

Description

This invention relates to improvements in container-ships and in particular it relates to improvements intended to increase the speed of handling containers both into and out of a cellular type container-ship and to increase the security of containers normally carried on the deck of container-ships by altering the structural configuration of the superstructure of conventional container-ships.

One previously known method of lifting containers out of a typical container-ship or lowering them into the hold, is to stack the containers in a cellular vertical guidance system, and when several adjacent stacks reach the height of the hatch coamings, these stacks are covered by steel hatch covers which serve the dual purpose of sealing the hold spaces against entry of water and to provide a platform for those containers which are to be carried on deck.

In the prior art container-ships it is necessary to remove the hatch covers in order to gain access to any containers which are located in the hold, and this means that all containers mounted on the hatch cover above the container(s) required must first be removed to a container stack or holding area ashore.

The hatch covers themselves are generally of heavy and robust construction in order to withstand the substantial forces due to the ship's motion in a seaway.

In modern cellular container-ships, approximately 40% of the total number of containers carried may be carried on the hatch covers and must be secured to the deck by means of substantial lashing fittings. These lashing fittings must be secured manually before the ship can safely proceed to sea.

It may be seen therefore that the process of removing deck containers and hatch covers for access to below-deck containers and the securing of exposed deck containers is expensive in time and effort, thus adding to the cost of unloading and loading the ship.

In addition, containers which are mounted on deck and secured to hatch covers are exposed to the vagaries of the seas and have been, on occasions, lost overboard or the containers have been damaged and their contents lost overboard or damaged by sea-water. Such incidents add to the insurance costs of cargo thus increasing the cost of goods to the consumer.

Due to the fact that cargo containers are seldom completely filled with cargo, the centre of gravity of a stack of containers is considerably higher than the centre of gravity of a comparable weight of cargo when stowed in the conventional manner in the hold of a general cargo vessel. This fact, coupled with the practice of carrying three or four tiers of containers on top of the hatch covers, requires particular care to be taken to achieve and maintain adequate positive ship stability.

In the past, it has been known to stack containers in a vertical alignment, (as is disclosed in

German Patent Specification number 2529350—1975), such that the weatherdeck comprising the hatches and an upper container bearing deck is eliminated. This enables more efficient storage of containers due to space economy. In the German specification, the stability and security of the containers is intended to be achieved by the use of under deck guide rails being extended uninterrupted above the weather deck level.

In the aforesaid German specification the longitudinal coamings on each side of the cargo hold extend over the entire cargo hold area and transverse coamings are only provided on the ends of the longitudinal coamings. This arrangement is intended to prevent water from the weatherdeck entering the cargo hold.

Further, releasable protecting devices are provided for the sides of the containers which are above the deck to prevent entering the hold. These devices may be in the form of spray walls which are intended to absorb the movements and forces generated by the bending of the ship.

Also disclosed are means for casting containers overboard.

Surge walls can also be located between the guiderails to minimise the amount of water entering the hold.

German Specification No. 3134636 discloses a container-ship having a structure 2 provided at the top of the side walls of the ship's hull (see Fig. 1).

German Specification No. 1947841 discloses a container-ship in which the containers are stacked above the weather deck, a wall structure being provided about the container bearing area for protection of the containers from sea water.

British Specification No. 1546396 (which corresponds to French Specification No. 2313255) relates to means for loading and unloading a container-ship and describes a ship having a container-bearing deck which is close to the water line, and optionally being provided with side plates to protect the containers from rain or sea water.

In contrast, the present invention provides a means for the restraint of and for the protection from sea surge and spray of containers.

This is achieved by increasing the height of the walls of the ship resulting in an increase in the depth of the ship and a consequent increase in the freeboard.

The increased wall depth obviates the need for coamings, detachable sea walls, extended guide rails, and any lashings for the containers.

The increased wall depth results in the strength deck on the top of the wall approximating the position of the uppermost container when the ship is fully laden.

The deeper ship beam allows a narrower wall width due to increased resistance to bending. It also provides improved torsional resistance in the container-ship. The deeper ship beam also allows less steel to be used in the ship wall without compromise to the overall structural integrity of

the ship. The present invention simplifies the container-ship superstructure's configurational design and raises the weather deck to a point whereby the containers are better protected from the elements. The elongated ship wall also provides built-in restraint for the containers when the container-ship pitches and rolls and virtually eliminates the possibility of containers falling into the sea during transit in heavy seas.

It has not hitherto previously been known to provide a container-ship having a container bearing deck below the water line and at the same time having the strength deck positioned such that all containers are protected by the ship wall structure instead of with extension structures from an abbreviated wall as is the case with the prior art.

Throughout the specification the term 'weatherdeck' applies to those decks on a ship which are exposed to the elements; the term 'strength deck' applies to the longitudinal structural member or box girder which runs along the top of the ship walls; the term 'freeboard' applies to the vertical distance between sea level and the upper surface of the strength deck.

The present invention seeks to ameliorate the aforesaid shortcomings of the prior art container-ship loading configuration and method of containment of cargo by providing an open hull into which containers can be stacked on top of each other in vertical alignment, said containers being retained in position and stabilised by an extended ship sidewall.

This invention reduces the time taken to remove or exchange containerised cargo because no lashing of the containers is required. The containers are restrained by the ship's sides which are extended higher than normal to support the uppermost tier of containers.

In its broadest form the present invention provides a ship for transporting freight containers, the ship having a hull comprising a container bearing deck which, when the ship is laden, is located beneath the water line, sidewalls extending upwardly from the said container bearing deck to define a container hold located within the hull, and a strength deck at the top of each of the sidewalls, wherein the depth of the sidewalls is increased such that when the ship is fully laden the position of the said strength deck approximates the level of the uppermost container and the freeboard is increased, the sidewalls thereby providing support for and a weathershield for the uppermost containers, and further characterised in that the hold is an open hold having no hatch covers.

In the preferred embodiment the container-ship is essentially 'U'-shaped in cross-section with the walls being extended to a depth considerably greater than has been known previously. This is achieved together with the elimination of the conventional coamings and hatches.

In order to achieve the elongated ship walls, the box girder forming the strength deck and the wall structure requiring redesigning.

The sidewalls are preferably double-skinned sidewalls. The sidewalls preferably extend upwardly from the lateral extremities of the container-bearing deck.

The sidewalls and container-bearing deck may define a 'U'-shape. The sidewalls may be continuous with the container-bearing deck. The sidewalls may be strengthened by transverse bulkheads spanning therebetween. The container-bearing deck is preferably cambered either inwardly or outwardly.

The containers may be stacked in a vertical alignment from the container-bearing deck and parallel to the sidewalls.

The present invention will now be described in detail according to a preferred but non limiting embodiment and with reference to the accompanying illustrations wherein:

Fig. 1 shows a midship cross-sectional view of a container-ship structure according to the preferred embodiment of the present invention;

Fig. 2 shows an abbreviated cross-sectional view of the container bearing deck having alternative means for drawing bilge water; and

Fig. 3 depicts an isometric view of a midship portion of a container-ship of indefinite length.

Referring to Fig. 1 there is shown a midship section of a typical ship carrying nine containers high and nine containers wide. It is feasible to employ a number of varied loading configurations within the ship structure depending upon the particular size of a container-ship.

The container-ship section shown comprises a substantially U-shaped hull 1 having a container bearing deck 2 and sidewalls 3 and 4. The container bearing deck 2 is, when the ship is floating, below sea level. A hold 5 is formed by the clear passage which exists within the deck 2 and the walls 3 and 4. The containers 6 are placed in hold 5 in the configuration shown in Fig. 1. The containers can be retained transversely and equidistantly by guides 7. The walls 3 and 4 have been made narrower than in conventional container-ships because the thickness can be reduced as a result of a deeper ship beam. At the top of walls 3 and 4 is a box girder forming a strength deck 8.

The strength deck 8 is substantially in alignment with the uppermost row of containers 9 and thereby provides lateral restraint and weather protection for the containers. Along with the considerably increased wall depth Fig. 1 also shows that the normal hatch comings, hatch covers and associated lashing devices which are used in the prior art container-ships are eliminated. The freeboard of the vessel is increased proportionally and side plating extended up, adjacent to the uppermost row of containers 9 in the stack, thus affording protection of all containers against heavy weather damage.

The necessary structural strength is obtained by the inclusion of transverse members and bulkheads, (not shown), appropriately positioned along the length of the container-ship.

The container bearing deck 2, as depicted in Fig.

1. is inwardly cambered towards a centrally located drain 10. The camber is so designed to facilitate the progress of bilge water toward the drain so it can be subsequently pumped out. Although the elongated walls 3 and 4 provide significant protection for the containers against the elements it is inevitable that some water either from rain or spray will enter the ship. This necessitates the provision of a means for drawing and pumping the water.

To cope with any accumulation of rainwater or spray on the double bottom tank top of the vessel, each hold may be appropriately divided to reduce free surface effects to a minimum and suitable hold pumping arrangements provided. Various methods may be used for keeping the holds drained of rainwater and spray and Figs. 1 and 2 show two alternative methods of draining to bilge hat boxes or drains 11 recessed in the double bottom of the ship.

In Fig. 2 the container bearing deck 2 is adapted with bilge hat boxes at its lateral extremities.

The double bottom tank top may be straight and not cambered as shown in Figs. 1 and 2 with suitable drainage and pumping arrangements provided.

Fig. 3 shows an isometric view of the midship portion of a ship fully loaded with containers.

The containers 6 are shown bearing on support rails 12 running longitudinally along the ship hull.

This view makes it apparent that there is no need for additional structures or attachments such as coamings or sea walls beyond the sidewalls 3 and 4 to retain or protect the containers.

The vessel may therefore be fully loaded without the use of any lashing devices for the containers. The stability of the vessel is improved and any container may be accessed by the removal of a minimum number of other containers.

Claims

1. A ship for transporting freight containers, the ship having a hull comprising a container bearing deck which when the ship is laden is located beneath the water line, sidewalls extending upwardly from the said container bearing deck to define a container hold located within the hull, and a strength deck at the top of each of the sidewalls, characterised in that the depth of the sidewalls is increased such that when the ship is fully laden the position of the said strength deck approximates the level of the uppermost container and the freeboard is increased, the sidewalls thereby providing support for and a weathershield for the uppermost containers, and further characterised in that the hold is an open hold having no hatch covers.

2. A container-ship according to claim 1, wherein the sidewalls are double-skinned sidewalls.

3. A container-ship according to claim 1 or claim 2, wherein the said sidewalls extend upwardly from the lateral extremities of the container bearing deck.

4. A container-ship according to claim 3, wherein

the sidewalls and container bearing deck define a "U"-shape.

5. A container-ship according to any one of claims 1 to 4, wherein the sidewalls are continuous with the container bearing deck.

6. A container-ship according to claim 3, wherein the containers are stacked in a vertical alignment from the container bearing deck and are parallel to the side walls.

7. A container-ship according to any one of claims 1 to 6, wherein the sidewalls are strengthened by transverse bulkheads spanning therebetween.

8. A container-ship according to claim 7, wherein the container bearing deck is cambered either inwardly or outwardly.

9. A container-ship according to any one of claims 1 to 8, in which the ship is fully laden with containers and the position of the strength deck approximates the level of the uppermost container.

Patentansprüche

1. Ein Schiff für den Transport von Frachtcontainern, welches Schiff einen Rumpf mit einem Containertragdeck umfaßt, das bei beladenem Schiff unterhalb der Wasserlinie liegt, sich von dem Containertragdeck aufwärts erstreckende Seitenwandungen umfaßt zum Begrenzen eines Containerstauraums innerhalb des Rumpfes, und ein Festdeck auf der Oberseite jeder Seitenwandung umfaßt, dadurch gekennzeichnet, daß die Tiefe der Seitenwandungen derart vergrößert ist, daß bei voll beladenem Schiff die Position des Festdecks sich dem Niveau des obersten Containers nähert und das Freibord vergrößert wird, wodurch die Seitenwandungen eine Abstützung und eine Wasserabschirmung für die obersten Container bilden, und ferner dadurch gekennzeichnet, daß der Stauraum ein offener Stauraum ohne Abdeckluken ist.

2. Ein Containerschiff nach Anspruch 1, bei dem die Seitenwandungen doppelschalige Seitenwandungen sind.

3. Ein Containerschiff nach Anspruch 1 oder Anspruch 2, bei dem die Seitenwandungen sich von seitlichen Enden des Containertragdecks aufwärts erstrecken.

4. Ein Containerschiff nach Anspruch 3, bei dem die Seitenwandungen und das Containertragdeck eine "U"-Form definieren.

5. Ein Containerschiff nach einem der Ansprüche 1 bis 4, bei dem die Seitenwandungen kontinuierlich mit dem Containertragdeck sind.

6. Ein Containerschiff nach Anspruch 3, bei dem die Container in vertikaler Ausfluchtung vom Containertragdeck ausgehend gestapelt sind und parallel zu den Seitenwandungen sind.

7. Ein Containerschiff nach einem der Ansprüche 1 bis 6, bei dem die Seitenwandungen durch sich zwischen ihnen erstreckende Querspanten versteift sind.

8. Ein Containerschiff nach Anspruch 7, bei dem das Containertragdeck einwärts oder auswärts

1. is inwardly cambered towards a centrally located drain 10. The camber is so designed to facilitate the progress of bilge water toward the drain so it can be subsequently pumped out. Although the elongated walls 3 and 4 provide significant protection for the containers against the elements it is inevitable that some water either from rain or spray will enter the ship. This necessitates the provision of a means for drawing and pumping the water.

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6. A container-ship according to claim 3, wherein the containers are stacked in a vertical alignment from the container bearing deck and are parallel to the side walls.

7. A container-ship according to any one of claims 1 to 6, wherein the sidewalls are strengthened by transverse bulkheads spanning therebetween.

8. A container-ship according to claim 7, wherein the container bearing deck is cambered either inwardly or outwardly.

9. A container-ship according to any one of claims 1 to 8, in which the ship is fully laden with containers and the position of the strength deck approximates the level of the uppermost container.

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gewölbt ist.

9. Ein Containerschiff nach einem der Ansprüche 1 bis 8, bei dem das Schiff mit Containern voll beladen ist und die Position des Festdecks sich dem Niveau des obersten Containers nähert.

Revendications

1. Un navire destiné à transporter des conteneurs de fret, le navire comportant une coque comprenant un pont porte-conteneurs, qui, lorsque le navire est chargé, est situé au-dessous de la ligne de flottaison, des parois latérales s'étendant vers le haut à partir dudit pont porte-conteneurs pour définir une cale de conteneurs située à l'intérieur de la coque, et un pont de renforcement au sommet de chacune des parois latérales, caractérisé en ce que la profondeur des parois latérales est augmentée de telle manière que, lorsque le navire est complètement chargé, la position dudit pont de renforcement est voisine du niveau de conteneur supérieur et le franc-bord est accru, les parois latérales réalisant ainsi, pour les conteneurs supérieurs, un support et un abri contre les intempéries, et caractérisé en outre en ce que la cale est une cale ouverte ne possédant pas de couvercles d'écouilles.

2. Un navire porte-conteneur selon la revendication 1, dans lequel les parois latérales sont des parois latérales à double bordé.

3. Un navire porte-conteneur selon la revendication 1 ou la revendication 2, dans lequel lesdites parois latérales s'étendent vers le haut à partir des extrémités latérales du pont porte-conteneurs.

4. Un navire porte-conteneur selon la revendication 3, dans lequel les parois latérales et le pont porte-conteneurs définissent une forme de "U".

5. Un navire porte-conteneur selon l'une quelconque des revendications 1 à 4, dans lequel les parois latérales sont continues avec le pont porte-conteneur.

6. Un navire porte-conteneur selon la revendication 3, dans lequel les conteneurs sont empilés en un alignement vertical à partir du pont porte-conteneurs et sont parallèles aux parois latérales.

7. Un navire porte-conteneur selon l'une quelconque des revendications 1 à 6, dans lequel les parois latérales sont renforcées par des cloisons étanches transversales qui franchissent l'intervalle entre elles.

8. Un navire porte-conteneur selon la revendication 7, dans lequel le pont de porte-conteneur est incurvé soit vers l'intérieur soit vers l'extérieur.

9. Un navire porte-conteneur selon l'une quelconque des revendications 1 à 8, dans lequel le navire est complètement chargé de conteneurs et la position du pont de renforcement est voisine du niveau du conteneur supérieur.

