



US 20090178989A1

(19) **United States**(12) **Patent Application Publication**
Accuardi(10) **Pub. No.: US 2009/0178989 A1**(43) **Pub. Date: Jul. 16, 2009**(54) **MULTI-FUNCTION STORAGE BIN****Publication Classification**(76) Inventor: **Ronald David Accuardi**, Stow, OH
(US)(51) **Int. Cl.****B65D 21/032** (2006.01)**B65D 85/62** (2006.01)(52) **U.S. Cl. 211/126.7; 206/509**

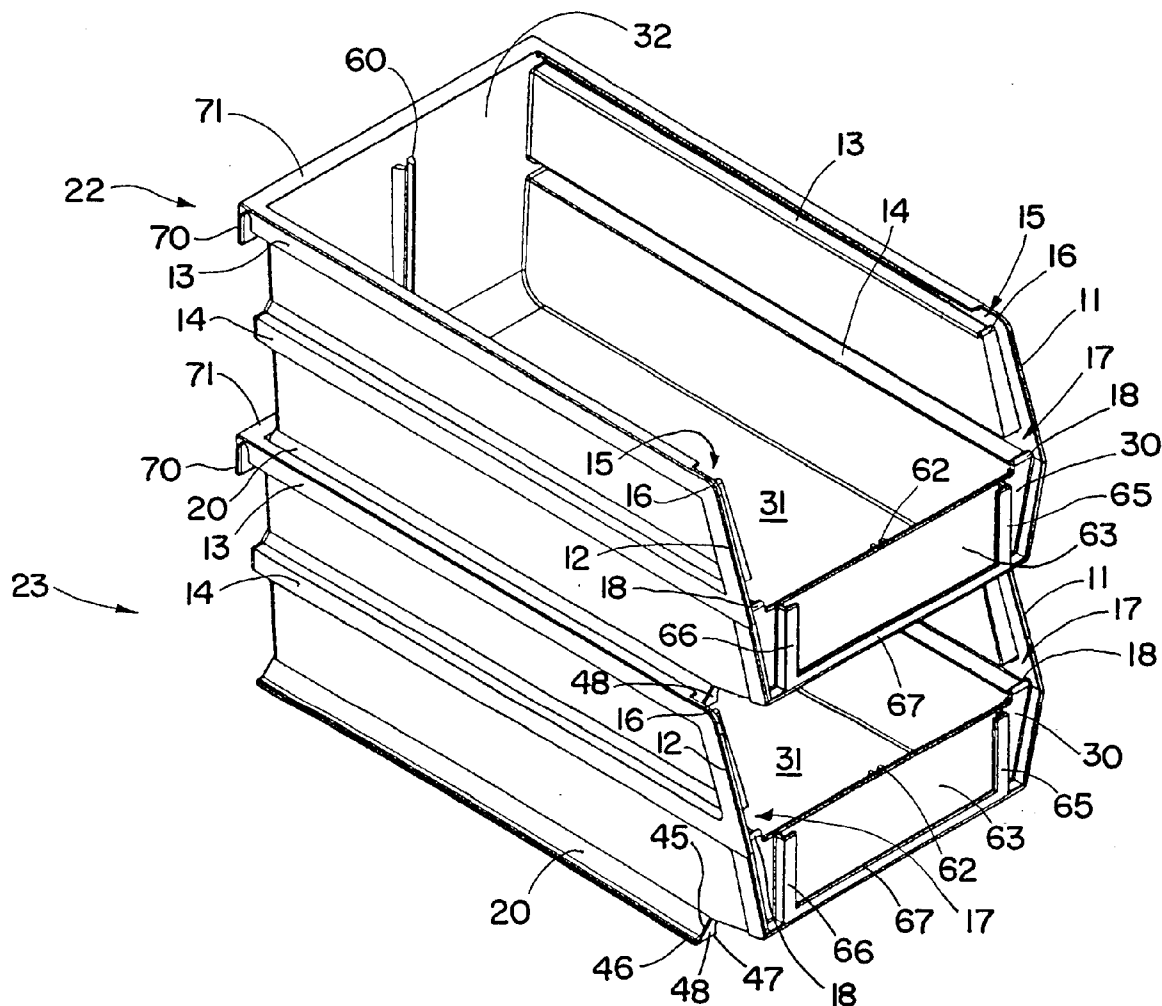
(57)

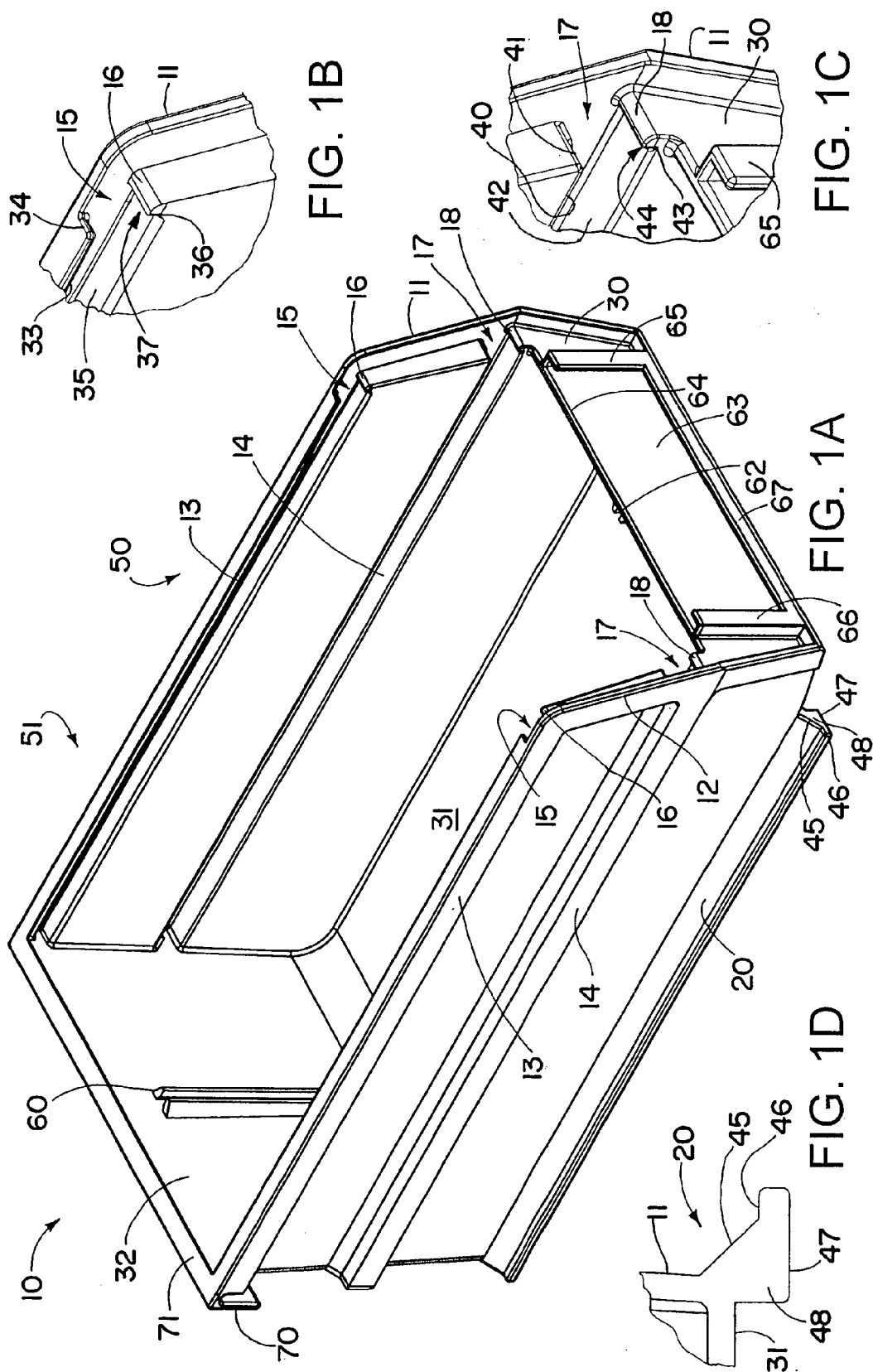
ABSTRACT

Correspondence Address:

RENNER OTTO BOISSELLE & SKLAR, LLP
1621 EUCLID AVENUE, NINETEENTH FLOOR
CLEVELAND, OH 44115 (US)(21) Appl. No.: **12/110,636**(22) Filed: **Apr. 28, 2008****Related U.S. Application Data**(60) Provisional application No. 61/020,282, filed on Jan.
10, 2008.

A storage bin having two side walls, each having an upper channel and a lower channel. The upper and lower channels have a point of entry that is partially blocked by a tab. The storage bin also has a pair of feet, which are insertable into the upper channels to stack the bins, or the lower channels to nest the bins. The tabs partially block the points of entry and act as a barrier to inhibit removal of the feet from the channels. Removal of the feet from the channels generally requires a vertical force to lift the feet over the tab and a horizontal force to slide the feet out of the channel. The channel and tab configuration therefore reduces the risk that the bins will fall into one another, tip over and separate or crack from placing unnecessary stress on the side walls of the bin when inserting and removing the feet from the channel. These as well as other features of the storage bin, are described more fully below.





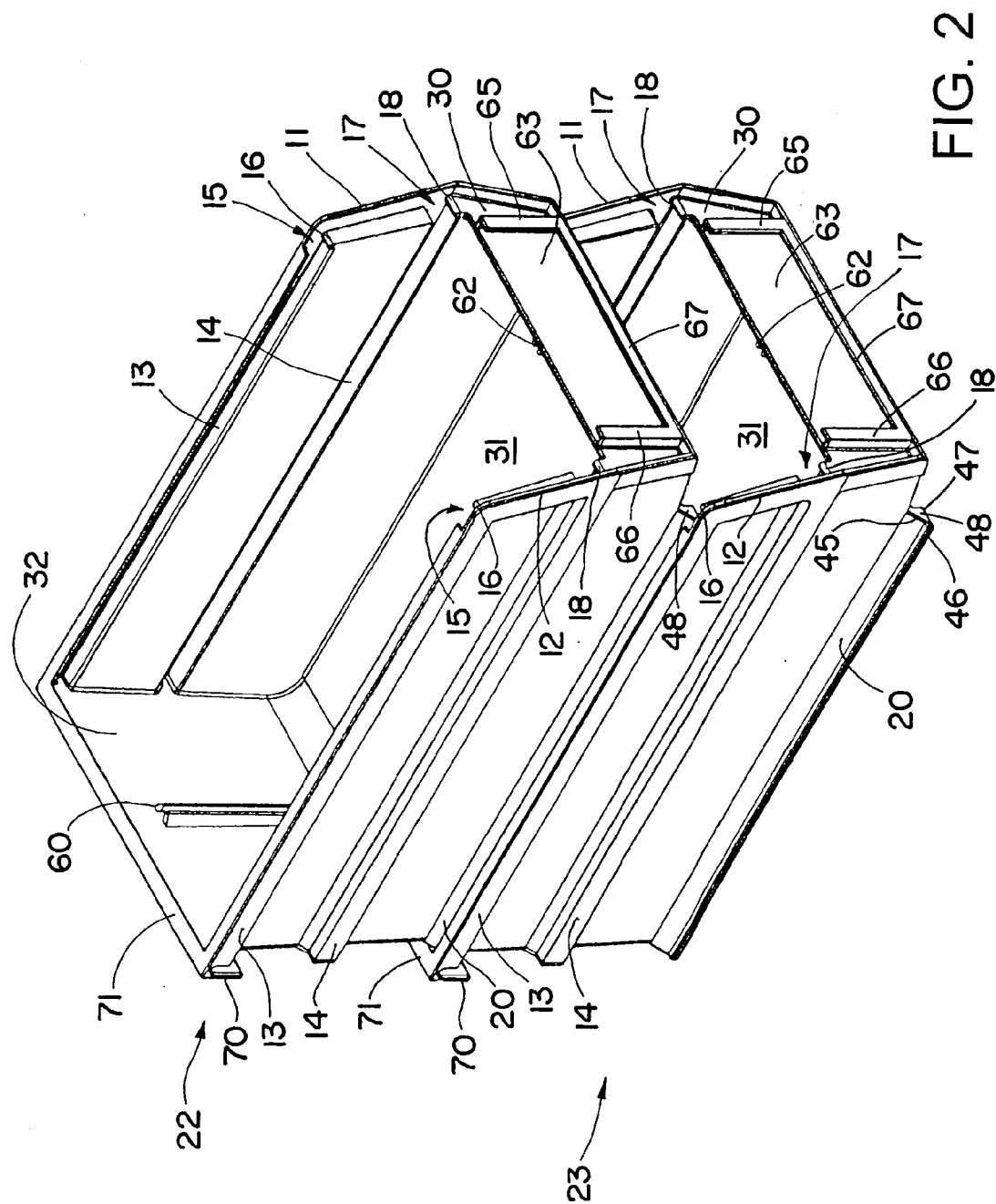
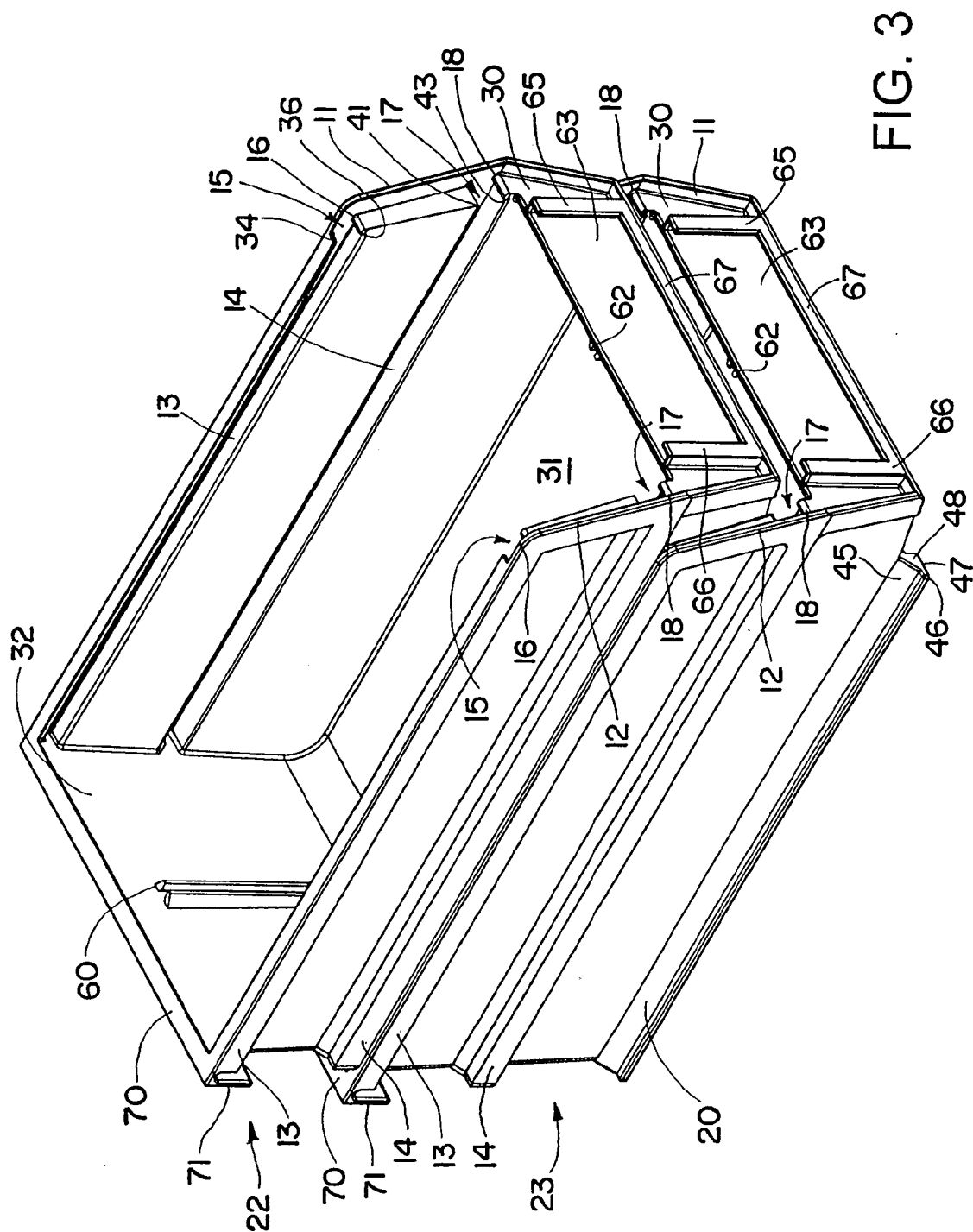
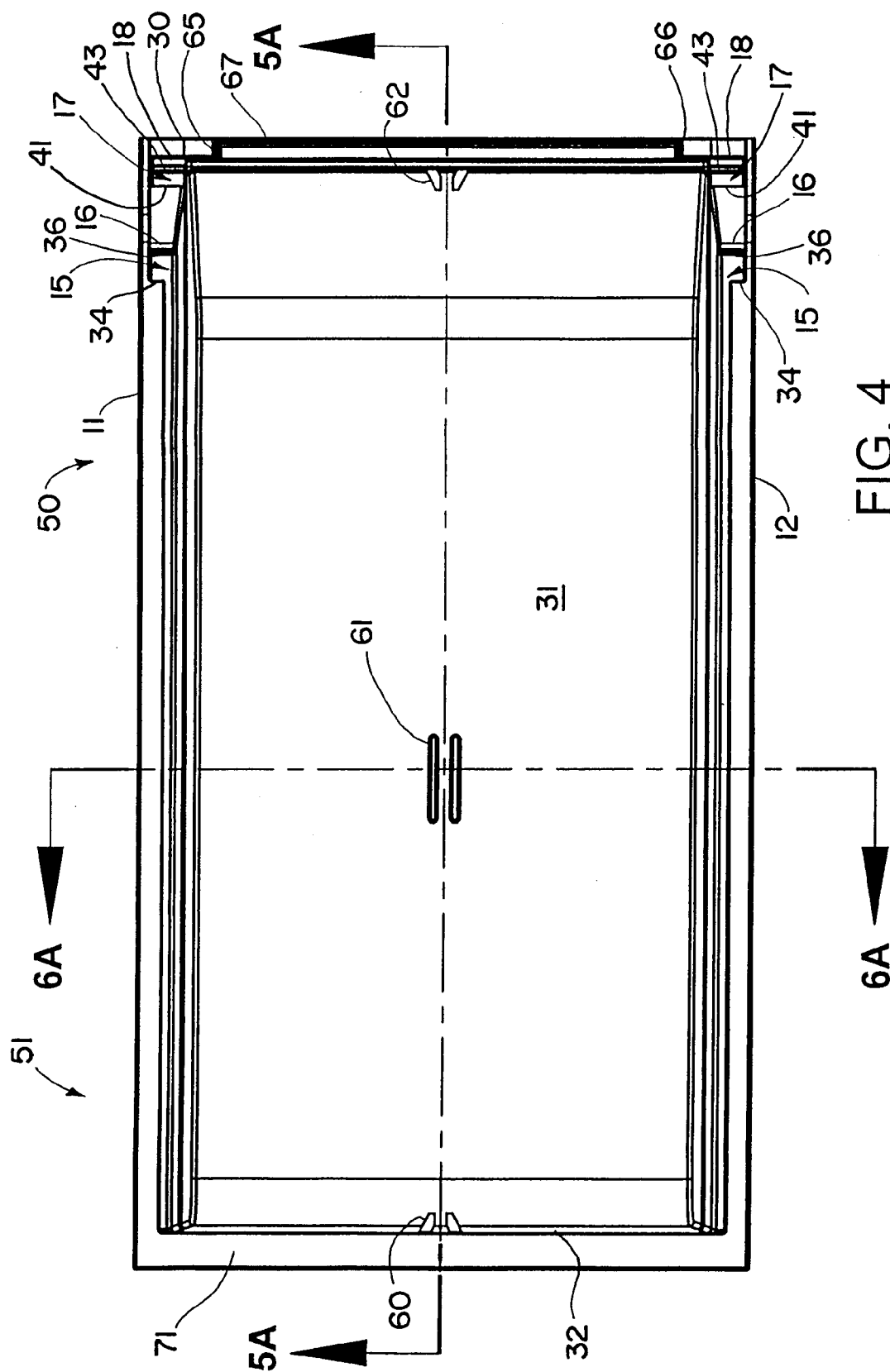
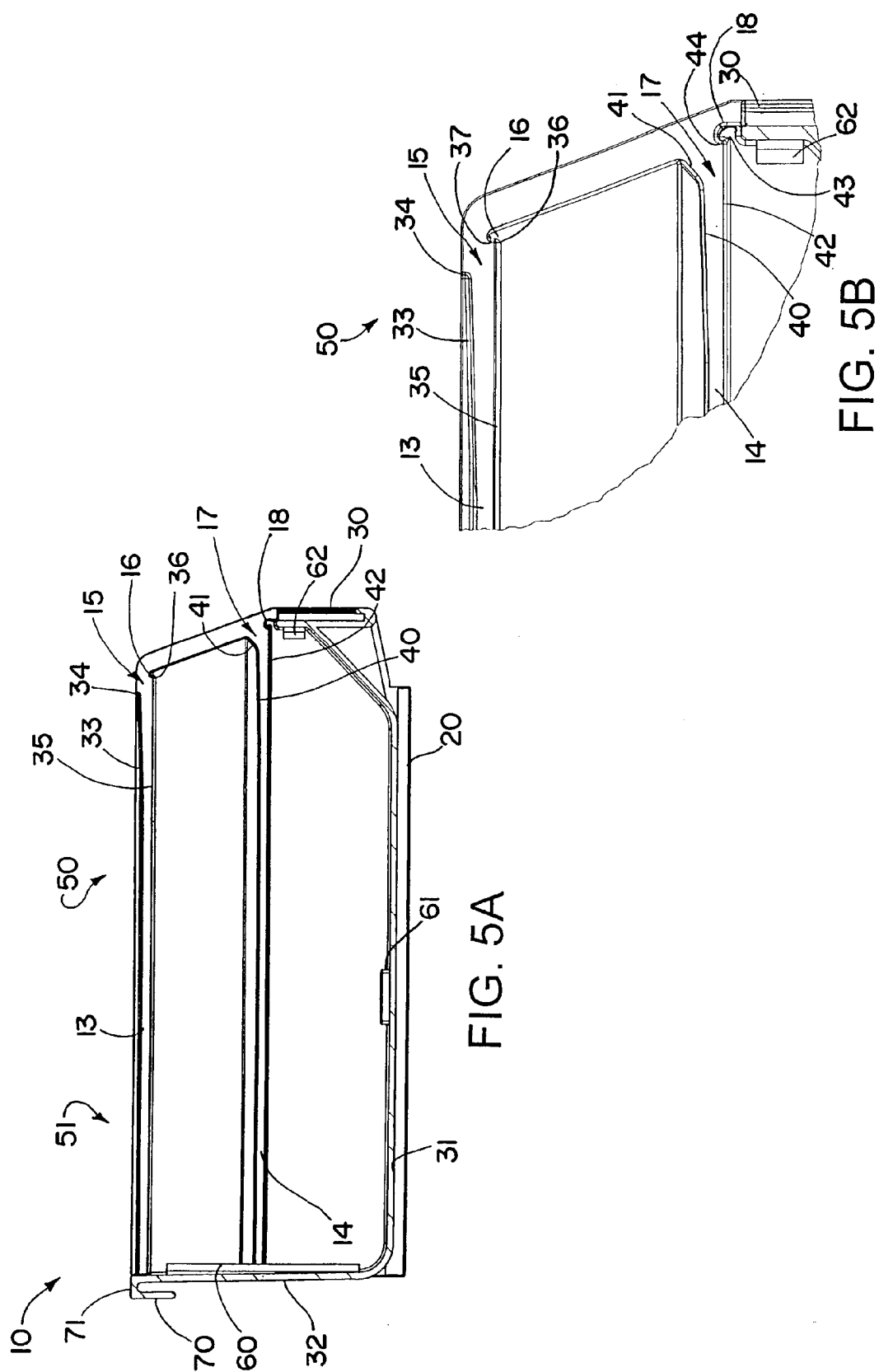


FIG. 2







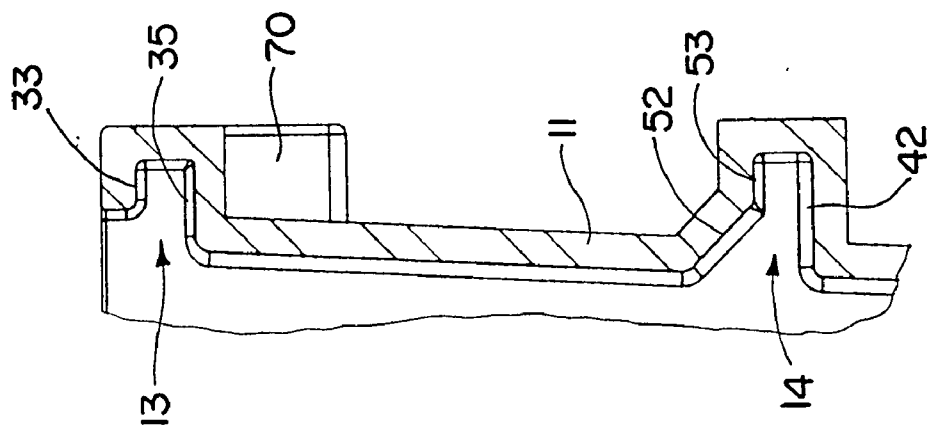


FIG. 6B

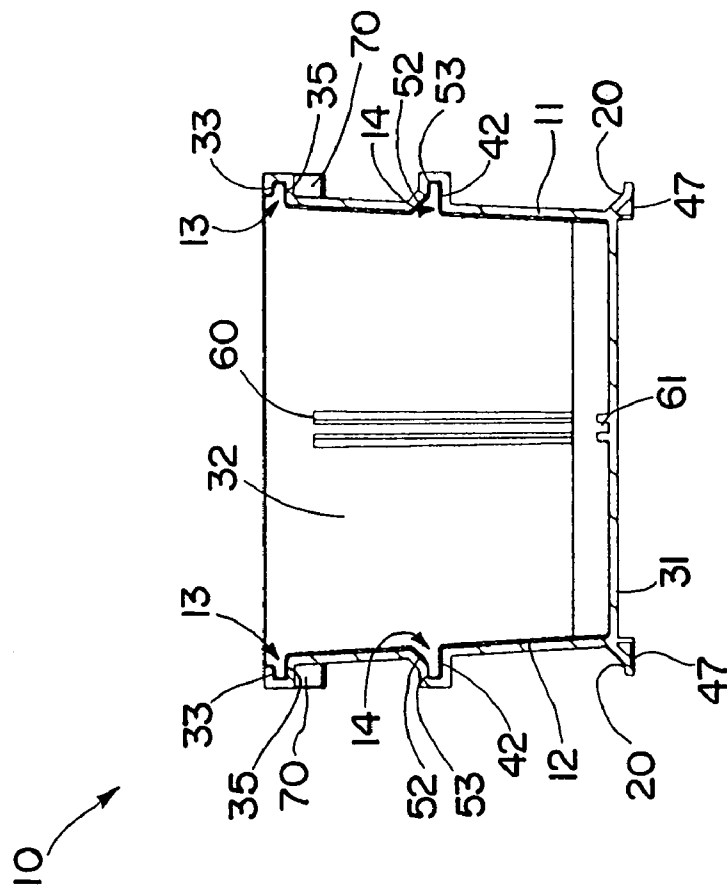
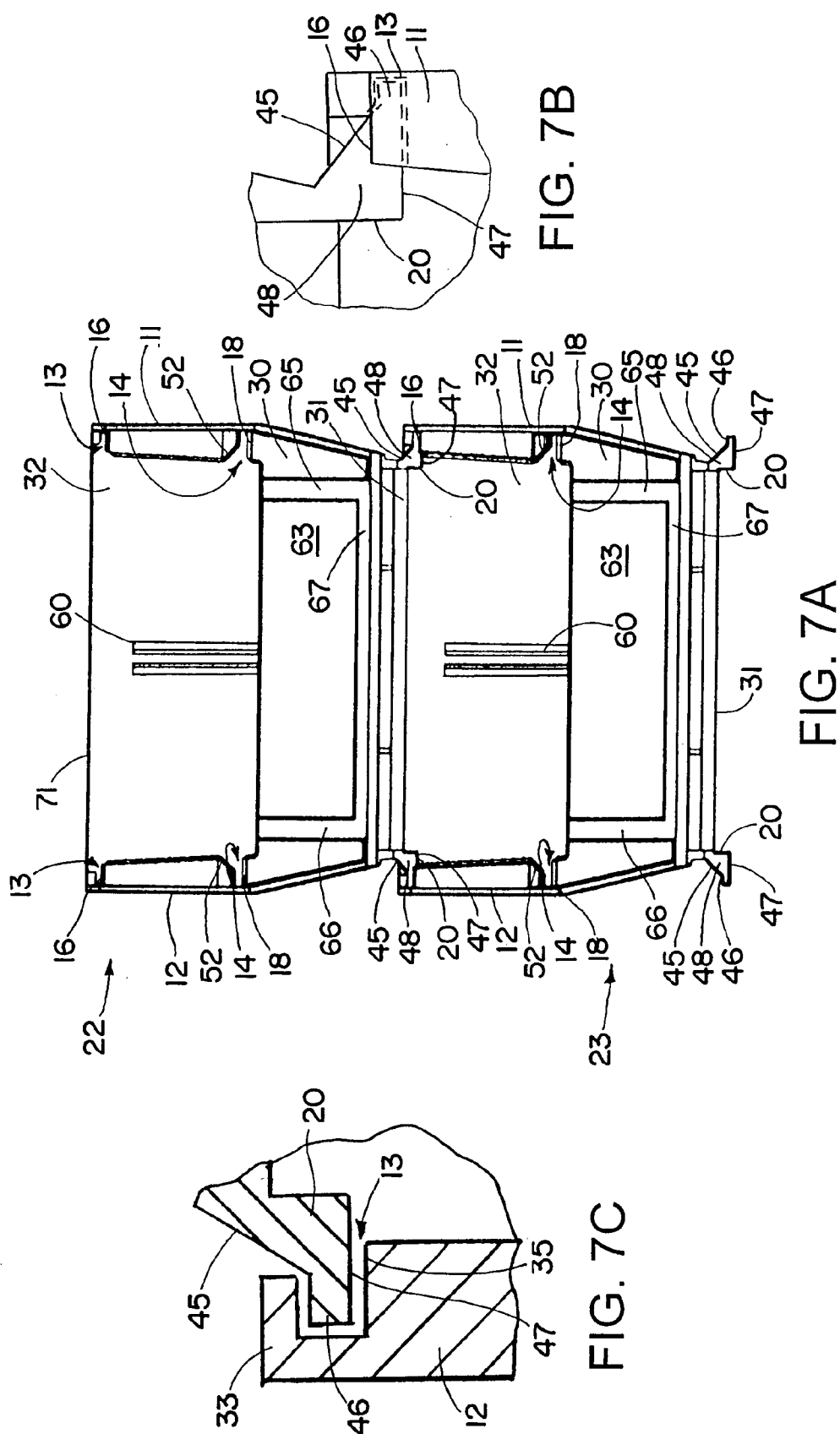


FIG. 6A



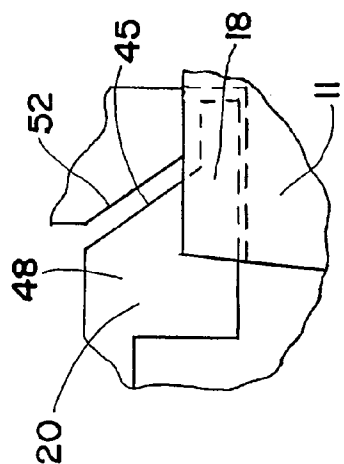


FIG. 8B

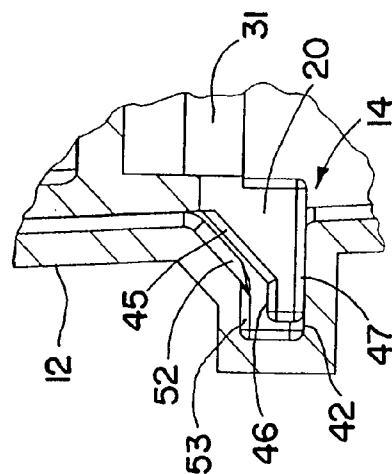


FIG. 8C

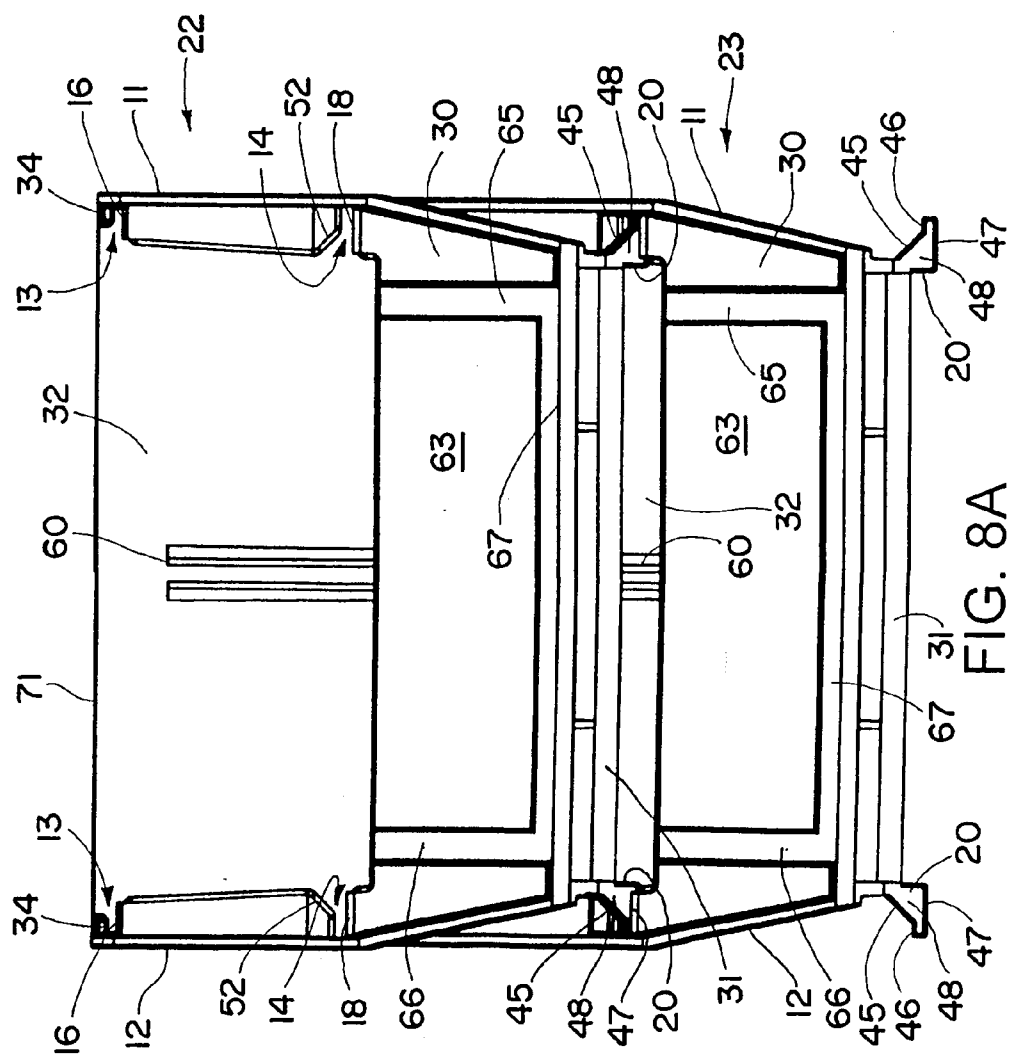


FIG. 8A

MULTI-FUNCTION STORAGE BIN**RELATED APPLICATION DATA**

[0001] The present application claims the benefit of U.S. Provisional Application Ser. No. 61/020,282 filed Jan. 10, 2008, the disclosure of which is herein incorporated by reference in its entirety.

FIELD OF THE INVENTION

[0002] This invention relates to storage bins and, more particularly, to multi-function storage bins that can be interlocked with one another when the bins are stacked on top of one another or nested together.

DESCRIPTION OF RELATED ART

[0003] Storage bins or containers are used to store loose objects such as screws, nuts, bolts, nails, pegs, etc. Storage bins may be hung from or mounted to a perforated support panel or perf-board. Storage bins also may be stacked on top of one another or nested together.

[0004] Known storage bins of one type generally have two side walls separated by front, back and bottom surfaces. The top edges of the side walls typically include a ledge and the bottoms of the side walls include feet. Several bins can be stacked together by resting the feet of one bin on the ledges of another bin, and unstacked by lifting the bins off of each other. Due to the relative ease with which the bins can be stacked and unstacked, a stack of bins is relatively cumbersome or difficult to move because the bins easily separate if the stack is toppled or knocked over, causing the contents of the bins to spill and/or intermix. Thus, in order to move the bins they must either be lifted by the bottommost bin in the stack or moved individually.

[0005] Stackable storage bins of another known type incorporate slotted feet that are configured to engage pins or tabs in the area of the ledge. One such bin incorporates two triangular tabs at the ledge. Inserting the pins into the slots in the feet provides guidance for stacking the bins, but does not provide suitable retention. As a result, these bins suffer from the same problems as their unslotted counterparts, namely, they are difficult to move because they separate easily if they are knocked over.

[0006] Other storage bins are designed to nest together in order to consolidate space, for example, when shipping the bins. Like the stackable bins, the nesting bins have a ledge along the upper edges of the side walls. Additionally, the side walls of the bin have a horizontal ridge that separate the bin into an upper portion and a slightly narrower lower portion. The bins are nested together by placing one bin into another such that the narrower bottom portion of one bin rests in the wider, upper portion of a second bin. When the bins are nested together, the ridge of the upper bin is supported by the ledge of the lower bin. Known storage bins with this configuration do not have feet and therefore cannot be stacked on top of one another. The bins can be separated or pulled apart by lifting one bin from another bin, and consequently, the bins may be difficult to move because they easily separate if the stack of nested bins is knocked over. Furthermore, given the flexibility of the side walls, the bins sometimes may undesirably collapse into one another, for example, if a heavy load is placed on an upper bin.

[0007] Nesting bins of another variety have a pair of feet that are insertable into a channel in the side walls. These bins

are nested together by inserting the feet of one bin into a respective channel of another bin. In order to hold the feet in place, the width of the channel is slightly narrower at the channel entrance or opening. Thus, the side walls of the channel must be flexed slightly outwardly to allow the feet to pass through the opening and into the channel. The repeated flexing of the side walls creates stress in the areas of the openings and eventually may cause the bin to crack, split, break or otherwise fail.

SUMMARY OF THE INVENTION

[0008] Briefly, an aspect of the invention relates to improvements in storage bins that overcome the previously mentioned drawbacks.

[0009] According to an aspect of the invention, a storage bin includes a pair of side walls separated from each other by a rear portion and a bottom portion, the rear portion and the bottom portion extending between the side walls. One or more channels in each side wall have a point of entry and a tab partially blocking a portion of at least one of the channels such that the tab impedes the removal of a foot of a second storage bin when the foot is inserted in the channel.

[0010] In an embodiment of the storage bin, the channel extends from a front portion of the storage bin towards the rear portion of the storage bin, and the point of entry is near the front portion of the storage bin.

[0011] In an embodiment of the storage bin, the channel has an upper wall having an upper front edge and a lower wall having a lower front edge, and the upper front edge is offset from the lower front edge.

[0012] In an embodiment of the storage bin, the channel is tapered such that it is wider near the point of entry and narrower near the rear portion of the storage bin.

[0013] In an embodiment of the storage bin, the channel is tapered such that the channel is wider near the point of entry facilitating insertion of a foot of a second storage bin into the channel and narrower near the rear portion of the storage bin tending to retain in the channel the feet of a second storage bin.

[0014] In an embodiment of the storage bin, the upper wall of the channel is sloped relative to the lower wall of the channel to center the foot of the second storage bin in the channel.

[0015] In an embodiment of the storage bin, the upper wall of the channel further includes a lateral portion to restrict the vertical movement of the foot in the channel.

[0016] In an embodiment of the storage bin, the tab partially blocks the point of entry of at least one channel.

[0017] In another embodiment, the foot of a second storage bin is insertable into the channel to stack the storage bins on top of one another or to nest one storage bin at least partially within the other storage bin.

[0018] According to another aspect of the invention, a storage bin includes a pair of side walls separated from each other by a rear wall and a bottom surface, the rear wall and bottom surface extending between the side walls. An upper channel in each side wall, has a point of entry and a tab partially blocking the point of entry. The tabs impede removal of a pair of feet on a second storage bin when the feet are inserted into the upper channels to stack the storage bins on top of one another. A lower channel in each side wall has a point of entry and a tab partially blocking the point of entry such that the tabs impede

removal of the feet on the second storage bin when the feet are inserted into the lower channels to at least partially nest the storage bins together.

[0019] In an embodiment of the storage bin, at least one of the upper or lower channels has an upper wall having an upper front edge and a lower wall having a lower front edge and the upper front edge is offset from the lower front edge.

[0020] In an embodiment of the storage bin, at least one upper or lower channel is tapered such that the channel is wider near the point of entry and narrower near the rear portion of the storage bin.

[0021] In an embodiment of the storage bin, the tab extends from the lower front edge of the channel to restrict the horizontal movement of the foot in the channel.

[0022] In an embodiment of the storage bin, the upper wall of the at least one channel further includes a lateral portion to restrict the vertical movement of the foot in the channel.

[0023] In an embodiment of the storage bin, the lateral portion is a flange-like lateral extension of the side walls.

[0024] In an embodiment of the storage bin, the upper wall of at least one channel is angled relative to the lower portion of the channel.

[0025] According to another aspect of the invention, a storage bin includes a pair of side walls separated from each other by a rear portion and a bottom portion, the rear portion and bottom portion extending between the side walls, and a channel in each side wall, each channel having an upper portion having an upper front edge and a lower portion having a lower front edge. A point of entry defined by the upper front edge and the lower front edge, and a tab at least partially blocks the point of entry of at least one channel such that the tab impedes removal of a foot on a second storage bin when the foot is inserted into the channel.

[0026] In an embodiment of the storage bin, the tab extends from the lower front edge of the channel.

[0027] In an embodiment of the storage bin, the upper front edge is offset from the lower front edge.

[0028] In an embodiment of the storage bin, the upper portion of the channel is sloped relative to the lower portion of the channel.

[0029] In an embodiment of the storage bin, the upper portion of the channel has a lateral portion.

[0030] In an embodiment of the storage bin, the lateral portion is a flange-like lateral extension of the side walls.

[0031] In an embodiment of the storage bin, the foot is comprised of an angular portion and a lateral portion.

[0032] In an embodiment of the storage bin, the bin includes a second channel in each side wall.

[0033] According to another aspect of the invention, a method of arranging storage bins includes the steps of inserting a foot of a first storage bin into a channel of a second storage bin and impeding the movement of the first storage bin at least partially blocking a point of entry to the channel.

[0034] According to an embodiment, the storage bins are stacked on top of one another.

[0035] According to an embodiment, the storage bins are at least partially nested within each other.

[0036] According to an embodiment, the method includes the step of lifting the foot to unblock it from removal from the channel.

[0037] These and further features of the present invention will be apparent with reference to the following description and drawings. In the description and drawings, particular embodiments of the invention have been disclosed in detail as

being indicative of some of the ways in which the principles of the invention may be employed, but the invention is not limited correspondingly in scope. Rather, the invention includes all changes, modifications and equivalents coming within the spirit and terms of the claims.

[0038] Features that are described and/or illustrated with respect to one embodiment may be used in the same way or in a similar way in one or more other embodiments and/or in combination with or instead of the features of the other embodiments.

BRIEF DESCRIPTION OF THE DRAWINGS

[0039] FIG. 1A is an isometric view of a storage bin according to an embodiment of the invention.

[0040] FIG. 1B is a fragmentary view of an upper channel of the storage bin.

[0041] FIG. 1C is a fragmentary view of a lower channel of the storage bin.

[0042] FIG. 1D is a fragmentary view of a foot of the storage bin.

[0043] FIG. 2 is an isomeric view of two stacked storage bins.

[0044] FIG. 3 is an isometric view of two nested storage bins.

[0045] FIG. 4 is a top view of the storage bin of FIG. 1.

[0046] FIG. 5A is a sectional view of the storage bin looking generally in the direction of the arrow 5A-5A in FIG. 4.

[0047] FIG. 5B is a fragmentary view of a front region of the storage bin of FIG. 5A.

[0048] FIG. 6A is a sectional view of the storage bin looking generally in the direction of the arrow 6A-6A in FIG. 4.

[0049] FIG. 6B is a fragmentary view of a portion of the side wall of the storage bin of FIG. 6A.

[0050] FIG. 7A is a front view of the stacked storage bins of FIG. 2.

[0051] FIG. 7B is a fragmentary front view of the stacked bins of FIG. 2 with a foot of the upper bin fully inserted in the upper channel.

[0052] FIG. 7C is a fragmentary sectional view of the stacked bins of FIG. 2 with a foot of the upper bin fully inserted in the upper channel.

[0053] FIG. 8A is a front view of the nested storage bins of FIG. 3.

[0054] FIG. 8B is a fragmentary front view of the nested bins of FIG. 3 with a foot of the upper bin fully inserted in the lower channel.

[0055] FIG. 8C is a fragmentary sectional view of the nested bins of FIG. 3 with a foot of the upper bin fully inserted in the lower channel.

DETAILED DESCRIPTION

[0056] In the following description, with reference to the drawings, like reference numerals are used to refer to like elements throughout. It will be appreciated that the drawings are not necessarily to scale. Certain terminology is used herein to describe the different embodiments of the invention. Such terminology is used only for convenience when referring to the figures. For example, “vertically” or “horizontally” merely describe the configuration shown in the figures. The components can be oriented in any direction and the terminology should therefore be interpreted to include such variations.

[0057] FIGS. 1A-1D illustrate a multi-use storage bin 10. The storage bin 10 has two sides 11,12, each having a pair of upper channels 13 and a pair of lower channels 14. Each upper channel 13 has a point of entry 15 that is partially blocked by a tab 16. Similarly, the each of the lower channels 14 have a point of entry 17 that also is partially blocked by a tab 18. A pair of feet 20 are disposed at the bottom of each side 11,12 and are used for stacking several bins on top of one another or nesting several bins together.

[0058] With additional reference to FIG. 2, two or more bins are stackable on top of one another by inserting the feet 20 of a first or upper storage bin 22 into the upper channels 13 of a second or lower storage bin 23. Because the tab 16 partially blocks the point of entry 15 to the upper channel 13, it interferes with or impedes removal of the foot 20 from the channel 13. Thus, removal of the foot 20 from the channel 13 requires a vertical force to lift the foot 20 over the tab 16 and a lateral force to slide the foot 20 from the channel 13.

[0059] Similarly, with additional reference to FIG. 3, two or more storage bins can be nested together by inserting the feet 20 of the upper storage bin 22 into the lower channels 14 of the second storage bin 23. Because the tab 18 partially blocks the point of entry 17 to the lower channel 14, it interferes with or impedes removal of the foot 20 from the channel 14. Like the upper channel, removal of the foot 20 from the lower channel 14 requires a vertical force to lift the foot 20 over the tab 18 and a lateral force to slide the foot 20 from the channel 14.

[0060] The channel and tab configuration and the combination of the lateral and vertical forces to remove the feet 20 of the upper storage bin 22 from the upper channel 13 or lower channel 14 of the lower storage bin 23 allows the storage bins to be interlocked with one another when stacked or nested. This further allows the storage bins to be moved easily without separating from one another, and prevents or inhibits the accidental sliding or removal of the feet 20 from the channels. The channel and tab configuration also reduces the risk that the bins will fall or collapse into one another, tip over and separate, or crack from placing unnecessary stress on the side walls of the bin when inserting and removing the feet from the channels. These as well as other features of the storage bin are described more fully below.

[0061] Referring generally to FIGS. 1A and 4, the storage bin 10 has two sides 11, 12 that are spaced from each other by a front portion 30, a bottom portion 31 and a rear portion 32. Together, the sides 11, 12, front 30, bottom 31 and rear 32 portions form a cavity that can be used for storage of miscellaneous loose items, such as, e.g., screws, nuts, bolts, nails, etc., sewing materials, powder, or virtually anything that will fit in the bin.

[0062] The pair of upper channels 13, also referred to as stacking channels, are disposed on or molded in the sides 11, 12 of the storage bin 10. The upper channels 13 are used to stack two storage bins on top of one another as described above with respect to FIG. 2 and as will be described in more detail below. The pair of lower channels 14, also referred to as nesting channels, are disposed on or molded in the sides 11, 12 of the storage bin 10. The lower channels 14 are used to nest two or more storage bins together as described above with respect to FIG. 3 and as will be described in more detail below.

[0063] Although the storage bin 10 is shown with both upper channels and lower channels 14, it will be appreciated that the bin 10 alternatively may have only a single pair of

channels. For example, if the storage bin only has a pair of upper, stacking channels 13, several storage bins could be stacked on top of one another, but not nested together. Likewise, if the storage bin only has a pair of lower, nesting channels 14, then several bins could be nested together, but not stacked on top of one another. If desired, the storage bin also may have more than two pairs of channels. It will be appreciated that either or both of the channels can be located at any desired height to achieve any variation and/or combination of nesting and/or stacking.

[0064] The front portion of the upper channel 13 is shown in more detail in FIG. 1B. The upper channel 13 has an upper wall 33, which also may be referred to as a locking lip. The upper wall 33 has an upper front edge 34. The upper channel 13 has a lower wall 35, which has a lower front edge 36. The upper front edge 34 and the lower front edge 36 define the point of entry 15 to the upper channel 13. To facilitate insertion and removal of a foot from the upper channel 13, for example, a flared foot 20, the upper front edge 34 is horizontally offset from the lower front edge 36.

[0065] The tab 16 is molded or otherwise attached to the lower front edge 36 of the upper channel 13. The tab 16 partially obstructs or blocks the point of entry 15. A rear face 37 of the tab 16 inhibits the horizontal movement of the foot 20 when the foot 20 is fully inserted in the upper channel 13. Sliding the foot 20 from the upper channel 13 is impeded by the tab 16, thus tending to block removal of the foot 20 from the channel 13 unless the foot 20 is lifted vertically and slid over the tab 16.

[0066] Referring to FIG. 1C, the front portion of the lower channel is shown in greater detail. The lower channel 14 has an upper wall 40 having an upper front edge 41 and a lower wall 42 having a lower front edge 43. The upper front edge 41 and the lower front edge 43 define the point of entry 17 to the lower channel 14. The upper front edge 41 and lower front edge 43 are horizontally offset from one another to facilitate the insertion and removal of a foot 20 from the channel 14.

[0067] A tab 18 extends from the front edge 43 of the lower wall 42 to partially block the point of entry 17. As described above with respect to the upper channel 13, the tab 18 at the lower front edge 43 has a rear face 44. The rear face 44 of the tab 18 inhibits the horizontal movement of the foot when the foot is fully inserted in the lower channel 14. Sliding the foot 20 from the lower channel 14 is impeded by the tab 18, thus tending to block removal of the foot 20 from the channel 14 unless the foot 20 is lifted vertically and slid over the tab 18.

[0068] The two forces in different directions (e.g., one up and one out) that are required to remove the feet 20 from the channels 13, 14 reduce the likelihood that several stacked or nested storage 22, 23 bins will separate from one another should they be knocked or toppled over, and also reduces the likelihood that the bins may be accidentally slid apart.

[0069] In one embodiment, the offset between the upper 34 and lower 36 edges of the upper channel 13 and the upper 41 and lower 43 edges of the lower channel 14 is approximately 1/8 inch, however it will be appreciated that the size of the channels, and points of entry may be increased or decreased to accommodate the feet of larger or smaller storage bins or feet having different profiles, etc.

[0070] Although the tabs 16,18 are shown extending vertically to partially block a portion of the points of entry 15, 17 to the upper 13 and lower channels 14, it will be appreciated that the tabs 16, 18 may be oriented at other positions on or within the channel. For example, the tabs may extend from

the front edges **34, 41** of the upper walls **33, 40** of the channels **13, 14** or may be disposed at another position along the length of the channels. Although shown as a tab **16, 18** partially blocking the point of entry **15, 17**, it will be appreciated that another implement may be used to inhibit or interfere with the removal of the feet from the channels. Additionally, one or more tabs may be incorporated into the channel or may block part of the channel, as may be desired.

[0071] Referring to FIG. 1D, one embodiment of the foot **20** is shown in more detail. The foot **20** in FIG. 1D is a flared foot. The foot **20** has a sloped portion **45** and a lateral portion **46**. The sloped portion **45** and lateral portion **46** cooperate with the upper walls of the channels to center stacked or nested bins with respect to one another and also distribute the forces in the feet and channels when several stacked or nested bins are lifted, as described in more detail below.

[0072] The bottom surface **47** of the foot **20** is generally planar along the length of the bin **10**. The bottom surface **47** rests on the lower wall **35** of the upper channel **13** when two or more bins are stacked on top of one another (FIG. 2). The bottom surface **47** rests on the lower wall **42** of the lower channel **14** when two or more bins are nested together (FIG. 3).

[0073] The foot **20** also has a front face **48**. When the foot **20** is fully inserted into the upper channel **13** and the bins are stacked together, the front face **48** engages or abuts the rear face **37** of the tab **16** to prevent or to impede the foot **20** from sliding out of the channel **13**. To remove the foot **20** from the channel **13**, a vertical lifting force is required to raise the bottom **47** of the foot **20** over the tab **16**. The front face **48** of the foot **20** and rear face **44** of the tab **18** interact in a similar manner when the bins are nested together, and a vertical force is required to lift the bottom **47** of the foot **20** over the tab **18** to remove the foot from the channel **14**. The front face **48**, therefore, prevents or inhibits accidental removal of the feet from the channels.

[0074] The flared foot **20** is insertable into a variety of different profile channels. For example, the channel may have a sloped profile, a rectangular profile or a profile that has a sloped component and a lateral component similar to the profile of the flared foot **20**. Although illustrated as having approximately a 45-degree slope, it will be appreciated that the sloped portion **45** of the foot **20** may be any desired angle, for example, to accommodate different channel profiles, or to vary the distribution of the forces in the feet and channels, etc.

[0075] Referring now to FIGS. 5A and 5B, which depict a sectional view of the storage bin **10** looking generally along the line 5A-5A in FIG. 4, the profiles of the upper channel **13** and lower channel **14** are shown in greater detail. The feet **20** generally are freely slidable into the channels **13, 14** with limited friction. The upper channel **13** extends generally along the length of the storage bin **10** and has an upper wall **33** and a lower wall **35**. The upper wall **33** is a flange-like lateral extension of the side wall that has two general regions, a front region **50** and a rear region **51**. The front region **50**, shown in greater detail in FIG. 5B is generally tapered or sloped while the rear region **51** is generally horizontal or untapered. The lower wall **35** of the channel **13** is generally horizontal or untapered along the entire length of the storage bin **10**. Thus, the height of the upper channel **13** at the front region **50** is greater than the height of the upper channel **13** at the rear region **51**. The wider front region **50** of the upper channel **13** allows more freedom of movement for the foot **20**, to facilitate insertion and removal of the foot **20** from the channel **13**

and lifting the foot **20** over the tab **16** when the foot is inserted and/or removed from the channel **13**. Conversely, because it is not tapered, the rear region **51** of the upper channel **13** restricts the movement of the foot **20** when the foot **20** is fully inserted into the channel **13** and generally retains the foot **20** in the upper channel **13**. In one embodiment, the rear region **51** is narrow enough to create a friction fit with the foot **20**.

[0076] As described above, the point of entry **15** to the upper channel **13** is defined by the front edge **34** of the upper wall **33** and the front edge **36** of the lower wall **35**. The upper front edge **34** is offset from lower front edge **36** to allow greater freedom of movement for inserting and removing the foot **20** from the channel **13**.

[0077] The lower channel **14** extends generally along the length of the storage bin **10** and has the same general profile as the upper channel **13**, including a tapered region near the point of entry **17** for facilitating the insertion and removal of the foot **20** from the lower channel **14** and an untapered region near the rear region **51** of the bin. To further facilitate insertion and removal of the foot **20** from the lower channel **14**, the upper front edge **41** of the channel **14** is sloped. The combination of the front portion **50** of the channel **14** and sloped upper front edge **41** allow greater freedom of movement to lift the foot **20** over the tab **18** when the foot **20** is inserted or removed from the lower channel **14**. It will be appreciated that the front edge **41** need not be sloped, as shown in FIG. 1C but instead may have a similar profile to the upper channel **13**.

[0078] The rear region **51** of the lower channel **14**, which is not tapered, restricts the movement of the foot **20** when the foot **20** is fully inserted into the lower channel **14**. As described above with respect to the upper channel **13**, the rear region **51** may be narrow enough to create a friction fit with the foot **20**.

[0079] As described above with respect to the upper channel **13**, the point of entry **17** to the lower channel **14** is defined by the front edge **41** of the upper wall **40** and the front edge **43** of the lower wall **41**. The upper front edge **41** is offset from lower front edge **43** to allow greater freedom of movement for inserting and removing the foot **20** from the lower channel **14**.

[0080] FIGS. 6A and 6B depict a sectional view of the storage bin **10** looking generally along the line 6A-6A of FIG. 4, and in particular detail a cross-section of the upper channel **13** and the lower channel **14**. The upper channel **14** has an upper wall **33** or locking lip and a lower wall **35**. The locking lip **33** extends along the length of the sides **11, 12** and generally engages a top portion of the foot **20**. When a stack of bins is lifted, the lateral portion **46** of the flared foot **20** engages the locking lip **33** and retains the foot **20** in the upper channel **13**. Other varieties of feet also may be inserted and retained in the upper channel **13**. For example, the foot **20** may be a flared foot as depicted in FIG. 1D or the foot may have a triangular cross-section, a rectangular cross-section, a spherical cross-section, etc.

[0081] The lower channel **14** also is configured to receive a foot **20** having a flared cross-section. The lower channel **14** has a sloped upper wall **52** and a lateral upper wall **53**. When a flared foot **20** is fully inserted in the channel **14**, the sloped upper wall **52** cooperates with the sloped portion **45** of the foot **20** to center the foot **20** in the lower channel **14**, and to evenly distribute any lifting forces in the foot **20** and the lower channel **14**. The lateral upper wall **53** cooperates with the lateral portion **46** of the flared foot **20** in the same manner. The feet of other storage bins, such as those described in the Background, also may be inserted and retained in the chan-

nels 13, 14 of the storage bin 10 as described herein. It also will be appreciated that while the upper channel 13 and lower channel 14 have been described as having specific configurations, the upper channel 13 may be flared and lower channel 14 may be rectangular, or, the channels may have a different profile, as will be appreciated by one of skill in the art. Furthermore, the upper walls may be configured to allow feet with a multitude of different profiles or cross-sections to be inserted and retained in the channel 14, for example, feet with triangular, rectangular, or circular cross-sections, etc., may be inserted and generally retained in the channels.

[0082] With additional reference to FIGS. 2, and 7A-7C, two or more storage bins 22, 23 are stackable on top of one another. The bins 22, 23 are stacked by inserting the feet 20 of one bin 22 into the upper or stacking channel 13 of a second bin 23. As described above with respect to the bin 10 (FIG. 1), the upper channel 13 is tapered at the point of entry 15 and upper front edge 34 and lower front edge 36 are horizontally offset from one another to facilitate insertion and removal of the foot 20 from the channel 13.

[0083] The foot 20 initially is inserted into the upper channel 13 at an angle, e.g., along the angle of the tapered front region 50 of the upper channel 13 (FIGS. 5A-5B). The angled trajectory of insertion allows the bottom surface 47 of the foot 20 to clear or be slid over the tab 16, which partially blocks the point of entry 15. The foot 20 is then slid along the front, tapered region 50 of the channel into the rear, untapered region 51 of the upper channel 13 (FIGS. 5A-5B).

[0084] As shown in FIG. 7B, tab 16, which partially blocks the point of entry 15, generally limits the horizontal movement of the foot 20 in the channel 13 when the foot 20 is slid over the tab 16 and fully inserted into the channel 13. When fully inserted, the foot 20 cannot be slid horizontally out of the channel 13 and, therefore, is retained in the channel 13 during normal usage.

[0085] As shown in FIG. 7C, the narrower rear region upper wall or locking lip 33 of the upper channel 13 inhibits removal of the foot 20 in the vertical direction and allows the stacked bins to be lifted as a unit without separating from one another, for example, an entire stack of bins can be lifted without falling apart by grabbing and lifting the stack by the topmost bin. The bottom surface 47 of the foot 20 is supported by the bottom wall 35 of the upper channel 13 when the bins are stacked thereby decreasing the likelihood that the upper bin 22 will collapse into the lower bin 23, for example, if a heavy load is placed into an upper bin 22.

[0086] Thus, the stacked bins 22, 23 are interlocked with one another and separating the bins requires a combination of a vertical force to lift the bottom 47 of the foot 20 over the tab 16 and a horizontal force to slide the foot 20 from the channel 13. The combination of the vertical and horizontal movement necessary to remove the foot 20 from the upper channel 13 keeps the bins together and decrease the likelihood that the bins will separate during normal usage or if the stack of bins tips or topples over.

[0087] The length of the upper channel 13 is slightly greater than the length of the foot 20 such that there is a small gap between the front face 48 of the foot 20 and the rear face 37 of the tab 16 when the foot 20 is fully inserted into the upper channel 13. The gap allows the foot 20 to move slightly in the upper channel 13, which facilitates lifting the foot 20 over the tab 16 to separate one bin from another. In one embodiment, the gap between the front face 48 of the foot 20 and the rear face 37 of the tab 16 is between $\frac{1}{8}$ -inch and $\frac{1}{16}$ -inch, how-

ever, it will be appreciated that the clearance or gap may be larger or smaller based upon the size of the storage bins and the tolerance needed to insert and remove the foot from the channel.

[0088] With additional reference to FIGS. 3 and 8A-8C, several storage bins 22, 23 also are nestable within each other by sliding the foot 20 of one storage bin 22 into the lower or nesting channel 14 of a second bin 23. As described above, the offset and taper of the channel 14 facilitate insertion of the foot 20 over the tab 18 and into the lower channel 14. With specific reference to FIG. 8B, the tab 18 partially blocks the point of entry 17 of the lower channel 14, thereby limiting the horizontal movement of the foot 20 in the channel 14 when the foot 20 is fully inserted into the lower channel 14. As a result, the foot 20 generally is maintained in the lower channel 14 during normal usage and ordinarily cannot be slid out of the lower channel 14 without a combination of a vertical force to lift the bottom 47 of the foot 20 over the tab 18 and a horizontal force to slide the foot 20 out of the lower channel 14.

[0089] Referring specifically to FIG. 8C, the sloped portion 52 and lateral portion 53 of the upper wall of the lower channel 14 limit the vertical movement of the foot 20 in the channel 14. For example, when the bins are lifted from an upper bin in a stack of nested bins, the sloped portion of the upper wall 52 cooperates with and provides a surface for engaging the sloped portion 45 of the flared foot 20. Likewise, the lateral portion of the upper wall 53 cooperates with and engages the lateral portion 46 of the flared foot 20. Thus, the sloped upper wall 52 and the lateral upper wall 53 maintain the bins together. It will be appreciated that if the foot has a triangular cross-section, then only the sloped upper wall will engage the foot or if a foot with a rectangular cross-section is inserted then only the lateral portion of the channel will engage the foot, etc.

[0090] Continuing to refer to FIG. 8C, the bottom surface 47 of the foot 20 is supported by the lower wall 42 of the lower channel 14 when the bins are nested together thereby decreasing the likelihood that the upper bin 22 will collapse into the lower bin 23, for example, if a heavy load is placed into an upper bin 22.

[0091] The nested bins 22, 23 interlock with one another and separating the bins ordinarily requires a combination of a vertical force to lift the bottom 47 of the foot 20 over the tab 18 and a horizontal force to slide the foot 20 out of the channel 14. The combination of the vertical and horizontal movement necessary to remove the foot from the lower channel keep the bins together during normal usage and decreases the likelihood that the bins will separate if they tip over.

[0092] Like the upper channel 13, the length of the lower channel 14 is slightly greater than the length of the feet 20 such that there is a small gap or clearance between the front face 48 of the foot and the rear face 44 of the tab 18. The gap facilitates the insertion and removal of the foot 20 from the channel 14.

[0093] Although the figures illustrate the stacking and nesting of bins that are the same size, it will be appreciated that different sized bins may be stacked on top of one another or nested together. For example, a shorter bin may be stacked on top of or nested within a larger storage bin, etc. Although illustrated with respect to two bins, it will be appreciated that multiple bins, including the same and different sized bins, may be stacked on top of each other and/or nested together.

[0094] Referring back to FIGS. 1 and 4, the internal cavity of the storage bin 10 has several divider slots into which a divider may be inserted to divide the bin into one or more smaller areas or compartments. The bin 10 has a rear divider slot 60, a bottom divider slot 61 and a front divider slot 62. The slots are aligned such that a divider may be inserted into the bin and held in place by each of the slots at the same time. The divider may be shaped to match the contour of the bin 10, including the contour of the front portion 30, bottom portion 31 and rear portion 32. The configuration of the slots and dividers also may be varied any number of ways to divide bin 10 into multiple compartments of any desired size. For example, the slots may be located on the sides 11, 12 to divide the cavity of the bin 10 laterally or the slots may be located on both the side walls and front and back walls to divide the bin into quadrants. The slots also may be arranged to divide the bin 10 into thirds, or into a combination of larger and smaller regions, etc. The divider may be formed from plastic, cardboard, or another other suitable material, as will be appreciated by one of skill in the art.

[0095] The storage bin 10 also has a label holder 63 disposed or formed on the front portion 30. A label or card is insertable into the holder 63 and may be used to label or identify the contents of the storage bin 10. The holder 63 has an opening 64 into which an identification card may be inserted. The identification card is supported by the card holder sides 65, 66 and bottom 67. The label or identification card may be removed from the holder 63 by sliding the card through the opening 64, allowing the identification card to be replaced or changed as desired.

[0096] A hanger 70 or other hanging implement, is attached or molded to the top edge 71 of the rear portion 32 of the storage bin 10 to allow the bin to be hung. For example, the storage bin may be hung from louvered panels or racks, bin rails, perforated panels, perf-board, or on cabinet doors or walls, etc. The hanger 70 may be molded to the top edge 71 of the rear portion 32, as shown in FIG. 1, or alternatively may be a strap or other hanging implement that may be attached by a rivet, screw, button or other fastener to the rear portion 32 of the bin 10. The storage bin 10 may be hung from or more BinClips, pegboard hooks, louvered panels, louvered racks, Bin Rail systems, Bin Rail racks, and hanging Bin Rail carts or other hanging systems or mechanisms.

[0097] The storage bin 10 may be constructed from a rigid and/or flexible material such as metal or plastic and may welded or formed by an injection molding process. Some suitable materials include polyvinylchloride (PVC), polyethylene, or polypropylene, however, other suitable material may be used based on the size of the bins and the desired strength of materials, etc., as will be appreciated by one of skill in the art. While the storage bin has been described as being constructed from materials that form solid walls, it will be appreciated that the storage bins may instead be constructed from other materials including for example, flexible materials that may be stretched over a solid frame, metal, or a combination thereof, such as, mesh stretched over rigid frame.

[0098] The bins also may vary in shape, including height, width and depth. Additionally, the height of the front portion 30 is less than the height of the side walls 11, 12 and rear wall 32 to provide a space for access to the lower bins, for example, if several bins are stacked on top of one another.

[0099] Although not shown in the figures, a flat cover may be slidably inserted into the channels 13, 14 to cover the

storage bin 10 and protect the stored items from dust or other contaminants as well as to prevent the contents of the storage bins from spilling and/or intermixing. The cover may, for example, be manufactured from a clear, rigid material that allows the contents of the storage bin to be seen when the bin is covered. Alternatively, the cover may be constructed from a rigid frame that supports or stretches a flexible material, such as plastic or fabric across the opening of the storage bin.

[0100] The cover is insertable into the lower channel 14 to substantially enclose the lower half of the bin cavity. Alternatively, the cover may be inserted into the upper channel 13 to substantially enclose the top of the bin cavity. In yet another alternative, the cover may have a flap to cover the open front portion of the storage bin 10 when the cover is inserted into the upper channel 13. The flap may be rigidly attached or molded to the cover or alternatively may be attached via a hinge or a flexible member such that the flap can be opened and/or closed as desired to access the contents of the storage bin 10. The flap also may have a securing member to maintain the flap in a closed position. Possible securing members include, for example, Velcro, a latch, a hook or another suitable mechanism. Alternatively, the flap may be configured slide along the inside of the front portion 30 or to be inserted and/or secured into the label holder 63.

[0101] The storage bin 10 also may be fixed or attached to a surface, for example, a work bench or table. A track or channel, shaped like the upper or lower channels described above, e.g., a tapered channel having an offset, point of entry, and a tab partially blocking the front edge of the point of entry, may be integrated or attached to the work surface. The channel may be molded to the work bench or attached to the work bench by screws, nails, glue, etc.

[0102] The feet of the storage bin 10 may be inserted into the channel at a slight angle with the configuration of the channel and tab limiting the vertical and horizontal movement of the foot in the channel, as described above. Additional storage bins may be stacked on or nested in the storage bin that is attached to the work surface. By attaching the bins to the work surface, the bins are less likely to tip or be accidentally knocked over. It also will be appreciated that the tracks may be inclined relative to the surface of the work bench thereby causing the contents of the storage bins to migrate or slide towards the front of the bin. Similarly, the storage bins may be arranged on a shelving unit or a separate rack, for example a gravity shelf having, which have inclined tracks or channels into which the feet of storage bins may be slid.

[0103] It also will be appreciated that the bins may be standalone units and may, for example, be placed in a drawer or cabinet or on a cart, shelf, rack, gravity shelf, etc.

[0104] Although particular embodiments of the invention have been described in detail, it is understood that the invention is not limited correspondingly in scope, but includes all changes, modifications and equivalents coming within the spirit and terms of the claims.

I claim:

1. A storage bin comprising:

- a pair of side walls separated from each other by a rear portion and a bottom portion, the rear portion and the bottom portion extending between the side walls,
- a channel in each side wall, each channel having a point of entry,

a tab partially blocking a portion of at least one channel such that the tab impedes removing a foot of a second storage bin when the foot is inserted in the channel.

2. A storage bin according to claim 1 wherein the channel extends from a front portion of the storage bin towards the rear portion of the storage bin, and the point of entry is near the front portion of the storage bin.

3. A storage bin according to claim 1 wherein the channel has an upper wall having an upper front edge and a lower wall having a lower front edge, and the upper front edge is offset from the lower front edge.

4. A storage bin according to claim 3 wherein the channel is tapered such that the channel is wider near the point of entry and narrower near the rear portion of the storage bin.

5. A storage bin according to claim 3 wherein the channel is tapered such that the channel is wider near the point of entry facilitating insertion of a foot of a second storage bin into the channel and narrower near the rear portion of the storage bin tending to retain in the channel the feet of a second storage bin.

6. A storage bin according to claim 3 wherein the upper wall of the channel is sloped relative to the lower wall of the channel to center the foot of the second storage bin in the channel.

7. A storage bin according to claim 6 wherein the upper wall of the channel is further comprised of a lateral portion to restrict the vertical movement of the foot in the channel.

8. A storage bin according to claim 1 wherein the tab partially blocks the point of entry of at least one channel.

9. A storage bin according to claim 1 further comprising a second storage bin, wherein the foot on the second storage bin is insertable into the channel to stack the storage bins on top of one another or to nest one storage bin at least partially within the other storage bin.

10. A storage bin comprising:

a pair of side walls separated from each other by a rear wall and a bottom surface, the rear wall and bottom surface extending between the side walls,

an upper channel in each side wall, each upper channel having a point of entry and a tab partially blocking the point of entry such that the tabs impede removal of a pair of feet on a second storage bin when the feet are inserted into the upper channels to stack the storage bins on top of one another, and

a lower channel in each side wall, each lower channel having a point of entry and a tab partially blocking the point of entry such that the tabs impede removal of the feet on the second storage bin when the feet are inserted into the lower channels to at least partially nest the storage bins together.

11. A storage bin according to claim 10 wherein at least one of the upper or lower channels has an upper wall having an upper front edge and a lower wall having a lower front edge and the upper front edge is offset from the lower front edge.

12. A storage bin according to claim 11 wherein the at least one upper or lower channel is tapered such that the channel is wider near the point of entry and narrower near the rear portion of the storage bin.

13. A storage bin according to claim 11 wherein the tab extends from the lower front edge of the channel to restrict the horizontal movement of the foot in the channel.

14. A storage bin according to claim 13 wherein the upper wall of the at least one channel is further comprised of a lateral portion to restrict the vertical movement of the foot in the channel.

15. A storage bin according to claim 14 wherein the lateral portion is a flange-like lateral extension of the side walls.

16. A storage bin according to claim 14 wherein the upper wall of at least one channel is angled relative to the lower portion of the channel.

17. A storage bin comprising:

a pair of side walls separated from each other by a rear portion and a bottom portion, the rear portion and bottom portion extending between the side walls,

a channel in each side wall, each channel having an upper portion having an upper front edge and a lower portion having a lower front edge,

a point of entry defined by the upper front edge and the lower front edge, and

a tab at least partially blocking the point of entry of at least one channel such that the tab impedes removal of a foot on a second storage bin when the foot is inserted into the channel.

18. A storage bin according to claim 17 wherein the tab extends from the lower front edge of the channel.

19. A storage bin according to claim 17 wherein the upper front edge is offset from the lower front edge.

20. A storage bin according to claim 17 wherein the upper portion of the channel is sloped relative to the lower portion of the channel.

21. A storage bin according to claim 20 wherein the upper portion of the channel has a lateral portion.

22. A storage bin according to claim 21 wherein the lateral portion is a flange-like lateral extension of the side walls.

23. A storage bin according to claim 22 wherein the foot is comprised of an angular portion and a lateral portion.

24. A storage bin according to claim 22 further comprising a second channel in each side wall.

25. A method of arranging storage bins comprising the steps of:

inserting a foot of a first storage bin into a channel of a second storage bin, impeding the movement of the first storage bin at least partially blocking a point of entry to the channel.

26. The method of claim 25 wherein the storage bins are stacked on top of one another.

27. The method of claim 25 wherein the storage bins are at least partially nested within each other.

28. The method of claim 25 further comprising the step of lifting the foot to unblock it from removal from the channel.

* * * * *