US 20100154684A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2010/0154684 A1

(43) Pub. Date: Jun. 24, 2010

Mayne et al.

(54) TRAY TABLE AND RELATED METHODS

(76) Inventors: **Rudy Mayne**, Hilliard, OH (US); **Trent Hobbs**, Marysville, OH (US); **Derek Lindsay**, Marysville, OH (US)

Correspondence Address:
Emerson, Thomson & Bennett, LLC
777 W. Market Street
Akron, OH 44303 (US)

(21) Appl. No.: **12/341,454**

(22) Filed: **Dec. 22, 2008**

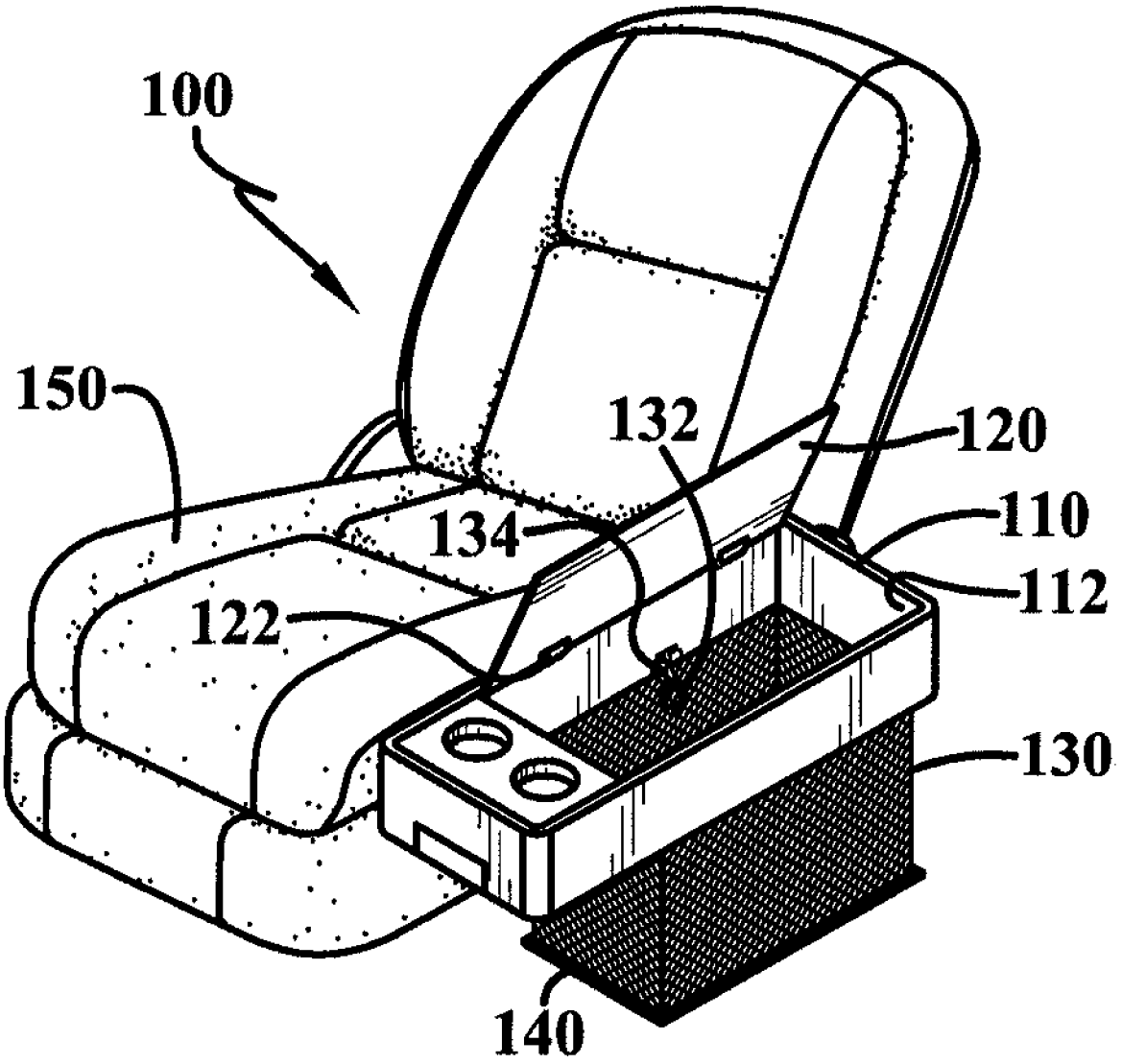
Publication Classification

(51) **Int. Cl.**
A47B 37/00 (2006.01)

(52) **U.S. Cl.** **108/44**

(57) **ABSTRACT**

The present invention generally relates to tray table devices and related methods. Some embodiments include foldable tray table devices capable of being stowed. Some embodiments also include tray tables that have expandable and/or collapsible storage compartments. Other embodiments relate to methods for making and/or using structural embodiments of the invention.



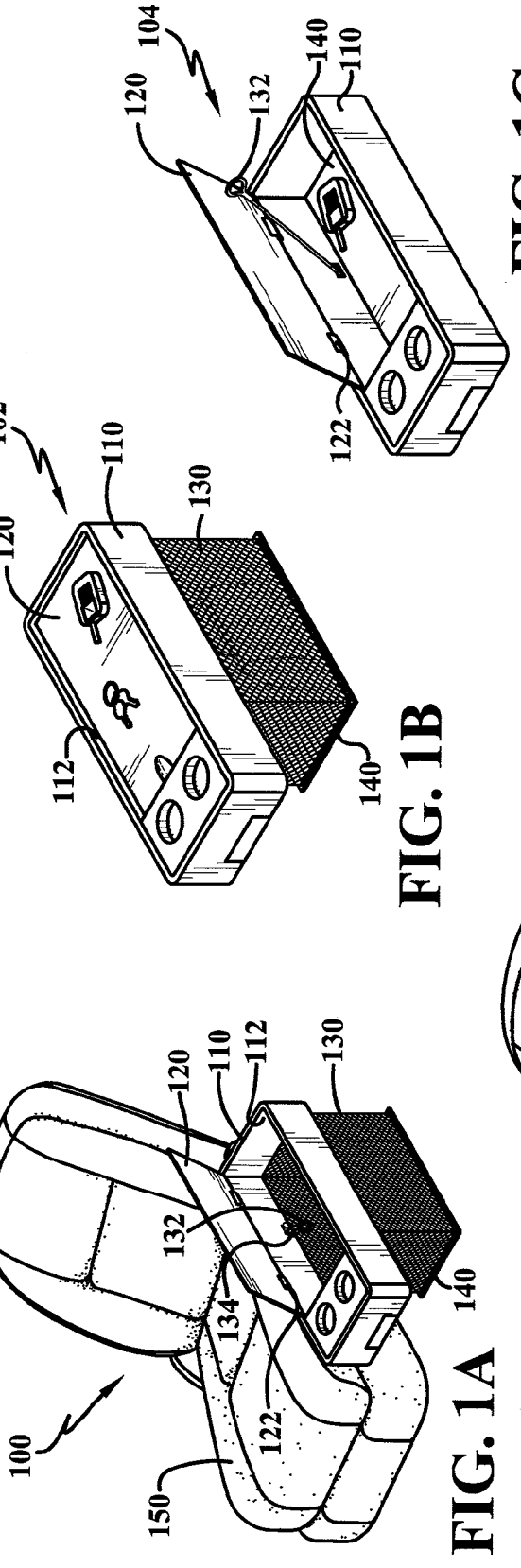


FIG. 1A

FIG. 1B

FIG. 1C

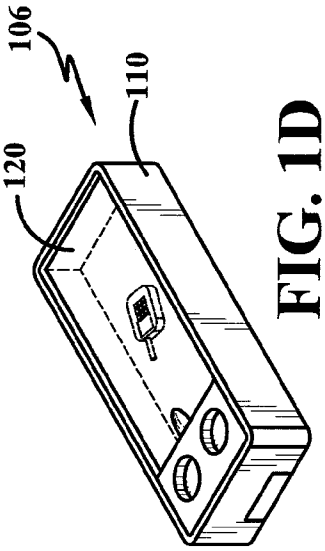


FIG. 1D

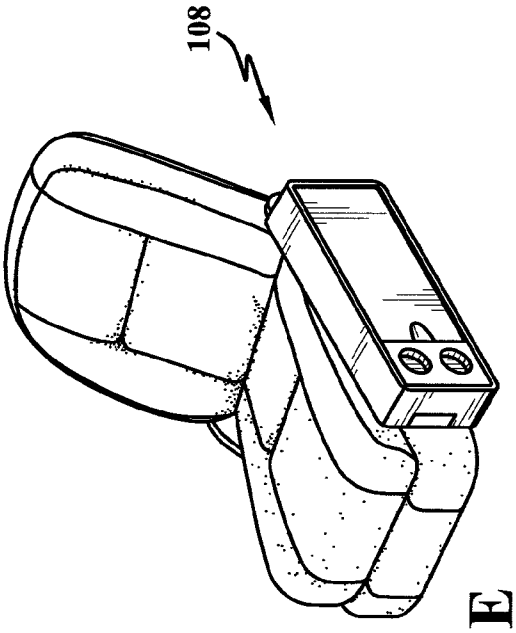


FIG. 1E

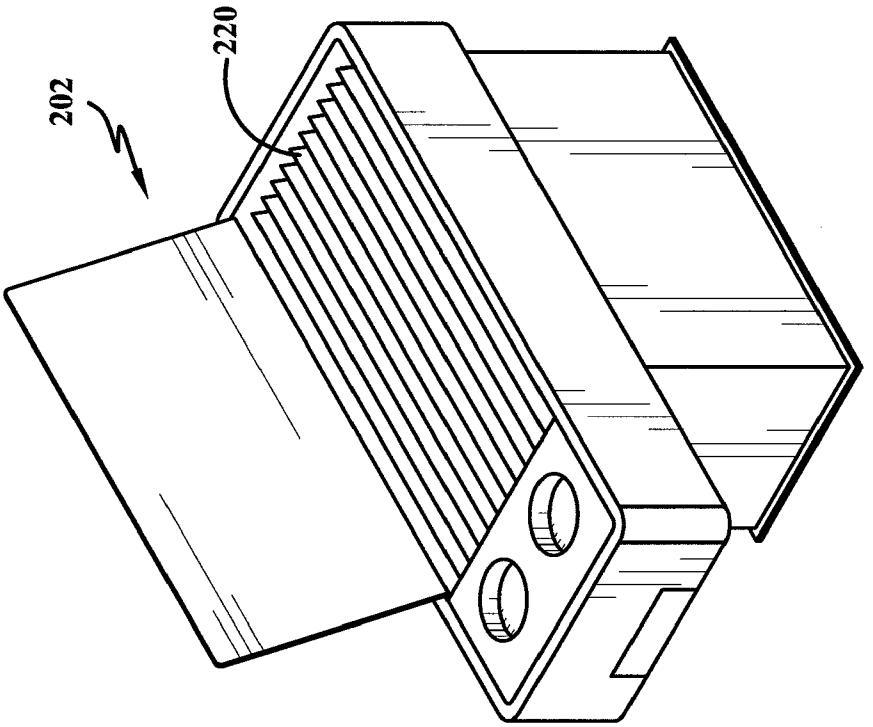


FIG. 2B

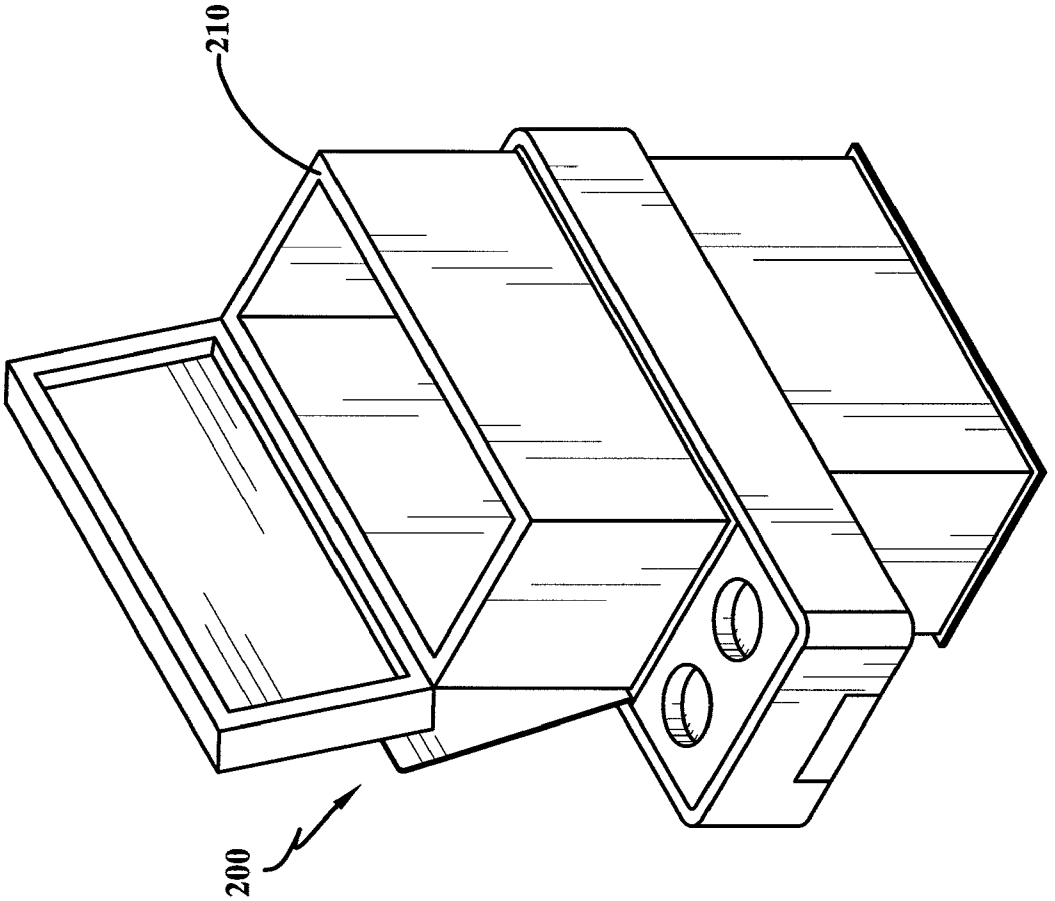


FIG. 2A

TRAY TABLE AND RELATED METHODS

I. BACKGROUND OF THE INVENTION

[0001] A. Field of Invention

[0002] This invention relates to vehicle tray table devices. Some embodiments relate to methods with respect to such devices.

[0003] B. Description of the Related Art

[0004] Tray devices for vehicles are known in the art. Some prior devices including folding features whereby the tray may take on a stowed or deployed orientation. The art also includes some tray devices that do not fold, but that include a storage compartment located under a hinged tray. For example, the tray top may open to reveal a hidden storage space. However, this area does not include a collapsible/expandable storage space. Thus, the prior art is deficient in that it fails to provide tray devices that include collapsible/expandable storage spaces that are capable of being stowed when they are not in use.

[0005] The present invention provides embodiments that are capable of being stowed when not in use, and that include collapsible/expandable storage compartments. Some embodiments relate to methods associated with such devices.

II. SUMMARY OF THE INVENTION

[0006] Some embodiments of the present invention relate to a tray table, comprising: a tray frame defining an outer perimeter and an inner perimeter, the inner perimeter further defining an opening, and the tray frame having a top portion, a bottom portion and four side portions; a mounting means for mounting a side portion of the tray frame to a vehicle in a swinging relation; a fixing means for reversibly fixing the tray frame in an approximately parallel orientation relative to the floor of the vehicle; a tray top member having a top face, a bottom face, and four side faces defining a rectangular shape having a thickness, the tray top member being hingingly attached to the tray frame at one side face of the tray top member; a tray bottom member having a top face, a bottom face, and four side faces defining a rectangular shape having a thickness; at least one collapsible side member having a top end and a bottom end, the top end being attached to the tray frame, and the bottom end being attached to the tray bottom member; and a pull-cord in mechanical communication with the at least one collapsible side member such that pulling the pull-cord reversibly raises the tray bottom member.

[0007] Other embodiments relate to an apparatus, comprising: a tray frame defining an outer perimeter and an inner perimeter, the inner perimeter further defining an opening, and the tray frame having a top portion, a bottom portion and four side portions, wherein the tray frame is free to swing about a longitudinal axis by an angle from about 0 degrees to about 90 degrees relative to a floor of a vehicle; a mounting structure affixed to the vehicle and to the tray frame, the mounting structure being selected from the group consisting of a hinge, a ball and socket pivotable joint, a pin and socket rotatable joint, and a foldable brace; a fixing structure adapted to fix the orientation of the tray frame in a horizontal relation to a floor of the vehicle, the fixing structure comprising one or more structures selected from the group consisting of a latch, a hook, a mechanical stop, and a foldable brace; a tray top member having a top face, a bottom face, and four side faces defining a rectangular shape having a thickness, the tray top member being hingingly attached to the tray frame at one side face of the tray top member; a tray bottom member having a top face, a bottom face, and four side faces defining a rectangular shape having a thickness; at least one collapsible side member having a top end and a bottom end, the top end being attached to the tray frame, and the bottom end being attached to the tray bottom member; and a pull-cord in mechanical communication with the at least one collapsible side member such that pulling the pull-cord reversibly raises the tray bottom member.

[0008] Other benefits and advantages will become apparent to those skilled in the art to which it pertains upon reading and understanding of the following detailed specification.

III. BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The invention may take physical form in certain parts and arrangement of parts, embodiments of which will be described in detail in this specification and illustrated in the accompanying drawings which form a part hereof and wherein:

[0010] FIG. **1**A-E is a series of drawings showing various configurations of one embodiment.

[0011] FIG. **2**A-B is a pair of drawings showing alternative configurations of an embodiment that includes one or more accessories.

IV. DETAILED DESCRIPTION OF THE INVENTION

[0012] The present invention generally relates to tray table devices and related methods. According to some embodiments, a tray table can be foldable and/or expandable. Some embodiments include features that enable stowing the tray table and/or components thereof.

[0013] According to one embodiment, a tray table device includes a tray frame member. The tray frame member can have a generally rectangular shape, or any other suitable shape. In some embodiments the tray frame member comprises a top portion, a bottom portion and four side portions. The top and bottom portions are spaced apart to define a thickness, and the thickness is bounded by the side portions. In some embodiments the tray frame member defines an outer perimeter and at least one inner perimeter. An inner perimeter defines a space for accepting a tray top member, which is adapted to fit within the inner perimeter. In some embodiments a tray top member can comprise a generally rectangular shape, and can include a means for attaching the tray top member to the tray frame member. Some embodiments also include a tray bottom member. A tray bottom member can comprise a generally rectangular shape adapted to fit within an inner perimeter of the tray frame member. In some embodiments the tray bottom member is attached to the tray frame member through one or more collapsible side walls.

[0014] According to some embodiments, the tray frame member can include a means for mounting the frame member to a vehicle. Such means for mounting can be disposed at or near one or more side portions and/or the bottom portion of the tray frame member. And, in some embodiments the means for mounting can enable a swinging relation between the tray frame member and the vehicle, including a range of motion from at least about 0 to 90 degrees relative to a floor of the vehicle. In some embodiments, the means for mounting can include one or more devices selected from the group consisting of a hinge, a ball and socket pivotable joint, a pin and socket rotatable joint, and a foldable brace.

[0015] Some embodiments include one or more means for fixing the orientation of the tray frame member. For example, one suitable fixing means is capable of reversibly fixing the tray frame member in a horizontal orientation relative to a floor of the vehicle. A variety of mechanical means can be used to perform this function including, without limitation, one or more of a latch, a hook, a mechanical stop or a foldable brace.

[0016] A tray top can define a shape such as a generally rectangular shape. Rectangular tray tops include a top face, a bottom face, and four side faces. In some embodiments, tray tops are adapted to fit within a perimeter of the tray frame member. Some embodiments can also include a means for attaching the tray top to the tray frame member in a swinging relation. According to some embodiments, a suitable means for attaching the tray top to the tray frame member can include, without limitation, one or more of a hinge, a ball and socket pivotable joint, a pin and socket rotatable joint, or any combination thereof. For example, the one or more hinge members can be affixed to the tray top and to the tray frame member so that the tray top is free to swing out and away from the tray frame member.

[0017] A tray bottom member can define a shape such as a generally rectangular shape. Rectangular tray bottoms include a top face, a bottom face, and four side faces. In some embodiments, a tray bottom member is adapted to fit within a perimeter of the tray frame member. Tray bottom members can be affixed to the tray frame member by any of a variety of collapsible means including, without limitation, netting, fabric, accordion-folded materials, string, rope, chain, cable, chain mail, woven metal fiber, and the like. Some embodiments include at least one collapsible side member.

[0018] Some embodiments also include a means for raising and lowering the tray bottom member and/or collapsing the collapsible member. In some embodiments the means for raising and lowering can comprise one or more of a string, rope, chain, cable and the like, or any combination thereof. Furthermore, in some embodiments, the means for raising and lowering can operate manually or automatically. For instance, in one embodiment the means can include a pull-cord in mechanical communication with the at least one collapsible side member. According to such embodiments, the tray bottom member can be raised by pulling the pull-cord, and the tray bottom member can be lowered by releasing the pull-cord. In automatic embodiments, a collapsible side member can be raised and lowered with the aid of a motorized means. For instance, a motor can be used to draw and release a cord or chain in mechanical communication with a collapsible side member.

[0019] Some embodiments having a pull-cord also include a pull-cord locking means, for locking the position of the pull-cord. For example, when the pull-cord is drawn and the tray bottom member is in a raised orientation, it may be desirable to lock the tray bottom member in the raised orientation by locking the pull-cord in the drawn state. This can be accomplished with any of a variety of structures including, without limitation, a cinch, a slideable clip, a clasp, a knot, and the like, or any combination thereof.

[0020] Referring now to the drawings wherein the showings are for purposes of illustrating embodiments of the invention only and not for purposes of limiting the same, FIG. **1** is a series of drawings showing various configurations of one embodiment. FIG. **1**A shows the embodiment in an open configuration **100**. According to FIG. **1**A the embodiment comprises a tray frame member **110** defining an inner perimeter **112**. A tray top member **120** is adapted to fit within the inner perimeter **112**, and is attached to the tray frame member **110** through a pair of hinges **122**. The embodiment also includes a tray bottom member **140**, which is attached to the tray frame member **1 10** through a collapsible side member **130**. In this embodiment, the collapsible side member **130** comprises a net structure. The collapsible side member can be collapsed by pulling the pull-cord **132**, and the collapsed orientation can be maintained by applying a pull-cord locking means. According to FIG. **1**A the pull-cord locking means comprises a slideable clip **134**.

[0021] FIG. **1**B shows the embodiment of FIG. **1**A where the tray top member **120** is in a closed configuration **102**, and is fitted within an inner perimeter **112** of the tray frame member **110**. FIG. **1**C shows a configuration **104** where the tray top member **120** is in an open orientation and the tray bottom member **140** is in a raised orientation. FIG. **1**C shows that the pull-cord **132** has been pulled, thereby collapsing the collapsible side member **130** and raising the tray bottom member **140** into an inner perimeter of the tray frame member **110**. The tray frame member **110** can have different inner perimeters for accepting the tray top member **120** and the tray bottom member **140**. FIG. **1**D shows still another configuration **106**, wherein the tray top member **120** is in a closed configuration and the tray bottom member **140** is in a raised configuration. Finally, FIG. **1**E shows a configuration **108**, wherein the tray top member **120** is in a closed orientation, the tray bottom member **140** is in a raised orientation, and the tray frame member **110** is folded against the seat **150** or seat bracket to which it is mounted. Thus, in FIG. **1**E the embodiment is in a stowed configuration.

[0022] FIG. **2** shows two additional embodiments that include one or more accessories. In FIG. **2**A, an embodiment **200** is shown that includes a cooler **210**. The cooler **210** fits within the tray frame member **110** when the tray frame member **110** is in a deployed, rather than stowed, orientation. Furthermore, the cooler **210** can include one or more electrical contacts for providing power to a refrigeration means disposed in the cooler **210**. Alternatively, the cooler **210** can rely primarily on insulation rather than refrigeration, and therefore may include no electrical contacts. FIG. **2**B shows an embodiment **202** that includes a file accessory **220**. The file accessory **220** fits within the tray frame member **110** when the tray frame member **220** is in a deployed orientation.

[0023] The embodiments have been described, hereinabove. It will be apparent to those skilled in the art that the above methods and apparatuses may incorporate changes and modifications without departing from the general scope of this invention. It is intended to include all such modifications and alterations insofar as they come within the scope of the appended claims or the equivalents thereof.

[0024] Having thus described the invention, it is now claimed:

I/we claim:

1. A tray table, comprising:

a tray frame defining an outer perimeter and an inner perimeter, the inner perimeter further defining an opening, and the tray frame having a top portion, a bottom portion and four side portions;

a mounting means for mounting a side portion of the tray frame to a vehicle in a swinging relation;

a fixing means for reversibly fixing the tray frame in an approximately parallel orientation relative to the floor of the vehicle;

a tray top member having a top face, a bottom face, and four side faces defining a rectangular shape having a thickness, the tray top member being hingingly attached to the tray frame at one side face of the tray top member;

a tray bottom member having a top face, a bottom face, and four side faces defining a rectangular shape having a thickness;

at least one collapsible side member having a top end and a bottom end, the top end being attached to the tray frame, and the bottom end being attached to the tray bottom member; and

a pull-cord in mechanical communication with the at least one collapsible side member such that pulling the pull-cord reversibly raises the tray bottom member.

2. The tray table of claim **1**, wherein the tray frame is free to swing about a longitudinal axis defined by a mounted side portion of the tray frame.

3. The tray table of claim **2**, wherein the tray frame is free to swing about the longitudinal axis by an angle of from about 0 degrees to about 90 degrees relative to a floor of the vehicle.

4. The tray table of claim **1**, wherein the mounting means comprises a structure selected from the group consisting of a hinge, a ball and socket pivotable joint, a pin and socket rotatable joint, and a foldable brace.

5. The tray table of claim **1**, wherein the fixing means comprises one or more structures selected from the group consisting of a latch, a hook, a mechanical stop, and a foldable brace.

6. The tray of claim **1**, wherein the tray top member is free to swing out from the frame, defining an open orientation, and the tray top member is free to swing into the frame member, defining a closed orientation.

7. The tray of claim **6**, wherein the closed orientation is further defined by the tray top member being at about **0** degrees relative to the tray frame.

8. The tray of claim **1**, further comprising a closing means for reversibly maintaining the tray top member in a closed orientation.

9. The tray of claim **1**, wherein collapsing the at least one collapsible side member raises the tray bottom member, and expanding the at least one collapsible side member lowers the tray bottom member.

10. The tray of claim **9**, wherein the at least one collapsible side member comprises a structure selected from the group consisting of a net, a fabric sheet, an accordion sheet.

11. The tray of claim **9**, wherein the at least one collapsible side member comprises a plurality of side members.

12. The tray of claim **1**, further comprising a pull-cord locking means for reversibly locking the pull-cord position.

13. The tray of claim **12**, wherein the pull-cord locking means comprises a structure selected from the group consisting of a clip, a cinch, a clasp, and a knot.

14. The tray of claim **1**, wherein the tray frame member is adapted to receive one or more accessories.

15. The tray of claim **14**, wherein the accessories are selected from the group consisting of a cooler, and a file storage container.

16. The tray of claim **14**, wherein the tray frame member further comprises at least one electrical contact adapted to supply electrical power to the one or more accessories.

17. The tray of claim **1**, wherein the vehicle is an automobile.

18. The tray of claim **1**, further comprising at least one electric motor in mechanical communication with the at least one collapsible side member and adapted to reversibly collapse and expand the collapsible side member.

19. An apparatus, comprising:

a tray frame defining an outer perimeter and an inner perimeter, the inner perimeter further defining an opening, and the tray frame having a top portion, a bottom portion and four side portions, wherein the tray frame is free to swing about a longitudinal axis by an angle from about 0 degrees to about 90 degrees relative to a floor of a vehicle;

a mounting structure affixed to the vehicle and to the tray frame, the mounting structure being selected from the group consisting of a hinge, a ball and socket pivotable joint, a pin and socket rotatable joint, and a foldable brace;

a fixing structure adapted to fix the orientation of the tray frame in a horizontal relation to a floor of the vehicle, the fixing structure comprising one or more structures selected from the group consisting of a latch, a hook, a mechanical stop, and a foldable brace;

a tray top member having a top face, a bottom face, and four side faces defining a rectangular shape having a thickness, the tray top member being hingingly attached to the tray frame at one side face of the tray top member;

a tray bottom member having a top face, a bottom face, and four side faces defining a rectangular shape having a thickness;

at least one collapsible side member having a top end and a bottom end, the top end being attached to the tray frame, and the bottom end being attached to the tray bottom member; and

a pull-cord in mechanical communication with the at least one collapsible side member such that pulling the pull-cord reversibly raises the tray bottom member.

20. The apparatus of claim **19**, further comprising a pull-cord locking means for reversibly locking the pull-cord position, wherein the pull-cord locking means comprises a structure selected from the group consisting of a clip, a cinch, a clasp, and a knot.

* * * * *