E. H. EWERTZ.

VESSEL.

APPLICATION FILED FEB. 20, 1918.

1,364,626.

Patented Jan. 4, 1921.

5 SHEETS—SHEET 1.

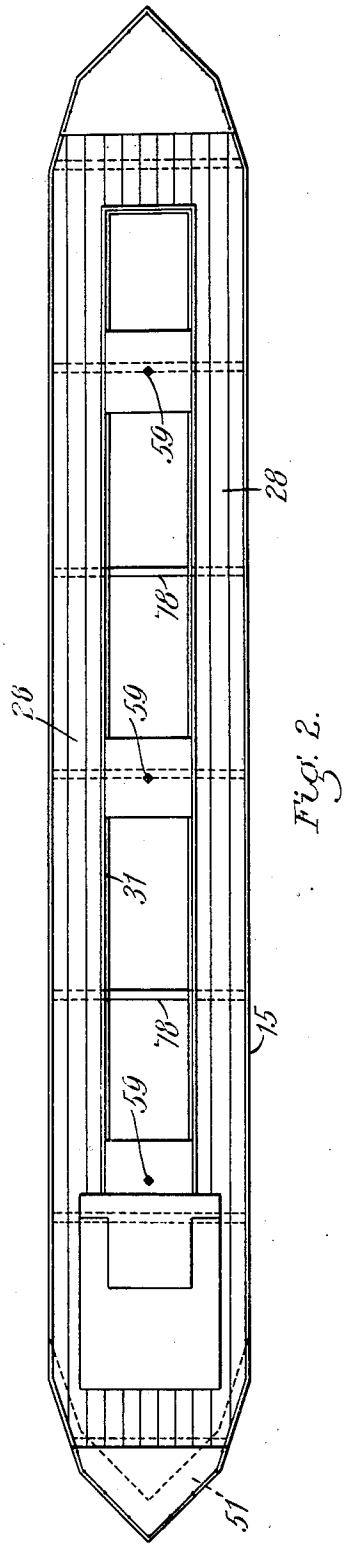


Fig. 2.

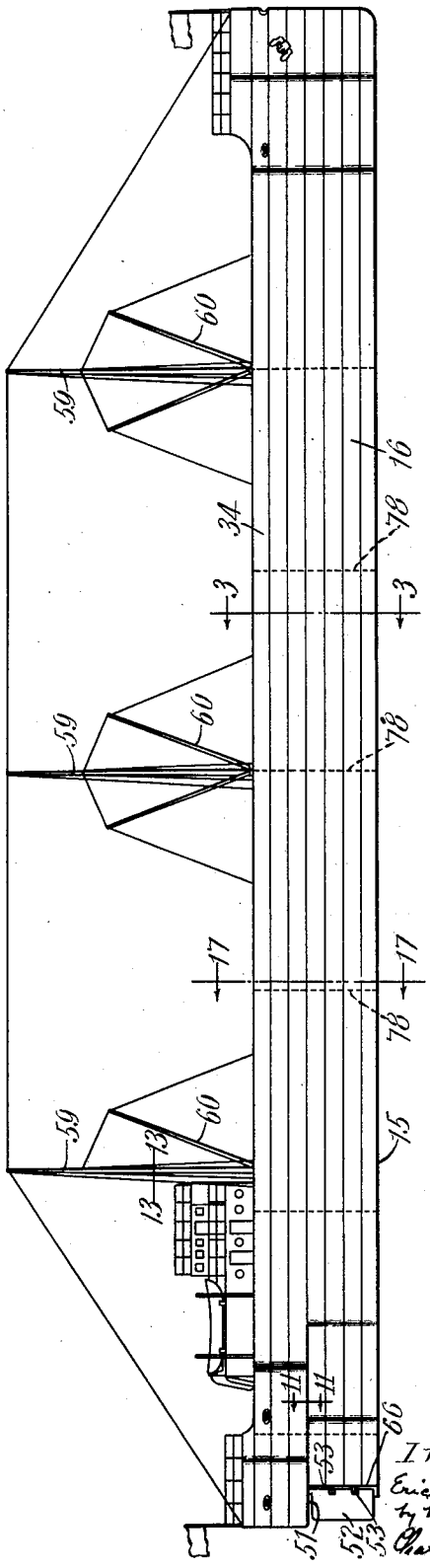


Fig. 1.

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Charles S. Goodwin.

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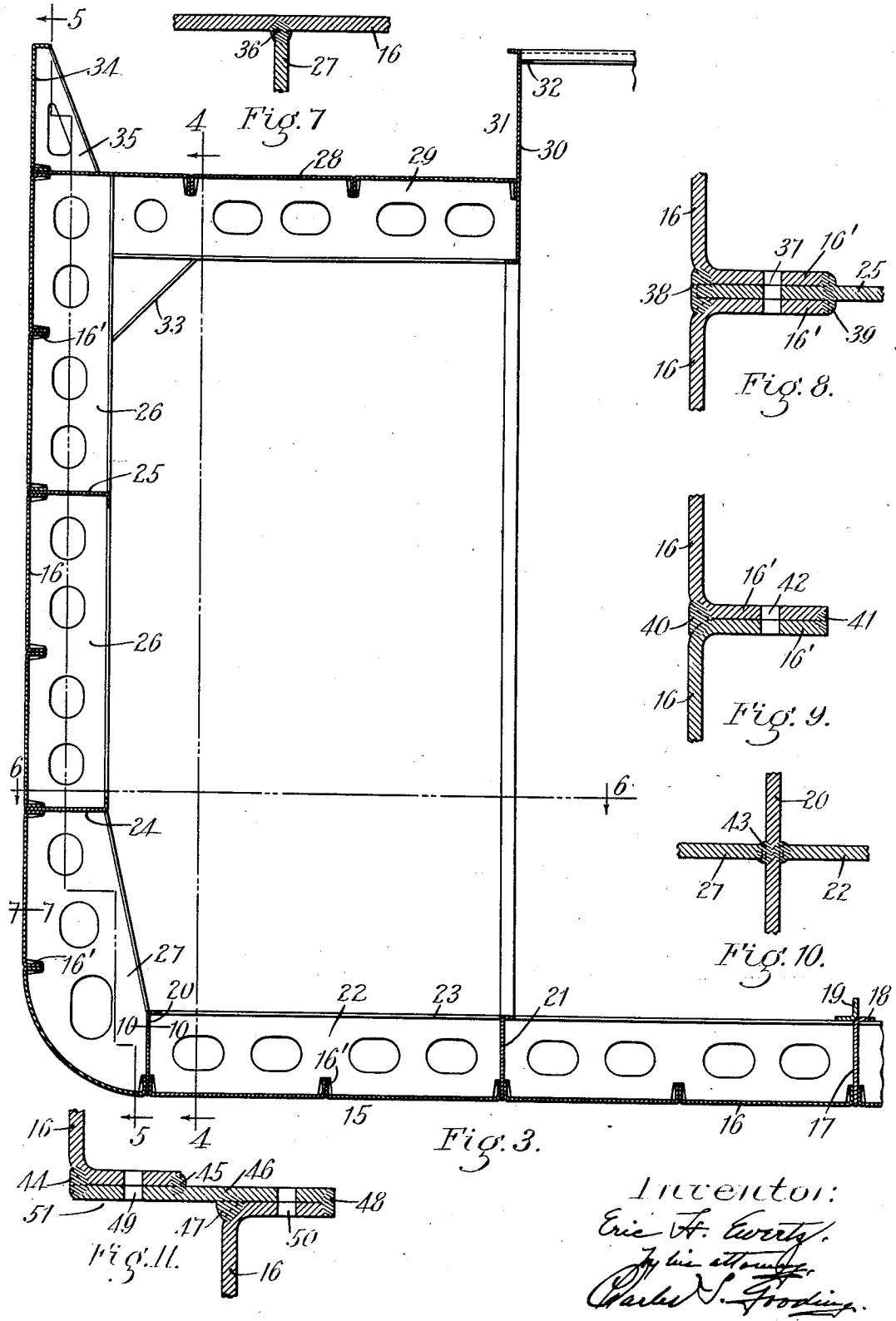
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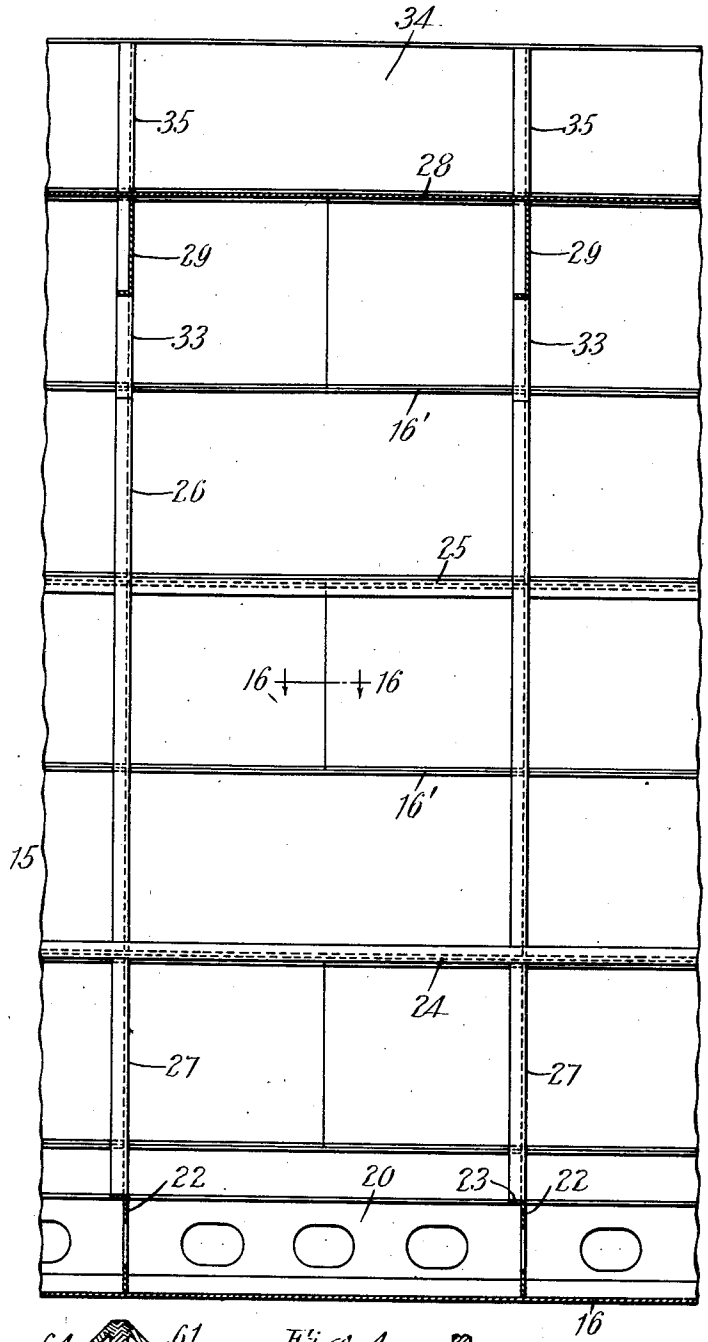


Fig. 4.

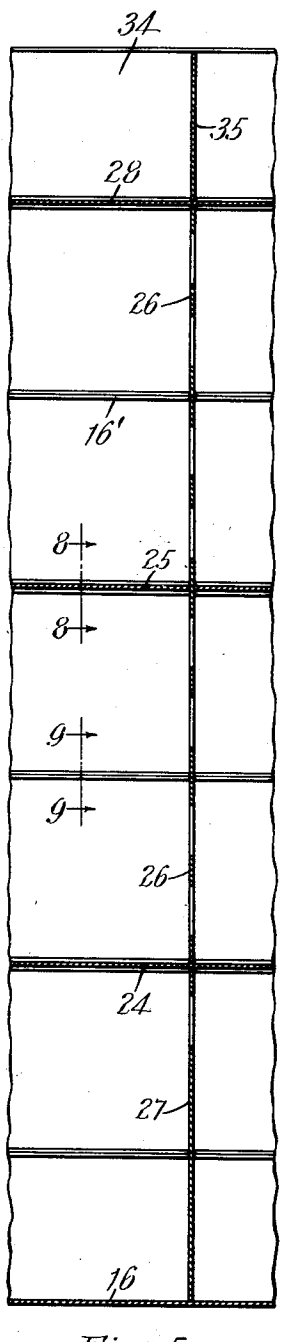


Fig. 5.

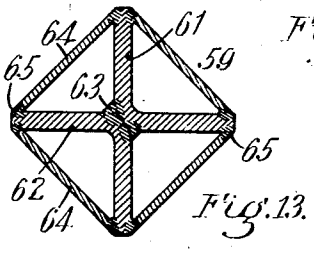


Fig. 13.

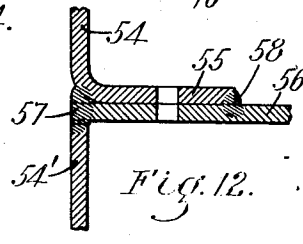


Fig. 12.

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5 SHEETS—SHEET 4.

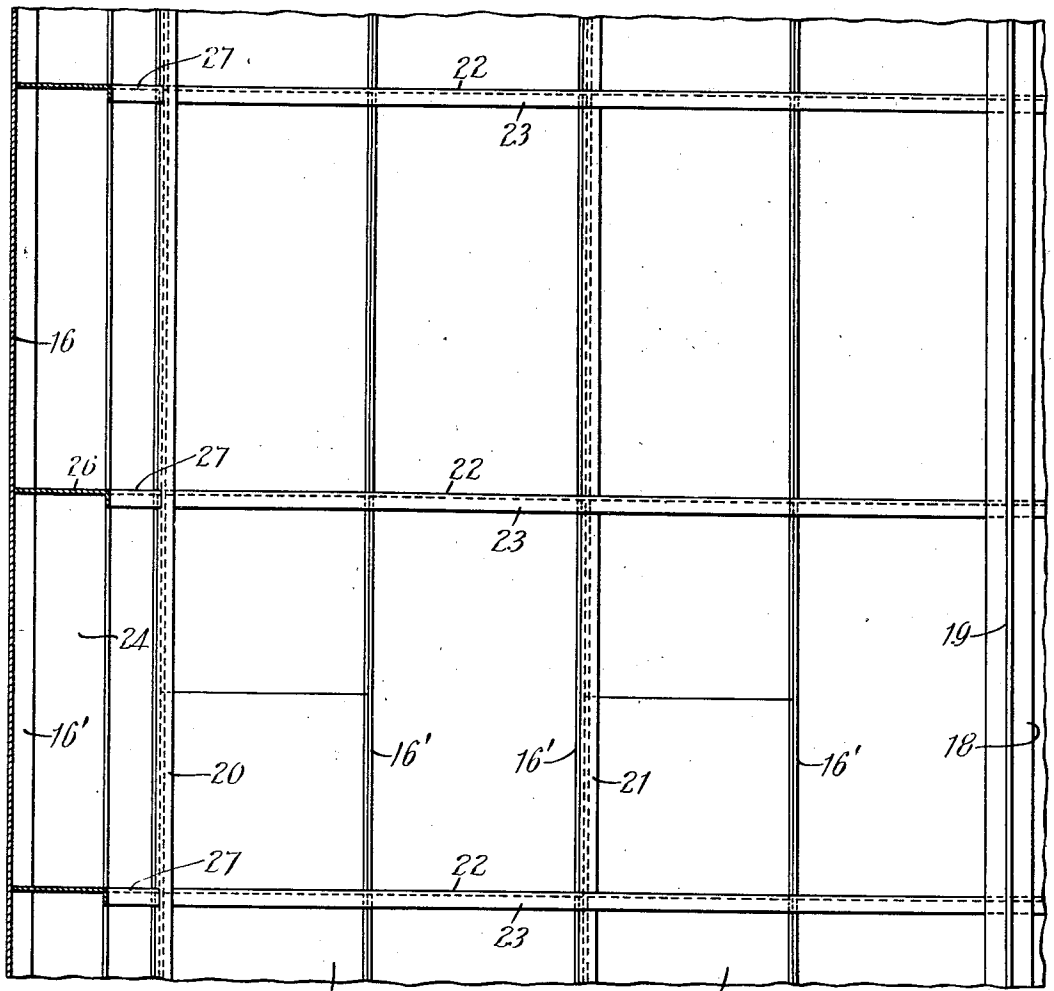


Fig. 6.

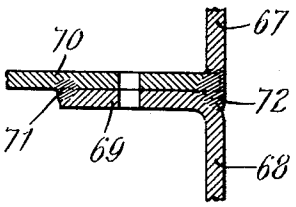


Fig. 14.

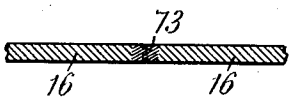


Fig. 16.

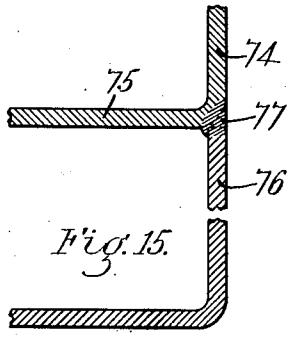


Fig. 15.

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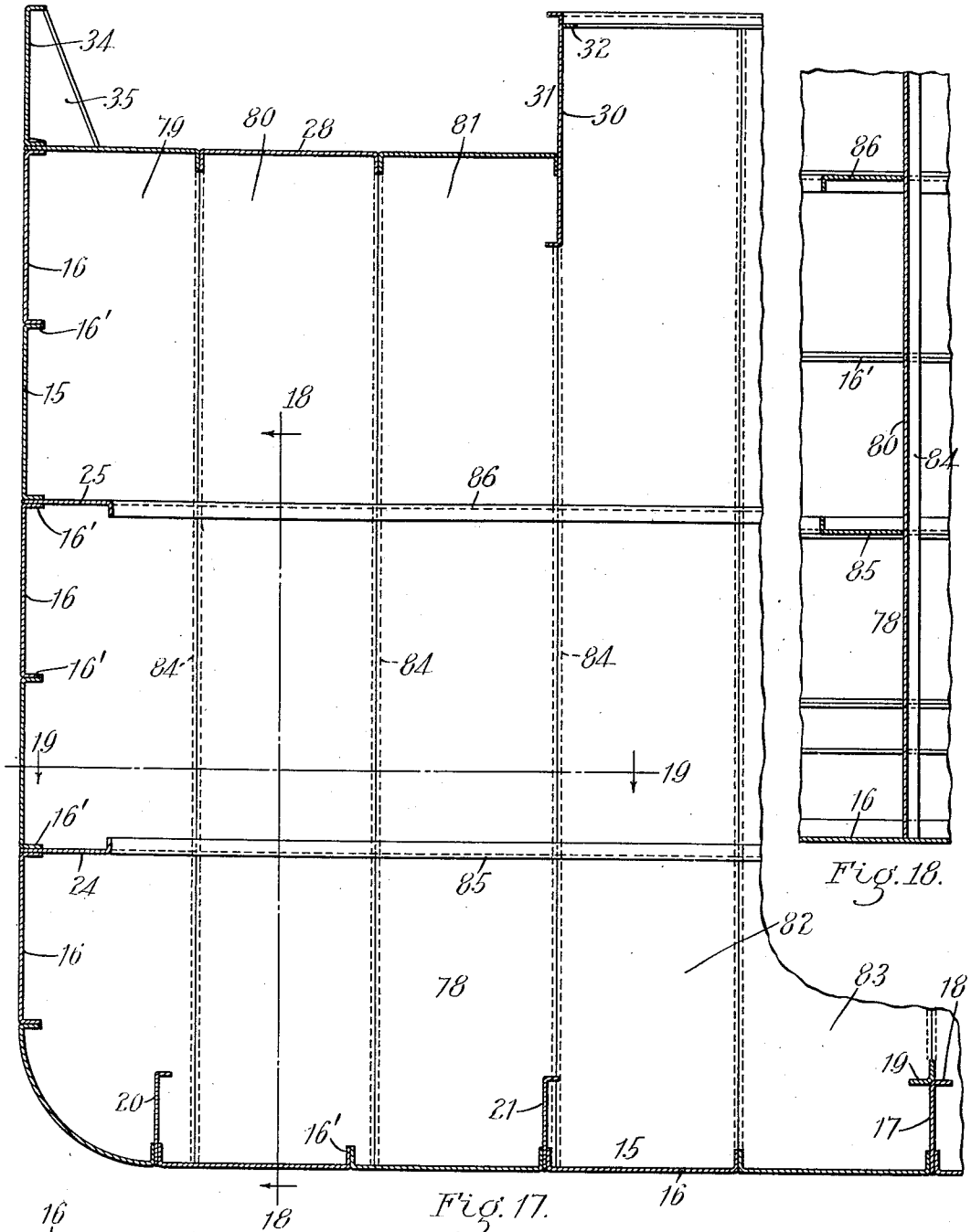


Fig. 17.

Fig. 18.

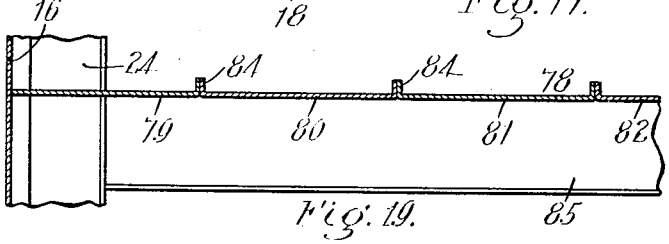


Fig. 19.

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UNITED STATES PATENT OFFICE.

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1,364,626. Specification of Letters Patent. Patented Jan. 4, 1921.

Application filed February 20, 1918. Serial No. 218,242.

To all whom it may concern:

Be it known that I, ERIC H. EWERTZ, a citizen of the United States, residing at Quincy, in the county of Norfolk and State of Massachusetts, have invented new and useful Improvements in Vessels, of which the following is a specification.

This invention relates to an improved vessel of the type known as "barge," the object of the invention being to provide a vessel of large carrying capacity and made of channeled or flanged steel which can be manufactured at a comparatively small cost and in a comparatively short time, the outer shell of the vessel being formed of metal channel or flanged plates, preferably steel, extending from the bow to the stern of the vessel and with the flanges on the channels projecting inwardly, said channel plates constituting a complete water-tight shell, the same being electrically welded together.

In addition thereto the invention contemplates reinforcing and strengthening said channel plate shell by means of longitudinally extending keelsons on the bottom of the vessel and by means of longitudinally extending side stringers on the opposite sides of the vessel, and furthermore said vessel is strengthened by means of transversely extending floor plates on the bottom of said vessel and vertically disposed plates extending transversely of said shell plates on the opposite sides of said vessel. All of the plates referred to are preferably flanged. The deck is also formed of channel plates strengthened by transversely extending flanged web plates. Flanged brackets are also interposed where desirable to lend strength to the structure.

It will be understood that the hull of the vessel is constructed entirely of flanged metal plates electrically welded together so that in the completed structure the plates are practically integral with each other, and by this construction a very strong and light vessel is obtained at a comparatively small expense. The flanged plates are formed of sheet metal rolled out in a manner well known to those skilled in this art. Great quantities of the plates can be produced in a short time and with absolute accuracy.

While the vessel of my invention is particularly adapted to that type of vessels known as "barges," I do not wish to be understood as limiting my invention to any particular type of vessel, as the same may be used in the construction of other types of vessels than barges with equally desirable results.

The invention consists of a vessel formed as hereinafter described and particularly as set forth in the claims.

Referring to the drawings:

Figure 1 is a side elevation of a vessel constructed in accordance with my invention.

Fig. 2 is a somewhat diagrammatic plan view of the same, the masts, booms and rigging being omitted.

Fig. 3 is an enlarged sectional elevation taken on line 3—3 of Fig. 1.

Fig. 4 is a sectional elevation taken on line 4—4 of Fig. 3.

Fig. 5 is a sectional elevation taken on line 5—5, Fig. 3.

Fig. 6 is a sectional plan taken on line 6—6, Fig. 3.

Fig. 7 is a detail section on line 7—7 of Fig. 3 and illustrates the construction of a joint between the shell and web frame at this point, the same construction of joints being applicable oto joints between web frames and stringers, floor plates and keelsons, web plates to hatch coaming and bulwarks to brackets and the like.

Fig. 8 is a detail section taken at line 8—8, Fig. 5, and illustrates the construction of joint between flanged shell plates and keelsons and between stringers and shell plates.

Fig. 9 is a detail section taken at line 9—9, Fig. 5, and illustrates the construction of joint between flanged plates, such, for example, as the shell plates.

Fig. 10 is a detail section taken on line 10—10, Fig. 3, and illustrates the construction of joint between stringers and web frames and the floor plates and keelsons.

Fig. 11 is a detail section taken at line 11—11, Fig. 1, and illustrates the construction at the stern to form a space for the rudder.

Fig. 12 is a detail section illustrating a modified form of joint for the shell plating at the deck, stringers and keelsons, being a modified form of the joint illustrated in Fig. 8.

Fig. 13 is a transverse section of one of the masts taken on line 13—13, Fig. 2.

Fig. 14 is a detail section illustrating a modified form of joint for the shell plating at the deck, stringers and keelsons.

Fig. 15 is a transverse section illustrating a modified form of joint and shell plates.

Fig. 16 is a detail section taken on line

16—16, Fig. 4, illustrating the joint between the adjacent ends of two shell plates.

Fig. 17 is a sectional elevation taken on line 17—17, Fig. 1.

Fig. 18 is a sectional elevation taken on line 18—18, Fig. 17.

Fig. 19 is a sectional plan taken on line 19—19, Fig. 17.

Like numerals refer to like parts throughout the several views of the drawings.

In the drawings, the outer shell 15 of the vessel consists of a plurality of channel plates 16, the flanges 16′ on said plates extending inwardly and being fastened securely together to make water-tight joints by electric welding. The channel plates which extend along the sides and bottom of the vessel each consists of one continuous piece extending from the bow to the stern of the vessel. Each of these channel plates is, in the completed structure, a continuous piece, although they are each made from a plurality of sections of channel plate with their ends butted and electrically welded together, and the word "continuous" throughout the specification and claims, where it applies to shell plates, keelsons, side stringers and deck plates, is used in this sense, viz., that the piece is continuous although formed of a plurality of pieces welded together. The butted ends of said sections of channel plates in one of the continuous channel plates extending from the bow to the stern of the shell of the vessel are out of alinement with the similar butted ends of the channel plates above and below the same, that is, the butted ends of the sections of channel plates forming each continuous piece break joints with the butted ends of the sections of channel plate forming the continuous channel plates above and below the same as illustrated in Fig. 4.

In Fig. 16 is illustrated two sections of a channel plate 16 with their butted ends electrically welded together at 73.

A continuous flanged keelson 17 extends from the bow to the stern of the vessel and projects between the flanges of two adjacent channel plates 16 to which it is electrically welded in a manner illustrated in Figs. 3 and 8. This keelson is also formed of a plurality of flanged metal plates with their ends butted and welded together to form one continuous keelson. The keelson 17 has a horizontal flange 18 along its upper edge and is still further strengthened by an angle plate 19 which is welded thereto.

Similar continuous keelson plates 20 are provided at each side of the vessel and between the continuous keelsons 17 and 20 are provided intercostal keelsons 21. Each of said keelsons has a flange extending along its upper edge and is interposed, at its lower edge portion, between the flanges of adjacent channel shell plates.

In order to still further strengthen the bottom of the vessel, floor plates 22 are provided which extend transversely of the keelsons and are electrically welded along their lower edges to the channel plates 16 and at their ends are also welded to the keelsons where they abut against or intersect the same. The floor plates 22 have a horizontal flange 23 thereon.

Each side of the vessel is strengthened by means of a continuous side stringer 24 and intercostal side stringers 25. Said side stringers are provided with flanges along their inner edges and their outer edge portions project between flanges on adjacent shell flanged plates 16 and are electrically welded thereto, as illustrated in Figs. 3 and 8.

The sides of the vessel are still further strengthened by means of flanged web frames 26 and 27. The web frames are welded along their edges to the channel shell plates and are also welded at their ends to the side stringers.

The deck is formed by a plurality of continuous channel metal plates 28, the flanges on said deck plates extending downwardly and being welded together. The deck is strengthened by means of web plates 29 which are welded along their upper edges to the inner faces of the channel deck plates. Said web plates 29 are also welded at one end to the flanged side web frames 26 and at the opposite end to a channel plate 30 which extends above the deck to form a coaming 31. The coaming has a flat bar 32 welded to the inner face thereof adjacent its upper edge to support the hatch. Where the coaming does not occur the web plates which support the deck extend entirely across from one side of the deck to the other and are welded at their ends to the flanged side web frames 26.

The web plates 28 and flanged web frames 26 are further strengthened and joined together by means of flanged brackets 33 which are welded to said web plates and web frames along their meeting edges.

The bulwarks 34 are also formed of channel plates extending the full length of the vessel from the bow to the stern thereof and are strengthened laterally by means of flanged bulwark brackets 35 which are welded to the bulwark plates and to the deck plates where they abut against the same.

The manner of welding the edge of the web frame 27 to the shell plate 16 is illustrated in detail in Fig. 7, in which 36 is the welded joint. This particular construction of joint is to be employed between the shell plates 16 and web frames 26, 27 and also where the web frames 26, 27 are welded to the stringers 24, 25 and the floor plates 22 to the keelsons 17, 20, 21, the web plates 29 to the hatch coamings 31, the bul-

warks 34 to the brackets 35 and in any joint where the edge of one plate abuts against the face of another plate.

In Fig. 8 is illustrated in detail the form of joint employed between the flanged shell plates 16 and the side stringers 24, 25 and also between the shell plates 16 and the keelsons 17, 20 and 21, or in any joint where it is desired to join together flanged shell plates with another plate interposed between the flanges of said shell plates.

As illustrated in Fig. 8 a hole 37 is provided which extends through the flanges of the shell plates 16 and through the stringer 25. This hole is to provide means for temporarily fastening the plates 16 and stringer 25 together prior to the welding operation. These holes can be plugged and welded subsequently to the joint welding operation where a water-tight joint is required. The shell plates 16 and the stringer 25 are welded together at 38 and 39, as illustrated in Fig. 8.

The construction of joint between the flanged plates, such as two of the shell plates 16, is illustrate in Fig. 9, in which the welded joints are illustrated at 40 and 41. For temporarily fastening the plates together prior to the welding operation, the flanges of the plates 16 are provided with holes 42 through which a bolt may be passed to temporarily join the flanges of the shell plates together during the welding operation.

In Fig. 10 is illustrated the construction of welded joint 43, where the end of a floor plate 22 is welded to one side of a keelson 20 and the edge of a web frame 27 is welded to the opposite side of said keelson. This construction of joint can be employed wherever the edges of two plates abut against the opposite faces of another plate interposed between such edges.

In Fig. 11 the construction at the stern is illustrated in which one of the channel plates 16 is welded at 44 and 45 to the upper face of a shelf plate 46 and another channel plate 16 is welded at 47 and 48 to the under face of said shelf plate 46. These channel plates and the shelf plate are also provided with holes 49 and 50 whereby the channel shell plates and the shelf plate may be temporarily attached to each other prior to the welding operation by means of bolts, the bolts after the welding operation being removed and the holes 49 and 50 being plugged and welded in order to insure water-tight construction.

It will be seen that the channel shell plates above the shelf plate 46 extend outwardly beyond the channel shell plates beneath the shelf plate 46 at the stern of the vessel to provide a space 51, Figs. 1 and 11, to receive the rudder 52 which is pivotally mounted at 53 upon a frame 66 fastened between the shell plates 16 where they are brought together at the stern of the boat and said rudder is operated by mechanism well known to those skilled in this art.

Instead of the shell plates 16 having flanges 16′ at the top and bottom edges thereof, said shell plates may be constructed with a flange at the bottom edge thereof only, as illustrated in Fig. 12, in which the shell plate 54 has an inwardly extending flange 55 at the bottom thereof and the shell plate 54′ has no flange at its upper edge. An intercostal side stringer 56 is interposed between the adjacent edges of the shell plates 54 and 54′ and said stringer and plates are welded together at 57, as seen in Fig. 12, and the flange 55 is welded to the stringer 56 at 58, this being a modified construction of the form of welded joint illustrated in Fig. 8.

Another modified construction is illustrated in Fig. 14 in which the shell plate 67 has no flange at the bottom edge thereof. The shell plate 68 has a flange 69 at the top thereof and a side stringer 70 is interposed between the lower edge of the shell plate 67 and the flange 69 of the plate 68, the parts being electrically welded together at the joints 71 and 72.

In Fig. 15 a modified construction of joint between two adjacent flanged shell plates is illustrated in which the shell plate 74 has a flange 75 along its lower edge and the upper edge of the shell plate 76 has no flange thereon. The adjacent upper and lower edges of the shell plates 74 and 76 are shown as electrically welded together at the joint 77.

The vessel is preferably subdivided into compartments by a plurality of bulkheads 78. The construction of said bulkheads is illustrated in Figs. 17, 18 and 19. Each of the bulkheads consists of a plurality of flanged plates 79, 80, 81, 82 and 83 on each side of the keelson 17, said bulkheads extending entirely across the vessel and being welded to the shell plates 16 of the vessel and also to the channel plates forming the outer shell of the vessel.

The bulkheads are stiffened laterally thereof by horizontal flanged plates 85 and 86 which extend horizontally across the bulkhead in alinement with the side stringers 24 and 25, respectively. Said stiffeners are welded to the vertically extending plates 79, 80, 81, 82 and 83 and at their ends are welded to the side stringers 24 and 25. It will be understood further that the bulkhead plates are welded to the keelsons where they abut against the same and to the angle plate 19.

The flanges 84 on the plates forming the bulkheads extend vertically and are welded

together. The bulkhead plates 79 are slotted to receive the keelsons 17, 21 and 20 and the flanges extending along the upper edges of said keelsons are cut away or slotted to allow the keelsons to enter the slots in the bulkhead plates. The flanges on the side stringers 24 and 25 are also cut to allow the bulkhead plates to pass thereon, said bulkhead plates being slotted to receive the side stringers. The horizontal flange on the angle plate 19 is also slotted where it intersects the bulkhead plates. The upper ends of the bulkhead plates are welded to the under faces of the deck plates 28.

The bulkhead plates are each preferably made of a plurality of flanged plates, their ends butted together and welded.

It will be seen that the bulkheads being welded to the bottom and side shell plates and to the deck plates of the vessel, and each bulkhead extending from side to side of the vessel, not only divide the vessel into compartments but also greatly strengthen the same laterally.

The vessel is provided with masts 59 and booms 60, said masts and booms being preferably constructed as illustrated in Figs. 1 and 13, viz., by two pieces of flanged plates 61 and 62 which are welded together at 63. Said masts and booms are still further strengthened by means of flat iron braces 64 which are welded at their ends at 65 to the flanged plates 61 and 62.

The different parts of the vessel hereinbefore described may be welded together either by a continuous welding joint or they may be welded together in spots, the welded spots being about three inches apart. The preferred method of welding the parts together is that well known to those skilled in the art as "arc" welding.

In building the vessel hereinbefore described, the keelsons 17, 21 and 20, the channel plates 16 and the floor plates 22 are first bolted together and tied with ribbands extending longitudinally of the keelsons in a manner well known to those skilled in this art. The side web frames 27 and 26 and side stringers 24, 25 are next assembled, being joined together by bolts, and the shell plates temporarily affixed thereto by bolts. The different joints are welded together, as hereinbefore described, on the bottom and sides of the vessel, the final work being, so far as the hull of the vessel is concerned, to assemble the web plates 29, deck plates 28 and channel plates 30 forming the coaming, all of these latter being temporarily bolted together and then welded as hereinbefore described.

In the foregoing specification the preferred construction has been described, but it is evident that without departing from the spirit of my invention the flanged shell plates may have their flanges bolted together, or to the stringers 24, 25 and keelsons 17, 20 and 21. In such case, however, the flanged plates 16 and the flanged keelsons and side stringers would be made in continuous pieces from a plurality of pieces by butting the ends together and electrically welding the same as hereinbefore described.

It will be seen from the foregoing specification that a water-tight outer shell for a vessel is formed by a plurality of flanged sheet metal plates welded together, each of said sheet metal plates preferably extending from the bow to the stern of the vessel, and that said water-tight outer shell is strengthened laterally by means of keelsons along the bottom of the vessel, by means of side stringers along the sides of the vessel, and further strengthened by means of plates extending transversely to said keelsons and side stringers, the whole being welded together to form a vessel of flanged sheet metal members practically integral with each other.

Furthermore, the bulkheads being formed of plates welded together and being welded around their edges to the flanged shell plates forming the sides and bottom of the vessel and to the deck plates, side stringers and keelsons form water-tight compartments, so that any damage to the hull of the vessel, whereby a hole is made through the shell into one of the compartments, would leave the other compartments intact.

Having thus described my invention, what I claim and desire by Letters Patent to secure is:

1. A vessel, the outer shell of which embodies a plurality of metal plates, each plate having a single flange along one longitudinal edge thereof, the flanged longitudinal edge of each of said plates being welded to the non-flanged longitudinal edge of the plate adjacent thereto.

2. A vessel, the outer shell of which embodies a plurality of metal plates, each having a single flange along one longitudinal edge thereof, the flanged longitudinal edge of each of said shell plates being welded to the non-flanged longitudinal edge of the shell plate adjacent thereto, the ends of said shell plates abutting and being welded together, so that each of said flanged plates extends in one piece from the bow to the stern of the vessel.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ERIC H. EWERTZ.

Witnesses:
CHARLES S. GOODING.
SYDNEY E. TAFT