ARTICULATED GAMING CONTROLLER

A controller includes a right-hand unit and a left-hand unit, with a link articulating the units so that the units are tiltable relative to the link. The link is generally further configured to maintain the units in a parallel orientation. The controller also includes a sensor arrangement configured to sense an angle of a unit relative to the link, as well as an interface for interfacing with a gaming console to provide the sensed angle to an operating system of the console.
ARTICULATED GAMING CONTROLLER

Background of the invention

This invention relates to an articulated gaming controller.

Description of the Prior Art

Reference in this specification to any prior publication (or information derived from it), or to any matter which is known, is not, and should not be taken as an acknowledgment or admission or any form of suggestion that the prior publication (or information derived from it) or known matter forms part of the common general knowledge in the field of endeavour to which this specification relates.

Gaming controllers are known. These devices generally allow a user or gamer to interact with a gaming console. Examples include a keyboard, a mouse, a gamepad, a joystick, a paddle, or the like. A game controller is typically used to govern the movement or actions of an entity in a video game. The type of entity controlled in such a manner generally depends upon the game, but a typical element controlled would be the player character's actions and movements.

A gamepad, also known as a joystick, is the most common kind of game controller. It is typically held in both hands with thumbs and fingers used to provide input via keypads omni-directional analogue or digital control sticks. In addition, gamepads can have anywhere from two buttons to a dozen or more. In one example, gamepads generally feature a set of action buttons handled with the right fingers or thumb, and a direction controller handled with the left. These let the player control the game element movements in up to three dimensions, with many buttons to perform quick actions. Due to the ease of use and precision of gamepads, they have spread from traditional consoles, where they originated, to computers as a common input device for gaming purposes.
Most modern game controllers are a variation of a standard gamepad. Some common additions to the standard pad include shoulder buttons placed along the edges of the pad, centrally placed buttons labeled, for example, "start", "select", and "mode", and an internal motor to provide haptic or force feedback. Gamepads are the primary means of input on nearly all modern video game consoles.

Other known controllers include steering wheel controllers that are used for driving games or driving simulators. One shortcoming of these steering wheel controllers is that they usually have limited application only to driving games, as they can be unsuitable for other games due to their inherent design.

This means that gamers wishing to switch between different types of games must also switch controllers, which can be an expensive and time-consuming option. This invention proposes a possible solution to this problem.

Summary of the present invention

According to an aspect of the invention there is provided an articulated gaming controller having:

a right-hand unit and a left-hand unit;
a link articulating the units so that the units are tiltable relative to the link, the link further configured to maintain the units in a parallel orientation;
a sensor arrangement configured to sense an angle of a unit relative to the link; and
an interface for interfacing with a gaming console to provide the sensed angle to the console.

Typically, the units include controls for receiving input signals from a user for relaying, via the interface, to the gaming console.
Typically, the controls include an interchangeable control module configured to be removable from a unit, said unit defining a corresponding socket for receiving the interchangeable control module.

Typically, the interchangeable control module includes a grip handle shaped and dimensioned to simulate a motorcycle handlebar.

Typically, the link includes at least one arm forming a substantially right angle with each respective unit when the units are in a neutral position.

Typically, the link includes two arms articulated with the respective units to form a parallel linkage arrangement.

Typically, the link includes urging means for urging the units into the neutral position.

Typically, the controller includes a force feedback arrangement responsive to feedback signals from the console.

Typically, the force feedback arrangement includes a vibrating mechanism.

Typically, the force feedback arrangement includes the urging means.

Typically, the interface includes a wireless interface.

The invention is now described, by way of example, with reference to the accompanying drawings. The following description is intended to illustrate particular examples of the invention and to permit a person skilled in the art to put those examples of the invention into effect. Accordingly, the following description is not intended to limit the scope of the preceding paragraphs or the claims in any way.
Brief Description of the Drawings

An example of the present invention will now be described with reference to the accompanying drawings, in which:

Figure 1 shows an example of a schematic representation of a gaming controller in a neutral position;

Figure 2 shows the controller of Figure 1 out of the neutral position;

Figure 3 shows a further example of a gaming controller in a neutral position;

Figure 4 shows the controller of Figure 3 not in the neutral position;

Figure 5 shows a further example of a gaming controller;

Figures 6A to 6C show an operating principle of a gaming controller;

Figure 7 shows a further example of a gaming controller; and

Figure 8 shows an additional example of a gaming controller.

Detailed Description of preferred examples

With reference now to Figure 1 of the drawings, there is shown an example of a gaming controller 10. The controller 10 includes a right-hand unit 12 and a left-hand unit 14. Each unit 12 and 14 typically includes controls, such as buttons, triggers, toggles, joysticks, or the like (generally shown by reference numeral 22) via which a user can provide input to a gaming console (not shown).

The controller 10 also includes a link 16 connecting the units 12 and 14 in an articulated manner. This is typically done by connecting the units 12 and 14 to an arm 24, as shown, the units hingable at arm 24. In this manner, the link 16 connects the units 12 and 14 whilst at the same time allowing the units 12 and 14 to tilt relative to the link 16. In addition, the link 16 is further configured to maintain the units 12 and 14 in a parallel orientation relative to each other when tilted, as shown in Figure 2 (and further exemplified in Figures 6A to 6C).
The link can be configured to maintain this parallel orientation in a number of ways. For example, the link 16 can include the arm 24 which, in turn, includes a strut or similar rod 26 securing internal joints or sockets 28 of the units 12 and 14 to each other so that rotation of one joint of a unit is transferred via the link to the joint of the other unit. The arm 24 and strut or rod 26 form a linkage linking the two units 12 and 14. By linking the units 12 and 14 in this fashion, the link 16 ensures that tilting of one unit is transferred to the other, which maintains a parallel orientation between the units 12 and 14.

The operation of the link 16 is further exemplified by Figures 6A to 6C. As shown in this example, link 16 includes two arms 24 linking units 12 and 14. Corresponding axes 30 are shown as a shared orientation of the units 12 and 14 relative to the link 16. When the units 12 and 14 are tilted to the right (Figure 6B) or to the left (Figure 6C), the link acts to maintain the units 12 and 14 in a parallel orientation relative to the link 16. It is clear that axes 30 are substantially parallel throughout the tilting of the units 12 and 14.

It is to be appreciated that one example of the controller 10 defines a rhombus shape which provides the inherent parallel orientation of the units 12 and 14. The articulated link 16 connecting the units 12 and 14 can rely on the inherent geometry of a rhombus shape to facilitate in keeping the units substantially parallel independent of an angle formed when the units are titled.

It is also to be appreciated that different examples of controllers can include different links 16. The link can includes a single arm 24 incorporating internal joints or gearing arrangements configured to keep the units 12 and 14 substantially parallel when tilting relative to the link 16.

Returning now to Figures 1 and 2, the controller 10 also includes an interface 20 for interfacing the controller with a gaming console. The interface 20 includes a wireless interface in this example, however other examples can include wired interfaces, or the like. One
example can include a Bluetooth or similar radio interface, or the like. All the controls 22 are linked to the interface to transmit any input from the controls 22 to the gaming console.

In addition, the controller 10 includes a sensor arrangement generally indicated by reference numeral 18. The sensor arrangement 18 is configured to detect movement of the units 12 and 14 relative to the link 16. In this example, the sensor arrangement 18 is configured to sense an angle of the units 12 and 14 relative to the link 16. This sensed angle is then indicative of movement of the units 12 and 14. For ease of explanation, the position of the units 12 and 14 relative to the link 16 in Figure 1 will be referred to as a neutral position. In this neutral position, imaginary parallel axis of the units 12 and 14, as described above, are typically at a right angle to the link 16.

If a user tilts the units 12 and 14 out of the neutral position, the sensor arrangement 18 senses the resulting angle and provides this sensed angle value to the gaming console via the interface 20. The gaming console is configured to interpret the sensed angle received from the controller 10. As such, the sensor arrangement 18 typically senses the angle at predetermined intervals, e.g. once every millisecond, or the like. In this manner, the gaming console can easily determine a rate of change of the angle, which can also be useful in certain circumstances.

For example, a driving simulator can interpret the sensed angle similar to a steering wheel controller. The controller 10 can replicate the movements of conventional steering wheel controllers where the angle between the units 12 and 14 and the link 16 represents how far an imaginary steering wheel is turned. In this example, the neutral position indicates a straight-line tack where the imaginary steering wheel is not turned.

It is to be appreciated that only one of the unit 12 or 14 may include a sensor arrangement 18, as the link 16 ensures that the units 12 and 14 are maintained substantially parallel. As such, if the sensor arrangement 18 senses an angle between one of the units 12 or 14 and the link, then
the angle between the other unit and the link 16 can be easily calculated by the console, if necessary.

Figures 3 and 4 show a more ergonomically designed controller 40. Figure 2 shows the controller 40 in the previously defined neutral position, and Figure 4 shows the controller tilted to the right, e.g. the imaginary steering wheel is turned to the right. Although the units 12 and 14 have an arcuate shape, it is to be appreciated that axes can be defined to assist in defining the neutral position described above, where these axes form a generally right angle with respect to the link 16. In this example, the controller 40 also includes respective controls and buttons 22, and the link 16 includes two arms 32 to maintain the parallel orientation of the units 12 and 14, as described above.

Figure 5 shows a further example of a controller 40. In this example, the link 16 includes urging means 34 for urging the units 12 and 14 into the neutral position. In one example, the urging means 34 can include a spring or similar resiliently deformable element which resists tilting of the units 12 and 14 out of the neutral position.

In a further example, the controller 40 includes a force feedback arrangement 36 responsive to feedback signals from the console. Typically, the force feedback arrangement 36 includes a vibrating mechanism. It is to be appreciated that the force feedback arrangement 36 typically includes the urging means 34. For example, the force feedback arrangement 36 can include an electric motor which is configured to provide force feedback as well as urging the units into the neutral position in use. This haptic feedback provided by the urging means 34 finds particular application in driving simulators or games where a natural steering effect of a moving vehicle tends to return a steering wheel to the neutral position.

With reference to Figure 7 of the drawings, there is shown another example of the controller 40. In this example, the controller 40 includes interchangeable control modules 22 that fit into a corresponding socket 42 on the respective units 12 and 14. Each socket 42 typically includes
a connector 44 for receiving a corresponding electrical or mechanical connector of the module 22.

It is to be appreciated that the interchangeable control module 22 can include buttons, triggers, toggles, joysticks, or the like. In this manner, the controller 40 can be modified or adjusted to a particular gaming application. For example, one game may require joysticks on both units 12 and 14, while another game requires one joystick control and a button control, e.g. a D-pad, or the like. A joystick control can be interchanged with a button control on a unit, or the like. The interchangeable control modules 22 also allow adjustment for left- or right-handed player preference. It is to be appreciated that the location of the socket 42 can depend on the design of the controller 40, typically as dictated by ergonomics.

Referring now to Figure 8 of the drawings, there is shown a further example of controller 40. In this example, the controller 40 includes interchangeable control modules 46 in the form of grip handles shaped and dimensioned to simulate a motorcycle handlebar. The grip modules 46 typically also include controls 48, such as buttons, levers, triggers, or the like. In this manner, the controller 40 can be adapted for specific use in motorcycle games or driving simulators.

Each unit 12 and 14 includes a socket 52 for receiving the grip handles 46. Each socket 52 is typically configured to receive an electrical connector 50 of the grip handle 46 for receiving electrical or mechanical signals from control 48 on the grip handle 46. It is to be appreciated that input via controls 48 are relayed via connector 50 to the interface 20.

It is to be appreciated that reference in this specification to the term "console" includes reference to any electronic device able to execute a set of instructions which provides an electronic game to be realised. For example, a console can include a personal computer, a video gaming console, a handheld device, or the like.
Persons skilled in the art will appreciate that numerous variations and modifications will become apparent. All such variations and modifications which become apparent to persons skilled in the art should be considered to fall within the spirit and scope of the invention broadly appearing and described in more detail herein.

The Inventor believes that the controller allows the controlling precision of a steering wheel controller in a smaller hand held gamepad controller. The controller also offers greater comfort and mobility than a simulated steering wheel controller as the controller is independently hand-held and can move around with the user or gamer and function correctly in any sitting or reclining position without losing any steering precision.

The Inventor further believes that the controller provides the ability to perform secondary functions with the controls 22 without repositioning the hands. For example, the additional controls 22 allow the user or gamer to effect gear changes, fire guns, perform tricks etc. all while never losing grip of the imaginary steering wheel offered by the controller. As such, the controller offers similar functionality as a gamepad controller as well as that of a steering wheel controller in a single package.

It is to be appreciated that reference to "one example" or "an example" of the invention is not made in an exclusive sense. Accordingly, one example may exemplify certain aspects of the invention, whilst other aspects are exemplified in a different example. These examples are intended to assist the skilled person in performing the invention and are not intended to limit the overall scope of the invention in any way unless the context clearly indicates otherwise.

Features that are common to the art are not explained in any detail as they are deemed to be easily understood by the skilled person. Similarly, throughout this specification, the term "comprising" and its grammatical equivalents shall be taken to have an inclusive meaning, unless the context of use clearly indicates otherwise.
THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. An articulated gaming controller having:
   a right-hand unit and a left-hand unit;
   a link articulating the units so that the units are tiltable relative to the link, the link further configured to maintain the units in a parallel orientation;
   a sensor arrangement configured to sense an angle of a unit relative to the link; and
   an interface for interfacing with a gaming console to provide the sensed angle the console.

2. The controller of claim 1, wherein the units include controls for receiving input signals from a user for relaying, via the interface, to the gaming console.

3. The controller of claim 2, wherein the controls include an interchangeable control module configured to be removable from a unit, said unit defining a corresponding socket for receiving the interchangeable control module.

4. The controller of claim 3, wherein the interchangeable control module includes a grip handle shaped and dimensioned to simulate a motorcycle handlebar.

5. The controller of any one of claims 1 to 4, wherein the link includes at least one arm forming a substantially right angle with each respective unit when the units are in a neutral position.

6. The controller of claim 5, wherein the link includes two arms articulated with the respective units to form a parallel linkage arrangement.

7. The controller of any one of claims 1 to 6, wherein the link includes urging means for urging the units into a neutral position.
8. The controller of any one of claims 1 to 7, which includes a force feedback arrangement responsive to feedback signals from the console.

9. The controller of claim 8, wherein the force feedback arrangement includes a vibrating mechanism.

10. The controller of claim 8, wherein the force feedback arrangement includes the urging means.

11. The controller of any one of claims 1 to 10, wherein the interface includes a wireless interface.

12. An articulated gaming controller substantially as hereinbefore described

13. An articulated gaming controller substantially as hereinbefore described and illustrated with reference to the accompanying drawings.

* * * *
A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl.
A63F 13/06 (2006.01) G06F 3/033 (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

DWPI & EPDOC: IPC A63F13, A63F9/24, G06F3, B62D 1 & keywords (controller, joystick, angle, parallel, articulated, link, sense, and similar terms)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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<td>JP 08-047581 A (NAMCO LTD) 20 February 1996 Figures 3A-5 and translation from <a href="http://www.ipdl.inpit.go.jp/homepg_e.ipdl">http://www.ipdl.inpit.go.jp/homepg_e.ipdl</a>, see paragraphs [0001, 0003, 0015, 0022, 0026-0028, 0039-0041, 0044]</td>
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<td>Y</td>
<td>EP 0734444 B1 (JUNGHEINRICH AG) 09 October 1996 Figure 2 and column 6, lines 18-21, 44-46</td>
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<td>US 2005/0255915 A1 (RJGGS etal.) 17 November 2005 Abstract, Figure 3, paragraphs [0003, 0010-0012]</td>
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[X] Further documents are listed in the continuation of Box C [X] See patent family annex

* Special categories of cited documents:
  "A" document defining the general state of the art which is not considered to be of particular relevance
  "B" earlier application or patent but published on or after the international filing date
  "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
  "O" document referring to an oral disclosure, use, exhibition or other means
  "P" document published prior to the international filing date but later than the priority date claimed

  "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
  "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
  "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
  "&" document member of the same patent family

Date of the actual completion of the international search 15 July 2009

Date of mailing of the international search report 20 JUL 2009

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Form PCT/ISA/210 (second sheet) (July 2008)
INTERNATIONAL SEARCH REPORT

Box No. II  Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1.  
   - [ ] Claims Nos.:  
     - because they relate to subject matter not required to be searched by this Authority, namely:

2.  
   - [X] Claims Nos.: 12, 13  
     - because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
       
       Claims 12 and 13 do not comply with Rule 6.2(a) because they rely on references to the description and/or drawings.

3.  
   - [ ] Claims Nos.:  
     - because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a)

Box No. III  Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1.  
   - [ ] As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2.  
   - [ ] As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.

3.  
   - [ ] As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4.  
   - [ ] No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- [ ] The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

- [ ] The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

- [ ] No protest accompanied the payment of additional search fees.
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This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

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Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.