

Dec. 2, 1969

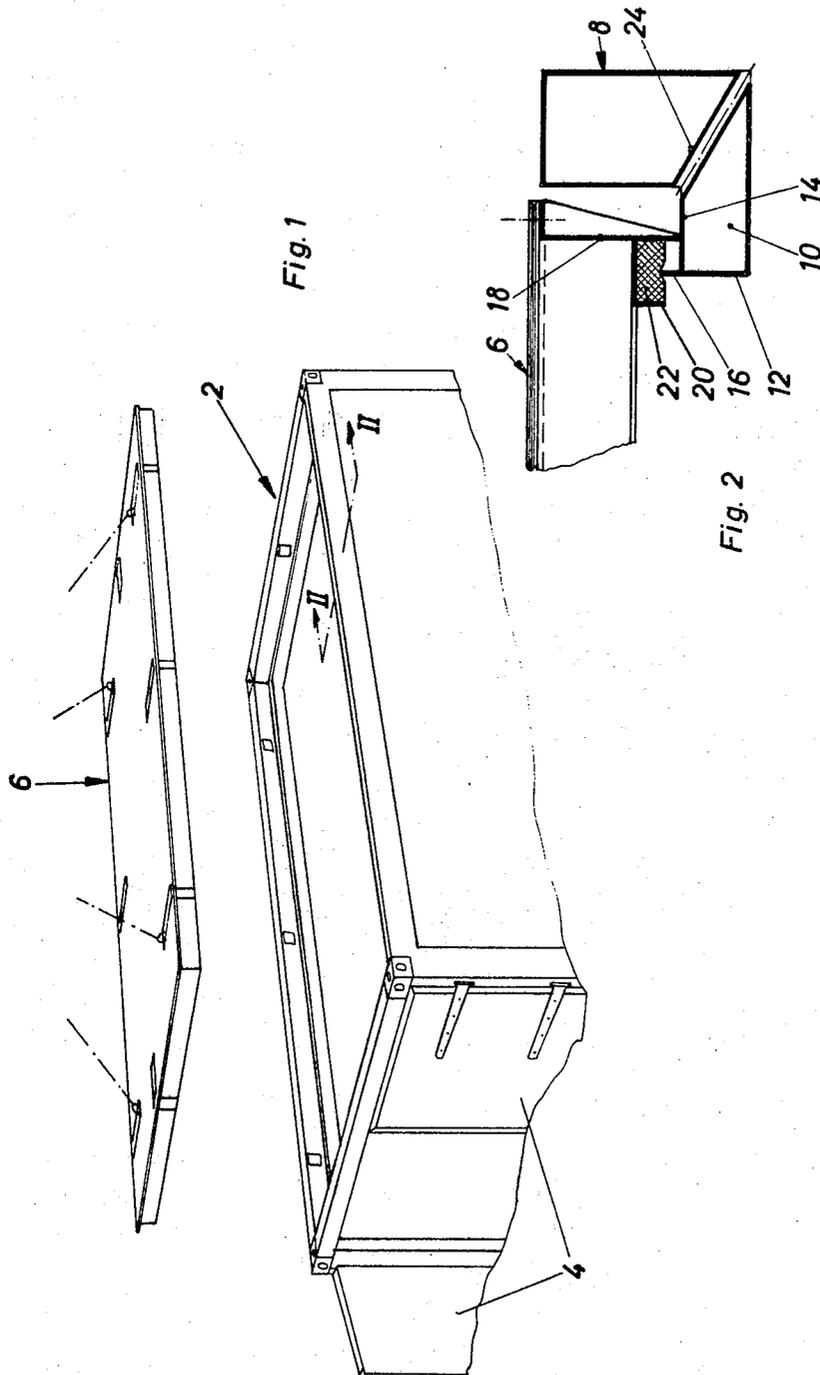
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3,481,503

FREIGHT CONTAINERS

Filed April 29, 1968

6 Sheets-Sheet 1



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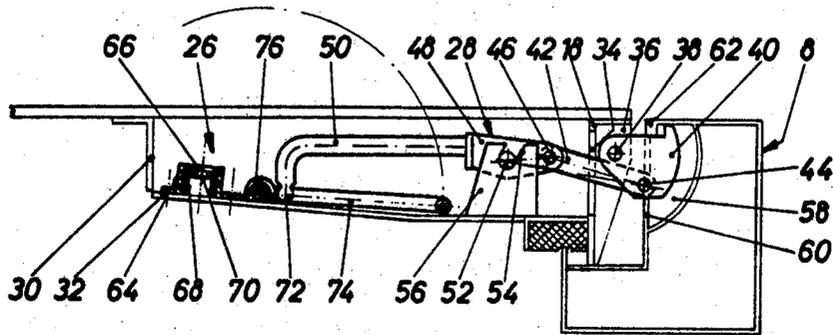


Fig. 4

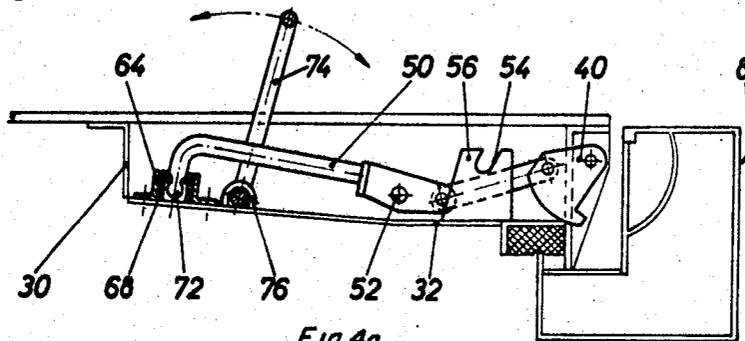


Fig. 4a

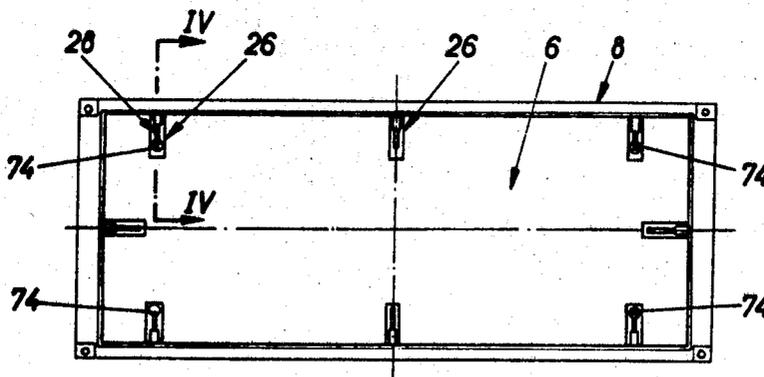


Fig. 3

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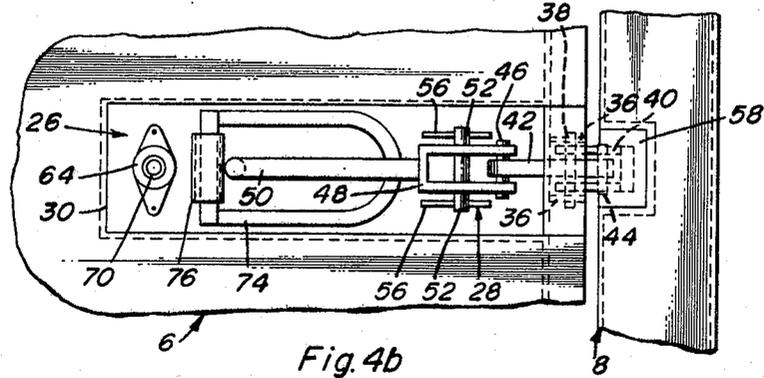


Fig. 4b

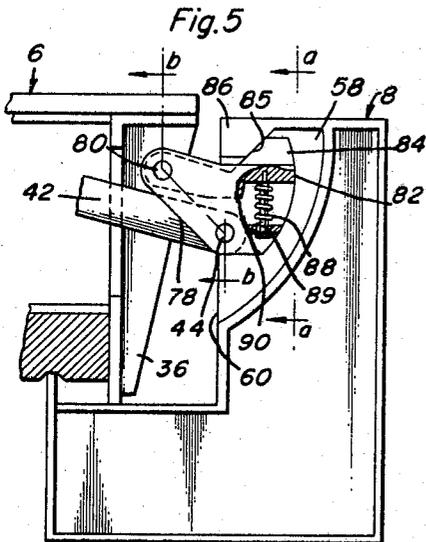


Fig. 5

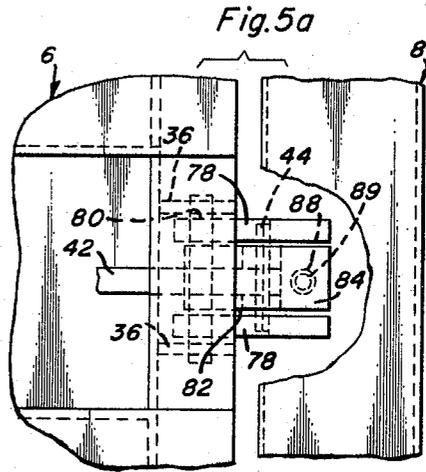


Fig. 5a

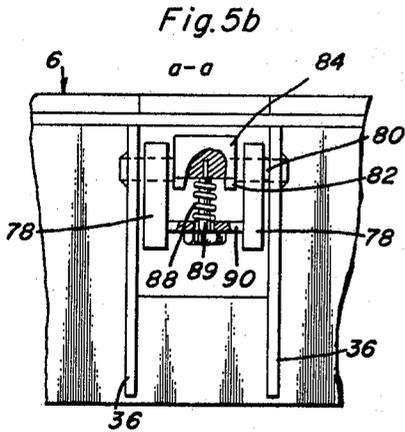


Fig. 5b

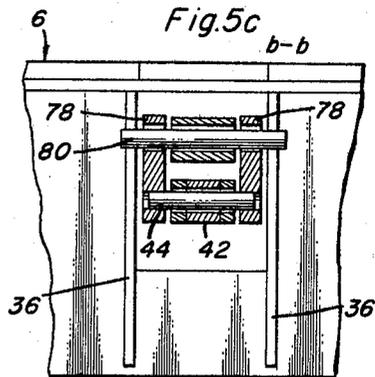


Fig. 5c

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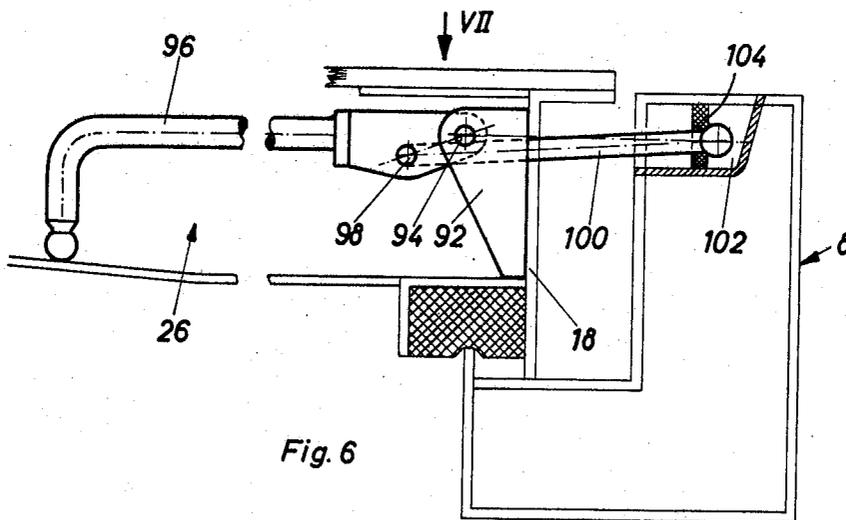


Fig. 6

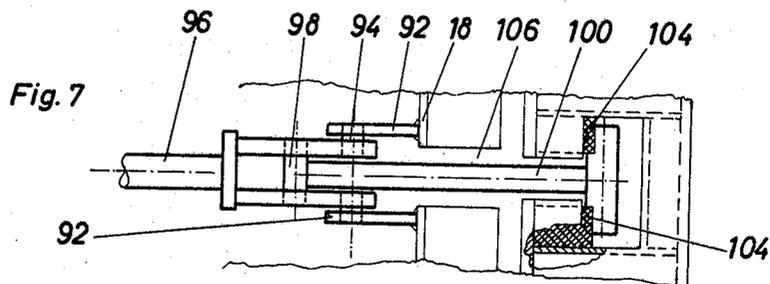


Fig. 7

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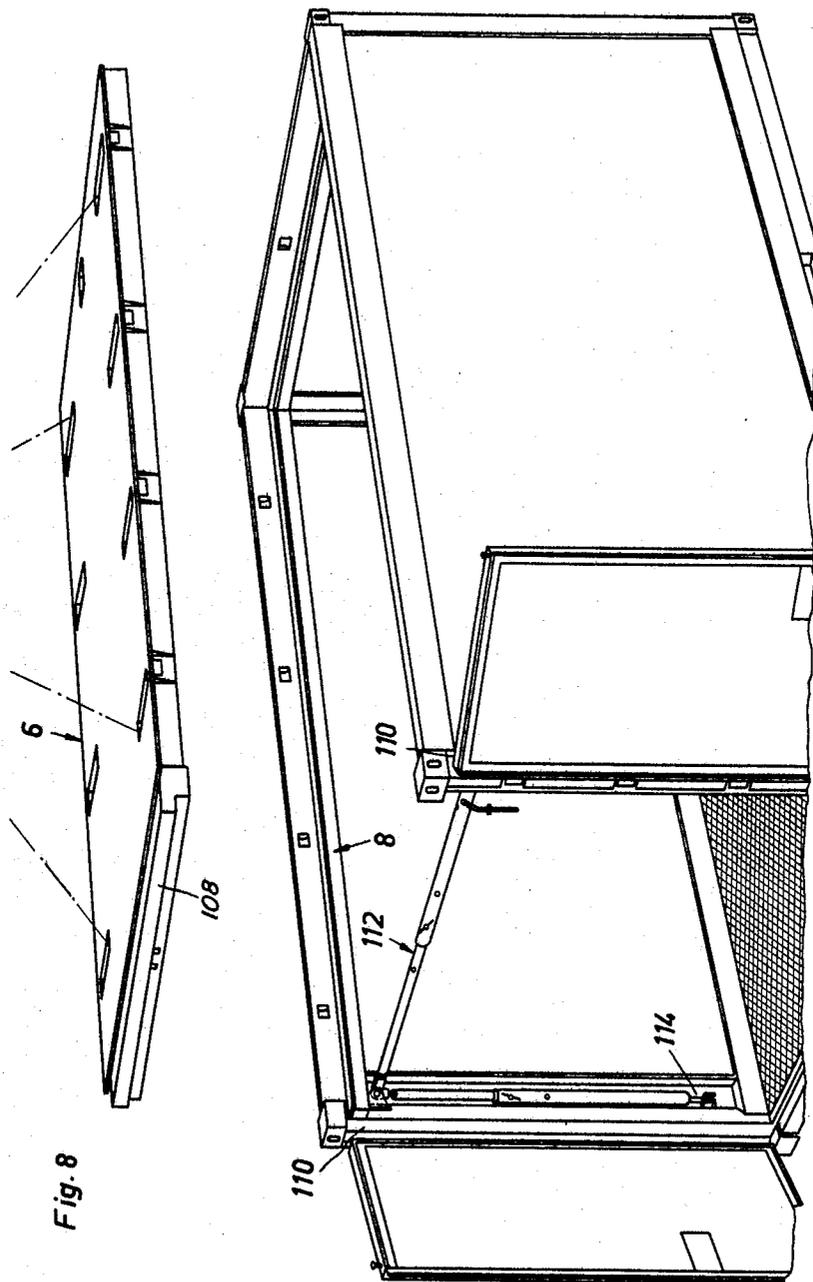


Fig. 8

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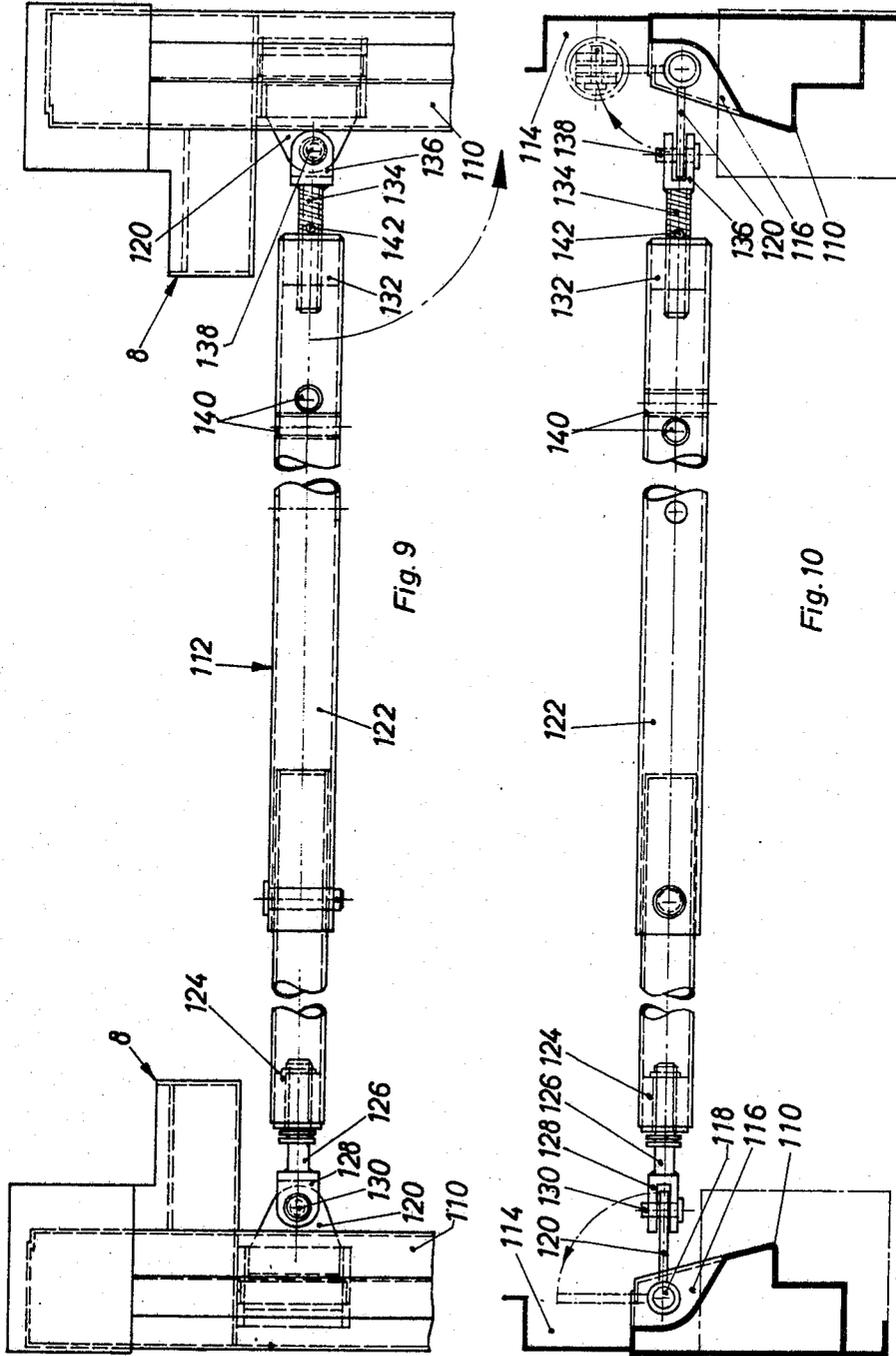
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FREIGHT CONTAINERS

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U.S. Cl. 220—1.5

13 Claims

ABSTRACT OF THE DISCLOSURE

An improved open top container with detachable top cover wherein the improvement comprises the provision of a watertight stiff top cover provided with secure locking devices the locking action of which provides both a vertical and a transversely directed locking component and wherein the door opening of the container may be completely opened to provide unobstructed access to the container for the loading and unloading thereof, and comprising means for re-aligning the free standing door posts prior to the fitting of the roof to ensure its tightness and well fitting properties.

The invention relates to containers with detachable tops, or so-called open top containers. These containers form one of the two main groups of containers developed in accordance with the recommendations of the ISO.

It is known to cover containers by a tarpaulin which is either tightened over the top or folded together in the open top.

These known constructions have the drawback that the tarpaulin can be easily damaged and that it cannot support any load.

It is an object of the invention to provide a container with detachable top cover which is easily removable, ensures a complete seal against water and can be loaded in the same way as the fixed roof of known containers.

It is a further object of the invention to provide a container of the kind above described with a top cover forming a plate shaped insert of a skeleton frame with lining, having along its circumference a channel shaped groove on its underside with a rubber seal embedded therein whilst the outer leg of the channel extends beyond the surface of the seal and the upper edge of the container forms an L-shaped box profile with an inwardly directed horizontal leg, carrying a sealing strip co-operating with the seal, and wherein the top cover contains locking mechanisms located in upwardly open pockets arranged over the circumference and adapted to be manually operated.

It is a further object of the invention to provide a container of the kind hereinbefore described in which the manually operated locking devices comprise each a locking lever, hinged to the cover, producing a substantially vertically downwardly directed contact pressure, and adapted to be pivoted back into the cavity of the cover, and a pivotable manual lever, wherein these two levers are so connected by a linkage that in the locking position the link between the manual lever and the connecting lever is beyond the dead center position, whilst pockets, open towards the top, are provided in the L-shaped box profile opposite the locking levers and comprise on the top an abutment surface for the locking levers.

In order to prevent the manual lever projecting beyond the surface of the cover when the locking device is open, the hinge of the manual lever is preferably detachable. To this end the manual lever may be equipped with lateral stub pins which engage into upwardly open bearing grooves of two bearing plates arranged in mutually spaced relationship.

In order to locate the locking device in the inoperative position the handle has conveniently a ball shaped end and the pocket has a ball shaped recess behind the support for the manual lever in the locking position into which the ball head of the manual lever may be fitted.

For mounting the cover, the pockets nearest the corners preferably have eyelets mounted pivotably on the base of the pockets, the joint being preferably such that, in the locking position the eyelet is below the manual lever and can be operated only when the locking mechanism is released.

It may be convenient, particularly with long containers, for example with a length of 40 ft., to arrange, in addition to locking devices acting on the cover with a pressure acting downwardly on to the surface of the L-shaped frame, also transverse locking devices which may also be arranged in corresponding pockets. These transverse locking devices comprise conveniently a manual lever hinged to the cover, to which is articulated a pull rod whose end cooperates with an abutment in the frame in such a way that the connecting joint is beyond the dead center position when the locking device is locked. Preferably the free end of the pull rod has hammer head shaped projections and the upright leg of the L-shaped box profile carries an upwardly opening pocket with preferably elastic abutments for these hammer head shaped projections.

It is a further object of the invention to provide a top for a container with locking device acting simultaneously in the vertical and transverse directions, in which the locking lever has a gib surface forming an angle of about 45° with the vertical and cooperating with a corresponding surface in the box profile of the upper rim of the container. In order to produce a constant and uniform locking force even with flexing of the rim, the oblique surface is arranged conveniently on a separate lever, arranged preferably to pivot about the same axis as the locking lever, and wherein a compression spring is arranged between these two parts.

Open top containers are frequently loaded with fork lift trucks. In order to facilitate the anchoring of the fork lift truck it is known to provide a detachable cross spar. In known containers the upper cross spar of the door is pivotable and must be swivelled out in an additional operation after the roof has been opened. It is here a disadvantage that the cross bar projects in this position beyond the outer walls of the container and obstructs thereby the loading.

It is therefore a further object of the invention to provide a container in which the upper cross spar of the door is firmly connected with the detachable roof and in which the cross bar is removed automatically when the top cover is lifted.

It has been shown in practice that during loading the side posts of the door tend to tilt inwardly or outwardly. Hence these door posts must be re-aligned before the upper cross spar is fitted.

The invention provides therefore a locking bar mounted rotatably on a pivoting arm located on one of the door posts, and into which engages a screwed spindle fitted on a pivoting arm mounted on the other door post. Conveniently the screwed spindle is connected detachably with the associated pivoting arm.

The invention will be further described by way of example with reference to the accompanying drawing, in which:

FIG. 1 shows in perspective a container with a detachable top cover according to the invention;

FIG. 2 is a cross section along the line II—II in FIG. 1.

FIG. 3 is a top view of a container according to FIG. 1 with fitted cover.

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FIG. 4 is a cross section along the line IV—IV in FIG. 3 and shows a locking mechanism in the locking position;

FIG. 4a is a cross section similar to FIGURE 4, with the locking mechanism in the unlocked position;

FIG. 4b represents a top view of the arrangement according to FIGURE 4;

FIG. 5 shows a modification of the locking lever;

FIG. 5a represents a top view of the embodiment according to FIGURE 5;

FIG. 5b represents a cross section taken along line a—a of FIGURE 5;

FIG. 5c represents a cross section taken along line b—b of FIGURE 5;

FIG. 6 shows a cross section of a cover pocket with transverse locking device;

FIG. 7 is a top view in the direction of the arrow VII in FIG. 6;

FIG. 8 is a perspective view of a further embodiment in which the upper cross spar of the door is detachable and firmly connected with the cover;

FIG. 9 shows the upper part of the door opening with a locking device according to the invention;

FIG. 10 is a cross section along the line X—X in FIG. 9.

As may be seen from FIG. 1 a container 2 has doors 4 on one narrow side and a detachable roof cover in the form of a plate shaped insert top 6. Preferably the top cover 6 consists of a skeleton frame with a lining of sheet metal or impregnated water proofed plywood.

As may be seen from FIG. 2 the upper rim of the container forms an L-shaped box profile 8 with a horizontal, inwardly directed leg 10. At the end of the horizontal leg 10 the wall 12 extends beyond the upper surface 14 of the horizontal leg and forms a sealing strip 16.

The outer frame of the cover 6 has on its inside an angular profile 20 forming a groove for a rubber strip 22 which cooperate with the sealing strip 16. The lower end of the frame 18 projects beyond the lower plane of the rubber strip 22 and rests on the surface 14 of the box profile; consequently the weight of the cover rests directly on the box profile and the arrangement provides a constant sealing pressure between the sealing strip 16 and the rubber strip 22.

Small drain pipes 24, passing through the box profile between the corners, are provided at intervals for draining the space between the cover and the box profile.

As may be seen from FIG. 3 upwardly open pockets 26 are provided spaced over the circumference of the top cover 6 and house locking devices 28 for locking the top cover.

These pockets are formed by edge profiles 30 and a base plate 32 as shown in the cross section in FIGURES 4 and 4a and, in top view, in FIGURE 4b.

On the outside of the cover frame 18 there are arranged on both sides of an opening 34 in the frame two parallel plates 36 which are chamfered towards the bottom and may therefore also act as guide plates when the cover is lowered on to the rim of the container. A locking lever 40 is mounted pivotally about a spindle 38 between the two plates 36; preferably this lever 40 consists of two identical parts mounted in spaced relationship from each other. A connecting link 42, hinged to the locking levers at 44 engages between the two parts of the lever. The other end of this link 42 is connected by a joint 46 with a U-shaped end portion 48 of a manual lever 50, having an angled end. The manual lever 50 is provided with a hinge pin 52 projecting on both sides of the manual lever. These projecting ends cooperate with a mounting slot 54 formed in two mutually spaced bearing plates 56 mounted on both sides of the manual lever on the bottom 32 of the pocket.

Opposite the openings 34 in the top frame 18 pockets 58 are formed in the frame 8 and can receive the pivotable locking lever. The section 60 of the box profile 8 leading to this pocket is so formed that a bar 62 remains on the upper edge of this recess.

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The end of the pocket 26 terminates in a pot shaped housing 64 with a bore 66 in the bottom; a pot shaped rubber part 68 with a hole 70, aligned with the hole 66 but smaller than the same, is arranged therein. The end of the angled portion of the handle 50 carries a ball head 72.

As may be seen from FIGURE 4a, in the locked position, the handle is lifted out of the bearing slots 54 and the ball head end of the manual lever 50 is pushed into the holes 66 and 70 after the manner of a press stud, so that the lever 50 is firmly located in this position. The locking lever 40 is pulled back so that it is outside the outer profile of the cover. For locking the cover the manual lever 50 is released and hooked with its bearing pins 52 into the mounting slots 54, with the handle facing upwards. When the handle is pivoted in an anticlockwise direction, the locking lever 40 is swivelled into the pocket 58 of the box profile 8 by means of the link 42 and it is pressed against its top. During this movement the hinge joint 46 passes beyond the dead centre position between the joints 52 and 44, so that the end of the manual lever is pushed against the bottom 32 of the pocket 26 and no further locking is necessary. The lug 62 prevents the locking member of the locking lever 40 from being disengaged from the box profile 8 in consequence of flexions in the container walls.

As shown in FIG. 3, the pockets nearest the corner of the top cover are provided with securing eyelets 74. These eyelets 74 are connected by fixing members 76 in which they are pivotably mounted, firmly with the bottom 32 of the pocket. The arrangement of the fixing members is such that in the inoperative position the securing eyelets 74 are below the handle 50. Thus the securing eyelets can be raised into the operating position only after the release of the locking mechanism so that lifting tackle can be attached to the top cover only after it has been effectively released.

With long containers, for example containers with the length of 40 ft., it may happen that particularly the long walls may be affected by an outwardly directed pressure, for example in consequence of a freight shifting at sea which may lead to a certain deformation of the rim 8. The locking device of FIG. 4 can counter such a deformation only when the lug of the locking lever abuts against the bar 62.

FIGURES 5, 5a, 5b and 5c show an arrangement in which the locking lever provides components acting both vertically downward and transversely, relatively to the cover plane. In this embodiment, as in the embodiment according to FIGURES 4, 4a and 4b, the locking lever includes two spaced apart jaws 78 pivotably mounted about an axis for rotation through an angle of about 90 degrees. Between the two jaws 78, the connecting link 42 is inserted, interconnected with the jaws through the hinged joint 44. The two jaws 78 are rigidly interconnected by means of a cross bar 90. An arm 82 is mounted, pivotably about pivot axis 80, between the two jaws 78, the arm 82 supporting a locking lug 84, which is provided with an oblique supporting surface 85.

The supporting surface 85 cooperates with a complementary oblique surface provided on a bar located above the upper part of the door opening. Preferably, the oblique surface on the bar 78 forms an angle of 45 degrees with the vertical. A stack of plate springs 88 is provided between the underside of lever 82 and the cross bar, the stack of plate springs 88 being guided on a screw 89 loosely passed through a bore in the cross bar 90 and abutting against the underside thereof by means of a screw head while the other end of said screw is threaded into the underside of the lever 82.

Through the manual lever not shown in FIGURE 5 but developed according to the embodiment shown therein, a contact pressure is exerted upon the jaws or side portions 78 for the locking lug 84, which contact pressure is then transferred by the stack of plate springs 88 to the lever 82. By the resilient support of the arm 82, it is possible to move the manual lever beyond the dead center position

thereof even if the side wall of the container has been slightly bent outwardly before the top cover is fitted.

It is also possible to provide additional transverse locking members such as shown in FIGS. 6 and 7. In this construction mounting plates 92 are arranged on the inside of the cover frame 18; a manual lever 96 is adapted to swivel in a hinge 94 and is connected by a joint 98 with a pull rod 100 having hammer head shape ends.

The box profile 8 is again equipped with a pocket 102, having openings both on the upper side of the box profile, and on the side facing the cover, into which the hammer head shaped end of the pull rod 100 can be introduced. The pocket 102 is provided to this end with elastic members 104 in the receiving spaces, and forming the abutment.

As shown in FIG. 7 the outer frame 18 of the cover has a recess 106 for the passage of the pull rod 100. After releasing the transverse lock, the pull rod may be pivoted through this recess 106 into the pocket so that it rests above the manual lever 96. In the embodiment of FIG. 8 the upper cross spar 108 of the door is detachable from the container and firmly connected with the cover. After lifting the cover 6 it is possible to enter the container through the door opening with fork lift trucks having a height higher than that of the container. The mounting of the upper door cross spar 108 on the top cover 6 eliminates any additional mechanisms for detaching this upper cross spar of the door.

As has become apparent in practice, the side posts of the door which are free standing when the upper door spar has been lifted, tend to incline towards the inside or outside during the loading. Consequently, the reliable closure of door and roof cannot always be guaranteed. In order to provide means for restoring inclined door posts to their original structural position a locking rod 112 is provided between the upper ends of the door posts 110. As described in detail in the following, this locking bar 112 is mounted pivotably and detachably at one end so that it can be positioned in a recess 114, arranged parallel to one of the door posts 110 during the loading or unloading of the container, as shown in FIG. 8.

FIGS. 9 and 10 show this arrangement in detail. The profiles of the door posts 110 have each a pocket 116 below the front end of the box profile 8; a pivoting arm 120 is mounted pivotably about a vertical axis 118 in this pocket 116.

The locking rod 112 comprises a tubular part 122 in the left end of which a bush 124 is located; a threaded pin 126 is rotatable in this bush and carries a forked head 128 whereby the pin 126 is connected pivotably through a link member 130 with the pivot arm 120. The other end of the tube 122 carries a threaded bush 132 into which is screwed a spindle 134, equipped with a fork head 136 connected by a link member 138 with the right hand pivoting arm 120. The tube is equipped with two transverse bores 140, offset by 90° and lined with bushes serving to receive rods, whereby the tube can be rotated.

The spindle 134 is provided with a mark 142 indicating the nominal distance between the door posts 110. In the embodiment shown in the drawing the left hand link member 130 is detachable and may be equipped, for example with a handle, not shown in the drawing. After releasing the link member 130, the locking bar 112 can be swivelled downwards and fitted with the right hand arm 120 into the recess 114.

The left hand pivoting arm 120 may also be lowered, leaving a completely unobstructed free passage.

After the loading the locking rod 112 is hooked into the left hand swivel arm 120 and the tube 122 is rotated until the distance between the door posts reaches the structural dimensions; the bar 112 may either operate as a pulling or a pushing member and the structural dimension may easily be ascertained by means of the marking 142.

We claim:

1. An improved container with detachable top cover, wherein the improvement comprises that the top cover is a plate shaped insert (6) of a skeleton frame with lining having along its circumference on the underside a downwardly open channel (20) with a rubber seal embedded therein, wherein the outer leg of this channel is extended beyond the surface of the seal, the upper rim of the container forms an L-shaped box profile (8) with inwardly directed horizontal leg (10) having at its end an upwardly facing sealing strip (16) cooperating with the rubber seal, and comprising manually operated locking devices (28) arranged in upwardly open pockets (26) distributed over the circumference of the top cover, and further including a door having an upper cross spar (108) firmly connected with said top cover.

2. A container as set forth in claim 1 wherein the locking devices comprise each a locking lever (40, 78, 84) articulated to; the cover, producing a contact pressure acting substantially vertically downwardly, and pivotable through an angle of about 90 degrees extending into the outline of the top cover, and a pivotable manual lever (50, 96), said locking and manual levers being interconnected by a link (42) with a connecting hinge (46) connecting said manual lever and said connecting link such that in a locking position the connecting hinge (46) is beyond a dead center position, and further comprising pockets (58) open towards the top cover in the L-shaped box profile opposite the locking levers and forming a top abutment for said locking levers.

3. A container as set forth in claim 1, wherein said manual lever (50) includes a detachable hinged joint (52, 54).

4. A container as set forth in claim 3, further comprising two mutually spaced apart bearing plates (56) with upwardly open bearing sockets provided therein for mounting the manual lever, said manual lever having laterally projecting bearing studs.

5. A container as set forth in claim 1, wherein the end of the manual lever (50) is angled and has a ball shaped head and recesses are provided in the cover pocket (26) spaced behind the support point for the manual lever and adapted to receive the ball shaped end of the manual lever.

6. A container as set forth in claim 1 comprising lifting eyelets (74) in the top cover pockets (26) nearest the corners and mounted pivotably on the bottom of the pockets.

7. A container as set forth in claim 1, further comprising lifting eyelets in the top cover pockets nearest the corners of the box, wherein said lifting eyelets (74) have a hinged joint (76) arranged such that the eyelets located under the manual lever in the locked position.

8. A container as set forth in claim 1, comprising transverse locking devices arranged in the cover (6) in upwardly open pockets (26) and having a manual lever (96) hinged to the cover and a pull rod (100) hinged to the manual lever, wherein the pull rod may be connected to the box profile (8) of the container.

9. A container as set forth in claim 1 with transverse locking devices comprising a manual lever hinged to the cover and a pull rod hinged to the manual lever and engagable into the box profile of the container, wherein the end of the pull rod is hammer head shaped and the box profile (8) contains a pocket (102) open towards the cover and equipped with resilient, spaced apart abutments (104).

10. A container as set forth in claim 1, wherein each of said locking levers has a resiliently supported locking lug (84) said lugs having a supporting surface forming an angle with the horizontal and the vertical, said box profile having a supporting surface (86) with a corresponding angular orientation for cooperation therewith.

11. A container as set forth in claim 1, wherein each of said locking levers include two spaced apart locking jaws (78) interconnected by a cross member (90), and

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further including an obliquely positioned resiliently supported locking lug mounted pivotably about a pivot axis (80) of said jaws and a spring (88) between said locking lug and said cross member.

12. A container as set forth in claim 1, wherein said container further includes two door posts and further comprising a locking bar (112) mounted pivotably on a swivel arm (120) fitted to one door post (110) and a screwed spindle (134) connected by a swivel arm (130) to the other door post detachably connected to said locking bar.

13. A container as set forth in claim 12, wherein the screwed spindle (134) is provided with a marking (142) indicating the nominal distance between the door posts (110).

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U.S. Cl. X.R.

220—46, 55; 292—68, 97