A shipping container (20) includes a floor (40) and opposite side walls (42, 44), with each side wall including a panel supporting element (68, 70) at or near an upper region of the side, wall for supporting a plurality of removable rigid cover panels (30). Each cover panel (30) has opposite side edges (60, 66) and first and second ends (56, 58). The panel supporting elements of the side walls are configured to at least partially receive the side edges of the cover panels to support the cover panels at the upper region of the side walls. The cover panels are configured to be removably supported at the panel supporting elements in adjacent relationship, whereby the first end (56) of at least one of the cover panels engages the second end (58) of another of the cover panels.
REMOVABLE ROOF FOR CARGO CONTAINER

BACKGROUND OF THE INVENTION

[0001] The present invention relates generally to open top shipping containers and, more particularly, to open top shipping containers for transporting goods via cargo ships or trucks.

[0002] Shipping containers are used to hold goods such that the goods may be transported by both cargo ships and trucks. Open top shipping containers are known and have an open roof such that large goods that are not readily transported using a forklift may be loaded into the shipping container using a crane or the like. Such goods include, for example, building and construction material, such as steel, glass, and granite. Upon loading of the open top shipping container, a removable soft top assembly is installed over the open roof of the shipping container to provide protection to the goods from inclement weather and wind blown water.

[0003] Frequently, upon reaching a delivery destination, the open top containers are returned or shipped to another location in an empty, unused state as they are not favorable for use with dry goods, such as electronics, certain manufactured items, and textiles. This is due to the inability of open top containers with soft top assemblies to provide adequate security to the goods from theft and tampering, or to adequately protect the goods from inclement weather and water damage.

[0004] Shipping or transporting empty open top containers to points where they can be reused results in added expense by reducing the amount of cargo that a given ship may transport and/or by causing trucks to travel between locations without moving goods. Therefore, a means of shipping is desired that substantially eliminates the inefficiencies associated with transporting empty open top containers.

SUMMARY OF THE INVENTION

[0005] The present invention provides an open top shipping container having a removable hard top assembly that enables the open top shipping container to be used to transport goods requiring added protection from theft, tampering, inclement weather, and water as compared to conventional soft top assemblies.

[0006] According to an aspect of the present invention, a shipping container comprises a floor, first and second side walls, and a hard top assembly that includes a panel supporting element at or near an upper region of each side wall and a plurality of removable rigid cover panels. The cover panels are received and supported by the panel supporting elements. The cover panels are installed in adjacent relationship such that the first end of a given cover panel engages the second end of an adjacent cover panel.

[0007] The removable cover panels of the hard top assembly of the present invention are readily assembled or mounted or installed at an open top shipping container and may be used alone or together with a conventional soft top assembly. The removable hard top assembly includes multiple cover panels that are generally light in weight and readily handled and, when not in use, may be readily transported. Optionally, the side regions or edges of the cover panels may be configured for sliding insertion into tracks or channels affixed to the side walls of the shipping container. The ends of the cover panels may also be constructed to engage the ends of adjacent cover panels in an overlapping and/or interlocking manner to provide further security and weather resistance to removable hard top assembly.

[0008] According to another aspect of the present invention, a method of selectively covering a shipping container includes providing a shipping container, side panel supporting elements along said side walls, and a plurality of removable rigid cover panels. The shipping container includes a floor, opposite side walls, and first and second ends. Each of the cover panels has first and second side edges and first and second ends, and the cover panels are configured to be removably supported by the side panel supporting elements in adjacent relationship. A first cover panel is inserted along the side panel supporting elements such that the side panel supporting elements at least partially receive the first and second side edges of the first cover panel. A second cover panel is inserted along the side panel supporting elements such that the side panel supporting elements at least partially receive the first and second side edges of the second cover panel. The cover panels are moved along said side panel supporting elements until the first end of the second cover panel engages the second end of the first cover panel, such that the cover panels are supported by the side panel supporting elements in adjacent relationship.

[0009] Optionally, the shipping container includes a moveable header element between the opposite side walls and proximate an upper region of the second end of the shipping container. The header element is moved into an open position before insertion of the cover panels such that the side panel supporting elements are adapted to receive the side edges of the cover panels. The header element is moved into a closed position after insertion of the cover panels to limit retraction of the cover panels from the side panel supporting elements.

[0010] Optionally, the method may include uncovering the shipping container. Uncovering the shipping container may include moving the header element into an open position such that the panel supporting elements and the cover panels are readily accessible. The cover panels are moved along the panel supporting elements and the cover panels are removed from the side supporting elements, after which the header element, if included, may be moved to a closed position.

[0011] Therefore, the open top shipping container of the present invention may be used to transport large, bulky goods that must be loaded through the open roof of the shipping container. The present invention enables the shipping container to be used to transport such goods, as well as other types of goods that typically must be transported in a more secure or protected manner than the manner provided by use of only a conventional soft top assembly. Furthermore, the removable hard top assembly of the present invention and the soft top assembly may both be installed to the shipping container such that added protection is provided to goods being shipped within the shipping container. In situations where the components of the hard top assembly are not used, however, the cover panels may be conveniently handled and stacked within the shipping container while occupying a limited amount of space.

[0012] These and other objects, advantages, and features of the present invention will become apparent upon review of the following specification in conjunction with the drawings.
BRIEF DESCRIPTION OF THE DRAWINGS

[0013] FIG. 1 is a perspective view of an open top shipping container of the present invention being loaded with goods through the open roof;

[0014] FIG. 2 is a perspective view of the open top shipping container of FIG. 1, shown assembled with the removable hard top assembly of the present invention;

[0015] FIG. 3 is a perspective view of the open top shipping container of FIG. 2, shown assembled with a removable soft top assembly installed thereon;

[0016] FIG. 4 is a perspective view of the open top shipping container of FIG. 2, shown with portions of both the hard top and soft top assemblies installed thereon;

[0017] FIG. 5 is a perspective view of an open top shipping container of the present invention, showing an open top shipping container having the hard top assembly installed beneath cross members of the soft top assembly;

[0018] FIG. 6 is an interior perspective view of a shipping container installed with a removable hard top assembly of the present invention;

[0019] FIG. 7 is an interior perspective view of the closed end of the shipping container of FIG. 6, showing the interface of the end wall, first side wall, and an end cover panel;

[0020] FIG. 8 is an interior perspective view of the closed end of the shipping container of FIG. 6, shown with the cover panels of the hard top assembly removed and showing the components of the soft top assembly;

[0021] FIG. 9 is an interior perspective view of the open end of the shipping container of FIG. 6, shown with the cover panels of the hard top assembly removed and showing portions of the soft top assembly;

[0022] FIG. 10 is an interior perspective view of the open end of the shipping container of the present invention, showing the door assembly, first side wall, header, and the opposite end cover panel, the header being partially cut away;

[0023] FIG. 11 is an end elevation and partial sectional view of an open top shipping container of the present invention, showing portions of the hard top assembly installed beneath portions of the soft top assembly;

[0024] FIG. 12 is an end elevation and partial sectional view similar to FIG. 11, showing an open top shipping container of the present invention with alternatively constructed side walls;

[0025] FIG. 13 is a perspective view of a removable cover panel component of the hard top assembly of the present invention;

[0026] FIG. 14 is a side elevation view of a removable cover panel component of the hard top assembly of the present invention;

[0027] FIG. 15 is a perspective view of a portion of a bracket-mounted track or channel for receiving a removable cover panel;

[0028] FIG. 16 is an interior perspective view of a shipping container of the present invention, as viewed looking toward the bracket-mounted track or channel for receiving a removable cover panel;

[0029] FIG. 17 is an interior perspective view of a shipping container of the present invention, showing a bracket-mounted track or channel along a side wall thereof;

[0030] FIG. 18 is an interior perspective view of a shipping container of the present invention, showing the side wall with the track or channel removed therefrom;

[0031] FIG. 19 is an end elevation and partial sectional view of an open top shipping container similar to FIG. 11 and having the bracket-mounted channel of FIG. 15; and

[0032] FIG. 20 is an end elevation and partial sectional view similar to FIG. 12, showing an open top shipping container having the hard top assembly installed beneath the soft top assembly and including the bracket-mounted track or channel of FIG. 15.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0033] The present invention will now be described with reference to the accompanying figures, wherein the numbered elements in the following written description correspond to like-numbered elements in the figures. An open top shipping container 20 is shown in FIG. 1 mounted to a delivery vehicle 22, with the removable roof assemblies described below removed from the shipping container 20, such that goods 24 may be loaded or lowered into the shipping container 20 through the open roof 26. As shown in FIG. 2, a removable hard top assembly or rigid cover assembly 28 may be installed or attached to and along the sides of the shipping container so as to substantially close and/or seal the open roof or top of the shipping container, as discussed below. The removable hard top assembly 28 includes multiple panel sections or rigid cover panels 30 that may be removable installed at least partially within and along tracks or channels which are mounted to the shipping container 20. When the cover panels 30 are installed and door assembly 32 is closed, the shipping container 20 is substantially sealed and access to the interior of shipping container 20 is substantially prohibited. The removable hard top assembly 28 thus provides protection to the contents within shipping container 20 in the form of security from theft and tampering, and protection from inclement weather, such as driving wind and water.

[0034] Open top shipping container 20 may be provided with a conventional removable soft top assembly or flexible cover assembly 34, such as illustrated in FIGS. 3 and 4. The soft top assembly 34 includes multiple support members or bows or rods 36 and a flexible top element or member or tarp or cover 38. Open top shipping container 20 may be selectively provided or used with either the removable hard top assembly 28 or the removable soft top assembly 34. Notably, the removable hard top assembly 28 may also be simultaneously used with the removable soft top assembly 34. For example, and as shown in FIGS. 4, 5, 11, 12, 19, and 20, the cover panels 30 of hard top assembly 28 may be installed beneath the support members 36 and top members 38 of soft top assembly 34. Open top shipping container 20 may thus be used to ship bulky goods 24, such as building and construction materials, that are loaded through the open roof 26 and may also be used to ship various smaller dry goods, such as manufactured items and textiles, which must be protected from theft and tampering, as well as from moisture. The hard top assembly and/or soft top assembly is selectable attached to the shipping container depending on the particular application of the shipping container and the goods being shipped therein.

[0035] In the illustrated embodiment, open top shipping container 20 includes a floor 40, opposite first and second side walls 42, 44, an end wall 46 (FIG. 6) and a door assembly 32 opposite the end wall 46. The first and second side walls 42, 44, end wall 46, and door assembly 32 may be of a painted or coated corrugated steel construction for strength and corro-
sion protection. First and second side walls 42, 44 include an upper rail or beam 48 and, in like manner, an upper rail or beam 50 is also provided on end wall 46. As shown in FIGS. 11 and 19, the upper rails 48 of first and second side walls 42, 44 may extend upward above the upper edges of the side walls. Optionally, and as shown in FIGS. 12 and 20, the upper rail 48 for the first and second side walls may be substantially rectangular or square shaped beams, and may also be used to support an end wall. Although not shown, the upper rail 50 of end wall 46 is also of like construction.

[0036] Door assembly 32 comprises two pivotally mounted doors 52a, 52b, with one of the doors 52a pivotally mounted to shipping container 20 adjacent to first side wall 42 and the other door 52b pivotally mounted to second side wall 44 as shown in FIGS. 2-4, 9, and 10. Door assembly 32 also includes a header or beam 54 (FIGS. 2-5, 9, 10, and 18) extending between first and second side walls 42, 44 above doors 52. Beam 54 is movably or removably mounted at shipping container 20, and may be removable from shipping container 20 or may pivot or otherwise move with respect to either of doors 52a, 52b of door assembly 32, so as to allow for loading and unloading of goods and to allow for insertion and removal of the cover panels as discussed below.

[0037] It should be understood that alternative open top shipping containers may be constructed in accordance with the present invention. For example, in the illustrated embodiment, first and second side walls 42, 44 and end wall 46 are immovable relative to floor 40. However, an alternative open top shipping container may be constructed with side walls that are removable from the floor or are pivotally connected to the floor such that they may be lowered or moved or removed for further improved loading. The end wall may also be constructed to be removable or pivotal, or may be constructed as a second door assembly, such as a door assembly similar to door assembly 32, discussed above. Also, although shown with a door assembly 32 opposite end wall 46, the open top shipping container may optionally have a second end wall opposite the end wall 46. Other variations to door assembly 32 may include, but are not limited to, one or more doors pivotally or otherwise movably mounted to shipping container 20 adjacent one or more of the side walls, the header, or the floor, whereby the door or doors may pivot about either a horizontal pivot axis or vertical pivot axis or may otherwise move relative to the end of the shipping container to open the end of the container, while remaining within the spirit and scope of the present invention. It is further envisioned that the header 54 may be incorporated into the door or doors of the door assembly, and may pivot or move (or may be removed) with the door or doors of the door assembly, while remaining within the spirit and scope of the present invention. Furthermore, the open top shipping container may also be constructed of alternative materials and, while typically constructed to have a length of twenty or forty feet, may be constructed of alternative lengths, widths, and heights.

[0038] As noted above, removable hard top assembly 28 is constructed of multiple cover panels 30. A representative cover panel 30 is illustrated in FIG. 13 and includes first and second ends or end edges 56, 58 and first and second side edges 60, 62, with the cover panels 30 having a width 64 of approximately 85 inches (or other width depending on the width of the container and separation distance of the tracks or channels) and a length 66 of approximately 30 inches or other lengths as may be desired. Cover panels 30 may be constructed of a corrugated metallic material and may include a corrosion inhibiting protective coating, with the corrugated design providing a relatively light weight and strong construction. Cover panels 30, for example, may be constructed of GALVALUME® provided by BIEC International, Inc. of Vancouver, Wash.

[0039] Although illustrated as being corrugated and constructed of a coated metallic material, it should be understood that cover panels 30 may be alternatively constructed while remaining within the scope of the present invention and while still functioning as intended. For example, cover panels may be constructed of different widths and/or lengths depending upon the size of shipping container to which they will be installed. The cover panels may also be constructed of any suitable material, such as a plastic material or composite material, or may be constructed of generally flat materials as opposed to being corrugated while remaining within the spirit and scope of the present invention.

[0040] As previously noted, cover panels 30 are removably installed within panel supporting elements or receiving elements, such as first and second side tracks 68, 70 (FIGS. 8-12, 17, 19, and 20), end track 72 (FIGS. 7, 8, and 17), and door track 74 (FIG. 9), all mounted at or near an upper region of the respective side walls 42, 44, end wall 46, and door assembly 32. In the illustrated embodiment, first and second side tracks 68, 70, end track 72, and door track 74 are constructed of a substantially U-shaped or C-shaped channel 76. As shown in FIG. 11, the base of the channel 76 of first and second tracks 68, 70 is mounted to the upper rail 48 of first and second side walls 42, 44, respectively. Channel 76 of end track 72 and channel 76 of door track 74 are similarly mounted (as shown in FIGS. 7, 8, and 9). When the channels of the tracks are mounted to the respective upper rail or header, the openings of the channels 76 are all directed generally inwardly toward the center of shipping container 20. Alternatively constructed tracks and/or channels may also be used, such as, for example, tracks having a generally “T” or “L” shaped profile, depending on the shape or configuration of the cover panels.

[0041] Optionally, the panel supporting elements or channels may terminate a substantial distance, such as about 12 inches or more, from an end of the open top shipping container in order to allow installation of the cover panels at the top region of shipping container 20. For example, the channels may terminate 12 inches or more from the end of the container at the door assembly, whereby the cover panels may be inserted into and removed from the channels and through the open doors, without having to move or remove the header at the end of the container. Optionally, it is further envisioned that a gap between two side panel supporting elements along respective side walls of the shipping containers may be established, whereby one or more cover panels may be inserted in both directions into and along the respective side panel supporting elements or channels so that the cover panels may be installed and uninstalled from substantially within the shipping container. For example, two side channels may be provided along each side wall and separated by a gap of about 12 inches or more, and one or more cover panels may be inserted at the gap into the respective opposite side channels in one direction, while one or more cover panels may be inserted at the gap into the respective opposite side channels in the other direction to close one at least partially over the open top shipping container.

[0042] Optionally, channels 76 may be constructed of any suitable material, such as a coated metallic material, or a plastic material or a composite material or the like. Channels
76 may be secured to the upper rails 48, 50 and door header 54 using fasteners, such as screws or bolts, and/or may be affixed or secured to the rail or header with an adhesive or the like, or may be welded to the rail or header or walls of the shipping container. Optionally, the panel supporting elements or channels may be integrally formed with and at least partially along the upper rails and/or door header of a shipping container, and from at least partially within the shipping container, such as by rolling, molding, stamping, or embossing the channels along the inner side or surface of the rails and/or header, such as during the process that forms the rails and/or header.

[0043] Optionally, and as shown in FIGS. 16, 17, 19, and 20, channels 76 may be mounted to the shipping container via brackets 77 (FIG. 15), which may be welded or otherwise secured to the panels. The brackets 77 are removably connected to the shipping container 20 such as at upper rails 48, 50, with fasteners, such as bolts or screws or the like, as shown in FIGS. 16, 17, 19, and 20. Optionally, a sealant may be disposed at or around the interfaces between the channels 76 and/or brackets 77 and the upper rails 48, 50 and door header 54 to limit or substantially preclude moisture from entering into the interior of the covered shipping container 20 during transport of the goods.

[0044] Optionally, channels 76 may be provided with various structural formations to further prevent or direct water away from the interior of the shipping container 20, such as rolled lips or flanges 76a, 76b (FIGS. 15 and 16) at the end or open edge of each horizontal leg of the channel 76. For example, the lower horizontal leg of the channel 76 of side tracks 68, 70, end track 72, and/or door track 74 may be provided with a conduit, such as an indented groove or rolled lip 76a (FIGS. 15 and 16), or the like, formed or established therealong, whereby any water entering into the channels 76 may be directed or carried by the conduit to locations outside of the shipping container 20. Alternatively, or in addition thereto, one or more holes or passageways may be provided that extend from the base of the channels through and into the interior of the upper rails 48, 50 and header 54 whereby water may be guided through the holes and substantially not into the interior of the container. Similarly, holes or passageways may be provided that extend from the lower horizontal leg of the channels 76, whereby water may be similarly guided.

[0045] Channels 76 of side tracks 68, 70 are configured to slidably receive the side edges of the cover panels as the cover panels are inserted into and moved along the side tracks. In the illustrated embodiment, cover panels 30 are corrugated metal panels, whereby the side edges of the panels are formed in a corrugated or wave pattern. The side tracks 68, 70 receive the wave-shaped side edges of the cover panels, with an upper surface portion of the upper “wave” portions of the panel engaging an upper rail or portion of the track and with a lower surface portion of the lower wave portions of the panel engaging a lower rail or portion of the track. Optionally, the channel size may be selected to provide a snug fit of the corrugated side edges, and may frictionally retain the cover panels, and thus may limit free movement of the cover panels to reduce displacement of the cover panels and rattling of the cover panels during transport. The corrugated metal panels may flex or partially flatten as the panels are inserted into and along the channels of the tracks to provide the snug fit of the panels within and along the side tracks. Optionally, however, the channels of the side tracks may be sized so as to loosely receive the side edges of the cover panels, without affecting the scope of the present invention. The channels of the end track 72 and door track 74 may have a lower profile than the channels of the side tracks, since the end track and door track are configured to receive the substantially flat end edges of the end cover panels positioned at the ends of the shipping container. However, other shaped cover panels and other types or sizes of tracks or channels may be implemented at the shipping container while remaining within the spirit and scope of the present invention.

[0046] As previously noted, cover panels 30 are adapted for sliding insertion into first and second tracks 68, 70, end track 72, and door track 74. For example, and as shown in FIG. 2, hard top assembly 28 may include multiple cover panels 30 supported along the container with an end cover panel 78 being installed proximate end wall 46 and an end cover panel 80 being installed proximate door assembly 32, with a plurality of cover panels positioned between end cover panels 78, 80.

[0047] When it is desired to close the top of shipping container 20, the cover panels 30 may be slid or installed in and along the channels of the tracks. To assemble hard top assembly 28 to shipping container 20, header 54 is initially removed or pivoted or moved into an open position such that first and second tracks 68, 70 are readily accessible at that end of the container. Optionally, and such as for an embodiment where the channels terminate a substantial distance from an end of the open top shipping container, the header may remain stationary during the process of installing and uninstalling the cover panels at the shipping container. End cover panel 78 is then inserted into first and second tracks 68, 70 such that first side edge 60 of end cover panel 78 is positioned within first track 68 and second side edge 62 is positioned within second track 70. End cover panel 78 may then be moved along or slid within first and second tracks 68, 70 substantially along the length of shipping container 20 until first end edge 56 engages and is received in or contained within end track 72 at end wall 46.

[0048] Next, a second cover panel 30 is inserted into first and second tracks 68, 70 in like manner as end cover panel 78, such that the first side edge 60 is within first track 68 and the second side edge 62 is within second track 70 (FIG. 11). The cover panel 30 is then slid the remaining length of shipping container 20 until the first end edge 56 of the second cover panel 30 being installed engages the second end edge 58 of the end cover panel 78, previously installed. Such engagement may provide an interlocking or overlapping engagement such as discussed below. The above installation steps are then repeated for the remaining cover panels 30 until the last end cover panel 80 is installed, with the second end edge 58 of the end cover panel 80 being located proximate the end of the shipping container with door assembly 32. After the end cover panel 80 is installed, header 54 may be moved to its closed position or reinstalled at the end to retain the cover panels and limit or substantially preclude retraction of the cover panels from the tracks or channels. When header 54 is reinstalled or pivoted or moved back into the closed position, the door track 74 of header 54 engages or receives the second end edge 58 of the end cover panel 80 such that all of the cover panels 30 are securely held within and mounted to shipping container 20. Optionally, and such as for an embodiment where the channels terminate a substantial distance from an end of the open top shipping container, the end cover panel 80 may be held or secured after installation via other means, such as via fasteners connecting the end cover panel 80 to the tracks or channels, or to the side walls or header or the like.
Although header 54 is shown as being pivotally mounted at the end of the shipping container, any movable or removable member or element that will substantially prevent removal of cover panels 78, 30, 80 may be used at the end of open top shipping container 20 opposite end wall 46. For example, such elements may include one or more locking pins, bars, straps, fasteners, or the like, such as at the ends of the tracks or at the ends of the side walls, or the doors may extend upward whereby the top portions of the doors may cover or close the ends of the track or otherwise limit removal of the cover panels within the tracks. When it is desired to remove the cover panels, the stop element or elements may be selectively opened or moved, such as by pivoting at a top, bottom, or side edge, or by sliding or by otherwise disengaging from the area proximate the second end edge 58 of end cover panel 80 when end cover panel 80 is installed, in order to permit removal of cover panels 80, 30, 78 from open top shipping container 20. Additionally, such elements may include, for example, one or more fasteners that fix end cover panel 80 to tracks 68, 70 and/or to the side walls 42, 44 of shipping container 20.

Notably, the engaging of the first or second end edge 56, 58 of one cover panel 30 with the second or first end edge 56, 58 of an adjacent cover panel 30 may be accomplished in an overlapping and/or an interlocking relationship. An overlap may be obtained by merely passing a flat section of one end edge 56, 58 over a flat section of the engaged end edge 56, 58 of an adjacent panel 30. This overlap may also serve to interlock the adjacent cover panels 30 by wedging the cover panels 30 into a pressed engagement with the C-shaped channel 76. Optionally, an alternative overlap and interlock may also be accomplished by overlapping one or more of the corrugated ridges or troughs of one cover panel 30 with one or more of the corrugated ridges or troughs of an adjacent cover panel 30. Optionally, and as shown in FIG. 18, the end edges 56, 58 of the cover panels 30 may be constructed to form interlocking members 56a, 58a for receiving or engaging interlocking members 58a, 56a of adjacent cover panels. Interlocking member 56a of a first cover panel may overlap and then engage and interlock with interlocking member 58a of an adjacent cover panel in an interlocking relationship to substantially secure cover panels 30 together and protect against entry and water intrusion and other weather conditions. Optionally, the various end edges of the cover panels may be constructed to include interlocking members for receiving adjacent end edges, such as elastomeric grommets or the like, to thereby form an interlocking relationship. Optionally, the overlapping end edges of adjacent cover panels 30 may be secured together using fasteners such as screws, bolts, clips, rivets, or the like, to provide a substantially secure engagement. Optionally, one or more fasteners may be used to secure first and second side edges 60, 62 of cover panels 30 within first and second tracks 68, 70 to individually secure the cover panels in place along the tracks. For example, a threaded screw or bolt may be passed upwards from below a channel and into the first or second end of a cover panel to secure the cover panel relative to the track.

To uncover or open the top of shipping container 20, such as for loading or unloading the shipping container, the steps of covering shipping container 20 may be substantially followed in reverse order. Briefly, the header 54 may be moved or removed or opened (and/or fasteners may be released from the end cover panel) to allow for removal of the end cover panel. The first end 56 of end cover panel 80 is then disengaged from second end 58 of adjacent cover panel 30 and removed from channels 76. Subsequent cover panels 30 are moved along channels 76 and removed in a similar manner, ending with end cover panel 78, after which the header 54 may be closed or reinstalled as desired.

As previously noted, open top shipping container 20 may also be provided with a standard or conventional soft top assembly 34 comprising support members 36 and a top member 38. The support members 36 extend transversely across shipping container 20 and are mounted to the upper sides 48 of first and second side walls 42, 44 above first and second tracks 68, 70 (FIG. 11). The support members 36 are used to support the flexible top member 38 (FIGS. 16 and 17), which may be secured to the side walls or rails of the sides walls when pulled substantially taut over the support members, such as via tie downs or hooks and grommets or the like. The flexible top member may comprise any suitable flexible material, such as canvas or a polymeric material or the like. However, it should be appreciated that an alternative shipping container may be constructed for use only with hard top assembly and thus not include soft top assembly, while remaining within the spirit and scope of the present invention.

Therefore, the open top shipping container of the present invention may be used in a conventional manner to transport large, bulky goods, such as building and construction materials, that must be loaded through the open roof of the shipping container. The removable hard top assembly of the present invention enables the shipping container to be used to transport such goods, as well as other types of goods, such as manufactured items, electronics, textiles, and the like, that typically must be transported in a more secure or protected manner than the manner provided by use of only a conventional soft top assembly. Furthermore, the removable hard top assembly of the present invention and the soft top assembly may both be installed to the shipping container such that added protection is provided to goods being shipped within the shipping container and, notably, no additional space is required for transporting unused components of the hard and soft top assemblies. In situations where the components of the hard top assembly are not used, however, the cover panels may be conveniently handled and stacked within the shipping container while occupying a limited amount of space.

Changes and modifications in the specifically described embodiments can be carried out without departing from the principles of the present invention which is intended to be limited only by the scope of the appended claims, as interpreted according to the principles of patent law including the doctrine of equivalents.

1. A shipping container for cargo ships and trailer trucks, said shipping container comprising:
a floor; opposite side walls, each of said side walls comprising a panel supporting element at or near an upper region of said side wall; a plurality of removable rigid cover panels, each of said cover panels having opposite side edges and first and second ends; and wherein said panel supporting elements of said side walls are configured to at least partially receive said side edges of said cover panels to horizontally support said cover panels at said upper region of said side walls, said cover panels being configured to be removable supported at said panel supporting elements in adjacent relationship,
whereby said first end of at least one of said cover panels engages said second end of another of said cover panels, wherein said panel supporting elements comprise opposed tracks affixed to respective ones of said side walls, and wherein said side edges of said cover panels of each of said cover panels are removably received in respective ones of said tracks.

2. The shipping container of claim 1 further comprising a removable cover assembly, said removable cover assembly comprising a plurality of support members and at least one flexible cover member, wherein said support members are configured to be removably extended between said opposite side walls, and wherein said flexible cover member is removably disposed over said support members when said support members are extended between said opposite side walls.

3. The shipping container of claim 2, wherein said removable cover assembly and said side walls are configured such that said removable cover assembly is installed above said removable cover panels.

4. (canceled)

5. The shipping container of claim 1, wherein each of said opposed tracks is affixed to a plurality of brackets, each said bracket being removably mounted to respective ones of said side walls.

6. The shipping container of claim 1 further comprising a first end track at an end wall at a first end of said shipping container, and wherein said removable cover panels include a first end cover panel, and wherein said first end of said first end cover panel is configured to be received at least partially in said first end track.

7. The shipping container of claim 6 further comprising a second end track at a second end of said shipping container, said second end being opposite said first end, said removable cover panels including a second end cover panel, said second end of said second end cover panel being configured to be received at least partially in said second end track.

8. The shipping container of claim 7, wherein said second end track is movably mounted at said second end of said shipping container and is movable between an open position, where said tracks of said side walls are open for receiving said side edges of said cover panels at least partially therein, and a closed position, where said tracks of said side walls are at least partially restricted thereby insertion of and removal of said cover panels into said tracks of said side walls is substantially limited.

9. The shipping container of claim 8 further comprising a door assembly at said second end of said shipping container, said door assembly comprising a door panel and a door beam extending between said opposite side walls and generally above said door panel, said door beam including said second end track.

10. The shipping container of claim 9, wherein said tracks of said side walls comprise elongated channel members that are configured to slidingly receive said side edges of said cover panels.

11. The shipping container of claim 10, wherein said channel members comprise substantially C-shaped channel members.

12. The shipping container of claim 1, wherein said tracks each include a water conduit, said water conduit adapted to divert water away from an interior of said shipping container.

13. The shipping container of claim 1, wherein said first end of at least one of said cover panels engages said second end of an adjacent one of said cover panels in an overlapping relationship.

14. The shipping container of claim 1, wherein said first end of at least one of said cover panels engages said second end of an adjacent one of said cover panels in an interlocking relationship.

15. The shipping container of claim 1, wherein said first and second ends of adjacent ones of said cover panels are removably secured together using at least one fastener.

16. The shipping container of claim 1, wherein said cover panels comprise a corrugated metallic material.

17. The shipping container of claim 16, wherein said cover panels include a protective coating.

18. A method of selectively covering a shipping container for cargo ships and trailer trucks, said method comprising:

providing a shipping container, said shipping container including a floor, opposite side walls, and first and second ends;

providing side panel supporting elements along said side walls, said side panel supporting elements comprising opposed tracks affixed to respective ones of said side walls at or near an upper region of said side walls;

providing a plurality of removable rigid cover panels, each of said cover panels having first and second side edges and first and second ends, said cover panels configured to be removably supported by said side panel supporting elements in adjacent relationship;

inserting a first cover panel along said side panel supporting elements such that said side panel supporting elements at least partially receive said first and second side edges of said first cover panel;

inserting a second cover panel along said side panel supporting elements such that said side panel supporting elements at least partially receive said first and second side edges of said second cover panel;

moving said cover panels along said side panel supporting elements until said first end of said second cover panel engages said second end of said first cover panel, such that said cover panels are supported by said side panel supporting elements in adjacent relationship.

19. The method of claim 18, wherein moving said cover panels comprises moving said first cover panel until said first end of said first cover panel engages an end panel supporting element at said first end of said shipping container.

20. The method of claim 19 further comprising inserting a plurality of cover panels until said cover panels substantially cover and close over the top of said shipping container, said plurality of cover panels including an end cover panel at said second end of said shipping container.

21. The method of claim 18 further comprising:

providing a removable flexible cover assembly, said removable flexible cover assembly comprising a plurality of support members and at least one flexible cover member;

extending said support members between said opposite side walls of said shipping container, and disposing said flexible cover over said support members when said support members are extended between said opposite side walls.
22. The method of claim 18 further comprising:
providing a movable header element between said opposite side walls and proximate an upper region of said second end of said shipping container;
before inserting said first cover panel, moving said header element into an open position such that said side panel supporting elements are adapted to receive said side edges of said cover panels as said cover panels are inserted along said side panel supporting elements; and
after inserting said cover panels, moving said header element into a closed position to limit retraction of said cover panels from said side panel supporting elements.

23. The method of claim 22 further comprising inserting a plurality of cover panels until said cover panels substantially cover and close over the top of said shipping container, said plurality of cover panels including an end cover panel at said second end of said shipping container.

24. The method of claim 23, wherein moving said header element into a closed position comprises moving said header element such that a header panel supporting element engages
said second end of said end cover panel to limit retraction of said cover panels from said side panel supporting elements.

25. The method of claim 18 further comprising uncovering said shipping container.

26. The method of claim 25, wherein uncovering said shipping container comprises:
moving said cover panels along said side panel supporting elements and removing said cover panels from said side supporting elements.

27. The method of claim 26 further comprising:
providing a movable header element between said opposite side walls and proximate an upper region of said second end of said shipping container; and
before removing said cover panels from said side supporting elements, moving said header element to an open position such that said panel supporting elements and said cover panels are readily accessible.

28. The method of claim 27, further comprising, after removing said cover panels from said side supporting elements, moving said header element to a closed position.

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