ISO STANDARD-COMPLIANT CONTAINER

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ABSTRACT

A container is an ISO standard-compliant container that has at least: a freight chamber in which freight is loaded; and side doors that are provided on the sides of the freight chamber in the longitudinal direction and are obtained from pairs of doors that open to the left and right from near the center of the longitudinal direction of the freight chamber. Each of the pairs of doors that configure the side doors are obtained from: sub-doors near the center; and sub-doors that are mounted to rotate freely via hinges and support the sub-doors to rotate freely via hinges. The longitudinal dimension of the sub-doors is shorter than the longitudinal dimension of the sub-doors.
ISO STANDARD-COMPLIANT CONTAINER
CROSS REFERENCE TO RELATED APPLICATIONS


TECHNICAL FIELD

[0002] The present invention relates to a container compliant with the ISO (International Organization for Standardization) standard.

BACKGROUND ART

[0003] A container compliant with the ISO standard meets prescribed external dimensions, a prescribed total superimposed mass, prescribed strength requirements, and the like that are specified in the ISO standard. As a result, in marine transportation or overland transportation, highly-efficient container transportation can be materialized, for example, in such a way that a lot of containers being the same in form can be piled up. Furthermore, by way of providing prescribed strength, it is intended to preserve a cargo and to ensure security of a ship or a vehicle for transporting a cargo. Moreover, in the case of a container compliant with the ISO standard, a door to be used for loading and unloading a cargo is provided only to one of two side sections that are located along a widthwise direction of the container. In the following explanation, such a door is called a “rear door.”

[0004] In the meantime, being different from such a container compliant with the ISO standard, there exists another type of container that has a door provided to at least one of two side sections that are located along a longitudinal direction of the container, in addition to the rear door mentioned above, for purpose of attaching importance to workability at the time of loading and unloading a cargo, for example, as PTL 1 shows. In the following explanation, such an additional door is called a “lateral face door.” According to this arrangement, when a certain cargo needs to be loaded or unloaded, it becomes possible to open a lateral face door proximate to the cargo so as to load or unload only the cargo or a small number of cargoes adjacent to the cargo.

CITATION LIST
Patent Literature

[PTL 1] EP1136291A1

Non Patent Literature

SUMMARY OF INVENTION

Technical Problem

[0005] As described above, a container compliant with the ISO standard has one and only rear door to be used for loading and unloading a cargo. In that case, it brings a difficulty to unload only a cargo, if located at a deepest section (a location in a front-end section opposite to the rear door) of the container compliant with the ISO standard, and the intended cargo cannot be unloaded without unloading almost all cargoes placed in front of the cargo located at the deepest section. Moreover, in the case where a cargo that needs to be loaded originally at the deepest section (the front-end section) has actually not been loaded by mistake and loading the rest of cargoes has been finished, it is difficult to load the cargo later at the deepest section. On the other hand, in the case of a container compliant with the ISO standard, all parts except the rear door are built up with a panel member of a wall component so that the container can easily satisfy the certain strength requirements prescribed in the ISO standard.

[0006] In the meantime, while a container of PTL 1 has high workability for loading and unloading a cargo owing to existence of a lateral face door, unfortunately the container may not be able to satisfy the ISO standard because an opening section for installing the lateral face door is wide, and the container has lower strength, being compared with a container in accordance with the ISO standard.

[0007] As described above, the workability for loading and unloading a cargo and the strength of a container are in relation of “Trade-off” each other.

[0008] The present invention is materialized against such a background, and thus it is an objective of the present invention to provide a container compliant with the ISO standard, while the container maintaining high workability for loading and unloading a cargo, and furthermore being able to satisfy the strength requirements prescribed in the ISO standard.

Solution to Problem

[0009] A container according to the present invention is a container compliant with the ISO standard comprising at least: a cargo chamber where a cargo is loaded; a lateral face door including a pair of doors provided at a lateral face of the cargo chamber in a longitudinal direction, the lateral face door performing casement-door motion in a horizontal direction from a vicinity area around a center of the cargo chamber in the longitudinal direction; wherein each of the pair of doors constituting the lateral face door includes: a first door member at a side closer to the center of the cargo chamber, and a second door member fit to the lateral face of the cargo chamber so as to be rotatable by the intermediary of a first hinge, and a dimension of the first door member in the longitudinal direction is shorter than a dimension of the second door member in the longitudinal direction, the second door member supporting the first door member so as to be rotatable by the intermediary of a second hinge.

[0010] It is preferable for the container according to the present invention that the container includes locking means for locking the first door member and the second door member to the lateral face under conditions where the lateral face door is in a closed condition; the locking means has a manual steering unit; and the manual steering unit of the locking means, which the second door member has, is provided at a lower area being further outside than an outer frame of the second door member.

[0011] It is preferable for the container according to the present invention that the first hinge being provided in plurality, the plurality of first hinges are placed in a vertical direction perpendicular to the longitudinal direction of the cargo chamber, and at least at a highest section and a lowest section, two or more of the first hinges are placed side by side at each section.
Advantageous Effects of Invention

According to the present invention, it becomes possible to provide a container compliant with the ISO standard, while the container maintaining high workability for loading and unloading a cargo, and furthermore being able to satisfy the strength requirements prescribed in the ISO standard (The container compliant with the ISO standard is hereinafter simply called a “container”).

BRIEF DESCRIPTION OF DRAWINGS

FIG. 1 is a diagram showing a lateral view of a vehicle in which a container according to an embodiment of the present invention is installed. FIG. 2 is a diagram of a lateral view of the container shown in FIG. 1. FIG. 3 is a diagram showing a partial enlarged lateral view of the container shown in FIG. 2. FIG. 4 is a diagram of a top view of the container shown in FIG. 2. FIG. 5 illustrates diagrams showing opening sections of the container with its doors removed. FIG. 6 is a perspective view of the container under conditions where the doors are removed. FIG. 7 is a diagram showing conditions where the doors of the container of FIG. 3 are opened. FIG. 8 is a diagram showing conditions where a lateral face door is opened, wherein sub-doors are sized the same, as a comparative example. FIG. 9 is a diagram showing a handle position at a time when the lateral face door is folded.

DESCRIPTION OF EMBODIMENTS

Construction of a Container 1

According to an Embodiment of the Present Embodiment

Construction of a container 1 is explained below with reference to FIG. 1 through FIG. 4. FIG. 1 is a diagram showing a lateral view of a vehicle 2 in which the container 1 is installed. FIG. 2 is a diagram of a lateral view of the container 1 (a diagram showing only the container 1 of FIG. 1). FIG. 3 is a diagram showing a partial enlarged view of the container 1 shown in FIG. 2. FIG. 4 is a diagram of a top view of the container 1. Incidentally, in a top view such as FIG. 4, illustrations of a top panel and a corner bracket 4 are omitted in order for easily understanding conditions of a lateral face door 3 and a rear door 3B.

The container 1 is transported, while being firmly locked to the vehicle 2, for example as shown in FIG. 1, or, otherwise being installed in a ship that is not graphically shown. Explained here is a so-called “40-ft container” compliant with the ISO standard. External dimensions of the 40-ft container compliant with the ISO standard are 9-ft 6-in (2,896 mm) in height, 8-ft (2,438 mm) in width, and 40-ft (12,192 mm) in length, and a maximum total mass of the container is 30,480 kg.

As shown in FIG. 1 through FIG. 4, the container 1 has a cargo chamber 5 shaped as a rectangular parallelepiped. A corner of the cargo chamber 5 is equipped with a corner bracket 4. A side wall face in a longitudinal direction of the cargo chamber 5 has a lateral face door 3, and meanwhile one (at a side facing the rear of the vehicle 2) of two side wall faces in a widthwise direction, perpendicular to the side wall face in the longitudinal direction, has a rear door 3B. The lateral face door 3 includes; sub-doors 3L-1 and 3R-1, as a first door member; and sub-doors 3L-2 and 3R-2, as a second door member. The sub-doors 3L-2 and 3R-2 are fit to a main body of the container 1 by use of a hinge 6a as a first hinge so as to be openable and closable. The sub-door 3R-1 and the 3R-2 are connected each other by use of a hinge 6b as a second hinge so as to be rotatable, and in the meantime, the sub-door 3L-1 and the 3L-2 are also connected each other by use of a hinge 6b as a second hinge so as to be rotatable. The rear door 3B is fit to the main body of the container 1 by use of a hinge 6c so as to be openable and closable. Incidentally, only some of the hinges 6a, 6b, and 6c are provided with their reference numerals, and providing reference numerals for others of the same members are omitted. Moreover, as shown in FIG. 2, a length 1L of the sub-doors 3L-1 and 3R-1 in the longitudinal direction is shorter than a length 1L of the sub-doors 3L-2 and 3R-2 in the longitudinal direction.

The sub-doors 3L-1 and 3R-1 are provided with a locking part 7a as a locking means, the sub-doors 3L-2 and 3R-2 are provided with a locking part 7b as a locking means, and meanwhile the rear door 3B is provided with a locking part 7c. The locking parts 7a, 7b, and 7c work to fix the sub-doors 3L-1, 3R-1, 3L-2, and 3R-2, and the rear door 3B to a frame of the cargo chamber 5, when those sub-doors and the rear door are closed.

A structure of the locking parts 7a and 7b is explained below with reference to FIG. 3. Since the locking part 7c has the same structure as the locking part 7a, an explanation of the locking part 7c is omitted. As shown in FIG. 3, the locking part 7a includes a cam 70a, a cam guide 71a, bearing units 72 and 73, a locking bar 74, a handle 75a as a manual steering unit, a handle receiving part 76a, and a handle rotating part 77a. The cam 70a is formed at both ends of the locking bar 74. When being rotated together with the locking bar 74, the cam 70a locks up with the cam guide 71a that is fit to the cargo chamber 5, or unlocks out of the cam guide 71a. At the time, the locking bar 74 is manually rotated when an operator moves the handle 75a in a horizontal direction (in a backward direction in the figure). Incidentally, the cam 70a is so prepared as to lock up with the cam guide 71a under conditions where the lateral face door 3 is closed and the handle 75a is positioned at the handle receiving part 76a.

Although a basic configuration of the locking part 76 is the same as that of the locking part 7a, as shown in FIG. 3, mounting locations of a cam 70b, a cam guide 71b, a handle 75b, a handle receiving part 76b, and a handle rotating part 77b in a lower section of the locking part 76 are different from those of the locking part 7a. Namely, as shown in FIG. 3, the handle receiving part 76a of the locking part 7a is fit within an extent of the sub-door 3L-1, and then the handle 75a and the handle rotating part 77a are located at a lower section within an extent of the sub-door 3L-1. On the other hand, the handle receiving part 76b, the handle 75b, and the handle rotating part 77b of the locking part 7b are fit to a lateral face of the cargo chamber 5, at an lower outside area of the sub-door 3L-2. Accordingly, mounting locations of the cam 70b and the cam guide 71b are lower than those of the cam 70a and the cam guide 71a.

Furthermore, as shown in FIG. 3, a plurality of hinges 6a supporting the sub-doors 3L-2 and the cargo chamber 5 so as to keep them rotatable, are neighboring each other at a highest section and a lowest section of the sub-door 3L-2 in such a way as to make up groups of hinges 60 and 61. The
same arrangement is also applied to hinges 6a, between the other sub-doors 3R-2 and the cargo chamber 5, which are outside the figure.

Opening Sections 30 and 30B of the Container

A lower diagram of FIG. 5 shows opening sections 30 and 30B, wherein the lateral face door 3 and the rear door 3B of the container 1 shown in an upper diagram of FIG. 5 are removed. FIG. 6 is a perspective view of the container 1 under conditions where the lateral face door 3 and the rear door 3B are removed. In this way, the lateral face door 3 and the rear door 3B are fit to the opening sections 30 and 30B.

As shown in FIG. 5 and FIG. 6, the container 1 has the opening sections 30 and 30B for fitting the lateral face door 3 and the rear door 3B. The upper figure of FIG. 5 shows the container 1 in which the cargo chamber 5 has the lateral face door 3 and the rear door 3B, and in the meantime, the lower figure of FIG. 5 shows the opening sections 30 and 30B from which the lateral face door 3 and the rear door 3B are removed. This explanation is based on the premise that an opening percentage is defined as a ratio of L12 to L11; namely [(L12/L11) x 100] (%); wherein L12 is a length of the opening section 30 that appears when the lateral face door 3 is removed, and L11 is an overall length of the container 1. Incidentally, the corner bracket 4 is used for mutually connecting each frame and each pillar, constructing the container 1, by way of welding; and the corner bracket 4 protrudes a little out of the cargo chamber 5. The overall length of the container 1 for calculating the opening percentage does not include the protrusion of the corner bracket 4. In this explanation, it is assumed that the overall length of the container 1 (L11 to be described later) does not include the protrusion of the corner bracket 4. Therefore, at the time of calculating an opening percentage, the overall length of the container 1 (L11) to be applied is 12,000 mm.

The greater the opening percentage is, the lower the strength of the container 1 becomes; and meanwhile it is known that an opening percentage up to 95% is included within an allowable range that can satisfy the strength requirements specified by the ISO standard (refer to Japanese Patent Publication No. 2012-201374 A). On the other hand, in the case of an opening percentage being less than 60%, loading/unloading a pallet requires a pallet transfer distance being equal to or longer than size of two pallets so as to lead to a significantly low workability. Therefore, “60%” is appropriately determined to be a lower limit of an opening percentage. As a result, a maximum applicable range of an opening percentage extends from 60% to 95%. Incidentally, a pallet in this explanation is assumed to be a flat-pallet through transit according to the JIS standard Z0105, and dimensions of the pallet are 1,100 mm in length times 1,100 mm in width times 144 mm in height. Notwithstanding the above descriptions, when actual usage conditions of the container 1 are considered while vibration and the like acting on the container 1 during transportation being taken into account, it is appropriately assumed that an opening percentage up to 90% does not exceed the allowable range of strength even if actual usage conditions of the container 1 are taken into consideration. Moreover, in the case of an opening percentage being greater than 75%, a pallet transfer distance being shorter than size of two pallets is enough for loading/unloading a pallet so as to lead to an improvement in workability of loading/unloading a pallet. Therefore, it is appropriate to have an opening percentage in a range from 75% to 90%.

Moreover, wall sections 8F and 8R built with a panel member are placed at both sides of the opening section 30 in the longitudinal direction. Since a front end of the container 1 has no rear door 3B, the front end can have more strength than a rear end with the opening section 30B for the rear door 3B. Therefore, an area of the wall section 8F may be prepared so as to be smaller than an area of the wall section 8R. Nevertheless, in order to reduce the number of components included in the container 1, it is preferable to use the same panel member for both sections 8F and 8R. Accordingly, in this case, the areas of the wall sections 8F and 8R are the same in the right and left sections.

Opening/Closing Operation of the Doors 3 and 3B of the Container

An opening/closing mechanism of the lateral face door 3 and the rear door 3B of the container 1 is explained with reference to FIG. 7. Incidentally, illustrations of the locking parts 7a, 7b, and 7c are omitted in FIG. 7. FIG. 7 is a diagram showing conditions where the doors of the container 1 are opened. The lateral face door 3 and the rear door 3B of the container 1 are opened and closed by use of the hinges 6a, 6b, and 6c, as shown in FIG. 7; and, moreover the sub-doors 3R-1, 3R-2, 3L-1, and 3L-2 are constructed in such a way as to be folded by use of the hinges 6a. Incidentally, FIG. 7 shows conditions where the door 3L-2 is not opened.

Advantageous Effect

In the container 1 according to the embodiment of the present invention, a dimension of the sub-doors 3L-1 and 3R-1 in the longitudinal direction (L1) is shorter than a dimension of the sub-doors 3L-2 and 3R-2 in the longitudinal direction (L2), as shown in FIG. 2. According to this arrangement, the sub-doors 3L-1 and 3R-1 can be stored inside the sub-doors 3L-2 and 3R-2 while being folded there, as shown in FIG. 7. In other words, in the case of “L1=L2” or “L1>L2”, an outer frame of the sub-doors 3L-1 and 3R-1 touches an outer wall of the cargo chamber 5 before the sub-doors 3L-2 and 3R-2 turn sufficiently, at a time when the sub-doors 3L-1, 3R-1, 3L-2, and 3R-2 are folded. As a result, when the sub-doors 3L-1, 3R-1, 3L-2, and 3R-2 are folded, a width of the container 1 increases so that, unfavorably, a working space for loading/unloading a cargo to/from the container 1 is widely occupied. FIG. 8 shows such conditions as a comparative example. In the example shown in FIG. 8, the sub-doors 30R-1 and 3R-2 included in a lateral face door 30 are sized in the same. In this case, the sub-door 30R-1 touches a side wall of the cargo chamber 5 before the sub-door 3R-2 turn sufficiently. On the other hand, in the case of “L1<L2” as shown in FIG. 7, the outer frame of the sub-doors 3L-1 and 3R-1 does not touch the outer wall of the cargo chamber 5 even if the sub-doors 3L-2 and 3R-2 turn sufficiently, at a time when the sub-doors 3L-1, 3R-1, 3L-2, and 3R-2 are folded. As a result, a working space for loading/unloading a cargo to/from the container 1 can be made less.

Moreover, as shown in FIG. 1 and FIG. 2, the cam 76b, the cam guide 71b, the handle receiving part 76b, and the handle rotating part 77b in a lower section of the locking part 7b are provided at a lower area being further outside than an outer frame of the sub-doors 3L-2 and 3R-2. Therefore, the sub-doors 3L-1 and 3R-1, being folded over the sub-doors 3L-2 and 3R-2, can be kept away from interfering with operation of the handle 75b, at a time when the
sub-doors 3L-1, 3R-1, 3L-2, and 3R-2 are folded. FIG. 9 shows such conditions. In FIG. 9, the sub-door 3L-1 is folded into a side of the sub-door 3L-2, and a most part of the locking part 77b hides out in a rear side of the sub-door 3L-1. Even in such a condition, the handle 75b is positioned still lower than the sub-door 3L-1 so that, not hiding out in the rear side of the sub-door 3L-1, the handle 75b can be operated.

Furthermore, the hinges 6a located at the highest section and the lowest section of the sub-doors 3L-2 and 3R-2 make up groups of hinges 60 and 61, in each of which two hinges are placed side by side. According to this arrangement, strength can be increase, being compared to a case of a single piece of the hinge 6a. Moreover, since the groups of hinges 60 and 61 are made up by using a plurality of the same hinges 6a, it is possible to make up the groups of hinges 60 and 61 having higher strength than a single piece of the hinge 6a has, without increasing the number of components. Needless to add, any unit equivalent to the groups of hinges 60 and 61 may be made up and applied by using an element other than the hinges 6a. Furthermore, when the groups of hinges 60 and 61 are applied only to the highest section and the lowest section of the sub-doors 3L-2 and 3R-2, required strength can be maintained by using the minimum required number of hinges 6a.

Other Embodiments

The embodiment of the present invention can be modified without departing from the concept of the present invention. For example, although the groups of hinges 60 and 61 are materialized by placing two hinges 6a side by side, three or more hinges 6a may be arranged side by side. Moreover, although two-fold casement doors in each of the right and left sides; including the sub-doors 3L-1 and 3R-1, and the sub-doors 3L-2 and 3R-2; are provided in the embodiment described above, the number of sub-doors may arbitrarily be changed, such as three-fold doors in each of the right and left sides, or four-fold doors in each of the right and left sides. In such a case, it is preferable that a dimension of each sub-door in the longitudinal direction is made longer in due order, starting from the sub-door that is positioned at a center of the casement-door structure. Moreover, in that case, it is preferable to adopt the locking part 7b for all sub-doors other than the sub-door positioned at the center of the casement-door structure. Alternatively, another arrangement may be adopted in such a way that the sub-doors 3L-1 and 3L-2 are structured as a single door member, and meanwhile the sub-doors 3R-1 and 3R-2 are structured as a single door member; and then each door member is supported by using the groups of hinges 60 and 61. Moreover, although the container 1 is explained above as a 40-ft container compliant with the ISO standard, it may be a container either shorter or longer than the length. Furthermore, a structure of the embodiment described above may be applied even to a container that is not compliant with the ISO standard. In such a case, the vehicle 2 is not limited to an articulated vehicle.

1. A container compliant with the ISO standard comprising at least:
   a cargo chamber where a cargo is loaded;
   a lateral face door including a pair of doors provided at a lateral face of the cargo chamber in a longitudinal direction, the lateral face door performing casement-door motion in a horizontal direction from a vicinity area around a center of the cargo chamber in the longitudinal direction;
   wherein each of the pair of doors constituting the lateral face door includes: a first door member at a side closer to the center of the cargo chamber, and a second door member fit to the lateral face of the cargo chamber so as to be rotatable by the intermediary of a first hinge, and a dimension of the first door member in the longitudinal direction is shorter than a dimension of the second door member in the longitudinal direction, the second door member supporting the first door member so as to be rotatable by the intermediary of a second hinge.

2. The container according to claim 1,
   wherein, the container includes locking means for locking the first door member and the second door member to the lateral face under conditions where the lateral face door is in a closed condition;
   the locking means has a manual steering unit; and
   the manual steering unit of the locking means, which the second door member has, is provided at a lower area being further outside than an outer frame of the second door member.

3. The container according to claim 1,
   wherein, the first hinge being provided in plurality, the plurality of first hinges are placed at a vertical direction perpendicular to the longitudinal direction of the cargo chamber, and at least at a highest section and a lowest section, two or more of the first hinges are placed side by side at each section.