Jan. 13, 1953 B. FREES, JR 2,625,187

APPARATUS FOR MOLDING VENEER BOATS

Filed Nov. 17, 1948 2 SHEETS—SHEET 1

Fig. 1

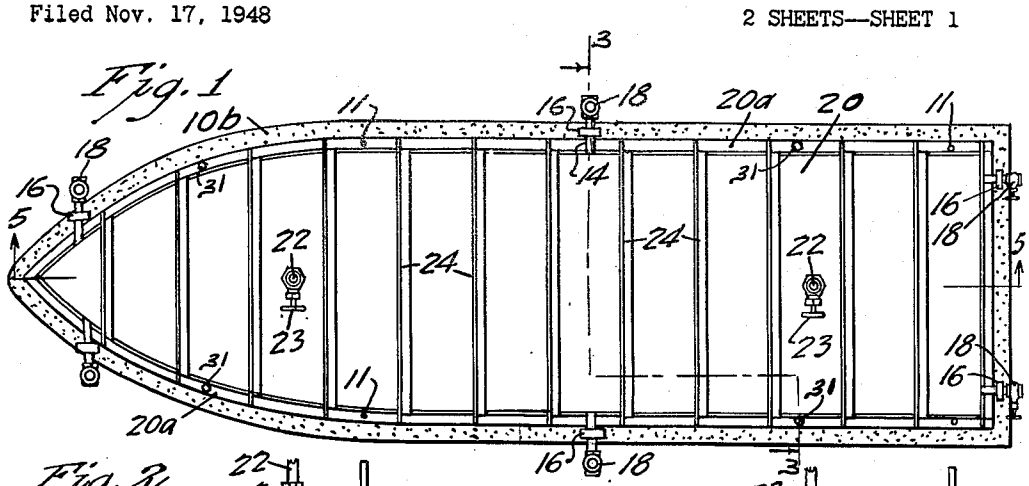


Fig. 2

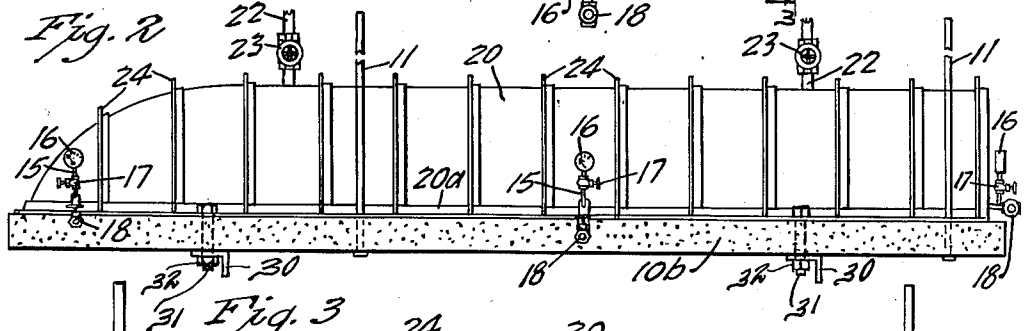


Fig. 3

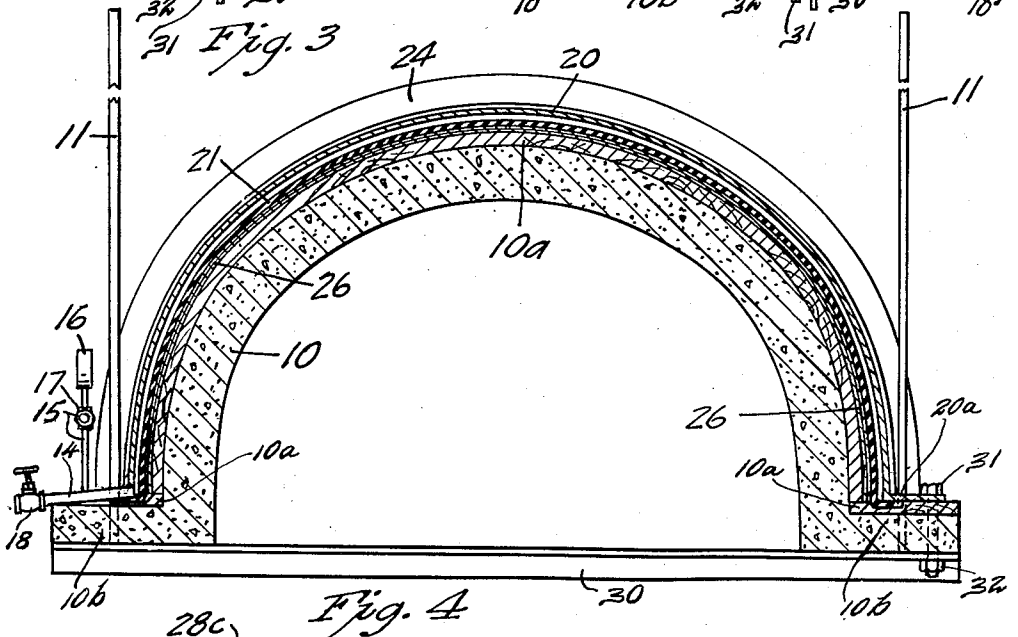
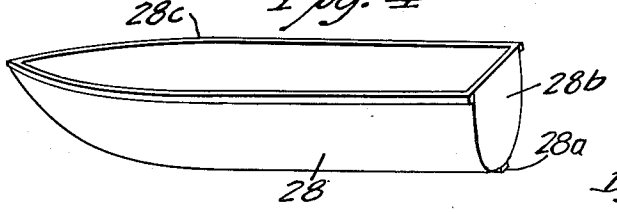


Fig. 4



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APPARATUS FOR MOLDING VENEER BOATS

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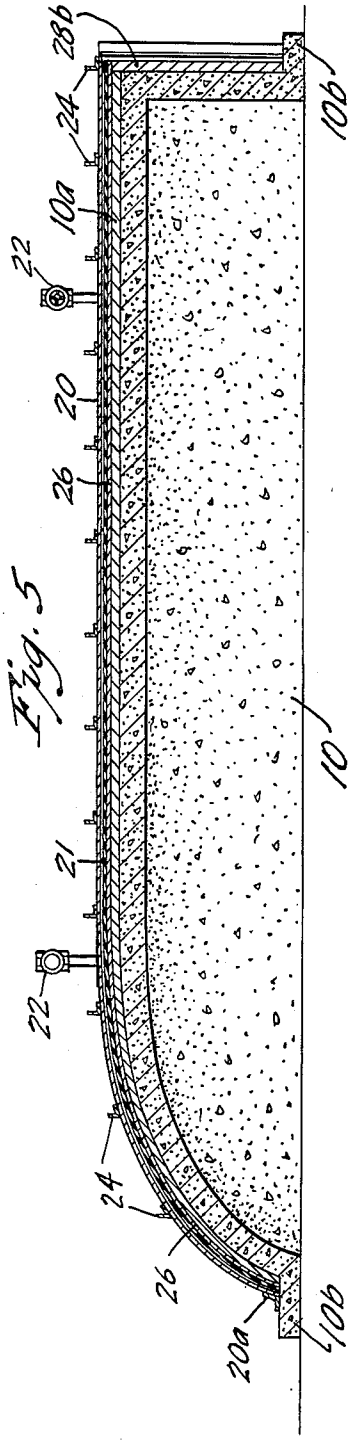


Fig. 5

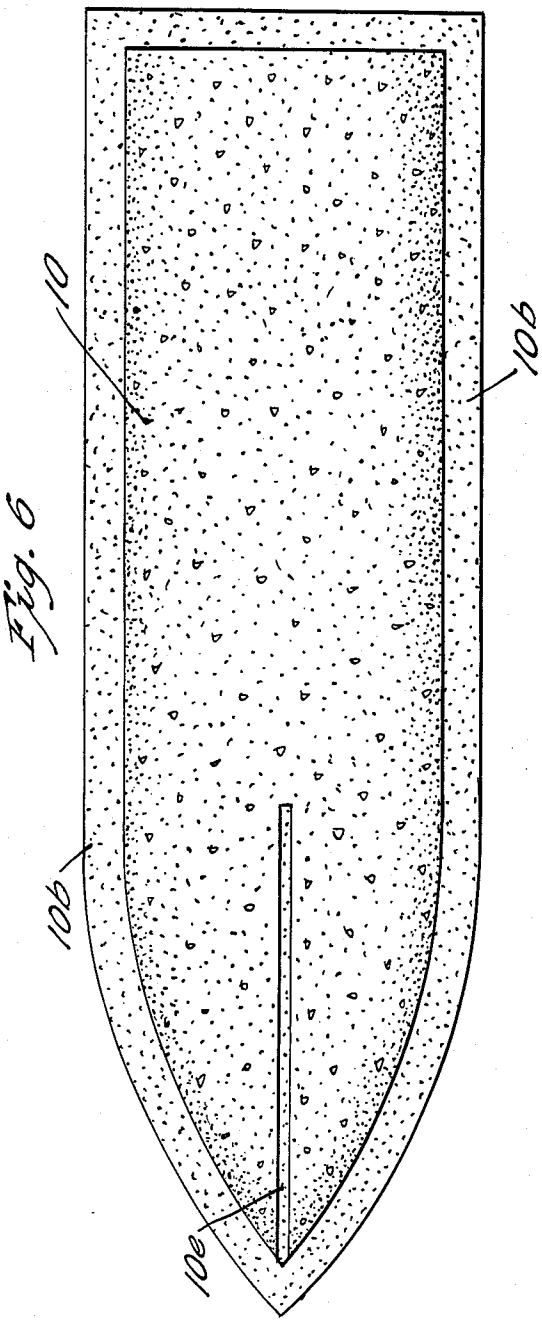


Fig. 6

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APPARATUS FOR MOLDING VENEER BOATS

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2 Claims. (Cl. 144—281)

1

This invention relates to a boat and method of molding the same, and while the method could be used for different articles and different kinds of boats, it specifically is designed to make molded boats of wooden veneer.

It is an object of this invention to provide a simple and efficient method for making a boat of wooden veneer, which method may be easily and quickly performed.

It is a further object of the invention to provide a method of making a veneer boat or similar article which consists in providing a form the outer surface of which constitutes a matrix for the inner side of the boat or article to be produced, securing veneer to the outer side of said form over the outer surface thereof, providing a shell adapted to fit over said form, which shell has a flexible diaphragm therein adapted to engage over the outer surface of said veneer on said form, applying air pressure to said diaphragm within said shell to press said diaphragm against said veneer and press said veneer against the outer surface of said form, then applying steam under pressure to said diaphragm for transmitting heat and pressure to said veneer to mold the same and press the same against said form, relieving said steam pressure and then removing said shell from said form and removing said boat from said form.

It is another object of the invention to provide a method for making a molded veneer boat which consists in providing a form the outer surface of which constitutes a matrix for the inner side of said boat, placing a wooden layer to form the outer side of said form, tacking two or more layers of wooden veneer to said form to cover the outer surface thereof, providing a metal shell having the general shape of said form, said shell having a flexible diaphragm spaced from the inner wall of said shell and secured to said wall along the bottom edge portion thereof, charging air under pressure into said shell above said diaphragm to press said diaphragm against said veneer and to press said veneer against said form gradually draining or bleeding off said air preferably adjacent the bottom of said shell, gradually charging steam under pressure into said shell above said diaphragm to replace said air, maintaining said steam under pressure on said diaphragm for a considerable period to mold and hold said veneer against said form, then relieving said steam pressure, removing said shell from said form and removing said boat formed by said veneer from said form.

It is still another object of the invention to provide a device for making a molded veneer boat or article comprising a form preferably made of concrete, said form having a wooden layer on its outer surface, said outer surface constituting a matrix for the inner side of a boat or article to be molded, a plurality of rods extending upwardly at each side of said form and spaced longitudinally thereof, a metal shell having the general shape of said form adapted to be placed over said form and having apertures through which said rods pass for guiding said shell vertically in alignment with said form, a flexible diaphragm within said shell secured to the bottom of said shell and adapted to extend over the surface of said form, a plurality of inlet conduits at the top of said shell spaced longitudinally thereof and a plurality of outlet conduits adjacent the lower side of said shell spaced longitudinally thereof.

2

It is more specifically an object of the invention to provide such a device as set forth in the preceding paragraph, said form having an outwardly extending flange at its bottom side, said shell having an outwardly extending flange at its bottom side adapted to rest on said first mentioned flange, said shell preferably having a plurality of reenforcing members, such as angle irons, extending transversely thereover and secured to the flange of said shell at their lower ends and said inlet and outlet conduits being provided with regulating valves.

These and other objects and advantages of the invention will be fully set forth in the following description made in connection with the accompanying drawings in which like reference characters refer to similar parts throughout the several views and in which:

Fig. 1 is a top plan view of the molding device;

Fig. 2 is a view in side elevation of the molding device;

Fig. 3 is a vertical section taken substantially on line 3—3 of Fig. 1, as indicated by the arrows;

Fig. 4 is a perspective view of a boat made by the method of the invention;

Fig. 5 is a longitudinal vertical section taken substantially on line 5—5 of Fig. 1, as indicated by the arrows; and

Fig. 6 is a top plan view of the form used.

Referring to the drawings, a device is shown comprising a form 10. While this form might be variously made and made of different materials, in the embodiment of the invention illustrated and in practice said form has been made from concrete. As shown in Fig. 3, the form is hollow and comprises a rather heavy layer of concrete. The outer portion of form 10 comprises a layer

of wood 10*a*. The form 10, as shown in Fig. 6, in plan, has the general shape of the boat or article to be molded. Said form has an outwardly extending flange 10*b* surrounding the same which also comprises the top layer of wood 10*a*. A plurality of guiding rods 11 extend vertically at each side of form 10 being spaced longitudinally thereof, said rods being shown as two in number at each side of said form. Said rods are secured in and extend from the flange 10*b*. The form 10 or the outer surface thereof has the same shape as the inner side of the boat or article to be molded and the form thus forms in effect a matrix for said boat or article. Form 10 has at its front end in the upper surface thereof a slot 10*e* disposed centrally thereof and extending for some distance from its front end. This slot is of rectangular or trapezoidal shape in cross section.

A shell 20 is provided, preferably made from a sheet of metal and this has the general shape of the form 10 and is adapted to fit thereover with its inner wall in spaced relation to form 10. Shell 20 has an outwardly extending flange 20*a* at its bottom which rests upon the top of flange 10*b*. Flange 20*a* is provided with openings through which the rods 11 extend and in which they substantially fit so that said shell 20 can be moved vertically in alignment with the form 10. A flexible diaphragm 21 is disposed within the shell 20 and will have the general shape of said shell and of the outer surface of form 10 so that it extends over the entire outer surface of form 10 rather closely adjacent thereto. Diaphragm 21 is secured to the lower edge portion of shell 20, as shown in Fig. 3, in any suitable manner, such as being secured thereto by a suitable adhesive. Said diaphragm extends under the inner edge of flange 20*a* and is disposed in a recess in wooden portion 10*a*. Conduits 14 extend outwardly and somewhat downwardly from adjacent the bottom of shell 20 and communicate at their inner ends with the bottom of the space between shell 20 and diaphragm 21. Conduits 15 are secured to conduits 14 and extend vertically therefrom, the same being provided at their upper ends with pressure gauges 16. Valves 17 are preferably provided in the conduits 15. The conduits 14 are also provided with valves 18 for opening and closing the same. Diaphragm 21 is preferably made of a sheet of rubber, rubber composition or a combination of rubber and fabric. The shell 20 has a plurality of spaced inlet conduits 22 extending upwardly from the top thereof which communicate with the inner side of said shell, which conduits are preferably provided with suitable regulating valves 23. Quite a large number of ribs 24 are shown extending transversely around the shell 20 and spaced longitudinally thereof. While members 24 could take various shapes, in the embodiment of the invention illustrated they are shown as being made of angle iron, the ends of which are secured to flange 20*a* in any suitable manner, as by welding. Angle irons 30 are secured to the bottom of form 10 and spaced bolts 31 extend through flanges 20*a* and 10*a* and through the horizontal flanges of members 30. Bolts 30 are equipped with nuts 32 which may be welded to angle irons 30.

In carrying out the method of the invention, form 10 will be placed upon the floor or suitable support. The shell 20 may be removed entirely from the form or it may be moved to an elevated position with its flange 20*a* adjacent the upper ends of the rods 11. These rods will be of considerable height and will extend quite a distance

above the form 10. Two or more layers of thin wood veneer 26 will now be laid over the outer surface of form 10 and these layers will be tacked to the form by small nails or tacks driven through the sheets of veneer and into the wooden layer 10*a*. Usually either three or five layers of the veneer are employed. The sheets of veneer will be coated with a suitable adhesive on their contacting surfaces. A keel strip 28*a* forming part of the boat 28, as shown in Fig. 4, will be disposed in the slot 10*e*. Said strip will be curved so that it will fit into said slot. The adjacent edges of the veneer sheets may be tacked or screwed to this keel strip. After the veneer has thus been tacked to the form 10 so as to conform generally to its shape and cover the same, the shell 20 is lowered or placed over the form with the veneer thereon. This shell, due to the ribs 24 and its own weight and the weight of the parts carried thereby, is quite heavy. It will be secured in position on flange 10*a* by bolts 31. Air under pressure is now charged into the shell 20 through inlet conduits 22 and between the inner wall thereof and diaphragm 21 to give a pressure of from 15 to 25 pounds. This air pressure forces the diaphragm 21 against the veneer sheets 26 and the veneer is pressed closely against and molded to the outer surface of form 10. The air pressure is maintained for a short period. The air is then removed by draining or bleeding the same through the outlet conduits 14. As shown, there are two of these conduits at each side of the form and there are two at the rear end of the form. As the air is withdrawn through conduits 14, steam under pressure is admitted through the inlet conduits 22. The steam then gradually replaces the air in the shell 20 above the diaphragm 21 and moves downwardly as the air is removed. The conduits 14 are placed adjacent the bottom of the shell so that all of the air will be removed and there will be no air pockets left in the shell between its inner wall and the diaphragm 21. Steam pressure up to from 40 to 60 pounds is used. The steam pressure causes diaphragm 21 to press tightly against the veneer and mold the same to the form 10 and heat and pressure is thus applied to the veneer by the steam. The heat acts to soften the adhesive and then cause the same to set and dry. The steam pressure is maintained for quite a period, usually from 20 to 40 minutes. The pressures used can be seen on the steam gauges 16. After said period the steam is discharged by opening the valves 18 in the conduits 14. Shell 20 is now elevated on the rods 11 or it may be removed altogether. The veneer is then removed from the form 10 and is now molded into the shape of the boat desired. It may be stated that the boat is provided with a transom 28*b* and this is placed against the rear end of the form 10 and the rear ends of the plywood tacked thereto before the shell 20 is placed over the form 10 and the plywood thereon. When the veneer is removed a boat or other article will be formed, the inside of which will have the same shape as the outer side of form 10. All that is necessary is then to place a gunwale 28*c* on the boat and provide the same with the usual seats and other accessories.

From the above description it will be seen that I have provided a method and apparatus by means of which veneer boats can be very easily and quickly produced. The air and steam pressure molds the boat perfectly to the shape of the form and the veneer and adhesive thereon is set into permanent form by the application of the

heat and pressure of the steam. The boat therefore retains the shape that it has when removed from form 10. The veneer boats have been found in practice to be very strong and rugged and the same are at the same time quite light in weight. A very satisfactory boat is produced and the same may constitute a rowboat, a boat adapted to receive an outboard motor on a large boat known as a cruiser. The method and apparatus have a high degree of utility. For instance, if it is desired to reproduce a boat, the boat may be used as a mold from which to make the concrete form. This is particularly feasible when making boats, such as duck boats. Heretofore it has been the practice to use a large and very expensive autoclave in the molding process. Applicant's mold and shell can be produced at comparatively small expense and can be made by ordinary mechanics in a comparatively short time. Applicant therefore has a method and apparatus which involves a comparatively small amount of capital or expense. The mold and shell is thus capable of being transported without great inconvenience. The method and apparatus have been amply demonstrated in actual practice and found to be very successful and efficient.

It will of course be understood that various changes may be made in the form, details, arrangement and proportions of the apparatus and in the steps and sequence of steps of the method without departing from the scope of applicant's invention, which, generally stated, consists in a method and apparatus capable of carrying out the objects above set forth, such as disclosed and defined in the appended claims.

What is claimed is:

1. A form for use in making an article to be molded comprising a body having an outer surface of the shape of the inside of the desired article, said body having an outwardly projecting flange at its lower side and having an outer layer of wood forming its outer surface, a plurality of vertically extending guide rods at each side of said form extending upwardly from said flange, a metal shell having substantially the shape of said form and having an outwardly projecting flange at its lower side, said last mentioned flange having openings therethrough through which said guide rods are arranged to extend so that said shell can be elevated in alignment with said form and substantially above the upper portion of the same on said guide rods, said shell having a diaphragm therein shaped to extend over said form and secured at its lower edges to said shell and forming a chamber between said shell and said diaphragm, valve equipped inlet conduits at the top of said shell adapted to admit air or steam under pressure and valve equipped outlet conduits adjacent the bottom of said shell.

2. A device for molding a boat having in combination, a form comprising a body of concrete of the general shape of the inside of the boat to be molded, a layer of wood on said concrete, said form having an outwardly projecting flange at its lower side, a plurality of vertically extending rods secured at their lower ends in said flange at each side of said form, a shell having an inner side adapted to extend over said form and of the general shape thereof, said shell having an outwardly extending flange at its bottom, said flange on said shell being provided with apertures through which said rods extend whereby said shell can be elevated vertically in alignment with said form, a flexible diaphragm at the inner side of said shell shaped to extend over the surface of said form, said diaphragm being spaced from said shell but secured thereto at its lower edge, a plurality of inlet conduits at the top of said shell spaced longitudinally thereof and a plurality of outlet conduits adjacent the lower side of said shell spaced longitudinally thereof, and a plurality of reenforcing straps extending transversely over said shell and secured at their lower ends to the flange on said shell.

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