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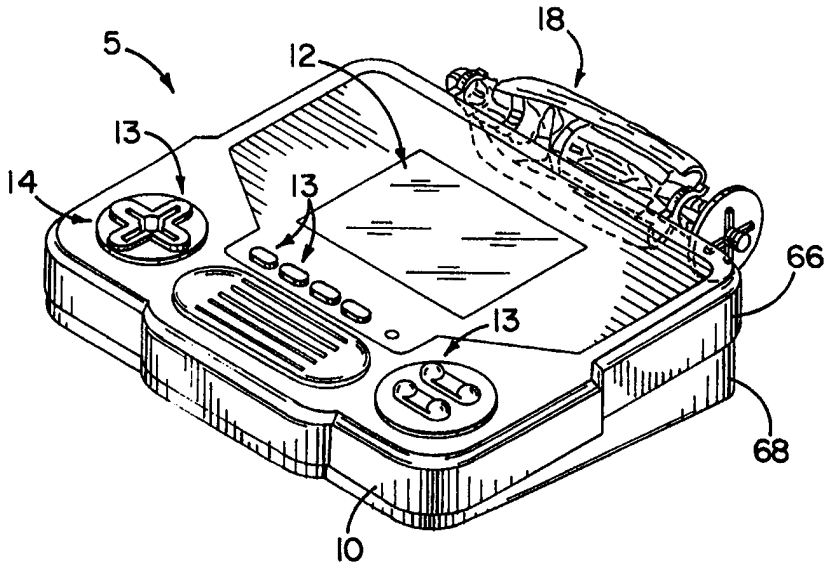

(57) Abstract

An electronic game (5) having a display screen (12) for viewing images generated by the internal circuitry of the game is provided. The game includes player controls (13) for interactively playing the game with one of the controls being a multi–directional control key (14) which can be used by a player to control movements of an image on the screen for playing the game. The game has a joystick adapter (16) which allows a player to use a joystick in lieu of the control key for controlling image movement. Preferably, the joystick adapter includes a releasable snap–fit attachment (28, 130) between the joystick and control key to allow the joystick to be readily snapped into an operative position on the key for pivoting the key with the joystick. The game can also include mounting clips (160, 170) attached to the game housing for receiving and storing the joystick when it is not being used. The joystick can be configured in the form of an action figure to enhance its appeal to youngsters.

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DETACHABLE JOYSTICK AND ADAPTER

Field of the Invention

The invention relates to electronic games, and more particularly, to electronic games which have a control key for controlling movement of an image displayed on the display screen of the game.

Background of the Invention

Interactive video games such as found in video game arcades have long been popular where players can exercise some degree of control over the action viewed on the screen of the game. Such control can include controlling movement of images or characters in a precise manner so as to accomplish predetermined goals as set out by the scheme of the game. For example, video games can include various types of control keys which allow a character to be moved to avoid being hit, such as by another image generated by the game program or by projectiles, missiles, etc., while at the same time allowing the player to control the image to selectively engage other characters on the screen or shoot or throw projectiles of its own at target images, such as at other characters or obstacles generated on the game screen.

The types of controls used on video games include multi-directional control keys to be mounted to the game so that when a player pushes on a portion of the key, the key pivots in response to the pressure towards the direction of desired image movement. Some control keys allow the image to move in four directions, such as right and left and up and down on the screen. The use of multi-directional joystick controls for controlling image movement are also known, and similar to the above-described control key, work to control image movement depending on how the joystick is pushed or pulled by the player. Other common types of controls include the use of directional buttons which can be positioned adjacent each other so that a player can

utilize the fingers of one hand to push on the button corresponding to the direction of movement desired, and also roller balls wherein the player simply rolls the ball towards the direction of movement desired for the image.

With the progress in miniaturization of integrated circuits, the ability to provide hand-held video games that include game schemes comparable to that of regular stand-alone arcade video games has improved. However, with hand-held video games, the space taken up by the game housing and the player controls thereon are still significant design factors that must be considered. Thus, the provision of joysticks on hand-held video games is typically not done. Instead, the use of the previously-described player controls such as keys and buttons are normally utilized. However, where a player does not have sufficient tactile control, such as with younger players, it can be difficult for them to coordinate precise manipulation of the keys and buttons for them to properly realize full enjoyment of the game. Thus, it would be desirable to provide a video game where a player has the option of either utilizing the player controls such as a control key, or in lieu of the control key, a joystick for controlling image movement on the video display screen.

Summary of the Invention

In accordance with the present invention, an electronic game is provided in which the players can exercise control of movements of an image generated on the display screen of the game by either utilizing a control key or a joystick attached to the control key. In this regard, the electronic game is provided with a joystick adapter where the control key is provided with an opening for receiving a portion of the joystick therein and there is a releasable attachment provided between the key and joystick in the key opening which allows the joystick portion to be inserted in the key opening and to be

releasably locked therein for using the joystick to pivot the control key. Thus, the present invention gives the player the option of whether to use the control key or the joystick for controlling image movement while playing the game.

The present invention provides significant flexibility in how the electronic game of the present invention is to be played. Where the player has a sufficient degree of skill so that the use of a joystick is unnecessary, the joystick can be removed from the control key so that the players can use the control key for controlling image movements on the display screen of the game. Where the player does not have the requisite degree of coordination to properly manipulate the keys or simply desires to use a joystick, the present invention allows a joystick to be releasably attached to the key so that manipulating the joystick also manipulates the key for controlling image movement on the game display screen.

Accordingly, in one form of the invention, an electronic game is provided having a housing including a display screen and circuitry for generating images on the screen. The game further includes player controls to control playing of the game including movement of at least one of the images generated on the game screen and having a joy stick adapter to allow a joystick to be used for controlling image movement. The joystick adapter includes a control key of the player controls for moving the at least one image on the screen. The control key is pivotally mounted to the housing so that when a player pushes on a portion of the key, the key pivots in a direction corresponding to the direction of image movement. An opening on the key can receive a portion of the joystick therein. A releasable attachment between the key and joystick is provided in the key opening to allow the joystick portion to be inserted in the key opening and to be releasably locked therein for using the joystick to

pivot the control key. The control can include a top surface and the key opening can be a central recess formed in the key top surface into which the joystick portion can be releasably attached.

In a preferred form, the control key includes a depending portion having a curved bottom engaging and pivotally mounted on an interior surface of the housing. The housing interior surface on which the curved bottom of the depending portion is pivotally mounted can be the surface of a printed circuit board with the printed circuit board including switch circuits which are closed by pivoting of the control key about the depending portion curved bottom.

In another form of the invention, an electronic game having a display screen and circuitry for generating a movable image on the screen is provided with the electronic game including a housing of the game including an interior and an exterior with the movable image on the display screen being viewable from the exterior of the housing and the circuitry being in the interior of the housing. A multi-directional control key is mounted to the housing to be accessible at the exterior thereof to a player. The key is connected to the game circuitry for controlling movement of the movable image in a plurality of directions on the screen. A joystick control is provided for actuating the control key when placed in an operative position thereon. A releasable attachment is provided between the control key and the joystick control allowing the joystick control to be attached to the control key in the operative position to actuate the key for controlling the key for controlling the movement of the image in the plurality of directions on the screen, and to be released from attachment with the control key with the control key being directly actuated by a player for controlling the movement of the image in a plurality of directions on the screen.

In one form, the joystick control includes a mounting post depending therefrom and the control key includes a central recess for receiving the mounting post with the joystick control in its operative position. Snap fit structure on the post and the key in the central recess thereof allows the mounting post to be inserted into the central recess and to be removably captured therein with the joystick control in its operative position.

In another form, one of the joystick post and key recess includes a raised portion and the other of the joystick post and key recess includes a grooved portion in which the raised portion is tightly received by a snap fit formed by the post and key recess raised and grooved portions with the joystick control in its operative position. The joystick control can include a support stand having top and bottom surfaces with the mounting post depending from the stand bottom surface and having ribs extending radially outward from the mounting post along the bottom surface of the stand. The control key can include a top surface in which the recess is centrally formed and having slots extending radially outward from the central recess. The support stand ribs seat in the slots with the joystick control placed in its operative position on the control key to prevent turning of the joystick control relative to the control key with the raised portion received by the snap fit in the grooved portion.

The joystick control can include an upper gripping portion extending upwardly from its support stand for being gripped to move the joystick control and control key with the joystick control in its operative position. The gripping portion can have a predetermined shape in the form of an action figure so as to make the use of the joystick more attractive to younger players.

In a preferred form of the invention, a hand-held electronic game is provided including a housing having internal game circuitry and a display screen for viewing

images generated by the game circuitry during playing of the game, a control key on the game housing and connected to the circuitry for moving an image on the screen and a joystick having first and second attached positions on the game with the first attached position being an operative position with the joystick attached on the control key for controlling movement of the image on the screen by operation of the joystick, and the second attached position being a stored position with the joystick attached to the housing and operation of the control key controlling movement of the image on the screen. Thus, the joystick can be removed and placed in its stored position so that the joystick will remain with the game even when the control is directly being utilized and pressed to move the image on the game screen, thus reducing the chance of losing the joystick when it is not being used.

In one form, the housing includes joystick mounting clips for receiving and holding the joystick in the clips to store the joystick in the joystick second attached position when the control key is being operated for controlling image movement. The housing can include clip receiving openings and have a first half and a second half thereof which when attached together tightly capture the mounting clips in the clip receiving openings thereof.

In another form of the invention, an electronic game is provided including a housing for containing internal circuitry of the game. A control key is mounted to the housing for controlling movements of an image generated by the game circuitry when the game is being played. A joystick is provided having an operative position with the joystick operable to control image movements as the game is played, and a stored position with the joystick kept with the game housing for staying therewith and the control key used to control image movements as the game is played.

The joystick operative position can be a first attached position with the joystick attached to the control key, and the joystick stored position can be a second attached position with the joystick attached to the game housing.

The housing can include clips for holding the joystick in the stored position. The holding clips can include a pair of spaced clips each defining an aperture in which the joystick is received. The aperture of one of the clips is closed-ended. The aperture of the other clip is open-ended and includes an entry opening leading thereto. The joystick has a length including a pair of portions spaced therealong with the joystick placed in the stored position by first inserting one of the joystick portions in the closed-ended aperture of the one clip and then inserting the other portion through the entry opening and into the open-ended aperture of the other clip. Where the joystick includes a mounting post for attaching the joystick to the control key in its operative position, the mounting post can be inserted into the closed-ended aperture when the joystick is placed in the stored position.

The housing may include a joystick compartment in which the joystick is placed in the stored position. The housing can include a door for the joystick compartment pivotally mounted thereto.

In one form, the joystick mounting post is inserted into an opening of the control key for attaching the joystick to the key, and the key includes resilient members for guiding the post as the post is inserted into the key opening with one of the joystick post and key resilient members including a raised portion and the other of the post and resilient members including a grooved portion. The raised portion causes the resilient members to deflect during post insertion into the key opening until the raised portion is aligned with the grooved portion to

allow the resilient members to rebound with the raised portion tightly received in the grooved portion for attaching the joystick to the control key in the operative position.

The control key can have a first upper part including the resilient members and a second lower part secured to the upper part and including a curved bottom for pivoting on a circuit board including switch circuits mounted in the game housing.

Brief Description of the Drawings

FIG. 1 is a perspective view of an electronic game having a display screen according to the present invention and showing the joystick in its stored position with a control key being accessible to the player for use in controlling movements of an image on the game display screen;

FIG. 2 is a perspective view similar to FIG. 1 showing the joystick removed from the stored position to an operative position attached on the control key to use the joystick for controlling image movement;

FIG. 3 is an enlarged fragmentary sectional view of the control key and a lower portion of the joystick before being releasably attached to the key;

FIG. 4 is a view similar to FIG. 3 showing the joystick lower portion releasably attached to the control key;

FIG. 5 is a rear perspective view of the electronic game showing mounting clips for receiving the joystick in the stored position;

FIG. 6 is a rear perspective view similar to FIG. 5 showing the joystick attached in the mounting clips in the stored position;

FIG. 7 is a side sectional view of the assembled housing of the electronic game according to the present invention;

FIG. 8A is an enlarged fragmentary sectional view of the mounting of one of the clips to the game housing;

FIG. 8B is an enlarged fragmentary sectional view of the mounting of the other clip to the housing;

FIG. 9 is a top plan view of a top half of the game housing;

FIG. 10 is a side sectional view taken along line 10-10 of FIG. 9 of the housing top half;

FIG. 11 is a bottom plan view of a bottom half of the game housing;

FIG. 12 is a side sectional view taken along line 12-12 of FIG. 11;

FIG. 13 is an enlarged fragmentary perspective view of the mounting of the clip of FIG. 8A to the housing;

FIG. 14 is a perspective view of another embodiment of an electronic game according to the present invention showing a game housing have holding clips with a joystick removed therefrom;

FIG. 15 is a cross-sectional view taken along line 15-15 of Fig. 14 showing the ring-shaped clip and its mounting to the housing;

FIG. 16 is a sectional view of a control key assembly mounted to the game housing and a lower portion of the joystick before being releasably attached to the key;

FIG. 17 is a view similar to Fig. 16 showing the joystick lower portion releasably attached to the control key;

FIG. 18 is a perspective view of a third embodiment of an electronic game according to the present invention showing a joystick in its operative position releasably attached to a control key for using the joystick to control image movement;

FIG. 19 is a perspective view of the bottom of the electronic game of Fig. 18 showing the joystick removed from the operative position and placed in a joystick

compartment with a door for the storage compartment shown pivoted opened in phantom;

FIG. 20A is a cross-sectional view taken along line 20-20 of Fig. 19 showing a detent mechanism for releasably locking the door of the storage compartment;

FIG. 20B is a cross-sectional view similar to Fig. 20A showing a player's finger used to release the detent mechanism for opening the cover of the storage compartment;

FIG. 21 is an exploded perspective view of a control key assembly used with the electronic game of Fig. 18; and

FIG. 22 is a sectional view showing the control key assembly mounted to the game housing and before the joystick lower portion is releasably attached to the key.

Detailed Description of the Preferred Embodiments

In FIG. 1, a preferred form of an electronic hand-held game 5 according to the present invention is illustrated. The hand-held game 5 includes a housing 10 with an interior and an exterior thereof. A video display screen 12 is provided for displaying images in accordance with the programmed game scheme when the game 5 is being played and is viewable by the player from the exterior of the housing 10. Internal circuitry (not shown) is provided in the interior of the electronic game housing 10 to generate the images shown on the screen 12. Controls 13 which can be manipulated or pressed by the player for playing the game 5 are provided on the exterior of the housing 10 accessible to the player. Movement of at least one of the images can be controlled by one of the player controls 13 in the form of a multi-directional control key 14.

The game 5 has a joystick adapter 16 (FIG. 3) so that a joystick 18 can be utilized by the player in lieu of the control key 14 for moving the movable image displayed

on screen 12. Although the game 5 is shown as a relatively compact hand-held game for use with the joystick adapter 16 provided herein, it will be recognized that the joystick adapter 16 can also be used in the larger stand-alone video arcade games as well. The provision of the joystick adapter 16 allows a player to choose between use of the control key 14 or the joystick 18 while playing the game 5 for controlling image movement on the display screen 12. The significant flexibility provided by the joystick adapter 16 is particularly important where younger players who do not have their motor skills sufficiently developed for proficiently utilizing touch control keys, can more easily and proficiently use a joystick control 18. Such younger players can simply remove the joystick 18 from its stored location on the game housing 10 (FIGS. 1 and 6) and place into the joystick adapter 16 on the control key 14 (FIG. 2) to allow them to more proficiently play the game 5 utilizing the joystick 18, as will be more particularly described herein.

Referring to FIG. 3, the joystick adapter 16 is shown and preferably includes a portion thereof in the control key body 20 and another portion thereof on a lower portion 26 of the joystick control 18. The key body 20 has a top surface 22 with a central opening 24 formed therein for receiving the lower portion 26 of the joystick 18 to connect the joystick 18 to the control key 14 as by releasable attachment 28 formed therebetween, as best seen in FIG. 4.

More specifically, the control key 14 includes a central depending portion 30 having a curved bottom 32 which engages and is pivotally mounted on top surface 34a of a printed circuit board (PCB) 34 positioned in the interior of the game housing 10. The key body 20 can be provided with four annular mounting bosses 36, two of which are shown in FIGS. 3 and 4. The mounting bosses 36 each define an annular space 36a. The circuit board 34 includes

electronic circuitry for the game 5 such as switch circuits including switch contacts thereon (not shown) below the mounting bosses 36 of the control key 14. Switch caps 37 are mounted over the PCB switch contacts and can include contacts 37a thereof formed from a conductive material. The mounting bosses 36 receive upright portions 38 of the caps 37 in their spaces 36a so that when the portion of the key top surface 22 over a particular mounting boss 36 is depressed sufficiently against the bias of the associated rubber caps 37, the conductive rubber material of the cap 37, and in particular contact portion 37a thereof, will contact the switch contacts provided on the circuit board 34 to close the switch circuit to provide four momentary switches which are operable by pivoting of the control key 14. Other means for providing the directional control utilizing control key 14 will be apparent to those skilled in the art and are also within the purview of the present invention.

As can be seen in FIGS. 3 and 4, the switch caps 31 include an upper base portion 40 above which the upright portion 38 projects into the space 36a of the bosses 36 with there being a shoulder 42 formed between the base 40 and the upright portion 38 onto which the bottoms of the bosses 36 are seated. The base 40 is biased upwardly by an inclined shell portion 44 of the cap rubber material with the caps 37 being supported on the PCB by annular lower foot portion 46 so that there is a space 48 between the switch contacts on the circuit board 36 and the cap contact portion 37a attached to the bottom of the base 40. Thus, when the player pushes down on the portion of the top surface 22 of the control key body 20 over one of the switches, the bottom of the corresponding mounting boss 36 pushes on the shoulder 42 collapsing the shell portion 44 to push the contact portion 37a on the bottom of the base 40 through the space 48 into contact with the switch contact on the circuit board 34 to close the momentary

switch until the key 22 is released or pressed at another location thereon. As the shell portion collapses, the key 14 is allowed to pivot about the curved bottom 32 of the key depending portion 30 with there being sufficient room or space 49 provided between sides of the top wall of the game housing 10 and the key peripheral annular surface 50 to accommodate the requisite pivoting action of the control key 14.

The releasable attachment 28 provided between the key 14 and the joystick 18 can be in the form of snap-fit structure provided on the joystick lower portion 26 and the control key depending portion 30. More specifically, the key opening 24 is a central annular recess 52 defined by the key depending portion 30, and the joystick lower portion 26 is in the form of a mounting post 54 depending from a support stand 56 for the joystick 18. The stand 56 extends transversely relative to the mounting post 54 and has top and bottom parallel surfaces, 56a and 56b, which can have a circular shape with the mounting post 54 depending centrally from the stand bottom surface 56b. The mounting post 54 has a diameter substantially corresponding to the diameter across the central annular recess 52 so that the mounting post 54 is tightly received therein. The mounting post 54 can have an annular groove 58 formed thereon at a predetermined distance below the bottom of the support stand 56. The depending portion 30 has a substantially annular wall 30a extending up from the bottom portion 32. An annular raised portion or bead 60 is formed on the wall 30a and projects radially into the recess 52 defined by the depending portion 30. The bead 60 is formed at a predetermined distance from the key top surface 22. The groove 58 and bead 60 have cooperating arcuate surfaces 58a and 60a, respectively, which have complementary shapes so that the bead 60 can seat snugly within the groove 58 when the mounting post 54 is inserted into the annular

recess 52 for releasably attaching or locking the joystick 18 in its operative position on the control key 14.

Continuing with reference to FIGS. 3 and 4, the support stand 56 has ribs 62 formed on its bottom surface 56b extending radially outward from the joystick mounting post 54, and the control key 14 has corresponding radial slots 64 in the key top surface 22 which extend radially outward from the key central opening or recess 52. When the joystick 18 is snapped into the control key 14 in its operative position thereon, the seating of the ribs 62 in the slots 64 prevents the joystick 18 from turning relative to the control key 14 when being pulled or pushed by a player for moving the image on the game screen 12.

The predetermined distance at which the post groove 58 is located from the bottom surface 56b of the support stand 56 and the predetermined distance of the bead 60 in the annular recess 52 from the key surface 22 is such that when the mounting post 54 is snap fit into the recess 52 with the bead 60 tightly seated in the groove 58, as shown in FIG. 4, the stand bottom surface 56b will rest on the key top surface 22 so that pivoting the joystick 18 will tip or pivot the stand 56 thereof with the portion of the stand 56 tipping down pushing on the corresponding portion of the key surface 22 therebelow, thereby transmitting the pivoting action of the joystick 18 to the control key 14 for controlling image movement on the game screen 12.

As previously mentioned, the post 54 is snap fit into the recess 52 by way of arcuate surfaces 58a formed in the groove 58 and complementary arcuate surfaces 60a formed on the bead 60. Thus, when inserting the post 54 into the recess 52, the bottom chamfered end 63 of the post 54 will initially engage and cam against the upper portion of the arcuate surface 60a. As the housing and control key are preferably formed from a plastic material, such as ABS, the ABS material of the key body 20 will deform slightly

radially outward to allow the post bottom end 63 to move past the upper portion of the curved surface 60a with the curved surface 60a then camming against the post annular surface 67. Continued insertion force eventually will cause the curved surface 60a to be radially aligned with post groove 58 to allow the wall 30a to rebound to its original unreformed configuration with the curved surface 60a camming and snapping into engagement with the groove surface 58a as the ribs 62 are being seated in their corresponding slots 64, as seen in FIG. 4. To separate the joystick 18 from the control key 14, the reverse operation is performed with one or both of the joystick 18 or the housing 10 being pulled away from one another so as to exert a separation force sufficient enough to cause the groove curved surface 58a to cam over the lower portion of the bead curved surface 60a deforming the depending portion walls 30a radially outward until the post bottom end 66 clears the bead 60 to release the joystick 18 from its snap fit lock with the control key 14.

Thus, with the joystick adapter 16 herein, the present electronic game 5 provides users of all ages with the opportunity to play the game 5 in a manner which best suits their abilities. With smaller children, the joystick 18 can be snap fit into the control key opening 24, whereas with older children, the joystick 18 can be removed from the control key 14 and placed in a stored position attached to the game housing 10. The joystick 18 is particularly suited for younger children as it can be provided with a gripping portion 65 attached to and extending up from the stand top surface 56 with the gripping portion 65 being provided with a predetermined shape such as in the form of an action figure, such as the Darth Vader® configuration illustrated herein.

Inasmuch as the joystick 18 is adapted to be removed from the control key 14 such as when the game 5 is not being played or the key 14 is being directly used to

control image movements, the joystick 18 herein is provided with two different attached positions to the housing 10. In the first attached position or operative position, the joystick 18 is snapped into the key 14 for playing of the game 5 using the joystick 18. In the second attached position, or stored position, the joystick 18 is snapped out from the key 14 for attachment to the housing 10 at a different location as described hereinafter.

Turning to FIGS. 5 and 6, the second attached or stored position of the joystick 18 will next be described. The game housing 10 preferably is constructed from first and second housing halves 66 and 68, respectively, with the first housing half 66 being the upper housing portion and the second housing half 68 being the lower housing portion. At the rear of the housing 10, a pair of plastic mounting clips 70 and 72 are provided, as best seen in FIG. 5. The clips 70 and 72 are adapted to receive the joystick 18 between jaws thereof in the stored position, as shown in FIG. 6.

Referring to FIG. 8A, the mounting clip 70 has a main body portion 74 connected to an intermediate mounting block portion 76 which in turn is connected to the back mounting plate portion 78 of the clip 70. At the front of the main body portion 74, opposed arcuate resilient jaws 80 and 82 are provided which define a small entry opening 84 at their distal ends leading to a larger joystick-receiving space 86 between curved portions of the jaws 80 and 82. The jaws 80 and 82 can be resiliently expanded at their distal ends to enlarge the entry opening 84 for tightly receiving a portion of the joystick 18 between the jaws 80 and 82 in the space 86 provided therebetween. Mounting clip 72 as shown in FIG. 8B is provided with a similar construction to mounting clip 70 with corresponding reference numerals given a prime (') to indicate their association with mounting clip 72. Thus, mounting clip 72 likewise has a main body portion 74', a mounting block

portion 76' and a mounting plate portion 78'. The flexible jaws 80' and 82' also define an entry opening 84' therebetween at their distal ends which leads to a joystick receiving space 86' between curved portions of the jaws 80' and 82'. As can be seen by a comparison of FIGS. 8A and 8B, the jaws 80' and 82' preferably have a greater curve than jaws 80 and 82 so that mounting clip 72 is adapted to receive a thicker portion of the joystick therein between its jaws 80' and 82'. This can be necessary where the joystick 18 has its upper portion 65 configured in the shape of an action figure so that the size of the gripping portion 65 varies along its length. In this regard, the jaws 80' and 82' at their distal ends can be provided with flared-out portions 88 and 90, respectively, so that the entry opening 84' initially is slightly larger than the initial entry opening 84 for the mounting clip 70. This allows the foot region 65a of the action figure joystick 65 to be inserted in clip 72 while the smaller head region 65b can be inserted in clip 70, as best seen in FIG. 6.

For mounting the clips 70 and 72 to the housing 10, the top housing half 66 can have a pair of clip receiving openings in the form of inverted T-slots 89 formed therein and the bottom housing half 68 has a ledge 91 so that when the housing 10 is assembled, the ledge 91 cooperates to capture the clips 70 and 72 in the slots 89, as will be more fully described herein. Returning to the construction of the clips 70 and 72, the mounting block 76 is slightly narrower than the width of clip main body portion 74 so as to form a vertical shoulder 92 therebetween on either side of the back of the main body portion 74 to which the mounting block 76 is connected. The mounting plate portion 78 is attached to the back of the mounting block 76 and extends laterally widthwise beyond both the sides of the mounting block 76 and the sides of the body portion 74 of the clips and thus forms a shoulder 93 with the mounting block 76. The plate 78 is

connected to the block 76 at a location above the bottom of the block 76 so as to form a horizontal shoulder 94 between the plate 78 and the block 92. In addition, since the block 76 does not extend to the height of the main body portion 74, a channel 96 between the front surface of the plate 78 and the back surface of the body portion 74 is formed over the top of the block 76.

The top housing half 66 can have a substantially vertical rear wall 98 having a thickness corresponding to the distance across the channel 96 between the front of the plate portion 78 and the rear of the body portion 74. The inverted T-slot 89 is formed in the vertical rear wall 98 and can have a vertical portion 89a of the slot 89 which has a width slightly larger than the width of the clip mounting block 76. Thus, to assemble the game housing 10 with the clips 70 and 72 mounted in their respective slots 89, the clips mounting block portion 76 is slid in the vertical portion 89a of the slot until the top of the block 76 engages against the top of the slot portion 89a with the portion of the rear wall 98 above the slot vertical portion 89a tightly received in the channel 96 between the front of the mounting plate 78 and the back of the body portion 74 and the portions of the rear wall 98 on either side of the slot vertical portion 89a received tightly between the body shoulders 92 and the plate shoulders 93.

The lower housing half 68 includes a right angle wall 100 at the rear thereof having a substantially horizontal portion 100a integral with a substantially vertical portion 100b. The ledge 91 extends integrally outwardly from the vertical portion 100b intermediate the top and bottom thereof, as best seen in FIG. 13. Fastener mounting bosses 102 are provided at various locations around the upper and lower housing halves 66 and 68 so that when aligned with one another, the bosses 102 can receive fasteners therein to clamp the housing halves 66 and 68 together for assembly of the game housing 10. With the

mounting bosses 102 aligned for assembly of the game housing 10, the right angle wall 100 of the lower housing half 68 will be spaced inwardly from the vertical rear wall portion 98 of the upper housing half 66 with the ledge 91 extending out to a point in vertical alignment with the vertical rear wall portion 98, as best seen in FIGS. 8A and 8B. When the housing halves 66 and 68 are fastened together and the clips 70 and 72 are slid into the inverted T-slots 89 as previously described, the ledge 91 will cooperate to engage the bottom of the clip mounting block portion 76 and clamp it up against the bottom of the vertical rear wall portion 98 in the channel 96, *i.e.*, against the top of the slot vertical portion 89a, to securely capture the mounting clips 70 and 72 in the clip-receiving openings or slots 89 of the game housing 10.

Referring to Fig. 14, a slightly different version of an electronic game 105 in accordance with the present invention is shown and includes a housing 110 having a display screen 112 and controls 113 accessible to the player for playing the game 105 similar to previously-described game 5. Accordingly, one of the control 113 serves as a multi-directional control key 114 which controls movement of at least one of the images generated on the display screen 112 by the game circuitry.

The game 105 has a joystick adapter 116 (Fig. 16) to allow joystick 118 to be used by a player to control image movements on the screen 112. The joystick adapter 116 has a slightly different construction over joystick adapter 16 of game 5. The control key assembly 114 has a key body 120 that includes a raised cross-shaped portion 122 which extends upwardly from circular base 124 to a top surface 123 thereof. The game housing 5 includes a plate 125 having a cross-shaped cut-out slot 125a formed therein such that when the key assembly 114 is mounted to the game housing 5, the key raised portion 122 projects through the slot 125a above plate 125. For providing the joystick

adapter 116, the body 120 has a central opening 126 for receiving a lower portion 128 of the joystick 118 therein to releasably connect the joystick 118 to the control key assembly 114 as by releasable attachment 130 formed therebetween, as best seen in Fig. 17.

Instead of the central depending portion 30 with the integral curved bottom 32 of control key 14, the control key 114 has resilient finger members 132 which project downwardly from the bottom of the key body 120 about the central opening 126 thereof. The depending fingers 132 are curved in an arc about the opening 126 and are spaced above circuit board 134 at their bottoms.

The joystick lower portion 128 is in the form of a mounting post 136 which depends from a support stand 138 of the joystick 118. As shown, the support stand 138 has a cross-shape with the mounting post 136 depending from the bottom of the cross-shaped stand 138 centrally at the intersection of the arms or wings 138a of the stand 138. The post 136 similar to post 34 has an annular groove 140 formed thereon at a predetermined distance from the bottom 139 of the support stand 138. The resilient finger members 132 are each provided with a raised portion or bead 142 which project radially into the opening 126 about which the finger members 132 extend. The respective beads 142 are provided at a predetermined distance from the top surface 138a of the key body 120 such that when the mounting post 136 is inserted into the central opening 126, the beads 142 will snap into the annular groove 140, as best seen in Fig. 17.

More specifically, the annular groove 140 of the mounting post 136 has a lower shoulder 140a that extends radially transverse to the length of the post 136 with the shoulder 140a being spaced from the bottom 139 of the joystick stand 138 approximately the same distance at which the bottom 142a of the raised beads 142 are spaced from the top surface 123 of the key body portion 122. Thus, when

the joystick 118 is releasably attached to the control key 114, the post shoulder 140a and the bead lower surface 142a will be in confronting relation to limit movement of the joystick 118 in a direction away from the control key 114 absent a sufficient separation force being exerted between the joystick mounting post 136 and control key finger members 132, and the bottom surface 139 of the joystick support stand 138 will seat on the top surface 123 of the key body portion 122 to prevent axial movement of the joystick 118 in a direction towards the interior of the game housing 110 such that there is little or no loose play in an axial direction between the joystick 118 and the control key 114 when releasably attached together.

The support stand 138 is provided with ribs 144 projecting downwardly from the stand bottom surface 139 and extending radially outward from the joystick mounting post 136 with the ribs 144 terminating distal from the mounting post 136 and spaced radially inwardly from the outer edges of the support stand wings 138a and being thinner than the wings 138a so that the stand bottom surface 139 is exposed around the ribs 144. Wing portions 122a of the key cross-shaped portion 122 have recessed slots 148 formed therein which extend radially outward from the key central opening 126 stopping short of the outer edge of the wings 122a. The ribs 144 seat in the slots 148 to prevent rotation of the joystick 118 when releasably attached to the key 114.

To releasably connect the joystick 118 to the control key 114, the mounting post 136 is aligned over the central opening 126 and the radial ribs 144 are similarly aligned over corresponding radial slots 148. Thereafter, the joystick 118 and game housing 110 are moved relative to one another to cause the mounting post 126 to be inserted into the central opening 126 with the post 136 guided by the resilient fingers 122 during insertion. The bottom end of the post 136 is chamfered at 150 so that as it is inserted, the chamfered end 150 cams against the raised

beads 142 of the fingers 132. Continued insertion of the mounting post 136 in the opening 126 causes the fingers 132 to resiliently deflect until the beads 142 are aligned with the groove 140, and specifically until the shoulder 140a clears the lower surface 142a of the beads. At this time, the resilient finger members 132 will snap back to their original non-deflected orientation causing the beads 142 to enter into the angular groove 140 with the surfaces 140a and 142a in confronting relation with one another, and the radial ribs 144 will be received in the radial slots 148, as shown in Fig. 17. As previously mentioned, with the mounting post 136 snap fit in the key central opening 126, the bottom surface 139 of the joystick stand 138 extending around the ribs 144 will be abutted against the key body top surface 123 which extends around the radial slots 148.

Accordingly, to utilize the joystick 118 to control image movements during game play, the joystick 118 is removed from its stored position, which will be more fully described hereinafter, and connected to the control key assembly 114 via the releasable attachment 130 provided by the key joystick adapter 116, as described above. Similar to the previously-described releasable attachment 28 of joystick adapter 16, to separate the joystick 118 from the control key 114, the reverse operation is performed with one or both of the joystick 118 or the housing 110 being pulled away from one another so as to exert a separation force that is sufficient to cause the groove shoulder 140a to cam over the lower surface 142a of the beads 142 with the resilient fingers 142 deflecting radially outward until the post bottom 150 clears the beads 142 to release the joystick 118 from its snap fit connection to the control key 114.

When the joystick 118 is releasably attached to the control key 114 as shown in Fig. 17, the joystick 118 is utilized to control image movements by pivoting thereof in the desired direction of image movement which, in turn,

causes the attached control key 114 to likewise pivot in the desired direction in a manner similar to the previously-described key 14. More particularly, the key body 120 is provided with annular mounting bosses 150 spaced radially out from the resilient fingers 142 and below the radially outer portions of the key body wings 122a. The bosses 150 each have an annular interior space that is adapted for mounting a flexible switch cap 152, and specifically an upright portion 154 thereof in the boss 150. The caps 152 have a contact 156 attached in their interior and at top of the inclined shelf portion 158 of the cap 152 which is at the bottom of the upright portion 154 thereof and thus, directly below the associated boss 150. In this manner, the contact 156 is spaced above the printed circuit board 134 until the control key body 120, and with the joystick 118 attached therein, the joystick 118, are pivoted causing one or more of the bosses 150 to move towards the circuit board 134 against the bias of associated caps 152 by collapsing of the inclined shelf portions 158 thereof. When the key body 120 is pivoted sufficiently, a cap contact 166 will be brought into engagement with a switch circuit formed on the circuit board 154 to close the circuit for providing the game 105 with momentary switches, as previously-described with respect to game 5.

When the joystick 118 is to be stored such as if the game 105 is not being played or when the control key 114 is to be directly engaged by the player during game play, the joystick 118 can be stored in holding clips 160 and 162 provided at the rear of the game housing 110. Similar to joystick 18, the joystick 118 is provided with an upper gripping portion 164 that can have the configuration of an action figure with a head at the end 178 thereof distal from the stand 168. The clip 162 is substantially the same as previously-described clips 70 and 72 in that it is provided with a pair of arcuate flexible

jaws 166 and 168 which define an open-ended aperture 170 therebetween with a small lead-in entry opening 172 at the distal end of the jaws 166 and 168. The jaws 166 and 168 can be separated at their distal ends to enlarge the entry opening 172 so that a portion of the joystick 118 can be inserted therebetween and into the clip aperture 170.

The other clip 160 has a ring portion 174 which defines a closed-ended aperture 176, as best seen in Fig. 15. Thus, for storing the joystick 118 when not in use, one of the joystick portions 128 or 164 can be inserted into one of the clips 160 and 162 with the other portion being inserted and held by the other of the clips 160 and 162. As can be seen in Fig. 14, it is preferred that the mounting post 136 be inserted into closed-ended aperture 176 of holding clip 160 with the gripping portion 164 held in open-ended aperture 170 of holding clip 162. Where the gripping portion 164 is in the form of the Darth Vader® action figure as shown, the end 178 remote from the support stand 138 will be smoothly curved as it forms the helmeted head of the Darth Vader® figure. With the post 128 inserted into the aperture 176, the joystick 118 can be pivoted to bring the curved helmet 178 into engagement with the distal ends of the jaws 160 and 168 of the mounting clip 170 at the entry opening 166 formed therebetween. Continued pivoting of the joystick 118 causes the jaws 166 and 168 to separate to allow the helmeted head 178 to be inserted into the aperture 170 and be resiliently held therein by the jaws 166 and 168.

The mounting of the holding clips 160 and 162 to the housing 110 is substantially the same as that of the clips 70 and 72. Accordingly, the clips 160 and 162 each have a main body portion 180, an intermediate mounting block portion 182 and a back mounting plate portion 184. The housing 110 is formed from a top housing half 186 and a bottom housing half 188 substantially the same as the housing halves 66 and 68 of electronic game 5 such that the

top housing half 186 is provided with a pair of inverted T-slots 190 at the rear thereof for mounting of the clips 160 and 162 therein. The top housing half 186 has a substantially vertical rear wall 192 in which the slots 190 are formed and which fits over the block portion 182 between the body portion 180 and plate portion 184 when the housing halves 186 and 188 are connected together. The housing half 188 includes a battery compartment 193 which has a battery compartment door 194 at the rear of the housing half 188 and including a horizontal portion 194a and a vertical portion 194b that is displaced slightly inwardly relative to the vertical wall 192 of the top top housing half 186 when the housing halves 186 and 188 are connected, as best seen in Fig. 15. The battery compartment further includes a right angle wall 196 for supporting the batteries (not shown) when the door 194 is opened and the batteries are first inserted into the compartment 193 with the right angle wall 196 including a horizontal portion 196a and a vertical portion 196b.

A pair of ledge portions 198 extend horizontally out from the vertical wall portion 196b and are adapted to fit in the bottom of the inverted T-slots 190 when the housing halves 186 and 188 are assembled and attached together. Thus, the ledge 198 projects over the top of the vertical wall portion 194b of the battery compartment door 194 to be in substantial vertical alignment with the upper housing half vertical wall 192 so as to cooperate therewith in clamping the block portion 182 of the clips 160 and 162 when the housing half 186 and 188 are fastened together. In addition, a small amount of adhesive 200 can be applied between the vertical wall 192 and the mounting clip plate portions 194 for providing a further securing force for the mounting clips 161 and 162 in the interior of the housing 110.

Figs. 18 and 19 illustrate another version of an electronic game 205 in accordance with the present

invention. The game 205 has a housing 210 having the display screen 212 formed on its upper face 210a similar to the other games 5 and 105. Controls 213 are provided projecting above the housing upper face 210a to be accessible to the player for controlling game play. Image movement can be controlled by at least one of the player controls 213 in the form of multi-directional control key assembly 214. As with the games 5 and 105, the control key 214 of the game 205 provides a joystick adapter 216 to allow a joystick 218 to be used by the player for controlling image movement as the game 205 is played.

Referring to Fig. 22, the key assembly 214 includes a key body 220 having an upper cross-shaped portion 222 with a circular skirt wall 224 depending from the bottom thereof to a ring-shaped base 226. Where the wings 222a of the cross-shaped portion 222 intersect, a central opening 228 is formed for receiving the joystick mounting post 230 therein. As with the previously described games 5 and 105, a releasable attachment is provided between the joystick 218 and control key 214.

Similar to the control key body 120 of game 105, the control key body 220 includes resilient finger members 232 which are spaced from each other around the key central opening 228. When the key 214 is mounted to the game housing 210 so as to project through opening 211 in the housing face 210a, the finger members 222 will be spaced above printed circuit board 234 in the interior of the game housing 210. The PCB 234 includes switch circuits 236 printed thereon. A circular rubber pad 238 rests on top of the PCB 234 and includes cap portions 240 thereof spaced around a small central opening 242 formed therein. Thus, instead of the distinct cap members 37 and 152 of games 5 and 105, respectively, the game 205 has a unitary rubber pad 238 having the cap portions 240 integrally formed therewith.

The pad 238 includes a base 244 with the cap portions 240 including inclined shelf portions 246 projecting up from the base 244 to upright portion 248 extending up from the top of the shelf portions 246. Conductive switch contacts 250 are attached in the cap portions 240 in the interior and at the top of the shelf portion 246 thereof below the cap upright portions 248 so that the contacts 250 are spaced above the PCB 244, and more particularly, the switch circuits 236 formed thereon. The key body 220 includes bosses 252 spaced radially outward from the resilient finger members 232 and which engage the tops of the upright portions 248 of the pad cap portions 240, as best seen in Fig. 22. Thus, when the key 222 is pivoted causing a particular boss 252 to move towards the PCB 224 in the game housing 210, the shifted boss 252 pushes on the top of the upright portion 248 of associated cap portion 240 causing the inclined shell 264 to collapse to bring the contact 250 into engagement with the switch circuit 236 therebelow so as to close that particular switch while the key 214 is held in this position. Once released, the shell portion 226 will resume its original configuration thereby biasing the key body 220 back to its non-pivoted orientation so that the switch circuit is no longer closed. In this manner, momentary switches are provided for the game 205 similar to those of games 5 and 105.

Unlike the key assemblies 14 and 114 which positively capture the upright portions of switch cap members in annular bosses, the bosses 252 of key assembly 214 rest on the tops of upright portions 248 of cap portions 240. In this regard, the control key assembly 214 also includes a lower pivot part 254 for being secured to the key body part 220. The pivot part 254 includes a downwardly projecting curved nose 256 with mounting arms 258 extending radially out from the top of the nose of the 256. The mounting arms 258 fit between the bosses 252 in

alignment with smaller internally threaded bosses 260 so that apertures in the arms 258 and bosses 260 are aligned for receiving screw fasteners 262 to secure the lower pivot part 254 to the upper key body part 220 of the control key assembly 214. With the pivot part 254 so fastened, the bottom of the nose 256 will extend through the central aperture 242 of the rubber pad 238 into engagement with the PCB 234 so that as the control key body 220 is pushed, the key body 220 will pivot with the nose 256 pivoting on the PCB 234. To prevent rotation of the key 215 when mounted to the housing 210, the base 226 includes opposite radial tabs 262 which are to be located in corresponding opposite slots 264 formed in skirt wall 266 in the interior of the housing 210. Thus, in contrast to the previously-described keys 14 and 114, the key 214 is provided with a two-part construction with an upper body part 220 and a lower pivot part 254.

Consistent with the previously-described snap fit releasable attachments 28 and 130, the releasable attachment formed between the key 214 and joystick 218 is also in the form of snap fit structure formed around the joystick mounting post 230, and similar to the key 114, on the resilient finger members 232. In this regard, the joystick mounting post 230 depends from a support stand 268 and has an annular groove 270 formed at a predetermined distance down from the bottom surface 269 of the stand 268. The resilient fingers 232 each have a raised bead 272 which project radially into the central opening 228. The post 230 has a chamfered curved end 274 so that upon encountering the raised beads 272 when inserted into the central opening 228, the beads 272 and post end 274 will cam against one another deflecting the resilient fingers 232 to allow continued insertion of the post 230 until the beads 272 are aligned with the groove 270.

More specifically, once lower shoulder 270a of mounting post groove 270 clears the lower surface 272a of

the beads 272, the fingers 232 will rebound and snap the beads 272 into the groove 270 with the underside 269 of the support stand 268 abutted against the top surface 223 of the key body 222. In this manner, the joystick mounting post 230 is tightly captured in the control key central opening 228 with little or no loose play until a sufficiently large separation force between the joystick 218 and control key 214 is exerted for pulling the post 230 out from the central opening 228 with the groove shoulder 270a being pulled past the bead lower surfaces 272a.

To prevent rotation of the joystick 218 when attached to the control key 214, the joystick support stand 268 has ribs 274 projecting down from the bottom surface 259 and extending radially outward from the mounting post 230, and the upper cross-shape portion 222 of the key body 220 has recessed slots 276 formed in each wing 222a for receiving the ribs 274 therein similar to keys 14 and 114. Thus, with the joystick 218 releasably attached to the control key 214, the joystick 218 will be prevented from rotating relative to the key 214. In addition, the joystick 218 will be limited in its axial movement both towards the interior of the housing 210 by engagement with the support stand with the top of the key body 220, and in the absence of a separation force, axial movement of the joystick away from the control key 214 is limited by the engagement of the abutting surfaces 270a and 272a of the groove 270 and raised beads 272, respectively.

When the joystick 218 is not in use, it can be placed in a stored position or location where it is kept with the game 205 so that as the game housing 210 is moved about, the joystick 218 will stay therewith and not become separated therefrom lessening the chance that it will be lost when disconnected from the control key 214. As can be seen in Fig. 19, on the underside 210b of the housing 210 both a battery compartment 278 and a joystick storage compartment 280 are provided. The joystick storage

compartment 280 is sized to receive the joystick 218 therein by pivoting of compartment door 282 to an open position, as shown in phantom in Fig. 19. With the joystick 218 inserted in the storage compartment 280, the door 282 can be pivoted back down to its closed position and releasably locked in place with the exterior surface 282a of the door flush with the bottom surface 210b of the housing 210.

A detent mechanism 284 for releasably locking the door 282 is provided, as best seen in Figs. 20a and 20b. To form the detent mechanism 284, the rear end of the door 282 has a downwardly displaced projection 286 extending rearwardly therefrom and having an enlarged cam 288 formed at its distal end. The projection 286 is adapted to be received through a slot 290 formed between an over-hung lip 292 projecting towards the housing interior from the housing bottom 210b and an interior horizontal ledge wall 294 which projects rearwardly from back wall 296 of the storage compartment 280. Hinges are also provided at 298 at either side of the detent mechanism 284. When the door is releasably locked by the detent mechanism 284, vertical shoulder 300 of the projection enlarged cam end 288 abuts against the back side of the lip 292. To open the compartment door 282, a player pushes down on the door top surface 282a adjacent the detent mechanism 284 to flex the door sufficiently so that the top of the shoulder 300 clears the bottom of the lip 292 allowing the door 282 to be slid forwardly for pivoting open about hinges 298.

For releasably locking the door 282, the door is pivoted back closed about hinges 298 and then slid rearwardly with ramp surface 302 of the projection cam end 288 engaging the front side of the lip 292 so that continued rearward sliding causes the cam end 288 to be shifted downwardly until its upper end clears the bottom of the lip 292 allowing the projection 286 to be slid through slot 290. Once the top of the projection end 288 clears the

bottom of the back side of the lip 292, the door can be released so that it resiliently shifts upwardly to move the shoulder 300 of the projection end 288 into confronting relation with the back side of the lip 292 keeping the door 282 releasably locked until the joystick 218 is desired to be retrieved from the storage compartment 280.

As previously discussed, to enhance the appeal of the game to youngsters, the gripping portions of the joysticks can take the form of an action figure. With joystick 218, the gripping portion 306 is in the form of a Batman® action figure, as best seen in Fig. 18.

While there have been illustrated and described particular embodiments of the present invention, it will be appreciated that numerous changes and modifications will occur to those skilled in the art, and it is intended in the appended claims to cover all those changes and modifications which fall within the true spirit and scope of the present invention.

WHAT IS CLAIMED IS:

1. An electronic game having a housing with a display screen and circuitry for generating images on the screen, the game further including player controls to control playing of the game including movement of at least one of the images and having a joystick adapter to allow a joystick to be used for controlling image movement, the joystick adapter comprising:

a control key for moving the at least one image on the screen and being pivotally mounted to the housing so that when a player pushes on a portion of the key, the key pivots in a direction corresponding to the direction of image movement;

an opening on the key for receiving a portion of the joystick therein; and

a releasable attachment between the key and joystick in the key opening to allow the joystick portion to be inserted in the key opening and to be releasably locked therein for using the joystick to pivot the control key.

2. The joystick adapter of claim 1 wherein the control key includes a top surface and the key opening is a central recess in the key top surface into which the joystick portion can be releasably attached.

3. The joystick adapter of claim 1 wherein the control key includes a depending portion having a curved bottom pivotally mounted on an interior surface of the housing for pivoting of the key.

4. The joystick adapter of claim 3 wherein the interior surface is on a printed circuit board with the printed circuit board including switch circuits which are closed by pivoting of the control key.

5. An electronic game having a display screen and circuitry for generating a movable image on the screen, the electronic game comprising:

a housing of the game including an interior and an exterior with the movable image on the display screen being viewable from the exterior of the housing and the circuitry being in the interior of the housing;

a multi-directional control key mounted to the housing to be accessible at the exterior thereof to a player and connected to the game circuitry for controlling movements of the movable image in a plurality of directions on the screen;

a joystick control for actuating the control key when placed in an operative position thereon; and

a releasable attachment between the control key and the joystick control allowing the joystick control to be attached to the control key in the operative position to actuate the key for controlling the movement of the image in the plurality of directions on the screen, and to be released from attachment with the control key with the control key being directly actuated by a player for controlling the movement of the image in the plurality of directions on the screen.

6. The electronic game of claim 5 wherein the multi-directional key is pivotally mounted to the game housing and includes a top surface for being pushed to pivot the key based on the portion of the top surface pushed in a direction corresponding to the desired direction of movement of the image on the screen.

7. The electronic game of claim 5 wherein the joystick control includes a mounting post depending therefrom and the control key includes a central recess for receiving the mounting post with the joystick control in its operative position, and

snap fit means on the post and the key in the central recess thereof for allowing the mounting post to be inserted into the central recess and be removably captured therein with the joystick control in its operative position.

8. The electronic game of claim 5 wherein the joystick control includes a mounting post and the control key includes a central recess, and one of the joystick post and key recess includes a raised portion and the other of the joystick post and key recess includes a grooved portion in which the raised portion is tightly received by a snap fit between the post and key recess raised and grooved portions with the joystick control in its operative position.

9. The electronic game of claim 8 wherein the joystick control includes a support stand having top and bottom surfaces with the mounting post depending from the bottom surface and having ribs extending outward from the mounting post along the bottom surface of the stand, and the control key includes a top surface in which the recess is centrally formed and having slots extending outward from the central recess with the ribs seating in the slots with the joystick control in its operative position on the control key to prevent turning of the joystick control relative to the control key with the raised portion received by the snap fit in the grooved portion.

10. The electronic game of claim 5 wherein the joystick control includes a support stand for seating on the control key with the joystick control in its operative position, and an upper gripping portion extending upward from the stand for being gripped to move the joystick control and control key with the joystick control in its

operative position and having a predetermined shape in the form of an action figure.

11. The electronic game of claim 5 wherein the housing includes clips mounted to the exterior thereof for storing the joystick controller when it is removed from its operative position on the control key.

12. The electronic game of claim 11 wherein each of the clips includes a mounting foot and the housing has corresponding openings in which the feet are captured.

13. A hand-held electronic game comprising:

a housing having internal game circuitry and a display screen for viewing images generated by the game circuitry during playing of the game;

a control key on the game housing and connected to the circuitry for moving an image on the screen; and

a joystick having first and second attached positions on the game with the first attached position being an operative position with the joystick attached on the control key for controlling movement of the image on the screen by operation of the joystick attached on the key, and the second attached position being a stored position with the joystick attached to the housing and operation of the control key controlling movement of the image on the screen.

14. The hand-held electronic game of claim 13 wherein the control key is pivotally mounted to the game housing and includes a top surface for being pushed to pivot the key based on the portion of the top surface pushed in a direction corresponding to the desired direction of movement of the image on the screen.

15. The hand-held electronic game of claim 13 wherein the control key includes a top surface having a central opening therein and the joystick includes a mounting post for being inserted in the key opening to attach the joystick to the key to use the joystick for controlling image movement in the joystick first attached position.

16. The hand-held electronic game of claim 13 wherein the housing includes joystick mounting clips for receiving and holding the joystick in the clips to store the joystick in the joystick second attached position when the control key is being operated for controlling image movement.

17. The hand-held electronic game of claim 13 wherein the control key includes a top surface having a central opening therein and the joystick includes a mounting post for being inserted in the key opening to attach the joystick to the key to use the joystick for controlling image movement in the joystick first attached position, and the housing includes joystick mounting clips for receiving and holding the joystick in the clips to store the joystick when the control key is being operated for controlling image movement in the joystick second attached position.

18. The hand-held electronic game of claim 13 wherein the joystick includes a mounting post and the control key includes a central recess, and one of the joystick post and key recess includes a raised portion and the other of the joystick post and key recess includes a grooved portion in which the raised portion is received with the joystick control in its operative position.

19. The hand-held electronic game of claim 18 wherein the joystick includes a support stand having top and bottom surfaces with the mounting post depending from the bottom surface and having ribs extending outward from the mounting post along the bottom surface of the stand, and the control key includes a top surface in which the recess is centrally formed and having slots extending outward from the central recess with the ribs seating in the slots with the joystick control in its operative position on the control key to prevent turning of the joystick control relative to the control key the raised portion received in the grooved portion.

20. The hand-held electronic game of claim 16 wherein the housing has clip receiving openings and a first half and a second half which when attached together tightly capture the mounting clips in the clip receiving openings of the housing.

21. An electronic game comprising:

a housing for containing internal circuitry of the game;

a control key mounted to the housing for controlling movements of an image generated by the game circuitry when the game is being played; and

a joystick having an operative position with the joystick operable to control image movements as the game is played, and a stored position with the joystick kept with the game housing for staying therewith and the control key used to control image movements as the game is played.

22. The electronic game of claim 21 wherein the joystick operative position is a first attached position with the joystick attached to the control key, and the joystick stored position is a second attached position with the joystick attached to the game housing.

23. The electronic game of claim 21 wherein the housing includes clips for holding the joystick in the stored position.

24. The electronic game of claim 23 wherein the holding clips comprise a pair of spaced clips each defining an aperture in which the joystick is received and the aperture of one of the clips being closed-ended and the aperture of the other clip being open-ended having an entry opening leading thereto, and the joystick having a length including a pair of portions spaced therealong with the joystick placed in the stored position by first inserting one of the portions in the closed-ended aperture of the one clip and then inserting the other portion through the entry opening and into the open-ended aperture of the other clip.

25. The electronic game of claim 24 wherein the one portion of the joystick includes a mounting post for attaching the joystick to the control key in its operative position and being inserted into the closed-ended aperture in the stored position.

26. The electronic game of claim 21 wherein the housing includes a joystick compartment in which the joystick is placed in the stored position.

27. The electronic game of claim 26 wherein the housing includes a door for the storage compartment pivotally mounted thereto.

28. The electronic game of claim 21 wherein the joystick is attached to the control key in the operative position so that shifting the joystick moves the control key to control image movements during game play.

29. The electronic game of claim 28 wherein the joystick has a mounting post and the control key includes an opening with the mounting post inserted in the key opening for attaching the joystick to the key.

30. The electronic game of claim 29 wherein the key includes resilient members for guiding the post as the post is inserted into the key opening, and one of the joystick post and key resilient members include a raised portion and the other of the post and resilient members includes a grooved portion with the raised portion causing the resilient members to deflect during post insertion into the key opening until the raised portion is aligned with the grooved portion to allow the resilient members to rebound with the raised portion tightly received in the grooved portion for attaching the joystick to the control key in the operative position.

31. The electronic game of claim 30 including a printed circuit board with switch circuits mounted in the housing below the control key, and the control key has a first upper part including the resilient members and a second lower part secured to the upper part and including a curved bottom for pivoting on the circuit board.

32. The electronic game of claim 29 including a printed circuit board with switch circuits mounted in the housing below the control key to form a space between the mounting post and the circuit board with the joystick attached to the key.

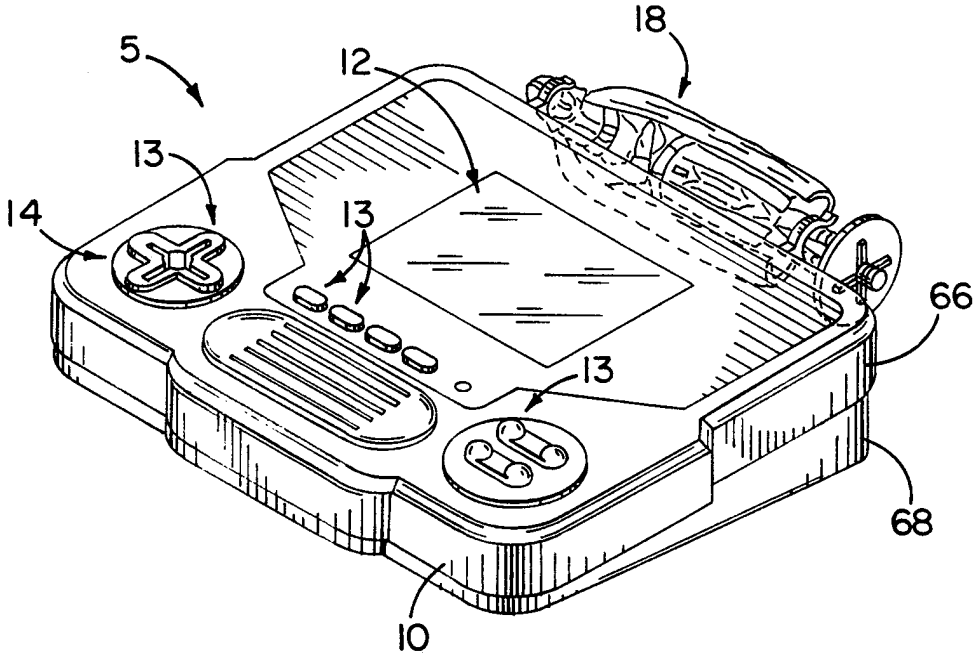

FIG. 1

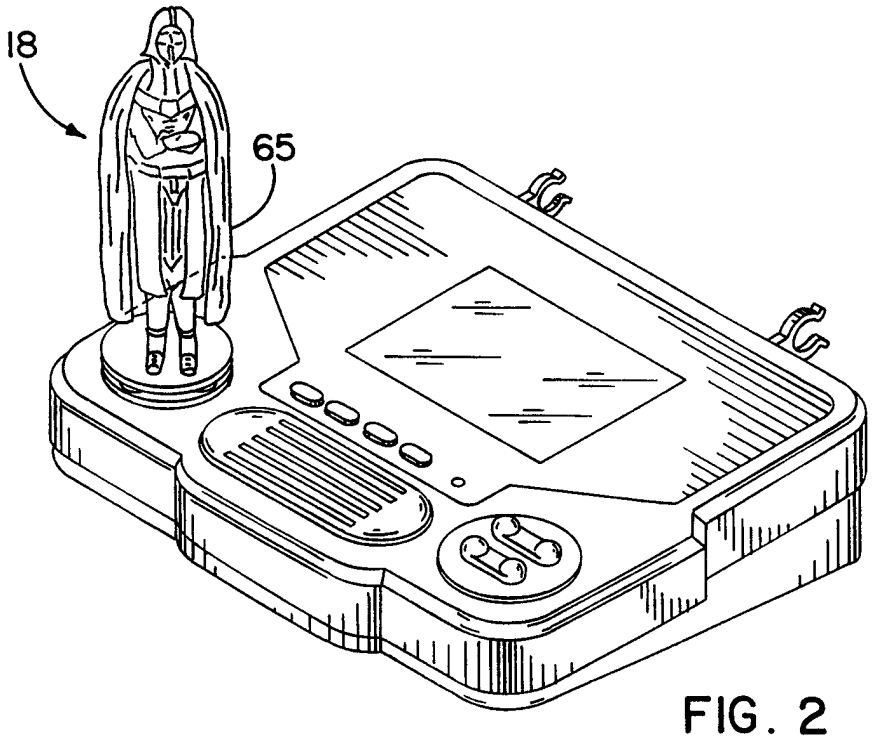

FIG. 2

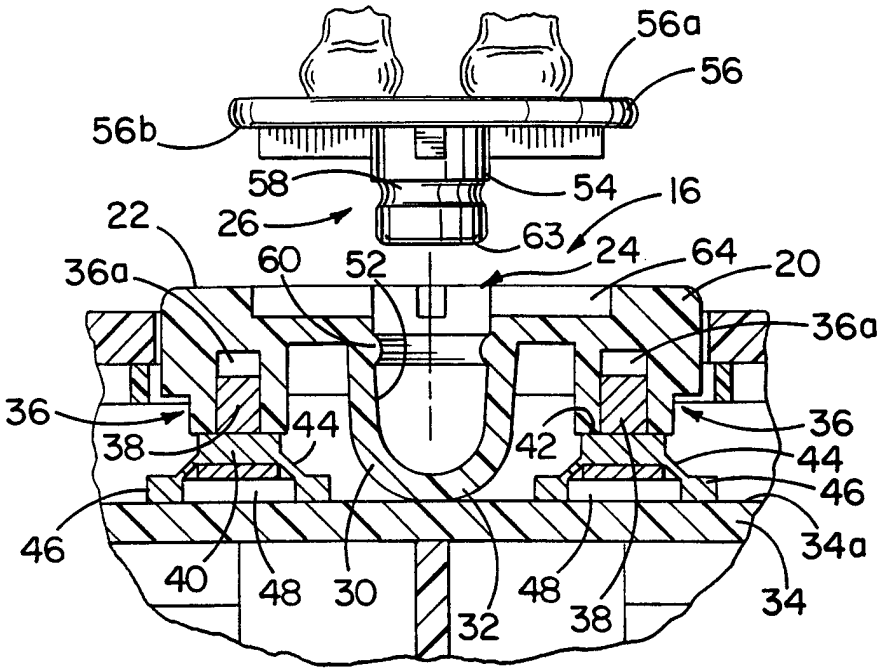
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FIG. 3

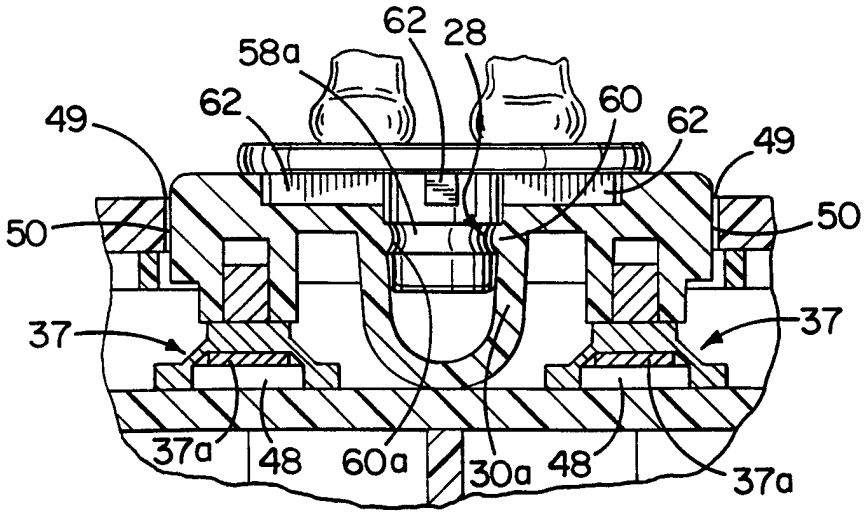
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FIG. 4

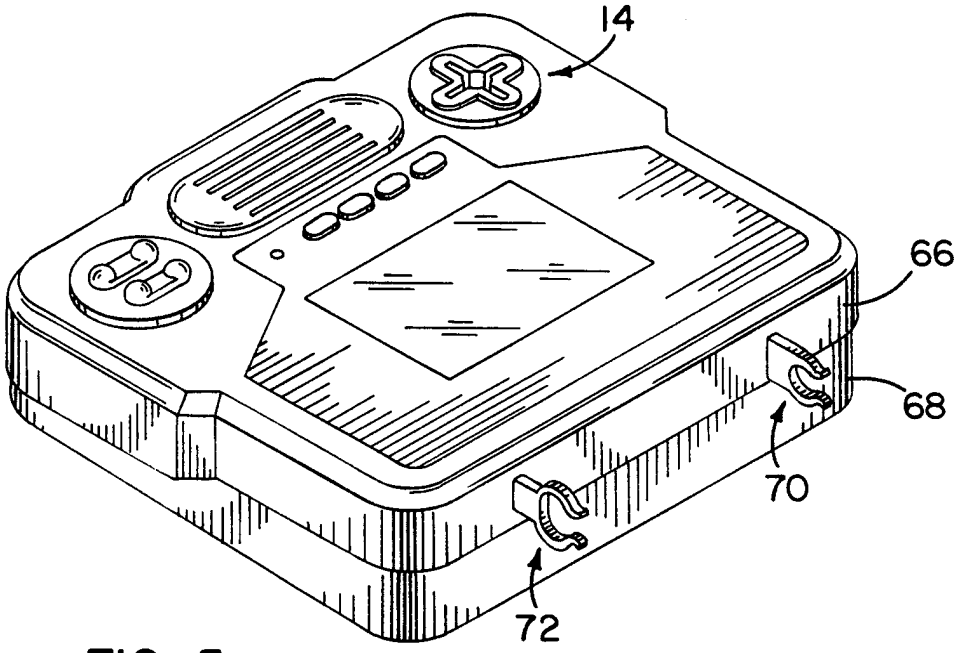


FIG. 5

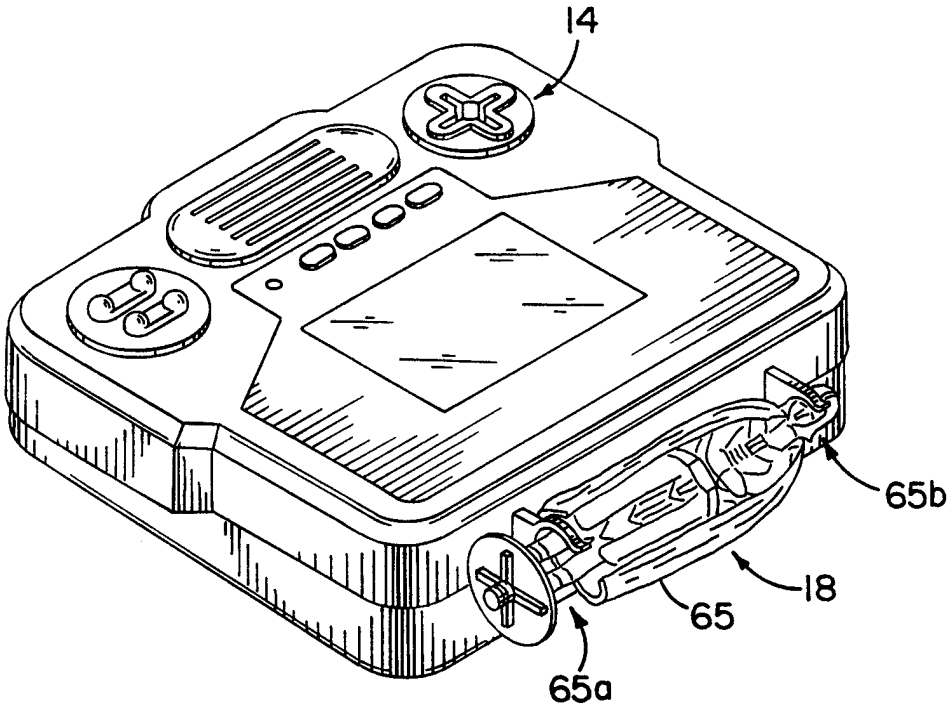


FIG. 6

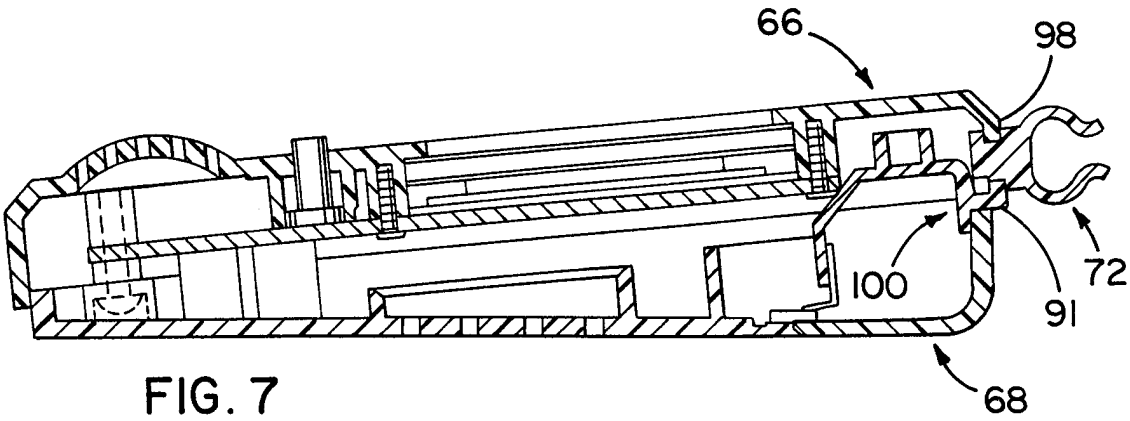
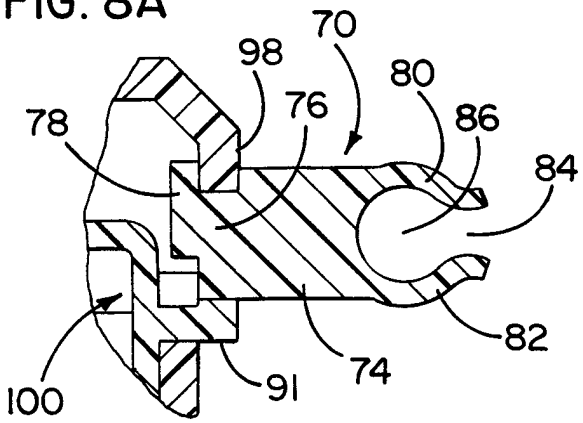


FIG. 7

FIG. 8A



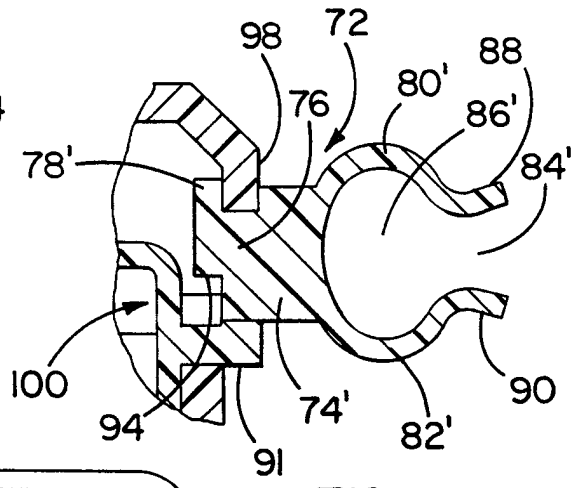


FIG. 8B

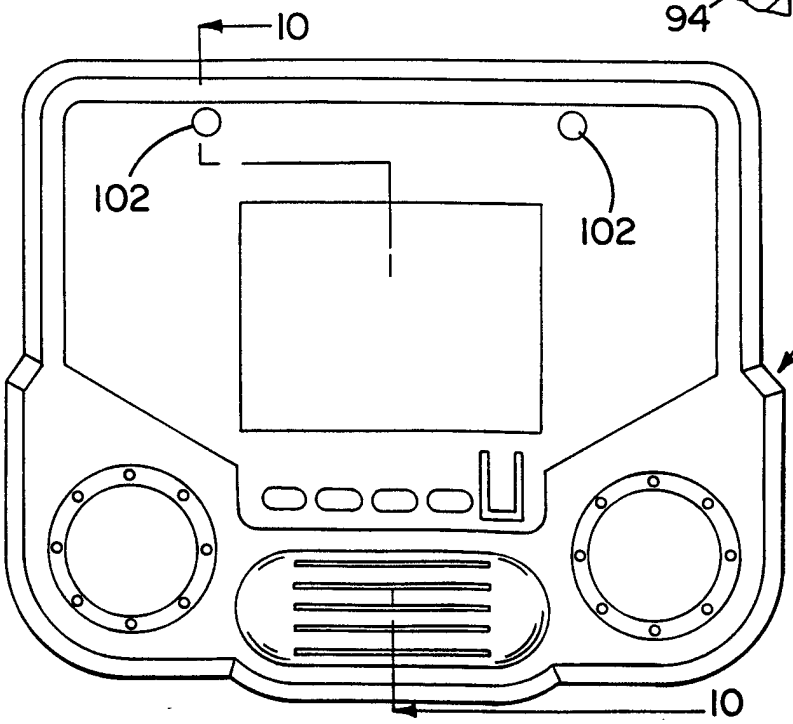


FIG. 9

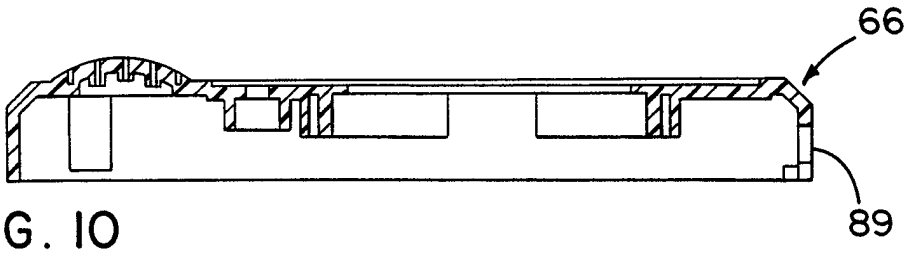


FIG. 10

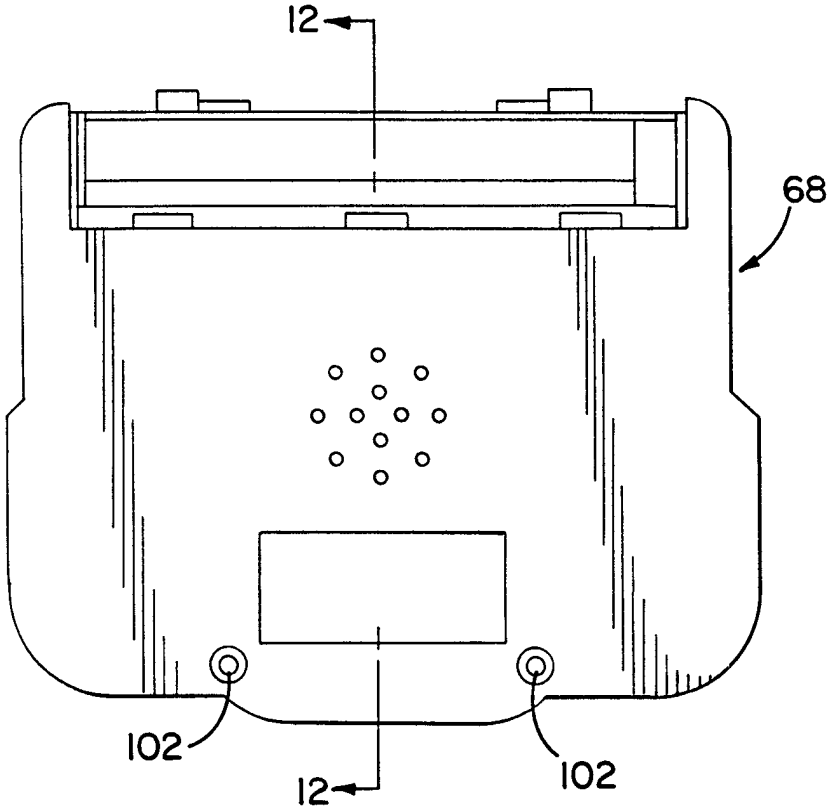


FIG. 11

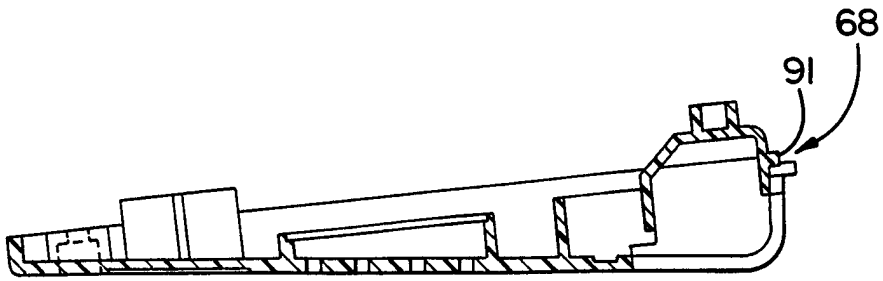


FIG. 12

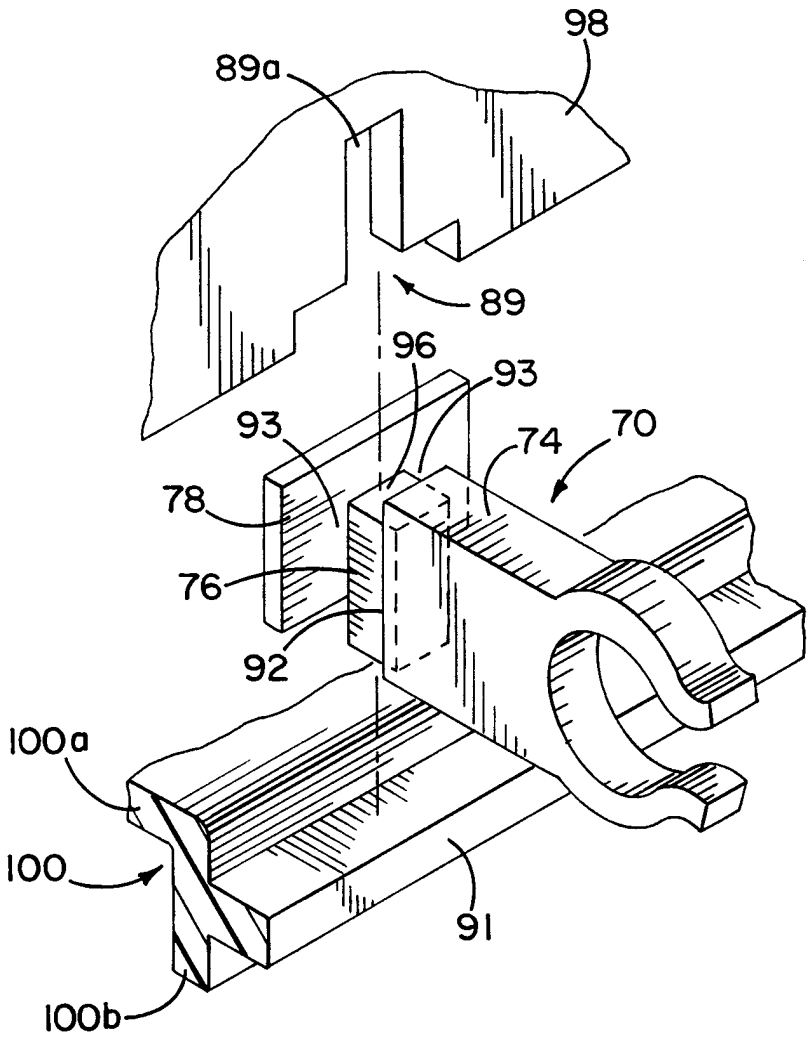


FIG. 13

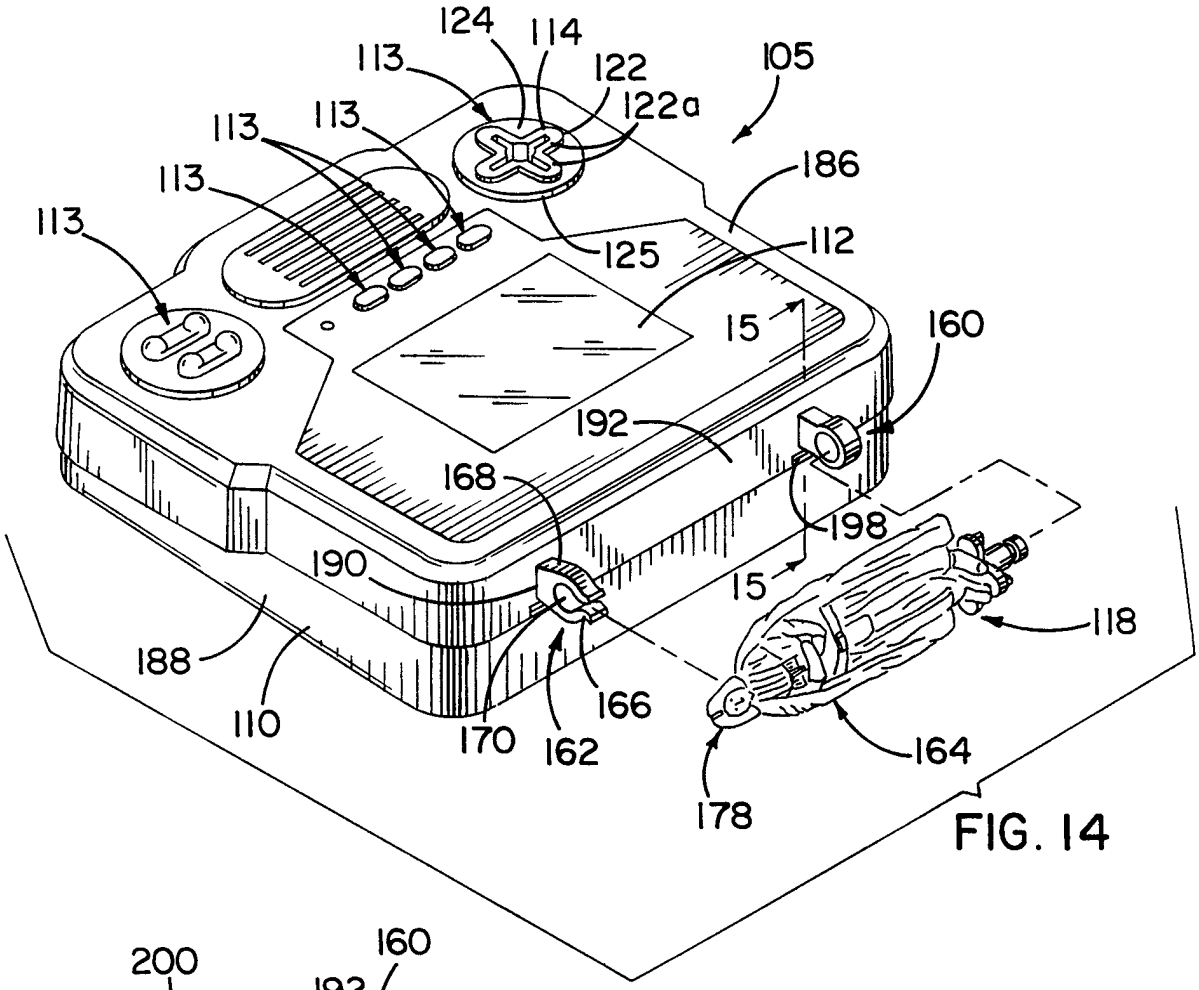


FIG. 14

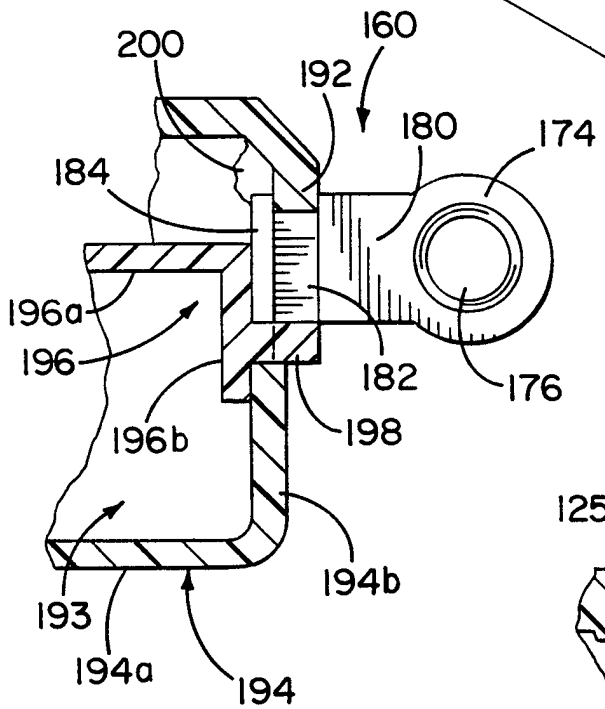


FIG. 15

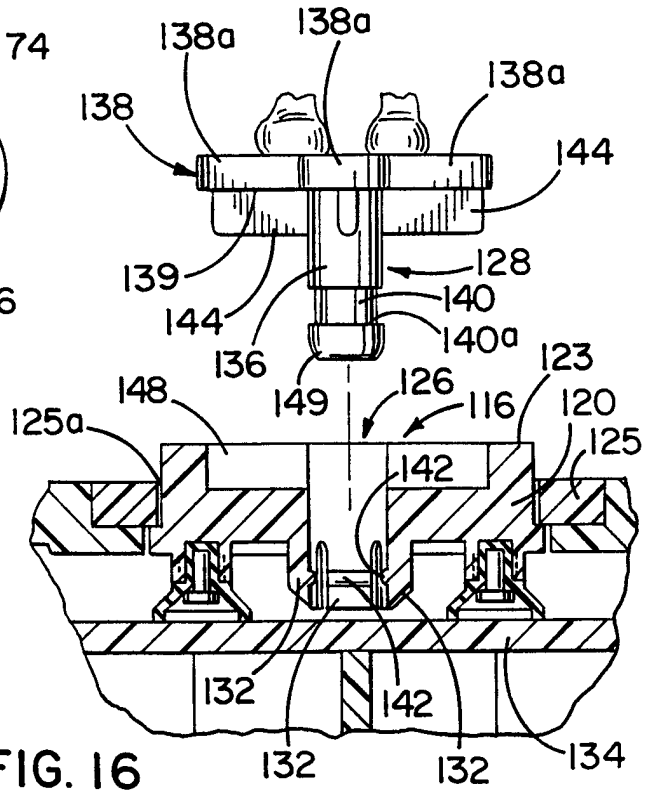


FIG. 16

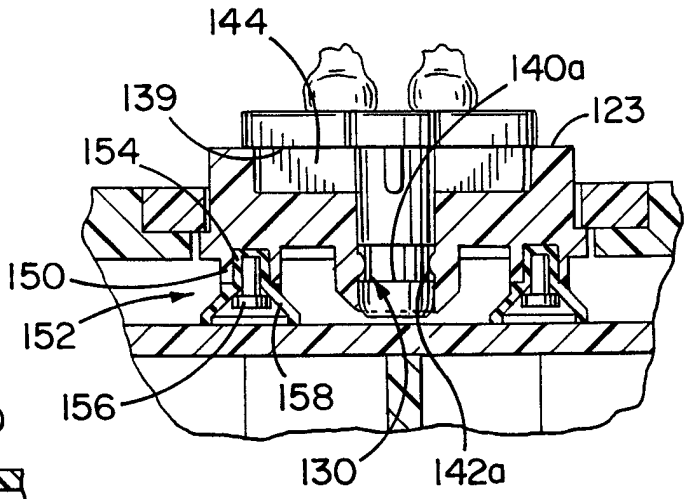


FIG. 17

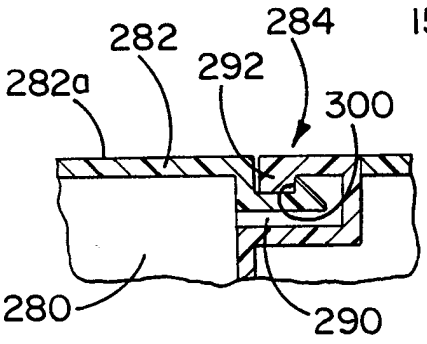


FIG. 20A

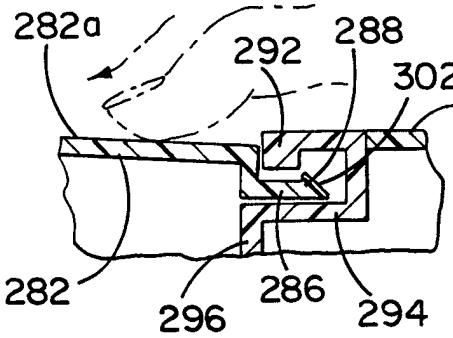


FIG. 20B

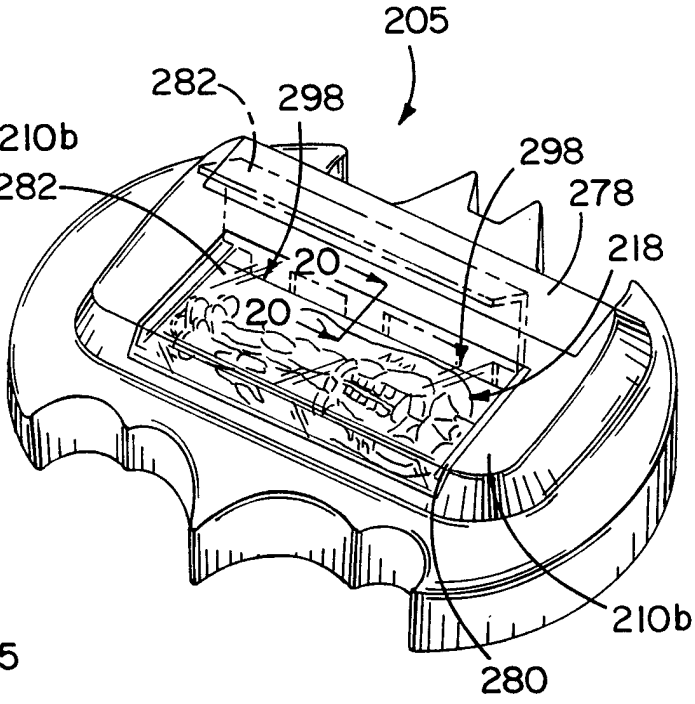


FIG. 19

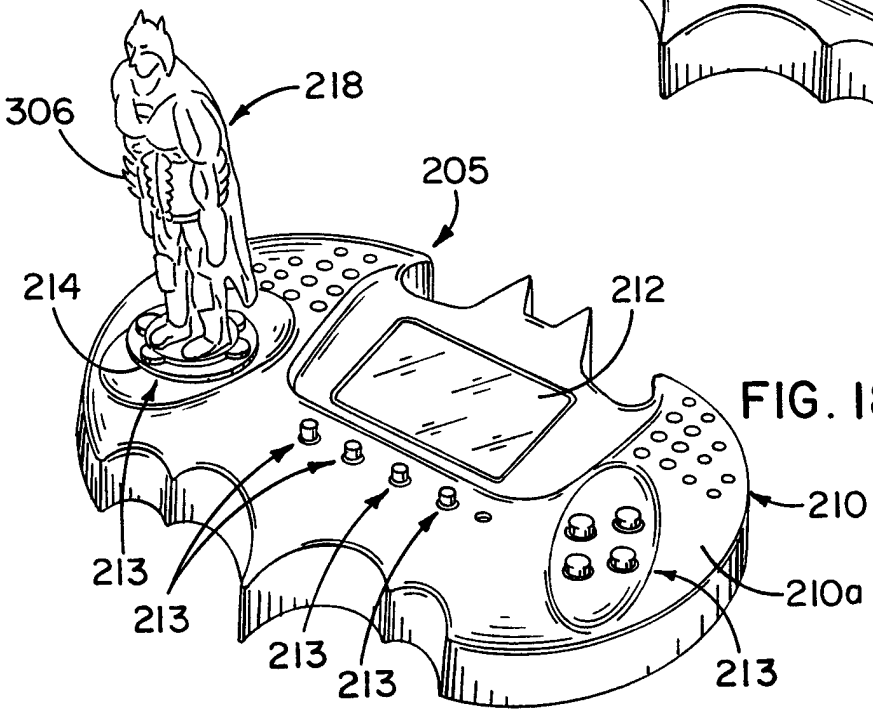


FIG. 18

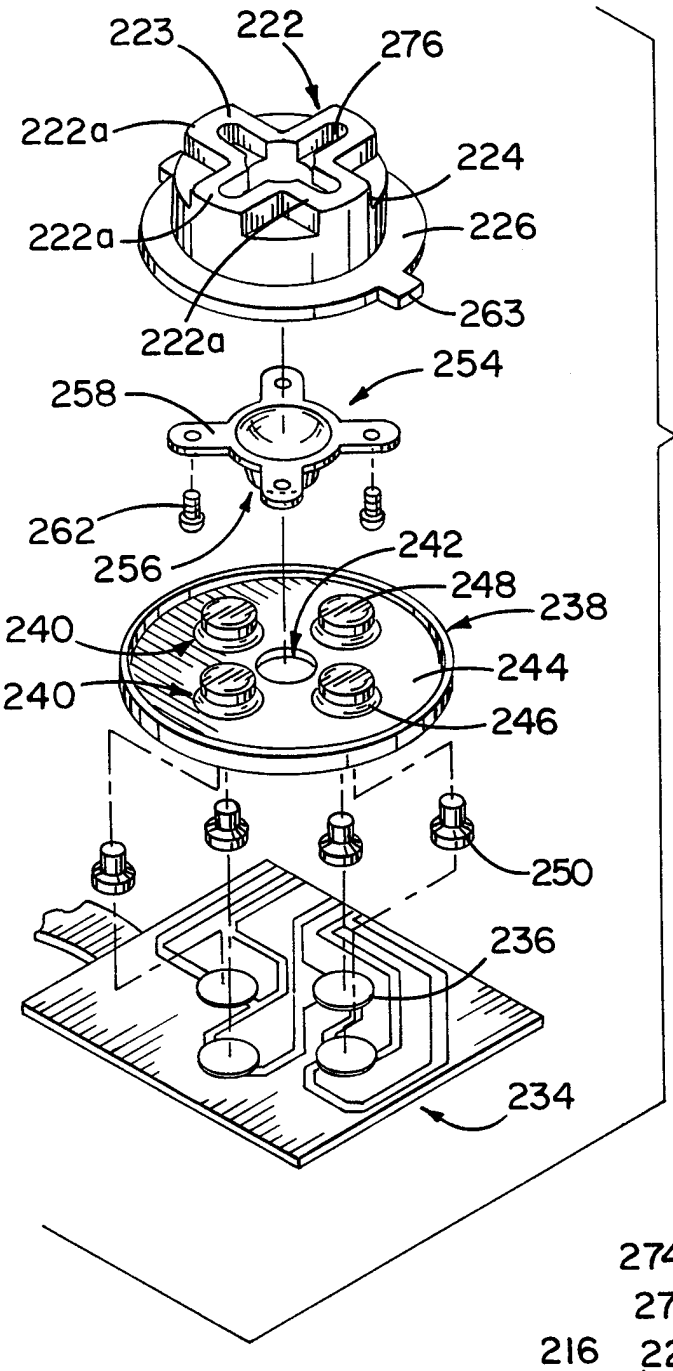

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FIG. 21

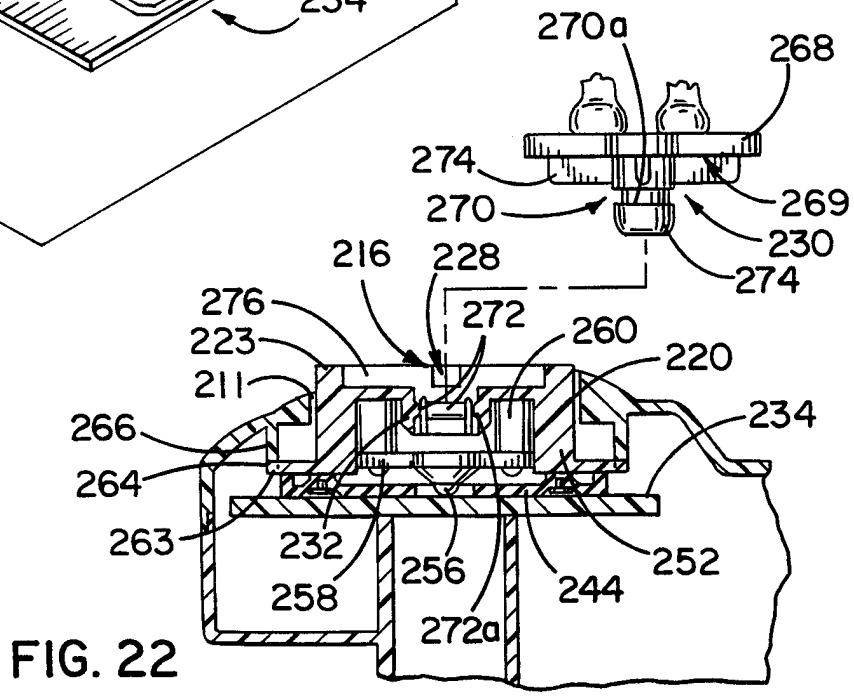
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FIG. 22

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US98/02171

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :A63F 9/22
US CL :463/38; 273/148B; 345/161
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)

U.S. : 463/38; 273/148B; 345/161; D21/48; 463/36, 37, 46, 47

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)

APS
(200/6a/ccls or 345/clas) and detach? (4a) joystick

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y --- A	US 5,213,327 A (KITAUE) 25 May 1993, see entire document.	5-6 --- 1-4, 7-10 --- 11-20
Y,P ---- A,P	US 5,615,083 A (BURNETT) 25 March 1997, see entire document.	1-4, 7-10 --- 15, 17-19
Y	DES 261,402 A (LOVEJOY) 20 October 1981, see entire document.	10
A	US 4,469,330 A (ASHER) 04 September 1984, see entire document	1-4, 7-8, 10, 15,

[X] Further documents are listed in the continuation of Box C. [ ] See patent family annex.

*	Special categories of cited documents:	"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
"A"	document defining the general state of the art which is not considered to be of particular relevance	"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
"E"	earlier document published on or after the international filing date	"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
"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)	"&"	document member of the same patent family
"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		

Date of the actual completion of the international search
23 APRIL 1998

Date of mailing of the international search report
05 MAY 1998

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Washington, D.C. 20231
Facsimile No. (703) 305-3230

Authorized officer
Sheila Verley
Paralegal Specialist
for ALISON KESSLER
Group 3200 3700
Telephone No. (703) 308-1148

Form PCT/ISA/210 (second sheet)(July 1992)★

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US98/02171

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A,P	5,607,158 A (CHAN) 04 March 1997, see entire document	1-20