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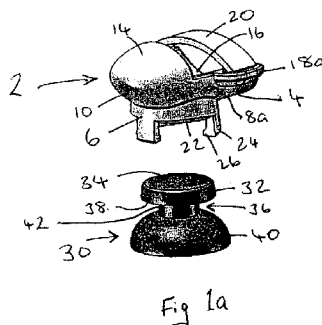
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(54) **Title:** CONTROLLER COMPONENT



(57) **Abstract:** A controller component (2) comprising a digit receiving portion and a connector, wherein the digit receiving portion includes a base (16) and a pair of opposed side wall elements (8a, 8b), the side wall elements being sufficiently spaced apart to allow insertion therebetween of a digit, and the connector (6) defines a toggle receiving portion which includes at least two resiliently deformable legs (24), wherein each leg (24) includes a lug (26) at the distal end thereof such that the legs (24) are adapted to snap-fit onto a controller toggle (30).

WO 2010/112814 A1

## Controller Component

The present invention relates to controller components and in particular to a component that can be retrofitted to an existing controller. The invention is particularly suited to computer games  
5 controllers, but can be applied to other types of controlling devices that operate on similar principles.

Game controllers typically include a toggle or pad that can be moved in two dimensions. In use, the movement is typically a substantially horizontal plane. The range of movement is limited such that the toggle or pad may be operated by the thumb of a user.

10

The term "toggle" is used herein to define a control element of a controller which is moveable in at least two dimensions, typically in a substantially horizontal plane in use. These may also be known as control pads or buttons. The toggle tends to be mushroom-shaped and is connected to the controller by a shaft.

15

The contact surface (i.e. the surface which is contacted by the user's thumb in use) of the toggle tends to be substantially planar. This can lead to problems where the user is operating the controller for extended periods of time, for example during gaming competitions or in particularly involved games. In such circumstances, sweat from the thumb can cause the contact surface to become slippery,  
20 causing the user periodically to "lose" control. In addition, the need to maintain a downward pressure on the toggle can cause fatigue or cramp in the thumb and can, in extreme circumstances, lead to a repetitive strain-type injury to the user.

25

A toggle attachment is described in US 6,459,420. However, this attachment was designed to fit early generations of controllers in which the gap between the toggle cap and the controller was significantly greater than modern controllers. The attachment described in US 6,459,420 describes a rubber skirt which fits over the toggle to secure the attachment to the toggle. This was a suitable method of securing an attachment to the early controllers, where the gap between the toggle cap and the rest of the controller was sufficiently large that such an arrangement did not interfere with  
30 the operation of the toggle. However, modern controllers define a gap between the toggle cap and the controller which is significantly smaller than the controllers described in US 6,459,420 (i.e. the shaft of the toggle is much shorter) and it has been found that the arrangement described in US 6,459,420 is not suitable for modern controllers, as the rubber skirt either interferes with the

operation of the toggle or is so thin that it is incapable of fixing satisfactorily the attachment to the toggle.

The present invention seeks to address or ameliorate at least some of the above problems.

5

According to a first aspect of the invention, there is provided a controller component comprising a digit receiving portion and a connector, wherein the digit receiving portion includes a base and a pair of opposed side wall elements, the side wall elements being sufficiently spaced apart to allow insertion therebetween of a digit, and the connector defines a toggle receiving portion which  
10 includes at least two resiliently deformable legs, wherein each leg includes a lug at the distal end thereof such that the legs are adapted to snap-fit onto a controller toggle.

The connector portion of the component allows at least the cap of the mushroom-shaped toggle to be secured within the receiving portion. The legs snap-fit around the toggle cap and the lugs are  
15 configured to locate an underside portion of the toggle cap without interfering with its operation.

The provision of the side wall elements on the component means that the digit, typically a thumb of a user, is prevented from slipping sideways in use. In addition, the side walls result in a component that does not require a downward pressure from the user's digit as well as a sideways (i.e. lateral)  
20 pressure to effect sideways movement of the toggle, as the user can simply press sideways against the relevant wall to effect a corresponding sideways movement of the toggle. The downward pressure that is required for conventional controllers to prevent the digit from slipping from the toggle when exerting the required sideways pressure is no longer necessary.

25 Thus, the component limits slippage of a user's digit relative to the toggle, without interfering with the operation of the toggle (e.g. restricting the movement of the toggle).

In order to simplify construction of the controller component, the digit receiving portion and the legs of the connector may be formed as a one-piece construction. This is suitably formed from a  
30 polymeric material and may be formed by an injection moulding process. This arrangement may also add to the strength and resilience of the component.

The toggles to which the component may be fitted may have different dimensions. To ensure that the lugs are capable of engaging an underside portion of the toggle cap in such a way that the

component is securely fixed to the toggle, the lugs may be biased towards an engagement surface of the toggle cap. For example, the connector may include a resiliently deformable body. Suitably, the resiliently deformable body is arranged to contact a first surface of the toggle cap (e.g. a contact or upwardly facing surface) when the lugs engage a second, opposed surface (e.g. an underside or downwardly facing surface) which comprises the engagement surface. In this way, the lugs are biased towards the engagement surface. The lugs being biased towards the engagement surface of the toggle cap resists unintended removal of the component from the toggle.

Suitably, the connector includes an annular wall which is sized to accommodate therewithin a toggle cap having a circular cross section, and the two or more resiliently deformable legs project axially from the annular wall. The resiliently deformable body may be located within the annular wall.

The resiliently deformable body may be an annular body. In such an arrangement, the annular body may be arranged concentrically within the annular wall.

In an embodiment of the invention as defined anywhere herein, the connector includes three legs. Such a connector provides an acceptable compromise between properly securing the component to the toggle, operation of the toggle and manufacturing costs of the component.

The wall elements of the digit receiving portion typically extend upwards from the base such that when the digit is located on the base, it is retained laterally within the walls.

The wall elements may be curved to more closely match the contour of the user's digit. Thus, the side wall elements may define a concave inwardly facing surface when viewed in cross section. In addition, the walls may not necessarily be parallel, but may converge towards each other at one or both ends.

The side wall elements and the base may be formed as a one-piece construction. In other words, the base and side wall elements may be a unitary construction.

In an embodiment of the invention, the digit receiving portion of the component further includes a front wall element. The front wall element prevents the digit from slipping forwards in use and provides similar benefits to the user as the sidewalls.

The front wall may connect the front portions of both of the side wall elements to provide a continuous wall along the sides and front of the base of the digit receiving portion.

5 As with the side walls, the front wall need not be vertical, but may define a concave inwardly facing surface and may define an arc between the side wall elements.

In a further embodiment of the invention, an upper part of the front wall element projects rearwards and together with at least a portion of the side wall elements defines a housing which is capable of enveloping at least a part of the digit in use.

10

The housing defined by the side wall elements, the front wall element and a roof element extending rearwards from the upper part of the front wall element provides an enclosure within which the user's digit may be retained, further preventing slippage of the digit relative to the toggle.

15 Suitably, the side wall elements, the front wall element and the roof element are integrally formed as a one-piece construction. Thus the housing defined by these elements may be a unitary construction.

In a still further embodiment, the digit receiving portion further includes a releasable digit retainer, wherein the digit retainer has an open position which permits the insertion and release of the digit  
20 and a closed position which is capable of maintaining the digit engaged with the digit receiving portion.

The digit retainer secures the user's digit with respect to the digit receiving portion. Such an arrangement limits still further the likelihood of the user's digit slipping relative to the toggle.

25

In addition, this allows for the possibility of the toggle being used in three dimensions instead of just two dimensions. Conventionally, the toggle moves in two dimensions which are typically in a substantially horizontal plane. Occasionally, in addition to this two dimensional movement, the toggle may also be depressed into the controller to provide an additional control effect. However, a  
30 component which includes a releasable digit retainer opens the possibility that the toggle may have a still further control action when it is lifted or pulled away from the controller in a substantially vertical direction.

In a further embodiment of the invention, the digit retainer includes a first retainer securing element carried by one of the side wall elements, a second retainer securing element carried by the other side wall element and a restraining element fixed to the first retainer securing element and adapted to be releasably engaged with the second retainer securing element.

5

This embodiment provides a simple and reliable retainer. The first and second retainer securing elements may be provided integrally with the side wall elements. Furthermore, the restraining element may be formed from a strap. The strap may include a connector at one end thereof to allow it to releasably engage the second retainer securing element. The connector may be slidably  
10 connected to the strap such that the length of the strap may be varied.

Alternatively, the strap may include a plurality of holes arranged longitudinally along a portion of its length. In such an arrangement, the second retainer securing element may include a projecting post adapted to be secured within one of the holes in use.

15

In an alternative embodiment, the connector may include a hook and eye-type arrangement. In this type of arrangement, the second retainer element may include an elongate aperture through which the strap may pass and then be secured to itself via the hook and eye connector. This arrangement also allows the length of the strap to be continuously variable within the confines defined by the  
20 length of the hook part and the eye part carried by the strap.

In a further embodiment of the invention, the digit receiving portion of the component includes one or more ventilation apertures.

25

Where the component is used for prolonged periods of time, the thumb may become sweaty and uncomfortable. The ventilation apertures provide a cooling flow of air to the digit receiving portion.

30

A second aspect of the invention provides a combination of a controller with a controller component, wherein the controller includes a toggle cap having an upwardly facing surface and a downwardly facing surface and the component includes a digit receiving portion and a connector, wherein the  
digit receiving portion includes a base and a pair of opposed side wall elements, the side wall elements being sufficiently spaced apart to allow insertion therebetween of a digit, and the connector defines a toggle receiving portion which includes at least two resiliently deformable legs, wherein each leg includes a lug at the distal end thereof, the digit receiving portion being located on

the upwardly facing surface of the toggle cap and the legs being secured to the controller toggle such that the lugs engage the downwardly facing surface of the toggle cap.

5 The skilled person will appreciate that the term “upwardly facing” is used in the context of the controller in normal use. Thus, the upwardly facing surface of the toggle cap is the contact surface that would receive the user’s thumb or other digit in the absence of the component of the invention. Clearly, the “downwardly facing” surface is the opposite surface, which in use typically faces a portion of the controller

10 The controller component may be as defined in any embodiment or combination of embodiments described herein.

It should be appreciated that the terms “an embodiment” and “an embodiment of the invention” should be understood to refer to any embodiment or aspect of the invention as defined or described herein. Therefore, it should be understood that the features of specific embodiments can be  
15 combined with one or more other specific features described herein or be combined with any aspect or embodiment of the invention described herein. All such combinations of features are considered to be within the scope of the invention as defined in the claims and made available to the skilled person.

20

An embodiment of the invention will now be described, by way of example only, with reference to the accompanying drawings in which:

25 Figure 1a is a perspective view of a controller component prior to connection to a controller;  
Figure 1b is a perspective view of the component connected to a controller;  
Figure 2a is a front elevational view of the component;  
Figure 2b is a side elevational view of the component;  
Figure 2c is a plan view from above of the component;  
Figure 2d is a plan view from below of the component;  
30 Figure 3 is a perspective view of the component; and  
Figure 4 is a plan view from below of a second embodiment of the invention.

For the avoidance of doubt, the skilled person will appreciate that in this specification, the terms "up", "down", "front", "rear", "upper", "lower", "vertical", "horizontal", etc. refer to the orientation of the features of the component when installed for normal use as shown in the Figures.

5 Figure 1a shows a controller component 2 according to a first embodiment, which is separate from a controller toggle 30.

The component 2 comprises a digit receiving portion which is formed from a base 16, a pair of  
10 opposed side wall elements 8a, 8b (only side wall element 8a being shown in Figure 1a), a front wall  
element 10 and a roof element 14. It further comprises a connector 6 which includes an annular wall  
22 and three resiliently deformable legs 24, each of which includes a lug 26 at the distal end thereof.  
The retaining element 6 is secured to the bottom surface 4 of the base 16, such that the wall 22  
projects downwardly from the bottom surface 4.

15 The digit receiving portion further includes a pair of restraining strap securing elements 18a, 18b  
each of which is carried by a respective side wall element 8a, 8b, and a restraining strap 20. The  
restraining strap 20 is secured at one end to the restraining strap securing element 18a. The other  
end of the restraining strap 20 is free and includes a portion containing a hook part of a hook and eye  
coupling and a portion containing the eye part.

20

The restraining strap securing element 18b (shown in more detail in Figure 2c) defines an aperture  
19b which is sized to allow the restraining strap 20 to pass therethrough.

The controller toggle 30 includes a body 40 and extending upwardly therefrom a cap 32 joined to the  
25 body via a neck 42. The body 40, cap 32 and neck 42 define therebetween an annular recess 36.

The cap 32 includes an upwardly facing top surface 34 and a downwardly facing bottom surface 38.

Figure 2a, 2b, 2c, 2d and 3 show the component 2 in more detail.

30

The component 2 is made by an injection moulding technique and the base 16, side wall elements  
8a, 8b, front wall element 10 and roof element 14 are all connected to form a unitary construction.



As seen in Figure 2c, the roof 14 overlies a front portion of the base 16, but does not extend to cover the entire base 16. As such, it defines an enclosure at the front of the digit receiving portion.

Figure 2c and 2d show the restraining strap securing elements 18a, 18b in more detail. Each of the  
5 securing elements 18a, 18b defines therein a corresponding aperture 19a, 19b through which the  
restraining strap 20 may pass. In use, the restraining strap 20 will be fixed to one of the securing  
elements 18a, 18b and will be releasably connected to the other of the securing elements 18a, 18b.

The component 2 further includes three ventilation slots 50a, 50b and 50c which are shown in Figure  
10 2c (slots 50a and 50b) and Figure 3 (slots 50a and 50c).

In use, the component 2 is secured to the controller toggle by aligning the component 2 with the cap  
32 and applying a pressure vertically downwards. This causes the resiliently deformable legs 24 to  
splay outwards and allows the top part of the cap 32 to sit within the annular wall 22. When the cap  
15 32 is properly located within the retaining element 6, the lugs 26 at the end of each leg 24 are free to  
enter the annular recess 36 and the legs 24 snap back to their rest position (i.e. unsplayed position).  
With the legs 24 in their rest position, the lugs 26 engage the downwardly facing surface 38 of the  
cap 32 and resist removal of the component 2 from the toggle 30. This arrangement is shown in  
Figure 1b.

20

With the component 2 properly secured to the controller toggle 30, the user can insert a digit  
(typically a thumb) into the digit receiving portion. The digit is placed on the base 16 with the end of  
the digit being located within the enclosure defined by the front wall element 10, the base 16, the  
side wall elements 8a, 8b and the roof element 14. The restraining strap 20 is then placed over the  
25 digit and secured to the restraining strap securing element 18b by passing the strap 20 through the  
aperture 19b defined by the securing element 18b and then securing the strap to itself by connecting  
the hook portion of the strap to the eye portion of the strap.

The digit is now securely held in the component and slippage of the digit relative to the toggle 30 is  
30 resisted or prevented.

In a second embodiment, as shown in Figure 4, the connector 106 further includes an annular body  
130 made from a flexible resilient rubber polymer. With the exception of the annular body 130, all  
other aspects and features of the second embodiment are identical to those described above in

connection with the first embodiment. For ease of reference, the common features are given reference numerals in Figure 4 which simply include a "100-series" prefix.

5 The annular body 130 is located concentrically within an annular wall 122. In use, the annular body 130 contacts the upwardly facing top surface 34 of the toggle 30 and is compressed slightly to allow the lugs 126 at the end of each leg 124 to enter the annular recess 36 and the legs 124 to snap back to their rest position. In this way, the annular body 130 biases the lugs 126 towards the downwardly facing surface 38 of the cap 32 to maintain the component 102 in a secured arrangement with the toggle cap 30.

10

## Claims

- 5 1. A controller component comprising a digit receiving portion and a connector, wherein the digit receiving portion includes a base and a pair of opposed side wall elements, the side wall elements being sufficiently spaced apart to allow insertion therebetween of a digit, and the connector defines a toggle receiving portion which includes at least two resiliently deformable legs, wherein each leg includes a lug at the distal end thereof such that the legs are adapted to snap-fit onto a controller toggle.
- 10 2. A controller component according to Claim 1, wherein the digit receiving portion and the legs of the connector are formed as a one-piece construction.
- 15 3. A controller component according to Claim 1 or Claim 2, wherein the lugs of the legs are biased towards an engagement surface of the toggle.
- 20 4. A controller component according to Claim 3, wherein the connector includes a resiliently deformable body, wherein the resiliently deformable body is adapted to contact a first surface of the toggle which is opposed to the engagement surface of the toggle and to provide the biasing force.
- 25 5. A controller component according to any preceding claim, wherein the connector includes three legs.
- 30 6. A controller component according to any preceding claim, wherein the digit receiving portion of the component further includes a front wall element.
7. A controller component according to Claim 6, wherein an upper part of the front wall element projects rearwards and together with at least a portion of the side wall elements defines a housing which is capable of enveloping at least a part of the digit in use.

8. A controller component according to any preceding claim, wherein the base and side wall elements are integrally formed as a one-piece construction.
- 5 9. A controller component according to any preceding claim, wherein the digit receiving portion further includes a releasable digit retainer, wherein the digit retainer has an open position which permits the insertion and release of the digit and a closed position which is capable of maintaining the digit engaged with the digit receiving portion.
- 10 10. A controller component according to Claim 9, wherein the digit retainer includes a first retainer securing element carried by one of the side wall elements, a second retainer securing element carried by the other side wall element and a restraining element fixed to the first retainer securing element and adapted to be releasably engaged with the second retainer securing element.
- 15 11. A controller component according to any preceding claim, wherein the digit receiving portion of the component includes one or more ventilation apertures.
- 20 12. A combination of a controller and a controller component, wherein the controller includes a toggle and the controller component is as defined in any of Claims 1 to 11.

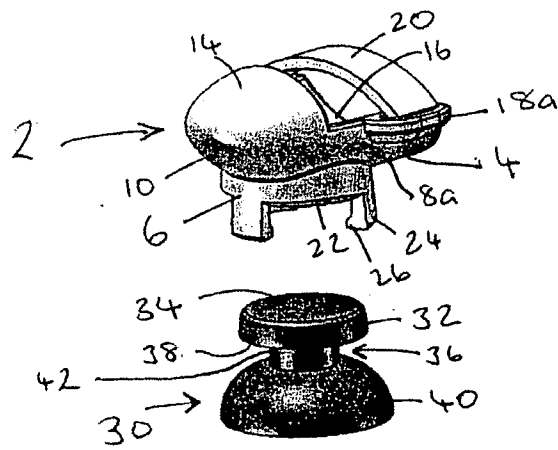


Fig 1a

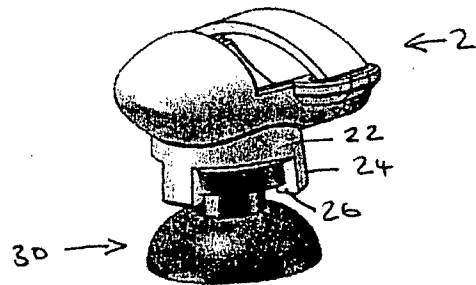


Fig 1b

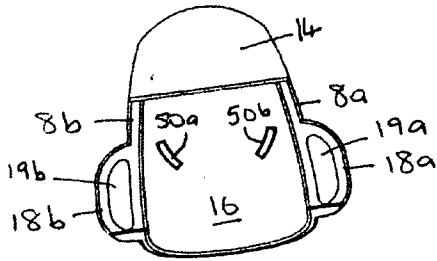


Fig 2c

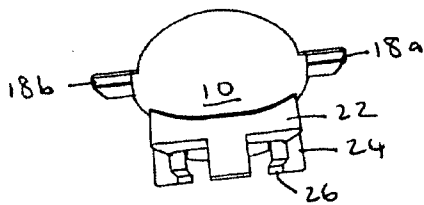


Fig 2a

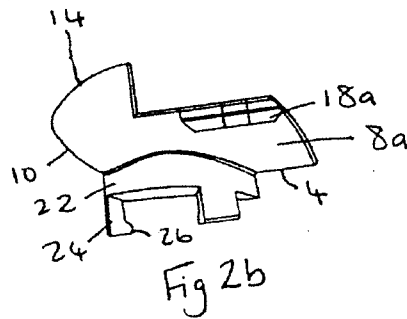


Fig 2b

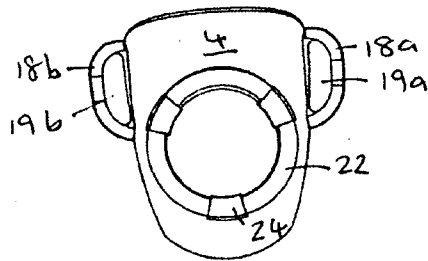


Fig 2d

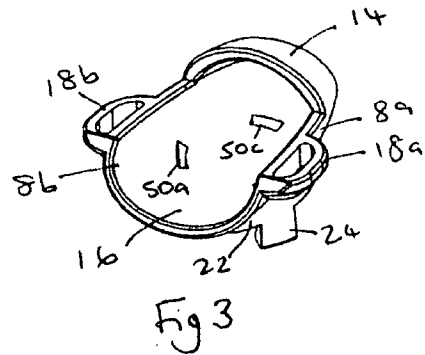


Fig 3

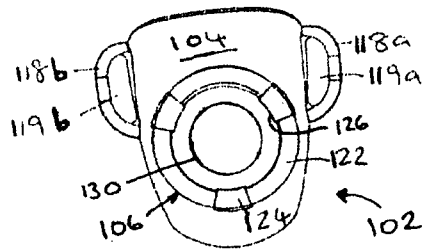


Fig 4

# INTERNATIONAL SEARCH REPORT

International application No  
PCT/GB2010/000559

**A. CLASSIFICATION OF SUBJECT MATTER**

INV. G05G1/06  
ADD.

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)

G05G

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 practical, search terms used)

EPO-Internal

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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X	JP 2000 306448 A (NINTENDO CO LTD) 2 November 2000 (2000-11-02) * abstract; figures -----	1-5,8,12
X	US 6 338 485 B1 (HUETTLINGER JOHN D [US]) 15 January 2002 (2002-01-15) column 2 - column 3; figures -----	1-4,9-12
Y	WO 2009/038483 A1 (DYNAMIC CONTROLS [NZ]; FORRER ROLAND T [NZ]; DELLOW GARY ANDREW JAMES) 26 March 2009 (2009-03-26) page 4, line 30 - page 5, line 33; figures 1a,1b,1c -----	1,5
-/--		

Further documents are listed in the continuation of Box C.

See patent family annex.

\* Special categories of cited documents :

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Date of the actual completion of the international search

13 July 2010

Date of mailing of the international search report

20/07/2010

Name and mailing address of the ISA/

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Popescu, Alexandru

# INTERNATIONAL SEARCH REPORT

International application No  
PCT/GB2010/000559

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5 559 432 A (LOGUE DELMAR L [US]) 24 September 1996 (1996-09-24) column 7; figures 11, 11A -----	1, 5
A	EP 1 615 096 A1 (FAHLANDER JOHAN [SE] GYLLING INVEST AB [SE]) 11 January 2006 (2006-01-11) paragraph [0063]; figure 12e -----	1



# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB2010/000559

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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US 6338485	B1	15-01-2002	US 2002060425 A1 23-05-2002
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