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(54) TANK CONTAINER WITH INCREASED VOLUME AND LOAD CAPACITY

TANKBEHÄLTER MIT ERHÖHTEM VOLUMEN UND LADEKAPAZITÄT

CONTENEUR CITERNE AVEC VOLUME ACCRU ET UNE MEILLEURE CAPACITÉ DE CHARGE

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Description

TECHNICAL FIELD

[0001] The present invention relates to a container, in particular a tank container for storing and/or transporting gas, liquid and/or solids.

BACKGROUND

[0002] A tank container is an intermodal container for the transport of liquids and/or gases. A standard tank container comprises a manhole and at least one connection. Loading and unloading is carried out by connecting tubes of the load and unload installation to connections of the tank container. Subsequently, one can load or unload. A connection is part of a valve, also called outlet valve, which can interrupt the supply or discharge of liquids and/or gases, if necessary. The connections are made of a composed valve in accordance to legislation.

[0003] Tank containers often also contain corner castings (or corner pieces) at the ends of the front and back frame, which corner castings are provided with lifting openings (lifting eyes) for lifting the container by means of a crane. These corner castings are normalized and hence, tank containers are often limited to gross weights of maximum 34 ton, with exceptions to 38 to 40 ton.

[0004] Documents US732227B2 and CA2765684A1 describe examples of a tank container according to the state of the art in the patent literature.

[0005] Document NL8902602A more in particular describes a tank container comprising at least one tank or vessel attached in a parallelepiped frame wherein the width of the frame is such a fraction part of the width of the container standardized according to the ISO norms (about 8 feet) that by connecting a number of adjacent containers, a cluster is formed with said ISO norm width (8 feet) and that the length of the frame is equal to the length of a container standardized according to the ISO norms (for example about 10 feet, about 20 feet) or such a fraction part that by connecting a number of adjacent containers, a cluster is formed with the length of an ISO norm container.

[0006] Document EP13192751.9, published as EP 2 730 832, discloses tank containers with increased volumes of 24000 to 52500 l. This tank container is designed for storing and/or transporting a gas and/or liquid, which tank container comprises a tank vessel, a frame and at least one outlet valve, wherein the end of said outlet valve is attached to a tank flange, which is preferably countersunk between 1 and 30 cm in a recess at an end base of the said tank vessel, more preferably between 5 and 20 cm, most preferably between 10 and 15 cm. By countersinking at least one outlet valve, the length of the tank vessel can be increased within the frame.

[0007] A problem with the known intermodal tank containers is that the volume is limited by the dimensions of the frame around the container and by the space the

outlet valve takes at the container and which must be comprised within (the casing of) the ISO frame.

[0008] When transporting tank containers on railway wagons, two or three standard containers of 20 feet long or two standard containers of about 26 or 30 feet long can indeed be placed successively on e.g. a four-axis wagon (e.g. 45 or 60 feet, with a tare weight of about 16 to 22 ton), that can be loaded till a gross weight of maximum 90 ton. To this end, the two containers may or may not be connected to each other by means of a double frame. However, it remains unseen to make full use of a wagon by placing one big, separate tank container with increased volume and load capacity, offering a faster and easier placement.

[0009] If containers are attached to each other to form one unit, the corner castings at the bottom (2 x 4 corner castings) will in practice not be loaded simultaneously or equally during force transmission on the chassis or the wagon, as a result of which the container can be deformed permanently.

[0010] A further length and volume increase in one tank container, thus without forming clusters, and allowing to transport even more gas and/or liquid with an increased load capacity, without permanently deforming the tank container while lying on a railway wagon or lifting, is as yet not known.

[0011] The object of the present invention is an improved device of a tank container offering a solution for at least one of said disadvantages when transporting gases and/or liquids, as described in claim 1. Documents US 3 446 394 and US 6 079 580 show container of smaller dimensions but with front and back ends protruding from front and back frames.

SUMMARY

[0012] The present invention relates in a first aspect to a tank container for storing and/or transporting a gas and/or liquid, which tank container comprises in a first aspect an elongated, mainly cylindrical tank vessel, a frame and at least one outlet valve, wherein the frame comprises a front and back frame each with 2 or 4 corner castings with facilities for receiving or engaging with connection means, which are attached to head ends of the tank container, characterized in that the gross weight of the tank container is more than 40000 kg. By using a better material quality for the corner castings of the container, it can be prevented that the container deforms permanently in case of such high tonnages, e.g. when lifting.

[0013] In a second aspect, the invention relates to a box container with 4 bottom corner castings for storing and/or transporting solids, wherein the gross weight of the box container is more than 40000 kg.

[0014] In a third aspect, the invention relates to the use of a tank container or box container as described in this document for subsequent transport and/or storage whereby said tank container or box container is placed

on a wagon and any of the following: a chassis, a container terminal. Hence, the present invention allows intermodal transport that includes rail transport, and also allows interim storage on a wagon.

[0015] In a fourth aspect, the invention relates to a system for storing and/or transporting a gas, liquid and/or solid with a tank container or box container, wherein the tank container or box container is placed on a chassis, wagon or container terminal.

[0016] Further preferred embodiments are described in the dependent claims.

[0017] The explicit characteristics, advantages and objectives of the present invention will become clear for the skilled worker in the technical domain of the invention from the following detailed description of the embodiment of the invention and the attached figures. The figures are only illustrative of the invention, and are in no case limitative of the invention.

DESCRIPTION OF THE FIGURES

[0018] The following figures show preferred embodiments of the invention.

Figure 1 is a side view of a tank container along to the longitudinal axis, according to a preferred embodiment of the invention.

Figure 2 is a plan view of a tank container along to the longitudinal axis of a tank container, according to a preferred embodiment of the invention.

Figure 3 is a back view of a tank container, according to a preferred embodiment of the invention.

Figure 4 is a perspective view of a tank container, according to a preferred embodiment of the invention.

DETAILED DESCRIPTION OF THE INVENTION

[0019] In the following, the invention will be described by means of non-limiting examples illustrating the invention, and not meant to be interpreted as limiting the scope of the invention.

[0020] In this document, the term "chassis" refers to the base frame of a wheeled vehicle, particularly that of a truck or a wagon. The term "truck" refers to a large, heavy road vehicle comprising a chassis and adapted to carry a tank container. The term "head end" refers to either one of a "front head" and a "back head".

[0021] In this document, the terms "wagon module" and "wagon" are used interchangeably.

[0022] "About" as used herein referring to a measurable value such as a parameter, an amount, a temporal duration, and the like, is meant to encompass variations of $\pm 20\%$ or less, preferably $\pm 10\%$ or less, more preferably $\pm 5\%$ or less, even more preferably $\pm 1\%$ or less,

and still more preferably $\pm 0.1\%$ or less of and from the specified value, in so far such variations are appropriate to perform in the disclosed invention. However, it is to be understood that the value to which the modifier "about" refers is itself also specifically disclosed.

[0023] In a first aspect, the present invention relates to a tank container (1) (also called "container" in this document) for storing and/or transporting a gas and/or liquid, which tank container (1) comprises, in a first aspect, an elongated, mainly cylindrical tank vessel (2), a frame and at least one outlet valve (21), wherein the frame comprises a front and back frame (4) each with 2 or 4 corner castings (7), also known as corner points or corner castings, with facilities for receiving or engaging with connection means, which are attached to said tank vessel (2) of the tank container (1), characterized in that the gross weight of the tank container is more than 40000 kg.

[0024] The tank vessel (2) comprises a front head and a back head connected by a shell. The tank vessel (2) has a longitudinal direction defining a vessel length. In a preferred embodiment of the invention, the front frame is attached to said tank vessel near the front head of the tank vessel, whereby the distance between the front head and the front frame is not larger than 50% of said vessel length. In a more preferred embodiment, said distance between the front head and the front frame is not larger than 40% of said vessel length. Likewise, in a preferred embodiment of the invention, the back frame is attached to said tank vessel near the back head of the tank vessel, whereby the distance between the back head and the back frame is not larger than 50% of said vessel length. In a more preferred embodiment, said distance between the back head and the back frame is not larger than 40% of said vessel length.

[0025] In a preferred embodiment of the invention, the maximum gross weight of the tank container is more than 40000 kg. In a more preferred embodiment of the invention, the gross weight of the tank container is more than 50000 kg. In a still more preferred embodiment of the invention, the gross weight of the tank container is more than 60000 kg. In a still more preferred embodiment of the invention, the gross weight of the tank container is more than 70000 kg. In a most preferred embodiment of the invention, the gross weight of the tank container is 75000 kg. This characteristic is in particular appropriate for storing and/or transporting heavy liquids, i.e. with a density of about 1.0 - 1.7 kg/l, which can substantially add to the weight of the cargo.

[0026] In a preferred embodiment of the invention, the corner castings (7) of the tank container are made of a material with an elasticity limit of minimum 600 N/mm².

[0027] In a preferred embodiment of the invention, the corner castings (7) of the tank container are made of steel.

[0028] The corner castings (7) at the end of the frames of the tank container are normally dimensioned according to ISO norms for use on containers with a weight of 38 to 40 ton, but are dimensioned, in the present invention,

for higher tonnages (more than 40 ton to maximum 75 ton). When using a better material quality, namely steel, the elasticity limit of minimum 600 N/mm² is appropriate for preventing that such heavy tank container is deformed permanently when for example lifting it by means of a crane.

[0029] In a preferred embodiment of the invention, three support saddles (19, also known as supporting points) are provided at the bottom of the tank container:

- one at a distance of 1.6 m to 2.2 m of the front frame;
- one at a distance of 1.6 m to 2.2 m of the back frame;
- one centrally under the tank container;

wherein said support saddles (19) preferably have a free height of 12 mm above the bottom surface of the frame.

[0030] When the container is placed on a railway wagon, these support saddles normally do not touch the upper side of the wagon, considering the free height of 12 mm.

[0031] When mounting the container on a carrying means, e.g. a trailer of a truck, the support saddles will touch the carrying means. This offers an optimal support of the container during storage and transport, in particular thanks to the central support saddle.

[0032] An inventive aspect of this modularity of the present invention is hence that the chassis or the wagon can further be used for other activities while the container is loaded, unloaded, moved on the site, repaired or cleaned (e.g. after having unloaded chemicals). As a result, the chassis or the wagon is in such periods not further occupied by such container(s). The modularity further offers the possibility to transport empty containers by truck to maintenance and cleaning facilities. This solution is flexible and cheap and will, in a certain degree, allow the apparatus to be used for several purposes (different kinds of goods).

[0033] The development and the use of the present invention will be the key to the reorganisation and flexibilization of on-site logistics, including first-mile and last-mile transport and interim storage. The handling of such containers will substantially increase the use of the apparatus and will substantially shorten round-trip times.

[0034] In a preferred embodiment of the invention, the corner castings (7) of the tank container are provided with lifting openings for the passage of a twistlock for attaching the tank container to a chassis or wagon (at the bottom) or container terminal (at the upper part), which lifting openings are suitable for allowing the expansion of the material of the tank vessel (2) under the influence of heat.

[0035] For example: when in case of a 40 feet or 45 feet container, the difference in temperature between the environment and the inside of the tank container is 100°C, it can be expected that a stainless steel container wall will expand by about 20-25 mm.

[0036] In a preferred embodiment of the invention, the tank container is minimum 6058 mm (20 feet) long, pref-

erably 7820 mm (26 feet), 9144 mm (30 feet), 12192 mm (40 feet), 13716 mm (45 feet), 15240 mm (50 feet) or more than 50 feet long, minimum 2438 mm (8 feet) wide, preferably 2550 mm or more than 2550 mm wide, and minimum 2438 mm (8 feet) high, preferably 2591 mm (8.6 feet), 2895 mm (9.5 feet) or more than 2895 mm high.

[0037] In a preferred embodiment of the invention, the volume of the tank container is minimum 24000 l, more preferably minimum 30000 l, still more preferably minimum 37500 l, still more preferably minimum 50000 l, still more preferably minimum 60000 l, still more preferably minimum 81500 l and most preferably minimum 95500 l.

[0038] In a preferred embodiment of the invention, the weight of the filled tank container is minimum 40 ton, more preferably minimum 50 ton, still more preferably minimum 60 ton, still more preferably minimum 70 ton and most preferably minimum 75 ton. In an embodiment with 75 ton, the tank container has a loading capacity that is the double of a usual tank container and comparable to that of a rail tank car according to a known concept, i.e. a wagon comprising a tank vessel as an integrated whole.

[0039] Another inventive aspect of the present invention is hence that the container is designed for an optimal handling and storing of goods. This principle is known of conventional intermodal transport, but the present container offers an even better efficiency as to storage and transport. Higher tonnages enable e.g. a faster delivery of cargo, particularly in cases where the present invention allows delivery with a single container, whereas more than one container is required for delivery of the same cargo weight with smaller containers (with lower tonnage). In this manner, make conventional rail transport as flexible and fast as combined transport without compromising on the advantages offered by the existing, high-load capacity of conventional rail transport.

[0040] In a preferred embodiment of the invention, at least one manhole is located in a shell or in a head end of said tank vessel of the tank container.

[0041] In a preferred embodiment, two or more manholes are provided, so that the tank container can be cleaned optimally.

[0042] In a preferred embodiment of the invention, one or more outlet valves are provided at an end or a left and/or right side of the tank container.

[0043] In a preferred embodiment of the invention, a slight inclination is provided on the tank container along the longitudinal direction, preferably an inclination of 0.1°, corresponding to an inclination of 20-25 mm over the full length of a 45-feet tank container, or more preferably an inclination of 0.3°, corresponding to an inclination of 50-60 mm over the full length of a 45-feet tank container. This inclination in particular allows an improved emptying through the outlet valve (21) at the lowest end of the tank container, e.g. when the tank container is mounted immovably onto a wagon.

[0044] In a preferred embodiment of the invention, the tank container can be isolated.

[0045] In a preferred embodiment of the invention, the tank container can be heated.

[0046] In a second aspect, the invention relates to a box container with 4 bottom corner castings for storing and/or transporting solids, wherein the gross weight of the box container is more than 40000 kg. Hereby, 2 of the 4 bottom corner castings belong to the front frame, and the other 2 belong to the back frame, all four situated at bottom corners of their respective frame. In an embodiment of the invention, the maximum gross weight of the box container is more than 40000 kg. In a more preferred embodiment of the invention, the gross weight of the box container is more than 50000 kg. In a still more preferred embodiment of the invention, the gross weight of the box container is more than 60000 kg. In a still more preferred embodiment of the invention, the gross weight of the box container is more than 70000 kg. In a most preferred embodiment of the invention, the gross weight of the box container is 75000 kg. This characteristic is in particular appropriate for storing and/or transporting much or heavy cargo, for example steel coils. Hereby, given the fact that no more than four bottom castings are present, the bottom corner castings are adapted to carry very large weights.

[0047] In a preferred embodiment of the invention, the corner castings (7) of the box container are made of steel. By using a better material quality, for example of steel, the elasticity limit of minimum 600 N/mm² is appropriate for preventing that such heavy box container is deformed permanently when for example lifting it by means of a crane.

[0048] In a preferred embodiment of the invention, the corner castings (7) of the box container are provided with lifting openings for the passage of a twistlock for attaching the tank container to a chassis or wagon (at the bottom) or container terminal (at the upper part).

[0049] A further aspect of the present invention concerns a wagon adapted for receiving a tank container as described in this document. Hereby, said wagon able to carry said tank container, and said wagon is optimized for compactness, fast braking and low noise, with TSI noise level preferably below 78 dB(A). According to an embodiment of the present invention with tank container weight of 75 ton, being able to carry said tank container requires the ability to carry up to 75 ton on the four bottom corner castings of the container. Also here, given the fact that no more than four bottom castings are present, the bottom corner castings are adapted to carry very large weights.

[0050] In a preferred embodiment, said wagon is optimized for compactness. Hereby, optimizing the compactness encompasses aspects of physical dimensions as well as a reduced weight of the wagon, taking into account the load that is to be carried. In one embodiment, the wagon is adapted for carrying a first load, a single 45 feet tank container, or a second load, which is a combination of a 20 feet and a 26 feet container. In case of said first or second load, the length of said wagon is pref-

erably between 14.8 meter and 15.8 meter, more preferably between 15 meter and 15.6 meter, most preferably about 15.3 meter, where the latter corresponds to a loading length of 46 feet. Still for said first and second load, the loading height is preferably between 90 cm and 130 cm, more preferably between 100 cm and 120 cm, most preferably about 110 cm. In terms of weight, still for said first and second load, the wagon weight or tare weight is preferably between 13 ton and 19 ton, more preferably between 15 and 17 ton, most preferably about 16 ton. A compact design of the wagon provides important advantages in terms of logistics.

[0051] In a preferred embodiment, said wagon is optimized for improved braking, preferably with a disc brake. Hereby, the improvement to the brake comprises aspects of strength but also of noise. Specifically, due to the high load requirements it is important to ensure that timely and powerful braking is possible. In a preferred embodiment, the improved brakes comprise automatic brake-check equipment. Additionally, noise levels can be reduced by means of improved braking, as explained below.

[0052] In a preferred embodiment, said wagon is optimized for low noise, with TSI noise level preferably below 78 dB(A). This relates to the European Union noise regulations for new or upgraded interoperable rail vehicles, with standards that are known as Technical Specifications for Interoperability (TSI).

[0053] Of all sources of noise, braking and curve squeal are specific sources of noise disturbance and annoyance. In a preferred embodiment, disc brakes are used since these allow for larger noise reduction potential than common current technologies such as composite brake blocks. Disc brakes are superior to said composite brake blocks because they allow reduced wheel wear and are compatible with further options to improve the acoustic properties of the wheels. In a further preferred embodiment, the acoustic properties of the wheels and the wagon are further improved by the use of acoustic absorbers and/or highly efficient noise-attenuating appliances and/or axle coatings to reduce vibration noise and/or the fitting of substructure isolation.

[0054] In this way, said wagons are adapted for reduced TSI noise level, preferably below 78 dB(A). Noise reduction is important to protect the health and quality of life of people living near railways. Rail traffic noise, and public resistance to increasing traffic and new infrastructures due to noise, is a major obstacle towards achieving the ecological objective of shifting traffic to less carbon-intensive transport modes such as rail.

[0055] An important aspect of the present invention is the combined use of said tank container or box container with a wagon adapted for this purpose. For the large loads concerned in the present invention, existing concepts for transport by train have always relied on a wagon comprising a tank vessel as an integrated whole. Opposed to this, the present invention allows to separate the vessel containing the goods (tank container module) from the

chassis (wagon module). The wagon module or wagon concerned in the present invention comprises a chassis but does not comprise a vessel. Rather, the wagon is adapted for receiving a tank container. This modularity brings about cost advantage. The tank container module can be designed for optimum handling and storage. This principle is known from conventional intermodal transport. On the other hand, the wagon module can be further used for operations whilst the tank container is loaded, unloaded, moved on-site, repaired or cleaned. The wagon is not occupied by the tank container any longer than strictly needed. Due to this modularity, the present invention allows to significantly increase the utilisation of equipment as round-trip times can be shortened significantly. The higher utilisation of the equipment will lead to shorter innovation cycles and hence lead to a quicker integration of up-to-date standards including safety. Overall, less wagons are needed. The use of a crane improves supply and cleaning and repairs can be carried out faster.

[0056] The modularisation further provides the opportunity that empty modules can be transported via truck to maintenance and cleaning facilities. Hereby, transport via truck has the advantage of being flexible. Furthermore, the modularisation allows to some extent to use the equipment for multiple purposes (types of goods). Nowadays, wagons comprising a tank vessel as an integrated whole are to a large extent used dedicatedly due to lacking cleaning possibilities requiring an empty transport back to the point of loading.

[0057] In a third aspect, the invention relates to the use of a tank container or box container as described in this document for subsequent transport and/or storage whereby said tank container or box container is placed on a wagon and any of the following: a truck chassis, a container terminal. As such, the tank containers can be used for rail transport, inland waterways and (when empty) also for road transport.

[0058] According to a first embodiment of said use, a tank container is handled and filled at a first container terminal in a first step. In a second step, the tank container is transported by train on a wagon to a second container terminal. In a third step, the tank container is handled and emptied at said second container terminal. In a fourth step, said tank container is transported by truck in empty state to a cleaning facility.

[0059] In a second embodiment of said use, the first, second and third step are identical to the corresponding steps in the first embodiment of said use. However, the fourth step does not involve transport by truck because the tank container is kept in the vicinity of the second container terminal and is cleaned in place.

[0060] According to a third embodiment of said use, a tank container is handled and filled at a first container terminal in a first step. In a second step, the tank container is transported by train to a first ship terminal comprising facilities for handling containers. In a third step, the tank container is shipped on a barge to a second ship terminal

comprising facilities for handling containers. In a fourth step, the tank container is transported by train to a second container terminal. In a fifth step, the tank container is cleaned at or near the second container terminal.

[0061] In further embodiments of said use, short distances, e.g. between a container terminal and a cleaning facility, can be bridged with transport by train (filled or empty tank container) or by truck (empty tank container). Additionally, interim storage on a wagon can be included in-between handling. Alternatively, tank containers may stand alone (without wagon) during interim storage.

[0062] In a preferred embodiment of the invention, a first tank container comprises two frames (a front frame and a back frame) at its outer portions. Each of said frames is adapted to carry large weights and is adapted for stacking of a second tank container on top of said container. Hereby, said frames may be adapted to be in contact with the frames of the second tank container when said second tank container is stacked on the first tank container. Preferably, said second tank container likewise comprises two frames adapted for stacking of a tank container on top of it. This allows the stacking of a third tank container on the second, and so on. Said stacking is advantageous especially when the tank containers are placed into container depots for storage. By stacking containers, the surface needed for storage is reduced, freeing up rail capacity that would otherwise have been taken up by loaded tank containers.

[0063] In a fourth aspect, the invention relates to a system for storing and/or transporting a gas, liquid and/or solid with a tank container or box container, according to any one of the claims 1 to 13, characterized in that the tank container or box container is placed on a chassis, wagon or container terminal.

EXAMPLES

[0064] The invention will now be further described by means of following examples, without being limited thereto.

[0065] Figure 1 is a side view of a tank container along to the longitudinal axis, according to a preferred embodiment of the invention.

[0066] Figure 2 is a plan view of a tank container along to the longitudinal axis of a tank container, according to a preferred embodiment of the invention.

[0067] Figure 3 is a back view of a tank container, according to a preferred embodiment of the invention.

[0068] Figure 4 is a perspective view of a tank container, according to a preferred embodiment of the invention.

[0069] The tank container (1) is provided with an elongated, mainly cylindrical tank vessel (2) and a frame, comprising two lateral frames (4) attached on the tank vessel (2) of the tank container (1), whereby a front frame is attached near to a front head, and a back frame is attached near to a back head. These lateral frames (4) carry the tank vessel (2). The tank vessel (2) is composed of different welded parts. The tank container (1) is pro-

vided with a supply and discharge connection (valve) (21), which is latest visible at the back side in Figure 3.

[0070] The front and back frame (4) carry the tank vessel (2). Additional support can be obtained by means of three support saddles (19) that are connected to the shell of the tank vessel (2). Each frame (4) is provided with two upper and two lower corner castings (7). Both lateral frames (4) comprise top cross members (15) and bottom cross members (14) and corner supports (16) that are placed between the corner castings (7).

[0071] In this embodiment of the tank container (1), a manhole (10) is provided in the shell of the tank vessel (2). The manhole (10) is sealed using manhole bolts (11) by means of a manhole lid (12).

[0072] It is supposed that the present invention is not limited to the embodiments described above and that some changes or modifications can be added to the described examples without reappraisal of the appended claims.

Claims

1. Tank container (1) for storing and/or transporting gas and/or liquid, which tank container (1) comprises a frame and an elongate, mainly cylindrical tank vessel (2) having a front head (13) and a back head (13) connected by a shell, and further provided with a manhole (10) and at least one outlet valve (21), wherein the frame comprises two lateral frames (4), of which a front frame (4) is attached to the tank vessel (2) near said front head (13), and of which a back frame (4) is attached to the tank vessel (2) near said back head (13), wherein said front frame (4) and said back frame (4) further comprise 2 or 4 corner castings (7) each, said corner castings (7) having lifting openings, adapted for passage of a twistlock, which tank container (1) is minimum 40 feet long, and which tank container (1) has a volume of minimum 50,000 l and a maximum gross weight of more than 40,000 kg, up to a maximum of 75,000 kg, **characterized in that** the front and back heads (13) protrude a distance from the front and back frames (4), which distance is not larger than 40% of the tank vessel (2) length, and **in that** said corner castings (7) are made of a steel material with an elasticity limit of at least 600 N/mm².

2. Tank container (1) according to claim 1, **characterized in that** three support saddles (19) are provided at the bottom side of the tank container:

- one at a distance of 1.6 m to 2.2 m of the front frame;
- one at a distance of 1.6 m to 2.2 m of the back frame;
- one centrally under the tank container;

wherein said support saddles (19) have a free height of 12 mm above the bottom surface of the frame.

3. Tank container (1) according to any of claims 1-2, **characterized in that** two or more manholes (10) are provided in a shell or a head end of the tank vessel (2).

4. Tank container (1) according to any of claims 1-3, **characterized in that** one or more outlet valves are provided at a head end (13), or at the left and/or right side of the tank container.

5. Tank container (1) according to any of claims 1-4, **characterized in that** a slight inclination is provided at the tank container, in the longitudinal direction.

6. Tank container (1) according to any of claims 1-5, **characterized in that** the tank container is isolated and/or adapted to be heated.

7. Use of a tank container (1) for intermodal transport, at least including railway transport, and in which the tank container (1) corresponds to any of claims 1 - 6, said use comprising:

- handling and filling said tank container (1) at a first container terminal, and
- transporting the filled tank container (1) by train, from said first container terminal towards a second container terminal, during which the tank container (1) is provided onto the chassis of a container wagon module that is adapted for receiving the tank container (1),

wherein, during said transport by train, only one tank container (1) is provided onto the container wagon module, which tank container (1) is filled to a gross weight of at least 40000 kg, and wherein the tank container (1) is separated from the container wagon module, at said first or second container terminal for filling, emptying, moving on site, repairing, or cleaning the tank container.

8. The use according to previous claim 7, further comprising the steps of handling and emptying said tank container (1) at said second container terminal, wherein the empty tank container (1) is separately transported to a maintenance and cleaning facility, onto the chassis of a separate heavy road vehicle that is adapted for receiving the tank container (1).

9. The use according to any of claims 7-8, wherein said tank container (1) is filled with a liquid having a density of between 1.0 kg/l and 1.7 kg/l.

Patentansprüche

1. Tankcontainer (1) zum Lagern und/oder Transportieren von Gas und/oder Flüssigkeit, wobei der Tankcontainer (1) ein Gestell und ein gestrecktes, hauptsächlich zylinderförmiges Tankgefäß (2) umfasst, das ein vorderes Kopfende (13) und ein hinteres Kopfende (13) aufweist, die durch einen Mantel verbunden sind, und ferner mit einem Mannloch (10) und mindestens einem Auslassventil (21) versehen ist, wobei das Gestell zwei seitliche Gestelle (4) umfasst, von denen ein vorderes Gestell (4) nahe dem vorderen Kopfende (13) an dem Tankgefäß (2) angebracht ist, und von denen ein hinteres Gestell (4) nahe dem hinteren Kopfende (13) an dem Tankgefäß (2) angebracht ist, wobei das vordere Gestell (4) und das hintere Gestell (4) ferner jedes 2 oder 4 Eckbeschläge (7) umfassen, wobei die Eckbeschläge (7) Hebeöffnungen aufweist, die zum Hindurchführen einer Drehverriegelung eingerichtet sind, wobei der Tankcontainer (1) mindestens 40 Fuß lang ist und wobei der Tankcontainer (1) ein Volumen von mindestens 50.000 l und ein maximales Bruttogewicht von mehr als 40.000 kg bis höchstens 75.000 kg aufweist, **dadurch gekennzeichnet, dass** das vordere und der hintere Kopfende (13) um einen Abstand aus dem vorderen und dem hinteren Gestell (4) hervorstehen, wobei der Abstand nicht größer als 40 % der Länge des Tankgefäßes (2) ist, und dadurch, dass die Eckbeschläge (7) aus einem Stahlmaterial mit einer Elastizitätsbegrenzung von mindestens 600 N/mm² besteht.

2. Tankcontainer (1) nach Anspruch 1, **dadurch gekennzeichnet, dass** an der Unterseite des Tankcontainers drei Stützsättel (19) bereitgestellt sind:

- einer in einem Abstand von 1,6 m bis 2,2 m des vorderen Gestells,
- einer in einem Abstand von 1,6 m bis 2,2 m des hinteren Gestells,
- einer mittig unter dem Tankcontainer,

wobei die Stützsättel (19) eine freie Höhe von 12 mm über der Unterseite des Gestells aufweisen.

3. Tankcontainer (1) nach einem der Ansprüche 1 bis 2, **dadurch gekennzeichnet, dass** zwei oder mehrere Mannlöcher (10) in einem Mantel oder einem Kopfende des Tankgefäßes (2) bereitgestellt sind.

4. Tankcontainer (1) nach einem der Ansprüche 1 bis 3, **dadurch gekennzeichnet, dass** an einem Kopfende (13) oder an der linken und/oder rechten Seite des Tankcontainers ein oder mehrere Auslassventile bereitgestellt sind.

5. Tankcontainer (1) nach einem der Ansprüche 1 bis

4, **dadurch gekennzeichnet, dass** an dem Tankcontainer (1) in der Längsrichtung eine leichte Neigung bereitgestellt ist.

6. Tankcontainer (1) nach einem der Ansprüche 1 bis 5, **dadurch gekennzeichnet, dass** der Tankcontainer isoliert und/oder dafür eingerichtet ist, beheizt zu werden.

7. Verwendung eines Tankcontainers (1) für intermodalen Transport, mindestens den Schienentransport einschließend, und wobei der Tankcontainer (1) einem der Ansprüche 1 bis 6 entspricht, wobei die Verwendung Folgendes umfasst:

- Handhaben und Füllen des Tankcontainers (1) an einer ersten Containerendstation, und
- Transportieren des gefüllten Tankcontainers (1) per Eisenbahn, von der ersten Containerendstation zu einer zweiten Containerendstation, währenddessen der Tankcontainer (1) auf dem Fahrgestell eines Containerwagenmoduls bereitgestellt ist, das zum Aufnehmen des Tankcontainers (1) eingerichtet ist,

wobei, während des Transports per Eisenbahn, nur ein Tankcontainer (1) auf dem Containerwagenmodul bereitgestellt ist, wobei der Tankcontainer (1) bis zu einem Bruttogewicht von mindestens 40.000 kg gefüllt ist, und wobei der Tankcontainer (1) an der ersten oder zweiten Containerendstation zum Füllen, Leeren, Vorort-Bewegen, Reparieren oder Reinigen des Tankcontainers von dem Containerwagenmodul getrennt wird.

8. Verwendung nach dem vorhergehenden Anspruch 7, ferner die Schritte des Handhabens und Leerens des Tankcontainers (1) an der zweiten Containerendstation umfassend, wobei der leere Tankcontainer (1) auf dem Fahrgestell eines separaten Schwerlastfahrzeugs, das für die Aufnahme des Tankcontainers (1) eingerichtet ist, separat zu einer Wartungs- und Reinigungseinrichtung transportiert wird.

9. Verwendung nach einem der Ansprüche 7 bis 8, wobei der Tankcontainer (1) mit einer Flüssigkeit gefüllt ist, die eine Dichte zwischen 1,0 kg/l und 1,7 kg/l aufweist.

Revendications

1. Conteneur-citerne (1) pour le stockage et/ou le transport de gaz et/ou de liquide, lequel conteneur-citerne (1) comprend un châssis et une cuve de citerne allongée essentiellement cylindrique (2) ayant une tête avant (13) et une tête arrière (13) reliées par une coque, et pourvue en outre d'un trou d'homme (10)

- et d'au moins une soupape de sortie (21), dans lequel le châssis comprend deux châssis latéraux (4), dont un châssis avant (4) est fixé à la cuve de citerne (2) à proximité de ladite tête avant (13), et dont un châssis arrière (4) est fixé à la cuve de citerne (2) à proximité de ladite tête arrière (13), dans lequel ledit châssis avant (4) et ledit châssis arrière (4) comprennent en outre chacun deux ou quatre pièces de coin (7), lesdites pièces de coin (7) possédant des ouvertures de levage, conçues pour le passage d'un verrou tournant, lequel conteneur-citerne (1) mesure au moins 40 pieds de long, et lequel conteneur-citerne (1) a un volume minimum de 50 000 l et un poids brut maximal de plus de 40 000 kg, jusqu'à un maximum de 75 000 kg, **caractérisé en ce que** les têtes avant et arrière (13) font saillie à une distance par rapport aux châssis avant et arrière (4), laquelle distance n'excède pas 40 % de la longueur de la cuve de citerne (2), et **en ce que** lesdites pièces de coin (7) sont constituées d'un matériau en acier ayant une limite d'élasticité d'au moins 600 N/mm².
2. Conteneur-citerne (1) selon la revendication 1, **caractérisé en ce que** trois selles de support (19) sont prévues sur le côté inférieur du conteneur-citerne :
- une à une distance de 1,6 m à 2,2 m du châssis avant ;
 - une à une distance de 1,6 m à 2,2 m du châssis arrière ;
 - une centralement sous le conteneur-citerne ;
- dans lequel lesdites selles de support (19) ont une hauteur libre de 12 mm au-dessus de la surface inférieure du châssis.
3. Conteneur-citerne (1) selon l'une quelconque des revendications 1 et 2, **caractérisé en ce que** deux trous d'homme (10) ou plus sont prévus dans une coque ou une extrémité de tête de la cuve de citerne (2).
4. Conteneur-citerne (1) selon l'une quelconque des revendications 1 à 3, **caractérisé en ce qu'**une ou plusieurs soupapes de sortie sont prévues au niveau d'une extrémité de tête (13), ou sur le côté gauche et/ou droit du conteneur-citerne.
5. Conteneur-citerne (1) selon l'une quelconque des revendications 1 à 4, **caractérisé en ce qu'**une légèreté inclinaison est prévue sur le conteneur-citerne, dans la direction longitudinale.
6. Conteneur-citerne (1) selon l'une quelconque des revendications 1 à 5, **caractérisé en ce que** le conteneur-citerne est isolé et/ou conçu pour être chauffé.
7. Utilisation d'un conteneur-citerne (1) pour le transport intermodal, comprenant au moins le transport ferroviaire, et dans lequel le conteneur-citerne (1) correspond à l'une quelconque des revendications 1 à 6, ladite utilisation comprenant de :
- manutentionner et remplir ledit conteneur-citerne (1) au niveau d'un premier terminal à conteneurs, et
 - transporter le conteneur-citerne (1) rempli par chemin de fer, à partir dudit premier terminal à conteneurs vers un second terminal à conteneurs, au cours de quoi le conteneur-citerne (1) est situé sur le châssis d'un module de wagon porte-conteneurs qui est conçu pour recevoir le conteneur-citerne (1),
- dans lequel, pendant ledit transport par chemin de fer, un seul conteneur-citerne (1) est situé sur le module de wagon porte-conteneurs, lequel conteneur-citerne (1) est rempli à un poids brut d'au moins 40 000 kg, et dans lequel le conteneur-citerne (1) est séparé du module de wagon porte-conteneurs, au niveau dudit premier ou second terminal à conteneurs pour le remplissage, le vidage, le déplacement sur site, la réparation ou le nettoyage du conteneur-citerne.
8. Utilisation selon la revendication précédente 7, comprenant en outre les étapes consistant à manutentionner et à vider ledit conteneur-citerne (1) au niveau dudit second terminal à conteneurs, dans lequel le conteneur-citerne vide (1) est transporté séparément vers une installation de maintenance et de nettoyage, sur le châssis d'un poids lourd séparé qui est conçu pour recevoir le conteneur-citerne (1).
9. Utilisation selon l'une quelconque des revendications 7 et 8, dans lequel ledit conteneur-citerne (1) est rempli d'un liquide ayant une densité comprise entre 1,0 kg/l et 1,7 kg/l.

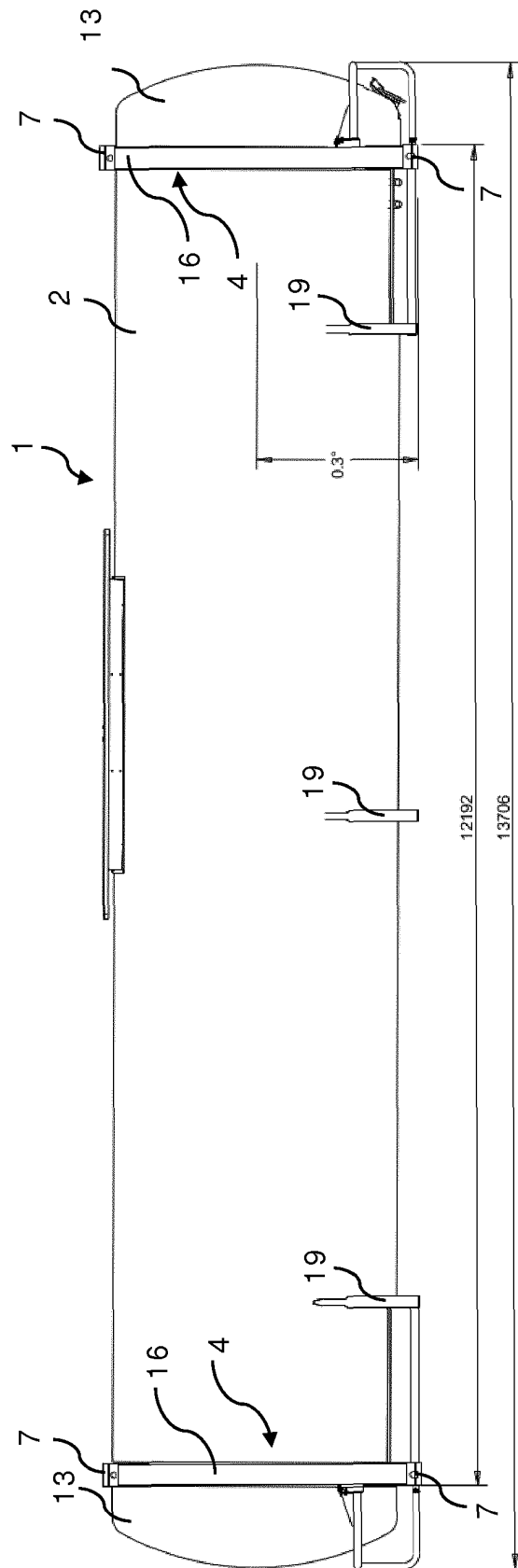


FIG. 1

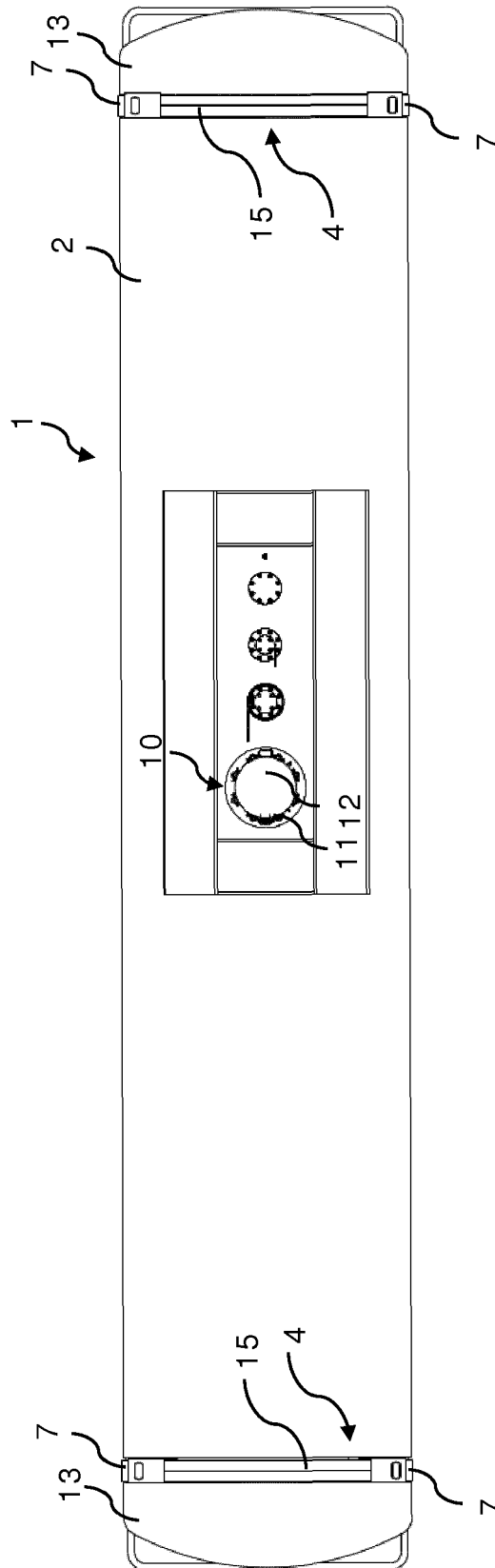


FIG. 2

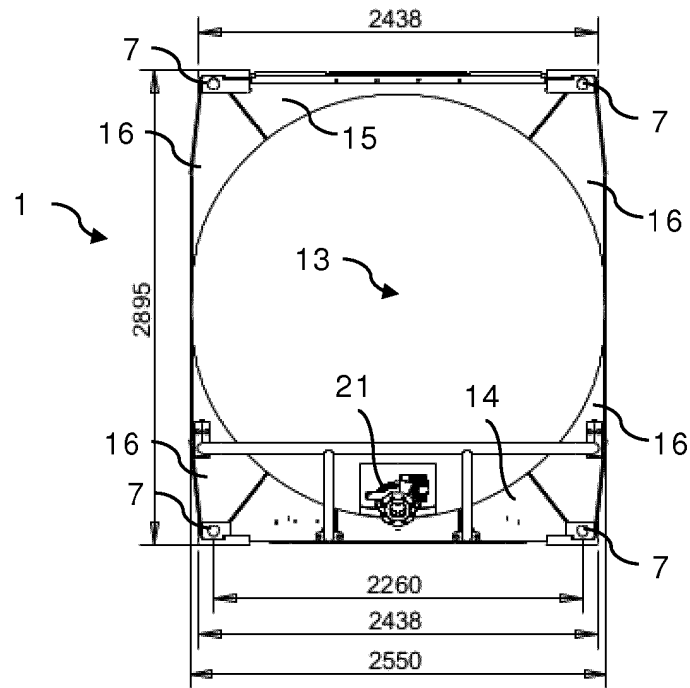


FIG. 3

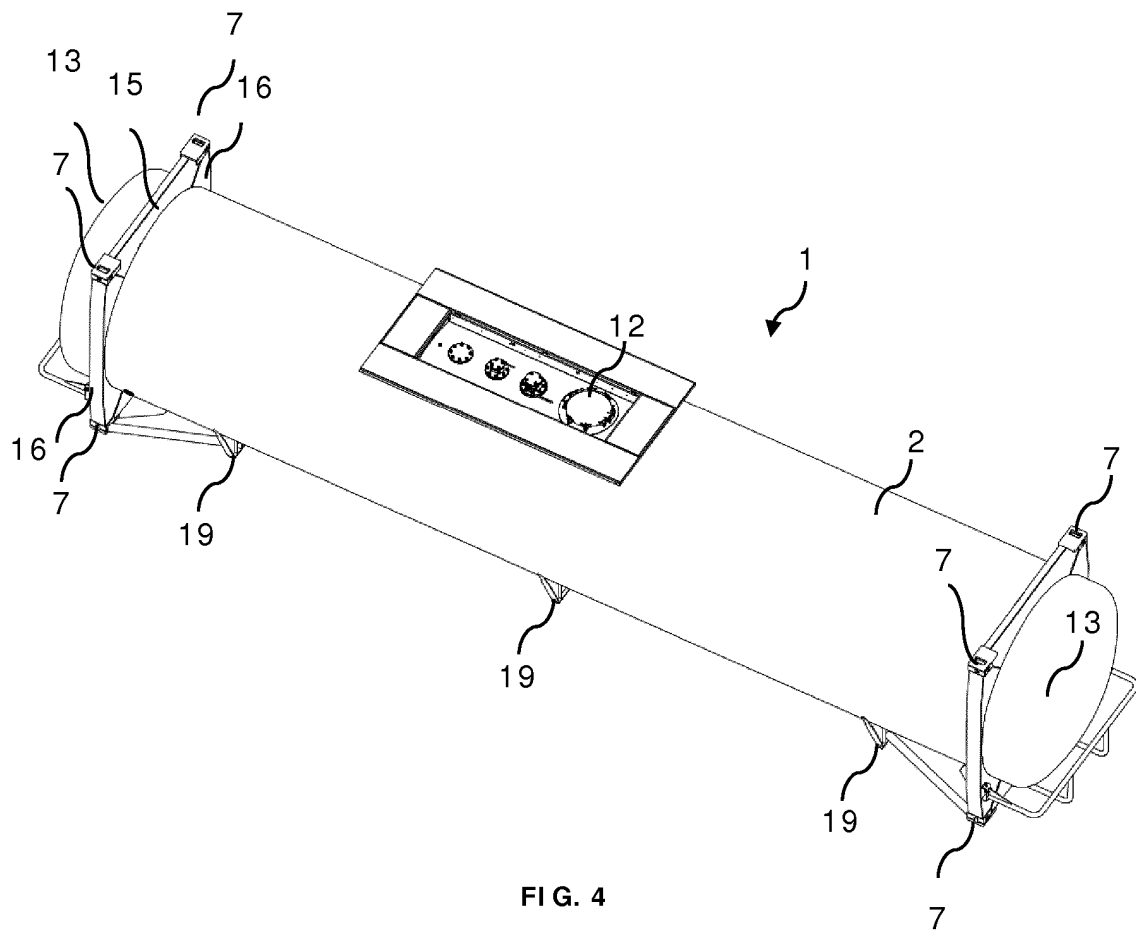


FIG. 4

REFERENCES CITED IN THE DESCRIPTION

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