J. R. OLDHAM.

CONSTRUCTION OF SHIPS AND OTHER VESSELS.

APPLICATION FILED NOV. 28, 1913.

1,110,077. Patented Sept. 8, 1914.

Fig. 1.

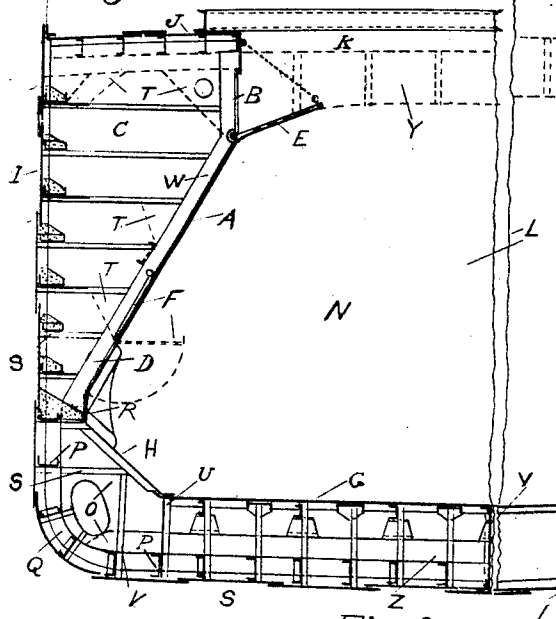


Fig. 2.

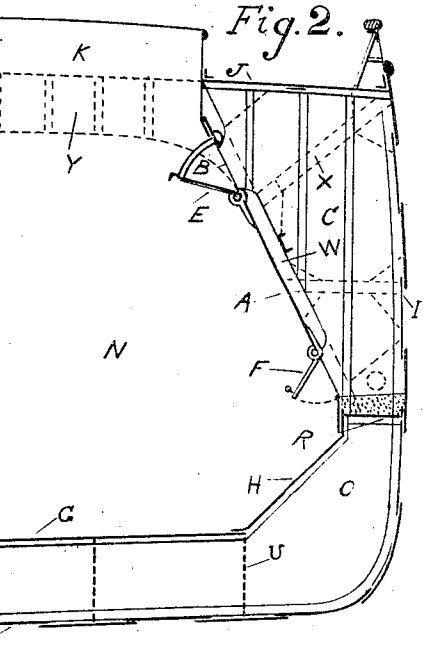


Fig. 3.

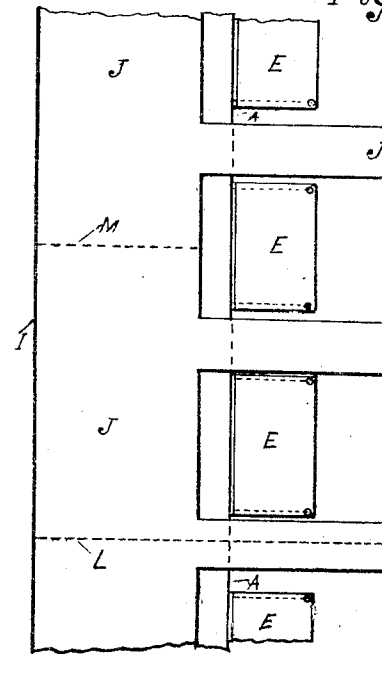
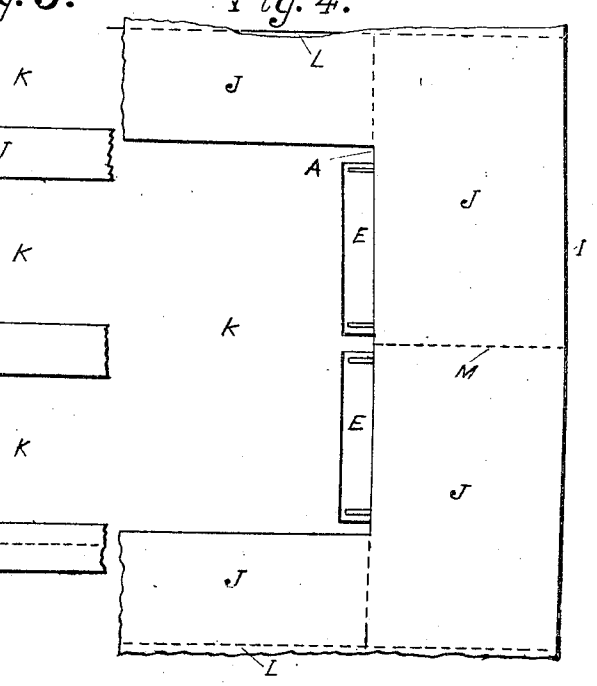


Fig. 4.



WITNESSES

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CONSTRUCTION OF SHIPS AND OTHER VESSELS.

1,110,077. Specification of Letters Patent. Patented Sept. 8, 1914.

Application filed November 28, 1913. Serial No. 803,491.

To all whom it may concern:

Be it known that I, JOSEPH R. OLDHAM, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in the Construction of Ships and other Vessels, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to the construction of steel bulk-cargo vessels, and particularly to ships designed for the ore carrying trade on the Great Lakes.

In Great Lakes vessels when loaded with ore there is invariably a large vacant space in the upper wings and at the sides between the top of the side water ballast tanks and the deck, throughout the cargo holds and as such vessels have been known to capsize when loaded with a bulk-cargo, it is more than probable that the shifting of the cargo in a seaway, into the empty wings, has been a contributory cause of such losses.

The primary object, therefore, of my invention is to so construct, or reconstruct a bulk cargo vessel that the ore cargo can not fall over from the center of the holds into the upper wings so as to severely incline, or capsize, the vessel.

Another object of my invention, with the construction of longitudinally extending bulkheads, or strong screens, throughout the holds, for securing a bulk cargo against dangerous lateral movement within the center or main holds, is to utilize the upper wings and lower sides of the holds, which are now commonly used for holding water ballast, for carrying bulk cargoes; and that, without perforating my decks or stringer plates, to provide extra special hatchways over these wing or side holds.

I will first describe my improvement in detail and then further explain and point out its novelty in claims.

Figure 1 represents a transverse section of parts of one side of a vessel embodying my improvement. Fig. 2 represents a similar section showing a different form of vessel with my longitudinal bulkheads and apertures, cargo chutes and doors. Fig. 3 is a plan view of same showing hatchways, transverse, and partial transverse bulkheads within the side holds, also the cargo chutes and the top edge of the longitudinal bulkheads. Fig. 4 is a similar plan view showing a different form and arrangement of hatchways and bulkheads.

The structural details shown in the drawings may be considerably varied without departing from the spirit of my invention, which, however, it will serve to make clear.

Similar letters of reference designate corresponding parts in all the figures.

A designates the longitudinal bulkheads which extend throughout the cargo holds, and within the boiler and engine spaces when it is desired to construct these bulkheads so as to carry oil fuel.

B represents ports or gateways to form chutes near to the top of the diagonal longitudinal bulkheads to admit cargo into the side holds C.

D represents the apertures or lower gateways near the bottom of the side holds, to permit the cargo to enter the central or main holds.

E shows the doors or chutes in the upper part of the bulkheads.

F indicates the lower doors or gates, when fitted, and which may be either hinged or slidable, and be secured by chains or bars and bolts.

G is the upper bottom forming water ballast tanks.

H is the diagonal extension upwardly of the upper bottom, which is supported by my novel bilge futtock and improved framing device, and which is connected to the longitudinal diagonal screen bulkheads. This futtock may be added to, to extend it upwardly if desired.

I represents the shell of the vessel, which may be of familiar construction. J the deck. K hatchways.

L represents the main or complete transverse bulkheads. M the partial bulkheads within the side holds. The central, or main holds are marked N.

O, represents the bilge futtock which extends out to the inner line of the longitudinal frames P, to which it is attached and to the intercostal bars Q. The top of the water ballast tank is marked R, angle cross bars S, brackets and knee-plates T, bilge keelson U and water-tight center keelson V. Longitudinal screen bulkhead stiffening bars are marked W, the struts or ties X, arched girders Y and bottom web frames Z.

So far as supporting and securing an ore cargo is concerned, my vessel may be said

to have a complete inner skin throughout the cargo holds, as she will carry a full deadweight cargo, such as iron-ore, without the cargo coming into contact with the shell of the hull at any point, and as the breadth of my main or central holds is much greater at the lower edge of my inwardly inclined diagonal bulkheads or screens, than at their upper edge, it will be impossible for the cargo, as usually loaded, to shift to such a degree as to seriously incline the hull. To keep such a cargo from shifting, these bulkheads or partitions, are constructed throughout the holds at a suitable distance from the sides of the hull. They are secured to the upper, or spar deck, in a line with the sides of the hatchways, or in some cases slightly inside of the hatch coamings, from whence they extend downwardly and outwardly to a point at, or somewhat above, the upper turn of bilge where they join the top of the ballast tank which turns down and joins the broad flat or almost flat floor of the tank, which extends across the hull almost from bilge to bilge.

In transverse section my central main holds somewhat resemble the frustum of a pyramid with the lower corners cut off. Or it may be compared with the section of an ink bottle, having a broad base. These longitudinally extending partitions may be made slightly concave transversely to save space in the central holds, or convex to give strength and they may be continued upward to the bar connection with the deck on a continuous diagonal, or inwardly inclined line, and the strong transverse stiffening bars, or framing, will largely support the longitudinal deck frames. With this inner shell narrowing from the top of the tanks to the deck an ore cargo will be held secure, or so securely held that no large movement of ore transversely can take place. With such cargoes as coal or grain both the central and side holds will be practically filled, therefore such cargoes cannot shift in a seaway. The apertures or gates near the top of the screens, or longitudinal bulkheads, will be constructed to act as chutes, being strongly hinged to the bulkheads and will be held open at a suitable angle by radial bars or by chains, and will be fitted with securing bolts and fasteners. In general the central holds will first be filled with the coal or grain and then the balance of the cargo will readily flow through these open chutes, which, however, will be closed while the central holds are being filled. When the side holds are filled these gates may be left open to help secure the cargoes in the main hold. At the bottom of the bulkheads or screens other large apertures or gates are formed so that the cargo may gravitate into the central holds and be taken out like the bulk of the cargo. These apertures or portholes may also be equipped with hinged or sliding doors to keep the contents of the side holds secure and separate from the cargo in the central holds if required, but in general no such doors will be required when a homogeneous bulk cargo is carried.

The diagonal bulkheads or screens, will be of a strength say almost equal to the shell or outer skin, but they need not be watertight like the upper bottom, unless for bunkers required to hold oil fuel. In addition to web frames, bilge futtocks and channel bar stiffening, these longitudinal bulkheads will be supported by strong transverse bulkheads spanning the holds, and by partial bulkheads, spaced from about twenty four feet to about thirty six feet apart within the wing compartments or side holds. I do not confine myself to any particular angle of inclination for these bulkheads, and the point where these screens connect with the top of water ballast tanks may be lowered, or be raised up in vessels of different types. In vessels having deep water ballast tanks extending up to about the load water line, these inwardly upwardly extending diagonal screens can be constructed from the top of such tanks to the deck at sides of hatchways, and be fitted with gates or chutes near the top, and with apertures or doors at the bottom, to emit cargo which may be loaded into the side holds on top of the water ballast tanks. So far as securing a cargo from shifting is concerned the benefit of my invention will be about equally great if my longitudinal bulkheads or screens begin to rise upward from the top of wing chambers or water ballast tanks situate at a much greater height from the bottom than I have shown. It is from the top of the water ballast tanks at the sides of the hull that my main improvement may be said to commence, and the connection with same and with the deck will greatly strengthen the vessel. Though the lower part of my diagonal bulkheads, where they connect with the upper bottom, or "floor," is nearer to the sides of the hull than the sides of my hatchways, the recently improved modern unloading grabs will be able to reach out to the lower diagonal extension and thus remove the cargo without delay. For certain trades I prefer to make my longitudinal screens of corrugated plates so as better to withstand the violent impact of heavy ore or coal falling from a considerable height.

This improvement is applicable to vessels of old familiar construction or to ships built in accordance with the most approved design of bulk cargo vessel. The intercostal bars connected to the bilge futtock may be of flanged steel plates, channel bars, or steel castings. My longitudinal frames being drawn with flanges upwardly turned, I show these filled in with concrete to prevent coal

or grain lodging therein. This bulkhead construction, connecting the water ballast tanks with the deck, adds largely to the longitudinal and transverse strength of the hull.

Having described my invention, what I desire to secure by Letters Patent is:—

1. In a steel bulk-cargo vessel having a water bottom with lower side tanks, longitudinal bulkheads extending diagonally inward from the top of the water ballast tanks at sides to the deck at the sides of the hatchways, throughout the cargo holds, the upper part of said bulkheads being perforated to form chutes to admit bulk cargo into the side holds, with apertures at the lower part of said bulkheads to emit the cargo into the main holds, substantially as and for the purpose specified.

2. In a steel bulk-cargo vessel, longitudinal screen bulkheads extending diagonally upward and inward from the top of water ballast tanks, to which they are connected near the sides of the holds above the upper turn of bilge, said bulkheads having gateways forming chutes for filling the side holds, and apertures in the lower part of said bulkheads for emitting cargo from the side to the central holds, with doors, chains and fasteners substantially as and for the purpose set forth.

3. In a steel vessel for carrying bulk cargoes, the combination of longitudinal screen bulkheads extending diagonally upward from the top of side water ballast tanks to the deck, to which they are secured at the sides of hatchways, with ports near the deck forming chutes for directing the cargo from the central to the side holds, and with apertures near the bottom of said bulkheads to emit the cargo into the central holds to be unloaded, substantially as and for the purpose specified.

4. A steel vessel for carrying coal or grain cargoes, the combination of longitudinal bulkheads extending diagonally downward and outward from the deck at sides of hatchways to above the bilges, forming central and side cargo holds, and connecting with the downward and inward diagonal extension of the upper bottom, with bilge futtocks and intercostal bars between the longitudinal frames, angle cross bars, stiffening channel bars, main transverse and side-holds transverse bulkheads, substantially as and for the purpose set forth.

5. A ship's hull having channel bar longitudinal frames supporting the shell and decks, with steel plate transverse bulkheads secured by angle bars within the side holds, the combination of longitudinal bulkheads extending diagonally from the top of water ballast tanks at sides to the deck at hatchways, with cargo ports near the top and near the bottom of said longitudinal bulkheads, channel and angle bar stiffeners, bracket and knee plates, substantially as and for the purpose set forth.

6. A steel ship having central and side bulk-cargo holds and inner skin formed by longitudinal screen bulkheads extending from the top of water ballast tanks at sides of hull to the deck at sides of hatchways, inclosing the side holds, with gates at top and bottom, substantially as and for the purpose specified.

7. In a steel hull for transporting bulk cargoes, with water ballast tanks extending up the sides over the bilges, the combination of longitudinal-screen bulkheads extending from the hatchways downward and outward to the bilge, forming central and side cargo holds, respectively, and connecting with the downward and inward extension of the upper bottom over the bilges, with bilge futtocks and intercostals between the longitudinal frames substantially as and for the purpose set forth.

8. In a steel bulk cargo vessel diagonally inclined longitudinal screen bulkheads, having cargo ports at top and bottom, and extending downward from the deck at sides of hatchways to the top of water ballast tanks forming central and side cargo-holds substantially as and for the purpose specified.

9. A bulk cargo vessel having an upper bottom and water ballast tanks above the bilges, the combination of longitudinal bulkheads extending downward and diagonally outward from the deck at sides of hatchways, to secure the cargo, and attached to the top of the water ballast tanks, with portholes and gates for admitting and emitting the cargo at the top and bottom of said diagonal bulkheads, channel frames and stiffening bars, angle cross bars and knee plates, transverse partial bulkheads dividing the side holds, complete transverse bulkheads dividing the main, or central, holds, substantially as and for the purpose set forth.

10. A steel vessel adapted for the transportation of bulk cargoes, having a double bottom and water ballast tanks up the sides to above the bilges, the combination of longitudinal screen bulkheads extending diagonally upward and inward from the top of said water ballast tanks to the deck, to which they are attached inside of the hatch coamings, with apertures forming cargo chutes into side holds, and apertures in the lower portion of said bulkheads, close to the top of water ballast tanks, to which they are secured, channel bar web-frames across the bottom, secured to the longitudinal frames and to the bilge futtock, transverse bulkheads, intercostals and cross bars, transverse arched girders and stiffening bars, brackets and knee plates, substantially as and for the purpose specified.

11. In a modern steel bulk cargo vessel, longitudinal screen bulkheads throughout the cargo holds, extending diagonally upward and inward from above the bilges to the deck, to which they are secured at the sides of the hatchways, having ports and doors forming cargo chutes in their upper part, and apertures, for the emission of cargo, in their lower part above the bilges at the top of water ballast tanks, to which they are connected, and which are supported by steel plate bilge futtocks connected to the longitudinal channel bar frames and to channel intercostals, angle cross bars, also chains and fasteners, substantially as and for the purpose specified.

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Witnesses:
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EMMA JOHNSON.