An explosion resistant cargo container (1), useful for storing cargo on aircraft, is made of side wall panels (6), top wall panels (50) and bottom wall panels (7) mounted onto a frame, where a side door (51) is connected to a top wall, bottom wall and side wall panel by a locking mechanism (5) which has fingers (11) and perforations (21) locked together when closed by wedge action, and where the panels (6, 7, 50) are, for example, woven polymer sheeting and/or aluminum.
FIG. 13
EXPLOSION RESISTANT CARGO CONTAINER

CROSS-REFERENCE TO RELATED APPLICATION

[0001] The instant application claims priority from Provisional Application No. 60/386,853 filed Jun. 7, 2003, the disclosures of which are incorporated herein by reference.

FIELD OF THE INVENTION

[0002] The present invention relates to cargo containers for luggage and the like for use in the hold of aircraft, boats, etc. where the container has sufficient strength to contain detonation of an explosive charge.

BACKGROUND OF THE INVENTION

[0003] Cargo containers for holding luggage and the like are well known, especially for air travel, and most conform to a standardized design as set out in one or other of the International Air Transport Association’s specifications. Recently, there has been increased interest in making these containers bomb proof. Such containers would be useful on airplanes, boats or trains. For air travel it is thought that only small explosive devices might pass through the security process, but even these could cause extensive damage if detonated since the aircraft superstructure is directly adjacent to the cargo containers in the aircraft hold.

[0004] Such containers as unitary systems have been described, for example, in U.S. Pat. Nos. 5,595,431; 5,833,782 and 6,341,706 B1 (Miklar; Crane et al. and Palley et al. respectively). Latching mechanisms for blast attenuating containers have been described, for example, in U.S. Pat. Nos. 4,432,285; 5,395,682; 6,089,398 and 6,112,931 (Boyars et al.; Holland et al.; Weinstein and Booth et al.). Such latching mechanisms, especially at the interface of the door and the containment structure are especially vulnerable to any interior bomb blast and require sophisticated interlocking arrangements. Weinstein relies on a hooked or J-shaped engagement flange defining at least one latch-receiving groove, where small clearances are involved, which could be a problem after substantial daily use where the flange and groove could become stretched or worn. During an explosion the engagement flanges of Weinstein further lock. Booth et al. relies on a rigid joint under normal conditions which then becomes a relatively flexible hinged joint which transmits tensile loads between joined panels under blast conditions. The external frames for cargo containers have been described, for example, in U.S. Pat. Nos. 4,923,076; 5,645,184 and especially 6,237,793 B1 which shows a current design with one tapered end to fit the curve at the bottom side of most commercial aircraft (Weise et al.; Rosew et al. and Fingerhub et al. respectively). Panel attachment has also been described, for example, in U.S. Pat. No. 5,395,682 (Holland et al.)

[0005] A great number of the above patents relate to hard paneled containers. At least one blast-resistant container uses flexible composite panels containing KEVLAR® fibrous materials. This eliminates substantial weight as described at web site http://www.tclair.com/info/news/press/prm01.html (22 Apr. 2002).

[0006] What is still needed is a modular design for an explosion-resistant cargo container for aircraft that can be easily assembled/disassembled for use in smaller aircraft and facilitate ease of repair, and that would better absorb a blast within the container and prevent damage to the aircraft. It is one of the main objects of this invention to provide such an explosion-resistant container having a greatly improved door latching mechanism and internal and external frame.

SUMMARY OF THE INVENTION

[0007] The above need and object is accomplished by providing an explosion resistant cargo container comprising: a frame; side wall, top wall and bottom wall panels mounted to the frame to form an enclosure having at least four corners; and a side door connected to a top wall panel, a bottom wall panel and a side wall panel by a locking mechanism comprising fingers and perforations locked together when closed by wedge action caused by a 2° to 45° angle between the fingers and perforations; where interior corners are supported by supports connected to a strap plate with fasteners that do not pass through the frame and where the panels are of sheeting. Preferably the supports are hollow. The invention also resides in an explosion resistant cargo container comprising: (a) a plurality of panels, each said panel comprising 1) a panel body having a circumferential edge and 2) at least one flange support member, wherein at least a portion of said circumferential edge is attached to at least one said flange support member, and wherein said plurality of panels is contiguously positioned along said flange support members to form an enclosure; (b) a plurality of straps, each said strap removably attached to at least two contiguously positioned flange support members; (c) a hinge attached to at least one of said panels; (d) a door attached to said hinge; (e) a locking mechanism comprising a plurality of fingers and a perforating member having a plurality of orifices, said plurality of fingers slidably engageable with said orifices, said plurality of fingers attached to at least one of said panels and said perforating member attached to said door; and (f) a flexible ballistic curtain attached to said plurality of panels and suspended within said enclosure. Preferably, the plurality of fingers in the locking mechanism are attached to the door where the perforated member is attached to at least one of the panels.

[0008] The locking mechanism is engaged by rotating the fingers about an axis to physically engage the perforations on at least the top and bottom and preferably also at the side corners of the container. Sudden internal pressure would tighten the locking mechanism. The panels can be made of woven polymer sheeting such as Kevlar®, metal or metal polymer/foam laminates, preferably, the panels are attached without perforating them so maximum strength is retained. Preferably an inner Kevlar® curtain is held in place by Velerco or a mounting mechanism. A latch catch associated with the locking mechanism is tapered from 2° to 45°, preferably about 4° to about 40° relative to the perforations and such a taper adds to the wedge action. This provides a latching system that is very forgiving of the variability in its components. By introducing a wedge shaped interlock means are provided for absorbing component variations, including normal wear without detrimentally impacting performance. By using a hollow support the fasteners can attach the strap plate by a bolt or the like which can penetrate the hollow part of the support without passing through the frame of the container. Preferably the container frame and hollow supports are aluminum.
BRIEF DESCRIPTION OF THE DRAWINGS

[0009] In order that the invention may be more clearly understood, convenient embodiments thereof will now be described, by way of example, with reference to the accompanying drawings in which:

[0010] FIG. 1 is a three dimensional drawing showing one form of the explosion resistant cargo container of this invention with one form of a door locking mechanism and frame;

[0011] FIG. 2 is a three dimensional drawing showing an exploded view of the various panel components that make up the explosion resistant cargo container, showing the modular design;

[0012] FIG. 3 is an enlarged drawing of one embodiment of the top locking mechanism;

[0013] FIG. 4 is a further enlarged drawing of the top locking mechanism when locked in place;

[0014] FIG. 5, which best illustrates the invention, is a cross-sectional view of the locking mechanism of FIG. 4, illustrating the wedge action and wedge angle of the locking mechanism;

[0015] FIG. 6 is a further enlarged drawing of the top locking mechanism when open as in FIGS. 1 and 3;

[0016] FIG. 7 is a generalized cross-sectional view of Fig. 6;

[0017] FIG. 8 is a further enlarged, exploded drawing of the top latching mechanism showing the fingers and perforations and other components of the locking mechanism;

[0018] FIG. 9 is a cross-sectional view of one embodiment of a bottom locking mechanism, showing the door latch, the bottom of the explosion resistant cargo container and one embodiment of the interior strap plate and dual extruded triangular frame support members attaching the various panel components as well as an interior liner material;

[0019] FIG. 10a is another cross-sectional view of triangular support members;

[0020] FIG. 10b is another cross-sectional view of the triangular support members and another embodiment of the interior strap plate.

[0021] FIG. 11 shows a cross-sectional view of the locking mechanism of FIG. 5, where there is a sudden internal pressure;

[0022] FIG. 12 shows a cross-sectional view of the bottom locking mechanism of FIG. 9, where there is a sudden internal pressure;

[0023] FIG. 13 shows a cross-sectional view of the triangular support members of FIG. 10a, where there is a sudden internal pressure where the support members are further forced together and the strap plate maintains the joint as the panel walls are forced outward;

[0024] FIG. 14 is a three dimensional drawing of one embodiment of the corner portion of the external frame showing the corner node and adjacent panels;

[0025] FIG. 15 is a three dimensional drawing of an external view of one possible embodiment of the corner node with channels having external strengthening cables therethrough;

[0026] FIG. 16 is a three dimensional drawing of an internal view of one possible embodiment of the corner node with internal strengthening cables;

[0027] FIG. 17 is a three dimensional drawing of the square, front portion of the explosion resistant cargo container showing the corner nodes, the frame and a bottom panel;

[0028] FIG. 18 is a cross-section through the flange support member and part of two panels showing frame-panel connection;

[0029] FIG. 19 is a cross-sectional view of one embodiment of a panel attachment mechanism so that perforations/holes are not punched in the panel;

[0030] FIG. 20 is a cross-sectional view of another embodiment of a panel attachment mechanism; and

[0031] FIG. 21 shows a cross-sectional view of one embodiment of an aluminum-foam core panel.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0032] Referring now to FIG. 1, an explosion-resistant cargo container 1 is shown, having a box like section 2, and a tapered section 3 which can conform to the curved bottom fuselage of most commercial aircraft. Cargo doors 4 are also shown along with a cargo door locking mechanism 5 generally shown connected to a top wall panel, a bottom wall panel and a side wall panel. FIGS. 1-2 also show a variety of panels, such as top panel 50, a piano hinged 36 bi-fold door 51, side wall panel 6 and a bottom wall panel 7, before assembly into the explosion-resistant cargo container. These panels can all be taken apart for ease of storage.

[0033] Generally, the locking mechanism of the explosion resistant cargo containers is shown in detail in FIGS. 3-9. The locking mechanism comprises a plurality of fingers 11, perforations 21 such as at perforated external corner 20 and an internal corner 30. The final latch 34 associated with the locking mechanism is shown, for example, in FIG. 3. Fingers 11 are attached to a finger projection which is attached to a plurality of sockets 12. These plurality of sockets 12 are insertable into openings 32 of internal corner 30 such that a pin or axle (not shown) can be inserted into the openings 32 of sockets 12 (as in a door hinge or a panel hinge) to rotatably engage fingers 11 to internal corner 30. The fingers are insertable into perforations/orifices 21 in external corner 20. The internal corner 30 is attached to top wall panel 50 and external corner 20 is attached to door panel 51, all best illustrated in FIG. 5. As shown in FIG. 5, a wedge action at point 8 locks the door. The wedge action is caused by the angle 16 caused by the wedge shaped slope of the inner part 10 of finger 11. This wedge action becomes even stronger if there is an explosion inside the container because under the force 300 of pressure, shown in FIG. 4, the container will begin to assume a more spherical shape. This will create a rotational joint moment 24, best shown in FIGS. 11 and 12, along the frame joints including the latch portion of the door, as shown in FIGS. 11 and 12. FIGS.
11-13, involving forced rotational movement will be discussed in more detail later in the specification. With the proper design of the latch geometry, the moment can be utilized to resist the component of the pressure load that tends to drive the door open. Contact point 8 is positioned to further rotate finger projection 11 into the joint under the loading produced during pressurization. FIGS. 5 and 11 show one embodiment of the latching system in the normal and pressurized conditions, respectively. FIG. 9 shows another embodiment of a locking mechanism as might be used, for example, at the bottom of the container. Again, pressurization as shown in FIG. 12 produces a joint rotation 24 as well as an outward movement of the container walls, due to the internal force 300. Careful design of the latch components to place wedge contact position 8 properly, relative to pivot 100 will result in forces rotating finger projection 11 toward complete locking engagement, shown best in FIG. 11.

[0034] With reference to FIGS. 3-9 and FIGS. 11-12, the locking mechanism is engaged by rotating fingers 11 about the axis 100 until fingers 11 enter perforations/orifices 21 to physically engage external corner 20 with internal corner 30. The latch is designed so that application of sudden internal pressure inside a cargo container (that is an explosion) would apply pressure to the internal surfaces of the container and tighten the grip that fingers 11 have on external corner 20, as described previously, and most clearly seen in FIG. 11.

[0035] Due to the many repeat features shown in the various figures, it will be necessary to move back and forth in many instances. Thus, referring again now to FIGS. 9-10b, in the preferred embodiment, the container top wall, bottom wall and side wall frame members are constructed, preferably, from high strength extruded aluminum as flange support members 104. These are preferably hollow. The top wall, bottom wall and side wall panels are constructed of relatively high strength aluminum sheet that also has suitable toughness to withstand the pressure produced by an explosive placed in the contained luggage. The extruded frame flange support members 104 and the sheet are assembled into the container panels using a combination of joining methods, preferably GMAW (gas metal arc welding) and FSW (friction stir welding) or laser welding. The extruded frame flange support members 104 are preferably hollow and configured to allow the container panels to be assembled using conventional tools and fasteners, such as, for example, bolts 17 or other threaded inserts which do not penetrate the container. A solid support, sufficiently thick to prevent the fastener from passing through the frame to the container is also within the scope of this invention. However, a hollow support is preferred to reduce material costs and overall weight of the container. The figures and description herein disclose a generally triangular frame flange support member 104 such as shown in FIGS. 9, 10a, 10b, 12, 13 and 18. However, it is within the scope of this invention that other shapes could be employed so long as such shapes include at least one surface to facilitate removable attachment of one frame support member to another frame support member and a second surface that allows contiguous positioning of the frame support members such that an explosive force and/or a rapid increase of pressure within the container results in a compressive force transmitted to the interface of the contiguous surfaces of the frame support members.

[0036] The modular design involves construction of panels made from the sidewall material and the frame members 52, as most clearly shown in FIG. 2. These panels are then assembled into a container through the use of the straps and fasteners as shown in FIGS. 9, 10a and 10b. Very importantly, as most clearly shown in FIG. 10a, any bolt 17, or other similar type fasteners will pass into the hollow portion 14 of hollow support member 104 where the fastener can penetrate into the hollow portion 14 without passing through and puncturing the container.

[0037] FIG. 10b demonstrates an alternative embodiment of interior strap 106 used in FIG. 10a. In this embodiment, the shape of strap 106 is achieved through the use of a high strength aluminum extrusion. A generally hook shaped feature 500 in strap 106 is used to engage a corresponding hook shape feature 501 in one of the triangular frame support members 104. The hook feature 500 in strap 106 includes a tapered portion 502 that directly contacts the receiving hook feature 501 in frame member 104. The tapered portion 502, with an angle 505 of 20° to 40°, produces a load of magnitude when engaged into frame member 104. This embodiment of strap 106 minimizes the number of fasteners 17 required to effect the locking together of frame members 104.

[0038] The modular design allows for convenient storage of spare containers. The modular design also facilitates assembly and disassembly of the container inside of aircraft cargo holds with limited egress. The modular design also provides for quick repair of containers that have suffered damage through accident or heavy use. FIGS. 1-3, 5 and 10a best illustrate the modular design concept, where a plurality of panels, for example 6 and 7, each panel comprising: a panel body having a circumferential edge frame 35, and at least one flange support member 104 (best shown in FIG. 10a), wherein at least a portion of said circumferential edge is attached to at least one said flange support member 104, and wherein said plurality of panels is contiguously positioned along said flange support members 104 to form an enclosure; a plurality of straps 106, each said strap removably attached to at least two contiguously positioned flange support members 104; a hinge 36 (best shown in FIG. 1) attached to at least one of said panels; a door 4 attached to said hinge; a locking mechanism 5 having a plurality of fingers 11 and a perforated member 20 (best shown in FIG. 5) such as part of the locking mechanism 5, having a plurality of orifices/perforations 21, said fingers slidably engageable with said orifices/perforations 21, said fingers attached to at least one of said panels and said perforated member attached to said door; and a flexible ballistic curtain 200 (best shown in FIG. 10a) attached to said plurality of panels and suspended within said enclosure.

[0039] An interior ballistic curtain, shown as 200 in FIGS. 9 and 10, is provided as ballistic protection. In the preferred embodiment, the curtain material is constructed of multiple plies of Kevlar® and is attached to the interior walls of the container in a manner that permits easy replacement and service. The first embodiment utilizes Velcro piece 202 for attachment of the ballistic curtain. A second embodiment, shown most clearly at the right side of FIG. 10a, would additionally capture the curtain 200 with the fasteners 17 at point 204.

[0040] An alternate method of frame construction is illustrated in FIGS. 19 and 20. Referring to FIG. 19 the side
panel 6 is attached to a specially constructed frame member 63 through a clamping mechanism 70. Extruded frame member 63 includes a recess feature 71 into which the side panel 6 is clamped by extruded clamp 72. Extruded clamp 72 is held in position by the interlocking of features in clamp 72 and frame member 63. Extruded clamp 72 is locked through the engagement of faster 73 which do not perfor-rate the side panel. Another method of construction is illustrated in FIG. 20. Side panel 6 is clamped to the frame member by reduction of clearance between leg 84 and leg 85 through the engagement of faster means 82-83. Radius 80 provides a hinge point to allow legs 84 and 85 to close and clamp side wall 6 into recesses 81 formed by the features of first leg 84 and second leg 85. Also, as shown in FIG. 18, side panels, such as 6, can be constructed of a combination of composite material and aluminum extrusion materials joined to the frame members/hollow support 104 as previously described. An extrusion such as 66 has mechanical or other locking features such as 68 can be introduced by joint 69 into the composite construction process to produce panels with an aluminum periphery capable of utilizing aluminum to aluminum joining processes.

[0041] Referring back again to FIGS. 1, 4 and 5, and as a summary, the container 1 provides for an opening through which luggage is loaded. The opening is covered by a moveable door 4 which is latched when closed and is capable of withstanding the blast forces produced by the explosive threat. The panels of the door are constructed of the same materials as the container walls. The door panels are joined to extruded framing corner members 20 which include perforation features 21 that receive latching finger 11. Latching finger 11 is part of a finger projection which pivots about latch pin 100 through annular socket feature 12. At the door opening, frame member 30 provides the means for accepting latch finger 11. The finger feature 11 is tapered 2° to 45°, preferably 4° to 40°, most preferably 6° to 35°, as shown 16, at point 9 to provide a wedging effect when engaging door latch frame 20 through perforations 21 at point 8. The taper of the finger provides the means for compensating for variability in the dimensions of the components by allowing for larger clearances. This will allow for easy initial engagement followed by the wedging close of the door once the final/secondary latch is applied (34 in FIG. 3).

[0042] As shown in FIG. 11, summarizing actions during pressurization, as a result of the explosive event, the taper of finger 11, as shown by angle 16, combined with the relative position of the engagement point of the finger 11 and perforated external corner door latch frame 20 will act to maintain the locking engagement. Rotation of finger projection about latch pin axis 100 will become more difficult as the deformation of the container frame member increases as a result of the container pressurization. The locking mechanism members are preferably constructed from high strength, high toughness aluminum extrusions, most preferably of the 2xxx or 7xxx aluminum alloy series, preferably 2519 alloy and 7005 alloy.

[0043] In an alternate embodiment, the container frame members 63 are joined together at the corners 108 of the container through the use of cast corner nodes 60, as shown in FIGS. 14-16 and 19-20. Reinforcement of the corner nodes 60 is accomplished through the use of high strength cable 62. Cable end caps lock the cable 62 to the cast node 60. The cable acts as a reinforcing tension member during the pressurization event. The frame members 63 can be joined to the nodes 60, as shown in FIG. 17, using GMAW, FSW or other suitable joining methods.

[0044] The invention also includes the use of aluminum extrusions for the external frame which will define the corners and edges of the container. As also described above, the node or corner piece 60 is shown in FIGS. 14-17. The node 60 can contain channels. The channels will contain a flexible strengthening member 62 such as aircraft cable. Nodes 60 will be attached to edge frame members 63, as shown in FIG. 17, which can have channels through which strengthening members (cables) 62 can be disposed.

[0045] FIG. 21 shows one possible embodiment of the aluminum panel material as a foam. The foam panel material consists of aluminum skin material of, for example, high density aluminum, 404, about 70 vol. % to 98 vol. % dense, and the substantially less dense foamed aluminum, 406, about 30 vol. % to 50 vol. % dense (50 vol. % to 70 vol. % porous). The skin and the foam are integrally connected and created simultaneously and are not separate pieces. The ballistic protection material is added as previously described. Certain of these materials are weakened when holes are cut into the panels. To avoid this problem a Velcro attachment 202, shown in FIG. 10k, can be used. The invention can include two different panel attachment mechanisms shown in FIGS. 19 and 20 described previously. During an explosion within the container, outward forces, as shown by arrows 300 in FIG. 20, would tend to force the inner leg surface 84 against outer leg surface 85 of clamp 80 to resist disengagement of panel 6 from clamp 80.

[0046] More specifically, with regard to what are considered the most important figures, FIGS. 11-13, a more detailed description follows. FIG. 11 shows one embodiment of the latching mechanism during the pressurization of the container as a result of the detonation of an explosive inside the container. For example, container top panel 50 is attached to container internal frame member 30 and door panel 51 is attached to door latch frame member 20. Container internal frame member 30 includes features to accept finger projection which includes fingers 11 and socket 12. When the door is closed, bringing door latch frame member 20 in close proximity to internal frame member 30, finger projection is rotated relative to frame member 30 and fingers 11 engage door latch frame member 20 through perforations/perforated slots 21. The taper of fingers 11 produces a wedging effect at point 8. During pressurization of the container, the side walls will begin to expand as the container begins to take on a more spherical shape. The inter-locking of latch fingers 11 and door latch frame member 20 will resist the opening of the door and result in joint rotational moment 24 further driving together the latching system components. Proper design of the latching components will ensure that point 8 is positioned relatively outboard of the pivot point 100 such that the load applied through point 8 tends to rotate the finger projection in the closed, latched position.

[0047] FIG. 12 shows another embodiment of the latching mechanism as well as the modular frame design. As described previously, pressure 300 produced by the explosion event introduces joint rotation 24 as a result of the interlocking of finger projection with the door frame mem-
ber at point 8. Again, placement of point 8 relative to pivot 100 is critical to the proper restraint of the door until gross deformation of the frame members further hampers rotation of finger latch 11. In this figure, bottom frame and sidewall frame flange support members 104 are shown joined together with strap 106 and fasteners 117. In addition, ballistic material 200 is shown attached to the aluminum sidewall material via Vekero material 202. Under pressurization, the members 104 experience the same rotational moment 24 experienced at the door latch. In the case of the frame, strap 106 prevents separation of members 104 and becomes a shear tie as the external corners of the frame flange support members 104 are driven together. This is further illustrated in FIG. 13. The flanges of members 104 deform as pressure 300 forces sidewalls 6 outward.

[0048] Having described the presently preferred embodiments, it is to be understood that the invention may be otherwise embodied within the scope of the appended claims.

What is claimed is:

1. An explosion resistant cargo container comprising:
   a frame;
   side wall, top wall and bottom wall panels mounted to the frame to form an enclosure having at least four corners;
   and a door connected to a top panel, a bottom wall panel and a side wall panel by a locking mechanism comprising fingers and perforations locked together when closed by wedge action caused by a 2° to 45° angle between the fingers and perforations;
   where interior corners are supported by supports connected to a strap plate with fasteners that do not pass through the frame and where the panels are of sheeting.

2. The cargo container of claim 1, where the panels are of woven polymer sheeting supported without perforating the sheeting and the door is a side door.

3. The cargo container of claim 1, where the locking mechanism is engaged by rotating the fingers about an axis to physically engage the fingers with perforations on at least the top and bottom wall panels of the container.

4. The cargo container of claim 1, where internal pressure tightens the locking mechanism.

5. The cargo container of claim 1, where the angle between the fingers and perforation is about 4° to about 40°.

6. The cargo container of claim 1, where the supports are hollow and the fasteners pass through the strap plate and into the hollow portion of the support.

7. The cargo container of claim 1, where the frame and hollow supports are aluminum.

8. The cargo container of claim 1, where the wall panels are a composite of high density aluminum and low density foamed aluminum.

9. An explosion resistant cargo container comprising:
   a plurality of panels, each said panel comprising (1) a panel body having a circumferential edge and (2) at least one flange support member, wherein at least a portion of said circumferential edge is attached to at least one said flange support member, and wherein said plurality of panels is contiguously positioned along said flange support members to form an enclosure;
   a plurality of straps, each said strap removably attached to at least two contiguously positioned flange support members;
   a hinge attached to at least one of said panels;
   a door attached to said hinge;
   a locking mechanism comprising a plurality of fingers and a perforated member having a plurality of orifices, said plurality of fingers slidable engageable with said orifices, said plurality of fingers attached to at least one of said panels and said perforated member attached to said door; and
   a flexible ballistic curtain attached to said plurality of panels and suspended within said enclosure.

10. The explosion resistant cargo container of claim 9 wherein said plurality of fingers are attached to said door and said perforated member is attached to at least one of said panels.

11. The explosion resistant cargo container of claim 9 wherein said straps are aluminum extrusions.

12. The explosion resistant cargo container of claim 9, where the locking mechanism is engaged by rotating the fingers about an axis to physically engage the fingers with orifices on at least the top and bottom wall panels of the container.

13. The explosion resistant cargo container of claim 9, where internal pressure tightens the locking mechanism.

14. The explosion resistant cargo container of claim 9 wherein said straps include a generally hook shaped feature that engages at least one frame support member.

15. The explosion resistant cargo container of claim 14 in which said hook feature includes a tapered portion that results in a wedge action when engaged with said frame support member.

16. The explosion resistant cargo container of claim 12 when in the locking mechanism the fingers and orifices are locked together when closed by a wedge action caused by a 2° to 45° angle between the fingers and orifices.

17. The explosion resistant cargo container of claim 14 where the wedge action is caused by a 4° to 40° angle between the fingers and orifices.