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(54) **Buffering protective handheld controller**

Stossabsorbierende tragbare Steuerungseinrichtung

Dispositif de commande portatif absorbant les chocs

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**Description****BACKGROUND OF THE INVENTION****1. Field of the Invention**

[0001] The present invention is related to a handheld controller, especially a configuration that provides buffering protection.

**2. Description of the Related Art**

[0002] Current handheld controllers use plastic material to make the touch buttons on the main unit, possibly covered by soft material like in the document EP-A-0 903 659. However, under a long period of pressing time, the rigid plastic material around the button makes the user feel discomfort due to an opposite force. Usually this results in ache, blistering, callus, or finger deformation, as the worst. Besides, because the handheld part of the main unit is made of injection molded ABS or rigid plastics, the user feels discomfort at the holding hands. Therefore, the comfortability of current handheld controller needs to be improved.

**SUMMARY OF THE INVENTION**

[0003] The inventor realized the need of an improved handheld controller in comfortability and invented a buffering protective handheld controller.

[0004] The main objective of the invention is to provide a handheld controller that provides buffering protection.

[0005] Another objective of the invention is to provide a buffering protective handheld controller which main unit has the handheld base in a hollow shape and enclosed by a sticking soft pad with a proper size. Thus, it can provide a cushion air-bag effect to fit the user's palm in any shape and any size. Particularly, because the user can hold the unit with a firm grasp by fingers, the grasping force is significantly minimized during use. The invention further provides the handheld controller with the most grasping comfort.

[0006] The handheld controller concerned comprises a directional button and a number of functional buttons on one side of the main unit; the surface of the directional button being covered by a soft protective pad.

[0007] According to the invention,

- the directional button is surrounded by a floating ring that is enclosed in a layer of soft protective pad; the bottom of the floating ring being held by a multiple number of buffering devices; said buffering devices including multiple molded axles all connected to elastic washers or pads at the bottom, so the floating ring can float around the top of a slot within the main unit and avoid jumping off the main unit;
- the functional buttons includes first buffering devices and are surrounded by a floating ring which surface

is covered by a soft protective pad and is held by a multiple number of second buffering devices at the bottom, said second buffering devices including a number of moulded axles connected to elastic washers, so the floating ring is limited to float around the top of a slot within the main unit and avoids jumping off the main unit;

- the handheld rigid plastic portion of the main unit base is in a hollow shape, which is enclosed by a sticking soft pad.

[0008] Mainly, the invention provides a buffering protective configuration for direction button and a number of functional buttons on one side of the main unit. The user is allowed to have greater touch area and more comfortability when pressing the button. Especially, under a long period of button-pressing time, the user has finger contact with surrounding buffering devices to reduce pressure. Therefore, the invention can provide fatigue reduction, blistering prevention and benefits like finger protection from callus and deformation.

[0009] Through the invention, when the user presses the button, the user can hold the unit with a firm grasp by fingers, the grasping force being minimized during use; when the user's hand presses the functional button or the directional button to the bottom, the touch action is on the soft protective floating rings around the buttons; this not only provides a greater touch area but also pressure reduction by a multiple sets of buffering devices at the bottom of the floating rings and cushion action on a number of axles and washers; in this way, the user is under a multiple protection from top to bottom.

**BRIEF DESCRIPTION OF THE DRAWINGS****[0010]**

Figure 1 is an illustration of the appearance of the invention.

Figure 2 is an illustration of the A-A crosssectional view of the invention.

Figure 3 is an illustration of the B-B crosssectional view of the invention.

Figure 4 is an illustration of the crosssectional view of another buffering device for the functional button of the present invention.

Figure 5 is an illustration of the C-C crosssectional view of the invention.

Figure 6 is an illustration of the side view of the base of the handheld main unit for the present invention.

Figure 7 is an illustration of the top view of the base of the handheld main unit for the present invention.

**DETAILED DESCRIPTION OF ILLUSTRATIVE EMBODIMENT**

[0011] Please refer to Figure 1. The buffering protective handheld controller in the present invention is mainly

to provide a buffering protective configuration for a directional button 2 and a number of functional buttons 3 on one side of the main unit 1.

**[0012]** As shown in Figure 2, the surface of the directional button 2 is covered by an elastic ring 22, which is a layer of soft protective pad 23. Further, the bottom of the elastic ring 22 is held by a number of buffering devices 24. The buffering devices 24 can be flexible rubber, spring ... etc. to reduce holding pressure (a spring in the Figure). A number of moulded axles 25 at the bottom connect with an elastic pad 26. Thus, the elastic ring 22 is allowed to move around the top of a slot 27 and avoids jumping off the main unit 1.

**[0013]** When the user presses the directional button 2 for direction control, the user can acquire better comfortability by direct hand pressing on the protective pad 21 that covers the directional button 2. Especially, before the user's hand presses the directional button 2 to the bottom, it feels the touch on the protective pad 23 on the elastic ring 22 around the directional buttons 2. This not only provides a greater touch area but also pressure reduction by a multiple sets of buffering devices 24 at the bottom of the elastic ring 22 and cushion action on a number of axles 25 and washers 26. In this way, the user is under a multiple protection from top to bottom, which includes the protective pad 21 on top of the directional button 2, the elastic ring 22 moving around in the middle to reduce pressure, and bottom cushion composed of buffering devices 24, axles 25 and washers 26. Such a handheld controller not only has the most comfortability but also reduced holding pressure. Furthermore, the invention can provide fatigue reduction, blistering prevention and benefits like finger protection from callus and deformation.

**[0014]** As shown in Figure 3 and Figure 4, the multiple number of functional buttons 3 have a buffering device, which can be an elastic silicone bushing 31 (as shown in Figure 3). On the top of the bushing 31, a through-hole 311 of a height  $h$  is to incorporate the functional button 3. By increasing the through-hole height, we can increase the pressure reduction for the functional button 3. Or the buffering device can be a hollow silicone elastic pin 32 (as shown in Figure 4), which connects to the bottom of functional buttons 3 against the bushing 31. The elastic pin 32 enhances the pressure reduction for the functional buttons 3. On the other hand, as shown in Figure 5, around the functional buttons 3, there are elastic rings 33 that surface is covered by soft protective pad 34. The elastic ring 33 is held by a multiple number of buffering devices 35, which can be soft rubber, spring ... etc. to alleviate the pressure (spring in the Figure). A multiple sets of moulded axles 36 at its bottom all connect to an elastic washer 37 and are covered by a spring 39, so the elastic ring 33 can float around the top of the slot 38 and avoid jumping off the main unit 1.

**[0015]** When the user presses the functional button 3, the buffering device at the bottom of the functional button 3 can provide comfort operability by reducing the pres-

sure on user's hands. Besides, when the user's hand presses the functional button 3 to the bottom, the touch action is on the protective pad 34 of the top of the elastic ring 33 around the functional button 3. It not only enlarges the touch area but also reduces pressure by the multiple number of buffering devices 35 at the bottom of the elastic ring 33 and the pressure reduction mechanism through a number of axles 36 and washers 37. In this way, the user is under a multiple protection from top to bottom, which includes the buffering device at the bottom of the functional button 3, the elastic ring 33 moving around in the middle to reduce pressure, and bottom cushion composed of buffering devices 35, axles 36 and washers 37. The invention that reduces the button holding pressure can provide fatigue reduction, blistering prevention and benefits like finger protection from callus and deformation.

**[0016]** Further, as in Figure 6 and Figure 7, the handheld portion of the base 11 of the main unit 1 in the invention is in a proper design of a hollow hole 111, which may be enclosed by a sticking soft pad 112 with a proper size. Thus, it can provide a cushion air-bag function to fit the user's palm in any shape and any size. Particularly, because the user can hold the unit with a firm grasp by fingers, the grasping force is greatly minimized during use. Such a handheld controller not only has the most comfortability but also reduced holding pressure.

**[0017]** To summarize on the above description, the buffering protective handheld controller provided in the present invention is mainly a unit with a buffering protective configuration for direction button and a number of functional buttons on one side of the main unit. Thus, the user is allowed to have greater touch area and more comfortability when pressing the button. In addition, under a long period of button-pressing time, the user has finger contact with surrounding buffering devices to reduce pressure. Further, the handheld main unit has the rigid plastic base in an appropriate hollow shape, which may be enclosed by a sticking soft pad with a proper size. Thus, it can provide a cushion air-bag function and fits the user's palm in any shape and any size. Particularly, because the user can hold the unit with a firm grasp by fingers, the grasping force is minimized during use. Such a handheld controller not only has the most comfortability but also reduced holding pressure. Therefore, the invention can provide fatigue reduction, blistering prevention and benefits like finger protection from callus and deformation. This invention is considered to have great industrial applicability and progressiveness.

## Claims

1. A handheld controller, comprising a directional button (2) and a number of functional buttons (3) on one side of the main unit (1); the surface of the directional button (2) being covered by a soft protective pad (21), **characterized in that:**

- the directional button (2) is surrounded by a floating ring (22) that is enclosed in a layer of soft protective pad (23); the bottom of the floating ring (22) being held by a multiple number of buffering devices (24); said buffering devices (24) including multiple molded axles (25) all connected to elastic washers or pads (26) at the bottom, so the floating ring (22) can float around the top of a slot (27) within the main unit (1) and avoid jumping off the main unit (1);
- the functional buttons (3) include first buffering devices (31) and are surrounded by a floating ring (33) which surface is covered by a soft protective pad (34) and is held by a multiple number of second buffering devices (35) at the bottom, said second buffering devices (35) including a number of molded axles (36) connected to elastic washers (37), so the floating ring is limited to float around the top of a slot (38) within the main unit (1) and avoids jumping off the main unit (1);
- the handheld rigid plastic portion of the main unit base (11) is in a hollow shape, which is enclosed by a sticking soft pad (112).
2. A handheld controller as described in Claim 1, **characterized in that** the buffering devices at the bottom of the functional buttons (3) can be elastic silicone bushing (31) with a through-hole (311) at a certain height on its top to incorporate the functional button (3).
3. A handheld controller as described in Claim 2, **characterized in that**, at the bottom of the functional button (3), there is a hollow elastic silicone pin (32) to hold the bottom of the bushing (31).
4. A handheld controller as described in Claim 1, **characterized in that** the buffering devices (24, 35) can be any pressure reducing devices like soft rubber or spring.

#### Patentansprüche

1. Handsteuergerät, umfassend eine richtungsgebende Taste (2) und eine Anzahl von Funktionstasten (3) auf einer Seite der Haupteinheit (1); wobei die Oberfläche der Richttaste (2) mit einem weichen Schutzkissen (21) bedeckt ist, **dadurch gekennzeichnet, dass:**
- die Richttaste (2) durch einen schwebenden Ring (22) umgeben ist, welcher mit einer Schicht aus weicher Schutzmatte (23) eingeschlossen ist; wobei der Boden des schwebenden Ringes (22) durch eine Vielzahl von Puffervorrichtungen (24) gehalten wird; wobei die Puffervorrichtungen (24) gegossene Mehrfachachsen (25)

umfassen, die alle mit elastischen Beilagscheiben oder Kissen (26) an der Unterseite verbunden sind, so dass der schwebende Ring (22) um die Oberseite eines Schlitzes (27) innerhalb der Haupteinheit (1) herumschweben kann und es vermeidet von der Haupteinheit (1) abzuspringen;

- die Funktionstasten (3) erste Puffervorrichtungen (31) umfassen und durch einen schwebenden Ring (33) umgeben sind, dessen Oberfläche durch ein weiches Schutzkissen (34) bedeckt ist und durch eine Vielzahl von zweiten Puffervorrichtungen (35) an der Unterseite gehalten wird, wobei die zweiten Puffervorrichtungen (35) eine Anzahl von gegossene Achsen (36) umfassen, die mit elastischen Beilagscheiben (37) verbunden sind, so dass der schwebende Ring darauf beschränkt ist, um die Oberseite eines Schlitzes (38) innerhalb der Haupteinheit (1) herumzuschweben, und es vermeidet von der Haupteinheit (1) abzuspringen;

- der steife Kunststoffhandabschnitt der Haupteinheitsschale (11) von hohler Gestalt ist, welche durch ein klebendes weiches Kissen (112) eingeschlossen ist.

2. Handsteuergerät gemäß Anspruch 1, **dadurch gekennzeichnet, dass** die Puffervorrichtungen an der Unterseite der Funktionstasten (3) elastische Silikonbuchsringe (31) mit einem Durchgangsloch (311) auf einer bestimmten Höhe auf ihrer Oberseite sein können, um jeweils die Funktionstaste (3) aufzunehmen.
3. Handsteuergerät gemäß Anspruch 2, **dadurch gekennzeichnet, dass** sich auf der Unterseite der Funktionstaste (3) ein hohler elastischer Silikonstift (32) befindet, um den Boden des Buchsrings (31) zu halten.
4. Handsteuergerät gemäß Anspruch 1, **dadurch gekennzeichnet, dass** die Puffervorrichtungen (24, 35) aus jeder Druck verringernden Vorrichtung wie weicher Gummi oder eine Feder sein können.

#### Revendications

1. Un dispositif de commande maintenu à la main, comportant un bouton directionnel (2) et un certain nombre de boutons de fonctions (3) d'un côté de l'unité principale (1) ; la surface du bouton directionnel (2) étant recouverte par une garniture souple de protection (21), **caractérisé en ce que :**
- le bouton directionnel (2) est entouré par un anneau flottant (22) qui est inclus dans une couche de garniture souple de protection (23) ; la

- partie inférieure de l'anneau flottant (22) est maintenu par de multiples dispositifs d'amortissement (24) ; lesdits dispositifs d'amortissement (24) comprenant de multiples axes moulés (25) tous reliés à des rondelles élastiques ou des coussinets (26) à la partie inférieure, de sorte que l'anneau flottant (22) peut flotter autour du sommet d'une fente (27) dans l'unité principale (1) et éviter d'être éjecté hors de l'unité principale (1) ;
- les boutons de fonctions (3) incluent des premiers dispositifs d'amortissement (31) et sont entourés par un anneau flottant (33) dont la surface est recouverte par une garniture souple de protection (34) et est maintenue par de multiples seconds dispositifs d'amortissement (35) à sa partie inférieure, lesdits seconds dispositifs d'amortissement (35) comprenant un certain nombre d'axes moulés (36) reliés à des rondelles élastiques (37), de sorte que l'anneau flottant est limité à flotter autour du sommet d'une fente (38) dans l'unité principale (1) et évite une éjection hors de l'unité principale (1) ;
- la partie destinée à être maintenue à la main, en plastique rigide, de la base (11) de l'unité principale a une forme creuse, qui est entourée par une garniture souple adhérente (112).
2. Un dispositif de commande maintenu à la main tel que décrit dans la revendication 1, **caractérisé en ce que** les dispositifs d'amortissement à la partie inférieure des boutons de fonctions (3) peuvent être une douille élastique (31) en silicone avec un trou traversant (311) ayant une certaine hauteur sur sa partie supérieure pour recevoir le bouton fonctionnel (3).
3. Un dispositif de commande maintenu à la main tel que décrit dans la revendication 2, **caractérisé en ce que**, à la partie inférieure du bouton fonctionnel (3), il y a une tige creuse (32) en silicone élastique pour tenir la partie inférieure de la douille (31).
4. Un dispositif de commande maintenu à la main tel que décrit dans la revendication 1, **caractérisé en ce que** les dispositifs d'amortissement (24, 35) peuvent être n'importe quels dispositifs réduisant la pression tels que du caoutchouc souple ou un ressort.

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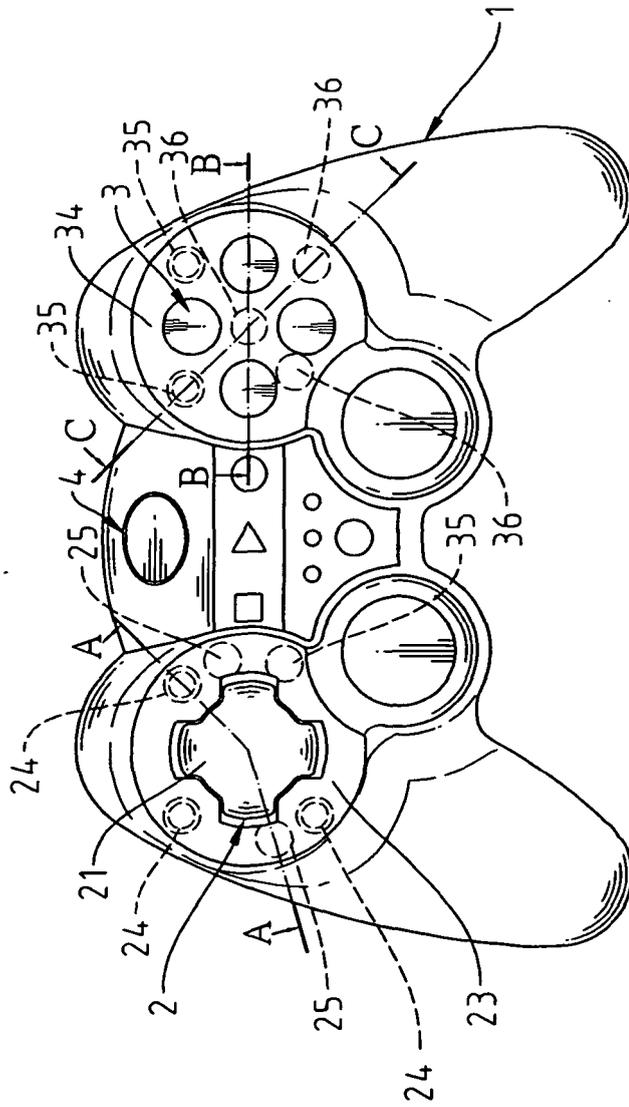


Fig. 1

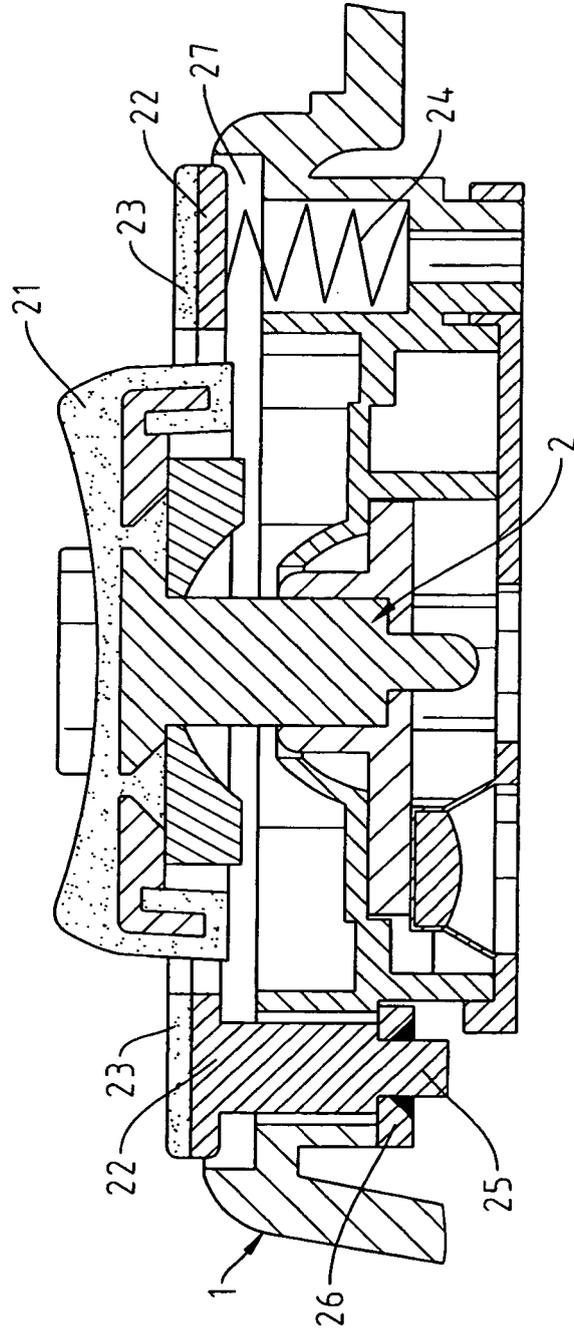


Fig. 2

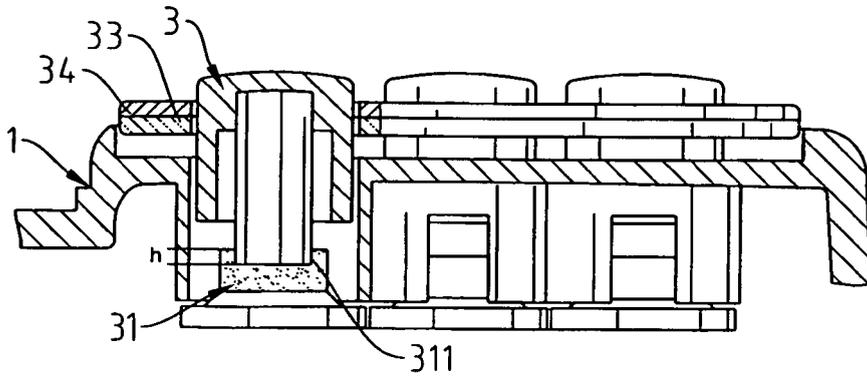


Fig. 3

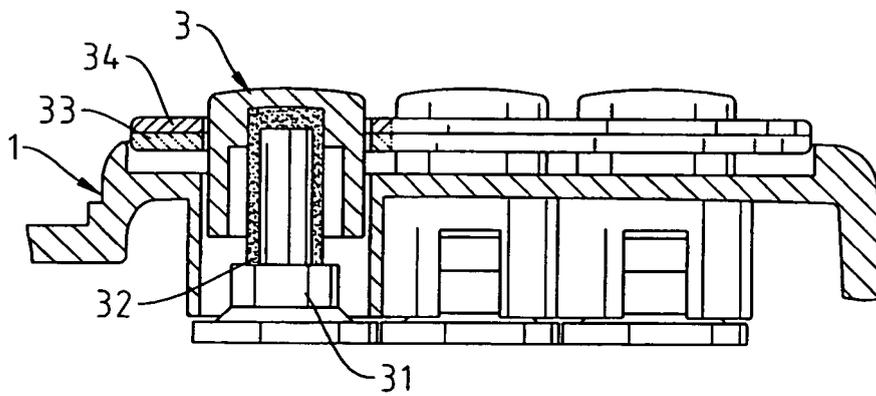


Fig. 4

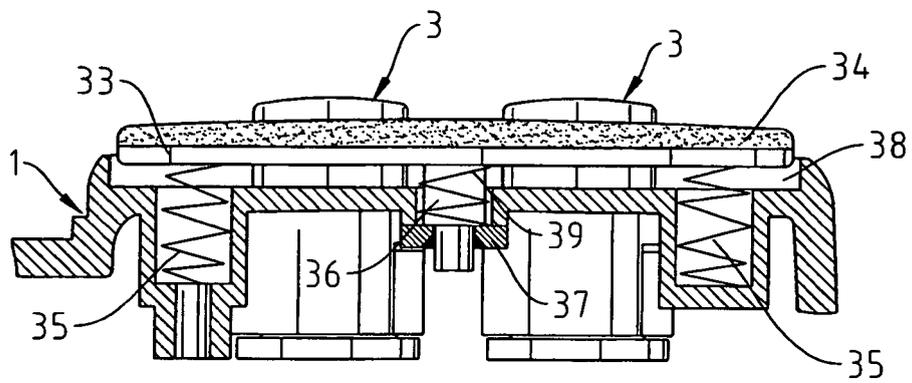


Fig. 5

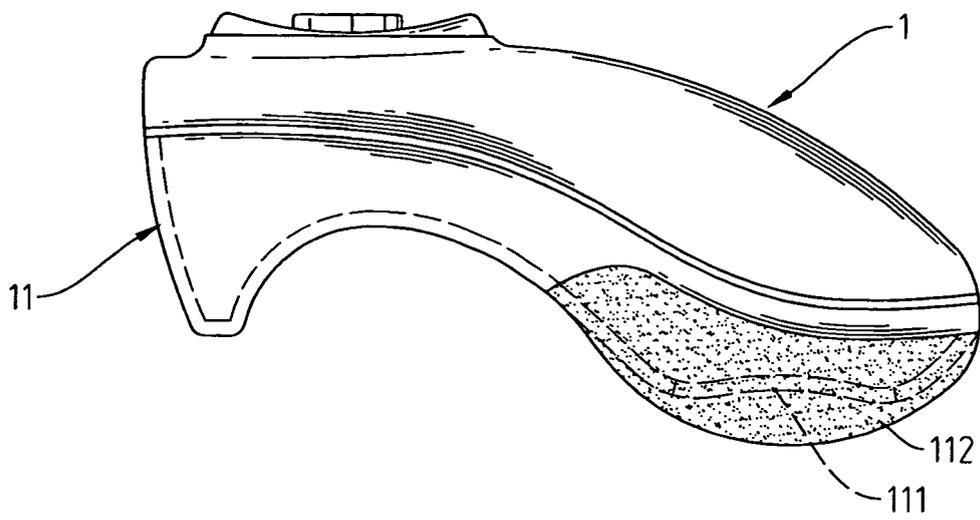


Fig. 6

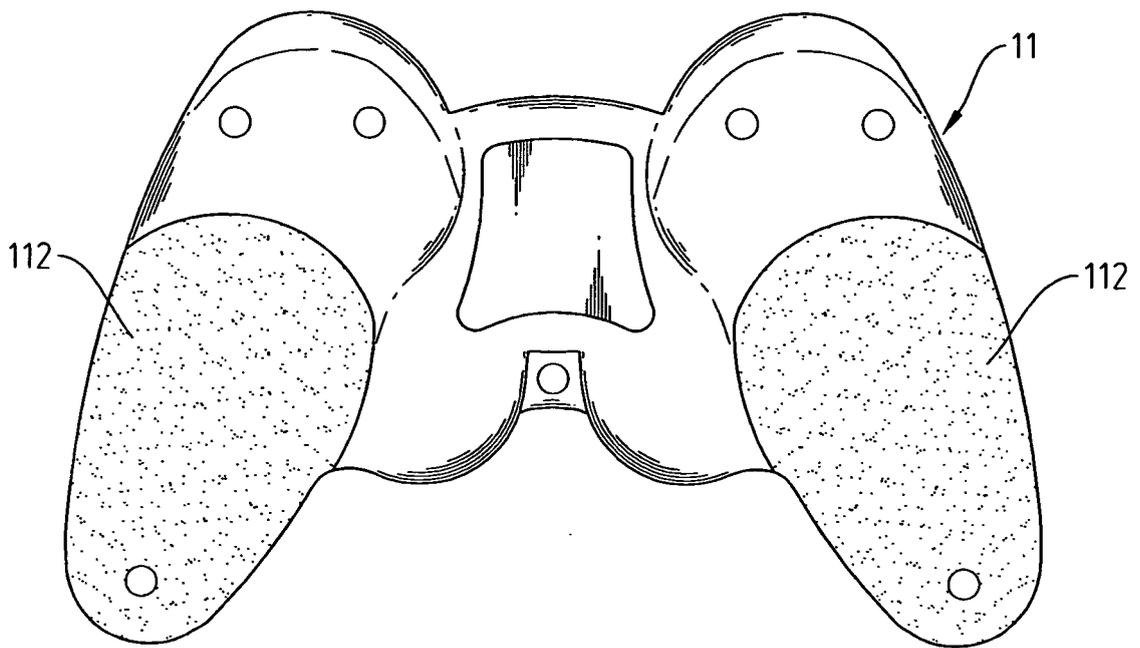


Fig. 7