A vehicle headrest assembly includes a portable media device and a frame assembly, including an inner frame, attached to a vehicle headrest. The system includes a locking mechanism configured to secure the portable media device within the inner frame and further configured to release the portable media device from the inner frame.
DOCKABLE MEDIA SYSTEM

BACKGROUND

[0001] 1. Field of the Invention

[0002] The present invention generally relates to a vehicle media system. More particularly, the invention relates to a vehicle media system that may be removably attached to the inside of a vehicle.

[0003] 2. Description of Related Art

[0004] In order to alleviate boredom within a motor vehicle, a variety of devices have been provided that serve to entertain passengers within a vehicle. These devices include DVD players, video game systems, broadcast television or satellite tuners, video cassette players, CD players, MP3 players, computers, etc. Devices may also be provided to travelers for navigation, such as global positioning systems (GPS). Furthermore, travelers have become accustomed to using cell phones and email during travel. Many such entertainment devices and other devices are portable in nature, and travelers bring them into a vehicle. However, often it is desirable for these devices to be attached to the vehicle, in order to provide the desired functionality. For example, passengers may desire that a DVD player be attached to the vehicle in a position that is optimal for viewing.

[0005] Current in-vehicle rear-seat entertainment systems (RSE’s) comprise two categories: overhead and headrest-based. Overhead systems are limited to vehicles for which the cockpit size allows for the inclusion of such systems, while observing the limits of safety and positive consumer experience (i.e., distance of screen from the user's face).

[0006] In the case of the headrest-based system, current technology includes “all-in-one” type systems that are completely integrated in the headrest. They play DVD’s, include viewing angle adjustment, and allow for the transfer of audio and video signals between the headrests, allowing the consumer a great deal of functionality. One limitation of the current technology is that it does not allow the consumer to continue this experience outside the vehicle.

[0007] Creating portability would permit the consumer greater choice in device selection (i.e., one headrest could house a media DVD player, and one headrest could house a media player with hard drive and gaming capability), as well as eliminate the need to purchase additional devices for entertainment when a user is not in his/her automobile. Furthermore, portability would also prevent theft of the devices, allowing them to be removed from the headrest and stored in the trunk, in the user’s home, or in a carrying case.

[0008] Existing solutions include the ability to hang a media device on a bracket or the headrest itself, with no communication ability between headrest assemblies or ability to charge the media device’s battery using vehicle power. These systems also typically lack adequate viewing angle adjustment features. Additionally, these solutions present safety hazards because by nature they are not secured in a manner consistent with current automotive design practices to protect vehicle occupants in an impact event.

[0009] In view of the above, it is apparent that there exists a need for a head-rest media device system that is integrated within the head-rest, and at the same time, portable for use and storage outside the motor vehicle.

[0010] It is also apparent that there exists a need for a portable media device configured for use and storage outside the motor vehicle that can be pivotally attached within a vehicle at various desired viewing angles.

SUMMARY

[0011] In satisfying the above need, as well as overcoming the enumerated drawbacks and other limitations of the related art, the present invention provides a portable media device and a frame assembly attached to a vehicle headrest. The frame assembly has an inner frame and a locking mechanism configured to secure the portable media device within the inner frame. The locking mechanism is further configured to release the portable media device from the inner frame.

[0012] In another aspect, the present invention provides a dockable media system having a portable media device, a frame assembly, and a locking mechanism. The frame assembly has an inner frame and an outer frame. The inner frame is pivotally attached to the outer frame, and the outer frame is fixedly attached to a vehicle. The locking mechanism is configured to secure the portable media device within the inner frame and to release the portable media device from the inner frame.

[0013] Further objects, features and advantages of this invention will become readily apparent to persons skilled in the art after a review of the following description, with reference to the drawings and claims that are appended to and form a part of this specification.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] FIG. 1 is a perspective view of a vehicle seat including a first embodiment of a dockable media system embodying the principles of the present invention;

[0015] FIG. 2 is a perspective view of the dockable media system of FIG. 1;

[0016] FIG. 3 is an exploded view of the dockable media system of FIGS. 1-2;

[0017] FIG. 4 is a cross-sectional view of the inner frame and portable media device of the dockable media system of FIGS. 1-3;

[0018] FIG. 5 is a cross-sectional view of the pivot joint of the dockable media system of FIGS. 1-4;

[0019] FIG. 6 is a perspective view of a vehicle seat including a second embodiment of a dockable media system embodying the principles of the present invention;

[0020] FIG. 7 is a perspective view of the dockable media system of FIG. 6;

[0021] FIG. 8 is an exploded view of the dockable media system of FIGS. 6-7;

[0022] FIG. 8A is a cut-away rear perspective view of the portable media device of the dockable media system of FIGS. 6-8; and

[0023] FIG. 9 is a perspective view of a third embodiment of a dockable media system embodying the principles of the present invention.

DETAILED DESCRIPTION

[0024] Referring now to the FIGS. 1-4, a dockable media system embodying the principles of the present invention is illustrated therein and designated generally at 10. The dockable media system 10 includes a portable media device 12 attached to a frame assembly 14. The portable media device 12 preferably includes a viewing screen 15, such as an LCD screen. The frame assembly 14 includes a locking mechanism 16, which secures the portable media device 12 to the frame
assembly 14, and is operable to release the portable media device 12 from the frame assembly 14 when a user activates a releasing feature.

[0025] The frame assembly 14 includes an inner frame 18 and an outer frame 20. The locking mechanism 16 attaches the portable media device 12 within the inner frame 18, securing the portable media device 12 within the inner frame 18. In the embodiments illustrated herein, the locking mechanism 16 fixedly attaches the portable media device 12 within the inner frame 18. It is contemplated, however, that the portable media device 12 could be attached within the inner frame 18 in a different manner. For example, the portable media device 12 could be pivotally or slidably attached to the inner frame 18.

[0026] The inner frame 18 defines a cavity 50 that receives the portable media device 12 therein. The cavity 50 is substantially the same size and shape as the outer edge of the portable media device 12. When the portable media device 12 is received within the cavity 50 of the inner frame 18, the viewing side of the portable media device 12 is preferably substantially flush with the corresponding edge of the inner frame 18.

[0027] The inner frame 18 is pivotally connected to the outer frame 20. This allows the user of the portable media system 10 to adjust the viewing angle of the portable media device 12 without moving the headrest 34. With reference to FIG. 5, a close-up view of the pivotal mechanism 22 of the frame assembly 14 is illustrated. A first member 24 is pivotally attached to the inner frame 18, thereby allowing the first member 24 to pivot with respect to the inner frame 18 along a pivot axis 26. The first member 24 is fixedly received within a second member 28, which is fixedly attached to the outer frame 20. A first hole 30 located within the first member 24 mates with a second hole 32 located within the second member 28. The first and second members 24, 28 are fixedly attached through the first and second holes 30, 32 by a threaded member, for example.

[0028] In the embodiment of FIG. 5, the inner frame 18 pivots along the axis 26, which is a horizontal axis. Therefore, the viewing angle may be adjusted upward or downward. It is also contemplated that the first member 24 of the inner frame 18 could be configured to pivot along a vertical axis, allowing the viewing angle to be adjusted from left to right. Furthermore, it is contemplated that the viewing angle could also be configured with a vertical and a horizontal axis. For example, a ball-and-socket configuration of the pivotal mechanism 22 would allow the inner frame 18 to pivot along horizontal and vertical axes.

[0029] The inner frame 18 is pivotally attached to the outer frame 20, the outer frame 20 is fixedly attached to a vehicle headrest 34, preferably in a manner such that the outer frame 20 is substantially flush with the rear surface of the headrest 34. However, it is contemplated that the outer frame 20 could also have a pivot joint or ball-and-socket joint attaching it to the vehicle headrest 34. For example, the inner frame 18 could pivot along a horizontal pivot axis 26, while the outer frame pivots along a vertical axis.

[0030] It is also contemplated that the frame assembly 14 could have a simpler attachment configuration. For example, the inner frame 18 could be fixedly attached to the outer frame 20. Furthermore, the outer frame 20 could be integrally formed with the vehicle headrest 34.

[0031] The outer frame 20 is preferably fixed to the back of a vehicle headrest 34 for viewing by persons seated in the second or third row of a vehicle. Preferably, the headrest 34 contains a recess that receives the outer frame 20. This allows the outer frame 20 to be flush or nearly flush with the rear surface of the headrest 34, rather than protruding from the rear surface of the headrest 34.

[0032] It is also contemplated that the outer frame 20 could be fixedly attached to the front side of a headrest 34, which would be the preferred configuration for use of the invention by an infant seated in a rear-facing child safety seat. The frame assembly 14 could optionally include a cover for attachment to the frame assembly 14 when the portable media device 12 is released from the frame assembly 14. The cover could also be attachable to the dockable media device 10 when the portable media device 12 is attached to the frame assembly 14, in order to hide or protect the portable media device when not in use. A cover could include a cloth or leather surface operable to provide comfort when used on the front of a headrest 34 and an aesthetically pleasing look on the back of a headrest 34.

[0033] The headrest 34 need not be of any particular form or shape, while generally providing the function of head support. For example, the headrest 34 could be removable attached to the vehicle seat or integrally formed therewith.

[0034] Furthermore, although the frame assembly 14 may be preferably attached to a vehicle headrest 34, it is also contemplated that the frame assembly 14 could be attached to vehicle structure other than a headrest 34, such as the underside of the vehicle roof. Likewise, it is contemplated that the system could be used within various types of vehicles, such as automobiles, boats, and planes, without departing from the spirit of the invention.

[0035] The portable media device 12 can be secured within the inner frame 18 for use within a vehicle and released from the inner frame 18 upon activation of a release feature by a user. In other words, the portable media device 12 can be “docked” and “undocked.” The user can “dock” the portable media device 12 for use within a vehicle, thereby attaching the portable media device 12 to the inner frame 18, and “undock” the portable media device 12, thereby releasing the portable media device 12 from the inner frame 18, for use outside of the vehicle or to store the portable media device.

[0036] Because users can remove the portable media device 12 from the vehicle, users can avoid purchasing duplicate sets of the same device. Instead, users can use the same portable media device 12 within the vehicle and within the home. The portable media device 12 could function as a stand alone device outside of the vehicle or be connected to an external docking bracket. Furthermore, users can store the portable media device 12 in a carrying case, in the trunk of a vehicle, or in the home, thereby protecting the portable media device 12 against theft.

[0037] The portable media device 12 can be configured for use as a multimedia device. For example, the portable media device 12 could be configured for use as a DVD player, a game console, a CD player, and an MP3 player. The portable media device 12 could also be configured for other uses. For example, the portable media device 12 could contain a television tuner or satellite antenna to receive television signals or radio signals, the device could be configured to operate as a computer capable of sending and receiving email or browsing the World Wide Web, or the device could be configured for use as a global positioning system (GPS). Additionally, the portable media device 12 could be configured for use with various storage media, such as DVD’s, CD’s, SD cards, and flash drives.
The locking mechanism 16, which secures the portable media device 12 within the inner frame 18 and releases the portable media device 12 from the inner frame 18, could take on various forms, as illustrated by the various embodiments included in the drawings.

With reference to FIGS. 1-4, the locking mechanism 16 includes a push member 140, a lever 136, and a locking feature 38. In the embodiment of FIGS. 1-4, the push member is a release button 40. The locking feature 38 is located on a telescoping subassembly 44 of the inner frame 18. The locking feature 38 receives an engaging feature of the lever 36, which holds the telescoping subassembly 44 into an engaged position. In the engaged position, the portable media device 12 is fixed into place within the inner frame 18 by tabs 48 located on the bottom of the telescoping subassembly 44. In the engaged position, a spring 42 is compressed between the telescoping subassembly 44 and the upper inside edge 46 of the inner frame 18.

When the release button 40 is pushed by a user, the engaging feature of the lever 36 is moved away from the locking feature 38, into a disengaged position. Since the telescoping subassembly 44 is no longer fixed to the lever 36 by the locking feature 38, the spring 42 expands and pushes the telescoping subassembly 44 downward. As the telescoping subassembly 44 moves downward, the tabs 48 move away in a downward direction from the portable media device 12, thereby releasing the portable media device 12 from the inner frame 18.

When a user desires to re-attach the portable media device 12 to the frame assembly 14, the user places the portable media device 12 within the cavity 50 of the inner frame 18 and pushes the telescoping subassembly 44 upward until the locking feature 38 engages the engaging feature of the lever 36, holding the telescoping subassembly 44 in an engaged position.

A storage medium, such as a DVD 52, may be inserted into the portable media device 12 through its bottom side. The DVD 52 can be inserted when the portable device 12 is in the engaged or disengaged positions, because there is ample clearance at the bottom of the frame assembly 14 to insert a DVD 52.

An alternative embodiment of a locking mechanism 116 is illustrated in FIGS. 6-8. The locking mechanism 116 includes a push member 140, a lever 136, and locking features 138. The locking features 138 are located on the portable media device 112, on the side opposite the screen 115, and are configured as squares recesses with a bottom lip for engagement with engaging parts 154 of the lever 136. The locking features 138 receive the engaging parts 154 of the lever 136, which hold the portable media device 112 to the lever 136 in an engaged position. In the engaged position, a spring 142 extends between a top portion of the lever 136 and a plate. The lever 136 has a protrusion 156 operable to slide within a slot 158 located in a bracket 160 that is attached to the inner frame 118. In the engaged position, the spring 142 biases the lever 136 downward, so that the protrusion 156 is located at the bottom of the slot 158 and the engaging parts 154 are fixedly held to the portable media device 112 to the inner frame 118.

The push member 140 is a lever that can be activated either directly or indirectly. The push member 140 is pivotally attached to the lever 136 about point a and pivotally attached to the inner frame 18 about point b. When a user presses down on the push member 140, the push member 140 pivots about points a and b, which causes the rear side 162 of the push member 140 to move upward. Since the rear side 162 is pivotally attached to the lever 136 about point a, the lever 136 moves upward with the rear side 162 of the push member 140. As the lever 136 moves upward, compressing the spring 142, the engaging features 154 of the lever 136 move upward into a disengaged position.

In the disengaged position, the engaging features 154 release the portable media device 112. A spring-loaded door, which is commonly known in the art, pushes the portable media device 112 to a semi-retained position that provides hand-clearance for removal, and then pushes a door outward to create a continuous surface when the portable media device 112 is not present.

After the user releases the push member 140, the protrusion 156 of the lever 136 returns to the bottom of the slot 158 within the bracket 160 because the spring 142 biases the lever 136 downward, i.e., the locking mechanism 116 returns to the engaged position. When the user desires to re-attach the portable media device 112 to the frame assembly 114, the user inserts the right side 164 of the portable media device 112 into a lip 166 on the right side of the inner frame 118 and rotates the left side 168 of the portable media device 112 backward and into the inner frame 118. The engaging parts 154 of the bracket 160 snap into place, via ramped edges, within the locking features 138 of the portable media device 112, thereby fixing, via lips, the portable media device 112 to the inner frame 118 in the engaged position.

A storage medium, such as a DVD 152, may be inserted into the bottom of the portable media device 112, whether the portable media device 12 is docked or undocked. When the portable media device 112 is docked, it may be pivoted about a pivot axis 26 (as shown in FIG. 5) so that the screen 115 of the portable media device 112 faces upward, such that the top of the portable media device 112 swings back into the frame assembly 114 and the bottom of the portable media device 112 swings out of the frame assembly 114. In this position, the bottom of the portable media device 112 is accessible for inserting and removing media storage devices. It is contemplated that storage media, such as DVD’s, could also or alternatively be inserted through other sides of the portable media device 112, depending on the location of the pivotal mechanism between the inner frame 118 and the outer frame 120.

With reference to FIG. 9, another alternative embodiment of the locking mechanism 216 is illustrated. The locking mechanism 216 uses a servomechanism or motor 270 instead of a spring-loaded system to move the lever 236. A user activates the servomechanism or motor 270 with a push member 240, and the servomechanism or motor 270 moves the lever 236 upward to disengage the portable media device 212. As one skilled in the art will appreciate, the servomechanism or motor 270 could be configured to return to the engaged position after the push member 240 is released by the user or after a predetermined time. The other features of the locking mechanism 216 are substantially similar to those of the locking mechanism 116 in the previous embodiment, having a lever 236 with two engaging features that mate with two locking features located on the portable media device 212, etc.

Alternatively, other locking mechanisms may be used to connect the portable multimedia device 12 to the frame assembly 14 within the spirit and scope of the invention. Other locking mechanisms could include, but may not be limited to, listeners, plug-and-suction, Velcro®️️️️️️️️, a ball-and-
socket joint, a press-fit, or a rail structure that slideably receives the portable media device 12.

[0050] In addition, the dockable media system 10 may include a secondary or safety lock to provide extra security and protection, in order to ensure that the portable media device 12 remains within its attached (docked) position during travel, thereby ensuring the safety of passengers. The safety lock could include safety features, such as, for example, preventing the portable media device 12 from operating without the safety lock being engaged.

[0051] The frame assembly 14 would preferably include an integrated connector for electrical connection with the portable media device 12. More preferably, the integrated connector provides an interface for electrical connection with the portable media device 12 without requiring the user to manually connect any wires. This result could be accomplished in various ways. For example, the portable media device 12 could have a female terminal strip, such as a Bourns connector arrangement, that is visible on the rear side of the portable media device 12 (the side opposite the screen 15). When the portable media device 12 is docked in the inner frame 18, the female terminal strip contacts a male terminal strip mounted on the inner frame 18. The inner frame 18 has internal circuit boards in electrical communication with the male terminal strip. The wires that run to the circuit board are routed down through the posts of the headrest 34. The wires could then be connected to the vehicle power source and an FM modulator, an FM transmitter, or the vehicle audio system.

[0052] The electrical connector could transmit audio and video signals, as well as any other signals that may be needed. The portable media device 12 could also, or in the alternative, have its own audio output, such as speakers. Furthermore, the dockable media system 10 could have audio and visual inputs, such as an RCA jack. Various other configurations for supplying power or inputs to the portable media device 12 are also contemplated without departing from the spirit and scope of the invention.

[0053] Likewise, the frame assembly 14 could provide other necessary connections for the portable media device 12, such as connection with a satellite, broadcast, or cell phone antenna.

[0054] The portable media device 12 could also, or in the alternative, be configured to run off of its own internal power supply, thereby acting as a self-contained entertainment device. The internal power supply could be of any suitable type, such as rechargeable battery power. A rechargeable system could be configured to charge the internal power supply from vehicle power.

[0055] The frame assembly 14 and the outer casing of the portable media device 12 are preferably constructed of a high-strength plastic, in order to provide durability and light weight, as one skilled in the art would appreciate. Furthermore, the frame assembly 14 preferably includes fans (not shown) placed behind the portable media device 12, in order to prevent the electronics from overheating.

[0056] Control of the portable media device 12 is facilitated by virtue of various control buttons located on the outside of the inner frame 18. Such control buttons are conventional in nature, and may take a variety of forms. A remote control device may further be provided to control the portable media device 12. Various other configurations of the controls of the portable media device are also contemplated, such as locating the controls on the armrest of an airplane seat or locating the controls on the portable media device 12 itself.

[0057] Furthermore, the dockable media system 10 may be configured such that a single system comprises several units, with each unit attached to a different vehicle headrest 34, for example. This is advantageous when there are multiple passengers seated on the back seats a vehicle and each would prefer to use his/her own dockable media system 10. The dockable media system 10 could be configured to allow use of each portable media device 10 independently of each other portable media device 10. For example, a first user could watch a movie on a first portable media device 12 while a second user plays a video game using a second portable media device 12 within the system.

[0058] As a person skilled in the art will readily appreciate, the above description is meant as an illustration of implementation of the principles this invention. This description is not intended to limit the scope or application of this invention in that the invention is susceptible to modification, variation and change, without departing from the spirit of this invention, as defined in the following claims.

1. A vehicle headrest assembly comprising:
   a vehicle headrest;
   a frame assembly attached to the vehicle headrest, the frame assembly comprising an inner frame;
   a portable media device; and
   a locking mechanism, the locking mechanism configured to secure the portable media device within the inner frame, the locking mechanism further configured to release the portable media device from the inner frame.

2. The vehicle headrest assembly of claim 1, wherein the frame assembly further comprises an outer frame, the inner frame being pivotal to the outer frame.

3. The vehicle headrest assembly of claim 1, wherein the locking mechanism is operable to fixedly attach the portable media device within the inner frame.

4. The vehicle headrest assembly of claim 2, wherein the outer frame is fixedly attached to the vehicle headrest.

5. The vehicle headrest assembly of claim 1, wherein the locking mechanism comprises:
   a locking feature operable to secure the inner frame to the portable media device when a lever engages the locking feature in an engaged position; and
   a push member operable to move the lever between the engaged position and a disengaged position, the lever being disengaged from the locking feature when positioned in the disengaged position, the portable media device being released from the inner frame when the lever is disengaged from the locking feature.

6. The vehicle headrest assembly of claim 5, wherein the locking mechanism further comprises a biasing member, the biasing member being in mechanical communication with the lever, the biasing member operable to bias the lever into the engaged position.

7. The vehicle headrest assembly of claim 6, wherein the biasing member is a spring.

8. The vehicle headrest assembly of claim 5, wherein the locking mechanism further comprises a biasing member, the biasing member being in mechanical communication with the lever, the biasing member operable to bias the lever into the disengaged position.

9. The vehicle headrest assembly of claim 8, wherein the biasing member is a spring.
10. The vehicle headrest assembly of claim 1, wherein the locking mechanism comprises a motor operable to release the portable media device when the motor is activated.

11. The vehicle headrest assembly of claim 1, wherein the locking mechanism comprises a servomechanism operable to release the portable media device when the servomechanism is activated.

12. A dockable media system comprising:
   a portable media device;
   a frame assembly having an inner frame and an outer frame, the inner frame configured to fixedly receive the portable media device, the inner frame pivotally attached to the outer frame, the outer frame fixedly attached to a vehicle; and
   a locking mechanism configured to secure the portable media device within the inner frame, the locking mechanism further configured to release the portable media device from the inner frame.

13. The dockable media system of claim 12, wherein the outer frame is fixedly attached to a vehicle headrest.

14. The dockable media system of claim 12, wherein the locking mechanism comprises:
   a locking feature operable to secure the inner frame to the portable media device when a lever engages the locking feature in an engaged position; and
   a push member operable to move the lever between the engaged position and a disengaged position, the lever being disengaged from the locking feature when positioned in the disengaged position, the portable media device being released from the inner frame when the lever is disengaged from the locking feature.

15. The dockable media system of claim 14, wherein the locking mechanism further comprises a biasing member, the biasing member being in mechanical communication with the lever, the biasing member operable to bias the lever into the engaged position.

16. The dockable media system of claim 15, wherein the biasing member is a spring.

17. The dockable media system of claim 14, wherein the locking mechanism further comprises a biasing member, the biasing member being in mechanical communication with the lever, the biasing member operable to bias the lever into the disengaged position.

18. The dockable media system of claim 17, wherein the biasing member is a spring.

19. The dockable media system of claim 12, wherein the locking mechanism comprises a motor operable to release the portable media device when the motor is activated.

20. The dockable media system of claim 12, wherein the locking mechanism comprises a servomechanism operable to release the portable media device when the servomechanism is activated.

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