

June 21, 1960

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2,941,216

KITS FOR PRODUCING BOAT HULL AND OTHER HOLLOW OBJECTS

Filed March 2, 1956

2 Sheets-Sheet 1

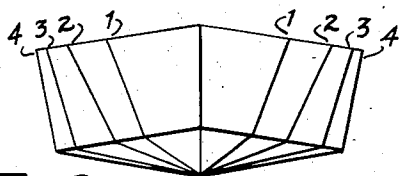
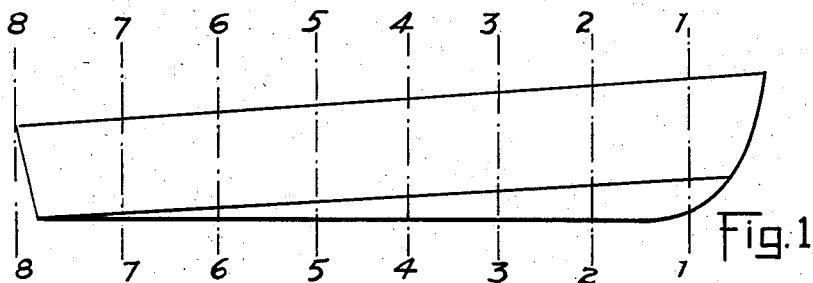


Fig. 2

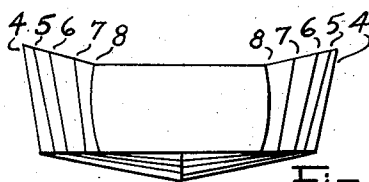


Fig. 3

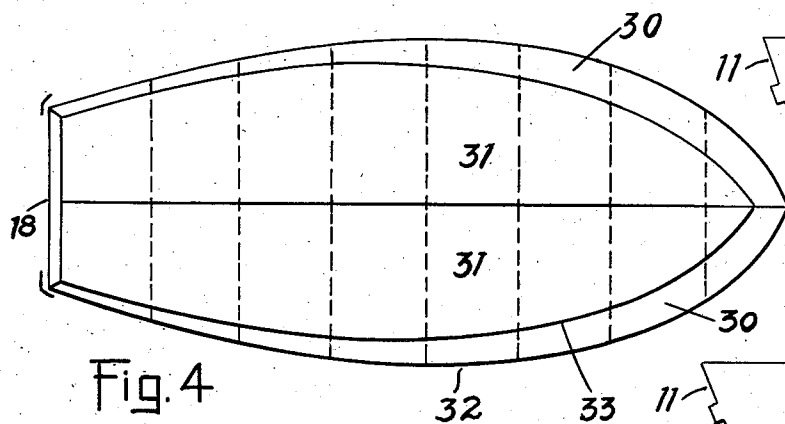


Fig. 4

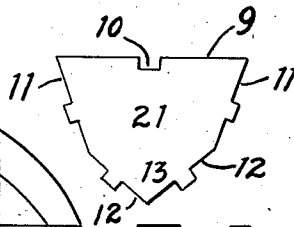


Fig. 5

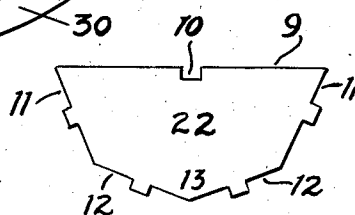


Fig. 6

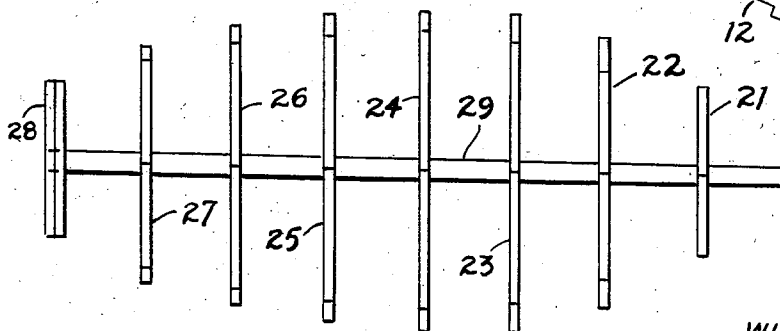


Fig. 7

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2 Sheets-Sheet 2

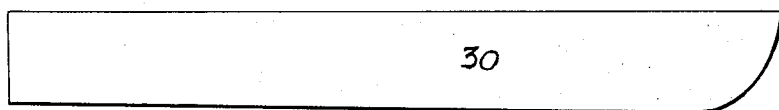


Fig. 8

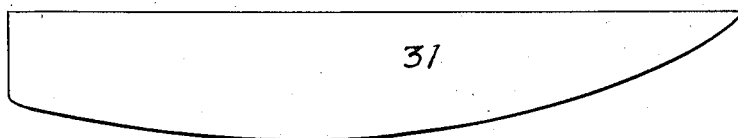


Fig. 9

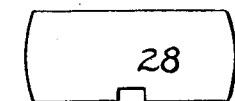


Fig. 10

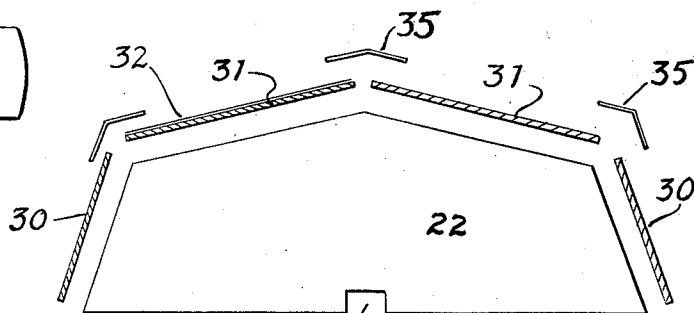


Fig. 11

Fig. 12

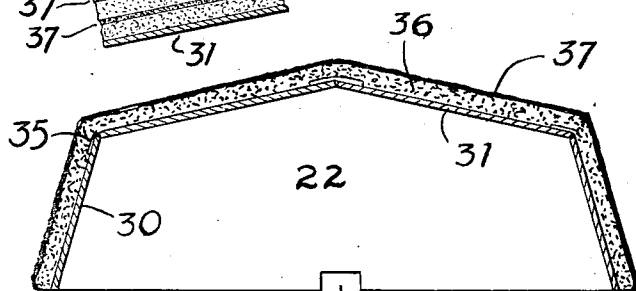
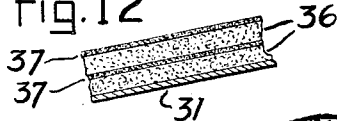


Fig. 13

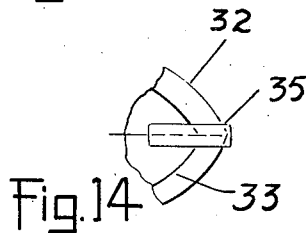


Fig. 14

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KITS FOR PRODUCING BOAT HULL AND OTHER HOLLOW OBJECTS

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1 Claim. (Cl. 9-6.5)

This invention is an improvement in kits for making boat hulls and other hollow bodies having a desired configuration, out of suitable plastic material containing fibre glass.

An important object of my invention is to provide a kit for producing the hull of a boat, and comprising parts that are capable of being assembled to serve as a form to which fibre glass, which is pliable, can be added and worked till the materials assume the shape of a hull and then hardened till it is smooth and finished throughout.

Another object is to provide a kit consisting of ordinary material, easy to obtain, such as cardboard, in pieces of the required outline, adapted to be bent and set up in juxtaposition, to present continuous areas or surfaces which conform to the bottom and sides of a boat and over which the fibre glass and the plastic substance can readily be coated till the operation is complete.

A further object is to provide a kit containing members that can easily be manipulated and combined into a complete structure that has the likeness of a hull or other hollow object, and is curved where necessary; especially along the sides; and retained in curved formation when the fibre glass is added and processed till the hull is ready for launching. One set of cross members acts as supports or braces for the remaining necessary members, and the kit with all parts in place and connected imparts to the hull its distinctive lines.

Still another object is to provide a kit for building the hull of a boat and containing members that can quickly be united and given the shape of a hollow mold form resembling the hull of a boat; and are so prepared that the fibre glass and other substances which are super added thereto will harden without adhering to said members. Hence when the plastic layer attains its final stage, all the members or portions of the kit can easily be removed without distorting the hull or otherwise affecting it; and discarded or retained for further use.

The foregoing objects and others, and the advantages of my invention are made clear in the description that follows, and the characteristics of my improved boat kit are defined in the appended claims. On the drawings a preferred embodiment of the invention is illustrated, but I reserve the right to make changes in the shape, size, and arrangement of parts and other details without deviating from the general design in which the invention resides.

On said drawings:

Figure 1 is a diagram representing in side elevation a boat hull to be built, and disclosing the first step in the practice of my invention, with the positions to be given to the cross supports of the kit indicated.

Figure 2 is a diagram of a vertical cross section of such a hull, as if taken on line 4-4 of Figure 1, with the observer looking towards the bow; and likewise showing the positions to be assumed by the cross supports or bracing members to which the other members are joined to make up a body constituting the entire mold form for the hull.

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Figure 3 is a similar section on the line 4-4 as seen when the observer looks toward the stern.

Figure 4 is a top plan of the entire body of the kit showing surfaces that have the approximate shape of the bottom and sides of a hull.

Figures 5 and 6 are plan views of some of the bracing members of the mold form, with the necessary outlines.

Figure 7 depicts in plan how the bracing members are to be set up in place to be covered by the remaining members.

Figure 8 shows the form and outline of certain members to be covered with plastic for the sides of the boat.

Figure 9 shows the outline of sheets of cardboard which are other members to receive the plastic for the bottom of the boat.

Figure 10 shows the outline of another member for the stern of the mold form.

Figure 11 shows one of the cross bracing members in elevation and other members in cross section supported thereby.

Figure 12 shows part of several layers of plastic and cloth sheets between them.

Figure 13 is a view similar to Figure 11 indicating plastic containing fibre glass superposed over the outside of the hollow mold form.

Figure 14 presents a detail at the bow of the mold form.

On Figure 1, the diagram of a boat hull to be built, is seen from one side, and the transverse planes marking the positions of the cross members for use as parts of the kit, are shown; on Figures 2 and 3, by the lines 1-1, 2-2, 3-3, 4-4, 5-5, 6-6, 7-7, and 8-8; and the hull will of course have a stern indicated at 18.

Two of the transverse inside members or braces are illustrated by the outlines in Figures 5 and 6. Each of said members has a transverse edge 9 with a central notch 10, converging edges 11 beginning at the ends of the edge 9 and joined to edges 12, that are more convergent and intersecting to form an angle 13 opposite the edge 9. The members 21 and 22 occupy the positions in the mold form indicated in Figure 1 at 1-1 and 2-2, and in Figures 5 and 6 these members appear in full. The shape of the remaining transverse supports or cross bracing members is indicated on Figures 1 and 2 at the lines 3-3, 4-4, 5-5, 6-6, 7-7, and the lines representing the stern 18 between the lines 8-8. All except the member 18 have five sides and the edges 11-11 and 12-12 are respectively equal; and the various members are of diminishing height from bow to stern, with the angles 13 progressively larger.

The full set of brace members to be placed as indicated by the planes of the lines 1-1, 2-2, 3-3, 4-4, 5-5, 6-6, 7-7 and 8-8, are shown in top edge view on Figure 9 at 21, 22, 23, 24, 25, 26, 27 and 28 respectively, and all the cross members are inverted and alined on an elongated member or stringer 29 which has the cross sectional shape of the notches 10. The member 28 having the same shape as the stern of the hull, also has a central notch, and the stringpiece 29 fits the notches 10, so that all the brace members are held upright. These members all vary in length across the stringpiece 29, being longest amidships and progressively shorter toward the end of the member 29.

When the cross members are thus located and secured in vertical positions, the other members are laid on, in contact with the edges 11 and 12 of the bracing or supporting members. The other members are portrayed on Figures 10, 11 and 12. All cross and other members are preferably of corrugated cardboard that is stiff but sufficiently flexible.

The other members have the outlines shown at 30 in Figure 8 for the sides, and at 31 in Figure 9 for the

inverted bottom, and at 28 in Figure 10 for the stern area 18 of the mold form. All the cross members now serve as ribs for the other members. The other members which are so laid that two members 30 engage the edges 11 of the bracing members, one member 30 at each side of the mold form, and the members 31 are laid side by side on the edges 12, and the rear member 28 makes contact with the straight ends of the pieces 30 and 31. The edges of the other members are made fast in abutting positions by pieces of adhesive tape 35, along the entire length of said edges, and the curved ends of the members 30 are especially so secured as shown in Figures 4 and 14. The bracing or supporting members may have short projections as indicated at Figures 5 and 6 to engage small notches in the side and bottom members 30 and 31, or these projections and notches may be omitted.

A top view of the finished mold form has the appearance of Figure 4. Each side is delineated by the space between an outer curved line 32 and an adjacent inner curved line 33 which represents the location of the chine of the hull, and the area between the lines 33 represents the bottom of the hull. The mold form then resembles an overturned boat hull with the lines 32 and 33 curving smoothly from end to end.

A cross section of the mold form has the appearance indicated in Figure 11, and the pieces 30 present no transverse edges or bends, with angles, along the sides, but have smoothly curved surfaces throughout and impart to the hull its final shape.

When all members of the mold form are assembled, a coating of wax 32 is put on the members 30, 31 and 28, and a layer of fibre glass 36 is laid on the entire area of the pieces 30, 31 and 28, which have their adjacent edges in close contact. The fibre glass is given a coating of polyester resin which is put on with a roller. The resin fills all the interstices and small crevices of the fibre glass and sets and hardens, forming a smooth rigid covering for the mold form having the curved formation of a finished boat. The resin enters into a chemical combination with the glass and contains a catalyst which hastens the process.

Several layers of fibre glass and resin can thus be put on, and the resin in each is rolled to render it as smooth as possible. The layers 36 will be separated by mat 37 of finer fibre glass; also permeated with polyester resin and rolled smooth. The last or outermost layer 37 is also a mat of finer fibre glass and is applied in the same manner. See Figure 12. When the hardening is completed, the whole hull is strong and rigid and can be put into the water at once.

Seats can be built into the hull by using pieces of fibre glass laminate, treated with polyester resin in the same way. The seats will have the necessary thickness and will be joined with polyester resin at the ends to the inner faces of the sides of the hull at the selected points. When the plastic has hardened, the adhesive pieces 35 are cut and the inner and outer members are pulled out. The shell which has taken its shape from the mold form is hard and smooth and rigid throughout.

If the boat is to have a special gunwale, the upper edges of the side member of the mold form will have corresponding lines along the upper edges.

The entire kit can be made up with the various cross and other members in a flat package. The long pieces 30 and 31 can be in several smaller pieces or sections, or

in one piece scored transversely on the inside faces of the mold form, so that they can be folded crosswise into shorter lengths. Such division or score lines if adopted will be so located as to be between the cross members. The pieces 30 and 31 can then again be smoothly curved and their curved surfaces can be maintained by the pieces of adhesive 35 at the score or division lines, and the long member as before will have the desired curved surfaces along the sides. The cross bracing members can also be centrally scored and folded, if desired. A molding strip can also be affixed to the gunwale inside or out, and a keel attached to the bottom by putting on fibre glass strips and adding resin as above set forth.

This method of producing the hull of a boat can be utilized to obtain other hollow bodies by means of inside bracing members and outside members having appropriate shapes.

When the plastic has hardened, the adhesive pieces 35 are cut and the inner and outer members are pulled out. The shell which has taken its shape from the mold form is hard and smooth and rigid throughout.

Having described my invention, what I believe to be new is:

A mold form for a boat hull comprising plastic material, said form having a string piece extending from end to end of said form, bracing members extending crosswise of the string piece and each having a lower edge engaging the string piece, the bracing members also having edges at the ends of the lower edges converging and intersecting above the string piece, said members decreasing progressively in size transversely of said form from a point in the length of said string piece towards the ends thereof, all said members having collectively the configuration of the hull, with one of said members forming a stern for said hull at one end of the string piece, the opposite end of the string piece extending beyond said members and being at the bow of said hull and projecting past from the adjacent bracing member, top members laid side by side affixed to said bracing members, and extending from one end of the hull to the other to form the bottom of the hull, side members affixed to said bracing members adjacent the bottom members, the top and side members engaging the converging edges of said transverse members, the adjacent longitudinal edges of said bottom of side members being connected by adhesive tape extending over the entire length of said top and side members.

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