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(54) Titre : SYSTÈME, PROCÉDE ET DISPOSITIFS POUR LA MANŒUVRE DE BATEAUX STOCKES DANS UNE CALE
SECHE EN UTILISANT UN PONT ROULANT ET UNE TOUR COULISSANTE
(54) Title: SYSTEM, METHOD AND DEVICES FOR HANDLING BOATS STORED IN A DRY DOCK USING A ROLLING
BRIDGE AND SLIDING TOWER

(57) **Abrégé/Abstract:**

Device for the handling and storage of boats in a vertical dry dock. The boats (16) are removed from the water (7) via forks (13) which slide in a sliding fork- shaped system (12) carrying a cradle (10). The forks are displaced via a motor driven rack and pinion (14) system. The run of the rack and pinion system is limited by sensors (15 et 20). The entire mechanism is supported by a structure (8) which carries a tower (9) and a sliding fork-shaped system (12) that enables the cradles (10) to be deposited in berths (2, 2a). A rolling bridge (6) enables the entire assembly to be moved along X, Y and Z axes. The device is specifically useful for vertical dry dock management of boats, allowing the latter to be removed from the water and stored safely, or removed from storage and placed onto the water, as needed.



ABSTRACT

Device for the handling and storage of boats in a vertical dry dock. The boats (16) are removed from the water (7) via forks (13) which slide in a sliding fork-shaped system (12) carrying a cradle (10). The forks are displaced via a motor driven rack and pinion (14) system. The run of the rack and pinion system is limited by sensors (15 et 20). The entire mechanism is supported by a structure (8) which carries a tower (9) and a sliding fork-shaped system (12) that enables the cradles (10) to be deposited in berths (2, 2a). A rolling bridge (6) enables the entire assembly to be moved along X, Y and Z axes. The device is specifically useful for vertical dry dock management of boats, allowing the latter to be removed from the water and stored safely, or removed from storage and placed onto the water, as needed.

Figure 1

SYSTEM, METHOD AND DEVICES FOR HANDLING BOATS STORED IN A DRY DOCK USING A ROLLING BRIDGE AND SLIDING TOWER

The present invention relates to a device, system and methods for manipulating, storing and managing said stored objects, in particular for storing and handling boats
5 in corresponding storage spaces in dry docks.

Increased protection of the coastline against urban development, an insufficient number of wet mooring berths capable of dealing with the expanding development of pleasure boating, and the desire to store and protect boats from corrosion and bad weather for periods of time when the boats are not in use, have led to the
10 development of buildings for housing said boats on land. Such constructions are generally known as vertical dry docks.

In such vertical dry docks, boats are generally removed from the water and stored in boat parking spaces which are comprised of compartments arranged along sets of openings or corridors disposed in parallel between vertical supports in order to
15 reduce the surface area used by the construction. Prior to parking, the boats are usually hosed down with domestic water, as opposed to seawater, as this is considered by many to be an essential service necessary to protect against corrosion, particularly before immobilisation of the boat for a long period, for example, over the winter.

20 Known systems and devices to date have been described in several patent applications and patents.

For example, European patent application EP1201536 to Jouve, describes an automated dry dock system and device. In this system, the boat is brought to the quayside and positioned in a hoist trolley much larger than the boat itself. The hoist
25 trolley is attached to a hoist or elevator system that runs along a rail. The rail rises vertically, in order for the boat to be lifted from the quayside by the hoist system, and then another tangentially positioned rail system with a cross-over rail and corresponding counter-balance wheels on the hoist trolley is provided, in order to prevent the trolley from tipping over as it engages the change of direction. The
30 horizontal rail then moves the trolley towards a circular storage carousel, at which

point the load, i.e. the boat, is transferred via rails to a central turntable system that can be raised or lowered within the carousel. At the desired height, the boat is moved from the turntable to a housing berth or parking space, requiring yet another load transfer. The carousel houses the parking spaces for the boats which are disposed in radial fashion around the central turntable. This system thus involves at least two transfers of the load when moving a boat from the water to its berth and the use of a complex cradle to support the boat during movement. Additionally, the civil engineering work required to get the system up and running is significant, complex, and various other boat movements involved require extra handling operations and several loading and unloading manoeuvres, before a boat can be removed from the water and parked, or vice-versa, removed from its parking place and set to water.

Another known system is of the type described in French patent FR2901535 to Giroud. In this patent, a rolling bridge system is moved over the water. A vertically sliding forklift system, attached to a fixed length and vertically fixed rigid upper support frame, carries a pallet which is deposited in the areas where the boats are to be parked. The vertically fixed and rigid upper support frame is attached to a central crown, which can be rotated in order to turn the forks, pallet and boat about a central vertical axis. The forks, however, have no horizontal sliding movement capability, and the upper support frame is not movable in a vertical direction. One major disadvantage of such a system is that, in order to be able to rotate the boat taken from the water, it is necessary to provide a much greater space in the central corridor or opening, which thereby increases the surface area covered by the vertical dry dock building, and additionally, for any given surface area, reduces the number of boats that can be stored thereon.

US patent 4,953,488 to Heidtmann discloses a carousel-type vertical dry dock system where the boat elevator device is provided outside of the storage building, the building itself being provided with motorised means for turning the building structure in order to position a housing or parking space opposite the correspondingly positioned boat which has been raised from water level by a crane system comprising pincers or grab arms to grasp the boat. The use of such arms is potentially very damaging to the boat's hull and preventing the boat load from swinging around whilst on the move, e.g. when turning from a facing out, waterward

position, to a facing inward, boathouse position, also poses a significant number of technical challenges, increasing the complexity and cost of setting up, and operating such a system.

US patent 6,007,288, and US patent 7,367,747, as well as US patent applications
 5 US20050035259, US20090304480, US20120114417, all to Maffett et al, disclose a vertical dry storage system for boats involving a boat cradle that is attached directly to a cable winch system. The cradle itself must be docked with support rails provided in the berths of the housing structure, whereby the support rails engage in corresponding grooves provided within the cradle. This requires a great deal of
 10 control and precision over the movements of the cable hoists, and with swing movements involved in shifting loads at the end of support cables, even if contained within a cradle larger than the size of the boat, one can expect boats to move sufficiently out of alignment during translational movement, that an increased risk of collision with the structure is likely. Additionally, the space requirements of such a
 15 system are directly proportional to the way in which the boats are stored, i.e. longitudinally, or along the boat's longitudinal axis from the central corridor. This means that the depth of the support structures for the berths must be at least as long as the longest of the boats to be stored, and the building must provide for sufficient space to be able to rotate the boats in their cradle in order to insert them into their
 20 berths, thereby increasing the overall width, surface area, and cost, of the building, and moreover, reducing the total number of boats that can be stored per given predetermined surface area, as each boat has an individual berth.

All of the devices and systems described above, however, have a number of important disadvantages :

- 25 - the systems used to grab the boats are expensive and complex ;
- the risk of damaging the boat is always present, due to the increased handling and movement of the latter ;
- as the various handling operations are themselves complex, the known systems do not easily lend themselves to complete automation.

30 The devices, systems and methods according to the present invention overcome said

limitations and disadvantages, and in particular:

- enable the management of the complete set of handling operations : removal of the boat from the water, translation, lifting and storage of the latter via a single system made from components readily available in general commerce ;
- 5 - avoid costly and expensive civil engineering or maritime works, with no, or only an optional, requirement to build quays or maritime docks ;
- enable complete automatic management of the various handling operations, thereby allowing the desired parking spot to be reached via an XYZ coordinate system inside the vertical dry dock system;
- 10 - enable moving a boat into its parking space or removing it from said space, via, for example, a coded card, that commands and controls a completely automatic and user-friendly and safe system.

The vertical dry dock system according to the invention is made up of one or more parallel openings formed between vertical supports, each one comprising a central
 15 passage or corridor, which is free of obstruction, to allow for the movement of boats in and out, the boat handling device, and parking spaces located on either side of the passage or corridor, on one or more levels. The device according to the invention consists of a mechanical displacement system to move watercraft from when they arrive, floating at the water's edge, to their parking spot on the ground, in their
 20 allotted berth, all without interruption of load on the system during transfer, and fully automatically. According to one embodiment, the device includes :

- a roll path formed by at least two parallel rails which project out over the water in one direction, and extend into a passage or corridor of the building in the opposite direction along the whole length of said passage or corridor. The roll path is located
 25 at a height which is sufficient to vertically cover all of the storage spaces along the path, and preferably bears down on the external vertical uprights of the opening. A rolling bridge moves along the roll path, the bridge being formed by two parallel beams that are perpendicular to said roll path. This direction of movement of the rolling bridge along the roll path is called the X axis. A movable chariot moves along
 30 the whole length of, and on, at least two beams that form the framework of the rolling

bridge, thereby covering the whole width of the openings. This direction of movement of the movable chariot is called the Y axis.

Within the XY axes of the moving rolling bridge, a mobile chariot system is located that has a vertically movable structure, the height of which can be adjusted,
 5 preferably defined as a sliding telescopic tower. The chariot is thus movable on the rolling bridge along the Y axis, whereas the Z axis corresponds to vertical movement of the vertically movable structure, in the present case, the sliding telescopic tower. The sliding telescopic tower is equipped with a prehensile assembly at its lower extremity, in the present embodiment a horizontally sliding forklift system, that
 10 enables boat support cradles to be lifted and lowered along the Z axis, and then moved or translated along the X and Y axes. The vertical Z axis movement can be achieved, for example, by pulleys and winches, or via hydraulic pistons, or any other suitable hydraulic or mechanical system. The forks engage a boating support cradle via horizontal sliding displacement of the forks on either side of the vertical axis of the
 15 telescopic tower, and as required when either withdrawing a boat from its berth, or when depositing a boat into its storage berth.

The horizontally sliding forks are moved forwards and backwards on both sides via rack and pinion means or another similar system, the movement of which is controlled by positioning sensors located on the sliding forklift system attached to the
 20 telescopic tower, and respectively, at corresponding locations on the boating support cradle. The sliding forklift system is also movable vertically along a relatively short distance of the telescopic tower, in order to allow for fine, or precise, vertical positioning control when taking a boat support cradle from a berth, or when putting said support cradle back onto a berth.

25 On either side of the telescopic tower, the sliding forklift systems are equipped with rack and pinion means, in order to balance out the loads, and enable boats to be taken from, and deposited into, berths on either side of the opening and central passage, without having to rotate them about the tower. One major advantage of such a non-rotating system is a notable saving in surface area required for
 30 manipulating the boats when transferring to or from their berths. The extra space gained through the use of this system can also be used, for a predetermined fixed surface area, to store a greater number of boats per square meter, or boats of

greater width, for example, by increasing corresponding storage strut support length and berth depth.

The system and device according to the present invention thus allows for the boat support cradles borne by the fork-shaped systems to be freely moved from one area
 5 of the opening, or central corridor, to any other part thereof, thereby optimising use of the available storage space. Generally, the cradles are adapted both to be engaged by the sliding forklift systems so that they can be handled correctly, and also to the geometry of the boats to be handled. The handling device carried by the rolling bridge can then move on to subsequent boats to be handled.

10 The cradles are laid on storage berths which are arranged parallel to the length of the opening, corridor, or central passage. The vertical run of movement in the telescopic tower and horizontally sliding forklift system is sufficient to enable it to be lowered to ground level and even below the water level, depending on the loads to be handled. The device functions generally as follows :

- 15 - a boat support cradle is engaged by the sliding forklift system at a berthing space, and removed therefrom by reverse horizontal movement of the forks via the rack and pinion means until it is clear of the berthing structure and free to move up and down the length of the central corridor, and up and down vertically;
- 20 - the rolling bridge is then moved along the upper rails and corresponding roll path, which in turn displaces the chariot holding the telescopic tower and sliding forklift system, to a point just above the water, whereafter the sliding forklift system and boat support cradle are lowered into the water to a level
 25 located beneath the lowest depth of a boat to be handled – for the majority of boats envisaged by the system, device and method of the present invention, this depth corresponds to approximately 1.5 meters below the lowest part of the boat to be handled;
- the boat moves to a position above the sliding forks, bearing the cradle, and then the forks are moved into position such that the cradle now supports the
 30 hull of the boat, thereby preventing the forks from coming into direct contact

with said boat;

- the forks are then raised, via retraction of the telescopic tower, to the desired height corresponding to the height of the berth in which the boat is to be stored;
 - 5 - the rolling bridge is then moved along the roll path once more to a spot in alignment with the storage berth to be used for the boat;
 - optionally, any fine adjustment needed in positioning the height of the boat support cradle with respect to the berth can be carried out via the vertical displacement means of the sliding fork system, either before movement along
10 the rolling bridge roll path, or alternatively, once the cradle has already effected this movement – generally, the boat support cradle is positioned to be slightly above the final resting position of the cradle in the berthing space, to allow for clearance when moving the forks forward into the berthing space;
 - the cradle is then deposited into the storage berth via horizontal extension of
15 the sliding forks, the sliding forklift system lowered to allow for withdrawal thereof from the cradle, thereby enabling the cradle to rest on the berth, and subsequent withdrawal of the forks in the opposite direction back towards the telescopic tower.
- 20 A known device can optionally enable the rolling bridge on one roll path to be moved from one opening having a central passage to an adjacent opening with its own passage and having a separate roll path located above it. This movement occurs along the Y axis. An example of such a device is a transfer bridge and comprises a rolling bridge that is moved on rails which are perpendicular to the axes of the
25 openings and which carries a part of the rails of the rolling path on which the rolling bridge carries the telescopic tower, sliding fork-shaped system and boats, along the X axis. Such a system makes it possible to move the rolling bridge from one opening to another along the Y axis.

Some of the advantages of the present invention are given below:

- boats are located on their cradles in their corresponding berths, for example, three or more different sizes of cradle can be used depending on the size of the boat to be handled ;
- 5 - the cradles all have a lower base structure which is common to each type of cradle, and an upper structure adapted to the size and particular conformation of the boat to be handled. Such a cradle enables manipulation of the boat without touching it, and additionally always being able to have the same width between the forks of the sliding fork-shaped system;
- 10 - the forks are moved via a rack and pinion system, which enables boats to be taken from, or stored to, either side of the tower, once the sliding fork-shaped system has been aligned with, and engaged in, the cradle, with the help of the correctly located sensors - this enables the boat to be handled without knocks or judders, and thereby eliminates risk of damage to the boat;
- 15 - the boats are stored longitudinally and perpendicularly to the portside quay, which when coupled with the fact that the handling device only requires a minimum length of 7 metres for complete operational movement, allows for up to between 60% and 200% more boats to be stored in any given surface area when compared to a classical dry dock system, even those which are semi-
20 automatic;
- the number of stories of storage is relatively large, for example 6 or 7 stories are possible;
- removing boats from storage and introducing them to the water, and the reverse operation of removing them from the water and depositing them for
25 storage, can be carried out without having to load and unload more than once, and without the boat being manhandled, through the use of the cradle.

The accompanying figures, provided for purposes of non-limiting illustration of the

invention, are included to better facilitate comprehension of the features and advantages of the device according to the invention :

- Figure 1 is a cross-sectional representation of a storage opening within a housing ;
- 5 - Figure 2 is a representation of a telescopic tower and sliding fork-shaped removing a boat from the water ;
- Figure 3 represents a cradle and the positions of the location sensors on the forks of the sliding fork-shaped system, as well as the locationnn of the rack and pinion means ;
- 10 - Figure 4 represents a cross-sectional view of a boat hangar seen from above;
- Figure 5 is a schematic representation of a boat storage system, or vertical dry dock system and device according to the present invention, where several storage halls are illustrated, side-by-side, each one equipped with a manipulation system according to the present invention;
- 15 - Figure 6 is a schematic representation of part of the telescopic tower, and the sliding forklift system being either brought into position relative to, or moved away from, a boat located on the water;
- Figure 7 is a schematic partial representation of the vertical dry dock system according to the invention, showing in particular part of the telescopic tower,
- 20 forklift system, and boat support cradle when depositing or removing a cradle with boat onto, or from, a berthing space.
- Figure 8 is a schematic representation of the view side-on to the sliding forklift system, cradle and boat located thereon;
- Figure 9 is an enlarged view of the schematic representation in Figure 8,
- 25 illustrating the detail of the rack and pinion means in the sliding forklift system;
- Figure 10 is a schematic representation of a boat being removed via its cradle, the sliding forklift system and telescopic tower (in part) from a ground floor

berthing space within the boat storage system according to the present invention.

Turning now to the Figures, Figure 1 is a cross-sectional schematic representation of a vertical dry dock (1) including storage spaces which form berths (2, 2a). Vertical
 5 uprights (3), having berth supports (2, 2a), support rails (5, 5a), on either side of a central opening or corridor (4), which form a roll path for a rolling bridge (6) that can be moved along the whole length of the corridor (4), as well as above the port water area (7).

A movable chariot structure (8) is movable along parallel beams forming the rolling
 10 bridge (6). The movable structure (8) carries a telescopic sliding tower (9) that enables boat support cradles (10) to be lowered or raised and moved vertically along a Z axis, and horizontally along the X and Y axes, whereby the cradles are carried via a horizontally sliding, and vertically height-adjustable, forklift system (12) which itself engages with the telescopic lifting tower (9), the latter being raised or lowered, for
 15 example, via pulleys (11) or hydraulic pistons, or other suitable mechanical means. The forks (13) both carry, engage and cooperate with, the rigid cradles (10). The forks (13) can be moved horizontally either side of an axis defined by the vertical axis of the telescopic tower (9), both via rack and pinion systems (14) that are provided on the sliding forklift system (12), and via movement of the sliding telescopic tower (9)
 20 and chariot (8) along the rolling bridge (6). Positioning sensors (15, 20), located above the rack and pinion systems (14), cooperate with corresponding sensors located on the cradles (10), thereby causing the motors of the rack and pinion systems to stop and and thus arrest any relative movement of the forks in each possible direction of movement.

25 In Figure 2, the rolling bridge (6) which carries the telescopic tower (9) is represented. The tower (9) enables boats (16) to be raised from, or lowered onto, the water (7). The cradles (10), equipped with positioning sensors (15, 20), are lifted by a combination of movements along the X, Y and Z axes, of the sliding forklift system, telescopic tower, and rolling bridge, in order to deposit the boats precisely onto their
 30 berths (2, 2bis).

In Figure 3, a boat support cradle (10) has been illustrated. The cradle has the

following components :

- a lower part (17) with a substantially rectangular base is subdivided into two further identical and opposite framework sections (18) forming cavities (21) and cross-support struts (19). The cavities (21) and cross-support struts (19) enable the forks to
5 be introduced and moved within the cradle base. The cradle base is designed so that the forks (13) bearing the rack and pinion systems (14), which are located on metal profiles (23) on the forks, can be slid into the cavities (21). The lower part (17) of the cradle also contains positioning sensors (15, 20) configured to determine the limits of forward and backward movement of the forks which cooperate with corresponding
10 sensors on the forklift system;
- an upper part of the cradle is configured in shape and form to conform to the shape of the boats it is to receive and carry, but is also provided with reinforcing struts (22) made for example, of softwood and covered, in a suitable material, for example rubber, or an impact resistant or impact absorbing plastic, viscoelastic or elastomeric
15 material, in order not to damage the boat hull.

Figure 4 represents 4 a cross-sectional view from above of a vertical dry dock (1) and illustrating :

- the storage spaces and berths (2, 2a) and vertical uprights (3) ;
- the rolling bridge (6), supported by rails (5, 5a) either side of the corridor or
20 opening (4) ;
- a structure (8) carrying the sliding telescopic tower (9), said structure being movable along the rolling bridge (6) ;
- boats (16) on the water (7) and boats being raised via the telescopic tower (9), and sliding fork system ;
- 25 - cradles (10) located in their respective berths (2,2a) ;
- the tower (9) being raised or lowered to deposit the boat support cradle (10) at the required height for the supports (3) in the uprights ;

- boats being moved via the sliding forklift system (12) to their respective berths and depositing the cradle (10) on the berth (2, 2a).

According to another preferred embodiment, as represented in Figure 5, it is possible to organize several adjoining storage halls or buildings. As each hall can store on average up to 125 boats, depending on the boat size, five similarly arranged halls would provide storage space for up to 625 boats. The boats are stored on shelves formed by the support struts and corresponding uprights. Each boat is stored parallel to the length of the hall, nose-to-tail on the racks, with an average spacing of approximately 500 millimeters between the nose of one boat and the corresponding tail of the next boat in front. The precision of the system is such that this can be achieved without damaging the boats in any way. As the handling system according to the present invention are fairly rigid, the boats do not sway or twist, such as one might find with a cable suspended cradle or grabs attached to a cable. The various handling systems can all be operated independently of one another, and fully automatically as will be described hereinafter. This means that the storage systems according to the present invention can deposit or remove any given boat from any given berth in a programmed, orderly manner, thereby saving both operating and personnel costs. Each storage building or hall can be approximately 100 meters long and approximately 15 meters wide. The central corridor is then generally about 8.8 meters wide. The boats are stored, as mentioned above, parallel to the length of the building on berthing shelves that are approximately 3 meters in depth. The building can have up to about 5 levels of storage, including the ground floor, or more if required.

Each new boat to be stored is registered with a management system, for example, when the boat owner subscribes to a storage service – the management system can be computer controlled, for example, with data residing on one or more servers or electronic storage systems, and the data being used to coordinate the movement and handling manoeuvres of the boats;

When a subscription for storage is taken out, for example, a cradle is reserved for the boat which corresponds to the size of the boat to be handled – in order to do this the boats specifications are entered into the system, and the boat is measured and weighed, for example using the sliding forklift system and sensors;

The cradle comprises two main parts, a lower part, which is common to all of the cradles, with a framework and reinforcing struts, for example, made of tubular steel, and an upper part, the size and dimensions of which are adapted to the size of the boat. Although there is a substantial number of boat sizes, the applicant has

5 determined that most cases can be met with just three different types of upper part for the cradle, although naturally, more than three types could be designed to cater for all manner of shapes and sizes of boat, especially for larger ones. The upper part of the cradle that comes directly into contact with the hull of the boat is preferably made from wood, for example softwood, optionally with a further coating or

10 cushioning, such as rubber, or a suitable elastomeric or plastics material, capable of absorbing shocks and preventing or reducing direct contact damage to the boathulls;

The lower part of the cradle also comprises orifices adapted to receive and engage with the forks from the sliding forklift system. These orifices are identical for each type of cradle with regard to their spacing, distribution, dimensions, etc, The lower

15 part of the cradle is furthermore provided with positioning sensors, that cooperate with corresponding sensors on the sliding forklift system.

In an exemplary embodiment, the forks of the sliding forklift system have a depth of approximately 200 millimeters, which in turn means that the height of the orifices in the lower part of the cradle would be at least about 250 millimeters.

20 The system according to the invention makes it impossible for a boat to be manipulated directly by the sliding forks, as it is programmed to only pick up a boat that is already on a cradle. This avoids any risk of damage to the boathulls through imprecise or incorrect movement of the sliding fork system and also guarantees the physical integrity of the boats both moving into, and out of, storage.

25 When the system is in operation, and the telescopic tower inside the building or hall, the latter at rest is always in a raised, uppermost, or vertically withdrawn, position. This also allows for movement of personnel within the central corridor or passage, or maintenance or service vehicles. When a boat requires handling, the telescopic tower is activated to initially extend downwards from its uppermost position, and then

30 move up and down according to the desired positioning of the boat on its cradle, whether it be to deposit the boat on a berth, or to place it on the water. The telescopic

tower can be moved up and down via a winch system, and appropriately equipped braking and security systems that can be controlled remotely.

The horizontal sliding forklift system comprises a frame that is adapted to be vertically movable up and down a relatively short distance of the telescopic tower.

- 5 This allows for fine tuning of the vertical positioning of the sliding forklift system. The vertically movable frame can for example, be moved by a winch system, itself also equipped with suitable braking and security means, and means allowing it to be controlled remotely. The vertically movable frame can comprise, for example, drive wheels having a circumferential slot that engages by friction with a corresponding
- 10 projecting rail on the telescopic tower, or any other equivalent well known means of enabling such movement. The sliding forks are moved by motors housed within the frame that turn a pinion, the teeth of which engage with a rack located on the upper surface of the forks and extending at least partially along the length thereof. The racks are located either side of a vertical axis that is defined by the vertical axis of the
- 15 telescopic tower. As each fork is made of a continuous strip of material, for example, steel, this enables the forks to slide horizontally in both a leftward and rightward direction on command in order to be able to engage with the cradle on either side of the central passage or corridor of the hall. Preferably, the drive motors for the rack and pinion systems are waterproofed, in order to maintain functionality and protect
- 20 the mechanisms from corrosion when the sliding forklift system is immersed in the water.

The system further preferably comprises suitable electrical power means for powering up the various components, motors, and command and control equipment.

- 25 As can be seen from the figures, the telescopic tower comprises a guide mast and a a telescopic frame that moves vertically relative to the guide mast. The guide mast is generally is welded structure made of steel. The guide mast can be welded to the movable chariot or affixed by another suitable means. Guide wheels are provided on the guide mast in order to facilitate guiding of the telescopic framework located around the guide mast. The telescopic framework is mainly comprised of a trellis or
- 30 latticework of interconnected pipes, bars or struts to create a pylon. It is also provided with guide rails for the sliding forklift system and for the guide mast, and can have a pulley or winch system to assist in lifting the structure.

As mentioned above, the horizontal sliding forklift system is comprised of a framework, which can also be a latticework or trellis of interconnected pipes, struts or bars, the dimensions of the framework being such that it is located around, and can move vertically up and down, the telescopic framework of the telescopic tower, which in turn is provided with guide wheels which engage with the telescopic mast framework. The framework carries the sliding forks, but also positioning sensors located above the forks, and additionally measurement arms laterally spaced from the forks on either side of the vertical axis defined by the tower. These measurement arms can comprise laser sensors used to carry out positioning and other measurements, for example, measurements related to the size, shape and weight of the boat. The laser sensors are preferably located affixed to the underside of the measurement arms, and interact with corresponding positioning sensors located on the upper surface of the the cradle in order to assist in positioning the forks within the orifices provided for that purpose in the cradle. Sensors are preferably also mounted laterally within each measurement arm, and also serve to assist in vertical positioning of the forks for engagement with the orifices of the cradle.

In addition to the above sensor systems, the handling system according to the invention is further preferably provided with a water level sensor, to detect and determine the level of the water into which, or from which the boat is to be placed or retrieved. A central processing unit, for example a computer server, or equivalent functional system, can be provided to manage the data, exchanges with the components, and sensors, and command and control the system. This can advantageously be located outside of the storage hall, in which case the hall can be equipped with surveillance means, such as cameras, or other location sensors, connected to the command and control system, enabling remote control and verification of the operational functioning of the system.

The management system used to command and control the handling system and operate the machinery can be based on a client server software program for example, with integrated logistics management. An operator will have at his disposal a series of programs enabling him to interact with the systems mechanical components. Among others, the system can provide the following:

- system diagnostics and messages;

- statistics and trace analysis, and maintenance schedules;
- user management functions for operators, administrators, service personnel, etc
- visual representations of the storage spaces and occupied or reserved spaces in the hall;
- 5 - space allocation and management;
- database management to manage boat data and owner details;
- logistics capabilities for primary registration of boats;
- means for managing and displaying the order of boat movements and handling, relayed to a display on site, for example, within a clubhouse, for boat owner
- 10 information;
- logging systems for transaction surveillance and auditing.

The functioning of the system can be described generally as follows:

A boat arrives for primary registration with the system;

15 The boat owner notifies reception of the arrival of his boat and provides relevant required details;

The boat management system assigns a cradle to the boat according to the boats size, weight and other measurement data, as well as a berth in the storage hall. The boat owner receives a badge which uniquely identifies both him, the boat and the corresponding storage location. This data is kept in the management system for

20 further reference and use;

The storage halls can optionally be provided with a reserved space for the reception of boats via land transport, in which service personnel can work safely, and which is separated from the handling system by an openable closure or separation system. This allows the automated handling system to continue operation without

25 endangering the service personnel;

The boat, whether arriving by land transport or via water, is identified by the system, for example, via the owner's badge or an optical surveillance system;

If a boat has arrived via water, as would usually be the case, the boat approaches a small jetty or pontoon and is moored temporarily by the skipper. He uses his badge to
 5 activate the system, either via a remote detection system or a service stand near the jetty;

The boat then enters a queue for handling the processing request;

A member of the service personnel of the storage facility can see which boats have arrived or are departing and which is next in line to be handled;

10 Optional security systems can be provided to ensure that boats are not removed or manipulated by unauthorised personnel, for example, movement sensors can be provided quayside and at the berths in order to detect any unauthorised movement;

Within the hall the system is activated to being handling processing;

The rolling bridge is then moved automatically, the management and storage system
 15 executing the instructions and communicating with the equipment to move the rolling bridge into position, and commanding the sliding forks to move to the corresponding assigned berth, engage with the cradle, and lift it up;

An optional safety feature can be provided wherein the support struts of the storage berths have an additional sensor that communicates with the system and the forks
 20 own sensors on the measurement arm to recalibrate the position of the forks as required;

Only once positioning has been deemed to be complete, are the fork motors commanded to move the forks forward and into the orifices in the cradle;

The cradle is then lifted by upward movement of the sliding fork system;

25 The forks are then moved backwards, drawing the cradle away from the berth;

The telescopic tower carrying the cradle via the sliding fork system is then moved

towards the exterior of the building and the waterside;

The cradle is lowered into the water to a depth below the lowest point of the boat hull, the water level being detected by a sensor that communicates with the management system;

- 5 The cradle is positioned approximately 1.5 meters below the lowest point of the hull, and then the sliding fork motors actuated to bring the cradle underneath the boat and positioned at the correct spot for subsequent lifting – as the parameters of the boat are known to the system beforehand, this operation occurs automatically;

- 10 Additionally, the boat can optionally have a marking on its hull corresponding to its longitudinal center of gravity, defined by and known to the management system, where laser positioning guarantees correct alignment of the boat with the cradle;

The cradle is then lifted to meet the boat hull;

Optional visual inspection by an operator or a surveillance system can provide additional safety measures for correct handling and positioning of the boat;

- 15 The lifting system can also optionally comprise weight measuring means, for example dynamometric measuring means, enabling the system to determine if an anomalous weight is present in the boat compared to the declared weight, and which would be likely to shift the know center of gravity and endanger the handling operation;

- 20 The rolling bridge then moves the cradle, boat and sliding forklift system back into the storage hall, positioning the sliding forks slightly above the assigned berth;

The fork motors are engaged to advance the cradle at the correct position over the berth, and then the cradle is lowered onto the berth space;

The fork motors are then re-engaged to withdraw the forks from the cradle and the operation is complete.

- 25 A boat can be placed into the water, ready for its owner, in a reverse manner to the above. When the owner arrives at the storage facility, he uses his badge to activate the system, or alternatively books this in advance via e-mail or another acceptable

remote form of communication and validation. The owner knows how long it will take for the boat to be made ready from the display system, which shows the list of boats being handled and their priority scheduling.

CLAIMS

- 1) Device for manipulating boats, vehicles or other loads requiring storage in spaces located either side of parallel openings in storage buildings formed from superimposed storage spaces, designated storage berths, positioned longitudinally, to receive cradles, the device being carried by a rolling bridge that is moved along rails which are an integral part of the lateral framework of said openings, characterised in that the rolling bridge (6) carries a telescopic tower (9) and a sliding forklift system (12) for lifting boats out of the water, the cradles (10) being carried by the sliding forklift system (12) having a variable length enabling the cradles (10) to be deposited on the berths (2, 2a).
- 2) Device according to claim 1, characterised in that the telescopic tower (9) is movable along the rolling bridge (6) and carried by a movable chariot (8) perpendicularly to the X and Y axes of the rolling bridge (6).
- 3) Device according to claim 1, characterised in that the cradles (10) are adapted to the shape of the load with regard to the cradle's upper part (22) and to the prehensile system for the cradle's lower part (17).
- 4) Device according to claim 1, characterized in that the cradles (10) are carried by the tower structure (9) and by profiles (23) bearing rack and pinion systems (14), which are adjustable in length via engagement in openings (21) provided within the free width of the cradles (10) and enabling a boat to be handled without the handling tool coming into contact with the hull of the boat.
- 5) Device according to claim 1, characterized in that boats are stored in dedicated spaces on berths (2, 2a) via scanning to memorize the shape and features of the boat load (16).
- 6) Device according to claim 4, characterized in that the cradles (10) and forks (12) are brought into contact with each other automatically via the use of positioning detectors or sensors (15, 20).
- 7) Device according to any one of the preceding claims wherein the sliding forklift system comprises means for moving forks of the forklift system horizontally

with respect to vertical movement of the telescopic tower.

- 8) Device according to any one of the preceding claims wherein the sliding forklift system comprises a rack and pinion system enabling horizontal movement of the forks to engage with, and withdraw from, said cradles.
- 5 9) Method for the management and storage of boats in a vertical dry storage system, comprising:
 - registration of a boat with an automated boat storage and management system;
 - recognition of a registered boat;
 - 10 - handling of said registered boat by said automated boat storage and management system to effect the storing, or making available, of said boat.
- 10) Automated boat management system for the management and storage of boats in a vertical dry storage system, comprising:
 - an automated boat manipulation and storage device;
 - 15 - command and control means for operating the automated boat manipulation and storage device;
 - boat identification means for uniquely identifying a boat in the automated boat management system and causing the command and control means to operate the automated boat manipulation and storage device.

Date : January 19, 2016 12:57:01.

Commissioner of Patents
50 Victoria Street
Place du Portage
Phase I
Gatineau, Quebec
Canada
K1A 0C9



058

2916285

Application Number:n/a

Applicant: GIROUD, Gérard

Title: SYSTEM, METHOD AND DEVICES FOR HANDLING BOATS STORED IN A DRY DOCK USING A ROLLING BRIDGE AND SLIDING TOWER

Reference Number: 43171-0004e

Attention: Shirley Lauzon, PCT UNIT Please see the attached regarding unpublished International Application No. PCT/IB2014/064879.

Attached are the following documents:

: 2016_01_19_file_additional_docs.pdf
cover ltr (1 pg)

: 2367wo_abstract_tqd.pdf
Abstract (1 pg)

: 2367wo_description_tqd.pdf
Description (19 pgs)

: claims.pdf
claims (2 pgs)

: fig01_10.pdf
figures (9 pgs)

: 20150601_ISR_2367WO.pdf
ISR (5 pgs)

: 20150601_WrittenOpinion_2367WO.pdf
Written Opinion (6 pgs)

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pure ip*

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January 19, 2016

The Commissioner of Patents
Canadian Intellectual Property Office
Place du Portage I
50 Victoria Street, Room C-114
Gatineau, QC K1A 0C9

ATTENTION: Shirley Lauzon, PCT UNIT

Dear Commissioner:

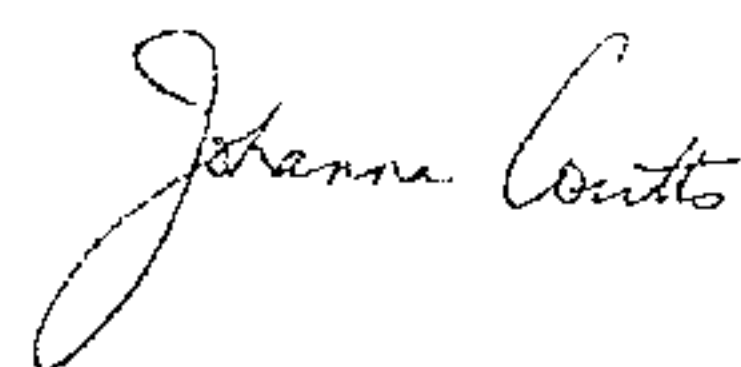
Re: National Entry in Canada of
Intl. Appln. No.: PCT/IB2014/064879
Intl. Filing Date: September 26, 2014
Title: SYSTEM, METHOD AND DEVICES FOR HANDLING BOATS STORED IN
A DRY DOCK USING A ROLLING BRIDGE AND SLIDING TOWER
Applicant: GIROUD, Gérard
Our Ref.: 43171-0004e

Reference is made to your telephone conversation today with Janet McKenzie of our office.

Further to our submission of December 24, 2015, please find attached the following to be made of record with unpublished International Application No. PCT/IB2014/064879:

Abstract
Description
Claims
Figures 1-10
International Search Report
Written Opinion

Yours very truly,
CASSAN MACLEAN



Johanna Coutts
JIC:jlm
Encls.

cassan maclean

307 Gilmour St Ottawa ON K2P 0P7 Canada
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1/9

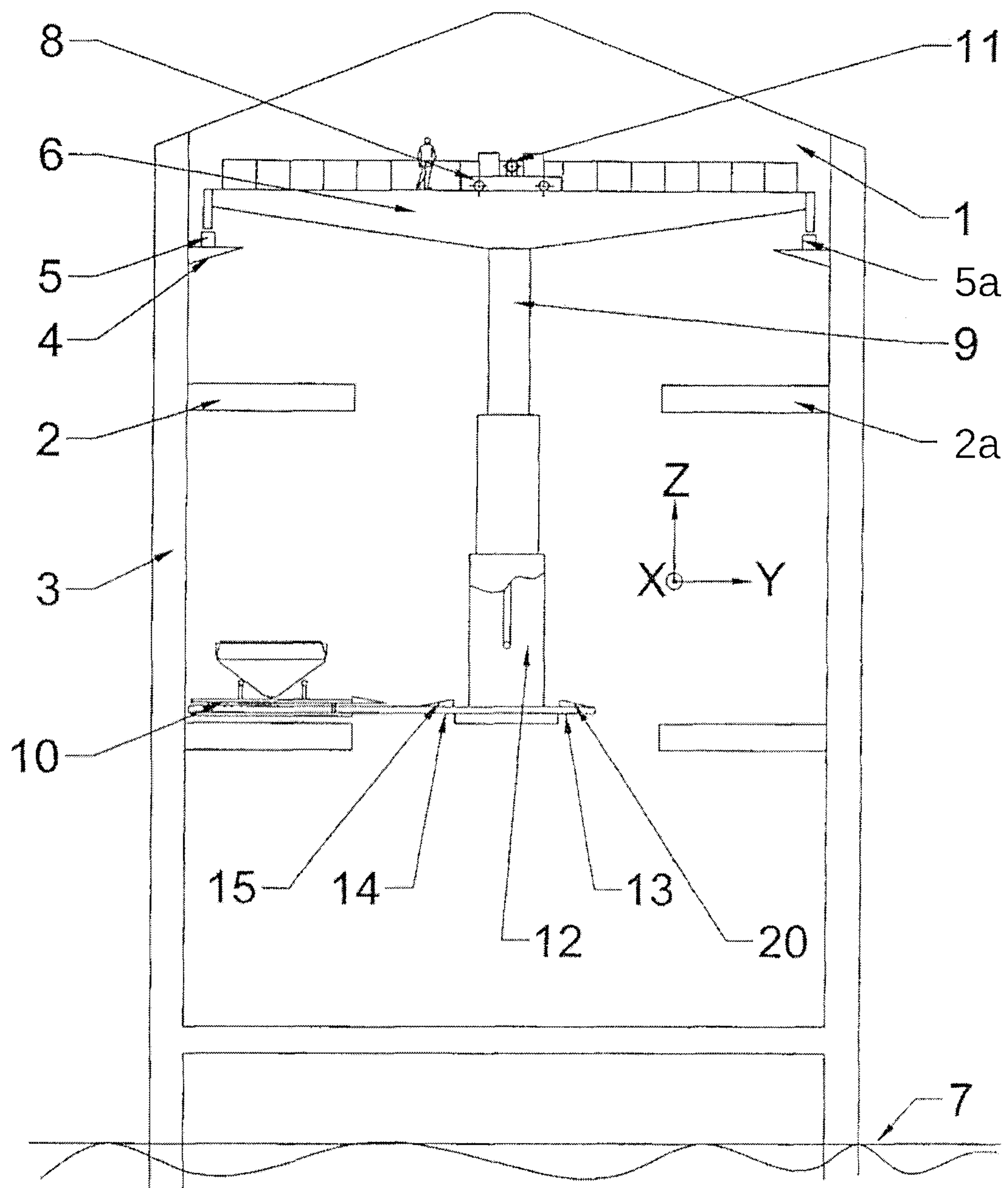


Fig. 1

2/9

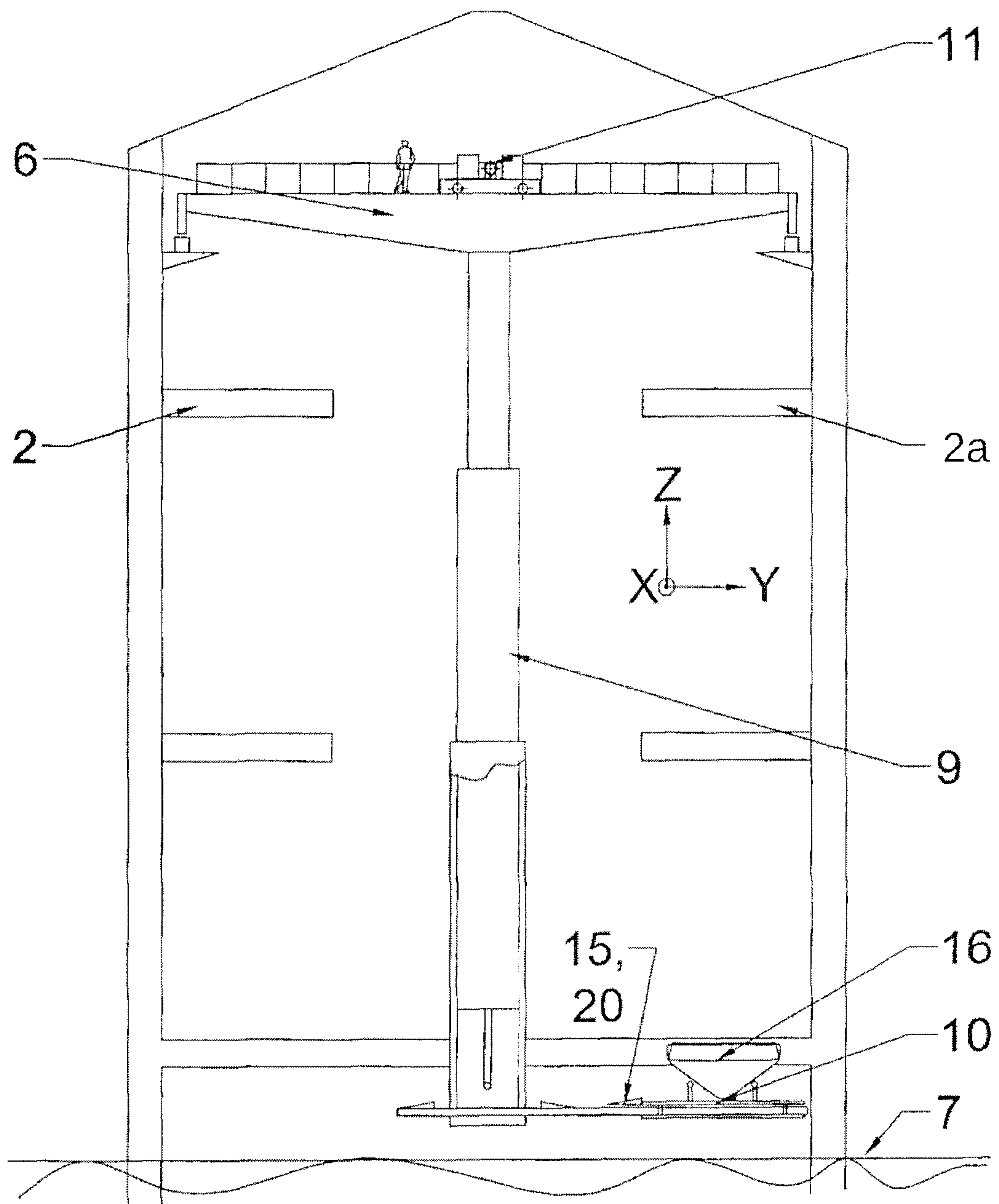


Fig. 2

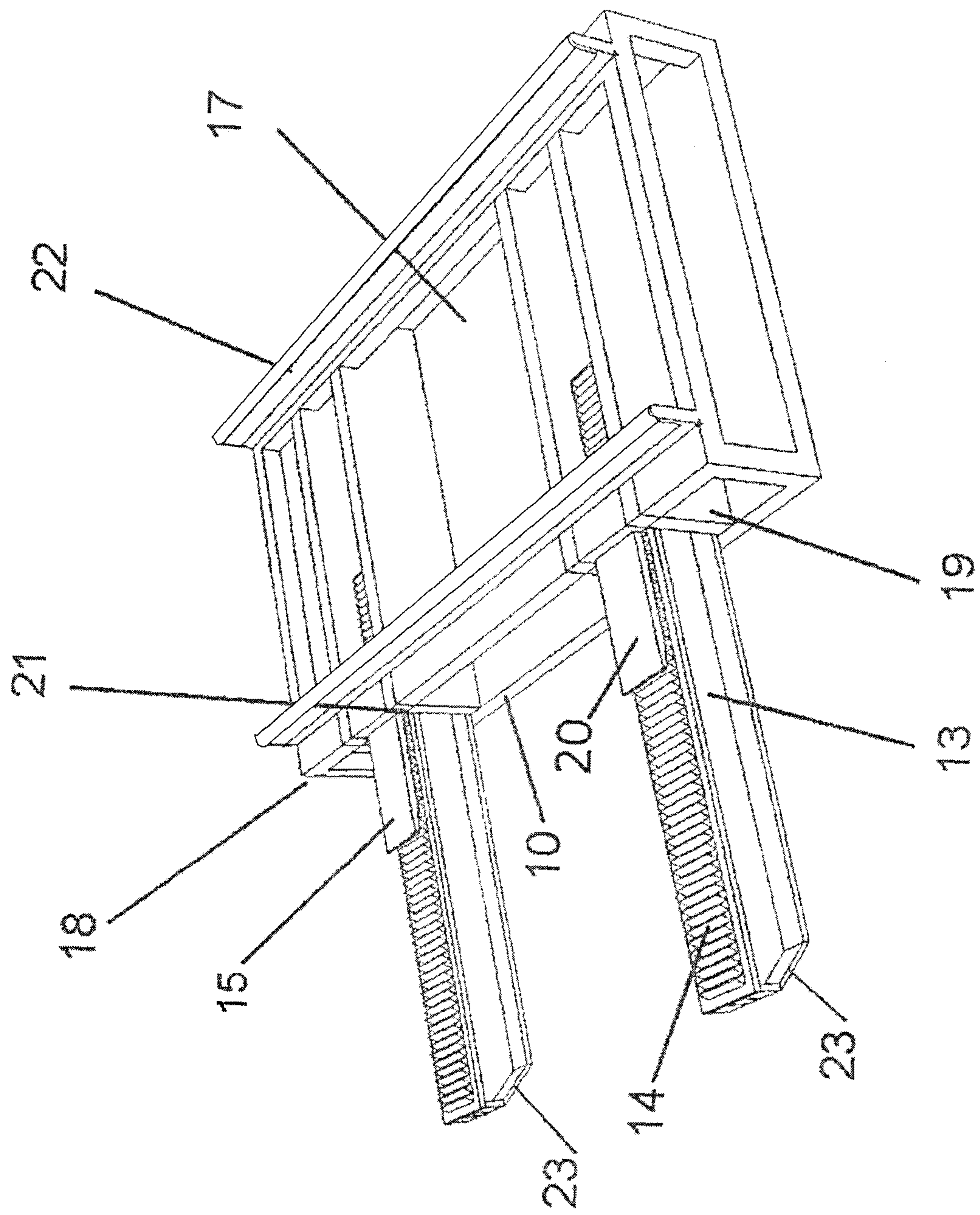


Fig. 3

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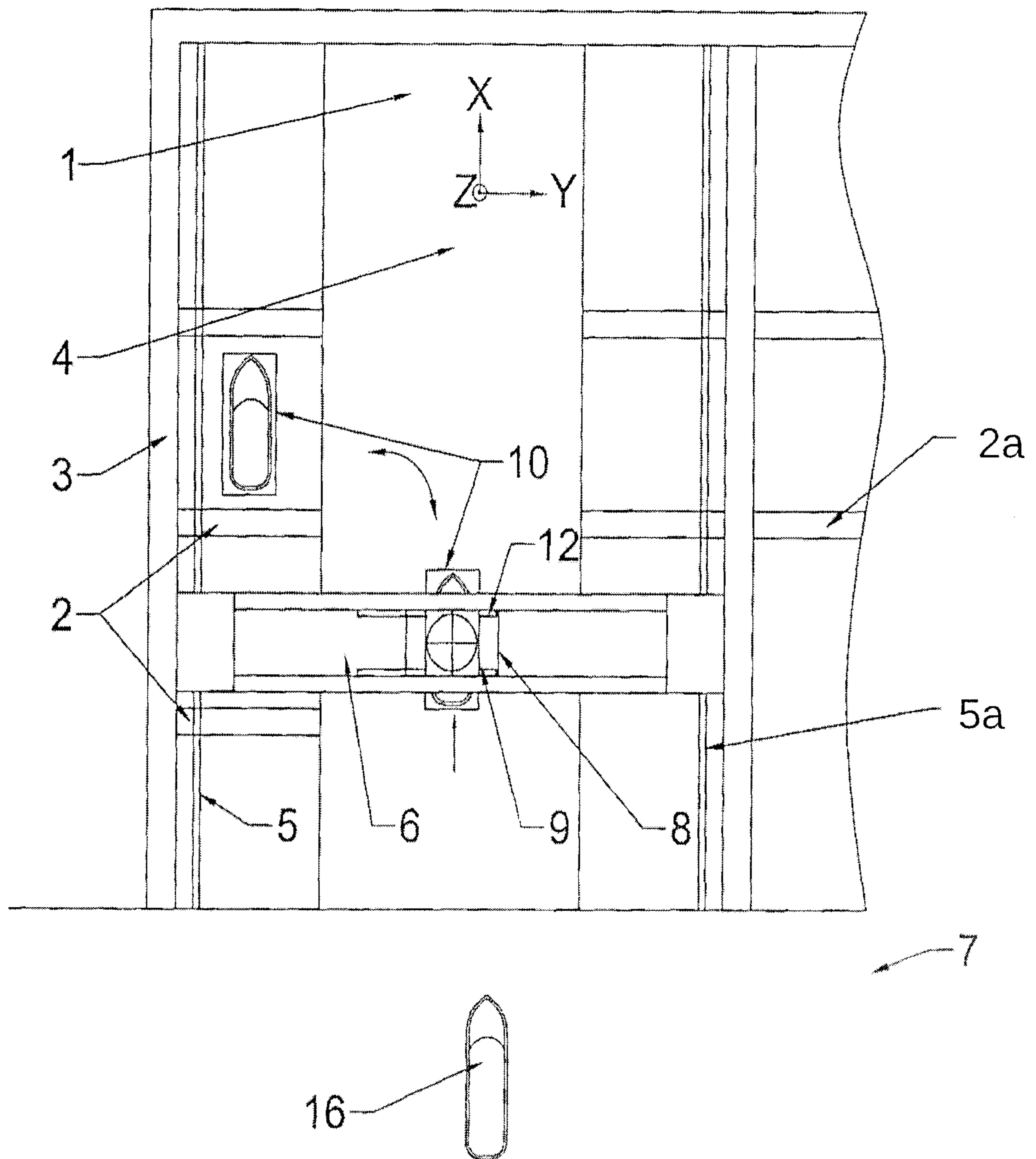


Fig. 4

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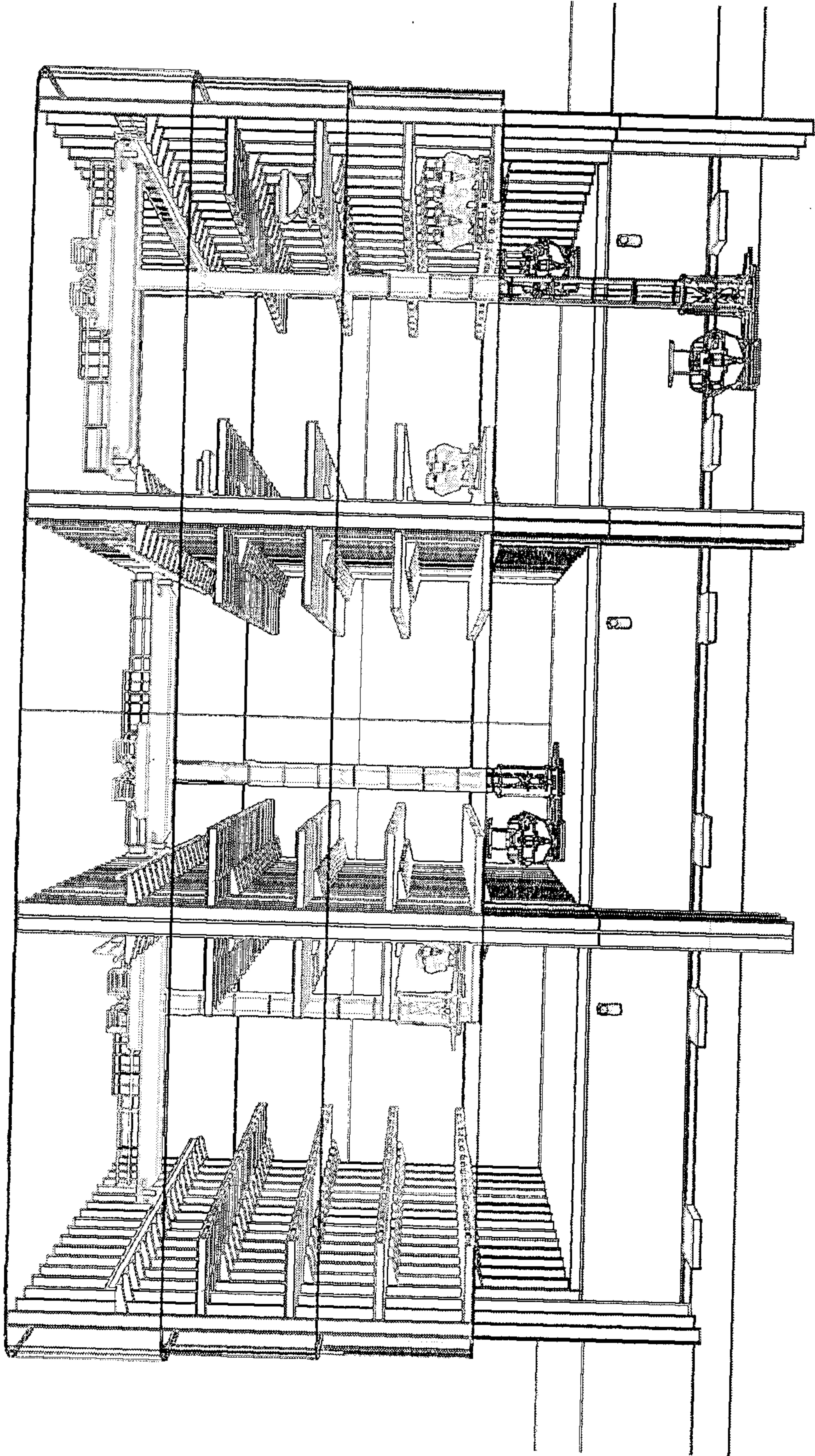


Fig. 5

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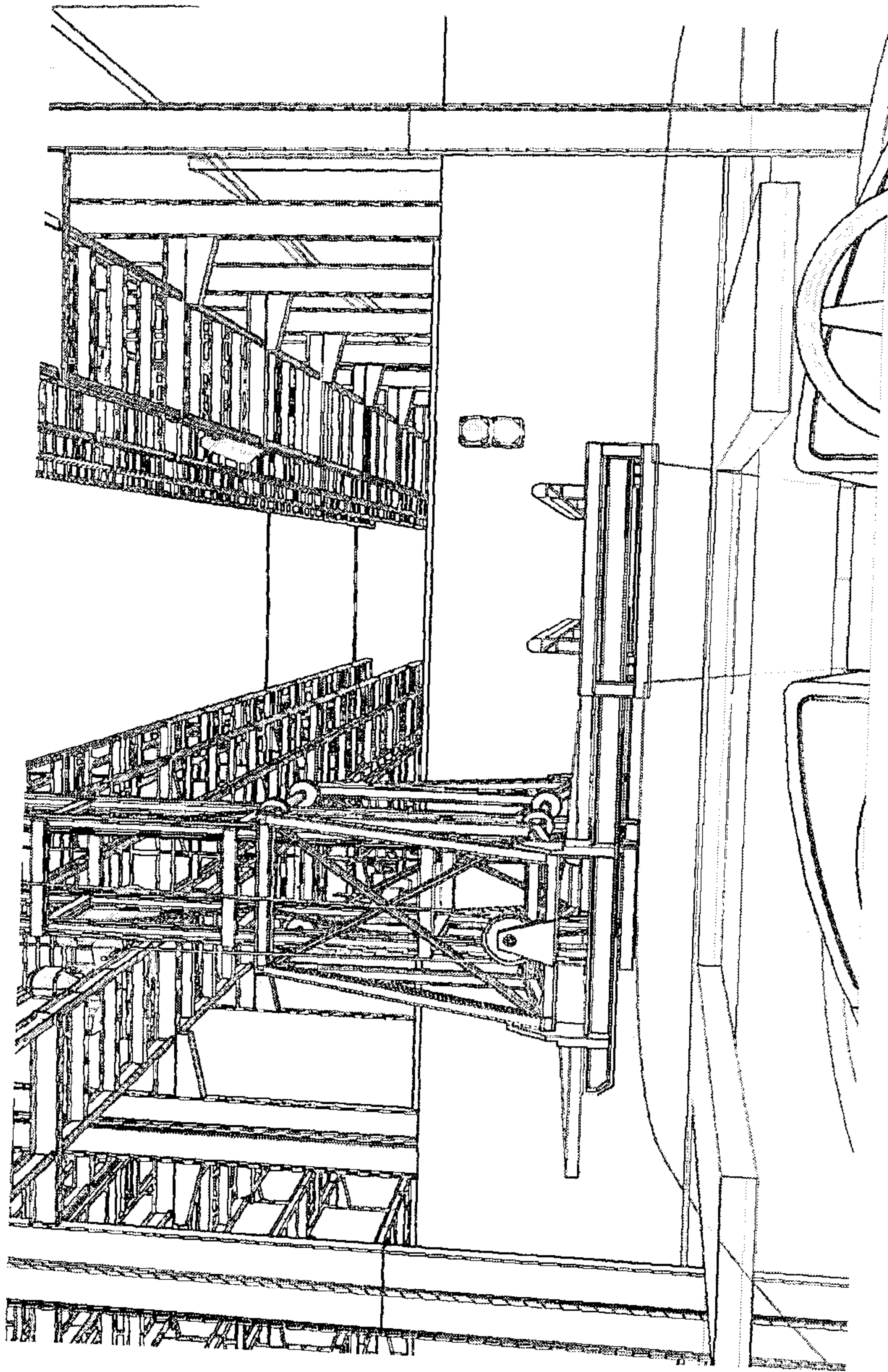


Fig. 6

7/9

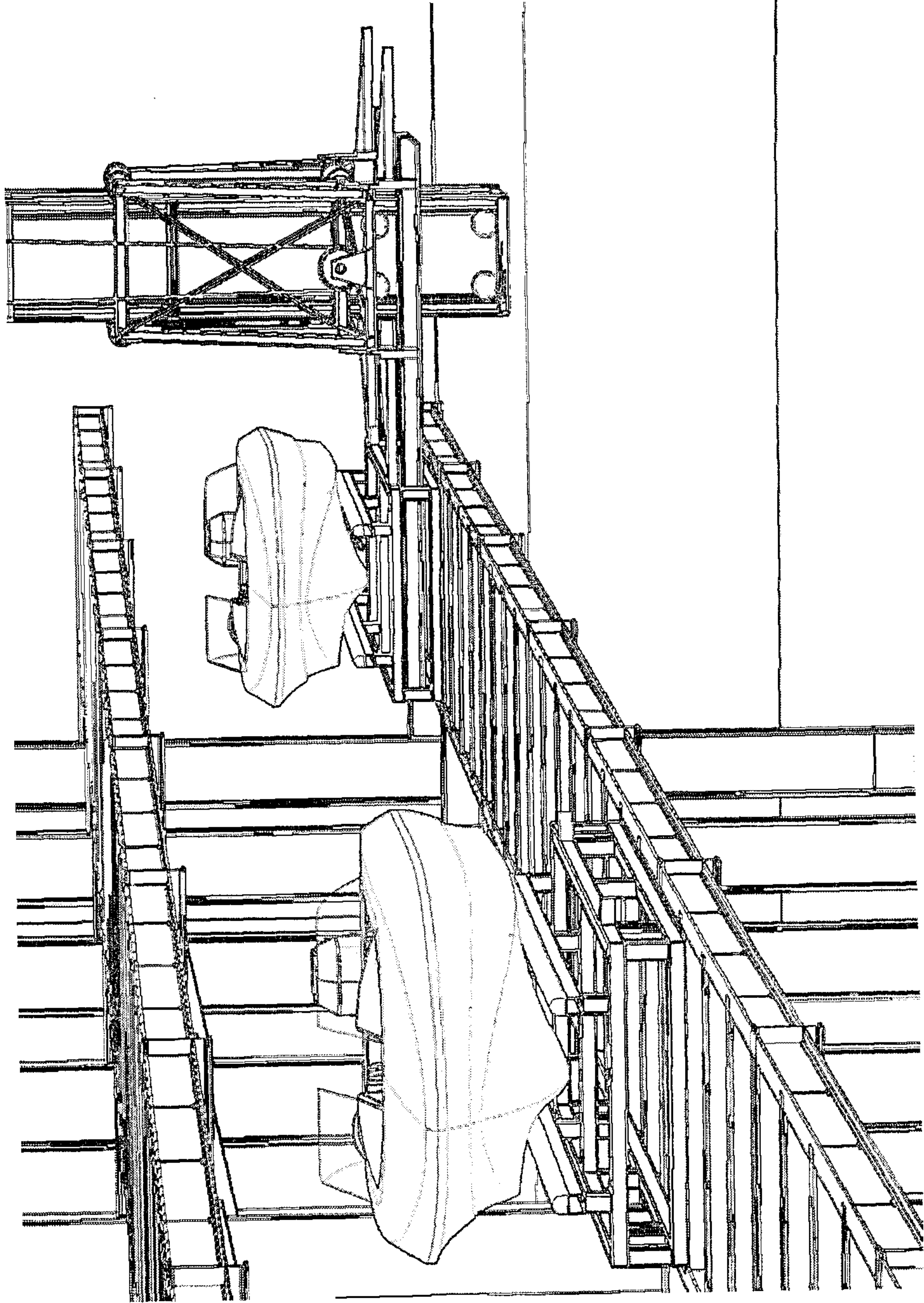


Fig. 7

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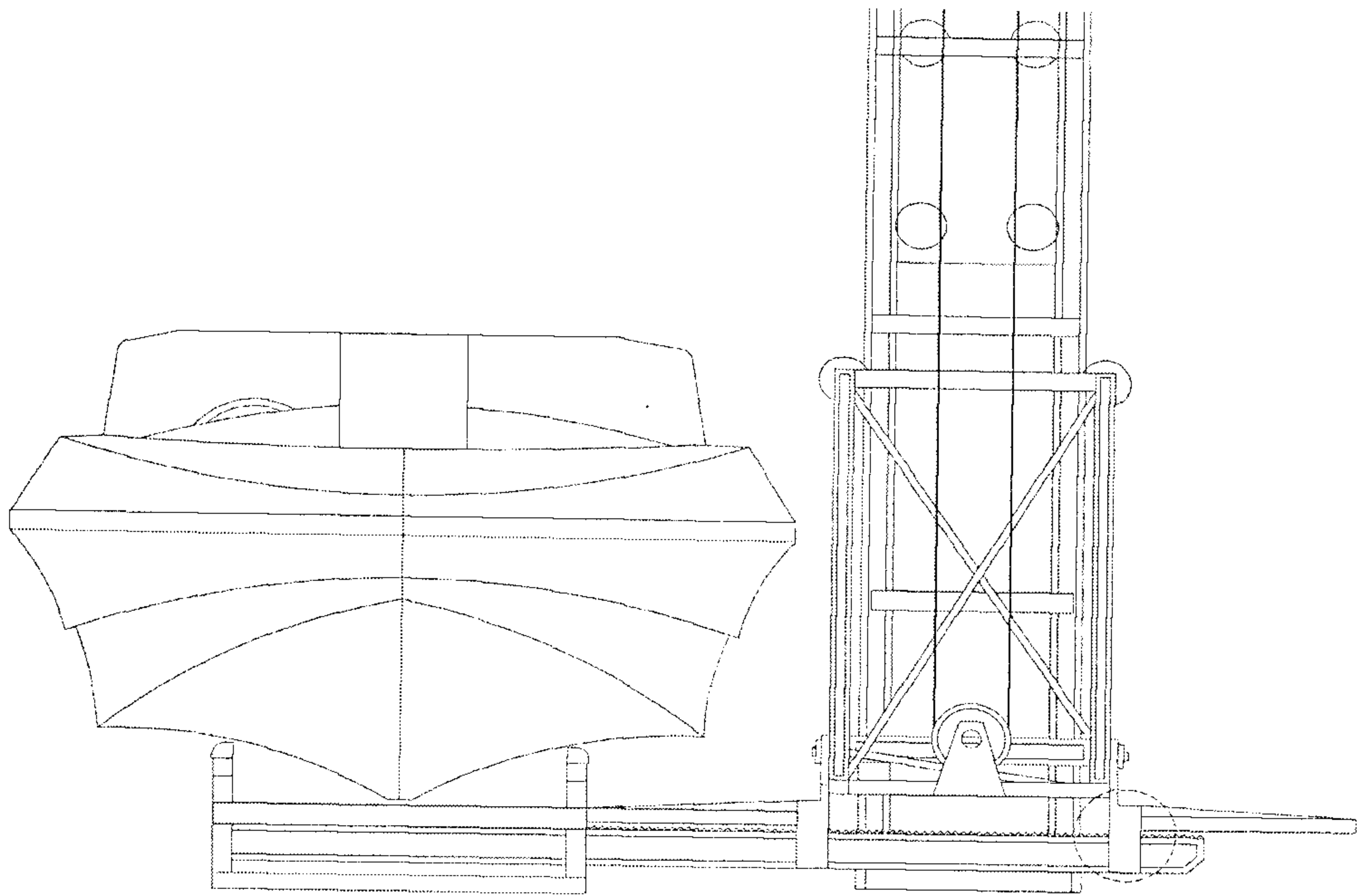


Fig. 8

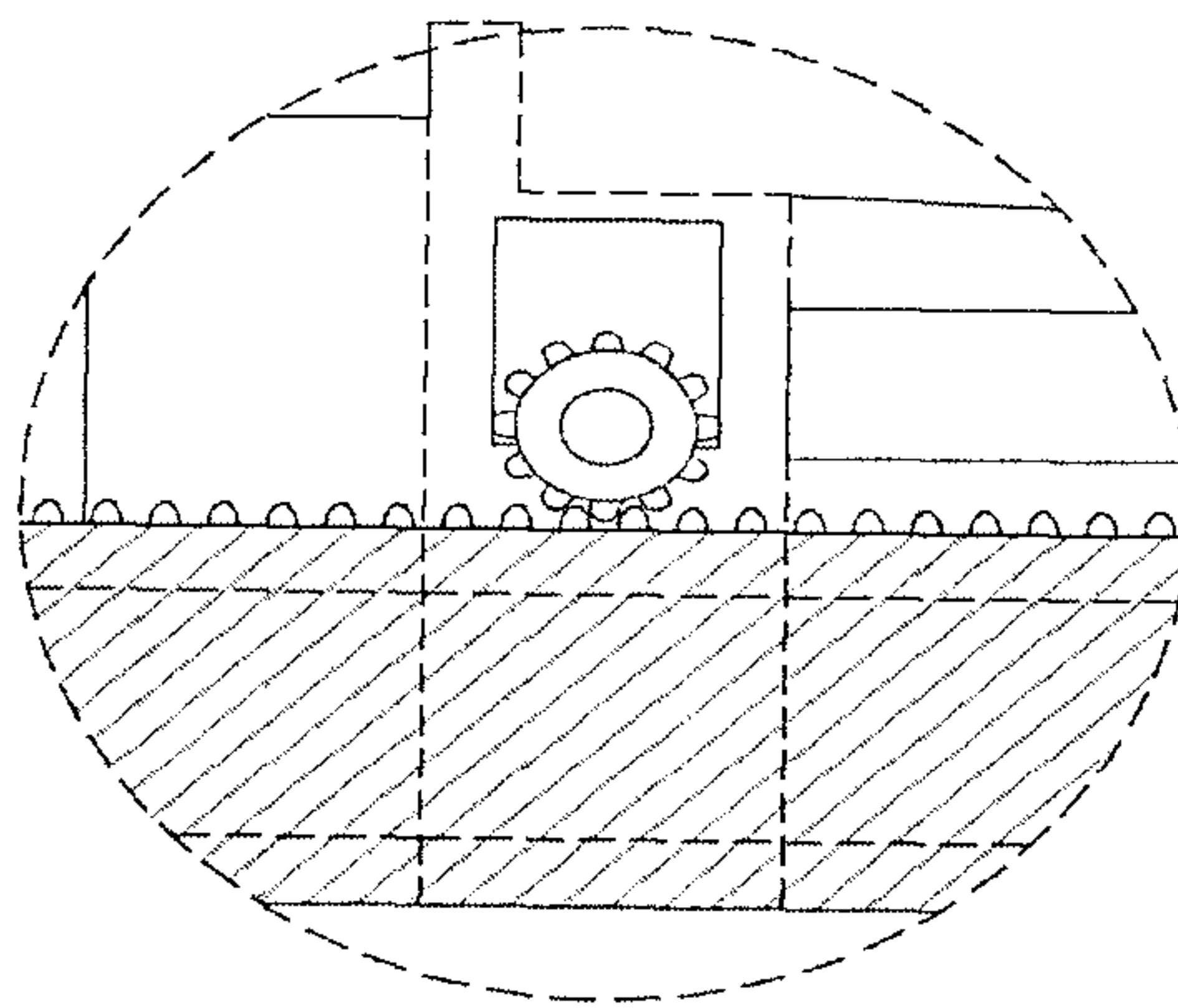


Fig. 9

9/9

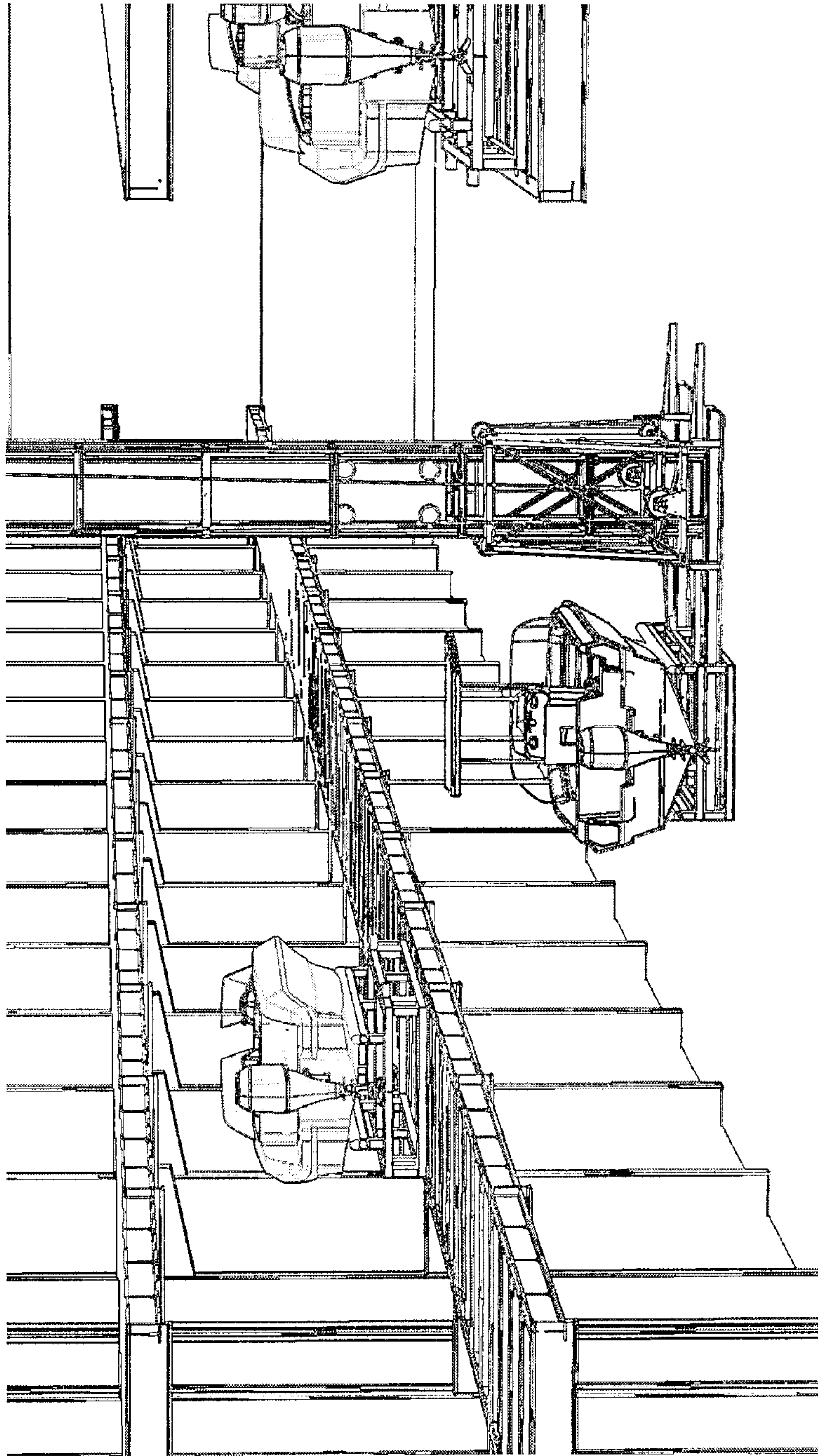


Fig. 10

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

PCT

To:

Thurgood, Alexander
IP GALORE
4 Rue Durette
F-63500 Brenat
FRANCE

NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL SEARCH REPORT AND
THE WRITTEN OPINION OF THE INTERNATIONAL
SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

Date of mailing (day/month/year)		1 June 2015 (01-06-2015)
Applicant's or agent's file reference 2367WO	FOR FURTHER ACTION See paragraphs 1 and 4 below	
International application No. PCT/IB2014/064879	International filing date (day/month/year) 26 September 2014 (26-09-2014)	
Applicant GIROUD, GERARD		

1. ☒ The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.
- Filing of amendments and statement under Article 19:**
The applicant is entitled, if he so wishes, to amend the claims of the International Application (see Rule 46).
- When?** The time limit for filing such amendments is normally two months from the date of transmittal of the International Search Report.
- How?** Directly to the International Bureau of WIPO, 34 chemin des Colombettes
1211 Geneva 20, Switzerland, Facsimile No.: (41-22) 338.82.70
- For more detailed instructions, see *PCT Applicant's Guide*, International Phase, paragraphs 9.004 - 9.011.**
2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.
3. ☐ With regard to any protest against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:
- ☐ the protest together with the decision thereon has been transmitted to the International Bureau together with any applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.
- ☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.
4. **Reminders**
- The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. These comments will be made available to the public after international publication. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established.
- Shortly after the expiration of 18 months from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau before the completion of the technical preparations for international publication (Rules 90bis.1 and 90bis.3).
- Within 19 months from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later); otherwise, the applicant must, within 20 months from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices. In respect of other designated Offices, the time limit of 30 months (or later) will apply even if no demand is filed within 19 months. For details about the applicable time limits, Office by Office, see www.wipo.int/pct/en/texts/time_limits.html and the *PCT Applicant's Guide*, National Chapters.
- Within 19 months from the priority date, the applicant may request that a supplementary international search be carried out by a different International Searching Authority that offers this service (Rule 45bis.1). The procedure for requesting supplementary international search is described in the *PCT Applicant's Guide*, International Phase, paragraphs 8.006-8.032.

Name and mailing address of the International Searching Authority	Authorized officer
 European Patent Office, P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk Tel. (+31-70) 340-2040 Fax: (+31-70) 340-3016	REMIENS, Carolina Tel: +31 (0)70 340-4390

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 2367WO	FOR FURTHER ACTION		see Form PCT/ISA/220 as well as, where applicable, item 5 below.
International application No. PCT/B2014/064879	International filing date (<i>day/month/year</i>) 26 September 2014 (26-09-2014)	(Earliest) Priority Date (<i>day/month/year</i>)	
Applicant GIROUD, GERARD			

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 4 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the language, the international search was carried out on the basis of:

☒ the international application in the language in which it was filed

☐ a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))

b. ☐ This international search report has been established taking into account the rectification of an obvious mistake authorized by or notified to this Authority under Rule 91 (Rule 43.5b(a)).

c. ☐ With regard to any nucleotide and/or amino acid sequence disclosed in the international application, see Box No. I.

2. ☐ Certain claims were found unsearchable (See Box No. II)

3. ☐ Unity of invention is lacking (see Box No. III)

4. With regard to the title,

☒ the text is approved as submitted by the applicant

☐ the text has been established by this Authority to read as follows.

5. With regard to the abstract,

☒ the text is approved as submitted by the applicant

☐ the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority

6. With regard to the drawings,

a. the figure of the drawings to be published with the abstract is Figure No. 1

☒ as suggested by the applicant

☐ as selected by this Authority, because the applicant failed to suggest a figure

☐ as selected by this Authority, because this figure better characterizes the invention

b. ☐ none of the figures is to be published with the abstract

INTERNATIONAL SEARCH REPORT

International application No.

PCT/IB2014/064879

A. CLASSIFICATION OF SUBJECT MATTER

INV. B63C3/06 B63C15/00
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B63C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base used, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	FR 2 901 535 A1 (GIROUD GERARD [FR]) 30 November 2007 (2007-11-30) cited in the application page 3, line 17 - page 4, line 14; figures 1-3	1-10
Y	FR 2 964 083 A1 (RTMO [FR]) 2 March 2012 (2012-03-02) page 10, line 8 - page 14, line 9; figures 1-4	1-10
X	EP 1 201 536 A2 (JOUVES MAX [FR]) 2 May 2002 (2002-05-02) cited in the application	9,10
A	paragraphs [0008], [0012], [0028], [0037], [0067], [0068]; figures 1-3	5,6
	- / - -	

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

A document defining the general state of the art which is not considered to be of particular relevance

E earlier application or patent but published on or after the international filing date

L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

O document referring to an oral disclosure, use, exhibition or other means

P document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

Z document member of the same patent family

Date of the actual completion of the international search

21 May 2015

Date of mailing of the international search report

01/06/2015

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2250 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

Authorized officer

Mauriès, Laurent

INTERNATIONAL SEARCH REPORT

International application No.

PCT/IB2014/064879

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 7 367 747 B2 (MAFFETT WILLIAM C [US] ET AL) 6 May 2008 (2008-05-06) cited in the application column 4, line 39 - column 5, line 13; figures 3-6 -----	3-8

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2014/064879

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
FR 2901535	A1	30-11-2007	NONE
FR 2964083	A1	02-03-2012	NONE
EP 1201536	A2	02-05-2002	AT 372257 T 15-09-2007
		DE 60130303 T2 29-05-2008	
		DK 1201536 T3 07-01-2008	
		EP 1201536 A2 02-05-2002	
		ES 2292516 T3 16-03-2008	
		FR 2815932 A1 03-05-2002	
US 7367747	B2	06-05-2008	US 2006177271 A1 10-08-2006
		WO 2006081196 A2 03-08-2006	

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

PCT

see form PCT/ISA/220

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY
(PCT Rule 43bis.1)

Date of mailing

(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION

See paragraph 2 below

International application No.

PCT/B2014/064879

International filing date (day/month/year)

26.09.2014

Priority date (day/month/year)

International Patent Classification (IPC) or both national classification and IPC

INV. B63C3/06 B63C15/00

Applicant

GIROUD, GERARD

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA:



European Patent Office
P.B. 5816 Patentlaan 2
NL-2280 HV Rijswijk - Pays Bas
Tel. +31 70 340 - 2040
Fax: +31 70 340 - 3016

Date of completion of
this opinionsee form
PCT/ISA/210

Authorized Officer

Telephone No. +31 70 340-0



WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/IB2014/064879

Box No. I Basis of the opinion

1. With regard to the language, this opinion has been established on the basis of:
 - ☒ the international application in the language in which it was filed.
 - ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1 (b)).
2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a))
3. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing:
 - a. ☐ forming part of the international application as filed:
 - ☐ in the form of an Annex C.ST.25 text file.
 - ☐ on paper or in the form of an image file.
 - b. ☐ furnished together with the international application under PCT Rule 13ter.1(a) for the purposes of international search only in the form of an Annex C.ST.25 text file.
 - c. ☐ furnished subsequent to the international filing date for the purposes of international search only:
 - ☐ in the form of an Annex C.ST.25 text file (Rule 13ter.1(a)).
 - ☐ on paper or in the form of an image file (Rule 13ter.1(b) and Administrative Instructions, Section 713).
4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITYInternational application No.
PCT/IB2014/064879

Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	<u>1-8</u>
	No: Claims	<u>9-10</u>
Inventive step (IS)	Yes: Claims	
	No: Claims	<u>1-10</u>
Industrial applicability (IA)	Yes: Claims	<u>1-10</u>
	No: Claims	

2. Citations and explanations

see separate sheet

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)

International application No.

PCT/IB2014/064879

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

- 1 Reference is made to the following documents:
 - D1 FR 2 901 535 A1 (GIROUD GERARD [FR]) 30 November 2007 (2007-11-30)cited in the application
 - D2 FR 2 964 083 A1 (RTMO [FR]) 2 March 2012 (2012-03-02)
 - D3 EP 1 201 536 A2 (JOUVES MAX [FR]) 2 May 2002 (2002-05-02)cited in the application
 - D4 US 7 367 747 B2 (MAFFETT WILLIAM C [US] ET AL) 6 May 2008 (2008-05-06)cited in the application
- 2 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 1 does not involve an inventive step in the sense of Article 33(3) PCT.
 - 2.1 D1, which is considered to represent the most relevant state of the art, discloses a device for manipulating boats, vehicles or other loads requiring storage in spaces located either side of parallel openings in storage buildings (1) formed from superimposed storage spaces (e.g. 2, 2bis), designated storage berths, positioned longitudinally, to receive cradles (11), the device being carried by a rolling bridge (6) that is moved along rails (5, 5bis) which are an integral part of the lateral framework of said openings, wherein the rolling bridge (6) carries a telescopic tower (8) and a forklift system (10) for lifting boats out of the water, the cradles (11) being carried by the forklift system (10) to be deposited on the berths (2, 2bis),
 - 2.2 from which the subject-matter of claim 1 differs in that the forklift system is sliding, the cradles being carried by the sliding forklift system having a variable length enabling the cradles to be deposited on the berths.
 - 2.3 The problem to be solved by the present invention may therefore be regarded as to improve movement capabilities of the lifting system.

WRITTEN OPINION OF THE
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International application No.

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- 2.4 The feature of the sliding forklift system having a variable length is a matter of normal design procedure, see for example document D2, p. 10, l. 21 - p. 11, l. 19 and fig. 2. Its inclusion in the device for manipulating boats described in D1 would therefore be an obvious design possibility for the skilled person in order to solve the problem posed.
- 3 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 9 and 10 is not new in the sense of Article 33(2) PCT.
- Concerning claim 9: D3 discloses a method for the management and storage of boats in a vertical dry storage system, comprising:
- registration of a boat with an automated boat storage and management system (feature d in paragraph [0012]);
 - recognition of a registered boat (feature f in paragraph [0012], see also paragraph [0028]);
 - handling of said registered boat by said automated boat storage and management system to effect the storing, or making available, of said boat (implicit from features d, e, f in paragraph [0012], see also paragraph [0028]).
- 4 Concerning claim 10, D3 discloses an automated boat management system for the management and storage of boats in a vertical dry storage system (see e.g. paragraphs [0012], [0028]), comprising:
- an automated boat manipulation and storage device (see e.g. fig. 2);
 - command and control means for operating the automated boat manipulation and storage device (see paragraph [0028]);
 - boat identification means for uniquely identifying a boat in the automated boat management system and causing the command and control means to operate the automated boat manipulation and storage device (implicit from features d, e, f in paragraph [0012], see also paragraph [0028]).
- 5 Dependent claims 2 - 8 do not appear to contain any additional features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step, the reasons being as follows:

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Concerning claims 2 and 3: the additional features of these claims are shown in D1, see e.g. p. 3, l. 23 - 39 and fig. 1, 2.

Concerning claims 4, 7 and 8: the additional feature of these claims are known from D2, see e.g. p. 10, l. 21 to p. 11, l. 19.

Concerning claims 5 and 6: the additional features of these claims are implicitly derivable from the automated systems of D1 or D3.

It would be obvious to the skilled person to combine for the same purpose, in accordance with circumstances, the additional features of claims 2 - 8 with the known features of document D1, without the exercise of inventive skills, in order to solve the problem posed.

E-Commerce

Date : December 24, 2015 07:51:40.

Commissioner of Patents
50 Victoria Street
Place du Portage
Phase I
Gatineau, Quebec
Canada
K1A 0C9

3622063



IB2014/064879

Application Number:n/a

Applicant: GIROUD, Gérard

Title: SYSTEM, METHOD AND DEVICES FOR HANDLING BOATS STORED IN A DRY DOCK USING A ROLLING BRIDGE AND SLIDING TOWER

Reference Number: 43171-0004e

We request entry of PCT/IB2014/064879 into the national phase in Canada. The required fee of \$400.00 is included in our submission.

Attached are the following documents:

: 2015_12_24_filing ltr.pdf
cover ltr (2 pgs)

: 2015_12_24_request form.pdf
request form (2 pgs)

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December 24, 2015

The Commissioner of Patents
Canadian Intellectual Property Office
Place du Portage I
50 Victoria Street, Room C-114
Gatineau, QC K1A 0C9

ATTENTION: PCT UNIT

Dear Commissioner:

Re: National Entry in Canada of
Intl. Appln. No.: PCT/IB2014/064879
Intl. Filing Date: September 26, 2014
Title: SYSTEM, METHOD AND DEVICES FOR HANDLING BOATS STORED
IN A DRY DOCK USING A ROLLING BRIDGE AND SLIDING TOWER
Applicant: GIROUD, Gérard
Our Ref.: 43171-0004e

We request entry of the above-referenced application into the national phase in Canada. We enclose the following documents, pertaining to this request:

a. Request Form

Included in our payment of today's date is the sum of \$400.00 covering the following:

b. the basic national fee - \$400.00

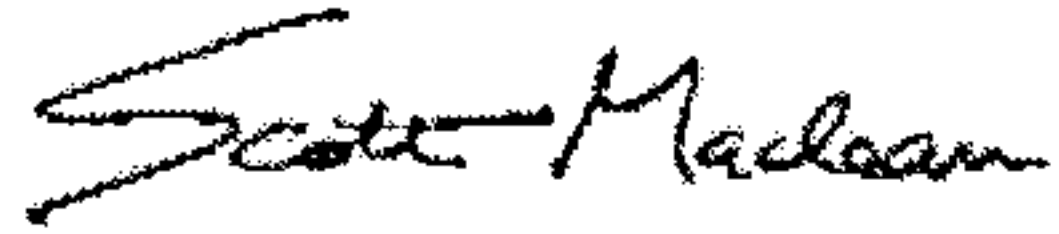
Should the fees submitted with this letter be insufficient to cover all of the fees for which payment is explicitly or implicitly requested by this letter, the Commissioner is authorized to charge the amount of the insufficiency to Deposit Account No. 600001006. If, for any reason, the foregoing authorization is considered to be inapplicable, defective or insufficient, then we hereby authorize you to charge any and all necessary fees in support of this letter to Deposit Account No. 600001006. Further, should the concerned application or patent be considered respectively to be abandoned or in a grace period, then we hereby respectively request reinstatement or late payment, as is appropriate,

cassan maclean

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cassanmaclean.com

and authorize you to charge any and all necessary fees to place the application or patent into good standing, including the reinstatement or late payment fee, to Deposit Account No. 600001006.

Yours very truly,
CASSAN MACLEAN



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Encl.

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PCT/CA

File No.: 43171-0004e

FORM FOR REQUEST OF ENTRY INTO NATIONAL PHASE
UNDER ARTICLE 22 OR 39 OF THE PATENT COOPERATION TREATY

IN THE MATTER OF PCT International Application

PCT/IB2014/064879
(international application #)

September 26, 2014
(international filing date)

in the name of

GIROUD, Gérard
(full name of applicant)

1. The above-identified applicant, whose full post office address is 2312C Boulevard Paul Valéry, 34070 Montpellier, France, owns the entire right in Canada to an invention entitled SYSTEM, METHOD AND DEVICES FOR HANDLING BOATS STORED IN A DRY DOCK USING A ROLLING BRIDGE AND SLIDING TOWER as described and claimed in the said international application and any amendments thereto.
2. The applicant is the sole inventor.
3. The applicant hereby appoints Cassan Maclean, whose full post office address is 307 Gilmour Street, Ottawa, Ontario, Canada K2P 0P7 as
 - (a) his representative for service of any proceedings taken under the *Patent Act*; and
 - (b) his agent with full power to appoint an associate agent when required to do so by Section 21 of the Patent Rules and to revoke such appointment, to sign this request and drawings, to amend the specification and drawings, to prosecute the application and to receive the patent granted on said application, and the applicant/inventor hereby ratifies any act done by the said appointees in respect of the said application.

4. The applicant accordingly hereby requests commencement of national phase procedures consequent to the designation of Canada in such international application and prays that a patent may be granted to him for the said invention.

SIGNED AT Ottawa, Ontario, Canada on 24 December 2015.

GIROUD, Gérard

A handwritten signature in black ink, appearing to read "Cassan Maclean". The signature is fluid and cursive, with a prominent initial 'C'.

Cassan Maclean
Agents for the Applicant