resistant to such inadvertent opening, but without the locking mechanisms adding unnecessarily to the cost or tare weight of the container, and without including unnecessarily complicated mechanism that can make locking or unlocking unnecessarily complicated or time consuming. It is generally undesirable for the locking members to include excessive numbers of small parts, such as small springs associated with latches or locks, that may potentially break or become separated from their associated containers, resulting in parts or fragments that might potentially fall into a payload. There is a need for improvement in locking mechanisms for collapsible shipping containers.

[0008] Collapsible shipping containers often include a bar code label, RFID tag, or other means to facilitate tracking by providing a unique, machine readable identifier for each container. In some cases, labels or tags can be difficult to access, e.g., for containers at the top of a five-high stack. Such labels and tags can also be subject to damage or wear due, e.g., to impacts with or abrasion by forklift tines, other containers. There is a need for improvement in this area as well.

SUMMARY

[0009] Described herein are collapsible containers that address one or more of the above-mentioned issues. Each container comprises a generally rectangular base with four walls extending upward therefrom, i.e., a front wall, a rear wall, and a pair of side walls. In some embodiments, a lid may extend generally horizontally between the upper edges of the walls to enclose the interior of the container. The containers are preferably compliant with applicable ASTM standards, e.g., drop test, road vibration and stack test standards. In some embodiments, the containers include the features of the containers described in the above-referenced U.S. Patent No. RE 47,210, except to the extent that such features are inconsistent with those described and shown herein.

[0009A] According to a first aspect of the present invention, there is provided a collapsible container having an erected and a collapsed condition for transporting goods in the erected condition, the container comprising:

a base;

a front wall and a rear wall pivotably attached to the base; and

side walls pivotably attached to the base, the side walls positionable between the front and rear walls when the container is in its erected condition;

wherein the base includes an upper frame and a lower frame that is spaced apart from the upper frame to receive forklift tines therebetween, wherein the lower frame comprises a checker plate having a bottom surface that includes a pattern of anti-skid features, and wherein bottom surfaces of corner supports that extend between the upper frame and lower frame are free of anti-skid features.

[0009B] According to a second aspect of the present invention, there is provided a collapsible container having an erected and a collapsed condition for transporting goods in the erected condition, the container comprising:

a base;

a front wall and a rear wall pivotably attached to the base; and

side walls pivotably attached to the base, the side walls positionable between the front and rear walls when the container is in its erected condition;

wherein the base includes an upper frame and a lower frame that is spaced apart from the upper frame to receive forklift tines therebetween, wherein the lower frame comprises a checker plate having a bottom surface that includes a pattern of anti-skid features; and

wherein each of the front and rear walls has a pair of locking mechanisms mounted adjacent opposite sides of its upper end to facilitate securing and releasing a front wall when the container is in its erected position;

each locking mechanism including (a) a locking pin that is longitudinally movable between a closed position in which it extends into an opening in an associated adjacent side wall, and an open position in which it does not extend into the opening, (b) a handle rigidly joined to the locking pin, (c) a spring that urges the locking pin away from its associated adjacent side wall, and (d) a fixed stop that prevents inadvertent unlocking due to vibration;

wherein, when locked, the pin is prevented from rotating and is constrained against lateral displacement by the handle engaging the stop;

wherein, to open the locking mechanisms, the handle must first be displaced laterally toward the adjacent side wall into which its associated locking pin extends, against the urging of the spring, then rotated outward, away from the exterior surface of its associated front or rear wall, thereby disengaging the handle from the stop, then displaced laterally away from the associated adjacent side wall to remove the locking pin from engagement therewith.

[00010] In some embodiments, each container includes lightweight, easy-to-use locking mechanisms adjacent opposite vertical edges of a front wall to facilitate securing and releasing a front wall when the container is in its erected position. In some embodiments, the locking mechanism includes a locking pin that is longitudinally movable between (1) a closed position in which it extends into an opening in an adjacent sidewall, and (2) an open position in which it does not extend into the opening. When

CLAIMS

What is claimed is:

1. A collapsible container having an erected and a collapsed condition for transporting goods in the erected condition, the container comprising:

a base;

a front wall and a rear wall pivotably attached to the base; and

side walls pivotably attached to the base, the side walls positionable between the front and rear walls when the container is in its erected condition;

wherein the base includes an upper frame and a lower frame that is spaced apart from the upper frame to receive forklift tines therebetween, wherein the lower frame comprises a checker plate having a bottom surface that includes a pattern of anti-skid features, and wherein bottom surfaces of corner supports that extend between the upper frame and lower frame are free of anti-skid features.

2. The collapsible container of claim 1 wherein the lower frame comprises a plurality of checker plates.

3. The collapsible container of claim 1 wherein the lower frame includes a square arrangement of checker plates.

4. The collapsible container of claim 1 wherein the lower frame includes checker plates arranged end-to-end about an outer perimeter of the base.

5. The collapsible container of claim 4 wherein end portions of the checker plates are secured to the corner supports.

6. A collapsible container having an erected and a collapsed condition for transporting goods in the erected condition, the container comprising:

a base;

a front wall and a rear wall pivotably attached to the base; and

side walls pivotably attached to the base, the side walls positionable between the front and rear walls when the container is in its erected condition;

wherein the base includes an upper frame and a lower frame that is spaced apart from the upper frame to receive forklift tines therebetween, wherein the lower frame comprises a checker plate having a bottom surface that includes a pattern of anti-skid features; and

wherein each of the front and rear walls has a pair of locking mechanisms mounted adjacent opposite sides of its upper end to facilitate securing and releasing a front wall when the container is in its erected position;

each locking mechanism including (a) a locking pin that is longitudinally movable between a closed position in which it extends into an opening in an associated adjacent side wall, and an open position in which it does not extend into the opening, (b) a handle rigidly joined to the locking pin, (c) a spring that urges the locking pin away from its associated adjacent side wall, and (d) a fixed stop that prevents inadvertent unlocking due to vibration;

wherein, when locked, the pin is prevented from rotating and is constrained against lateral displacement by the handle engaging the stop;

wherein, to open the locking mechanisms, the handle must first be displaced laterally toward the adjacent side wall into which its associated locking pin extends, against the urging of the spring, then rotated outward, away from the exterior surface of its associated front or rear wall, thereby disengaging the handle from the stop, then displaced laterally away from the associated adjacent side wall to remove the locking pin from engagement therewith.

7. The collapsible container of claim 6 wherein the locking mechanism further comprises a spacer that provides space between the handle and an adjacent wall

surface to facilitate insertion of a digit between the handle and the adjacent wall surface to initiate unlocking.

8. The collapsible container of claim 6 wherein unlocking can be accomplished manually using only one hand.

9. The collapsible container of claim 6 further comprising an impermeable inner container fitting within the front, rear and side walls to hold liquid cargo, the impermeable inner container including a discharge spout; and

an adapter provided at or near the bottom of one of the front, rear or side walls to receive the discharge spout from the inner container;

wherein the adapter defines an opening through which the discharge spout may be pulled, and includes an interior locking structure that locks the spout in an extended discharge position to facilitate discharge of liquid cargo by gravity, with the inner container collapsing as the liquid cargo flows out of the inner container through the discharge spout.

10. The collapsible container of claim 1 further comprising:

an impermeable inner container fitting within the front, rear and side walls to hold liquid cargo, the impermeable inner container including a discharge spout; and

an adapter provided at or near the bottom of one of the front, rear or side walls to receive the discharge spout from the inner container;

wherein the adapter defines an opening through which the discharge spout may be pulled, and includes an interior locking structure that locks the spout in an extended discharge position to facilitate discharge of liquid cargo by gravity, with the inner container collapsing as the liquid cargo flows out of the inner container through the discharge spout.