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(54) **A SYSTEM FOR TRANSPORTING AND UNLOADING CONTAINERS FOR GOODS, IN PARTICULAR FOR BULK MATERIAL, A CONTAINER AND A CONTAINER SPREADER**

(57) The invention provides a system for transporting and unloading containers (1) for goods, in particular for bulk material, comprising a container (1), suited to a container spreader (2) with a system of rotatably locking pins (14) for catching the container (1), comprising a bottom wall (3), side walls (4), a rear wall (5) and a front wall in a form of a hatch (6) pivotable about its upper edge, and having a locking mechanism (8), a hatch (6) and a catching assembly (7) with a catch (7a) for locking the hatch (6) in a closed position, and comprising a container spreader (2) with a system of rotatable locking pins (14), actuated by means of actuators, for catching the container (1). The system of the invention is characterized in that the locking mechanism (8) for locking the hatch (6) of the container (1) is positioned along a vertical edge of a side wall (4) of the container (1) at the side of the hatch (6), and comprises a tie rod (9), the upper end of which is connected to a button (12) for activating the locking mechanism (8), while the container spreader (2) has at least one opening actuator (15) for opening the hatch (6) of the container (1), cooperating with the locking mechanism (8) for locking the hatch (6). The invention also provides a container (1) and a container spreader (2) that constitute constituent elements of the system.

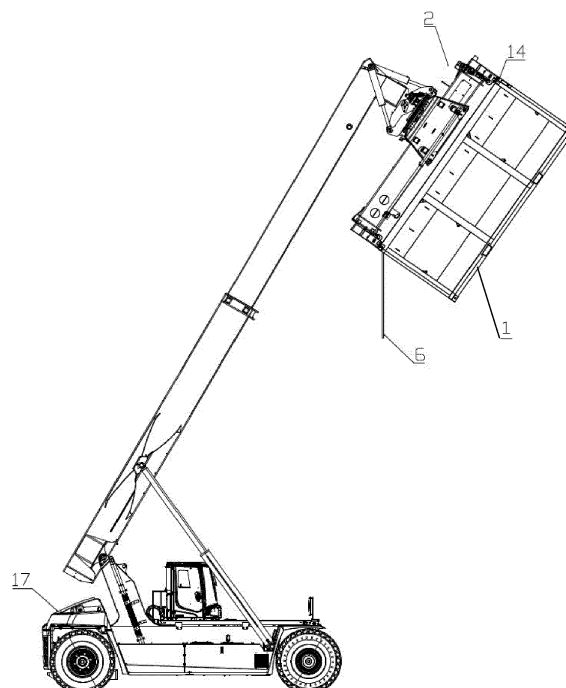


Fig. 1

Description

[0001] This invention provides a system for transporting and unloading containers for goods, in particular for bulk material, comprising a container suited to a container spreader with a system of rotatable locking pins for catching the container, comprising a bottom, side walls, a rear wall and a front wall in a form of a hatch pivotable about its upper edge, comprising a mechanism to lock the hatch and a catching assembly with a catch for locking the hatch in a closed position, and comprising a container spreader with a system of rotatable locking pins actuated by means of actuators, for catching the container, as well as a container and a container spreader included in the system.

[0002] Varied systems for transporting and unloading containers are known in the art.

[0003] Innofreight system from SKARNA SP. Z O.O company is known. In this system, containers, open or openable at the top, are shipped and unloaded by means of a fork lift carriage by turning them upside down which causes the load being poured out under the wheels of the carriage. Upon unloading of the container it is necessary to move the load into a storage location. In this system heavy containers exert a high pressure onto the wheels of the fork lift carriage and this requires high durability of the pavement of the unloading site. This system uses containers of a small capacity which affects efficiency of transportation thereof.

[0004] Also known are systems that comprise a container spreader with a system of rotatably locking pins ("twist-locks") and containers intended for such a spreader.

[0005] Most commonly, a container spreader is a part of a reach-stacker vehicle and is fastened on an extension arm of such a vehicle. For example, such system is offered by LAUDE SMART INTERMODAL S.A. Usually in such system a container has a bottom, side walls, a rear wall and a front wall in a form of a double door, most frequently the container also being closed at the top. In this system a spreader is affixed on an extension arm of the vehicle so as its long axis is perpendicular to the longitudinal axis of the vehicle. Unloading of the container is effected by tilting the container about its short axis, i. e. perpendicularly to the longitudinal axis of the vehicle. In order to unload the container, its door is manually open by an operator in close vicinity of the vehicle which poses a risk of the operator contacting the container or the vehicle. Moreover, pouring out of goods is in this system hindered due to the fact that the container may be tilted at a small angle only and also because the container doors are narrower than the container width. In this systems small containers are used that have walls made of corrugated plate. Small capacity of the containers affects efficiency of transport and the corrugated plate used in their construction also hinders pouring out of goods.

[0006] In Polish patent applications Nos. P.399872 and P.402832 of the above-mentioned company a con-

tainer is disclosed that by means of a lever system enables conversion of the container double door into a hatch that may be tilted about its upper edge, in a closed position locked by a closing means mounted in the container bottom, comprising a bar with two catches.

[0007] Containers with a hatch are also known from patent documents EP 444333 B1, US 5624049 A, WO 2012096584 A1 and WO 2012120452 A1. In EP 444333 B1 an unloading hatch in a side wall of the container is suspended on articulated couplings. In US 5624049 A a container hatch is locked in a closed position by means of a system of snap fasteners, provided at the edges of both side walls and a bottom wall of the container, and bolts, provided at the side edges and the bottom edge of the hatch. WO 2012096584 A1 discloses a container with a pivotable door and a set of locks for locking, and WO 2012120452 A1 discloses an unloading cover in a form of a hatch mounted pivotably to a container wall by means of hinges along its upper edge, where a releasing bar, secured to the cover along its lower edge, has locking means at each of its ends, to engage locking means at the adjacent part of the container.

[0008] US 2015267445 A1 discloses a container locking mechanism that comprises: a locking rod constructed so as it is pilotable between a first open position and a second closed position; a locking member one end of which is securely connected to a locking rod and the other end of which may cooperate with the container door when a locking mechanism is mounted on the container, the locking member may be separated from the door when the locking rod is rotated to the first open position and may lock the door when the locking rod is rotated to the second closed position; a slidable block which may move slideably in a reciprocating motion; and a first driving connection one end of which is fixed to the slidable block, where the reciprocal movement of the block may drive the locking rod by means of the first driving connection so as it is rotated between the first open position and the second closed position.

[0009] Document US 2014312638 A1 discloses a container spreader assembly comprising: a spreader having container coupling devices, for coupling and decoupling the container; a device for coupling a cover, mounted to the spreader, where this device has an actuator for setting a coupling frame in the vicinity of the container cover, where the frame is arranged for coupling the cover so as it can be moved by relative the container by the actuator.

[0010] It is the object of this invention to provide a system that will enable more efficient unloading of containers and moreover will obviate the necessity of an additional person being present at the unloading site for opening the container so as to enhance safety of the operation. This invention also enables use of containers of a higher load-carrying capacity to enhance efficiency of transportation of containers as well as enables use of containers of diverse sizes.

[0011] The invention provides a system for transporting and unloading containers for goods, in particular for

bulk material, comprising a container suited to a container spreader with a system of rotatable locking pins for catching the container, comprising a bottom wall, side walls, a rear wall and a front wall in a form of a hatch pivotable about its upper edge, possessing a hatch locking mechanism and a catching assembly with a catch for locking the hatch in a closed position, and comprising a container spreader with a system of rotatable locking pins actuated by means of actuators for catching the container. The system of the invention is characterized in that the container hatch locking mechanism is positioned along a vertical edge of a side wall of the container at the hatch side and comprises a tie rod the upper end of which is coupled with a button to activate the locking mechanism, and the container spreader has at least one actuator for opening the container hatch, cooperating with the hatch locking mechanism.

[0012] Preferably, a lever is secured to the bottom end of the tie rod, the opposite end of the lever being connected to the catch that locks the container hatch in a closed position.

[0013] Preferably, the lever of the locking mechanism, at the site where it is connected to the tie rod, abuts the bottom edge of the container wall by means of a spring and securing elements.

[0014] Also more preferably, the catching assembly comprises a transverse bar extending along the bottom edge of the hatch, provided with catches.

[0015] Preferably, the tie rod is provided with a grip.

[0016] Preferably, the opening actuator cooperates with a hatch locking mechanism upon coupling of the container with the container spreader by means of rotatably locking pins.

[0017] Preferably, the container is closable at the top.

[0018] Preferably, the container hatch locking mechanism is positioned at the front edges of both side walls of the container at the hatch side.

[0019] Preferably, the side walls of the container are planar.

[0020] Preferably, the container is provided with a running gear being a bogies.

[0021] More preferably, the bogies are bogies of a railway type.

[0022] Preferably, the container spreader has two opening actuators for opening the container hatch, cooperating with two locking mechanisms that lock the hatch, positioned at both sides of the side walls of the container at the hatch side.

[0023] Preferably, the container spreader further has opening actuators for opening container hatches of diverse types, sizes, and moreover it has a switching valve for switching between these actuators.

[0024] Preferably, the opening actuator of the container hatch is a hydraulic actuator.

[0025] Preferably, the container spreader is an equipment component of a vehicle of a reach-stacker type.

[0026] Also a container suited to the system of the invention is provided. The container of the invention is characterized in that the hatch locking mechanism is positioned along a vertical edge of a side wall of the container, at the hatch side, and it comprises a tie rod the upper end of which is connected to a button for activating the locking mechanism.

acterized in that the hatch locking mechanism is positioned along a vertical edge of a side wall of the container, at the hatch side, and it comprises a tie rod the upper end of which is connected to a button for activating the locking mechanism.

[0027] Preferably, a lever is connected to the lower end of the tie rod, the opposite end of the lever being connected to a catching assembly for locking the container hatch in a closed position.

[0028] Preferably, the lever of the locking mechanism, at the site of connection with the tie rod, abuts a lower edge of a container wall by means of a spring and fixing elements.

[0029] Also more preferably, the catching assembly comprises a transverse bar extending along the lower edge of the hatch and provided with catches.

[0030] Preferably, the tie rod is provided with a grip.

[0031] Preferably, the container is closable at the top.

[0032] Preferably, the mechanism that locks the container hatch is positioned at the front edges of the side walls of the container at the hatch side.

[0033] Preferably, the side walls of the container are planar.

[0034] Preferably, the container is provided with a running gear being bogies.

[0035] More preferably, the bogies are bogies of a railway type.

[0036] The invention also provides a container spreader suited to a system of the invention. The spreader according to the invention is characterized in that it has at least one opening actuator for opening the container hatch, cooperating with a hatch locking mechanism.

[0037] Preferably, the spreader has two opening actuators for opening the container hatch and cooperating with two mechanisms that lock the hatch, positioned at both sides of the side walls of the container at the hatch side.

[0038] Preferably, the spreader also has opening actuators for opening container hatches of diverse types, of diverse sizes, and moreover has a valve for switching between the actuators.

[0039] Preferably, the opening actuator of the container spreader is a hydraulic actuator.

[0040] The subject-matter of the invention is illustrated in embodiments in the drawing where fig. 1 shows a general view of a system of the invention in one embodiment where a container spreader is an equipment component of a vehicle of a reach-stacker type; fig. 2 shows a side view of a container caught by the container spreader in a system of the invention; fig. 3 shows a front view of a container caught by a container spreader of a system of the invention; fig. 4 shows a locking mechanism for locking a container hatch; fig. 5 shows an isometric view of a container spreader according to the invention, in an embodiment with two actuators for opening container hatches of different sizes, fig. 5a shows a portion of a container spreader in the embodiment of fig. 5, in an enlarged view.

Fig. 1 shows a system according to the invention in one embodiment that comprises a container 1, suited to a container spreader 2, and a container spreader 2 which is an equipment component for a vehicle of a reach-stacker type 17. The container 1 is suited to the container spreader 2 with a system of rotatable locking pins 14 ("twist-locks") shown in fig. 2 and 5, for catching the container 1 and has a front wall in a form of a hatch 6 pivotable about its upper edge. Side walls 4 of the container 1 in this embodiments are planar as shown also in figs. 2 and 3.

Figs. 2 and 3 show a container 1 caught by a container spreader 2 and comprising a bottom wall 3, side walls 4, a rear wall 5 and a front wall in a form of a hatch 6 pivotable about its upper edge, and a container spreader 2 with a system of rotatable locking pins 14 actuated by actuators so as to catch the container 1. In this embodiment the container 1 is open at the top, but it may be closeable at the top (not shown in the drawing) by means of e.g. a rigid cover, a cloth of a waterproof material such as tarpaulin, etc. In this embodiments the side walls 4 of the container 1 are planar in order to eliminate accumulation of the contents within creases of the inner surfaces. For this reason also the side walls 4 may be planar solely at their inner side. In an embodiment not shown the container 1 may be provided with a running gear, being bogies, in particular these may be bogies of a railway type.

In fig. 4 a locking mechanism 8 for locking a hatch 6 of a container 1 is positioned along a vertical edge of a side wall 4 of the container 1 at the side of the hatch 6 and it comprises a tie rod 9 the upper end of which is connected to a button 12 for activating the locking mechanism 8. In the embodiment of fig. 4, a lever 10 is secured to the lower end of the tie rod 9, the opposite end of the lever 10 being connected to a catching assembly 7 for locking the hatch 6 of the container 1 in a closed position. In this embodiment the lever 10 of the locking mechanism 8, at the site where it is connected to the tie rod 9, abuts a lower edge of a wall of the container 1, by means of a spring 13 and securing elements 18. The catching assembly 7 comprises a transverse bar 19 extending along the lower edge of the hatch 6, provided with catches 7a, and furthermore the tie rod 9 is provided with a grip 20.

[0041] A container spreader 2, suited to this locking mechanism 8 and not shown in the drawing, has one opening actuator 15 for opening the hatch 6 of the container, cooperating with the mechanism 8 for locking the hatch 6 (as shown in fig. 4) positioned along a vertical edge of one side wall 4 of the container 1 at the side of the hatch 6, upon connection of the container 1 to the container spreader 2 by means of rotatable locking pins

14.

[0042] In another embodiment of a container, a locking mechanism 8 for locking the hatch 6 of the container 1 may be positioned at the front edges of both side walls 4 of the container 1 at the side of the hatch 6. In such embodiment, a container spreader 2 suited to the container 1 has two opening actuators 15 positioned respectively in a manner so as to cooperate with the corresponding locking mechanisms 8 for locking the hatch 6 positioned along the vertical edges of both side walls 4 of the container 1 at the side of the hatch 6.

[0043] It will be obvious for a person skilled in the art that a container 8 may have both its front side and its rear side in a form of a hatch 6 at the same time, and they may be handled by two separate locking mechanisms 8, positioned at the front and at the back of the container, each at the corresponding hatch 6, or they may be handled by one shared locking mechanism 8.

[0044] In the embodiment shown in fig. 5 a container spreader 2 has two opening actuators 15 for opening hatches 6 of containers 1 of different sizes. Each of such actuators 15 cooperates with a locking mechanism 8 for locking the hatch 6 in a container 1 of a different size. The opening actuators 15 cooperate with locking mechanisms 8 for locking the hatch 6 upon connecting the container 1 to the container spreader 2 by means of rotatable locking pins 14. A valve 16 is provided for switching between these actuators 15.

[0045] Actuators 15 may be actuators of any suitable type, and in particular they may be hydraulic actuators.

[0046] It is clear that the invention is not limited to the embodiments shown and diverse modifications/combinations thereof are possible within the scope of the patent claims without departing from the concept of this invention, including combination of features of dependent claims.

Claims

1. A system for transporting and unloading containers (1) for goods, in particular for bulk material, comprising a container (1), suited to a container spreader (2) with a system of rotatable locking pins (14) for catching the container (1), comprising at least a bottom wall (3), side walls (4), a rear wall (5) and a front wall in a form of a hatch (6) pivotable about its upper edge, having a locking mechanism (8) for locking the hatch (6) and a catching assembly (7) with a catch (7a), for locking the hatch (6) in a closed position, and comprising a container spreader (2) with a system of rotatable locking pins (14), actuated by means of actuators, for catching the container (1), **characterized in that** the locking mechanism (8) for locking the hatch (6) of the container (1) is positioned along a vertical edge of a side wall (4) of the container (1) at the side of the hatch (6), and comprises a tie rod (9) the upper end of which is connected to a button

- (12) for activating a locking mechanism (8), while the container spreader (2) has at least one opening actuator (15) for opening the hatch (6) of the container (1), cooperating with the locking mechanism (8) for locking the hatch (6).
2. The system according to claim 1, **characterized in that** a lever (10) is fastened to the lower end of the tie rod (9), the opposite end of the lever (10) being connected to the catching assembly (7) for locking the hatch (6) of the container (1) in a closed position.
 3. The system according to claim 2, **characterized in that** the lever (10) of the locking mechanism (8), at the site where it is connected to the tie rod (9), abuts a lower edge of a wall of the container (1) by means of a spring (13) and securing elements (18).
 4. The system according to claim 2, **characterized in that** the catching assembly (7) comprises a transverse bar (19) extending along the lower edge of the hatch (6) and provided with catches (7a).
 5. The system according to claim 1, **characterized in that** the tie rod (9) is provided with a grip (20).
 6. The system according to claim 1, **characterized in that** the opening actuator (15), preferably a hydraulic actuator, cooperates with the locking mechanism (8) for locking the hatch (6), upon connecting of the container (1) to the container spreader (2) by means of rotatable locking pins (14).
 7. The system according to claim 1, **characterized in that** the locking mechanism (8) for locking the hatch (6) of the container (1) is positioned at the front edges of both side walls (4) of the container (1) at the side of the hatch (6).
 8. The system according to claim 1, **characterized in that** the side walls (4) of the container (1) are planar.
 9. The system according to claim 1, **characterized in that** the container (1) is provided with a running gear being bogies, preferably railway type bogies.
 10. The system according to claim 1, **characterized in that** the container spreader (2) has two opening actuators (15), preferably hydraulic actuators, for opening the hatch (6) of the container (1) and cooperating with two locking mechanisms (8) for locking the hatch (6) positioned at both sides of the side walls (4) of the container (1) at the side of the hatch (6).
 11. The system according to claim 1, **characterized in that** the container spreader (2) has at the same time opening actuators (15), preferably hydraulic actuators, for opening the hatch (6) of containers (1) of diverse types, of diverse sizes, and moreover it has a valve (16) for switching between these actuators (15).
 12. The system according to claim 1, **characterized in that** the container spreader (2) is an equipment component of a vehicle of a reach-stacker type (17).
 13. A container (1) for transporting goods, in particular for bulk material, suited to a container spreader (2) with a system of rotatable locking pins for catching the container (1), comprising at least a bottom wall (3), side walls (4), a rear wall (5) and a front wall in a form of a hatch (6) pivotable about its upper edge, and it has a locking mechanism (8) for locking the hatch (6) and a catching assembly (7) with a catch (7a) for locking the hatch (6) in a closed position, **characterized in that** the locking mechanism (8) for locking the hatch (6) is positioned along a vertical edge of a side wall (4) of the container (1), at the side of the hatch (6), and comprises a tie rod (9), the upper end of which is connected to a button (12) for activating the locking mechanism (8).
 14. The container (1) according to claim 13, **characterized in that** a lever (10) is fastened to the lower end of the tie rod (9), the opposite end of the lever (10) being connected to the catching assembly (7) for locking the hatch (6) of the container (1) in a closed position.
 15. The container (1) according to claim 13, **characterized in that** the lever (10) of the locking mechanism (8), at the site where it is connected to the tie rod (9), abuts a lower edge of a wall of the container (1) by means of a spring (13) and securing elements (18).
 16. The container (1) according to claim 13, **characterized in that** the catching assembly (7) comprises a transverse bar (19) extending along the lower edge of the hatch (6) and provided with catches (7a).
 17. The container (1) according to claim 13, **characterized in that** the tie rod (9) is provided with a grip (20).
 18. The container (1) according to claim 13, **characterized in that** the locking mechanism (8) for locking the hatch (6) of the container (1) is positioned at the front edges of both side walls (4) of the container (1) at the side of the hatch (6).
 19. The container (1) according to claim 13, **characterized in that** the side walls (4) of the container (1) are planar.
 20. The container (1) according to claim 13, **characterized in that** the container (1) is provided with a running gear being bogies, preferably railway type bo-

gies.

21. A container spreader (2) with a system of rotatable locking pins (14), actuated by means of actuators, for catching a container (1), suited to such a container spreader (2), for transporting goods, in particular bulk material, comprising at least a bottom wall (3), side walls (4), a rear wall (5) and a front wall in a form of a hatch (6) pivotable about its upper edge, a locking mechanism (8) for locking the hatch (6) and a catching assembly (7) with a catch (7a) for locking the hatch (6) in a closed position, **characterized in that** it has at least one opening actuator (15) for opening the hatch (6) of the container (1) and for cooperating with a locking mechanism (8) for locking the hatch (6).
22. The container spreader (2) according to claim 21, **characterized in that** it has two opening actuators (15), preferably hydraulic actuators, for opening the hatch (6) of the container (1) that cooperate with two locking mechanisms (8) for locking the hatch (6) and positioned at both sides of the side walls (4) of the container (1) at the side of the hatch (6).
23. The container spreader (2) according to claim 21, **characterized in that** it has at the same time opening actuators (15), preferably hydraulic actuators, for opening hatches (6) of containers (1) of diverse types, of diverse sizes, and a valve (16) for switching between these actuators (15).

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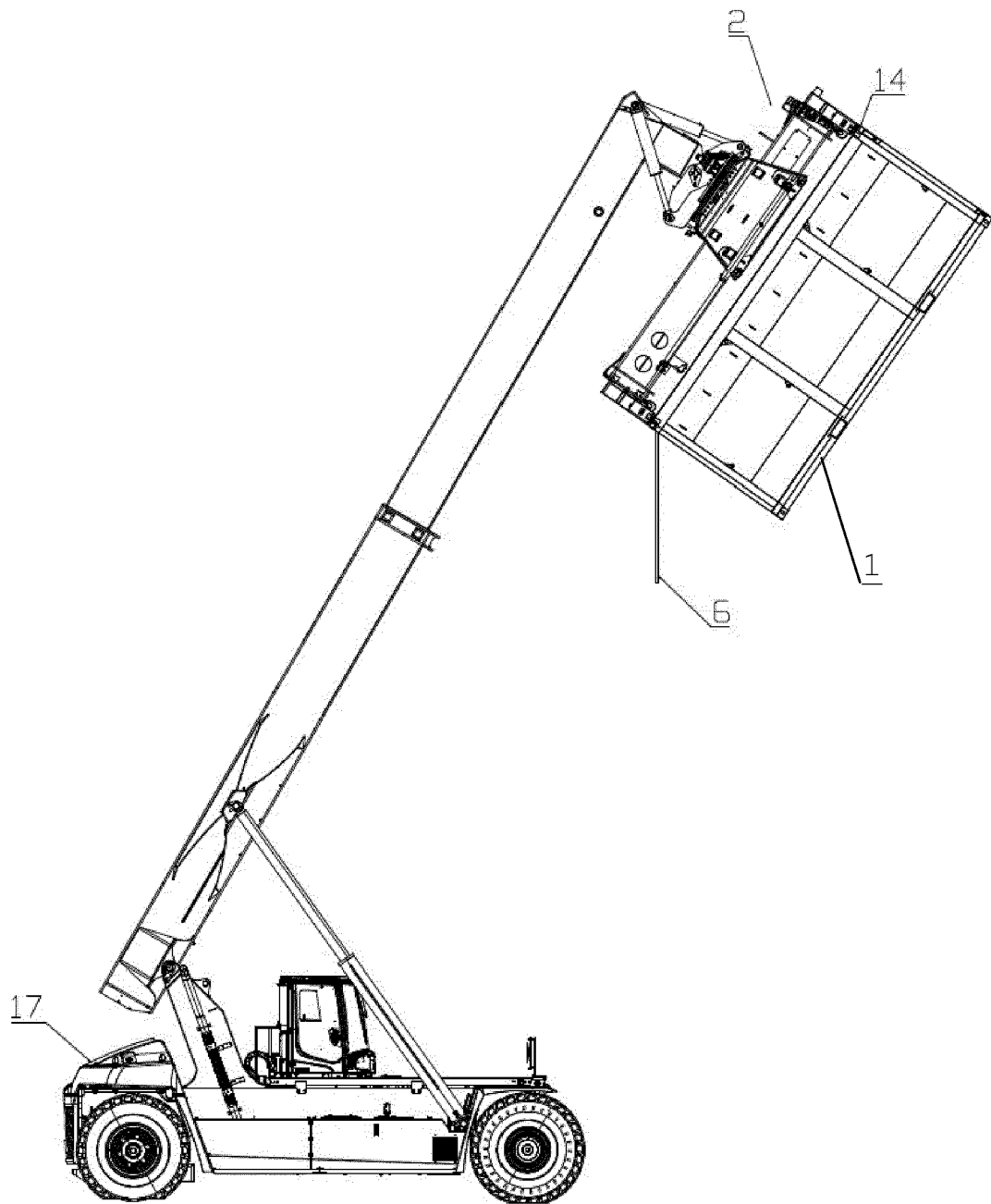
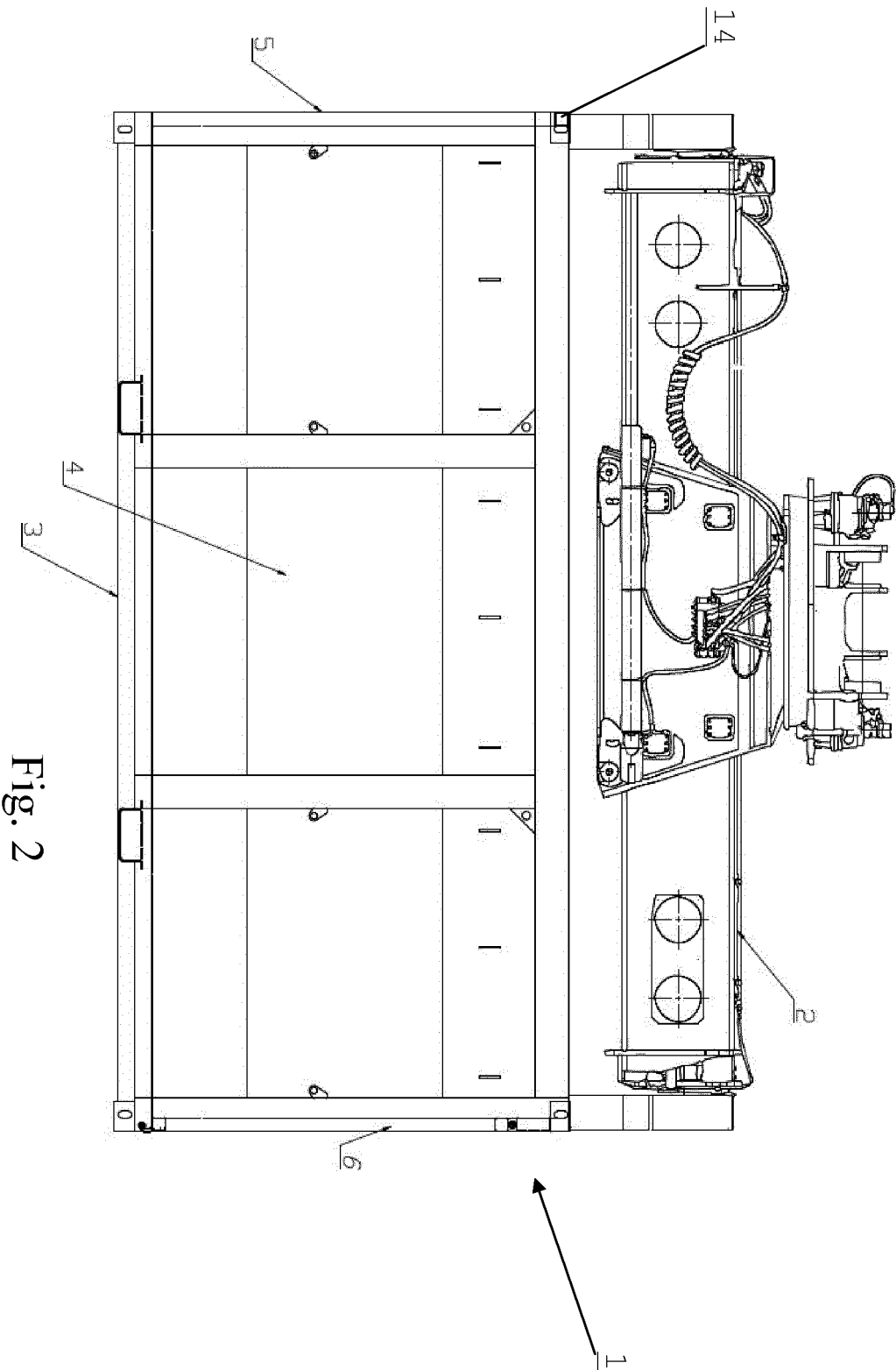


Fig. 1



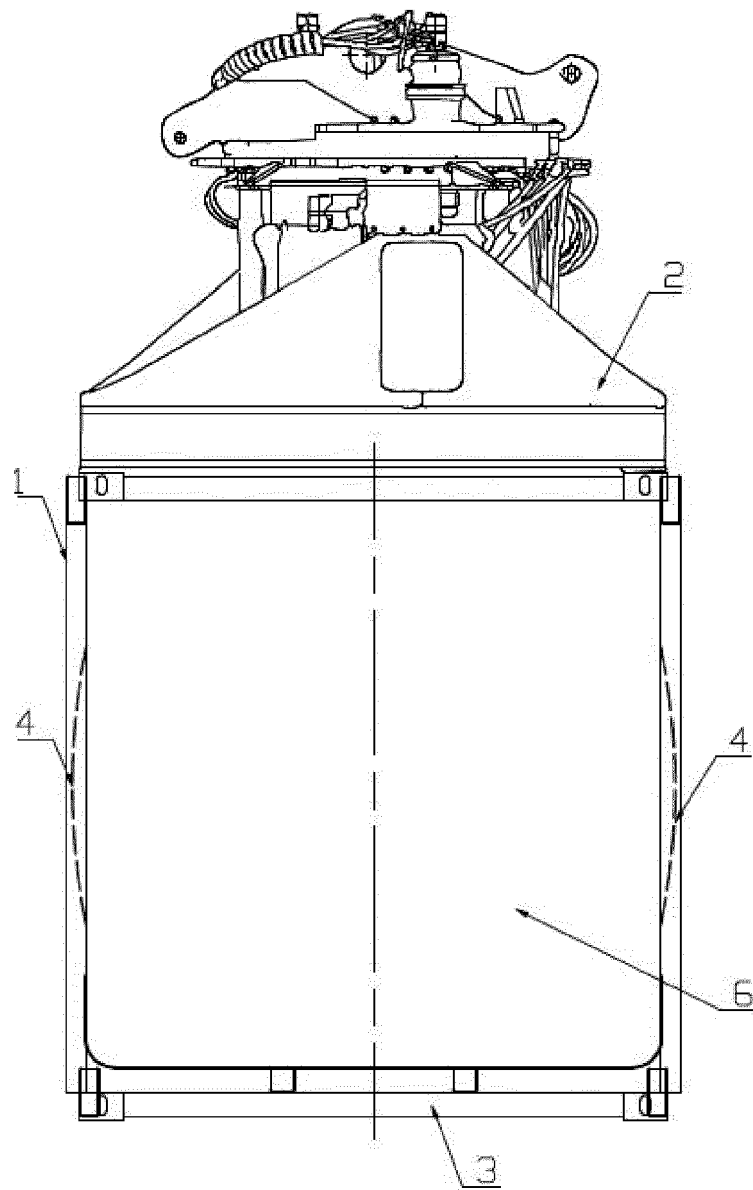


Fig. 3

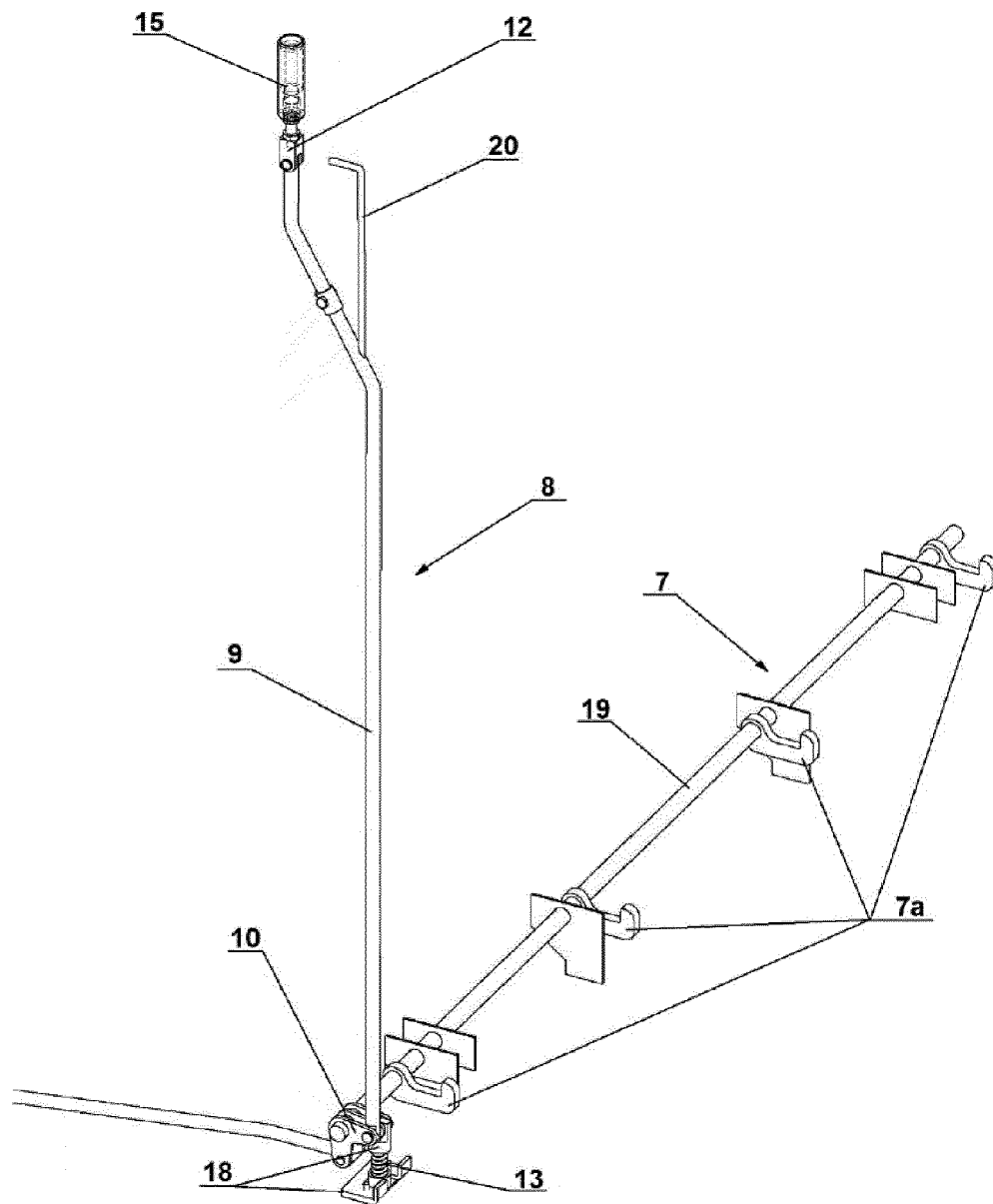


Fig. 4

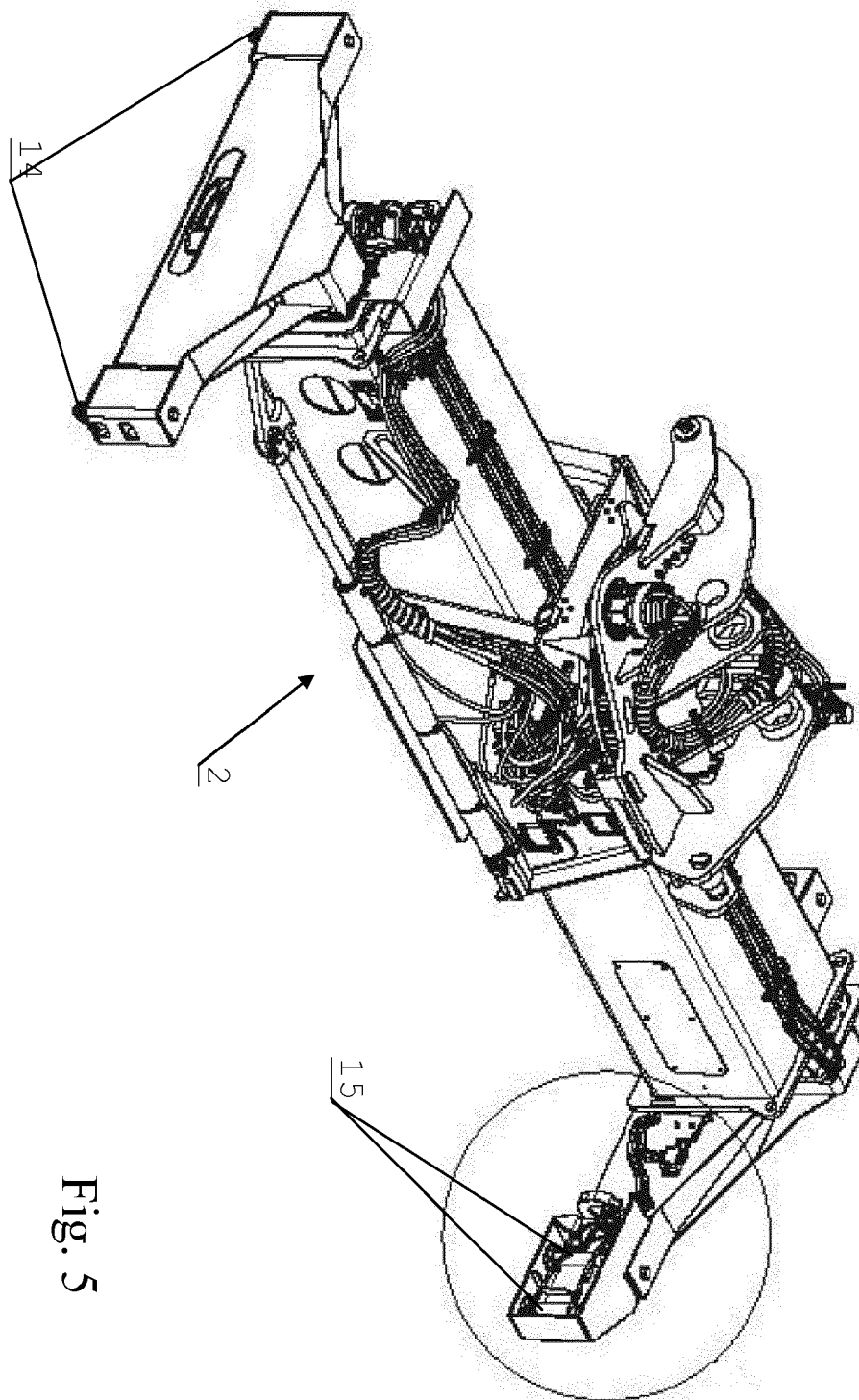


Fig. 5

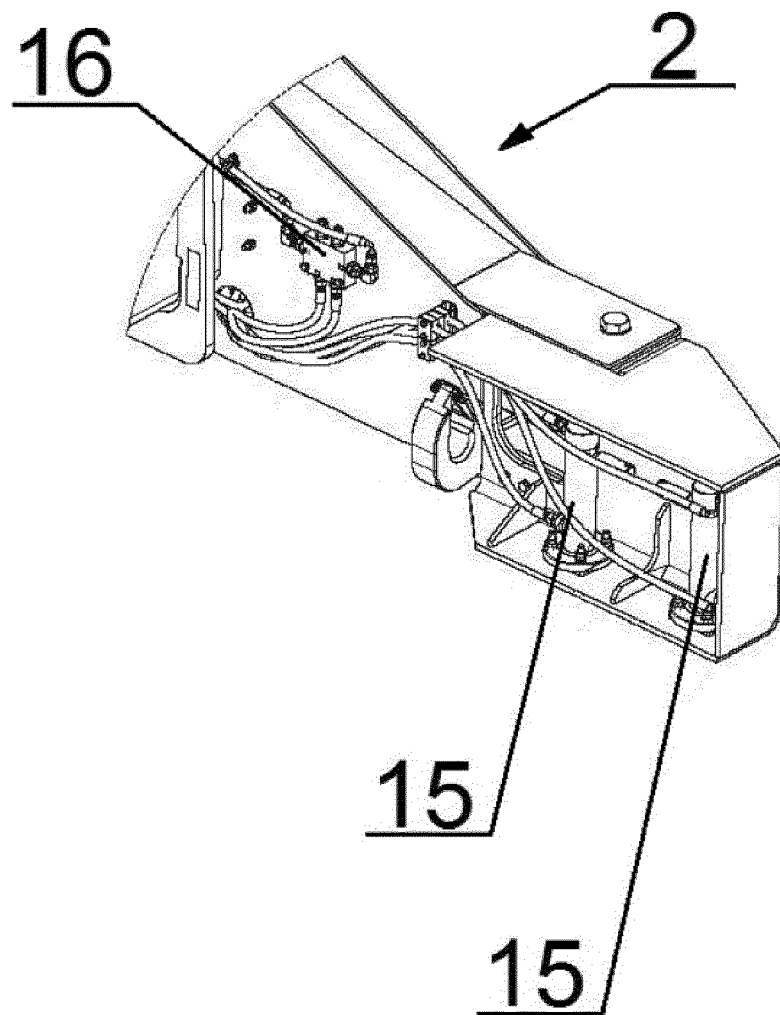


Fig. 5a



EUROPEAN SEARCH REPORT

 Application Number
 EP 17 19 4275

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 2013/011097 A1 (LONGAGNA BRUNO [IT]) 24 January 2013 (2013-01-24)	21-23	INV.
A	* page 3, line 5 - page 6, line 28; figures 1-7 *	1-20	B66C1/10 B66C1/66 B66F9/065 B65D90/00 E05B83/08
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A	* paragraph [0054] - paragraph [0056]; figures 1-6 *	1-20, 22, 23	
			TECHNICAL FIELDS SEARCHED (IPC)
			B66C B66F B65D E05B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 6 February 2018	Examiner Rupcic, Zoran
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 17 19 4275

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The members are as contained in the European Patent Office EDP file on
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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