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(54) **VARIABLE VOLUME CONTAINER**

(57) A variable volume container, comprising:
a lower portion comprising a base and four walls, the four
walls extending from the base and comprising a lip at the
top of the walls of the lower portion; and
an upper portion comprising four walls, wherein opposing
walls of the upper portion comprise one or more protrus-
ions configured to abut the lip of the lower portion to
allow the upper portion to rest upon the lower portion, to

place the container in an extended position; and
wherein the opposing walls of the upper portion compris-
ing the one or more protrusions are configured to flex
laterally, relative to the lip of the lower portion, to allow
the one or more protrusions to be disengaged from the
lip to allow the upper portion to be moved downwards
relative to the lower portion, to place the container in a
retracted position.

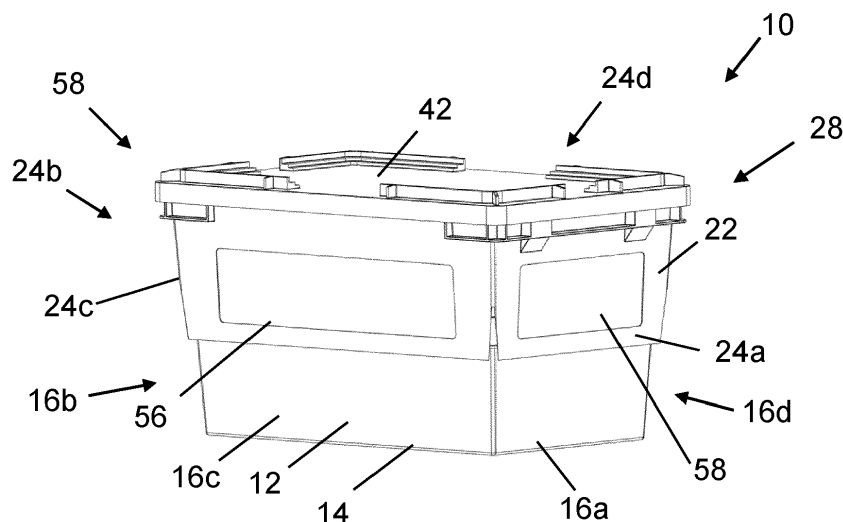


FIG. 1

Description

TECHNOLOGICAL FIELD

[0001] Embodiments of the present disclosure relate to a variable volume container and associated methods.

BACKGROUND

[0002] Containers of various forms can be used to transport items, including, but not limited to, pharmaceutical products, cosmetics, e-commerce items, spare parts, and so on.

[0003] It is desirable to have a container that can be used to transport one or more items and be stored in an efficient manner.

BRIEF SUMMARY

[0004] According to various, but not necessarily all, embodiments there is provided a variable volume container, comprising:

a lower portion comprising a base and four walls, the four walls extending from the base and comprising a lip at the top of the walls of the lower portion; and an upper portion comprising four walls, wherein opposing walls of the upper portion comprise one or more protrusions configured to abut the lip of the lower portion to allow the upper portion to rest upon the lower portion, to place the container in an extended position; and wherein the opposing walls of the upper portion comprising the one or more protrusions are configured to flex laterally, relative to the lip of the lower portion, to allow the one or more protrusions to be disengaged from the lip to allow the upper portion to be moved downwards relative to the lower portion, to place the container in a retracted position.

[0005] In some examples, the opposing walls of the upper portion comprising the one or more protrusions are configured to flex away from each other to allow the one or more protrusions to be disengaged from the lip.

[0006] In some examples, the walls of the lower portion, corresponding to the opposing walls of the upper portion comprising the one or more protrusions, comprise a substantially wedge-shaped portion underneath the lip configured to force the opposing walls of the upper portion away from each other as the upper portion is moved upwards relative to the lower portion, from the retracted position, to allow the one or more protrusions to move past the lip.

[0007] In some examples, two other opposing walls of the upper portion comprise one or more protrusions at their lower ends, the one or more protrusions configured to interact with a lower surface of the lip to retain the upper portion on the lower portion.

[0008] In some examples, the one or more protrusions of the two other opposing walls of the upper portion comprise a substantially wedge-shaped portion configured to force the two other opposing walls of the upper portion away from each other as the upper portion is moved downwards relative to the lower portion, to allow the one or more protrusions of the two other opposing walls to move past the lip.

[0009] In some examples, when the container is in the extended position, the one or more protrusions of the opposing walls abut the lip and the one or more protrusions of the other opposing walls are located underneath the lip.

[0010] In some examples, the container is substantially rectangular in shape, the two opposing walls are the shorter sides of the rectangle and the two other opposing walls are the longer sides of the rectangle.

[0011] In some examples, the variable volume container comprises a lid configured to be positioned on the upper portion to close the container.

[0012] In some examples, the lid is configured to be positioned on the lower portion, to close the lower portion.

[0013] In some examples, the upper portion and/or lower portion comprise one or more features, and wherein the lid comprises one or more corresponding features to allow the lid to be positioned on the upper portion or lower portion.

[0014] In some examples, the lid comprises one or more features configured to cooperate with one or more corresponding features of another similarly configured lid to allow the lids to be stacked.

[0015] In some examples, the upper portion comprises one or more features configured to cooperate with one or more corresponding features of another similarly configured upper portion to allow the upper portions to be stacked.

[0016] In some examples, the lower portion comprises one or more features configured to cooperate with one or more corresponding features of another similarly configured lower portion to allow the lower portions to be stacked.

[0017] In some examples, the container comprises one or more features configured to cooperate with one or more corresponding features of another similarly configured container to allow the containers to be stacked.

[0018] In some examples, at least one of the walls of the upper and/or lower portion comprises at least one external, recessed, substantially flat portion configured to receive at least one label.

[0019] In some examples, the opposing walls of the upper portion that are configured to flex laterally comprise at least one external, substantially smooth area.

[0020] According to various, but not necessarily all, embodiments there is provided method comprising: manufacturing a variable volume container as described herein

[0021] According to various, but not necessarily all, embodiments there is provided a method comprising: us-

ing a variable volume container as described herein.

[0022] According to various, but not necessarily all, embodiments there is provided examples as claimed in the appended claims.

[0023] The description of a function and/or action should additionally be considered to also disclose any means suitable for performing and/or configured to perform that function and/or action.

BRIEF DESCRIPTION

[0024] Some examples will now be described with reference to the accompanying drawings in which:

FIG. 1 shows an example of a variable volume container;

FIG. 2 shows an example of a lower portion of a variable volume container;

FIG. 3 shows an example of an upper portion of a variable volume container;

FIGS. 4A and 4B show examples of a variable volume container;

FIGS. 5A and 5B show examples of a variable volume container;

FIGS. 6A and 6B show examples of a variable volume container;

FIGS. 7A and 7B show examples of a variable volume container;

FIGS. 8A and 8B show examples of a variable volume container;

FIGS. 9A, 9B, 9C, 9D and 9E show examples of a lid;

FIG. 10 shows an example of stacking of lower portions of a variable volume container;

FIG. 11 shows an example of stacking of upper portions of a variable volume container;

FIG. 12 shows an example of stacking of variable volume containers; and

FIGS. 14A, 14B, 14C and 14D show examples of stacking of variable volume containers.

DETAILED DESCRIPTION

[0025] The figures generally illustrate examples of a variable volume container 10.

[0026] In examples, the variable volume container 10 can be considered a variable volume box, and/or a variable volume receptacle, and/or a variable volume vessel and so on.

[0027] In examples, the variable volume container 10 can be considered an extendable/retractable container 10.

[0028] In examples, the variable volume container 10 comprises:

a lower portion 12 comprising a base 14 and four walls 16a-d, the four walls 16a-d extending from the base 14 and comprising a lip 20 at the top of the walls 16a-d of the lower portion 12; and

an upper portion 22 comprising four walls 24a-d, wherein opposing walls 24a, 24b of the upper portion 22 comprise one or more protrusions 26 configured to abut the lip 20 of the lower portion 12 to allow the upper portion 22 to rest upon the lower portion 12, to place the container 10 in an extended position; and wherein the opposing walls 24a, 24b of the upper portion 22 comprising the one or more protrusions 26 are configured to flex laterally, relative to the lip 20 of the lower portion 12, to allow the one or more protrusions 26 to be disengaged from the lip 20 to allow the upper portion 22 to be moved downwards relative to the lower portion 12, to place the container in a retracted position 30.

[0029] Movement of the upper portion 22 downwards relative to the lower portion 12 can be considered a movement downwards during normal use of the container 10.

[0030] Movement of the upper portion 22 downwards relative to the lower portion 16 can be considered movement of the upper portion 22 generally towards the base 14 of the lower portion 16.

[0031] Movement of the upper portion 22 downwards relative the lower portion 12 can be considered movement of the upper portion 22 to reduce the internal volume of the variable volume container 10.

[0032] Similarly, movement of the upper portion 22 upwards relative to the lower portion 16 can be considered movement of the upper portion in a generally opposite direction to the downward direction.

[0033] In examples, external can be considered to relate to exterior and/or outside of the container 10. For example, an external surface can be considered a surface of container 10 on the exterior or the outside of the container 10.

[0034] In examples, internal can be considered to relate to interior and/or inside of the container 10. For example, an internal surface can be considered a surface of container 10 on the interior or the inside of the container 10.

[0035] The variable volume container 10 can be made/formed from any suitable material or materials. For example, the variable volume container 10 can be formed from any suitable plastic. In examples, the variable volume container 10 is made from end-of-life vehicle plastic.

[0036] FIG. 1 illustrates an example of a variable volume container 10.

[0037] Various features referred to during discussion of a FIG can be found in on or more of the other FIGs.

[0038] In the example of FIG. 1, the variable volume container 10 comprises a lower portion 12 and an upper portion 22.

[0039] The variable volume container 10 of FIG. 1 also comprises a lid 42. However, in some examples, the variable volume container 10 does not comprise a lid 42.

[0040] In the illustrated example, the variable volume container 10 is in an extended position 28.

[0041] FIG. 2 illustrates an example of a lower portion

12. The lower portion 12 illustrated in FIG. 2 can be the lower portion 12 of FIG. 1.

[0042] In the example of FIG. 2, the lower portion 12 comprises a base 14 and four walls 16a-d, the four walls 16a-d extending from the base 14.

[0043] In examples, the base 14 can comprise any suitable surface or surfaces upon which the container can rest during normal use. In examples, the base 14 can be considered the bottom of the container 10.

[0044] The four walls 16a-d of the lower portion 12 extend from the base 14 to define an internal volume in which one or more items can be placed/stored.

[0045] In the example FIG. 2, the walls 16a-d extend in a generally upward direction from the base 14. In the illustrated example, the four walls 16a-d taper outwards as they extend away from the base 4.

[0046] The lower portion 12 comprises a lip 20 at the top of the walls 16a-d of the lower portion 12.

[0047] In examples, the lip 20 can have any suitable form. For example, the lip 20 can have any suitable form to allow the upper portion 22 to rest upon the lower portion 12 when the variable volume container 10 is in an extended position 28.

[0048] For example, the lip 20 can have any suitable form to allow one or more protrusions 26 of the upper portion 22 to abut the lip of the lower portion 12 to allow the upper portion 22 to rest upon the lower portion 12 when the container 10 is in an extended position 28.

[0049] In the example of FIG. 2, the lip 20 extends away from the walls 16a-d of the lower portion 12 to provide a substantially flat surface that is substantially parallel to the base 14.

[0050] In the example of FIG. 2, the substantially flat surface of the lip 20 is configured to allow one or more protrusions 26 of the upper portion 22 to abut the lip 20 of the lower portion 12 to allow the upper portion 22 to rest on the lower portion 12 to place the container 10 in an extended position 28.

[0051] FIG. 3 illustrates an example of the upper portion 22.

[0052] In the example of FIG. 3, the upper portion 22 comprises four walls 24a-d configured to correspond to the walls 16a-d of the lower portion 12.

[0053] In examples, the four walls 24a-d of the upper portion 22 effectively extend the walls 16a-d of the lower portion 12, when the container 10 is in an extended position 28.

[0054] The walls 24a-d of the upper portion 22 taper outwards from the bottom of the upper portion 22 to the top of the upper portion 22, where the bottom of the upper portion can be considered the portion of the upper portion 22 configured to interact with the top of the lower portion 12.

[0055] In the illustrated example, opposing walls 24a, 24b of the upper portion 22 comprise one or more protrusions 26 configured to abut the lip 20 of the lower portion 12 to allow the upper portion 22 to rest upon the lower portion 12, to place the container 10 in an extended

position 28.

[0056] The opposing walls 24a, 24b of the upper portion 22 comprising the one or more protrusions 26 can be considered abutment walls.

[0057] The one or more protrusions 26 of the opposing walls 24a, 24b of the upper portion 22 can be considered abutment protrusions 26.

[0058] In the example of FIG. 3, the one or more protrusions 26 are visible on the interior of wall 24b. However, in the example of FIG. 3, similar protrusion(s) 26 are present on the interior of wall 24a, opposing wall 24b.

[0059] In examples, the one or more protrusions 26 can have any suitable form, for example, the one or more protrusions 26 can have any suitable form to abut the lip 20 of the lower portion 12 to allow the upper portion 22 to rest upon the lower portion 12.

[0060] In some examples, the one or more protrusions 26 comprise a substantially flat surface configured to rest upon the lip 20 of the lower portion 12, for example on a substantially flat surface of the lip 20 of the lower portion 12. See, for example, FIG. 5A and 5B.

[0061] In the example of FIG. 3, the opposing walls 24a, 24b of the upper portion 22 comprising the one or more protrusions 26 are configured to flex laterally, relative to the lip 20 of the lower portion 12, to allow the one or more protrusions 26 to be disengaged from the lip 20 to allow the upper portion 22 to move downwards relative to the lower portion 12, to place the container in a retracted position 30.

[0062] In examples the opposing walls 24a, 24b of the upper portion 22 can be configured in any suitable way to flex laterally to allow the one or more protrusions 26 to be disengaged from the lip 20 of the lower portion 12.

[0063] In some examples, the opposing walls 24a, 24b can be considered resiliently deflectable walls 24a, 24b, wherein in their deflected state the distance between the deflected portions of the walls 24a, 24b is larger (if deflected outwards) or smaller (if deflected inwards) than the distance between those portions when not in a deflected state.

[0064] In examples the opposing walls 24a, 24b of the upper portion 22 can be considered to be configured to bend and/or move laterally, relative to the lip 20 of the lower portion 12.

[0065] Accordingly, FIG. 1 illustrates a variable volume container 10, comprising:

a lower portion 12 comprising a base 14 and four walls 16a-d, the four walls 16a-d extending from the base 14 and comprising a lip 20 at the top of the walls 16a-d of the lower portion 12; and
an upper portion 22 comprising four walls 24a-d, wherein opposing walls 24a, 24b of the upper portion 22 comprise one or more protrusions 26 configured to abut the lip 20 of the lower portion 12 to allow the upper portion 22 to rest upon the lower portion 12, to place the container 10 in an extended position 28; and

wherein the opposing walls 24a, 24b of the upper portion 22 comprising the one or more protrusions 26 are configured to flex laterally, relative to the lip 20 of the lower portion 12, to allow the one or more protrusions 26 to be disengaged from the lip 20 to allow the upper portion 22 to be moved downwards relative to the lower portion 12, to place the container 10 in a retracted position 30.

[0066] Accordingly, the container 10 is configured to have a variable volume for storing items dependent on whether the container 10 is in an extended position 28 or a retracted position 30.

[0067] With reference again to the example of FIG. 3, in examples, the opposing walls 24a, 24b of the upper portion 22 comprising the one or more protrusions 26 are configured to flex away from each other to allow the one or more protrusions 26 to be disengaged from the lip 20.

[0068] In examples, the opposing walls 24a, 24b of the upper portion 22 comprising the one or more protrusions 26 can be configured to be flexed by hand and/or by suction.

[0069] For example, the opposing walls 24a 24b can comprise a portion at their lower ends configured to be grasped to allow the opposing walls 24a, 24b to be flexed by hand. See, for example, FIG. 5B.

[0070] For example, the opposing walls 24a, 24b of the upper portion 22 that are configured to flex laterally can comprise at least one external, substantially smooth area 58. See, for example, FIG. 1 and/or FIG. 4B.

[0071] In examples, the at least one external, substantially smooth area 58 is configured to allow a suction robot to attach to the outside of the container and flex the opposing walls 24A, 24B away from each other to disengage the one or more protrusions 26 from the lip 20 of the lower portion 12.

[0072] In some examples, the walls 16a, 16b of the lower portion 12, corresponding to the opposing walls 24a, 24b of the upper portion 22 comprising the one or more protrusions 26, comprise a substantially wedge-shaped portion 32 underneath the lip 20 configured to force the opposing walls 24a, 24b of the upper portion 22 away from each other as the upper portion 22 is moved upwards relative to the lower portion 12, from the retracted position, to allow the one or more protrusions 26 to move past the lip 20. See, for example, FIGS. 4A, 4B, 5A and 5B.

[0073] FIG. 4A shows a side view of a variable volume container 10 and FIG. 4B illustrates an example of an end view of a variable volume container 10.

[0074] The variable volume container 10 of the example of FIGS. 4A and 4B can be a variable volume container 10 as illustrated in the example of FIG. 1.

[0075] FIG. 5A shows a cross section taking through the line B - B in the example of FIG. 4B.

[0076] FIG. 5B shows a detailed view of the circled portion indicated in FIG. 5A.

[0077] In the example of FIG. 5B, the intersection be-

tween one of the opposing walls 24a of the upper portion 22 and the corresponding wall 16a of the lower portion 12 can be seen.

[0078] In the example of FIG. 5B, protrusion 26 of the wall 24a of the upper portion 22 is abutting/resting on the lip 20 of the lower portion 12. In the example of FIG. 5B, the protrusion 26 is a substantially planar protrusion.

[0079] In the illustrated example, the wall 16a comprises a substantially wedge-shaped portion 32 underneath the lip 20 configured to force the wall 24a outwards as the upper portion 22 is moved upwards relative to the lower portion 12.

[0080] In examples, the wedge-shaped portion 32 can have any suitable form. For example, the wedge-shaped 32 portion can have any suitable form to force the wall 24a of the upper portion 22 outwards as the upper portion 22 is moved upwards relative to the lower portion 12.

[0081] The wedge-shaped portion 32 can be considered a slanted portion, and/or a triangular portion, and/or at least one angled surface and so on.

[0082] Returning to the example of FIG. 3, in examples, two other opposing walls 24c, 24d of the upper portion 22 comprise one or more protrusions 34 at their lower ends, the one or more protrusions 34 configured to interact with a lower surface 38 of the lip 20 to retain the upper portion 22 on the lower portion 12.

[0083] In examples, the other opposing walls 24c, 24d of the upper portion 22 comprising the one or more protrusions 34 can be considered retaining walls.

[0084] In examples, the one or more protrusions 34 of the other opposing walls 24c, 24d of the upper portion 22 can be considered retaining protrusions 34.

[0085] In examples, the retaining protrusions 34 can have any suitable form. For example, the retaining protrusions 34 can have any suitable form to interact with a lower surface 38 of the lip 20 to retain the upper portion 22 on the lower portion 12.

[0086] In some examples, the one or more protrusions 34 of the two other opposing walls 24c, 24d of the upper portion 22 comprise a substantially wedge-shaped portion 40 configured to force the two other opposing walls 24c, 24d of the upper portion 22 away from each other as the upper portion 22 is moved downwards relative to the lower portion 12, to allow the one or more protrusions 34 of the two other opposing walls 24c, 24d to move past the lip 20. See, for example, FIG. 6A and FIG. 6B.

[0087] FIG. 6A shows a cross section taking through the line A - A in the example of FIG. 4A.

[0088] FIG. 6B shows a detailed representation of the circled area in the example of FIG. 6A.

[0089] In the example of FIG. 6B, the intersection between one of the other opposing walls 24c of the upper portion 22 and the corresponding wall 16c of the lower portion 12 can be seen.

[0090] In the illustrated example, the lip 20 is substantially planar and therefore provides a substantially flat lower surface 38.

[0091] In the example of FIG. 6B, the other wall 24c of

the upper portion 22 comprises a protrusion 34 at its lower end configured to interact with the lower surface 38 of the lip 20 to retrain the upper portion 22 on the lower portion 12.

[0092] In the example of FIG. 6B, the protrusion 34 comprises a substantially flat surface configured to interact with the substantially flat lower surface 38 of the lip 20 to prevent the upper portion 22 from readily being removed from the lower portion 12.

[0093] In the illustrated example, the protrusion 34 comprises a substantially wedge-shaped portion 40 configured to force the wall 24c of the upper portion 22 outwards as the upper portion 22 is moved downwards relative to the lower portion 12 to allow the one or more protrusions 34 of the wall 24c to move past the lip 20 and to effectively lock into place.

[0094] The wedge-shaped portion 40 can be considered a slanted portion, and/or a triangular portion, and/or at least one angled surface and so on.

[0095] In examples, when the container 10 is in the extended position 28, as illustrated in, for example, FIG. 1 and FIGS. 4A to 6B, the one or more protrusions 26 of the opposing walls 24a, 24b abut the lip 20 and the one or more protrusions 34 of the other opposing walls 24c, 24d are located underneath the lip 20.

[0096] Accordingly, in examples, when the container 10 is in the extended position the upper portion 22 and lower portion 12 cannot move significantly relative to each other without lateral movement of the opposing walls 24a, 24b/24c, 24d to allow the upper portion 22 to move downwards relative to the lower portion 12 or to allow the upper portion 22 to be removed from the lower portion 12.

[0097] As illustrated in the FIGs, in examples, the container 10 is substantially rectangular in shape, wherein the two opposing walls 24a, 24b are the shorter sides of the rectangle and the two other opposing walls 24c, 24d are the longer sides of the rectangle.

[0098] In some examples, such as that of the example of FIG. 1, the variable volume container 10 comprises a lid 42 configured to be positioned on the upper portion 22 to close the container 10.

[0099] In examples, the lid 42 is configured to be positioned on the lower portion 12, to close the lower portion 12.

[0100] Accordingly in examples, the container 10 can have a sealed internal volume in the extended position 28, in retracted position 30 and/or with the lower portion sealed with the lid 42.

[0101] In some examples, the upper portion 22 and/or lower portion 12 comprise one or more features 44 and wherein the lid 42 comprises one or more corresponding features to allow the lid 42 to be positioned on the upper portion 22 or lower portion 12.

[0102] In examples, any suitable features 44 and corresponding features can be used. For example, the upper portion 22 and/or lower portion 12 can comprise any suitable shape(s) and/or form at their upper end to cooperate

with one or more corresponding features of the lid 42 to allow the lid 42 to be positioned on the upper portion 22 or lower portion 12.

[0103] By way of example, reference is made to FIG. 3.

[0104] In the example of FIG. 3, the upper portion 22 comprises features 44 at the corners. In particular, in the example of FIG. 3, the upper surface of the upper portion 22 comprise thicker sections at the corners.

[0105] Accordingly in the example of FIG. 3, the lid 42 would comprise corresponding thicker recesses at the corners to allow the lid 42 to be placed on the features 44 of the upper portion 22.

[0106] In examples, at least one of the walls 24a-d, 16a-d of the upper and/or lower portion 22, 12 comprises at least one external, recessed, substantially flat portion 56 considered to receive at least one label.

[0107] When the container 10 is in the extended position 28, the protrusion(s) 26 can be disengaged from the lip 20 and the upper portion 22 moved downwards relative to the lower portion 12 to place the container in the retracted position 30.

[0108] FIGS. 7A and 7B show an example of a variable volume container 10 in the retracted position 30.

[0109] FIG. 7A shows the variable volume container 10, of the example of FIG. 4B, in the retracted position 30 and FIG. 7B shows the variable volume container 10, of the example of FIG. 4B, in the retracted position 30.

[0110] FIG. 8A shows the cross section along the line B - B in the example of FIG. 7B and FIG. 8B shows the cross section through the line A - A in the example of FIG. 7A.

[0111] In examples, the lid 42 comprises one or more features 48 configured to cooperate with one or more corresponding features of another similarly configured lid 42 to allow the lids 42 to be stacked.

[0112] In examples, the lid 42 can be considered stackable and/or self-stackable.

[0113] In examples, the lid 42 can be considered to be configured to stack with other lids 42 that are configured in the same way.

[0114] In examples, the lid 42 can comprise any suitable features 48 and/or corresponding features to allow the lids to be stacked.

[0115] For example, the lid 42 can comprise any suitable protrusion(s) and/or shape(s) and/or recess(es) and so on to allow the lids 42 to be stacked.

[0116] FIG. 9A illustrates an example of a plurality of lids 42 in a stacked configuration.

[0117] In the illustrated example, the lids 42 comprise features 48 configured to cooperate with one or more corresponding features of another similarly configured lid to allow the lids 42 to be stacked.

[0118] In the example of FIG. 9A, the features 48 comprise a raised portion.

[0119] FIG. 9B shows an example of the underside a lid illustrated in FIG. 9A.

[0120] As can be seen in the example of FIG. 9B, the underside of the lid 42 comprises a corresponding recess

to cooperate with the features 48 of another lid 42 to allow the lids to be stacked.

[0121] In examples, the lower portion 12 comprises one or more features 52 configured to cooperate with one or more corresponding features of another similarly configured lower portion 12 to allow the lower portions 12 to be stacked.

[0122] In examples, the lower portion 12 can be considered stackable and/or self-stackable.

[0123] In examples, the lower portion 12 can be considered to be configured to stack with other lower portions 12 that are configured in the same way.

[0124] In examples, the lower portion 12 can comprise any suitable features 52 and/or corresponding features to allow the lids to be stacked.

[0125] For example, the lower portion 12 can comprise any suitable protrusion(s) and/or shape(s) and/or recess(es) and so on to allow the lower portions 12 to be stacked.

[0126] FIG. 9C shows an example of a plan view of a lid 42.

[0127] FIG. 9D shows a cross section taken through the line A - A in the example of FIG. 9C.

[0128] FIG. 9D shows a cross section taken through the line B - B in the example of FIG. 9C.

[0129] FIG. 10 shows an example of a plurality of lower portions 12 in a stacked configuration.

[0130] In the example of FIG. 10, the lower portions 12 comprise one or more features 52 configured to cooperate with one or more corresponding features of another similarly configured lower portion 12 to allow the lower portions 12 to be stacked.

[0131] In the example of FIG. 10, the walls of the lower portions 12 are tapered to allow the lower portions 12 to be stacked.

[0132] In examples, the upper portion 22 comprises one or more features 50 configured to cooperate with one or more corresponding features of another similarly configured upper portion 22 to allow the upper portions 22 to be stacked.

[0133] In examples, the upper portion 22 can be considered stackable and/or self-stackable.

[0134] In examples, the upper portion 22 can be considered to be configured to stack with other upper portions 22 that are configured in the same way.

[0135] In examples, the upper portion 22 can comprise any suitable features 50 and/or corresponding features to allow the lids to be stacked.

[0136] For example, the upper portion 22 can comprise any suitable protrusion(s) and/or shape(s) and/or recess(es) and so on to allow the upper portions 22 to be stacked.

[0137] FIG. 11 shows an example of a plurality of upper portions 22 in a stacked configuration.

[0138] In the example of FIG. 11, the upper portions 22 comprise one or more features 50 configured to cooperate with one or more corresponding features of another similarly configured upper portion 22 to allow the

upper portions 22 to be stacked.

[0139] In the example of FIG. 11, the walls of the upper portions 22 are tapered to allow the upper portions 22 to be stacked.

[0140] In some examples, the container 10 comprises one or more features configured to cooperate with one or more corresponding features of another similarly configured container to allow the containers 10 to be stacked.

[0141] In examples, the container 10 can be stacked with or without a lid 42. Accordingly, in examples, the container 10 can be stacked in an open and/or closed configuration.

[0142] For example, the container 10 can comprise any suitable protrusion(s) and/or shape(s) and/or recess(es) and so on to allow the containers 10 to be stacked.

[0143] In examples, the walls of the container 10 are tapered to allow the containers 10 to be stacked and/or the lid can comprise features to allow the containers 10 to be stacked and so on.

[0144] The variable volume container 10, and/or one or more parts of the variable volume container 10, can be stacked in any suitable way and/or in any suitable combination and/or in any suitable configuration.

[0145] FIG. 12 shows an example of a plurality of lower portions 12, a plurality of upper portions 22 and a plurality of lids 42 in a stacked configuration.

[0146] As can be seen in the example of FIG. 12, in examples, the three parts of the variable volume container 10 can stack and/or nest together.

[0147] FIG. 14A shows an example of three variable volume containers 10 in a stacked configuration.

[0148] In the example of FIG. 14A, the containers 10 are sealed with lids 42. In the illustrated example, the upper and lower containers 10 in the stack are in an extended position 28 and the middle container 10 is in a retracted position 30.

[0149] FIG. 14B shows a side view of the example of FIG. 14A.

[0150] FIG. 14C shows a cross section through the line A - A in the example of FIG. 14B.

[0151] FIG. 14D shows a closer view of the middle section of the example of FIG. 14A.

[0152] In examples, there is provided a method comprising: manufacturing a variable volume container 10 as described herein.

[0153] In examples, there is provided a method comprising: using a variable volume container 10 as described herein.

[0154] Examples of the disclosure are advantageous and/or provide one or more technical benefits.

[0155] For example, examples of the disclosure provide for a container 10 that can be easily changed in volume to accommodate items as required.

[0156] For example, examples of the disclosure provide for a container 10 that can be configured to prevent wasting space in, for example, a delivery van.

[0157] For example, examples of the disclosure provide for a container 10, part of which can be readily

stacked.

[0158] For example, examples of the disclosure provide for a container 10 that can be readily changed in volume.

[0159] Where a structural feature has been described, it may be replaced by means for performing one or more of the functions of the structural feature whether that function or those functions are explicitly or implicitly described.

[0160] The term 'comprise' is used in this document with an inclusive not an exclusive meaning. That is any reference to X comprising Y indicates that X may comprise only one Y or may comprise more than one Y. If it is intended to use 'comprise' with an exclusive meaning then it will be made clear in the context by referring to "comprising only one..." or by using "consisting".

[0161] In this description, reference has been made to various examples. The description of features or functions in relation to an example indicates that those features or functions are present in that example. The use of the term 'example' or 'for example' or 'can' or 'may' in the text denotes, whether explicitly stated or not, that such features or functions are present in at least the described example, whether described as an example or not, and that they can be, but are not necessarily, present in some of or all other examples. Thus 'example', 'for example', 'can' or 'may' refers to a particular instance in a class of examples. A property of the instance can be a property of only that instance or a property of the class or a property of a sub-class of the class that includes some but not all of the instances in the class. It is therefore implicitly disclosed that a feature described with reference to one example but not with reference to another example, can where possible be used in that other example as part of a working combination but does not necessarily have to be used in that other example.

[0162] Although examples have been described in the preceding paragraphs with reference to various examples, it should be appreciated that modifications to the examples given can be made without departing from the scope of the claims.

[0163] Features described in the preceding description may be used in combinations other than the combinations explicitly described above.

[0164] Although functions have been described with reference to certain features, those functions may be performable by other features whether described or not.

[0165] Although features have been described with reference to certain examples, those features may also be present in other examples whether described or not.

[0166] The term 'a' or 'the' is used in this document with an inclusive not an exclusive meaning. That is any reference to X comprising a/the Y indicates that X may comprise only one Y or may comprise more than one Y unless the context clearly indicates the contrary. If it is intended to use 'a' or 'the' with an exclusive meaning then it will be made clear in the context. In some circumstances the use of 'at least one' or 'one or more' may be

used to emphasis an inclusive meaning but the absence of these terms should not be taken to infer any exclusive meaning.

[0167] The presence of a feature (or combination of features) in a claim is a reference to that feature or (combination of features) itself and also to features that achieve substantially the same technical effect (equivalent features). The equivalent features include, for example, features that are variants and achieve substantially the same result in substantially the same way. The equivalent features include, for example, features that perform substantially the same function, in substantially the same way to achieve substantially the same result.

[0168] In this description, reference has been made to various examples using adjectives or adjectival phrases to describe characteristics of the examples. Such a description of a characteristic in relation to an example indicates that the characteristic is present in some examples exactly as described and is present in other examples substantially as described.

[0169] Whilst endeavoring in the foregoing specification to draw attention to those features believed to be of importance it should be understood that the Applicant may seek protection via the claims in respect of any patentable feature or combination of features hereinbefore referred to and/or shown in the drawings whether or not emphasis has been placed thereon.

Claims

1. A variable volume container, comprising:

a lower portion comprising a base and four walls, the four walls extending from the base and comprising a lip at the top of the walls of the lower portion; and

an upper portion comprising four walls, wherein opposing walls of the upper portion comprise one or more protrusions configured to abut the lip of the lower portion to allow the upper portion to rest upon the lower portion, to place the container in an extended position; and wherein the opposing walls of the upper portion comprising the one or more protrusions are configured to flex laterally, relative to the lip of the lower portion, to allow the one or more protrusions to be disengaged from the lip to allow the upper portion to be moved downwards relative to the lower portion, to place the container in a retracted position.

2. A variable volume container as claimed in claim 1, wherein the opposing walls of the upper portion comprising the one or more protrusions are configured to flex away from each other to allow the one or more protrusions to be disengaged from the lip.

3. A variable volume container as claimed in claim 1 or claim 2, wherein the walls of the lower portion, corresponding to the opposing walls of the upper portion comprising the one or more protrusions, comprise a substantially wedge-shaped portion underneath the lip configured to force the opposing walls of the upper portion away from each other as the upper portion is moved upwards relative to the lower portion, from the retracted position, to allow the one or more protrusions to move past the lip. 5
4. A variable volume container as claimed in any preceding claim, wherein two other opposing walls of the upper portion comprise one or more protrusions at their lower ends, the one or more protrusions configured to interact with a lower surface of the lip to retain the upper portion on the lower portion. 10
5. A variable volume container as claimed in claim 4, wherein the one or more protrusions of the two other opposing walls of the upper portion comprise a substantially wedge-shaped portion configured to force the two other opposing walls of the upper portion away from each other as the upper portion is moved downwards relative to the lower portion, to allow the one or more protrusions of the two other opposing walls to move past the lip. 15 20
6. A variable volume container as claimed in any of claims 4 to 5, wherein when the container is in the extended position, the one or more protrusions of the opposing walls abut the lip and the one or more protrusions of the other opposing walls are located underneath the lip. 25 30
7. A variable volume container as claimed in any preceding claim, comprising a lid configured to be positioned on the upper portion to close the container. 35
8. A variable volume container as claimed in claim 7, wherein the lid is configured to be positioned on the lower portion, to close the lower portion. 40
9. A variable volume container as claimed in claim 7 or 8, wherein the upper portion and/or lower portion comprise one or more features, and wherein the lid comprises one or more corresponding features to allow the lid to be positioned on the upper portion or lower portion. 45 50
10. A variable volume container as claimed in any of claims 7 to 9, wherein the lid comprises one or more features configured to cooperate with one or more corresponding features of another similarly configured lid to allow the lids to be stacked. 55
11. A variable volume container as claimed in any preceding claim, wherein the upper portion comprises one or more features configured to cooperate with one or more corresponding features of another similarly configured upper portion to allow the upper portions to be stacked.
12. A variable volume container as claimed in any preceding claim, wherein the lower portion comprises one or more features configured to cooperate with one or more corresponding features of another similarly configured lower portion to allow the lower portions to be stacked.
13. A variable volume container as claimed in any preceding claim, wherein the container comprises one or more features configured to cooperate with one or more corresponding features of another similarly configured container to allow the containers to be stacked.
14. A variable volume container as claimed in any preceding claim, wherein at least one of the walls of the upper and/or lower portion comprises at least one external, recessed, substantially flat portion configured to receive at least one label.
15. A variable volume container as claimed in any preceding claim, wherein the opposing walls of the upper portion that are configured to flex laterally comprise at least one external, substantially smooth area.

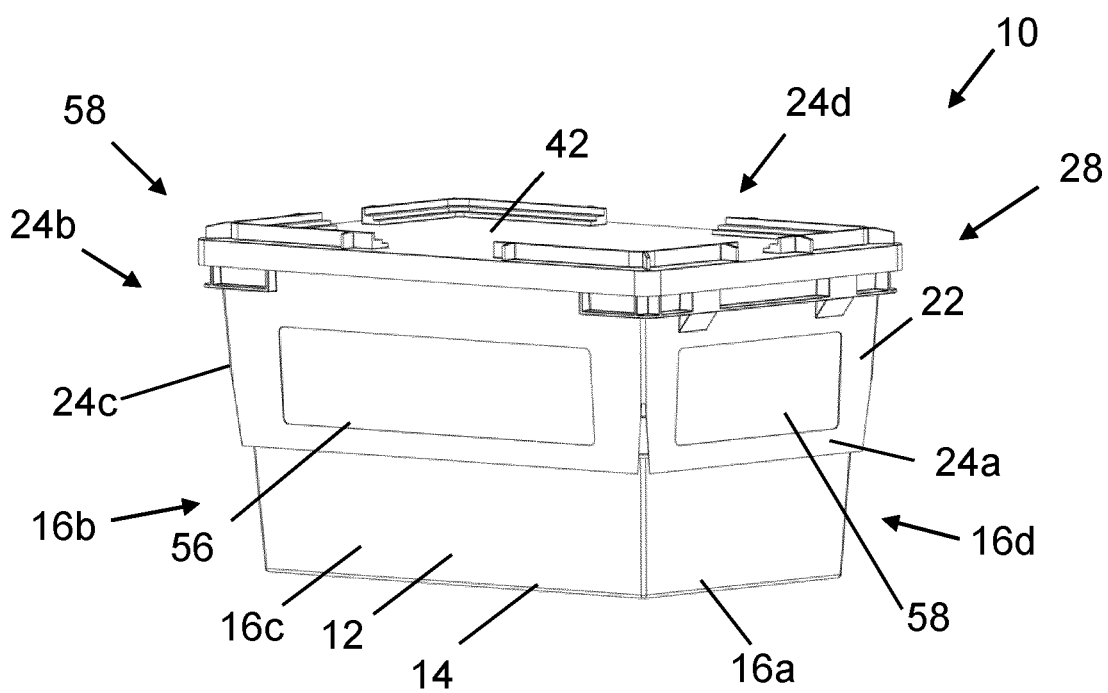


FIG. 1

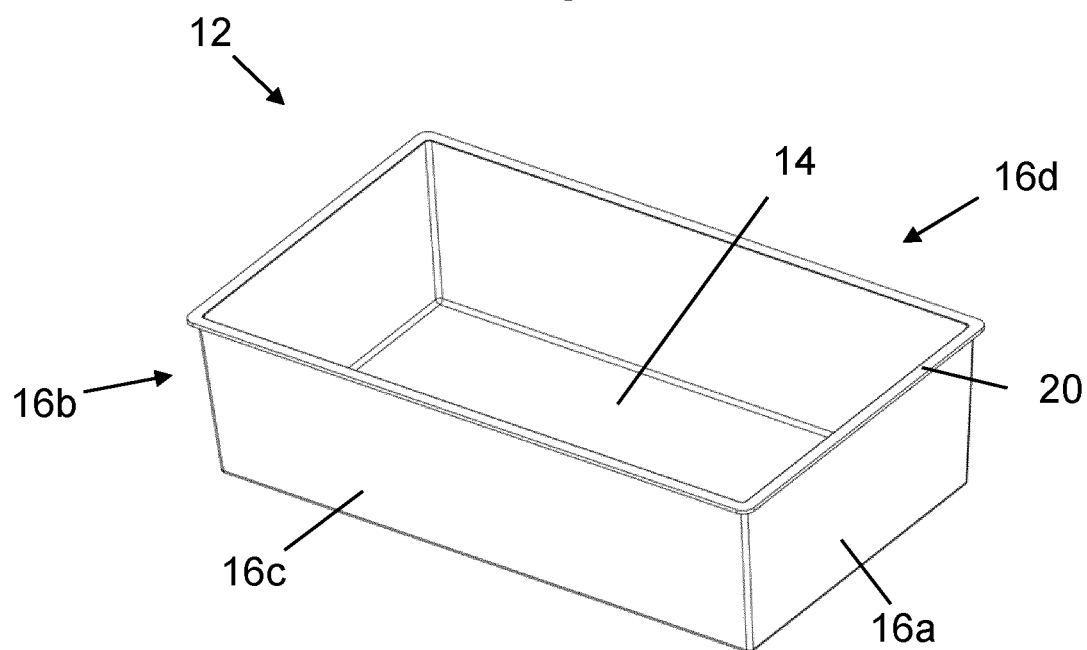


FIG. 2

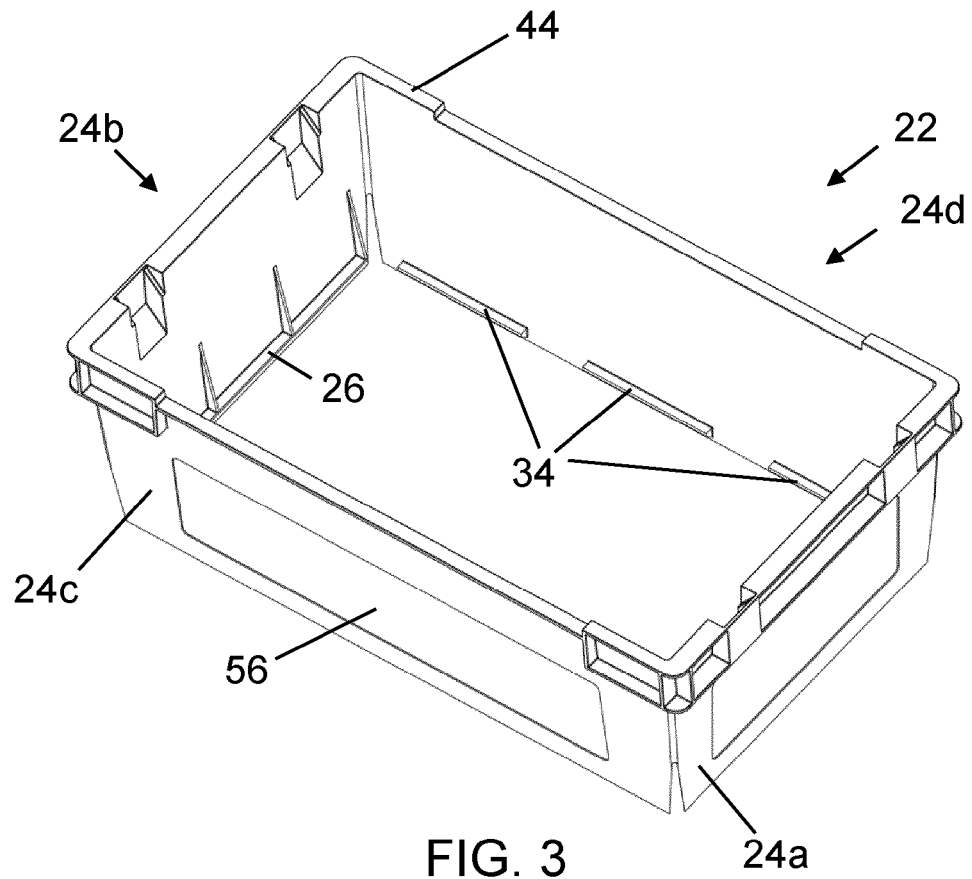


FIG. 3

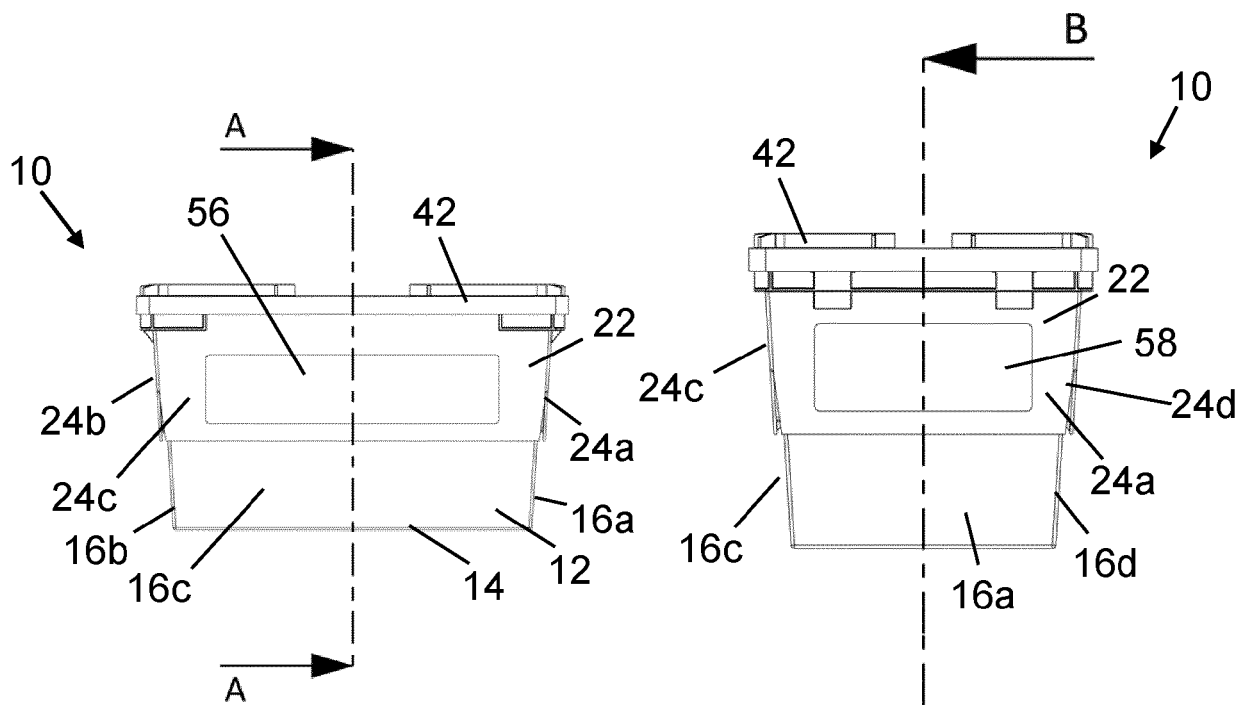


FIG. 4A

FIG. 4B

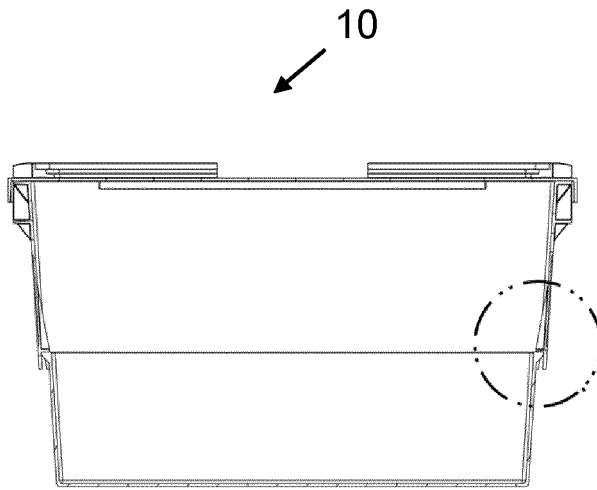


FIG. 5A

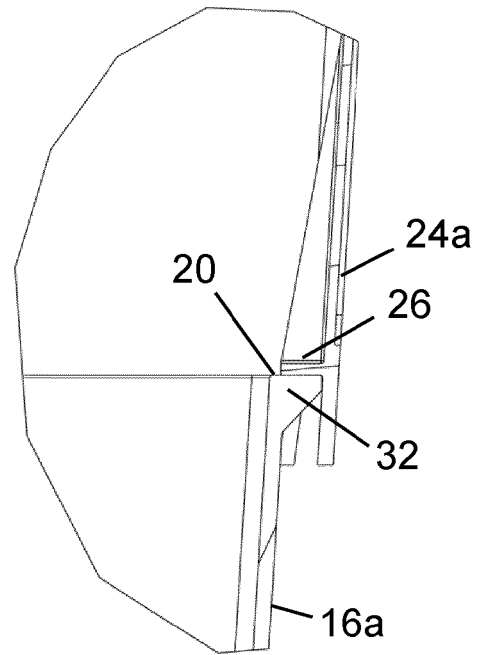


FIG. 5B

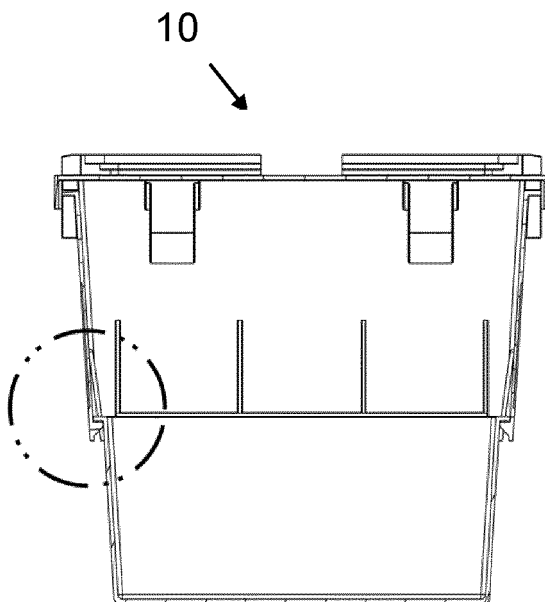


FIG. 6A

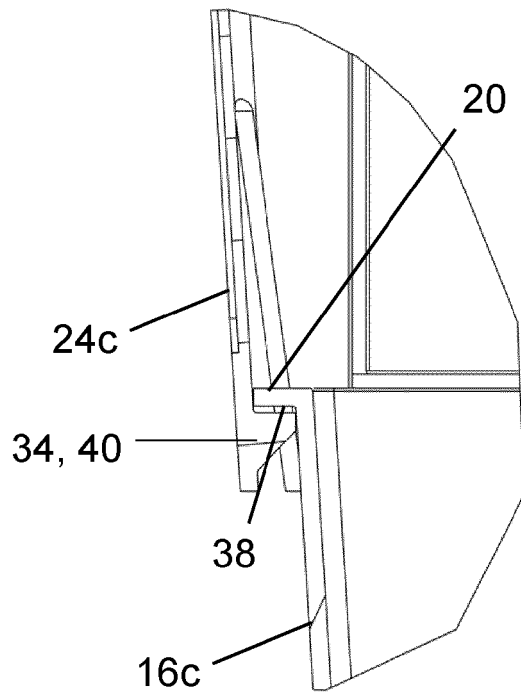


FIG. 6B

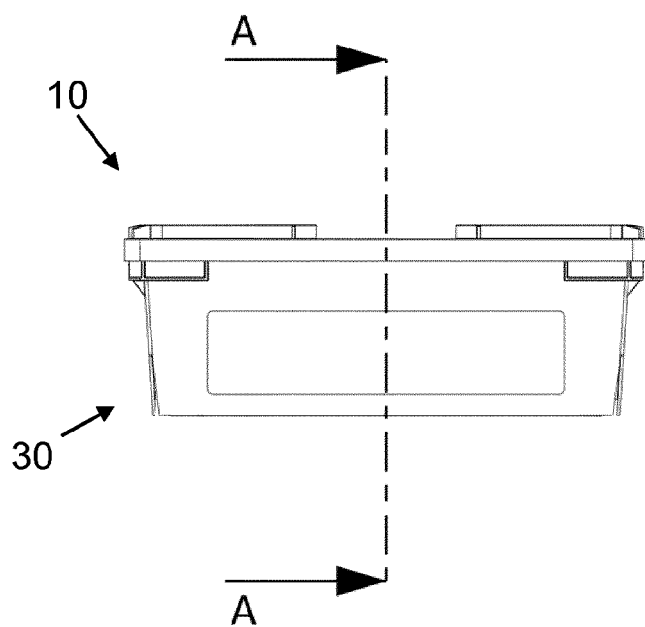


FIG. 7A

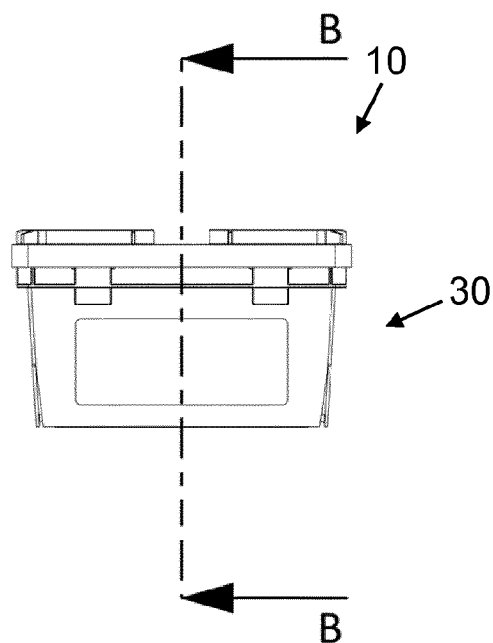


FIG. 7B

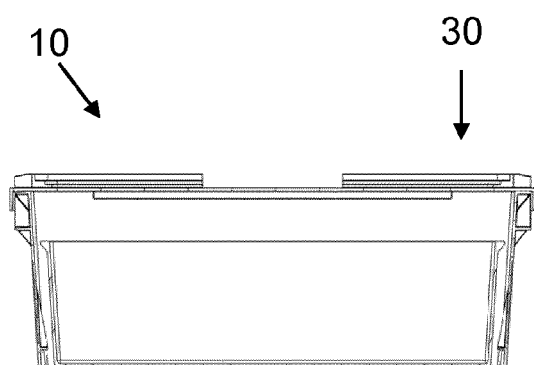


FIG. 8A

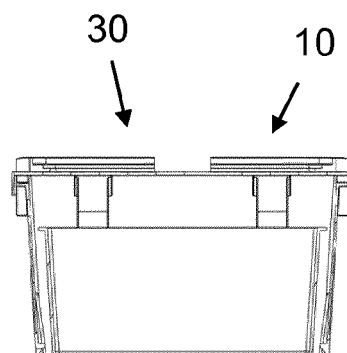


FIG. 8B

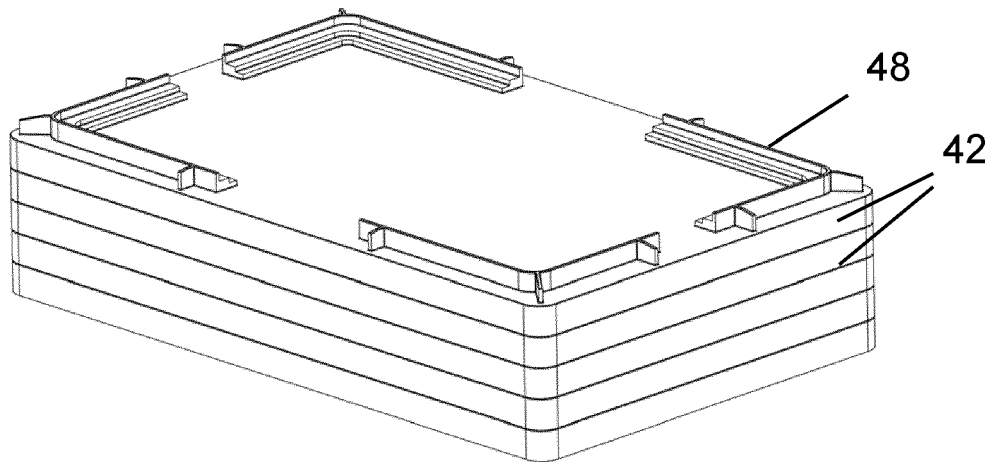


FIG. 9A

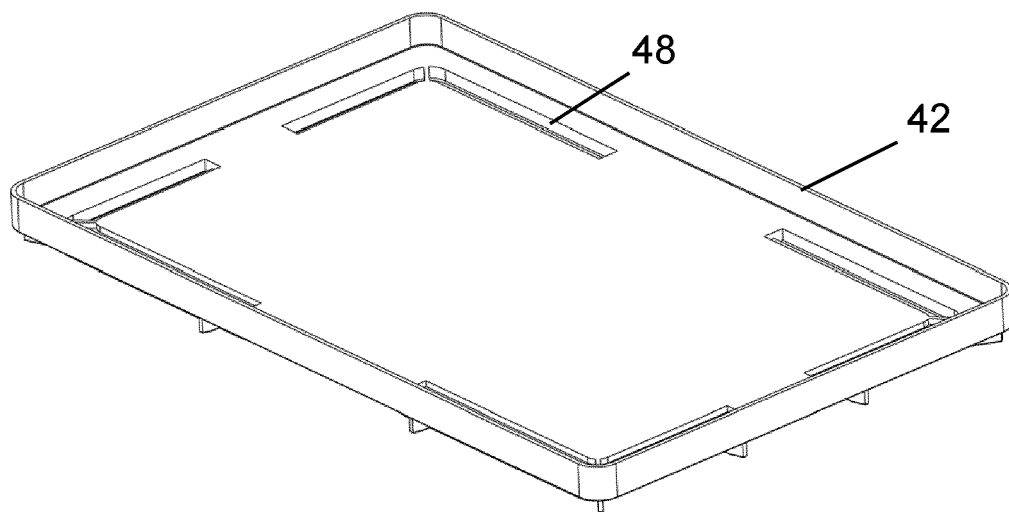


FIG. 9B

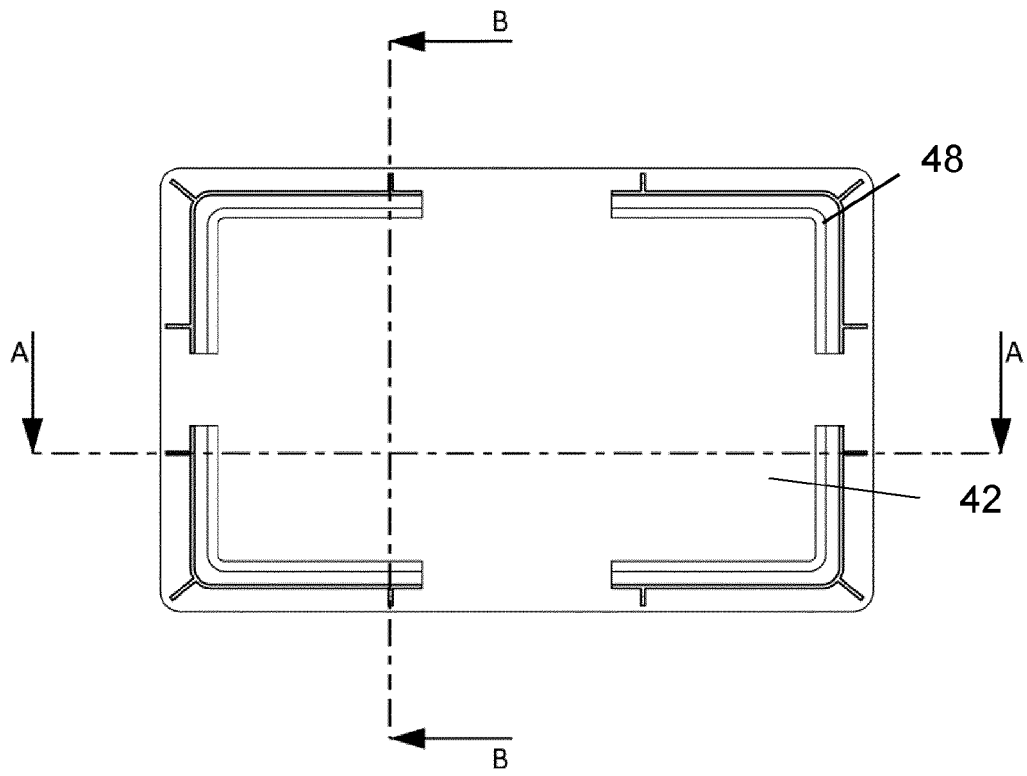


FIG. 9C

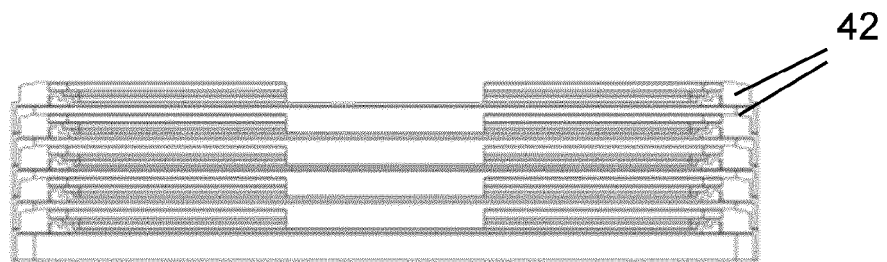


FIG. 9D

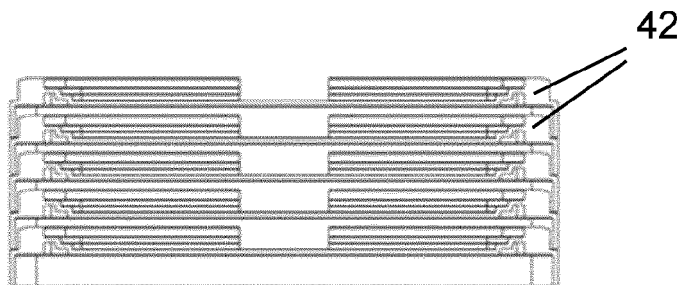


FIG. 9E

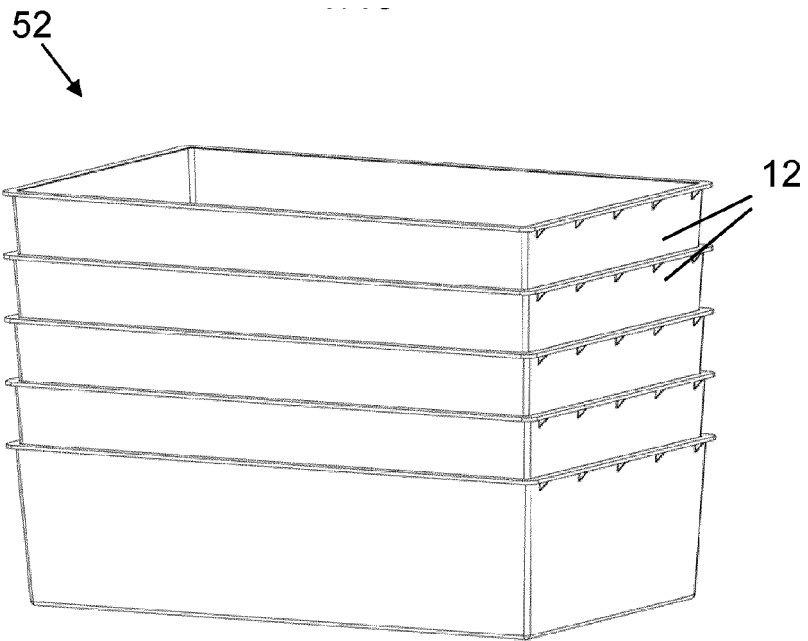


FIG. 10

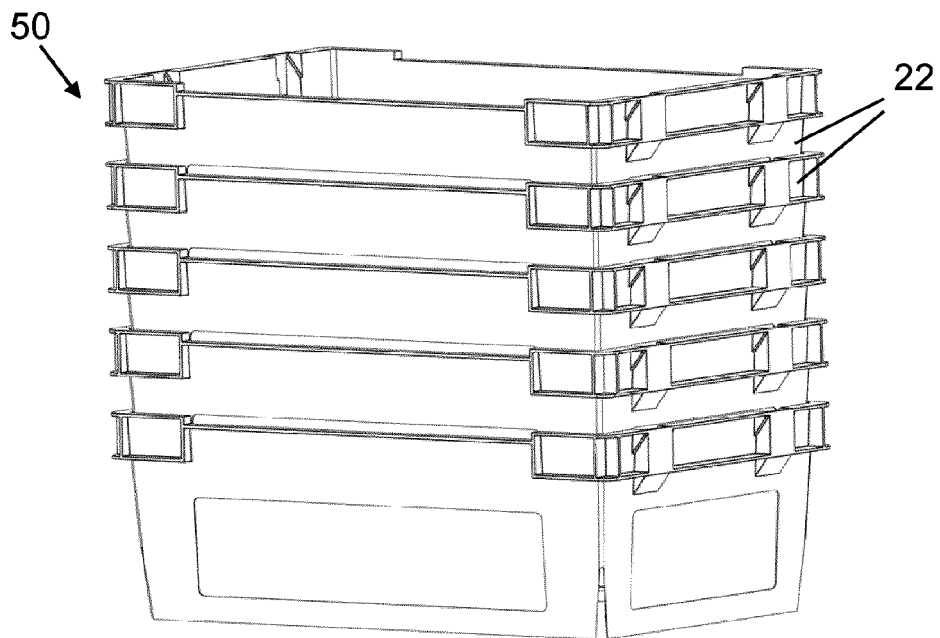


FIG. 11

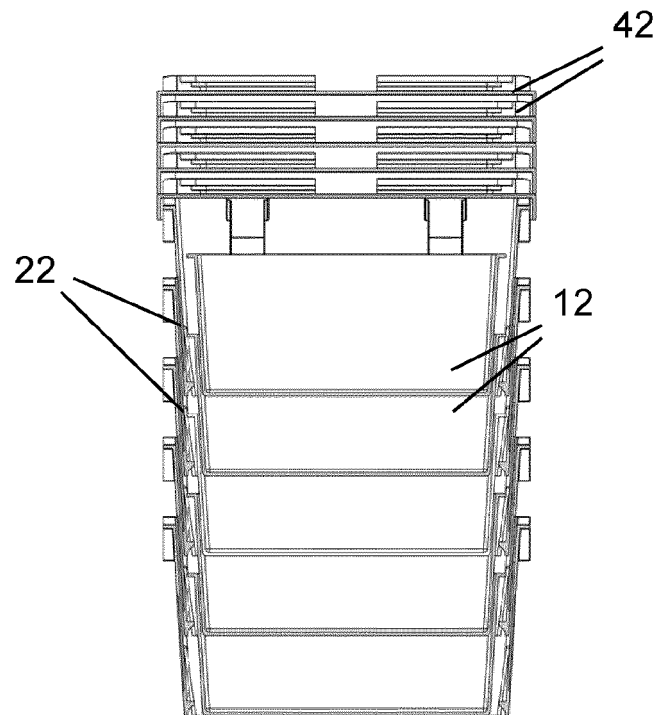


FIG. 12

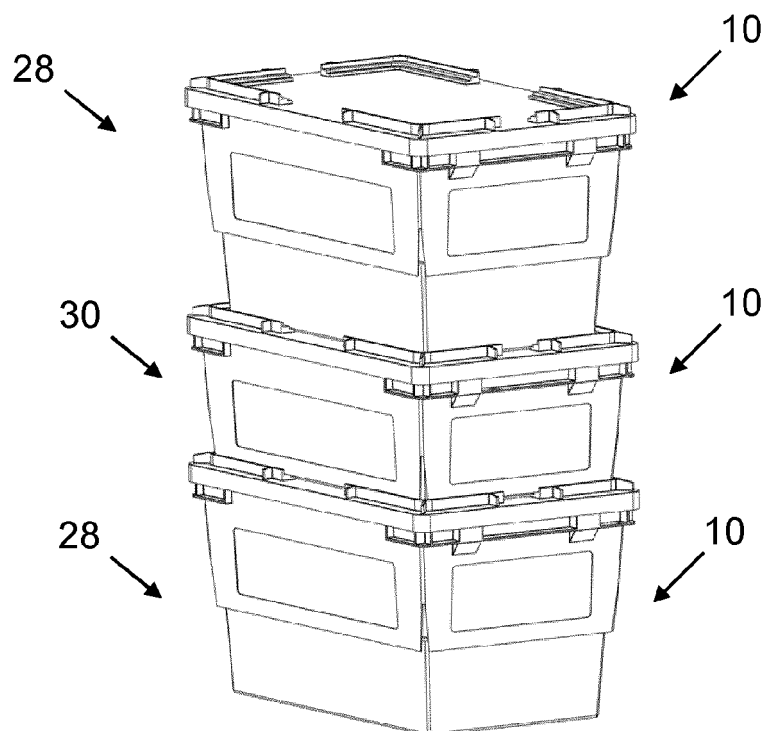


FIG. 14A

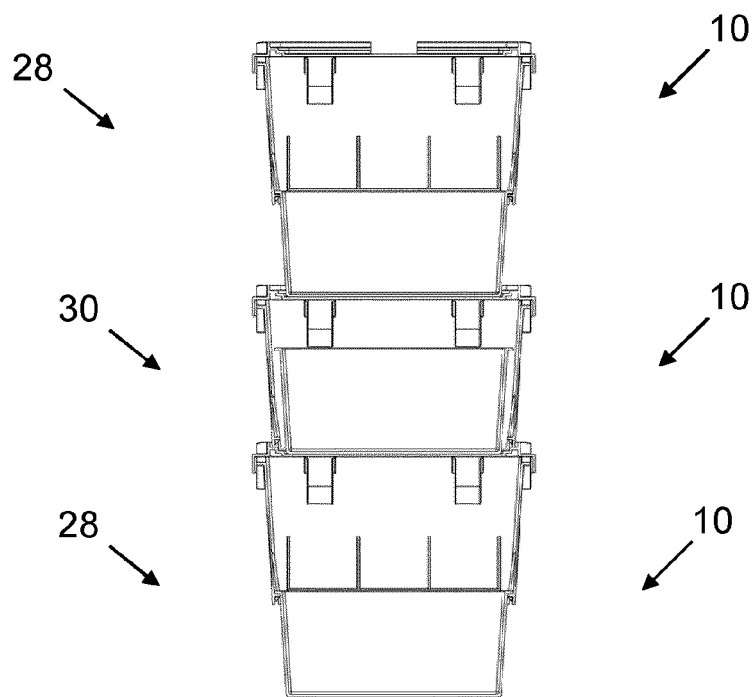
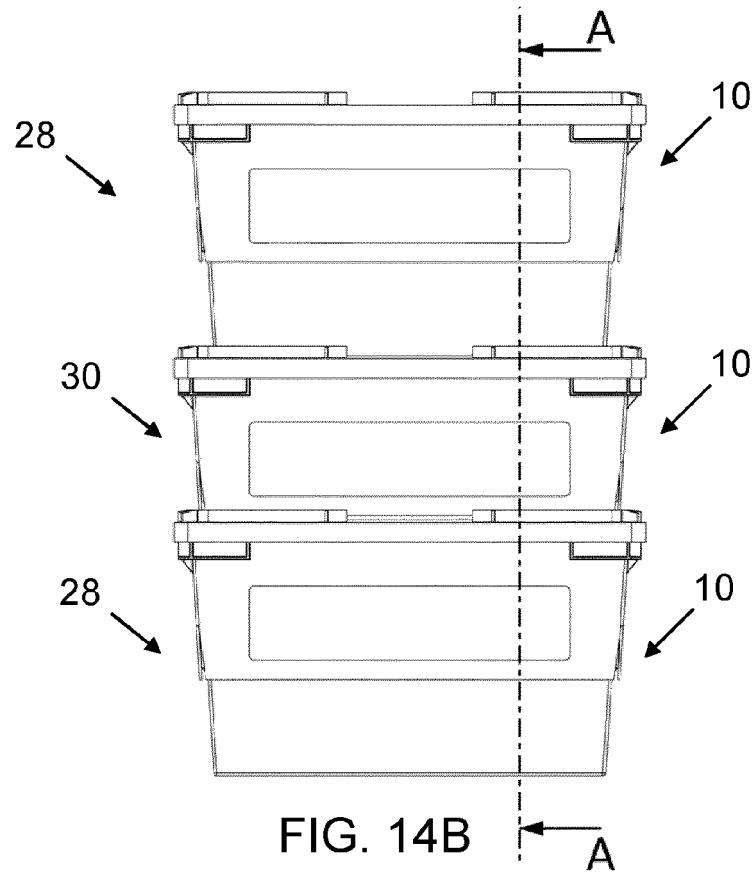


FIG. 14C

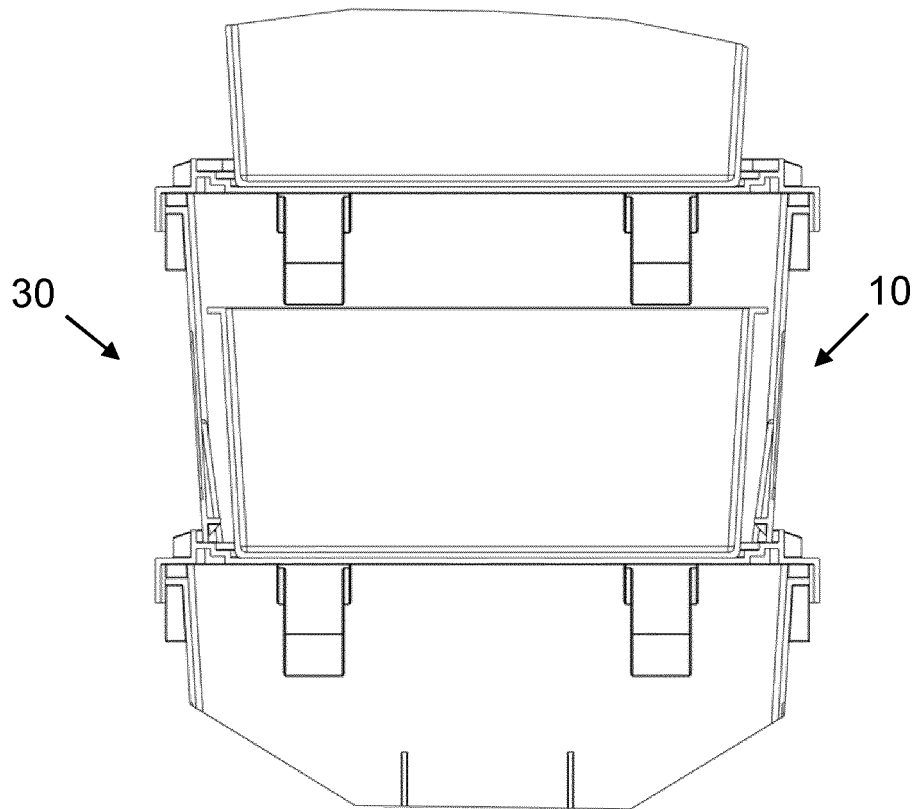


FIG. 14D



EUROPEAN SEARCH REPORT

Application Number

EP 23 17 8743

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EPO FORM 1503 03.82 (P04C01)

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	KR 2012 0008160 A (KOREA CONTAINER POOL CO LTD [KR]) 30 January 2012 (2012-01-30)	1, 11-15	INV.
Y	* figures 1, 2, 6-8 *	7-10	B65D21/02
A	-----	2-6	B65D21/08
Y	US 2022/033151 A1 (GREEN JEFF [US]) 3 February 2022 (2022-02-03)	7-10	
A	* abstract; figures 1, 3, 7b *	1-6, 11-15	
A	US 2018/177344 A1 (BAGLEY JUSTIN [US]) 28 June 2018 (2018-06-28)	1-15	
	* abstract; figures 1-3 *		
	* paragraph [0032] *		
A	FR 2 332 920 A1 (LAURAGRI SA [FR]) 24 June 1977 (1977-06-24)	1-15	
	* figures 1-3 *		

			TECHNICAL FIELDS SEARCHED (IPC)
			B65D
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		9 October 2023	Tempels, Marco
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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ON EUROPEAN PATENT APPLICATION NO.

EP 23 17 8743

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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09-10-2023

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	KR 20120008160 A	30-01-2012	NONE	

15	US 2022033151 A1	03-02-2022	NONE	

	US 2018177344 A1	28-06-2018	NONE	

20	FR 2332920 A1	24-06-1977	NONE	

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