Title: PORTABLE TRAY AND TRAY MOUNTS.

Abstract: A portable cup holder and tray for attachment to a structural support typically on a movable object such as a car, boat, stroller, walker or chair. The cup holder and tray can be attached to the support structure by one of two mechanisms. For attachment to a car door, a flange for insertion between a roll-down window and a window gasket is used with a counterbalancing shim to secure the tray. For attachment to a single, long or two separate tube- or rod-like supports, two independently extendable arms with multi-directional clips at the ends of the arms are used.
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.
PORTABLE TRAY AND TRAY MOUNTS

CROSS-REFERENCES TO RELATED APPLICATIONS
This application claims the benefit of priority of United States provisional application Serial Numbers 60/402,828 and 60/408,402 filed August 9, 2002 and September 5, 2002, respectively, which are incorporated herein by reference in their entirety.

FIELD OF THE INVENTION
The invention relates to portable trays that are reversibly mountable to support structures.

BACKGROUND OF THE INVENTION
Cup and drink holders are common accessory items in automobiles, boats, baby strollers, chairs and the like. Often it is desirable to modify such items with the addition of one or more cup holders to provide additional or more convenient places (e.g. in the back seat of a car for children) where beverages or other items may be securely held. Additionally trays have been designed for attachment to such items to provide convenient work or storage surfaces.

A number of beverage holders have been designed. For example, US Patent No 6,390,427 issued to McConnell teaches a universal bracket for attachment to a support to which a cup holder or other accessory can be attached by means of a connector. Ranger (US Patent No. 6,264,153) teaches a beverage holder for mobile equipment comprising a body for holding the beverage, an integral spring and an attachment clip for attaching the holder to a handle or other appropriate support.

Trays for attachment to supports are also well known. Diletto (US Patent No. 5,893,331) teaches a tray for attachment to a lounge chair with either brackets or straps along one edge for attachment to the arm of the chair. Hofmeyer (US Patent 5,251,956) teaches a foldable table for attachment to a collapsible chair wherein the tray is pivotally attached to the seat portion of the chair and supported by a leg.
SUMMARY OF THE INVENTION

The invention is a portable cup holder and tray for attachment to cars, boats, chairs, strollers, walkers and the like. For simplicity, hereafter the cup holder and tray are referred to simply as the tray. The tray may be attached by insertion of a flange into roll-down vehicle windows with at least one adjustable shim attached to the bottom of a recessed portion of the tray, opposite the flange to securely attach the apparatus to the window. Alternatively, the tray may be attached to the desired structure by use of a support bracket attached to the bottom of the tray with ends on opposing sides of the tray that extend beyond the periphery of the tray. The bracket is adjustable so that the ends may be extended away from each other to attach the tray to any of a number of supports. Independent, multidirectional clamps are attached to the distal ends of the bracket for affixing the tray to two independent points on a support structure that may comprise a single entity (e.g. arm of a chair) or two independent supports with a fixed relationship to each other (e.g. parallel supports on a walker). A single tray can also contain both attachment mechanisms, the flange and shims and the adjustable bracket. The base of the recessed portions and the opposing flange can also act as supports for placement of the tray on a flat surface.

The surface of the tray is generally planar with at least one recessed area preferably dimensioned for holding a beverage container such as a soda can or bottle, travel mug, or disposable beverage cup sufficiently securely to prevent tipping. The periphery of the tray is typically raised slightly to prevent items from falling or rolling off of the tray as it is commonly used in conjunction with movable objects (e.g. cars, strollers). The raised edge can be interrupted by hooks to hold keys, mesh bags or other items that can be readily hung on such hooks. The surface may also contain ridges for pens, pencils or other desirable surface modifications.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a perspective view of the tray;
Figure 2 is a top plan view of the tray;
Figure 3 is a front elevation view of the tray;
Figure 4 is a side elevation view of the tray showing a cross section of the extendable support bar retained beneath the tray;
Figure 5 is a perspective view of the underside of the tray;
Figure 6 is a partial perspective view of the tray showing a partially extended support bar;
Figure 7 is a cross sectional view of the support bar and clamp; and
Figure 8 is a perspective view of the clamp assembled (A) and an exploded view of the clamp (B).

The present invention will be better understood from the following detailed description of an exemplary embodiment of the invention, taken in conjunction with the accompanying drawings in which like reference numerals refer to like parts and in which:

**DETAILED DESCRIPTION OF THE DRAWINGS**

A perspective view of the tray 10 is shown in Figure 1. The tray has a generally planar top tray surface 12. In the embodiment shown, the tray is fairly trapezoidal with two recessed portions 14 on the long edge of the trapezoid 16. In a preferred embodiment of the invention, the recessed portions are appropriately sized for holding a beverage container such as a soda can or bottle, a travel mug, a lidded child's cup, a disposable cup or the like. One skilled in the art is knowledgeable regarding the sizes of such containers. The recessed portions can be used for holding any of a number of items, and the size and shape of the recessed portions adjusted accordingly. Such items include, but are not limited to, cellular phones, eyeglasses, writing implements, tools or other items that fit into the recessed areas. The recessed portions may be solid as shown or of a more open construction. However, it is required that the recessed areas be relatively rigid to provide support to the tray as detailed below. The tray further includes a raised edge 18 that extends around the
periphery of the top tray surface, which is either continuous or nearly continuous. The raised edge can be interrupted by hooks 20 attached to the periphery of the tray.

The tray is designed for attachment to any of a number of solid supports. The tray is composed of a sufficiently rigid material, such as hard plastic, so that upon attachment of the tray to the appropriate support, the tray remains essentially flat and level. On the edge of the tray opposite the edge to which the recessed portions are adjacent 22, a downward pointing, optionally pivotal flange 24 is attached. The flange is nearly perpendicular to the planar surface of the tray, with the angle between the undersurface of the tray 52 and the flange 24 typically being approximately 100° (see Figure 4). The angle between the flange and the planar surface of the tray is such that when the flange is inserted into the space between the gasket adjacent to a roll-down window and the window in a vehicle, the surface of the tray is sufficiently flat to retain items on the tray. The flange is of an appropriate thickness 26 to allow it to be inserted between the gasket and the window in a vehicle with roll-down windows. The flange is preferably approximately centered on the edge 22 of the tray to which it is attached. The overall length of the flange L is preferably at least half of the length L’ of edge 22. In the figures, the flange is a single piece; however, it is possible for the flange to be comprised of multiple downward pointing flanges as long as the multiple flanges provide sufficient support to keep the tray essentially level when inserted into a support (e.g. between a roll-down car window and window gasket) or placed on a flat surface. Such determinations can easily be made by those skilled in the art. The height of the flange is such that the bottom of the flange 28 and the base of the recessed portion 30 are approximately the same distance from the planar surface of the tray when measured perpendicularly from the surface of the tray. This allows the tray to rest on the flange edge and the base of the recessed portion and to be flat and stable when placed on a flat surface.

Adjustable shims 32 are slidably attached to slots 38 in the base of the recessed portion 30. The alignment of the shims is maintained by rails 46 within
the slots (see Figures 3 and 5). The shims can be adjusted to aid in the leveling of the tray and to hold it securely in place when the flange is inserted into the space between a car window gasket and the window or other similar support (e.g. over a flat, horizontal rail). The support to which the instant invention is attached is not a limitation of the invention. The shims are preferably placed such that the shims provide appropriate counter-pressure across the length of the flange. In the embodiment shown, the shims are approximately equidistant from the sides of the centered flange 24. Alternatively, a single flange could extend from a single recessed portion opposite the middle of the flange. Other arrangements of flanges, recessed portions and shims can be readily envisioned by those skilled in the art.

In an alternative embodiment, the tray may be attached to a solid support by an extendable support bracket 50 attached to the underside of the tray 52 rather than by flanges and shims. The support bracket includes two independently extendable support bars 54 and 56 that extend beyond opposite edges of the tray, 58 and 60, at an angle that is essentially parallel to the surface of the tray, and if the tray includes a flange, essentially parallel to the length L of the flange. The distal end of each of the support brackets terminates in an engagement head 62 for the attachment of a multidirectional, independently adjustable clamps 64 that can be attached by inserting spring fingers 66 into a clip socket 68 or by other easily reversible and adjustable attachment mechanisms.

A number of multidirectional clamps are known to those skilled in the art. The clamps can be adjusted to any of a number of angles independently to allow the tray to be attached to two independent points on at least one support structure that are at essentially any angle relative to each other. This allows for great versatility of the instant invention and attachment of the tray to two independent points on a single support (e.g. arm of a chair) or two points on separate, independent supports (e.g. opposite sides of a ladder, arms of adjacent chairs).

In a preferred embodiment, the clamps 64 have screws 86 or other
incremental adjustment mechanisms that allow them to be adjusted by hand without the need for tools. The clamps may also be spring loaded (not shown), with or without secondary mechanisms to keep the clamp tight around the support. Alternatively, clamps that require the use of simple tools (e.g. screwdriver, pliers) for adjustment can be used, but it is not preferred.

Figure 5 is shows the support bars 54 fully telescoped so that the support bars are partially extended on the underside of the tray 52. Latches 40 and 42 engage tabs (of which 48 is visible) to releasably hold the support bar 54 in a stowed position on the underside of the tray 52. Comparable tabs on support bar 56 hold it in position until the spring tabs are pressed and the respective support bar withdrawn from under the tray. The support bars are retained in slideable relation to the underside of the table by tracks 44 (the track is visible in Figure 4).

Figure 6 is an enlarged view of a partially extended clamp bar. The clamp bar 54 is shown to terminate in an engagement head 62. The head 62 is received within the female socket 68. The clamp 62 is exemplary of the features of both clamps 62 and 64. The clamp jaw 70 has a cylindrical recess 74. The recess has a series of radial serrations (not shown) which cooperate with radial serrations on the cylinder plug 76 on the socket 78. A bolt 80 has a head 82 shown within the cross-section of the socket 78. The bolt 80 terminates in screw threads which are engaged by corresponding threads on the screw knob 84. When the screw knob 84 is tightened, the jaws of the clamp 64, 70 and 72 are pressed together to surround and engage stroller bars or other suitable support. At the same time, tension on the screw knob 84 causes all of the associated parts, including the screw knob, bolt and jaws 70 and 72 as well as the socket 82 to be pulled into frictional engagement so that the selected position of the clamp arms will be retained in the same angular relationship as they were in when the screw knob is tightened down. With the screw knob loosened, the clamp assembly 64 may be removed from the clamp bar by operating the retention finger 66 toward the tray so that the clamp bar is released from the female socket 68 with the finger being withdrawn through the clip socket 90. The
support bar 54 has a U-shaped cross-section leaving a bar recess 88 in the upper surface of the support bar 54. The bar recess 88 is sized to accommodate the telescope support bar 56 when the support bars are retracted under the tray 10.

A variety of multidirectional clamps can be used with the tray of the instant invention as discussed above. An exemplary clamp is shown in a perspective (A) and exploded (B) view in Figure 8 which shows details of the inner jaw 70 and outer jaw 72. The inner jaw 70 has a female receptacle in which the radial serrations 92 are shown. The socket 78 has complementary male serrations on the plug 76 (not shown) so that a relatively low force exerted by the screw knob 84 holds the jaws 70 and 72 in a fixed angular relationship to the female socket 78 and thereby to the clamp bar. Non-skid pads 94 and 96 are sized to fit within recesses in the jaws, such as recess 98 shown in the jaws 72. Channels within the recess 100 accommodate ridges such as the exemplary ridge 102 shown on the pad. Thus the pad is frictionally held within the jaw so that the pad does not become dissociated from the jaw when the jaws are open. The pads are desirably made of elastomeric material with a high co-efficient of friction for engaging without damaging stroller bars and other suitable supports including chair arms and the like. A suitable elastomeric material is Santoprene® 8000 Rubber 8211-45W237 Units: Advanced Elastomer Systems - Thermoplastic Elastomer. The outer clamp jaw 72 has a single boss 104 which is straddled by upper and lower bosses on the inner jaw (only jaw 106 is visible in the view). When assembled, the jaws are arranged for pivoting rotation around a pivot pin 108 (see Fig. 8).

In a preferred embodiment of the invention, the tray can be attached to supports by either the flange, or by use of the extendable support arms, or may be placed on a level surface for support by the flange edge and the base of the recessed area. Such a tray can be supported in three basic modes. The first mode is typified by the preferred clamps which are attached to the end of the support bars and where the support bars may be extended a sufficient distance to reach between stroller bars or chair arms or seat backs. As will be apparent,
other clamps besides the jaws illustrated may be utilized with the invention. For example, an inverted U-shaped support could be utilized as an alternative to the clamp jaws for supporting the tray from the arms of folding chairs.

The second principal mode of support of the tray is to rest the tray on a horizontal surface with the flange 24 extended. This provides a stable support for the tray and cup holders on any suitable surface.

The third major mode of support for the tray 10 is the use of the flange 24 inserted into the window slot of a vehicle or other narrow opening. The panel 24 is inserted into the opening between the glass and structural support of the window slot and the device is lowered until the support bars 54 contact the upper surface of the car door or the cup holders engage the door panel.

Although an exemplary embodiment of the invention has been described above by way of example only, it will be understood by those skilled in the field that modifications may be made to the disclosed embodiment without departing from the scope of the invention, which is defined by the appended claims.

WE CLAIM:
CLAIMS

1. A portable tray for attachment to a support comprising:
   a generally planar tray surface wherein the tray comprises a top surface,
   a bottom surface and a periphery;
   at least one recessed area in the top of the tray surface; and
   a flange mount attached to the periphery of the tray surface approximately
   perpendicular to the tray surface.

2. The tray of claim 1, wherein the recessed area is dimensioned to
   fit a standard beverage container

3. The portable tray of claim 1, wherein the flange is a thickness to
   be inserted into a roll-down vehicle window.

4. The portable tray of claim 1, further comprising cooperating,
   adjustable shims facing the flange to secure the cup holder and tray to a
   support.

5. The portable tray of claim 1, further comprising:
   two support bars slidably attached to an underside of the tray wherein the
   two supports have distal ends that extend beyond the periphery of the tray
   surface on opposite sides of the tray surface and the distal end of each support
   comprises an engagement head for attachment of a multi-directional clamp.

6. The portable tray of claim 4, wherein the two support bars are
   independently extendable.

7. The portable tray of claim 1, further comprising:
   a raised edge around the periphery of the tray surface.
8. The portable tray of claim 1, further comprising:
utility hooks on the periphery of the tray surface.

9. The portable tray of claim 1, wherein the flange has a bottom edge
and the recessed portion has a base and the bottom edge of the flange and the
base of the recessed portion are essentially co-planar to support the tray when
placed on a level surface.

10. A portable tray for attachment to a support comprising:
a generally planar tray surface wherein the tray comprises a top surface,
a bottom surface and a periphery;
at least one recessed area in the top of the tray surface dimensioned to
fit a standard beverage container; and
two support bars slidably attached to an underside of the tray wherein the
two supports have distal ends that extend beyond the periphery of the tray
surface on opposite sides of the tray surface and the distal end of each support
comprises an engagement head for attachment of a multi-directional clamp.

11. The portable tray of claim 10, wherein the recessed area is dimensioned
to fit a standard beverage container.

12. The portable tray of claim 10, wherein the two support bars are
independently extendable.

13. The portable tray of claim 10, further comprising, a raised edge around
the periphery of the tray surface.

14. The portable tray of claim 10, further comprising, utility hooks on the
periphery of the tray surface.