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Cavenagh et al.

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(54) **FLEXIBLE CONTAINER ASSEMBLY AND METHODS FOR MAKING AND USING THE SAME**

(75) Inventors: **Edward John Cavenagh**, Winnipeg (CA); **Karen Lee MacDonald**, Winnipeg (CA); **Alden Dale Friesen**, Winnipeg (CA); **Selamawit Tedesse Desta**, Winnipeg (CA)

(73) Assignee: **Illinois Tool Works Inc.**, Glenview, IL (US)

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B65D 90/12 (2006.01)
B65D 30/12 (2006.01)

(52) **U.S. Cl.**
USPC **220/9.4**; 220/475; 220/495.08; 383/125

(58) **Field of Classification Search**
USPC 220/9.3, 9.4, 475, 495.08, 495.01; 383/125, 123, 124, 31
See application file for complete search history.

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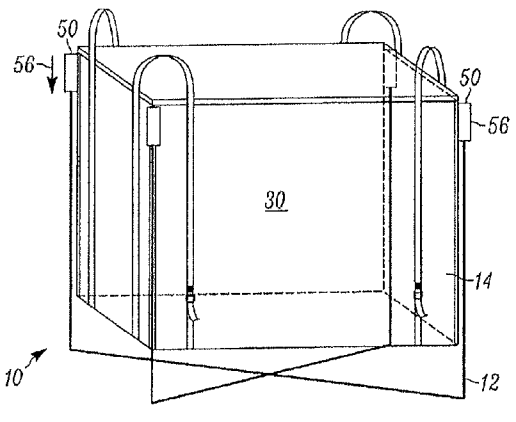
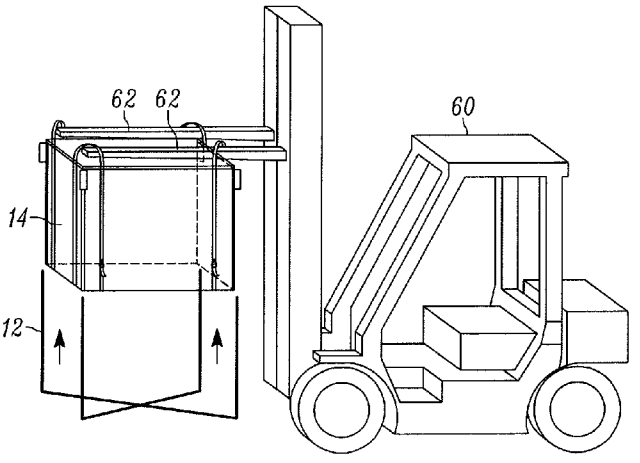
Primary Examiner — Anthony Stashick
Assistant Examiner — Don M Anderson
(74) *Attorney, Agent, or Firm* — Whyte Hirschboeck Dudek S.C.

(57) **ABSTRACT**

A flexible container assembly and methods for making and using such an assembly are disclosed herein. The assembly is configured to hold an amount of material, such as heavy and/or bulky material (e.g., industrial, job or work site waste material). In some embodiments, the assembly includes a support structure and a flexible container structure configured to interface with, so as to be supported at least in part by, the support structure.

12 Claims, 8 Drawing Sheets





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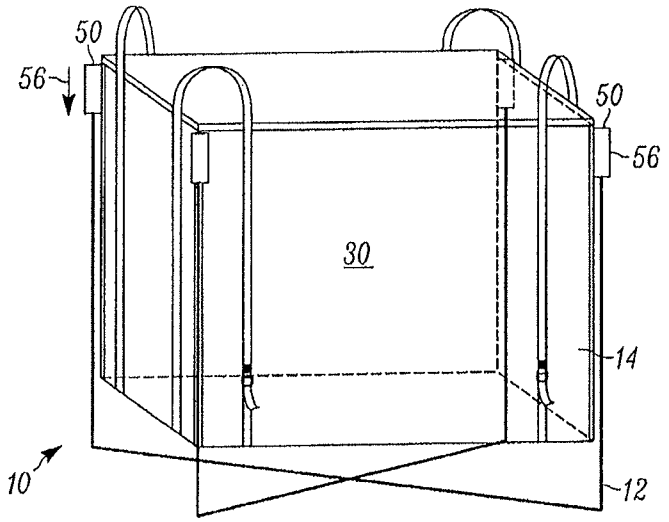


FIG. 1

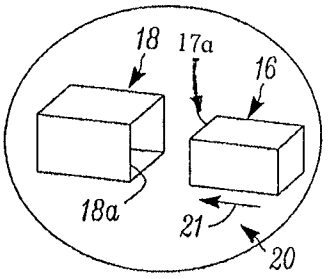


FIG. 3

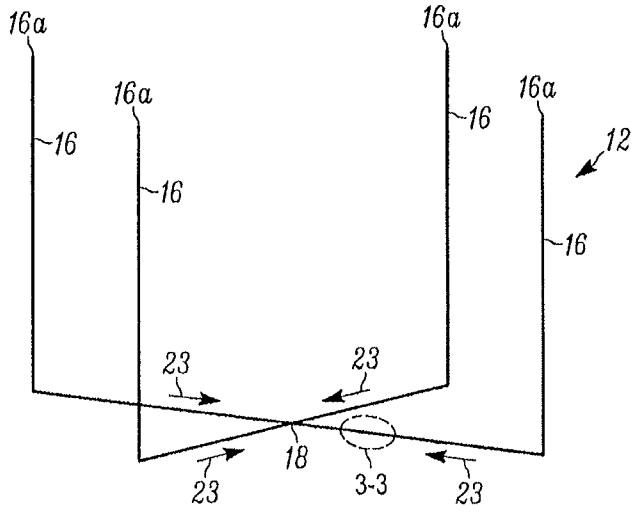
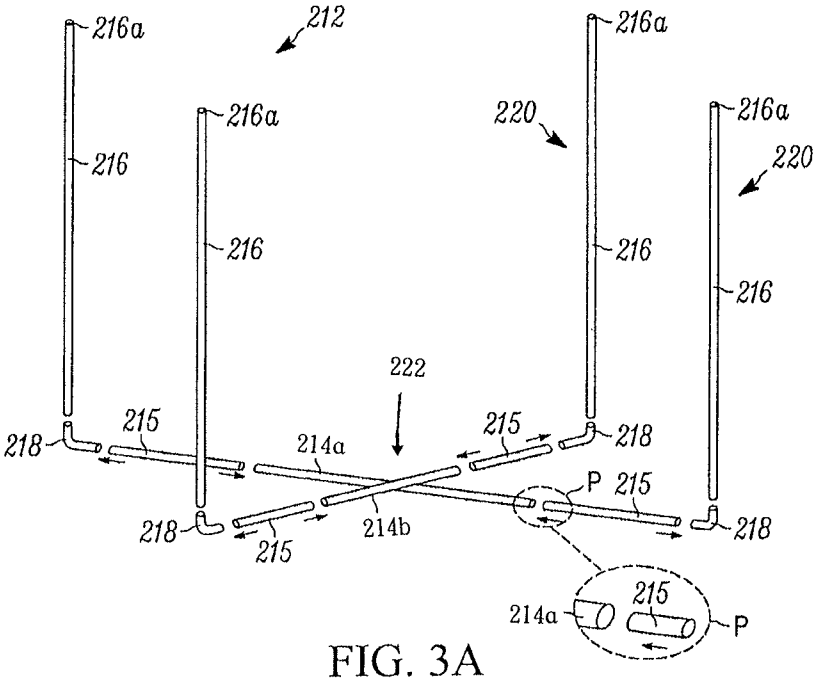


FIG. 2


216a
212
216a
216a
220
216a
220
216
216
216
216
222
215
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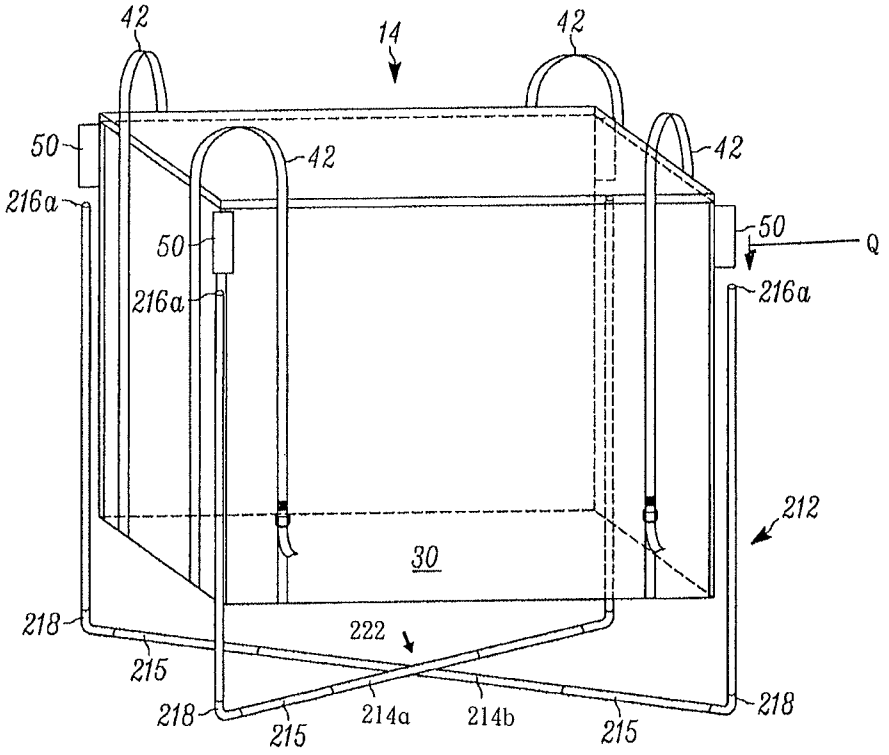
218
214a
218
P 215
218
214b
218
215
215
214a
P

FIG. 3A


42
14
42
50
42
42
216a
50
Q
50
216a
216a
212
30
218
222
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218
214a
214b
218
215
215

FIG. 3B

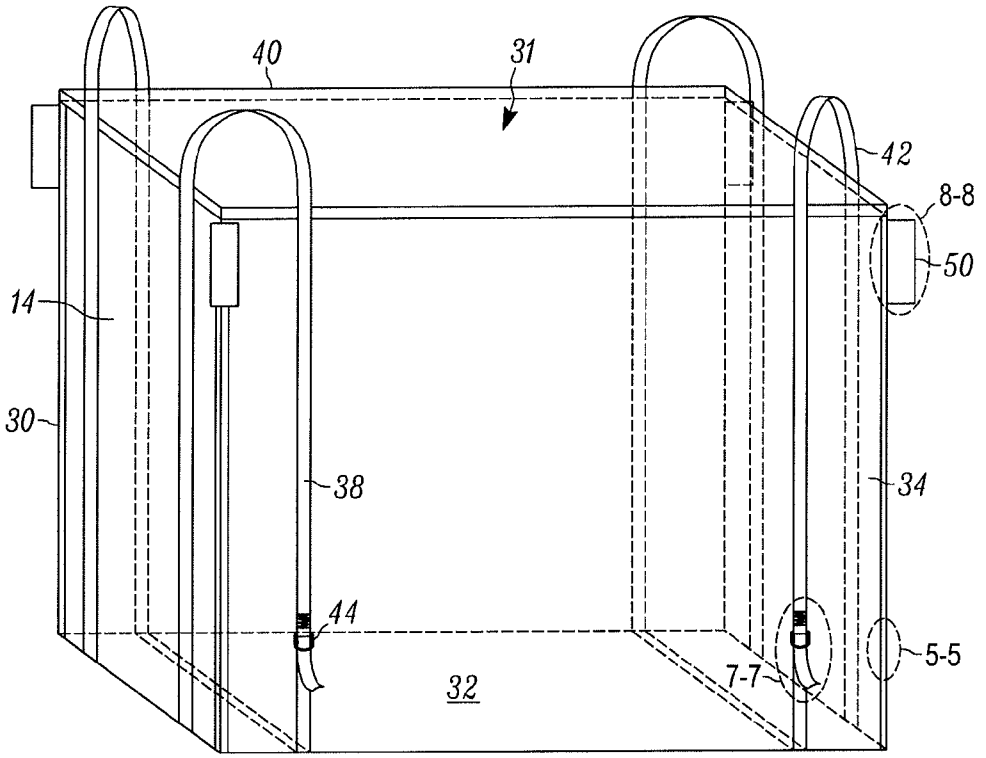


FIG. 4

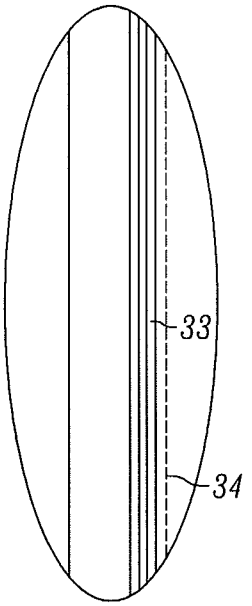


FIG. 5

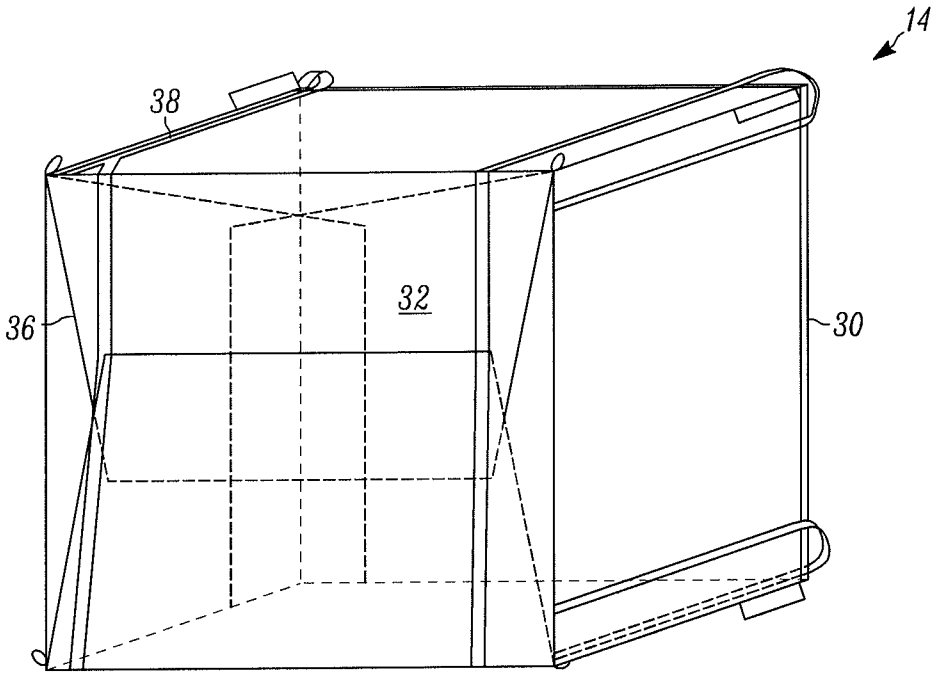


FIG. 6

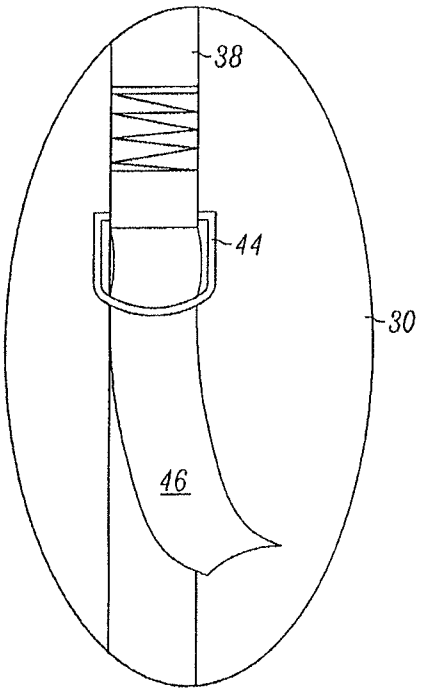


FIG. 7

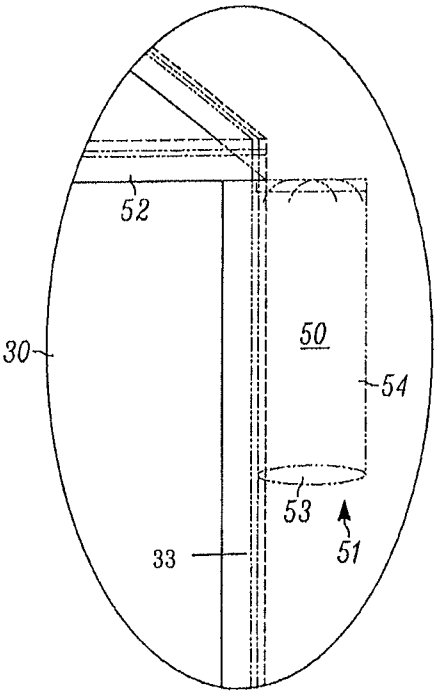


FIG. 8

FIG. 9A

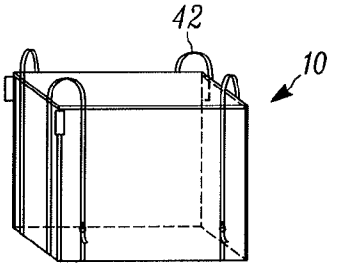


FIG. 9B

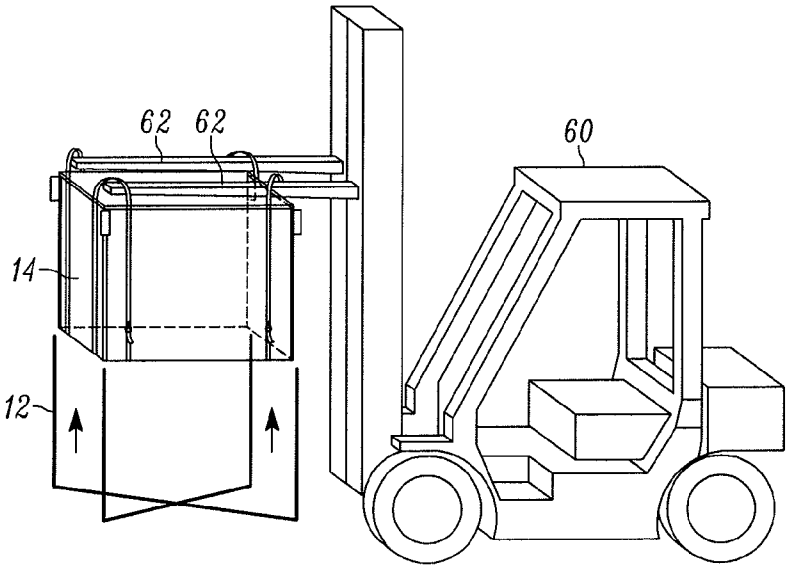
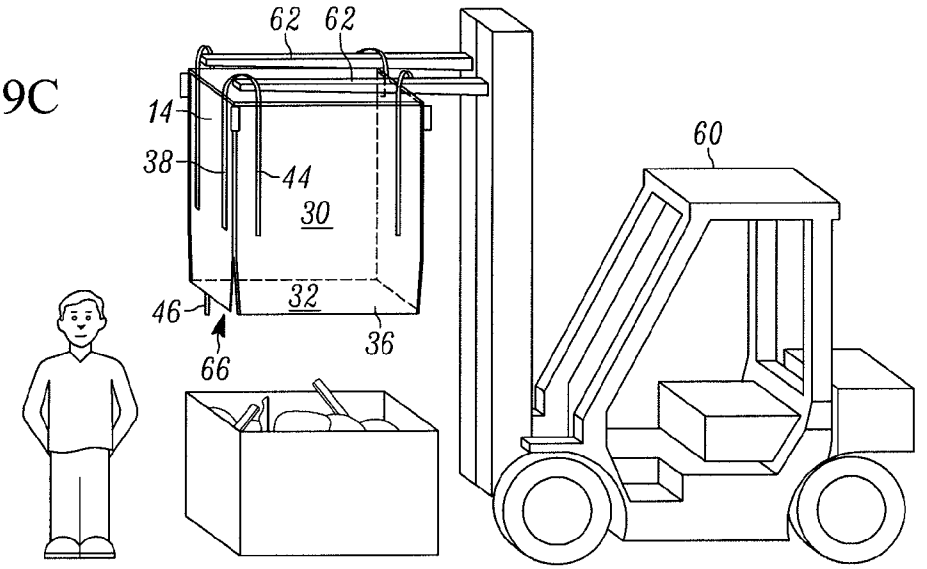


FIG. 9C



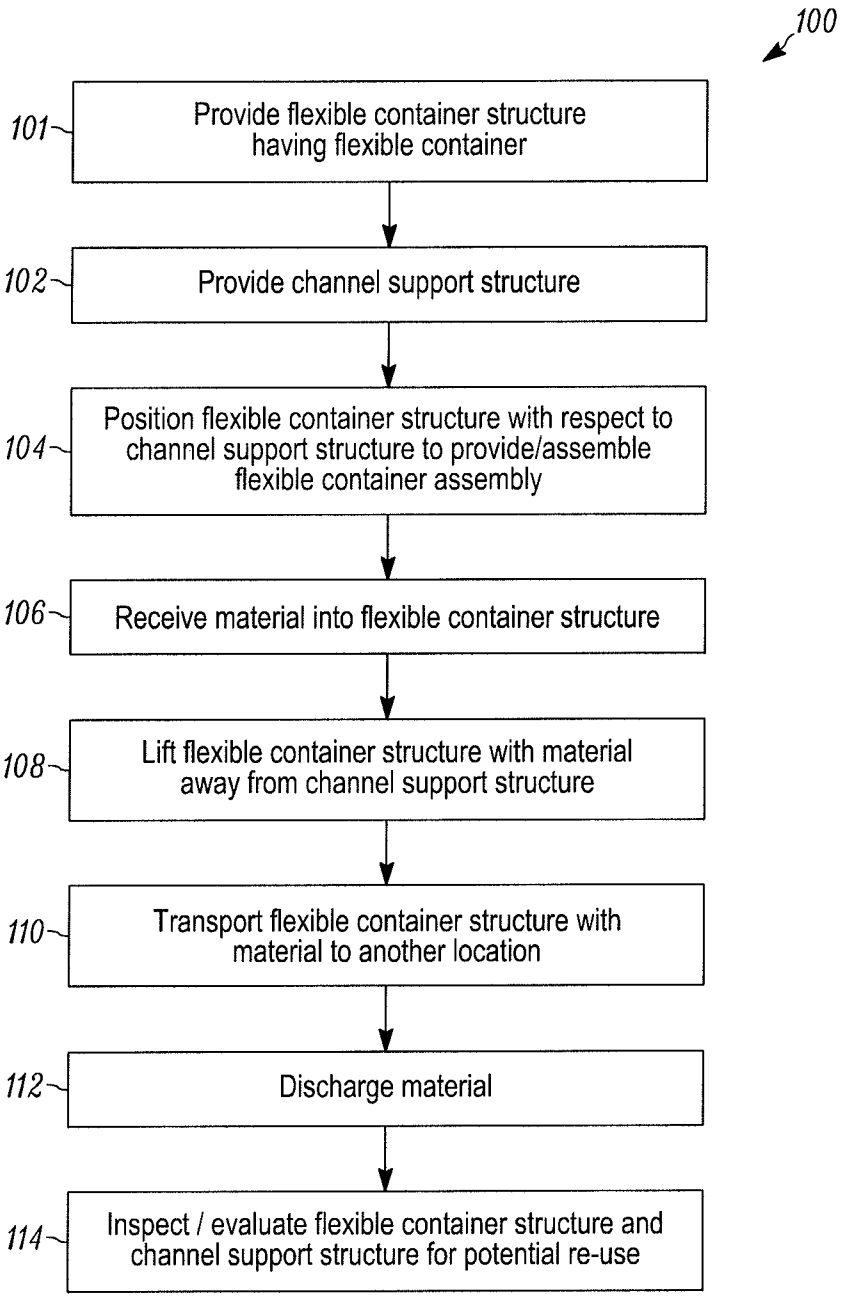
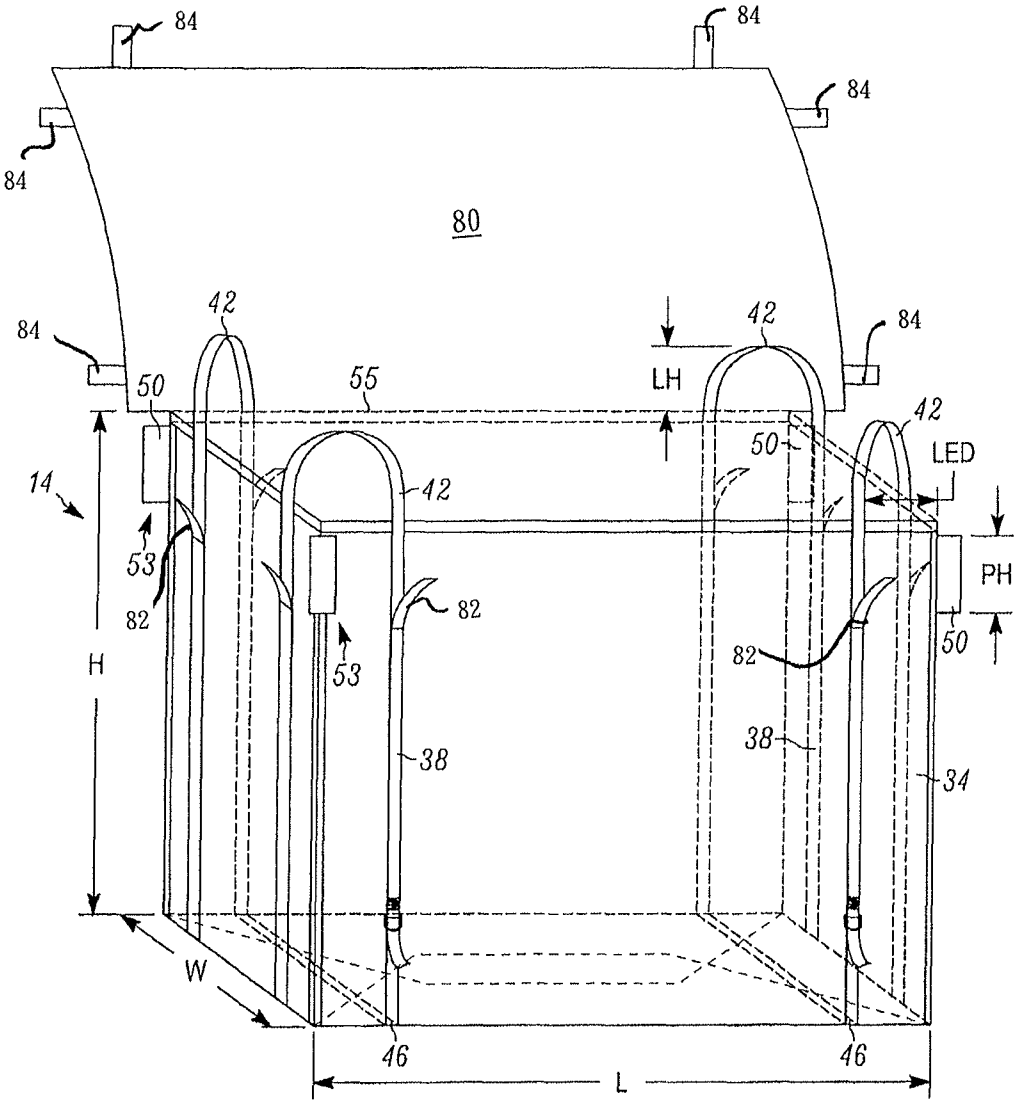

100
101
Provide flexible container structure having flexible container
102
Provide channel support structure
104
Position flexible container structure with respect to channel support structure to provide/assemble flexible container assembly
106
Receive material into flexible container structure
108
Lift flexible container structure with material away from channel support structure
110
Transport flexible container structure with material to another location
112
Discharge material
114
Inspect / evaluate flexible container structure and channel support structure for potential re-use

FIG. 10


84
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LH
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LED
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PH
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H
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W
46
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L

FIG. 11

FLEXIBLE CONTAINER ASSEMBLY AND METHODS FOR MAKING AND USING THE SAME

PRIORITY CLAIM

This application claims priority to U.S. provisional patent application Ser. No. 61/456,604 filed on Nov. 8, 2010, the entire content of which is incorporated by reference herein.

FIELD OF THE INVENTION

The present disclosure relates to container assemblies and methods of making and/or using such container assemblies and, more particularly, to flexible container assemblies configured to hold any of a variety of heavy and/or bulky materials in a controlled manner.

BACKGROUND

Work or job sites, such as industrial and construction work sites, create significant amounts of waste materials of multiple types, including but not limited to, concrete, cardboard, framing, wood scraps, lumber, metal, insulation, nails, screws, wires, glass, dirt, gravel, rocks, among others (i.e., "construction material"). Such materials often take a variety of forms, shapes or sizes and include several different sources, including waste from packaging, disposal of used materials, cut-offs, damage and the like. The materials are often heavy and bulky.

One known method of collection and disposal of such work site waste includes renting a large garbage bin. With this approach, costs can be substantial, with the rental amount including costs to deliver and pick up the large garbage bin, and the cost to dispose of the materials placed into the bin. Another known method includes sectioning off a portion of a work site. With regard to this approach, a section of a work site often must be fenced off, at least temporarily, and waste materials are transported to this area for holding before later loading (usually into a large garbage bin) and transporting them away from the site. One significant disadvantage associated with this approach is that it effectively results in gathering and removing waste products not once, but twice. This can be very costly and inefficient.

It is often desired that materials such as work site waste be stored and/or transported from time to time. In view of this and given the above considerations, it is desirable for containers within which work site waste materials are stored and/or transported to be robust and to prevent or minimize premature disposal or dispersion of such wastes into the outside environment. Nevertheless, problems have been encountered in the development of such containers.

Accordingly, there exists a need for a new or improved container assembly for containing construction waste materials and/or other substances, and/or a method of making and/or a method of using such a container assembly, which addresses one or more of the above-described issues.

SUMMARY

Various embodiments of the present disclosure provide a flexible container assembly configured to hold an amount of material, such as heavy and/or bulky industrial, job or work site waste material. In one embodiment, the assembly includes a support structure and a flexible container structure configured to interface with, so as to be supported at least in part by, the support structure.

In other embodiments, the present disclosure provides methods for making, assembling and/or using such a flexible container assembly, described further below. Other features and advantages of the present disclosure will be apparent from the following detailed disclosure, taken in conjunction with the accompanying sheets of drawings, wherein like numerals refer to like parts, elements, components, steps and processes.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of an exemplary embodiment of a self-supporting flexible container assembly;

FIG. **2** is a perspective view of an exemplary embodiment of a support structure for use with the container assembly of FIG. **1**;

FIG. **3** is an enlarged perspective view taken along line **3-3** of FIG. **2**, showing an exemplary embodiment of a connection section of the support structure;

FIG. **3**A is an exploded perspective view of a support structure in accordance with an embodiment of the present disclosure;

FIG. **3**B is a perspective view of a flexible container assembly in accordance with an embodiment of the present disclosure;

FIG. **4** is a perspective view of an exemplary embodiment of a flexible container structure including an exemplary embodiment of a flexible container for use with the container assembly of FIG. **1**;

FIG. **5** is an enlarged view taken along line **5-5** of FIG. **4**, illustrating an exemplary edge portion of the container structure and an exemplary manner of joining or mating the edge portion;

FIG. **6** is a bottom view of the exemplary flexible container structure of FIG. **4**;

FIG. **7** is an enlarged perspective view taken along line **7-7** of FIG. **4** illustrating an exemplary embodiment of a flap closure buckle mechanism;

FIG. **8** is an enlarged perspective view taken along line **8-8** of FIG. **4** illustrating an exemplary embodiment of a support pocket structure;

FIG. **9**A-**9**C are illustrations showing operation of the flexible container assembly in use in accordance with exemplary embodiments of the present disclosure;

FIG. **10** is a flowchart of an example process for set-up and use of the flexible container assembly; and

FIG. **11** shows the flexible container assembly including representative dimensions in accordance with embodiments of the present disclosure.

DETAILED DESCRIPTION

Referring now to FIG. **1**, an exemplary embodiment of the flexible container assembly **10** of the present disclosure (also referred to as a "container assembly") is shown. The illustrated container assembly **10** generally includes a support structure **12** and a flexible container structure **14**, exemplary embodiments of which are shown. The flexible container structure **14** includes a flexible container **30**, as described in greater detail below. The flexible container structure **14** and the support structure **12** are capable of or otherwise configured to interface with each other as described further below. In various embodiments, the support structure **12** supports the flexible container structure **14** in an upright fashion and, in this manner, the container assembly **10** is or can be termed "self-standing" or "self-supporting". The term "self-supporting," as used herein, is the act of maintaining the flexible

container structure **14** in an upright position with the support structure **12** and without assistance from any other structure.

Referring now to FIG. **2**, the support structure **12** includes two U-shaped support members which include a plurality of supports and, more specifically, four (4) such vertical supports **16** are shown. Each U-shaped support member includes (also referred to as "support mechanisms") a flat bottom portion and upstanding or post-like portion extending upwardly from the respective bottom portion. In one embodiment, the vertical supports **16** are shaped/configured or otherwise formed to create an "L-shaped" configuration as shown in FIG. **2**. In an embodiment, the vertical supports **16** are constructed of metal (e.g., steel). However, it should be appreciated that the vertical supports **16** may be constructed of any suitable material. The support structure **12** further includes a center piece **18**. The center piece **18**, as shown in FIG. **2**, is a centrally-disposed device or mechanism, which is generally shaped like an "X" or a cross.

Referring now to FIG. **3**, an enlarged perspective view of an exemplary embodiment of a center piece and support connection section (also referred to as a "connection section"), generally referred to by numeral **20**, of the support structure **12** is shown. At the connection section **20** and as shown, center piece **18** is about to be joined to a horizontal portion of the vertical support **16**. More specifically, an end **17***a* on the horizontal portion of the vertical support **16** can be moved or slid in a direction indicated by the arrow **21** and received into an end **18***a* of the center piece **18**. In the illustrated embodiment, each of the four (4) ends **17***a* of the vertical supports **16** is received by a respective one of the ends **18***a* of the center piece **18** at respective connection sections **20**, as indicated by the arrows **23** shown in FIG. **2**. In this manner, the overall support structure **12** is assembled. It should be appreciated that providing the connection sections **20** as described herein permits variability of container size. That is, by virtue of the sliding arrangement of the horizontal portions of the vertical supports **16** with respect to the center piece **18**, the support structure can accommodate flexible container structures **14** having dimensions that can vary in at least two dimensions (e.g., a length L and a width W) as described below with reference to FIG. **10**. Thus, the support structure **12** is a support structure that is configured to accommodate and support flexible container structures **14** of varying dimensions.

As illustrated in FIG. **3**, ends **17***a* and **18***a* have generally rectangular cross-sections, with ends **18***a* sized larger so as to receive smaller ends **17***a*. It shall be understood that the illustrated support structure is intended to be representative and not limiting. It should be appreciated that alterative geometries, shapes and configurations are contemplated and considered within the scope of the present disclosure. It should also be appreciated that alternative manners of joining or interfacing component structures, pieces or parts, and the number of components making up a given support structure (or support), as well as the materials used to construct the structure (or component part) are contemplated and considered within the scope of the present disclosure.

In an embodiment, FIG. **3**A and FIG. **3**B show a support structure **212**. Support structure **212** includes horizontal supports **214***a* and **214***b*, extension members **215**, vertical supports **216**, and L-shaped members **218**. The L-shaped members are 90° members. Each of the horizontal supports **214***a*, **214***b*, the extension members **215**, the vertical supports **216**, and the L-shaped members **218** have a circular cross-section. Each of the horizontal supports **214***a*, **214***b*, the extension member **215**, the vertical supports **216**, and the L-shaped members **218** may be made from metal, wood, fiberglass, and any combination thereof. In an embodiment, the horizontal supports **214***a*, **214***b* and the L-shaped members **218** are made of metal, such as steel conduit. The extension members **215** and the vertical supports **216** are made from fiberglass, such as reinforced fiberglass rebar.

The horizontal supports **214***a* and **214***b* attach to each other to form centerpiece **222**. Horizontal support **214***a* may be releasably attachable to horizontal support **214***b* by way of an attachment device (such as a bolt/nut, screw, and/or rivet). Alternatively, horizontal support **214***a* may be integral to horizontal support **214***b* (weld or die cast). The centerpiece **222** is X-shaped.

The extension members **215** cooperatively attach to the horizontal supports **214***a*, **214***b* and cooperatively attach to the L-shaped members **218** by way of male-female engagement, as shown in the enlarged area P of FIG. **3**A. The length of the extension members **215** may be adjusted so that the support structure **212** can accommodate flexible support containers of various sizes and different sizes.

The vertical supports **216** cooperatively attach to the L-shaped members **218** by way of male-female engagement. The horizontal supports **214***a*/**214***b*, the extension members **215**, the vertical supports **216**, and the L-shaped members form two U-shaped support members **220** with the bottom of each "U" contacting the ground or other support surface. The U-shaped supports members **220** are arranged in a crisscross manner, crossing at a common midpoint and giving the support structure **212** an X-shaped footprint on the ground as shown in FIG. **3**A. The vertical supports **216** extend vertically parallel to or substantially parallel to each other. Vertical support ends **216***a* are the distal most points from the ground when the support structure **212** is assembled and deployed. The vertical support ends **216***a* are positioned to insert into the support pocket structures **50** when the flexible container **30** is moved downward to align the support pocket structures **50** on the respective vertical support ends **216***a*, as shown by down arrow Q in FIG. **3**B. With the vertical support ends **216***a* inserted into the support pocket structures **50**, the support structure **212** supports the flexible container structure **14** as will be further discussed below.

As illustrated in FIG. **4**, the flexible container structure **14** includes a flexible container **30**. As shown, the flexible container **30** includes a bottom wall **32** (or "bottom wall section") and four (4) side walls **34** (or "side wall sections") extending from and connected to the bottom wall **32**. Thus, in the illustrated embodiment, the flexible container structure **14** takes the form of a flexible, rectangular receptacle (having a generally rectangular interior). In accordance with various embodiments, the flexible container structure **14**, when assembled, can be considered a walled structure or a flexible walled structure.

In one embodiment, the flexible container **30** is constructed of a coated woven material. In a further embodiment, the coated woven material is polypropylene fibers woven together and coated. One example of a coated woven material that can be used to make the flexible container **30** is a 6 oz coated polypropylene fabric, which is commercially available. It should be appreciated, however, that any suitable material may be utilized for making the flexible container **30**. Generally, materials contemplated for use in making the walls (or material layers making up the walls) of the flexible container **30** have the ability to protect (at least to some extent) against puncture or other invasive actions (such as from the robust and bulky material contemplated for storage and/or transport within the main interior of the container) that might otherwise affect the walls in a negative manner. Moreover, materials contemplated for making the flexible container **30** typically provide at least some resistance to or at least some

protection against leakage of the material contents from the main interior to the exterior of the container.

FIG. **5** is an enlarged view of a portion of the flexible container assembly **14** and specifically the flexible container **30** with the portion indicated by line **5-5** of FIG. **4**. As illustrated in FIG. **5**, edges portions or edges **33** of the side walls **34** are joined or mated. In the illustrated example, such joining is accomplished by a double needle chain stitch. However, it should be appreciated that other ways or manners of joining portions of the flexible container **30** are contemplated and considered within the scope of the present disclosure.

FIG. **6** is a bottom view of the exemplary flexible container structure **14** of FIG. **4**, where the flexible container **30** is shown folded (described further below). With further reference to FIGS. **5** and **6**, flexible container **30** includes a plurality of flap structures **36** (also referred to as "folded bottom flaps"), each of which extends from a respective side wall **34**. The flap structures **36** are folded, one with respect to another, to create bottom wall **32**. In this manner, bottom wall **32** can be termed a "folded bottom wall." The folded bottom wall is reinforced and capable of carrying or holding a substantial load or amount of material as described herein. In an embodiment, the material is a construction material. In the illustrated embodiment, each of the flap structures **36** are generally trapezoidal in shape. It should be appreciated, however, that the shape of respective side walls and bottom walls, and the shape of respective flap structures **36** extending from the side walls, can vary.

As illustrated in FIGS. **4** and **6**, the flexible container **30** includes several vertically extending first straps **38**. The vertically extending first straps **38** extend beyond an upper edge **40** or rim of the side walls **34** so as to form lifting loops **42** which facilitate grabbing/holding and/or transporting of the flexible container structure **14**. By way of example, the flexible container structure **14** is configured, in some embodiments, to be grasped and raised by a forklift or other machine when it is being transported or moved. In some embodiments, including the example embodiment illustrated in FIG. **4**, the lifting loops **42** are "cross-corner" loops that extend from one of the side walls **34** of the flexible container **30** to another of the side walls **34**. The first straps **38** also assist in improving the structural strength of the flexible container **30**.

Referring now to FIG. **7**, as well as FIG. **4**, a plurality of closure buckles **44** are provided along the vertically extending first straps **38** (or "straps") proximate the bottom wall **32** of the flexible container **30**. The closure buckles **44** (or "buckles"), which can take the form of D-rings or other forms, are configured to receive second straps **46** (or "bottom straps"), which are provided along the bottom wall **32**. By inserting the second straps **46** through the buckles **44** and wrapping the second straps **46** back around downward through the buckles **44**, the second straps **46** and the bottom wall **32** can be attached to a side wall **34** of the flexible container **30**. Thus, the bottom wall **32** can be closed, thereby providing support for any material contained in an interior portion **31** within the flexible container **30** as shown in FIG. **4**. The buckles **44** can be undone to release the flap structures **36** and permit the flap structures **36** to unfold and open, thereby permitting discharge of materials from the container.

In an embodiment, the flexible container structure includes lifting loops independent and separate from the first straps and the second straps. A lifting loop is permanently attached to each corner of the flexible container **30**. In addition, the flexible container **30** also includes first strap **38**, second strap **46** and buckle **44** as discussed above. In this embodiment, the lifting loops operate independently to support the flexible container structure during transport and/or discharge.

Referring now to FIGS. **1**, **4** and **8**, at least one or a plurality of support pocket structures **50** (or "pockets") is connected to the flexible container **30**. As shown in FIG. **1**, in the illustrated example, four support pocket structures **50** are connected to the flexible container **30** of the flexible container assembly **14**. FIG. **8** shows one of the support pocket structures **50** connected to flexible container **30**. The support pocket structures **50** are, in some embodiments, constructed of the same material as that of the flexible container **30**, although other materials are contemplated and considered within the scope of the present disclosure.

In one embodiment, the support pocket structures **50** are connected near upper ends **52** of side walls **34**. In some embodiments, each of the support pocket structures **50** includes a single piece of material that is stitched together along a single seam. In one embodiment, the connection of each support pocket structure **50** to the flexible container **30** is accomplished by stitching, typically at a location other than (e.g., opposite to) the seam, the support pocket structures directly to the flexible container **30**. In various embodiments, the connection is accomplished via stitching, such as double needle chain stitching, although other manners of connecting are contemplated and considered within the scope of the present disclosure. In some embodiments, the support pocket structures **50** include portions **54** that are stitched together along edges **33** (FIG. **8**) to create an interior region **51** (or "interior") that is accessible via an opening **53**. In some embodiments, edge connection or mating is accomplished via a single needle lock stitch, although other manners of connecting are contemplated and considered within the scope of the present disclosure.

It is further noted that the flexible container structure **14** can be positioned, for example, using the lifting loops **42** (including manually), relative to the support structure **12** such that the vertical supports **16** (**216**), may be received into respective interior regions **51** (FIG. **8**) of the support pocket structures **50**, as indicated by arrows **56** of FIG. **1**. It is noted that interior regions **51** can be shaped or otherwise designed to receive vertical supports **16** (**216**) in an appropriate manner. In this manner, a variety of support and support pocket structure shapes and/or sizes are contemplated and considered within the scope of the present disclosure.

Set-Up/Use/Operation

A flowchart of an example process **100** for set-up and use of the container assembly **10** is illustrated in FIG. **10**. Although the process **100** is described with reference to the flowchart illustrated in FIG. **10**, it will be appreciated that many other methods of performing the acts associated with process **100** may be used. For example, the order of many of the steps may be changed, and many of the steps described are optional.

As indicated by block **101**, a flexible container structure **14** is provided, typically, along with a plurality of identical or substantially identical flexible containers and typically via a shipping or other transporting type of vessel or container (not shown). The flexible container structure is unpacked or otherwise removed from the shipping container and inspected (e.g., manually and visually) to ensure the folded bottom flap structures **36** are folded and appropriately secured using buckles **44**, which secure the first straps **38** and the second straps **46**. A support structure **12** is provided, as indicated by block **102**. In one example embodiment, horizontal portions of the vertical supports **16** are fit into or otherwise connected to center piece **18** as described above, to at least partially assemble support structure **12**. Flexible container structure **14** is positioned with respect to the support structure **12**, as indicated by block **104**. In some embodiments, support

pocket structures **50** are positioned to receive vertical supports ends **16***a* (**216***a*). For example, two diagonally-opposing (at corners) support pocket structures **50** can be stretched and fit over, so as to receive, two respective vertical support ends **16***a* (**216***a*) and then the two remaining support pocket structures **50** can be stretched and fit over, so as to receive the remaining two vertical support ends **16***a* (**216***a*) within an interior (e.g., a cylindrical interior having a circular opening) of each of the pocket structures. The flexible container **30** can then be extended so as to be positioned to receive materials, such as the types of materials described herein, as indicated by block **106**. For example, a user can reach into the flexible container **30** and straighten its fabric so as to create expanded interior space.

The flexible container **30** can hold from 0, or greater than 0, or 10 kg, or 100 kg, or 200 kg, or 300 kg, or 400 kg, or 500 kg, to greater than 2000 kg, or 2000 kg, or 1000 kg, or 750 kg of material within the interior portion **31**. The support structures of the kind contemplated for use herein typically provide at least some stability for the flexible containers of the kind contemplated for use therewith, for example, during at least certain conditions caused by wind. The support structures of the kind contemplated also facilitate flexible container loading due to the allowance for vertical and horizontal stretching of the container.

As indicated by block **108**, the flexible container structure **14** is raised upwardly and away from the support structure **12**. As illustrated in FIGS. **9**A-**9**C, the lifting loops **42** are arranged or oriented in an appropriate manner (e.g., to form a generally arched or contoured form) so as to be received by a forklift **60**, or other suitable industrial machine, such as a crane. In various embodiments, the forklift **60** or other industrial machine is positioned with respect to and so as to engage the lifting loops **42**. For example, engagement of the forks **62** of the forklift **60** occurs by positioning the forks **62** through the lifting loops **42**. Alternatively and again by way of example (not illustrated), a crane hitch of a crane (or a crane hook) is lowered so as to be positioned with respect to and to grasp the lifting loops, thereby engaging the lifting loops

Using the forklift **60** or other industrial machine, the flexible container structure **14** is raised upwardly and away from the support structure **12**. The raised flexible container structure **14** is transported to a dump site or to a vehicle (not shown), such as a transport or dump vehicle. By lifting the flexible container structure **14** via the lifting loops **42**, the present assembly and/or method imparts little, or no, damage or disrepair to a location from which the present assembly is removed, such as, a driveway, a lawn, or other location. Moreover, the flexible container requires only enough space to accommodate the container assembly itself and accessibility for an industrial machine, for example, of the kinds noted herein. In at least this respect, the flexible container assembly of the present disclosure advantageously has a reduced overall footprint and can save space, and, as such, storage and/or placement locations of the flexible container assembly may be more varied and, among other things, include both privately and publicly owned locations.

Referring back to FIG. **10**, the flexible container structure **14** is transported or hauled with the material to another location. In various embodiments, transporting or hauling of the flexible container structure **14** from one location to another (such as for disposing or discharging any materials contained therein) can take place via a larger transport bin that is towed (e.g., on or in conjunction with a trailer), or via, in some instances, in or on a truck (e.g., a truck bed) when the container is sized for such application. Other transport schemes or methods are contemplated and considered within the scope of the present disclosure. Once transported to another location (not shown), the contents or the materials contained by the flexible container structure **14** (not shown) are disposed or discharged from the flexible container structure **14**, as indicated by block **112**. For example, the material or contents (e.g., construction materials or other materials or contents) can be conveniently emptied or discharged from the flexible container structure **14** into a depositing region intended to receive such material (e.g., a receiving structure positioned beneath the container structure, which is also not shown).

In various embodiments of the present disclosure, discharge of contents (not shown) takes place via the bottom wall **32** (FIG. **6**). That is, the buckles **44** are released to disconnect the second straps **46** from respective the first straps **38**, and the flap structures **36** are unsecured or otherwise released to unfold and discharge any contents or materials making up a given load via a bottom opening **66** of flexible container **30** (FIG. **9**). The positioning of the buckles, in some embodiments, permits the buckles to be undone without reaching under or below the flexible container **30**. Once discharge of contents from the flexible container structure **14** has taken place, the flexible container **30** and/or flexible container structure **14** is typically inspected, as indicated by block **114**, such as to determine if the flexible container structure **14** is acceptable for re-use. In various embodiments, such inspection includes an evaluation or inspection of the coated woven material of the flexible container **30**, as well as the support structure **12** (including the vertical supports **16** and the center piece **18**), for wear and tear, including damage to the materials making up the flexible container **30** and/or the support structures. If the flexible container structure **14** and/or the support structure **12** is re-useable, the buckles **44** are typically reattached (following folding of the respective folded bottom flaps) and the flexible container structure **14** is typically moved (e.g., using the industrial machine) and lowered once again for set-up with respect to the support structure **12**, typically via the support pockets **50** described previously.

FIG. **11** shows an exemplary flexible container structure **14** having a flexible container **30** in accordance with embodiments of the present disclosure and including exemplary measurements or dimensions for the container structure. It should be appreciated that the measurements are provided by way of example and not limitation, and measurements are provided not in absolute terms, but rather, are indicative of measurements that can be achieved within acceptable tolerances. The illustrated flexible container **30** has a length (L) of 66", a width (W) of 66" and a height (H) of 54". Lifting loops **42** extend from first straps **38**, which are positioned at a distance ("LED" for "loop edge distance") of 11" from the sidewall edges **54**. Lifting loops **42** further extend, as noted above in a generally arcuate fashion, to a height ("LH" for "loop height") of 10" above an upper edge **55** of sidewalls **34**. Finally, pocket structures **50** are shown having a finished height dimension of 12". Additionally, pocket structure **50** is shown to include an opening **53** having a 6" circumference. The flexible container **30** may alternatively be sized to have a length (L) of 72", a width (W) of 72" and a height (H) of 54". In alternative embodiments, the flexible container **30** may be sized to have a length (L) of 96", a width (W) of 96" and a height (H) of 54". Alternative sizes for the above are contemplated and considered within the scope of the present disclosure. It is contemplated that, in some embodiments, material contents of the flexible container **30** or the flexible container structure **14** can fit or otherwise be contained in a conventional **20** yard sized roll-off bin (22' long by 8' wide) and, in other embodiments, the contents of the flexible container **30** or the flexible container structure **14** itself can fit or otherwise

be contained in a utility trailer. Moreover, as noted above, the support structure is, in some embodiments, capable of being used in conjunction with flexible container structures of varying sizes and/or dimensions. Accordingly, if a differently sized flexible container structure is desired for use, the support structure can be adjusted (e.g., at least partially disassembling and then reassembling) to accommodate the flexible container structure having one or more dimensions that are different from a previous flexible container structure used with the support structure. The process and/or actions described above can be performed with the adjusted support structure.

FIG. **11** shows an embodiment wherein the flexible container structure **14** includes a top flap **80**. The top flap **80** is attached along a portion of the edge **55**. In an embodiment, the top flap **80** is sewn or otherwise stitched to forming a hinge-like attachment between the top flap **80** and the flexible container **30**. The top flap **80** covers the interior region **51**.

In an embodiment, side straps **82** extend from the first straps **38**. Tabs **84** attach to the top flap **80**. The tabs **84** and are positioned on the top flap **80** so a tab **84** is configured to cooperatively interface with a respective side strap **82**. Each tab **84** releasably attaches to a respective side strap **82** to secure the top flap **80** to the flexible container **30**. Nonlimiting examples of releasable attachment between the side strap **82** and the tab **84** may be by way of buckle, hook and loop material, and/or knot-tying.

In various embodiments of the present disclosure, an efficient system and/or assembly is disclosed here that provides for support, collection and/or holding, and transport or movement of materials (e.g., construction site or other waste materials), including one or more of: (i) materials that are bulky, robust, and typically heavy and/or otherwise cumbersome to gather and transport; (ii) materials that are homogenous in nature; (iii) materials that are a heterogeneous mix; (iv) and a variety of other materials (e.g., at a construction site, materials may include multiple material types, such as concrete, cardboard, wood scraps, plastic, metal, insulation, etc.).

The system/assembly of the present disclosure provides for both transport (e.g., via a transport vehicle) and later disposal (e.g., at a disposal location or site) of such materials or substances. It should be appreciated that the size, shape, and configuration of the container assembly (or constituent subassemblies, structures, or components) and/or the weight support capabilities of the container assembly can vary. In various embodiments, the flexible container comprises a polypropylene receptacle or bag that is capable of lifting large or substantial loads, from greater than 0 kg to 2000 kg, or greater than 2000 kg when used by way of example in a construction application, the bag can be stored and/or folded with other construction supplies.

The flexible container assembly of the present disclosure and components for the same are mobile, particularly when empty, and often re-usable. The lifting loops **42** facilitate movement or transport of material loads when the flexible container structure is full or substantially full of material contents and the flexible container structure is dischargeable at another location, such as a location remote from the fill location, and by way of example, via a truck or trailer. The flexible container can be of a material or design and size (e.g., height) that can be used to hide or at least obstruct viewing of container contents, as well as provide for large print-receiving or printable panels or walls/wall surfaces (e.g., external) that could display logos and or other information. Generally, the flexible container assembly is designed to be capable of withstanding a variety of weather and/or environmental conditions.

The present disclosure is intended to encompass numerous embodiments that include some, but not all, of the features discussed above as being part of the container assembly **10**, as well as one or more other features in addition to some or all of the features discussed above. For example, while the various embodiments (including embodiments illustrated) take a substantially box-like or rectangular appearance, in other embodiments, the overall container assembly and/or assembly components or subassemblies can take other geometric shapes. For example, the flexible container or receptacle can be cylindrical in shape. Also, and by way of example, the present disclosure is intended to encompass partially-assembled subportions of the flexible container assembly, such as the container structure and/or support structure discussed above, as well as portions of such subassemblies.

Flexible container assemblies of the kind described herein can be relatively light and, thus, relatively easy to transport, while remaining robust to a sufficient extent (e.g., making it unlikely that materials contained inside the containers will be prematurely disposed of or discharged). In some cases, the container assemblies of the kind described herein are sufficiently robust enough to continue to physically contain such materials even after the materials have been collected, transported and ultimately disposed of or dumped at a final location and, thus are in at least some instances re-usable.

Further, in some embodiments, the container will have a 5:1 Lift Ratio. It should be noted that, notwithstanding discussion regarding possible safety-related features (including, for example, features related to possible damage, puncture resistance, etc.), the inclusion of such discussion should not be understood as any representation that any embodiments of the present disclosure will be, safe or satisfy any particular safety standard. Indeed, safe operation can depend on numerous factors outside of the scope of the present disclosure including, for example, manners of installation, maintenance, training of the individuals involved, etc.

Also, notwithstanding the usage above of terms such as "upper", "lower", "top", "bottom", "side", "downward" and other terms or references (e.g., arrows) to describe relative positioning or movement of various elements of the container assembly **10** relative to one another and/or another reference point (e.g., to ground), it should be understood that the present disclosure is intended to encompass a variety of other embodiments having features that do not satisfy one or more the above relational characteristics described above.

The present disclosure is further intended to encompass methods of making and/or using container assemblies such as the container assembly **10** and other container assemblies. Also, the present disclosure is intended to encompass a variety of methods of filling, transporting, and otherwise utilizing the container assembly and other container assemblies for one or more purposes such as storing and transporting various materials, such as construction waste materials and/or other materials.

While the present invention has been described in connection with what is presently considered to be the most practical and preferred embodiments, it is to be understood that the disclosure is not limited to the disclosed embodiments, but on the contrary is intended to cover various modifications and equivalent arrangements included within the spirit and scope of the claims. It is thus to be understood that modifications and variations in the present disclosure may be made without departing from the novel aspects of this disclosure as defined in the claims, and that this application is to be limited only by the scope of the claims.

Nonlimiting examples of the present invention are provided below.

E1. A flexible container assembly configured to hold an amount of material. The assembly includes a flexible container structure comprising

(i) a flexible container comprising a bottom wall section and a plurality of side wall sections, the bottom wall section and the side walls sections forming a walled enclosure for containing the amount of the material within the flexible container when the bottom wall is in a closed state; and

(ii) a plurality of support pocket structures, wherein a support pocket structure is connected to an upper end of each respective side wall section; and

a support structure comprising a plurality of vertical supports, an end of each vertical support received into a respective support pocket for maintaining the flexible container in an upright position.

E2. The assembly of E1 wherein the support structure comprises two U-shaped support members in a crisscross arrangement.

E3. The assembly of E2 wherein the support structure has an X-shaped footprint.

E4. The assembly of E1, wherein the walled enclosure includes an open top.

E5. The assembly of E1, wherein the flexible container comprises a coated woven material.

E6. The assembly of E5, wherein the coated woven material comprises polypropylene fibers woven together and coated.

E7. The assembly of E1, wherein the bottom wall section is formed from one or more flap structures extending from one or more of the plurality of side wall sections.

E8. The assembly of E1, comprising a first strap affixed to a side wall section and a second strap affixed to the bottom wall section, the first strap releasably connected to the second strap to permit opening of the bottom wall section.

E9. The assembly of E1, comprising a plurality of lifting loops attached to a top rim of the flexible container structure.

E10. The assembly of E1, wherein the amount of material includes an amount of construction material.

E11. A method of assembling a flexible container assembly configured to hold an amount of material. The method includes:

(a) providing a flexible container structure comprising (i) a flexible container comprising a bottom wall section and a plurality of side wall sections, the bottom wall section and the side walls sections forming a walled enclosure for containing the amount of the material within the flexible container when the bottom wall is in a closed state, and

(ii) a support pocket structure connected to an upper end of each respective side wall section;

(b) providing a support structure comprising a plurality of vertical supports;

inserting an end of each vertical support, into a respective support pocket structure; and

(c) maintaining, with the support structure, the flexible container in an upright position.

E12. A method of disposing an amount of material, the method comprising:

(a) providing a flexible container assembly comprising (i) a flexible container structure comprising

(A) a flexible container comprising a bottom wall section and a plurality of side wall sections,

(B) a plurality of support pocket structures connected to an upper end of each respective side wall section,

(C) a first strap affixed to a side wall section and a second strap affixed to the bottom wall section, the first strap releasably connected to the second strap and placing the bottom wall in a closed state, the bottom wall section and the side walls sections forming a walled enclosure for containing the amount of the material within the flexible container, and

(ii) a support structure comprising a plurality of vertical supports, an end of each vertical support received into a respective support pocket structure;

(b) lifting the flexible container structure away from the support structure;

(c) opening the bottom wall; and

(d) discharging the amount of material from the flexible container.

E13. The method of E12 wherein the flexible container assembly comprises a plurality of lifting loops attached to a top rim of the flexible container structure, the method comprising

engaging, with a machine, the lifting loops; and

lifting the flexible container away from the support structure.

E14. The method of E 12 comprising releasing the first strap from the second strap and discharging the material from the flexible container.

E15. The method of E12 comprising transporting, after the lifting, the flexible container structure to another location.

It should be understood that various changes and modifications to the presently preferred embodiments described herein will be apparent to those skilled in the art. Such changes and modifications can be made without departing from the spirit and scope of the present subject matter and without diminishing its intended advantages. It is therefore intended that such changes and modifications be covered by the appended claims.

We claim:

1. A method of disposing an amount of material, the method comprising:

(a) providing a flexible container assembly comprising

(i) a flexible container structure comprising

(A) a flexible container comprising — an openable bottom wall comprising folded bottom flaps and four side wall sections,

(B) four support pocket structures connected to an exterior upper end of each respective side wall section,

(C) a first strap affixed to a side wall section and a second strap affixed to the bottom wall section, the first strap releasably connected to the second strap and placing the bottom wall in a closed state, the bottom wall section and the side walls sections forming a walled enclosure for containing the amount of the material within the flexible container,

(D) four cross-corner lifting loops attached to a top rim of the flexible container structure and

(ii) a support structure comprising two U-shaped support members in a crisscross arrangement and having an X-shaped footprint, the two U-shaped support members comprising four vertical supports, an end of each vertical support received into a respective support pocket structure;

(b) lifting the flexible container structure upwardly and away from the support structure;

(c) removing the vertical support members from each respective support pocket structure;

(d) opening the bottom wall; and

(e) discharging the amount of material from the flexible container.

2. The method of claim **1** comprising

engaging, with a machine, the lifting loops; and

lifting the flexible container away from the support structure.

3. The method of claim 1 comprising releasing the first strap from the second strap;

opening the openable bottom wall; and

discharging, through the opened bottom wall, the material from the flexible container.

4. The method of claim 1 comprising transporting, after the lifting, the flexible container structure to another location.

5. The method of claim 1 comprising transporting, after the removing and before the opening, the raised flexible container structure to a dump site.

6. The method of claim 1 comprising discharging the amount of material into a truck bed.

7. The method of claim 1 wherein the containing comprises containing an amount of construction material in the flexible container structure.

8. The method of claim 1 comprising containing from 100 kg to 2000 kg of material within the flexible container.

9. The method of claim 6 comprising discharging from 100 kg to 2000 kg of material through the open bottom wall.

10. The method of claim 1 comprising closing, after the discharging, the opened bottom wall.

11. The method of claim 1 comprising

folding, after the discharging, the bottom flaps to close the opened bottom wall;

reattaching the first strap to the second strap; and

lowering the raised flexible container structure onto the support structure.

12. The method of claim 11 comprising inserting the end of each vertical support into a respective support pocket structure.

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