



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
15.12.2021 Bulletin 2021/50

(51) Int Cl.:
B65D 88/12 (2006.01) **B65D 88/52 (2006.01)**
B65D 90/00 (2006.01) **B65D 90/18 (2006.01)**

(21) Application number: **21461538.7**

(22) Date of filing: **10.05.2021**

(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

(30) Priority: **09.06.2020 PL 43426120**

(71) Applicant: **Wojskowa Akademia Techniczna im.
Jaroslawa
Dabrowskiego
00-908 Warszawa 49 (PL)**

(72) Inventors:
• **Krason, Wieslaw**
05-082 Blizne Jasinskiego (PL)
• **Kedzierski, Piotr**
01-470 Warszawa (PL)
• **Slawinski, Grzegorz**
05-850 Ozarow Mazowiecki (PL)
• **Stankiewicz, Michal**
01-651 Warszawa (PL)
• **Kiepora, Jaroslaw**
04-784 Warszawa (PL)

(74) Representative: **AOMB Polska Sp. z o.o.**
Ul. Emilii Plater 53
21st Floor
00-113 Warsaw (PL)

(54) **A PLATFORM FOR RAIL-ROAD TRANSPORT, IN PARTICULAR WOOD AND METAL LOGS**

(57) A platform for rail-road transport, in particular wood and metal logs, according to the invention consists of a frame, stanchions and at least one transverse wall, the platform frame being made of a floor and sideboards, the floor having the form of a rectangle consisting of two longitudinal beams, two transverse beams and support beams spanning between the longitudinal beams, and a single sideboard consisting of a skid, a handrail, vertical posts and stanchion slots, and it is characterised in that the skids (1g) and the handrails (1f) end with container corners (1j, 1k), a connector (2f) for hook-loading is mounted to the transverse wall (2), transport rollers (4a) and rails (1m) engaging the roller mechanism (11b) of a hook device (11) are mounted symmetrically under the floor (1a), and in the rails (1m) there are two forklift pockets (1t), whose position corresponds to the position of forklift pockets (1u) in the sideboards (1b), the spacing of axes of pockets (1t) in the rails (1m) equalling the spacing of axes of forklift pockets of 20-foot containers.

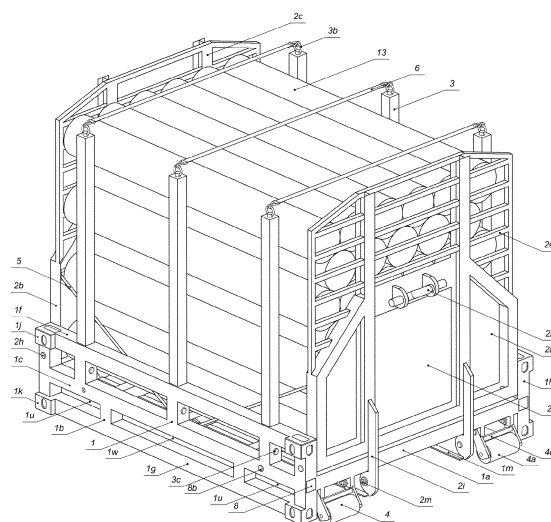


Fig. 1

Description

[0001] The object of the invention is a platform for rail-road transport, in particular wood and metal logs, which reduces the time of reloading operations of elongated commodities.

[0002] Carrying of wood and metal logs is a complex transport problem, usually arranged between a manufacturer and a receiver. The process of transporting wood logs starts in a place of tree felling, from which the wood after loading is transported by means of lorries and tractors to loading sites next to railway sidings, where the logs are reloaded to railway wagons. A reverse process takes place at the receiver's end. Upon reaching the target railway siding, the logs are unloaded and subsequently loaded onto lorries, which transport the logs to a receiver, e.g. sawmills. A similar transport process takes place in the case of transporting metal logs, e.g. transmission pipes. To sum up, it should be concluded that the supply chains of wood and metal logs are characterised by numerous loading and unloading operations, which, due to the specifics of the transported commodities, are complicated and time-consuming.

[0003] From the European patent description EP2525996 there is a known cargo box for transporting wood in the form of logs. The frame of the box consists of two longitudinal beams and two transverse beams. At the beginning and the end of the box, there are racks of hook connectors. A rack consists of two convergent legs ending with a connector, wherein the legs of the rack being rigidly connected to the ends of longitudinal beams of the frame. At the ends of the longitudinal beams, there are slots of a mechanism locking the cargo box on semi-trailers and railway wagons. The slots are entered by profile pins of the bodies of transporting means. The transverse beams of the frame are extended outside the longitudinal beams in order to mount rollers. The carrier is provided with stanchions, which are capable of rotating to a horizontal position. The convergence of racks of the hook connectors and the foldable stanchions enable storage and transport of carriers stacked on each other.

[0004] From the international application description WO2006/005920 there is a known elongated rack for wood logs. The rack is a flat container whose floor is formed by two longitudinal rails connected by transverse beams. The load rests on support beams spanning between the rails, wherein the upper profiled part of the beams entering between the rails of the rack located above, in the case of storing stacked racks. Foldable stanchions and foldable feet of the container are mounted to the rack rails. At the end of the rack, there is a rotatable mounted rear wall, whose movement is limited by chains attached to the floor rails. The rack is provided with standard container corners constituting points of mounting on to semi-trailers and railway wagons.

[0005] From the international application description WO95/16622 there is a known method for transporting wood and a container for transporting wood. The method

assumes the loading of wood at the felling site, to containers which are subsequently tugged to a site of loading onto standard lorries. The containers are loaded onto lorries by means of a winch. The container has the form of an open cuboid with a front wall, a rear wall, stanchions and a floor with a frame construction reinforced by transverse profiles. Eyes for mounting a hook or a rope of the winch are attached to the front and rear walls of the container, while transport rollers are mounted to the floor. Empty containers can be stored and transported in stacks after disassembling the stanchions and folding the walls, which are capable of rotating around the horizontal axis.

[0006] From the South Korean application description of utility model KR20170002410 there is a known rack for transporting wood logs. The rack consists of two opposite walls and a floor with a frame construction. In the floor, there are forklift pockets enabling reloading the rack by means of a forklift. Eyes constituting points of mounting of slings for crane devices are mounted to the upper corners of the rack.

[0007] From the German patent description DE102008052238 there is a known device for transporting considerably elongated items with a circular cross-section. The device consists of a floor in the form of a rectangular frame reinforced with transverse and longitudinal profiles. Pockets with two elongated holes on the opposite walls and a recess on the outer wall of the pocket are mounted to the longer beams of the floor. In the pockets, there are vertically placed stanchions, whose pins enter the elongated holes of a pocket. After raising a stanchion to a height at which its pin is above the recess in the pocket wall, it is possible to rotate it to a horizontal position. A towing eye is mounted to the front surface of the frame, and under the frame there are transport rollers. In the frame, there are through forklift pockets, both on the front and side surfaces. Mounted to the corners of the frame are upward-facing protrusions, which enter the frame of a device located above when storing and transporting stacked devices, upon prior folding of the stanchions.

[0008] From the German patent description DE102005042243 there is a known foldable transport container. The frame of the device consists of a floor and a front wall which is rigidly connected to the floor. The container is provided with a foldable rear wall and side stanchions connected to the floor in a hinged manner, which enables folding them to the inside. The towing eye of the hook device is mounted to the front and back walls, with transport rollers under the floor. When storing and transporting stacked containers, the towing eye of the container placed above enters the window of the front wall of the container placed below. On the other hand, the locking pins protruding from the rear wall of the container placed below enter the slots in the floor of the container placed above, in order to lock it.

[0009] From the European application description EP1728729 there is a known pallet for transporting round wood or sawn timber on lorries and/or container wagons,

in particular for intermodal freight transport. The pallet has a frame design consisting of two longitudinal beams, transverse reinforcing profiles and three protruding transverse deck boards, on which the wood is stored. In the corners of the pallet there are stanchions, and the outer deck boards of the pallet have on-board rotary joints mounted to them, whose spacing corresponds to the spacing of the slots of rotary joints on semi-trailers and container wagons. The load is mounted on the pallet by means of belting clamping devices. A loaded pallet is manipulated by means of a forklift, whose fork enters between the wood and the longitudinal beams. In the disclosed solution, the load serves a bearing function, and the pallet only provides stability of dimensions.

[0010] The purpose of the invention is to present a platform for rail-road transport, in particular wood and metal logs, which can be manipulated by means of hook devices, forklifts, cranes and gantry cranes, and transported on lorry beds, trailers, semi-trailers, container semi-trailers, tractors and trailers equipped with hook devices, flat wagons of the normal type and flat wagons of the special type.

[0011] A platform for rail-road transport, in particular wood and metal logs, according to the invention consists of a frame, stanchions and at least one transverse wall, wherein the platform frame being made of a floor and sideboards, the floor having the form of a rectangle consisting of two longitudinal beams, two transverse beams and support beams spanning between the longitudinal beams, and a single sideboard consists of a skid, a hand-rail, vertical posts and stanchion slots, characterised in that the skids and the handrails end with container corners, a connector for hook-loading is mounted to the transverse wall, transport rollers and rails engaging the roller mechanism of a hook device are mounted symmetrically under the floor, and in the rails there are two forklift pockets, whose position corresponds to the position of forklift pockets in the sideboards, wherein the spacing of axes of pockets in the rails equalling the spacing of axes of forklift pockets of 20-foot containers.

[0012] Preferably, the transverse wall has the form of a rectangular plate with bevelled corners, with external reinforcements and internal reinforcements, as well as horizontal grating in the upper part.

[0013] Preferably, the transverse wall is a movable element mounted to the frame by means of a pair of pins connecting the external reinforcements of the transverse wall to the sideboards, and in a vertical position the fork placed in the lower part of flat bars mounted rigidly to the front surfaces of the internal reinforcements of the transverse wall comprises the webs of rails, to which they are connected using pins.

[0014] Preferably, the flat bars mounted to the internal reinforcements of the transverse wall have a bevelled lower corner, and the fork of the flat bars has kinked inner edges.

[0015] Preferably, in the transverse wall there are slots, in which there are mounted pins constituting the points

of mounting of ties connecting the transverse wall to the frame.

[0016] Preferably, stanchions placed in the slots of the sideboards are locked by means of loosely fitted pins, entering the through holes in the slots and the through holes in the lower part of the stanchions, wherein the pins being secured by cotters.

[0017] Preferably, the through holes in the stanchion slots being parallel to the longitudinal beams.

[0018] Preferably, the stanchions located at the opposite side of the platform are connected in pairs by means of ties in the form of chains, belts or ropes, which are mounted to the eyes located in the upper part of the stanchions.

[0019] Preferably, in the longitudinal beams of the floor there are placed sliding mandrels, which enter the longitudinal beams of the attached platform, wherein the mandrels being locked in their extreme positions by means of loosely fitted pins.

[0020] Preferably, the mandrels have a length of $2/3$ the length of the longitudinal beams of the frame.

[0021] Preferably, in a longitudinal beam there are two through holes, and in the mandrel there are two through holes for the pins, wherein the distance between the axis of the hole in the beam and the closer end of the beam, and the distance between the axis of the hole in the mandrel and the closer end of the mandrel equalling $1/6$ the length of the longitudinal beam.

[0022] Preferably, the frame is symmetrical relative to the longitudinal vertical plane and the transverse vertical plane.

[0023] Preferably, in each rail there are two additional forklift pockets, whose position corresponds to the position of the window in the sideboard, wherein the distance between the vertical outer walls of both pockets equalling the length of the window in the sideboard, and the distance from the axis of each pocket to the closer face of the frame equalling half the spacing of axes of the forklift pockets of a 20-foot container.

[0024] Preferably, under at least one transverse beam of the frame, between the sideboards and the rails there are mounting eyes of the hangers of the transport rollers, to which the hangers are connected in an articulated manner by means of the pins, wherein the mounting eyes comprising resistance protrusions limiting the movement of the arms of the hangers.

[0025] Preferably, in the lower part of the arms of the hangers, on their outer side, there are ballast protrusions.

[0026] Preferably, the load transported on the platform is belted with compression straps which are mounted to the sideboards.

[0027] Preferably, the frame of the platform is connected to the frame of the platform placed above by means of rotary joints, wherein the profile pin of the rotary joint entering the upper container corner of the platform located below and the lower container corner of the platform located above.

[0028] The platform enables rail-road transport of

wood and metal logs from the original loading site to the intended target site, with no need to repeat loading and unloading operations of the transported commodities while changing between various transport means. Once filled with logs, the platform can be reloaded multiple times using various loading and unloading techniques and carried with the use of various transport means. The platform consists of a frame, a transverse wall, sideboards and stanchions. The load, whose transverse and longitudinal movement is limited by the transverse wall and the stanchions, is stored on the frame. The sideboards consist of a handrail, a skid, vertical posts and slots, in which the stanchions are mounted detachably. The container corners, which constitute the ending of handrails, are points of mounting for the slings of cranes and gantry cranes. The container corners, which in turn constitute the ending of skids, enable connecting the platform to container semi-trailers and railway wagons, for transporting the containers using on-board rotary joints, the so-called bottom twist locks. A connector mounted on the transverse wall enables lifting the platform by means of lorries and trailers equipped with hook devices. On the other hand, rails under the platform floor engage the roller mechanism of a hook device when raising or lowering the platform. The transport rollers assist in the movement of the platform during hook-loading/unloading. The forklift pockets in the sideboards and rails of the hook device enable manipulating the platform using forklifts. The dimensions of the platform frame correspond to the dimensions of a 10-foot container, i.e. 2438 mm x 2991 mm.

[0029] The transverse wall of the platform with a plate design prevents undesired displacement of the transported logs in the longitudinal direction. The external reinforcements of the transverse wall additionally constitute a point of mounting the wall to the sideboards, with the internal reinforcements being a point of mounting the wall to the rails of the hook device. The horizontal grating in the upper part reduces the mass of the transverse wall, while the bevelled corners of the wall facilitate manipulating the platform and transporting the platform on forest roads and at the tree-felling site.

[0030] The transverse wall can rotate relative to the pins connecting its external reinforcements to the sideboards. On the other hand, the pins connecting the fork of the flat bars of the transverse wall and the rails of the hook device lock the wall in its vertical position and transfer strains to the rails during hook-loading of the platform. The detachable connection of the transverse wall and the frame enables folding the wall to a horizontal position or its complete removal. Folding the wall to a horizontal position reduces storage and transport volume of the platform. On the other hand, after complete removal of the transverse walls, the platform constitutes a pallet.

[0031] The bevelling of lower corners on the front surface of flat bars protects the roller mechanism of the hook device against damage when loading the platform. The kink of the inner edges of the fork of the flat bars in turn

directs the webs of the rails of the hook device into a recess within the fork during rotation of the transverse wall to a vertical position.

[0032] Connection of the transverse wall to the frame by means of the tie constitutes additional protection of the transverse wall against leaning outside in the case of dynamic loads caused by sudden braking of the transport means.

[0033] The detachable connection of the frame and the stanchions by means of the pins enables disassembly of the stanchions, for storage and transport of empty platforms stacked on each other.

[0034] The parallel orientation of the axes of holes for pins in the stanchion slots relative to the longitudinal beams enables driving out the pin when the platform is full, and removing the stanchion in order to increase access to the load when emptying the platform.

[0035] Due to the impact of the load, the stanchions mounted in the slots are subjected to cantilever bending, wherein the value of the bending moment being the highest at the support. The connection of stanchions located at the opposite side of the platform by means of ties reduces the value of maximum bending moment in stanchions, limiting the possibility of their permanent deformation.

[0036] The use of sliding mandrels placed in longitudinal beams with a box-like cross section, which are locked in their extreme positions by means of loosely fitted pins, enables serial connection of frames in order to produce a platform with multiplied size. Before connecting, each mandrel is completely concealed in the longitudinal beam of one frame and locked by one pin. After the connection, two mandrels are placed in the longitudinal beams of both frames, and they are locked in each one of the beams by means of a pin. The use of sliding mandrels enables achieving flat front surfaces of the frames and symmetry of the frames relative to the transverse vertical plane. In addition, mandrels placed in the longitudinal beams of the frames increase their flexural strength.

[0037] The use of mandrels with a length of $2/3$ the length of the longitudinal beams facilitates the positioning of mandrels in the beams during the operations of combining the frames. After unlocking and removing the mandrels from the attached frame, the frames should be preliminarily aligned. Subsequently, the claws of bridge joints, the so-called bridge fittings, are placed in the container corners of the combined frames in order to combine and precisely assemble the frames. This is followed by inserting mandrels previously removed from the second frame into the longitudinal beams of the first frame, in which there are mandrels, so that they move the mandrels of the first frame into the beams of the second frame. After complete insertion of the mandrels of the second frame into the beams of the first frame, the mandrels of the first frame have equally entered the first and the second frame, and their holes overlap with the holes of the combined frames.

[0038] The formation of two holes in each longitudinal beam and in each mandrel at a distance of 1/6 the length of the longitudinal beam from their ends limits to a minimum the number of necessary holes in the beams and the mandrels. The holes, which are used to lock the mandrels in the beams of a single frame, are also used to combine the frames by means of the mandrels.

[0039] The double symmetry of the frame, in particular symmetry in the transverse plane, enables moving the transverse wall and the rollers to the other end of the frame, in case their mounting nodes are damaged; it facilitates the configuration of platforms consisting of two and more frames, eliminating the problem of proper positioning of the frames.

[0040] The additional forklift pockets in the rails of the hook device enable lifting a platform consisting of two combined frames by means of forklifts.

[0041] The articulated connection of the transport rollers to the frame by means of the hangers enables folding the rollers, solving the problem of the rollers protruding below the level of the container corners. Concealing the rollers under the platform allows for the connection of container corners to the on-board rotary joints of the transport means. The resistance protrusions of the mounting eyes restrict the tilting of the rollers outside the platform, ensuring their proper arrangement in the working position.

[0042] The ballast protrusions in the lower part of the arms of the hangers cause their asymmetry relative to an axis extending through the axis of rotation of the transport roller and the axis of pins connecting the hanger to the frame. Due to the asymmetry, once the platform is raised, the axis of rollers moves under the platform due to the action of gravity. When lowering the platform onto the body of a transport means, the arms of the hangers rotate automatically towards the centre of the frame, causing the set of rollers to be concealed under the platform.

[0043] Belting the load with compression straps enables using only one transverse wall, limiting the possibility for the load to leave the platform. In addition, the pressure of the load against the platform frame, resulting from belting, increases the rigidity of the platform by using the rigidity of the load. As a result, the structure of the platform can be made thinner. The absence of a second transverse wall enables quick unloading by raising the opposite end of the platform, having previously unfastened the compression straps.

[0044] Combining stacked platforms by means of standard rotary joints, the so-called twist locks, secures the platforms against their relative horizontal and vertical displacement during storage and transport.

[0045] The solution according to the invention, in which sideboards of the platform end with container corners, on the transverse wall there is a connector for hook-lifting, under the platform floor there are mounted transport rollers and rails of the hook devices, and forklift pockets have been made in the sideboards and rails of the hook

device, enables the performance of loading and unloading operations of the platform using various means of short-distance transport, in particular hook devices, forklifts, cranes and gantry cranes, and carrying the platform using various means of long-distance transport, in particular road vehicles and railways wagons.

[0046] The invention has been presented in embodiments, in which fig. 1 presents the platform with two transverse walls filled with load, fig. 2 presents the platform frame, fig. 3 presents the transverse wall in a front view, fig. 4 presents a fragment of the transverse wall in a rear view, fig. 5 presents a platform made of two frames filled with logs forming a stack, fig. 6 presents the platform with the mandrels extended, fig. 7 presents a cross-section across the longitudinal beams of two connected frames, fig. 8 presents the mutual positioning of two frames by means of bridge joints before connecting by mandrels, fig. 9 presents the rollers: a) during lowering from a vehicle equipped with a hook device; b) in the working position; c) after raising the platform; d) when lowering the platform onto a lorry/railway wagon; e) in the transport position, fig. 10 presents the platforms with folded stacked transverse walls, fig. 11 presents the method for combining platforms in stacks by means of rotary joints, fig. 12 presents the platform placed on a vehicle provided with a hook device, fig. 13 presents the platform loaded on a hook lift trailer coupled with a farm tractor, fig. 14. presents the platform placed on a railway wagon for transporting containers, fig. 15 presents the platform lifted by a forklift.

[0047] The platform for rail-road transport consists of a frame 1, a transverse wall 2, stanchions 3 and a set of transport rollers 4. The frame 1 consists of a floor 1a and sideboards 1b, wherein the floor 1a being made of longitudinal beams 1c, transverse beams 1d and support beams 1e, on which the load 13 rests, the sideboard 1b in turn being made of a handrail 1f, a skid 1g, vertical posts 1h and stanchion slots 1i. The handrails 1f end with upper container corners 1j, while the skids 1g end with lower container corners 1k. Under the floor 1a, there are rails 1m, which during hook-loading/unloading engage the roller mechanism 11b of hook devices 11. The rails 1m are mounted symmetrically relative to the longitudinal axis of the frame 1 to the transverse beams 1d and the support beams 1e. The transverse wall consists of a lower plate 2a, external reinforcements 2b, internal reinforcements 2c, a lower reinforcement 2d and a horizontal grating 2e in the upper part. A hook connector 2f is mounted on the outer side of the wall. The transverse wall 2 is connected in an articulated manner to the frame 1 by means of pins 2h, which are inserted into bushings 1n welded into the vertical posts 1h of the sideboards 1b and bushings 2g welded into the external reinforcements 2b of the transverse wall 2. The flat bars 2i which protrude below the lower reinforcement 2d are mounted in an upright manner to the internal reinforcements 2c. In the lower part of the flat bars 2i, on their rear wall there is a fork 2j, wherein the distance between the inner walls of the

fork 2j corresponding to the width of webs 1n of the rails 1m, taking into account clearance. During rotation of the transverse wall 2 towards the vertical, the fork 2j overlaps the web 1n, so that the web 1n is embraced by the fork 2j. The kink of the inner edges 2o of the fork 2j guides the web 1n onto the recess 2k within the fork 2j. The fork 2j of the flat bar 2i is connected to the webs 1n of the rails 1m using pins 2m, which enter holes 21 in the fork 2j and holes 1s in the rail 1m. The articulated connection of the flat bars 2i and the rails 1m locks the transverse wall 2 in its vertical position, and it transfers the strain to the rails 1m during hook-loading. Disconnection of the flat bars 2i and rails 1m by removing the pins 2m enables rotation of the transverse wall 2 relative to the pins 2h to a horizontal position, in which the transverse wall 2 rests on the support beams 1e of the floor 1a. In the vertical position, the transverse wall 2 is additionally secured by ties 5, which connect pins 2r concealed in slots 2p to points of mounting 1z, wherein the slots 2p being made at the inner side of the transverse wall 2 and the points of mounting 1z being rigidly connected to the middle support beam 1e and the longitudinal beam 1c. The ties 5 prevent the transverse wall 2 from tilting outside during pushing of the logs, caused, e.g. by sudden braking. Transverse displacement of the load 13 is prevented by the stanchions 3, which are placed in the stanchion slots 1i. The stanchions 3 are locked by means of removable, loosely fitted pins 3c, which enter the through holes 1p of the frame 1 and the through holes of the stanchions 3a. The holes 1p are made parallel to the longitudinal axis of the frame 1, at the same distance from the handrails 1f and the longitudinal beams 1c. The described situation of the holes 1p makes it possible to drive out the pins 3c when the platform is loaded and remove selected stanchions 3 in order to increase access to the load 13 being emptied. In the upper part of the stanchions 3, there are eyes 3b constituting a point of mounting for ties 6 connecting the stanchions 3 located at the opposite side of the frame 1. Binding the opposite stanchions 3 eliminates the condition of cantilever bending of the stanchions 3, reducing the maximum value of the bending moment.

[0048] The platform can consist of several frames 1 combined in series, connected by means of mandrels 8, which before connection are placed in the longitudinal beams 1c and locked by pins 8b. The longitudinal beams 1c have a box-like cross-section with internal dimensions corresponding to the dimensions of the mandrels 8, taking into account clearance. After aligning the frames 1, half of the length of the mandrels 8 has entered the longitudinal beams 1c of the first frame, and the second half of the length of the mandrels 8 has entered the longitudinal beams 1c of the second frame. The process of combining begins with unlocking the pins 8b of the frame 1 being attached and removing the mandrels 8 therefrom. After preliminary positioning of the frames 1, they are combined by means of bridge joints 10, so that the claws 10a of the joints 10 enter the container corners of both

platforms. The rotation of a lead screw 10b causes tightening of the combined frames 1. Subsequently, the previously removed mandrels 8 are inserted into the longitudinal beams 1c of the first frame, moving the mandrels 8 placed therein, which enter the longitudinal beams 1c of the second frame. Due to the length of the mandrels 8, which is $\frac{2}{3}$ the length L of a single frame, after complete insertion of the mandrels 8 of the second frame into the longitudinal beams 1c of the first frame 1, the mandrels 8 of the first frame have entered both frames equally, and their holes 8a are opposite the holes 1r of the longitudinal beams 1c of the combined frames 1. The distance between the axes of the holes 1r in the longitudinal beams 1c and the closer face of the frame 1, and the distance between the axes of the holes 8a in the mandrels 8 and their end equal $\frac{1}{6}$ of the frame length L, due to which the number of holes in the longitudinal beams and mandrels is minimal, and each one of the holes can be used to lock the mandrels concealed in the beam of one frame or the mandrels connecting the two frames. The mandrels 8 placed in the beams 1c increase their bending stiffness.

[0049] The platform can be reloaded by means of hook devices 11 placed on lorries 12 or trailers 14 coupled with farm tractors 15. During the loading, a hook 11a connects to the hook connector 2h. The hook device 11 raises the front part of the platform and subsequently pulls it onto a bed 11c. When loading/unloading the platform by means of the hook device, the rails 1m rest against the roller mechanism 11b of the hook device 11. The movement of the platform on the ground is supported by two sets of rollers 4 placed symmetrically relative to the frame 1. A set of rollers consists of a roller 4a, a roller axis 4b and a hanger 4c connected in an articulated manner to the mounting eyes 1x by means of pins 4f inserted into the hole 1q, wherein the mounting eyes 1x being placed under the transverse beam 1d between the sideboard 1b and the closer rail 1m. The resistance protrusions 1y, which restrict the tilting of the set of rollers 4 to the outside, are an integral part of the mounting eyes 1x. The movable connection of the set of rollers 4 to the frame 1 allows for concealing the rollers 4a under the platform during transport, in particular for connecting the lower container corners 1k to the on-board rotary joints. The arms 4d of the hangers 4c have in their lower part ballast protrusions 4e, located at the outer side of the axis extending through the pin 4f and the roller axis 4b. The ballast protrusions 4e cause the asymmetry of the arms 4d of the hangers 4c. During free hanging, the gravity causes tilting of the axis extending through the pin 4f and the axis of the roller 4b towards the centre of the frame 1, and when lowering the platform onto the transport means, it hides the set of rollers under the frame 1. The platform can be manipulated by means of cranes and gantry cranes, with the use of a traverse beam and slings. The points of mounting of linear slings are the upper container corners 1j or the lower container corners 1k. Reloading of the platform can proceed with the use of forklifts 17, whose fork enters

the forklift pockets 1u in the sideboards 1b and the forklift pockets 1t in the rails 1m, in the case when the platform consists of an odd number of frames 1. The inner walls of the pockets 1u and the inner walls of the pockets 1t are at the same distance from the closer face of the frame 1. The spacing W of the forklift pockets 1t is 2050 ± 50 mm. When reloading platforms consisting of an even number of frames 1, the fork of the forklifts enters the windows 1w of the sideboards 1b and the additional forklift pockets 1v of the rails 1m. The distance from the axes of the additional forklift pockets 1v to the nearest frame face equals $1/2$ of the spacing W . The platform can be carried by means of various transport means. When carried by container semi-trailers and railway wagons for transporting containers 16, the profile pins of on-board rotary joints enter the lower corners 1k of the platform, connecting it to the body of the transport means. When transporting a platform made of two frames 1, whose length is smaller than the length of a 20-foot container by 3 inches, the platform is mounted using only four lower container corners 1k of the first frame and on-board rotary joints dedicated for a 10-foot container.

[0050] After folding the transverse walls, the platforms can be stored and transported in a stacked state. The mutual connection of platforms is provided by rotary joints 9, whose profile pins 9a enter the upper container corners 1j of the platform located below and the lower container corners 1k of the platform located above.

[0051] The frame 1 of the platform is symmetrical relative to the longitudinal vertical plane L_p and the transverse vertical plane T_p . The width and length of the frame are 2438 mm and 2991 mm, respectively, corresponding to the dimensions of a 10-foot container (ISO 1D container).

[0052] The use of the platform according to the invention solves the problem of numerous and time-consuming loading and unloading operations in the supply chains of wood and metal logs. The platform along with the logs can be reloaded multiple times between various transport means, with no need to empty the platform of the logs. The platforms can be delivered to a loading site in stacks in an assembled state, in which they occupy much less transport space. Once configured depending on the purpose, filled ones can wait for loading onto means of long-distance transport. The use of the platform considerably shortens the time of preparing sets of railway wagons, and stoppages of transport means.

Claims

1. A platform for rail-road transport, in particular wood and metal logs, consists of a frame, stanchions and at least one transverse wall, wherein the platform frame being made of a floor and sideboards, the floor having the form of a rectangle consisting of two longitudinal beams, two transverse beams and support beams spanning between the longitudinal beams,

and a single sideboard consists of a skid, a handrail, vertical posts and stanchion slots, **characterised in that** the skids (1g) and the handrails (1f) end with container corners (1j, 1k), a connector (2f) for hook-loading is mounted to the transverse wall (2), transport rollers (4a) and rails (1m) engaging the roller mechanism (11b) of a hook device (11) are mounted symmetrically under the floor (1a), and in the rails (1m) there are two forklift pockets (1t), whose position corresponds to the position of forklift pockets (1u) in the sideboards (1b), wherein the spacing of axes of pockets (1t) in the rails (1m) equalling the spacing of axes of forklift pockets of 20-foot containers.

2. The platform according to claim 1, **characterised in that** the transverse wall (2) has the form of a rectangular plate with bevelled corners with external reinforcements (2b) and internal reinforcements (2c), as well as a horizontal grating (2e) in the upper part.
3. The platform according to claim 1 or 2, **characterised in that** the transverse wall (2) is a movable element mounted to the frame (1) by means of a pair of pins (2h) connecting the external reinforcements (2b) of the transverse wall (2) to the sideboards (1b), and in a vertical position the fork (2j) placed in the lower part of flat bars (2i) mounted rigidly to the front surfaces of the internal reinforcements (2c) of the transverse wall (2) comprises the webs (1n) of rails (1m), to which they are connected using pins (2m).
4. The platform according to claim 3, **characterised in that** the flat bars (2i) mounted to the internal reinforcements (2c) of the transverse wall (2) have a bevelled lower corner, and the fork (2j) of the flat bars (2i) has kinked inner edges.
5. The platform according to claim 1, 2, 3 or 4, **characterised in that** in the transverse wall (2) there are slots (2p), in which there are mounted pins (2r) constituting the points of mounting of ties (5) connecting the transverse wall (2) to the frame (1).
6. The platform according to any of the preceding claims, **characterised in that** the stanchions (3) placed in the slots (1i) of the sideboards (1b) are locked by means of loosely fitted pins (3c) entering the through holes (1p) in the slots (1i) and the through holes (3a) in the lower part of the stanchions (3), wherein the pins (3c) being secured by cotters, and preferably the through holes (1p) in the stanchion slots (1i) being parallel to the longitudinal beams (1c).
7. The platform according to any of the preceding claims, **characterised in that** the stanchions (3) located at the opposite side of the platform are con-

nected in pairs by means of ties (6) in the form of chains, belts or ropes, which are mounted to the eyes (3b) located in the upper part of the stanchions (3).

8. The platform according to any of the preceding claims, **characterised in that** in the longitudinal beams (1c) of the floor (1a) there are placed sliding mandrels (8), which enter the longitudinal beams (1c) of the attached platform, wherein the mandrels (8) being locked in their extreme positions by means of loosely fitted pins (8b). 5 10
9. The platform according to claim 8, **characterised in that** the mandrels (8) have a length of 2/3 the length of the longitudinal beams (1c) of the frame (1). 15
10. The platform according to claim 8 or 9, **characterised in that** in the longitudinal beam (1c) there are two through holes (1r), and in the mandrel (8) there are two through holes (8a) for the pins (8b), wherein the distance between the axis of the hole (1r) in the beam (1c) and the closer end of the beam (1c) and the distance between the axis of the hole (8a) in the mandrel (8) and the closer end of the mandrel (8) equalling 1/6 the length of the longitudinal beam (1c). 20 25
11. The platform according to any of the preceding claims, **characterised in that** the frame (1) is symmetrical relative to the longitudinal vertical plane and the transverse vertical plane. 30
12. The platform according to any of the preceding claims, **characterised in that** in each rail (1m) there are two additional forklift pockets (1v) whose position corresponds to the position of the window (1w) in the sideboard (1b), wherein the distance between the vertical outer walls of both pockets (1v) equalling the length of the window (1w) in the sideboard (1b), and the distance from the axis of each pocket (1v) to the closer face of the frame (1) equalling half the spacing of axes of the forklift pockets of a 20-foot container. 35 40
13. The platform according to any of the preceding claims, **characterised in that**, under at least one transverse beam (1d) of the frame (1) between the sideboards (1b) and the rails (1m), there are mounting eyes (1x) of the hangers (4c) of the transport rollers (4), to which the hangers (4c) are connected in an articulated manner by means of the pins (4f), wherein the mounting eyes (1x) comprising resistance protrusions (1y) limiting the movement of the arms (4d) of the hangers (4c). 45 50
14. The platform according to claim 13, **characterised in that** in the lower part of the arms (4d) of the hangers (4c), on their outer side, there are ballast protrusions (4e). 55

15. The platform according to any of the preceding claims, **characterised in that** the frame (1) of the platform is connected to the frame (1) of the platform placed above by means of rotary joints (9), wherein the profile pin (9a) of the rotary joint (9) entering the upper container corner (1j) of the platform located below and the lower container corner (1k) of the platform located above.

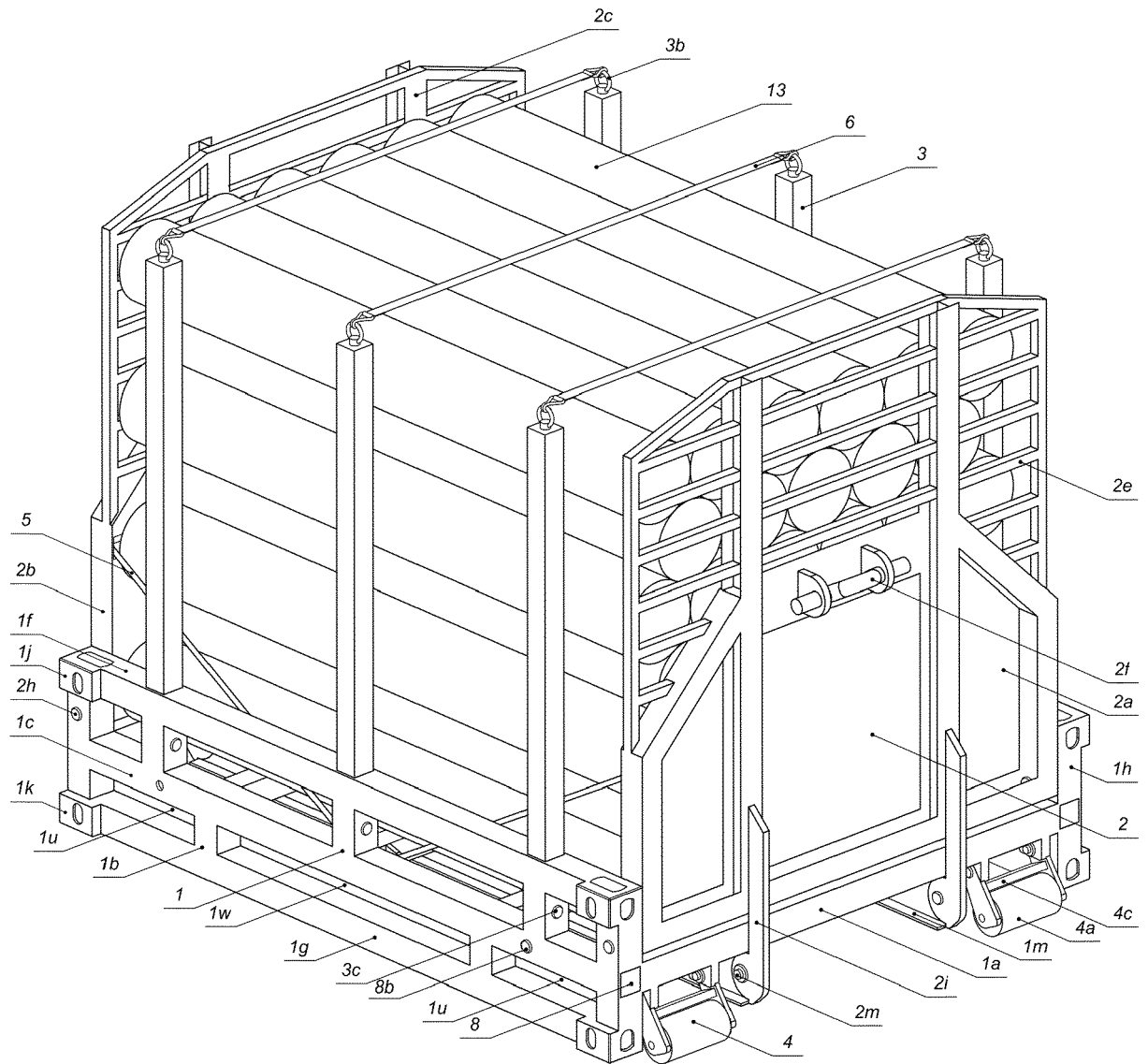


Fig. 1

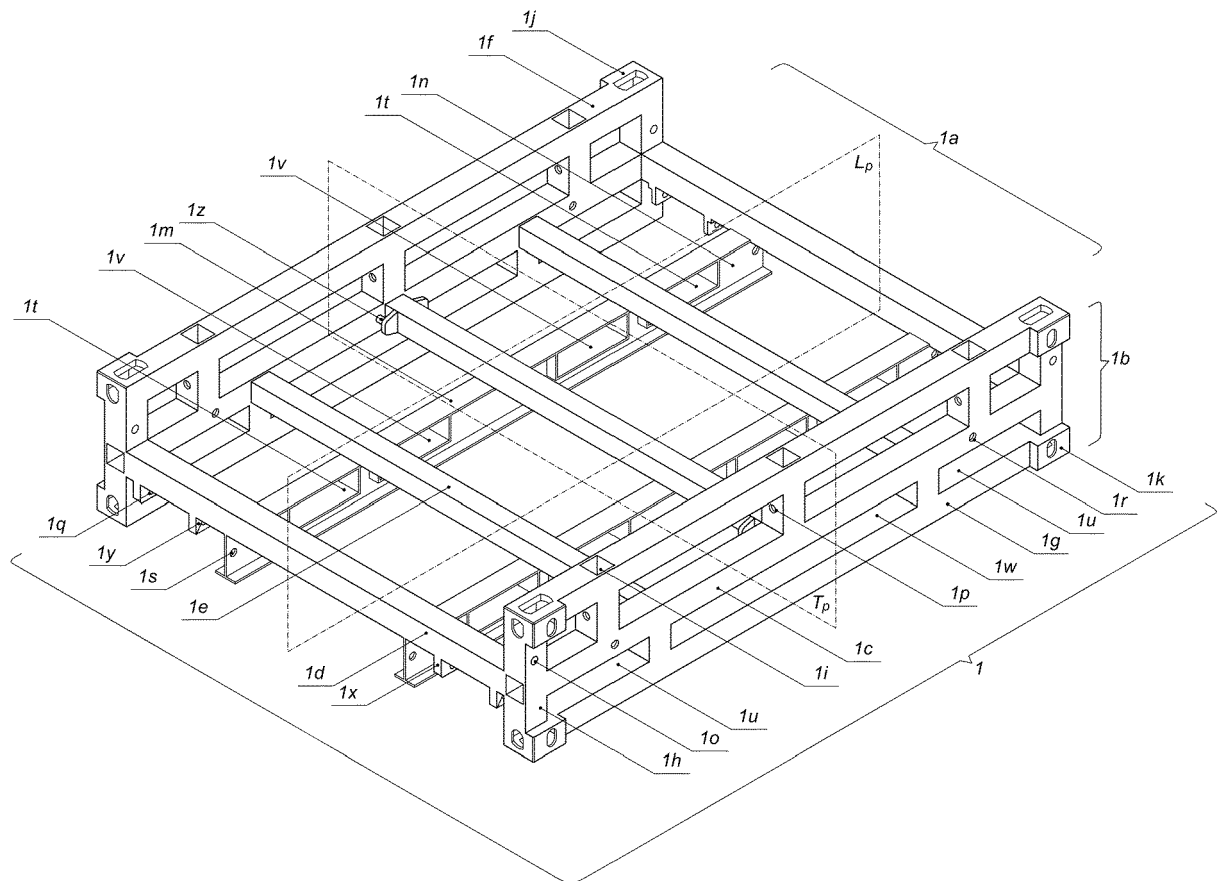


Fig. 2

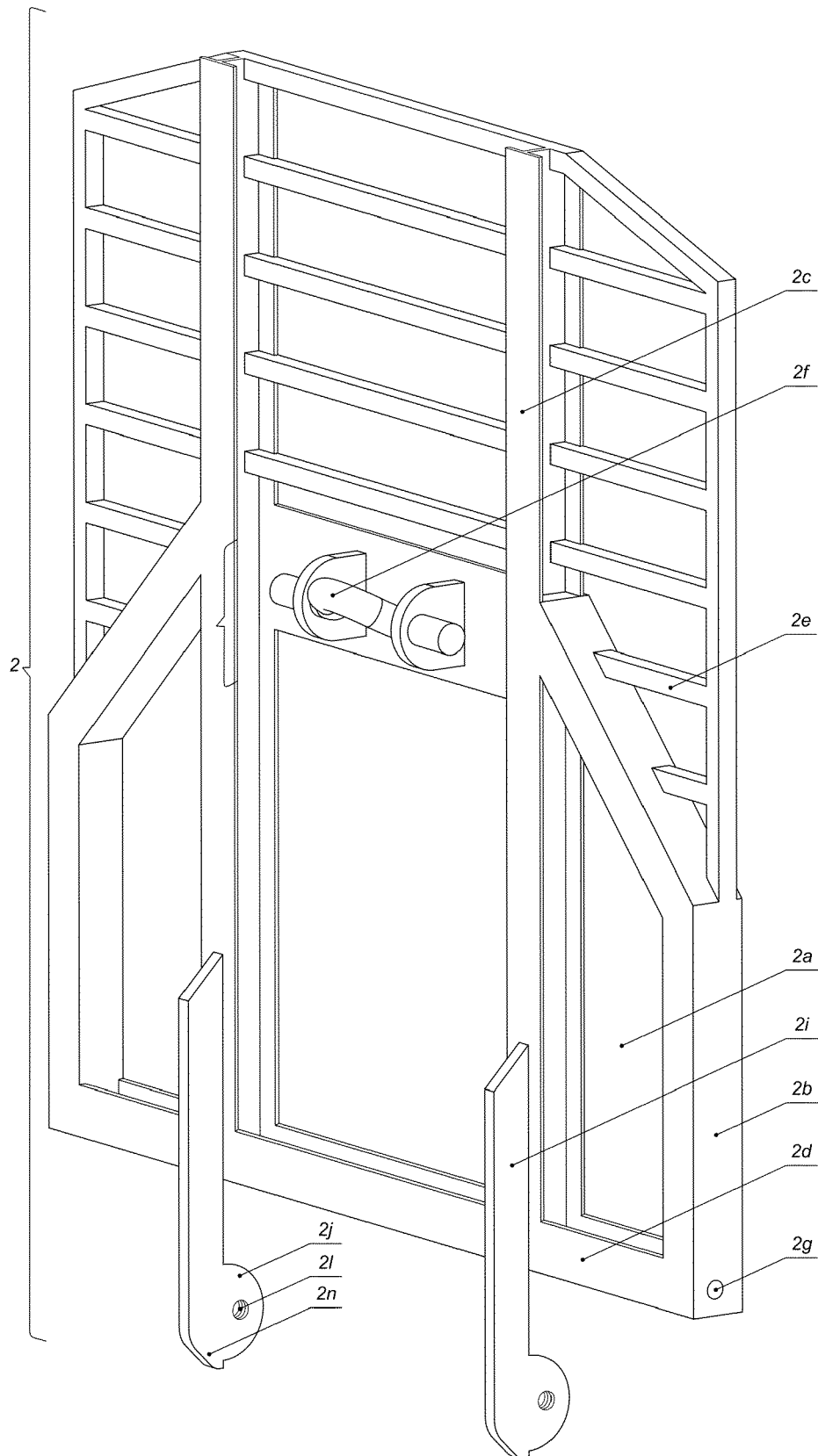


Fig. 3

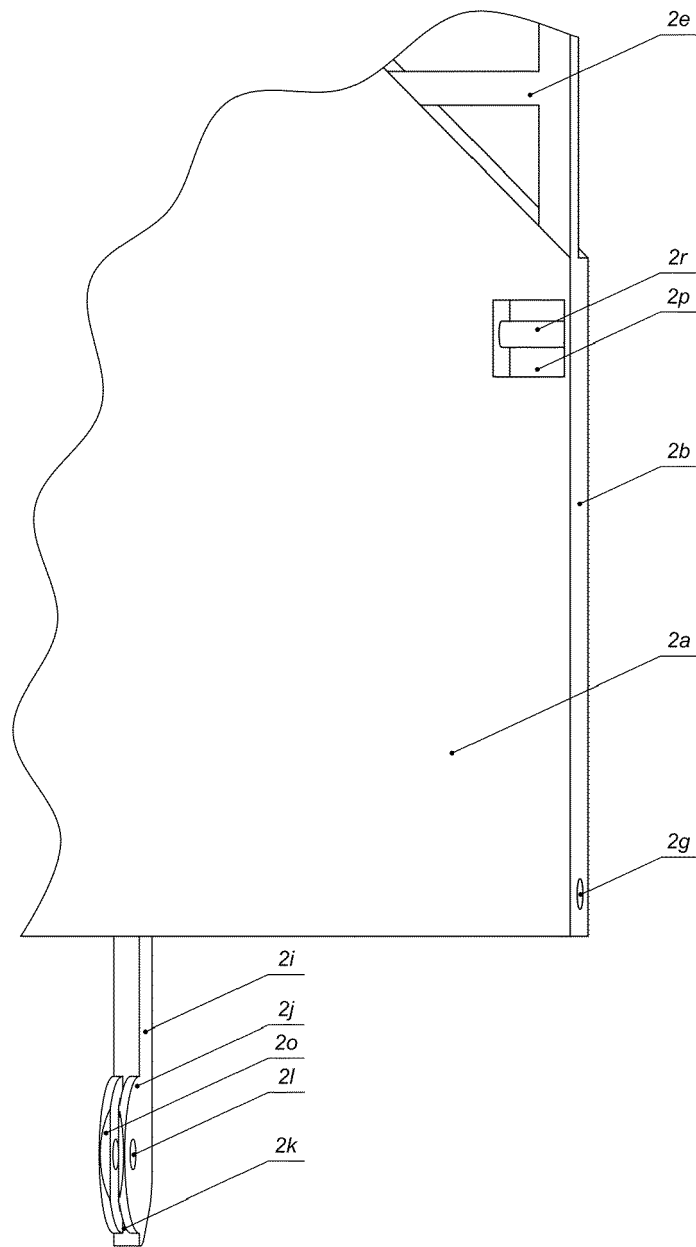


Fig. 4

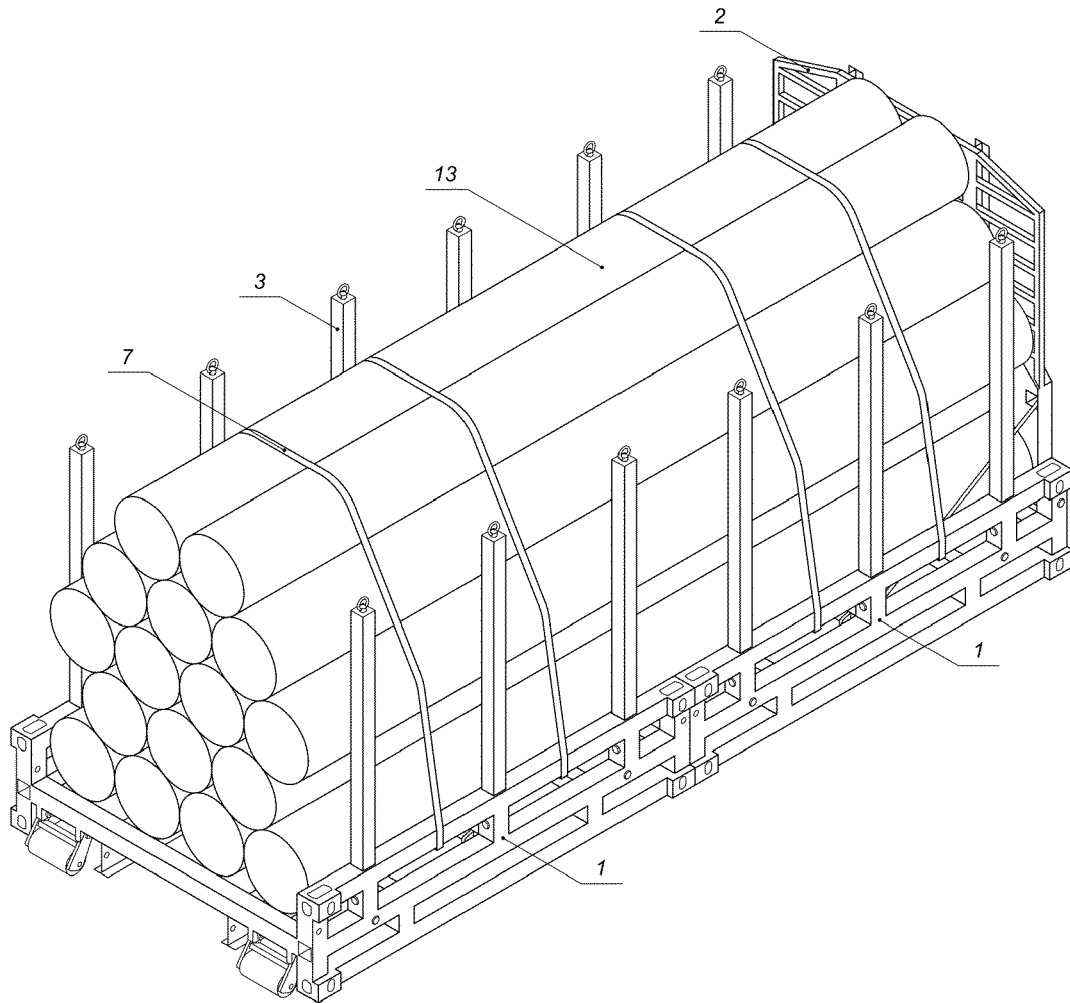


Fig. 5

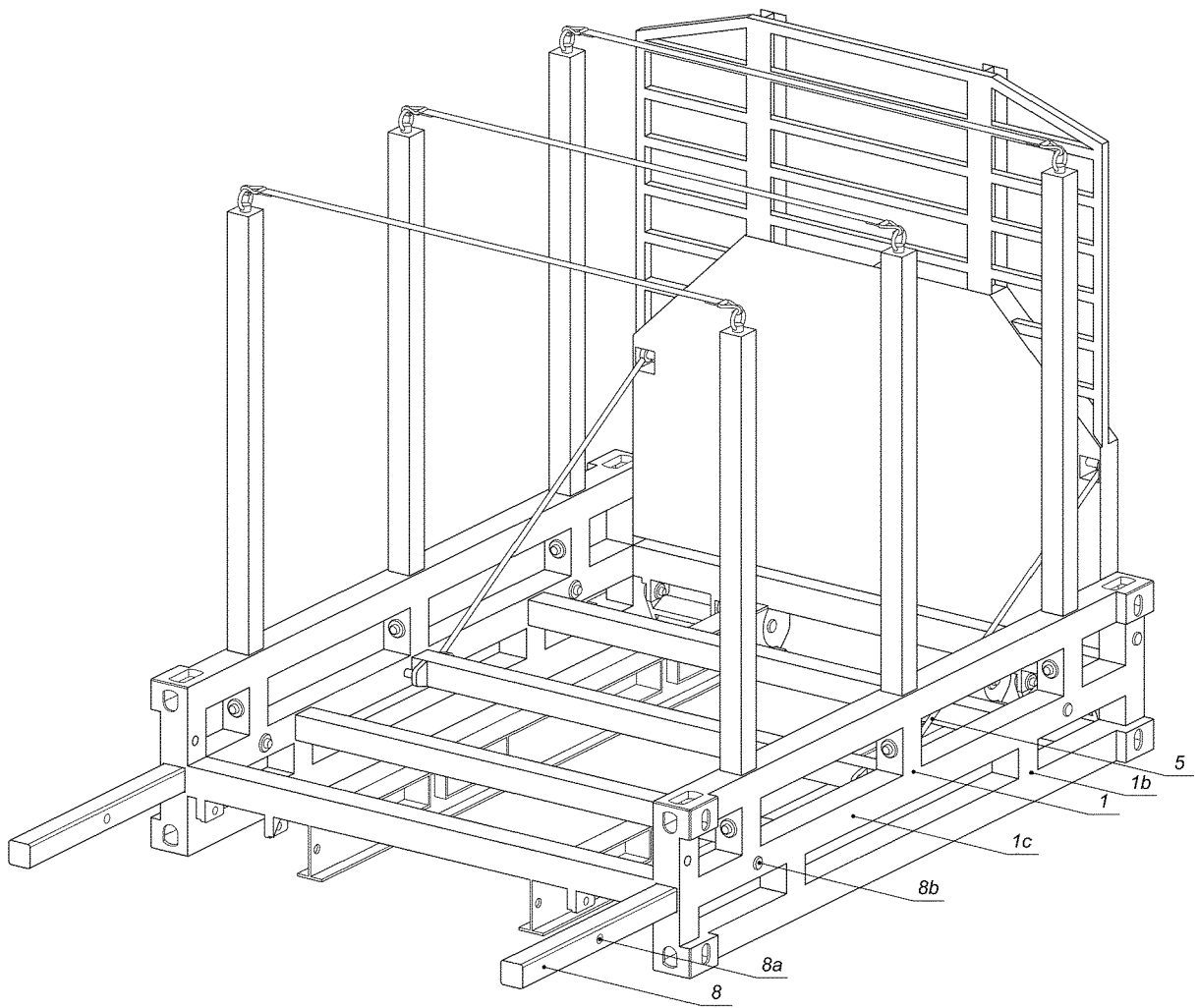


Fig. 6

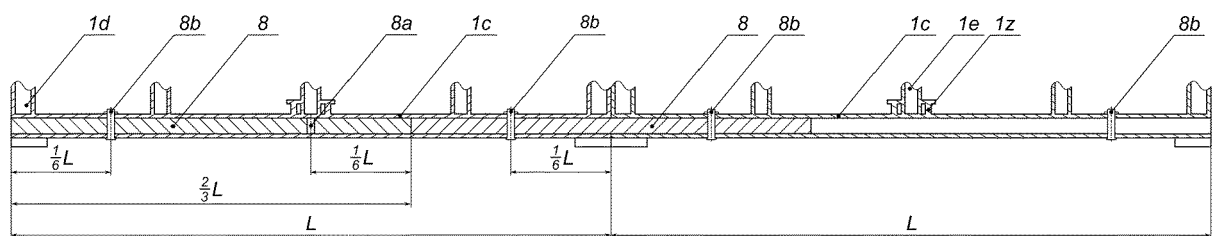


Fig. 7

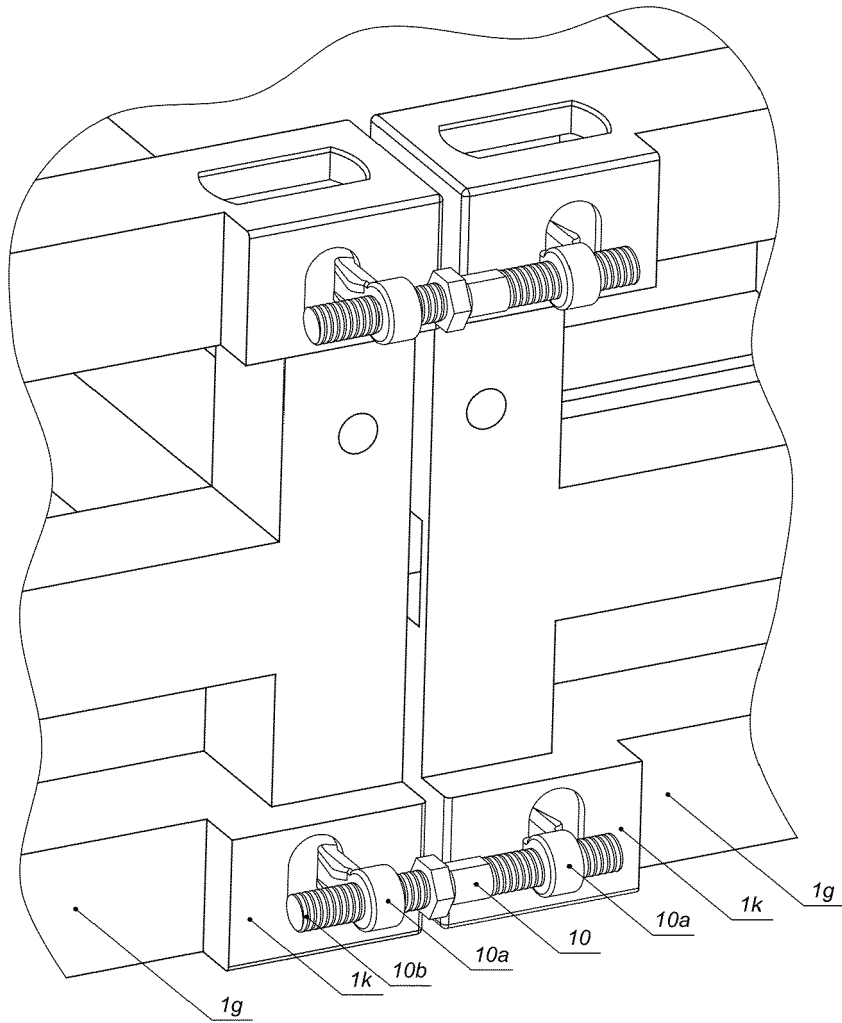


Fig. 8

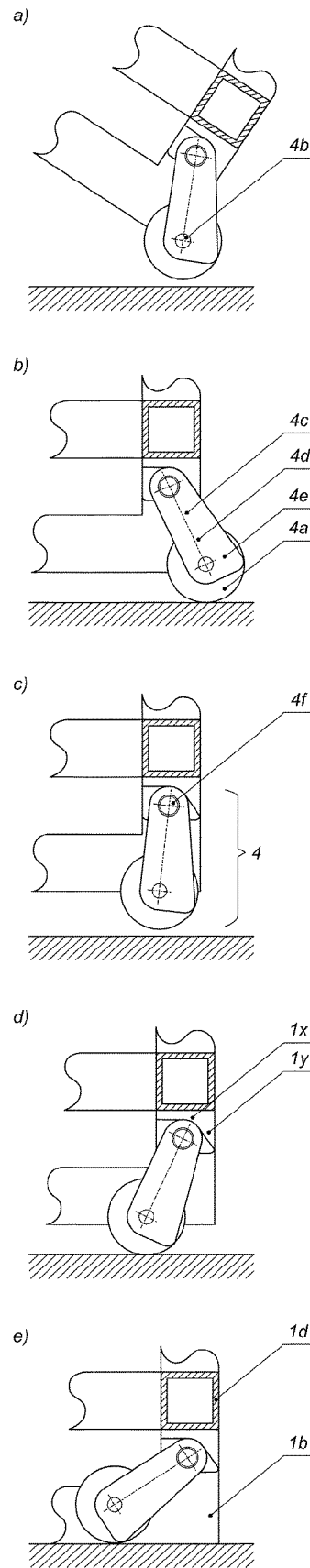


Fig. 9

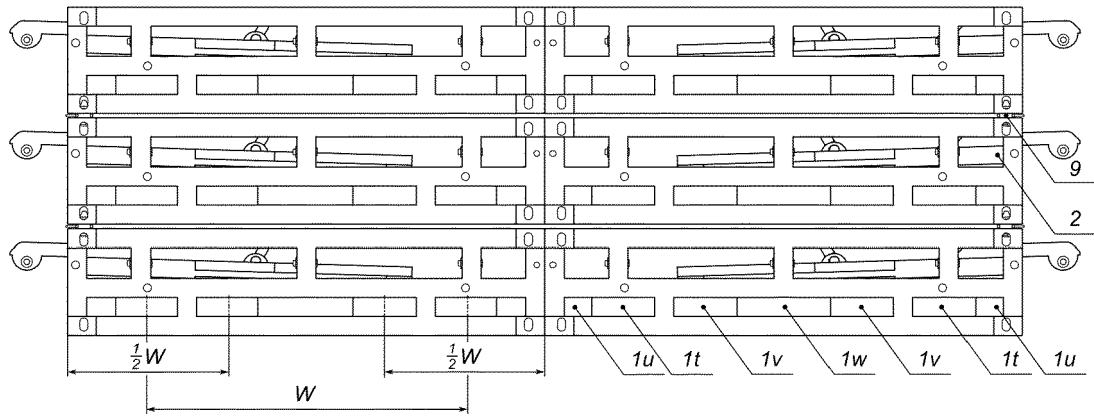


Fig. 10

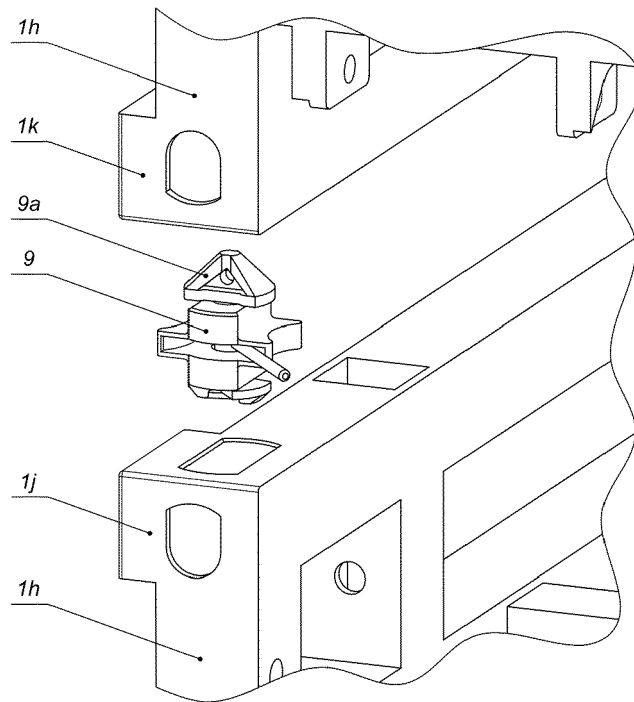


Fig. 11

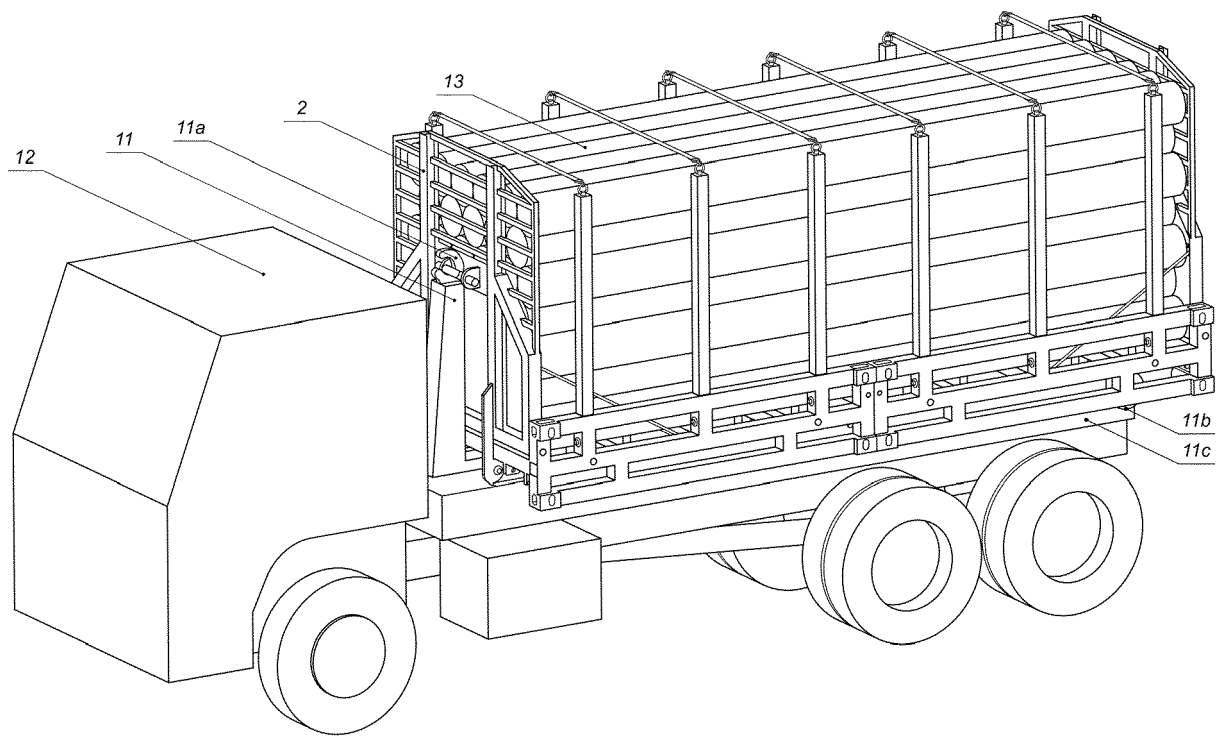


Fig. 12

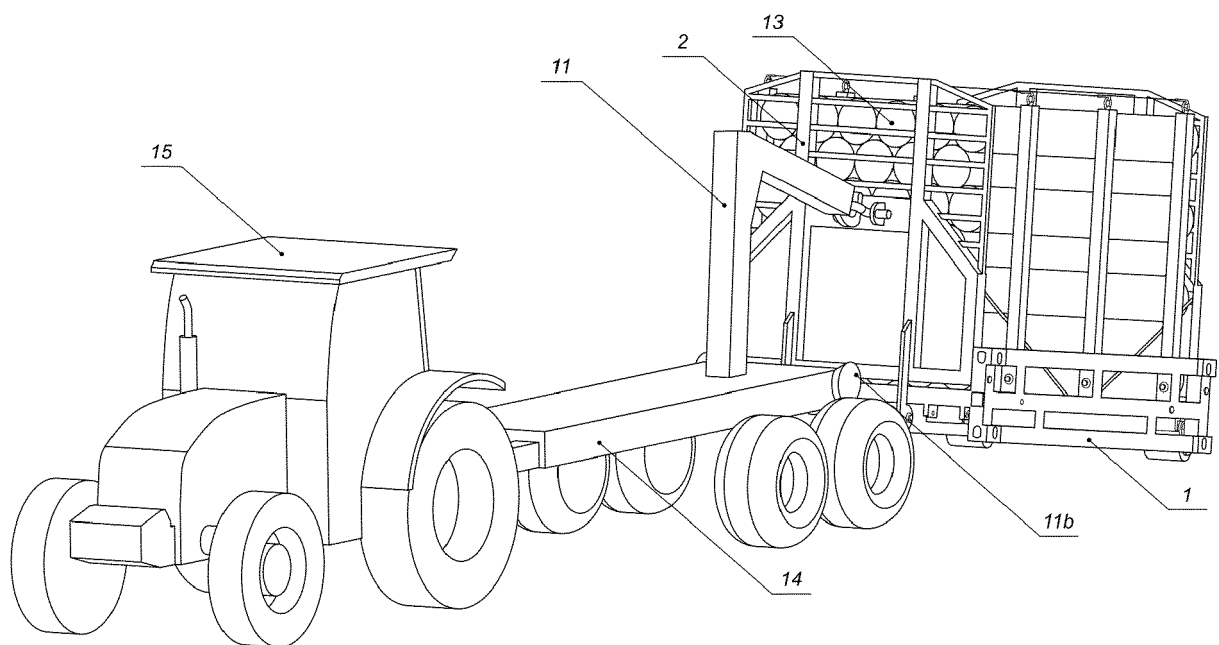


Fig. 13

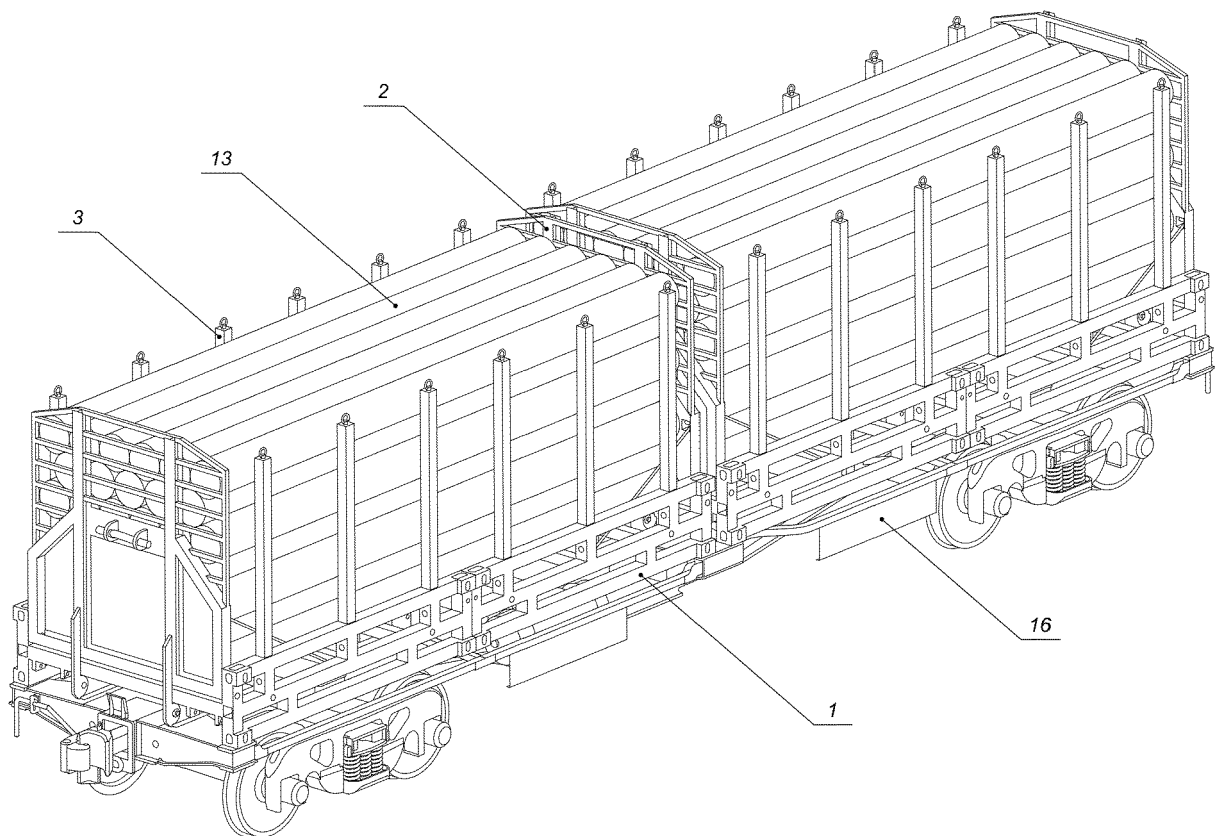


Fig. 14

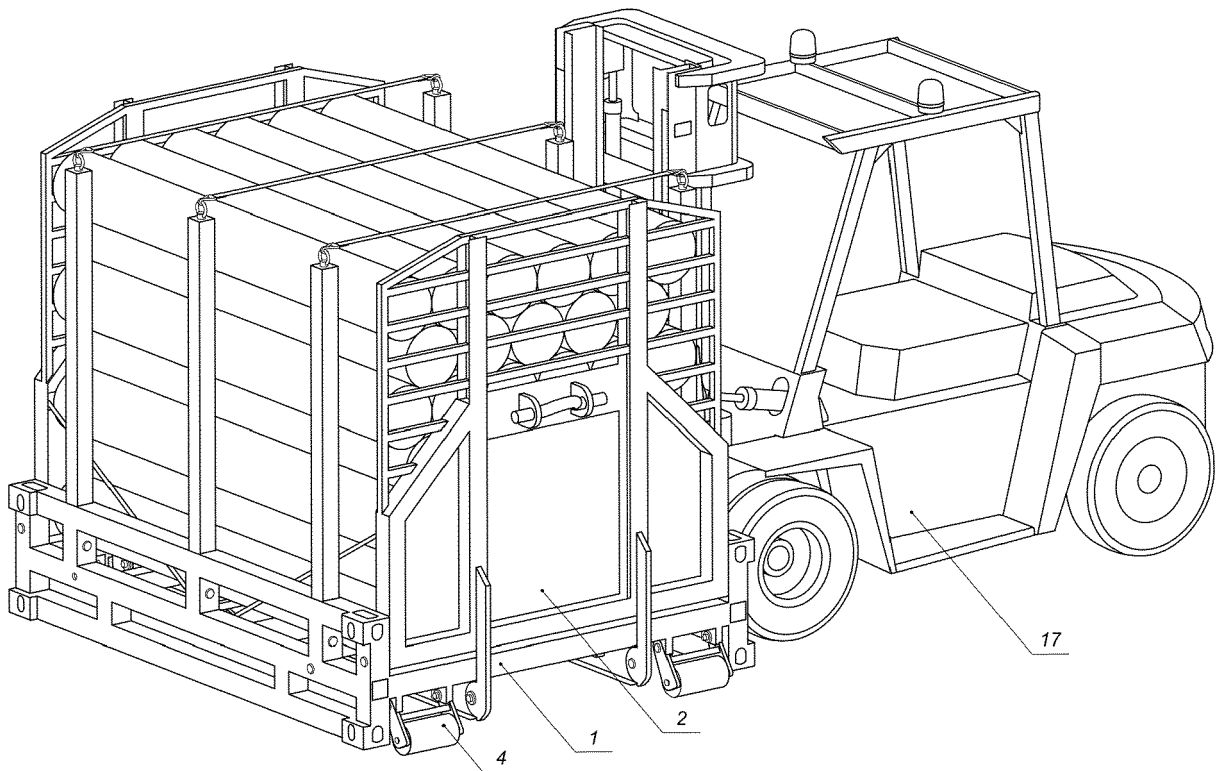


Fig. 15



EUROPEAN SEARCH REPORT

Application Number
EP 21 46 1538

5

10

15

20

25

30

35

40

45

50

55

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	DE 295 00 060 U1 (CLIVE SMITH [GB]) 6 April 1995 (1995-04-06) * page 5, line 9 - page 6, line 4 * * figure 1 *	1	INV. B65D88/12 B65D88/52 B65D90/00 B65D90/18
A	CA 2 199 653 A1 (G & P ENTERPRISES LTD [CA]) 11 September 1998 (1998-09-11) * page 4, line 2 - page 6, line 13 * * figures 1-14 *	1	
			TECHNICAL FIELDS SEARCHED (IPC)
			B65D B60P A01G
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 5 October 2021	Examiner Piolat, Olivier
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 21 46 1538

5

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

05-10-2021

10

15

20

25

30

35

40

45

50

55

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 29500060 U1	06-04-1995	DE 19500173 A1	13-07-1995
		DE 29500060 U1	06-04-1995
		GB 2285437 A	12-07-1995
		US 5720228 A	24-02-1998

CA 2199653 A1	11-09-1998	CA 2199653 A1	11-09-1998
		US 6202863 B1	20-03-2001

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- EP 2525996 A [0003]
- WO 2006005920 A [0004]
- WO 9516622 A [0005]
- KR 20170002410 [0006]
- DE 102008052238 [0007]
- DE 102005042243 [0008]
- EP 1728729 A [0009]