Sept. 13, 1932. J. W. GOODYEAR 1,877,235

HULL OF SHIPS

Filed Aug. 20, 1931

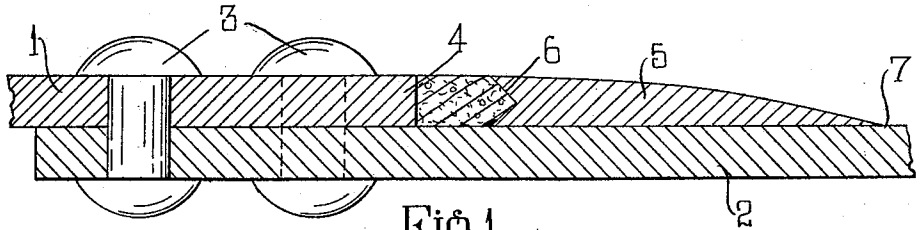


Fig. 1.

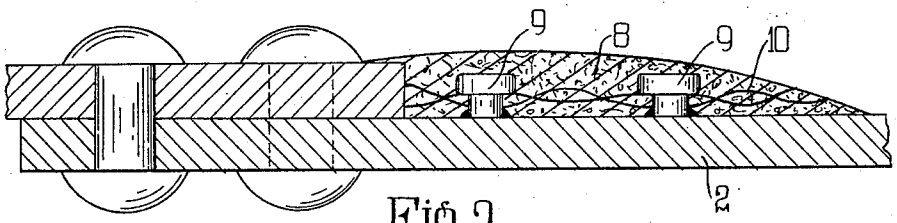


Fig. 2.

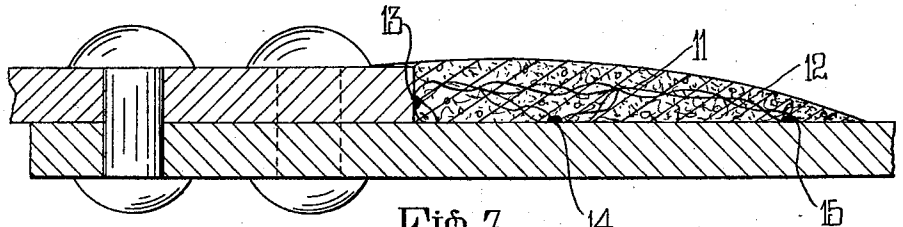


Fig. 3.

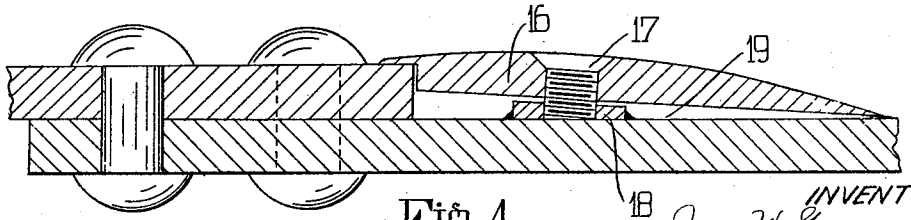


Fig. 4.

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Patented Sept. 13, 1932 1,877,235

UNITED STATES PATENT OFFICE

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HULL OF SHIPS

Application filed August 20, 1931, Serial No. 558,393, and in Great Britain October 30, 1930.

The present invention relates to hulls of ships or other vessels.

The object of the invention is to reduce the resistance of a ship to propulsion through the water in which it is supported.

According to the present invention, irregularities in the surface of a ship's hull beneath the waterline caused by the lapped joints and the like of the hull plates are faired by means of insertions or fairing members of tapered or substantially triangular cross section.

The invention may be carried into practice in various ways. For instance, insertions or fairing members may be cut from a rolled bar of triangular sections of say six inches width and of maximum thickness equal to the thickness of the plates, the laps of which are to be faired. These insertions may be welded or preferably spot welded to the hull and caulked against the hull plating along one or more edges or if desired they may be riveted or bolted thereto. Alternatively, insertions of cast metal may be employed.

In one method of securing triangular section solid metal insertions to a hull, such insertion is spot welded at its thin edge to an inner strake of plating and at its thick edge to the edge of an outer strake of plating. The thin edge of the insertion is caulked against said inner strake and the thick edge thereof is caulked along its outer face against the edge of said outer strake of plating. Alternatively, the thin edge of the insertion may be continuously welded to an inner strake of plating whereby caulking along this edge is eliminated.

In an alternative arrangement of solid metal triangular section insertions, each insertion is secured to the inner strake of plating in such a disposition that the broad edge of the insertion is slightly displaced, say by ¼″ or ½″ from the edge of an outer strake of plating. The thin edge of the insertion is spot welded and caulked to the inner strake of plating or alternatively it may be continuously welded thereto. The thick edge of the insertion is welded or preferably spot welded to the inner strake, and the space between the insertion and the adjacent edge of the outer strake of hull plating is filled with cement or other suitable material. Preferably the broad edge of the insertion is longitudinally recessed to form a lock or dovetail for retaining the cement in position, the recess being of V, arcuate or like contour so that a convenient landing for welding is formed on the insertion adjacent the hull plating.

A lighter construction may be obtained by using thin metal stampings of outer shape similar to that of said solid rolled insertion members. These stampings are preferably spot welded to the hull, but may of course be secured thereto in any other desired manner such as by riveting. Further the space between these stampings and the hull may be filled with cement or other suitable material.

In each of the above mentioned cases, a joint canvas or like material impregnated with red lead paint or the like may be provided between the insertion and the hull to protect those parts of the hull which are covered by the insertion and which cannot, therefore, be painted frequently.

As a still further alternative, the fairing may consist wholly of cement, bituminous cement, tar or the compositions which may be reinforced by means of wire netting, expanded metal or the like which may be located on or slightly below the surface of such insertions.

The reinforcement is preferably secured to the hull by one or more short pins, columns or the like which may be welded or otherwise secured to the hull and to the reinforcement.

Again, the cement or like insertions may be reinforced by the provision of rag bolts, metal bars or the like secured to the hull, or by a combination of this latter with wire netting, expanded metal or the like.

The invention is more particularly described by way of example with reference to the accompanying drawing, in which:—

Figure 1 is a sectional view of one form of fairing according to the present invention.

Figures 2, 3 and 4 show similar views of three other forms.

In the arrangement shown in Figure 1 a pair of plates 1, 2 are secured together to

form a lapped joint by means of rivets 3, the edge 4 of the plate 1 which lies on the outside of the hull is faired by means of a solid metal insertion 5 of tapering section which has a recess 6 formed in its thick longitudinal edge. The insertion 5 is secured to the inner plate 2 by any suitable means such as welding, spot welding or riveting and is displaced by a short distance from the edge 4 of the plate 1.

The space so formed between the edge 4 of the plate 1 and the groove 6 is filled with cement, bituminous concrete or other like material which, on setting, becomes keyed in position by means of said recess 6. In the example shown, the recess is of V form but may, of course, be of any other suitable shape. The insertion 5 may be spot welded to the plate 2 at its thicker edge and continuously welded to the plate 2 along its thinner edge 7. Alternatively, however the plate may be spot welded along its thinner edge 7 and caulked continuously along said thinner edge to the plate 2.

In the arrangement shown in Figure 2, the fairing 8 may consist of concrete, bituminous concrete,—tar or other suitable material. Short studs or pillars 9 are secured to the plate 2 by welding, riveting or screwing for assisting in holding the insertion in position. If desired, additional reinforcement for the insertion may consist of expanded metal or wire netting 10 extending between the said studs or pillars and across the breadth of the fairing.

In the arrangement shown in Figure 3 a fairing or insertion 11 of concrete or other suitable material is reinforced by expanded metal or wire netting 12 which is spot welded at spaced points 13, 14, 15.

In the construction according to Figure 4 a cast metal insertion member 16 has countersunk openings formed therein for the reception of the screws as at 17 adapted to secure the fairing in position. The screw 17 in the example shown is threaded into a nut member 18 welded to the hull. The space 19 between the insertion 16 and the hull may be filled with concrete or other suitable material.

I declare that what I claim is:—

1. A ship's hull including plating above the water line, plating below the water line, all arranged and secured in overlapping relationship and tapered insertions for fairing those edges which are formed by said overlapping plates below the water line and which extend substantially normally to the longitudinal axis of the hull.

2. A ship's hull including plating above the water line, plating below said water line, means to interconnect said plates to present external edges substantially normal to the path of the ship, and a plurality of fairings, each of varying thickness in cross section, between said edges and the flat surfaces of said plates.

3. A ship's hull comprising a plurality of plates, means for interconnecting said plates in overlapping relationship, and fairing members of varying thickness and substantially tapered in section for filling in those irregularities which are formed by said overlapping plates in the face of the hull beneath the waterline and which extend substantially normally to the longitudinal axis of the hull.

4. A ship's hull comprising a plurality of plates, means for interconnecting said plates in overlapping relationship, solid metal fairing members of varying thickness and substantially tapered in section for filling in those irregularities which are formed by said overlapping plates in the face of the hull beneath the waterline and which extend substantially normally to the longitudinal axis of the hull and rivets for securing said fairing members to said plates.

5. A ship's hull comprising a plurality of plates, means for interconnecting said plates in overlapping relationship, and metallic fairing members of varying thickness and substantially tapered in section secured to said plates by welding for filling in those irregularities which are formed by said overlapping plates in the face of the hull beneath the waterline and which extend substantially normally to the longitudinal axis of the hull.

6. A ship's hull comprising a plurality of plates, means for interconnecting said plates in overlapping relationship, and metallic fairing members of varying thickness and substantially tapered in section which are continuously welded to the hull along their thin edges and spot welded and caulked along their thick edges for filling in the irregularities formed in the face of the hull by the overlapping plates.

7. A ship's hull comprising a plurality of plates, means for interconnecting said plates in overlapping relationship, solid metal insertions of tapered section secured to the hull each with its thick edge slightly displaced from the edge of a hull plate and with its face lying against the face of said plate, and fillings of cement each between the thick edge of an insertion and the edge of the corresponding hull plate.

8. A ship's hull comprising a plurality of plates, means for interconnecting said plates in overlapping relationship, solid metal insertions of tapered section secured to the hull each with its thick edge slightly displaced from the edge of a hull plate and having a groove formed longitudinally thereof and with its face lying against the face of said plate, and fillings of cement each between the thick edge of an insertion and the edge of the corresponding hull plate, said cement

also filling said groove in said insertion to lock the same in position.

9. A ship's hull including plating above the water line, plating below the water line, all arranged and secured in overlapping relationship and tapered insertions of cement for fairing the edges formed by said overlapping plates below the water line.

10. A ship's hull including plating above the water line, plating below the water line, all arranged and secured in overlapping relationship and tapered insertions of cement reinforced with a metal frame for fairing the edges formed by said overlapping plates below the water line.

11. A ship's hull comprising a plurality of plates, means for interconnecting said plates in overlapping relationship, cement fairing members of varying thickness and substantially tapered in section for filling in the irregularities formed in the face of the hull by the overlapping plates and metallic reinforcement means enclosed within said cement fairing members.

12. A ship's hull comprising a plurality of plates, means for interconnecting said plates in overlapping relationship, short studs secured to the faces of said plates, cement fairing members of varying thickness and substantially tapered section for filling in the irregularities of the face of said hull formed by said overlapping plates, said fairing members enclosing said studs which form reinforcement means therefor, and additional reinforcement means for said fairing members secured to said hull.

13. A ship's hull comprising a plurality of plates, means for interconnecting said plates in overlapping relationship, short studs secured to the faces of said plates, cement fairing members of varying thickness and substantially tapered section for filling in the irregularities of the face of said hull formed by said overlapping plates, said fairing members enclosing said studs which form reinforcement means therefor, and expanded metal reinforcement means within said fairing members which means are spot welded to the hull for further reinforcement of said fairing members.

14. A ship's hull comprising a plurality of plates, means for interconnecting said plates in overlapping relationship, and fairing members formed of light metal stampings of tapered section which are welded to the hull plates below the water line thereof for filling in the irregularities in the hull face below the water line.

15. A ship's hull comprising a plurality of plates, means for interconnecting said plates in overlapping relationship, cast metal fairing members of varying thickness and substantially tapered in section with countersunk holes formed therein for filling in the irregularities formed in the face of the hull by the overlapping plates and screws for securing said fairing members to said plates.

16. A ship's hull comprising a plurality of plates, means for interconnecting said plates in overlapping relationship, cast metal fairing members of tapered section secured to said plates with their thick edges lying against the overlapping faces of said plates, and a lip on each fairing member engaging over the edge of the next succeeding plate to which said fairing member is secured.

17. An insertion for fairing the joints of hull plating consisting of a metal plate of tapered cross section having a groove formed in its thicker longitudinal edge

18. An insertion for fairing the joints of hull plating consisting of a cast metal plate of tapered cross section having countersunk holes formed therein and having a lip formed along its thicker longitudinal edge.

In witness whereof, I have hereunto signed my name this 14th day of July, 1931.

JAMES WALLIS GOODYEAR.