J. VAGHI.

FOLDING BOAT.

APPLICATION FILED SEPT. 30, 1909.

955,020.

Patented Apr. 12, 1910.

4 SHEETS—SHEET 1.

Fig. 1.

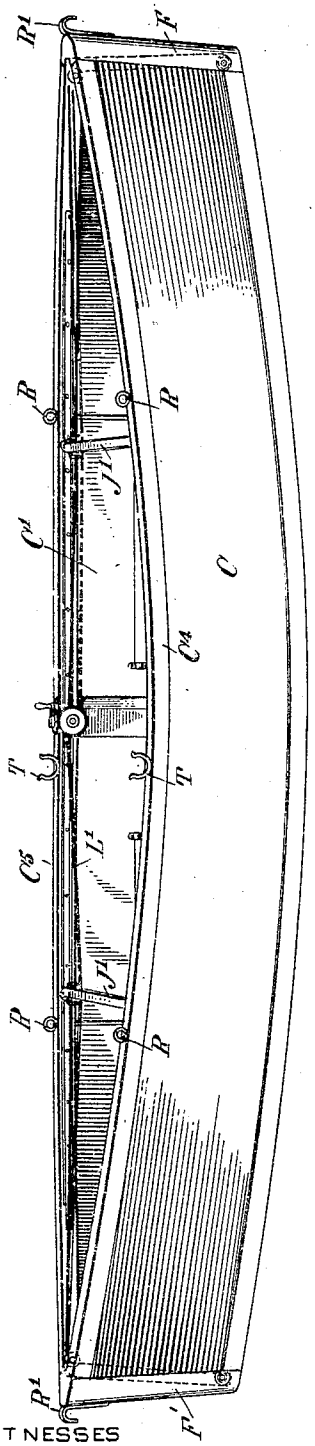
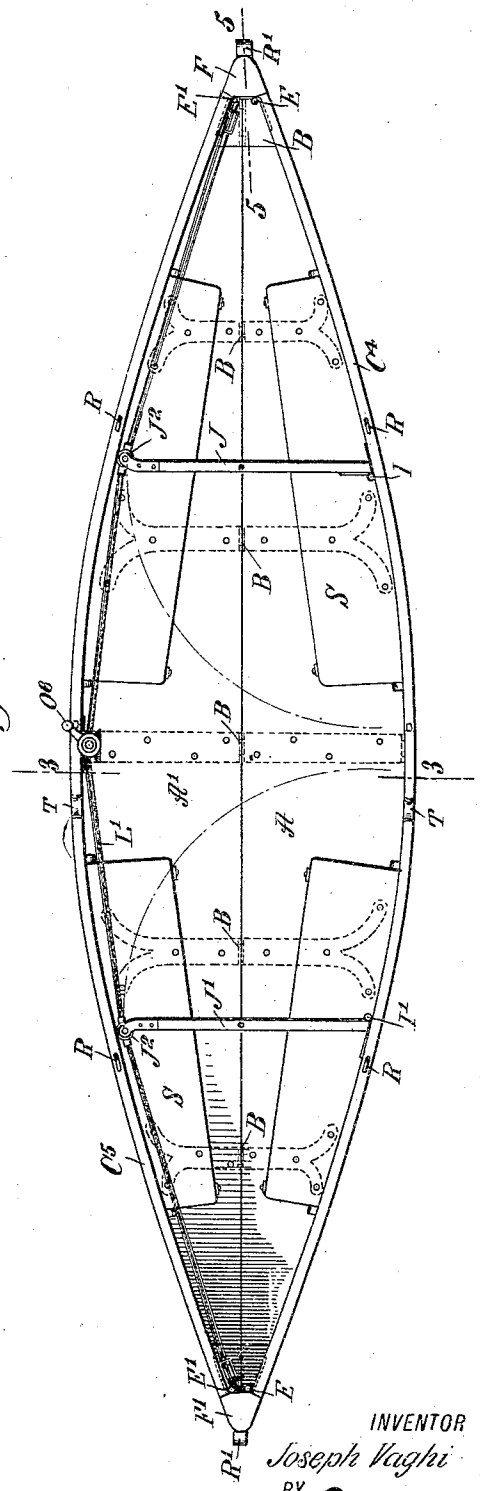


Fig. 2.



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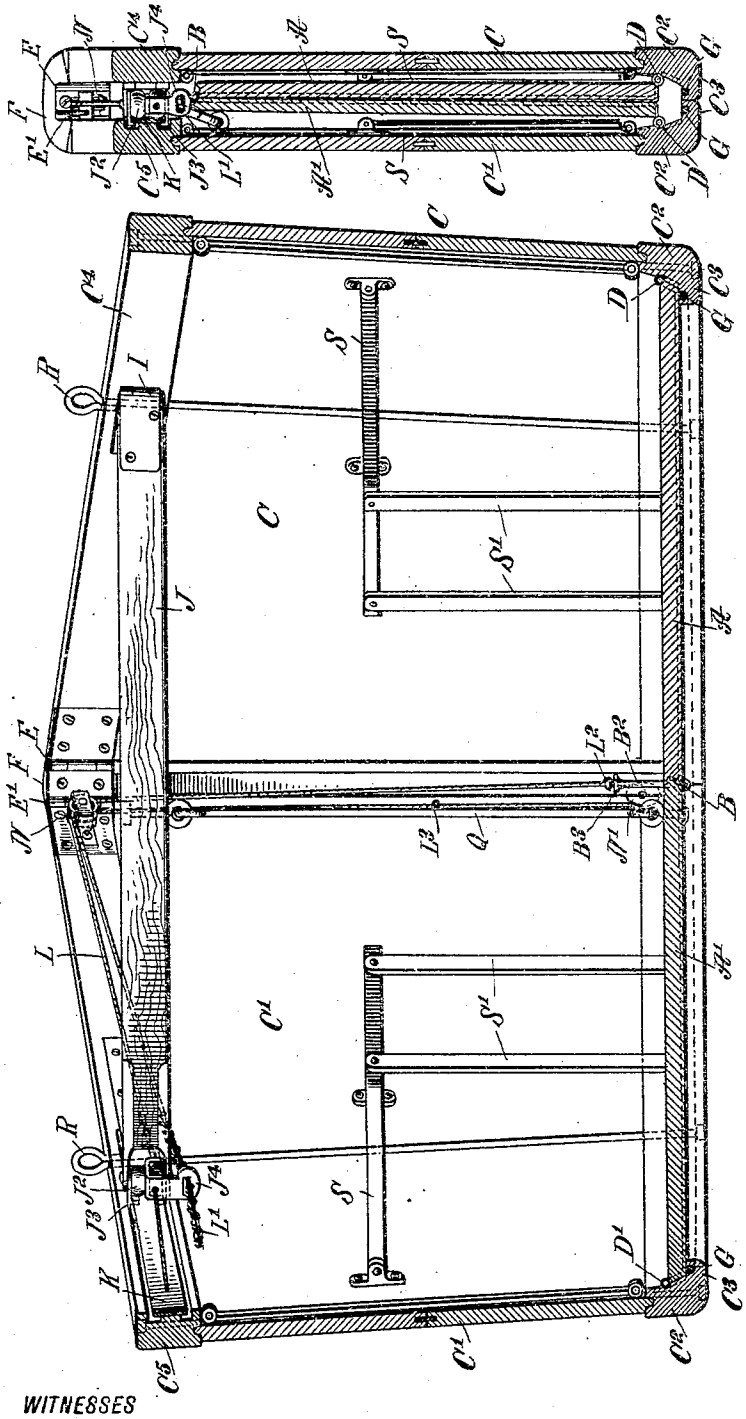

Fig. 4.

Fig. 3.

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4 SHEETS—SHEET 3.

Fig. 6.

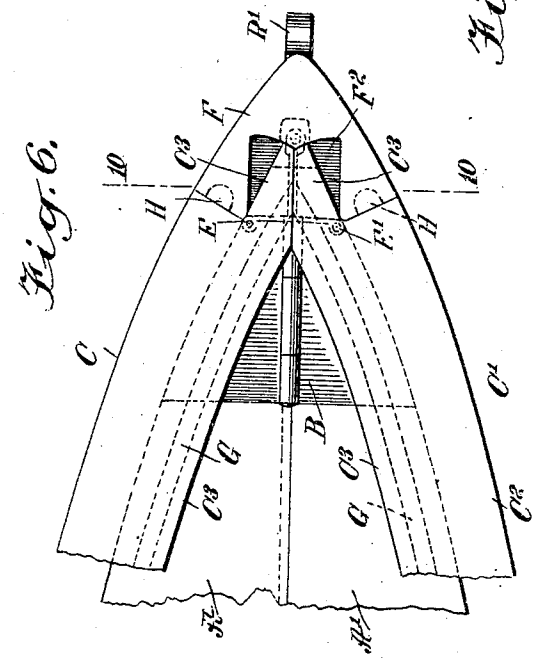


Fig. 8.

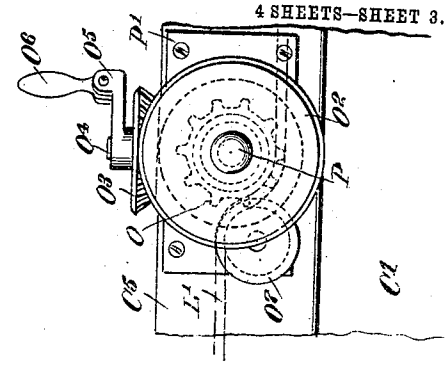


Fig. 7.

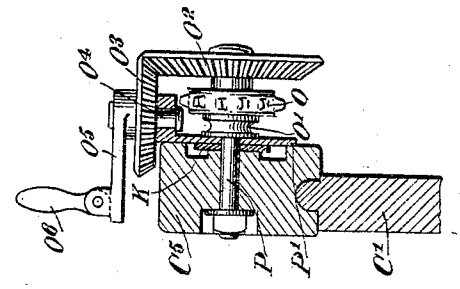
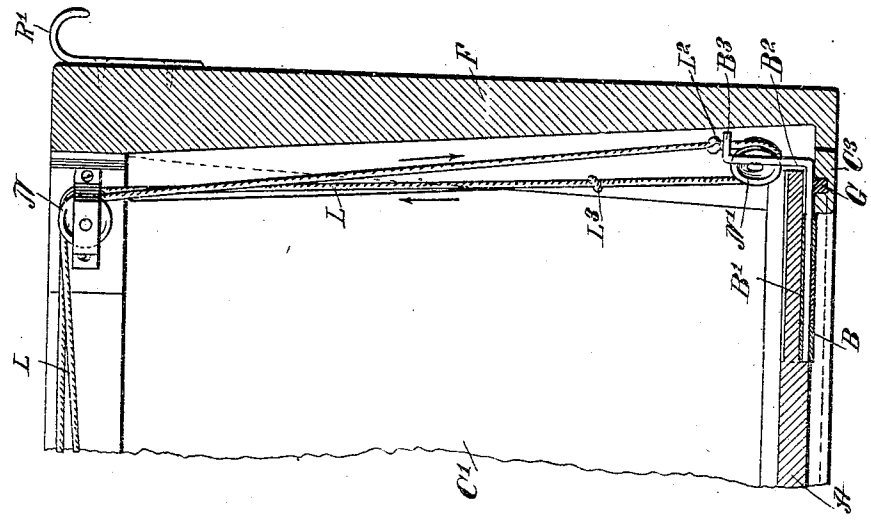


Fig. 5.



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4 SHEETS—SHEET 4.

Fig. 9.

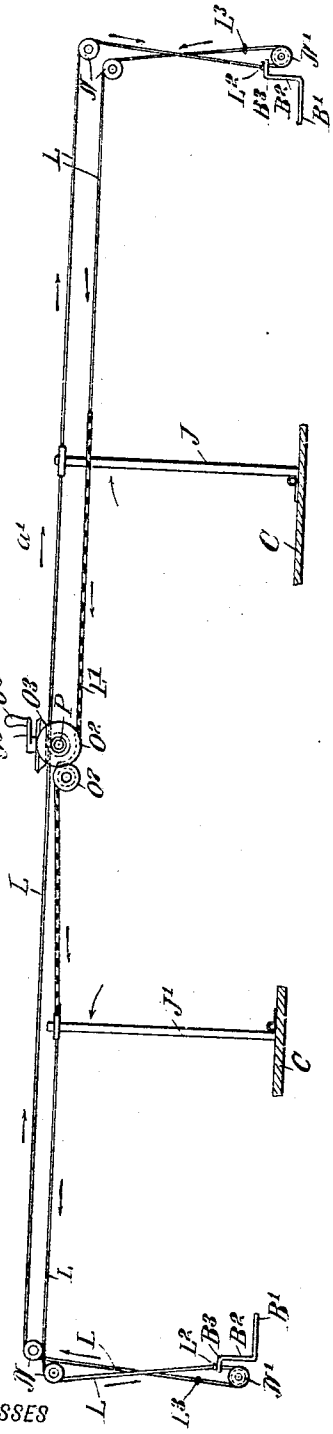


Fig. 11.

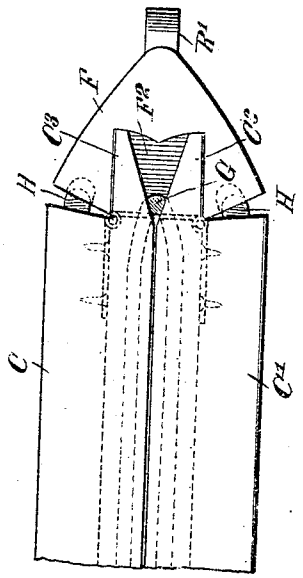
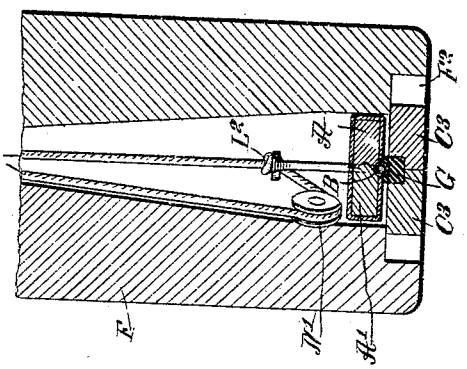


Fig. 10.



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FOLDING BOAT.

955,020. Specification of Letters Patent. Patented Apr. 12, 1910.

Application filed September 30, 1909. Serial No. 520,248.

To all whom it may concern:

Be it known that I, JOSEPH VAGHI, a subject of the King of Italy, and a resident of Bethel, in the county of Fairfield and State of Connecticut, have invented a new and Improved Folding Boat, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved folding boat, more especially designed as a life-saving boat, for use on ocean and like steamers and other marine vessels, the boat being normally folded and stored on board the marine vessel, thus allowing the use of a large number of such folded boats on board without taking up too much space, and in case of shipwreck each boat can be quickly extended and put overboard for saving the lives of the passengers.

For the purpose mentioned, the bottom of the boat is made foldable and the sides are connected with each other at the ends and with the said bottom, so that when the latter is extended the sides are bent outward from end to end.

A practical embodiment of the invention is represented in the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a perspective view of the boat extended; Fig. 2 is a plan view of the same; Fig. 3 is an enlarged transverse section of the same on the line 3—3 of Fig. 2; Fig. 4 is a like view of the same showing the parts in folded position; Fig. 5 is an enlarged sectional side elevation of one end of the boat, the section being on the line 5—5 of Fig. 2; Fig. 6 is an inverted plan view of the same; Fig. 7 is an enlarged cross section of the actuating gear for the flexible connection employed to manipulate the braces employed for drawing the boat sides into extended position and holding the same therein; Fig. 8 is a side elevation of the same; Fig. 9 is a diagrammatic view of the braces and means for actuating the same; Fig. 10 is an enlarged cross section of one end of the boat, the section being on the line 10—10 of Fig. 6; and Fig. 11 is an inverted plan view of one end of the boat when folded.

The bottom of the boat is of an approximately elliptical shape and made in two sections A, A′, connected with each other along their inner edges by hinges B, the joint of the said edges ranging lengthwise of the boat at the longitudinal center line thereof, as plainly indicated in Fig. 2. The hinges B permit of folding the bottom sections A, A′ into the vertical position illustrated in Fig. 4, so that the said sections A, A′ are arranged side by side, and when the sections are extended, as shown in Figs. 2 and 3, they form a flat bottom for the boat.

The sides C, C′, of wood or other flexible material, are each continuous from end to end, and are connected at their lower edges at the middle by hinges D, D′ to the outer edges of the bottom sections A, A′ at their middle, that is, at the widest portion of the boat bottom. The ends of the sides C, C′ are connected by hinges E, E, and E′, E′ with bow and stern posts F and F′, so that when the boat is folded, as shown in Fig. 4, the now straight sides C, C′ range lengthwise on opposite sides of the folded bottom sections A, A′, and when the bottom sections A, A′ are moved from this folded position into an extended position, then the sides C, C′ are bent or sprung outward, to follow the shape of the outer curved edges of the bottom sections A, A′, the end posts F, F′ during this movement moving correspondingly toward each other to form a tight joint with the ends of the bottom sections A, A′.

The bottom sections A, A′ are tongued and grooved at their inner or meeting edges, to form a tight interlocking joint along the longitudinal center line of the bottom, as plainly indicated in Fig. 3, and in order to provide tight joints between the outer edges of the bottom sections A, A′ and the sides C, C′ at the time the boat is extended, the following arrangement is made: The sides C, C′ are provided at their lower edges with rails C^2 having inwardly-extending flanges C^3 for the outer margins of the bottom sections A, A′ to rest on, and each flange C^3 is provided in its top with a gasket G, of rubber or other material, and in contact with the under side of the bottom sections A, A′, thus forming a tight joint between the bottom sections A, A′ and the sides C, C′. The flanges C^3 and the gaskets G extend the entire length of the sides C, C′, which join at the ends when the boat is extended, as plainly indicated in Fig. 6. The terminals of the flanges C^3 project beyond the hinges E, E′ at each end of the boat, and the said terminals extend into recesses F^2 formed on

the under sides of the posts F, F′ (see Figs. 6, 10 and 11), the recesses F^2 being sufficiently enlarged to allow the terminals of the flanges C^3, to swing transversely on folding or extending the boat. The ends of the sides C, C′ are provided with dowel pins H, engaging recesses in the posts F and F′, to securely connect the sides C, C′ and the posts F, F′ with each other, whenever the boat is extended.

In order to readily fold or extend the boat, use is made of the following device: To the inner face of the gunwale C^4 of the side C are attached by hinges I, I′, the braces J, J′, provided at their free ends with friction rollers J^2, adapted to travel on lengthwise arranged plates K, attached to the inner face of the gunwale C^5 of the side C′ (see Fig. 3). The free end of each brace J, J′ is also provided with pivoted hooks J^3, engaging the upper and lower edges of the plate K, to guide the free ends of the braces J, J′ along the said plate on extending or folding the boat. A cord, cable, chain or like flexible connection L is attached to the free ends of the braces J, J′ and passes over double pulleys N, N and single pulleys N′, N′, held on the side of the posts F, F′ at the upper and lower ends thereof, as plainly indicated in Fig. 5. One run of the flexible connection is provided with a sprocket chain portion L′, which is engaged by a sprocket wheel O, mounted to turn loosely on a transverse stud P, attached to the gunwale C^5 of the boat side C′ (see Figs. 7 and 8). On one side of the sprocket wheel O is secured a pulley O′ for guiding the other run of the flexible connection L, and on the other side of the said sprocket wheel O is secured a bevel gear wheel O^2 in mesh with a bevel pinion O^3 having its shaft O^4 journaled in a bracket P′ secured to the inside of the gunwale C^5 at or near the middle thereof. On the shaft O^4 is secured a crank arm O^5 provided with a folding handle O^6, adapted to be taken hold of by the operator, to turn the shaft O^4 and the bevel gear wheels O^3, O^2 and the sprocket wheel O, to impart a traveling motion to the flexible connection L. When the crank arm O^5 is turned in one direction the flexible connection L is caused to travel in the direction of the arrow a', as indicated in Fig. 9, so that the braces J and J′ are caused to swing outward to press by the friction rollers J^2 against the plates K, thereby forcing the sides C and C′ apart at the time of swinging the bottom sections A, A′ from the folded position shown in Fig. 4 into the extended position shown in Fig. 3. In a like manner when the crank O^5 is turned in the reverse direction, the braces J and J′ are swung toward each other into folding position, thus drawing the sides C, C′ toward each other into folding position, as previously explained. The sprocket chain portion L′ of the flexible connection L passes through guideways J^4 held on the free ends of the braces J, and the said sprocket chain portion L′ is held in engagement with the teeth of the sprocket wheel O by an idler O′ journaled on the bracket P′, as indicated in Fig. 8. Each of the braces J is pivotally connected by a link Q with the bottom sections A A′, so that when the braces J and J′ swing into open position shown in Figs. 1 and 2, then the links Q exert a downward pressure on the bottom sections A A′, with a view to extend the bottom from the folded position (see Fig. 2) to the flat position illustrated in Fig. 3. When the braces J, J′ swing toward each other into folded position on the gunwale C^4, then the links Q pull on the bottom sections A A′, to swing the sections A′ and A into a folded position. Thus by the operator turning the crank arm O^5 the boat can be readily extended or folded, and hence it requires but a single operator and but a short time, in order to change the folded boat to an extended boat, whenever it is desired to be used for the purpose mentioned.

The pintles B′ of the hinges B at the ends of the bottom sections A, A′ are provided with upwardly extending arms B^2 (see Fig. 5), terminating in eyes B^3, through which pass the corresponding portions of the flexible connection L, provided on opposite sides of the eyes B^3 with knots L^2, L^3, to limit the movement of the flexible connection L, and exert pressure on the eye B^3, with a view to assist in folding up or unfolding the bottom sections A and A′, at the time a swinging motion is given to the braces J and J′.

The gunwales C^4 and C^5 are provided at the top with eyes R, for suspending the boat from davits, whenever it is desired to launch the same from the deck of the marine vessel.

On the inner faces of the sides C and C′ are hinged longitudinally-extending seats S, provided with folding legs S′, to permit of holding the seats S extended, as shown in Fig. 3, or folded, as shown in Fig. 4.

Rowlocks T are held on the gunwales C^4, C^5, for engagement by oars employed in propelling the boat after the same is launched from the marine vessel.

On the posts F, F′ are arranged suitable hooks R′ adapted to receive a steel bar, or the like, transversely of the length of the boat, for conveniently carrying the same.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. A folding boat comprising end posts, sides hinged at their ends to the posts, a bottom rail connected with each side and having an inwardly extending flange, the ends of the said rails extending beyond the sides, the posts being recessed to receive

the extending ends, and a bottom divided longitudinally into sections, the outer edge of each section being hinged at approximately the center of the adjacent bottom rail above the flange and resting thereon when the boat is unfolded, said sections having their adjacent edges hinged together, and means for pressing the sides apart and the sections of the bottom into transverse alinement.

2. A folding boat comprising end posts, sides hinged at their ends to the posts, a bottom rail connected with each side and having an inwardly extending flange, the ends of the said rails extending beyond the sides, the posts being recessed to receive the extended ends, and a bottom divided longitudinally into sections, the outer edge of each section being hinged at approximately the center of the adjacent bottom rail above the flange and resting thereon when the boat is unfolded, said sections having their adjacent edges hinged together, and means for pressing the sides apart and the sections of the bottom into transverse alinement.

3. A folding boat comprising end posts, flexible sides hinged at their ends to the end posts, a bottom rail on each side having a flange on the inner face thereof, a bottom divided longitudinally into sections, the sections being hinged together to fold vertically and hinged to the bottom rails at approximately the center thereof above the flanges, and resting on the rails when extended, and means for pressing the sides apart and the sections of the bottom into alinement.

4. A folding boat, comprising a bottom made in sections hinged together along their inner edges, extending along the longitudinal central line of the boat, the sections being adapted to fold in a vertical direction, the outer edges of the bottom sections being curved, boat sides of flexible material hinged at the middle of their lower edges to the middle of the outer edges of the said bottom sections, a bottom rail on each side having an inwardly extending flange on which the bottom rests when the sections are in alinement and end posts hinged to the ends of the said boat sides and adapted to engage the ends of the said bottom sections and recessed to receive the ends of the rails.

5. A folding boat, comprising a sectional bottom of approximately elliptical shape when extended, the sections being adapted to join along the longitudinal center line of the boat, hinges connecting the inner contacting edges of the bottom sections with each other, sides pivotally connected at the middle of their lower edges with the middle of the outer edges of the said bottom sections, end posts pivotally connected with the ends of the said sides, a brace hinged on the gunwale of one side and adapted to press with its free end on the gunwale of the other side, a link extending from the brace to the adjacent bottom section and manually-controlled means connected with the free end of the said brace to impart a swinging motion to the same.

6. A folding boat, comprising a sectional bottom of approximately elliptical shape when extended, the sections being adapted to join along the longitudinal center line of the boat, hinges connecting the inner contacting edges of the bottom sections with each other, sides pivotally connected at the middle of their lower edges with the middle of the outer edges of the said bottom sections, end posts pivotally connected with the ends of the said sides, braces hinged at one end to one of the sides, guideways on the other side and engaged by the free ends of the said braces, and manually-controlled means connected with the said braces for imparting a simultaneous swinging motion to the same.

7. A folding boat, comprising a sectional bottom of approximately elliptical shape when extended, the sections being adapted to join along the longitudinal center line of the boat, hinges connecting the inner contacting edges of the bottom sections with each other, sides pivotally connected at the middle of their lower edges with the middle of the outer edges of the said bottom sections, end posts pivotally connected with the ends of the said sides, a brace hinged on the gunwale of one side and adapted to press with its free end on the gunwale of the other side, and a link connecting the said brace with one of the said bottom sections.

8. A folding boat, comprising a sectional bottom of approximately elliptical shape when extended, the sections being adapted to join along the longitudinal center line of the boat, hinges connecting the inner contacting edges of the bottom sections with each other, sides pivotally connected at the middle of their lower edges with the middle of the outer edges of the said bottom sections, end posts pivotally connected with the ends of the said sides, braces hinged at one end to one of the said sides, guideways on the other side for engagement by the free ends of the said braces, a flexible connection connected at its ends to the free ends of the said braces, pulleys for the said flexible connection to pass over and located at the ends of the said side having the guideways, and manually-controlled means on the said side having the guideways, for imparting movement to the said flexible connection to swing the braces simultaneously into and out of position.

9. A folding boat, comprising a sectional bottom of approximately elliptical shape when extended, the sections being adapted

to join along the longitudinal center line of the boat, hinges connecting the inner contacting edges of the bottom sections with each other, sides pivotally connected at the middle of their lower edges with the middle of the outer edges of the said bottom sections, end posts pivotally connected with the ends of said sides, braces hinged at one end to one of the said sides, guideways on the other side for engagement by the free ends of the said braces, a flexible connection connected at its ends to the free ends of the said braces, pulleys for the said flexible connection to pass over and located at the ends of the said side having the guideways, eyes held on the ends of the said bottom sections and through which passes the said flexible connection, the latter having spaced knots for engaging the said eyes, and manually-controlled means on the said side having the guideways, for imparting movement to the said flexible connection, to swing the braces simultaneously into and out of position.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOSEPH VAGHI.

Witnesses:

THEO. G. HOSTER,

PHILIP D. ROLLHAUS.