

(No Model.)

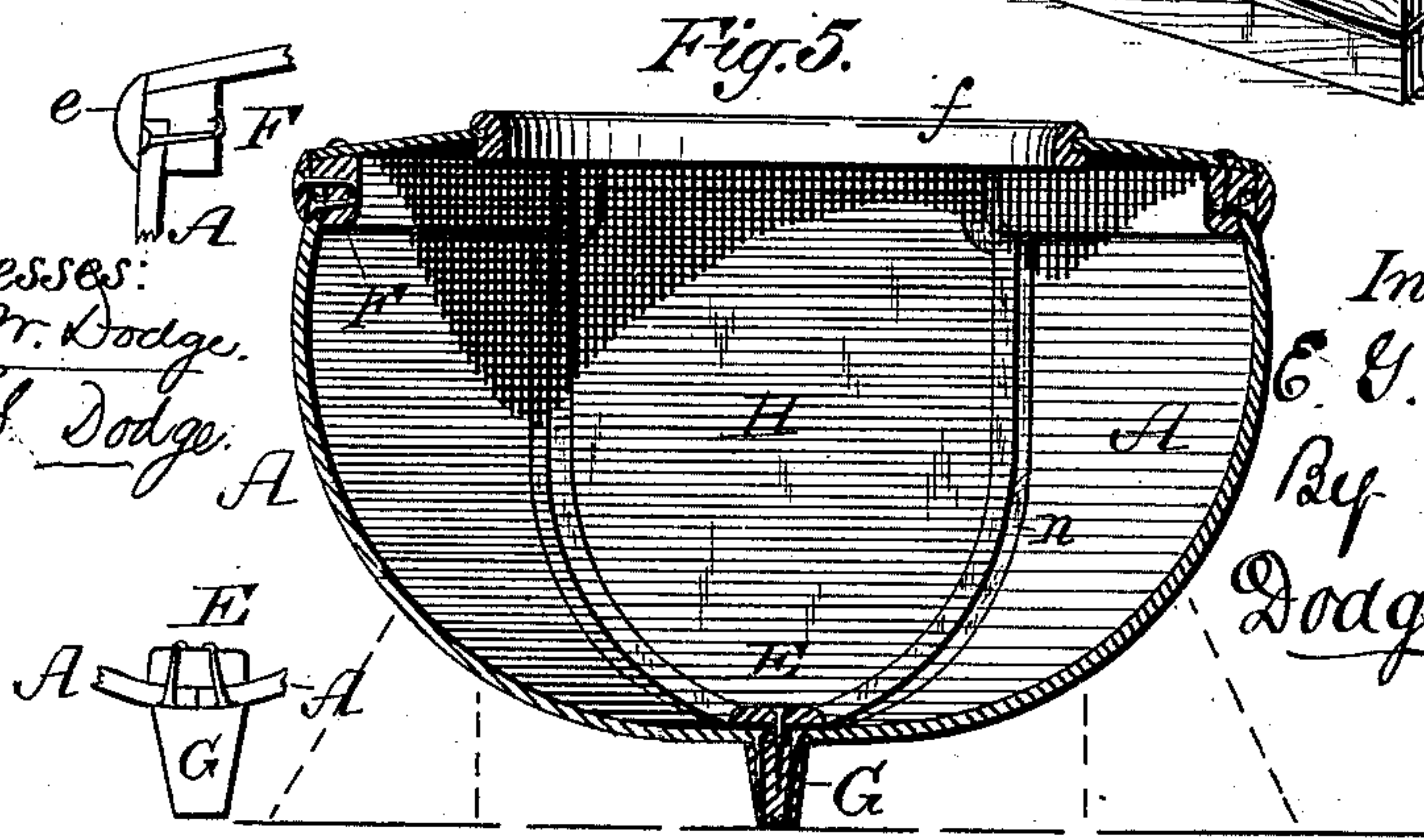
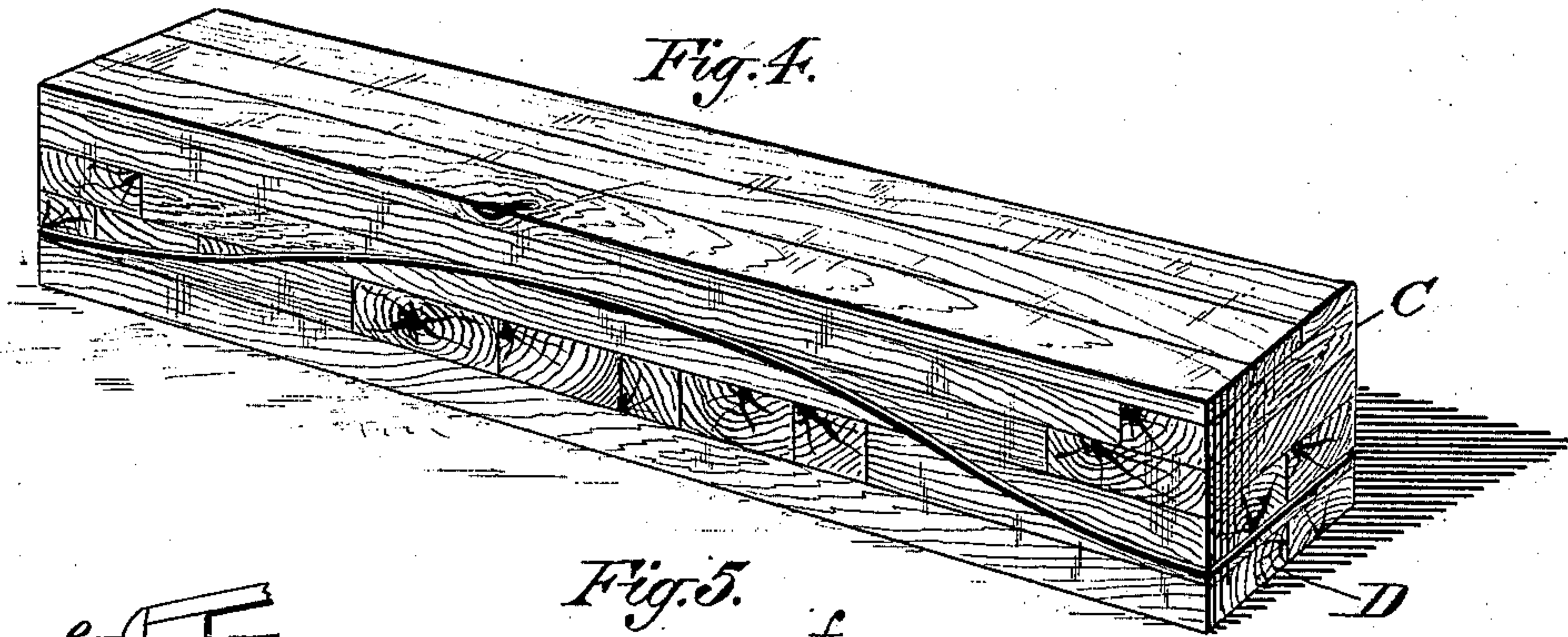
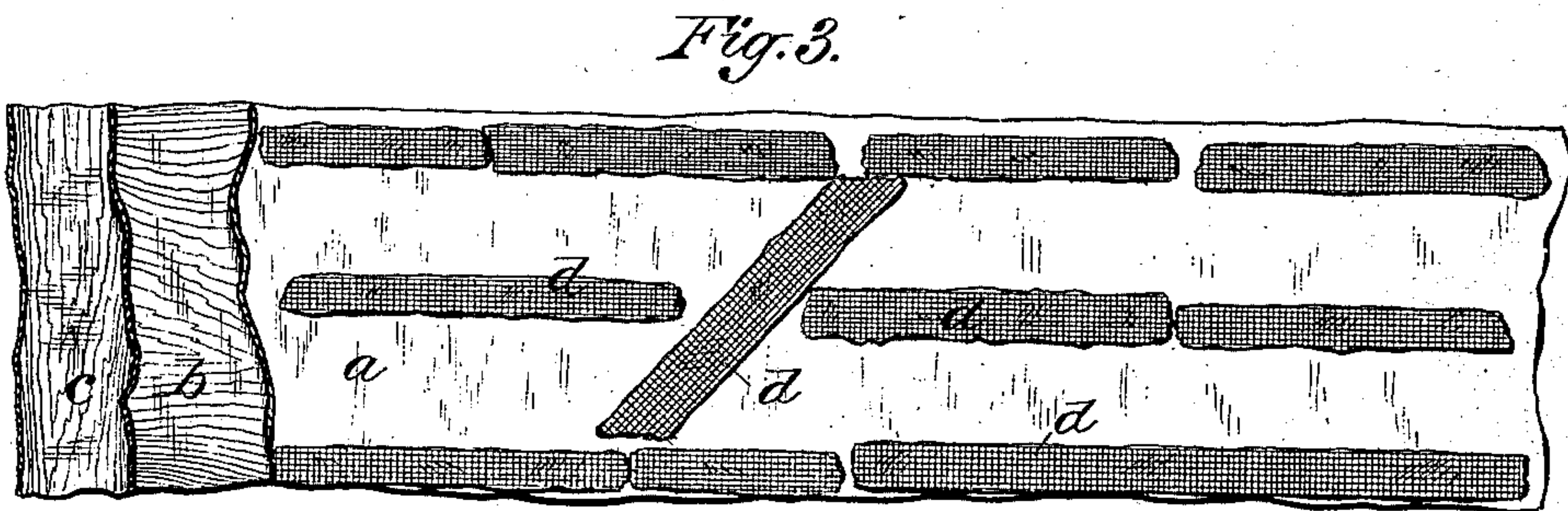
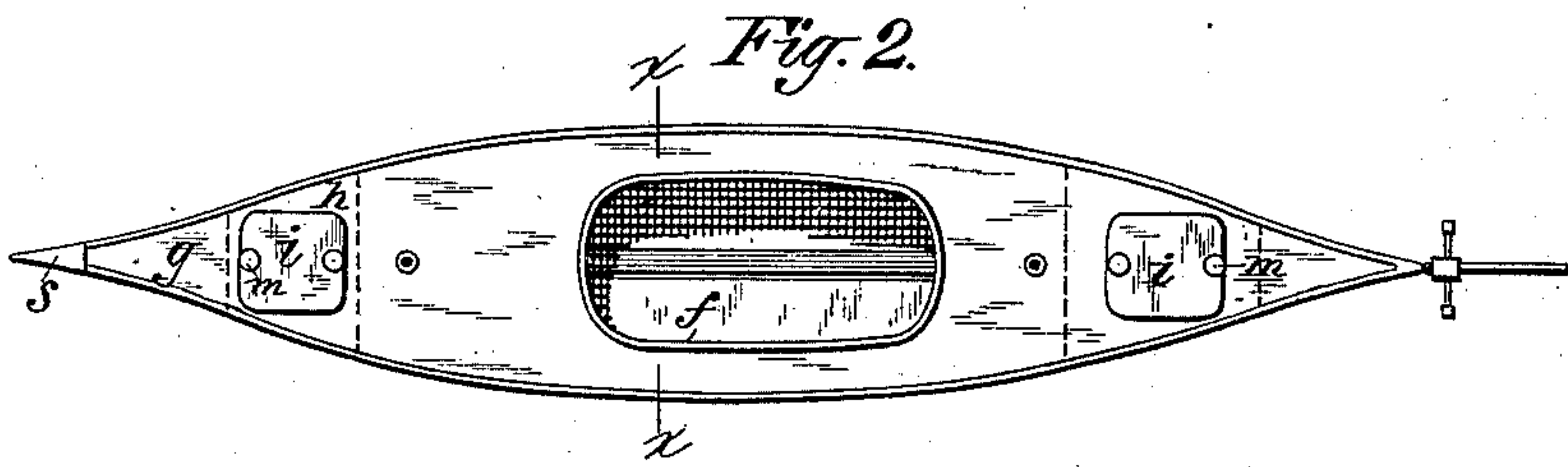
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E. G. DURANT.

BOAT AND METHOD OF CONSTRUCTING THE SAME.

No. 250,717.

Patented Dec. 13, 1881.



Witnesses:
William W. Dodge.
Walter J. Dodge.

Inventor:
E. G. Durant
By his attys
Dodge & Son

(No Model.)

2 Sheets—Sheet 2.

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Fig. 6.

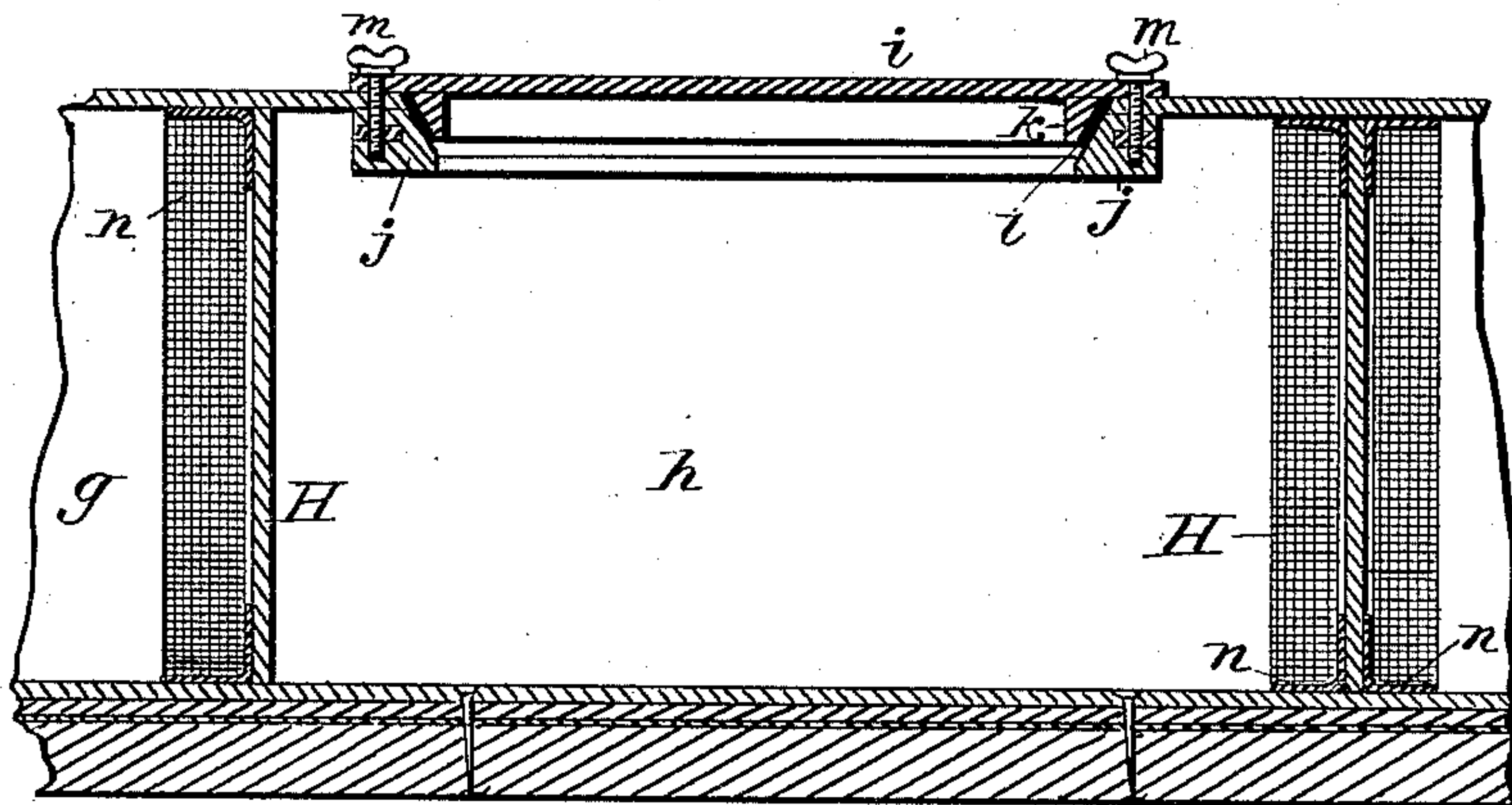


Fig. 7.

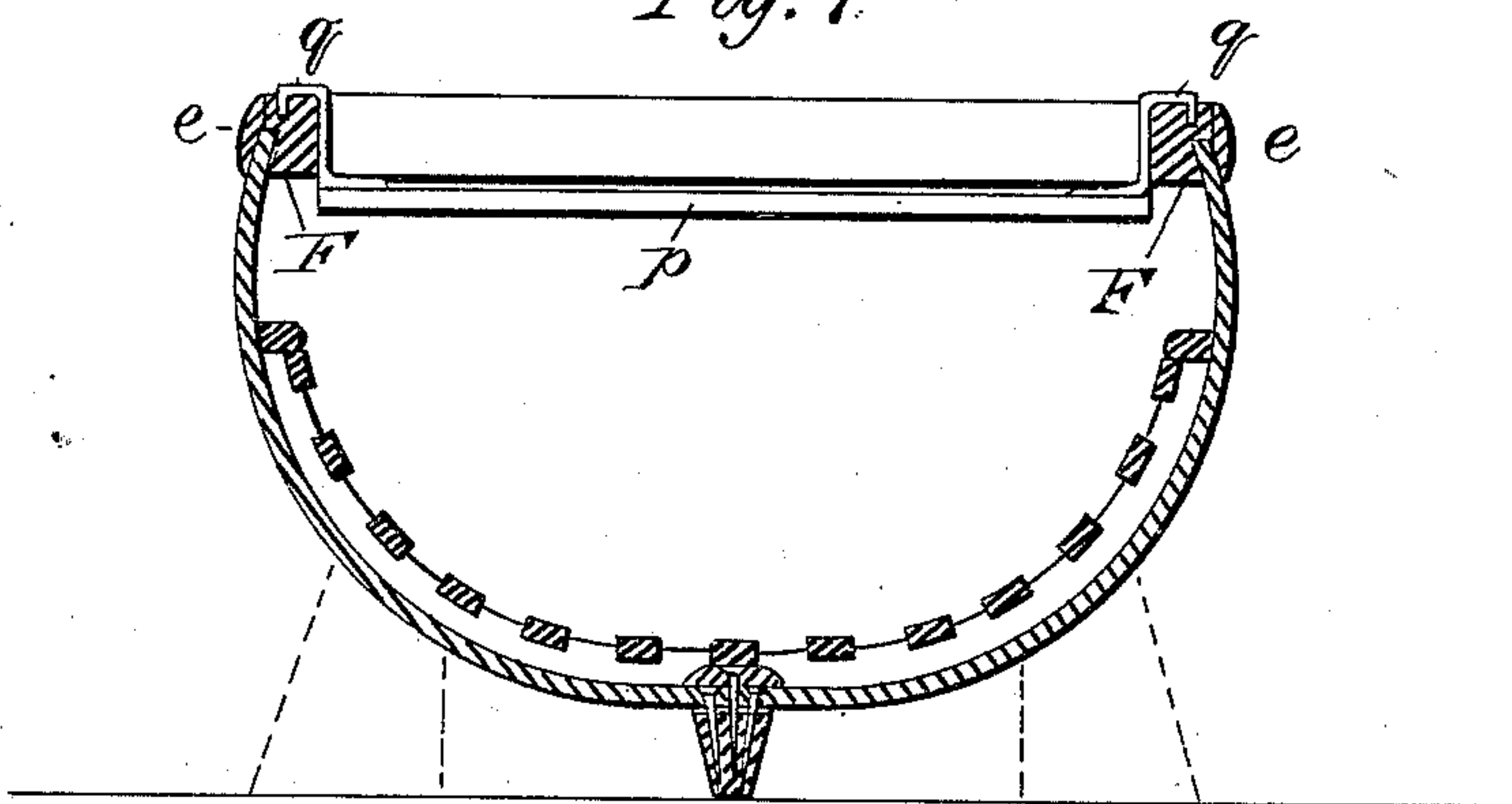
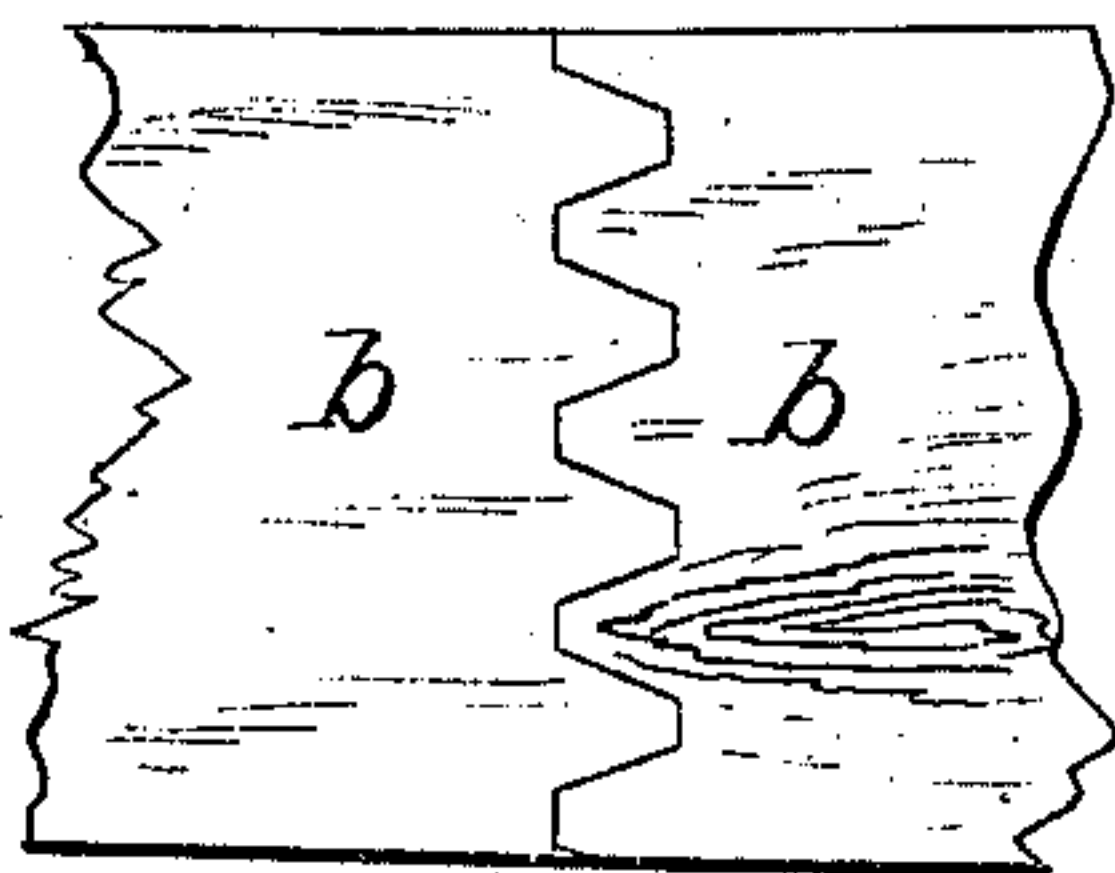


Fig. 8.



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UNITED STATES PATENT OFFICE.

EDWARD G. DURANT, OF RACINE, WISCONSIN.

BOAT AND THE METHOD OF CONSTRUCTING THE SAME.

SPECIFICATION forming part of Letters Patent No. 250,717, dated December 13, 1881.

Application filed November 30, 1880. (No model.)

To all whom it may concern:

Be it known that I, EDWARD G. DURANT, of Racine, in the county of Racine and State of Wisconsin, have invented certain Improvements in Boats and Methods of Constructing the Same, of which the following is a specification.

My invention relates more particularly to the construction of canoes, racing-shells, open row-boats, and other small boats.

The object of the invention is to reduce the cost of construction and give the boats great strength, durability, and elasticity.

To this end it consists in the manner and method of constructing the hull, and in the form and arrangement of various details, hereinafter fully explained.

My boat is ordinarily made without ribs or knees, the skin or body portion of the hull being molded into form and secured to a framing composed, ordinarily, of the keelson, stem and stern posts, and gunwale-strips. The body or skin is composed of two or more layers of wood veneer, which have their grain arranged diversely and their contiguous surfaces coated with glue or cement, and which are pressed together and molded permanently into the required forms, by means of powerful pressure between suitably-shaped molds or dies, usually from twelve to twenty-four hours. The pressure of the dies forms and sets the layers to the exact shape desired, and causes them to adhere inseparably to each other. Owing to the fact that the layers are each bent, shaped, and set upon the others in the mold before the firm adhesion takes place between them, and the fact that the diversity of the grain causes the layers to cause expansion and contraction of each other, it is found that the skin or body thus formed is very stiff, strong, and elastic; that it will resist severe strains and shocks, and that it will retain its original lines under the most extreme and unequal changes in temperature. The entire body or skin may be made in one piece, but it is preferred to make each side in a separate piece or section and unite the two along the keel. In forming the body sheets of cloth or other fibrous material may be applied permanently upon or between the layers of veneer.

In order to prevent the veneers from split-

ting or crimping when under pressure, owing to the fact that they are stretched at one point and condensed at another, I glue or cement narrow strips of cloth to the inside or outside faces, or both, transversely to the direction of the grain. These strips may be permitted to remain, or when on the outside they may be removed after the pressure is completed. The location of the cloth strips will vary with the forms of the boats and the requirements of each case.

Ordinarily the skin is composed of three layers of veneer, the inside layer having its grain arranged lengthwise of the boat, while the two external layers have the grain arranged crosswise of the boat, and in this case the cloth strips are generally applied along the edges and across the middle of the outside layers. After the skin or body is removed from the die it is ordinarily put on a form to keep it in shape. The skin or body, if possible, while it is still green from the dies, is placed upon a mold of the exact form of the boat, and secured to the keelson and gunwale-strips mounted in recesses in the mold, after which it is laid away to dry and season, ordinarily for a period of from ten to fifteen days. When dry it is scraped to smoothness and then the wood thoroughly filled and finished with any ordinary or suitable wood fillers and varnishes to adapt it to resist the action of the water.

The skin is preferably secured to the frame by nails, and before being finished all the joints are thoroughly filled with lead cement to exclude the water. It is important that the edges of the veneer shall be protected as far as possible from the water and the sun, and for this reason the frame is recessed and grooved, as hereinafter described, to confine and cover said edges.

In order to adapt the boat for use in rough water, I provide it, when required, at one or both ends, and also along the sides, if desired, with a deck constructed in the same manner as the skin. Transverse water-tight bulk-heads are arranged in the ends to form safety air-compartments and storage-compartments. These bulk-heads are connected with the skin and the deck by means of canvas or sheet rubber cemented to and having a wide bearing with the surfaces of both the bulk-head and the skin. This connection maintains a tight

flexible joint, and prevents leakage in case severe strains or shocks should twist or strain the hull and start the bulk-head from its place.

In order to give the boat additional strength and tie the sides together at the top, I make use of thwarts which have their ends provided with metal arms or hooks engaging detachably with the gunwales or other side pieces of the frame. For the purpose of protecting the interior of the boat from injury it is provided with a grating which is made removable bodily. This grating consists of transverse ribs adapted to fit closely but loosely against the inside of the body, and of longitudinal strips or slats nailed or otherwise secured to the ribs. To the grating made as above I sometimes connect the oar-locks and one or more of the thwarts.

Referring to the accompanying drawings, Figure 1 represents a side elevation of a decked canoe constructed on my plan; Fig. 2, a top-plan view of the same; Fig. 3, a side view, showing the manner of arranging the veneers and the strengthening-strips thereon previous to their introduction between the dies; Fig. 4, a perspective view of the dies with the material between them; Fig. 5, a cross-section of the canoe on the line *xx* of Fig. 2; Fig. 6, a longitudinal vertical section on the line *yy*; Fig. 7, a cross-section of an open boat with the removable thwarts and grating therein; Fig. 8, a view showing the manner in which the sheets of veneer are united at their ends.

Referring to Fig. 3, which represents the sheets to form one side of the boat ready for introduction between the dies, *a*, *b*, and *c* represent the three veneers, laid one upon another, with the grain of the central sheet running lengthwise and the grain of the outside sheets running crosswise. The cloth strips *d*, to strengthen the veneers and preserve their integrity during the action of the dies, are glued or otherwise fastened upon the face of the outer veneers, as shown. Before the veneers are placed together, glue, rubber cement, or other strongly-adhesive material is applied, so as to entirely cover their contiguous surfaces. If the veneers cannot be obtained of the required length in one piece, two or more pieces have their ends indented and fitted together in the manner shown in Fig. 8, or in any equivalent manner which will cause them to interlock and break joints. After the sheets are prepared as above they are placed between the dies *C* *D*, which are made of great strength and solidity, and of the exact form which it is required to give to each side of the hull. The dies may be made of wood, metal, or other suitable material, and, if desired, may be provided with a steam or air space for heating them; but this is not necessary in ordinary cases. The sheets being placed between the dies, the latter are brought together and the pressure increased to a high degree and continued until the sheets are bent and set permanently to the required form and caused to adhere firmly to each other.

The result is a strong, tough, and elastic skin or body, *A*, adapted to form one side or half of the hull. A second half is then made in like manner, after which the two parts are applied at their lower edges to the outside of the keelson *E*, and at their upper edges to the outside of the respective gunwale-strips *F*, which will be sustained in the meanwhile by suitable molds or frames, such as are commonly used in boat-building, or by any other means which will give the parts temporary support. The gunwales are rabbeted to receive the edge of the skin or body *A*, and the edges are secured to the gunwale and keelson by nails or rivets, as shown, the joints being made as close as possible, and filled with lead paint or cement. After the bottom joint is nailed the edges are covered and secured by a keel, *G*, applied to the outside, so as to overlap the edges of the two sides, and secured firmly in place by screws or nails, connecting the keel and the keelson. The upper or gunwale joints are covered and protected by an outside bead or strip, *e*, nailed to the gunwale, as shown.

When the boat is made with a deck it is constructed of veneers laid together and subjected to pressure in the same manner as the body. The deck, being cut to the desired form, is nailed at its outer edge to the top of the gunwale, and the joint covered by the before-mentioned bead *e*. The inner edges of the deck, which may cover a greater or less portion of the boat, are protected by a combing, *f*, which is grooved to receive the edge of the deck, and cemented firmly thereto, nails or other fastenings being added, if necessary. Each end of the canoe is provided outside of the cockpit with two transverse bulk-heads or partitions, *H*, producing two tight compartments, *g* *h*, in each end of the boat. The end compartments, *g*, remain closed air-tight, and are intended to prevent the swamping of the boat; but the compartments *h* are designed to receive provisions, baggage, &c., and are provided with top openings closed by removable covers *i*. The openings are encircled by internally-beveled frames *j*, secured to the deck, and the covers are provided with depending beveled flanges *k*, covered with rubber packing *l*, whereby a water-tight joint is produced when the cover is forced down in place. Thumb-screws *m*, or any equivalent means, may be used to secure the covers in place.

The bulk-heads are made of wood, battened, if necessary, to give them stiffness, and are fitted closely to the inside of the boat. They are secured in place by sheet-rubber, canvas, or equivalent material, *n*, applied as shown in Figs. 5 and 6. The sheet covers the joint around the bulk-head and laps over widely upon the interior of the hull and deck, and is cemented firmly in place. In the event of the joint being opened in any manner immediately around the edge of the bulk-head, the canvas or rubber, maintaining hold at its edges, will form an elastic water-proof connection between

the parts, and thus prevent the admission of water into the compartment.

When the boats are built very light, or when loaded heavily, it is desirable to tie them together from side to side. This I accomplish, as shown in Fig. 7, by providing the thwart or seat *p* at its ends with metal sustaining arms or hooks *q*, having lips which engage in notches in the gunwale. When, as in the case of a canoe, the boat is decked at the sides the hooks *q* may engage in sockets secured to the inside or under side of the gunwale, or to the upper side of the grating, to prevent it from spreading the boat.

The stem is covered and the parts are bound together by a hollow nose, *s*, fitted thereon, as shown.

The form of the boat and the arrangement of the details, other than those forming parts of my invention, may be changed as desired.

The dies may be forced together by means of a screw-press, or in any other suitable manner.

In practice I find that good results may be secured by introducing an intermediate layer of wire-gauze in place of or in addition to the central veneer, and also that in place of or in addition to the narrow strengthening-strips of cloth, a line of heavy stitching of thread, cord, or wire may be run in the veneers to keep them from splitting.

I am aware that boats have been constructed by riveting or nailing a series of planks upon a supporting-frame, and securing the edges of the numerous planks to each other by riveting them together, the planks being steamed and bent upon the frame by hand, one at a time, reliance being placed solely upon the frame to keep the planks in the required position.

I am also aware that racing-shells have been constructed of a single thickness of wood in two pieces, the wood being steamed and bent into place upon the previously constructed frame of the boat, and being secured thereto by means of numerous rivets or nails, reliance being placed upon the frame to give the required strength and rigidity to the structure, and to keep the skin or covering in shape.

I am also aware that boats have been constructed of paper, the latter being moistened and worked by hand into the required form and maintained in position by means of a sustaining frame and braces.

I am also aware that it has been proposed to construct the hull of a boat of the compound known in the art as "celluloid" in a single thickness by bending or molding the same into the required form upon a previously constructed hull or frame, and securing it hermetically thereto.

I am also aware that it has been proposed to form a boat of a plastic compound of gutta-percha and glue by the application of heat and pressure in a mold.

I am also aware that it is old to glue a number of wood veneers together to produce a com-

pound boat, commonly denominated "scale-board," and that it has been stated that said material could be used as a substitute for other materials in the construction of boats, ships, &c., such statement being unaccompanied by any directions or illustrations to indicate the manner in which the material could be applied or made available.

I make no claim to either of the methods described above, my method and the structure produced thereby differing materially from all others which have preceded it.

Having thus described my invention, what I claim is—

1. As a new article of manufacture, a wooden boat having its hull or skin composed of two equal unbroken sheets, each sheet composed of two or more veneers cemented together, with the grain diversified and set permanently in the required form.

2. The improved boat, consisting of two gunwale-strips, a keelson or keel, and two equal boat-sections, pressed and set up rigidly in form and composed of three or more layers of veneer cemented permanently together, with their grain lying in different directions.

3. The herein-described method of constructing boats, consisting in forming in dies two longitudinal half-hulls, alike in form and size, and joining them together at their inner edges.

4. As a new article of manufacture, a molded or pressed half-hull for a boat the two ends of which are identical in shape and size.

5. A laminated half-hull for a boat, pressed and molded permanently into form, and adapted to retain its form when in use without the assistance of sustaining-ribs, substantially as described and shown.

6. The improvement in the art of constructing hulls, or parts of hulls, consisting in placing two or more wooden veneers with diversified grain one upon another, coating their adjacent surfaces with adhesive material, subjecting them before the material sets and hardens to the action of dies of the exact form of the required boat, whereby the individual veneers are bent, set, and united one to another in such manner as to produce a strong self-sustaining hull.

7. In a boat, the laminated hull-sections having the lower edges inserted between the keel and keelson, and secured substantially as described.

8. As an improvement in the art of manufacturing wooden boats, the method of preventing the rupture of the wooden sheets while molding the same in curved dies, consisting in cementing narrow strips of cloth or other fibrous material thereto transversely with relation to the grain of the wood.

9. The combination of the laminated hull, the rabbeted gunwale, and the covering strip or body with the bulk-head secured by means of canvas, or its equivalent, cemented to the hull and the bulk-head, substantially as described and shown.

10. The laminated hull, having the different sheets of each lamina united at the ends by means of interlocking lips, as described and shown.

5 11. A pair of dies, substantially as herein described, constructed with two ends alike in form and size, and adapted to press wooden

sheets into such shape that each will form one-half of a hull for a boat.

EDWARD G. DURANT.

Witnesses:

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