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(54) **VERTICAL PANEL MOUNTABLE FOLDING TRAY**

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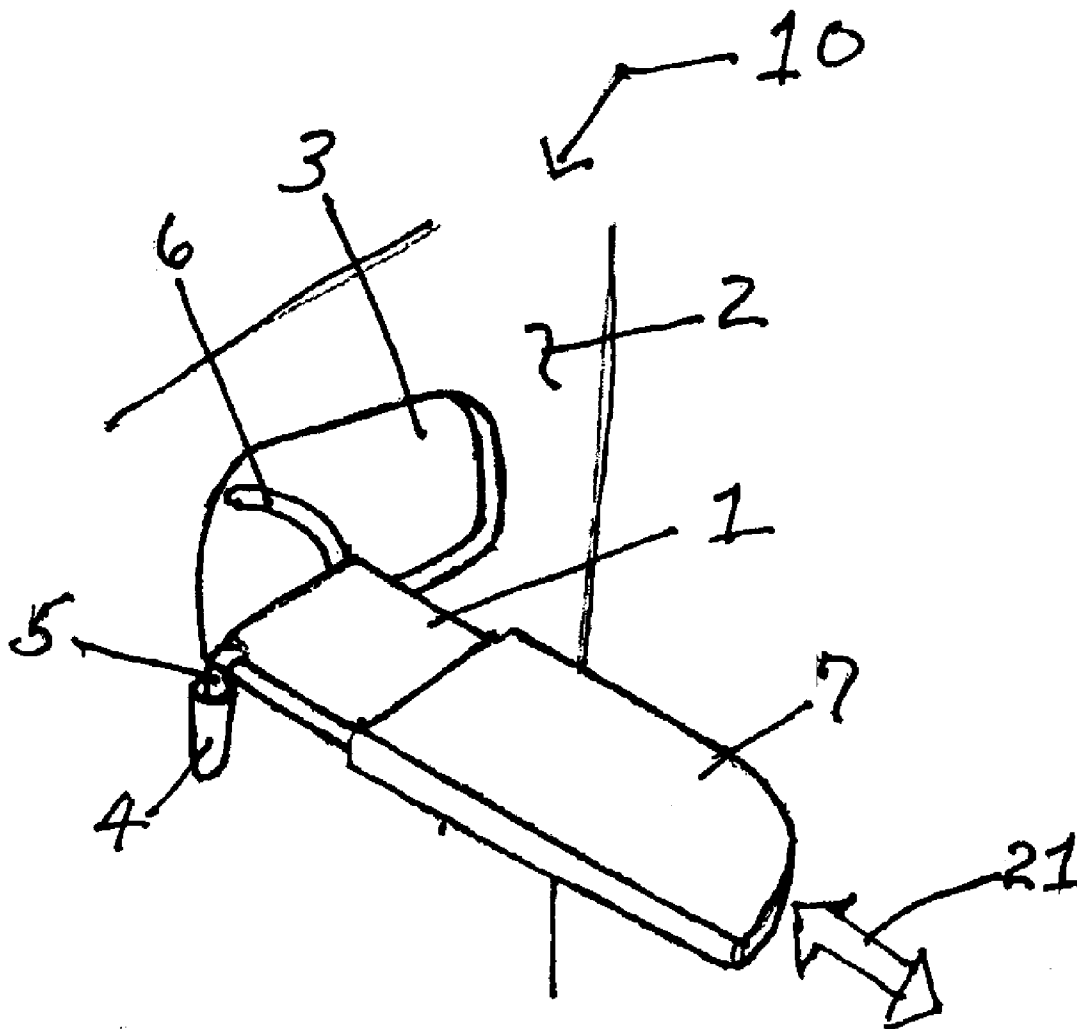
(57) **ABSTRACT**

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A fold-down utility tray which is mounted in a vertical panel of a vehicle and whose surface position is therefore independent of the position or attitude of the seats located around said fold-down utility tray. Also shown is a fold-down utility tray having an extension which allows for a larger tray surface in the down or use position than when the tray is in the up or storage position.

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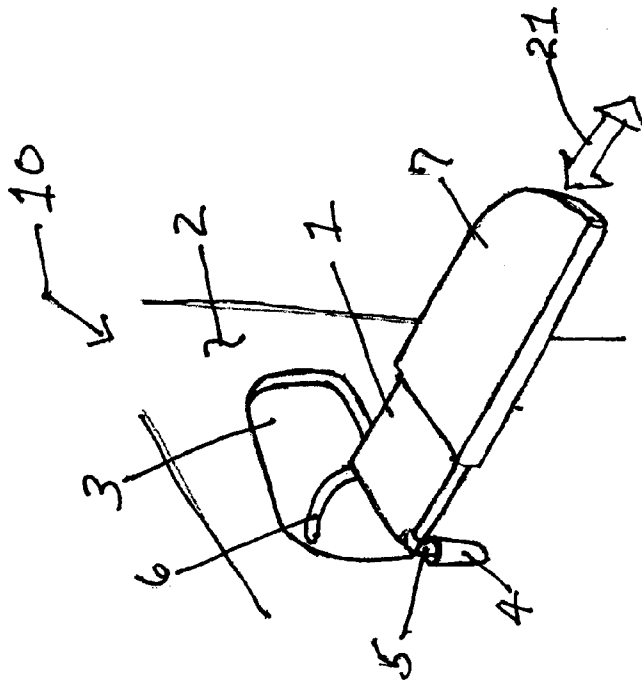


Fig. 1

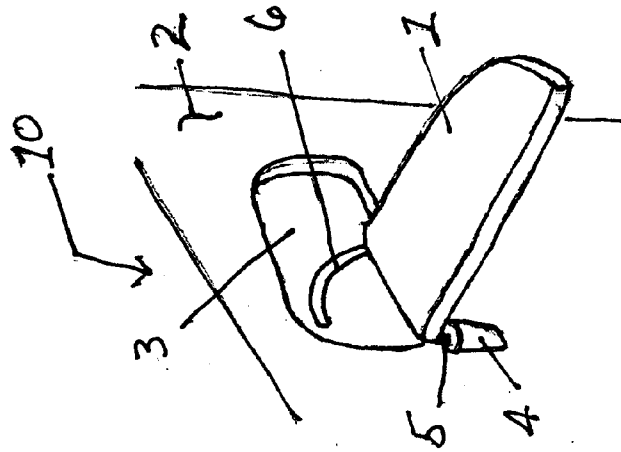


Fig. 2

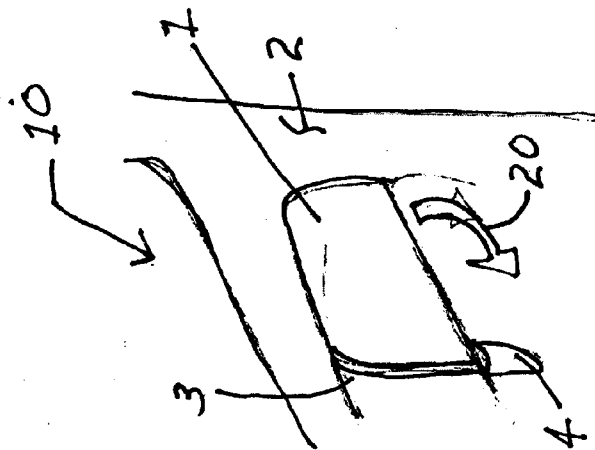


Fig. 3

Fig. 5

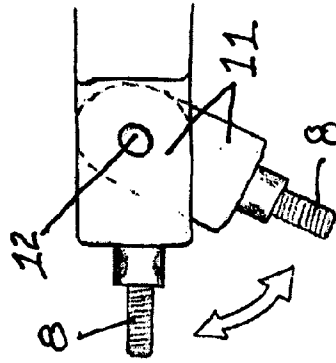
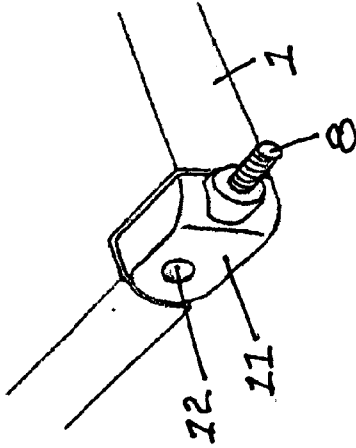


Fig. 6

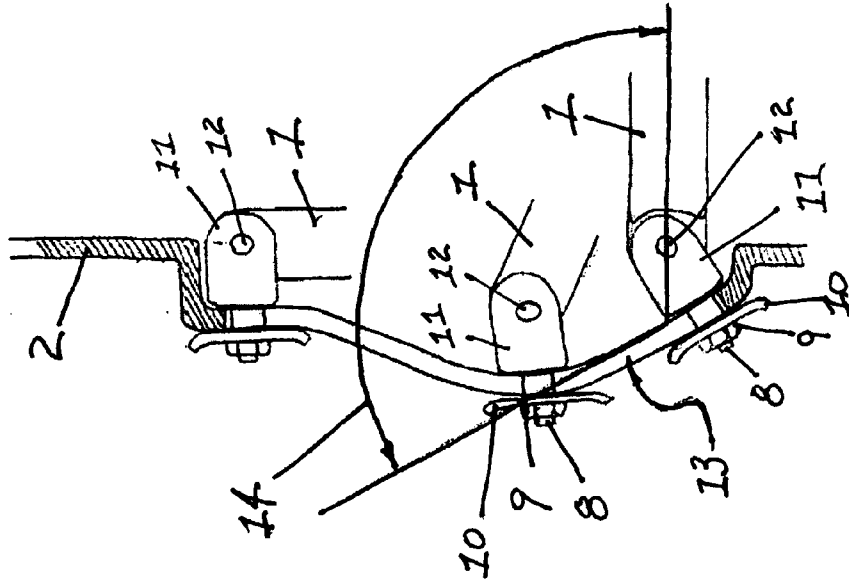


Fig. 4

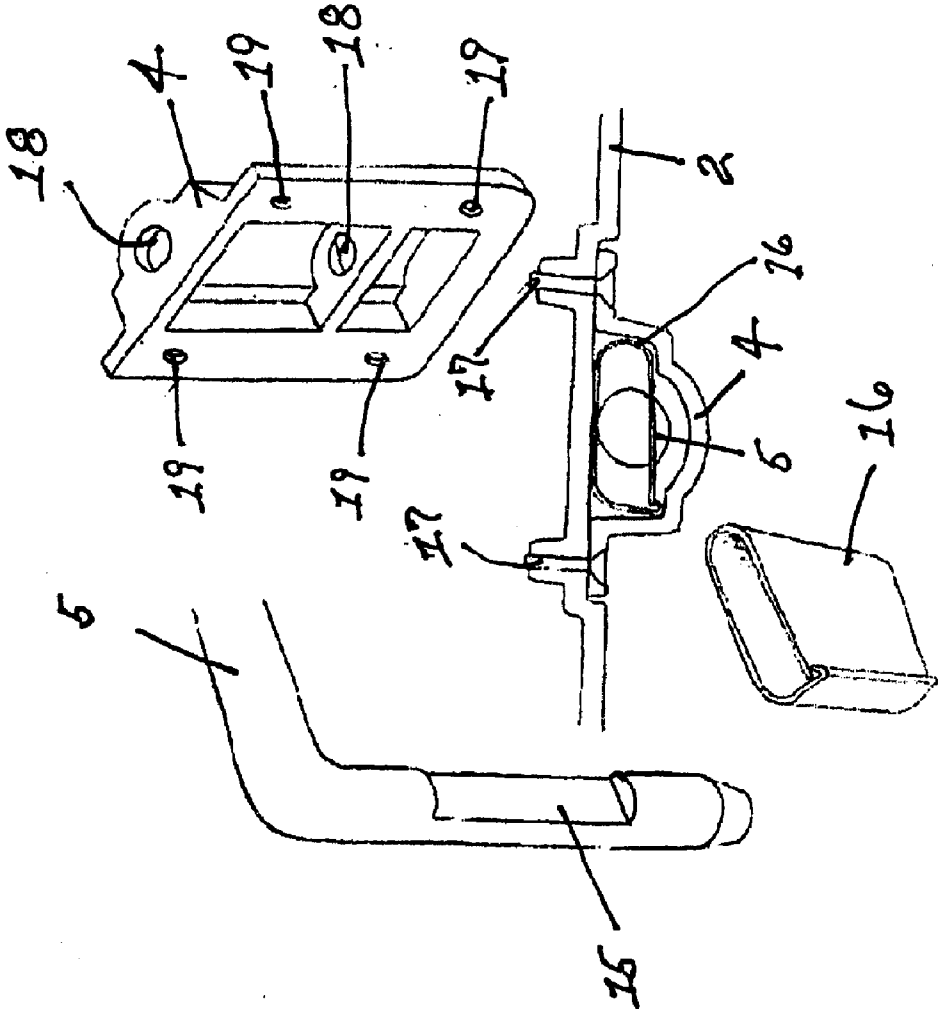


Fig. 7

VERTICAL PANEL MOUNTABLE FOLDING TRAY

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention generally relates to a folding tray for use in vehicles. More particularly the present invention relates to a folding tray permanently mounted in a vertical panel of a vehicle such that movement of the seat forward of the folding tray does not influence the position or orientation of said folding tray unit. The present invention is particularly suitable for mounting on a vertical door panel.

[0003] 2. Description of the Related Art

[0004] The use of folding trays is known in the art. More specifically, folding trays heretofore devised and utilized for the purpose of supporting food, beverages, computers, and the like, are known to consist basically of familiar, expected and obvious structural configurations, notwithstanding the myriad of designs encompassed by the art which have been developed for the fulfillment of countless objectives and requirements.

[0005] While these devices fulfill their respective, particular objective and requirements, these devices do not teach a multi-purpose fold-down utility tray which may be incorporated into a vertical panel and which is not affected by the position and attitude of the seats in front of or behind the utility tray so mounted. Nor do they teach the ability to fold quickly them from use position to stored position to allow for quick and easy egress from the vehicle in which they are mounted.

[0006] For example, U.S. Pat. No. 3,625,161 issued Dec. 7, 1971 to Rosner teaches a folding tray supported by a pair of hooks that hang over the back of a seat.

[0007] U.S. Pat. No. 5,413,035 issued May 9, 1995 to Fernandez teaches a folding tray that hangs by a hook from a vehicle steering wheel.

[0008] U.S. Pat. No. 5,480,058 issued Jan. 2, 1996 to Hutchins teaches a folding tray using a hook and loop fastener to store the tray in a non-use position and adhesive strips to attach the folding tray unit to a wall or other vertical flat surface.

[0009] U.S. Pat. No. 5,878,672 issued Mar. 9, 1999 to Ostermann et al. teaches a folding tray-type organizer desk that is hung from a head restraint mounting post using a flexible material strap.

[0010] U.S. Pat. No. 6,293,206 issued Sep. 25, 2001 to Simon et al. teaches a bi-folding tray that uses suction cups to mount the unit to a vertical glass surface such as a window pane.

[0011] U.S. Pat. No. 6,679,188 issued Jan. 20, 2004 to Spagnoli, Jr. teaches a folding tray that is attached to the back of a seat by a plurality of flexible detachable straps and which may further have optional sorting boxes incorporated therein.

[0012] Therefore, there continues to be a continuing need for a new and improved multi-purpose fold-down utility tray which can be mounted in a vertical panel of a vehicle and which is not dependent on the attitude or position of the seat in front of the unit for its position and orientation to the user.

DISCLOSURE OF THE INVENTION

[0013] The present invention provides advantages and alternatives over the prior art by providing a fold-down utility tray unit that may be mounted in a vertical panel of a vehicle that does not require mounting on a seat back.

[0014] According to a further aspect of the present invention, there is presented a fold-down utility tray that may be easily closed for quick and easy egress from the vehicle into which it is mounted.

[0015] According to yet another aspect of the present invention there is provided a fold-down utility tray mountable in a vehicle vertical panel designed to accept such fold-down utility tray comprising in cooperative combination: a folding tray having roughly rectangular shape and having a short first edge containing a pivot pin and a guide stud located in opposite corners of said first edge, a pair of long edges and a second short edge; and a vertical panel having a recess cooperatively shaped to accept said folding tray in a vertical orientation, a pivot pin mount for accepting said pivot pin and said recess having located therein a guide slot for accepting said guide stud; thereby providing a fold-down utility tray suitable for use and storage in a vehicle.

[0016] According to a yet further aspect of the present invention there is provided a fold-down utility tray mountable in a vehicle vertical panel designed to accept such fold-down utility tray comprising in cooperative combination: a folding tray having roughly rectangular shape and having a short first edge containing a pivot pin and a guide stud located in opposite corners of said first edge, a pair of long edges and a second short edge; a tray extension moveably mounted over said folding tray and; and a vertical panel having a recess cooperatively shaped to accept said folding tray in a vertical orientation, a pivot pin mount for accepting said pivot pin and said recess having located therein a guide slot for accepting said guide stud; thereby providing a fold-down utility tray suitable for use and storage in a vehicle.

[0017] The present invention thus advantageously provides a fold-down tray unit that can be mounted independent of the seats in a vehicle and which is further independent of the position or attitude of the seats in a vehicle in which it is installed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] **FIG. 1** shows a perspective view of a preferred embodiment of a fold-down utility tray of the present invention in a closed or stored position.

[0019] **FIG. 2** shows a perspective view of one preferred embodiment of a fold-down utility tray of the present invention in an open or use position.

[0020] **FIG. 3** shows a perspective view of a second preferred embodiment of a fold-down utility tray of the present invention having an extendable section in an open or use position.

[0021] **FIG. 4** show a cross section view of the articulated hinge end of a preferred embodiment of a fold-down utility tray of **FIG. 1** of the present invention.

[0022] **FIG. 5** shows a partial perspective view of the articulated hinge mounted on a preferred embodiment of a

fold-down utility tray of **FIG. 1** illustrating the tray folding into the closed or stored position.

[0023] **FIG. 6** shows a partial plan view of the articulating hinge of a preferred embodiment of the present invention.

[0024] **FIG. 7** shows plan bottom view of the pivot hinge of a preferred embodiment of the present invention as well as an exploded view of the pivot pin, the pivot pin mounting bracket and the detent spring.

DESCRIPTION OF THE PREFERRED EMBODIMENTS OF THE INVENTION

[0025] Reference will now be made to the drawings, wherein to the extent possible like reference numerals are utilized to designate like components throughout the various views. Referring to **FIG. 1**, which presents a perspective view of the fold-down utility tray unit **10** of the present invention having a tray **1** vertically mounted in the storage or closed position in a cooperative recess **3** in vertical panel **2**. Also shown is pivot pin mount **4** located in cooperative position on vertical panel **2** and arrow **20** indicating the opening movement of tray **1**.

[0026] Referring now to **FIG. 2**, there is shown a perspective view of the fold-down utility tray unit **10** of **FIG. 1** in an open or use position and having a tray **1** pivotably mounted to vertical panel **2** by means of pivot pin **5** and cooperating pivot pin mount **4**. Also shown are vertical panel recess **3** and tray guide slot **6** in the recess **3** of vertical panel **2**.

[0027] Turning now to **FIG. 3**, there is shown another preferred embodiment of the present invention fold-down utility tray unit **10** wherein said tray **1** has slidably mounted thereto a tray extension **7** which may be pulled outward from tray **1** to increase the size of the tray surface when in the down or use position. Also shown is vertical panel **2** having recess **3** therein and tray guide slot **6** located within recess **3** as well as pivot pin **5** mounted in pivot pin mount **4**. Double arrow **21** indicates the movement of tray extension **7** from a closed to an open position and back.

[0028] Referring to **FIG. 4** there is shown a partial cross section view of the articulating hinge **11** moveably mounted on tray **1** by mounting pin **12** and having tray-mounting stud **8** passing through tray guide slot **6** located within recess **3** of vertical panel **2**. Tray-mounting stud **8** moveably fastened to vertical panel **2** by way of nut **9** and washer **10**. The recess **3** in vertical panel **2** having a wall **13** angle to the tray of greater than 90 degrees to promote the sliding of the swiveling tray **1** when horizontal force is exerted to the rearward edge of tray **1**. The tray **1** and articulated hinge **11** moveably mounted to tray **1** by mounting pin **12** is shown in the down or use position with the tray **1** extended for use, in a partially closed position with the tray **1** in a partially closed position, and in the fully closed position with the tray **1** in a vertical position.

[0029] Referring to **FIG. 5** there is shown a partial perspective view of the articulating hinge **11** moveably mounted to tray **1** by way of mounting pin **12**. Also shown is mounting stud **8**.

[0030] Referring now to **FIG. 6** there is shown a partial plan view of the articulating hinge **11** moveably mounted to

tray **1** by way of mounting pin **12** as well as mounting stud **8** showing the movement of the articulating hinge **11** by the double arrow.

[0031] Finally referring to **FIG. 7** there is shown a bottom plan view of the pivot pin mount **4** fixedly mounted to vertical panel **2** by a plurality of fasteners **17** as well as pivot pin **5** and detent spring **16** mounted within pin mount **4**. Also shown is a partial perspective view of the pivot pin **5** showing detent flat **15**, a perspective view of detent spring **16** and a perspective rear view of one preferred embodiment of pivot pin mount **4** showing pivot pin mounting bores **18** and pivot pin mount **4** mounting bores **19**.

[0032] To bring the tray to a use position, the forward short edge is pulled away from the vertical panel **2** causing the tray to rotate on pivot pin **5** in the general direction of arrow **20** of **FIG. 1**. To place the tray in a closed position, horizontal force is applied to the long edge adjacent to pivot pin **5** which encourages the tray stud **8** to move upward in tray guide slot **6**. As the tray approaches the closed position, pressure of the detent spring **16** acting on the detent flat **15** of pivot pin **5** draws the tray to a contact position with vertical panel **2**. In the case of the embodiment where tray **1** has tray extension **7** after folding the tray **1** into an open or use position the tray extension **7** is pulled outward away from the free end of tray **1** thereby increasing the useable surface area of the utility tray. To close the opened and extended tray the procedure is reversed.

[0033] Another advantage of horizontal force closing the tray is especially useful if the vertical panel is mounted to a sliding door. Should the tray be in a use position, the door can still be opened from the outside as the tray will contact the body as the door slides past, the body thus exerting the necessary horizontal force on the tray, causing it to move to the closed position without damage to the tray.

[0034] The vertical panel **2** and the fold-down utility tray unit **10** are preferably molded of plastic. The vertical panel **2** and the utility tray unit **10** may be molded of the same or of different plastics as is desired. Preferred materials are polypropylene, reinforced polypropylene, ABS, polycarbonate, polycarbonate/ABS, nylon, and polyacetal. In addition, the pivot pin **5** may be molded as part of tray **1** or may be comprised of a suitable metal and fixedly mounted in tray **1**. For example the pivot pin **5** may be made from metals such as, for example, aluminum, steel, brass, and other metals to provide greater strength for applications that may require it.

[0035] Although the preferred embodiments of the present invention has been disclosed, various changes and modifications may be made without departing from the scope of the invention as set forth in the appended claims.

What is claimed is:

1. A fold-down utility tray mountable in a vehicle vertical panel designed to accept such fold-down utility tray comprising in cooperative combination:

- a folding tray having roughly rectangular shape and having a short first edge containing a pivot pin and a guide stud located in opposite corners of said first edge, a pair of long edges and a second short edge; and
- a vertical panel having a recess cooperatively shaped to accept said folding tray in a vertical orientation, a pivot pin mount for accepting said pivot pin and said recess

having located therein a guide slot for accepting said guide stud moveably mounted within said guide slot;

thereby providing a fold-down utility tray suitable for use and storage in a vehicle.

2. The fold-down utility tray as claimed in claim 1 wherein, said fold-down utility tray comprises an injection molded plastic.

3. The fold-down utility tray as claimed in claim 2 wherein, said injection molded plastic is selected from the group consisting of polypropylene, reinforced polypropylene, ABS, polycarbonate, polycarbonate/ABS, nylon, and polyacetal.

4. The fold-down utility tray as claimed in claim 1 wherein, said pivot pin is a metal pivot pin.

5. The fold-down utility tray as claimed in claim 4 wherein, said pivot pin is a metal selected from the group consisting of aluminum, steel, and brass.

6. A fold-down utility tray mountable in a vehicle vertical panel designed to accept such fold-down utility tray comprising in cooperative combination:

a folding tray having roughly rectangular shape and having a short first edge containing a pivot pin and a guide stud located in opposite corners of said first edge, a pair of long edges and a second short edge;

a tray extension moveably mounted over said folding tray and; and

a vertical panel having a recess cooperatively shaped to accept said folding tray in a vertical orientation, a pivot pin mount for accepting said pivot pin and said recess having located therein a guide slot for accepting said guide stud moveably mounted within said guide slot;

thereby providing a fold-down utility tray suitable for use and storage in a vehicle.

7. The fold-down utility tray as claimed in claim 6 wherein, said fold-down utility tray comprises an injection molded plastic.

8. The fold-down utility tray as claimed in claim 7 wherein, said injection molded plastic is selected from the group consisting of polypropylene, reinforced polypropylene, ABS, polycarbonate, polycarbonate/ABS, nylon, and polyacetal.

9. The fold-down utility tray as claimed in claim 6 wherein, said pivot pin is a metal pivot pin.

10. The fold-down utility tray as claimed in claim 9 wherein, said pivot pin is a metal selected from the group consisting of aluminum, steel, and brass.

11. A fold-down utility tray mountable in a vehicle vertical panel designed to accept such fold-down utility tray comprising in cooperative combination:

a folding tray having roughly rectangular shape and having a short first edge containing a pivot pin, said pivot pin having a detent flat therein and a detent spring mounted thereon; and a guide stud; located in opposite corners of said first edge, a pair of long edges and a second short edge; and

a vertical panel having a recess cooperatively shaped to accept said folding tray in a vertical orientation, a pivot pin mount for accepting said pivot pin and said recess having located therein a guide slot for accepting said guide stud moveably mounted within said guide slot;

thereby providing a fold-down utility tray suitable for use and storage in a vehicle further characterized in that said pivot pin detent and detent spring work in cooperation to hold the tray in a closed position.

12. The fold-down utility tray as claimed in claim 11 wherein, said fold-down utility tray comprises an injection molded plastic.

13. The fold-down utility tray as claimed in claim 12 wherein, said injection molded plastic is selected from the group consisting of polypropylene, reinforced polypropylene, ABS, polycarbonate, polycarbonate/ABS, nylon, and polyacetal.

14. The fold-down utility tray as claimed in claim 11 wherein, said pivot pin and said detent spring comprise a metal pivot pin.

15. The fold-down utility tray as claimed in claim 11 wherein, said pivot pin detent flat and said detent spring hold said fold-down utility tray in a closed position.

16. A fold-down utility tray mountable in a vehicle vertical panel designed to accept such fold-down utility tray comprising in cooperative combination:

a folding tray having roughly rectangular shape and having a short first edge containing a pivot pin, said pivot pin having a detent flat therein and a detent spring mounted thereon; and a guide stud; located in opposite corners of said first edge, a pair of long edges and a second short edge; and

a tray extension moveably mounted over said folding tray and; and

a vertical panel having a recess cooperatively shaped to accept said folding tray in a vertical orientation, a pivot pin mount for accepting said pivot pin and said recess having located therein a guide slot for accepting said guide stud moveably mounted within said guide slot;

thereby providing a fold-down utility tray suitable for use and storage in a vehicle.

17. The fold-down utility tray as claimed in claim 16 wherein, said fold-down utility tray comprises an injection molded plastic.

18. The fold-down utility tray as claimed in claim 17 wherein, said injection molded plastic is selected from the group consisting of polypropylene, reinforced polypropylene, ABS, polycarbonate, polycarbonate/ABS, nylon, and polyacetal.

19. The fold-down utility tray as claimed in claim 16 wherein, said pivot pin is a metal pivot pin.

20. The fold-down utility tray as claimed in claim 16 wherein, said pivot pin detent flat and said detent spring hold said fold-down utility tray in a closed position.

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