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(54) **TELESCOPIC SHIPPING CONTAINER**

(57) The invention relates to a telescopic shipping container (1) transformable between a reduced configuration having reduced height and an erected configuration, the container (1) comprising a top segment (3) and a bottom segment (2), wherein the container bottom segment (2) comprises a rigid base panel (4) having four corner fittings (5) and the container top segment (3) comprises a rigid roof panel (6) having four corner fittings (7), the container (1) comprising two opposite side panels (9), wherein each side panel (9) comprises a top section (10) rigidly connected to the roof panel (6) and constitutes part of the container top segment (3) and a bottom section (11) rigidly connected to the base panel (4) and constitutes part of the container bottom segment (2). The container (1) is characterized in that the container (1) comprises at least four hinged girder assemblies (15), wherein each girder assembly (15) comprises an upper end pivotably connected to the container top segment (3) and a lower end pivotably connected to the container bottom segment (2), the girder assemblies (15) being in upright position and supporting the container top segment (3) when the container (1) is in the erected configuration.

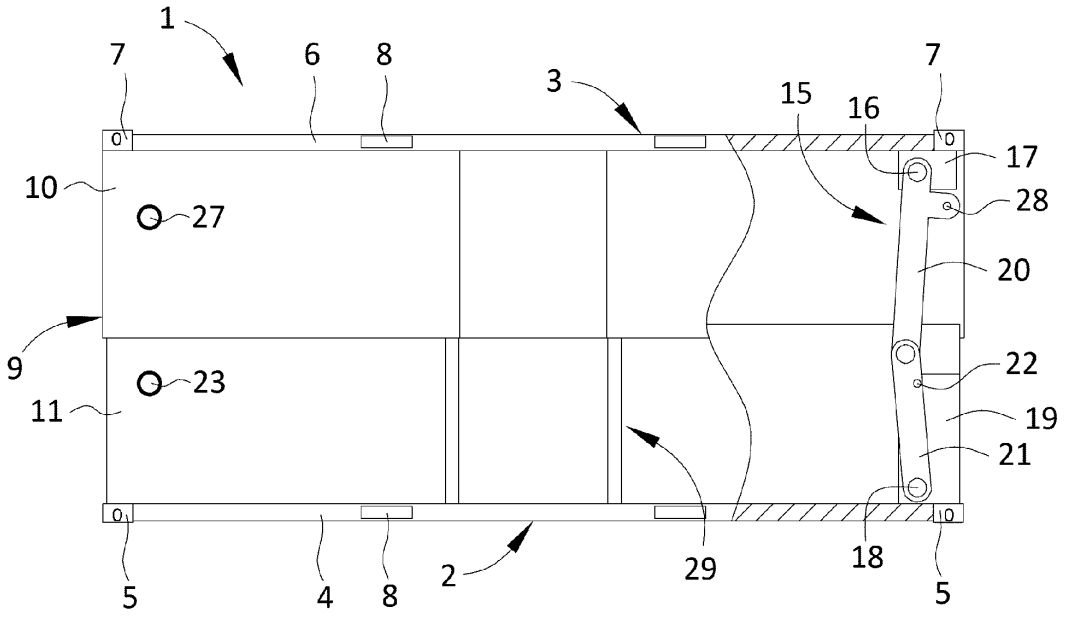


Fig. 1

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## Description

### Technical field of the Invention

**[0001]** The present invention relates generally to the field of shipping containers, also known as sea containers, freight containers, cargo containers, etc. Such containers are designed to meet standardized transporting, lifting and stacking requirements, i.e. they are designed to be conveniently moved from one mode of transport to another and thereby eliminating the need to unload the cargo from the first mode of transport and load the cargo to another mode of transport. Virtually the entire global shipping container market has adapted the standard of the International Organization for Standardization (ISO).

**[0002]** Further, the present invention relates specifically to the field of shipping containers that are transformable between a reduced configuration and an erected configuration, i.e. known as telescopic, foldable or collapsible shipping container, such that each container occupy less volumetric footprint and more containers may be transported together when the container is in the reduced configuration. The container comprises a top segment and a bottom segment, wherein the container bottom segment comprises a rigid base panel having four corner fittings and the container top segment comprises a rigid roof panel having four corner fittings. The container also comprises two opposite side panels, wherein each side panel comprises a top section rigidly connected to the roof panel and constitutes part of the container top segment and comprises a bottom section rigidly connected to the base panel and constitutes part of the container bottom segment.

### Background of the Invention

**[0003]** It is also known to use collapsible shipping containers as shelters, temporary housing or other temporary buildings, for instance at places suffering from weather disasters in order to provide temporary shelter/houses for the suffering people, at music festivals to provide a better alternative to tents, at sport events to provide headquarter for the sport event management, at temporary military base camps to provide headquarter and troop-rooms, etc. These containers may be reused many times at different locations.

**[0004]** One example is disclosed in US 2014/0263306, wherein the container has a collapsed configuration for transport and an erected configuration when in use. This container is designed such that each side panel has a top element hinged to the roof panel and has a bottom element hinged to the base panel and the top element and the bottom element are also hinged to each other, thereby the side panels will become double folded into the interior of the container when the container is in the collapsed configuration. Thereto the front-end panel and the back-end panel, together with the corner posts belonging to them, are hinged to the base panel and are also folded into the interior of the container when the container is in the collapsed configuration. Thus, when the container is in the collapsed configuration, the roof panel is lowered and secured to the base panel and virtually the entire interior of the collapsed container is filled with the end panels and side panels. Thus, the collapsible container may not carry any other cargo, furniture, fixtures, etc. when in the collapsed configuration. Thereby, any furniture, fixtures, etc. need to be separately transported in parallel to the collapsible container.

**[0005]** Thus, there is a need to provide a shipping container that fulfil all regulations/standards in the erected configuration and in the reduced configuration, and that is transformable between a reduced configuration and an erected configuration, and that is able to carry all the necessary cargo, equipment, furniture, fixtures, etc. needed when the container is used in the erected configuration also when used/transported in the reduced configuration.

### Object of the Invention

**[0006]** The present invention aims at obviating the aforementioned disadvantages and failings of previously known containers that are transformable between a reduced configuration and an erected configuration, and at providing an improved container. A primary object of the present invention is to provide an improved container of the initially defined type that may carry all the necessary cargo, equipment, furniture, fixtures, etc. needed when the container is used in the erected configuration also when transported in the reduced configuration. It is another object of the present invention to provide a container, which is weatherproof both in the reduced configuration and in the erected configuration.

**[0007]** It is yet another object of the present invention to provide a container which may be lifted and stacked both in the reduced configuration and in the erected configuration. It is also an object of the present invention to provide a container that can be transformed between the erected configuration and the reduced configuration multiple times.

**[0008]** It is another object of the present invention to provide a container which is transformed between the reduced configuration and the erected configuration, and vice versa, using the crane that is used for lifting the container from the truck, the railway-wagon, etc. It is yet another object of the present invention to provide a container wherein a maximum mutual displacement between the top segment and the bottom segment is guaranteed.

### Summary of the Invention

**[0009]** According to the invention at least the primary object is attained by means of the initially defined telescopic shipping container having the features defined in the independent claim. Preferred embodiments of the present invention are further defined in the dependent

claims.

**[0010]** According to the present invention, there is provided a telescopic container of the initially defined type, which is characterized in that the container comprises at least four hinged girder assemblies, wherein each girder assembly comprises an upper end pivotably connected to the container top segment and a lower end pivotably connected to the container bottom segment, the girder assemblies being in upright position and supporting the container top segment when the container is in the erected configuration.

**[0011]** Thus, the present invention is based on the insight that the telescopic container is made up of two main components/segments, i.e. a male container half comprising the base panel and a female container half comprising the roof panel, wherein when the container is in the reduced configuration the female container half is lowered over the male container half leaving enough floor area and interior volume to carry all the necessary cargo, equipment, furniture, fixtures, etc. needed when the container is used in the erected configuration also when transported in the reduced configuration. Thereto, the present invention is based on the insight that the container is subject to extreme and tough handling and thereby requires a reliable design/structure adapted to stand such handling without jeopardizing the transformability over time.

**[0012]** According to various embodiments of the present invention, the girder assemblies are secured in the upright position when the container is in the erected configuration, in order to prevent mutual displacement between the container top segment and the container bottom segment when the container is in the erected configuration. Thereby, when the girder assemblies are in the upright position and carries the entire load of the container top segment, the girder assemblies as such are prevented from departing from their upright position.

**[0013]** According to various embodiments of the present invention, the girder assemblies are secured in a folded position when the container is in the reduced configuration, in order to prevent mutual displacement between the container top segment and the container bottom segment when the container is in the reduced configuration. Thereby, when the girder assemblies are in the folded position, the girder assemblies as such are prevented from departing from their folded position and the container may be lifted in the container top segment and still remain in the reduced configuration.

**[0014]** According to various embodiments of the present invention, each side panel comprises a center guide assembly extending between the roof panel and the base panel at the center region of the container. Thereby the container is prevented from jamming/wedging during the transformations between the reduced configuration and the erected configuration, especially when the ground is not perfectly horizontal.

**[0015]** According to various embodiments of the present invention, the container in the reduced configuration has a reduced height equal to half the height of a standard shipping container so that two containers in the reduced configuration stacked one on top of the other occupy the same volumetric footprint as one standard shipping container.

**[0016]** Further advantages with and features of the invention will be apparent from the other dependent claims as well as from the following detailed description of preferred embodiments.

## Brief description of the drawings

**[0017]** A more complete understanding of the above-mentioned and other features and advantages of the present invention will be apparent from the following detailed description of preferred embodiments in conjunction with the appended drawings, wherein:

- Fig. 1 is a schematic illustration disclosing a side view of the inventive telescopic shipping container in the erected configuration, partly in cross section disclosing a hinged girder assembly in upright position,
- Fig. 2 is a schematic illustration disclosing a side view of the inventive telescopic shipping container in the reduced configuration, partly in cross section disclosing the hinged girder assembly in folded position,
- Fig. 3 is a schematic illustration disclosing the side view of the inventive telescopic shipping container according to figure 2, wherein the hinged girder assembly is removed,
- Fig. 4 is a schematic illustration disclosing the container top segment in perspective view from below having the front-end to the left and the back-end to the right,
- Fig. 5 is a schematic illustration disclosing the container bottom segment in perspective view from above having the front-end to the left and the back-end to the right,
- Fig. 6 is a schematic illustration disclosing one embodiment of a front-end panel of the telescopic shipping container in the erected configuration,
- Fig. 7 is a schematic illustration disclosing one embodiment of a back-end panel of the telescopic shipping container in the erected configuration,
- Fig. 8 is a schematic illustration disclosing the front-end panel according to figure 6, wherein the container is in the reduced configuration,
- Fig. 9 is a schematic illustration disclosing the back-end panel according to figure 7, wherein the container is in the reduced configuration,
- Fig. 10 is a schematic illustration disclosing a cross sectional side view of the container according to figures 6 and 8, wherein the container is in the erected configuration,

Fig. 11 is a schematic illustration disclosing another embodiment of a front-end panel of the telescopic shipping container in the erected configuration, and

Fig. 12 is a schematic illustration disclosing the front-end panel according to figure 11, wherein the container is in the reduced configuration.

Detailed description of preferred embodiments of the invention

**[0018]** The present invention relates to a telescopic shipping container, generally designated 1, that is transformable between an erected configuration and a reduced configuration, i.e. a configuration having reduced height. The reduced configuration is preferred when the container 1 is handled, transported, stored, stacked, etc. and the erected configuration is preferably only used when the container 1 is in use. The container 1 shall be construed to be capable of being handled without any permanent deformation when lifted in conventional manner, and shall comply with the requirements of the CSC (Convention for Safe Containers) and applicable ISO standards.

**[0019]** The interior of the container 1 may be pre-equipped with electric wiring including lamps, power sockets, etc. and the container 1 may externally comprise a male contact for connecting the internal electric wiring to the power mains, to an electric generator, to solar cells located on top of the container 1, etc., i.e. the container 1 may be prepared for being plugged-in. Thereto the interior of the container 1 may be pre-equipped with furniture, such as beds, tables, chairs, storage cabinets, water closet and sink to be connected to drain and water mains, etc. It is important that the furniture shall not obstruct the container 1 to reach the reduced configuration.

**[0020]** The container 1 comprises two major components, reference is initially made to figures 1-3 disclosing an illustrative embodiment of the inventive container 1 in the erected configuration and reduced/collapsed configuration. The two components are constituted by a bottom/male container half 2, i.e. bottom segment, and a top/female container half 3, i.e. top segment.

**[0021]** The container bottom segment 2 comprises a rigid base panel 4 having four base corner fittings 5, and the container top segment 3 comprises a rigid roof panel 6 having four roof corner fittings 7. The container 1 comprises four corners, wherein each corner extends between a roof corner fitting 7 and a base corner fitting 5. The container 1 lacks weight carrying corner posts, but the corner posts are configured to provide structural stability/strength to each of the top segment 3 and bottom segment 2 and to provide guiding during transformation between the erected configuration and reduced configuration.

**[0022]** Preferably, the roof panel 6 and/or the base panel 4 comprise insulation, and at least the outer layer of the base panel 4 and the roof panel 6 is preferably made of metal. The inner layer of the base panel 4 may be constituted by a wooden/plastic/metal floor. The base panel 4 and/or the roof panel 6 may be equipped with forklift fittings 8 configured for being lifted by means of a forklift, preferably in conformance with ISO standards. The forklift fittings 8 comprise suitable drain/rinse holes.

**[0023]** The base corner fittings 5 and the roof corner fittings 7 are preferably standardized corner fittings designed in conformance with ISO 1161. Thereby the container 1 may be lifted at the roof corner fittings 7 by means of spreaders fitted with hooks, shackles, twistlocks, etc. and be lifted at the base corner fittings 5 using slings with terminal fittings, hooks or equivalent. The container 1 may also be transported and secured by means of twistlocks or equivalent at the base corner fittings 5 and/or the roof corner fittings 7. The eight corner fittings, i.e. the four base corner fittings 5 and the four roof corner fittings 7, together define the outer boundaries of the volumetric footprint of the container 1. Thus, when placing multiple containers 1 side by side and/or one on top of the other, the corner fittings of adjacent containers 1 will contact each other. The corner fittings are made of metal. The container 1 may also comprise additional lifting shackles or the like, adjacent the roof corner fittings 7.

**[0024]** The container 1 comprises wall panels extending between the roof panel 6 and the base panel 4. Preferably, the wall panels comprise insulation, and at least the outer layer of the wall panels is preferably made of metal.

**[0025]** The container 1 comprises two opposite side panels 9, wherein each side panel 9 comprises a top section 10 rigidly connected to the roof panel 6 and constitutes part of the container top segment 3 and comprises a bottom section 11 rigidly connected to the base panel 4 and constitutes part of the container bottom segment 2. According to various embodiments, the top section 10 and the bottom section 11 of each side panel 9 are in telescopic engagement with each other. The top section 10 is preferably located outside the bottom section 11, i.e. the bottom section 11 is more or less entirely covered by the top section 10 when the container 1 is in the reduced configuration.

**[0026]** According to various embodiments, the container 1 has an overall elongated shape, wherein the side panels 9 are longer than the width of the container 1. However, the side panels 9 may have equal length as the width of the container 1, or the width of the container 1 may be wider than the length of the side panels 9. The width and length of the container 1 is preferably in conformance with standard shipping containers, i.e. ISO standard, such as 20-feet, 40-feet, etc.

**[0027]** In addition to the side panels 9, the container 1 also comprises a front-end panel 12 (see figure 6) and a back-end panel 13 (see figure 7) located opposite the front-end panel 12. The front-end panel 12 and the back-end panel 13 extend between the opposite side panels 9, i.e. the wall panels of the container 1 meet at the corners/corner posts of the container 1. Part of the side panel

9 and/or the adjoining end panel comprise a corner post assembly at the corner of the container 1.

**[0028]** According to various embodiments, each corner post assembly comprises a top element and a bottom element, wherein the top element is rigidly connected to the roof panel 6 and the bottom element is rigidly connected to the base panel 4. Each corner post has a retractable/extendable configuration, retracted state when the container 1 is in the reduced configuration and extended state when the container 1 is in the erected configuration. The top element and the bottom element of the corner post are arranged in telescopic engagement with each other, i.e. the top element and the bottom element are displaceable in the axial extension in relation to each other between the retracted state and the extended state. According to various embodiments, the corner posts or the corners of the container 1 comprise rollers, low-friction plates or equivalent corner guide assemblies 14 located at the interface between the top segment 3 and the bottom segment 2, in order to prevent jamming/wedging during hoisting and lowering, especially when the ground is not perfectly horizontal.

**[0029]** According to the invention, the container 1 comprises at least four hinged girder assemblies 15, wherein each girder assembly 15 comprises an upper end pivotably connected to the container top segment 3 and a lower end pivotably connected to the container bottom segment 2. Thus, the upper end of the girder assembly 15 is journaled/pivoted about a pin/pivot 16, wherein the pin/pivot 16 is connected to the container top segment 3. Preferably, the pin/pivot 16 is connected to an ear/plate 17, or the like, that is connected to the roof panel 6 and/or to the top element of the corner post. Thus, the lower end of the girder assembly 15 is journaled/pivoted about a pin/pivot 18, wherein the pin/pivot 18 is connected to the container bottom segment 2. Preferably, the pin/pivot 18 is connected to an ear/plate 19, or the like, that is connected to the base panel 4 and/or to the bottom element of the corner post.

**[0030]** The hinged girder assemblies 15 prevent unwanted disconnection of the container top segment 3 from the container bottom segment 2, when the top segment 3 is lifted from the bottom segment 2 in order to transfer the container 1 from the reduced configuration to the erected configuration. The bottom segment 2 is kept on the ground by its own weight when the top segment 3 is lifted from the reduced configuration. When the girder assemblies 15 has reach the maximum displacement, the container bottom segment 2 will be lifted together with the container top segment 3 via the girder assemblies 15.

**[0031]** The four hinged girder 15 assemblies are distributed/allocated such that the girder assemblies 15 is associated with one corner of the container 1 each, i.e. the individual girder assembly 15 is located near the associated corner of the container 1.

**[0032]** The girder assembly 15 is displaceable between an upright position when the container 1 is in the erected configuration and a folded position when the container 1 is in the reduces configuration. According to various embodiments, the pin/pivot 16 at the upper end of the girder assembly is located vertically above the pin/pivot 18 at the lower end of the girder assembly. When the container 1 is in the erected configuration and the girder assemblies 15 are in the upright position, the girder assemblies 15 support the container top segment 3, i.e. the weight of the container top segment 3 and any extra weight added on top of the container 1. Thereto, the girder assemblies 15 carry the weight of the bottom segment 2, together with cargo, when the container 1 in the erected configuration is lifted from the ground. The girder assembly 15 is preferably prevented from moving/displacing in the transverse direction of the container 1, i.e. along the extension of the pivots 16,18, when the container 1 is in the erected configuration, for instance by the plate 19.

**[0033]** According to the disclosed embodiment, each girder assembly 15 comprises an upper arm 20 and a lower arm 21 pivotably connected to each other. It shall be pointed out that the upper arm 20 and/or lower arm 21 may be constituted by one element each or by parallel elements or a combination thereof.

**[0034]** According to various embodiments, each side panel 9 comprises at least two hinged girder assemblies 15, i.e. one at each end of the side panel 9 associated with the corners of the container 1. One or more extra girder assemblies may be located intermediate the corners of the container 1, especially when the container 1 is long (for instance a 40-feet container).

**[0035]** According to various embodiments, the bottom section 11 of the side panel 9 of the container bottom segment 2 is a double wall construction (see figure 5), wherein the hinged girder assembly 15 is located between the inner and outer wall of said double wall construction in order to protect the girder assembly 15 as such and to secure its operation and also in order to protect operators and cargo located inside the container 1 during transformation of the container 1.

**[0036]** According to various embodiments, the top section 10 of the side panel 9 of the container top segment 3 is a double wall construction, wherein the hinged girder assembly 15 is located between the inner and outer wall of said double wall construction in order to protect the girder assembly 15 as such and to secure its operation and also in order to protect operators and cargo located inside the container 1 during transformation of the container 1. According to other embodiments, the top section 10 of the side panel 9 of the container top segment 3 only comprises an outer wall (see figure 4).

**[0037]** According to various embodiments, the girder assemblies 15 are secured in the upright position when the container 1 is in the erected configuration, in order to prevent mutual displacement between the container top segment 3 and the container bottom segment 2 when the container 1 is in the erected configuration, i.e. preventing the top segment 3 from going down.

**[0038]** Thus, the container 1 comprises a securing el-

ement 22, e.g. a pin, ratchet, etc., that is in engagement with the girder assembly 15 and the container bottom segment 2 in order to prevent displacement of the girder assembly 15 from the upright position. The securing element 22 is preferably in engagement with the girder assembly 15 and the ear/plate 19 that is connected to the base panel 4 and/or to the bottom element of the corner post. The securing element 22 is according to various embodiments maneuverable/accessible from the outside of the container 1 through an opening 23 in the bottom section 11 of the side panel 9 of the container bottom segment 2. The opening 23 is preferably covered by a lid or the like. According to the disclosed embodiment the securing element 22 in the shape of a pin is in engagement with a hole 24 in the girder assembly 15 and with a hole 25 in the ear/plate 19. When the container 1 is transformed into the erected configuration, i.e. when the top segment 3 is lifted max in relation to the bottom segment 2 and the girder assembly 15 is in the upright position, the securing element 22 is easily engaged/disengaged. It shall be pointed out that it is the girder assemblies 15 as such when located in the upright position that support the weight of the container top segment 3 and any additional weight. It shall be noted that the ear/plate 19 may divided into two separate members, i.e. a lower member for pivotably connection of the lower end of the girder assembly 15 and an upper member for engagement with the securing element 22.

**[0039]** According to various embodiments, the angel between the upper arm 20 and the lower arm 21 of the girder assembly 15 is less than 180 degrees when the girder assembly is in the upright position and equal to or more than 160 degrees, preferably equal to or more than 170 degrees. Thereby, when not locked in the upright position, the girder assembly 15 will automatically fold when the container top segment 3 is lowered. According to various embodiments the girder assembly 15 is biased by a spring element from the upright position, such that the girder assembly 15 will automatically fold when the container top segment 3 is lowered. Different combinations are also conceivable.

**[0040]** According to various embodiments, the girder assemblies 15 are secured in the folded position when the container 1 is in the reduced configuration, in order to prevent mutual displacement between the container top segment 3 and the container bottom segment 2 when the container 1 is in the reduced configuration, i.e. preventing the top segment 3 from going up.

**[0041]** Thus, the container 1 comprises a securing element 26, e.g. a pin, ratchet, etc., that is in engagement with the girder assembly 15 and the container bottom segment 2 in order to prevent displacement of the girder assembly 15 from the folded position. The securing element 26 is preferably in engagement with the girder assembly 15 and the ear/plate 19 that is connected to the base panel 4 and/or to the bottom element of the corner post. The securing element 26 is according to various embodiments maneuverable/accessible from the outside of the container 1 through an opening 27 in the top section 10 of the side panel 9 of the container top segment 3. The opening 27 is preferably covered by a lid or the like. Preferably the opening 27 in the top section 10 is aligned with the opening 23 in the bottom section 11 when the container 1 is in the reduced configuration.

**[0042]** According to the disclosed embodiment a securing element 26 in the shape of a pin is in engagement with a hole 28 in the girder assembly 15 and with the hole 25 in the ear/plate 19. When the container 1 is transformed into the reduced configuration, i.e. when the top segment 3 is lowered max in relation to the bottom segment 2 and the girder assembly 15 is in the folded position, the securing element 26 is easily engaged/disengaged. When the securing element 26 is in engagement, the container bottom segment 2 will follow the container top segment 3 when the top segment 3 is lifted, e.g. in the roof corner fittings 7, i.e. the container 1 will remain in the reduced configuration.

**[0043]** It shall be pointed out that if the securing element 26 is not present, the container 1 may be lifted in the reduced configuration by lifting in the container bottom segment 2, e.g. in the base corner fittings 5 or the forklift fittings 8 in the container bottom segment 2.

**[0044]** Reference is now made to figures 4 and 5, disclosing schematic perspective views of the container top segment 3 and the container bottom segment 2, respectively. Figure 4 is seen from below and figure 5 is seen from above.

**[0045]** According to various embodiments each side panel 9 comprises a center guide assembly, generally designated 29, extending between the roof panel 6 and the base panel 4 at the center region of the container 1, in order to prevent jamming/wedging during hoisting and lowering. The center guide assembly 29, according to the disclosed embodiment, comprises a male element 30 of the top segment 3 cooperating with a female element 31 of the bottom segment 2, i.e. the male element 30 and the female element 31 admit mutual displacement in the vertical direction but prevents mutual tilting and mutual displacement in the horizontal directions. The center guide assembly 29 preferably comprise rollers, low-friction plates or equivalent elements located at the interface between the top segment 3 and the bottom segment 2.

**[0046]** Reference is now made to figures 6-10, disclosing various embodiments of the container 1. According to figures 6 and 8, at least a part of at least the front-end panel 12 is constituted by a door assembly 32. Reference is also made to figure 10, disclosing a cross section of the container 1 in the erected position and disclosing the door assembly 32 in a folded state, i.e. more or less horizontal, as well as in a standing state. The door assembly 32 is pivoted between the folded state and the standing state, and according to the disclosed embodiment the door assembly 32 is pivoted about a hinge arranged at the lower end of the door assembly 32. The door assembly 32 is preferably manually pivoted between the folded

state and the standing state, e.g. by hand or by means of a pulley system. However, it is also conceivable that the container 1 comprises a suitable electrical motor in order to pivot the door assembly 32 or a mechanical linkage arrangement providing automatic pivot of the door assembly 32 when the top segment 3 is lowered and hoisted. The door assembly 32 comprises a door frame 33 and a door leaf 34, wherein the door leaf 34 is hinged to the door frame 33.

**[0047]** According to an alternative embodiment, the door assembly 32 is pivoted about a hinge arranged at the upper end of the door assembly 32, thereby the door assembly 32 may be pivoted from the standing state to the folded state, i.e. more or less horizontal, automatically or by means of a pulley system lifting the lower edge of the door assembly 32 before the top segment 3 is lowered.

**[0048]** After the door assembly 32 is pivoted from the folded state to the standing state, and vice versa, it is preferably secured/locked in place using sliding bolts or equivalent.

**[0049]** The front-end panel 12 comprises a top section 35 rigidly connected to the roof panel 6 and comprises a bottom section 36 rigidly connected to the base panel 4. Thus, the door assembly 32 may extend all the way between the roof panel 6 and the base panel 4 and may be located adjacent one of the corner posts. According to the disclosed embodiment the top section 35 of the front-end panel 12 is rigidly connected to the roof panel 6 and to the top elements of the two adjoining corner posts, and according to the disclosed embodiment the bottom section 36 comprises a first part that is rigidly connected to the base panel 4 and to the bottom element of one of the corner posts and a second part that is rigidly connected to the base panel 4 and to the bottom element of the other corner post. Thus, the front-end panel 12 comprises an opening for the door assembly 32 that is distanced from both corner posts and from the roof panel 6. Thus, the top section 35 of the front-end panel 12 is part of the top segment 3 and the bottom section 36 of the front-end panel 12 is part of the bottom segment 2. The top section 35 is located on the outside of the bottom section 36. When the door assembly 32 is in the standing state it is sealed to both the top section 35 of the front-end panel 12 and the bottom section 36 of the front-end panel 12.

**[0050]** In the disclosed embodiment the front-end panel 12 also comprises a hatch 37 that is used to close the opening in the top section 35 of the front-end panel 12 when the door assembly 32 is in the folded state and the container 1 is in the reduced configuration, in order to prevent rain, snow, dirt, dust, debris, etc. from entering the container 1. The hatch 37 is removed or locked in an open state when the container 1 is in the erected configuration and the door assembly 32 is in the standing state.

**[0051]** According to various alternative embodiments the entire front-end panel 12 is constituted by the door assembly 32, i.e. the door frame 33 occupies the entire area between the roof panel 6 and the base panel 4 and between the two corner posts.

**[0052]** According to figures 7 and 9 the back-end panel 13 comprises a top section 38 rigidly connected to the roof panel 6 and to the top elements of the two adjoining corner posts and having a bottom section 39 rigidly connected to the base panel 4 and to the bottom elements of said two adjoining corner posts. Thus, the top section 38 of the back-end panel 13 is part of the top segment 3 and the bottom section 39 of the back-end panel 13 is part of the bottom segment 2. The top section 38 is located on the outside of the bottom section 39, in telescopic configuration.

**[0053]** In the disclosed embodiment the top section 38 of the back-end panel 13 also comprises two windows 40, but it shall be pointed out that one or more of the wall panels may comprise one or more windows. It shall also be pointed out that a door assembly 32 may be located in one of the side panels or in the back-end panel, thus the above description of the front-end panel and door assembly 32 is then applicable to all wall panels.

**[0054]** According to various embodiments, at the interface between each pair of top section and bottom section of the wall panels, the container 1 comprises sealing means in order to prevent wind, moisture, dust, etc. from entering the container 1 when the container 1 is in the erected configuration. Preferably, the sealing means is also active when the container 1 is in the reduced configuration. Alternatively, a separate means may be arranged to seal between the base panel 4 and the lower ends of the top sections of the wall panels when the container 1 is in the reduced configuration.

**[0055]** Reference is now made to figures 11 and 12, disclosing a preferred embodiment of the front-end panel 12, which is also applicable to replace the back-end panel 13.

**[0056]** According to various embodiments, the container 1 comprises a front-end panel 12 having at least one hinged door leaf 41, wherein the door leaf 41 comprises a top section 42 pivotably connected to the top section 10 of the adjacent side panel 9 and a bottom section 43 pivotably connected to the bottom section 11 of the adjacent side panel 9. According to the disclosed embodiment the front-end panel 12 comprises two such hinged door leaves 41, one door leaf 41 connected to each side panel 9. The two door leaves 41 engage each other when closed, such that the entire front-end panel is closed. According to various embodiments, the two door leaves 41 comprise interlocking means that engage each other when the door leaves 41 are closed, in order to provide stability to the front-end panel 12 and to the container 1.

**[0057]** The upper end of the top section 42 of the door leaf 41 engages the roof panel 6 when closed and follows the container top segment 3 during hoisting/lowering of the top segment 3. The lower end of the bottom section 43 of the door leaf 41 engages the base panel 4 when closed. Thus, during hoisting/lowering of the top segment 3 the top section 42 and the bottom section 43 of the door leaf 41 are displaced in the vertical direction in relation

to each other.

**[0058]** According to various embodiments, the door leaf 41 comprises an intermediate section 44 that is in telescopic engagement with the top section 42 and/or the bottom section 43 of the door leaf 41. Thus, the top section 42 and the bottom section 42 does not overlap each other when the container 1 is in the reduced configuration, but both appear both when the container is in the reduced configuration and in the erected configuration. When the container 1 is in the reduced configuration, the intermediate section 44 may be located on the inner side of the top section 42 and the bottom section 43, or may be located inside or in-between the top section 42 and the bottom section 43. The intermediate section 44 may comprise several sub-sections that are in telescopic engagement with each other. According to various embodiments, the bottom section 43 is furnished with an inner wall section that extends above the bottom section 43 and is in telescopic engagement with the top section 42 and/or the intermediate section 44. According to various embodiments, the top section 42 is furnished with an inner wall section that extends below the top section 42 and is in telescopic engagement with the bottom section 43 and/or the intermediate section 44. Different combinations thereof are also conceivable.

**[0059]** According to various embodiments, each door leaf 41 comprises at least one locking bar assembly 45 having a telescopic locking bar 46. According to various embodiments each door leaf 41 comprises two locking bar assemblies 45. The locking bar assembly 45 is configured to engage the roof panel 6 and/or the base panel 4, when locked.

**[0060]** The locking bar 46 comprises an upper locking bar 47 that is rotationally journaled to the top section 42 of the door leaf 41 and comprises a cam 48 that is configured to engage a cam retainer 49 at the roof panel 6 upon rotation of the locking bar 46. The locking bar 46 comprises a lower locking bar 50 that is rotationally journaled to the bottom section 43 of the door leaf 41 and comprises a cam 51 that is configured to engage a cam retainer 52 at the base panel 4 upon rotation of the locking bar 46. The locking bar 46 comprises an intermediate locking bar 53, that is in telescopic engagement with the upper locking bar 47 and the lower locking bar 50. The lower locking bar 50 comprises a handle 54 in order to rotate the locking bar 46, in order to engage/disengage the cams and cam retainers. The handle 54 may be secured in a seat 55.

**[0061]** The upper locking bar 47 and the lower locking bar 50 preferably have circular outer cross section, and the intermediate locking bar 53 preferably has polygonal outer cross section. The inner cross section of the upper locking bar 47 and the lower locking bar 50 correspond/mate/engage the outer cross section of the intermediate locking bar 53 in order to transfer rotational movement, i.e. between the lower locking bar 50 and the upper locking bar 47 via the intermediate locking bar 53.

**[0062]** The door leaves 41 may be opened and closed at any time, i.e. when the container 1 is in the reduced configuration, in the erected configuration and therebetween.

**[0063]** It shall be pointed out that the embodiment of the front-end panel 12 disclosed in figures 6, 8 and 10, and/or the back-end panel 13 disclosed in figures 7 and 9, may be combined with the embodiment of the front-end panel disclosed in figures 11 and 12, wherein the latter is arranged outside the former. Thereby the "cargo container door" solution disclosed in figures 11 and 12 fulfil all regulations and the "inner" end panels are only used when the container is in the erected configuration and does not need to fulfil all regulations. During use of the container 1 the door leaves 41 of the front-end panel may be secured in an open state along the outsides of the side panels 9.

**[0064]** The container 1 in the reduced configuration has a reduced height equal to half the height of a standard shipping container so that two containers 1 in the reduced configuration stacked one on top of the other occupy the same volumetric footprint as one standard shipping container. Thereto, the container 1 in the erected configuration has an erected height that is equal to or less than the height of a standard shipping container. According to various embodiments, the container 1 in the reduced configuration has a reduced height equal to the height of a standard shipping container and when erected the erected height is almost equal to the height of two standard shipping containers stacked on top of each other.

**[0065]** The container 1 may also comprise internal walls that comprise a top section rigidly connected to the roof panel 6 and a bottom section rigidly connected to at least the base panel 4, wherein the top section and the bottom section of the internal wall are in telescopic engagement with each other.

**[0066]** The use of the invention. The container 1 is transported/shipped by truck, rail, ship, plane, etc. in the reduced configuration, preferably comprising all equipment that is intended to be used in/at the container 1. When the container 1 reaches the final destination, the container top segment 3 is lifted/hoisted in order to transform the container 1 from the reduced configuration to the erected configuration. The lifting is made by means of the crane of the truck, using slings attached to the roof corner fittings 7 or to the base corner fittings 5 or using a spreader, or by means of a forklift engaging the roof panel 6 at the fittings 8. During the hoisting the girder assemblies 15 will move from the folded position to the upright position. When the top segment 3 reaches the erected configuration, the securing means 22 are activated/attached and thereby the container 1 is secured in the erected configuration. Thus, one operator may unload the container 1 and transform the container 1 from the reduces configuration to the erected (ready to be used) configuration within a few minutes. According to various embodiments, the container 1 may comprise hoisting/lowering means operated by hand or by a motor, such as a rack and pinion or a lift jack.

Feasible modifications of the Invention

**[0067]** The invention is not limited only to the embodiments described above and shown in the drawings, which primarily have an illustrative and exemplifying purpose. This patent application is intended to cover all adjustments and variants of the preferred embodiments described herein, thus the present invention is defined by the wording of the appended claims and the equivalents thereof. Thus, the equipment may be modified in all kinds of ways within the scope of the appended claims.

**[0068]** It shall also be pointed out that all information about/concerning terms such as above, under, upper, lower, etc., shall be interpreted/read having the equipment oriented according to the figures, having the drawings oriented such that the references can be properly read. Thus, such terms only indicates mutual relations in the shown embodiments, which relations may be changed if the inventive equipment is provided with another structure/design.

**[0069]** It shall also be pointed out that even thus it is not explicitly stated that features from a specific embodiment may be combined with features from another embodiment, the combination shall be considered obvious, if the combination is possible.

**[0070]** Throughout this specification and the claims which follows, unless the context requires otherwise, the word "comprise", and variations such as "comprises" or "comprising", will be understood to imply the inclusion of a stated integer or steps or group of integers or steps but not the exclusion of any other integer or step or group of integers or steps.

## Claims

1. A telescopic shipping container (1) transformable between a reduced configuration having reduced height and an erected configuration, the container (1) comprising a top segment (3) and a bottom segment (2), wherein the container bottom segment (2) comprises a rigid base panel (4) having four corner fittings (5) and the container top segment (3) comprises a rigid roof panel (6) having four corner fittings (7), the container (1) comprising two opposite side panels (9), wherein each side panel (9) comprises a top section (10) rigidly connected to the roof panel (6) and constitutes part of the container top segment (3) and a bottom section (11) rigidly connected to the base panel (4) and constitutes part of the container bottom segment (2), **characterized in that** the container (1) comprises at least four hinged girder assemblies (15), wherein each girder assembly (15) comprises an upper end pivotably connected to the container top segment (3) and a lower end pivotably connected to the container bottom segment (2), the girder assemblies (15) being in upright position and supporting the container top segment (3) when the container (1) is in the erected configuration.

2. The telescopic shipping container (1) according to claim 1, wherein each side panel (9) comprises at least two hinged girder assemblies (15).

3. The telescopic shipping container (1) according to claim 1 or 2, wherein the girder assemblies (15) are secured in the upright position when the container (1) is in the erected configuration, in order to prevent mutual displacement between the container top segment (3) and the container bottom segment (2) when the container (1) is in the erected configuration.

4. The telescopic shipping container (1) according to any of claims 1-3, wherein the girder assemblies (15) are secured in a folded position when the container (1) is in the reduced configuration, in order to prevent mutual displacement between the container top segment (3) and the container bottom segment (2) when the container (1) is in the reduced configuration.

5. The telescopic shipping container (1) according to any of claims 1-4, wherein each girder assembly (15) is located adjacent a corner of the container (1).

6. The telescopic shipping container (1) according to any preceding claim, wherein each side panel (9) comprises a center guide assembly (29) extending between the roof panel (6) and the base panel (4) at the center region of the container (1).

7. The telescopic shipping container (1) according to any preceding claim, wherein the container (1) at each corner of the container (1) comprises a corner guide assembly (14) extending between the roof panel (6) and the base panel (4).

8. The telescopic shipping container (1) according to any preceding claim, wherein the top section (10) and the bottom section (11) of each side panel (9) are in telescopic engagement with each other.

9. The telescopic shipping container (1) according to any preceding claim, wherein the container comprises a back-end panel (13) having a top section (38) rigidly connected to the roof panel (6) and constitutes part of the container top segment (3) and a bottom section (39) rigidly connected to the base panel (4) and constitutes part of the container bottom segment (2).

10. The telescopic shipping container () according claim 9, wherein the top section (38) and the bottom section (39) of the back-end panel (13) are in telescopic engagement with each other.

11. The telescopic shipping container (1) according to

any preceding claim, wherein the container (1) comprises a front-end panel (12) having at least one hinged door leaf (41), wherein the door leaf (41) comprises a top section (42) pivotably connected to the top section (10) of the adjacent side panel (9) and a bottom section (43) pivotably connected to the bottom section (11) of the adjacent side panel (9).

**12.** The telescopic shipping container (1) according to claim 11, wherein the door leaf (41) comprises an intermediate section (44) that is in telescopic engagement with the top section (42) and the bottom section (43) of the door leaf (41).

**13.** The telescopic shipping container (1) according to claim 11 or 12, wherein the door leaf (41) comprises at least one locking bar assembly (45) having a telescopic locking bar (46).

**14.** The telescopic shipping container (1) according to any preceding claim, wherein the eight corner fittings together define the outer boundaries of the volumetric footprint of the container (1).

**15.** The telescopic shipping container (1) according to any preceding claim, wherein the container (1) in the reduced configuration has a reduced height equal to half the height of a standard shipping container so that two containers (1) in the reduced configuration stacked one on top of the other occupy the same volumetric footprint as one standard shipping container.

**16.** The telescopic shipping container (1) according to any preceding claim, wherein the container (1) in the erected configuration has an erected height that is equal to or less than the height of a standard shipping container.

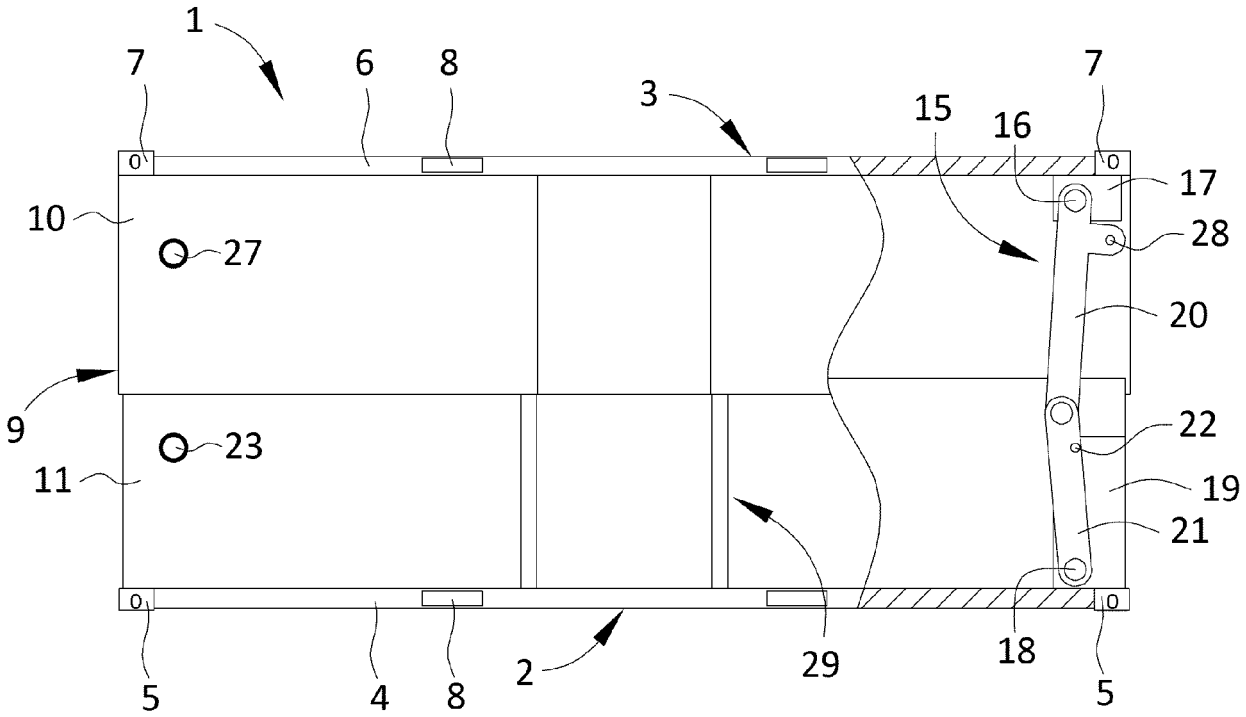
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Fig. 1

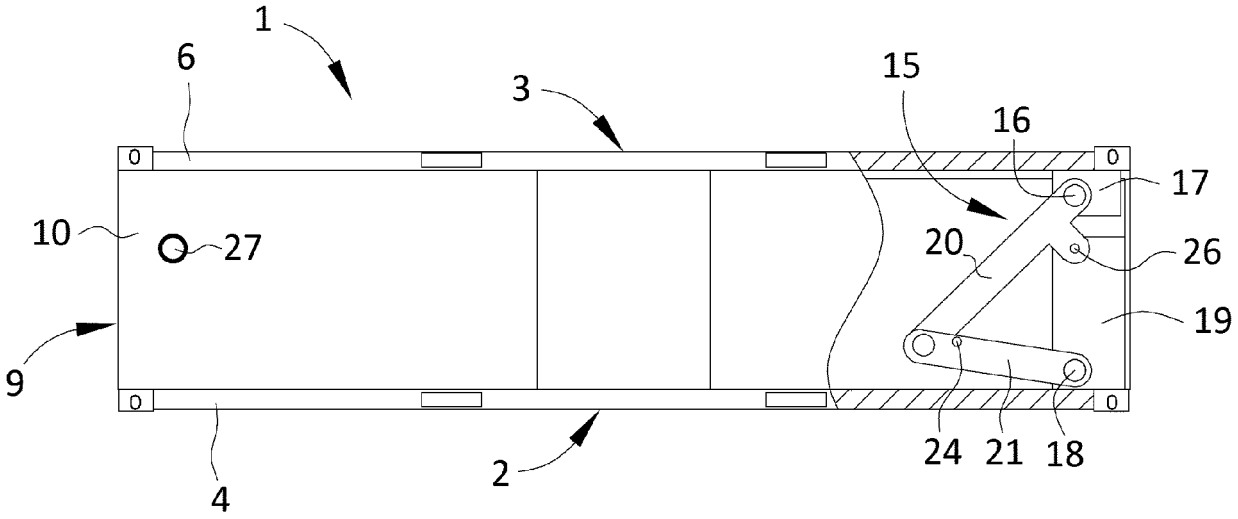
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Fig. 2

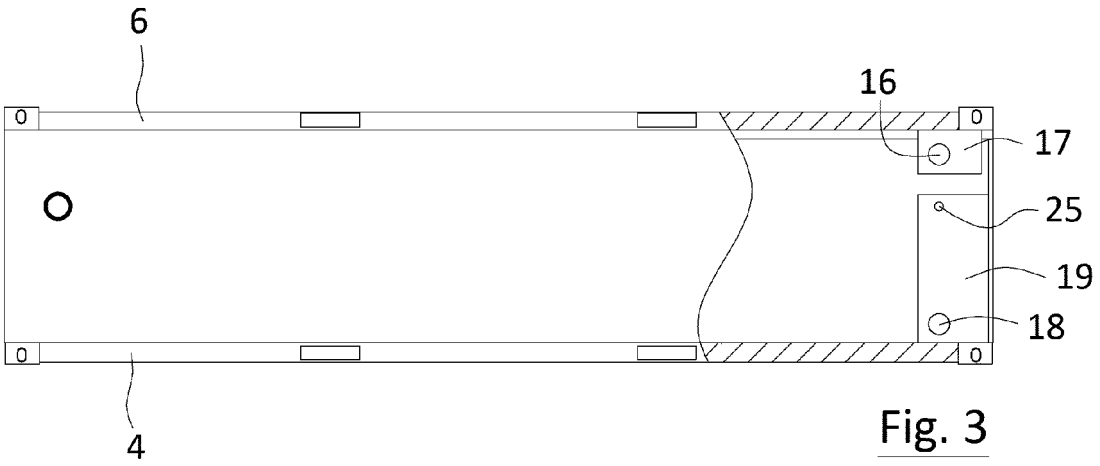


Fig. 3

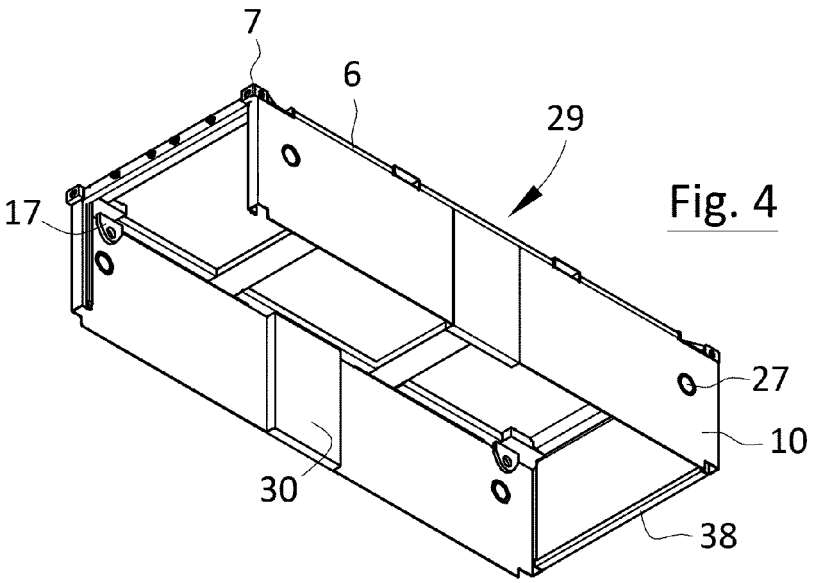


Fig. 4

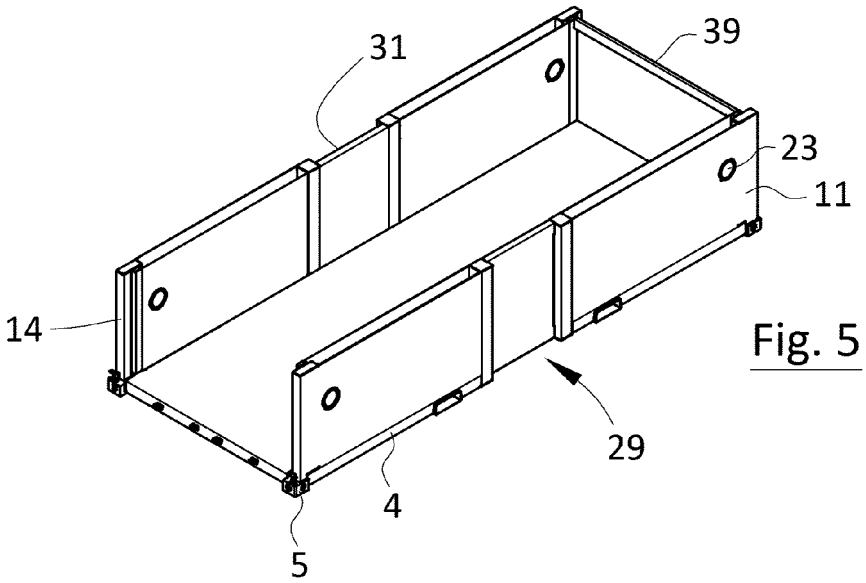


Fig. 5

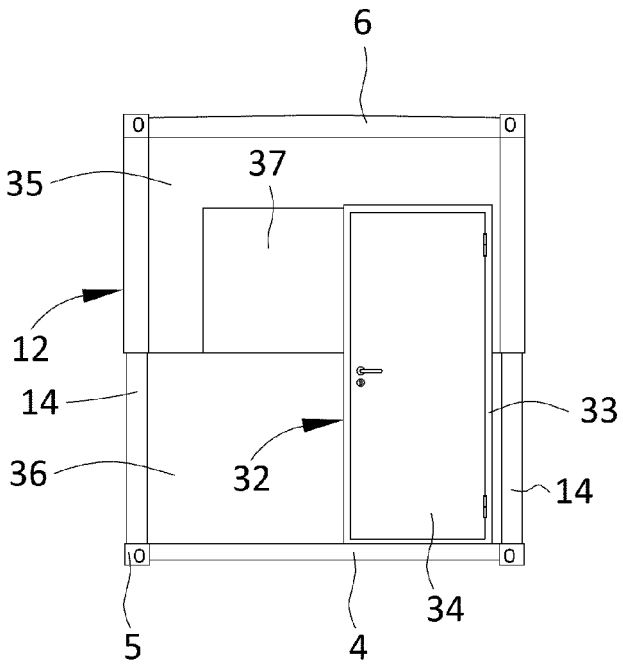


Fig. 6

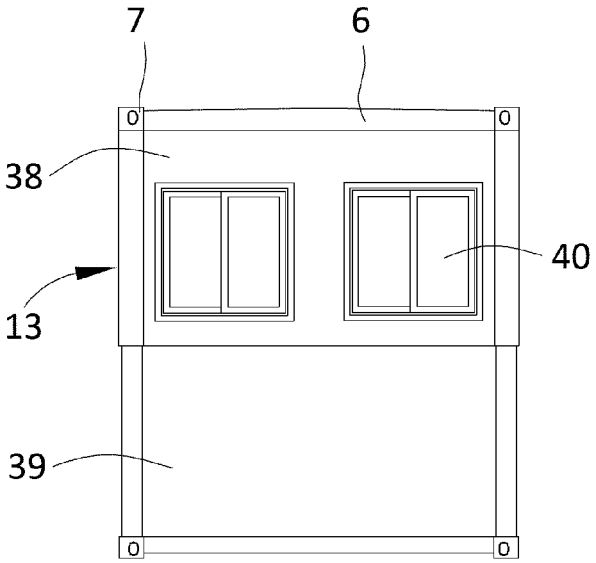


Fig. 7

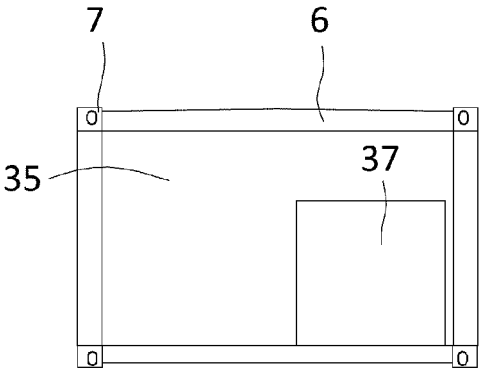


Fig. 8

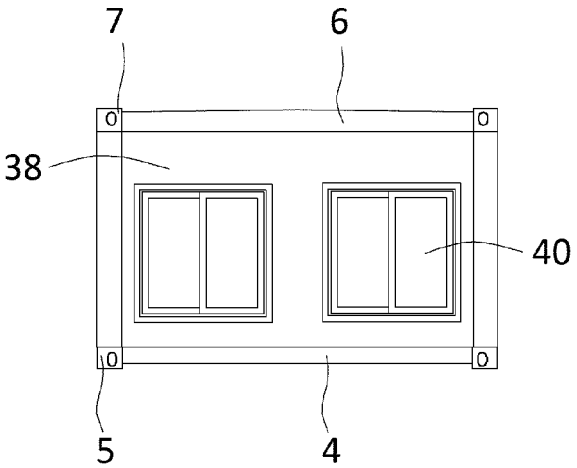


Fig. 9

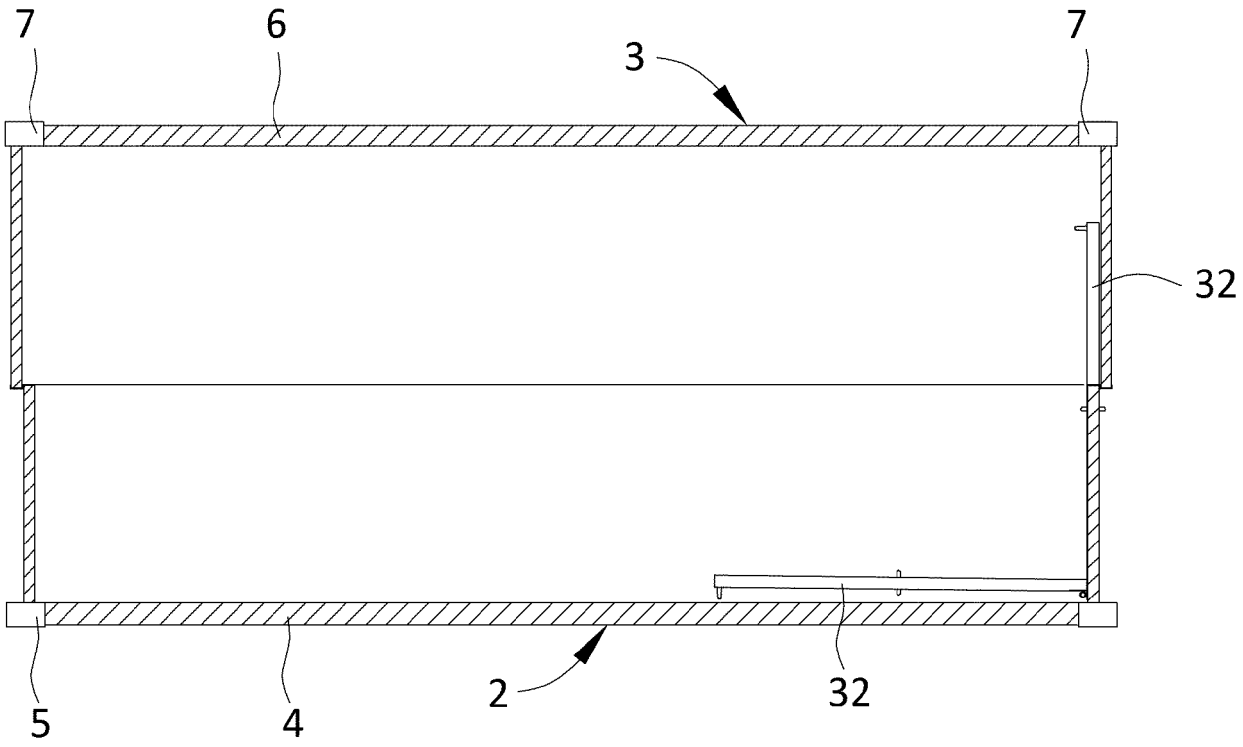


Fig. 10

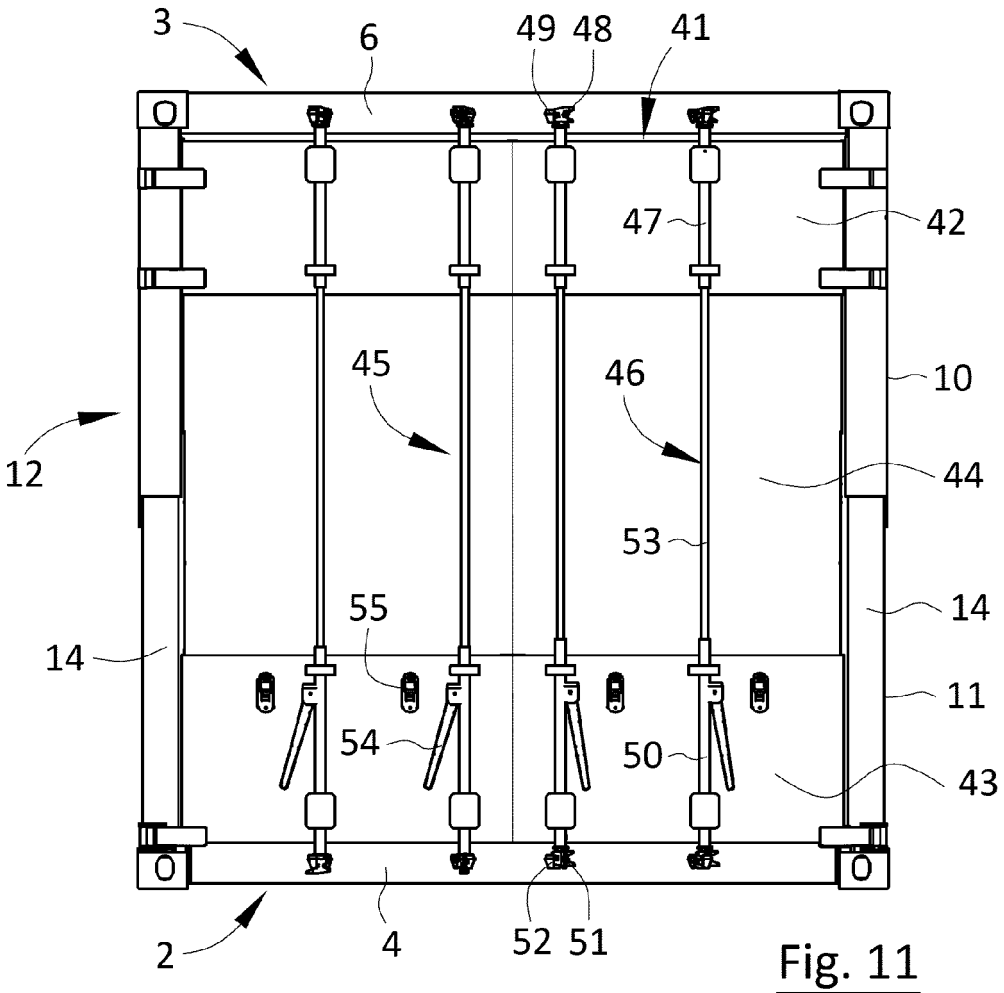
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Fig. 11

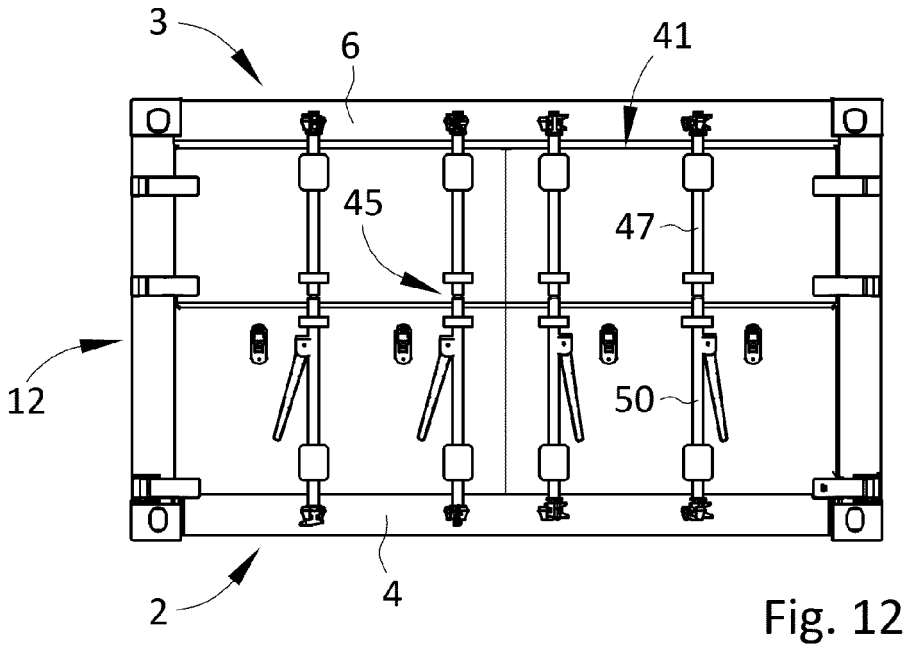
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Fig. 12

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# EUROPEAN SEARCH REPORT

Application Number
EP 21 21 0101

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| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (IPC) |
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| X | WO 2020/059697 A1 (OTA HIDEYUKI [JP]) 26 March 2020 (2020-03-26) * page 4, paragraph 11 - page 5, paragraph 13 * * page 10, paragraph 29 - page 11, paragraph 32 * * page 14, paragraph 44 - page 15, paragraph 47 * * figures 1, 11-13, 18 * | 1-16 | INV. B65D88/00 B65D90/00 E04B1/343 |
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| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| Munich | 21 April 2022 | Piolat, Olivier |

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EPO FORM 1503 03.82 (P04C01)

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