SYSTEM FOR THE COMPARTMENTALIZATION OF OBJECT CARRYING CABINS

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ABSTRACT

Provided are compartmentalization panels for attaching to other compartmentalization panels and forming compartmentalization systems for positioning and compartmentalizing object carrying cabinets, such as drawers and car trunks. A compartmentalization panel includes a support bar having an insert interlocking element on one end and an end slot interlocking element on the other end for engaging with such ends of other panels and extending the length. A compartmentalization panel also includes multiple side slot interlocking elements attached to two opposite sides of the support bar in between the two ends. The side slot interlocking element of one panel is configured to engage with the insert interlocking element of another panel such that the two panels are supported with respect to each other at the right angle. Spaces in between side slot interlocking elements of one module may receive such elements of another module to extend the length of the panels.
SYSTEM FOR THE
COMPARTMENTALIZATION OF OBJECT
CARRYING CABINS

CROSS-REFERENCE TO RELATED
APPLICATIONS


FIELD

[0002] The present invention relates generally to the compartmentalization of panels and systems of interconnected compartmentalization panels for the compartmentalizing of object carrying cabins having a plurality of interlocking panels. More specifically, this invention relates to systems for separating object-carrying cabins into two or more compartments of various adjustable sizes. The object-carrying cabins may include, but are not limited to, a vehicle trunk and a drawer organizer. A modular approach used for compartmentalization panels allows users to easily adjust patterns and sizes of these multiple compartments to best suit the user’s needs.

BACKGROUND

[0003] Cabins used for carrying objects, such as car trunks and drawers, are often much larger than the carried objects, and the objects may move within the cabins during acceleration of the cabinets (e.g., accelerating or stopping a car, opening or closing a drawer). Such movement (for example, during the sudden acceleration of the cabinets) may damage the objects and/or cabinets. While some compartmentalization of cabinets may be provided by positioning a holding net or dividers, previous approaches generally fail short of providing reconfigurable systems that may be installed in various size cabinets. A simple example may help to illustrate the overall problem: an unsecured watermelon or a propane tank in a car trunk is likely to move/roll when the car accelerates, stops, and turns. A watermelon may need a substantially smaller compartment than, for example, a propane tank, while a few golf balls may need a much smaller compartment than the watermelon. It is generally inefficient to have predetermined compartments in a cabin because different types and numbers of objects may be placed into the cabin at different times. At the same time, trunk nets that provide some flexibility are usually still small for many objects (e.g., propane tanks) and, at the same time, too large for other objects (e.g., golf balls).

SUMMARY

[0004] This summary is provided to introduce a selection of concepts in a simplified form that are further described below in the Detailed Description. This summary is not intended to identify key or essential features of the claimed subject matter, nor is it intended to be used as an aid in determining the scope of the claimed subject matter.

[0005] Provided are compartmentalization panels for attaching to other compartmentalization panels and forming compartmentalization systems for positioning and compartmentalizing object carrying cabins, such as drawers and car trunks. A compartmentalization panel includes a support bar having an insert interlocking element on one end and an end slot interlocking element on the other end for engaging to such ends of other panels and extending the length. A compartmentalization panel also includes multiple side slot interlocking elements attached to two opposite sides of the support bar in between the two ends. The side slot interlocking element of one panel is configured to engage with the insert interlocking element of another panel such that the two panels are supported with respect to each other at the right angles. Spaces in between side slot interlocking elements of one module may receive such elements of another module to extend the lengths of the panels.

[0006] In certain embodiments, a compartmentalization panel for attaching to one or more other compartmentalization panels and for the compartmentalizing of object carrying cabinets includes a support bar, an insert interlocking element, and multiple slot interlocking elements, each configured for receiving and interlocking with an insert interlocking element of another compartmentalization panel. The support bar includes a first end, a second end opposite of first end, a first side, and a second side opposite of the first side. The first side and the second side extend between the first end and a second end. The insert interlocking element is attached to the first end of the support bar. The multiple slot interlocking elements include an end slot interlocking element attached to the second end of the support bar, one or more first side slot interlocking elements attached to the first side of the support bar, and one or more second side slot interlocking elements attached to the second side of the support bar.

[0007] In certain embodiments, one or more first side slot interlocking elements include two first side slot interlocking elements such that spacing between the two first side slot interlocking elements forms a slot for receiving a slot interlocking element of another compartmentalization panel. In the same or other embodiments, one or more first side slot interlocking elements include eight first side slot interlocking elements, while one or more second side slot interlocking elements also includes eight side slot interlocking elements. The one or more first side slot interlocking elements are aligned with the one or more second side slot interlocking elements along the length of the support bar extending between the first end and the second end. In other embodiments, the two sets of side slot interlocking elements may be offset with respect to each other.

[0008] In certain embodiments, each of the multiple slot interlocking elements has a rectangular tubular cross-sectional profile. The profile has a partial opening facing away from the support bar and extending between two supporting lips of the slot interlocking elements. In these embodiments, an insert interlocking element may also have a rectangular cross-sectional profile for protruding into the rectangular tubular cross-sectional profile of the multiple slot interlocking elements. The rectangular cross-sectional profile of the insert interlocking element may have a tight fit with respect to the rectangular tubular cross-sectional profile of the multiple slot interlocking elements. The rectangular cross-sectional profile of the insert interlocking element is supported by a neck portion. Specifically, two supporting lips of the rectangular tubular cross-sectional profile of the multiple slot interlocking elements extend into the neck portion of the insert interlocking element. In other embodiments, each of the multiple slot interlocking elements has a round tubular cross-sectional profile allowing the insert interlocking ele-
ment of another compartmentalization panel to engage with one of the multiple slot interlocking elements at a range of angles.

In certain embodiments, multiple slot interlocking elements extend perpendicularly with respect to the support bar such that the centers of the multiple slot interlocking elements are offset with respect to the support bar. The centers of the multiple slot interlocking elements along their lengths may be aligned with respect to a third side of the support bar, which is perpendicular to the first and second sides and extending between the first and second ends. Multiple slot interlocking elements may extend perpendicularly with respect to the support bar and be slidably attached to the support bar.

Also provided are compartmentalization systems for the compartmentalizing of object carrying cabins. In certain embodiments, a compartmentalization system includes a first compartmentalization panel and a second compartmentalization panel. The first panel includes a first support bar having a first insert interlocking element attached to one end of the first support bar and a first end slot interlocking element attached to another end of the first support bar. The second panel includes a second support bar having second side slot interlocking elements attached to two opposite sides of the second bar. The first insert interlocking element is inserted into one of the second side slot interlocking elements to provide support to the first compartmentalization panel with respect to the second compartmentalization panel such that the first support bar is substantially perpendicular to the second support bar.

The compartmentalization system may include a third compartmentalization panel including a third support bar having a third end slot interlocking element engaged with the first insert interlocking element of the first compartmentalization panel to provide support to the first compartmentalization panel with respect to the third compartmentalization panel such that the first compartmentalization panel extends in line with the third compartmentalization panel. In the same or other embodiments, the compartmentalization system includes a third compartmentalization panel including a third support bar having a third side slot interlocking element extending in between the second side slot interlocking elements of the second compartmentalization panel to provide support to the second compartmentalization panel with respect to the third compartmentalization panel such that the first compartmentalization panel extends in line with the third compartmentalization panel. The second slot interlocking elements may extend substantially perpendicular with respect to the second support bar of the second compartmentalization panel, while the third slot interlocking elements may extend substantially perpendicular with respect to the third support bar of the third compartmentalization panel. The centers of the second slot interlocking elements may be offset in one direction with respect to the second support bar of the second compartmentalization panel, while the centers of the third slot interlocking elements may be offset in the opposite direction with respect to the third support bar of the third compartmentalization panel.

The characteristics and utilities of the sample representation described in this summary and the detailed description below are not exclusive. Many additional features and advantages will be apparent to one of ordinary skill when provided with the following drawings, specifications and claims.

**BRIEF DESCRIPTION OF DRAWINGS**

Embodiments are illustrated by way of example and are not limited by the figures of the accompanying drawings, in which like references indicate similar elements and in which:

FIG. 1A is a schematic perspective view of a compartmentalization panel for the compartmentalizing of object carrying cabins, in accordance with an exemplary embodiment.

FIG. 1B is a schematic side view of the compartmentalization panel illustrated in FIG. 1A, in accordance with an exemplary embodiment.

FIG. 2A is an expanded view of an insert interlocking element of the compartmentalization panel illustrated in FIG. 1A, in accordance with an exemplary embodiment.

FIG. 2B is an expanded view of an end slot interlocking element of the compartmentalization panel illustrated in FIG. 1A, in accordance with an exemplary embodiment.

FIG. 3A is a schematic top view of two compartmentalization panels engaged with each other along their lengths to form a combined extended panel, in accordance with an exemplary embodiment.

FIG. 3B is an expanded view of the engagement area of the two compartmentalization panels illustrated in FIG. 3A, in accordance with an exemplary embodiment.

FIG. 4A is a schematic top view of two compartmentalization panels engaged with each other at a right angle, in accordance with an exemplary embodiment.

FIG. 4B is an expanded view of the engagement area of the two compartmentalization panels illustrated in FIG. 4A, in accordance with an exemplary embodiment.

FIG. 5A is a schematic perspective view of two compartmentalization panels prior to engagement with each other, in accordance with an exemplary embodiment.

FIG. 5B is a schematic perspective view of the two compartmentalization panels illustrated in FIG. 5A after engagement with each other, in accordance with an exemplary embodiment.

FIG. 6 is a schematic top view of a compartmentalization system including eight compartmentalization panels engaged with each other at various positions and angles, in accordance with an exemplary embodiment.

**DETAILED DESCRIPTION**

Exemplary embodiments are described. In the following description, for purposes of explanation, numerous specific details are set forth in order to provide a thorough understanding of exemplary embodiments. It will be evident, however, to one skilled in the art, that the present invention may be practiced without these specific details.

In some exemplary embodiments, a compartmentalization system allows for compartmentalizing cabins, such as vehicle trunks, and also provides structure to the vehicle trunks and minimizes the shifting of items in the trunks during travel. The system is adjustable so that the number of compartments and the compartment sizes can be selected by the user. The system can include one or more compartmentalization panels. Each panel includes various slots on both sides and may have one or two locking mechanisms on one or more
ends of the panel. The locking piece of one panel can be inserted into the slot of an intersecting panel. Locking pieces can either form parallel connections or perpendicular connections. A compartmentalization panel includes a support bar having an insert interlocking element on one end and an end slot interlocking element on the other end for engaging to such ends of other panels and extending the length. A compartmentalization panel also includes multiple side slot interlocking elements attached to two opposite sides of the support bar in between the two ends. The side slot interlocking element of one panel is configured to engage with the insert interlocking element of another panel such that the two panels are supported with respect to each other at the right angle. Spaces in between the side slot interlocking elements of one module may receive such elements of another module to extend the panels’ lengths. The addition of more panels allows for more compartmentalization. Additionally, having more slots on both sides of the panels may allow the user more flexibility in determining the number and size of the compartments. Each panel may add to the structure of the organizer and contribute to the added compartmentalization of the trunk. Furthermore, the system may be fully adjustable in length, width, and the number of compartments.

[0027] FIG. 1A is a schematic perspective view of a compartmentalization panel 100 for the compartmentalizing of object carrying cabins, in accordance with an exemplary embodiment. Compartmentalization panel 100 includes a support bar 102 having a first end 103a and a second end 103b opposite of first end 103a in the direction of the length of compartmentalization panel 100 (the Y direction). Support bar 102 also includes two sides that may be parallel to the plane set by the Z and Y directions. The first side is visible in FIG. 1A, while the second side is the opposite of the first side. The first side and second side extend between two ends 103a and 103b. Compartmentalization panel 100 also includes an insert interlocking element 104 attached to first end 103a of support bar 102. Interlocking element 104 is configured to engage with a slot interlocking element of another module and is further described below with reference to FIG. 2A. Compartmentalization panel 100 also includes multiple slot interlocking elements, each configured for engaging (e.g., receiving and/or interlocking) with an insert interlocking element of another compartmentalization panel. One kind of slot interlocking element is an end slot interlocking element 108 attached to second end 103b of support bar 102. Another kind of slot interlocking element is a side slot interlocking element 106. Compartmentalization panel 100 may include two sets of side slot interlocking elements 106 positioned on opposite sides of support bar 102. Specifically, compartmentalization panel 100 may include one or more first side slot interlocking elements attached to the first side of the support bar and one or more second side slot interlocking elements attached to the second side of the support bar. In certain embodiments, each side has eight side slot interlocking elements. However, other numbers of elements may be used depending on the length of compartmentalization panel 100 and the individual sizes of each side slot interlocking element.

[0028] As shown in FIGS. 1A and 1B, side interlocking elements on one side of support bar 102 may be aligned with similar side slot interlocking elements on the other side along the length of support bar 102. In other embodiments, side slot interlocking elements on one side are offset with similar side slot interlocking elements on the other side along the length of support bar 102. For example, side slot interlocking elements on one side may be positioned in between similar side slot interlocking elements on the other side when projected on the same plane.

[0029] FIG. 1B is a schematic side view of compartmentalization panel illustrated in FIG. 1A, in accordance with an exemplary embodiment. As shown, side slot interlocking elements 106 may extend substantially perpendicular to support bar 102. In order to accommodate slidable engagement with side slot interlocking elements 106 of another compartmentalization panel (as further described with reference to FIGS. 5A and 5B), the centers of side slot interlocking elements 106 (along the lengths of the side slot interlocking elements, i.e., the Z direction) are offset with respect to a center axis 107 of support bar 102. As shown in FIG. 1B, the offset results in longer extensions of side slot interlocking elements 106 on one side of support bar 102 (represented by distance D1) than on the other side of support bar 102 (represented by distance D2). In certain embodiments, the offset is such that a combination of the smaller offset D2 and a height of support bar 102 (presented by H) is substantially the same as the larger offset D1. Another way of describing this relationship is that the centers of side slot interlocking elements 106 are aligned with respect to a third side 109 of support bar 102. In certain embodiments, side slot interlocking elements are slidably attached to support bar 102, such that these offsets may vary as needed.

[0030] FIG. 2A is an expanded view of an insert interlocking element 104 of the compartmentalization panel illustrated in FIG. 1A, in accordance with an exemplary embodiment. As shown, interlocking element 104 is attached to one end of support bar 102. Interlocking element 104 may have a rectangular cross-sectional profile 202 supported by a neck portion 204. Rectangular cross-sectional profile 202 is used for engaging with similar profiles of slot interlocking elements of other panels, including end slot interlocking elements and side slot interlocking elements. Rectangular cross-sectional profile 202 allows for maintaining a predetermined angle between these interlocking elements. However, other profiles may be used. For example, a round profile may be used for allowing one panel to swivel with respect to another panel while maintaining support. Such semi-flexible attachments may help to introduce additional configurability into the overall system.

[0031] FIG. 2B is an expanded view of end slot interlocking element 108 of the compartmentalization panel illustrated in FIG. 1A, in accordance with an exemplary embodiment. As shown, end slot interlocking element 108 is attached to another end of support bar 102. End slot interlocking element 108, as well as side slot interlocking elements, may have a rectangular tubular cross-sectional profile 212. Generally, the profile of the insert interlocking element drives the profiles of slot interlocking elements and vice versa. Rectangular tubular cross-sectional profile 212 has a partial opening 216 facing away from support bar 102 and extending between two supporting lips 214. Supporting lips 214 may be configured to extend into the neck portion of the insert interlocking element (element 204 in FIG. 2A). In certain embodiments, the rectangular cross-sectional profile of the insert interlocking element has a tight fit with respect to the rectangular tubular cross-sectional profile of the multiple slot interlocking elements.

[0032] FIG. 3A is a schematic top view of two compartmentalization panels 302a and 302b engaged with each other along their lengths to form a combined extended panel 300, in
accordance with an exemplary embodiment. Since compartmentalization panels 302a and 302b are engaged at their end slot interlocking element and insert interlocking element, combined extended panel 300 is about twice as long as each of the of two compartmentalization panels 302a and 302b. FIG. 3B is an expanded view of the engagement area of the two compartmentalization panels 302a and 302b illustrated in FIG. 3A, in accordance with an exemplary embodiment. Specifically, insert interlocking element 304b of panel 302b is inserted into end slot interlocking element 304b of panel 302b. One having ordinary skills in the art would understand that this arrangement may be continued such that an insert interlocking element of panel 302b and/or end slot interlocking element of panel 302a may be engaged with other modules.

[0033] FIG. 4A is a schematic top view of two compartmentalization panels 402a and 402b engaged with each other at a right angle and forming a corner unit 400, in accordance with an exemplary embodiment. Compartmentalization panel 402a extends in the X direction, while compartmentalization panels 402b extends into the Y direction. FIG. 4B is an expanded view of the engagement area of the two compartmentalization panels 402a and 402b illustrated in FIG. 4A, in accordance with an exemplary embodiment. Specifically, insert interlocking element 404b of panel 402b is inserted into a side slot interlocking element 404a of panel 402a. One having ordinary skills in the art would understand that other arrangements are possible as further shown and described in the context of FIG. 6. For example, additional insert interlocking elements of other panels may be inserted into other side slot interlocking elements of panel 402b, which are provided on the same or different sides of the support bar of this module.

[0034] FIG. 5A is a schematic perspective view of two compartmentalization panels 500a and 500b prior to engagement with each other, in accordance with an exemplary embodiment. Adjacent side slot interlocking elements of the modules are spaced to form slots for receiving side slot interlocking elements of another compartmentalization panel. FIG. 5B is a schematic perspective view of the two compartmentalization panels 500a and 500b illustrated in FIG. 5A after engagement with each other, in accordance with an exemplary embodiment as in 520. Specifically, a slot provided between side slot interlocking elements 504a and 506a of compartmentalization panel 500b is used for receiving side slot interlocking element 504a of compartmentalization panel 500a. Likewise, a slot provided between side slot interlocking elements 504b and 506b of compartmentalization panel 500b is used for receiving side slot interlocking element 504b of compartmentalization panel 500a. In a similar manner, the adjacent side slot interlocking elements of compartmentalization panel 500a form slots for receiving side slot interlocking elements 508a and 508b of compartmentalization panel 500b. Furthermore, support bars 502a and 502b are offset with respect to each other in the Z direction to prevent interference between these bars when compartmentalization panels 500a and 500b are engaged as shown in FIG. 5B.

[0035] FIG. 6 is a schematic top view of a compartmentalization system 600 including eight compartmentalization panels 602-616 engaged with each other at various positions and angles, in accordance with an exemplary embodiment. For example, compartmentalization panel 602 is engaged at a right angle with compartmentalization panels 612 and 604, which in turn are engaged at the right angle with compartmentalization panel 610. Therefore, compartmentalization panels 602, 612, 604, and 610 form one compartment of compartmentalization system 600. Another compartment is formed by compartmentalization panels 604, 606, 608, 614, 616, and 610. Various engagements among compartmentalization panels 602-616 are described above with reference to FIGS. 3A, 3B, 4A, 4B, 5A, and 5B.

What is claimed is:

1. A compartmentalization panel for attaching to one or more other compartmentalization panels and for compartmentalizing of object carrying cabins, the compartmentalization panel comprising:
   a. a support bar comprising a first end, a second end opposite of the first end, a first side, and a second side opposite of the first side, wherein the first side and the second side extend between the first end and the second end;
   b. an insert interlocking element attached to the first end of the support bar; and
   c. multiple slot interlocking elements each configured for receiving and interlocking with an insert interlocking element of another compartmentalization panel, the multiple slot interlocking elements comprising:
      i. an end slot interlocking element attached to the second end of the support bar;
      ii. one or more first side slot interlocking elements attached to the first side of the support bar; and
      iii. one or more second side slot interlocking elements attached to the second side of the support bar.

2. The compartmentalization panel of claim 1, wherein the one or more first side slot interlocking elements comprise two first side slot interlocking elements such that spacing between the two first side slot interlocking elements form a slot for receiving a slot interlocking element of another compartmentalization panel.

3. The compartmentalization panel of claim 1, wherein the one or more first side slot interlocking elements comprise eight first side slot interlocking elements wherein the one or more second side slot interlocking elements comprise eight side slot interlocking elements.

4. The compartmentalization panel of claim 1, wherein the one or more first side slot interlocking elements are aligned with the one or more second side slot interlocking elements along the length of the support bar extending between the first end and the second end.

5. The compartmentalization panel of claim 1, wherein the one or more first side slot interlocking elements are offset with the one or more second side slot interlocking elements along the length of the support bar extending between the first end and the second end.

6. The compartmentalization panel of claim 1, wherein each of the multiple slot interlocking elements has a rectangular cross-sectional profile.

7. The compartmentalization panel of claim 6, wherein the rectangular cross-sectional profile has a partial opening facing away from the support bar and extending between two supporting lips.

8. The compartmentalization panel of claim 7, wherein the insert interlocking element has a rectangular cross-sectional profile for protruding into the rectangular cross-sectional profile of the multiple slot interlocking elements.

9. The compartmentalization panel of claim 8, wherein the rectangular cross-sectional profile of the insert interlocking
element has a tight fit with respect to the rectangular tubular cross-sectional profile of the multiple slot interlocking elements.

10. The compartmentalization panel of claim 8, wherein the rectangular cross-sectional profile of the insert interlocking element is supported by a neck portion; and

wherein the two supporting lips of the rectangular tubular cross-sectional profile of the multiple slot interlocking elements extend into the neck portion of the insert interlocking element.

11. The compartmentalization panel of claim 1, wherein each of the multiple slot interlocking elements has a round tubular cross-sectional profile allowing the insert interlocking element of another compartmentalization panel to engage with one of the multiple slot interlocking elements at a range of angles.

12. The compartmentalization panel of claim 1, wherein the multiple slot interlocking elements extend substantially perpendicular with respect to the support bar.

13. The compartmentalization panel of claim 12, wherein centers of the multiple slot interlocking elements along the lengths of the multiple slot interlocking elements are offset with respect to a center axis of the support bar.

14. The compartmentalization panel of claim 13, wherein the support bar comprises a third side perpendicular to the first side and the second side; and

wherein the centers of the multiple slot interlocking elements are aligned with respect to the third side of the support bar.

15. The compartmentalization panel of claim 1, wherein the multiple slot interlocking elements extend perpendicularly with respect to the support bar and are slidably attached to the support bar.

16. A compartmentalization system for compartmentalizing of object carrying cabins, the compartmentalization system comprising:

a first compartmentalization panel comprising a first support bar having a first insert interlocking element attached to one end of the first support bar and a first end slot interlocking element attached another end of the first support bar; and

a second compartmentalization panel comprising a second support bar having second side slot interlocking elements attached to two opposite sides of the second bar, wherein the first insert interlocking element is inserted into one of the second side slot interlocking elements to provide support to the first compartmentalization panel with respect to the second compartmentalization panel such that the first support bar is substantially perpendicular to the second support bar.

17. The compartmentalization system of claim 16, further comprising a third compartmentalization panel comprising a third support bar having a third insert interlocking element engaged with the first end slot interlocking element of the first compartmentalization panel to provide support to the first compartmentalization panel with respect to the third compartmentalization panel such that the first compartmentalization panel extends in line with the third compartmentalization panel.

18. The compartmentalization system of claim 16, wherein the second slot interlocking elements extend substantially perpendicular with respect to the second support bar of the second compartmentalization panel; and

wherein the third slot interlocking elements extend substantially perpendicular with respect to the third support bar of the third compartmentalization panel.

19. The compartmentalization system of claim 16, wherein centers of the first slot interlocking elements are offset in one direction with respect to the first support bar of the first compartmentalization panel, while centers of the third slot interlocking elements are offset in the opposite direction with respect to the third support bar of the third compartmentalization panel as to allow slide slot interlocking elements of one panel to slide between side slot interlocking elements of another panel and to extend length of the compartmentalization system along the same direction as the support bar of the first panel.

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