

(19)



(11)

EP 3 741 712 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
25.11.2020 Bulletin 2020/48

(51) Int Cl.:
B65D 88/28 (2006.01) **B65D 88/30** (2006.01)
B65D 90/62 (2006.01)

(21) Application number: **20173485.2**

(22) Date of filing: **07.05.2020**

(84) Designated Contracting States:
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR**
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

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(30) Priority: **21.05.2019 PL 42999019**

(54) HOPPER TYPE SELF UNLOADING CONTAINER WITH SHUTTERS FLOOR

(57) The invention relates to a hopper container, particularly for bulk materials. The hopper container of the invention has a floor (1), a lock (2), a frame (3) and walls. The characteristic feature of the container is that the floor (1) consists of at least one set made of at least two flaps (5), the flaps (5) are pivotally mounted on mounting beams (6), and the flaps (5) are connected from the bot-

tom via pivotal elements (7) to at least one release beam (8), wherein said release beam (8) is connected by its one end to the lock (2), which is connected to an arm (9) seated on an axis (10) that extends along one of the walls, and wherein said lock (2) is separably connected to a locking lever (11) of the lock (2), and a grate (12) is placed above the flaps (5).

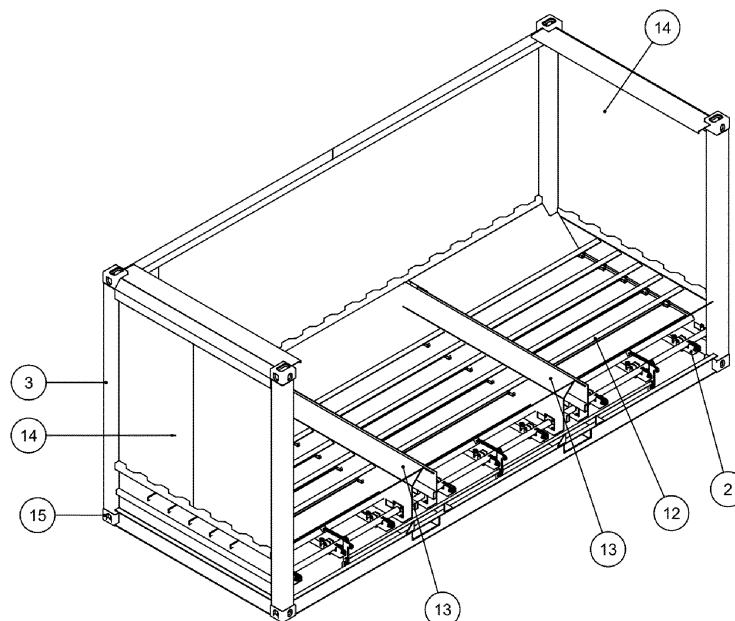


Fig. 1

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Description

[0001] The subject of this invention is a hopper container, particularly for bulk materials. The container according to the invention is an apparatus for transporting all types of bulk materials, especially more valuable materials, as well as agricultural raw materials such as grain, seeds, and also construction materials, minerals, and bulk chemicals. The container is particularly useful for the transport of bulk materials over long distances.

[0002] The prior art reveals many solutions that enable transporting various types of materials, including bulk materials.

[0003] The utility model description No. PL 62107 titled "*Container, in particular for storing wastes*" discloses a container designed mostly for the storage of waste materials, posing some difficulties or hazards while being handled and removed from said container. According to the disclosure, the container has a shape of a cuboid made of metal and is equipped with a prismatic bottom with a rectangular discharge opening at its centre, wherein in a closed position the opening is covered by a pivotal flap. The flap is fixed to the prismatic bottom by way of hinges, and its closed horizontal position is maintained by means of a bolt fixed on a driving shaft, which has a control lever mounted on its end for the flap opening. Upper corners of the container are equipped with handles, while lower corners are equipped with rectangular sockets and handles.

[0004] The description of European Patent EP 2871141 titled "*Container for the transport of bulk materials*" discloses a container for the transport of bulk materials, in particular on container wagons in railway freight transport, comprising a container for receiving the bulk material, with bottom elements arranged like a double-sloping roof and side walls with side flaps, which in the region of their upper longitudinal edges are fixed on the side walls and are pivotable outwards to an open position, wherein the container has a substantially square construction on a steel frame with two upper side members, two lower side members, upper and lower cross members, and angle rafters, and wherein the container is suspended on the upper side members and cross members, while its bottom elements are supported from the outside on the lower side members. The characteristic feature of the container is that the bottom elements extend above the lower side members and transform into sliding plates, which are made as one piece with the bottom elements, are inclined to the vertical at a smaller angle (β) than the bottom elements, and with the side flaps closed their ends are located accurately or placed still within the largest container width.

[0005] Another document, namely US patent application No. 2018/0016095 A1, titled "*Apparatus for the transport and storage of proppant*" discloses an apparatus for the transport and storage of proppant which has a container with a top wall, a pair of end walls and a pair of side walls. The side walls extend between the pair of end

walls. The container also has a bottom discharge opening. It is additionally disclosed that the container comprises a funnel extending from the pair of side walls and from the pair of end walls toward the bottom discharge opening. The funnel has sides extending in an angle larger than 25° with respect to horizontal. The funnel comprises a pair of side plates extending respectively from the pair of side walls toward the bottom discharge opening and a pair of end plates extending respectively from the pair of end walls toward the bottom discharge opening. Each of the side plates and the end plates is made of stainless steel.

[0006] The utility model description No. PL 057366 titled "*Container for the transport of bulk materials*" discloses a container for the transport of bulk materials which has a load-carrying construction made of cylinder profile sections that form the edges of a prism which constitutes the proper container. Surfaces between the edges are filled with steel sheets, building up walls of the container. To the upper edges of the steel sheets forming the walls there are welded side walls of a truncated pyramid and in the apex section of the said pyramid there is an opening with a latch. The opening is one time an inlet and another time a discharge opening, depending on the position of the opening relative to the base of the container. On the side walls of the container, at appropriate heights are mounted handles for hanging that enable turning over and discharging the container.

[0007] The subject of the international patent application No. PCT/US2016/013052 titled "*Intermodal bulk aggregate container*" is a container system for containing and discharging particulate, granular, or other flowable material, comprising a frame and at least one hopper having a plurality of discharge elements (funnels), each funnel having tapered walls and a bottom section having a discharge opening, the funnel and associated discharge openings being arranged in at least two rows, the walls of each funnel having an angle at least as large as the critical angle of the material to be held in the at least one hopper. The described container has a valve associated with each funnel proximate to the discharge opening, and the container is configured so that the material is discharged substantially by gravity from the bottom via the discharge openings.

[0008] Based on the existing prior art, it is possible to state that the field of container transport presently lacks in solutions that - due to their construction - would provide less manipulation of bulk freight and, therefore, would shorten the logistic process, which now requires a plurality of transshipment activities, between the place of loading (e.g. a mine) and the place of unloading (e.g. a transshipment port). In addition, the prior art lacks in solutions that would warrant the lack of need to incur expenditures on the construction of covered storage areas, obtaining potential discounts on access to railway infrastructure due to the intermodal nature of transport, environmental benefits (by avoiding additional potential dusting points), and efficient reloading process.

[0009] Therefore, the Applicant has developed a solution that eliminates the deficiencies and imperfections resulting from the state of the art.

[0010] The essence of the invention is a hopper container, particularly for bulk materials, which has a floor, a lock, and a frame in which walls are fixed, wherein two walls have in their lower section two oblique plates leaning toward the floor. The characteristic feature of the container according to the invention is that the floor consists of at least one set made of at least two flaps. The flaps are pivotally mounted on mounting beams, and the flaps are connected from the bottom *via* pivotal elements to at least one release beam. The release beam is connected, by its one end, to the lock. The lock is connected to an arm placed on an axis extending along one of the walls, and the lock is separably connected to a locking lever of the lock. A grate is placed above the flaps. Preferably, the grate is made of steel elements. Particularly preferably, the steel elements are plates of metal sheet, profile sections, pipes, or mesh. Preferably, the sets of pivotally mounted flaps, forming the floor, are separated by at least one separating element. Preferably, the frame is made of steel profile sections. Preferably, the walls include two shorter frontal walls and two longer side walls. More preferably, two shorter frontal walls and two longer side walls are convex. Preferably, the locking lever of the lock is connected to a release cord or a remotely controlled actuator. Preferably, the frame includes container corner fittings for stacking containers on top of one another. Optionally, on the frame, above the walls, there are profiled chute elements. Preferably, the container is made of weathering steel or wear-resistant steel or S690 steel or S700 steel or S960 steel. In addition, the container is dimensioned to meet the requirements of the International Convention for Safe Containers (CSC). The container according to the invention is used in intermodal transport.

[0011] The principle of operation of the container according to the invention is as follows. In the first step, i.e. before the bulk material is loaded into the container, the employee closes the flaps in the container floor. Closing the flaps is performed by turning, in the proper direction, the axis extending along one of the walls of the container. The axis can be turned by means of an additional lever, which is attached by the employee for the time of closing the flaps. The rotary movement of the axis and of an arm seated thereon causes the displacement of the lock together with the release beam connected to it, with the displacement being curved upwardly in the direction of the locking lever. The movement of the release beam *via* the pivotal elements forces the flaps to rise. The step of closing the flaps continues until the flaps lie flat, i.e. parallel to the ground on which the container is placed. In this position, the flaps form a stable and uniform floor of the container. Optionally, the container floor flaps can be separated by separating elements, thus forming sets. The purpose of the forming sets of flaps is to increase the mechanical strength of the container regarding the floor loading. When the flaps are positioned parallel to

the surface, the lock is latched to the locking lever, what prevents the flaps from being automatically diverted to the previous position. Consequently, when the flaps are lifter, no uncontrolled spilling of the material from the container is about to occur. The container, with the flaps lifted and secured by means of the lock and the locking lever, is ready for loading. During the loading process, the material is poured from the top of the container, where it first falls on the grate, which is placed above the flaps. The purpose of the grate is to absorb the first pressure exerted by the loaded material, what substantially reduces the pressure on the flaps. The role of the grate, located above the flaps, is also to increase the mechanical strength of the container construction. In addition, in order to eliminate the accumulation of the material on the upper edges of the frame during loading, there are mounted profiled chute elements above the walls on the frame. After loading, the material contained in the space defined by the floor and the four walls of the container can be transported to the destination where discharging takes place. The discharge is done when the employee pulls the release cord. The release cord is connected to the locking lever, which is displaced by the pull. Alternatively, this step can be performed by a remotely controlled actuator, which displaces the locking lever remotely. The displacement of the locking lever causes release of the lock and an automatic, gravitational displacement of the release beam in a curved downward direction. Due to the fact that the beam is pivotally connected to the flaps, the movement of the beam in a curved downward direction causes the flaps to drop, thus creating openings in the floor and discharging of the bulk material from the container.

[0012] It is an advantage of the hopper container of the invention that in order to discharge the transported material it is not necessary to turn the container over, which eliminates costs that would otherwise be spent on specialist carts and rotators. It is also not necessary to construct railway platforms specially adapted for discharging purposes or infrastructure for storing the goods. The hopper container of the invention can be lifted by a regular crane at a port or a railway station, its unloading at the destination place is fast and can be carried out directly to the ship hold. In addition, when unloading the material from the container there are no losses resulting from a fraction of the material being left in the container, and there is no mechanical damage to the container during the unloading process caused by the use of equipment and turning machines. An important advantage of the container of the invention is a limitation of the amount of dust released by the reloaded material, which in turn has a positive impact on the working conditions and the environment. The container, from the step of loading onto a means of transport, i.e. a truck, a semi-trailer, or a wagon, until the step of unloading, is able to transport the cargo without the need of reloading or using equipment or accessories that might damage it. The container of the invention is useful especially in intermodal transport with

use of more than one means of transport, e.g. a tractor unit and railway.

[0013] Accordingly, the technical problems resulting from the solutions disclosed in the prior art have been solved by the container of the invention.

[0014] The hopper container, particularly for bulk materials, is now presented by the way of examples and a drawing, in which:

Fig. 1 presents an axonometric view of the container according to the invention, with one side wall removed;

Fig. 2 presents a cross-sectional view of the mechanism for lifting/lowering the flaps;

Fig. 3 presents an axonometric view of the container according to the invention, with the flaps lifted and one frontal wall removed;

Fig. 4 presents an axonometric view of the container according to the invention, with the flaps lowered and one frontal wall removed;

Fig. 5 presents a top view of the container according to the invention;

Fig. 6 presents a cross-sectional view of the container according to the invention along its frontal walls;

Fig. 7 presents a cross-sectional view of the container according to the invention along the AA line from Fig. 6;

Fig. 8 presents an axonometric view of the container according to the invention, as viewed from the bottom;

Fig. 9 presents an axonometric view of the container according to the invention, with five sets of flaps, and with one side wall removed;

Fig. 10 presents an axonometric view of the container according to the invention, with five sets of flaps, and with one frontal wall removed;

Fig. 11 presents an axonometric view of the container according to the invention, with convex frontal walls and convex side walls, with one convex side wall removed.

Example 1

[0015] Example 1 presents a hopper container, particularly for bulk materials, comprising a frame 3 made of steel profile sections and having the outside dimensions of 6058 mm x 2438 mm x 2896 mm. Two shorter frontal walls 14 and two longer side walls 14' are permanently

mounted in the frame 3. The shorter frontal walls 14 and the longer side walls 14' are made of corrugated metal sheets, both longer side walls 14' being terminated in their lower sections with two oblique plates, 4 and 4', made of steel sheet, inclined towards the floor 1 at 45° angle, by means of which they form a steep funnel which aids the discharge of the whole cargo and, therefore, it prevents deposition of the material by the longer side walls 14' after unloading. In this Example, the floor 1 consists of three sets of flaps 5. One set of flaps 5 comprises five flaps 5 made of steel sheet, with the dimensions of 1789 mm x 288 mm. Flaps 5 in their central section from the bottom are equipped with additional reinforcements made of profiled steel sheet. The sets of flaps 5 are separated with two separating elements 13, which are made of steel sheet and are fixed in the lower section of the container loading space, perpendicularly to flaps 5 and two longer side walls 14'. Separating elements 13, in their upper section, are terminated with elements arranged like double-sloping roof, which reduce the pressure exerted by the loaded material and allow for better distribution of the loaded material between the adjacent sets of flaps 5. Inside the container, on the sides of the two shorter frontal walls 14 in their lower section and on the outside walls of the two separating elements 13, mounting beams 6 are attached with flaps 5 pivotally mounted thereon. In each of the three sets, flaps 5 are connected from the bottom via pivotal elements 7 to release beams 8 made of structural steel sections. A lock 2 made of profiled steel sheet is pivotally connected to one end of each release beam 8. The lock 2 is movably connected to an arm 9, which is mounted on an axis 10, which is a steel tube with an external diameter of Ø 60.3 mm. Axis 10 runs parallel along one of the longer side walls 14' in the lower section of the container. Axis 10 is a rotation axis shared by all three sets of flaps 5. Lock 2 is provided with three pins, one for each set of flaps 5. Pins hold flaps 5 in the closed (horizontal) position when placed in a recess on locking lever 11. The pin of each lock 2 and the recess of each locking lever 11 thus form a snap connection. Locking lever 11 is connected to a release cord. Pulling the release cord releases lock 2 and lowers flaps 5. A grate 12 is fixed permanently 120 mm above flaps 5. In this Example, grate 12 is divided into two outer segments and one central segment, which are located, respectively, above the three sets of flaps 5. The outer segments are connected on one side to the shorter frontal walls 14 of the container, and to separating elements 13 on the other side. The central segment is connected only to two separating elements 13. The grate 12, in this Example, is made of profiled steel sheet plates inclined at 45° angle to floor 1. On frame 3, over the two shorter frontal walls 14 and the two longer side walls 14', there are permanently placed profiled chute elements 16. On the side walls 14' and the frontal walls 14, at a distance of 200 mm from the upper edge of the walls 14, 14', there are mounted loops for fixing a tarpaulin to cover from the top the container according to the invention. The tarpaulin

protects the contents of the container from water and from freezing in winter conditions, which would make the discharge of the transported material more troublesome. In all eight corners of the container, container corner fittings 15 are permanently fixed on the frame 3.

Example 2

[0016] Example 2 presents a hopper container of the invention for the transport of some coarse-grained materials, such as aggregates. The container retains the outside dimensions of 6058 mm x 2438 mm x 2896 mm, has identical side walls 14' and frontal walls 14, and oblique plates 4 and 4' inclined at 45° angle, like in Example 1.

[0017] In this Example, floor 1 also consists of three sets of flaps 5 which are separated with two separating elements 13 shaped like in Example 1. One set consists of three flaps 5 which are made of wear-resistant steel sheet having dimensions of 1789 mm x 480 mm. Flaps 5, like in Example 1, are pivotally mounted on the sides of the frontal walls 14 and on the walls of central separating elements 13. Each of the three sets of flaps 5 is connected to release beams 8 via pivotal elements 7. A lock 2 made of profiled steel sheet is pivotally connected to one end of each release beam 8. The lock 2, like in Example 1, is movably connected to an arm 9, which is mounted on an axis 10, which is a steel tube with a diameter of Ø 60.3 mm. Axis 10 is a rotation axis shared by all three sets of flaps 5. Lock 2 is provided with three pins, one for each set of flaps 5. These pins hold flaps 5 in a closed (horizontal) position when placed in a recess on locking lever 11. Locking lever 11 is connected to a release cord, which is manually pulled, to release lock 2 causing gravitational drop of flaps 5. A grate 12 is permanently fixed at a distance of 160 mm above flaps 5. Grate 12 consists of three segments: two outer segments and one central segment. Like in Example 1, the outer segments are connected to frontal walls 14 on one side and to separating elements 13 on the other. The central segment of the grate is fixed to separating elements 13 on both sides. In this Example, all three segments of grate 12 comprise three plates in each segment. The plates of the grate are profiled metal sheets measuring 1789 mm x 260 mm, which are made of wear-resistant steel and are inclined at 55° angle to the floor. In this Example, separating elements 13 are 40 mm higher than separating elements 13 in Example 1. This is due to a larger inclination angle of flaps 5 as well as larger dimensions of the plates of the grate 12. The tarpaulin and container corner fittings 15 are identical like in Example 1.

Example 3

[0018] Example 3 presents a hopper container of the invention for the transport of bulk and powdery materials. The container retains the outside dimensions of 6058 mm x 2438 mm x 2896 mm, has identical side walls 14'

and frontal walls 14, and oblique plates 4 and 4' inclined at 45° angle, like in Example 1.

[0019] In this Example, floor 1 also consists of three sets of flaps 5 which are separated with two separating elements 13. One set of flaps 5 consists of seven flaps 5 made of corrosion-resistant steel sheet having dimensions of 1789 mm x 205 mm. Flaps 5, like in Example 1, are pivotally mounted on the sides of the frontal walls 14 and on the walls of central separating elements 13. Each of the three sets of flaps 5 is connected to release beams 8 via pivotal elements 7. A lock 2 made of profiled steel sheet is pivotally connected to one end of each release beam 8. The lock 2 is movably connected to an arm 9, which is mounted on an axis 10, which is a steel tube with a diameter of Ø 60.3 mm. Axis 10 is a rotation axis shared by all three sets of flaps 5. Lock 2 is provided with three pins, one for each set of flaps 5. These pins hold flaps 5 in a closed (horizontal) position when placed in a recess on locking lever 11. Locking lever 11 is connected to a release cord, which is connected to a remotely controlled electric actuator. The electric actuator is equipped with limit switches and is set to a suitable piston extension. The piston of the actuator, while extending, tilts the locking lever 11 and releases lock 2 causing gravitational drop of flaps 5. A grate 12 is permanently fixed at a distance of 90 mm above flaps 5. The grate 12 consists of three segments: two outer segments and one central segment, just like in Example 1 and 2. The outer segments are connected to front walls 14 on one side and to separating elements 13 on the other. The central segment of grate 12 is fixed to separating elements 13 on both sides, just like in Example 1 and 2. In this Example, grate 12 comprises three segments with seven plates in each segment. The plates of the grate 12 are profiled metal sheets measuring 1789 mm x 220 mm, are made of corrosion-resistant steel, and are inclined at 35° angle to floor 1. An increased number of flaps 5 and an increased number of the plates of the grate 12 as well as their smaller inclination angle to floor 1 is provided due to the powdery/fine-grained structure of the materials transported in and discharged from the container. Tarpaulin elements and container corner fittings 15 are identical like in Example 1 and 2. The tarpaulin protects the contents of the container from water and from freezing in winter conditions, which, especially in the case of powdery and bulk materials, would make the discharge of the transported material more troublesome.

Example 4

[0020] Example 4 presents a hopper container of the invention for bulk, fine- and middle-grained materials. The container has the outside dimensions of 9125 mm x 2438 mm x 2896 mm and a capacity of 50 m³, with identically constructed side walls 14' and frontal walls 14 as well as oblique chute plates 4 and 4' inclined at 45° angle, like in Examples 1-3.

[0021] In this Example, floor 1 consists of five sets of

flaps 5 separated with four separating elements 13 shaped like in Example 1. One central set consists of five flaps 5 made of wear-resistant steel sheet having dimensions of 1668 mm x 288 mm while four remaining sets also consist of five flaps 5 made of the same material, but having dimensions of 1428 mm x 288 mm. Flaps 5, like in Examples 1-3, are pivotally mounted on the sides of the frontal walls 14 and on the walls of central separating elements 13. Each of the five sets of flaps 5 is connected to three release beams 8 via pivotal elements 7. A lock 2 made of profiled steel sheet is pivotally connected to one end of each release beam 8. The lock 2, like in Examples 1-3, is movably connected to an arm 9, which is mounted on an axis 10, which is a steel tube with a diameter of $\varnothing 60.3$ mm. Axis 10 is a rotation axis shared by all five sets of flaps 5. Lock 2 is provided with three pins, one for each of the central sets of flaps 5. These pins hold flaps 5 in a lifted (horizontal) position when placed in a recess on locking lever 11. Locking lever 11 is connected to a release cord, which is manually pulled to release lock 2 causing gravitational drop of flaps 5. A grate 12 is permanently fixed at a distance of 120 mm above each set of flaps 5. Grate 12 consists of five segments consisting of five steel plates. The outer segments are connected to front walls 14 on one side and to separating elements 13 on the other. The three central segments of grate 12 are connected on both sides to the walls of the separating elements 13. The plates of the grate 12 are made of profiled wear-resistant metal sheet measuring 1744 mm x 236 mm (central set) and 1509 mm x 236 mm (four remaining sets) and are inclined to floor 1 at 45° angle. On frame 3, over the two shorter frontal walls 14 and the two longer side walls 14', there are permanently placed profiled chute elements 16. On the side walls 14' and the frontal walls 14, at a distance of 200 mm from their upper edge, there are mounted loops for fixing a tarpaulin for covering the container from the top. The tarpaulin protects the contents of the container from water and from freezing in winter conditions, which would make the discharge of the transported material more troublesome. In all eight corners of the container, container corner fittings 15 are permanently fixed on the frame 3.

Example 5

[0022] Example 5 presents a hopper container for bulk, fine- and middle-grained materials. The container has the outside dimensions of 6058 mm x 2438 mm x 2896 mm and a capacity of 32 m³. The container is equipped with two outwardly convex side walls 14' with convexity radius R 4500 mm, and two outwardly convex frontal walls 14 likewise with convexity radius R 4500 mm. Convex side walls 14' and convex frontal walls 14 in this Example are made of wear-resistant Hardox® type steel sheet with Re (yield strength) of at least 700 N/mm². In their lower sections, side walls 14' are connected to oblique chute plates 4 and 4', inclined at 45° angle, like in

Examples 1-4. Convex side walls 14', convex frontal walls 14, and oblique chute plates 4 and 4' facilitate the discharging of the container. Floor 1 of the container consists of three sets of flaps 5 separated with two separating elements 13 shaped like in Examples 1-4. One central set consists of five flaps 5 made of wear-resistant Hardox® type steel sheet having dimensions of 1668 mm x 288 mm. Two outer sets also consist of five flaps 5 made of the same material, but having dimensions 1428 mm x 288 mm. Flaps 5, like in Examples 1-4, are pivotally mounted on the sides of the frontal walls 14 and on the walls of central separating elements 13. Each of the three sets of flaps 5 is connected to three release beams 8 via pivotal elements 7. A lock 2 made of profiled steel sheet is pivotally connected to one end of each release beam 8. The lock 2, like in Examples 1-4, is movably connected to an arm 9, which is mounted on an axis 10, which is a steel tube with a diameter of $\varnothing 60.3$ mm. Axis 10 is shared by all five sets of flaps 5. Lock 2 is provided with three pins, one for each set of flaps 5. The pins hold flaps 5 in a lifted (horizontal) position when they are placed in a special recess on locking lever 11. Locking lever 11 is connected to a release cord, which is manually pulled to release lock 2 causing gravitational drop of flaps 5. A grate 12 is permanently fixed at a distance of 120 mm above flaps 5. Grate 12 consists of three segments each consisting of five Hardox® steel plates. Outer segments are connected to front walls 14 on one side and to separating elements 13 on the other. The central segment of grate 12 on both sides is fixed to the walls of separating elements 13. The plates of the grate 12 are made of profiled wear-resistant Hardox® steel sheet measuring 1744 mm x 236 mm (central set) and 1509 mm x 236 mm (both outer sets) and are inclined at 45° angle to floor 1. On frame 3, over the two shorter frontal walls 14 and the two longer side walls 14', there are permanently placed profiled chute elements 16. On the side walls 14' and the frontal walls 14, at a distance of 200 mm from their upper edges, there are mounted loops for fixing a tarpaulin for covering the container from the top. The tarpaulin protects the contents of the container from water and from freezing in winter conditions, which would make the discharge of the transported material more troublesome. In all eight corners of the container, container corner fittings 15 are permanently fixed on the frame 3, allowing the stacking of the containers and securing them on semi-trailers or container ships.

Example 6

[0023] Example 6 presents a hopper container which is analogous to the one in Example 5, with this difference that the convex side walls 14' and convex frontal walls 14 in this Example are made of smooth sheets of corrosion-resistant weathering steel, such as COR-TEN® type steel. In this Example also the floor flaps 5 and the plates of the grate 12 are made of corrosion-resistant COR-TEN® steel.

Example 7

[0024] Example 7 presents a hopper container which is analogous to the one in Example 5 and 6, with this difference that the convex side walls 14' and convex frontal walls 14 in this Example are made of smooth sheets of high strength steel S690. Floor flaps 5 and the plates of the grate 12 are made of high strength steel S690 as well.

Claims

1. A hopper container, particularly for bulk materials, which has a floor (1), a lock (2), and a frame (3) in which walls are fixed, two of the walls having in their lower section two oblique plates (4, 4') leaning toward the floor (1), **characterised in that** the floor (1) consists of at least one set made of at least two flaps (5), the flaps (5) are pivotally mounted on mounting beams (6), and the flaps (5) are connected from the bottom *via* pivotal elements (7) to at least one release beam (8), wherein said release beam (8) is connected by its one end to the lock (2), which is connected to an arm (9) seated on an axis (10) that extends along one of the walls, and wherein said lock (2) is separably connected to a locking lever (11) of the lock (2), and a grate (12) is placed above the flaps (5).
2. A hopper container according to claim 1, **characterised in that** the grate (12) is made of steel elements.
3. A hopper container according to claim 2, **characterised in that** the steel elements are plates of metal sheet, profile sections, pipes, or mesh.
4. A hopper container according to claim 1, **characterised in that** the sets of the pivotally mounted flaps (5), which form the floor (1), are separated by at least one separating element (13).
5. A hopper container according to claim 1, **characterised in that** the frame (3) is made of steel profile sections.
6. A hopper container according to claim 1, **characterised in that** the walls include two shorter frontal walls (14) and two longer side walls (14').
7. A hopper container according to claim 6, **characterised in that** the two shorter frontal walls (14) and the two longer side walls (14') are convex.
8. A hopper container according to claim 1, **characterised in that** the locking lever (11) of the lock (2) is connected to a release cord or to a remotely controlled actuator.

9. A hopper container according to claim 1, **characterised in that** the frame (3) has container corner fittings (15) for stacking containers on top of one another.

10. A hopper container according to claim 1, **characterised in that** on the frame (3), above the walls (14, 14'), there are profiled chute elements (16).

11. A hopper container according to claim 1, **characterised in that** it is made of weathering steel, or wear-resistant steel, or S690 steel, or S700 steel, or S960 steel.

12. A hopper container according to claim 1, **characterised in that** it is dimensioned to meet the requirements of the International Convention for Safe Containers (CSC).

13. A hopper container according to claim 1 for use in intermodal transport.

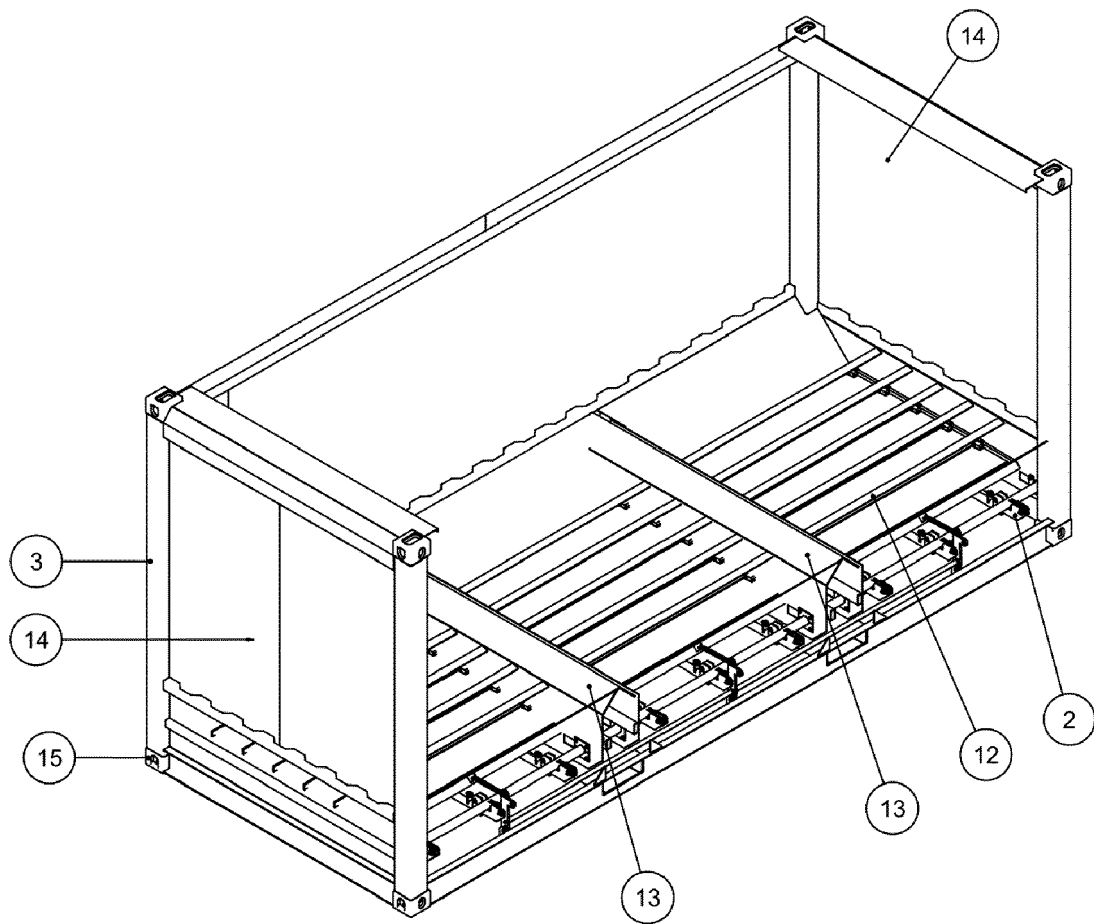


Fig.1

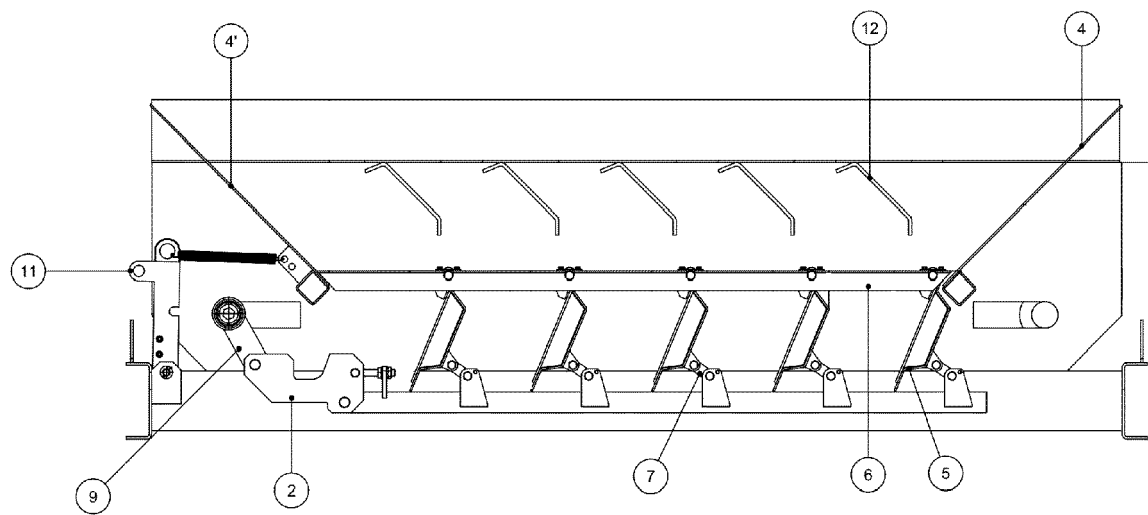


Fig.2

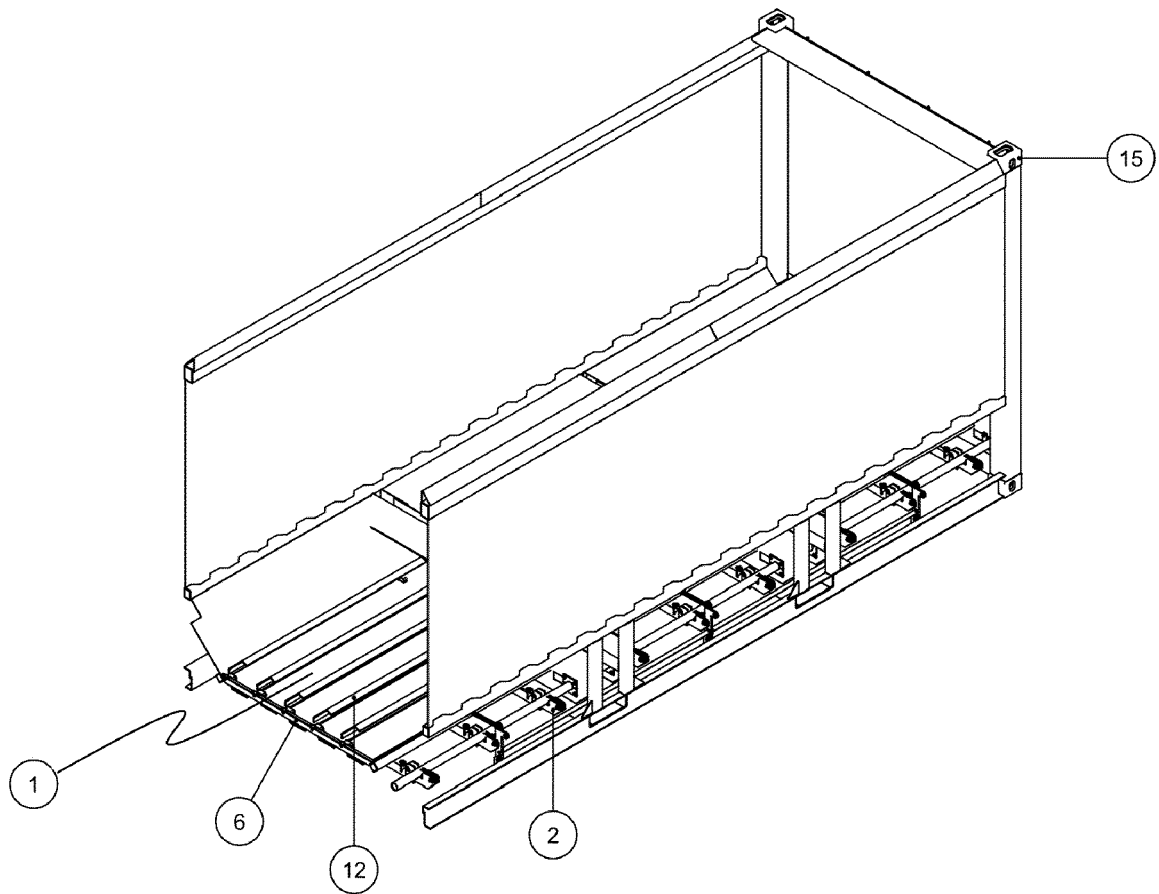


Fig.3

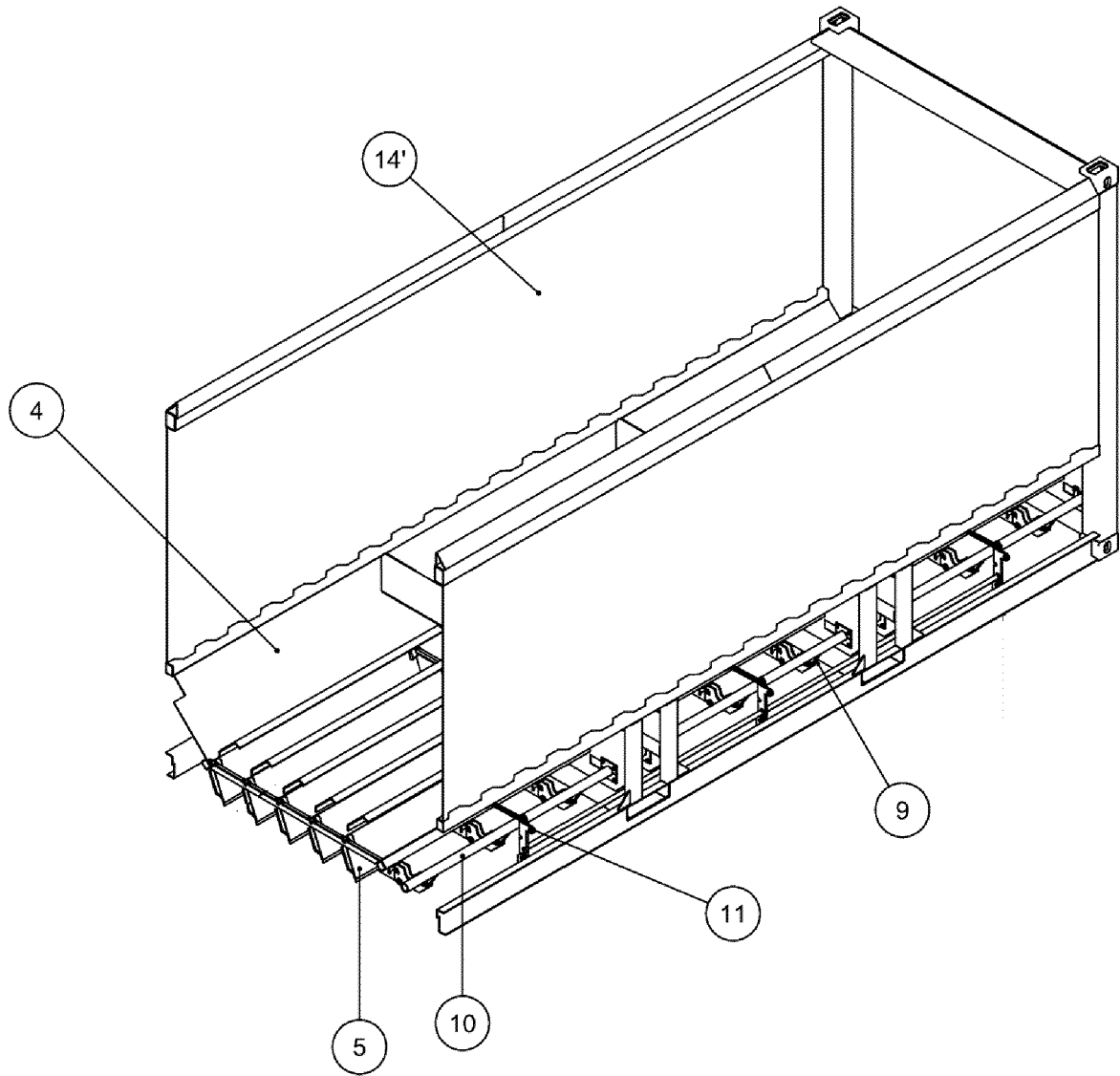


Fig.4

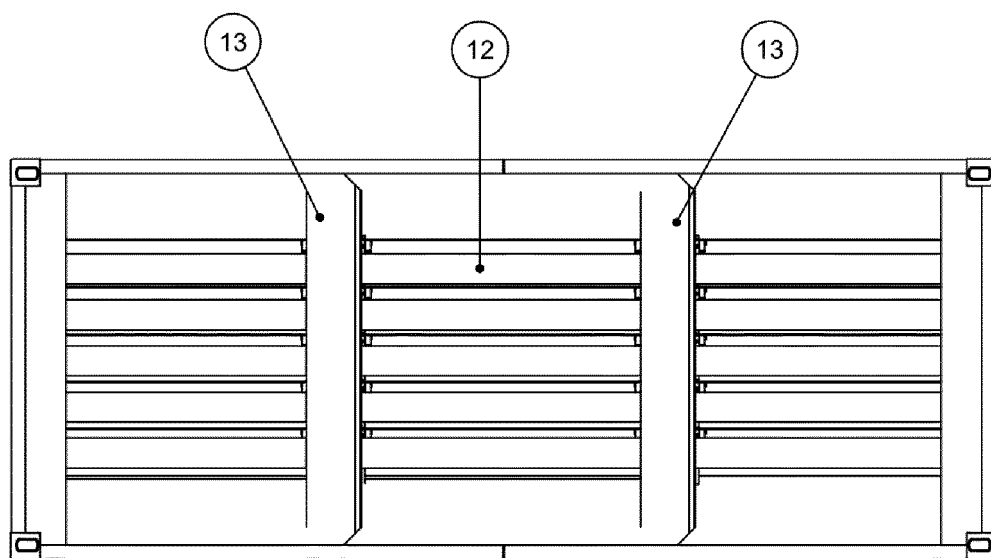


Fig.5

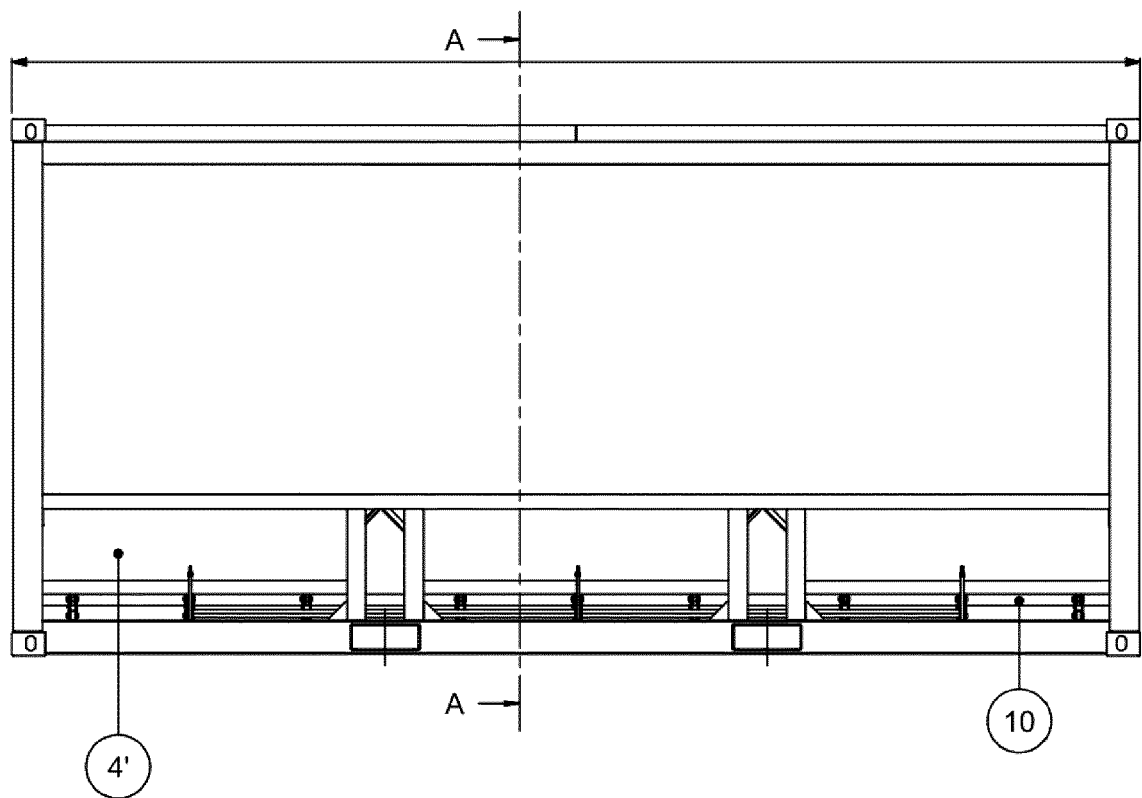


Fig.6

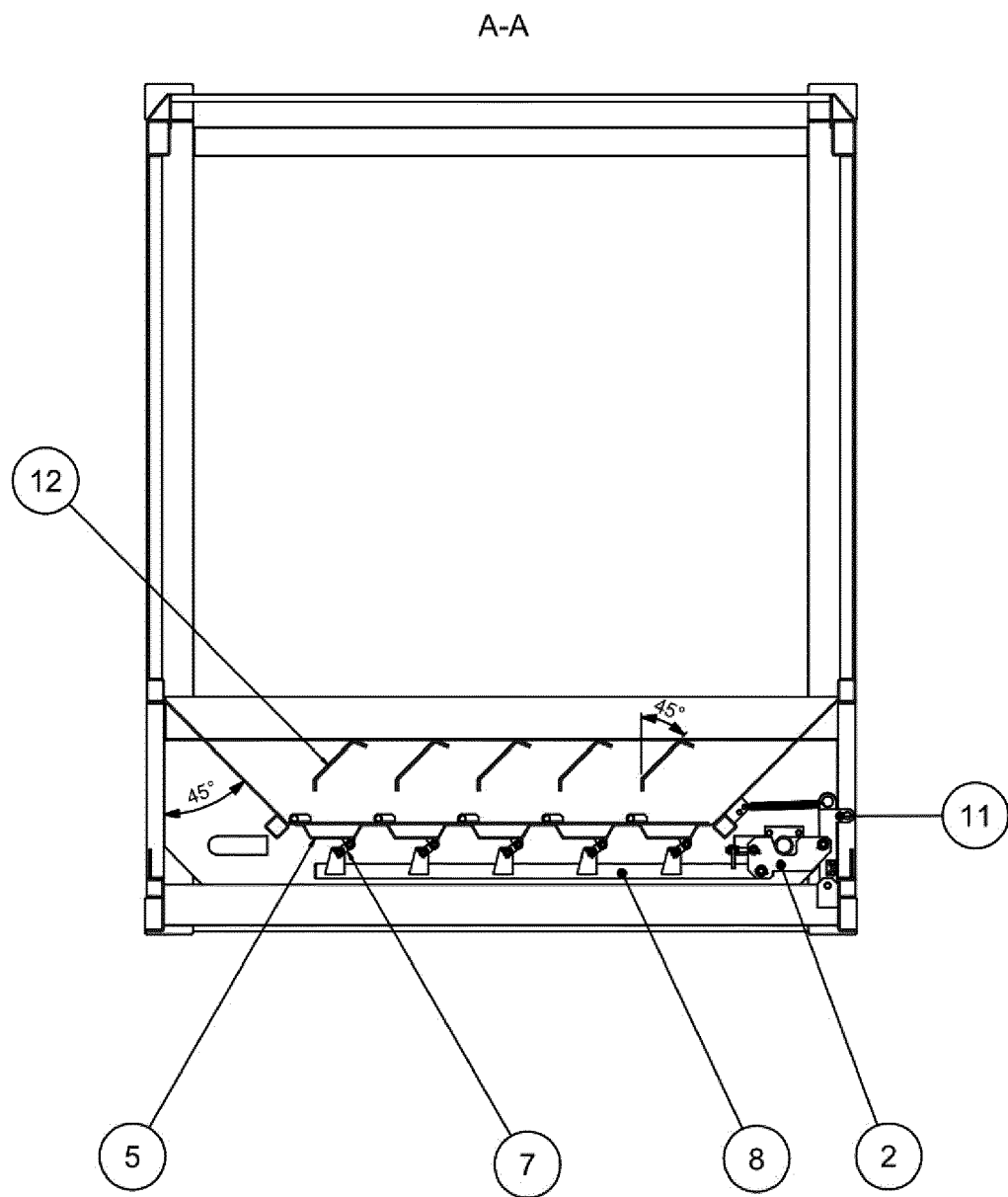


Fig.7

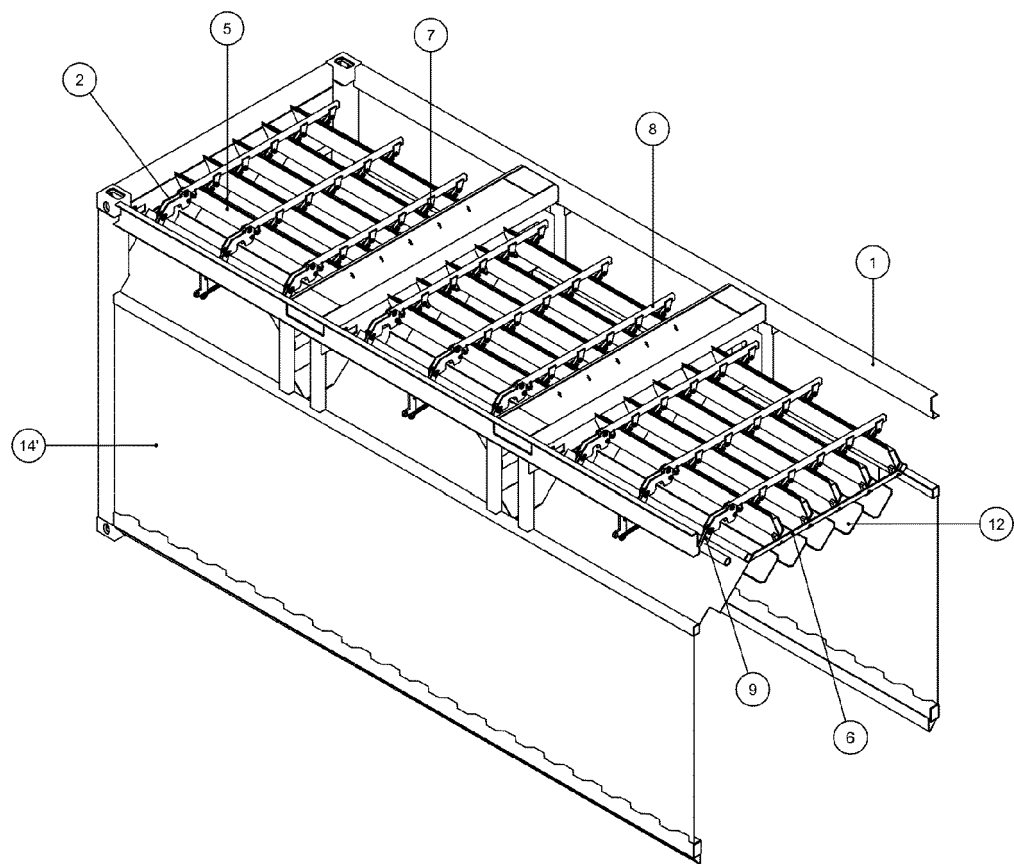


Fig.8

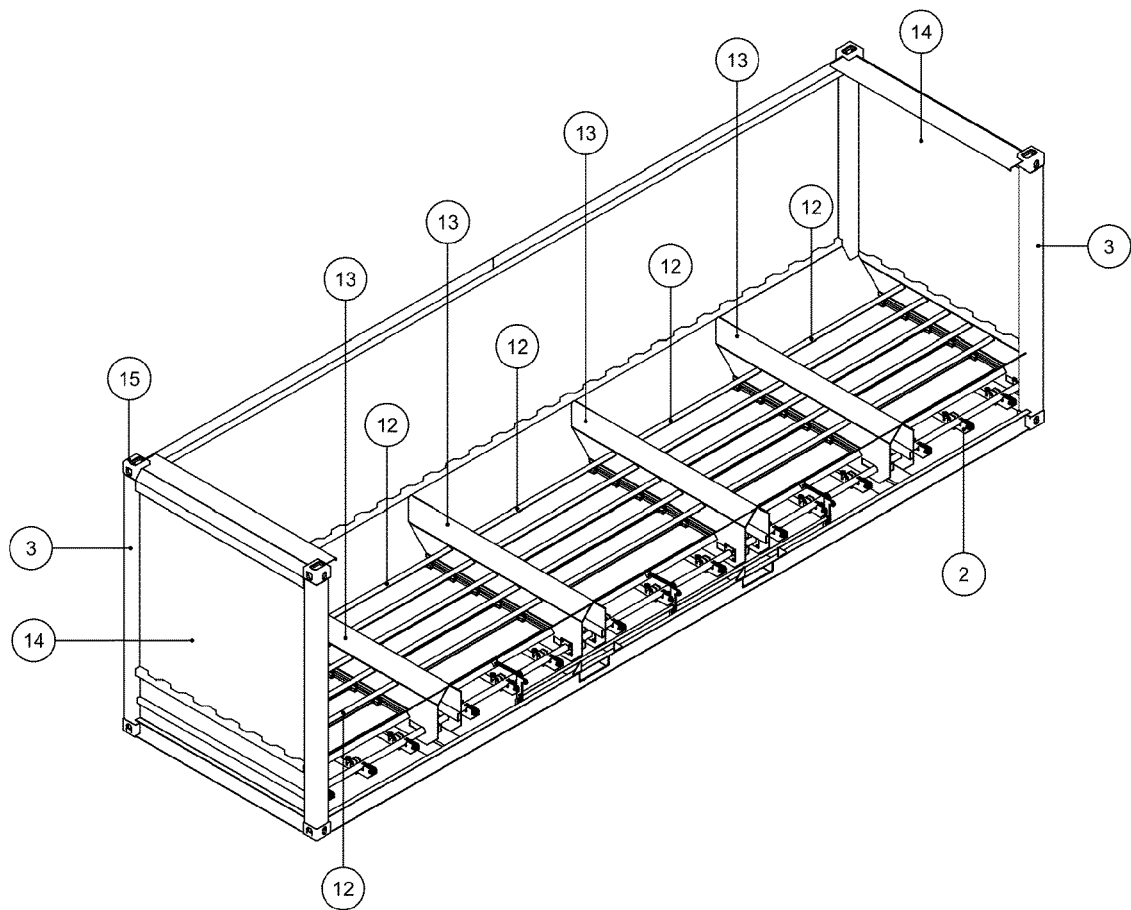


Fig.9

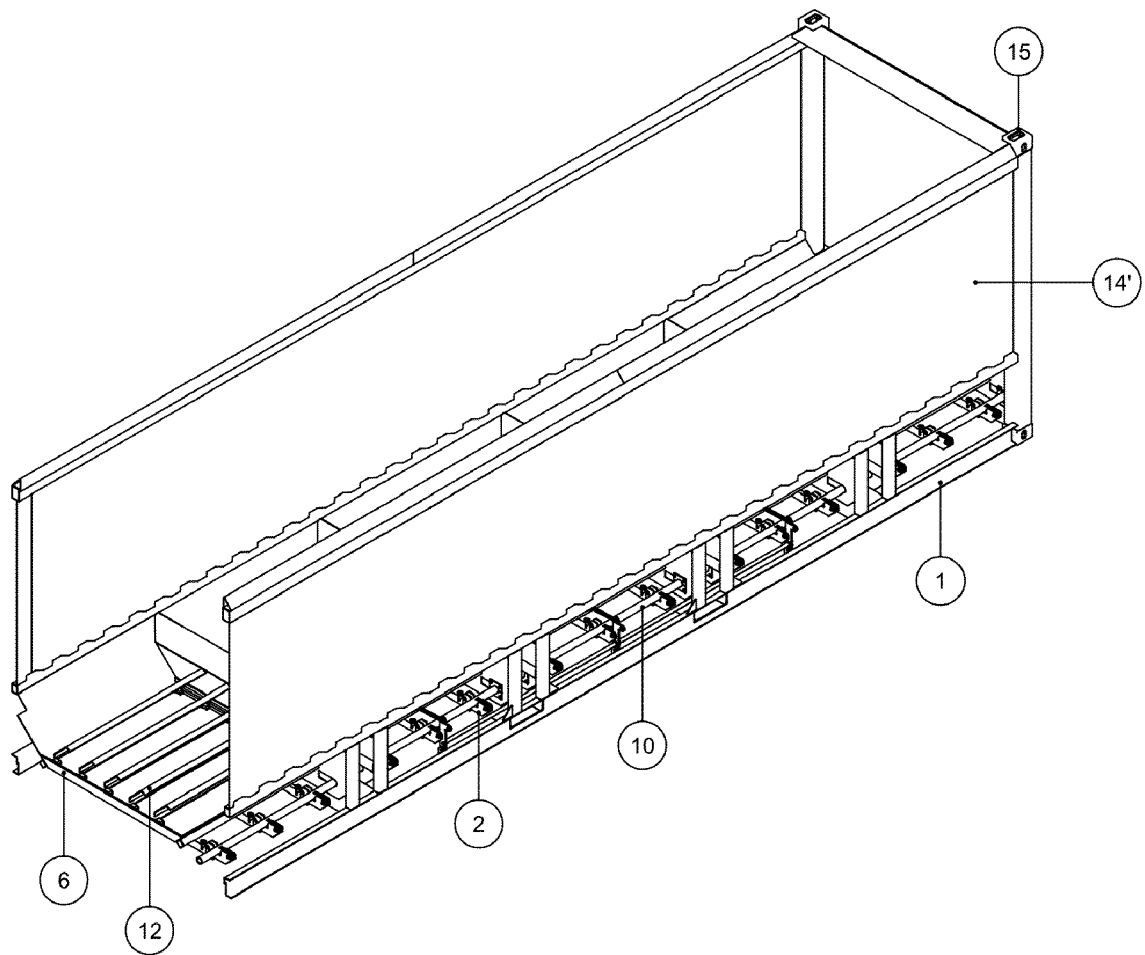


Fig.10

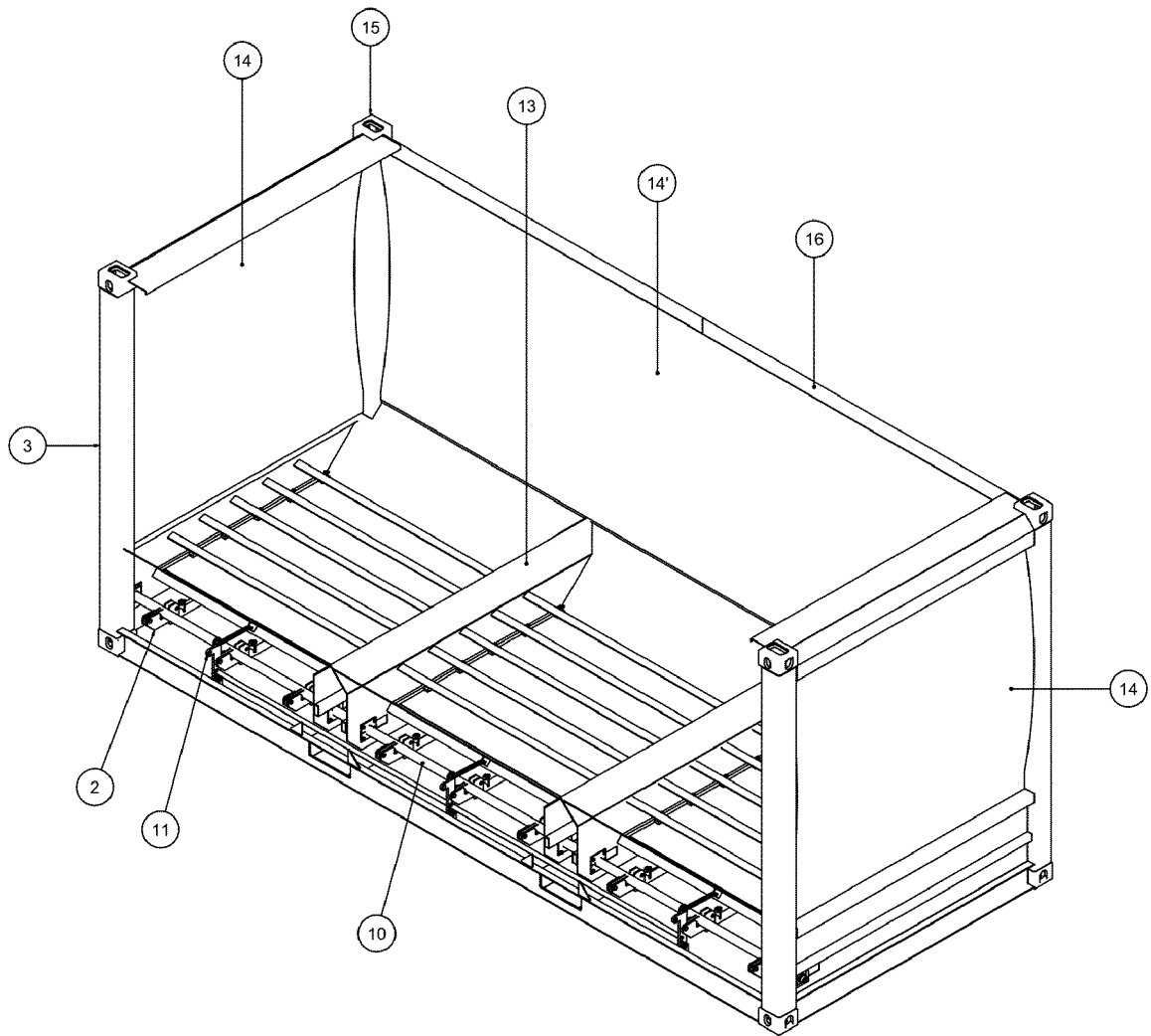


Fig.11



EUROPEAN SEARCH REPORT

Application Number
EP 20 17 3485

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A	WO 2012/120452 A1 (FREIGHTQUIP AUSTRALIA PTY LTD [AU] ET AL.) 13 September 2012 (2012-09-13) * page 4, line 16 - page 8, line 35; figures 1-6 *	1-13	
			TECHNICAL FIELDS SEARCHED (IPC)
			B65D
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 19 June 2020	Examiner Lämmel, Gunnar
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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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