(19) World Intellectual Property Organization

International Bureau





(43) International Publication Date 15 December 2005 (15.12.2005)

PCT

(10) International Publication Number $WO\ 2005/117648\ A1$

(51) International Patent Classification⁷:

A47B 97/00

(21) International Application Number:

PCT/US2005/018475

(22) International Filing Date: 26 May 2005 (26.05.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

| 60/575,604 | 28 May 2004 (28.05.2004) | US |
|------------|-------------------------------|----|
| 60/575,153 | 28 May 2004 (28.05.2004) | US |
| 60/575,605 | 28 May 2004 (28.05.2004) | US |
| 60/640,350 | 30 December 2004 (30.12.2004) | US |

- (71) Applicant (for all designated States except US): WMS GAMING INC. [US/US]; 800 South Northpoint Blvd., Waukegan, IL 60085 (US).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): CANTERBURY, Stephen, A. [US/US]; 40570 Lilac Place, Antioch, IL 60002 (US).
- (74) Agents: STEFFEY, Charles, E. et al.; P.O. Box 2938, Minneapolis, MN 55402 (US).

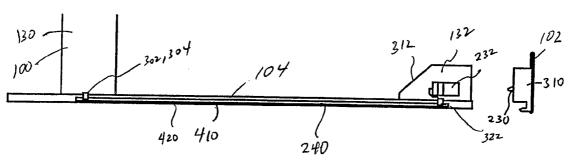
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: CHAIR INTERCONNECTION FOR A GAMING MACHINE



(57) **Abstract:** A gaming system includes a chair having an electrical connector and a gaming machine having an electrical connector, wherein the chair electrical connector is removably couplable to the gaming machine electrical connector.

CHAIR INTERCONNECTION FOR A GAMING MACHINE

Cross-Reference to Related Application

This application claims the benefit under 35 U.S.C. 119 (e) of U.S. 5 Provisional Application No. 60/575,605 filed on May 28, 2004, which is hereby incorporated by reference in its entirety. This application is related to United States Provisional Patent Application Serial No. 60/575,604, entitled "SPEAKER SYSTEM FOR A GAMING MACHINE" (Attorney Docket 1842.066PRV) and is also related to United States Provisional Patent 10 Application Serial No. 60/575,153, entitled "GAMING DEVICE WITH ATTACHED AUDIO-CAPABLE CHAIR" (Attorney Docket 1842.068PRV), both filed on May 28, 2004, and is also related to United States Provisional Patent Application Serial No. 60/640,350, entitled "CHAIR INTERCONNECTION FOR A GAMING MACHINE" (Attorney Docket 15 1842.141PRV), filed December 30, 2004, all of which are hereby incorporated by reference herein for all purposes.

Field

The invention relates generally to gaming systems, and more specifically to chair interconnections for gaming systems.

20

25

COPYRIGHT

A portion of the disclosure of this patent document may contain material that is subject to copyright protection. The copyright owner has no objection to the facsimile reproduction by anyone of the patent document or the patent disclosure, as it appears in the Patent and Trademark Office patent files or records, but otherwise reserves all copyright rights whatsoever. The following notice applies to the software and data as described below and in the drawings that form a part of this document: Copyright 2005, WMS Gaming, Inc. All Rights Reserved.

Background

A wide variety of gaming devices are now available to game players and to gaming establishment operators in computerized form, from slot machines to games that are traditionally played live such as poker and blackjack.

Computerized video game systems must provide sufficient feedback to the gamer to make the game fun to play, and they must provide a gaming experience that is at least as attractive as the older mechanical gaming machine experience to the gamer, to ensure success in a competitive gaming market.

Many computer elements have been employed in gaming systems, from computerized animation to playing prerecorded sounds through a gaming system's speakers. For example, these sounds are loaded within the computerized gaming machine and played through speakers to supplement the wagering game experience, much as is done with personal computer games and television-based video games.

15 <u>Summary</u>

10

25

In one aspect a gaming system includes a chair having an electrical connector and a gaming machine having an electrical connector, wherein the chair electrical connector is removably couplable to the gaming machine electrical connector.

20 Brief Description of the Drawings

Figure 1 shows the general environment for a gaming system according to one embodiment.

Figure 2 shows a schematic representation of components of an audio subsystem, in accordance with one embodiment.

Figure 3 shows a top view of a chair and gaming machine interconnection, in accordance with one embodiment.

Figure 4 is a side view of Figure 3.

Figure 5 shows a front view of a retention assembly, in accordance with one embodiment.

Figure 6 shows a front view of mounting plate, in accordance with one embodiment.

Figure 7 shows a front view of a latching mechanism according to one embodiment.

Figure 8 shows a top, cross-section view of a mounting cavity of the latching mechanism of Figure 7.

5

10

15

20

25

Detailed Description

In the following detailed description, reference is made to the accompanying drawings which form a part hereof, and in which is shown by way of illustration specific embodiments in which the invention may be practiced. These embodiments are described in sufficient detail to enable those skilled in the art to practice the invention, and it is to be understood that the embodiments may be combined or that other embodiments may be utilized and that structural changes may be made without departing from the spirit and scope of the invention. The following detailed description is, therefore, not to be taken in a limiting sense, and the scope of the invention is defined by the appended claims and their equivalents.

As used herein, the term "gaming machine" refers to a machine into which a coin or token is deposited, or which is activated by a card or token associated with data regarding non-monetary chattel, to play a game that uses a video display or an electromechanical device with a spinning reel. The gaming machines include slot machines and push button machines. The gaming machines include coin operated machines and machines having a serial interface. Gaming machines also include gaming tables capable of being initiated by a card or token.

Figure 1 shows the general environment for a gaming sound system according to one embodiment. In this example, the system includes chair 100 electrically and mechanically coupled to a gaming device 102. Gaming device

102 can be a gaming machine such as a slot machine, for example. In one embodiment, chair 100 is coupled to the gaming machine via a sled or base 104.

In one embodiment, the system further includes a speaker package 110 incorporated into chair 100 and coupled via an electrical connection to gaming device 102. Gaming device 102 includes hardware and software and produces sound signals which are delivered to speaker package 110. Speaker package 110 provides sound effects, game noises, and other audio effects from gaming device 102. In one example, an electrical connection 112 runs through base 104 from machine 102 to speaker package 110 in the chair.

5

10

15

20

25

Chair 100 generally includes a back 120 and a seat 125. The chair is swivel mounted to a seat post 130. Seat post 130 is at least partially hollow to allow connection 112 to run through the post. An access panel 135 can be provided in the seat post 130 to allow access to connection 112 to allow a user to connect wires running from speaker package 110 to a connection in base 104.

Base 104 is removably connectable to gaming device 102, both mechanically and electrically. This allows for easier installation and maintenance than a permanent connection.

Figure 2 shows a schematic representation of components of an audio subsystem 200, in accordance with one embodiment. For example, audio data resides on CompactFlash media used for holding the game code and inserted into a receptacle for the media located on a circuit board 202. The game software running on circuit board 202 is responsible for determining when to play certain sounds and for the mixing of the sounds. The mixed digital audio is then output via a USB port 204 located on the circuit board. The audio data transmitted over the USB bus consists of four discrete audio channels (2 stereo channels). A USB streaming audio circuit board 206 receives the audio data and splits it into two separate stereo outputs (the outputs can be line level or digital (S/PDIF). These outputs are routed to two audio amplifier modules 208 and 210, —

amplifier 208 is for front speakers 212 (speakers located in machine 102) and amplifier 210 is for rear speakers 214 (speakers located in chair 100).

5

10

15

20

25

The amplified audio to chair 100 is taken from two separate connectors — one connector provides for the audio for the left and right speakers and one provides the audio for a subwoofer, for example. These outputs are bundled in a cable 220 along with SPN serial communications and power. The serial communications and power are provided to the chair for components such as a display 222. Display can be a lit sign, a video display, or other component that could be located on the back of the chair. These connections go to a connector 230 fixed to the cabinet of game device 102 which mates with a connector 232 on base 104 of the chair. The corresponding connector 232 on base 104 includes a short wire harness connected to the connector that plugs into a connector on a base connection 240 that runs almost the entire length of the chair base 104, ending below the chair post. Base connection 240 can be a circuit board or a flex cable, for example.

In one embodiment, the system monitors the attachment of base 104 to machine 102. For example, an extra port pin on a streaming USB microcontroller on circuit board 206 can communicate via an extra ground wire taken to the connector 230 that the base connector 232 attaches to. The wire can be looped back on the base to a different pin on connector 230. That signal is returned to the USB Streaming Audio circuit board 206 and a pull-up resistor is tied to the signal and the signal is fed to the extra port pin on the microcontroller. The microcontroller samples the input - if it is high then the base is detached, if it is low then the base is attached (ground is connected through the loop). The game CPU then queries the USB Streaming Audio circuit board 206 via USB commands for the status of the base. If the game CPU detects that the base is missing, a tilt condition may occur (safety of the player may be at stake for a chair that is not attached properly) and/or the CPU can elect to mix the audio in a different manner to compensate for the missing chair audio. In other

embodiments, there are other ways to detect a missing base, for example, replace the ground wire with an active signal that is looped back, etc. Accordingly, gaming machine 102 can detect that the chair is missing or not connected properly and can act accordingly.

5

10

15

20

25

Figure 3 shows a top view of the interconnection between chair 100 and gaming machine 102, in accordance with one embodiment, and Figure 4 is a side view of Figure 3. In one embodiment, two connectors 302, 304 are located under chair post 130 and allow for an electrical connection, such as a cable harness, to be plugged into the board for the speakers and a separate harness for the SPN and power connections. These cable harnesses will be routed up through chair post 130 to the devices they attach to in the chair.

In one embodiment, connector 232 on base 104 is a receptacle side of a blind-mate drawer connector. One embodiment uses Tyco Electronics AMP 213974-1, for example. Connector 232 can be fixed to base 104 with the connector mating occurring when the base 104 is latched into a retention assembly 310, or connector 232 could be fixed to protective cover or shroud 132 with the cover 132 being able to move to mate connectors 232 and 230 as a secondary operation to the latching of the base to the machine 102. If the connection is made when the base is attached to the cabinet, then alignment between the base 104 and retention assembly 310 is configured to ensure that the base, and thus the connectors, are aligned in the horizontal and vertical direction prior to the connector housings coming into contact with each other.

Cover 132 for connectors 232, 230 helps to keep the connections from being exposed to tampering by patrons or drink spills. In one example, cover 132 is shaped as a foot rest including a sloping surface 312. If cover 132 moves to mate the connectors 232 and 230, then base 104 is not allowed to be unlatched unless the connectors are unlatched at the same time or prior to the base being unlatched. In other embodiments, the connector 232 can be buried into base 240 and cover 132 is omitted.

The connection from the receptacle side of connector 232 to a connector 322 on base connection 240 is also shown. In one embodiment, base connection 240 is placed in a channel 410 routed out underneath base 104 with an access hole 330 in base 104 for the connector 322 on the base connection 240 that mates with the drawer connector 232. In one example, connector 322 is a 16 contact Molex Micro-Fit Surface-Mount connector (part number 43045-18xx). In one example, base connector 240 can include a circuit board having a thickness of about 0.062" +/- 0.007". As noted above, other embodiments utilize a flex cable as the base connection. An insulator can be sandwiched between the base connector 240 and the base. A retention plate 420 can be used to hold the base connector 240 and insulator in place.

5

10

15

20

25

The other end of base connector 240 includes two connectors 302, 304. These facilitate cables that are dropped from the chair through the chair post 130 prior to being connected. In one embodiment, both of these connectors can also be Molex Micro-Fit Surface-Mount connectors. A 10-contact connector (part number 43045-10xx) can be used for connection to up to five speakers within the chair, for example. A 6-contact connector (part number 43045-06xx) can be used to connect auxiliary functions in the chair, for example.

Figure 5 shows a retention assembly 310, in accordance with one embodiment. Retention assembly 310 is mounted to game device 102 and is for electrically and mechanically mounting the chair base to the game device. Retention assembly 310 is mounted to the machine 102 so as to fit over an opening at the base of the front of the game cabinet 102. This opening is used to facilitate the routing of wires to the chair. Retention assembly 310 includes a plate 502 that runs across the width of the bottom of the cabinet 102 to provide rigidity. A latching mechanism 504 is mounted to plate 502 prior to the entire assembly 310 being mounted to cabinet 102.

Figure 6 shows a front view of mounting plate 502, in accordance with one embodiment. The back plate 502 includes holes 602 for mounting the plate

to the cabinet, holes 604 for mounting the latching mechanism 504, and a single larger opening 608 for the rear of connector 230 (Figure 3) along with its attached wires to protrude through.

5

10

15

20

25

Figure 7 shows a front view of latching mechanism 504 according to one embodiment. Latching mechanism 504 includes feet 702 that keep the mating chair base aligned in the up-down direction as the chair base is being pushed into the latching mechanism. In one embodiment, latching mechanism 504 includes one or more alignment pins 704 that keep the mating base aligned in the X and Y directions. For example, the base can include corresponding socket or grooves 340, 342 (Figure 3) that mate with pins 704. A spring-loaded door latch 706 locks the base in place by latching onto a cavity or hole 350 on the base (Figure 3). A hole 708 allows a tool to be inserted to release the door latch 706 and thus unlock the mated base. Holes 710 are used for mounting the latching mechanism to plate 502. An opening or cavity 712 allows the floating end of blind-mate connector 230 to be installed in the bracket. This cavity aligns to opening 608 in plate 502 to allow the wires to exit under the cabinet.

In one embodiment, connector 230 includes a blind-mate drawer style connector from AMP with up to 30 contacts (AMP part number 213973-1). The plug side of connector 230 floats and has alignment guides. Connector 230 is mounted to the cabinet side of the connection since that is the most fixed side. One technique is to bury the connector into the latching mechanism. For example, cavity 712 can house the plug side of the connector.

Figure 8 shows a top, cross-section view of the mounting cavity 712 of latch mechanism 504. Two mounting holes 902 and 904 in the cavity are threaded for shoulder screws 906 and 908 that allow connector 230 to float in the cavity. In one embodiment, springs can be mounted on shoulder screws 906, 908 on either side of connector 230 to further allow the connector to move in an updown or left-right or diagonal manner. This allows substantial misalignment between the base and the gaming machine and allows for tolerance to connect

the electrical connection together. For example, the spring-loaded, float-mounted connector 230 adapts to the misalignment and can move up/down, left/right, or diagonally, as needed. Moreover, in one embodiment this can be a blind-mate connection system and the user does not manually manipulate the interconnection. Accordingly the system automatically adjusts as necessary.

5

10

15

20

To electrically and mechanically connect the chair to the device, the base is slid towards the device and guided as discussed above. The base is then latched to the device using one of the techniques described above or another latching system. Then the electrical connection is made from the connector on the base to the connector on the machine.

The latching mechanism provides a secure retention technique of the base and connector, while providing a stress-free electrical connection. This is important if somebody lifts the chair for example. In other words, the mechanical coupling holds the units together tightly enough that twisting one or the other does not effect the electrical connection. Also, the floating connection allows for mounting the base on either hard floors or carpeting.

To remove the base, for example, for maintenance reasons, the electrical connection is first decoupled, then the sled is unlatched and the base is slid away from the device.

The above description is intended to be illustrative, and not restrictive. Many other embodiments will be apparent to those of skill in the art upon reviewing the above description. The scope of the invention should, therefore, be determined with reference to the appended claims, along with the full scope of equivalents to which such claims are entitled.

What is claimed is:

20

- 1. A system comprising:
 - a chair having an electrical connector; and
- a gaming machine having a floating electrical connector, wherein the chair electrical connector is removably couplable to the gaming machine electrical connector.
- 2. The system of claim 1, wherein the chair includes a chair coupled to a base, and wherein the chair electrical connector is at a front section of the base.
 - 3. The system of claim 1, including a speaker mounted to the chair and coupled to the chair electrical connector.
- 15 4. The system of claim 1, including a mechanical latching mechanism on the gaming machine to mechanically latch the chair to the gaming machine.
 - 5. The system of claim 1, wherein the chair includes a chair mounted to a base and a base connector mounted to the base, wherein the chair electrical connector is coupled to the base connector.
 - 6. The system of claim 1, wherein the floating electrical connector on the gaming machine includes a blind-mate drawer style connector.
- 7. The system of claim 1, wherein the system includes a circuit recognition feature such that the machine detects when the chair is connected to the machine.

8. The system of claim 1, wherein the floating electrical connector on the gaming machine is a plug and the electrical connector on the chair is a receptacle.

5 9. An apparatus comprising:

a retention assembly mountable to a gaming machine, the retention assembly including a connector opening; and

an electrical connector mounted to the retention assembly and accessible through the connector opening.

10

10. The apparatus of claim 9, wherein the retention assembly includes a plate for mounting to the gaming machine, the plate including a plate connector opening, and a latching mechanism coupled to the plate and having a connector opening aligned with the plate connector opening.

15

- 11. The apparatus of claim 10, wherein the latching mechanism includes one or more alignment pins to guide a base of the chair when the base is mounted to the chair latching bracket.
- 20 12. The apparatus of claim 10, wherein the latching mechanism includes a spring-loaded door latch to engage a corresponding cavity on a base of a chair.
 - 13. The apparatus of claim 9, wherein the connector is a plug connector.
- 25 14. The apparatus of claim 9, wherein the connector is mounted to the chair mounting member with shoulder screws to allow for a floating connector.

- 15. An apparatus comprising:
 - a chair having a speaker;
 - a base, wherein the chair is mounted to the base;
 - an electrical connection running from the speaker through the base and
- 5 towards a front of the base; and
 - a connector coupled to the electrical connection, the connector adapted to be detachably connected to a mating floating connector on a gaming device.
- 16. The apparatus of claim 15, wherein the electrical connection includes
- 10 base connection mounted to the base.
 - 17. The apparatus of claim 15, wherein the connector on the base includes a receptacle connector.
- 15 18. The apparatus of claim 15, including a shroud movably coupled to the base and covering the connector on the base.
 - 19. A method comprising:
 - sliding a chair base toward a gaming device;
- electrically coupling the chair base to the gaming device via a floating connector on the gaming device; and
 - mechanically latching the chair base to the gaming device.
- 20. The method of claim 19, wherein electrically coupling includes
 electrically coupling a speaker attached to the chair to the gaming device.
 - 21. The method of claim 19, wherein electrically coupling includes coupling a receptacle connector on the sled to a plug connector on the gaming device.

22. A method comprising:

mechanically and electrically de-coupling a chair from a retention assembly mounted to a game device, the retention assembly including a connector opening having an electrical connector mounted therein and the chair including a base having a mating connector;

servicing the chair; and recoupling the chair to the gaming device.

- 23. The method of claim 22, wherein de-coupling includes de-coupling a
 floating connector on the gaming device from the mating connector on the base.
 - 24. A system comprising:

a chair having an electrical connector; and

a gaming machine having a mating electrical connector, the chair

electrical connector being removably couplable to the gaming machine electrical connector, wherein the gaming machine is configured to determine if the connector on the base is connected to the mating connection on the gaming machine.

- 20 25. The system of claim 24, wherein the chair includes a speaker coupled to the electrical connector of the chair.
 - 26. The system of claim 24, the gaming machine electrical connector includes a floating electrical connector.

25

5

27. A method comprising:

determining whether an electrical connector on a gaming machine is coupled to an electrical connector of a base; and

changing an audio mix of the gaming machine after determining if the electrical connector on the gaming machine is coupled to the electrical connector of the base.

5 28. The method of claim 27, wherein determining whether the electrical connector on the gaming machine is coupled to the electrical connector of the base includes sensing a signal returned on a wire coupled to the electrical connector of the gaming machine.

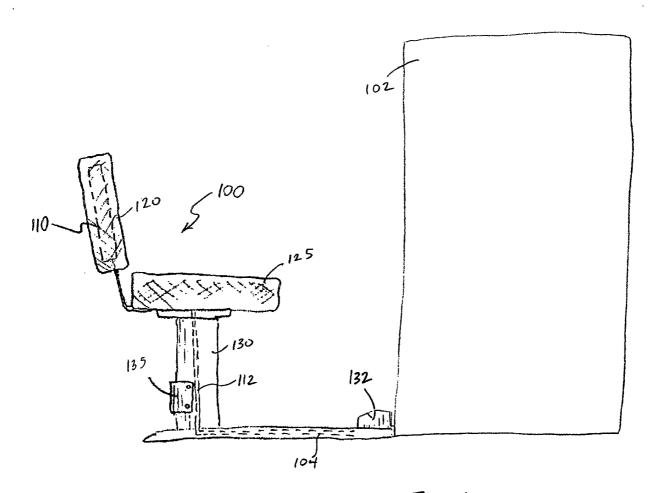
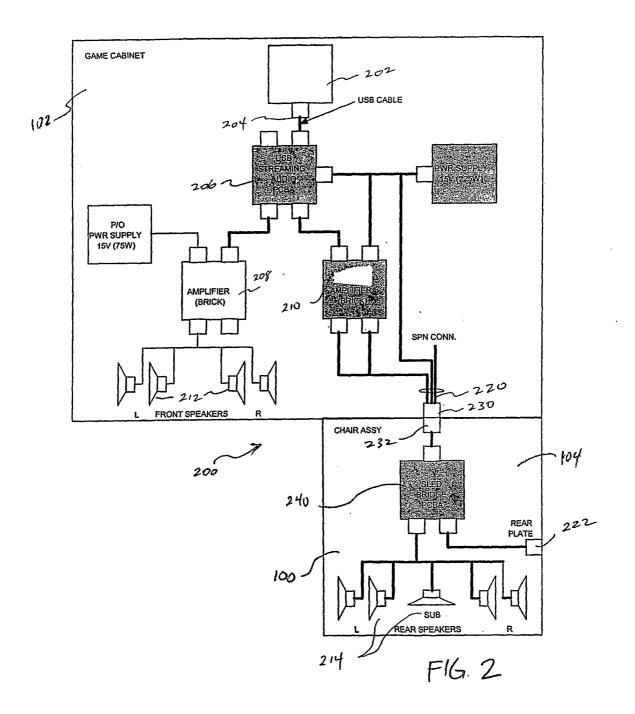
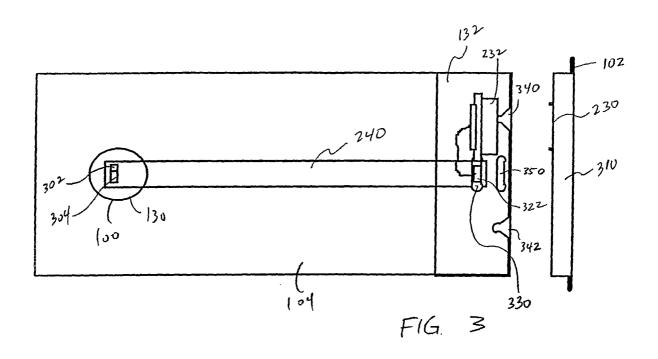
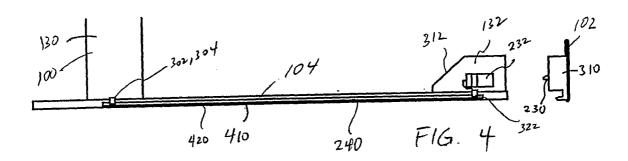
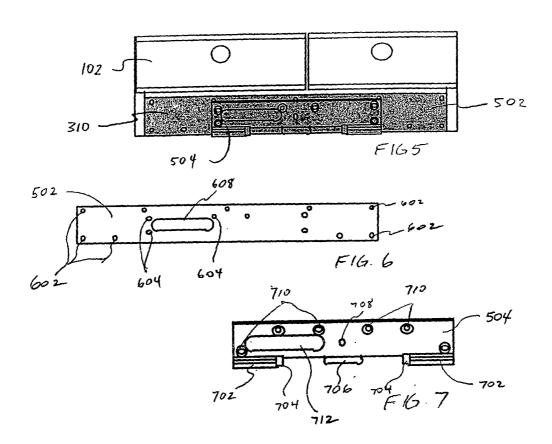


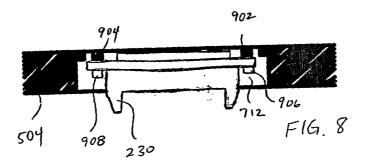
FIG. 1











INTERNATIONAL SEARCH REPORT

International application No.

PCT/US05/18475

| A. CLASSIFICATION OF SUBJECT MATTER IPC(7) : A47B 97/00 | | | | | | | |
|---|---|---|--------------------------------|--|--|--|--|
| | US CL : 297/217.3 | | | | | | |
| According to International Patent Classification (IPC) or to both national classification and IPC B. FIELDS SEARCHED | | | | | | | |
| | | (1 | | | | | |
| Minimum documentation searched (classification system followed by classification symbols) U.S.: Please See Continuation Sheet | | | | | | | |
| 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) | | | | | | | |
| C. DOC1 | JMENTS CONSIDERED TO BE RELEVANT | | | | | | |
| Category * | Citation of document, with indication, where a | | Relevant to claim No. | | | | |
| Y | US 5,791,731 A (INFANTI) 11 August 1998 (11.08.1998); figure 31; column 26, lines 42 to 60; figure 33 | | | | | | |
| Y | US 4,664,456 A (BLAIR et al) 12 May 1987 (12.05. | 1-28 | | | | | |
| Y | US 5,807,177 A (TAKEMOTO et al) 15 September | 3, 5, 15-18, 20, 22-28 | | | | | |
| Y | US 5,768,724 A (BUELL) 23 June 1998 (23.06.1998) 2, lines 7 to 11; column 6, line 40 to column 7, line | 7 | | | | | |
| Y, P | US 6,824,419 B1 (WU) 30 November 2004 (30.11.2004); figure 1; column 2, lines 45 to 53; claim 13 | | | | | | |
| Y | US 6,191,892 A (CHABANNE et al) 19 December 2000 (19.12.2000); claim 1; column 3, lines 49 to 56 | | | | | | |
| Y, P | US 6,752,445 B1 (KOEHLER et al) 22 June 2004 (22.06.2004); column 3, lines 49 to 55; column 4, lines 11 to 28; abstract | | 18 | | | | |
| Y, P | US 6,885,899 B1 (YOON) 26 April 2005 (26.04.200 to 52; abstract | 24-28 | | | | | |
| Y | US 5,344,331 A (HOFFMAN et al) 06 September 19 68; column 2, lines 13-16; column 2, lines 33-39 | 18 | | | | | |
| | | | | | | | |
| 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 intern and not in conflict with the application by | | | | | |
| "A" document particular: | defining the general state of the art which is not considered to be of relevance | principle or theory underlying the invent | ion | | | | |
| "B" earlier application or patent published on or after the international filing date | | "X" document of particular relevance; the cla considered novel or cannot be considered when the document is taken alone | | | | | |
| "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) | | "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 | | | | | |
| "O" document referring to an oral disclosure, use, exhibition or other means | | to a person skilled in the art | , | | | | |
| "P" document published prior to the international filing date but later than the "&" document member of the same patent family priority date claimed | | | | | | | |
| Date of the actual completion of the international search | | Date of mailing of the international searce 21 OCT 2005 | ch report | | | | |
| | 05 (19.08.2005) | | 0 6 6/ | | | | |
| Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US | | Anthorized officer Cheila | of Vendy every | | | | |
| Commissioner for Patents | | Xuan M Thai | H. Veney ever U. Specialist | | | | |
| | Box 1450 | Tutage Telephone No. (571) 272-7147 Tech. (| enter 3700 | | | | |
| Alexandria, Virginia 22313-1450 Facsimile No. (571) 273-8300 | | | | | | | |

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US05/18475

| ategory * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No |
|-----------|--|----------------------|
| Y | US 5,910,991 A (FARRAR) 08 June 1999 (08.06.1999); abstract; column 4, lines 40-52; figure 2; column 5, lines 8-24 | 24-28 |
| Y | US 6,290,536 B1 (HWANG et al) 18 September 2001 (18.09.2001); figure 5 | 10-12 |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| 10.1111 | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

| | |
|---|--|
| | International application No. |
| INTERNATIONAL SEARCH REPORT | PCT/US05/18475 |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| Continuation of B. FIELDS SEARCHED Item 1: | 40D 400/070 000 101 5/110 101 501 000/00 |
| 297/217.3, 172, 463.1, 67, 440.6; 439/108, 259, 296, 342, 378; 463/47, 36; 273/14 | 48B; 439/3/8, 366, 131; 5/118, 12.1, 59.1; 296/69, |
| 65.03, 65.01, 65.13, 65.15; 700/94; 381/94.5, 123, 74, 94 | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |