

(No Model.)

2 Sheets—Sheet 1.

J. P. WRIGHT.

COLLAPSIBLE OR FOLDING BOAT.

No. 325,374.

Patented Sept. 1, 1885.

FIG. 1.

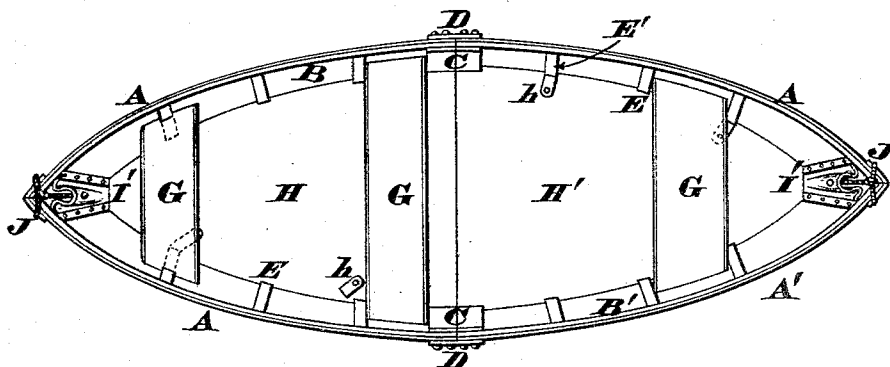


FIG. 2.

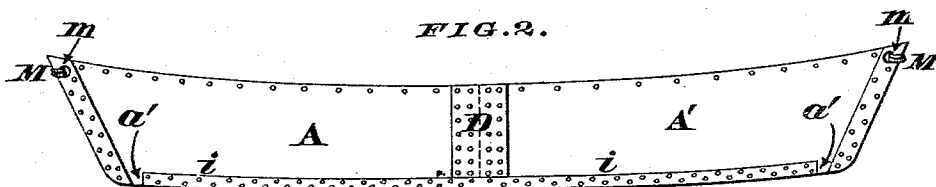


FIG. 4.

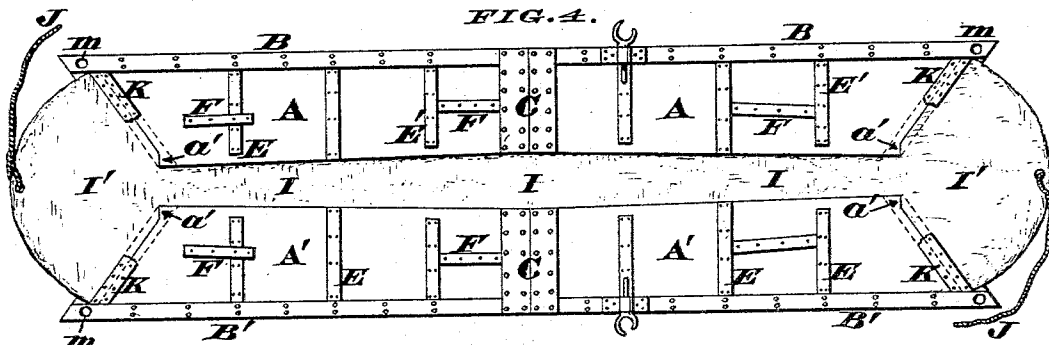


FIG. 6.

FIG. 5.



FIG. 3.

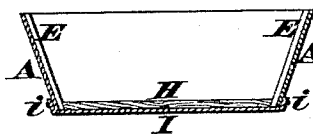
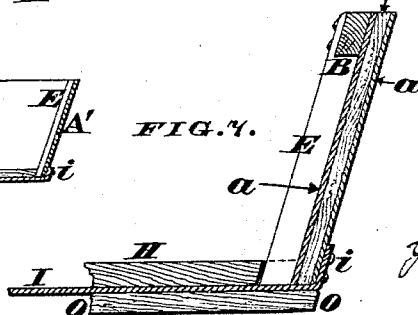
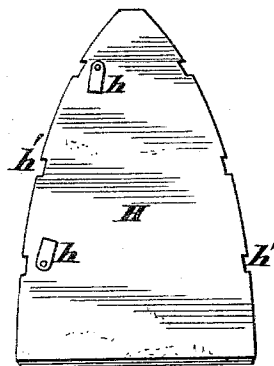


FIG. 4.



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FIG. 8.

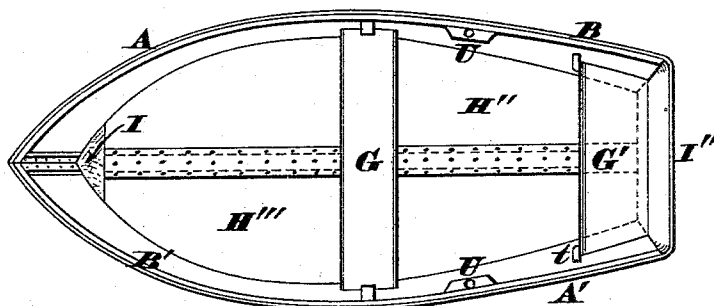


FIG. 12.

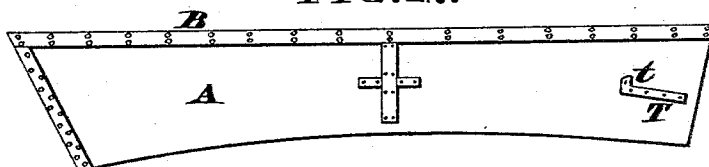


FIG. 10.

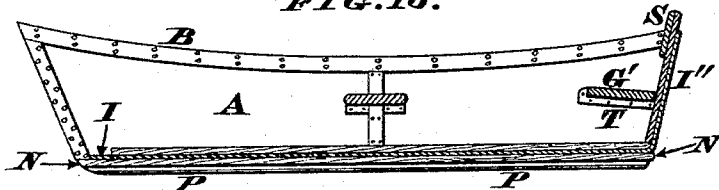


FIG. 11.

FIG. 9.

FIG. 13.

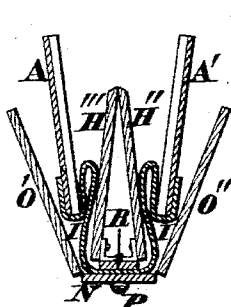


FIG. 14.

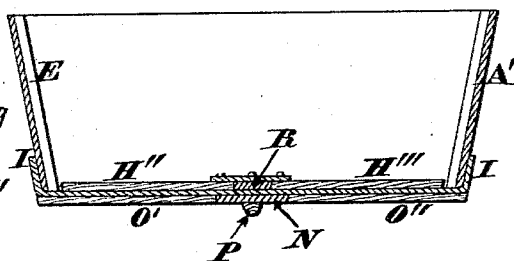


FIG. 15.

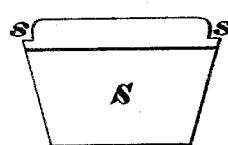


FIG. 16.

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UNITED STATES PATENT OFFICE.

JOHN PYNDAR WRIGHT, OF REDHILL, COUNTY OF SURREY, ENGLAND.

COLLAPSIBLE OR FOLDING BOAT.

SPECIFICATION forming part of Letters Patent No. 325,374, dated September 1, 1885.

Application filed October 4, 1884. (No model.) Patented in England March 4, 1882, No. 1,056.

To all whom it may concern:

Be it known that I, JOHN PYNDAR WRIGHT, a citizen of Great Britain, residing at Redhill, in the county of Surrey, England, have invented certain new and useful Improvements in Collapsible or Folding Boats, (for which invention an English patent was granted to me March 4, 1882, No. 1,056,) of which invention the following is a specification, reference being had therein to the accompanying drawings.

My invention comprises a novel construction of flat-bottomed boat, the sides of which are capable of being bent or sprung longitudinally to assume any desired curve, while at the same time said sides are sufficiently yielding or flexible to become straight, or practically so, in the direction of their length when relieved from the force that bends them. These flexible sides are connected at their lower edges to the opposite margins of a suitable elastic and water-proof material that constitutes the bottom of the boat, and upon which rests the wooden floor. Furthermore, when it is desired that the boat should simply collapse or close together, its sides are permanently united at their opposite ends by canvas hinges; but when a folding boat is constructed these ends are temporarily connected with rope lashings or other suitable fastenings, the sides of the folding boat being composed of two or more sections properly hinged together. Said hinges are preferably made of water-proof material applied externally to the sides of the boat, and being sewed or otherwise fastened to the elastic bottom. By this arrangement a boat is afforded whose length and breadth can be greatly diminished, thereby facilitating the transportation of such a vessel. The wooden floor, previously alluded to, is fitted snugly inside the boat and rests on the water-proof or elastic bottom, said floor being so shaped as to cause its insertion to force the sides of the vessel out to the desired curve, said bottom being practically of the same form as said floor. This wooden floor is made of any required number of pieces, and is provided either with bolts, buttons, or other convenient retaining devices that hold said floor in its proper position and prevent it being lifted by the upward pressure of the water. Furthermore, this floor may

either be detachable from the sides and elastic bottom, or it may be hinged to the sides, or to a keel, which latter can be attached to the elastic bottom. Finally, an outside or false bottom of the same shape as the inside floor may be secured directly under the elastic bottom by means of hooks or lashings or other equivalent devices, said false bottom being made of wood or heavy canvas, or both of these materials; but when a keel is used the false bottom may be hinged thereto, as hereinafter more fully described.

In the annexed drawings, Figure 1 is a plan of a combined collapsible and folding boat embodying my invention. Fig. 2 is an outside elevation thereof. Fig. 3 is a transverse section of the same. Fig. 4 is a plan of the inner side of the boat, the sides thereof and their connected bottom being laid out perfectly flat. Fig. 5 is a perspective view showing said boat folded up, ready for transportation. Fig. 6 is a plan of one of the floor-boards. Fig. 7 is an enlarged vertical section through one side of the boat. Fig. 8 is a plan of a simple collapsible boat in condition for use. Fig. 9 is a transverse section thereof. Fig. 10 is a longitudinal section of the same. Fig. 11 is a transverse section of the closed boat. Fig. 12 is a plan of one side of the same when lying flat. Fig. 13 represents the back-board of this boat. Figs. 14 and 15 are transverse sections showing the application of air-chambers to the boat. Fig. 16 shows a method of fastening cork to the sides of the boat.

The two sides A A' of the boat are made of thin pine or other suitable wood, and are preferably covered, both externally and internally, with canvas *a a*, as seen in Fig. 7, which canvas is cemented or glued in place; but said sides may be formed of thin wood only, the canvas covering being omitted. The sides can then be subsequently painted or varnished, or coated with any water-proof composition. Strips of wood B B' are fastened along the upper edges of the sides A A' to form gunwales, and other strips, C, are secured at right angles to said gunwales to afford attachments for the hinges D, another set of strips, E, being provided to serve as guides in inserting the floor. Horizontal strips F are placed at proper intervals to support the seats G. Some of the guide-strips, as E', do

not extend quite down to the bottom, thereby enabling them to serve as stops that retain the floor-boards H H' in position, as these boards, when the boat is opened, can be slipped in under said strips on one side, and be fastened on the opposite side of the boat by turn-buttons h or their equivalent devices.

To the lower edge of each side A A' the opposite margins of the elastic water-proof bottom I are attached and carried up an inch or two on the outside of the boat, as seen at i in Figs. 2, 3, and 7, where said margins are nailed and cemented to exclude water. This bottom may be composed of canvas that is rendered water-proof either by painting or otherwise.

In order to allow the boat to fold readily in any direction, said bottom I is brought to the inside through saw-cuts a', situated a few inches from the ends of the side pieces, A A'. This elastic material I is then carried up on the inside as far as the gunwales B B', so as to be elevated some distance above the water-line when the boat is opened, thus forming loose folds I', which are secured and kept up with the cords J, as seen in Fig. 1, or with lashings M, as represented in Fig. 2. These folds, however, are flat when the sides A A' are in the horizontal or open position seen in Fig. 4. The edges of the canvas extending from the kerfs a' to the gunwales B B' are then protected with thin strips or plates K.

In order to allow the boat to fold to half its length, hinges D, of canvas, painted or otherwise rendered water-proof, are provided, and to exclude the water are first sewed to the elastic bottom I, and then nailed and cemented to the exterior of the sides A A', one or more thicknesses of canvas being used, according to the strength required; or the hinges may be metallic, due provision being made for the exclusion of water by carrying the water-proof material I continuously until it extends above the water-line of the boat. The wooden floor H H' is shaped to the curve desired to be imparted to the sides A A', and is made in any convenient number of sections or pieces, but in this case of two sections, which rest on the elastic bottom I. Notches h' are cut in the edges of the floor, to clear the vertical strips E and E' when said floor is fitted in place, which insertion of the sections H H' preserves the sides A A' in exact relative position to each other.

The ends of the boat may be connected at top by any suitable means—such as hooks, or screws, or other devices—but the lashings J or M will be found very convenient and not liable to be lost. An outer protecting-bottom, O, of wood, covered on either or both sides with canvas, may be made of the same size and shape as the floor H H', and be secured underneath and outside the boat by lashings or otherwise. This false bottom will prevent the elastic member I from being cut or damaged when the boat is in use. As the hinges D are external, and the sides A A' are stayed and

held together by the elastic bottom I and fastenings J or M at the same time that said sides are forced apart by the floor H H' and seats G, it is evident the boat can be made to assume the curves most appropriate for a flat-bottomed vessel.

To fold such a boat in the most compact space, the floor-boards H H' and seats G are removed, and the lashings J or M are detached, thus allowing the sides A A' to be laid over flat, as seen in Fig. 4; and as the elastic bottom I was carried up a few inches before reaching the ends of the boat, it will be found that the sides at their nearest points will be about three or four inches apart. The hinges D being on the outside, it is convenient to turn that side uppermost, and then each side will fold together on its own hinge, and the two sides can be laid over the one on the other, as seen in Fig. 5.

In the modification of my invention seen in Fig. 8 the sides A A' are hinged or connected together at the bow with a strip or strips of water-proof canvas, which is first sewed to the bottom I, and then attached to and connected with said sides, as previously described. At the stern the material forming the elastic bottom I is continued upward at I' as far as the gunwales B B', thus connecting the two sides A A' and forming the rear end of the boat. A strip of wood, N, (seen in Figs. 9, 10, and 11,) is carried along the entire length of the outside of the elastic bottom I, against the under side of which a keel, P, may be fastened, and the two pieces of wood O' O', which are shaped to correspond with the bottom of the boat, are hinged to the opposite edges of said strip N, thus forming a false bottom capable of being folded up when the boat is closed. Inside the elastic bottom I another strip, R, is carried along the center of the boat, but not quite up to the bow thereof, as the boat would not fold compactly if this strip R should be too long.

To the strip R the longitudinally-divided floor-pieces H'' H''' are hinged, so as to fold upward in the same manner as the false bottom O' O', said floor-pieces being held down with buttons or otherwise.

To stiffen the stern and preserve its shape, a back-board, S, is applied, the lower edge of which rests on the floor H'' H''', while notches s are provided to slide in under the gunwales B B'. By this arrangement the back-board is prevented shifting upwardly. Said back-board is kept from moving forward by the seat G', and the water-proof material I'', inside which it is placed, stops the board from shifting rearwardly. Strips T, having stops t at front, are provided to support the stern seat G'.

As it is desirable in this form of boat that if a keel is to be fitted thereto the floor of the vessel shall be flat or level, and not rising at the ends, as seen in Fig. 2, it is necessary if any outward inclination be given to the top of the sides A A', when the boat is opened, as

shown in Fig. 9, that the lower edge of each side shall be shaped to a suitable curve, as represented in Fig. 12. The folding floor may, if preferred, be replaced by loose pieces to lift out and be removed bodily, as at H H' in Figs. 1, 3, and 6, and the false bottom O' O'' be entirely omitted or made in one or more pieces and attached under the bottom I by lashings or otherwise, as might be the most convenient. Pieces of wood U can be attached to the gunwales B B' and arranged to receive thole-pins or rowlocks.

In another modification of my invention I provide a complete outer covering of waterproof material having air-chambers along the entire length of each side A and A', and connected at the opposite ends and at the bottom by similar water-proof material, preferably india-rubber and canvas combined; but any arrangement of air and waterproof fabric or fabrics may be used. These air-chambers are shown in transverse section at V in Fig. 15, and are connected with a continuous water-proof bottom, the said chambers being joined at their ends, so as to exclude water from the interior of the boat.

The sides of the boat seen in this illustration need not be connected by a continuous water-proof elastic bottom, as previously described; but to save weight the sides may be maintained in their proper position and the floor-boards be supported by bands of canvas or any other suitable material placed at intervals and crossing the boat from side to side.

The air-chambers V' seen in Fig. 14 are represented as being attached to the sides of the boat by straps W, the free ends of which engage over hooks on the inside of the vessel.

The sides A A' of either of the above-described boats can be rounded on their outer surfaces by having loose folds of canvas carried along and nailed to the edges of said sides, thereby affording pockets that can be filled with cork cuttings or other light material or materials capable of increasing the buoyancy of the boat. These pockets are seen at X in Fig. 16; or said sides can be covered with solid cork, which is then shaped and covered over with canvas, the cork, even when several inches thick, being sufficiently flexible to permit the ready folding of the boat.

Any of these boats can be used for constructing ponton-bridges, in which event they may be divided into two or more water-tight compartments by carrying up above the water-line, at any point of the boat's length, a piece of canvas first sewed to the elastic bot-

tom, and then nailed and cemented to each side of the boat; or two boats, as shown in Figs. 8 to 13, may be made to attach to each other stern to stern, and thus form a long boat, which when collapsed would be easy to transport.

I am aware that folding boats have been made with flexible sides in one piece, or in sections of non-flexible material so hinged together that they formed a succession of straight lines inclined to each other, thereby affording the general outline of a boat; but in this latter case the opposing ends of the hinged sections are necessarily cut off at an angle of less than ninety degrees, so that no two sections being unfolded and the opposing ends being in contact, would form a straight line.

I claim as my invention—

1. A folding boat having flat flexible sides A A', coupled together by external hinges, D, of water-proof canvas or its equivalent, said sides being connected at their lower edges by a flexible water-proof bottom, I, which is carried up inside the boat, as at a' a', and then secured to said sides, lashings J, or other convenient devices, being employed for temporarily uniting the opposite ends of the vessel, substantially as herein described.

2. The combination, in a boat of the class specified, of flexible sides A A', gunwale-strips B B', notched floor-boards H H', turn-buttons h, guide-strips E, external hinges, D, flexible water proof bottom I, seats G, fastenings J, and detachable protecting-bottom O, for the purpose described.

3. The combination, in a folding boat, of hinged sections united at their lower edges by a flexible water-proof bottom, which flexible material is carried up inside the boat, and near the opposite ends thereof, for the purpose specified.

4. A flexible flat-sided folding boat having hinges of water-proof canvas attached to the outer surface thereof to allow such a boat to fold outwardly for the purpose of diminishing its length, the meeting ends of the hinged sections being cut at an angle of ninety degrees, and the hinged section of each side when unfolded forming a continuous straight line, substantially as herein described.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN PYNDAR WRIGHT.

Witnesses:

A. V. STREARFIELD,

R. C. HODRINGTON,

Both of the Bank of England.