June 28, 1938. F. P. SMITH, JR., ET AL 2,122,300

BOAT AND SIMILAR VEHICLE

Filed July 8, 1936 2 Sheets-Sheet 1

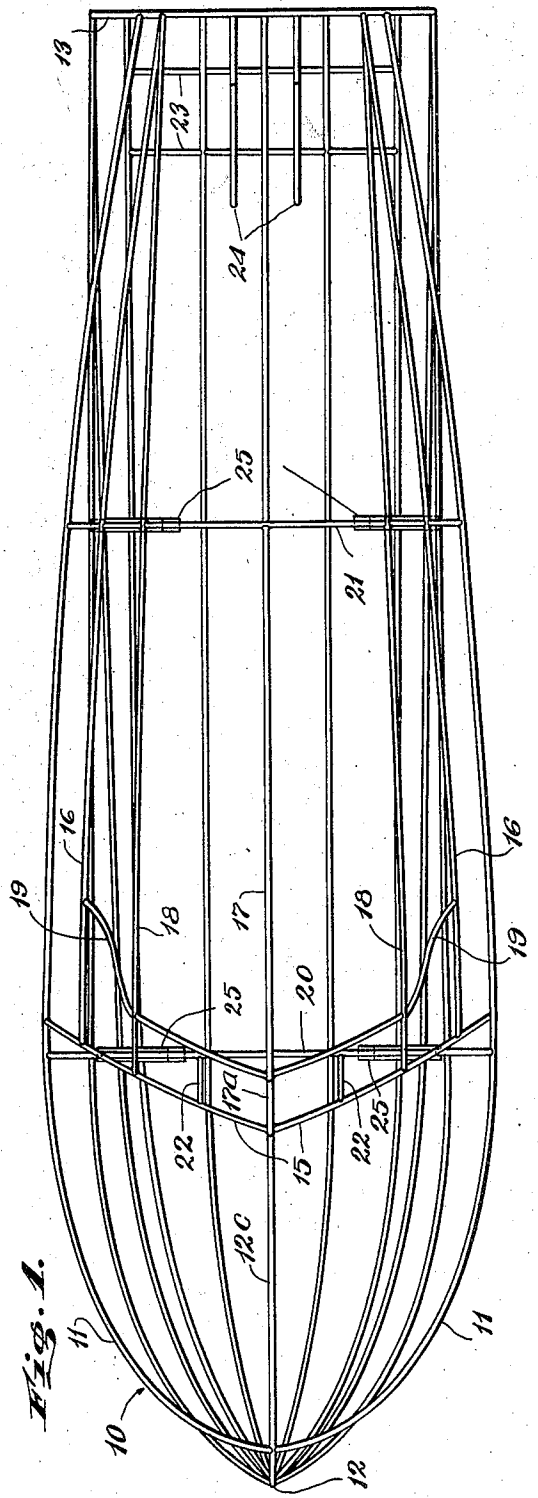


Fig. 1.

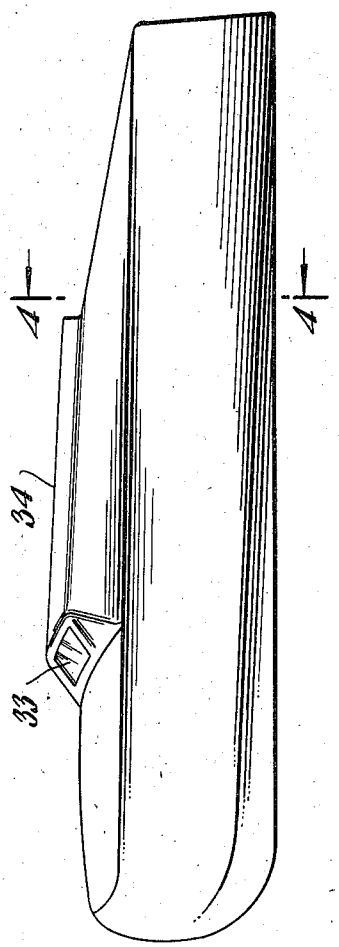


Fig. 2.

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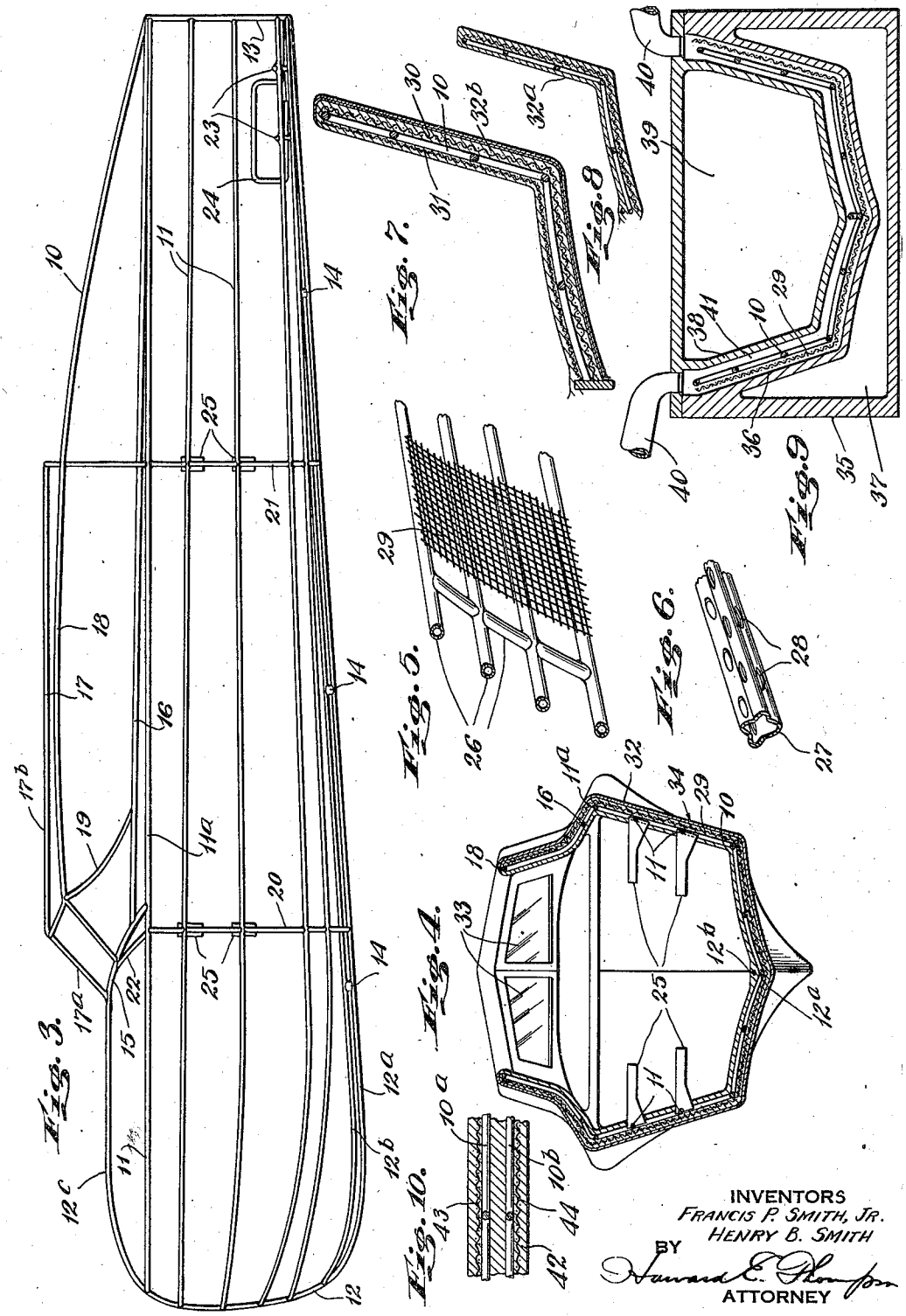


Fig. 3.

Fig. 7.

Fig. 8.

Fig. 5.

Fig. 6.

Fig. 9.

Fig. 4.

Fig. 10.

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BOAT AND SIMILAR VEHICLE

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20 Claims. (Cl. 114—65)

This invention relates to boats, ships or similar articles of manufacture; and the object of the invention is to construct the hull and other framework of a boat of an openwork or skeleton frame upon which is arranged a plastic body, forming a solid unitary mass of the entire boat hull and frame construction and forming a smooth outer surface as well as a smooth inner surface; a further object being to provide a boat of the class described, the skeleton frame of which may consist of a mesh body of metallic or fibrous material and which may also include a series of rods, tubes or the like composed of light metal or metal alloy, the parts being preferably welded together and the mesh body being welded or otherwise secured to said rod or tube-like frame; a further object being to provide a frame in which openwork bodies of two different meshes are employed; a further object being to provide the hull or frame structure of a boat of the kind under consideration with brackets and other supporting members anchored to and constituting part of the skeleton frame to provide means for supporting various fixtures, fittings and equipment of a boat; and with these and other objects in view, the invention consists in an article or apparatus of manufacture of the class described, which is constructed in accordance with the method more fully hereinafter described and claimed.

The invention is fully disclosed in the following specification, of which the accompanying drawings form a part, in which the separate parts of our improvement are designed by suitable reference characters in each of the views, and in which:

Fig. 1 is a plan view of the skeleton frame of a boat.

Fig. 2 is a side view of a boat made according to the invention diagrammatically illustrating the boat in its finished state.

Fig. 3 is a side view of the construction shown in Fig. 1.

Fig. 4 is a cross section substantially on the line 4—4 of Fig. 2.

Fig. 5 is a perspective view of a part of the skeleton frame of a boat showing a mesh body arranged thereon.

Fig. 6 is a perspective view of a modified form of rod or tubing which may be employed.

Fig. 7 is a partial transverse section through a boat, showing a modification.

Fig. 8 is a view similar to Fig. 5, showing another modification.

Fig. 9 is a cross sectional view through a die or mold indicating one method of forming a boat according to the invention.

Fig. 10 is a cross section through a modified form of wall structure which may be employed.

In referring to "boat" throughout the specification and claims, it is to be borne in mind that this term is to be regarded as descriptive of any kind or class of craft including ships, canoes, various kinds of sail boats and the like, regardless of the size and use thereof. At the same time, the invention is applicable to the construction of toy boats and ships, and in fact, to any other kind or class of articles of manufacture, such for example, as aeroplanes, especially wherein the type of construction forming the subject matter of this invention is applicable.

In its simplest form, the invention consists essentially in the use of a liquid, semi-liquid, or plastic substance incorporated with a suitable binder which may also act as a reinforcing agent in constructing the particular article or product desired. In referring to molding or plastic material, it is to be understood that these materials may have metallic bases or wood pulp, cellulose or fibrous bases. For the purpose of illustrating one method of carrying the invention into effect, we can use, for example; a product known as "plastic wood" which we preferably use in a semi-liquid form, by incorporating acetone extract therewith as a solvent, in the substantial proportions of one and one-half pints of the solvent to one pound of the "plastic wood". However, in some cases, the material employed may be applied in a more plastic state or in a more fluid state, depending entirely upon the method employed in forming the finished product.

While in some forms of the invention, a single mesh body of fibrous or metallic material may be employed as a binding and reinforcing agent through which the plastic compound penetrates to securely bind inner and outer surfaces of the resulting product, for the purpose of illustrating one use of the invention, in the construction of a boat, we have shown in the accompanying drawings a skeleton frame 10 consisting of a number of longitudinally extending rods or tubes 11 which extend from a front vertically disposed rod 12 to a loop frame 13, at the rear of the boat, the rods 11 being fashioned or shaped to produce the desired cross sectional and longitudinal contour of the boat to be formed. These rods or tubes are preferably welded together where they abut.

The lower end of the rod 12 also preferably extends in what may be termed a keel rod 12a, run-

ning centrally and longitudinally of the bottom of the hull of the butt, and to which a keel may be attached if the same is employed. To reinforce the rod 12*a*, a supplemental rod 12*b* is disposed directly thereabove and secured thereto at intervals as seen at 14. The upper end of the rod 12 also extends backwardly over the bow of the boat as seen at 12*c* and forms part of the upper structure. This rod joins laterally and backwardly extending rods 15 which are secured to the top longitudinal rods 11*a*. At 16, we have shown top rods extending from the rods 15 to the loop 13, which also form part of the upper or deck structure. Another rod 17 which may, if desired, constitute an extension of the rod 12*c* has an upwardly inclined front part 17*a* and a rearwardly extending substantially horizontal part 17*b*, the latter forming the top center of the cabin portion of the boat.

Similar rods 18 are disposed at opposite sides of the rod 17 and extend from the brace rods 15 to the rear loop 13. The front corner portions of the rods 17 and 18 are joined and braced by other transverse rods 19 fashioned in the manner shown in Figs. 1 and 3 of the drawings. The hull and frame structure of the skeleton frame 10 is also reinforced by a number of transverse brace rods, any desired number of which may be employed between the bow and stern of the boat. In the construction shown, two of such brace rods are shown at 20 and 21. These rods may be formed in a single member, but are preferably formed of separate parts which abut the parts in conjunction with which they are coupled so as to maintain the entire skeleton frame in one plane, or, in other words, to form one thickness of the skeleton frame throughout. The transverse frames 20, 21 or the separate parts thereof are secured to all of the longitudinal parts and the end of the part 17*b* is secured to the transverse frame 21. Additional braces or reinforcing members 22 are employed between the rods 15 and the transverse frame 20.

At the stern of the boat, two transverse rods 23 are secured to a number of the longitudinal rods at the bottom of the boat, and upon the rods 23 are arranged hangers or supports 24 for a motor. At 25, we have indicated brackets which are welded or otherwise secured to the frames 20, 21, to provide means for supporting various kinds and classes of equipment in the interior of the boat structure, the brackets being clearly shown in the cross section of the boat in Fig. 4.

In this connection, it will be understood that brackets or supporting members may be mounted and arranged at any part of the boat structure or the frame thereof to form supports for seats, bunks or other boat equipment. In the event of arranging such supports intermediate the transverse supports of the frame 10, the rods or frame parts to which they are attached may be suitably reinforced. The showing in the accompanying drawings is simplified for purpose of clarity and is only illustrative of the possible methods of constructing the boat. In the use of the term "rods", it will be understood that reference is made to the binding or reinforcing frame regardless of the manner of its construction.

Considering Fig. 5 of the drawings, it will be seen that the rods of the skeleton frame are composed of tubes of metal as indicated at 26; whereas, in Fig. 6 of the drawings, we have shown a part of a rod frame on an enlarged scale, which is in the form of what might be termed a corrugated tube 27. This cross sectional form is employed to give added strength to the frame in constructing the same from a light weight or thin metal, and furthermore, this tube may have perforations as indicated at 28, so that the plastic or other material may extend into the tube to establish a binding through the tube. This type of frame construction would be applicable to boats or ships of the larger construction.

In Fig. 5 of the drawings, we have shown at 29 a sheet of openwork fabric which may be secured to the inner or outer surface of the skeleton frame or the separate rods thereof. If this sheet is composed of wire mesh, the same may be welded or braced in position. In the construction shown in Figs. 2 and 4 of the drawings, the sheet 29 is shown arranged upon the outer surfaces of the skeleton frame 10. In some cases, we may arrange two openwork or mesh bodies or sheets one directly upon the other, and these sheets may have meshes of different sizes as well as being composed of lighter and heavier wires. On the other hand, a large mesh sheet 30 may be arranged on, for example, the outer surface of the skeleton frame 10, and a smaller mesh 31 on the inner surface thereof as seen in Fig. 7 of the drawings. The type of mesh fabric and the number of sheets of mesh fabric employed will depend entirely upon the strength of reinforcement desired or required in the construction of any particular type or kind of boat.

After the sheet or sheets of openwork fabric have been arranged upon the frame 10, as in the construction shown, the body portion of plastic or similar material 32 is then applied so as to imbed the frame and said sheet or sheets therein and to form smooth inner and outer surfaces which will define the hull and superstructure of the boat. Such fittings and fixtures as glass windows or panels 33 are fitted in the frame prior to the application of the plastic body 32 thereon. The windows or panels 33 are located between the frame parts 15, 17*a*, 18 and 19 and are located at either side of the frame rod 17*a* as clearly indicated in Fig. 4 of the drawings.

In Fig. 4 of the drawings we have indicated at 34 an outer facing or coating which may represent one or more coats of paint, lacquer, and if desired, a suitable filler, to give the final finish to the hull and superstructure of the boat and to aid in rendering certain plastic compounds, waterproof to a greater degree, it being understood that in the construction of boats, it is preferred to use a plastic compound which is substantially waterproof. The coating 34 may be of any number of colors to produce the desired appearance in the resulting boat structure. For example, the bottom of the boat may be painted green up to and including what might be termed the water line, the upper sides of the boat may be painted white, and the upper or superstructure may be of any desired color or of a clear varnish color, the surface being grained, if desired, to represent any kind or class of wood, as is common in the art of graining plain wood, as well as plain metal surfaces. The inner surfaces of the hull and superstructure of the boat may be varnished, painted or otherwise coated to produce the desired finish throughout the entire boat structure, and the exposed brackets or supports may either be painted or plated in

accordance with common practices in the construction of boats.

In Fig. 8 of the drawings we have shown a partial cross section of the hollow portion of a boat. In this figure we have indicated at 32a a body portion without any exterior coating as at 34 in Fig. 4 of the drawings. In this construction the compound employed in forming the body 32a may be of such characteristics as not to require any additional coating and may be of a solid and desired color throughout or a compound in which a color pigment has been introduced to produce this result. In the structure shown in Fig. 7, which illustrates the use of inner and outer mesh fabrics 31 and 30, no coating is shown on the body 32b, but it will be understood that coatings may be employed on this body as in the construction shown and described in connection with Fig. 4 of the drawings. Fig. 7 is included merely to illustrate one use of two mesh fabrics.

In constructing boats according to the invention, the material employed to form the body or filler structure 32, 32a, 32b, may be spread over the screen or mesh fabric employed by suitable instruments and smoothed down to the desired contour and thickness, or the same may be applied by a pressure spray and the exposed surfaces later sanded to provide a smooth and definite contour and surface, after which the coatings may be applied if the same are to be used. However, in large productions of boats and in constructing them of material suitable for the purpose, dies or molds may be employed as diagrammatically illustrated in Fig. 9 of the drawings, in which we have shown at 35 an outer die part having an impression or mold cavity and a jacket 37 therein.

At 38 we have shown a hollow core having a chamber 39 therein, the core defining the inner contour of the hull and superstructure of the boat. These die or mold parts 35, 38 may be made in sections to facilitate handling and each section will have one or more injection nozzles 40 through which the molding or casting material or compound may be introduced into the impression 41 formed between the cavity 36 and the core 38. The frame 10 including its mesh fabric sheeting 29 is disposed within and suitably supported within the impression 41 prior to the introduction of casting or molding material into the dies through the nozzles 40. A suitable number of nozzles will be employed in the dies or mold sections to provide the proper distribution and flow of the casting or molding material therethrough.

In some uses of the invention steam or another heating agent may be introduced into and circulated through the jackets 37, 39, to partially set the compounds introduced into the members 41 and prior to removing the finished casting from the dies in the separation thereof, whereas, in other types of casting materials, a cooling agent may be introduced into and circulated through the jackets 37 and 39 to provide for a quick setting of heated casting compounds that may be employed. In most types of casting or molding compounds, the same will be introduced into the impression of the die or die parts under pressure.

In producing boats and other articles or apparatus in accordance with the method diagrammatically illustrated in Fig. 9 of the drawings, the exposed surfaces will be smooth and finished and will not likely require sanding. In other words, these surfaces will be prepared for any coating material or materials that are applied thereto, whereas, if the desired color is introduced into the compound itself, the article will be finished in so far as the wall structure of the hull and upper or superstructure of the boat is molded. The usual finishing operations to complete the construction of the boat will be performed in the usual manner.

By constructing a boat in accordance with our invention, the materials or compounds selected in forming the body portion proper 32, 32a and 32b will be of a substantially flexible structure, that is to say, capable of taking a blow or strain without cracking or chipping, while at the same time, maintaining a relatively solid and rigid body portion. By forming this body portion of one homogeneous mass, the same will be leakproof and will not be subjected to leakage in the conventional manner of constructing the hulls of boats and will not require the corking operations of boat hull structures, nor the treatment required periodically to repair or otherwise condition a boat for use, especially when it has been in dry dock for some period of time. A boat of the kind under consideration may be made lighter in its construction and by reason of the reinforcement employed will be much stronger and at the same time more economical in construction. In other words, our improved structure lends itself to the production of boats on a large scale, and in a highly efficient manner, eliminating a great amount of skilled labor required in the construction of boats in accordance with the conventional methods.

By reason of the manner of constructing a boat as herein set forth, in the event of a damage to any part of the boat because of a collision or otherwise, the boat may be readily repaired by replacing the broken structure with the plastic or other compound employed. For example, if a hole were cut in the side of the hull a repair could be made by simply filling this hole with the compound and then refinishing the inner and outer surfaces. If the frame structure is damaged, the frame may be reinforced by welding a new frame piece in position.

As previously stated, in some instances, the use of the skeleton frame 10 is not absolutely essential, and this is especially true in the construction of small boats or in the construction of toys or other articles of manufacture. In the latter cases, an openwork binder of any suitable material, including fibrous material, may be employed, and in referring to openwork material, it is to be understood that this is to include a body or sheet of any desired material which is perforated or apertured solely for the purpose of establishing a binder between inner and outer surfaces of the plastic body employed. In some instances, plain sheets of material may be used in certain sections or areas of the product formed, in which event, such sheets will be composed of a material which will readily adhere to the casting or molding compound employed, or the surfaces of such sheets will be coated with a sizing suitable to establish a binding between the compound and surfaces of the sheet.

In Fig. 10 of the drawings, another form of hull or wall structure is shown, wherein two skeleton frames 10a, 10b are employed and imbedded in the molded or cast body 42 and preferably arranged in spaced relation to each other in said body. If desired, an openwork or mesh sheeting 43 may be arranged upon and secured

to the frame 10*a* and another openwork sheeting 44 secured to the frame 10*b*. This type of construction is adaptable for use in connection with large boats, ships or other large apparatus. In this connection, it will be understood that the type of frame filler or reinforcement will depend entirely upon the character of the device or apparatus produced. Our invention is by no means limited to the types and kinds of reinforcements or fillers herein disclosed. In forming the skeleton frame or openwork body of binding or reinforcing material, the same may be stamped or molded from a fibrous or metallic material.

While in the smaller and especially toy types of boat constructions as well as in the construction of other small articles, the entire frame and molded body may be unitary in construction, in other instances, it will be found practical and desirable to form independent units or parts of the entire structure and to suitably join or unite said parts in erecting the structure. This will be especially true with regard to the superstructure of a boat as well as interior wall structures which may be incorporated to partition or otherwise subdivide the boat into separate rooms or compartments.

When the body portion or wall structure of the device or apparatus produced is composed of "plastic wood" and semi-plastic materials or compounds, the same may be treated with a penetrating solution or compound to render the same substantially flame-proof as well as waterproof.

In the construction of boats of different kinds and classes, we have found that the use of "plastic wood" as a compound for constructing the body of the boat is practical and desirable, especially from the standpoint that this wood is substantially waterproof, and furthermore, provides a surface which may be readily coated with paints, lacquers and the like, to provide the desired finish thereto, and at the same time, provides a body to which various fittings and fixtures may be readily applied. While this particular material is mentioned specifically to illustrate one use of the invention, any other kind or class of material, suitable for handling or application in the manners herein set forth may be employed, the invention relating primarily to the type of construction and method of formation of the same, rather than to the particular type of compounds or molding materials employed.

The boat, as seen in Fig. 2 of the drawings, represents substantially the finished appearance of a boat made from the skeleton frame shown in Figs. 1 and 3 on a reduced scale to indicate the finished appearance of the boat. The shape, design and contour of the boat, including its superstructure, may be modified in many ways, the present drawings being merely illustrative of one type and kind of boat structure.

Having fully described our invention, what we claim as new and desire to secure by Letters Patent, is:

1. A vehicle body of the class described comprising a frame unit consisting of a skeleton frame having longitudinally and transversely spaced frame parts, a coarse fibrous sheeting of open woven fabric covering said skeleton frame, said unit substantially defining the contour of the article to be formed, and a body of plastic fibrous material applied to said unit frame and imbedding the sheeting therein and forming a binder between the sheeting and said skeleton frame.

2. A vehicle body of the class described comprising a frame unit consisting of a skeleton frame having longitudinally and transversely spaced frame parts, a coarse fibrous sheeting of open woven fabric covering said skeleton frame, said unit substantially defining the contour of the article to be formed, a body of plastic fibrous material applied to said unit frame and imbedding the sheeting therein and forming a binder between the sheeting and said skeleton frame, and a sheeting of wire mesh fabric arranged in juxtaposition to and intermediate said skeleton frame and first named fibrous sheeting.

3. A vehicle body of the class described comprising a frame unit consisting of a skeleton frame having longitudinally and transversely spaced frame parts, and two or more sheets of openwork fabric of different sized mesh disposed one directly upon the other and arranged upon and secured to said openwork frame, said unit substantially defining the contour of the article to be formed, a body of plastic fibrous material applied to and imbedding said sheets therein and forming a binder between adjacent sheets and said skeleton frame, and at least one surface of said body being finished to the contour of the article to be formed.

4. A vehicle body of the class described comprising a frame unit consisting of a skeleton frame having longitudinally and transversely spaced frame parts, and two or more sheets of openwork fabric of different sized mesh disposed one directly upon the other and arranged upon and secured to said openwork frame, said unit substantially defining the contour of the article to be formed, a body of plastic fibrous material applied to and imbedding said sheets therein and forming a binder between adjacent sheets and said skeleton frame, at least one surface of said body being finished to the contour of the article to be formed, one of said sheets being composed of fibrous material having an open weave, and another of said sheets being composed of wire mesh.

5. A vehicle body of the class described comprising a frame unit consisting of a skeleton frame having longitudinally and transversely spaced frame parts, and two or more sheets of openwork fabric of different sized mesh disposed one directly upon the other and arranged upon and secured to said openwork frame, said unit substantially defining the contour of the article to be formed, a body of plastic fibrous material applied to and imbedding said sheets therein and forming a binder between adjacent sheets and said skeleton frame, at least one surface of said body being finished to the contour of the article to be formed, one of said sheets being composed of fibrous material having an open weave, another of said sheets being composed of wire mesh, said plastic body having a predetermined color included therein to give distinct color value throughout the entire body when formed, and said finished exposed surface of the body being smooth and having a coating material thereon.

6. A vehicle body of the class described comprising a frame unit consisting of a skeleton frame having longitudinally and transversely spaced frame parts and two or more sheets of openwork fabric of different sized mesh disposed one directly upon the other and arranged upon and secured to said openwork frame, said unit substantially defining the contour of the article to

be formed, a body of plastic fibrous material applied to and imbedding said sheets therein and forming a binder between adjacent sheets and said skeleton frame, at least one surface of said body being finished to the contour of the article to be formed, one of said sheets being composed of fibrous material having an open weave, another of said sheets being composed of wire mesh, and said skeleton frame including supporting elements anchored thereto and projecting through one surface of said body.

7. A vehicle body of the class described comprising a frame unit consisting of a skeleton frame having longitudinally and transversely spaced frame parts and two or more sheets of openwork fabric of different sized mesh disposed one directly upon the other and arranged upon and secured to said openwork frame, said unit substantially defining the contour of the article to be formed, a body of plastic fibrous material applied to and imbedding said sheets therein and forming a binder between adjacent sheets and said skeleton frame, at least one surface of said body being finished to the contour of the article to be formed, and the separate parts of said skeleton frame being tubular in form.

8. A boat comprising a skeleton unit involving a frame having spaced longitudinal and transverse parts and a sheeting of coarse openwork fibrous material secured thereto, said unit substantially defining the contour of the boat to be formed, a body of plastic fibrous material applied to said unit and substantially imbedding the unit therein, and said body forming smooth exposed surfaces of a contour representing the predetermined boat to be formed.

9. An apparatus of the class described comprising a skeleton unit involving a frame having spaced longitudinal and transverse parts and sheetings of openwork material secured thereto, one of said sheetings being composed of coarse, fibrous material forming a relatively fine mesh, said unit substantially defining the contour of the apparatus to be formed, a body of plastic fibrous material applied to said unit, and said plastic body forming a binder between said mesh sheetings and frame parts.

10. A boat having a hull and superstructure, said boat comprising a body of fibrous plastic material, a reinforcing and binding unit imbedded therein, said unit involving spaced longitudinal and transverse frame members, and a sheeting of openwork fibrous material arranged on said members and substantially defining the contour of the boat to be formed, and said fibrous body forming a binder between said sheeting and members.

11. A boat having a unitary reinforced plastic hull, said hull comprising a body of fibrous plastic material, a reinforcing and binding unit imbedded therein, said unit comprising a sheeting of openwork fibrous material, and a skeleton frame, consisting of longitudinal and transversely spaced parts coupled together, said frame being secured to and serving to support said sheeting in a contour substantially defining the contour of the boat hull, and said skeleton frame being united to said sheeting by said plastic body to form a unitary structure of the entire hull of the boat.

12. A boat comprising a hull and superstructure in the form of a unitary body, said body having a reinforcing frame involving a fibrous reticulated element substantially defining the contour of the hull and superstructure of the boat, said frame being imbedded in a fibrous plastic compound forming the wall structure of said body and a finished surface for at least one surface of said body, and said frame including longitudinally and transversely arranged tubular rods supporting said element and bound thereto by said plastic compound.

13. A boat comprising a hull and superstructure in the form of a unitary body, said body having a reinforcing frame involving a fibrous reticulated element substantially defining the contour of the hull and superstructure of the boat, said frame being imbedded in a fibrous plastic compound forming the wall structure of said body and a finished surface for at least one surface of said body, said frame including longitudinally and transversely arranged tubular rods supporting said element and bound thereto by said plastic compound, and said rods being in common alinement with each other and welded together.

14. A boat comprising a hull and superstructure in the form of a unitary body, said body having a reinforcing frame involving a fibrous reticulated element substantially defining the contour of the hull and superstructure of the boat, said frame being imbedded in a fibrous plastic compound forming the wall structure of said body and a finished surface for at least one surface of said body, said frame including longitudinally and transversely arranged tubular rods supporting said element and bound thereto by said plastic compound, said rods being in common alinement with each other and welded together, and said element consisting of independent sheetings having different size mesh.

15. A boat comprising a hull and superstructure in the form of a unitary body, said body having a reinforcing frame involving a recticulated element substantially defining the contour of the hull and superstructure of the boat, said frame being imbedded in a fibrous plastic compound forming the wall structure of said body and a finished surface for at least one surface of said body, said frame including longitudinally and transversely arranged tubular rods supporting said element and bound thereto by said plastic compound, said element consisting of independent sheetings having different size mesh, one of said sheetings being composed of fibrous material, and the other sheeting of a metallic mesh.

16. A boat comprising a hull and superstructure in the form of a unitary body, said body having a reinforcing frame involving a fibrous reticulated element substantially defining the contour of the hull and superstructure of the boat, said frame being imbedded in a fibrous plastic compound forming the wall structure of said body and a finished surface for at least one surface of said body, said frame including longitudinally and transversely arranged tubular rods supporting said element and bound thereto by said plastic compound, and said frame including brackets and supporting members projecting through the wall structure of said plastic body.

17. A boat comprising a hull and superstructure in the form of a unitary body, said body having a reinforcing frame involving a fibrous reticulated element substantially defining the contour of the hull and superstructure of the boat, said frame being imbedded in a fibrous plastic compound forming the wall structure of said body and a finished surface for at least one surface of said body, said frame including longitudinally and transversely arranged tubular rods supporting

said element and bound thereto by said plastic compound, and said rods being perforated.

18. A boat comprising a hull and superstructure in the form of a unitary body, said body having a reinforcing frame involving a fibrous reticulated element substantially defining the contour of the hull and superstructure of the boat, said frame being imbedded in a fibrous plastic compound forming the wall structure of said body and a finished surface for at least one surface of said body, and another frame arranged in said body in spaced relation to said first named frame and forming a double reinforcement for said body.

19. A vehicle body of the class described comprising a frame unit consisting of a skeleton frame having longitudinally and transversely spaced frame parts, a coarse fibrous sheeting of open woven fabric covering said skeleton frame, said unit substantially defining the contour of the article to be formed, a body of plastic fibrous material applied to said unit frame and imbedding the sheeting therein and forming a binder between the sheeting and said skeleton frame, and another frame unit in said body in spaced relation to said first named unit.

20. An apparatus of the class described comprising a skeleton unit involving a frame having spaced longitudinal and transverse parts and sheetings of openwork material secured thereto, one of said sheetings being composed of coarse, fibrous material forming a relatively fine mesh, said unit substantially defining the contour of the apparatus to be formed, a body of plastic fibrous material applied to said unit, said plastic body forming a binder between said mesh sheetings and frame parts, and said sheetings being disposed on inner and outer surfaces of said frame.

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