practice the asserted claims. Specifically, the two game controllers modified by Mr. Armstrong to include analog buttons practice or can be used to practice at least claims 1-6, 9, 12-17 of the '802 patent, claim 7 of the '886 patent, and claims 1, 3, 6-8, 11-12, 16, 18, 19, 23-25, 28-30, 32-35, 40, 43, and 70-73 of the '991 patent. These two prototype controllers pictured in at least the following photographs: MS-ANAS159602 and MS-ANAS159622. Other controllers may have been made, developed or modified by or on behalf of Brad Armstrong, Global Devices, Extreme 6DOF Controllers, or Anascape, that practice the claimed inventions of the Asserted Patents or any Related Patent. Anascape is unaware of any dates the controllers were developed or manufactured.

Anascape demonstrated at least one controller to Microsoft on May 5, 1999, involving Brad Armstrong, Todd Holmdahl, and one other Microsoft employee. See also Anascape's response to Nintendo's Interrogatory No. 3. Anascape is unaware of any other dates of any public use, disclosure, commercial use, offer for sale, or sale, or the identity of all persons involved in such public use, disclosure, commercial use, offer for sale, or sale prior to the filing dates of any of the patents-in-suit.

VERIFICATION

I, Brad Armstrong, declare under penalty of perjury that the following is true and correct:

My name is Brad Armstrong, and I have read **ANASCAPE, LTD.'S OBJECTIONS AND RESPONSES TO MICROSOFT CORP.'S THIRD SET OF INTERROGATORIES.** I am authorized to sign these interrogatories on behalf of Anascape Ltd., and I certify that the matters stated in the document identified above are a corporate response to **MICROSOFT CORP.'S THIRD SET OF INTERROGATORIES**. Because the matters stated in the document identified above are a corporate response, they are not all necessarily within my personal knowledge or within the personal knowledge of any single individual. In addition, I have not reviewed any confidential discovery information. Subject to these limitations, the facts contained in the foregoing objections and responses are, to the best of my knowledge, true and correct. I declare under penalty of perjury that the foregoing is true and correct.

Dated: ~~November~~ Dec. 03, 2007

Anascape Ltd.

By: Brad Armstrong

Brad Armstrong

IN THE U.S. DISTRICT COURT
EASTERN DISTRICT OF TEXAS
--oOo--

ANASCAPE, LTD.,

Plaintiff,

vs.

MICROSOFT CORPORATION and NINTENDO OF AMERICA, INC.,

Defendants.

Case No. 9:06cv-158-RC

DEPOSITION OF BRIAN CARLSON

Thursday, October 4, 2007
(Pages 1 - 171)

REPORTED BY: ELIZABETH A. WILLIS RPR, CSR 12155
(01-400713)

Q. Okay. How about with respect to Microsoft and Nintendo -- have you or Mr. Armstrong made a determination that they manufacture or sell any controllers that would not infringe the 700 patent?

A. I am not sure. I don't -- I don't know.

Q. How about with respect to the 525 patent?

A. I am not sure about that either.

Q. I would like to mark as, I believe, Exhibit 102 a document from a portion of the prosecution history file of the -- of the 700 patent.

(Exhibit No. 102 was marked for identification.)

BY MR. JAKUBEK:

Q. You could take your time reviewing it, Mr. Carlson, but my first question is going to be, do you recognize this portion of the 700 patent prosecution file?

A. I don't recall the serial number of the 700 application. Is this the 700?

Q. Yes.

A. 532.

Q. Yes. And for the record, the serial number for the 700 application is 09/715,532. So the specific question is, do you recognize this portion of the 700 patent prosecution file?

A. I -- you know, it looks like part of the 700 prosecution. Yes, sir.

Q. If you could turn to -- on the top there are page numbers. It is page 5 on the top of the page.

A. Okay.

Q. It says -- there is a heading that says, "Amendment to the claims." Do you see that?

A. Yes, sir.

Q. Okay. And it says, "Please cancel claims 1 to 38." Do you see that?

A. I do.

Q. And then it says, "Then please insert the following new," and there is a blank there. It says, "Then examine all pending claims in view of all the public prior art and find that the claims are allowable. Thank you." Do you see that?

A. I do.

Q. And then it appears that this is a preliminary amendment that adds application claims 39, I believe, through 77. Do you see that?

A. Yes, sir.

Q. Okay. Were you involved in preparing this -- any part of this document?

A. Yes, sir.

Q. Okay. Do you recall specifically which parts

that you prepared or what your involvement was?

A. I would have typed up this first page. Is that a transmittal form? I would have set up page 1. I would have set up page 2 and calculated the fees. I would have typed and worked with Mr. Armstrong on page 3 and 4. I would have helped him with all of this.

Q. Okay. And what kind of help did you give him with this?

A. These starter pages and then when he got to the claims he would sit and dictate the words and I would type them for him.

Q. Okay. And, again, did you make any specific suggestions or add any of this particular claim language?

A. I am sure I made specific suggestions, probably.

Q. Do you recall any of those suggestions?

A. No, but if he was rolling along fairly good and he would get stuck and he would be hemming and hawing I might throw out a word or a series of words, hopefully to hit on something he liked so we could get moving again.

Q. Do you recall any particular words you might have suggested in any of these claims?

A. No, sir.

Q. Do you specifically recall Mr. Armstrong dictating these claims to you?

A. I remember that he did dictate these very -- you know, that he dictated these. He had a really solid idea of what he wanted for claims and I didn't want to get in his way. He knew what he wanted to write and I typed as he dictated. If he stumbled a little bit I would throw out words and he would either agree or not agree and we would move forward.

Q. Okay. Do you know what his basis was for his solid ideas as to what type of -- why he wanted these particular claims?

A. He was trying to cover as many controllers as he possibly could within the boundaries of his specification.

Q. Okay. When you say, "cover as many controllers," you mean the claims covering the controllers of third-party companies; is that correct?

A. First party, third party -- it doesn't really matter.

Q. Okay. Was he trying to have claims that would cover products made by Microsoft?

A. I am sure he was, yes. Yes, sir.

Q. Did he tell you that?

A. I think he did.

Q. Okay. How about -- was he trying to draft claims that would cover Sony?

A. I don't think so. I think -- I am not sure. If we had not settled with Sony at that time he may have been. He may have already understood that Sony was going to settle and he may have moved on with these claims without any concern to Sony.

Q. Okay. This amendment, I believe, was submitted to the patent office in July of 2002; is that correct?

A. That's correct.

Q. Do you know when the settlement with Sony was?

A. I think it was finally paid and agreed and signed in, I think, 2004 -- 2004, I believe.

Q. So this amendment was -- so this amendment was submitted before the Sony settlement; isn't that correct?

A. Yes, sir.

Q. Okay. Does that refresh your recollection then whether he was trying to draft claims to cover any Sony controllers?

A. I believe that he felt that the Sony controllers were already well covered, that we needed to move on, but I am not sure about that. There may be some claims in here that are directed toward Sony controllers also. I don't know. What is there -- 79

claims here? There may be some for Sony.

Q. Do you know of any other Anascape patents that would well, "cover," as you put it, the Sony controllers?

A. I think 802, 606 maybe. They insisted that we give them a license to all of them at that time. So I think 802, 991, maybe 997, 415, 525.

Q. Okay. Were these claims submitted to possibly cover any Nintendo products?

A. I don't remember specifically. If I had to guess I would say, yes, but I would just be guessing.

Q. And were they submitted to specifically cover the Nintendo Game Cube product?

A. I am not sure. I don't -- I am not sure, sir.

Q. Okay. And do you know if these claims were specifically submitted by Mr. Armstrong with the intention to cover Microsoft's X Box controllers?

A. They probably were, yes, sir.

Q. And, again, probably the same for Nintendo. Is that accurate?

A. I am not sure about the Nintendo, but I am more sure that he wanted to cover his invention in a way that Microsoft would be able to be shown to be infringing.

Q. And, again, I believe that your testimony today, Mr. Carlson, was that well before these claims

are submitted in July of 2002 you and Mr. Armstrong inspect controllers from Microsoft and Nintendo and Sony. Isn't that correct?

A. What dates did you say? I am sorry.

Q. Well, this amendment was submitted to the patent office in July of 2002, correct?

A. Yes, sir.

Q. Okay. And well before that time you and Mr. Armstrong physically inspected controllers manufactured by Sony, Microsoft and Nintendo; isn't that correct?

A. I think that's true, yes, sir.

Q. Okay. And other parties also, correct?

A. Yes, sir.

Q. Okay. Including the Sega controllers?

A. I don't remember Sega controllers. We had little to no discussion about Segas.

Q. Okay. When -- over what period of time did Mr. Armstrong dictate these (sic) particular set of claims to you? Do you recall?

A. Well, if I do recall correctly, I think these claims right here were probably written within -- within two weeks of this filing date, July 23rd, 2002.

Q. Okay. And over how many days or hours would you say he dictated these (sic) particular set of claims

to you? Do you have any idea?

A. Looks like something that would have taken maybe -- you know, maybe three to five days to do.

Q. Was anybody else in the room with you and Mr. Armstrong when he was dictating these claims?

A. No, sir.

Q. Did you have any of the controllers in front of you when these claims were being dictated?

A. There is a very good chance we did, yes, sir.

Q. Why do you say that?

A. Well, if they weren't in front of us they were in a box behind us, but that -- we probably had recently reviewed them.

Q. Okay. And why did you have those controllers in the room while these claims were being dictated?

A. We considered them to be infringing controllers and within the boundaries of the specification. Mr. Armstrong wanted to make sure that he had claims that would cover his invention that would also, because it is his invention, cover those infringing controllers.

Q. Okay. Well, at the time that this amendment was being drafted the 700 patent didn't issue, correct? I mean, obviously these claims were submitted in connection with the prosecution of the 700 patent, correct?

MR. MCLEROY: Objection. Form.

THE DEPONENT: The 700 patent received multiple Notices of Allowance. I don't know if he had received the Notice of Allowance or not at this date, but it was certainly pending.

BY MR. JAKUBEK:

Q. Okay. But you had the -- you and Mr. Armstrong had the controllers with you in the room while these claims were dictated for the specific purpose of trying to get claims in the 700 patent that would possibly cover those controllers, correct?

MR. MCLEROY: Objection. Form.

THE DEPONENT: Well, yes, I think -- I think that's fair to say.

BY MR. JAKUBEK:

Q. Okay. Where were you at when Mr. Armstrong was dictating these claims to you? Where did this take place?

A. This, I think, occurred at my home in my home office. It may have occurred in Brad's home in Carson City, but I think it was at my home office.

Q. Is that typically where Mr. Armstrong would dictate these claims to you?

A. More times than not, yes, sir.

Q. Did you store your files -- your patent

application files for Mr. Armstrong or Anascape at your house?

A. Yes, sir.

Q. And were the controllers kept at your house also and stored at your house?

A. Some of them were. Some of them Mr. Armstrong took with him.

Q. Okay. Did you go -- ever purchase the controllers on your own or did Mr. Armstrong always bring them to you?

A. When the Sony X Box came out they were difficult to get so I waited all night in line at the Wal-Mart in Oroville and was able to purchase one. Mr. Armstrong was waiting in line in Willows and did not get one. So I bought that one under his instructions.

Q. Just for the record, I believe you said the "Sony X Box." I think you meant the Microsoft X Box; is that correct?

A. No, I meant the Sony Playstation 2. I am sorry.

Q. Okay.

A. You know, Mr. Armstrong, you know, paid for everything. He would buy the controllers.

Q. Did you have the game consoles also with you when these claims were being drafted or just the

controllers?

A. Just the controllers, I believe.

Q. Okay. Why didn't you have the consoles?

A. We didn't -- I didn't have the consoles. Mr. Armstrong left them at home. I think he may have had the consoles. I know he did. I know he had an X Box and I think he had a Playstation 2. I know he had the original Playstation, but they were never brought over to my house.

Q. When Microsoft or Sony or Nintendo released a new product did you -- on the market did you or Mr. Armstrong obtain those as soon as possible?

A. Usually, yes, sir.

Q. Did you actually, like, stand in line the night before, waiting for them to be released?

A. I did on the Playstation 2.

Q. Okay. And why was it so urgent to obtain that as quickly as possible?

A. Because we had read reviews and descriptions and I believe Mr. Armstrong had issued patents. And the description we read was that the Sony Playstation 2 was a direct infringement of several of his patents and so we wanted to acquire one and tear it apart and look at it and see if it was an infringing device.

Q. Did you ever stand in line for either Microsoft

or Nintendo products?

A. No, sir.

Q. How about Mr. Armstrong? Do you know if he stood in line for any Microsoft or Nintendo products released to the public?

A. I don't think he did, but I am not aware if he did or not.

Q. Okay. Were any of these controllers ever physically given to the United States Patent and Trademark Office in connection with the -- Mr. Armstrong trying to obtain patents?

A. I don't think so. No, sir.

Q. In connection specifically with the 700 patent application, did Mr. Armstrong ever submit to the patent office photographs of these controllers that you had in front of you while you were drafting the claims?

A. I don't think any photographs of the controllers that we took apart were sent to the patent office. He may have sent -- and I am not sure about this, so I don't know. He may have sent patent pictures that were Microsoft patents that showed their controllers and said, "This is out there and this is an infringing device or similar to an infringing device that is out there." I am not sure about that.

Q. Are you aware of any Microsoft patent that

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November 20, 2007

***VIA EMAIL* (joseph.jakubek@klarquist.com)**
J. Christopher Carraway
KLARQUIST SPARKMAN, LLP
121 S.W. Salmon Street, Suite 1600
Portland, Oregon 97204

RE: *Anascape, Ltd. v. Microsoft Corp. and Nintendo of America, Inc.*
Civil Action No. 9:06-CV-158-RC

Dear Joe:

I am writing in response to your emails of November 7, 2007 and November 19, 2007.

Anascape intends to rely on July 5, 1996 – the filing date of the '525 patent – as the effective filing date for each asserted claim of the '525 and '700 patents.

Two of the prototypes that Anascape has made available for inspection – and have been inspected by counsel for Microsoft and Nintendo – practice the asserted claims. Specifically, the two game controllers modified by Mr. Armstrong to include analog buttons practice or can be used to practice at least claims 1-6, 9, 12-17 of the '802 patent, claim 7 of the '886 patent, and claims 1, 3, 6-8, 11-12, 16, 18, 19, 23-25, 28-30, 32-35, 40, 43, and 70-73 of the '991 patent.

If you have any questions, please do not hesitate to contact me.

Sincerely,

Luke F. McLeroy

cc: James S. Blank
Chris Carraway
Robert Gunther
Joseph S. Presta
Rob Faris

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
LUFKIN DIVISION

ANASCAPE, LTD.	§	
	§	Hon. Ron Clark
Plaintiff,	§	
	§	
v.	§	Civil Action No. 9:06-CV-00158-RC
	§	
MICROSOFT CORPORATION, and	§	
NINTENDO OF AMERICA, INC.,	§	
	§	
Defendants.	§	

EXPERT WITNESS REPORT OF STEPHEN BRISTOW
PURSUANT TO FED. R. CIV. P. 26(a)(2)(B)
REGARDING INVALIDITY OF U.S. PATENT NO. 6,906,700

I, Stephen Bristow, make the following first opening expert report:

optional collet about the vertical y axis, while still providing a sensor to sense rotation of the trackball about the vertical yaw axis.

3. Tactile feedback/finger depressible buttons

The ‘891 Patent discloses providing tactile feedback to a user, either through a click or snap, to notify users of the activation/deactivation of linear carriage sensors. The ‘891 further discloses using simple on/off switches under finger depressible thumb and finger buttons, serving the same function as in a mouse, remote control, or computer keyboard (*see* Figs. 8-10).

The ‘891 Patent does not describe using a motor and offset weight to generate electromechanical tactile feedback vibration, nor does it describe any other type of device providing vibration tactile feedback.

4. Sensor types

The ‘891 Patent further describes the use of a number of different sensor types, including proximity sensors, variable resistive or capacitive sensors, piezo sensors, variable voltage/amperage limiting or amplifying sensors and switches, potentiometers, resistive and optical encoders and simple on/off sensors.

C. The ‘525 Patent

United States Patent No. 6,222,525 (the “‘525 Patent”) (Exhibit J) issued from a “Continued Patent Application,” or CPA, filed on August 4, 2000, which was described as a continuation of an original application filed July 5, 1996 (or “1996 Application”) (‘525 Patent Prosecution History, Exhibit K). The ‘525 Patent disclosed a so-called six degree of freedom single-input member controller, employing a flexible membrane sensor sheet to connect to the sensors of the input member and additional finger depressible buttons, including, in some embodiments, buttons with resilient dome caps to provide tactile feedback and/or buttons using a pressure-sensitive variable conductance material to provide a proportional output, for use in

controlling television or computer-based images. In some embodiments, the flexible membrane sheet for the input member and buttons is further connected to another flexible membrane sheet or to one or more other circuit boards and/or rigid support structure(s). In some embodiments, the flexible membrane sheet is replaced with a circuit board.

1. Six degrees of freedom

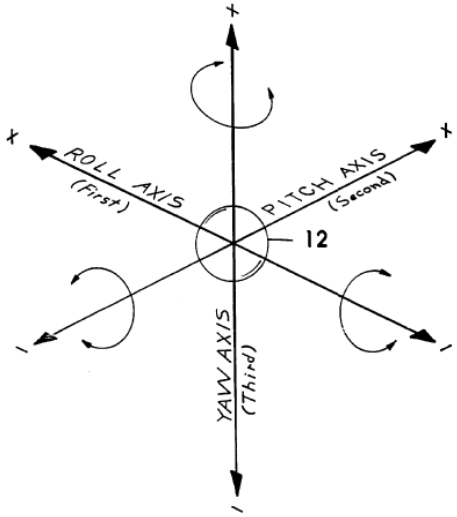

FIG. 7

Fig. J - Fig. 7 of the '525 Patent

The '525 Patent utilizes a similar lexicography to both the '891 Patent and the '828 Patent to describe six degrees of freedom. Specifically, it describes a six degree of freedom controller as capturing linear movement along and rotation about three separate axes (yaw, pitch and roll), with all three axes sharing "a mutual point of intersection at the center of the input member which is shown as a trackball but may be any hand manipulated input member." ('525 Patent, 9:17-20.)

In order to achieve six degrees of freedom of movement, the '525 Patent discloses using either a total of twelve "unidirectional" or six "bidirectional" sensors (or some combination of the two), including six unidirectional or three bi-directional sensors to capture linear hand

movement ("moment") of a carriage supporting a trackball or a carriage and shaft supporting a joystick handle along the yaw, pitch and roll axes in positive and negative directions and either six unidirectional or three bi-directional sensors (or some combination thereof) to capture rotation of the trackball and/or joystick shaft/handle about the same three axes.

In all disclosed embodiments said to represent the invention (seen below), the sensors to sense the six degrees of freedom of movement by the human hand are activated by a single input member.

2. Single input member trackball/joystick embodiments

a) 6DOF trackball assembly

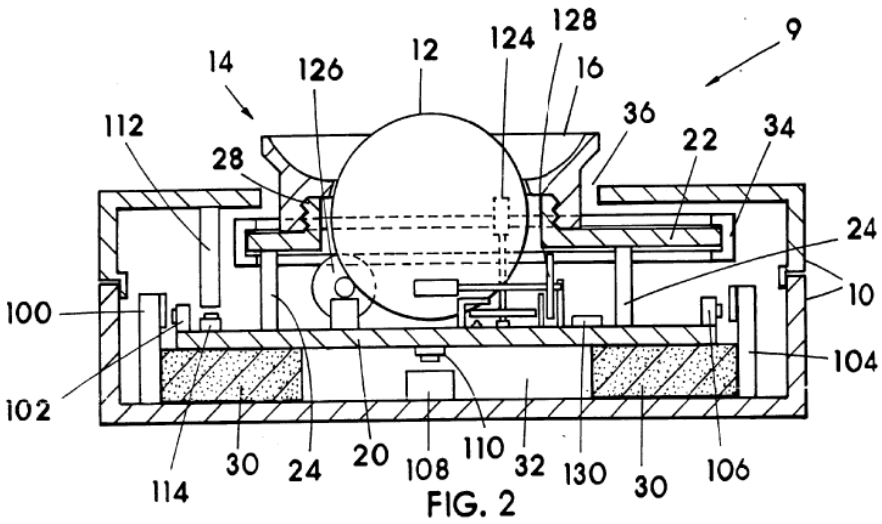

Fig. K - Fig. 2 of the '525 Patent

Figures 1-11 of the '525 Patent are similar to figures 1-11 of the '891 Patent in describing a 6DOF trackball assembly (see '891 Patent, above). While all the claims of the '525 Patent are drawn to an input member and sensors connected to a flexible membrane sheet, the '525 Patent does not teach the use of a flexible membrane sheet with its disclosed trackball embodiments.

b) First 6DOF joystick assembly
(trackball modification, all sensors in the base)

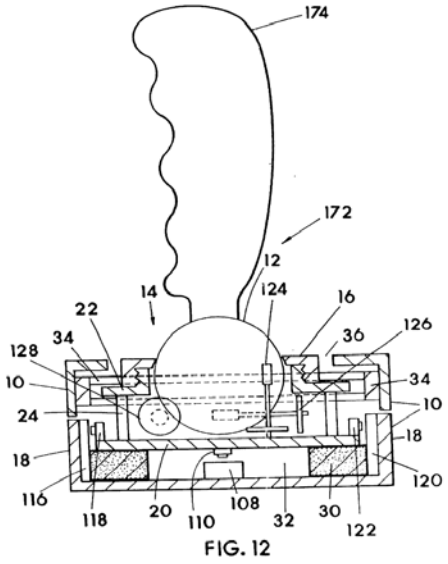

FIG. 12

Fig. L - Fig. 12 of the '525 Patent

Figure 12 of the '525 Patent is a figure submitted for the first time with the 1996 Application that describes placing a handle on the exposed portion of the trackball embodiment shown in Figures 1-3 (see '891 Patent, Fig. 3, above) to provide a 6DOF joystick. Other than having its rotation constrained by the limits imposed by the presence of a handle (it obviously cannot rotate a full 360 degrees), this embodiment would be similar in function to the trackball embodiment.

c) Second 6DOF joystick assembly (all sensors in the handle)

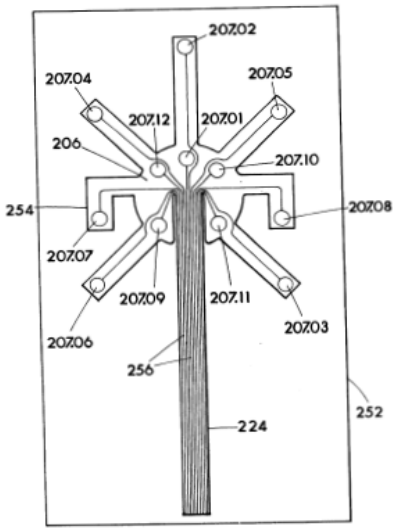

FIG. 14

Fig. M - Fig. 14 of the '525 Patent

Figures 13-19 of the '525 Patent are figures submitted for the first time with the 1996 Application that describe a 6DOF joystick embodiment (200) which is unlike the 6DOF joysticks previously taught in the '828 Patent in that it places all of the 6DOF sensors (207.01-207.12) on a single sheet located within the handle of the joystick.

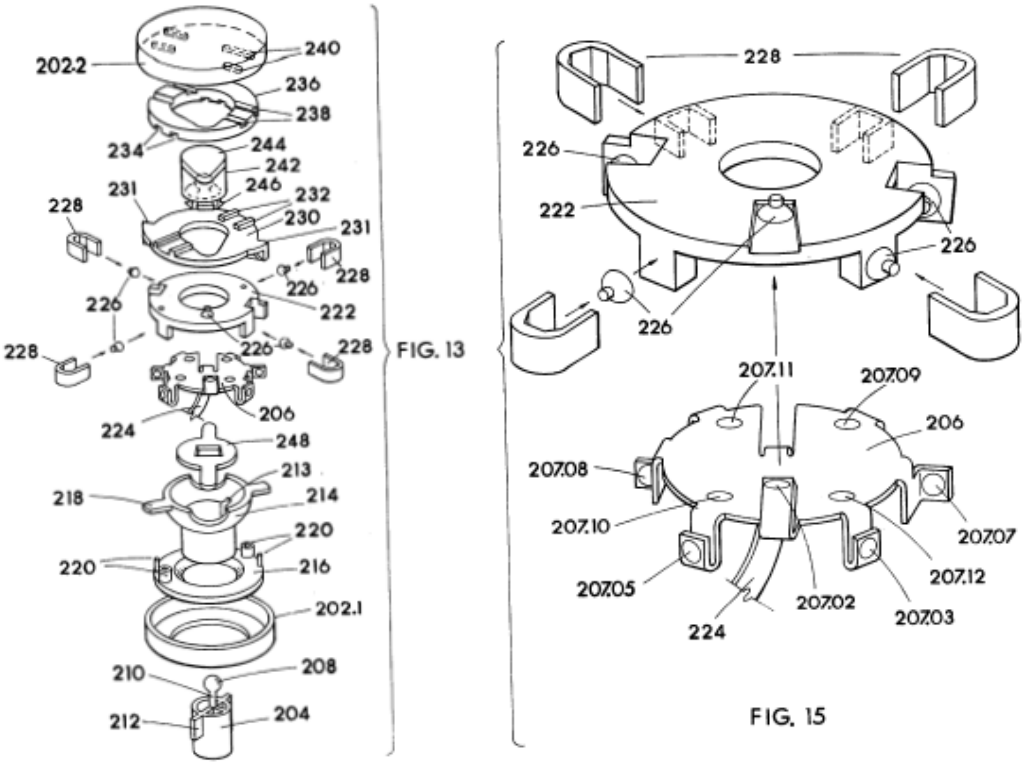

Fig. N - Figs. 13 and 15 of the ‘525 Patent

Specifically, this embodiment utilizes twelve unidirectional sensors (207.01-207.12) mounted on a flexible membrane sensor sheet (206) folded into the handle (202) of a joystick in such a manner as to sense linear movement of the handle along and rotation of the handle about the yaw, pitch and roll axes.

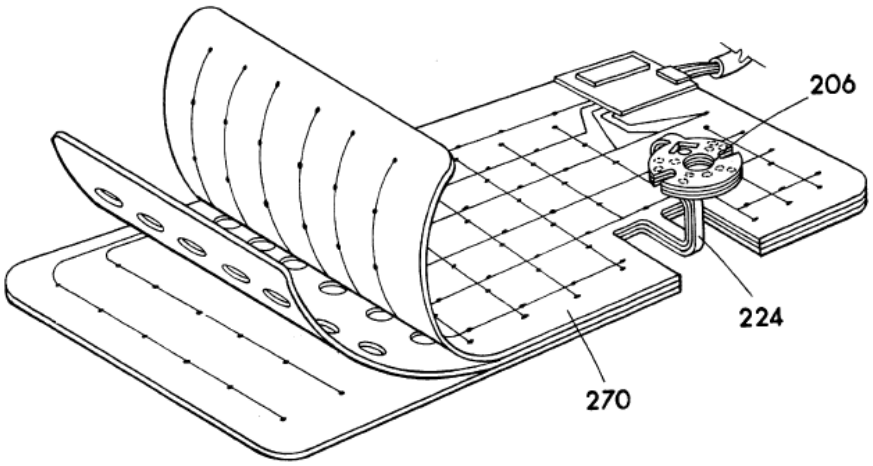

FIG. 18

Fig. O - Fig. 18 of the ‘525 Patent

The flexible membrane sensor sheet (206) containing all 6DOF sensors (207.1-207.12) in the handle (202) is then connected - using circuit traces (256) contained in a flexible “membrane tail” (224) - to “an otherwise typical computer keyboard membrane” (270), or other base.

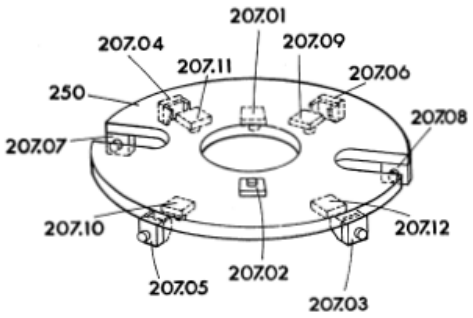

FIG. 16

Fig. P - Fig. 16 of the ‘525 Patent

In an alternative embodiment, all twelve unidirectional sensors are mounted to a rigid circuit board (250) in the joystick handle, replacing the flexible membrane sheet (206) in Figure 13, but not the membrane tail (224) connecting the circuit board sheet to a base or “otherwise typical computer keyboard membrane” (270).

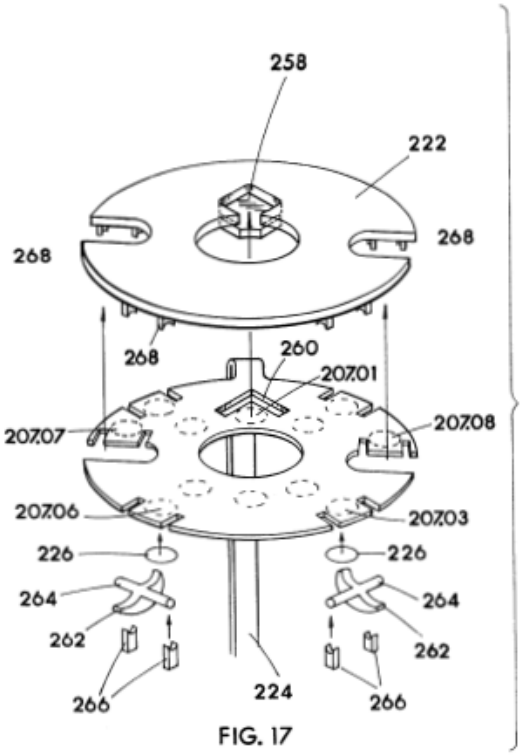

Fig. Q - Fig. 17 of the ‘525 Patent

In another alternative embodiment, rocker arm structures are used to activate sensors contained on a flat flexible membrane sensor sheet in a single plane, removing the need to “fold” the portions of the sensor sheet connecting certain sensors (207.03-207.08) at right angles within the joystick handle.

d) Third 6DOF joystick assembly (4 input member sensors and two pivotal buttons in the handle, 8 input member sensors in the <u>reference member housing, using rocker arm actuators)</u>

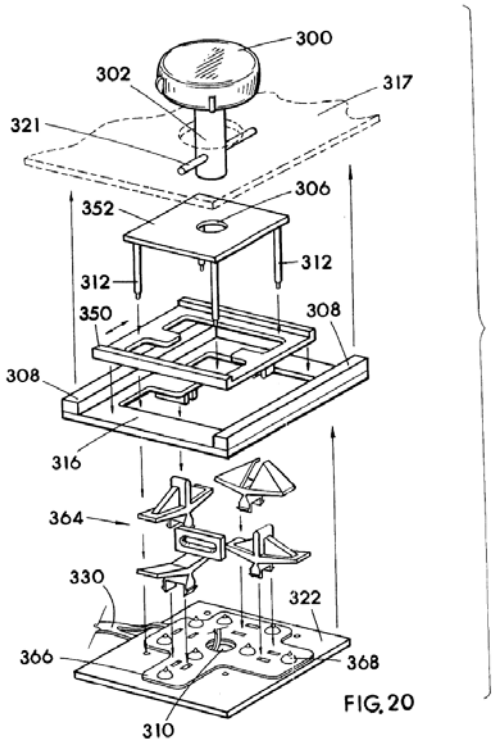

Fig. R - Fig. 20 of the ‘525 Patent

Figures 20-31 of the ‘525 Patent are figures submitted for the first time with the 1996 Application that describe a 6DOF joystick embodiment that demonstrates placing a flexible membrane sheet (330) on a platform (322) in the base or reference member housing (317), supporting eight unidirectional input member sensors under four rocker-arm structures (364).

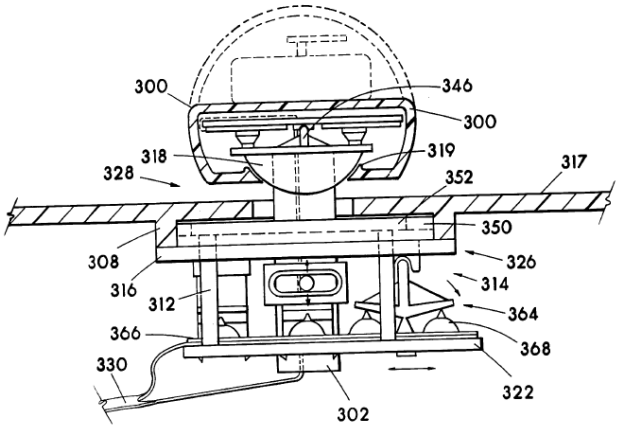

FIG. 21

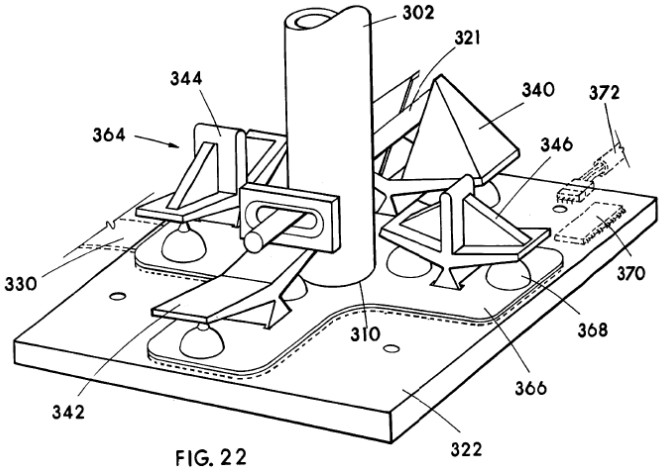

FIG. 22

Fig. S - Figs. 21 and 22 of the '525 Patent

These four rocker arm structures (364) include two T-bone actuators (344 and 346) to capture linear movement of the carriage (314) on the pitch and roll axes, an H-slot actuator (342) to capture movement of the shaft along the yaw axis, and a V-slot actuator (340) to capture rotation of the shaft about the yaw axis by bearing on dome-cap actuators (368) on a sheet of resilient thermoplastic rubber (366), said actuators impinging on sensors located on the flexible membrane sheet (330). The '525 Patent alternatively describes replacing the support platform (322) and flexible membrane sensor sheet (330) with a traditional circuit board bearing sensors and circuitry (370) to send signals to an image generation device through a cable (372).

Figure 21 (above) also contains an unnumbered dashed line drawing on top which is neither referenced, nor described in the patent.

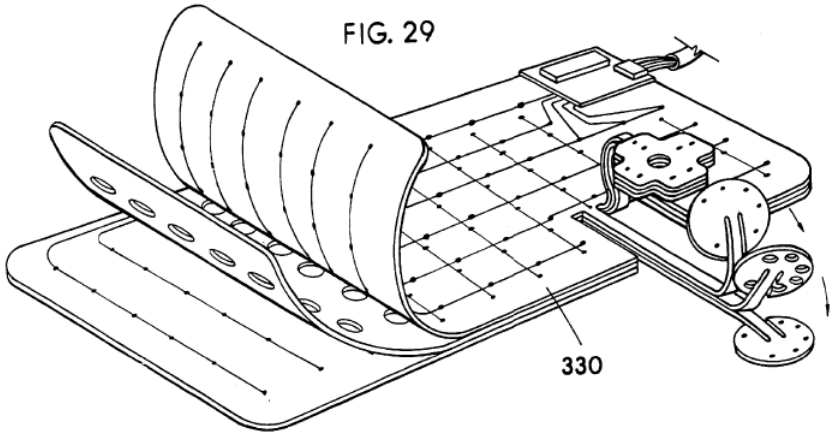

Fig. T - Fig. 29 of the ‘525 Patent

In addition, a narrow second appendage of the flexible membrane sheet is folded to pass through a hole (310) in the portion of the flexible membrane sheet located in the base, through corresponding holes in the platforms of the carriage, through the shaft (302), and into the handle (300), where it broadens into a circular shape.

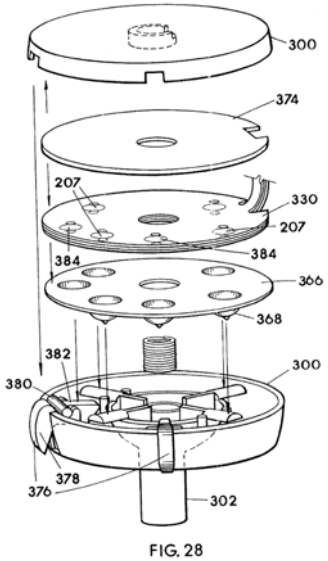

Fig. U - Fig. 28 of the ‘525 Patent

In the handle, the circular portion of the flexible membrane sheet (330) bears sensors (207) to sense rotation of the handle. Additionally, two pivotal buttons (376) are set into the side of the handle (300). When pressed by a user's finger(s), these buttons rotate to press against a dome cap (368) and activate finger depressible button sensors (384) mounted on the flexible membrane sensor sheet (330).

e) Fourth 6DOF joystick assembly
(4 input member sensors in the handle,
8 input member sensors in the reference member housing)

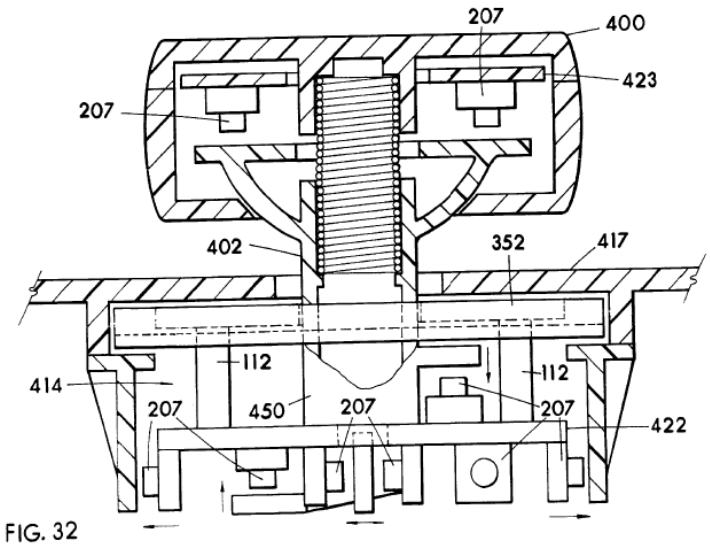

Fig. V - Fig. 32 of the '525 Patent

Figure 32 of the '525 Patent is a figure submitted for the first time with the 1996 Application that describes a 6DOF joystick embodiment that demonstrates replacing the rocker-arm structure of Figure 20 with simple flat-mount and right angle mount sensor switches (207) solder mounted to a circuit board contained in the handle (423), and to a second carriage unit/circuit board (422) in the base housing. As in the previous embodiment, all linear movements are captured by the sensors mounted to the carriage, as is rotation about the vertical

yaw axis. Four sensors (207) mounted on a circuit board (423) in the handle (400) sense rotation about the pitch and roll axes.

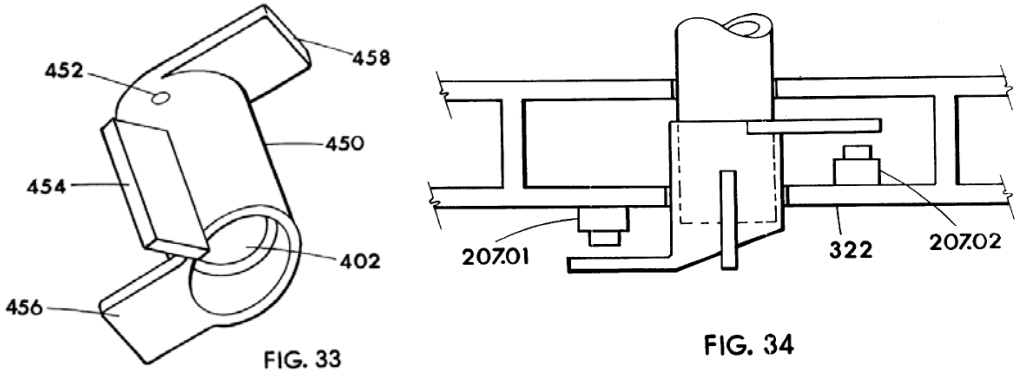

Fig. W - Figs. 33 and 34 of the '525 Patent

Vertical movement of the shaft along the yaw axis is captured using a 3rd axis actuator part (450) which is mounted to the base of the shaft to actuate sensors (207.02 and 207.03) fixed to the carriage unit/circuit board (322/422) in the base housing.

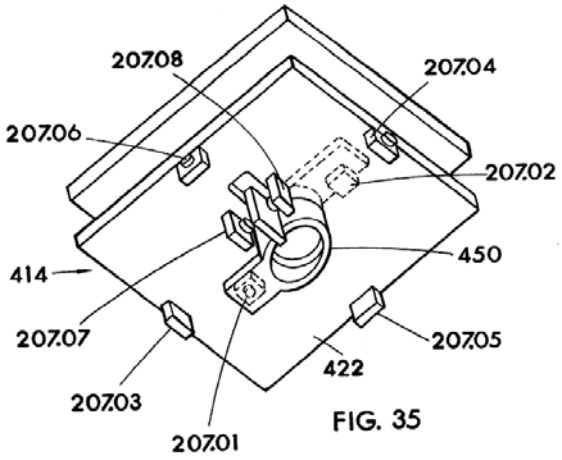

Fig. X - Fig. 35 of the '525 Patent

Rotation of the shaft about the yaw axis is captured using this same 3rd axis actuator part (450), which has a flange positioned to actuate sensors (207.07 and 207.08) right-angle mounted to the carriage unit/circuit board (322/422) in the base housing. Linear movement of the carriage

(422) along the pitch and roll axes relative to the reference member (417) will activate the remaining right-angle mount sensors (207.03-207.06)

f) Fifth 6DOF joystick assembly (4 input member sensors in the reference member housing, 8 input member sensors in the handle)

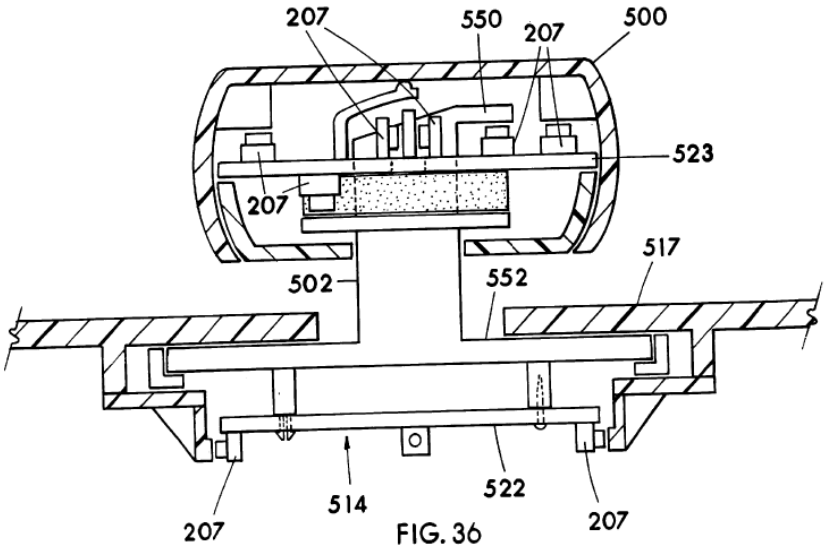

Fig. Y - Fig. 36 of the '525 Patent

Figure 36 of the '525 Patent is a figure submitted for the first time with the 1996 Application that describes a 6DOF joystick embodiment similar to the fourth embodiment, above. In this embodiment, however, the 3rd axis actuator part (550) is mounted to the top of shaft (502) within the handle (500), rather than in the reference member housing (517). As a result, all six rotation sensors (207) and the yaw axis linear sensors (207) are carried on the circuit board (523) in the handle, while the linear sensors for pitch and roll remain on the carriage (514) in the reference member housing (517).

('700 Patent, 21:42-44.)

2. "At least one" input member

While most of the specification in the '700 Patent appears to have been drawn directly from the '525 Patent, there are a number differences. As a example, in a number of places, the '700 Patent replaces references to a

> 6DOF controller . . . which includes a **single** input member [being] hand operable relative to a reference member of the controller

(*see*, e.g., '525 Patent, 7:52-53; 61-62; 8:4-6; 8:12-14; 8:20-22) with references to a

> 3D [image] controller . . . which includes **at least one** input member [being] hand operable relative to a reference member of the controller . . . .

(*see*, e.g., '700 Patent, 4:36-37; 4:46-47; 4:56-57; 4:64-76; 5:6-8).

The '700 Patent appears to use the terms "3D" and "6DOF" interchangeably, so it is understood that just like the input members of the 6DOF controllers of the '525 Patent, the input members of the 3-D controllers described in the '700 Patent would "provide structuring for converting full six degrees of freedom physical input provided by a human hand on a hand operable single input member." ('525 Patent, 4:50-53.) And this hand movement on the input member must be relative to "a [single] reference member." All the '700 Patent's disclosed embodiments do, in fact, provide such structuring.

The '700 Patent does not include any embodiments using more than one input member to accept six degrees of freedom of physical input provided by a human hand, nor does it include any embodiments where more than one reference member is used.

Further differences between the specifications of the '525 and '700 Patents are addressed in detail below.

3. Armstrong changed the specification of the '700 Patent from what was previously disclosed in the 1996 Application

Armstrong claims priority to U.S. Patent Application No. 08/677,378, filed on July 5, 1996 (hereinafter "the 1996 Application"), which issued into the '525 Patent through a CPA filed on August 4, 2000. In 2000, when he initially filed the '700 Patent Application as a "continuation" of the 1996 Application, Armstrong changed his disclosure substantially, as shown below.

1996 Application[5]	'700 Patent specification
Typically in the prior art, a three degree of freedom joystick type input device costs more to manufacture than a two degree of freedom joystick, and a **six degree of freedom (henceforth 6DOF) joystick input device** costs significantly more to manufacture compared to a three degree of freedom joystick. Likewise, a three or more degree of freedom mouse-type controller costs more to manufacture than a standard two degree of freedom mouse.	*Language removed entirely in '700 Patent specification*
Manufacturing costs in such devices generally increase because, for at least one reason, an increasing number of sensors is necessary for the additional axes control, and the sensors in the prior art, particularly with **6DOF controllers having a single input member,** typically have been positioned in widely-spread three dimensional constellations within the controller, thus requiring multiple sensor mounts and mount locations and labor intensive, thus costly, hand wiring with	*Language removed entirely in '700 Patent specification*

[5] It should be noted that the 1996 Application did include a description of so-called "secondary input members." However, the secondary input members (e.g. "two thumb select switches 144 and two finger select switches 146") (1996 Application, pg. 25, lines 9-10) were not described as contributing to providing six degrees of freedom, but rather functioning as "auxiliary secondary input buttons (select, fire buttons, special function keys, etc.)" (1996 Application, pg. 37, lines 15-16.) A design using additional input members to provide six degrees of freedom was seen by Armstrong as "functionally and structurally deficient." (1996 Application, pg. 5, line 34.)

1996 Application[5]	'700 Patent specification
individually insulated wires from the sensors to a normally centralized circuitry location remote from the sensors.	
In the prior art there exist **6DOF controllers of a type having a hand operable, single input member moveable in six degrees of freedom** for axes control relative to a reference member of the controller. This type of controller **having the 6DOF operable input member** outputs a signal(s) for each degree of freedom input, and it is this type of 6DOF controller which is believed to be by far the most easily used for 3-D graphics control, and it is with this type of 6DOF controller that the present invention is primarily concerned.	*Language removed entirely in '700 Patent specification*
In the prior art, **6DOF controllers of the type having a hand operable single input member** utilize individual sensors and sensor units (bi-directional sensors) mounted and positioned in a widely-spread three dimensional constellation, due to the failure to provide structuring for cooperative interaction with the sensors, so that some, most or all of the sensors may to be brought into or to exist in a generally single area and preferably in a generally single plane or planes. The prior art fails to provide structuring, such as a carriage member, for allowing cooperative interaction with sensors. The prior art fails to demonstrate a carriage member which typically carries a sheet member connecting and supporting sensors.	*Language removed entirely in '700 Patent specification*

1996 Application[5]	'700 Patent specification
Another failure in prior art **6DOF controllers of the type having a hand operable single input member** is the failure to use or anticipate use of inexpensive, flexible membrane sensor sheets, which are initially flat when manufactured, and which include sensors and conductive traces applied to the flat sheet structure. Such flat sheet membrane sensors could be advantageously used as a generally flat sensor support panel, or alternatively in bent or three dimensionally formed shapes in 6DOF controller structures which utilize three dimensional constellation sensor mounting and appropriate structures for cooperative interaction with the sensors. The prior art in **6DOF controllers of the type having a hand operable single input member,** has failed to use and anticipate the use of, providing structures for cooperative interaction with sensors all in a single area which would allow use of a flat membrane sensor sheet or a flat printed circuit board supporting the sensors and sensor conductors. The prior art in **6DOF controllers of the type having a hand operable single input member**, has failed to use or anticipate use of flat sheet substratum as the foundation upon which to define or apply sensors such as by printing with conductive ink, or to mount the sensors such as by plug-in or soldered connection of the sensors, and preferably all of the required sensors for 6DOF, and even further, the electrical conductors leading to and from the sensors in a printed or otherwise applied fixed position.	*Language removed entirely in '700 Patent specification*
Another problem in prior art controllers such as the King device is reliability. In the King device, reliability is less than optimum due to the typical **single input member 6DOF** prior art configuration of circuitry and sensors, because the hand wiring of sensors to remote circuitry is subject to malfunctions such as wires breaking, cold solder joints, and cross	*Language removed entirely in '700 Patent specification*

1996 Application[5]	'700 Patent specification
wiring due to error of the human assembler, etc.	
Another prior art disclosure believed somewhat relevant is taught in U.S. Pat. No. 5,298,919 issued Mar. 29, 1994 to M. Chang. The Chang device is basically a six degree of freedom computer controller for computer graphics, and includes a generally flat plane printed circuit board on which all of the sensors are mounted. **However, as will become appreciated, in Chang's controller, the lack of a hand operable single input member operable in six degrees of freedom has many significant disadvantages. Further, the Chang controller does not have a any [SIC] input member capable of being manipulated in 6DOF relative to any reference member of the controller, which yields additional significant disadvantages.**	*Language removed entirely in '700 Patent specification*
The Chang controller does not have a single input member such as one ball or one handle which can be operated (causing representative electrical output) in six degrees of freedom. Nor can any one Chang input member be manipulated (moved) relative to a reference member on the controller in six degrees of freedom. Thus, the Chang device is functionally and structurally deficient.	*Language removed entirely in '700 Patent specification*
In order that 6DOF controllers be more affordable, and for a user to be easily able to control objects and/or navigate a viewpoint within a three-dimensional graphics display, I have developed improved, low-cost hand operated 6DOF controllers for use with a computer or computerized television or the like host device. The controllers provide structuring for converting **full six degrees of freedom physical input provided by a human hand on a hand operable single input member** into representative outputs or signals useful either directly or indirectly for	In order that hand input to electrical output controllers be more affordable, and for a user to be easily able to control objects and/or navigate a viewpoint within a three dimensional graphics display, I have developed improved, low-cost hand operated controllers, providing up to 6 degrees of freedom in preferred embodiments, for use with a computer or computerized television or the like host device. The controllers in preferred embodiments, while not restricted or required to be full six degrees of freedom (6DOF), provide structuring for converting **full six**

1996 Application[5]	'700 Patent specification
controlling or assisting in controlling graphic image displays. The present controllers sense hand inputs on the input member via movement or force influenced sensors, and send information describing rotation or rotational force of the hand operable input member in either direction about three mutually perpendicular bi-directional axes herein referred to as yaw, pitch and roll, (or first, second and third); and information describing linear moment of the hand operable input member along the axes to a host computer or like graphics generation device for control of graphics of a display, thus six degrees of freedom of movement or force against the input member are converted to input-representative signals for control of graphics images.	**degrees of freedom physical input provided by a human hand on a** [] **hand operable input member(s)** into representative output or signals useful either directly or indirectly for controlling or assisting in controlling graphic image displays. The present controllers sense hand inputs on the input member via movement or force influenced sensors, and send information describing rotation or rotational force of the hand operable input member in either direction about three mutually perpendicular bi-directional axes herein referred to as yaw, pitch and roll, (or first, second and third); and information describing linear moment of the hand operable input member along the axes to a host computer or like graphics generation device for control of graphics of a display, thus 3D or six degrees of freedom of movement or force against 35 the input member are converted to input-representative signals for control of graphics images.
The present controllers include **the hand operable input member** defined in relationship to a reference member of the controller. The input member can be a trackball operable relative to a housing (reference member) as described in my above mentioned co-pending application, or alternatively, the input member can be any handle fit to be manipulated by a human hand, such as a joystick type handle, but in either case, the **input member accepts 6DOF of hand input relative to the reference member**, and the converter acts or operates from the hand inputs to cause influencing of the sensors which inform or shape electricity to be used as, or to produce such as by way of processing, an output signal suitable for a host device to at least in part control the image on the display of the host device.	The present controllers include **at least one hand operable input member (platform)** defined in relationship to a reference member, e.g., base, housing or handle of the controller. The input member can be a trackball operable relative to a housing (reference member), or the input member can be any handle fit to be manipulated by a human hand, such as a joystick type handle, but in any case, **the input member(s) accept 3D of hand input relative to the reference member,** and the converter acts or operates from the hand inputs to cause influencing of the sensors which inform or shape electricity to be used as, or to produce such as by way of processing, an output signal suitable for a host device to at least in part control or assist in controlling the image on the display of the host device.

1996 Application[5]	'700 Patent specification
A primary object of the invention is to provide a **6DOF image controller (physical-to-electrical converter), which includes a single input member** being hand operable relative to a reference member of the controller and the controller providing structure with the advantage of mounting the sensors in a generally single area or on at least one planar area, such as on a generally flat flexible membrane sensor sheet or circuit board sheet, so that the controller can be highly reliable and relatively inexpensive to manufacture.	A primary object of the invention is to provide a **3D image controller (physical-to-electrical converter), which includes at least one input member** being hand operable relative to a reference member of the controller, and the controller providing structure with the advantage of mounting the sensors in a generally single area or on at least one planar area, such as on a generally flat flexible membrane sensor sheet or circuit board sheet, so that the controller can be highly reliable and relatively inexpensive to manufacture.
Another object of the invention is to provide an easy to use **6DOF controller (physical-to-electrical converter) which includes a single input member** being hand operable relative to a reference member of the controller, and which provides the advantage of structure for cooperative interaction with the sensors positioned in a three dimensional constellation, with the sensors and associated circuit conductors initially applied to flexible substantially flat sheet material, which is then bent or otherwise formed into a suitable three dimensional constellation appropriate for circuit trace routing and sensor location mounting.	Another object of the invention is to provide an easy to use **3D controller (physical-to-electrical converter) which includes at least one input member** being hand operable relative to a reference member of the controller, and which provides the advantage of structure for cooperative interaction with the sensors positioned in a three dimensional constellation, with the sensors and associated circuit conductors initially applied to flexible substantially flat sheet material, which is then bent or otherwise formed into a suitable three dimensional constellation appropriate for circuit trace routing and sensor location mounting.
Another object of the invention is to provide an easy to use **6DOF controller, which includes a single input member** hand operable relative to a reference member of the controller, and which has the advantage that it can be manufactured relatively inexpensively using sensors and associated circuits of types and positional layout capable of being assembled and/or defined with automated manufacturing processes on flat sheet material.	Another object of the invention is to provide an easy to use **3D controller, which includes at least one input member** hand operable relative to a reference member of the controller, and which has the advantage that it can be manufactured relatively inexpensively using sensors and associated circuits of types and positional layout capable of being assembled and or defined with automated manufacturing processes on flat sheet material.
Another object of the invention is to provide an easy to use **6DOF controller, which includes a single input member** hand operable to a reference member of the	Another object of the invention is to provide an easy to use **3D controller, which includes at least one input member** hand operable relative to a reference member, e.g.,

1996 Application[5]	'700 Patent specification
controller, and which has the advantage that it can be manufactured using highly reliable automated manufacturing processes on flat sheet material, thus essentially eliminating errors of assembly such as erroneously routed wiring connections, cold or poor solder connections, etc.	base, housing or handle of the controller, and which has the advantage that it can he manufactured using highly reliable automated manufacturing processes on flat sheet material, thus essentially eliminating errors of assembly such as erroneously routed wiring connections, cold or poor solder connections, etc.
Another object of the invention is to provide an easy to use **6DOF controller, which includes a single input member** hand operable relative to a reference member of the controller, and which has the advantage that it can be manufactured using sensors and associated circuits on flat sheet material so that serviceability and repair are easily and achieved by a simple sheet replacement.	Another object of the invention is to provide an easy to use **3D controller, which includes at least one input member** hand operable relative to a reference member of the controller, and which has the advantage that it can be manufactured using sensors and associated circuits on flat sheet material so that serviceability and repair are easily and inexpensively achieved by a simple sheet replacement.

4. <u>Armstrong added active tactile feedback to the '700 Patent</u>

As shown below, the references from the '700 Patent to specific means for providing active tactile feedback were not contained in the 1996 Application:

1996 Application	'700 Patent specification
Another object of the invention is to provide a 6DOF controller which is structured in such a manner as to allow the controller to be made with a relatively low profile input member, which offers many advantages in packaging for sale, operation in various embodiments and environments (such as a low profile 6DOF handle integrated into a keyboard so that other surrounding keys can still be easily accessed) and function of the device (such as still allowing room for active tactile feedback means within a still small handle shape.)	Another object of the invention is to provide a 3D controller which is structured in such a manner as to allow the controller to be made with a relatively low profile input member, which offers many advantages in packaging for sale, operation in various embodiments and environments (such as a low profile 3D handle integrated into a keyboard so that other surrounding keys can still be easily accessed) and functions of the device such as still allowing room for active tactile feedback means **(electric motor, shaft and weight) within a still small low handle shape as indicated in the attached FIG. 21 in broken lines. "tactile feedback means" in reference to the active type as herein used can be an equivalent to or that which is detailed in the incorporated U.S. Pat. No. 5,589,828 which**

Thus, four years before Armstrong filed his application for the '700 Patent, Sega had already described a 3-D controller in a publicly available written publication containing many if not all of the elements Armstrong disclosed as "novel" in the '700 Patent, including at least the use of analog joysticks, pressure-sensitive pivotal buttons offering both analog and on/off functionality as desired by the user, and additional multiple independent buttons.

3. The Sega Saturn™ 3D Control Pad Controller

I have reviewed a Sega Saturn™ 3D Control Pad (Exhibit W), which was publicly released in the United States in August of 1996. The Sega Saturn™ 3D Control Pad has many of the same features described in the Himoto patent and all of the features described in the Sega Saturn™ 3D Control Pad Manual, including:

- A housing (PP)
- A "D-pad" input member (B) which pivots to impinge on dome caps (J-M) to activate sensors (T-W) to sense rotation about two axes
- An additional thumbstick input member (A), with analog sensors to sense rotation of the input member about two axes.
- Multiple thumb-depressible buttons on the face of the controller (C-I), most with dome caps (N-S) to provide tactile feedback
- Sensors for the input members (A, T-W) and all finger depressible buttons (X-Z, AA-DD) on the single sheet that is a circuit board (GG)
- Pivotal finger-depressible buttons (II, JJ) on the top of the controller (the side farthest from the user) with hall effect rotation sensors (KK-MM, QQ) to provide proportional output relating to the pressure applied to the triggers
- A circuit board (GG) on which the sensors of the D-pad and thumbstick input members and the finger and thumb depressible buttons are carried

D. The Sony Analog Controller Prior Art

As an initial matter, the Sony Analog controllers are not true six degree of freedom, or 3-D graphics controllers, in that they are not controllers "capable of movement in six degrees of freedom," even though they are all "device[s] held in the user's hand that allow[] hand or finger inputs to be converted into electrical signals for manipulation of images (graphics) on a display device, which are capable of being perceived by a human."

Anascape, however, claims infringement of the '700 Patent's "3-D graphics controller" claims by controllers (e.g., Microsoft's Xbox) that are not themselves capable of movement in six degrees of movement. In so doing, Anascape contends that a 3-D graphics controller is simply any controller that "manipulates images in 6DOF or in three dimensions." (Claim Construction Order, Part I, Exhibit C, pg. 8, quoting Tr. P. 19, ll. 21-25.) To the extent that Anascape argues that the Court's construction of 3-D graphics controller requires only a controller *capable of* providing sufficient outputs for manipulating images on a screen in 6DOF, as opposed to the controller itself moving in six degrees of freedom[12], the Sony analog controllers would meet this requirement, as each has sufficient sensors to provide the twelve directional inputs required to manipulate images in six degrees of freedom.

1. PlayStation Analog Joystick ("Flightstick")

I have reviewed a PlayStation Analog Joystick (Exhibit X) Sony's release of its PlayStation Analog Joystick ("Flightstick") was publicly announced in the United States in or about August of 1995, and the first public release took place in Japan on April 26, 1996. The Flightstick was not cited prior art during prosecution of either the '525 Patent or the '700 Patent.

The Flightstick has a directional pad (F) structured to rotate to activate four unidirectional sensors (SSS, TTT, UUU, VVV) located on a sheet (Z). Two analog joysticks (A, B), each are structured to activate two bi-directional sensors that are rotary potentiometers (RR, SS, TT, UU), which are electrically connected to a circuit board sheet (QQ) on which are mounted a plurality of finger depressible buttons (J, K, L, N, O, P, Q, R) with resilient dome caps (VV, WW, XX, YY, ZZ, AAA, BBB, CCC) structured to provide tactile feedback while actuating on/off sensors (DDD, EEE, FFF, GGG, JJJ, KKK, LLL, MMM).

[12] It does not appear that claims construed in this manner would have support in the specification.

2. Goto Patent

European Patent Application No. EP 0 867 212 A1, entitled "Operating Device for Game Machines" was filed by Teiyu Goto *et al.* on April 11, 1997, and was published on September 30, 1998 ("Goto") (Exhibit Y). Referring to Figure TT, below, Goto discloses virtually all of the elements contained in the '700 Patent, including the use of unidirectional sensors for directional control (8a, 8b, 8c, 8d), the use of pairs of bi-directional proportional rotational sensors to impart additional direction to a game (displayed as thumb joysticks 14a and 14b), and the use of multiple independent on/off buttons to impart additional game control (22, 23, 24, 11a, 11b, 11c, 11d, 17 and 18.) Goto was not disclosed to the patent office during prosecution of the '700 Patent.[13]

a) Goto discloses 3-D game control

Goto teaches the combination of these multiple input elements to provide three-dimensional control and complex character movements for a video game. (Goto, 16:4-10.) Specifically, Goto states that "This invention relates to an operating device used in a game machine employing a display device for, for example, a television receiver. More particularly, it relates to an operating device controlling the operation of rotating a display character displayed on a display screen, continuously changing its speed of movement or deforming the display character." (Goto, 1:5-11.)

[13] The subject matter of Goto is set forth in whole or part in U.S. Patent No. 6,231,444 ("'444 patent"), issued on May 15, 2001. The '444 patent is a cited reference but its teachings were not relied upon by the Examiner during prosecution of the '700 Patent, either alone or in combination with any references relied upon herein. The '444 Patent was the subject of an anticipation rejection for claims of U.S. Pat. App. No. 09/627,564, which application was filed shortly before the '700 Patent, and which was subsequently expressly abandoned by Armstrong. Additionally, the '444 patent was used in an obviousness rejection for claims of Armstrong's U.S. Pat. Appl. No. 09/721,848, resulting in Armstrong abandoning that application for failure to respond, despite Armstrong's 35 U.S.C. 120 priority claim allegedly predating the '444 patent's effective filing date.

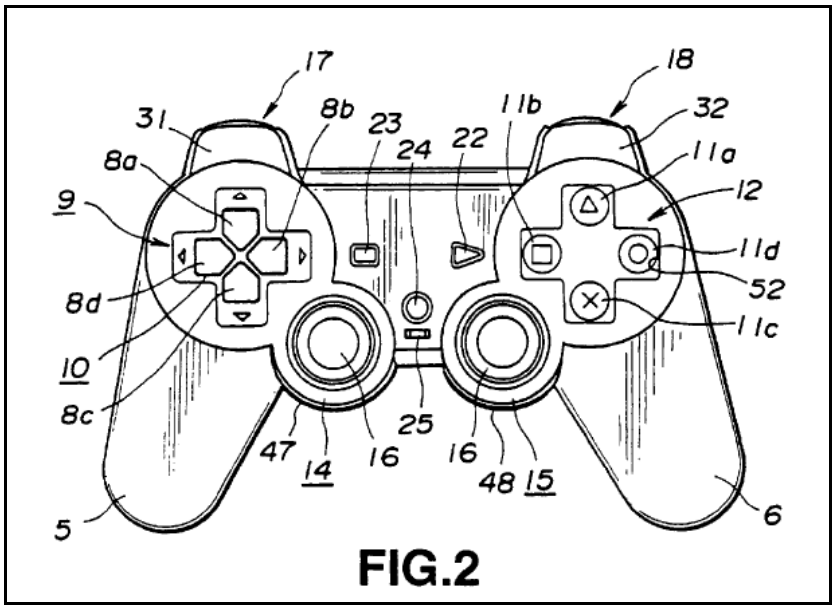

FIG.2

Fig. TT - Goto's Game Controller With Analog Joysticks, Multiple Independent Buttons

Goto further states: "by properly actuating the first to sixth operating units 9, 12, 14, 15, 17 or 18, not only can the display character be moved horizontally, but also the display character can be rotated or moved with accelerated movements in meeting with the game with the three-dimensional spatial picture." (Goto, 15:54 – 16:1.)

b) Goto discloses a circuit board and flexible sheet connected to unidirectional <u>sensors used for character movement</u>

Goto describes connecting a circuit board sheet to a flexible membrane sheet. Specifically, Goto describes mounting an elastic member to a circuit board with moveable contacts. (Goto, 8:57 – 9:8.) Goto further describes that: "The elastic member 35 is sandwiched between the circuit board 38 and the rotation actuating member 10 and includes four movable rubber contacts 34 in association with the first to fourth thrusting operators 8a to 8d." (Goto, 9: 32-35.)

Goto describes using unidirectional sensors for game control:

> On one end side of the main body portion 4 is mounted a first operating unit 9 having first to fourth thrusting operators 8a, 8b, 8c and 8d protruding from the upper surface of the main body portion 4 at right angles to each other, as shown in FIGS. 1 and 2. **The first to fourth thrusting operators 8a, 8b, 8c and 8d making up the first operating unit 9 are unified to a rotation actuating member 10 having its center portion supported for rotation and are arrayed at right angles to one another about the center of rotation of the rotation actuating member 10.** That is, the first to fourth thrusting operators 8a, 8b, 8c and 8d making up the first operating unit 9 are connected as one to one another. The first operator 9 is provided with switch devices, as signal input devices, in association with the first to fourth thrusting operators 8a, 8b, 8c and 8d. The first operator 9 operates as a direction command controller controlling the movement of the display character, such that, by selectively actuating the first to fourth thrusting operators 8a, 8b, 8c and 8d and by selectively turning on/off the switch devices associated with the thrusting operators, the display character is moved in the arraying direction of the thrust operators 8a, 8b, 8c or 8d.

(Goto, 5:37 – 6:1.)

c) Goto discloses use of bi-directional rotational sensors for increased axes of movement

Goto also describes using bi-directional sensors mounted in joysticks to provide additional directional control for the 3-D game. These sensors can be used to impart two additional axes of control each, allowing the controller to provide 3-D control, when used in conjunction with the other sensors in the controller. (Goto, 15:54 – 16:1.) The structure for the joysticks involves the use of two rotational sensors each, and the joysticks are arranged so that they can be operated by the thumbs of the user (*see* Fig. TT, above):

> The third operating unit 14 has a multi-directional input device as shown in FIG. 14. This multi-directional input device has a box-shaped upper frame 50 and an arched first interlock member 51, as shown in FIG. 14. This interlock member 51 has its warped end 52 engaged by a rotational shaft 54 of a first variable resistor **53a constituting a rotary detector** secured to a lateral side 50a of the upper frame 50. The interlock member 51 has on its opposite warped end 52 a boss 55 loosely fitted in an opening 56 formed in a lateral side 50b facing the lateral side 50a of the frame 50 for

> rotatably supporting the first interlock member 51 on the upper frame 50.
>
> An operating shaft 57 is mounted at the center of the upper frame 50. This operating shaft 57 has a saucer-shaped operating member 58 and a disk 59 at its mid portion. This disk 59 has an orifice 60 and a rotation member 16 is mounted on the upper end of the operating shaft 57.
> Within the upper frame 50 is arranged a second interlock member 62 extending at right angles to the operating shaft 57. The second interlock member 62 has a center ball 63 from which are transversely extended a pair of arms 64a, 64b. An elongated slot 65 extends from the upper surface to the lower surface of the ball 63. The operating shaft 57 and the disk 59 are inserted into the elongated slot 65. After registration of the orifice 60 in the disk 59 relative to a lateral side opening 66 in the ball 63, a pin 67 is inserted into the opening 66 and the orifice 60. The operating shaft 57 is thus mounted on the second interlock member 62 for rotation in the elongated slot 65 with the pin 67 as the center of rotation.
>
> The end of the arm 64a of the second interlock member 62 is engaged with the **rotary shaft 54 of the second variable resistor 53b** secured to a lateral side 50c of the upper frame 50, while the end of the opposite side arm 64b is fitted in an elongated opening 70 formed in the lateral side 50d of the upper frame 50 so as to protrude outwardly from the lateral side 50d of the upper frame 50. The operating shaft 57 is passed through the elongated slot 71 in the first interlock member 51 so as to protrude outwards via an opening 72 in the upper surface of the upper frame 50.

(Goto, 12:7-50.)

d) Goto discloses use of multiple additional independent <u>buttons for selecting and performing game functions</u>

Goto also describes using additional on/off buttons to start a game and to select difficulty of the game: "Between the first operating unit 9 and the second operating unit 12 on the upper surface of the main body portion 4 are mounted, side-by-side, a start switch 22 for commanding start of a game and a selection switch 23 for selecting, at the time of starting the game, the degree of ease or difficulty with which the game is played." (Goto, 6:55 – 7:3.) Goto further

discloses additional independent buttons on the right side of the controller for character control or to set other game functions. (Goto, 6:3-18.)

e) Goto discloses use of a motor and offset weight to provide active tactile feedback to a user's hand

Finally, Goto describes the use of tactile feedback vibration within the handles of the controller to increase the reality of game play, though the use of a motor and offset weight: (*See* Fig. UU, below.)

Goto explains the use of this active tactile feedback as comprising a motor and offset weight mounted in the housing of the handle of the game controller:

> The operating device 1 of the present invention is provided with a **vibration imparting mechanism 92** for imparting vibrations to the user so that the game will be played with a higher simulated reality feeling. This vibration imparting mechanism 92 is provided on the proximal end of the first grip portion 5 held by the left hand when the user grips the operating device 1. This vibration imparting mechanism 92 is made up of a driving motor 93 driven by a driving command signal supplied from the main body portion of the game machine and an **offset member 95 mounted on a driving shaft 94 of the driving motor 93**. The offset member 95 is formed by a metallic member of a large weight mass to constitute a semi-circular weight 95a offset with respect to a fitting hole 96 into which is fitted the driving shaft 94 and which operates as a center of rotation.

(Goto, 14:43 –15:12.)

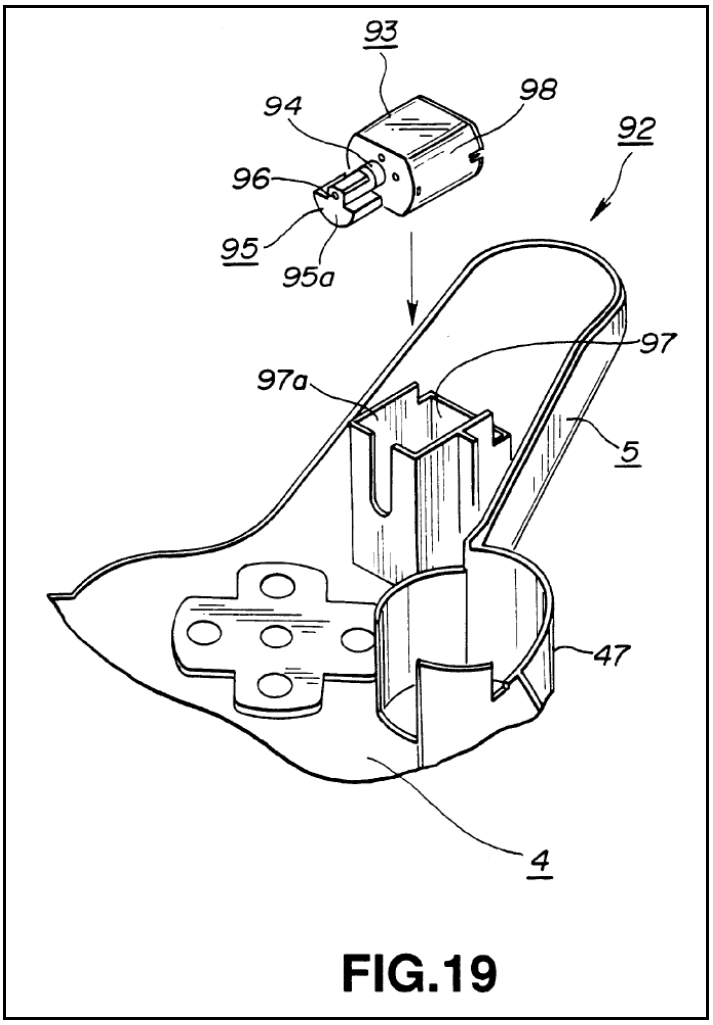

Fig. UU - Goto's Motor and Offset Weight For Providing Vibration Tactile Feedback

Thus, over two years before the '700 Patent Application was filed, Goto had disclosed the vast majority of functions and/or elements that Armstrong claimed were novel in the '700 Patent. Those few elements not disclosed were obvious in view of prior art controllers available at the time, as partially reflected in the remaining references.

3. Sony PlayStation® Analog Controller Manual[14]

The use of multiple analog and on/off controls in a controller with a printed circuit board was well-known two years before Armstrong filed the '700 Patent application. The Sony

[14] The PlayStation® Manual was not disclosed to the patent office during prosecution of the '700 Patent.

> **About the Vibration Feature**
> The accompanying Analog Controller is a sensory controller that has a vibration feature. Turning the vibration feature on or off can be manipulated on a screen in the software.

PlayStation® Manual, p. 9. (Emphasis in original.)

Thus, no less than two years before Armstrong filed his application for the '700 Patent, Sony had both published its patent application claiming a controller containing most of the features claimed as "novel" in the '700 Patent, and explained many of its features and functions in a separate written publication.

4. The Sony Dual Shock Controller

I have reviewed the internal assembly of a Sony Dual Shock Controller (Exhibit AA), which was publicly released in the United States on May 6, 1998. The Dual Shock has many if not most of the features described in the Goto patent and in the Sony PlayStation® Analog Controller Manual, including:

- A housing (WW)
- A "D-pad" input member (A) which pivots to activate on/off sensors (S, T, SS, TT) to sense rotation about two axes
- Two thumbstick input members (B, C), each activating two rotary sensors to sense rotation about two axes (VV, XX, YY, ZZ)
- Multiple thumb-depressible buttons on the face of the controller (D, E, F, G, H, I, J) with dome caps (CC-LL, NN, OO) to provide tactile feedback
- Multiple finger-depressible shoulder buttons (K-N) on the top of the controller, some of which (M, N) pivot upon depression to activate on/off sensors
- On/off sensors (O-T, SS, TT, AAA-CCC, V, W, Y, PP) for all finger and thumb-depressible buttons mounted to circuit board sheet(s)
- A ribbon cable (UU) electrically connecting two rigid circuit boards (U, RR) located on separate planes of the controller, which circuit boards electrically and structurally connect to the sensors of the input member and finger depressible buttons
- Two rumble motors (BB, MM) in the housing (WW) of the controller providing tactile feedback
- A sheet connecting to a large number of the sensors (U, RR)

5. The Sony Dual Shock 2 Controller

The Sony Dual Shock 2 Controller was very similar to its predecessor Dual Shock Controller, but had the primary additional feature of having analog buttons and a flexible membrane sheet connected to sensors for the input members and finger depressible buttons. I have reviewed a Sony Dual Shock 2 Controller (Exhibit BB), which was publicly released in the United States on before the November 16, 2000 filing date of the '700 Application, with a press release announcing both its upcoming U.S. release, and the addition of the analog button feature dated September 13, 1999 ("1999 Sony Press Release," Exhibit CC). The Dual Shock II controller has all of the features that were present in the publicly available Dual Shock Controller.

- A housing (GGG)
- A "D-pad" input member (A) which pivots to activate on/off sensors (S, T, SS, TT) to sense rotation about two axes
- Two thumbstick input members (B, C), each activating two rotary sensors to sense rotation about two axes (Q, R, S, T)
- Multiple thumb-depressible buttons on the face of the controller (D, E, F, G, H, I, J) with dome caps (PP-ZZ) to provide tactile feedback
- Multiple finger-depressible shoulder buttons (K-N) on the top of the controller
- A flexible membrane sheet (U) connected to a rigid circuit board (OO) located on separate planes of the controller, which electrically and structurally connects to the sensors of the input member and finger depressible buttons
- Two rumble motors (O, P) in the housing (GGG) of the controller providing tactile feedback
- A sheet connecting to a large number of the sensors (U, OO)

Additionally, Dual Shock II provided a full flexible membrane sensor sheet (U) connected to the rigid circuit board, rather than a simple ribbon cable, which sheet was directly structurally and electrically connected to the sensors of the finger depressible buttons (X-Z, AA-JJ), some of which were analog sensors which allowed the button sensors of both the thumb-depressible buttons on the face of the controller (X, Y, Z, AA), and the controller's finger depressible shoulder buttons (K, L, M, N) to create data proportionate to the amount of force

applied to the buttons. Because analog buttons were well-known at the time of the Sony's 1999 Press Release announcing Dual Shock 2's analog functionality for its buttons, and because there was already circuitry built into the first Dual Shock controller for taking analog input (from thumbsticks) and converting it into a digital signal, the press release would have enabled one of ordinary skill in the art to place analog buttons in the Dual Shock controller to provide analog functionality with little to no experimentation.

There are a number of different types of sensors working in different ways that are each capable of providing proportional output to a button. Some examples include: hall effect sensors, potentiometers, force sensing resistors and pressure sensitive variable conductance sensors. One of ordinary skill in the art would be aware of these various sensors, and it would have been within his skill to select from among them to provide the desired proportional output from a finger depressible button in the desired manner.

E. <u>O'Mara Patent</u>

Use of pressure-sensitive variable-conductance material to generate variable analog output from a pivotal or non-pivotal button while providing tactile feedback to a user operating a controller for electronic games was disclosed in U.S. Pat. No. 5,510,812 to Kerry O'Mara et al., entitled "Piezoresistive Input Device," issued on April 23, 1996 (Exhibit DD). O'Mara was neither cited nor relied upon by the Examiner during prosecution of the '525 Patent. While O'Mara was cited by applicant during prosecution of the '700 Patent, it does not appear that Examiner considered it in conjunction with other references cited herein, most of which were not before Examiner during prosecution.

The O'Mara patent uses the term "piezoresistive" to refer to electrically conductive material with a resistance that varies with the amount of pressure applied—in other words—a pressure-sensitive variable-conductance material. (O'Mara, 3:44-50.) At the time of the O'Mara

5. Claim 19 of the '700 Patent is invalid as anticipated and/or obvious[25]

A hand operated controller comprising structure allowing hand inputs rotating a platform on two mutually perpendicular axes to be translated into electrical outputs by four unidirectional sensors to allow controlling objects and navigating a viewpoint, the controller including a tactile feedback means for providing vibration detectable by the user through the hand operating the controller;

a second element movable on two mutually perpendicular axes, said second element structured to activate two bi-directional proportional sensors providing outputs at least in part controlling objects and navigating a viewpoint;

a third element movable on two mutually perpendicular axes, said third element structured to activate two bi-directional proportional sensors providing outputs at least in part controlling objects and navigating a viewpoint;

a plurality of independent finger depressible buttons, each button associated with a button sensor, said button sensor outputs at least On/Off data to allow controlling of the objects.

a) Claim 19 is anticipated by Flightstick

Flightstick contains all of the claimed elements, set forth above.

[25] To the extent that controlling objects and navigating a viewpoint is viewed as a limitation of these claims, and requires software, that Anascape never addressed such a limitation in its patents or in its infringement contentions. As I understand these terms, neither the prior art controllers nor the accused controllers work in a vacuum and only provide inputs to a computer system, whose capabilities are defined by the software running on them. It is this software which would interpret the output signals to perform functions in a game, such as controlling objects and navigating a viewpoint. The controller by itself is incapable of doing so. To the extent that Anascape alleges that the accused controllers satisfy these elements of the claim, however, the listed prior art would also satisfy these elements, thus rendering invalid Claim 19 and its dependents. Additionally, the Magellan 3D Controller AutoCAD manual, which was included with the Magellan 3D Controller, discloses using the controller to move either an object or a viewpoint, so to the extent that this is viewed as a limitation of the claims, it would have been obvious over the cited Magellan prior art combinations in view of the Magellan 3D Controller AutoCAD Manual.

To the extent that claims 19-20 and 22-23 of the '700 Patent require as a limitation actually controlling objects and navigating a viewpoint, the claims would still be obvious over the prior art references applied to the claims herein in further view of the 6DOF game Descent discussed in the introduction. Descent allows the player to both control objects and manipulate the player's viewpoint (a spaceship). Descent for the PC is specifically designed to operate with the Cyberman controller. Further, Descent was also released for the Sony Playstation in 1995. Accordingly, it would have been obvious to combine the operation of the Sony controllers (e.g., Dual Shock) with the Descent video game for the Sony Playstation, as there is an express motivation in the video game documentation of each version to use the respective video game controllers.

b) Claim 19 is further anticipated by Himoto

Himoto either recites or inherently discloses all of the claimed elements, set forth above.

c) Claim 19 is further anticipated by Dual Shock

Dual Shock contains all of the claimed elements, set forth above.

d) Claim 19 is further anticipated by Dual Shock 2

Dual Shock 2 contains all of the claimed elements, set forth above.

e) Claim 19 is obvious over CyberMan in view of Armstrong's admissions in the '891 Patent

CyberMan contains all the elements of claim 19 as set forth above, with the exception that the third "element" in CyberMan (the shaft of the handle) does not activate bi-directional proportional sensors, but rather corresponding pairs of on/off sensors. It would have been obvious to replace these pairs of on/off sensors with bi-directional proportional sensors, as this was well-known in the art. In addition, Armstrong had previously suggested that this substitution was possible, stating in the '891 Patent that:

> simple on-off contact sensors will indicate the direction that the [input member] is moved but only if it is moved a significant amount positionally sufficient to activate the sensor, and the on-off contact sensor will provide information describing whether the [input member] is at the sensor or not at the sensor, which in either case is valuable and useful information. A more sophisticated proportional positional sensor such as a potentiometer or optical positional sensor, etc. will indicate direction and position to a greater degree . . . . For the purposes of this disclosure the term "sensor" or "sensors" is considered to include not only proximity sensors; variable resistive and/or capacitive sensors, piezo sensors, variable voltage/amperage limiting or amplifying sensors and switches, potentiometers, resistive and optical encoders and the like, but to also include simple on/off switches.

(Armstrong '891, 3:7-15, 25-31.) Thus, it would have been obvious to replace the unidirectional sensors in the handle of CyberMan with bi-directional proportional sensors, such as potentiometers, to "indicate direction and position to a greater degree."

f) Claim 19 is further obvious over CyberMan in view of Magellan 3-D Controller

CyberMan contains all the elements of claim 19 as set forth above, with the exception that the third "element" in CyberMan (the shaft of the handle) does not activate bi-directional proportional sensors, but rather unidirectional sensors. It would have been obvious to replace these unidirectional sensors with bi-directional proportional sensors, as this was well-known in the art. One motivation to do so is found in Armstrong's own admissions:

> [a] more sophisticated proportional positional sensor such as a potentiometer or optical positional sensor, etc. will indicate direction and position to a greater degree . . . .

(Armstrong '891, 3:7-15.)

In fact, Logitech's Magellan 3-D Controller, which was available at the same time that Logitech was selling CyberMan, used six proportional sensors to capture the required six degrees of freedom of its hockey-puck shaped single input member. Because Logitech manufactured and sold both controllers, it would have been well within the knowledge of Logitech's engineers to replace one type of sensor with another.

Thus, it would have been obvious to replace the two pairs of on/off sensors in the handle of CyberMan with two bi-directional proportional sensors, such as potentiometers, used in Magellan 3-D Controller to "indicate direction and position to a greater degree," rendering the claim obvious over the prior art.

g) Additional claim rejections incorporated from Microsoft's Reexamination Request

Additionally, claim 19 is either anticipated by or obvious over the following prior art, as set forth in Microsoft's request for reexamination, which is attached as Exhibit HH, and incorporated by reference.

Claim 19 is Anticipated by:

Goto

Claim 19 is Obvious Over:

Goto in view of Armstrong's Admissions
Goto in view of PlayStation® Manual
Armstrong '891 in view of Armstrong's Admissions
Armstrong '891 in view of Armstrong '828

6. Claim 20 of the '700 Patent is invalid as anticipated and/or obvious

A hand operated controller according to claim 19 wherein the sensors are connected by at least one sheet.

a) Claim 20 is anticipated by Dual Shock

See discussion of Claim 19, above. Dual Shock contains all of the additional elements in Claim 20.

b) Claim 20 is anticipated by Flightstick

See discussion of Claim 19, above. Flightstick contains all of the additional elements in Claim 20.

c) Alternatively, Claim 20 is obvious over Dual Shock in view of Saturn 3D

Dual Shock contains all of the claimed elements, set forth above, but the sensors for the first input member's unidirectional sensors, and the sensors for the finger-depressible buttons are mounted to a circuit board connected by a flexible ribbon cable to a second circuit board to which are mounted the four bi-directional proportional sensors for the two thumbsticks. The Saturn 3D has a similar structure to Dual Shock, with the exception that all of the sensors for the input members and finger-depressible buttons are mounted to a single circuit board. Thus, it would have been obvious to replace the two circuit board structure of Dual Shock with a single circuit board connected to all sensors, as in Saturn 3D.

d) Claim 20 is further anticipated by Dual Shock 2

See discussion of Claim 19, above. Dual Shock 2 contains all of the additional elements in Claim 20.

e) Alternatively, Claim 20 is obvious over Dual Shock 2 in view of Saturn 3D

Dual Shock 2 contains all of the claimed elements, set forth above, but the sensors for the first input member's unidirectional sensors, and the sensors for the finger-depressible buttons are mounted to a flexible membrane sheet circuit board connected to a second circuit board to which are mounted the four bi-directional proportional sensors for the two thumbsticks. The Saturn 3D has a similar structure to Dual Shock 2, with the exception that all of the sensors for the input members and finger-depressible buttons are mounted to a single rigid circuit board, which in turn is connected to a flexible ribbon cable. Thus, it would have been obvious to replace the two circuit board structure of Dual Shock 2 with a single circuit board connected to all sensors, as in Saturn 3D.

f) Claim 20 is further obvious over CyberMan in view of Armstrong's admissions in the '891 Patent

See discussion of Claim 19, above. CyberMan contains all of the additional elements in Claim 20.

g) Claim 20 is further obvious over CyberMan in view of Magellan 3-D Controller

See discussion of Claim 19, above. CyberMan contains all of the additional elements in Claim 20.

h) Claim 20 is further obvious over Himoto in view of Saturn 3D

Himoto either recites or inherently discloses all of the claimed elements, set forth above, other than putting the sensors for all three elements as well as the sensors for the finger-depressible on a single sheet or at least one sheet. Himoto's disclosed modifications, however,

are modifications to a controller very similar in structure to the Saturn 3D controller, a controller made by Sega, the Himoto applicant. The Saturn 3D controller has all of its sensors mounted to a single circuit board sheet, so it would have been obvious to place all the sensors from the controller disclosed in Himoto onto a single sheet.

i) Additional claim rejections incorporated from Microsoft's Reexamination Request

Additionally, claim 20 is either anticipated by or obvious over the following prior art, as set forth in Microsoft's request for reexamination, which is attached as Exhibit HH, and incorporated by reference.

Claim 20 is Anticipated by:

Goto

Claim 20 is Obvious Over:

Goto in view of Armstrong's Admissions
Goto in view of Chandler
Goto in view of PlayStation® Manual
Armstrong '891 in view of Armstrong's Admissions
Armstrong '891 in view of Armstrong '828

7. Claim 22 of the '700 Patent is invalid as anticipated and/or obvious

A hand operated controller according to claim 19 wherein said button sensor outputs data proportionate to depression of one of said buttons.

a) Claim 22 is anticipated by Himoto

Himoto either recites or inherently discloses all of the claimed elements, set forth above.

b) Claim 22 is further anticipated by Dual Shock 2

Dual Shock 2 contains all of the claimed elements, set forth above.

c) Claim 22 is obvious over Dual Shock in view of Saturn 3D

Dual Shock contains all the elements of claim 22, as set forth above, other than buttons with sensors outputting a proportional signal, an element set forth in Saturn 3D. It would have

CyberMan with proportional buttons from Kramer or Furukawa '760, because CyberMan already included circuitry to collect analog data relating to translation of the input member and convert it to digital data for transmission to a game console, so one wishing to get analog control from the finger-depressible buttons would naturally look to other disclosures of buttons providing such control. Kramer and Furukawa '760 each disclose the use of pressure-sensitive material with the finger-depressible buttons of game controllers or other entertainment electronics, and it would be obvious to combine them with CyberMan, which is a game controller with finger-depressible buttons.

h) Additional claim rejections incorporated from Microsoft's Reexamination Request

Additionally, claim 22 is obvious over the following prior art, as set forth in Microsoft's request for reexamination, which is attached as Exhibit HH, and incorporated by reference.

Claim 22 is Obvious Over:

Goto in view of Furukawa '760
Goto in view of Kramer
Goto in view of O'Mara
Goto in view of Saturn 3D Control Pad Manual
Goto in view of O'Mara, in further view of Kramer
Armstrong '891 in view of Armstrong's Admissions
Armstrong '891 in view of Armstrong '828
Armstrong '891 in view of Armstrong '828, in further view of Kramer
Armstrong '891 in view of Armstrong '828, in further view of O'Mara
Armstrong '891 in view of Armstrong '828 and in further view of Furukawa '760

8. Claim 23 of the '700 Patent is invalid as anticipated and/or obvious

A hand operated controller according to claim 22 wherein the bi-directional proportional sensors are rotary potentiometers.

a) Claim 23 is anticipated by Dual Shock 2

Dual Shock 2 contains all of the claimed elements, set forth above.

b) Claim 23 is obvious over Himoto

112.		tactile feedback means for providing vibration detectable by the user of said electronic game, said tactile feedback means supported within said controller.	Goto. See Element 10.
113.	**18.**	A 3-D graphics controller according to claim 17 wherein the first and the second proportional sensors are each unidirectional sensors.	Goto. As to Claim 18, Goto discloses a 3-D graphics controller with unidirectional sensors. See Element 7. Kramer. As to Claim 18, Kramer discloses proportional sensors that are unidirectional. See Elements 108 and 110. The proportional sensors disclosed in Kramer were unidirectional sensors, as opposed to bi-directional sensors, such as potentiometers or rotary encoders.
114.	**19.**	A hand operated controller comprising structure allowing hand inputs rotating a platform on two mutually perpendicular axes to be translated into electrical outputs by four unidirectional sensors to allow controlling objects and navigating a viewpoint, the controller including a	Goto. As to Claim 19, Goto describes a hand-operated controller with structure allowing hand inputs rotating a platform on two mutually perpendicular axes to be translated into electrical outputs by four unidirectional sensors to allow controlling objects and navigating a viewpoint, including a tactile feedback means for providing vibration detectable by the user through the hand operating the controller. (Goto, Figs. 1 and 2; Col. 5, line 37 – Col. 6, line 1; Col. 14, lines 43-46; Col. 15, line 54 – Col. 16, line 1; Col. 16, lines 4-10.) Specifically, Goto describes "On one end side of the main body portion 4 is mounted a first operating unit 9 having **first to fourth thrusting operators 8a, 8b, 8c and 8d protruding from the upper surface of the main body portion** 4 **at right angles to each other**, as shown in FIGS. 1 and 2. The first to fourth thrusting operators 8a, 8b, 8c and 8d making up the first operating unit 9 are unified to a rotation actuating member 10 having its center portion supported for rotation and are arrayed at right angles to one another about the center of rotation of the rotation actuating member 10. That is, the first to fourth thrusting operators 8a, 8b, 8c and 8d making up the first operating unit 9 are connected as one to one another. The first operator 9 is provided with **switch devices, as signal input devices, in association with the first to**

		tactile feedback means for providing vibration detectable by the user through the hand operating the controller;	**fourth thrusting operators 8a, 8b, 8c and 8d.** The first operator 9 operates as a **direction command controller controlling the movement of the display character**, such that, by selectively actuating the first to fourth thrusting operators 8a, 8b, 8c and 8d and by selectively turning on/off the switch devices associated with the thrusting operators, the display character is moved in the arraying direction of the thrust operators 8a, 8b, 8c or 8d." (Goto, Col. 5, line 37 – Col. 6, line 1.) Goto further states that: "by properly actuating the first to sixth operating units 9, 12, 14, 15, 17 or 18, not only can the display character be moved horizontally, but also the display character can be rotated or moved with accelerated movements in meeting with the game with the **three-dimensional spatial picture**." (Goto, Col. 15, line 54 – Col. 16, line 1.) Finally, Goto states that: "Thus, by using the operating device 1 for the game machine according to the present invention, the display character can perform **complex movements to carry out a game program** with improved simulated reality feeling. For example, such a game can be played in which **an airplane or a submarine is moved through a three-dimensional spacing**." (Goto, Col. 16, lines 4-10.) Goto further discloses that: "The operating device 1 of the present invention is provided with a **vibration imparting mechanism 92 for imparting vibrations to the user** so that the game will be played with a higher simulated reality feeling." (Goto, Col. 14, lines 43-46.)
115.		a second element movable on two mutually perpendicular axes, said second element structured to activate two bi-directional proportional sensors providing outputs at least in part controlling objects and navigating a	Goto. See Element 5. See also Goto, Col. 15, line 54 – Col. 16, line 1; Col. 16, lines 4-10. Goto further states that: "by properly actuating the first to sixth operating units 9, 12, 14, 15, 17 or 18, not only can the display character be moved horizontally, but also the display character can be rotated or moved with accelerated movements in meeting with the game with the **three-dimensional spatial picture**." (Goto, Col. 15, line 54 – Col. 16, line 1.) Finally, Goto states that: "Thus, by using the operating device 1 for the game machine according to the present invention, the display character can perform **complex movements to carry out a game program** with improved simulated reality feeling. For example, such a game can be played in which **an airplane or a submarine is moved through a three-dimensional spacing**." (Goto, Col. 16, lines 4-10.) Further, as stated above, Goto specifically describes use of the various elements (unidirectional

		viewpoint;	sensors coupled with the two sets of two potentiometers to allow 3D game control. To the extent that bidirectional sensors are used to provide output for the third through sixth axes of control after using unidirectional sensors for the first two axes of control consistent with the disclosure of Goto, these axes would necessarily and inherently be mutually perpendicular to one another. Since Goto inherently disclosed providing the claimed feature, it is anticipated or obvious in the '700 Patent. (*See* MPEP § 2112 ("The express, implicit, and inherent disclosure of a prior art reference may be relied up on in the rejection of claims under 35 U.S.C. § 102 or 103.").) <u>Applicant's Admissions</u> It is generally known that full 3-D movement requires three axes of movement (up-down, left-right, forward-backward) and further requires rotation about each of these axes (also referred to as yaw, pitch and roll). For reference on this point, see Applicant's admissions in Armstrong '828, Col. 2, lines 32-49.) <u>PlayStation® Manual</u>. See Element 17. Additionally, a joystick is implicitly moveable on two mutually perpendicular axes. (*See* MPEP § 2112 ("The express, implicit, and inherent disclosure of a prior art reference may be relied up on in the rejection of claims under 35 U.S.C. § 102 or 103.").)
116.		a third element movable on two mutually perpendicular axes, said third element structured to activate two bi-directional proportional sensors providing outputs at least in part controlling objects and	<u>Goto</u>. See Element 6. See also Goto, Col. 15, line 54 – Col. 16, line 1; Col. 16, lines 4-10. Goto further states that: "by properly actuating the first to sixth operating units 9, 12, 14, 15, 17 or 18, not only can the display character be moved horizontally, but also the display character can be rotated or moved with accelerated movements in meeting with the game with the **three-dimensional spatial picture**." (Goto, Col. 15, line 54 – Col. 16, line 1.) Finally, Goto states that: "Thus, by using the operating device 1 for the game machine according to the present invention, the display character can perform **complex movements to carry out a game program** with improved simulated reality feeling. For example, such a game can be played in which **an airplane or a submarine is moved through a three-dimensional**

		navigating a viewpoint;	**spacing**." (Goto, Col. 16, lines 4-10.) Further, as stated above, Goto specifically describes use of the various elements (unidirectional sensors coupled with the two sets of two potentiometers to allow 3D game control. To the extent that bidirectional sensors are used to provide output for the third through sixth axes of control after using unidirectional sensors for the first two axes of control consistent with the disclosure of Goto, these axes would necessarily and inherently be mutually perpendicular to one another. Since Goto inherently disclosed providing the claimed feature, it is anticipated or obvious in the '700 Patent. (*See* MPEP § 2112 ("The express, implicit, and inherent disclosure of a prior art reference may be relied up on in the rejection of claims under 35 U.S.C. § 102 or 103.").) Applicant's Admissions It is generally known that full 3-D movement requires three axes of movement (up-down, left-right, forward-backward) and further requires rotation about each of these axes (also referred to as yaw, pitch and roll). For reference on this point, see Applicant's admissions in Armstrong '828, Col. 2, lines 32-49.) PlayStation® Manual. See Element 18. Additionally, a joystick is implicitly if not inherently moveable on two mutually perpendicular axes. (*See* MPEP § 2112 ("The express, implicit, and inherent disclosure of a prior art reference may be relied up on in the rejection of claims under 35 U.S.C. § 102 or 103.").)
117.		a plurality of independent finger depressible buttons, each button associated with a button sensor, said button sensor outputs at least On/Off data to allow	Goto. Goto describes a plurality of independent finger-depressible buttons, each associated with a sensor to output at least on/off data to allow controlling of objects. (Goto, Col. 6, lines 3-18; Col. 6, line 55 – Col. 7, line 3.) Specifically, Goto describes buttons to start a game and to select difficulty of the game: "Between the first operating unit 9 and the second operating unit 12 on the upper surface of the main body portion 4 are mounted, side-by-side, **a start switch 22 for commanding start of a game and a selection switch 23 for selecting, at the time of starting the game, the degree of**

		controlling of the objects	**ease or difficulty with which the game is played**." (Goto, Col. 6, line 55 – Col. 7, line 3.) Goto further discloses additional independent buttons for game control: "On the opposite side of the main body portion 4 is mounted a second operating unit 12 having protuberant first to fourth thrusting operators 11a, 11b, 11c and 11d arrayed at right angles to one another. **These first to fourth thrusting operators 11a, 11b, 11c and 11d are formed as independent members and switch devices as signal input devices are mounted in association with these thrusting operators** 11a, 11b, 11c and 11d By turning on the switch devices associated with the first to fourth thrusting operators 11a, 11b, 11c and 11d, the **second operating unit 12 sets the functions of the display character allocated to the thrusting operators 11a, 11b, 11c and 11d or executes the functions of the display character**, the second operating unit 12 thus operating as a function setting and/or executing section." (Goto, Col. 6, lines 3-18.) PlayStation® Manual. See Element 19. Additionally, the buttons used for game control would inherently control movement of objects. (*See* MPEP § 2112 ("The express, implicit, and inherent disclosure of a prior art reference may be relied up on in the rejection of claims under 35 U.S.C. § 102 or 103.").)
118.	**20.**	A hand operated controller according to claim 19 wherein the sensors are connected by at least one sheet.	Goto. As to Claim 20, Goto discloses a hand operated controller wherein the sensors are connected by at least one sheet. See Elements 4 and 83. Applicant's Admissions. See Element 4. Chandler. See Element 83.
119.	**21.**	A hand operated controller according to claim 20 wherein said at least one sheet comprises a flexible membrane sheet connected to a	Goto. As to Claim 21, Goto discloses a hand operated controller with a flexible membrane sheet connected to a substantially rigid circuit board. See Element 3. Applicant's Admissions. As to Claim 21, Applicant's Admissions disclose a hand operated controller with a flexible membrane sheet connected to a substantially rigid circuit board. See

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