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(54) Title: OVERHEAD STOWAGE SYSTEM

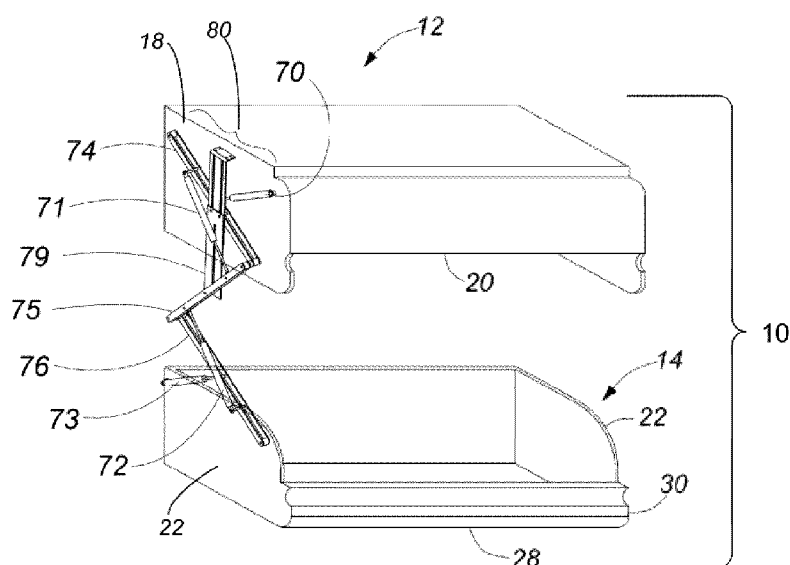


Figure 10B

(57) Abstract: A storage bin comprising a receptacle for receiving items to be stored, a cover fixedly attached to a structure substantially above a floor, the cover abutting the structure on at least one side of the cover, the cover shaped to slidably receive the receptacle so that receptacle is partly enclosed by the cover and forming a cavity between the cover and the receptacle, and a connection and articulating mechanism for connecting the receptacle to the cover and guiding the receptacle downward from the cover an open position and guiding the receptacle upward to the cover a closed position. The storage bin has the capability of being operated manually or electronically via a remote control. Alternatively, the storage bin may also comprise a receptacle frame and a mounting support rather than a receptacle and a cover, respectively.

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OVERHEAD STOWAGE SYSTEM

Field

5 The present disclosure relates to storage bins. In particular, this disclosure relates to storage in small spaces.

Background

As urban density continues to grow in major world centres and the access to consumer goods increases, the demand for storage is compounded. Floor and wall space are limited in housing such as condominiums and apartments.

10 Standalone housing provides little in the way of storage space for accumulated family items over the years. Rooms such as the family room, living room, and dining rooms are rarely outfitted with storage areas. Even in rooms which traditionally have cabinets, (such as kitchens, bathrooms, laundry rooms, and garages), lack of sufficient shelving or closets is often a common complaint from homeowners. In cases of families, there is also a desire to
15 have storage that is not easily reached or accessed by young children for items such as prescription medications and pharmaceutical necessities.

Storage in manufacturing settings is also often limited, especially in the multi-part assembly industries such as surface mount technology manufacturers. Fixed storage racks and shelves are costly and take up valuable real estate on manufacturing plant floors.

20 Office space is also often at a premium with many offices now being open-concept and having minimal furniture, such as shared workspaces. Storage for personal items in such environments is rarely available.

The background herein is included solely to explain the context of the disclosure. This is not to be taken as an admission that any of the material referred to was published,
25 known, or part of the common general knowledge as of the priority date.

Summary

In accordance with an aspect, there is provided a storage bin comprising a receptacle for receiving items to be stored; a cover fixedly attached to a structure substantially above a floor, the cover abutting the structure on at least one side of the cover,
30 the cover shaped to slidably receive the receptacle so that receptacle is partly enclosed by the cover and forming a cavity between the cover and the receptacle; and a connection and articulating mechanism for connecting the receptacle to the cover and guiding the receptacle from the cover in a downward motion to an open position and guiding the receptacle to the cover in an upward motion to a closed position.

35 In accordance with an aspect, there is provided a storage bin comprising: a receptacle frame for receiving items to be stored; a mounting support fixedly attached to a

structure substantially above a floor, the mounting support shaped to receive the receptacle frame; and a connection and articulating mechanism for connecting the receptacle to the cover and guiding the receptacle downward from the cover mounting support in a downward to an open accessible position and guiding the receptacle upward to the cover mounting support in an upward to a closed stored position.

It is understood that one or more of the aspects described herein (and above) may be combined in any suitable manner. The novel features of the present disclosure will become apparent to those of skill in the art upon examination of the following detailed description. It should be understood, however, that the detailed description and the specific examples presented, while indicating certain aspects, are provided for illustration purposes only because various changes and modifications will become apparent to those of skill in the art from the detailed description and claims that follow.

Brief Description of the Drawings

The present disclosure will be further understood from the following description with reference to the Figures, in which:

Figure 1A shows a perspective view of the storage bin of Figure 1 in the closed position.

Figure 1B shows a perspective view of the storage bin of Figure 1 as it is being opened and in the fully opened position.

Figure 2 shows a perspective exploded view of the upper cover and the lower receptacle.

Figure 3 shows a cross-sectional view of an exemplary storage bin installed in a room, and showing the storage bin positioned in a closed, as it is being opened, and once it is fully opened configuration.

Figure 4A shows a perspective view of the storage bin of Figure 1 in the open position showing an exemplary connection and articulating mechanism.

Figure 4B shows a perspective view of the storage bin of Figure 4A in the open position showing another embodiment of the connection and articulating mechanism.

Figure 5A shows a perspective view of the storage bin of Figure 1 in the closed position showing an alternative connection and articulating mechanism.

Figure 5B shows a perspective view of the storage bin of Figure 1 in the open position showing the alternative connection and articulating mechanism of Figure 5A.

Figure 6A shows a side view of the storage bin of Figure 1 in the closed position showing an alternative connection and articulating mechanism.

Figure 6B shows a perspective view of the storage bin of Figure 1 in the closed position showing the alternative connection and articulating mechanism of Figure 6A.

5 Figure 7A shows a perspective view of the storage bin of Figure 1 in the closed position showing an alternative connection and articulating mechanism.

Figure 7B shows a perspective view of the storage bin of Figure 1 as it is being opened showing the alternative connection and articulating mechanism of Figure 7A.

10 Figure 8 shows a perspective view of another embodiment of the storage bin in the fully opened position.

Figure 9 shows a cross-sectional view of the storage bin of Figure 8 installed in a room, and showing the storage bin positioned in a closed and fully opened configuration.

Figure 10A shows a perspective view of the storage bin of Figure 8 in the closed position showing an exemplary connection and articulating mechanism.

15 Figure 10B shows a perspective view of the storage bin of Figure 8 as it is being opened showing the exemplary connection and articulating mechanism of Figure 10A.

Figure 11 shows a perspective view of an alternative embodiment of the storage bin with an alternative connection and articulating mechanism.

20 Figure 12 shows a perspective view of a mounting support for the storage bin of Figure 11.

Figure 13 shows a perspective view of a receptacle frame for the storage bin of Figure 11.

Figure 14 shows a perspective view of the connection and articulating mechanism of Figure 11.

25

Detailed Description of Certain Aspects

Turning now to the figures, an exemplary storage bin 10 is shown in Figure 1A and 1B. Figure 1A shows the storage bin 10 in the closed position. Figure 1B shows the storage bin 10 of Figure 1A as it is being opened and when it is fully opened. Figure 2 is an exploded view of the storage bin 10 of Figures 1A and 1B.

Cover 12 has a top 16, side walls 18, and front portion 20. The cover may have a back wall (not shown) or may be open at the back. Receptacle 14 has side walls 22, back wall 24, bottom 26, and front portion 28 forming a bin, bucket, or deep tray shape. Front

portion 28 may be shaped to have form a handle 30. Receptacle 14 is sized to fit slidably within cover 12 when in the closed position and form a completely enclosed cavity within the storage bin 10. While, figures 1A, 1B, and 2, are depicting one example of a cover 12 and receptacle 14, it is not meant to be limiting to any particular shape of cover and receptacle.

5 Other shapes of cover 12 and receptacle 14 are possible. Additionally, the storage bin 10 may be of any size and dimensions may be typically dependent on the items to be stored as well as the location where the storage bin 10 will be installed.

10 In the closed position of Figure 1A, the side walls 18 of cover 12 enclose over the side walls 22 of the receptacle 14. If the cover 12 has a back wall (not shown) it may also enclose over the back wall 28 of the receptacle 14 when the storage bin 10 is in the closed position.

15 In this embodiment, front portion 34 of the receptacle 14 abuts front portion 26 of the cover 12. The underside of the bottom 32 of receptacle 14 is exposed when in the closed position. If the top cover 12 does not have a back portion, then the back portion 28 of the receptacle 14 is also exposed. As the receptacle 14 moves away from the cover 12 to an open position, as depicted in Figure 1B, the internal cavity of the receptacle 14 becomes exposed.

20 Figure 3 shows an example of how the storage bin may be installed. Figure 3 is a cross section of a room in which the storage bin 10 is installed. Cover 12 of storage bin 10 may be attached to the ceiling 32 above the floor 36 of a room by screws or other attachment means. Cover 12 may have holes to accommodate screws (not shown) in the top 16. Cover 12 may be attached to a wall 34 if cover 12 has a back wall (not shown), which may have holes to accommodate screws or other attachment means. Receptacle 14 is shaped to slideably fit within the cover 12 and form an enclosed box shape when the bin is closed. As shown in Figure 3, cover 12 is fixed to the ceiling or wall and receptacle 14 translates therefrom to an open or closed position.

While Figures 1B and 3 show the receptacle tray tilting downward as it moves from a closed to open position (and vice versa), it will be understood by those skilled in the art that the receptacle tray may move without tilting.

30 Figure 4A shows the storage bin 10 in an open position with cut-away portions to show an exemplary connection and articulating mechanism 38 of the storage bin 10. In this embodiment, the connection and articulating mechanism 38 is a telescopic track 40 and a lift assist 46 on shaft 50. The connection and articulating mechanism 38 may be operated manually or electronically with the addition of a motor, such as a servo motor (not shown) to open and close the storage bin 10 via the lift assist 46. In one example, when operated manually, the front portion 28 of the receptacle 14 is pulled down from the upper cover 12. The receptacle 14 may be pulled down by the handle 30 if the receptacle 14 provides one.

When operated electronically, for example, the servo motor may be hardwired to the electrical system of the building or may be battery-operated. In this example, the front portion may be pushed up or inwards to activate the connection and articulating mechanism 38. Alternatively, a remote control and sensor (not shown) may be used to control the connection and articulating mechanism 38. In another alternative, the storage bin may have a button on the outside of the top cover or receptacle to activate the connection and articulating mechanism 38. In yet another alternative embodiment, an activating button may be remotely located such as a nearby wall or within furniture that activates the connection and articulating mechanism 38.

In this embodiment, a track 40 is attached to the inner of side walls 18 of cover 12. The track 40 may include a linear track formed of nested planar sheet metal lengths with ball bearings interposed between the lengths to allow smooth movement relative to each other, (not shown). The nested or telescopic slide 42 at the lower end of the track is attached to the outer of side wall 22 of receptacle 14. Thus, as the storage bin 10 opens (i.e. the receptacle moves downward) the nested slide 42 of track 40 slide freely relative to each other.

The receptacle 14 may translate forward, away from the cover 12 as the storage bin 10 is opened. This allows for large or bulky items to be placed into or removed from the receptacle 14 without obstacle. The track 40 may be inclined at an angle to allow the forward translation of the receptacle 14. Likewise, as the storage bin is closed, the receptacle 14 may translate backward toward the cover 12. In another embodiment, the receptacle 14 may translate straight downwards as the storage bin 10 is opened, and straight upward as the storage bin is closed.

In an alternative embodiment, the lift assist 46 and servo motor may be replaced with a dampener or rotary gas dampener.

In another embodiment of Figure 4A shown in Figure 4B, a cable 41 runs through track 40 connecting to nested slide 42 at a first end. The cable 41 connects to a rotating spool 43. Spool 43 is connected to a shaft 50 which is rotated by a dampener or a rotary gas dampener 45 which may be rotated by a motor, such as a servo motor (not shown). The rotation created by the servo motor retracts the cable 41, causing the nested slide 42 to retract into track 40.

The downward motion of the receptacle may be slowed by the dampener 45, one end of which is attached pivotably to the inner of side wall 18 of cover 12, and an opposite end attached pivotably to the outer of side wall 22 of the receptacle 14. Thus, when the bin is closed, the dampener 45 is substantially (or nearly) horizontal. In some embodiments the dampener 45 may have a spring-loaded or pneumatic strut (not shown).

To close the bin, force may be applied to move the dampener 45 clockwise so that the strut is no longer parallel to the longitudinal axis of the dampener 45. The strut in turn

supplies a force that assists in pivoting the link dampener in a clockwise direction, i.e., assists in closing the bin. Therefore, when the storage bin is full, the strut reduces the amount of force that must be applied physically to close it.

In an alternative embodiment, the dampener 45 may be replaced with a lift assist and
5 a motor, such as a servo motor.

Figures 5A and 5B show an embodiment of the storage bin 10 with an alternative arrangement for the connection and articulating mechanism 38 when the storage bin 10 is in the closed and open positions respectively. Although one side of the storage bin 10 is shown in this example and the description refers to the arrangement in the singular, it is understood
10 that the other side of the storage bin has the same arrangement. In this example, the connection and articulating mechanism 38 may consist of articulating arms 54 and 56. A first articulating arm 54 is pivotably attached to an attachment point 55 on the inner side wall 18 of cover 12 at one end and pivotably attached to one end of the second articulating arm 56. The other end of the second articulating arm 56 is pivotably attached to an attachment point
15 57 on the outer side wall 22 of the receptacle 14. The point at which first articulating arm 54 and second articulating arm 56 are attached form a pivot point 58. When the storage bin is opened, the arms 54, 56 pivot at the attachment points 55, 57 respectively and around the pivot point 58 to straighten the arms and move the receptacle 14 forward and downward as shown in Figure 5B. Likewise, when the receptacle moves upward, the receptacle will also
20 move backward. The arms may be attached to gears and a motor, such as a servo motor (not shown) to provide the ability to open and close the bin electronically through an actuating button (not shown) on the storage bin or a remote control (not shown) or other through any other means of electronically controlling the servo motor.

Figures 6A and 6B an embodiment of the storage bin 10 with an alternative
25 arrangement for the connection and articulating mechanism 38 when the storage bin 10. Although one side of the storage bin 10 is shown in this example and the description refers to the arrangement in the singular, it is understood that the other side of the storage bin has the same arrangement. In this embodiment, the connection and articulating mechanism is a series of gears 60 attached to the outer side walls 22 of receptacle 14. The gears 60 engage
30 a drive gear 62 and a toothed track 64 to move the receptacle 14 along the tooth tracked 64 when the drive gear 62 is activated by a servo motor or other means of powering the drive. This connection and articulating mechanism 38 provides the ability to open and close the bin electronically through an actuating button (not shown) on the storage bin or a remote control (not shown) or other through any other means of electronically controlling the servo motor.

35 Figure 7A and 7B show an embodiment of the storage bin 10 with an alternative arrangement for the connection and articulating mechanism 38 when the storage bin 10 is in the closed and open positions respectively. Although one side of the storage bin 10 is shown

in this example and the description refers to the arrangement in the singular, it is understood that the other side of the storage bin has the same arrangement. In this embodiment, the connection and articulating mechanism 38 is a combination of pneumatic struts 70, 72 and pivotable mechanical arms 74, 76, 78. The following arrangement of the pneumatic struts 70, 72, and mechanical arms 74, 76, 78 is one example and many other arrangements may be possible that may have more or less arms and struts. Pneumatic struts 70, 72 are arranged opposite one another on bracket 73. First end of pneumatic strut 70 is attached to a first end of bracket 73. Second end of pneumatic strut 70 is pivotably attached a first end of mechanical arm 74. First end of pneumatic strut 72 is attached at second end bracket 73. Second end of pneumatic strut 72 is attached pivotably to first end of mechanical arm 76. Mechanical arm 74 is pivotably attached at second end to the inner side wall 18 of cover 12. Mechanical arm 76 is pivotably attached at a second end to a midpoint of mechanical arm 78. Mechanical arm 78 is pivotably attached at a first end to the second end of bracket 73. Mechanical arm 78 is pivotably attached at a second end to the outer wall 22 of the receptacle 14. When the bin is activated to open, pneumatic struts 70, 72 are induced to contract either by the action of opening the bin or by the weight within the bin. This causes mechanical arms 73, 74, 76, and 78 to pivot at each end around their attachment points respectively causing the translation of the receptacle downward and forward. The connection and articulating mechanism 38 may be operated manually to open and close the storage bin 10. In one example, when operated manually, the front portion 28 of the receptacle 14 is pulled down and away from the upper cover 12. The receptacle 14 may be pulled down by the handle 30 if the front portion 28 of the receptacle 14 provides one.

In the embodiments shown in Figures 5A to 7B, the downward motion of the receptacle may be slowed by a dampener (not shown), one end of which is attached pivotably to the inner of side wall 18 of cover 12, and an opposite end attached pivotably to the outer of side wall 22 of the receptacle 14. Thus, when the bin is closed, the dampener is substantially (or nearly) horizontal. Dampener may have a spring-loaded or pneumatic strut (not shown).

To close the bin, force may be applied to move the dampener clockwise so that the strut is no longer parallel to the longitudinal axis of the dampener. The strut in turn supplies a force that assists in pivoting the link dampener in a clockwise direction, i.e., assists in closing the bin. Therefore, when the storage bin is full, the strut reduces the amount of force that must be applied physically to close it.

In the embodiment shown in Figure 4A and 4B a rotary dampener, separate from the lift assist 45 may be employed to slow the movement of the spool 43.

Figure 8 shows an embodiment of the storage bin 10 in the open position where the receptacle 14 translates in a straight downward motion from the cover 12. Figure 9 shows an

example of the storage bin of Figure 8 installed in a room, and translating in a straight downward motion to an open position.

Figures 10A and 10B show the alternative arrangement for the connection and articulating mechanism 80 for the storage bin of Figure 8 to translate in a straight downward motion. Figure 10A shows the storage bin 10 in a closed position. Figure 10B shows the storage bin 10 in an open position. Although one side of the storage bin 10 is shown in this example and the description refers to the arrangement in the singular, it is understood that the other side of the storage bin has the same arrangement. In this embodiment, the connection and articulating mechanism 80 is a combination of pull-type pneumatic struts 70, 71, 72, 73, vertical travel guide bracket 79 and pivotable linkages 74, 75, 76. The following arrangement of the pneumatic struts 70, 71, 72, 73, vertical travel bracket 79, and linkages 74, 75, 76 is one example and many other arrangements may be possible that may have more or less arms and struts. Pneumatic struts 70, 71 are each pivotably attached at one end to fixed mounting points on linkage 74. The other end of pneumatic strut 70 is pivotably attached to the inside side wall 18 of cover 12. The other end of pneumatic strut 71 is pivotably attached to a fixed mounting point on linkage 75. Pneumatic struts 72, 73 are each pivotably attached at one end to fixed mounting points on linkage 76. The other end of pneumatic strut 73 is pivotably attached to the outer side wall 22 of the receptacle 14. The other end of pneumatic strut 72 is pivotably attached to a fixed mounting point on linkage 75. Linkage 74 is pivotably attached at one end to the inside of cover 12. Linkage 75 is pivotably attached at one end to the other end of linkage 74, and at the other end pivotably attached to one end of linkage 76. Linkage 76 is pivotably attached at the other end to the outer wall 22 of the receptacle 14.

When the bin is activated to open, pull-type pneumatic struts 70, 71, 72, 73 are extended by the action of unlatching and pulling down the bin combined with the weight within the bin. This causes linkages 74, 75, and 76 to pivot at each end around their attachment points respectively causing the translation of the receptacle in a downward direction. Vertical travel bracket 79 guides a pin attached to the center of linkage 75 to ensure symmetrical linkage deployment. The receptacle 14 may be pulled down by the handle 30 if the front portion 28 of the receptacle 14 provides one. The opening sequence of the storage bin 10 may be dampened by additional cylinders attached to or built into the pneumatic struts.

When the bin is permitted to close, the pull-type pneumatic struts 70, 71, 72, 73 will retract. This may be done by disengaging a braking mechanism (not shown, but described below), or the user releasing their hold on the bin. Vertical travel bracket 79 follows the ascent of mechanical arm 75 as the linkages pivot at each end around their attachment points respectively causing the translation of the receptacle in an upward direction until the

linkages are fully retracted. The closing sequence of the storage bin 10 may be dampened by additional cylinders attached to or built into the pneumatic struts.

In some embodiments, the storage bin 10 may be made from, but is not limited to plastic or recycled plastics. The plastics may be UV resistant, fire retardant, and thermally protective. The finish on the exposed sides of the storage bin 10 may have different color finishes or may be decoratable by the user or owner.

Figure 11 shows an alternative embodiment of the storage bin 100. In this embodiment, storage bin 100 comprises a mounting support 102, a receptacle frame 104, and a connection and articulating mechanism 106.

Figure 12 shows the mounting support 102 in more detail. In this embodiment, the mounting support has wall bracket 108 which, when placed against a wall, may be used to attach the mounting support 102 to that wall via screws or nails (not shown) in slots provided in the wall bracket 108 or by any other attachment means. The wall bracket 108 may be connected to two ceiling brackets 110 that extend from each end of the wall bracket 108. The ceiling brackets 110 may be substantially triangular in shape having a flat top surface 112 for engaging with and attaching to a ceiling. The flat top surface 112 of each ceiling bracket 110 may be provided with slots for accommodating screws or nails (not shown) to attach the mounting support 102 to the ceiling. The mounting support 102 may be attached to only a wall via the wall bracket 108. The mounting support 102 may be attached to only a ceiling via the ceiling brackets 110. The mounting support 102 may also be attached to both a wall and a ceiling via both the wall bracket 108 and the ceiling brackets 110. It is understood that while one shape of mounting support 102 is shown, that other shapes may be possible to attach the support to a wall and/or ceiling. The mounting support 102 may be made from sheet metal, such as aluminum or steel or any suitable metal. In some embodiments, the mounting support 102 may be made from plastic.

Figure 13 shows a receptacle frame 104. In this embodiment, the receptacle frame is substantially cuboid shaped. The receptacle frame 104 has a top 113, a bottom 114, two sides 116, and a back 118. The sides 116 and the back 118 are connected to the edges of the top 113 and bottom 114.

In this embodiment, the bottom 114 may be a solid, flat, substantially rectangular segment for receiving and holding storage items. The top 113 may comprise a rectangular border 120, which connect to the sides 116 and back 118. The rectangular border 120 may have crossbars 122 within the center opening of the border 120. The crossbars 122 reduce the weight of the receptacle frame in comparison to a solid segment while also providing rigidity for the overall receptacle frame 104. The sides 116 and back 118 are substantially rectangular with a plurality of openings or cutaways. The receptacle frame 104 is open at its front to access any contents placed within the receptacle frame, but may be shaped or

arranged to receive a door (not shown), a drawer (not shown) or a storage box (not shown). Alternatively, the front opening may be shaped to form a bottom lip, extending upwards from the bottom 114 to prevent items placed within the receptacle frame from falling out. The receptacle frame 104 may be made from sheet metal such as aluminum or steel or any
5 suitable metal. In some embodiments, the receptacle frame 104 may also be made from plastic or recycled plastic.

The brackets 108, 110 of the mounting support 102 and the frame-like nature of the receptacle frame 104 allow for the attachment and interchangeability of decorative housing or paneling (not shown) by a user to the outside of the mounting support and receptacle
10 frame 104. The housing or paneling may allow for the storage bin 100 to be any color or texture the user may prefer.

Figure 14 shows an alternative embodiment of connection and articulating mechanism 106. This embodiment of the connection and articulating mechanism 106 may be used on the storage bin 10 of Figure 1 as well as the storage bin 100 as depicted in
15 Figure 11. At least two of the connection and articulating mechanisms 106 are used on each side of the storage bins 10, 110. Like the connection and articulating mechanism 38 of Figures 4A and 4B, connection and articulating mechanism 106 also uses a cable 124 and track created by a plurality of linkages 126 and pulleys 128. The linkages 126 and pulleys 128 may be arranged between a top connector 132 and a bottom connector 134. The top
20 connector 132 attaches to the ceiling brackets 112 on the underside of one of the flat top surfaces 112 of the mounting support 102. The bottom connector 134 attaches to the receptacle frame. In an alternate embodiment, the linkages 126 may connect directly to the mounting support and receptacle frames without the top and bottom connectors. While
Figure 14 shows a particular number and arrangement of linkages and pulleys, it is
25 understood that any number and arrangement of pulleys is possible to affect the connection and articulation of the storage bin.

The cable 124 connects to a rotating spool (not shown), in Figure 11. Spool may be attached to axle 130 and may be connected to a motor, such as a servo motor (not shown) for rotating and winding the cable onto or from the spool. The rotation created by the servo
30 motor retracts the cable 124, causing the linkages 126 to be pulled together.

For embodiments of the storage bin 10 or storage bin 100 that are controlled electronically, for example by a servo motor, the storage bin may have the appropriate electronic circuitry to allow it to be hard-wired into the buildings electrical system or so that the storage bin may be operated wirelessly through remote control. In the case where the
35 storage bin 10, 100 is operated wirelessly, the servo motor may be powered by battery. In the example where the storage bin 10, 100 is controlled by remotely, via an app on a mobile device that utilizes Bluetooth™ signals between the mobile device and a Bluetooth™ sensor

on the storage bin 10, 100. Alternatively, the storage bin 10, 100 may be controlled by remote control, such that the remote control may utilize radio frequency between the remote control and a receiver on the storage bin 10. Alternatively, the mobile device may operate the storage bin through a Wi-Fi network that both the mobile device and storage bin are
5 connected to. In this case, the storage bin would be outfitted with suitable Wi-Fi network connection.

In some embodiments, the storage bin 10, 100 will have a locking mechanism. When the locking mechanism is engaged, the storage bin 10, 100 cannot be opened. The storage bin 10, 100 will not be openable until the locking mechanism is disengaged. The locking
10 mechanism may be engaged manually through a device, button or other actuating mechanism on the storage bin 10, 100. The locking mechanism may be engaged electronically by remote control or a mobile device application. The locking mechanism may be disengaged by a code entered either remotely by remote control, mobile application, or manually via a keypad affixed to the surface of the storage bin 10, 100. Such locking
15 mechanisms are useful for the protection of personal items from theft or to keep dangerous items from becoming accessible. In addition to a locking mechanism, some embodiments of the storage bin 10, 100 may provide armored cover 12 and receptacle 14 for the storage of items such as firearms or to ensure protection from destruction by fire.

In some embodiments, the storage bin 10, 100 may offer a braking mechanism. The
20 braking mechanism may be used to halt the travel of the storage bin 10, 100 as it moves up or down. The braking system may be engaged and disengaged manually using a device, button or other actuating mechanism on the storage bin 10, 100. The braking mechanism may be engaged and disengaged electronically by remote control or a mobile device application. The braking system may be set to halt the vertical travel at a custom height each
25 time it is used to avoid a collision between the receptacle 14 and surrounding equipment or furniture. Such braking mechanisms are useful for accessing bin contents at a desired height or simply to pause the movement.

In some embodiments, the storage bin 10, 100 may offer lighting systems. This lighting system may be installed within the underside of the bottom 26 of the receptacle 14 to
30 illuminate areas directly below the storage bin 10, 100. A lighting system may also be installed on the underside of top panel 16 to illuminate the contents of storage bin 10 or along the top frame of the receptacle frame 104 of storage bin 100. The lighting system may be LED lighting and offer the ability to change color or adjust the brightness. The lighting system may be controlled manually on the storage bin 10, 100 or through a remote control or
35 mobile device application. In some embodiments, the storage bin 10, 100 may offer a sound system.

In some embodiments, the storage bin 10, 100 may offer a display. The display may be part of an entertainment system such as a television or remote screen or monitor. The display may show a log of the items contained within the storage bin 10, 100.

In some embodiments, the storage bin 10, 100 will have an interior cavity shaped with fittings to accept storage accessories such as shoe racks, hooks, and shelving to keep items within organized and separated. In some embodiments, the storage bin 10, 100 may be outfitted with a refrigeration unit to keep chilled or frozen food storage. In this case where the contents are refrigerated, storage bin 100 would have a door or other such cover to cover the opening.

Unless otherwise explained, all technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this disclosure belongs. Although any methods and materials similar or equivalent to those described herein can be used in the practice for testing, the typical materials and methods are described herein.

It is also to be understood that the terminology used herein is for the purpose of describing particular aspects only and is not intended to be limiting. Patent applications, patents, and publications are cited herein to assist in understanding the aspects described. All such references cited herein are incorporated herein by reference in their entirety and for all purposes to the same extent as if each individual publication or patent or patent application was specifically and individually indicated to be incorporated by reference in its entirety for all purposes. To the extent publications and patents or patent applications incorporated by reference contradict the disclosure contained in the specification, the specification is intended to supersede and/or take precedence over any such contradictory material.

In understanding the scope of the present application, the articles “a”, “an”, “the”, and “said” are intended to mean that there are one or more of the elements. Additionally, the term “comprising” and its derivatives, as used herein, are intended to be open ended terms that specify the presence of the stated features, elements, components, groups, integers, and/or steps, but do not exclude the presence of other unstated features, elements, components, groups, integers and/or steps. The foregoing also applies to words having similar meanings such as the terms, “including”, “having” and their derivatives.

It will be understood that any aspects described as “comprising” certain components may also “consist of” or “consist essentially of,” wherein “consisting of” has a closed-ended or restrictive meaning and “consisting essentially of” means including the components specified but excluding other components except for materials present as impurities, unavoidable materials present as a result of processes used to provide the components, and components added for a purpose other than achieving the technical effect as disclosed. For

example, a composition defined using the phrase “consisting essentially of” encompasses any known acceptable additive, excipient, diluent, carrier, and the like.

It will be understood that any component defined herein as being included may be explicitly excluded by way of proviso or negative limitation.

5 In addition, all ranges given herein include the end of the ranges and also any intermediate range points, whether explicitly stated or not.

Terms of degree such as “substantially”, “about” and “approximately” as used herein mean a reasonable amount of deviation of the modified term such that the end result is not significantly changed. These terms of degree should be construed as including a deviation of
10 at least $\pm 5\%$ of the modified term if this deviation would not negate the meaning of the word it modifies.

The abbreviation, “e.g.” is derived from the Latin *exempli gratia*, and is used herein to indicate a non-limiting example. Thus, the abbreviation “e.g.” is synonymous with the term “for example.” The word “or” is intended to include “and” unless the context clearly indicates
15 otherwise.

It is further to be understood that all molecular weight or molecular mass values, are approximate and are provided for description. Although methods and materials similar or equivalent to those described herein can be used in the practice or testing of this disclosure, suitable methods and materials are described below.

20

WHAT IS CLAIMED IS:

1. A storage bin comprising:

a receptacle for receiving items to be stored;

5 a cover fixedly attached to a structure substantially above a floor, the cover abutting the structure on at least one side of the cover, the cover shaped to slidably receive the receptacle so that receptacle is partly enclosed by the cover and forming a cavity between the cover and the receptacle; and

10 a connection and articulating mechanism for connecting the receptacle to the cover and guiding the receptacle downward from the cover to an open position and guiding the receptacle upward to the cover to a closed position.

2. The storage bin of claim 1, wherein the connection and articulating mechanism is a combination of mechanical linkages and pneumatic struts arranged to connect the
15 receptacle to the cover and causing the receptacle to move downward when the pneumatic struts are extended and upward when the pneumatic struts are retracted.

3. The storage bin of claim 1, wherein the connection and articulating mechanism is a combination of mechanical linkages and pulleys arranged to connect the receptacle to the
20 cover.

4. The storage bin of claim 3, wherein the linkages and pulleys convey a cable, the cable connected to a spool and causing the receptacle to move downward when the cable is unwound from around the spool, and causing the receptacle to move upward when the cable
25 is wound around the spool.

5. The storage bin of claim 4, wherein the cable is wound or unwound from the spool via a motor.

30 6. The storage bin of claim 5, wherein the motor is a servo motor.

7. The storage bin of claim 1, wherein the connection and articulating mechanism is a track with a telescopic slide, the track pivotably connected to the cover and the telescopic slide nested within the track and connected to the receptacle.

5 8. The storage bin of claim 1, wherein the connection and articulating mechanism is a series of articulating arms connecting the cover to the receptacle, the articulating arms driven by a motor to move the receptacle downward or upward.

9. The storage bin of claim 1, wherein the connection and articulating mechanism is a
10 series of gears engaging one another, a first gear of the series of gears is a drive gear and is rotatably attached to the receptacle, a second gear of the series of gears engaging a toothed track on the cover, the drive gear driven by a motor to rotate the gears causing the receptacle to move downward or upward.

15 10. The storage bin of any one of claims 1 to 9, wherein the downward motion is slowed by a dampener.

11. The storage bin of any one of claims 1 to 10, wherein the connection and articulating mechanism is electronically activated.

20

12. The storage bin of claim 11, wherein the connection and articulating mechanism is activated by a remote control.

13. The storage bin of claim 12, wherein the remote control is a mobile application on a
25 mobile device, the mobile application communicating with a sensor on the storage bin to activate the connection and articulating mechanism.

14. The storage bin of claim 12, wherein the remote control is a radio frequency
30 transmitter able to communicate with a receiver on the storage bin to activate the connection and articulating mechanism.

15. The storage bin of any one of claims 1 to 14, wherein the structure is a ceiling.

16. The storage bin of any one of claims 1 to 14, wherein the structure is a wall.

5 17. The storage bin of any one of claims 1 to 14, wherein the structure is a ceiling and a wall.

18. The storage bin of any one of claims 1 to 17, wherein the cover and the receptacle are made from plastic, recycled plastic, sheet metal or a combination thereof.

10 19. The storage bin of any one of claims 1 to 18, wherein the storage bin is refrigerated.

20. The storage bin of any one of claims 1 to 19, wherein when the storage bin moves downward, the storage bin translate forward, and when the storage bin moves upward, the storage bin translates backward.

15

21. A storage bin comprising:

a receptacle frame for receiving items to be stored;

a mounting support fixedly attached to a structure substantially above a floor, the mounting support shaped to receive the receptacle frame; and

20 a connection and articulating mechanism for connecting the receptacle to the cover and guiding the receptacle downward from the mounting support to an accessible position and guiding the receptacle upward to the mounting support in an upward to a stored position.

25 22. The storage bin of claim 21, wherein the connection and articulating mechanism is a combination of mechanical linkages and pneumatic struts arranged to connect the receptacle to the mounting support and causing the receptacle to move downward when the pneumatic struts are extended and upward when the pneumatic struts are retracted.

23. The storage bin of claim 21, wherein the connection and articulating mechanism is a combination of mechanical linkages and pulleys arranged to connect the receptacle to the mounting support.

5 24. The storage bin of claim 23, wherein the linkages and pulleys convey a cable, the cable connected to a spool and causing the receptacle to move downward when the cable is unwound from around the spool, and causing the receptacle to move upward when the cable is wound around the spool.

10 25. The storage bin of claim 24, wherein the cable is wound or unwound from the spool via a motor.

26. The storage bin of claim 25, wherein the motor is a servo motor.

15 27. The storage bin of any one of claims 21 to 26, wherein the connection and articulating mechanism is electronically activated.

28. The storage bin of claim 27, wherein the connection and articulating mechanism is activated by a remote control.

20

29. The storage bin of claim 27, wherein the remote control is a mobile application on a mobile device, the mobile application communicating with a sensor on the storage bin to activate the connection and articulating mechanism.

25 30. The storage bin of claim 27, wherein the remote control is a radio frequency transmitter able to communicate with a receiver on the storage bin to activate the connection and articulating mechanism.

31. The storage bin of any one of claims 21 to 30, wherein the structure is a ceiling.

30

32. The storage bin of any one of claims 21 to 30, wherein the structure is a wall.

33. The storage bin of any one of claims 21 to 30, wherein the structure is a ceiling and a wall.
- 5 34. The storage bin of any one of claims 21 to 30, wherein the mounting support and the receptacle frame are made from plastic, recycled plastic, sheet metal or a combination thereof.
- 10 35. The storage bin of any one of claims 21 to 34, wherein the receptacle frame comprises a top frame, a bottom frame, a back frame, and two side frames arranged to form a cuboid with a front opening.
36. The storage bin of claim 35, wherein the top frame, bottom frame, back frame, and the two side frames accommodate paneling, forming a receptacle interior.
- 15 37. The storage bin of claim 35 or claim 36, wherein the front opening accommodates a door.
38. The storage bin of claim 37, wherein the receptacle interior is refrigerated.

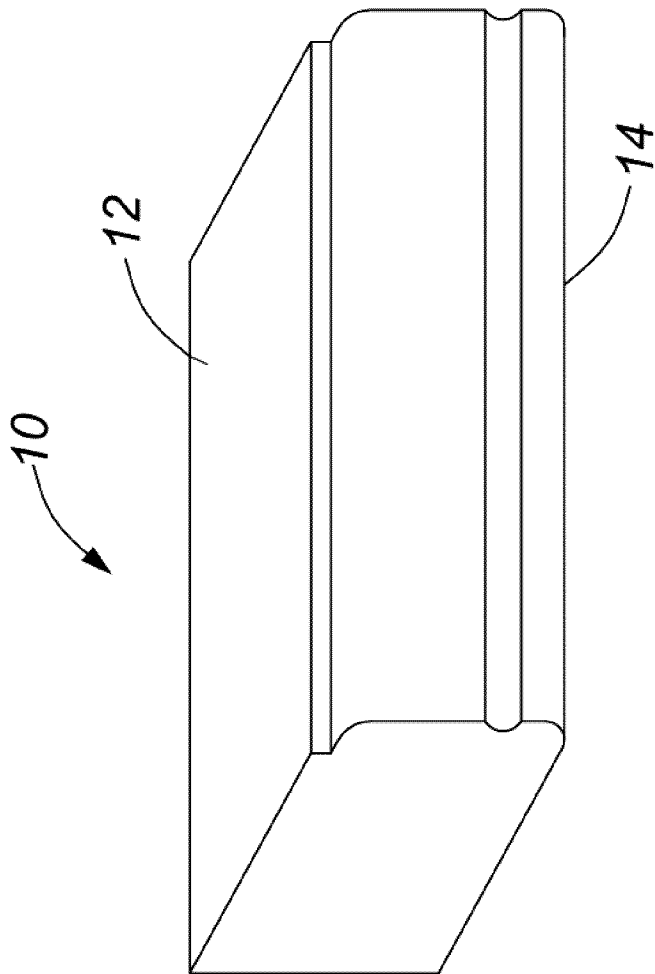


Figure 1A

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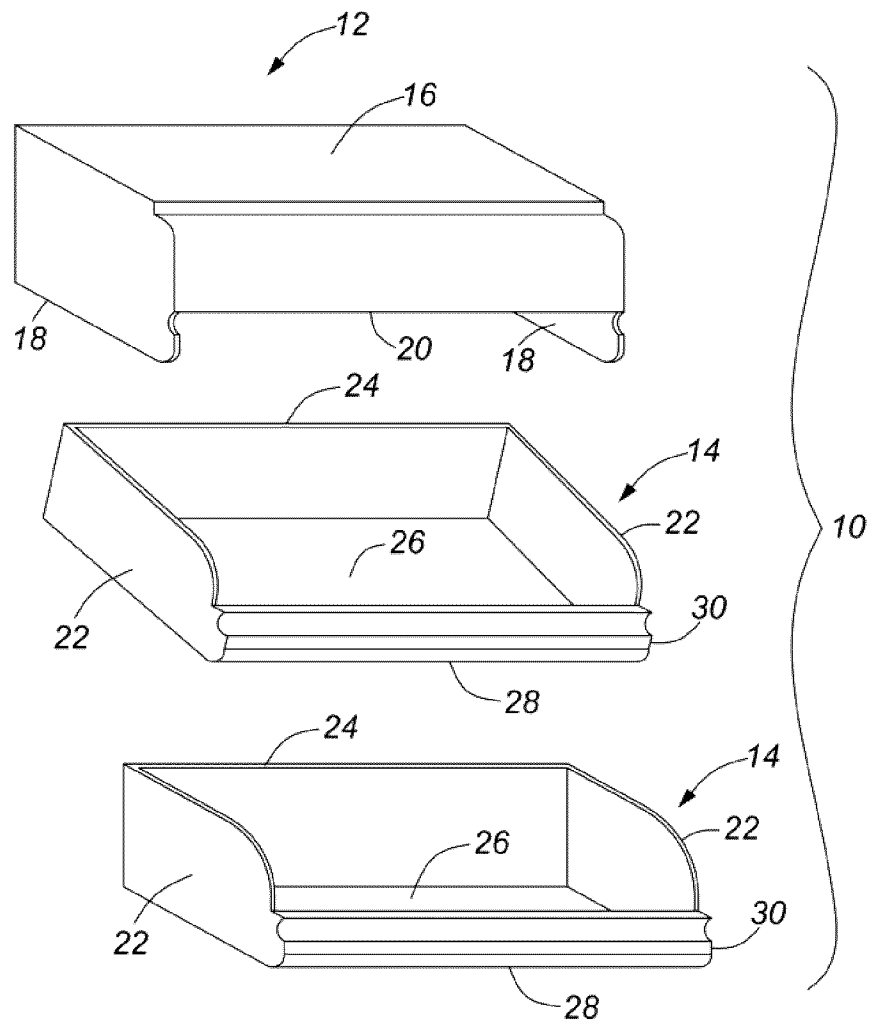


Figure 1B

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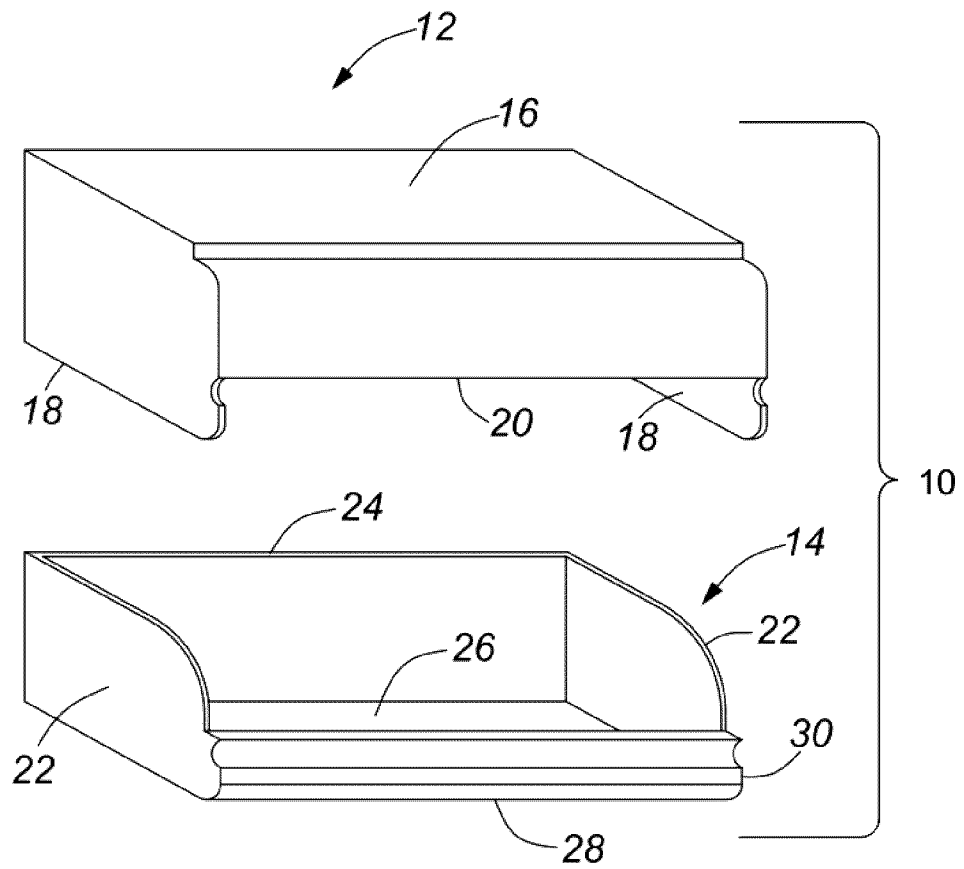


Figure 2

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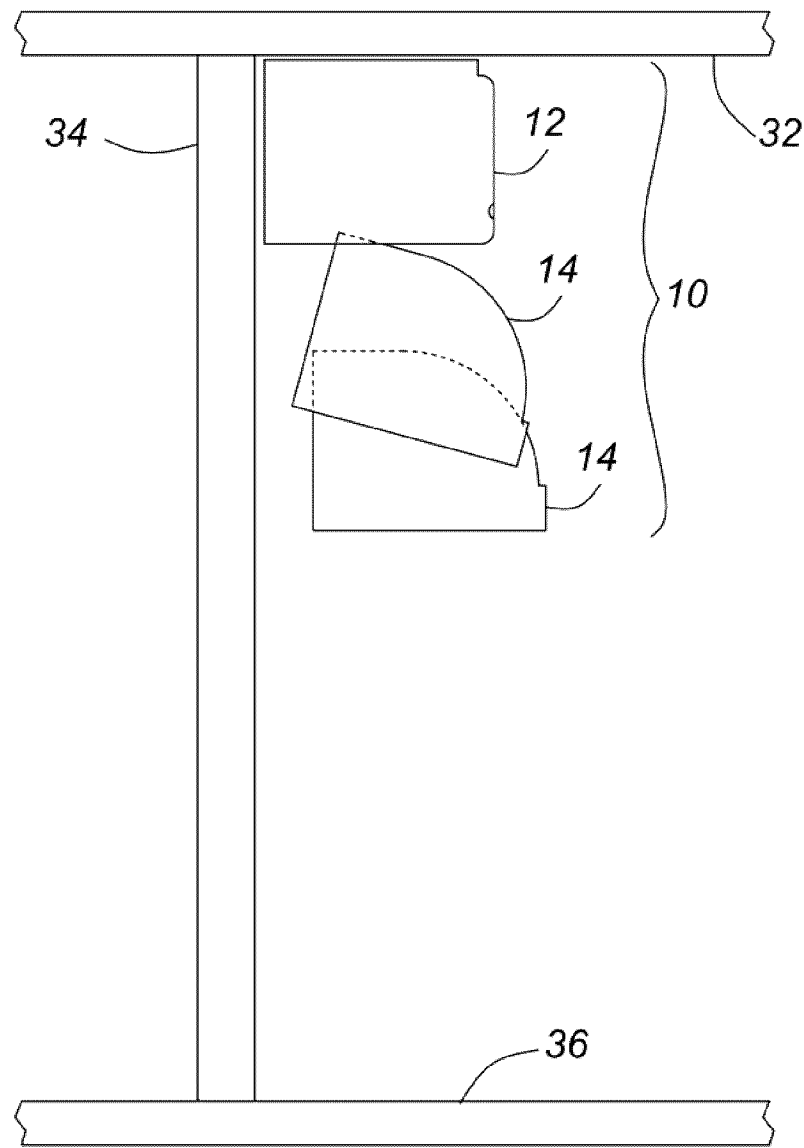


Figure 3

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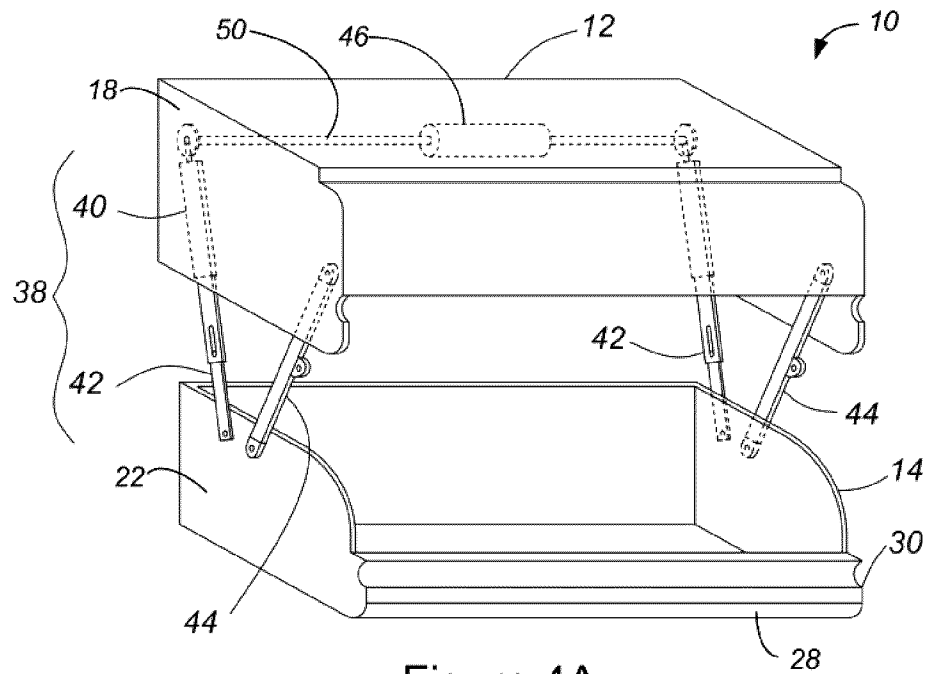


Figure 4A

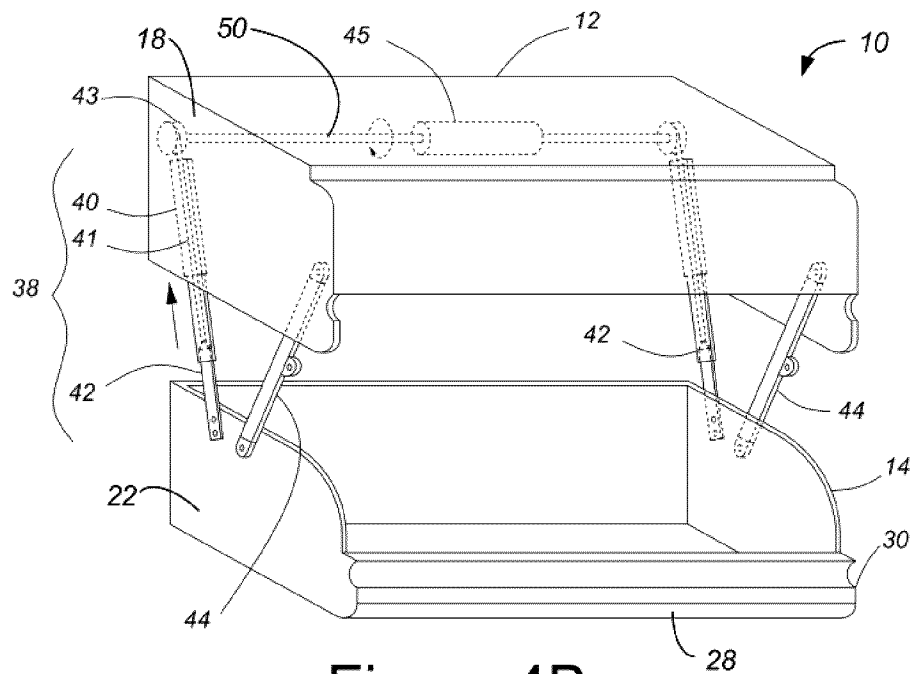


Figure 4B

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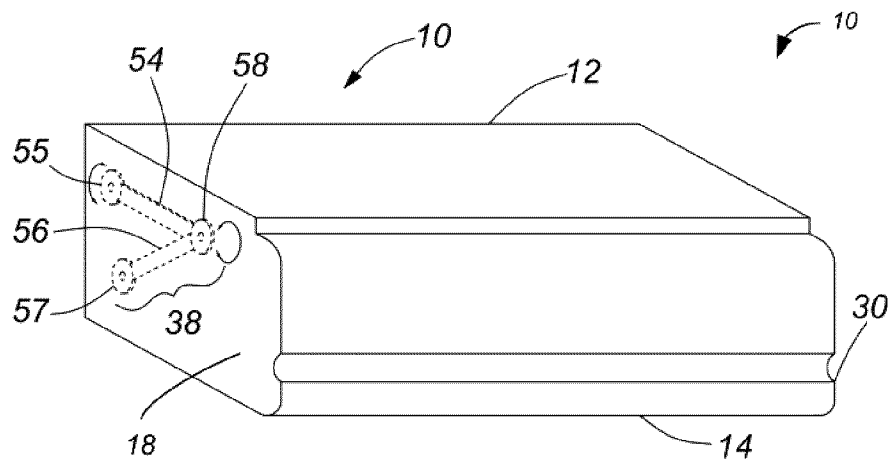


Figure 5A

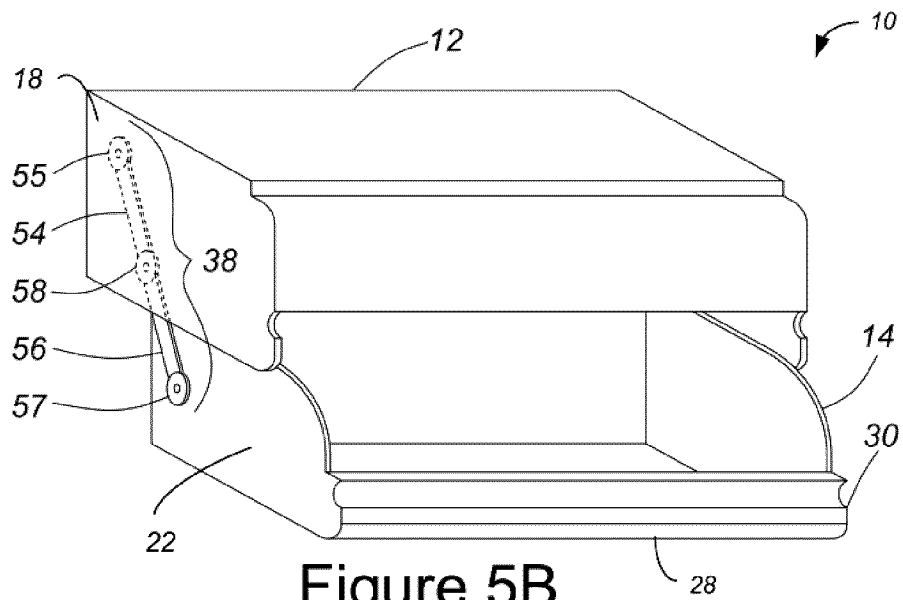


Figure 5B

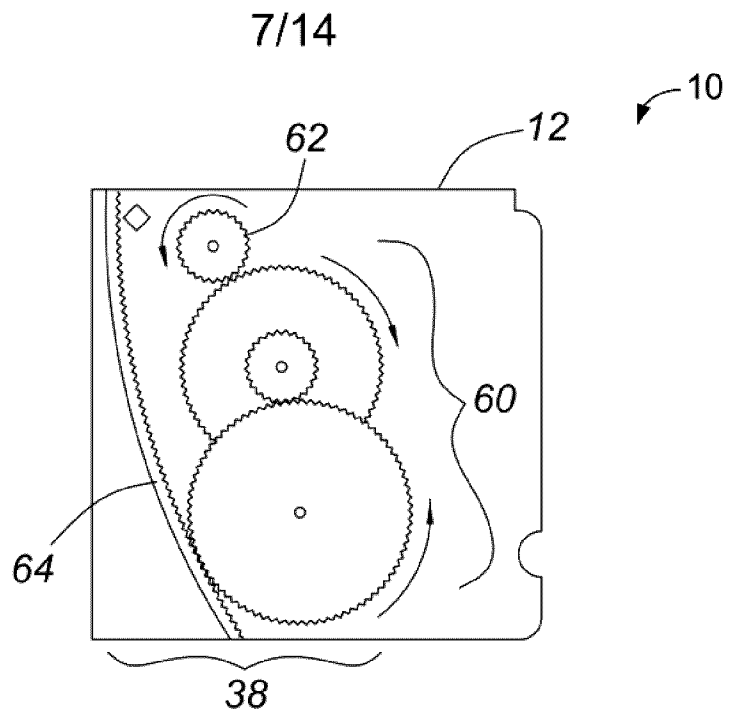


Figure 6A

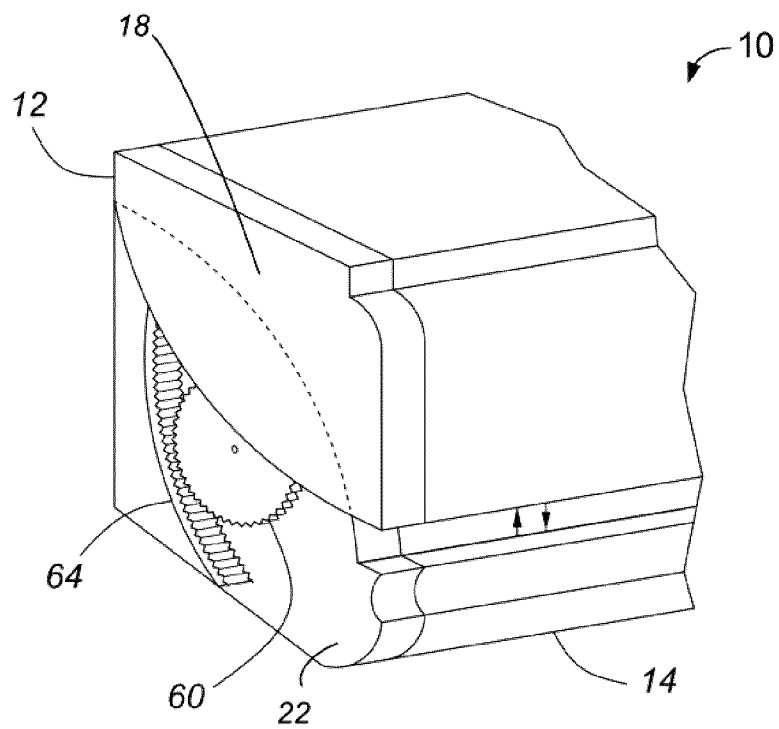


Figure 6B

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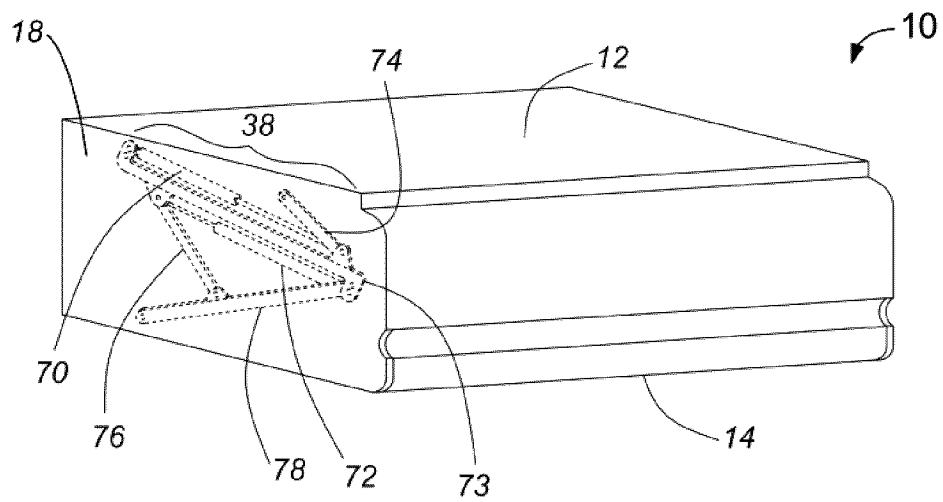


Figure 7A

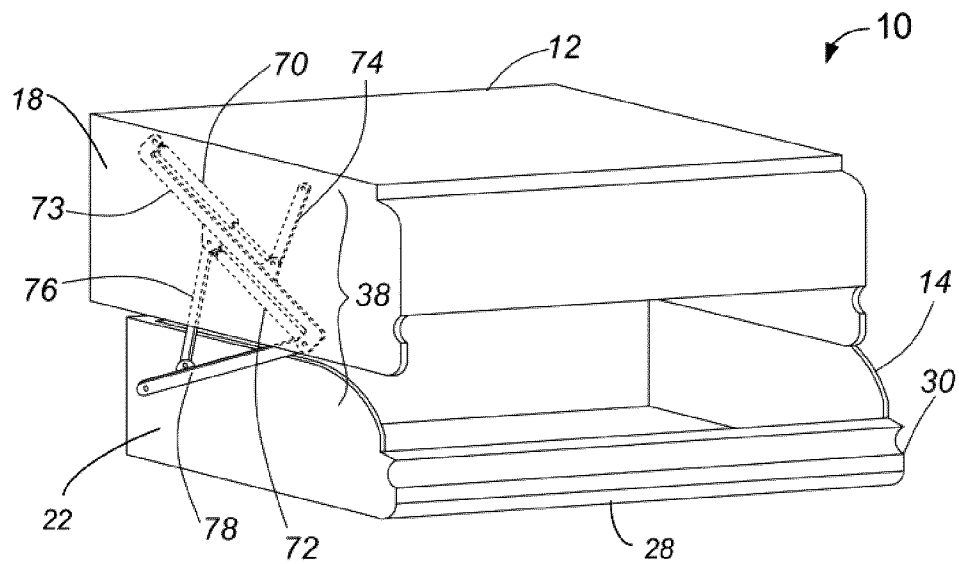


Figure 7B

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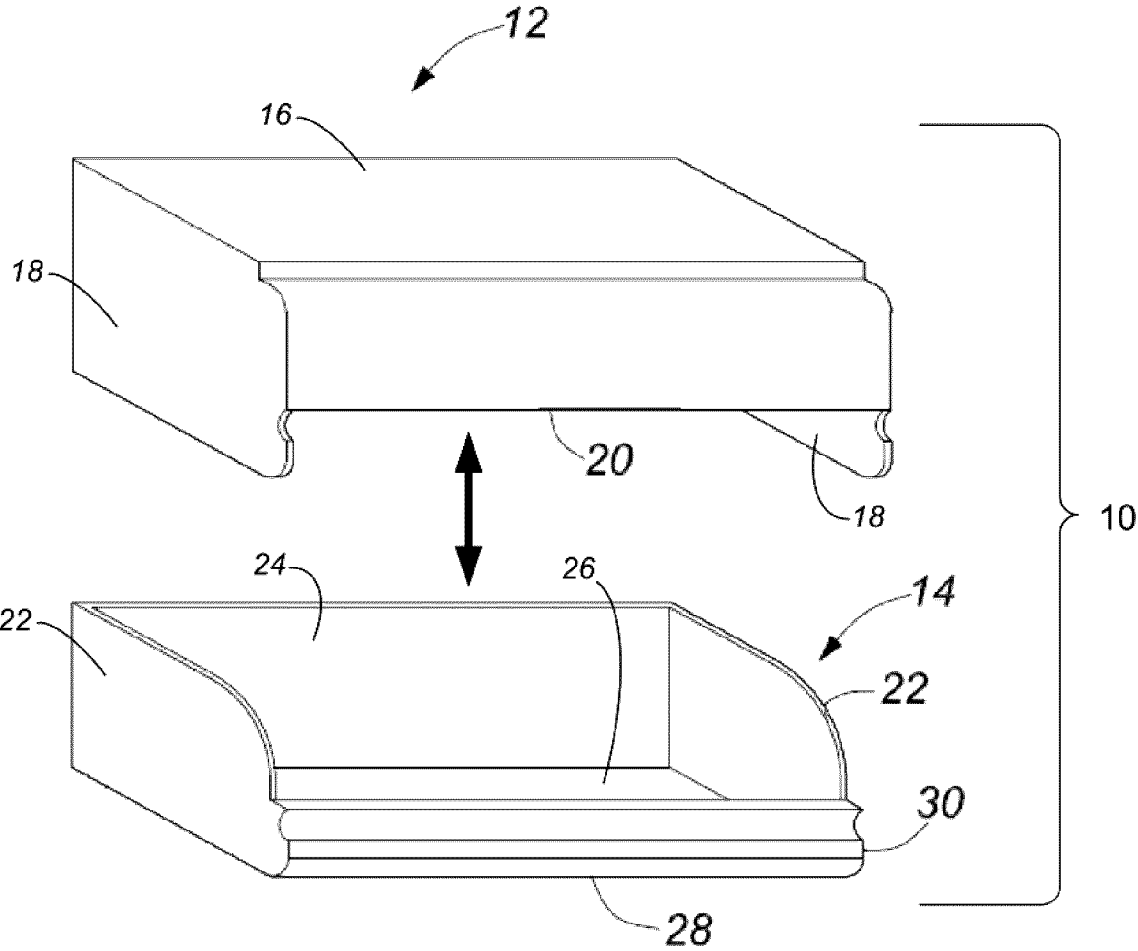


Figure 8

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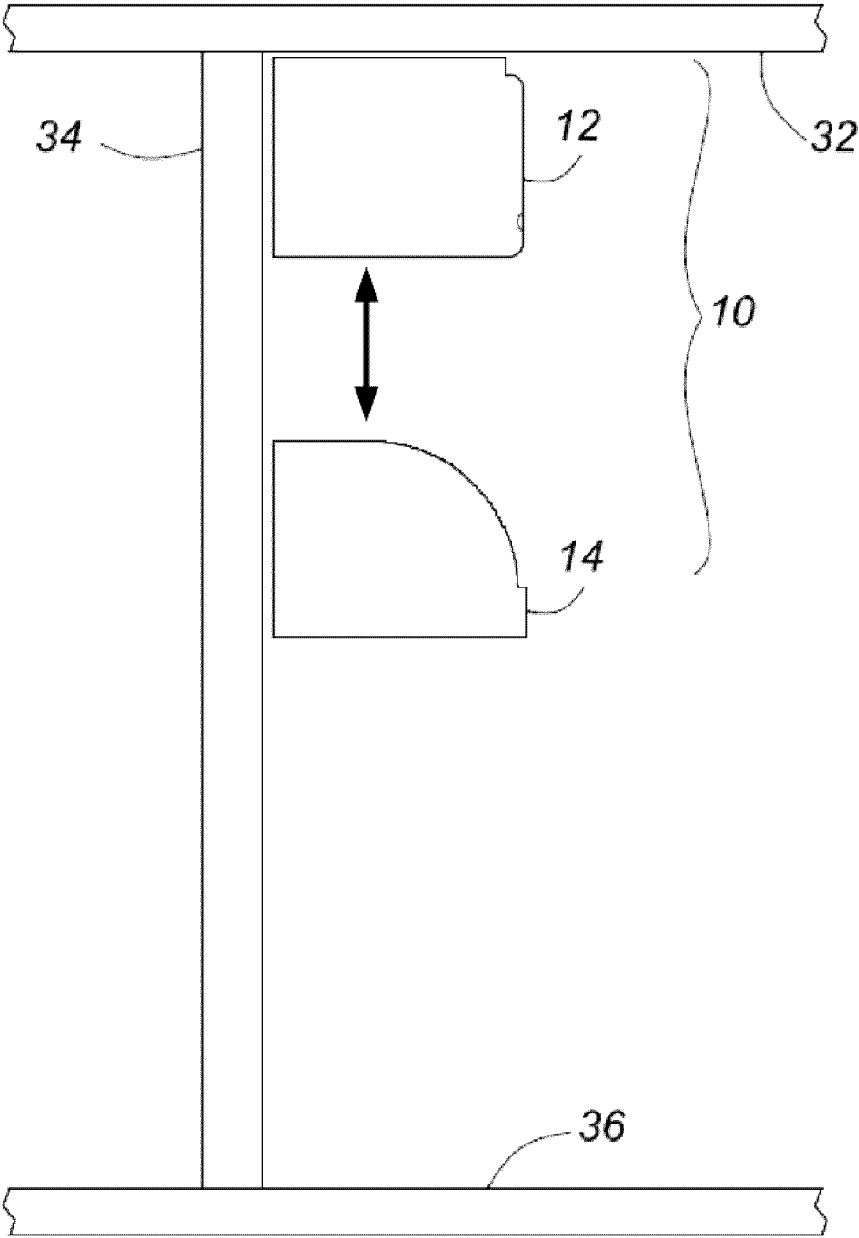


Figure 9

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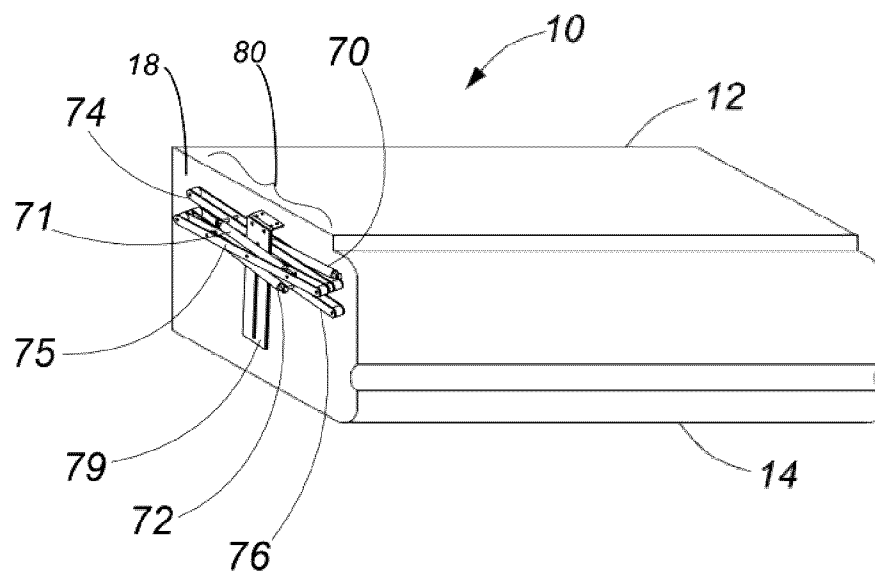


Figure 10A

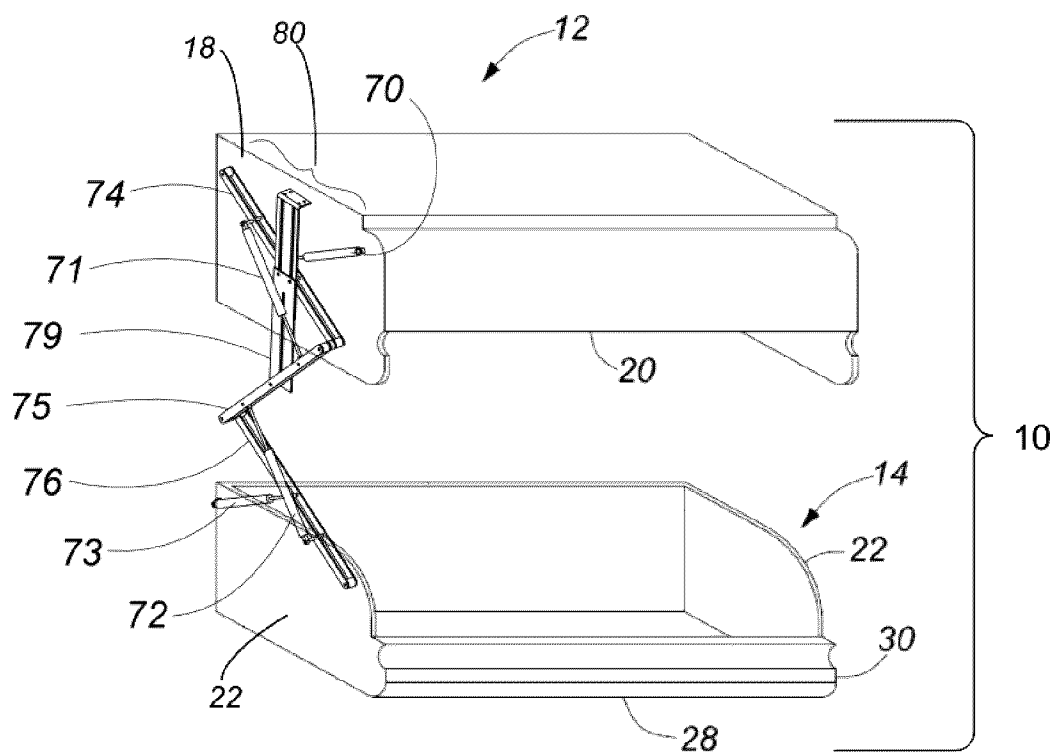


Figure 10B

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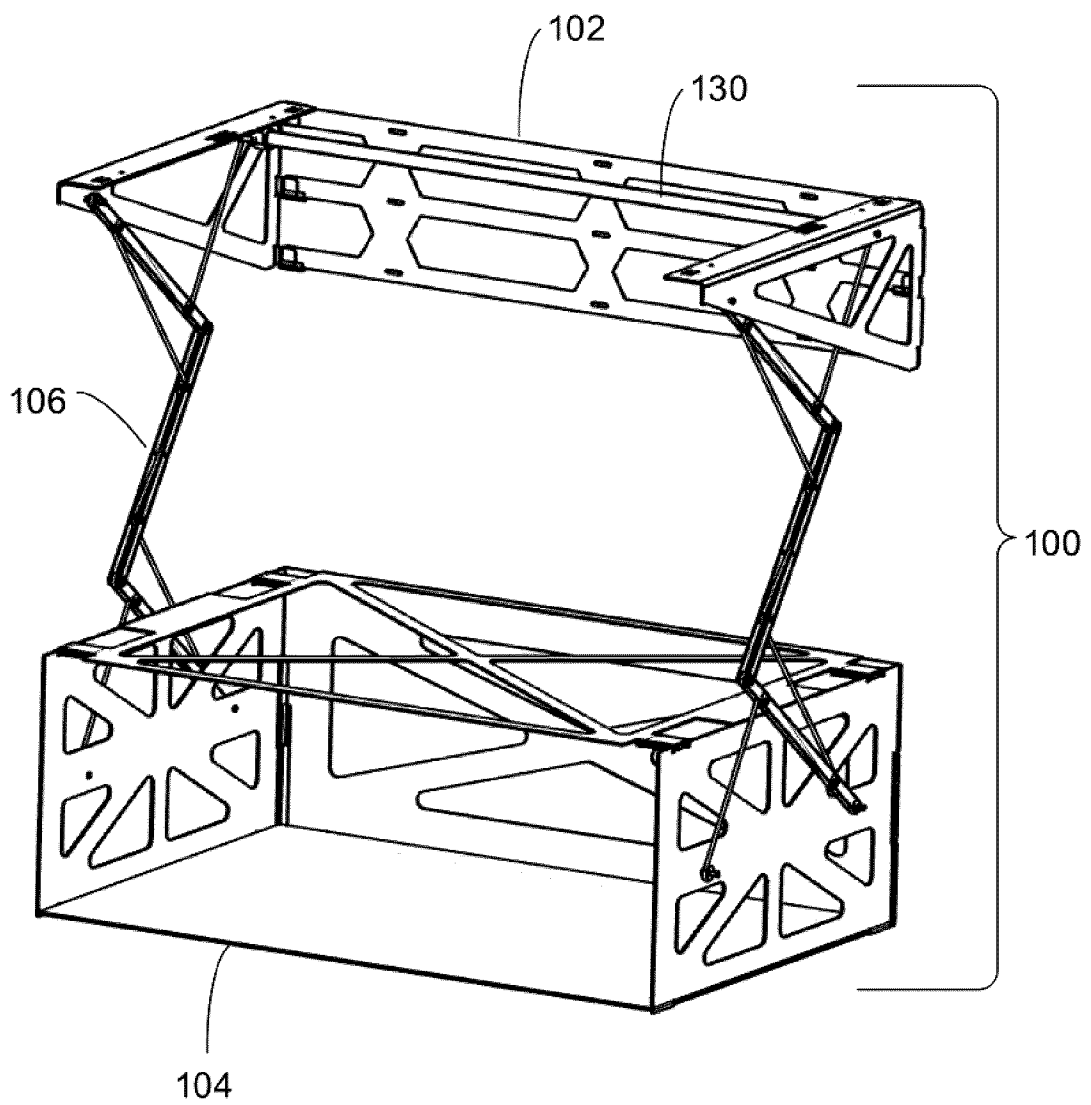


Figure 11

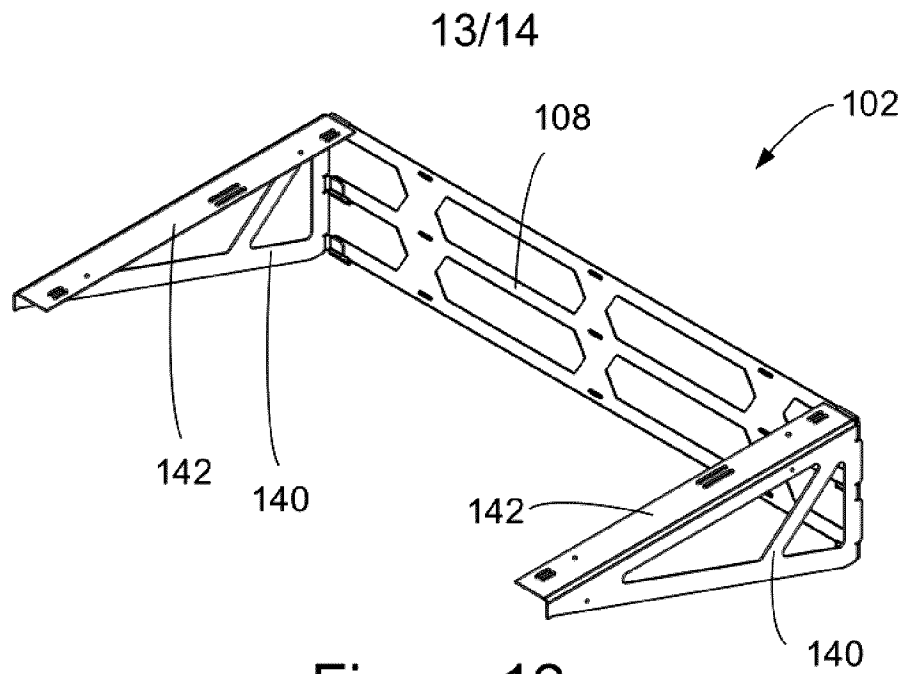


Figure 12

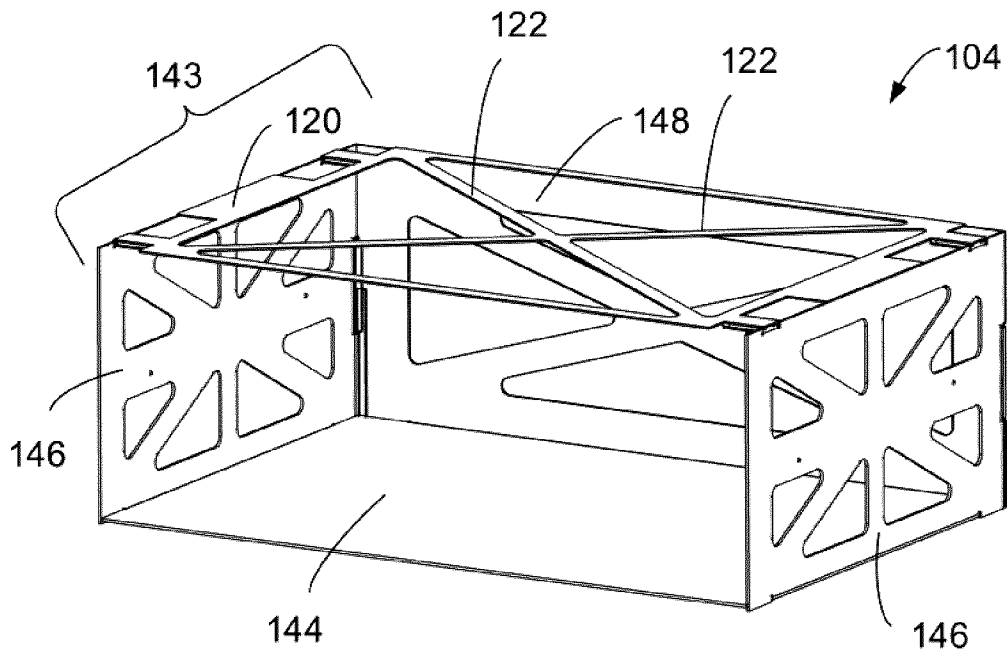


Figure 13

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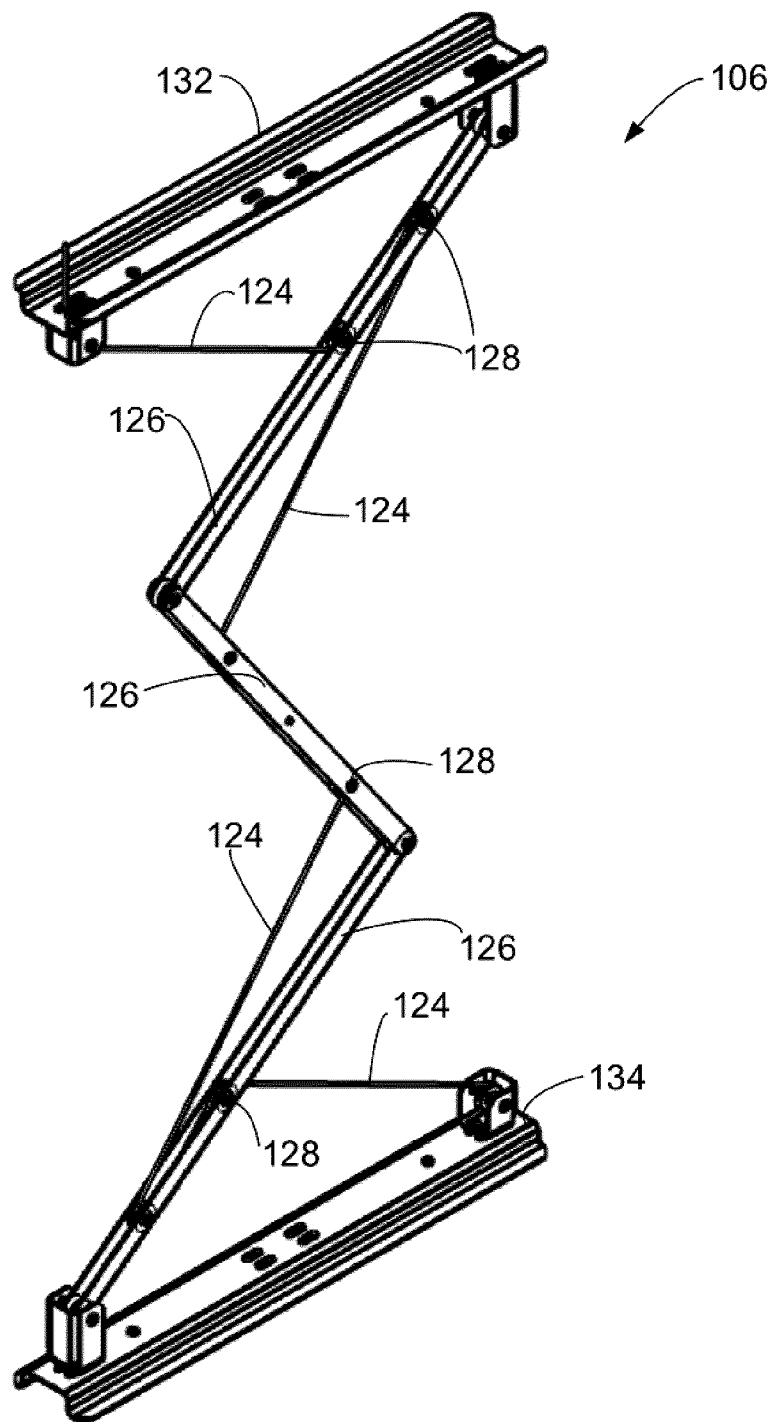


Figure 14

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CA2020/050072

A. CLASSIFICATION OF SUBJECT MATTER

IPC: **A47B 46/00** (2006.01), **A47B 51/00** (2006.01), **A47B 88/453** (2017.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: **A47B** (2006.01), **A45D** (2006.01), **B65F** (2006.01), **B65D** (2006.01), **A47J** (2006.01), **A47F** (2006.01), **A47K** (2006.01), **A61J** (2006.01), **A01F** (2006.01), **B64D 11/** (2006.01)CPC: **A47B**, **A45D**, **B65F**, **B65D**, **A47J**, **A47F**, **A47K**, **A61J**, **A01F**, **B64D 11/**

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic database(s) consulted during the international search (name of database(s) and, where practicable, search terms used)

Databases: Orbit (FAMPAT); GOOGLE Patents

Keywords: receptacle, storage, bin, container, box, cover, lid, panel, articulater, pivoter, tilt, suspend, overhead, wall, ceiling, mount, under, fixed, attach, secur, linkage, remote, sensor, mobile, refrigerate+

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	US 5456529 A (CHEUNG) 10 October 1995 (10-10-1995) * Whole document *	1-5, 8, 10, 15, 20-25, 31, 35-37 6, 19, 26, 38
X Y	US 6550878 B2 (NOTT et al.) 22 April 2003 (22-04-2003) * Whole document *	1, 3-5, 7-8, 11-12, 14-15, 18, 21, 23-25, 27-28, 30-31, 34 6, 13, 19, 26, 29, 38
X Y	US 8955805 B2 (SAVIAN et al.) 17 February 2015 (17-02-2015) * Whole document *	1-2, 10, 15-17, 21, 31-33 19, 38
X Y	US 5934615 A (TREICHLER et al.) 10 August 1999 (10-08-1999) * Whole document *	1-2, 7, 10, 20-22, 35-37 19, 38

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* "A" "D" "E" "L" "O" "P"	Special categories of cited documents: document defining the general state of the art which is not considered to be of particular relevance document cited by the applicant in the international application earlier application or patent but published on or after the international filing date document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) document referring to an oral disclosure, use, exhibition or other means document published prior to the international filing date but later than the priority date claimed	"T" "X" "Y" "&"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art document member of the same patent family
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Date of the actual completion of the international search
11 March 2020 (11-03-2020)Date of mailing of the international search report
24 March 2020 (24-03-2020)Name and mailing address of the ISA/CA
Canadian Intellectual Property Office
Place du Portage I, C114 - 1st Floor, Box PCT
50 Victoria Street
Gatineau, Quebec K1A 0C9
Facsimile No.: 819-953-2476

Authorized officer

Eric E. Breton (819) 639-7829

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CA2020/050072

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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X Y	US 5567028 A (LUTOVSKY et al.) 22 October 1996 (22-10-1996) * Whole document *	1-2, 10, 15, 20-22, 31 19, 38
X Y	US 7258406 B2 (STEPHAN et al.) 21 August 2007 (21-08-2007) * Whole document *	1, 20-21, 35-37 6, 19, 26, 38
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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CA2020/050072

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