

HANDLING MEANS FOR CONTAINER SHIP

5 The invention relates to facilities on board ships for loading and unloading cargo, and in particular to a container ship of the type having one hull, a propulsion mechanism, a handler that is movable along a guide disposed on a support.

At the present time there are three categories of container ships :

- 10 - Container ships that have no on-board handler, from which containers can only be unloaded in a port equipped with dock cranes,
- Container ships that have a container-handler such as cranes, traveling cranes, or portal cranes and that are able, entirely autonomously, to unload containers onto the dock of a port, and
- 15 - Container ships that have a handler that moves containers to a deck with which a ramp is associated, and from which a port transport device such as a truck or rail car, unloads one or more containers via the ramp.

20 Ships in the third category are described in US patent Nos. 4,158,416 and 3,591,023. These ships have either a movable bow or a movable stern and thus need safety devices to ensure both closure and leak-tightness.

25 Ships in the second category are described in US Patent No. 4,043,285 which each have a hull and a framework that is integral with the hull. The framework includes vertical, lengthwise, and crosswise beam. The lengthwise beams have rails that support an overhead crane and project beyond the stern of the hull. This projection, which is designed to overhang the dock of a port, enables the containers to be deposited directly onto the dock with the aid of the overhead crane.

30 Such an unloading device has the disadvantage of being only usable on large, high-tonnage ships on which movement of the container has little effect.

However, this type of ship can only moor in deep-water ports, and the containers cannot be unloaded onto an unequipped beach, bank, or landing slip. Moreover, loading and unloading cannot be continuous where the rise and fall of the tide is substantial.

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It is therefore an object of the invention to overcome these problems by providing container ship that enables containers to be unloaded near a variety of points of use, i.e., not only in ports that are not equipped with port handling facilities but also onto unequipped beaches, banks, or landing slips. It is also an object of the invention to unload these containers and to particularly place them on the ground in such a manner that it has practically no effect on the equilibrium of the ship, whatever its size.

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These objects are achieved by providing container ship of the type having a hull, a propulsion mechanism and a handler that moves along a guide disposed on a support, wherein the guide is extendible beyond the hull of the ship.

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In accordance with one aspect of the invention, the support includes at least one beam attached to the hull that supports a first part of the guide of the handler and that has a lengthwise cavity inside of which is disposed a second, movable beam that supports a second part of the guide. The second part of the guide constitutes an extension of the first part when the movable beam is deployed beyond the ship's hull.

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In accordance with another aspect of the invention, the support includes at least two beams attached to the hull inside which are disposed one movable beam, at least one cross beam, or a plate connecting the at least two movable beams.

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Other advantages and characteristics of the invention will appear in the description of several embodiments of the invention with reference to the attached figures, wherein :

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Figure 1 is a general diagram of a container ship according to the invention,

Figure 2 is a cross sectorial view taken through a guide and support of a handler according to the invention,

Figure 3a and 3b are two variants of a top view of the guide and support of the handler according to the inventions and

Figure 4 is another embodiment of the guide and support according to the invention.

Figure 1 shows a ship according to the invention. It has a hull 1, propulsion and electric power supply mechanisms (not shown) handlers 2 that handle containers 3, and devices that balance the ship (not shown), which can be of the weight-transfer type.

The hull is in the shape of a V in front, and a W, i.e., a catamaran, at the rear. For a given internal storage volume and a given stored weight, this shape allows the draft to be shallower than that of a single-hulled ship, while enhancing stability.

This shallow draft and this stability, both of which can be obtained with ships of the catamaran or landing type, are used in the framework of the invention to travel through shallow channels, and improve the stability of the ship both at sea and when the containers are being handled as they are loaded or unloaded.

The loaded draft of these types of ships or, more precisely, of these hulls, is less than 4 meters and preferably the ratio between their length and width is between 3 and 5.

The container handler 2 is shown in Figure 2. These handlers have a U-shaped portal crane 2, each of whose ends has wheels 5 that are designed to roll on a track that includes two beams 6 disposed lengthwise on the ship and integral with the hull.

Each of the beam 6 has a rail 7 on its upper surface. The presence of wheels 5 enables the portal crane 2 to move lengthwise and translationally.

The cross-section of each of the lengthwise beams 9 is in the shape of a C and defines a cavity. Second lengthwise beams 9 are connected by cross beams 10 and are disposed inside the cavities 8. The second lengthwise beams 9 are freely movable

translationally lengthwise inside these cavities 8. To facilitate their movement, each of the second lengthwise beams 9 has a wheel 11 at one of its ends.

The portal crane 2 has a hoist (not shown) to handle containers 3. The portal crane 2 is moved electrically. As in conventional cranes, electric motors are associated with wheels 5, and electric power is supplied from on board.

In one embodiment, the cross beams 10 are replaced with a plate 13. The plate 13 has a dual function : protecting the containers when the second lengthwise 9 are inside the cavities 8 ; and serving as an access ramp for pedestrians when the beams are deployed externally.

Advantageously, a rigid detachable element 17 is provided to connect the portal-crane 2 and the assembly that includes the lengthwise beams 9 and cross beams 10 or plate 13. This rigid link enables the entire assembly to be deployed with the aid of the portal crane 2, whereby the assembly does not require its own driving mechanism. On the other hand, the device may include a mechanism that locks this assembly translationally, for example by keying. Locking also enables the second lengthwise beams 9 to be oriented vertically. Moreover, to facilitate the orientation of these beams, these element 17 may be telescopic or include an actuator, for example.

As shown in Figure 2 of this embodiment second lengthwise beams 9 are not rectilinear and instead have an articulation 14 near the end opposite wheel 11. The second lengthwise beams also include two continuous parts 15, 16 that define an angle of about 10 degrees between each other. When containers 3 are unloaded onto a dock 12, which is higher than the lengthwise beams 6, this angle between parts 15, 16 enables the vertical distance separating the dock from part 16 to be reduced.

It may be noted that, because of the substantially fixed positions of the ends of the second lengthwise beams 9 located on the ground, they damp the movements of the ship, thus facilitating unloading.

As shown in Figure 4, the movable second lengthwise beams 9 can be flexible and made of several parts 9_1 , 9_2 , 9_3 that are articulated with each other. When the

beam 9 is folded, this design affords access to the entire storage area of containers 3, because cross beams 10 or plates 13 do not overhang this area. Figure 4 shows four different positions, A, B, C, D, of the movable beams. In two of the positions, i.e. A and C the beams are folded at each end of the storage area. In the other positions, i.e. B and D, the beams are deployed, with the first positions serving to protect against adverse influences from the marine environment in the case where plates 13 are used and the other as guide means.

The invention enables the guide means to be extended by a length of two to three times that of a conventional ramp, which is essential for loading and unloading containers onto a beach.

Moreover, the extension length of the guide means is adjustable so that it can be adapted as well as possible to the environment.

Of course, numerous modifications may be made to the embodiments described above without departing from the scope of the invention. Containers may be unloaded from the front of the ship or laterally, and thus the support and guide means will then be disposed differently as a consequence.

Moreover, the handler may include any device whose movement requires the presence of a guide and have an autonomous power source facilitating handling on land.

In addition, the covering of the containers may include foldable plates, that are independent from beams 9 and 10.



CLAIMS

1. Container ship of the type having a hull (1), propulsion means, and handling means (2) movable along guide means (7₁; 7₂) disposed on support means (6; 9), characterized in that these guide means are extendible beyond hull (2) of the ship.

5 2. Ship according to Claim 1, characterized in that the support means have at least one beam (6) attached to the hull, supporting a first part (7₁) of the guide means of the handling means, and having a lengthwise cavity (8) inside which is disposed a second movable beam (9) inside this cavity (8), supporting a second part (7₂) of the guide means, said second part (7₂) constituting an extension of first part (7₁) when
10 movable beam (9) is deployed beyond hull (2) of the ship.

3. Ship according to either of Claims 1 and 2, characterized in that guide means (7₁; 7₂) are comprised of at least one rail.

4. Ship according to any of Claims 1 to 3, characterized in that handling means (2) are comprised of a portal crane.

15 5. Ship according to any of Claims 2 to 4, characterized by having at least two beams (6) attached to the hull, inside which beams is disposed a movable beam (9), with at least one cross beam (10) connecting the at least two movable beams (9). X
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6. Ship according to any of Claims 2 to 4, characterized by comprising at least two beams (6) attached to the hull, inside which beams are disposed a movable beam
20 (9), with at least one plate connecting the at least two movable beams (9). X

7. Ship according to any of Claims 2 to 6, characterized in that each of movable beams (9) has two continuous rectilinear parts (15, 16) that form an angle between them, said angle enabling the vertical distance separating dock (12) from the



end of part (16) to be reduced when containers (3) are unloaded onto a dock (12) located at a height greater than that of guide means (7₁).

8. Ship according to any of Claims 2 to 7, characterized in that each of movable beams (9) has an articulation (14) close to its deployed end.

5 9. Ship according to any of Claims 1 to 8, characterized in that a rigid, movable means (17) connects handling means (2) to extendible guide means or to an assembly integral therewith, with displacement of the handling means causing displacement of said extendible part.

10 10. Ship according to any of Claims 1 to 9, characterized in that hull (1) is in the shape of a V in front and a W at the rear.

11. Ship according to any of Claims 1 to 9, characterized in that hull (1) is of the catamaran type.

12. Ship according to any of Claims 1 to 9, characterized in that hull (1) is of the landing ship type.

15 13. Ship according to any of Claims 1 to 12, characterized in that the ratio between its length and width is between 3 and 5.