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(56) Documents Cited:
GB 2198216 A **GB 2175729 A**
EP 1000643 A2 **EP 0915412 A2**
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(54) Abstract Title: **A dual analogue controller games in the form of an action figure, robot or animal**

(57) A controller, for a dual analog controller games system, has the form of an action figure, robot or animal having a base 62, a torso 64 and a arm or arms connected to the torso, wherein a first analogue stick input is obtained by detecting tilting in two planes of the torso relative to the base and where a second analogue stick input is partially obtained from rotation of the arm relative to the torso and partially from rotation of the torso relative to the base. Other buttons or switches; inertial or contact sensor to detect lifting of the controller; and wired or wireless connection to the games system may be provided.

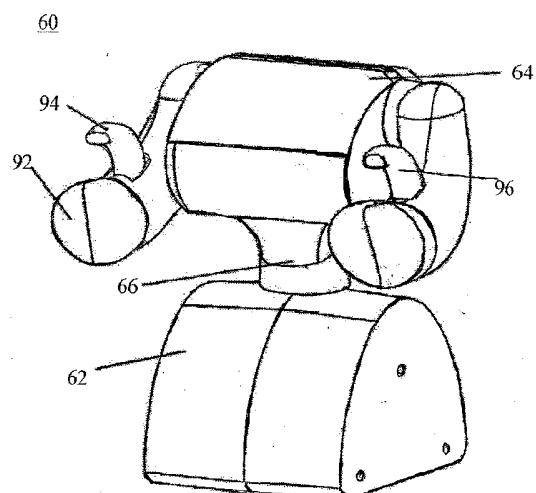


Figure 5

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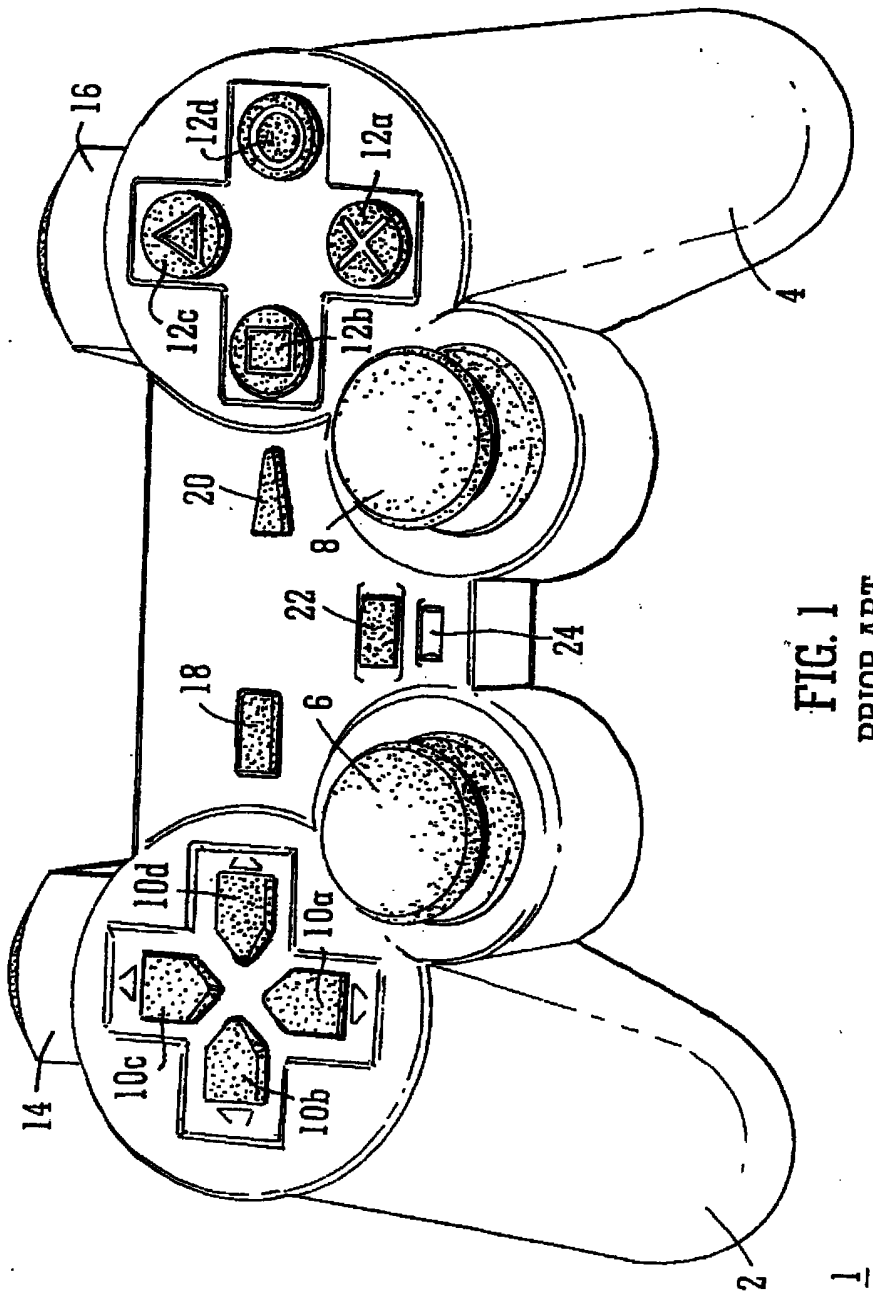


FIG. 1
PRIOR ART

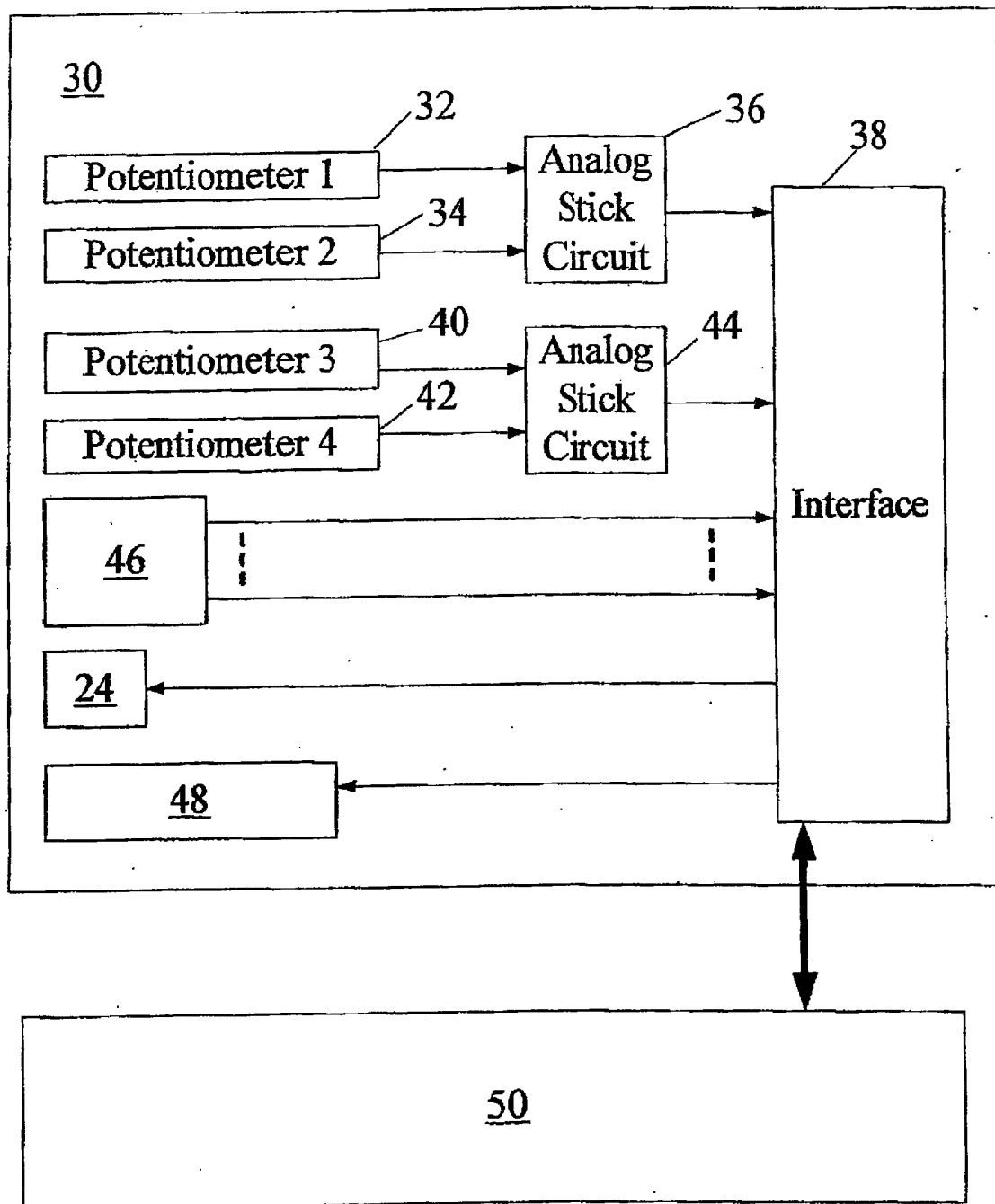


Figure 2

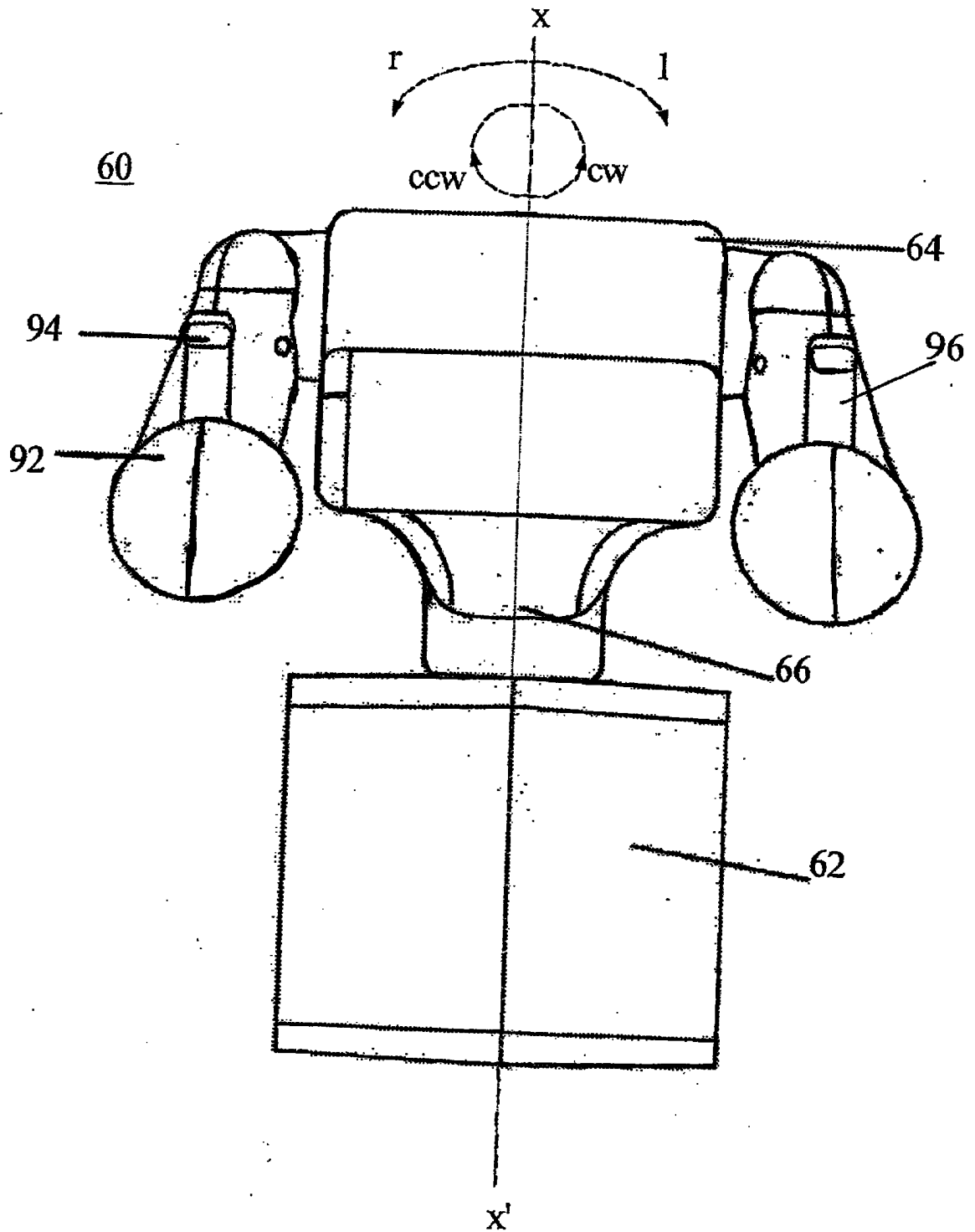


Figure 3

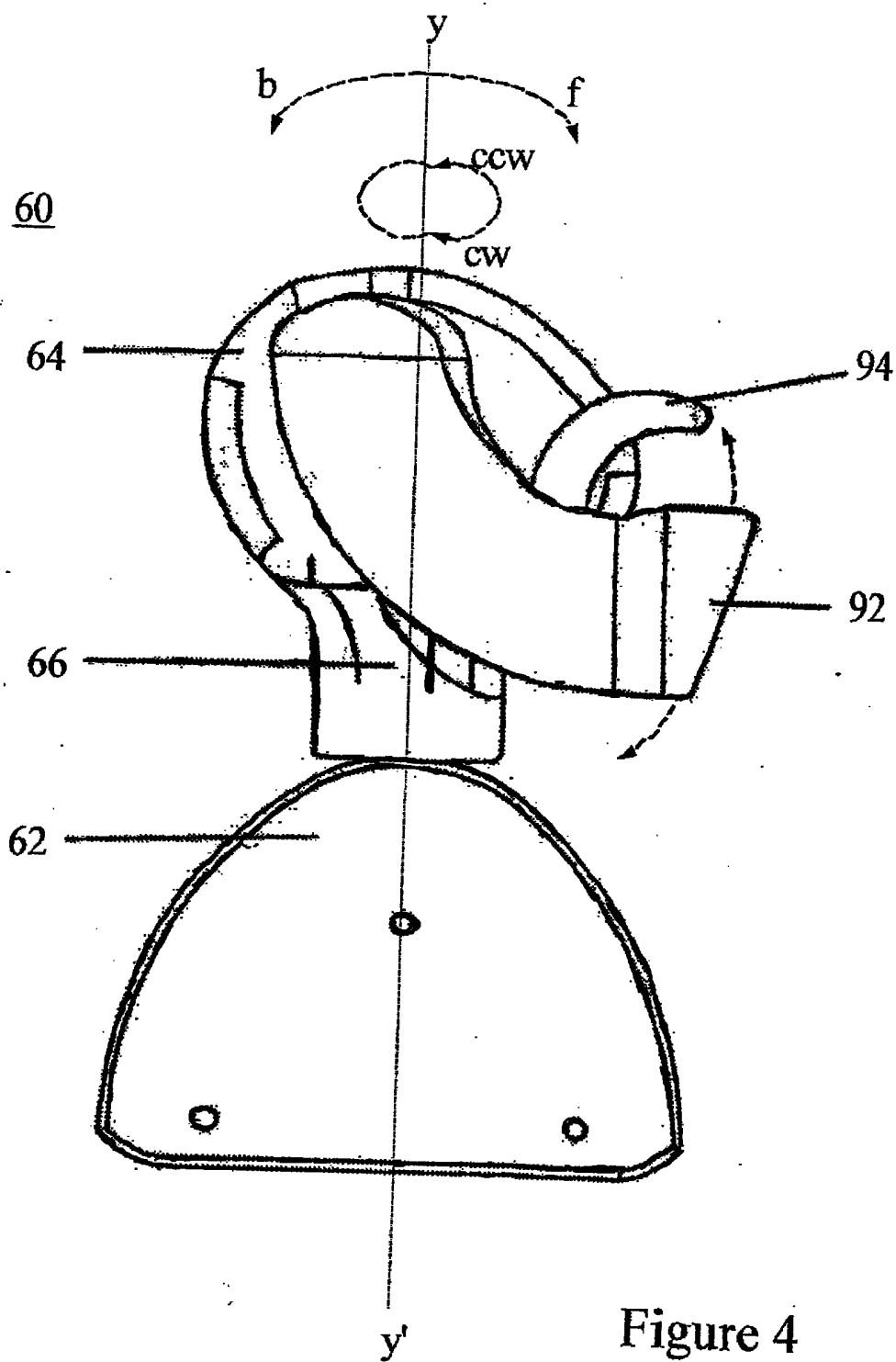


Figure 4

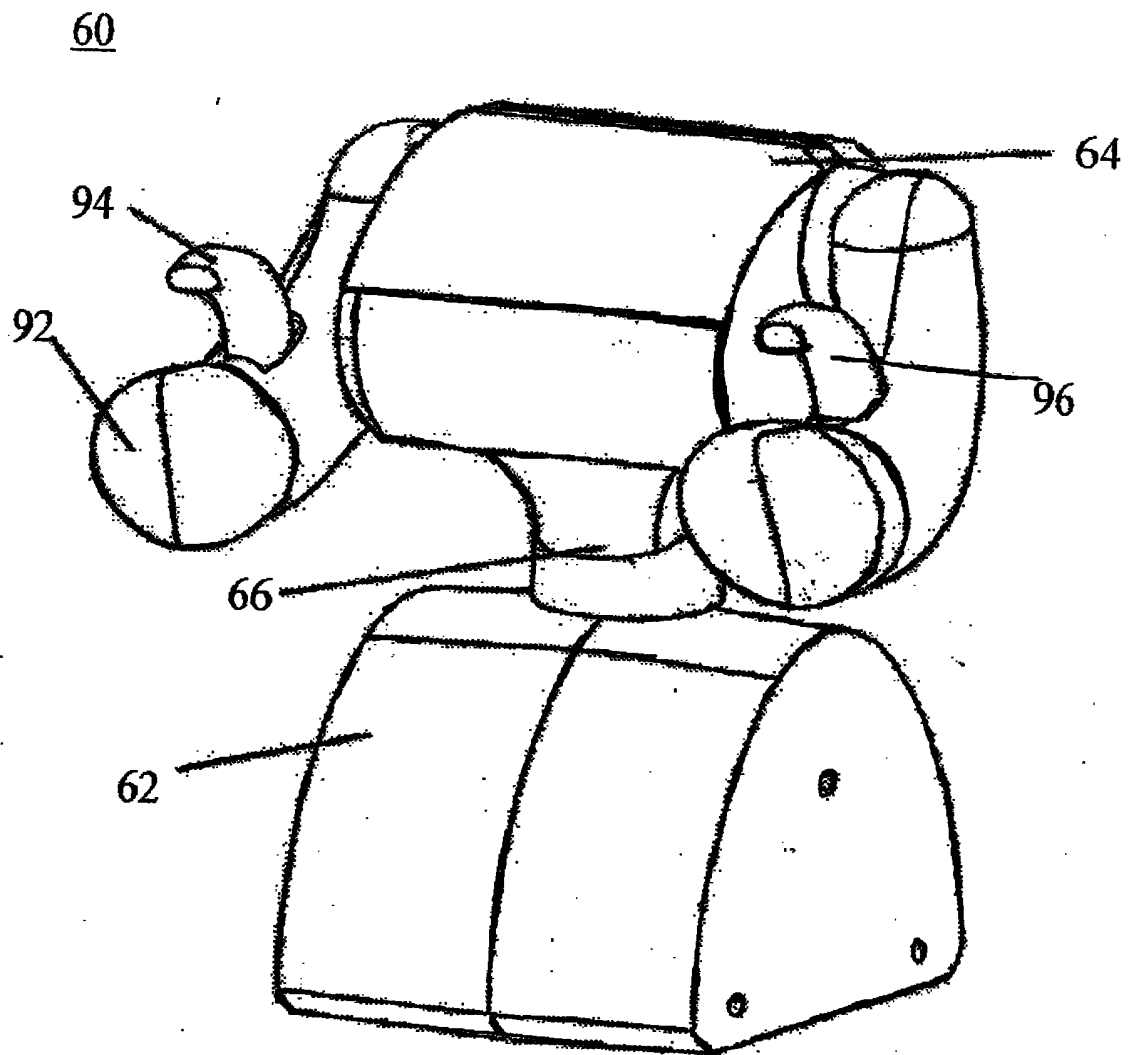


Figure 5

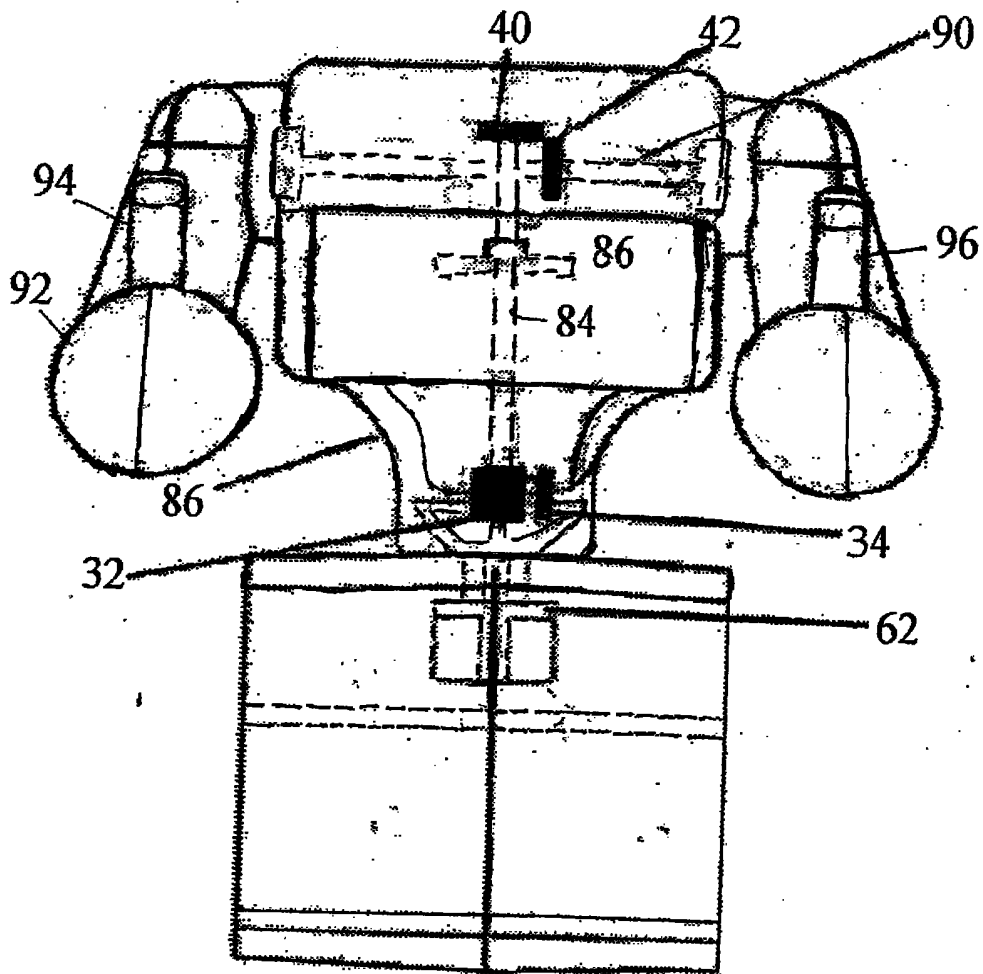
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Figure 6

Title

A controller for a games system

Field of the Invention

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The present invention relates to controllers for games systems in particular the present invention is directed to dual analog controllers.

Background Of The Invention

10

A variety of input devices are known for use with games systems including the mouse, keyboards, joysticks and analog sticks. The distinction between a joystick and an analog stick is generally considered that the joystick generally provides a simple output indicating the input direction of the joystick, generally
15 by means of contact switches. In contrast, an analog stick is one where the output indicates the position of the stick and not simply the direction. The position of the stick is generally derived using two orthogonally disposed potentiometers. The most common games controller is a type referred to generically as dual analog controllers. These dual analog controllers comprise
20 two analog sticks, each being controlled respectively by a user using their left and right thumbs. Examples of these devices include the DualShock controllers for SONY PLAYSTATIONS and the XBOX360 wireless controller. A variety of other manufacturers including NINTENDO also provide dual analog controllers and games systems\consoles which are configured to receive outputs from
25 such controllers.

There are also a class of input devices which allow the user a more realistic interaction. Examples of these types of devices would include steering wheels for car racing games and guns for use in shooting games. In addition, a
30 number of input devices have been proposed which replicate human or animal form. These devices typically employ tilt, inertia and/or contact switches to

detect the positions of various limbs. These devices are however extremely complex and require a purpose built interface and games system. As a result, they have to date not been commercially successful. Similar devices are however employed in other fields including animation, where a doll's
5 movements may be detected and replicated on screen.

A recent development in these types of input devices is the Wii™ controller from Nintendo. The Wii controller is motion sensitive and can sense motion in a variety of dimensions, including motion sensing of tilting and rotation
10 up and down, tilting and rotation left and right, rotation along the main axis, acceleration up and down, acceleration left and right and/or acceleration toward the screen and away. These allow the Wii controller to be used as a sword, a fishing rod, a car steering wheel or a gun. It could be used as a plane that is flown by directing the pad or a character that navigates the screen. This new
15 way of interfacing and interacting with a computer games control is suggested to be more natural than previous methods.

Nonetheless, it would be desirable if a more realistic interface device could be provided which was compatible with existing analog dual mode systems.
20

Summary Of The Invention

Accordingly, a first embodiment of the invention provides controllers as detailed in the appended independent claims. Advantageous embodiments are provided in the dependent claims.
25

Brief Description Of The Drawings

The present invention will now be described with reference to the accompanying drawings in which:

Figure 1 is a picture of a dual analog controller known from the prior art
30 Figure 2 is a schematic of a prior art circuit for providing an output signal from an analog stick,

Figure 3 is a front view of an exemplary controller according to the present invention,

Figure 4 is a side view of the controller of Figure 3,

Figure 5 is a perspective view of the controller of Figure 3, and

5 Figure 6 is front view of the controller of Figure 3 with internal features shown.

Detailed Description Of The Drawings

Known types of dual analog controllers, an example 1 of which is shown in
10 Figure 1, comprise generally a left hand analog stick 6 and a right hand analog stick 8. A first group of directional buttons 10a, 10b, 10c, 10d are provided on the same general surface as the analog sticks. These directional buttons may be used in place of one or other of the analog sticks or for other purposes selected by the games designer, i.e. one corresponds to forward, one
15 backwards, one left and one right. In some controllers, the user can switch between an analog mode and a non-analog mode by pressing a pre-defined button 22. A LED 24 or other indicator may be provided to indicate whether the controller is in an analog or non-analog mode.

20 A second group of directional buttons 12a, 12b, 12c, 12d may also be used in place of the second analog stick although conventionally these are employed as special function buttons. The analog sticks and most of the buttons are generally located on the top surface of the controller. Some controllers also have buttons 14, 16 on the front left and front right faces of the
25 controller. Generally, the controller is ergonomically shaped with features 2, 4 to fit within the hands of a user. Typically, in a game one of the analog sticks is employed to allow control of a character's motion in a game, with the second analog stick having a subsidiary feature such as, for example, targeting or viewing angle.

30

Each analog stick is resiliently biased to a generally upright (central) position defining a vertical axis of the stick. Each stick may be tilted away from

the central position in a direction along a primary axis (left\right) and\or a secondary axis (forwards\backwards). The first and secondary axes are orthogonal with respect to one and other. In contrast to a joystick the amount of tilt is measured and not simply the direction of tilt. Typically, the amount of tilt in each analog stick is measured by an arrangement of two orthogonally arranged potentiometers. In the first analog stick 6, a first potentiometer 32 provides a measurement for tilt along the first axis and the second potentiometer 34 provides a measurement of tilt along the second axis.

Changes in resistance in the first and second potentiometers as the first stick is tilted are converted by a stick sensor circuit 36 into a corresponding electrical signal, as shown in Figure 2, to provide a first stick signal.

Similarly, in the case of the second analog stick 8, a third potentiometer 40 provides a measurement for tilt along a first axis and the fourth potentiometer 42 provides a measurement of tilt along a second axis.

Changes in resistance in the third and fourth potentiometers as the second stick is tilted are converted by a second stick sensor circuit 44 into a corresponding electrical signal to provide a second stick signal.

The first and second stick signals are provided through an interface 38 to the games controller 50. It will be appreciated that methods and circuits for performing this conversion and communication are well known and would be familiar to those skilled in the art. Moreover, it will be appreciated that depending on the nature and configuration of the games system, the stick signals may be analog or digital and may comprise two or more individual signals. Additionally, inputs from the various other buttons 46 may be provided through the interface 38 to the games system 50. The interface may also receive a number of outputs from the games system including for example switching an LED 24 on when the controller is in analog mode and for activating a vibrator 48 built into the controller in the event that a specified action happens during a game, for example a player crashing a car in a race game.

The present application provides a controller, as shown in Figure 3, which is compatible with and suitable for use as a direct replacement for prior art dual analog controllers. The exemplary controller employs a substantially identical arrangement to the prior art circuit of Figure 2 (albeit that a reduced number of buttons and/or outputs may be provided). A fundamental difference with the prior art arrangement is however that the potentiometers of the analog sticks are not activated by the user by means of conventionally arranged/positioned analog sticks. The invention will now be described in greater detail with reference to an exemplary embodiment, in which the controller may advantageously be shaped as an action figure which resembles a human, animal or robotic like character.

The advantage of employing such a character is that the controller will have appeal to users in contrast to existing controllers which are largely purely functional in nature. In addition, the operations of the controller may be configured such that a user may intuitively use the action figure in contrast to existing dual analog controllers where the mode of operation must be learnt.

The action figure, as shown in Figures 3 to 6, suitably comprises a base portion 62 and a torso portion 64. The base portion may be shaped as legs in the case of a human character or as illustrated a solid base. In the case of the robotic character the base may be provided with tracks or wheels or decorated to show these. Similarly, the torso portion 64 of the controller may correspond to the upper torso of a human character or robot. A head may or may not be provided on top of the torso. The torso may narrow at a waist area 66 before joining the base 62. The base and torso are resiliently biased to a central vertical axis (x-x' and y-y') for example by means of a resilient member provided at the waist and provided in compression between the torso and base and resiliently biasing the torso upright with respect to the base. Nonetheless, the torso may be tilted relative to the base in a forwards/backwards direction (f-b) or a left/right direction (l-r) or any combination between the two away from the central vertical axis by the user. In an exemplary embodiment, the base portion houses an

analog stick mechanism as might be employed in a conventional dual analog controller. Suitably the stick mechanism comprises a housing and a stick, with means for tilting movement of the stick relative to the housing. Suitably, the tilting action of the stick is converted by suitable mechanical means into
5 rotational movements which in turn causes the movement of the potentiometer wipers\contacts in first 32 and second 34 sensors fixed to the housing as would conventionally be employed in prior art devices. It will be appreciated that potentiometers are a particularly cost effective method of measurement but that alternative sensors may also be employed. A first stick sensor circuit 36, as
10 would be employed in the prior art, converts the first and second sensor outputs into a first analog stick signal. The stick mechanism may be conventional in design. However, as the stick mechanism will be operated by a user's hand instead of their thumb, the strength and size of the mechanism may need to be increased accordingly. Alternatively, support may be provided by other
15 structures.

The stick 84 of the stick mechanism may comprise an elongated rod. One or more bearings 86 or similar support structures may be provided for rotateably connecting the torso to the rod, so as to allow rotation of the torso with respect
20 to the stick and thus the base. Thus the torso may be rotated relative to the base around the central axis in a clockwise (cw) or counter clockwise (ccw) direction. This rotation is independent of the previously described tilting action. A third sensor 40 is provided for measuring the relative rotation between the stick\base and the torso portion. The third sensor may be provided on the rod
25 but is preferably provided in the torso, for example, as a potentiometer with the rod operating the wiper\contact arm. The torso and stick connection may be arranged to limit the degree of relative rotation using stops or other suitable mechanical means. The output from the third sensor is provided as a sensor signal to the second analog stick circuit 44. In this respect, it will be appreciated
30 that the sensor has a central operating position representing a neutral input, with rotation in either direction from this central position representing an active input. The torso may be resiliently biased to the central position. The third

sensor signal would normally correspond to a tilting action to the left or the right of the second analog stick in a dual analog controller.

Two arms are attached to the torso. The arms are rotateably fixed to the torso, so that they may rotated upwards or downwards towards the base. The arms may be linked internally so that movement of one arm causes a corresponding movement in the opposite arm. Suitably, the arms are resiliently biased to a central position where they are substantially horizontally disposed from the elbow. The arms may be rotated up or down from this central position. Suitably means may be provided to limit the extent of rotation of the arms by means of stops or other mechanical means.

A fourth sensor 42 is provided, suitably in the torso, for measuring the rotation of the arms from the central position. As with the other sensors, it is suitably a potentiometer. Advantageously, the fourth sensor may be operated by a linkage rod joining the two arms so that movement of either arm actuates the sensor and moves the opposite arm. Suitably the linkage rod operates the contact/wiper arm of the potentiometer. The fourth sensor is connected as a second input to a second stick sensor circuit. This second input would normally correspond to a tilting action forwards or backwards of the second analog stick in a dual analog controller.

The second stick sensor circuit converts the third and fourth sensor outputs into a second analog stick signal, for example, as per the prior art circuit of Figure 2. In contrast to the prior art, the stick inputs are provided by the movement of two separate objects relative to the torso motion versus a single stick with respect to a stick mechanism. Similarly, the third and fourth sensors and the associated mechanisms are configured to provide a measurement of rotation rather than tilting as per the prior art. The circuitry (including the analog stick circuits and interface) may be provided within the base with a wire or wireless connection provided to the games system 50. In the case of a wireless

controller, the base section may also be employed to house batteries for the controller.

5 In dual analog controllers, a plurality of buttons are typically provided to allow the user to perform certain functions, for example to fire a weapon or to change the current selection of weapon. The present controller provides a button\trigger on one or both of the arms. The trigger is a suitably arranged contact switch such that movement of the trigger causes the switch to close\open depending on the position of the trigger indicating to the games
10 system that the trigger has been pressed. The switch may be resiliently biased to an inactive (off) position. Suitably, the triggers on the left and right arms correspond to separate buttons. Thus, the trigger button on the left hand side arm may be connected to provide a signal for a left hand button on a dual analog controller with the right hand trigger providing a signal for a left hand
15 (front) button. In certain games systems, there may be more than one button on the left\right hand side. For example, in DualShock controllers from Sony, there are two buttons located on the front side on both the left and right hand sides. Optionally, these additional buttons may be implemented as further contact switches using the triggers as actuators. In this arrangement, rearward
20 movement of the trigger from the inactive position would activate the first switch with forward movement of the trigger from the inactive position activating the second switch.

25 In some games, a button may be employed on the controller, to cause a character to jump in the game. In place of, or in addition to, this button, a sensor may be provided to identify when the controller has been lifted, this may be implemented by means of an inertia sensor to detect upward motion of the controller. Alternatively, a contact switch may be provided to detect when the controller has been lifted off a surface.

30

Known dual analog controllers typically also have a plurality of other buttons. These buttons may also be implemented on the present controller or

alternatively as a separate sub-controller which merely provides the buttons/functions missing from the present controller. When implemented on the controller the buttons may for example be located on the top surface of the torso and/or on the back surface of the torso. Other known features of dual
5 analog controllers include vibration and LED indicators to indicate for example when a controller is in analog mode. It will be appreciated that these features may also be included within the present controller by appropriate positioning.

Although the present invention has been described with reference to an
10 exemplary robot like figure, it will be appreciated that it may be implemented in a variety of forms.

The words comprises/comprising when used in this specification are to specify the presence of stated features, integers, steps or components but does
15 not preclude the presence or addition of one or more other features, integers, steps, components or groups thereof.

Claims

1. A controller for use with a games system, the games system being configured to receive inputs from a dual analog controller comprising at least two analog sticks, the controller comprising:
 - 5 a base,
 - a torso tiltably and rotably mounted with respect to said base,
 - at least one arm rotatably connected to said torso,
 - first and second sensors configured to detect tilting motion of the torso relative to the base, a first analog stick circuit accepting the first and
 - 10 second sensor outputs and providing a first analog stick output signal, a third sensor configured to detect rotational movement of the torso relative to the base,
 - a fourth sensor configured to detect movement of the arm relative to the torso,
 - 15 a second analog stick circuit accepting the third and fourth sensor outputs and providing a second analog stick output signal.
2. A controller according to claim 1, wherein the first and second sensors are orthogonally arranged.
- 20 3. A controller according to claim 1 or claim 2, wherein the first and second sensors are potentiometers.
4. A controller according to any preceding claim, wherein the torso is resiliently biased to central axis of said base.
- 25 5. A controller according to any preceding claim wherein the torso is mounted on a member extending from said base.
- 30 6. A controller according to claim 5, wherein the member is tiltably mounted to said base.

7. A controller according to claim 5 or claim 6, wherein the torso is rotatably mounted on said member.
- 5 8. A controller according to anyone of claims 5 to 7, wherein the third sensor is positioned in the torso at the top of the member.
9. A controller according to any preceding claim, wherein the first and second sensors are positioned in the base at the bottom of the member.
- 10 10. A controller according to any preceding claim wherein one or more controller buttons are provided on the one or both arms.
11. A controller according to any preceding claim, wherein one or more controller buttons are provided on the top surface of the torso.
- 15 12. A controller according to any preceding claim, wherein one or more controller buttons are provided on the front or rear surface of the torso.
- 20 13. A controller for a dual analog controller games system, the controller being provided in the form of an action figure having a base, a torso and at least one member connected to the torso, wherein a first analog stick input is obtained by detecting tilting motion of the torso relative to the base and where a second analog stick input is partially obtained by detecting rotational movement relative to the torso.
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Application No: GB0711286.5

Examiner: Terence Newhouse

Claims searched: 1,13

Date of search: 28 September 2007

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
Y	13	GB2198216 A SONY, see page 4 lines 7-14 and figure 1 noting base 4, tilting portion 2 and members 1,3
Y	13	US5652603 A ABRAMS, see e.g. col 6 lines 3-16 and figures noting base 12, tilting portion 17 and members 20,22
Y	13	EP1000643 A2 ARUZE, see figure 3 and paras 0032 & 0033
Y	13	EP0915412 A2 SEJI, see figure 3 noting joint sensors 120 and paragraphs 0017 & 0018
Y	13	GB2175729 A FRAZER/AGNEW, see figure noting analogue joint sensors 2 of figure 1, page 1 lines 12-15 and page 1 line 105 to page 2 line 37

Categories:

X Document indicating lack of novelty or inventive step	A Document indicating technological background and/or state of the art.
Y Document indicating lack of inventive step if combined with one or more other documents of same category.	P Document published on or after the declared priority date but before the filing date of this invention.
& Member of the same patent family	E Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^X:

F2Y

Worldwide search of patent documents classified in the following areas of the IPC

A63F; G05G; G06F; G06K

The following online and other databases have been used in the preparation of this search report

WPI, EPODOC, OPTICS

International Classification:

Subclass	Subgroup	Valid From
G05G	0009/047	01/01/2006

13

Subclass	Subgroup	Valid From
A63F	0013/06	01/01/2006
G06F	0003/00	01/01/2006