Oct. 17, 1933. P. PRITCHARD 1,930,770

METAL BOAT CONSTRUCTION

Filed June 29, 1931 2 Sheets-Sheet 1

Fig. 1.

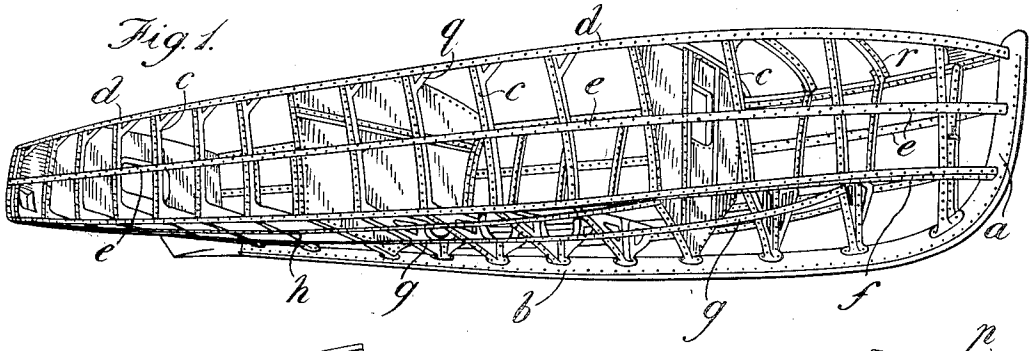


Fig. 3.

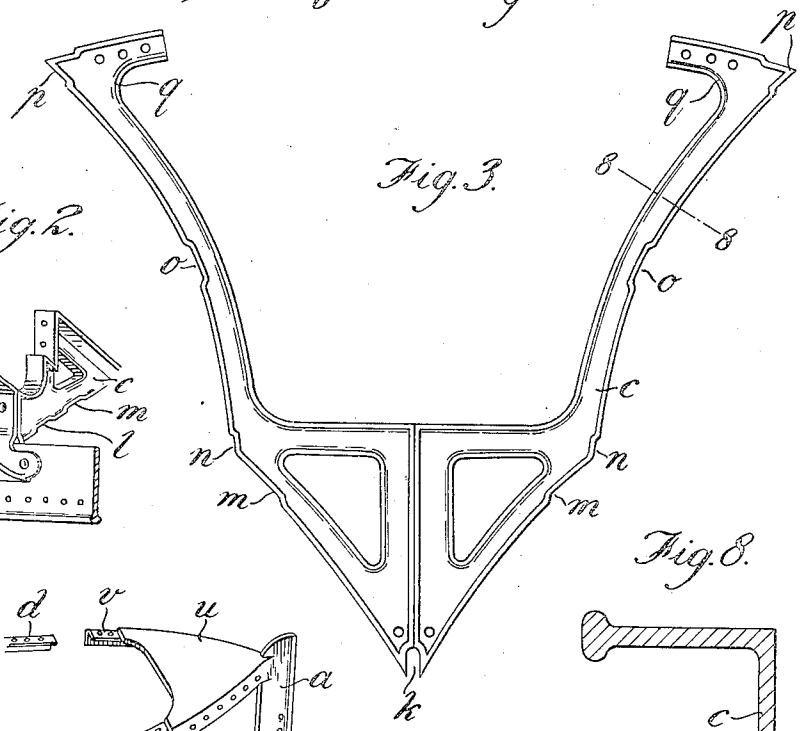


Fig. 2.

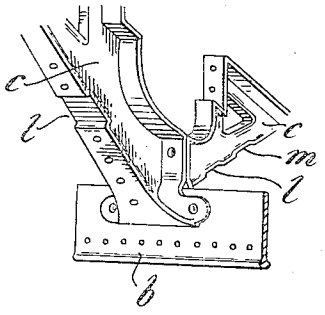


Fig. 8.

Fig. 6.

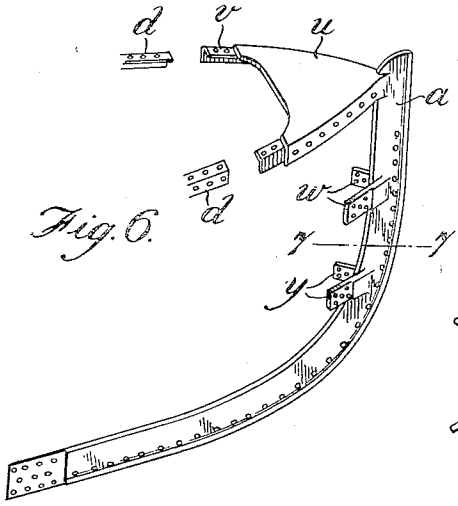


Fig. 7.

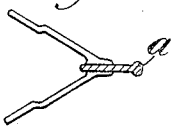
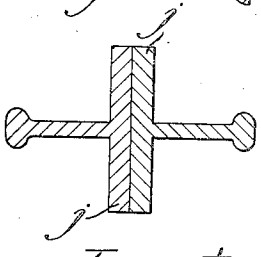


Fig. 10.



Inventor
Percy Pritchard
by Arthur Mills Nelson
Atty

Oct. 17, 1933. P. PRITCHARD 1,930,770

METAL BOAT CONSTRUCTION

Filed June 29, 1931 2 Sheets-Sheet 2

Fig. 9.

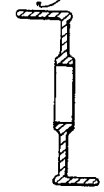
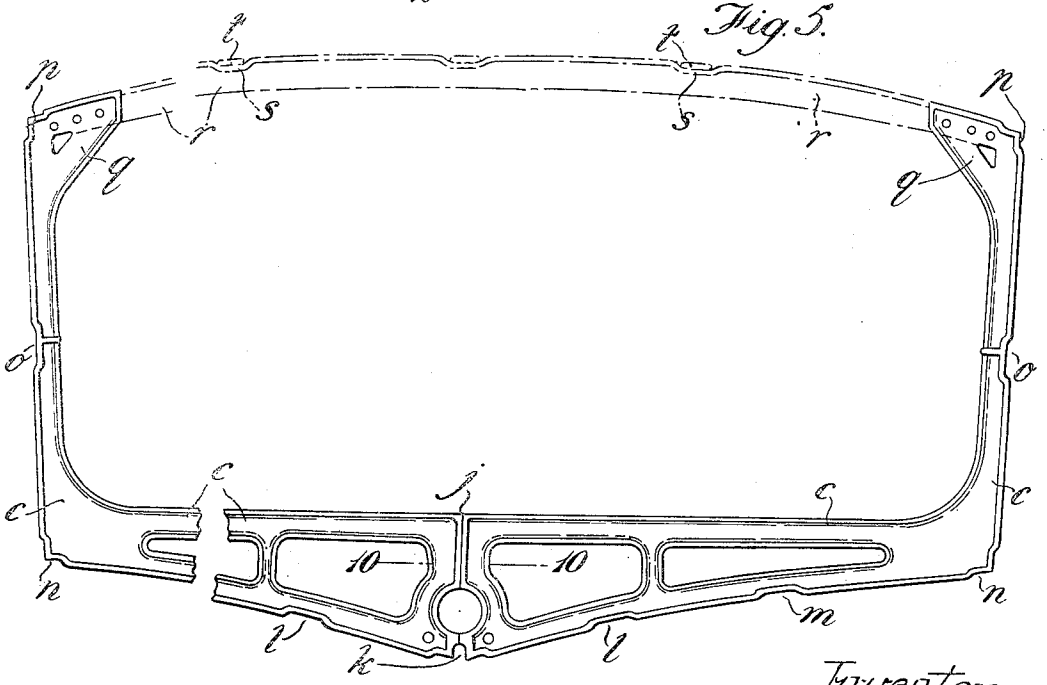


Fig. 4.

Fig. 5.



Inventor
Percy Pritchard
by Arthur Wm Nelson
Atty

Patented Oct. 17, 1933 1,930,770

UNITED STATES PATENT OFFICE

1,930,770

METAL BOAT CONSTRUCTION

Percy Pritchard, Smethwick, Birmingham, England, assignor of one-half to The Birmingham Aluminum Casting (1903) Company Limited, Smethwick, England

Application June 29, 1931, Serial No. 547,597, and in Great Britain August 9, 1930

6 Claims. (Cl. 114—79)

This invention relates to improvements in metal boat construction of the kind in which a metal plating is secured to a structural framework. The object of the invention is to produce a built-up metal boat having rigid structural members interlocked to form a strong metal skeleton onto which the metal sheeting or plating can be secured.

In accordance with the invention I form the ribs or stiffeners of the metal boat as castings in metal which include the rib or stiffener for the sides and bottom of the boat and provide for a keying connection with a keel member. The rib castings preferably provide the recesses and the keel preferably provides the projecting part of the keying connection, but this might be reversed. In addition to its keying provision, each rib casting is preferably provided with forwardly and rearwardly directed lugs at the point of connection to the keel so as to extend its bearing on the keel; also it is preferably recessed where each longitudinal stiffener or stringer will come.

Another characteristic feature of this built-up metal boat is a cast triangular breast hook on the stem of the keel and the provision of cast lugs on the stem. The breast hook receives the gunwale members on each side and is suitably stepped down or rabbeted to accommodate them; and the lugs are rabbeted or stepped down to receive the front ends of the stringer members which run along the sides of the boat and the chine longitudinal members respectively.

In the appended drawings:—

Figure 1 is a perspective view of a boat skeleton in accordance with the invention suitable for a motor boat.

Figure 2 is a detail view of the attachment of a cross-rib frame on the keel.

Figure 3 is an elevation of a cross-rib or stiffener frame of the kind employed in the part near the bow.

Figure 4 is a similar view of a cross-rib or stiffener frame employed near the middle part.

Figure 5 is a similar view of a cross-rib or stiffener frame employed toward the stern of the boat.

Figure 6 is a perspective view of the stem and breast hook before being secured in place.

Figure 7 is a section on line 7—7 of Figure 6.

Figure 8 is a section on line 8—8 of Figure 3.

Figure 9 is a section on line 9—9 of Figure 4.

Figure 10 is a horizontal section on line 10—10 of Figure 5.

In the drawings *a* is the stem or bow, *b* the main part of the keel, *c c* the ribs, *d* the gunwale members, *e* the main side stringers, *f* the chine bars, and *g h* are bottom stringers.

Each rib or stiffener *c* may be cast in one piece or two; but it is found most convenient to form them in two parts with meeting vertical connection flanges *j* in the middle, in the plane containing the keel *b* of the boat. It will be appreciated that the shape of the various ribs will differ to conform with the line of the hull at the various positions along it where the ribs will be located. The boat hull illustrated has a V bottom and we therefore cast the ribs so that they will be approximately V shape externally. The inner surface will be more U-shape so as to provide an approximately horizontal bearer portion at the middle for the reception of the inner flooring of the hull.

An important feature is the formation in the castings of a central recess *k* to receive, and key the rib *c* onto, the keel *b*. Another important feature is that on the outer surface at one or more places on each side of the centre of the bottom portion as at *l* and *m*, at each corner *n* where the bottom joins the upstanding side members of the rib, that is where the chine will be, at one or more places *o* in the outer edge of each upstanding side, and at the upper corner *p* of each upstanding side are cast recesses to accommodate the longitudinal metal stringer members *g*, *h* and *e* and the chine bars *f* and gunwale bars *d* respectively. These recesses are arranged in the outer edge or web of the rib in such a manner as to enable the bars *d e f g* and *h* when in place to be flush with the outer surface of the rib, leaving a smooth unbroken outer face for the reception of the sheet metal or metal plating forming the "skin" or walls of the boat proper. The stringer members *g h* and *e* for the bottom and the sides respectively will usually be flat metal bars so that their recesses *l*, *m*, *o* are rectangular in form, but at the corners *n* where the bottom joins the sides and *p* where the sides join the deck plating the recesses are angular to receive an angular section chine bar *f* and gunwale bar *d* respectively. At the upper end of

each upstanding side of each rib I preferably provide an integral upward and inwardly projecting knee piece *q* which forms a bracket at each side to receive the deck beams *r*. These will preferably be of angular or T section and will be separately formed. The deck beams will be similarly formed with recessed upper edges at one or more points *s* to accommodate deck stringers *t* so that the latter may be flush with the flange of each deck beam and leave the upper surface of the beam smooth for the reception of the deck sheeting or plating.

The rib frames where the locking or seating recess *k* occurs are each provided with fore and aft projecting lugs as clearly shown in Figure 2 so as to give a wider bearing on the keel member *b* and prevent any tendency of the rib to cant or twist relatively to the keel member. By means of these lugs the rib can be readily riveted or otherwise secured to the keel member.

A convenient section for the central part of the rib member is of Z section as shown in Figure 9 with the central or web portion at right angles to the top and bottom or flange portions. This provides a flat flange which forms the top of the middle portion of the rib on which the floor plates, motor carrying girders, and other parts may be secured. The upstanding side portions may be mainly angular in section, as shown in Figure 8, with the flange at the outer side of the rib while at the inner edge of the web a bulbous or slightly flanged section may be formed. The construction lends itself for easy casting and provides a rigid and strong structure.

With the object of providing a rigid bow assembly and in order to facilitate the attachment of the structural members on the stem I form this part *a* in one piece with a substantial part of the keel and on the upper part of it I cast or weld a breast hook *u* which forms the attachment for the gunwale structural members *d* on each side. The breast hook *u* is substantially triangular in plan and on each side a stepped-down or rabbeted part *v* is provided on which the angular or other suitable section gunwale member *d* can be riveted or otherwise secured.

In addition to the breast hook I cast on the stem two pairs of lugs *w* and *y* also rabbeted or stepped-down at the ends, one pair *w* serving to receive the stringer members *e* which form the part of the side structure of the boat and the lower pair serving to receive the chine longitudinal members *d*. This arrangement provides a very rigid and strong structure for the bow of the boat and it forms a simple and convenient method of attachment for the various longitudinal members mentioned. The breast hook projection is slightly rabbeted or shouldered down as is the stem so that the plating may be secured upon these members in a manner enabling it to be flush with the upper edge of the breast member and the outer edge of the stem. The keel and the stem are similarly rabbeted for the same purpose.

The attachment of the plating forms no part of this invention and may follow on any approved plan. As an example, it may be applied in sheets in two, three or more lengths along the boat, the sheets being butt-jointed and riveted. Each side sheet preferably is of a depth from the gunwale to the chine and each bottom sheet from the chine to the keel.

From Figure 1 it will be seen that the rib frames are variously shaped (Figures 3, 4, and 5 show three of these in elevation) and it must be obvious that so long as the external form is made to conform with the shape desired for the hull, and that it is recessed to form the locked connection points with keel and longitudinals, the frame admits of considerable modification to suit particular boat designs and requirements. For example, the openings for economizing metal and weight; or those for passing engine shafts, pump connections and the like; or the upper seating or bracket surfaces for flooring and the like may all be arranged as found most suitable for the particular hull under construction.

Two of the rib-frames, namely, one near the bow and one near the stern may be plated-in, as shown in Figure 1, and have bulkhead doors provided for openings in them so that watertight compartments may be formed in the well known manner. A similar plated rib frame is also shown amidships in Figure 1 at the rear of a compartment where the power unit will be disposed.

I claim:

1. A built-up boat hull comprising in combination a keel member, rib frames cast in light metal or light metal alloy with a central vertical recess for seating on the keel, lugs on the bottom of rib frames extending fore and aft with respect to the hull and bearing against each side of the keel, flanged edges on the rib frames having recesses formed therein to locate longitudinal structural members.

2. A built-up boat hull comprising a keel member, open rib frames each cast in two parts with central vertical meeting flanges by which they are united together at the bottom portion, there being a recess in the lower part of each meeting flange so that when the two parts are assembled and secured together the complete rib frame may engage the upper edge of the keel, surrounding flanges at the external edges of the rib frames having recesses formed therein to receive longitudinal structural members.

3. A built-up metal boat hull comprising in combination a keel member, rib frames cast in light metal or light metal alloy having means for locking them on the keel; a stem member cast separate from the keel and secured thereto, said stem having an integral breast hook at its upper end with means for receiving the longitudinal gunwale members and integral lugs on said stem for receiving other longitudinal structural members.

4. A built-up metal boat hull comprising in combination a keel member, rib frames cast in light metal or light metal alloy and having keying means for seating on and embracing said keel member to interlock said frames thereto without mutilating the section thereof, said frames being cast integrally with bracing means so as to be of girder like form, and said bracing means in the bottom portions of said frames forming transverse bearer or supporting members.

5. A built up metal boat hull comprising in combination a keel member and a number of rib frames cast in light metal or light metal alloy and interlocked with said keel against lateral canting independently of the securing means, said rib frames comprising cast members of girder like section having flanges externally directed and extending longitudinally of said hull for the attachment of longitudinal members and side plating, a deeper section in the bottom portions of said frames forming transverse bearer portions for receiving loads in the bottom of said hull.

6. A built up metal boat hull comprising in combination a keel member and a number of rib frames cast in light metal or light metal alloy and interlocked with said keel against lateral canting independently of the securing means, said rib frames comprising cast members of girder like section having flanges externally directed and extending longitudinally of said hull for the attachment of longitudinal members and side plating, a deeper section in the bottom portions of said frames forming transverse bearer portions for receiving loads in the bottom of said hull, and inturned integral bracket portions at the upper ends of said rib frames which receive cross bearers for the deck plating.

PERCY PRITCHARD.