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(54) Titre : TREMIE DE SEMOIR PLIANTE AVEC BASE POUR ELEVATEUR A FOURCHE
(54) Title: FOLDING SEED BOX WITH FORK LIFT BASE

(57) Abrégé/Abstract:
A collapsible bulk container for dry, flowable particulate material is provided with a frame to support a bottom wall having a discharge opening and a gate moveable between opened and closed positions relative to the discharge opening. Four side walls
are pivotally connected to the frame, with the pivot axes being at different elevations, such that the side walls can be folded between an upright use position and a substantially flat storage position. A lid is pivotally connected to opposite side walls for moving between an open position adjacent the connected side wall and a closed position over the bottom wall. Multiple containers can be stacked one upon another in both the use and storage positions. The base or frame of the container can receive forks from a lift truck on all four sides of the container.
ABSTRACT

A collapsible bulk container for dry, flowable particulate material is provided with a frame to support a bottom wall having a discharge opening and a gate moveable between opened and closed positions relative to the discharge opening. Four side walls are pivotally connected to the frame, with the pivot axes being at different elevations, such that the side walls can be folded between an upright use position and a substantially flat storage position. A lid is pivotally connected to opposite side walls for moving between an open position adjacent the connected side wall and a closed position over the bottom wall. Multiple containers can be stacked one upon another in both the use and storage positions. The base or frame of the container can receive forks from a lift truck on all four sides of the container.
TITLE: FOLDING SEED BOX WITH FORK LIFT BASE

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a Continuation-in-part of U.S. Serial No. 12/684,670 filed January 8, 2010, herein incorporated by reference in its entirety.

BACKGROUND OF THE INVENTION

Collapsible and folding containers are known in the art for storing bulk, dry, flowable particulate material, such as agricultural seeds. For example, the Buckhorn SeedBox container has telescoping side walls formed by a lower box portion and an upper ring portion, wherein the upper ring portion is inverted for nesting around the lower box walls. The Buckhorn container requires two people for setup and breakdown. The nested, collapsed height of the Buckhorn container is approximately 40% of the full height used for storing seed. The Buckhorn container also has a lid which must be completely removed before the container is collapsed and re-mounted after the container is erected.

Other types of bulk containers are also known in the art which have walls that can be disassembled for storage and erected for use. However, these containers do not have bottom discharge openings for dispensing material and do not have permanently attached lids or covers.

Some prior art containers are adapted to receive the forks of a forklift truck. Typically, the fork slots allow entry of the forks from only one side, and sometimes from the opposite side, but not from all four sides. The inability to pick up the container from any side limits the versatility and use of the containers.

Therefore, a primary objective of the present invention is the provision of an improved folding bulk container for particulate material.

Another objective of the present invention is the provision of an improved seed box having folding side walls.

Another objective of the present invention is the provision of a bulk container which can be quickly and easily folded between a compact storage condition and an upright use position.
Still another objective of the present invention is the provision of a folding seed box having a hinged lid permanently mounted to the box.

Another objective of the present invention is the provision of a folding bulk container having a bottom opening for discharge of particulate material from the container.

A further objective of the present invention is the provision of collapsible bulk seed container having a sloped bottom wall.

Yet another objective of the present invention is the provision of a folding seed box which can be converted between use and storage positions by one person.

Still another objective of the present invention is the provision of a folding seed box having one or more lid panels.

A further objective of the present invention is the provision of a folding seed box having a lid hinged to one of the side walls.

Another objective of the present invention is the provision of a folding seed box having a base adapted to receive the forks of a lift truck from any of the four sides of the box.

A further objective of the present invention is the provision of an improved bulk container wherein the base is free from obstructions which preclude use of a forklift from any side of the container.

Another objective of the present invention is the provision of an improved bulk container which is economical to manufacture, and durable and safe in use.

These and other objectives will become apparent from the following description of the invention.

**SUMMARY OF THE INVENTION**

The improved foldable bulk container of the present invention includes a frame which supports a bottom wall having a discharge opening. A gate is provided in the bottom wall for opening and closing the discharge outlet. Four side walls are pivotally connected to the frame, for movement between an upright use position and a folded storage position. Removable pins lock the side walls together when the walls are folded upward to the use position. Each side wall pivots at a different elevation above the bottom wall such that the side walls fold down substantially flat, one upon another, in the storage position. A
lid is formed in two sections which are pivotally connected to opposite side walls for folding between an open position adjacent the side wall and a closed position over the bottom wall. Multiple folding containers can be stacked on top of each other in both the use and storage positions.

In an alternative embodiment, the improved foldable bulk container of the present invention has a single lid hinged to one side wall for folding between open and closed positions. The walls are held in the upright position by removable pins, or alternatively, by spring biased lock arms. The pins can be quickly removed, or alternatively the lock arms can be quickly disengaged, to allow the walls to fold down.

Still another alternative embodiment of the container has a base with fork lift slots on each side. The base, which is free from obstructions, allows a lift truck to approach a container from any side, with the forks being received in the respective slots, without interference, for lifting the container.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a perspective view of the folding bulk container of the present invention with the walls in the upright, use position and the lid sections closed.

Figure 2 is a perspective view of the container and the first fold down step with one lid panel opened.

Figure 3 is a perspective view of the container and the second fold down step, with the second lid panel opened.

Figure 4 is a perspective view of the container and the third fold down step, with one side wall folded inward.

Figure 5 is a perspective view showing the container and the fourth fold down step, with the second side wall folded inwardly.

Figure 6 is a perspective view of the container and the fifth fold down step, with the third side wall folded inwardly.

Figure 7 is a perspective view of the container and the sixth fold down step, with the fourth side wall folded inwardly, such that the container is in a storage condition.

Figure 8 is a side elevation view of the container with the side walls folded up in the use position.
Figure 9 is an end elevation view of the container with the side walls folded up in the used position.

Figure 10 is a bottom plan view of the container with the gate in the closed position.
Figure 11 is a side elevation view of the container with the walls folded down in the storage position.

Figure 12 is an enlarged view showing a corner joint of the erected side walls with a locking pin in place.

Figure 13 is a view similar to Figure 12 showing the locking pin retracted so that the walls can be folded down.

Figure 14 is a perspective view of an alternative embodiment of the folding bulk container according to the present invention, with a single panel lid and an improved forklift base.

Figure 15 is a side elevation view of the container shown in Figure 14.
Figure 16 is an end elevation view of the container shown in Figure 14.

Figure 17 is a top plan view of the container shown in Figure 14.

Figure 18 is a perspective view showing the first fold down step for the container of Figure 14, with the lid folded open.

Figure 19 is a perspective view showing the second fold down step of the container of Figure 14, with one end wall folded down.

Figure 20 is a view showing the third fold down step, with the opposite end wall folded down for the container of Figure 14.

Figure 21 is a perspective view showing the fourth fold down step, with one of the side walls of the container of Figure 14 folded down.

Figure 22 is a perspective view showing the fifth fold down step, with the second side wall of the container of Figure 14 folded down.

Figure 23 is an enlarged view of one corner of the container, taken along line 23-23 of Figure 18.
DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The improved folding bulk container or seed box of the present invention is generally designated in the drawings by the reference numeral 10. The container includes a base or frame 12 with four corner legs 14. The frame 12 supports a bottom wall 16 which has a discharge outlet or opening 18 with a gate 20 moveable between open and closed positions relative to the discharge opening 18. Preferably, the gate is manually moveable between the open and closed positions, though a powered gate may also be provided. The bottom wall 16 includes sloped segments, as seen in Figures 8-11, so that particulate material in the container can flow to the discharge opening 18.

Four side walls 22, 24, 26 and 28 are pivotally connected to the frame adjacent their lower ends so as to be moveable between a raised, upright use position and a collapsed storage position. The pivot axes of the walls are at different elevations, so that the walls can be sequentially folded downwardly from the use position to the storage position and lay substantially flat, one upon another, as seen in Figure 7.

The container 10 also includes a lid or cover, which preferably is formed in two halves by panels 30, 32. Each panel 30, 32 is pivotally connected to the opposing third and fourth side walls 26, 28, respectively, so that the panels 30, 32 can be folded between a use position over the bottom wall 16 to cover the contents of the container, and a storage position adjacent the respective side walls, 30, 32.

The process for folding the container 10 from the use position shown in Figure 1 to the storage position shown in Figure 7 involves the following steps. First, the first lid panel 30 is folded open from the horizontal use position above the bottom wall 16 to a vertical position adjacent the third side wall 26, as shown in Figure 2. Then, the second lid panel 32 is folded open from the horizontal use position over the bottom wall 16 to a vertical position adjacent the side wall 28, as shown in Figure 3. Then, the first side or end wall 22 is folded downwardly from a vertical use position to a substantially horizontal storage position, as seen in Figure 4. Next, the second side or end wall 24 is folded down from a vertical use position to a substantially horizontal storage position on top of the first side wall 22, as shown in Figure 5. Then, the third side wall 26 is folded down from a vertical use position to a substantially horizontal storage position on top of the second side wall 24, as shown in Figure 6. Last, the fourth side wall 28 is folded down from a vertical
use position to a substantially horizontal storage position on top of the third side wall 26, as shown in Figure 7. The side walls 22, 24, 26, and 28 and the lid panels 30, 32 stacks within the frame 12 in the storage position, without detaching the walls from the frame or the lid panels from the walls 26, 28. The steps are reversed to convert the container from
the storage position to the use position.

Figures 12 and 13 show one of the corners of the container 10 when the walls 22-28 are erected in the used position. All four corners are identical. More particularly, each of the first and second side or end walls 22, 24 has a tube or post 34 at the opposite lateral edges. The third and fourth side walls 26, 28 each have L-shaped channels or flanges 36 at the opposite side edges. The corner posts 34 are received in the corner channels 36 when the walls 22-28 are upright. Aligned holes 38 in the post 34 and channel 36 allow a locking pin 40 to be inserted therethrough so as to maintain the walls in their upright position. The pins 40 are pulled from the holes 38 before the walls are folded down. Preferably, the first and second side or end walls 22, 24 have a horizontally disposed tubular sleeve 42 for guiding the pin 40, and a pin retention tab 44 which prevents the pin 40 from being completely removed from the sleeve 42 when withdrawn from the holes 38. Therefore, the pin 40 cannot be accidentally disconnected from the walls 22, 24, or otherwise lost.

Multiple containers 10 can be stacked one upon another in both the use and storage positions. The corner posts 34 and channels 36 provide structural support for stacked containers in the use position. The upper corners 46 of the frame 12 supports stacked containers in the storage position.

The height of the walls 22-28 is slightly less than the width of the container 10. When the walls 22-28 are folded down into the storage position, the height of the container 10 is less than half of the height of the container when the walls are folded up to the use position. Thus, the container 10 can be collapsed to substantially shorter height for shipping and storage. The ability to stack the containers minimizes space requirements during transport and storage. The frame 12 allows the containers to be moved, stacked and unstacked using a fork lift.

Preferably, the walls 22-28 and the lid panels 30-32 are made of steel, or other lightweight, yet thin material which has strength and durability. The container 10 can
replace or eliminate use of large bulk seed bags and the known problems associated with handling of such bags.

The hinged design of the container, walls, and lid panels permit one person to assemble and breakdown the container by simply pivoting one panel or side wall of the container at a time. Also, the permanent pivotal connection of the lid panels 30, 32 to the side walls 26, 28 eliminates the danger of the lid blowing off of the container in transit. The sloped bottom wall design eliminates particulate material from becoming stuck in the corners of the container 10 and creates a steady discharge flow of material while unloading.

A farmer can take the loaded container 10 directly to the field on a trailer, cart, or in a bed of a pickup truck for loading into a seed tender dispenser or directly into a seed planter.

The invention has been shown and described above with the preferred embodiments, and it is understood that many modifications, substitutions, and additions may be made which are within the intended spirit and scope of the invention. For example, alternative corner structure and locking means may be utilized, as opposed to the posts 34, channels 36 and pins 40, shown in the drawings. Also, the dimensions of the container 10 may be varied, as desired.

Figures 14-23 show an alternative embodiment of the folding particulate material container 10A according to the present invention. The container or seed box 10A of the alternative embodiment is substantially similar to the container or box 10 shown in Figures 1-13 including the base 12A, the legs 14A, the bottom wall 16A with a discharge opening 18A, and the four side walls 22A, 24A, 26A, and 28A. The side walls 22A-28A are pivotally connected to the frame adjacent their lower ends so as to be moveable between a raised, upright use position and a folded or collapsed storage position. The pivot axes of the walls 22A-28A are at different elevations, so that the walls can be sequentially folded downwardly from the use position shown in Figure 14 to the storage position shown in Figure 22, with the walls 22A-28A lying substantially flat, one upon the other.

One of the differences between the container or box 10, as compared to the box 10A, is that the base 12A includes rails 50 extending between each of the legs 14A, with each rail 50 having a pair of notches or slots 52 for receiving the forks of a forklift truck (not shown). Thus, a forklift can be driven up to any side of the container 10A, and the
forks inserted through the slots 52 to lift the container 10A. The container 10A is free of any interfering structure which would prevent the forks from being fully inserted from any side of the container.

The lid 30A of the container 10A is formed as a single panel, in comparison to the dual panels 30, 32 of the container 10. The lid or cover 30A is hinged to one of the side walls 22A-28A for movement between a use position covering the contents of the container, and a folded lowered position adjacent the attached side wall.

Another difference between the containers 10 and 10A is the structure of the corners of the containers. In the container 10A, the opposite edges of each wall 22A, 24A include a vertically extending lip 54 adapted to be received in a C-shaped flange 56 on the opposite edges of each side wall 26A, 28A. The lip 54 and flange 56 form a tongue and groove-type assembly. The lock pin 40 of the container 10 has been replaced with a sliding lock member or arm 40A on the container 10A. The lock arm 40A is slidably mounted in a bracket 58 on the side walls 22A, 24A and is movable between a locked position engaging the flange 56 and an unlocked position disengaged from the flange 56. The lock arm 48 is biased by a spring 60 to the locked position.

The container 10A folds down in a manner substantially identical to the folding action of the container 10, except that there is a single lid 30A, as opposed to the dual lids 30, 32. The fold down sequence is shown in Figures 18-22, and is reverse to fold the container 10A up from the storage position to the use position.

From the foregoing, it can be seen that the present invention accomplishes at least all of its stated objectives.
Claims

1. A foldable container for particulate material, comprising:
   a bottom wall;
   a top wall;
   four side walls extending between the top and bottom walls and having upper and
   lower edges and opposite lateral edges;
   the top wall being pivotally connected adjacent the upper edge of one of the side walls
   for movement between a use position over the bottom wall and a storage
   position adjacent the one side wall; and
   the side walls each being pivotal about the lower edges for movement between a
   substantially vertical use position and a substantially horizontal storage
   position.

2. The foldable container of claim 1 wherein the side walls fold down to stack
   flat one above another in the storage position.

3. The foldable container of claim 1 wherein each side wall has a pivot axis, and
   the pivot axes are vertically offset with respect to one another.

4. The foldable container of claim 1 further comprising a base to which the
   bottom wall and side walls are mounted.

5. The foldable container of claim 4 wherein the side walls are locked together in
   the use position and unlocked from one another in the storage position.

6. The foldable container of claim 1 wherein the bottom wall includes a
   discharge opening.

7. The foldable container of claim 6 wherein the bottom wall is sloped
   downwardly toward the discharge opening.
8. The foldable container of claim 6 further comprising a gate on the bottom wall to open and close the discharge opening.

9. The particulate material container of claim 1 wherein the walls fold down sequentially.

10. The foldable container of claim 1 further comprising legs to support the bottom wall above the ground.

11. The foldable container of claim 1 wherein the top wall includes a pair of lid panels pivotally secured to opposite side walls.

12. The foldable container of claim 1 wherein the side walls form four corners of the container, with each corner having an overlapping edge and an overlapped edge of adjacent side walls in the use position; and a lock member adjacent each overlapped edge, movable between locked and unlocked positions relative to the overlapping edge.

13. The foldable container of claim 12 wherein the lock member removably extends through aligned holes in the overlapped and overlapping edges to secure the adjacent side walls together in the use position.

14. The particulate material container of claim 12 wherein the overlapping edge has a C-shaped flange and the overlapped edge has a lip receivable in the flange.

15. The particulate material container of claim 14 wherein the lock member is mounted on the side wall with the overlapped edge, and engages the flange in the locked position and disengages the flange in the unlocked position.

16. The particulate material container of claim 1 further comprising a base to which the bottom wall and side walls are mounted.
17. The particulate material container of claim 16 wherein the base has a pair of slots on each side so that lift forks can be received on each side without interference from the bottom wall.

18. The particulate material container of claim 16 wherein the base includes four corner legs supporting the side walls and four perimeter rails extending between the legs, with a pair of recesses formed in each rail for receiving lift forks from all sides of the container.