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(54) A method loading or unloading a container ship

(57) A method for loading or unloading a container ship, wherein
- said container ship is moored on a fixed quay or dock (2);
- a U-shaped floating quay (7) composed of at least one pontoon (8,9',9'') is provided along said container ship so as to allow container vehicles (6) to drive around said container ship on a path defined by said fixed quay or dock (2) and said floating quay (7);
- free ends of legs (9',9'') of said U-shape are connected to said fixed quay or dock (2);
- container vehicles (6) are driven from said fixed quay or dock (2) - via a free end of a leg (9',9'') of said U-shape - onto said floating quay (7) in a direction towards a plurality of container cranes (1) movably mounted on a base (8) of said U-shape for loading containers from said container vehicles (6) onto said container ship or for unloading containers from said container ship onto said container vehicles (6), using hoistening means of said container cranes;
- said container vehicles (6) are driven from said floating quay (7) - via a free end of another leg of said U-shape - in a direction away from said container cranes (1) onto said fixed quay or dock (2) for loading containers onto said container vehicles (6) or unloading containers from said container vehicles (6).

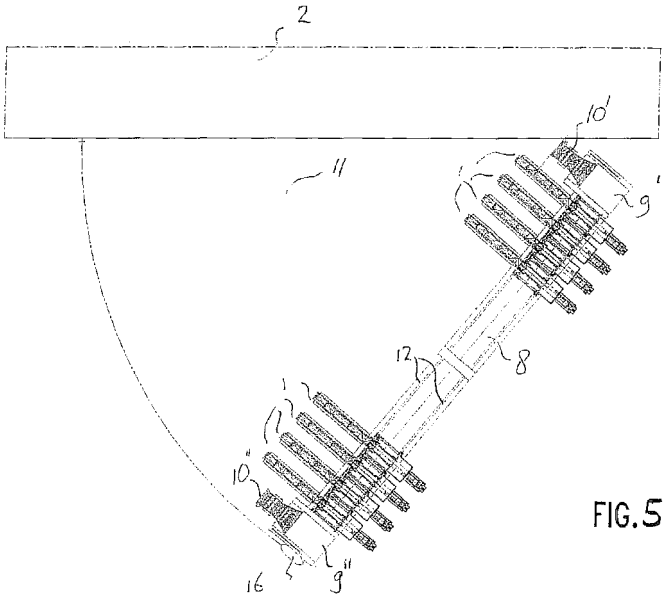

FIG. 5

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Description

[0001] The present invention relates to a method for loading or unloading a container ship.

[0002] Such a method is, of course, generally known. According to this known method first a container ship is moored on a fixed quay or dock. Several container cranes mounted on said fixed quay are subsequently used for loading containers from trucks onto said container ship or for unloading containers from said container ship onto said trucks, using hoistening means of said container cranes. However, a disadvantage of said known method is that loading and unloading said container ship is time consuming and therefore inefficient from a economical point of view.

[0003] United States patent publication no. 4,227,846 (Koskivirta) describes a method for loading and unloading water vessels, using a pair of floating elongate pontoon members. Said pontoon members are located parallel to and spaced from each other perpendicular to the edge of a dock or quay so as to define an area between the pontoon members for accommodating a water vessel. The vessel to be loaded or unloaded is directed between said pontoon members. A mobile crane apparatus is supported on either side of the vessel on the pontoon members and travels along the length of said pontoon members, whereas it has a hoistening apparatus extending horizontally over the width of the vessel. In another embodiment, an elongate pontoon member is located parallel to the edge of the dock or quay defining a vessel accommodating area between them. Again, a mobile crane apparatus is movably supported on said pontoon member and said quay on either side of the vessel, while a hoistening apparatus is present extending over the width of the vessel. Said method known from this United States patent publication suffers also from the disadvantage that loading and unloading takes a considerable time and is therefore economically inefficient.

[0004] It is the aim of the present invention to improve the prior art, particularly to speed up the process of loading or unloading a container ship from or to a fixed quay or dock.

[0005] In order to accomplish that objective a method according to the invention for loading or unloading a container ship is proposed, wherein

- said container ship is moored on a fixed quay or dock;
- a U-shaped floating quay composed of at least one pontoon is provided along said container ship so as to allow container vehicles to drive around said container ship on a path defined by said fixed quay or dock and said floating quay;
- free ends of legs of said U-shape are connected to said fixed quay or dock;
- container vehicles are driven from said fixed quay or dock - via a free end of a leg of said U-shape - onto said floating quay in a direction towards a plurality of container cranes movably mounted on a base of said U-shape for loading containers from said container vehicles onto said container ship or for unloading containers from said container ship onto said container vehicles, using hoistening means of said container cranes;
- said container vehicles are driven from said floating quay - via a free end of another leg of said U-shape - in a direction away from said container cranes onto said fixed quay or dock for loading containers onto said container vehicles or unloading containers from said container vehicles.

[0006] The present method ensures that a plurality of container cranes movably mounted along said floating quay are used for efficiently loading or unloading a container ship moored on a longitudinal side of said base of said U-shape or on both longitudinal sides of said base of said U-shape. Said container vehicles are able to drive around said container ship from and to the latter, each time carrying containers to or from a container stacking area, for example. In other words, the present method enables a very efficient supply and discharge of containers to and from said container ship. Particularly in case said fixed quay is unsuited for mounting container cranes thereon, for example because the soil of said fixed quay cannot bear such container cranes, the present invention still provides a fast process of loading or unloading said container ship. When a plurality of container cranes are provided on said fixed quay or dock as well, the present invention allows a two-sided (that is on either longitudinal side of said container ship) loading or unloading of said container ship in a fast though reliable manner.

[0007] In a preferred embodiment of a method in accordance with the invention said floating quay is composed of mutually connected pontoons. Preferably, a first pontoon is provided to be arranged in the longitudinal direction of said container ship, while two second pontoons shorter than the first pontoon are present to be arranged in the transversal direction of said container ship, such that said floating quay is U-shaped.

[0008] In a further preferred embodiment of a method according to the invention loading containers on said container vehicles or unloading containers from said container vehicles takes place in a container terminal on said fixed quay or dock.

[0009] In a further preferred embodiment of a method in accordance with the invention ramps are used to connect said free ends of said legs of said U-shape to said fixed quay or dock. These ramps will be described more in detail hereunder with reference to figures.

[0010] The present invention also relates to a U-shaped floating quay for carrying out a method according to the invention, comprising:

- a first elongate pontoon arranged to extend parallel to a fixed quay or dock;
- two second elongate pontoons shorter than said first pontoon arranged to extend perpendicular to said

fixed quay or dock;
- ramps arranged to connect said second pontoons to said fixed quay or dock;
- a plurality of container cranes movable along said first pontoon;
- said first and second pontoons being provided with (i) surfaces for accommodating container vehicles and (ii) pontoon interconnecting means such that said container vehicles can move between said first and second pontoons.

[0011] Preferably, said first and second pontoons are provided with stabilizing means for maintaining said first and second pontoons in position also when heavy weather is at issue.

[0012] Said container vehicles, such as container trucks, are thus allowed to drive around said container ship, each time carrying containers to or from a container terminal, for example. Instead of or in addition to said container trucks any other container carrying vehicles can be used, such as vehicles riding on rails, for example. Said surfaces for accommodating container vehicles comprise an asphalt layer covering said first and second pontoons, for example. In the alternative a layer of concrete is poured on top of said first and second pontoons. Alternatively, said first and second pontoons are covered by concrete plates. Said first pontoon is particularly provided with rails, so that said container cranes can slidably move over said rails along said first pontoon. Said pontoon interconnecting means ensure that said first and second pontoons are interconnected in a safe, sturdy and reliable manner, while a smooth transition for said container vehicles is realized between said first and second pontoons.

[0013] In a preferred embodiment of a U-shaped floating quay in accordance with the invention said floating quay further comprises at least one drive unit for moving the floating quay to a position completely surrounding a container ship moored on said fixed quay or dock. In the alternative a separate tug boat pushes (or pulls) said floating quay into place.

[0014] In a further preferred embodiment of a U-shaped floating quay according to the invention said floating quay is pivotally connected at the location of a second pontoon between a first position, wherein said floating quay allows said container ship to enter an area defined by said floating quay and said fixed quay or dock, and a second position, wherein said floating quay completely surrounds said container ship.

[0015] In a further preferred embodiment of a U-shaped floating quay in accordance with the invention said floating quay further comprises interconnecting means for interconnecting said floating quay and said container ship. Said interconnecting means preferably comprise vacuum means. Particularly, said vacuum means are attached to the hull of said container ship.

[0016] The invention will be explained in more detail hereafter with reference to a drawing, wherein

- figure 1 is a schematic side view of a container crane to be used on a fixed quay/dock or floating quay according to the invention;
- figure 2 is a schematic top view of a floating quay in a position fixed to a fixed quay according to the invention;
- figures 3 and 4 refer to a top view and side views and schematically show how said floating quay is connected to said fixed quay, using ramps;
- figure 5 corresponds to figure 2, on the understanding that it is schematically shown how said floating quay may be manoeuvred; and
- figure 6 shows vacuum means to be attached to the hull of a container ship.

[0017] Figure 1 shows a ship to shore crane 1 that is used to load and unload shipping containers. The crane 1 is positioned at the edge of a fixed quay 2 and includes a vertical superstructure 3 supporting a horizontally extending boom 4. A trolley 5 travels backwards and forwards along said boom 4 and can raise and lower a spreader that is sized and shaped to engage with containers. A vessel (not shown) is moored alongside said fixed quay 2 and includes a row of stacked containers. In the case where the vessel is being loaded, a container is transported from a storage yard or a remote location to said fixed quay 2 on the back of a container carrying truck or trailer 6. Said trailer 6 is accurately positioned at a desired location underneath said crane 1. The trolley 5 is moved along said boom 4 by a crane operator until said spreader is located directly above the container. The spreader is then lowered into engagement with the container and subsequently raised to lift the container off said trailer 6. The trolley 5 moves forward along said boom 4 until the container is located above the vessel. The container is then finally lowered into position and secured. In the case the vessel is being unloaded, a shipping container is lifted off the deck of the vessel using said spreader and the trolley 5 is moved backwards along the boom 4 until the container is located directly above the trailer 6. The spreader is then lowered to place the container on the trailer 6.

[0018] Figure 2 schematically shows a U-shaped floating quay 7 according to the invention comprising a first elongate pontoon 8 extending parallel to said fixed quay 2, two second elongate pontoons 9', 9" shorter than said first pontoon 8 extending perpendicular to said fixed quay 2, two ramps 10', 10" connecting said second pontoons 9 to said fixed quay 2, as well as eight cranes 1 of the type shown in figure 1. Said first pontoon 8 consists of two steel, hollow parts being welded together. The floating quay 7 and the fixed quay 2 define an area 11 for a container ship to be loaded or unloaded. Trucks or trailers 6 are driven from said fixed quay 2 via a ramp 10' onto

said floating quay 7 in a direction towards said cranes 1 for loading containers from said trailers 6 onto said container ship or for unloading containers from said container ship onto said trailers 6 in the above described manner. Said trailers 6 are subsequently driven from said floating quay 7 via another ramp 10" in a direction away from said cranes 1 onto said fixed quay 2 for loading containers onto said trailers 6 or unloading containers from said trailers 6. In other words, the trailers 6 can drive around the container ship, wherein said first and second pontoons 8,9',9" form a "one-way street" for said trailers 6. The cranes 1 are movable along said first pontoon 8 using rails 12.

[0019] With reference to figures 3 and 4, said ramps 10', 10" are each pivotally connected at point X (with the help of intermediate hinges 13) to a sliding deck 14 fitted to guides mounted in said second pontoons 9',9". An operating mechanism is fitted to said second pontoons 9', 9" to pull said sliding deck 14 back and forth so as to adjust the distance between the fixed quay 2 and said pontoons 9',9". Underneath the ramps 10', 10" a floating ramp pontoon 15 is provided to left said ramps 10', 10" when the floating quay 7 is disconnected from the fixed quay 2.

[0020] Figure 5 corresponds to figure 2, on the understanding that it is schematically shown how said floating quay 7 may be manoeuvred using a drive unit 16 for moving the floating quay 7 to a position completely surrounding a container ship moored on said fixed quay 2. Particularly, said floating quay 7 is pivotally connected at the location of a second pontoon 10' between a first position shown in figure 5, wherein said floating quay 7 allows said container ship to enter the area 11 defined by said floating quay 7 and said fixed quay 2, and a second position shown in figure 2, wherein said floating quay 7 completely surrounds said container ship. In the alternative, a tug boat pushes said floating quay 7 into a position completely surrounding said container ship.

[0021] Figure 6 schematically shows a device 17 fixed to said fixed quay 2 and comprising vacuum cups 18 to be attached to the hull of a containership. Said vacuum cups 18 are movable in vertical direction along a rack 19 connected to said fixed quay 2. Further, said vacuum means 18 are able to retract and extract in horizontal direction with the help of "scissors" 20 so as to move to or from the hull of said container ship.

[0022] The present invention is not restricted to the embodiments shown, but extends also to other preferred embodiments falling within the scope of the appended claims. For example, a skilled person will appreciate that said floating quay 7 may also be manufactured from a floating material, such as polystyrene, whether or not in combination with a rigid material, such as concrete. Of course, the first and second pontoons 8,9',9" are interconnected by welding, glueing or any mechanical connection, for example, such as such that said trailers 6 can smoothly drive thereon.

Claims

1. A method for loading or unloading a container ship, wherein

   - said container ship is moored on a fixed quay or fixed quay;
   - a U-shaped floating quay composed of at least one pontoon is provided along said container ship so as to allow container vehicles to drive around said container ship on a path defined by said fixed quay or dock and said floating quay;
   - free ends of legs of said U-shape are connected to said fixed quay or dock;
   - container vehicles are driven from said fixed quay or dock - via a free end of a leg of said U-shape - onto said floating quay in a direction towards a plurality of container cranes movably mounted on a base of said U-shape for loading containers from said container vehicles onto said container ship or for unloading containers from said container ship onto said container vehicles, using hoistening means of said container cranes;
   - said container vehicles are driven from said floating quay - via a free end of another leg of said U-shape - in a direction away from said container cranes onto said fixed quay or dock for loading containers onto said container vehicles or unloading containers from said container vehicles.

2. A method according to claim 1, wherein said floating quay is composed of mutually connected pontoons.

3. A method according to claim 1 or 2, wherein a plurality of container cranes is mounted on said fixed quay or dock.

4. A method according to claim 1, 2 or 3, wherein loading containers on said container vehicles or unloading containers from said container vehicles takes place in a container terminal on said fixed quay or dock.

5. A method according to any of the preceding claims 1 through 4, wherein ramps are used to connect said free ends of said legs of said U-shape to said fixed quay or dock.

6. A U-shaped floating quay for carrying out a method according to any of the preceding claims 1 through 5, comprising:

   - a first elongate pontoon arranged to extend parallel to a fixed quay or dock;
   - two second elongate pontoons shorter than said first pontoon arranged to extend perpendic-

ular to said fixed quay or dock;
- ramps arranged to connect said second pontoons to said fixed quay or dock;
- a plurality of container cranes movable along said first pontoon;
- said first and second pontoons being provided with

(i) surfaces for accommodating container vehicles and
(ii) pontoon interconnecting means such that said container vehicles can move between said first and second pontoons.

7. A U-shaped floating quay according to claim 7, further comprising at least one drive unit for moving the floating quay to a position completely surrounding a container ship moored on said fixed quay or dock.

8. A U-shaped floating quay according to claim 6 or 7, wherein said floating quay is pivotally connected at the location of a second pontoon between a first position, wherein said floating quay allows said container ship to enter an area defined by said floating quay and said fixed quay or dock, and a second position, wherein said floating quay completely surrounds said container ship.

9. A U-shaped floating quay according to claim 6, 7 or 8, further comprising interconnecting means for interconnecting said floating quay and said container ship.

10. A U-shaped floating quay according to claim 9, wherein said interconnecting means comprise vacuum means.

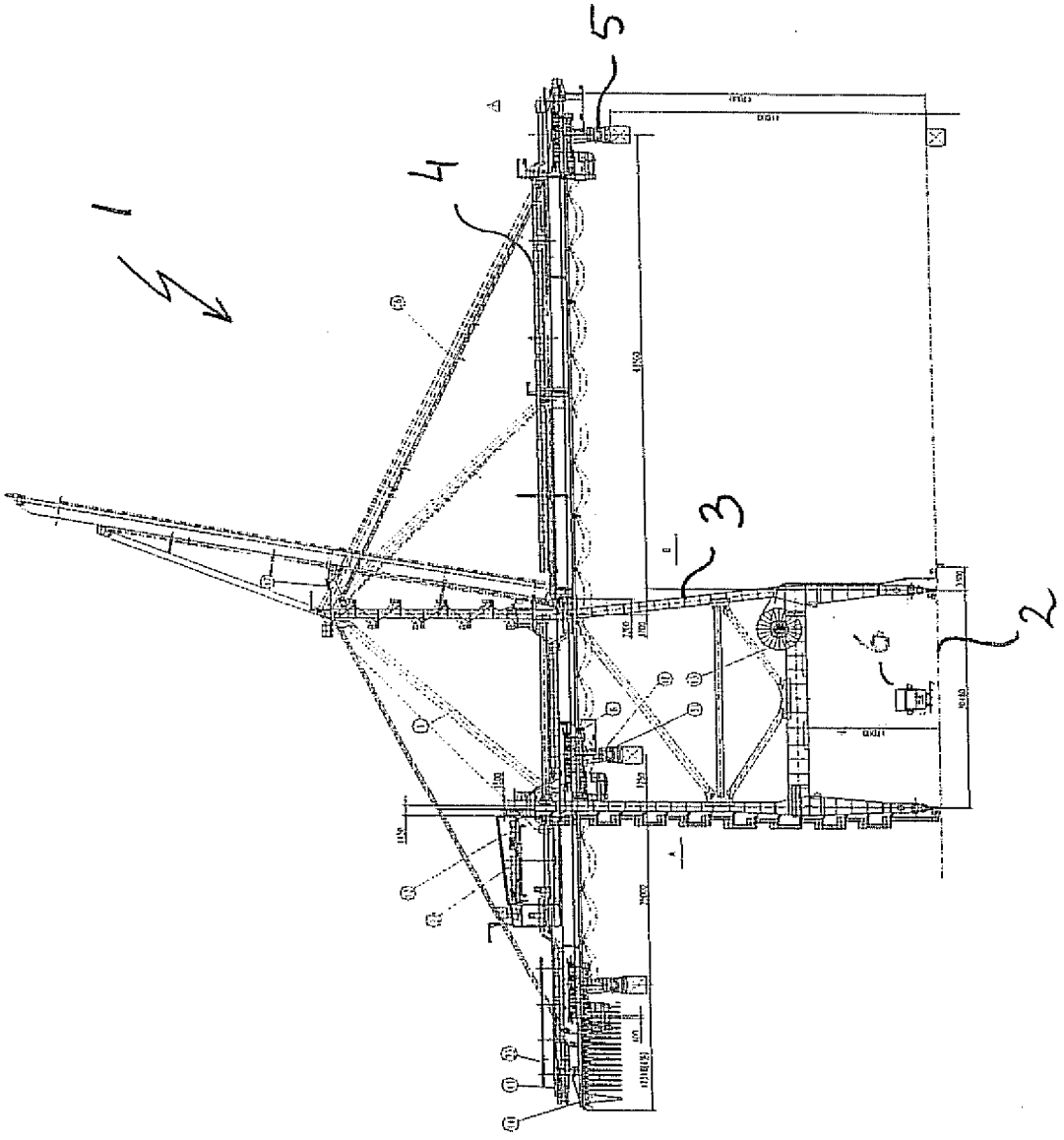

FIG. 1

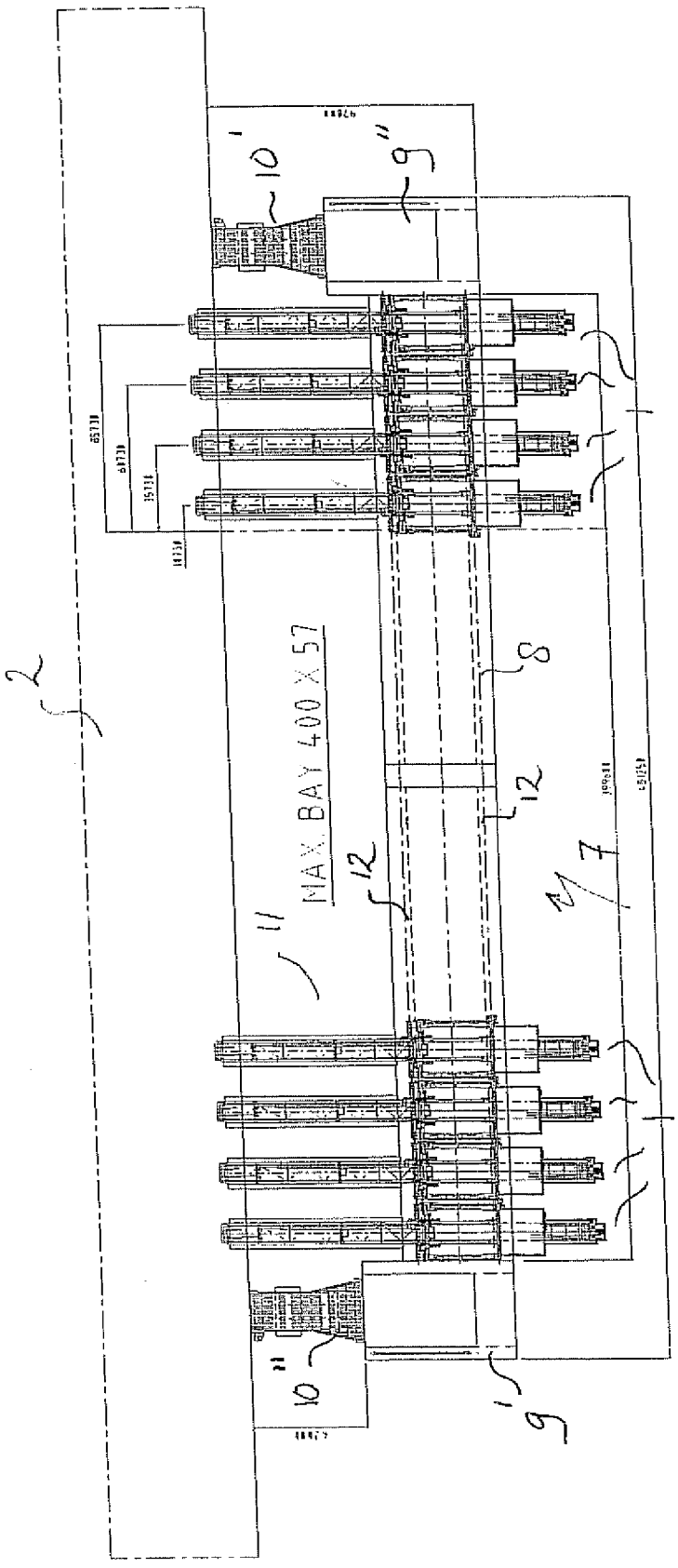

FIG. 2

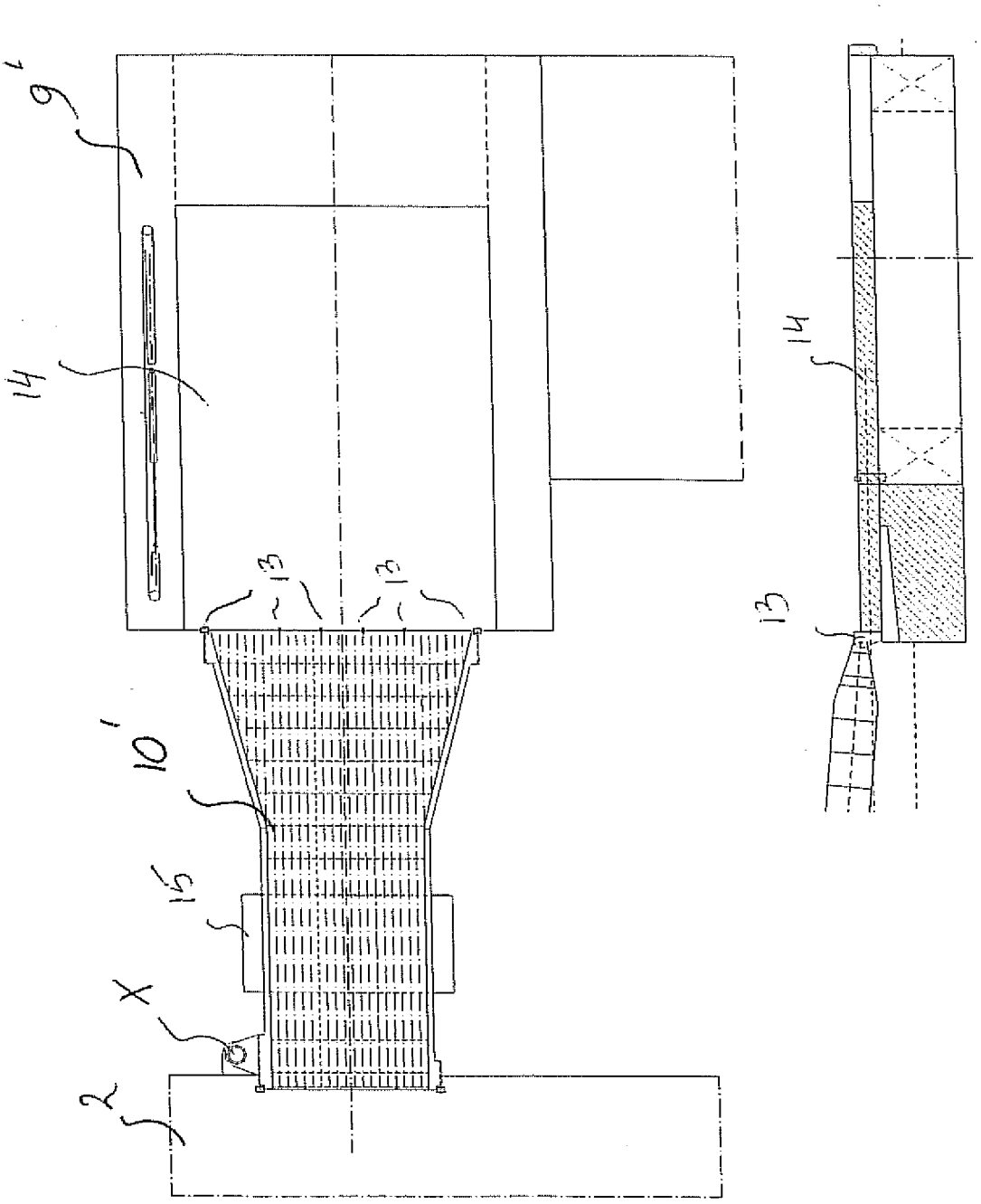

FIG. 3

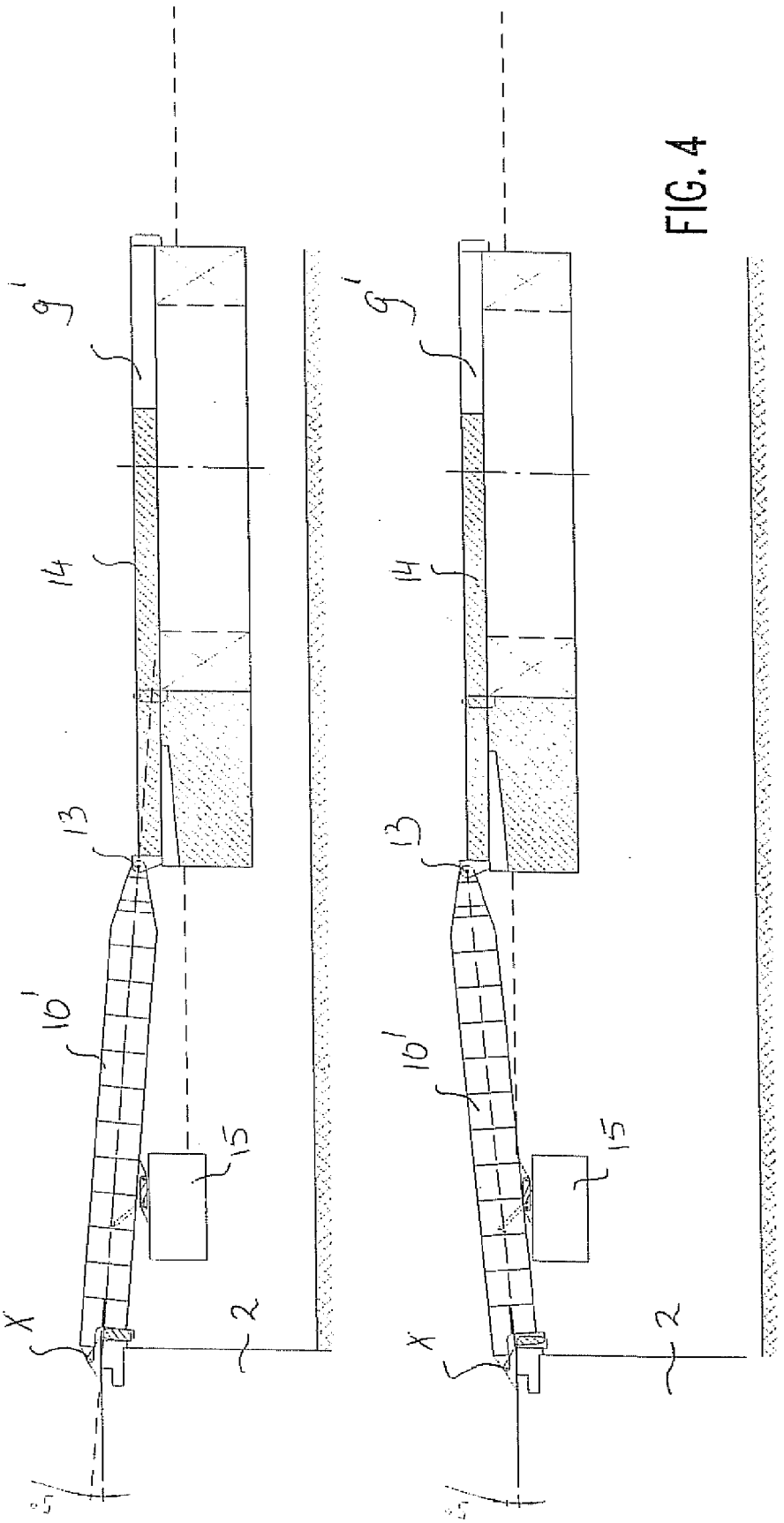

FIG. 4

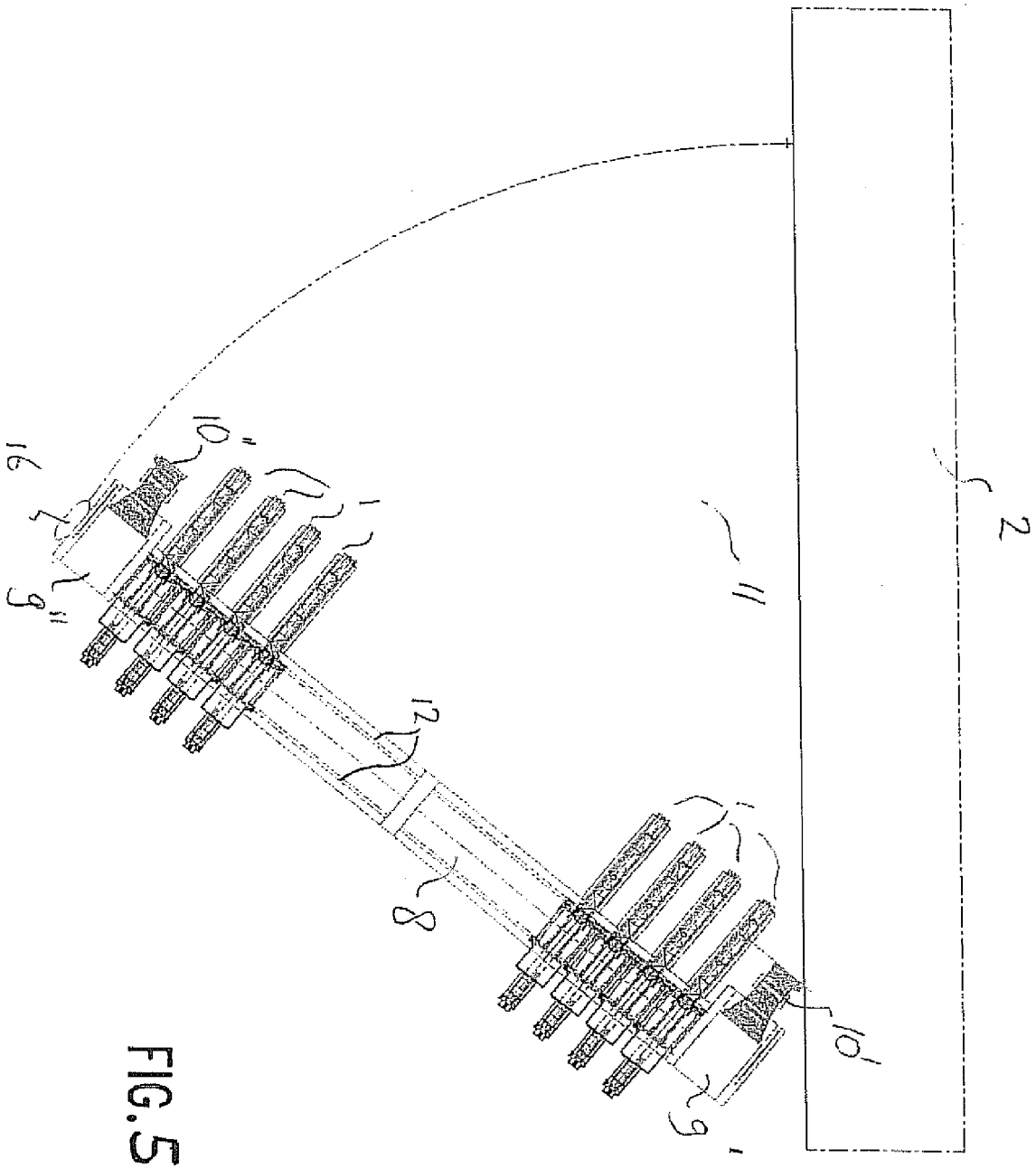

FIG. 5

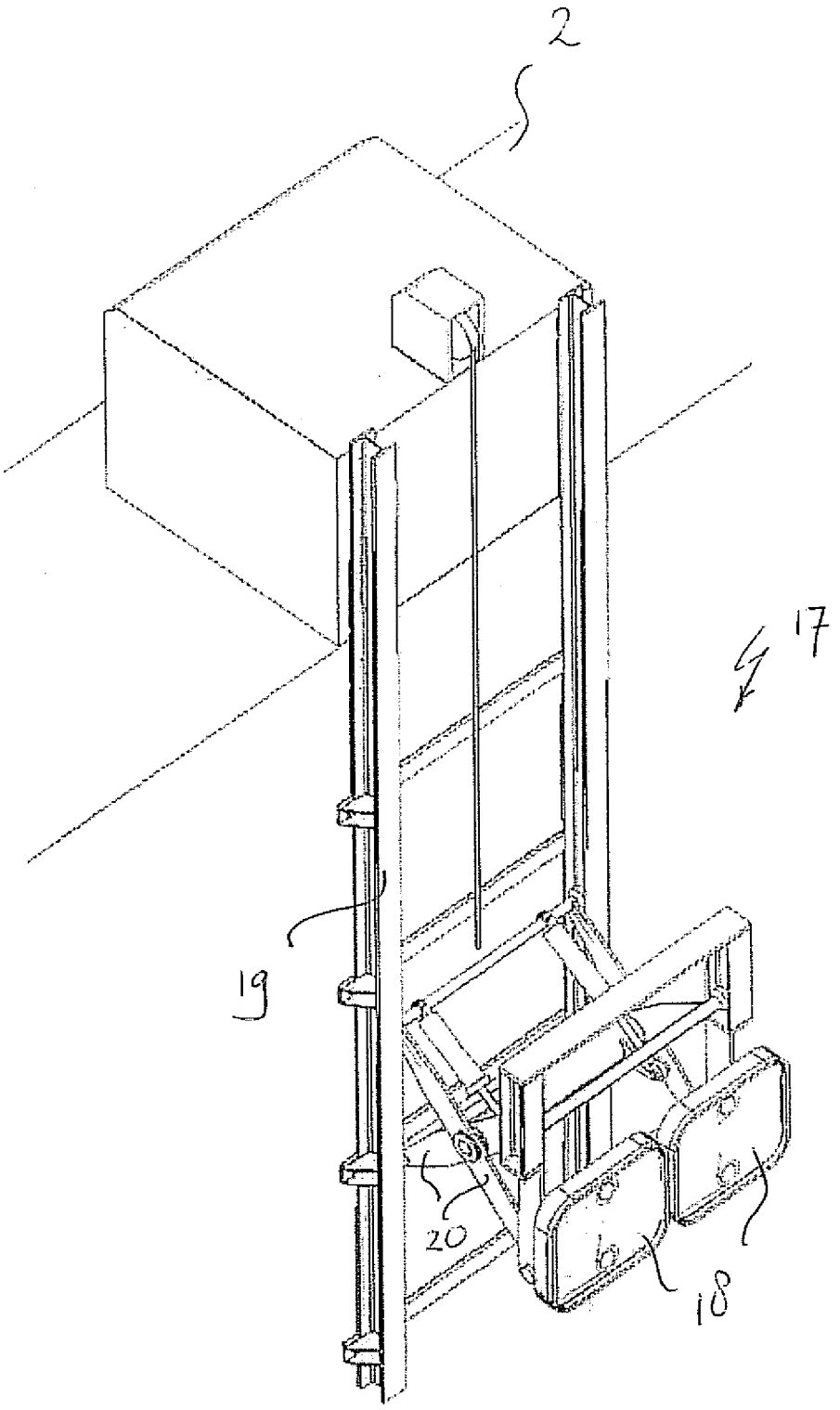

FIG. 6

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 07 10 9881

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,D	US 4 227 846 A (KOSKIVIRTA VEIKKO) 14 October 1980 (1980-10-14) * column 2, line 29 - line 47 * * column 5, line 35 - line 48 * -----	1,6	INV. B63B27/10 ADD. B63B27/00

TECHNICAL FIELDS SEARCHED (IPC)

B63B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	9 November 2007	Gardel, Antony

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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EPO FORM 1503 03.82 (P04C01)

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4227846 A	14-10-1980	NONE	

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

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Patent documents cited in the description

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