Dec. 3, 1957 S. P. KELLY 2,814,810

METAL BOAT

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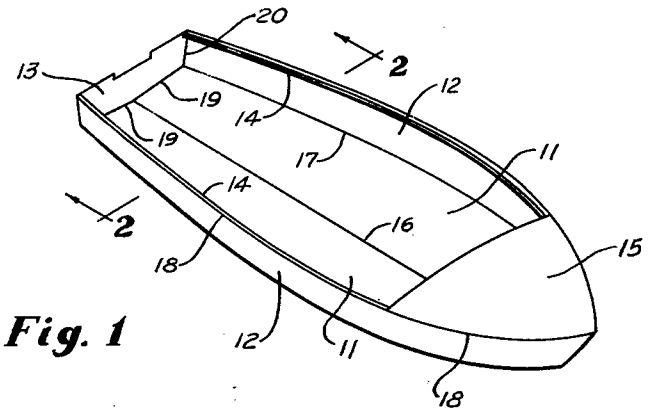


Fig. 1

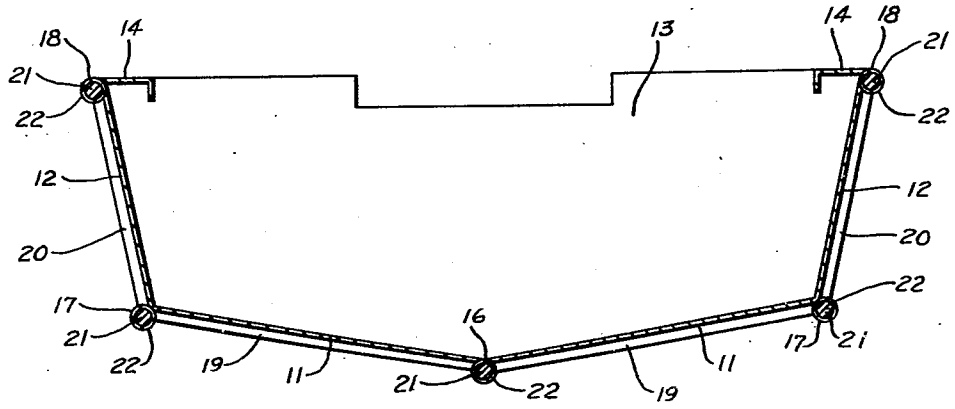


Fig. 2

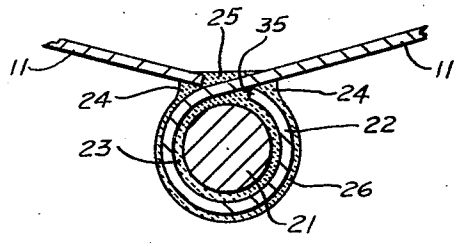


Fig. 3

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Fig. 4

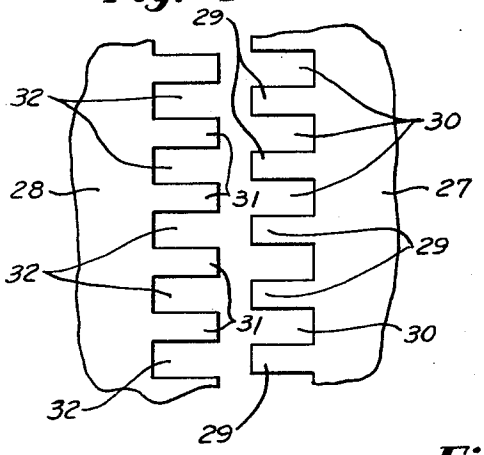


Fig. 5

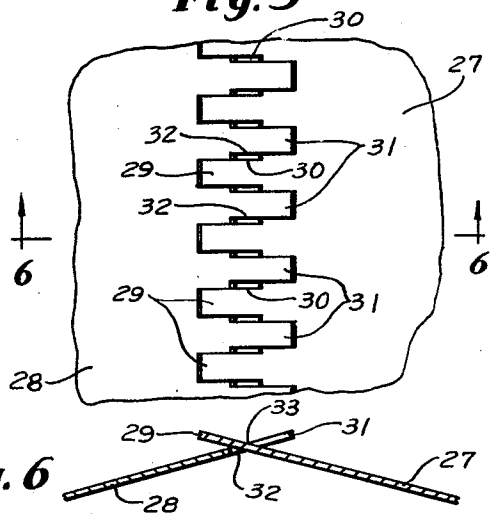


Fig. 6

Fig. 7

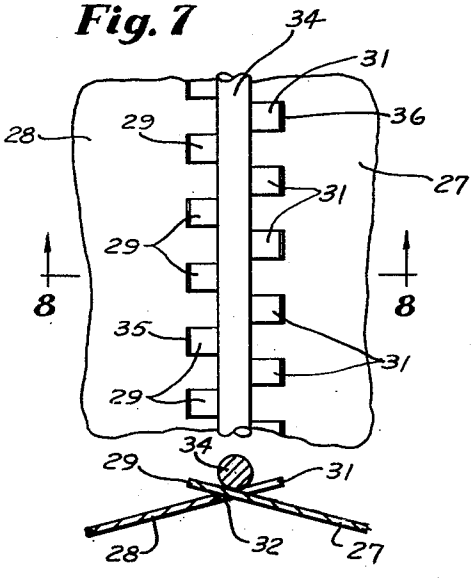


Fig. 8

Fig. 9

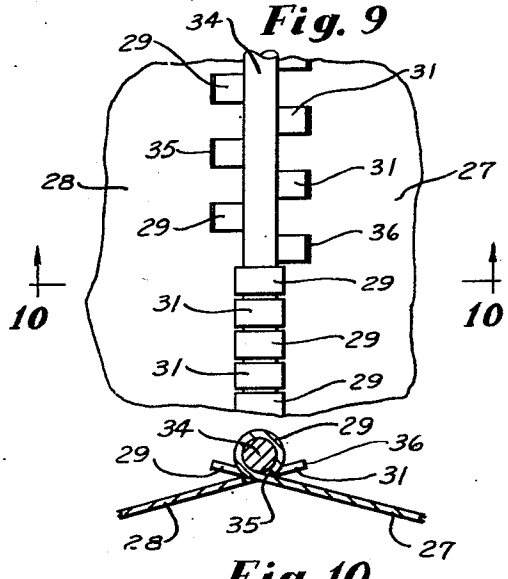


Fig. 10

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METAL BOAT

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Application April 6, 1955, Serial No. 499,601

6 Claims. (Cl. 9—6)

My invention relates to metal boats, and to the method of making metal boats.

In the manufacture of small metal boats it has been common practice to make these of a plurality of sheet metal sections that are riveted together, the seams that are riveted usually being along the keel and the chines of the boat. When such a boat is subjected to rough water in climbing over the crest of one wave and diving into the trough of the next wave, the stress and strain on the seams along the keel and chines cause the rivets to work loose and soon the boat begins to leak. It is the principal purpose of my invention to provide a boat construction in which such use of rivets is avoided and such leakage is avoided.

While my invention is particularly applicable to sheet metal boats, it is also adapted for use in providing a liquid tight seam in a metal body between the metallic sections thereof that will not loosen and leak even though subjected to stresses that would cause a riveted joint to leak. It is adapted for use in curved seams as well as straight seams and can be used in structures in which the seam is either on the convex or the concave side of the structure. In a metallic boat structure the seams are preferably on the outer side next to the water.

More specifically my invention comprises a seam or joint between the edges of a pair of sheet metal members comprising a stiffening member, which is preferably in the form of a rod-like member, and tubular ears on the marginal edges of the sections embracing and soldered to the stiffening member, such as the rod-like member. This results in a rigid structure that is braced or stiffened by the seams and which will not work loose so as to result in any leakage in the seam.

More specifically my invention comprises a sheet metal structure in which a pair of sheet metal members are joined at their adjacent edges by seams that comprise a rod-like member that extends longitudinally of the seam with tubular ears on the edges of the sections embracing the rod-like member, the ears on one of the sections alternating longitudinally of the rod-like member with the ears on the other of said sections and being in close adjacency and said ears being secured in fixed position on the rod-like member by continuous beads of solder that extend lengthwise of the seam at such points as to rigidly connect the ears to each other and to the rod-like member and seal the joints between said rod-like member and ears and between the adjacent ears. In the case of a boat, said joint or seam is provided with a rod-like member and the ears on the exterior of the boat.

My invention further comprises a metallic boat structure made up of a plurality of sheet metal sections that comprise sections that extend longitudinally of the boat and a transom section at the stern of the boat, said longitudinal sections and said transom section being connected together by the above referred to seams at their adjacent edges, thus providing a keel by means of such a seam and chines and gunwales.

It is a further purpose of my invention to provide a method of making a liquid tight seam between adjacent edges of sheet metal members comprising notching said edges to provide uniformly spaced duplicate rectangular ears on said edges, interfitting the ears on the adjacent edges of the sheets with the sheets placed at an oblique angle to each other so that said ears are in upwardly divergent relation to provide a V-shaped seat for a stiffening member, which seat extends lengthwise of the interfitted edges, placing a rod on said seat so as to be supported thereby and progressively bending alternately the ears on the sheets in opposite directions around the rod so as to form tubular sleeve-like members embracing the rod, and soldering the joint between the rod and ears so as to provide a liquid tight joint between both the rod and the ears and the adjacent ears along the rod.

Other objects and advantages of my invention will appear as the description of the drawings proceeds. I desire to have it understood, however, that I do not intend to limit myself to the particular details shown or described, except as defined in the claims.

In the drawings:

Fig. 1 is a perspective view of a boat made in accordance with my invention.

Fig. 2 is a transverse sectional view thereof taken on the line 2—2 of Fig. 1 on an enlarged scale.

Fig. 3 is a fragmentary sectional view of one of the seams on still a larger scale.

Fig. 4 is a fragmentary plan view of a pair of sheet metal sections, showing the first step in the making of the liquid tight seam between the sections.

Fig. 5 is a view similar to Fig. 4, showing the second step in my method of making a seam.

Fig. 6 is a section taken on the line 6—6 of Fig. 5.

Fig. 7 is a view similar to Fig. 4, showing the third step in my method.

Fig. 8 is a section taken on the line 8—8 of Fig. 7.

Fig. 9 is a view similar to Fig. 4, showing the fourth step of my method partly completed, and

Fig. 10 is a section taken on the line 10—10 of Fig. 9.

Referring in detail to the drawings, in Figs. 1 and 2 a boat is shown that is made up of a pair of longitudinally extending bottom sheet metal sections **11**, a pair of longitudinally extending side sheet metal sections **12**, a transom **13**, gunwales **14** and a deck **15**. The sections **11** are connected together at their longitudinally adjacent edges by means of a seam **16** made in accordance with my invention, which seam comprises the keel of the boat, and the side sections **12** are connected with the bottom sections **11** by means of seams **17** that comprise the chines of the boat, and the gunwales **14** and side sections **12** are connected together by means of seams **18**, said seams **18** also connecting together the deck **15** and the side sections **12**. Seams **19** and **20** connect the ends of the sections **11** and **12** with the transom **13**.

All of the seams **16**, **17**, **18**, **19** and **20** are made in the same manner, each of said seams comprising a rod-like member **21** extending longitudinally thereof and tubular ears **22** on the adjacent longitudinal edges of the sheet metal sections **11**, **12**, **13**, **14** and **15** closely embracing the rod-like member **21**. All said seams are soldered in a manner to be described below so that a layer of solder **23** extends around the rod-like member **21** and between said member and the inner faces of the ears **22** so as to provide a liquid tight joint between said ears **22** and rod-like member **21** and firmly secure said ears against movement on the rod-like member. A continuous bead of solder **24** is provided on each side of the joint between the sheet metal sections that are joined together and the ears **22**, such solder being shown between the sheet metal sections **11** and the ears **22** in Fig.

3, but is provided between all of the sheet metal sections and the ears 22 adjacent the same. Also a bead of solder 25 is provided on the interior of the boat at each seam in the valley between the sheet metal sections that extend at an oblique angle to each other, the solder also extending, as will be obvious from Fig. 3, from the bead 25 into the joint between the sections 11 and the ears 22 to flow downwardly into the very narrow space between the ears 22 and the rod 21, as shown at 23. The exterior of the joint is also provided with solder, as indicated at 26, around the outside of the ears 22 and between the adjacent edges of adjacent ears. Thus each of the seams is not only longitudinally stiffened and rigid, but is liquid tight.

The method of making the seams is illustrated in Figs. 5 to 10 inclusive, and in Fig. 3. In Fig. 4 fragmentary portions of a pair of sheet metal sections 27 and 28 are shown. These can be any pair of sections 11, 11 and 12, 12 and 14, 12 and 15, 11 and 19 or 12 and 20, the numerals 27 and 28 being applied to the sections, as the method is not only applicable to any particular sections of a boat, but to provide a rigid liquid tight joint between any pair of sheet metal sections wherever this may be desired. The section 27 is provided with a notched edge providing duplicate rectangular ears 29 thereon uniformly spaced along the length of said edge and alternating with rectangular notches 30 lengthwise of said edge. The notches 30 are slightly wider than the ears 29, the difference in width being somewhat exaggerated in Figs. 4, 5, 7 and 9 in order to more clearly illustrate the fact that there is a difference in the width of the ears and the notches. The adjacent edge of the sheet metal member 28 is similarly notched to provide rectangular ears 31 that are the same shape and size as the ears 29, and are uniformly spaced along said edge alternating with notches 32 that are of the same size as the notches 29.

The notched sheets 27 and 28 are placed in the relative position shown in Figs. 5 and 6 so that the ears 31 extend through the notches 30 in the sheet 27 and the ears 29 extend through the notches 32 in the sheet 28, said ears 29 and 31 extending upwardly above the bodies of the sheets 27 and 28 in the manner illustrated in Fig. 6 so as to diverge from each other in an upward direction and form a V-shaped seat 33 between the ears 29 and 31 that runs lengthwise of the seam. A stiffening member, such as the round rod 34, is next placed on the sheet formed by the ears 29 and 31, as shown in Figs. 7 and 8.

After the rod-like member 34 has been located in the seat formed by means of the ears 29 and 31, the ears are bent or curled around the rod-like member in the manner illustrated in Fig. 10. This is preferably done by bending an ear, such as the ear 29 on the sheet metal member 27, around the rod 34 in a clockwise direction, as illustrated in Fig. 10, so as to have the end edge 35 thereof in engagement with the face of the sheet 27, said ears 29 being made of such a length that they will extend snugly around the rod 34 with the end edge 35 thereof in engagement with the sheet on which the ear has been formed. Next a longitudinally adjacent ear 31 is similarly bent around the rod 34 in a counterclockwise direction so that the end edge 36 thereof is in engagement with the face of the sheet 28 and this bending of the ears around the rod-like members is continued, alternately bending the ears 29 and 31 around the rod 34 progressively lengthwise of said rod 34 to the end of the seam. It is immaterial whether an ear 29 or 31 is the first ear bent around the rod-like member 34 in this progressive alternate bending of the ears 29 and 31 around said rod-like member, this being dependent upon whether an ear 31 or an ear 29 is at the end of the seam at which the bending is first started.

If the sheets 27 and 28 are galvanized and a galvanized rod is used, the next step comprises applying full strength commercial muriatic acid to the surface of the joint with a small acid brush. By applying the muriatic acid to all of the exterior surfaces, sufficient of the acid will flow along the surfaces and between the adjacent ears and under the ears along the surface of the rod that it will contact the zinc coating sufficiently to attack the zinc, causing a foaming reaction, cleaning all of the surface ready for soldering. A hot soldering iron is then touched to the joint and at the same time a stick of solder is applied to the soldering iron to cause the solder to run down between the ears 22 and the rod 21, as shown in Fig. 3, the solder melting and flowing in all directions along the acid cleaned surfaces and penetrating the cracks between the ears and flowing between the ears and the rod, completely encircling the rod. This is continued along the seam so as to apply solder on the outer surface of the joint and longitudinally of the joint in the valley between the sheets, as shown at 25 in Fig. 3, and between said sheets and the ears on the sheets, as shown at 24 in Fig. 3.

Where stainless steel is used instead of galvanized steel, phosphoric acid or other special preparations can be used to clean the surface instead of the muriatic acid, and the soldering carried out in the same manner as above described, and the same joint produced. No foaming occurs where stainless steel is used, but the cleaning is accomplished in the same manner as above described and the solder is as effective as in the case of galvanized sheets and a galvanized rod. While the boat illustrated is shown as being of a certain cross sectional shape and having a deck thereon, obviously any other cross sectional shape of boat can be made in accordance with my method, as the sheet metal sections can be bent to any desired shape and the ears can be bent around the rod whether it is straight or curved. In connection with the illustration of the method, it is desired to call attention to the fact that due to the exaggeration of the difference in the width of the ears 29 and 31 and the notches 30 and 32, the ears 29 and 31 are shown as more widely spaced in Fig. 9 than in actual practice. Actually the ears 29 and 31 would be in closely adjacent side by side relation, leaving only a narrow crack between the same, through which the solder will penetrate to the interior of the joint.

What I claim is:

1. In a sheet metal boat construction, a plurality of longitudinally extending sheet metal sections connected together at their longitudinally adjacent edges including a keel comprising a rod-like member extending continuously longitudinally thereof and ears on the longitudinal edges of adjacent sheet metal sections extending around said rod-like member externally of said boat and soldered thereto in fixed liquid tight relation and in liquid tight relation to each other to provide a liquid tight seam extending longitudinally of said boat.

2. In a sheet metal boat construction, a plurality of longitudinally extending sheet metal sections connected together at their longitudinally adjacent edges and a transom connected to said sections at one end thereof, said sections being connected to each other and to said transom by seams comprising a rod-like member extending continuously longitudinally of each of said seams and ears on the longitudinal edges of adjacent sheet metal sections extending around said rod-like member externally of said boat and soldered thereto in fixed liquid tight relation and in liquid tight relation to each other to provide a liquid tight seam.

3. In a sheet metal boat construction, a plurality of longitudinally extending sheet metal sections connected together at their longitudinally adjacent edges including a keel, chines and gunwales, each comprising a rod-like member extending continuously longitudinally thereof and ears on the longitudinal edges of adjacent sheet metal sections extending around said rod-like member externally of said boat and soldered thereto in fixed liquid tight relation and in liquid tight relation to each other to

provide liquid tight seams extending longitudinally of said boat.

4. In a sheet metal boat construction, a plurality of longitudinally extending sheet metal sections connected together at their longitudinally adjacent edges including a keel comprising a rod-like member extending continuously longitudinally thereof and ears on the longitudinal edges of adjacent sheet metal sections extending around said rod-like member externally of said boat and soldered thereto in fixed liquid tight relation and in liquid tight relation to each other to provide a liquid tight seam extending longitudinally of said boat, and a continuous solder bead extending lengthwise of said seam on the inner side thereof.

5. In a sheet metal boat construction, a plurality of longitudinally extending sheet metal sections connected together at their longitudinally adjacent edges and a transom connected to said sections at one end thereof, said sections being connected to each other and to said transom by seams comprising a rod-like member extending continuously longitudinally of each of said seams and ears on the longitudinal edges of adjacent sheet metal sections extending around said rod-like member externally

of said boat and soldered thereto in fixed liquid tight relation and in liquid tight relation to each other to provide a liquid tight seam, and a continuous solder bead extending lengthwise of said seam on the inner side thereof.

6. In a sheet metal boat construction, a plurality of longitudinally extending sheet metal sections connected together at their longitudinally adjacent edges including a keel, chines and gunwales, each comprising a rod-like member extending continuously longitudinally thereof and ears on the longitudinal edges of adjacent sheet metal sections extending around said rod-like member externally of said boat and soldered thereto in fixed liquid tight relation and in liquid tight relation to each other to provide liquid tight seams extending longitudinally of said boat, and a continuous solder bead extending lengthwise of said seam on the inner side thereof.

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