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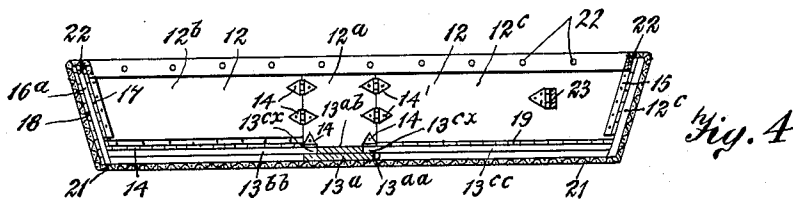
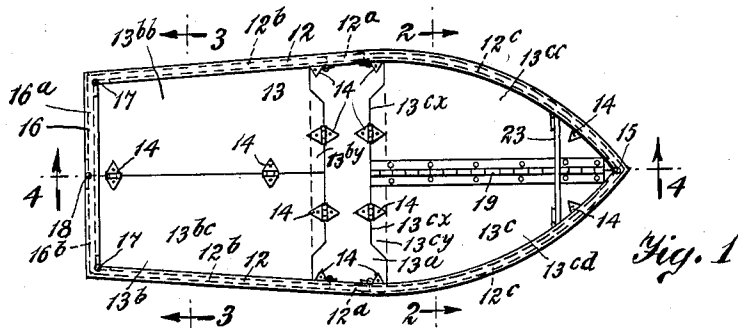
J. H. REUTHER

2,332,259

COLLAPSIBLE BOAT

Filed Dec. 3, 1940

3 Sheets-Sheet 1



Oct. 19, 1943.

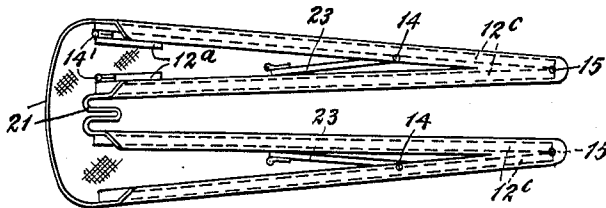
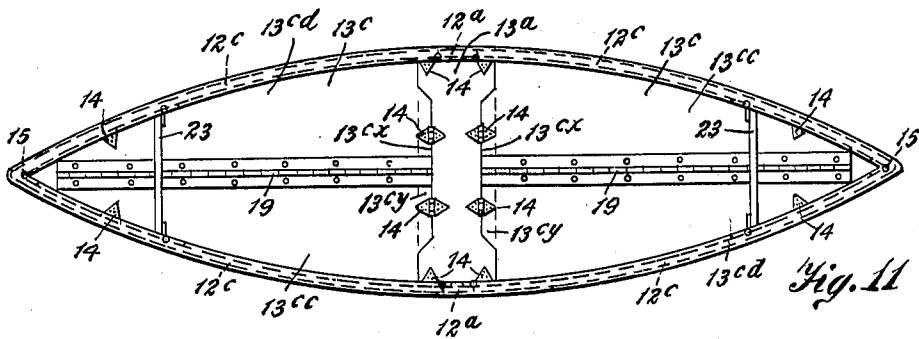
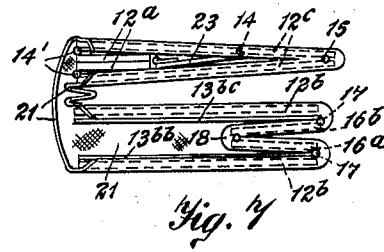
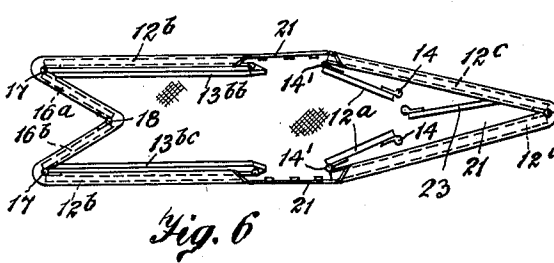
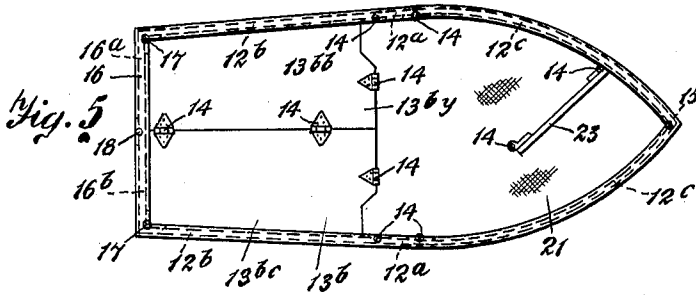
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COLLAPSIBLE BOAT

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3 Sheets-Sheet 2



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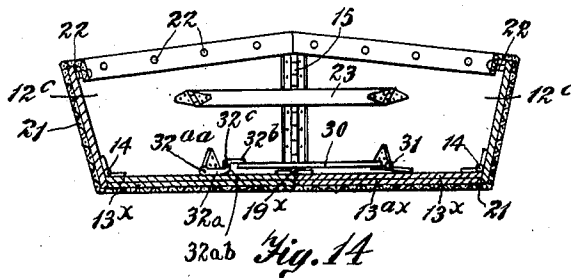
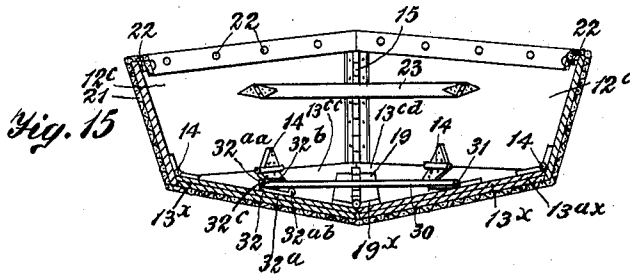
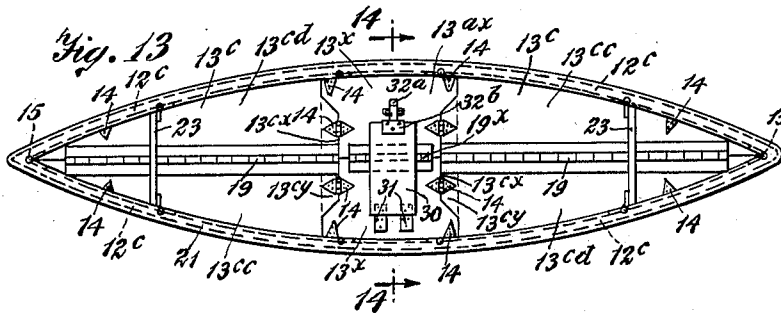
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COLLAPSIBLE BOAT

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3 Sheets-Sheet 3



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2,332,259

COLLAPSIBLE BOAT

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Application December 3, 1940, Serial No. 363,281

8 Claims. (Cl. 9—2)

This invention relates to new and useful improvements in a collapsible boat and an arrangement for folding the same.

Heretofore many collapsible boats have been devised. However, it is believed that the boat covered by this application is of a superior construction so that it may be collapsed with greater ease and into a smaller compass, and can be assembled quickly and conveniently when desired.

The invention proposes to characterize the collapsible boat by the fact that it has a body with side walls, and a floor of a certain construction, and connected together in a certain way to facilitate the collapsing and opening of the boat.

It is proposed that each of the side walls comprise a plurality of sections including a central gate section and means for releasibly connecting one side of the gate section with the adjacent section of the side wall so that it is possible to release the central gate section when collapsing the boat, and to engage the central gate section into position for extending the body when opening up the boat. It is proposed that the body be encased in a water-proof casing extended across the bottom of the body and up and over the sides thereof. The arrangement is such that the central gate sections control the extension of the body when the boat is opened so that the water-proof casing is held taut.

The invention proposes to construct the floor of a plurality of sections connected together in a certain way and including a central floor board section releasibly connected with the central gate sections of the side walls so as to facilitate collapsing and opening of the boat when desired.

It is proposed that certain of the sections of the body and the floor of the boat be connected together with permanent hinges, such as piano hinges, and other of the sections be connected together with a certain type of separable hinges to facilitate collapsing the boat when desired. With this arrangement it is merely necessary to separate the hinges when collapsing the boat and to reassemble these hinges when the boat is opened.

The invention particularly proposes to characterize the separable hinges by the fact that they comprise a pair of hinge leaves and a connecting pin of a specific construction. It is proposed that this connecting pin have an extension portion comprising a handle grip by which it may be conveniently gripped so that it may be removed and replaced in the hinge construction as desired. Moreover, it is proposed that the handle grip

continue into a certain curved portion which is capable of acting as a snap lock to hold the pin from accidentally coming out from the hinge construction.

The invention may be applied to a boat having a square stern or a boat which is pointed at the stern and at the bow, and to boats of numerous designs and shapes.

It is proposed to so construct the boat that certain of the sections of the floor may be removed, or all of the sections may be removed in accordance with design to permit the side walls of the body of the boat and the encasing water-proof casing to be folded as a unit.

Still further the invention proposes the construction of a collapsible boat as mentioned which is simple and durable and which may be manufactured and sold at a reasonable cost.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claims in which the various novel features of the invention are more particularly set forth.

In the accompanying drawings forming a material part of this disclosure:

Fig. 1 is a plan view of a collapsible boat constructed in accordance with this invention.

Fig. 2 is a vertical sectional view taken on the line 2—2 of Fig. 1.

Fig. 3 is a vertical sectional view taken on the line 3—3 of Fig. 1.

Fig. 4 is a longitudinal vertical sectional view taken on the line 4—4 of Fig. 1.

Fig. 5 is a plan view of the boat shown in Fig. 1 with certain sections of the floor removed so that the rest of the boat is ready to be folded and collapsed.

Fig. 6 is a plan view similar to Fig. 5 but illustrating the sections of the boat in the further collapsed position.

Fig. 7 is another plan view similar to Fig. 5 but illustrating the boat completely collapsed.

Fig. 8 is a fragmentary enlarged elevational view of one of the separable hinges of the collapsible boat.

Fig. 9 is a perspective view of the specific pin of the hinge shown in Fig. 8.

Fig. 10 is a perspective view of a modified form of pin which may be used in the hinge shown in Fig. 8.

Fig. 11 is a plan view of a modified form of collapsible boat constructed in accordance with this invention.

Fig. 12 is a plan view of the boat shown in Fig. 11 but in completely collapsed condition.

Fig. 13 is a plan view of a collapsible boat constructed in accordance with another form of this invention.

Fig. 14 is an enlarged transverse sectional view taken on the line 14—14 of Fig. 13.

Fig. 15 is a sectional view similar to Fig. 14 but illustrating the boat in a different condition.

The collapsible boat, in accordance with this invention, includes a body having side walls 12 and a floor 13 removably mounted transversely between the bottom edges of the side walls. Each of the side walls 12 comprises a plurality of sections, including a central gate section 12a. The other sections are indicated by reference numerals 12b and 12c. The sections of each side are connected together with each other by hinges 14 and 14'. The hinges 14 have separable leaves, of the type illustrated in great details in Fig. 8. The hinges 14' preferably are permanent hinges which cannot be readily separated but which permit the central gate sections 12a to be pivoted inwards and outwards.

At the bow of the boat the side walls 12 are connected with a permanent hinge 15, such as a piano hinge. The particular boat illustrated in Figs. 1 to 7 has a square stern 16. The sides of this stern are connected with the side walls 12 with piano hinges 17 or other permanent type of hinge. The stern 16 is formed from two sections, namely sections 16a and 16b which are hingedly connected together at their adjacent ends by a permanent piano hinge 18.

The floor 13 of the boat comprises a plurality of sections including a central floor board section 13a. There are also sections 13b and 13c. The central floor board section 13a is formed from two layers. There is a bottom layer 13aa and a top layer 13ab. The top layer 13ab is formed with cutouts 13ax at its sides forming shoulders for supporting inwardly extending lip portions 13by and 13cy from the sections 13b and 13c, respectively, which are also formed of two layers. The central floor board section 13a is releasibly connected with the central gate section 12a by separable hinges 14.

The bow floor section 13c is formed from a pair of adjacent side sections 13cc and 13cd which are hingedly connected together along their adjacent edges by a piano hinge 19, or other similar permanent hinge. The floor section 13c is releasibly held in position by several separable hinges 14 which connect the said floor section 13c with the central floor board section 13a and with the sections 12c of the side walls of the body of the boat.

The stern floor board section 13b is also formed from a pair of adjacent side portions 13bb and 13bc. The adjacent edges of these sections are releasibly connected together with separable hinges 14. At their outer edges these sections are hingedly connected with the sections 12b of the side walls by permanent hinges 20 such as piano hinges. Several separable hinges 14 also connect the floor sections 13b with the central floor board section 13a.

The water-proof sheet casing 21, preferably formed from rubberized cloth to avoid shrinkage, extends across the bottom of the body of the boat and up over the sides and front and back of the boat and is releasibly attached along its top edges to the body of the boat. This attachment is accomplished by separable fasteners 22 mounted along the edge portions of the casing 21 and

along the top edge of the body of the boat. These separable fasteners 22 are in the nature of snap fasteners. One of the sections thereof are permanently mounted on the body of the boat and are cooperative with the other sections thereof permanently mounted on the sheet casing 21. The side walls of the boat are reinforced with a brace 23. The brace 23 is extended across the bow of the boat. It is connected with the side walls of the boat by separable hinges 14. It is intended that the boat be provided with seats (not shown on the drawings) mounted across the side walls of the boat and acting to reinforce the side walls.

Figs. 8 and 9 illustrate in detail one of the separable hinges 14. It should be noticed that this hinge comprises hinge leaves 14a and 14b secured upon the adjacent sections which the hinge connects, as for example the sections 12a and 12b. Fastening elements 24 are used to secure the hinge leaves to said sections. The hinge leaves have the usual interengaging tubular socket portions 14c. A pin 14d engages through these socket portions to hingedly connect the leaves together. The pin 14d is of a certain construction. It is provided with an axle portion 14x which is pointed at one end and which at its other end continues into a handle grip portion 14y which extends along the sides of the socket portions 14c. This handle grip portion continues into a curved portion 14z which engages the axle portion 14x immediately adjacent the pointed end. This curved portion 14z acts as a snap lock, preventing the connecting pin from accidentally coming out from the socket portions of the hinge. However, the handle grip portion 14y may be manually gripped and then the pin may be forced out of the socket portions by merely moving it coaxially. The pin may be quickly and easily reengaged when desired.

In Fig. 10 a modified form of connecting pin has been disclosed which distinguishes from the prior form merely in the construction of the snap lock portion 14zz. This snap lock portion is in the form of a head formed upon the end of the handle portion 14y. In other respects this form of pin is identical to the prior form and its operation is likewise similar.

The method of folding the boat may best be understood by a careful examination of Figs. 1, 5, 6 and 7. Starting with the boat fully assembled as illustrated in Fig. 1, it is necessary that the sections 13a and 13c of the floor of the boat be first removed. This may be quickly accomplished by separating the separable hinges 14. One of the ends of the brace 23 is also freed by opening up the separable hinges at one of the ends thereof. The boat now has the appearance illustrated in Fig. 5.

The next step in collapsing the boat consists in freeing the central gate sections 12a by opening their separable hinges 14. The gate sections are then pivoted inwards as illustrated in Fig. 6. Then the floor sections 13bb and 13bc are pivoted upwards and simultaneously the sections 16a and 16b of the stern of the boat are pushed inwards. The boat now appears as illustrated in Fig. 6.

The boat is totally collapsed and folded by pressing together the sides as far as they will go and then bending around the bow portion relative to the stern portion of the boat to a position as illustrated in Fig. 7.

In Figs. 11 and 12 a modified form of the invention has been disclosed which distinguishes from the prior form merely in the fact that a

boat is illustrated having points at both the bow and stern. With this construction the floor of the boat is somewhat different from the floor previously described. It distinguishes in the fact that it comprises a central floor board section 13a and end floor board sections 13c at each of the ends of the boat. These sections 13c are constructed identically to the corresponding sections 13c previously described. The boat is also provided with braces 23 at the bow and stern portions thereof. In other respects this form of the invention is identical to the prior form and identical parts may be recognized by identical reference numerals.

In order to collapse the boat illustrated in Fig. 11 it is necessary that the entire floor be removed. This is easily accomplished by separating the separable hinges which secure the floor, consisting of the sections 13a and 13c with the side walls of the body of the boat.

In Figs. 13-15 inclusive another form of the invention has been disclosed which is very similar to the form shown in Figs. 11 and 12, distinguishing however in the fact that a construction has been provided by which the boat may be changed from a flat bottom boat to a V-shaped bottom boat, and vice versa. In accordance with this form of the invention the central floor board section 13ax comprises a pair of side portions 13x hingedly connected together at their adjacent edges with a permanent hinge 19x which is in line with the hinges 19 of the floor board sections 13c at the ends of the boat. Means is provided for holding these side portions 13x of the central floor board section 13ax in a common plane for forming a flat bottom boat and adjustable in a certain manner for holding these side portions in V-shape for forming a V-shaped bottom boat.

This later means is characterized by a strap 30 permanently attached to one of the said side portions 13x and adjustably connected with the other of the said side portions 13x. The permanent connection is accomplished with permanent hinges 31 connected between the strap 30 and the adjacent side portion 13x. The adjustable connection is accomplished with a separable hinge 32. This separable hinge comprises a stationary section 32a which is permanently attached to the adjacent side portion 13x and which has a front loop portion 32aa and a rear loop portion 32ab. The hinge 32 has another section 32b permanently mounted on the end of the strap 30. A pin 32c is adapted to secure the hinge sections 32a and 32b pivotally together. This pin 32c may coact with the front loop 32aa to hold the side portions 13x in V-shape formation, as illustrated in Fig. 15, or may coact with the rear loop 32ab for holding the side portions 13x in a common plane so that the boat has a flat bottom, as illustrated in Fig. 14.

In other respects this form of the invention is of identical construction as the previous and similar parts are identified by like reference numerals. Attention is called to the fact that since the end sections 13c are composed of adjacent side sections 13cc and 13cd hingedly connected together, and since these sections are rigidly connected with the sections 13x of the central floor board section 13ax the entire floor of the boat will assume the flat shape or the V-shape, in accordance with the way that the central floor board section 13ax is held. When the side portions 13x are in a common plane the side sections 13cc and 13cd will be in this plane also. When the side portions 13x are in V-shape the

side sections 13cc and 13cd will also be in V-shape.

A feature of this boat is that the flat bottom may be changed to the V-shaped bottom in a few minutes and this change may be made while the boat is out of water, or while the boat is floating on the water. To make the change while the boat is out of water is obvious and will not be further explained in this specification. The change while the boat is afloat is made in the following manner:

Assume that the boat has a flat bottom as shown in Fig. 14. The pin 32c is first removed and then a person's weight is shifted to the center of the boat forcing down the center and pulling the sides together, producing the V-shaped formation. The pin 32c is then slipped through the hinge 32 as illustrated in Fig. 15, and the boat now has a V-shaped bottom. To change back, the pin 32c is again removed and a person's weight is shifted to the sides of the boat so that the water pressure forces up the V-shaped bottom into a flat bottom. The pin 32c is then re-engaged in position as illustrated in Fig. 14 to lock the bottom of the boat in this position.

It should be noticed that when the bottom of the boat is in V-shape, the bottom portions of the sides of the boat will be drawn slightly together, reducing the beam of the boat for greater streamlining.

While I have illustrated and described the preferred embodiments of my invention, it is to be understood that I do not limit myself to the precise construction herein disclosed and the right is preserved to all changes and modifications coming within the scope of the invention as defined in the appended claims.

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

1. A collapsible boat, comprising a body having spaced side walls and a floor mounted transversely between the bottom edges of said side walls and removable from said position to release said side walls which may then be moved close together, each of said side walls comprising a plurality of sections including a central gate section extending from the top to the bottom of the side wall, said gate sections being opposite each other, means for releasibly connecting one side of each gate section with the adjacent side wall section, and a waterproof sheet casing mounted on said body and extended tautly across the bottom of said body and up over the sides, whereby when said central gate sections are freed said casing will become loose and when said floor is removed from said transverse position said body and casing may be folded at the openings in said side walls which were produced by opening said central gate sections.

2. A collapsible boat, comprising a body having spaced side walls and a floor mounted transversely between the bottom edges of said side walls and removable from said position to release said side walls which may then be moved close together, each of said side walls comprising a plurality of sections including a central gate section extending from the top to the bottom of the side wall, said gate sections being opposite each other, means for releasibly connecting one side of each gate section with the adjacent side wall section, and a waterproof sheet casing mounted on said body and extended tautly across the bottom of said body and up over the

sides, whereby when said central gate sections are freed said casing will become loose and when said floor is removed from said transverse positions said body and casing may be folded at the openings in said side walls which were produced by opening said central gate sections, said floor comprising a plurality of sections including a central floor board extending between and releasably connected with said central gate sections.

3. A collapsible boat, comprising a body having spaced side walls and a floor mounted transversely between the bottom edges of said side walls and removable from said position to release said side walls which may then be moved close together, each of said side walls comprising a plurality of sections including a central gate section extending from the top to the bottom of the side wall, said gate sections being opposite each other, means for releasably connecting one side of each gate section with the adjacent side wall section, and a waterproof sheet casing mounted on said body and extended tautly across the bottom of said body and up over the sides, whereby when said central gate sections are freed said casing will become loose and when said floor is removed from said transverse position said body and casing may be folded at the openings in said side walls which were produced by opening said central gate sections, said floor comprising a plurality of sections including a central floor board extending between and releasably connected with said central gate sections, said central floor section being releasably connected with other sections of said floor and completely removable from said other sections.

4. A collapsible boat, comprising a body having spaced side walls and a floor mounted transversely between the bottom edges of said side walls and removable from said position to release said side walls which may then be moved close together, each of said side walls comprising a plurality of sections including a central gate section extending from the top to the bottom of the side wall, said gate sections being opposite each other, means for releasably connecting one side of each gate section with the adjacent side wall section, and a waterproof sheet casing mounted on said body and extended tautly across the bottom of said body and up over the sides, whereby when said central gate sections are freed said casing will become loose and when said floor is removed from said transverse positions said body and casing may be folded at the openings in said side walls which were produced by opening said central gate sections, said floor comprising a plurality of sections including a central floor board extending between and releasably connected with said central gate sections, said central floor section being releasably connected with other sections of said floor and completely removable from said other sections, said other sections of said floor being foldable against the side walls of said body.

5. A collapsible boat, comprising a body having spaced side walls and a floor mounted transversely between the bottom edges of said side walls and removable from said position to re-

lease said side walls which may then be moved close together, each of said side walls comprising a plurality of sections including a central gate section extending from the top to the bottom of the side wall, said gate sections being opposite each other, means for releasably connecting one side of each gate section with the adjacent side wall section, and a waterproof sheet casing mounted on said body and extended tautly across the bottom of said body and up over the sides, whereby when said central gate sections are freed said casing will become loose and when said floor is removed from said transverse position said body and casing may be folded at the openings in said side walls which were produced by opening said central gate sections, said body also having a stern wall section normally holding said side walls in their spaced positions and foldable to free said side walls.

6. A collapsible boat, comprising a body having spaced side walls and a floor mounted transversely between the bottom edges of said side walls and removable from said position to release said side walls which may then be moved close together, each of said side walls comprising a plurality of sections including a central gate section extending from the top to the bottom of the side wall, said gate sections being opposite each other, means for releasably connecting one side of each gate section with the adjacent side wall section, and a waterproof sheet casing mounted on said body and extended tautly across the bottom of said body and up over the sides, whereby when said central gate sections are freed said casing will become loose and when said floor is removed from said transverse position said body and casing may be folded at the openings in said walls which were produced by opening said central gate sections, said central floor section comprises a bottom layer and a top layer, said top layer having cutout portions at its sides beneath which said bottom layer projects producing shoulders, and the adjacent sections of said floor extend over and on said shoulders so as to be supported by said shoulders.

7. In a boat having side walls, a floor flexibly connected with said side walls and being formed of side sections hingedly connected along the center of the boat, means for releasably holding said side sections in a plane for forming a flat bottom for the boat which may be released when desired, and for releasably holding said side sections jointly in a V-shape when desired for forming a V-shaped bottom for the boat which may be released when desired.

8. In a boat having side walls, a floor flexibly connected with said side walls and being formed of side sections hingedly connected along the center of the boat, a releasable brace mounted between points on said side sections for releasably holding the latter in a plane forming a flat bottom for said boat which may be released when desired, and said brace being releasably mountable between other points on said side sections for holding them jointly in a V-shape.

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