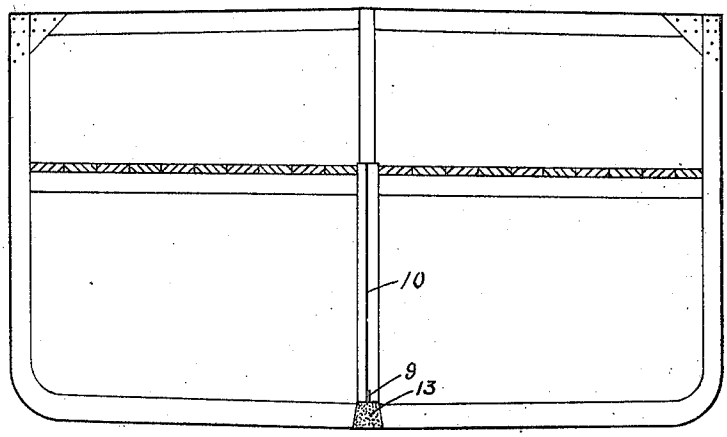
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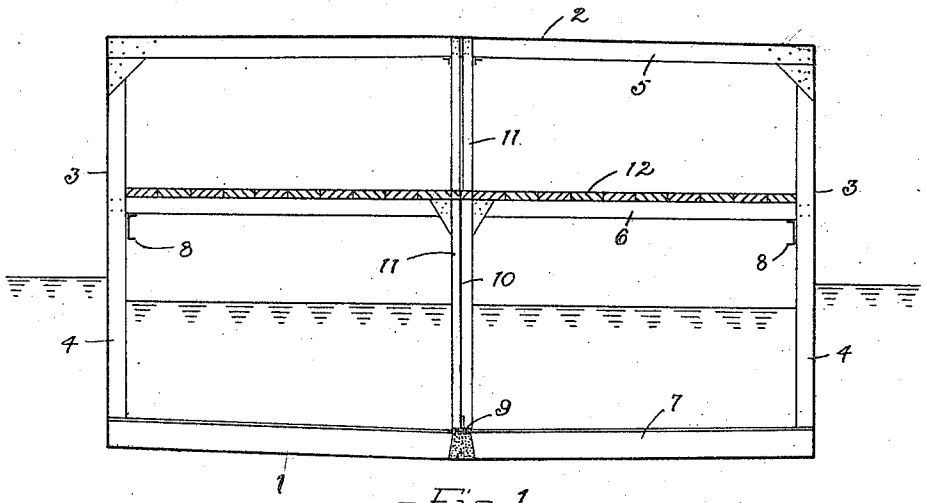
SHIP CONSTRUCTION.

APPLICATION FILED MAR. 27, 1916.

1,233,380. Patented July 17, 1917.



-Fig-2-



-Fig-1-

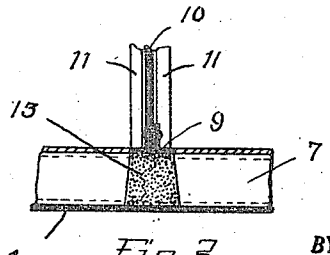


Fig-3.

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SHIP CONSTRUCTION.

1,233,380. Specification of Letters Patent. Patented July 17, 1917.

Application filed March 27, 1916. Serial No. 86,898.

To all whom it may concern:

Be it known that we, ALEXANDER McDOUGALL and ALEXANDER MILLER McDOUGALL, citizens of the United States, residing at Duluth, in the county of St. Louis and State of Minnesota, have invented certain new and useful Improvements in Ship Construction, of which the following is a specification, reference being had therein to the accompanying drawing.

Our present invention consists of certain new and useful improvements in metal ship's hulls and the method of constructing same.

And the invention herein disclosed is especially applicable and relative to that form of vessel illustrated in our U. S. Patent No. 1,128,886 dated Feb. 16, 1915, sea going canal boats, it being a form of hull peculiarly adapted to combination sea going and canal navigation.

The object is to produce a form and method of construction wherein the largest amount possible of steel just as it comes from the rolling mills may be used in building the vessel and thus obviate the necessity of additional heating and bending.

Another object is to employ a method of construction and combination of parts that will permit of the use of as large and long pieces of material possible to both facilitate in the erection and add to the strength of the structure.

Still another object is to provide a form of interior hull construction especially adapted to the class of transportation required of such combination vessels.

Referring now to the accompanying drawings forming part of this application and in which like reference characters indicate like parts:

Figure 1 is a cross sectional view of a ship's hull constructed in accordance with our improved form and method.

Fig. 2 is an enlarged cross sectional view of a fragmental portion of the ship's framing illustrating the method of bonding same, and

Fig. 3 is a cross sectional view of a modified form of ship's hull embodying our invention.

1 represents the bottom of the hull, 2 the upper deck and 3 the sides.

The frame work of the hull comprising the side frames 4—4, upper deck beams 5, intermediate deck beams 6 and floor beams 7 are preferably of channel iron suitably united in any desired manner, though for the peculiar sea going canal boat especially considered in this application, we prefer to locate the intermediate deck beams 6 approximately one-third of the depth of the hull below the beams 5. If desired to provide additional strength to the side walls of the hull and afford additional support to the beams 6, we illustrate fore and aft channel bars, 8—8, secured to the side frames 4—4 and upon which the ends of the intermediate deck beams 6 may rest.

Along the center line of the hull and upon the floor beams 7 is placed an inverted T-shaped bar 9 and which is securely riveted to the uppermost flanges of the floor beams.

To the upstanding web of the bar 9 is fixed the longitudinal central bulkhead 10 which may be reinforced vertically by any number of channel or other bars 11—11 and which preferably extend from the bar 9 to the upper deck beams 5 and support the same centrally.

The water tight portion or bulkhead 10 of this fabricated partition extends preferably only slightly above the upper edge of the intermediate deck beams 6, so as to be on a level with the top of the removable deck planks 12 carried upon the beams 6.

Portions only of the deck 12 may be removable as necessity may require, but one of the principal objects of said floor being removable is to provide easy access to the hold below for handling freight and cargo.

The object of the bulkhead 10 extending to the beams 6 only, aside from longitudinal strength to the ship, is for the purpose of controlling the water ballast when carried within the hull, as for example, when the vessel is lightly loaded and obliged to partly depress for passing under bridges and the like over canals. In this event, what cargo the vessel may be carrying can be placed upon the between deck and water put into the lower hold thereof, as illustrated, and the vessel thus submerged to the desired depth.

The height of the fabricated partition wall comprising the bulkhead 10 and stanchions 11—11 is such as to be somewhat greater than the height of the side walls of the hull and thus when put in place by the method hereinafter described, the deck 2

and bottom 1 will be slightly arched outwardly, the former to form camber for shedding water and the latter to form deadrise for improvement in shape and attract water within the hull toward the center line thereof.

Below the beam 9 and intermediate the floor beams 7 is formed a vertical partition wall 13 of concrete or like substance by first putting in forms (not shown) upon either side of the desired space therefor, either permanently or temporarily as desired, and then pouring through previously made holes in the horizontal flanges of the bar 9, the concrete mixture sufficient to fill the entire space between the molds, thus making a solid watertight partition through the entire lower hold of the hull and that without destroying the strength of or cutting the floor beams in any manner. Any suitable form of deck may be placed upon the floor beams 7.

The peculiar method employed in producing this form of hull is preferably and essentially as follows:

The bottom plates 1 are first laid in place and supported at suitable intervals along the outer side edges thereof by blocking, the middle being free to sag by gravity. The channel floor beams 7 are placed transverse the bottom plates and spaced the proper distance, approximately two feet apart, and they will also sag slightly in their centermost portion. Then the side frame 4—4, beams 6 and side walls 3—3 may be erected and properly attached, the bar 9 put in place and the fabricated central partition and bulkhead erected, the additional weight of which will further sag the center of the bottom to its proper form, then the upper deck beams 5 are secured to the uppermost ends of the stanchions 11—11 and the ends of said beams sprung down and secured to the side frames 4 by suitable means such as corner brackets and rivets common to the art.

In the modified form shown in Fig. 2, similar construction, is illustrated throughout except that the bilges are illustrated as being rounded, however the method of construction would be practically the same.

From the foregoing it is evident that we have devised a method and adaptation of vessel hull construction which will require the least skilled labor possible in erecting, the least variation in sizes and forms of individual pieces of material and the largest proportion of mill run stock possible in constructing a vessel hull of this character.

Having thus described our invention what we claim as new and desire to secure by Letters Patent, is:

1. In a ship's hull of substantially rectangular shape in cross section, a plurality of floor beams spaced apart upon the bottom of the hull, a central fore and aft bulkhead fixed to the uppermost edges of the floor beams and a water tight concrete wall between the bulkhead, the bottom and the floor beams.

2. In a ship's hull of substantially rectangular shape in cross section and having a deck approximately one third of the depth of the hull below the upper deck, of floor beams spaced apart upon the bottom of the hull, a central fore and aft bulkhead fixed to the uppermost edges of the floor beams and extending a slight distance above the beams forming the support for the between deck and a concrete wall formed intermediate the lower edge of the bulkhead, the bottom of the hull and the floor beams.

3. In a ship's hull of the character described, having a removable between deck, of thwartship beams spaced apart fore and aft the hull, a fore and aft central bulkhead supporting said beams longitudinally the center of the hull, thwartship floor beams spaced apart and supporting said bulkhead and a concrete wall intermediate the lowermost edge of the bulkhead, the bottom of the hull and the floor beams.

4. The herein described method of constructing a substantially rectangular shaped ship's hull, of first laying metal plates for the bottom thereof supported mainly at their outermost edges, laying floor beams transverse the plates and spaced apart, fixing a longitudinally disposed central bulkhead upon the floor beams, whereby the center of the floor and beams are sprung slightly downward by gravity while thus positioned, securely uniting the beams, bottom and central bulkhead, then erecting and uniting the side walls and deck and arching the latter by forming the bulkhead and its connecting stanchions of a height greater than the side wall of the hull.

5. The herein described method of constructing a ship's hull of substantially rectangular shape in cross section and having a central fore and aft bulkhead extending upward, substantially two thirds of the depth of the hull, of first laying metal plates for the bottom thereof, supported chiefly at their outermost edges, laying floor beams transverse the plates and spaced apart, fixing a longitudinally disposed central bulkhead upon the floor beams whereby the center of the floor and beams are sprung slightly downward to form a dead rise to the bottom, placing and fixing the side walls to the floor beams and bottom, fixing stanchions to the bulkhead and extending slightly above a plane with the upper edges of the side walls, springing the deck beams downward over the uppermost ends of the stanchions and suitably fastening them to the side walls and fixing a suitable deck to the beams, as and for the purpose described.

6. The herein described method of forming

a ship's hull of substantially rectangular shape in cross section and having a camber in the upper deck thereof and dead rise in the bottom thereof, of placing therein during the construction thereof a fabricated bulkhead division wall longitudinally and centrally positioned therein, and of a depth greater than that of the side walls.

7. The herein described method of forming a ship's hull of mill run metal material, of springing abnormally apart the center line of the bottom and deck of the hull, during construction and placing therebetween a fabricated longitudinal central bulkhead.

8. The herein described method of forming a ship's hull of mill run metal material and having a between deck within the hull, of forcing abnormally apart the upper deck and bottom of the hull and installing therebetween a central longitudinal water tight bulkhead, between the intermediate deck and the bottom of the hull and stanchions extending from the intermediate deck to the upper deck whereby the hull is formed with a camber to the deck and dead rise to the bottom thereof.

9. A ship's hull of the character described formed practically entirely of mill run metal material, comprising downwardly sprung bottom floor beams spaced apart and secured to the bottom, sides fixed to the bottom and extending upward to the upper deck, deck beams arched upwardly and fixed to the sides, an intermediate straight deck fixed to the sides, a water tight bulkhead resting upon and fixed to the floor beams and extending slightly above the intermediate deck and stanchions extending from the uppermost edge of the bulkhead to the upper deck, as and for the purpose described.

10. A ship's hull of the character described, formed largely of mill run metal material, comprising a downwardly sprung bottom, floor beams spaced apart and secured to the bottom, sides suitably fixed to the bottom and extending upward to the upper deck, upper deck beams arched upwardly and fixed to the sides, intermediate deck beams fixed to the sides, a central water tight bulkhead fixed to the floor beams and supporting the intermediate deck beams, a removable deck supported upon the intermediate deck beams and stanchions extending from the bulkhead and supporting the arched upper deck beams.

11. In a ship's hull of the character described, bottom floor beams spaced apart transverse the bottom and secured thereto, an upwardly extending bulkhead resting upon the beams and supporting the deck of the hull, a concrete water tight wall below the bulkhead and intermediate the floor beams and fixing members held by the beams and surrounded by the concrete for preventing movement of the latter.

12. In a ship's hull of the character described, a bottom, channel shaped floor beams spaced apart transverse the floor and secured thereto, an inverted T-shaped bar placed longitudinally the hull and upon the center of the floor channel beams, an upwardly extending water tight bulkhead fixed to one side of the T-bar, extending approximately two thirds of the depth of the hull, stanchions fixed to the sides of the bulkhead and extending above the upper edge thereof, to, and supporting the upper deck, an intermediate deck substantially upon a plane with the upper edge of the bulkhead and a water tight concrete wall between the lower edge of the bulkhead, bottom of the hull and channel beams.

13. In a ship's hull of the character described, composed chiefly of flat rectangular shaped plates and channel iron beams, of an inverted T-shaped bar extending centrally and longitudinally the upper edge of the floor beams, a water tight bulkhead fixed to the T-bar and extending upwardly therefrom and supporting the deck beams and a concrete wall between the lower edge of the bulkhead, the bottom and the floor beams.

14. In a ship's hull of substantially rectangular shape in cross section, a plurality of floor beams spaced apart upon the bottom of the hull, a center line of vertical stanchions resting upon the floor beams and supporting an upper deck and a concrete division wall between the floor beams and in line with the stanchions.

15. In a ship's hull of substantially rectangular shape in cross section, a plurality of individual floor beams extending entirely across the bottom of the hull, a deck upon the floor beams and a watertight concrete division wall intermediate the floor beams, the deck and the bottom of the hull.

In testimony whereof we hereunto affix our signatures in the presence of two witnesses.

ALEXANDER McDOUGALL.
ALEXANDER MILLER McDOUGALL.

Witnesses:
C. C. THOMPSON,
S. GEO. STEVENS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."