A storage tray includes a container having an opening and one or more elastic strips each coupled to the container and traversing the opening of the container. An object placed in the container through the opening is restrained by at least one the elastic strips. The container may be supported by a deformable pad coupled to the underside of the container. Magnetic elements may be use coupled the deformable pad to the container. The storage tray may be used for transporting objects in a vehicle.
STORAGE TRAY WITH MAGNETIC ATTACHMENT

BACKGROUND

[0001] A variety of lap trays are known in the art. Commonly, they are designed for use by a person seated in a bed or in a chair. For people seated in beds, the trays may be supported by the bed using legs attached to the tray. More generally, the trays are supported by the user's legs. These include shaping the underside of the tray to accommodate the user's legs, making the underside compliant, using foam rubber for example, so that the underside compresses to follow the shape of the legs, and making the underside of a bean-bag structure, that is, a flexible bag that contains many separate elements.

[0002] Since a lap tray may not be perfectly horizontal in use, and is subject to movement when the user moves, the upper surface of the tray is often covered with a rubber-like material to reduce the chance of objects slipping on the tray.

[0003] When a lap tray is used in a vehicle, such as an automobile, boat or light aircraft, the movement of a lap tray is greatly increased. In particular, the tray may be subject to sudden vertical movements. A non-slip surface is unable to prevent objects from bouncing off of the tray. Thus, most lap trays are not suited to use in vehicles.

BRIEF DESCRIPTION OF THE FIGURES

[0004] The accompanying figures, in which like reference numerals refer to identical or functionally similar elements throughout the separate views and which together with the detailed description below are incorporated in and form part of the specification, serve to further illustrate various embodiments and to explain various principles and advantages all in accordance with the present invention.

[0005] FIG. 1 is an example storage tray in accordance with some embodiments of the invention.

[0006] FIG. 2 is an example storage tray with a magnetic attachment in accordance with some embodiments of the invention.

[0007] FIGS. 3 and 4 are example storage trays with carrying handles in accordance with some embodiments of the invention.

[0008] FIGS. 5 and 6 show an example storage tray with a collapsible container in accordance with some embodiments of the invention.

[0009] FIGS. 7 and 8 show a system including a storage tray, a bowl and a support pad in accordance with some embodiments of the invention.

[0010] FIGS. 9 and 10 show a further system including a storage tray, a bowl and a support pad in accordance with some embodiments of the invention.

[0011] Skilled artisans will appreciate that elements in the figures are illustrated for simplicity and clarity and have not necessarily been drawn to scale. For example, the dimensions of some of the elements in the figures may be exaggerated relative to other elements to help to improve understanding of embodiments of the present invention.

DETAILED DESCRIPTION

[0012] Before describing in detail embodiments that are in accordance with the present invention, it should be observed that the embodiments reside primarily in combinations of method steps and apparatus components related to a storage tray and its use. Accordingly, the apparatus components and method steps have been represented where appropriate by conventional symbols in the drawings, showing only those specific details that are pertinent to understanding the embodiments of the present invention so as not to obscure the disclosure with details that will be readily apparent to those of ordinary skill in the art having the benefit of the description herein.

[0013] In this document, relational terms such as first and second, top and bottom, and the like may be used solely to distinguish one entity or action from another entity or action without necessarily requiring or implying any actual such relationship or order between such entities or actions. The terms “comprise,” “comprising,” or any other variation thereof, are intended to cover a non-exclusive inclusion, such that a process, method, article, or apparatus that comprises a list of elements does not include only those elements but may include other elements not expressly listed or inherent to such process, method, article, or apparatus. An element preceded by “comprises . . . a” does not, without more constraints, preclude the existence of additional identical elements in the process, method, article, or apparatus that comprises the element.

[0014] FIG. 1 is a diagrammatic representation of a storage tray in accordance with some embodiments. The storage tray 100 includes a container 102 having an opening 104, and one or more elastic strips 106. Each elastic strip 106 is coupled to the container 102 and traverses the opening 104 of the container. In use, one or more objects 108 placed in the container 102 through the opening 104 are restrained by at least one of the elastic strips 106. Placing an object in the container 102 deforms or more of the elastic strips 106, putting the strips into tension. This tension increases the friction between the strips and the object and holds the object in place. The elastic strips 106 may be constructed of a material, such as rubber, that resists slippage. The elastic strips provide sufficient tension to hold objects in place while the container is shaken in a vehicle, but also allow objects to be easily removed by a user.

[0015] The elastic strips may be bands, strips, cords or strings, for example.

[0016] The elastic strips 106 may be movably coupled to the container 102 so as to accommodate objects of differing sizes. For example, in one embodiment an elastic strip is coupled to the container via a hook 110. Other methods of attachment may be used.

[0017] By adjusting the elastic strips, the container may accommodate multiple and various objects. For example, the objects may be cups and/or bowls.

[0018] The container may have various sizes. In one embodiment, the width of the container is selected to accommodate two cups. For example, the width may be approximately 7.5 inches. The container may be sized to accommodate six cups in two rows of three. In a further embodiment, the container may be sized to accommodate a rectangular bowl of a specified width. In this embodiment a lip around the perimeter of the bowl may rest on top of the container sides, so that the bowl is supported by the sides of the container.

[0019] In some embodiments, the storage tray 100 includes a deformable pad 112 coupled to the underside of the container 102. The deformable pad may be permanently coupled to the container 102 or it may be removable coupled to it.
In one embodiment, the deformable pad 112 comprises a flexible bag containing multiple separate elements. The separate elements may be constructed of man-made or natural materials, such as dried beans, foam balls, Styrofoam balls, recycled cardboard balls or paper balls.

In a further embodiment the deformable pad 112 comprises a flexible bag containing a gel.

The deformable pad and the container may be constructed from a water resistant material, such as plastic or vinyl.

The deformable pad 112 provides a degree of vibration isolation between the supporting surface and the container 102.

Handles 114 may be attached to container 102. The attachment points are selected such that the center of gravity on the container (and any objects in it) is within the region defined by the attachment points so that the container may be carried without tipping. In one embodiment, the handles are attached to opposite ends of the container, as shown in FIG. 1. The handles may be constructed of rope or cord, for example, and may swivel at the attachment points.

In one embodiment, the container may have solid walls. In other embodiments the container may have perforated walls or mesh walls.

FIG. 2 shows an embodiment in which the deformable pad 112 is coupled to the container 102 using a first magnetic element 202 coupled to the top surface of the deformable pad 112 and a second magnetic element 204 coupled to the underside of the container 102. The deformable pad 112 is coupled to the underside of the container 102 by magnetic attraction between the first and second magnetic elements. This coupling method prevents the container from being bounced from the pad by movement of the vehicle or movement of a user. In addition, it also allows the container to be removed from the pad for transportation, cleaning, etc.

Either, or both, of the magnetic elements 202 and 204 may comprise rigid or flexible magnets.

In one embodiment, the top surface of the deformable pad 112 has a raised edge 206 around at least a part of its perimeter and the deformable pad 112 and raised edge 206 are sized such that the raised edge 206 encompasses the lower part of the container 102 and thereby restrains lateral motion of the container. In FIG. 2, the raised edge 206 is shown on three sides of the deformable pad 112. However, it should be recognized that pads and containers of other shapes may be used and that the raised edge may be on all edges or only some edges of the pad.

Optionally, the container 102 may have one or more carrying handles. In FIG. 2, the carrying handles comprise holes 114 at each end of the container 102.

The elastic strips 106 may be movably coupled to the container 102 so as to accommodate objects of differing sizes. For example, in one embodiment an elastic strip is coupled to the container via a hook 110. The hooks may be fastened to a lip 210 of the container, so that the hooks can be slid along the lip to vary the gaps between the elastic strips 106.

A hinged flap or ledge 208 may be coupled to one side of the container 102. The hinged flap 208 may be used, for example, to secure the container on the rear seat of an automobile by hooking the flap over a center console of the seat. This further increases the resistance of the container to sliding.

In FIG. 3, the carrying handles 114 comprise lips that may be integral with the walls of container 102. Also shown in FIG. 3 is an optional additional magnetic element 302. One or more optional additional magnetic elements 302 may be used to attach other objects to a side of container 102, provided that the object 306 be attached has a corresponding magnetic element 304 or is itself magnetic. In one embodiment, the object 306 is an external holder for sunglasses, writing implements, or other articles. In a further embodiment, the object 306 is an external holder comprising a ring that supports a bag for trash or the like.

In a further embodiment, shown in FIG. 4, the carrying handles 114 are attached to the sides of the container 102. The handles 114 may be rigid handles connected to opposite sides of the container 102 at pivots 402, of they be flexible handles, such as rope handles. A hand grip 404 may be incorporated to improved comfort for a user. When not in use, the carrying handles may be moved from the carrying position (shown in FIG. 4) to a second position, in which they do not interfere with access to objects in the container 102. The handles may be attached towards the ends of the container, so that the container, and objects within it, may be carried without tilting.

Referring to FIG. 4, the container may be constructed of a perforated material having holes 406. All or some of the surfaces of the container may be perforated. Similarly, the container may be constructed of a mesh, such as a wire mesh.

In one embodiment, the container and the objects it contains, such as food or drink containers, are made of a deformable material. In the event that the container is used in an automobile, deformation of the material would prevent injury to a user in the event of a crash.

The deformable pad 112 may be configured in a ‘saddle’ shape to facilitate the placement of the pad on the user's lap.

FIG. 5 is a diagram of a collapsible storage tray in accordance a further embodiment. The container includes a substantially stiff base 502, a frame 504 that defines the opening 104. The frame 504 may be a wire, wood or plastic frame, for example. The container also includes first and second collapsible walls 506, which are coupled between the frame 504 and the base 502 at opposite sides of the frame 504, and first and second stiff walls that are hinged to the frame 504 at opposite sides of the frame. The collapsible walls 506 may be constructed of a fabric, such as a woven nylon, or a flexible sheet. The first and second stiff walls 508 may be pivoted towards a first position substantially in-plane of the base 502, thereby enabling the container to be collapsed by lowering the frame towards the base. The walls 508 may be pivoted outwards to the second position substantially perpendicular to the base 502 and in contact with the base, thereby extending the first and second collapsible walls 506 into tension and forming the container. The ends of the base may be shaped to restrain the first and second stiff walls 508 when they are in the second position.

FIG. 6 is a further diagram of a collapsible storage tray in accordance a further embodiment. In this embodiment, a flexible pouch 602 is attached, either permanently or removably, to a side of the storage tray. The flexible pouch 602 may be attached to the frame 504 or to a flexible wall 506, for example. Handles 114 may be attached to the frame. In one embodiment, the handles are attached to the corners of the frame. The weight of the container base 502 and any placed
objects in the container extends the collapsible walls 506 and weight is transferred from the walls to the frame 504 and handles 114.

[0039] The storage tray may be used as a lap tray for seated person. In particular, the storage tray may be used as a lap tray for an occupant of a vehicle. The storage tray may be placed on a passenger seat in a vehicle. The deformable tray conforms to the shape of the seat and provides a stable base for the container. The elastic straps hold objects, such as food and drink containers, securely in the tray and prevent spillage. This is in contrast to prior lap trays, which do not have any means for preventing vertical motion of an object relative to the tray. The deformable pad 112 reduces sudden motion of the container by providing a degree of isolation between the container and the seat. This reduces spillage of liquids, such as drinks, held in the container.

[0040] Objects may be secured in the storage tray using a single hand, simply by pressing the object into the opening. No further action is required to secure the object in the container.

[0041] FIGS. 7 and 8 show a system including a storage tray, a bowl and a support pad in accordance with some embodiments of the invention. Referring to FIG. 7, a bowl 702, or other object, includes a magnetic element 704 affixed to the underside of the bowl. The magnetic element allows the bowl to removably held in the storage tray 100 by magnetic attraction between the magnetic element 704 and a magnetic element 706 fixed to the base of the container 102.

[0042] Referring to FIG. 8, the bowl 702 may be removed from the storage tray 100 and placed on a support base 802. The magnetic element 704 on the bowl/702 allows the bowl to be removably held on the support base 802 by magnetic attraction between the magnetic element 704 and a magnetic element 804 fixed to the support base 802. In one embodiment, the support base 802 is deformable pad comprising a flexible bag that contains multiple separate elements. The separate elements may be constructed of man-made or natural materials, such as dried beans, foam balls, Styrofoam balls, recycled cardboard balls or paper balls. The support base may be smaller that the storage tray and may be adapted to be placed on a user’s lap. This enables the user to eat from the bowl while in an automobile, since the support base 802 deforms to the shape of the user’s legs to prevent spillage, and magnetic attraction between the magnetic elements 704 and 804 prevents slippage of the bowl 702 relative to the support base 802. Further, the support base 802 acts as a vibration absorber and reduces the tendency for items to spill from the bowl.

[0043] FIGS. 9 and 10 show a further system including a storage tray, a bowl and a support pad in accordance with some embodiments of the invention. In FIG. 9, the bowl 702 includes a rim or lip 902 along at least two side walls of the top of the bowl 702. The bowl 702 and container 102 are sized such that portions of the lip 902 rest on the top 904 of the side walls of the storage tray 100. In this manner, the bowl 702 is securely supported within the storage tray 100. The depth of the bowl 702 is less than the depth of the storage tray 100.

[0044] Referring to FIG. 10, the bowl 702 may be removed from the storage tray 100 and placed on a support base 802. A magnetic element 704 on the bowl 702 allows the bowl to be removably held on the support base 802 by magnetic attraction between the magnetic element 704 and a magnetic element 804 fixed to the support base 802. In one embodiment, the support base 802 is deformable pad comprising a flexible bag that contains multiple separate elements. The separate elements may be constructed of man-made or natural materials, such as dried beans, foam balls, Styrofoam balls, recycled cardboard balls or paper balls. The support base may be smaller than the storage tray and may be adapted to be placed on a user’s lap. This enables the user to eat from the bowl while in an automobile, since the support base 802 deforms to the shape of the user’s legs to prevent spillage, and magnetic attraction between the magnetic elements 704 and 804 prevents slippage of the bowl 702 relative to the support base 802. Further, the support base 802 acts as a vibration absorber and reduces the tendency for items to spill from the bowl.

[0045] The support base 802 may comprise a deformable pad with a raised or lipped edge to catch spills of food or liquids and to help locate the bowl 702 on the base. In one embodiment, the lateral edges and the edge closest to the user are approximately 1" high, while the edge farthest from the user is approximately 2" high. The raised edge may support one or more pockets 1006 that are sized for holding objects such as cellular telephones, navigation devices, audio players, cutlery, tissues, etc. The pockets 1006 may be constructed of mesh or plastic materials, for example.

[0046] In the foregoing specification, specific embodiments of the present invention have been described. However, one of ordinary skill in the art appreciates that various modifications and changes can be made without departing from the scope of the present invention as set forth in the claims below. Accordingly, the specification and figures are to be regarded in illustrative rather than a restrictive sense, and all such modifications are intended to be included within the scope of the present invention. The benefits, advantages, solutions to problems, and any element(s) that may cause any benefit, advantage, or solution to occur or become more pronounced are not to be construed as a critical, required, or essential features or elements of any or all the claims. The invention is defined solely by the appended claims including any amendments made during the pendency of this application and all equivalents of those claims as issued.

What is claimed is:

1. A storage tray comprising:
   a container having an opening; and
   a plurality of elastic strips, each coupled to the container
   and traversing the opening of the container;
   wherein one or more objects placed in the container through
   the opening are restrained by at least one of the plurality of
   elastic strips.

2. A storage tray in accordance with claim 1, wherein at least
   one of the plurality of elastic strips is movably coupled to
   the container so as to accommodate objects of differing
   sizes.

3. A storage tray in accordance with claim 1, wherein an
   elastic strip of the plurality of elastic strips is coupled to the
   container via a hook.

4. A storage tray in accordance with claim 1, wherein the
   container has lip at the opening and wherein an elastic strip of
   the plurality of elastic strips is coupled to the container via a
   hook that engages the lip and may be slid along the lip to vary
   the spacing between adjacent elastic strips.

5. A storage tray in accordance with claim 1, further comprising:
   a deformable pad coupled to the underside of the container.

6. A storage tray in accordance with claim 5, further comprising:
a first magnetic element coupled to the top surface of the deformable pad; and
a second magnetic element coupled to the underside of the container,
wherein the deformable pad is removably coupled to the underside of the container by magnetic attraction between the first and second magnetic elements.

7. A storage tray in accordance with claim 6, wherein the top surface of the deformable pad has a raised edge around at least part of its perimeter, the deformable pad and raised edge being sized such that the raised edge encompasses the lower part of the container and thereby restraints lateral motion of the container.

8. A storage tray in accordance with claim 6, wherein at least one magnetic element of the first and second magnetic elements comprises a flexible magnet.

9. A storage tray in accordance with claim 4, wherein the deformable pad is saddle shape to facilitate placement on the lap of a user.

10. A storage tray in accordance with claim 4, wherein the deformable pad comprises:
a flexible bag; and
a plurality of separate elements contained within the flexible bag.

11. A storage tray in accordance with claim 4, wherein the deformable pad comprises:
a flexible bag; and
a gel contained within the flexible bag.

12. A storage tray in accordance with claim 1, further comprising at least one carrying handle attached to the container.

13. A storage tray in accordance with claim 12, wherein the at least one carrying handle is movable from a first carrying position to a second position in which it does not interfere with access to objects in the container.

14. A storage tray in accordance with claim 1, further comprising two carrying handles, coupled to the container are opposite sides of the opening.

15. A storage tray in accordance with claim 1, wherein the container comprises:
a base;
a frame that defines the opening;
first and second collapsible walls coupled between the frame and the base at opposite sides of the frame; and
first and second substantially rigid walls, hinged to the frame at opposite sides of the frame,
wherein first and second substantially rigid walls may be pivoted to a first position substantially in the plane of the base, thereby enabling the container to be collapsed, and may be pivoted to a second position substantially perpendicular to the base and in contact with the base, thereby extending the first and second collapsible walls into tension and forming the container.

16. A storage tray in accordance with claim 1, wherein the container is at least partially constructed of perforated material.

17. A storage tray in accordance with claim 1, wherein the container is at least partially constructed of a mesh.

18. A storage tray in accordance with claim 1, further comprising:
a magnetic element attached to a side of the container and configured to removably couple an external holder to the container using magnetic attraction.

19. A storage system comprising:
a first container having an opening;
a plurality of elastic strips, each coupled to the container and traversing the opening of the container, the plurality of elastic strips being positioned to restrain one or more objects placed in the container;
a first deformable pad coupled to the underside of the container;
a second container;
a first magnetic element attached to a side of the first container;
and
a second magnetic element attached to a side of the second container,
wherein the second container is removably coupled to the first container by magnetic attraction between the first and second magnetic elements.

20. A storage system in accordance with claim 19, further comprising:
a third magnetic element coupled to the top surface of the first deformable pad; and
a fourth magnetic element coupled to the underside of the container and
wherein the first deformable pad is coupled to the underside of the container by magnetic attraction between the third and fourth magnetic elements.

21. A storage tray in accordance with claim 19, wherein at least one of the plurality of elastic strips is movably coupled to the container so as to accommodate objects of differing sizes.

22. A storage tray in accordance with claim 19, further comprising:
a second deformable pad; and
a third magnetic element coupled to the upper surface of the deformable pad;
wherein the first magnetic element is attached to the upper surface of the base of the first container and the second magnetic element is attached to the underside of the second container, and
wherein the second magnetic element is adapted to mate with the first magnetic element when the second container is placed in the first container and adapted to mate with the third magnetic element when the second container is placed on the second deformable pad.

23. A storage tray in accordance with claim 19, wherein the second container comprises a bowl.

24. A storage tray in accordance with claim 19, wherein the second deformable pad is sized to fit on the lap of a user.

25. A storage tray in accordance with claim 19, wherein the second deformable pad has a raised edge to catch spills from the second container.

26. A storage tray in accordance with claim 25, wherein the raised edge of the second deformable pad supports one or more pockets.

27. A storage system comprising:
a first container having an opening defined by side walls;
a plurality of elastic strips, each coupled to the container and traversing the opening of the container, the plurality of elastic strips being positioned to restrain one or more objects placed in the container; and
a second container having lip along the tops of two side walls of the second container;
wherein the second container is sized such that the lip of the second container rests on the tops of at least two of the side walls of the first container, enabling the second container to be supported within the first container.