

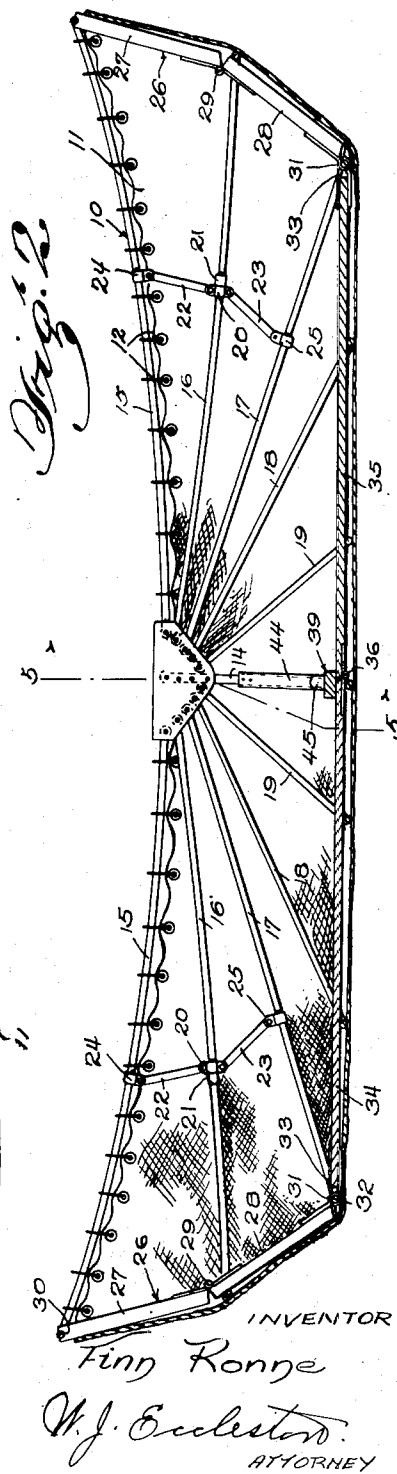
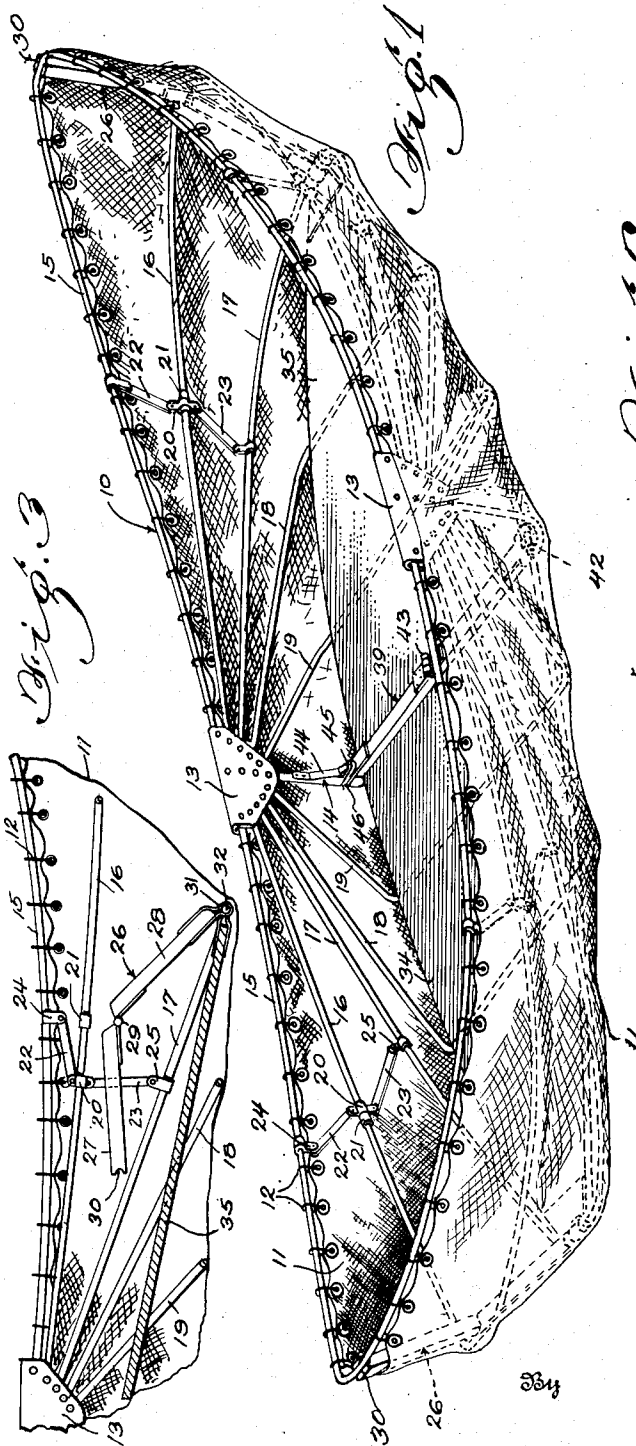
Jan. 1, 1952

F. RONNE
COLLAPSIBLE BOAT

2,580,465

Filed Oct. 19, 1949

2 SHEETS—SHEET 1



INVENTOR
Finn Ronne
W. J. Eccleston.
ATTORNEY

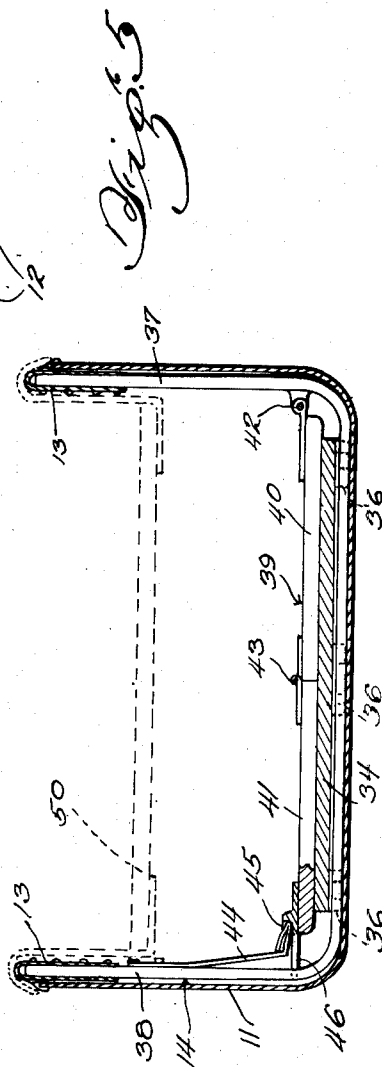
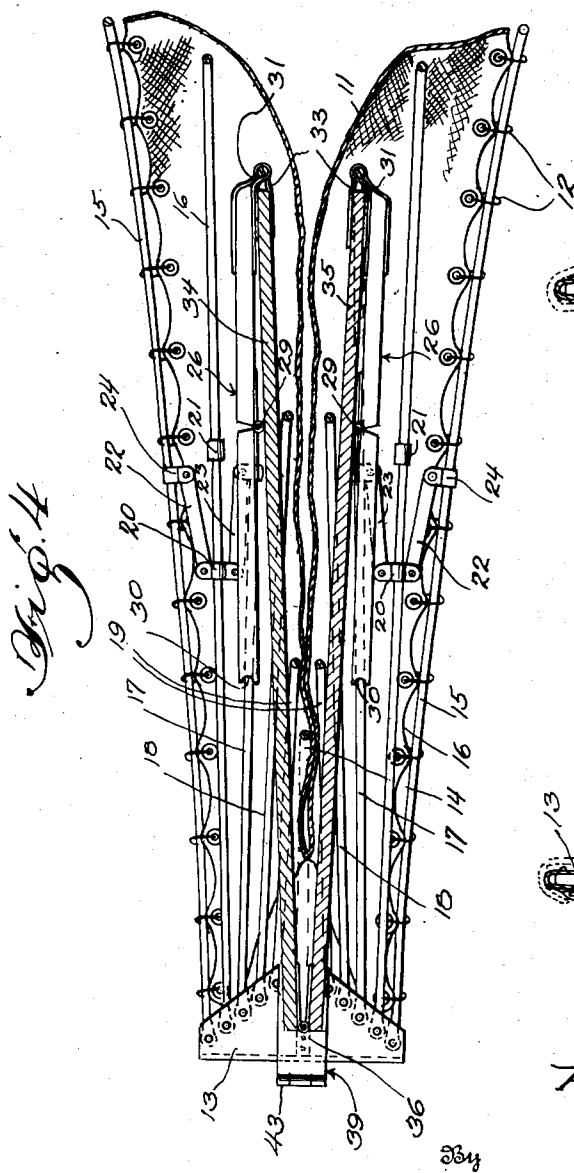
Jan. 1, 1952

F. RONNE
COLLAPSIBLE BOAT

2,580,465

Filed Oct. 19, 1949

2 SHEETS—SHEET 2



Inventor

Finn Ronne

W. J. Eccleston
ATTORNEY

UNITED STATES PATENT OFFICE

2,580,465

COLLAPSIBLE BOAT

Finn Ronne, Chevy Chase, Md.

Application October 19, 1949, Serial No. 122,342

8 Claims. (Cl. 9—2)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

1

The invention described herein, if patented, may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

My invention relates to collapsible boats and more particularly to frames for the same. Such boats are well known, and it is contemplated that the frame of the invention will have secured thereover either permanently or detachably a flexible cover of any suitable waterproof material. Thus, the frame and cover may be folded and unfolded as a unit. It is contemplated that the boat according to the invention will be readily portable, whereby it is particularly adapted for use by explorers.

With the foregoing in view, it is an object of my invention to provide an improved collapsible boat.

A further object is to provide an improved frame for a collapsible boat.

A further object is to provide in an improved frame for a collapsible boat, novel means for maintaining the frame in an extended or operative position.

A further object is to provide an improved frame for a collapsible boat, which includes collapsible floor boards, and novel means for maintaining such floor boards in an extended or floor-providing position.

Other objects and advantage reside in the particular structure of the invention, combination and arrangement of the several parts thereof, all of which will be readily understood by those skilled in the art upon reference to the attached drawings and following specification, wherein the invention is shown, described and claimed.

In the drawing:

Figure 1 is a perspective view of the invention, the same being shown in the operative position;

Figure 2 is a longitudinal vertical sectional view thereof;

Figure 3 is a fragmentary longitudinal vertical sectional view showing a portion of Figure 2 with the parts in the partially collapsed position;

Figure 4 is a longitudinal vertical sectional view showing the parts in the fully collapsed position;

Figure 5 is a transverse vertical sectional view on a slightly enlarged scale and taken substantially on the planes of the line 5—5 of Figure 2.

Referring specifically to the drawings, wherein like reference characters designate like parts throughout the several views, 10 indicates generally a collapsible frame for the boat according to the invention. The frame 10 is covered with a waterproof flexible cover 11 of any suitable

2

material. The cover 11 is secured to the frame 10 in any suitable manner as by the lacing 12.

The frame 10 comprises a pair of side plates 13, which are fixedly secured to the upper ends of the legs of a U-shaped transverse rib 14. The side plates 13 are disposed in laterally spaced parallel relation and cooperate with the rib 14 to form the base for the frame about which the other frame parts are moved to and from the collapsed and extended positions. Thus, the side plates 13 have pivoted thereto the free ends of the legs of two graded sets of hull-providing resilient ribs 15, 16, 17, 18 and 19. The ribs of each set are graduated so that each is of a different length. As the ribs of each set are identical, it will suffice to describe but a single set. Thus, the uppermost ribs 15 when in the extended positions, provide the gunwales of the boat as shown in Figure 1. In such positions, the legs of the ribs 15 are substantially aligned and extend from the side plates 13, in opposite directions. The second or next lowermost ribs 16 are slightly shorter than the ribs 15, and the webs thereof, when in the extended positions, are disposed substantially intermediate the gunwale and the keel. The third or next lowermost ribs 17 are still shorter and extend from the side plates 13 to the keel at the bow and the stern of the boat. The remaining fourth and fifth ribs 18 and 19 of each set underlie the keel intermediate the bow or stern and the side plates 13. As best seen in Figure 4, the sets of ribs are substantially parallel to each other when the frame 10 is in the folded position.

Certain of the ribs of each set are folded and extended by means now to be described. Thus, each second rib 16 has slidably mounted on each leg thereof a toggle slide 20. Also, each leg of each second rib 16 has fixedly secured in any suitable manner a stop 21, to limit sliding movement of the slide 20 in one direction. Each toggle slide 20, has pivotally secured thereto in any suitable manner, the inner ends of a pair of toggle links 22 and 23. The toggle link 22 extends upwardly from the slide 20 and the toggle link 23 extends downwardly therefrom. The outer ends of the links 22 and 23 are pivotally secured to ears 24 and 25, which in turn are rigidly secured to the legs of the uppermost ribs 15 and third ribs 17. In Figure 1, the toggle links 22 and 23 together with the slides 20 have been moved to the extended position, whereby to force the ribs 15 and 17 away from the intermediate rib 16. This movement is away from the side plates 13, and is limited by the engagement of the slides 20 with the stops 21.

The stops 21 are so located that the slides 20 and links 22 and 23 have passed their dead centers when the slides abut the stops 21. Therefore, the toggles are locked in the extended position by the resilient pressure of the legs of ribs 15 and 17 in a well-known manner. As best seen in Figure 3, when the slides 20 are slid away from stops 21 toward the side plates 13, the toggles are collapsed after passing their dead centers and as this movement is continued, the ribs 15, 16 and 17 are thereby drawn into juxtaposed substantially parallel relation. Thereafter, all ribs of each set may be swung downwardly on the side plates 13 to the fully collapsed position of Figure 4, wherein all ribs are substantially parallel.

Preferably, the bow and the stern of the boat are each provided with an additional toggle generally indicated at 25, which are effective to flex the front and rear portions of the ribs 15 upwardly, whereby to provide a raised bow and stern, as well as to provide reinforcements for the bow and stern. Each toggle 25, comprises an upper section 27 and a lower section 28, which are hingedly connected together by any suitable hinge 29. The upper end of the upper section 27 is formed with a notch or groove 30, in which is received the web of the upper rib 15. The lower end of the lower section 28 is pivotally secured by any suitable means 31 to the web 32 of the rib 17. Movement of the toggle sections in the extending direction is limited by the engagement of one of the sections with the web of the intermediate rib 16, as clearly seen in Figure 2. The parts are so arranged that this engagement occurs after the sections have passed the dead center whereby the sections are resiliently locked in the extended position by ribs 15 and 17.

The webs 32 of the ribs 17 have pivotally or hingedly secured thereto by any suitable hinge-providing members 33, the outer ends of a pair of floor boards 34 and 35. The inner ends of floor boards 34 and 35 are hingedly connected together by suitable hinges 36. The hinges 36 extend transversely of the hull and fold upwardly so that the floor boards may be collapsed from the extended position of Figures 1 and 2 to the folded or face-to-face position of Figure 4. Also, it should be noted that the web of the center rib 14 underlies the floor boards in the region of hinges 36 so as to limit movement of the floor boards in the unfolding or extending direction to the flush position of Figs. 1 and 2. As aforesaid the outer ends of the floor boards 35 and 36 are supported by the webs of the ribs 17. Intermediate portions of the floor boards 34 and 35 are supported by the webs of the shorter ribs 16 and 19, the webs of which underlie the floor boards.

To maintain the floor boards 34 and 35 in the extended position, whereby to give longitudinal rigidity to the boat, there has been provided the structure now to be described. Thus, a latch bar 39 is hingedly secured to one leg 37 of the center rib 14 by any suitable hinge 42. The latch bar 39 may comprise a single section or, as shown, a pair of sections 40 and 41 hingedly connected together in end-to-end relation by any suitable hinge 43. The latch bar 39 is so disposed as to overlie the joint between the floor boards 34 and 35, whereby to clamp such joint and boards against the web of the center rib 14. The opposite leg 38 of the center rib 14 is provided with a suitable latch 44, which is engageable with a latch detent 45, carried by the free end of the section 41 of the latch bar. Preferably, the de-

tent 45 and/or the free end of the latch bar section 41 is provided with a pair of furcations 46, which straddle the leg 38 of the rib 14 when the latch bar is extended across the floor boards. This arrangement prevents horizontal swinging of the latch bar, but permits vertical swinging thereof and/or collapsing thereof on the hinges 42 and 43. It is understood, of course, that the hinge 43 is provided merely to permit collapse of the latch bar 39, and is not necessary for the proper operation of the latch bar. As clearly seen in Figure 5, the abutting ends of the latch bar sections 40 and 41 limit downward swinging of the sections to the aligned position, and also prevent accidental upward collapse of the hinge 43. Thus, the latch bar 39 securely clamps the hinge joint of the floor boards 34 and 35 against the web of the center rib 14.

The sequence in which the several toggles and the latch bar are actuated in extending or collapsing the frame is unimportant. It is understood, of course, that all toggles must be collapsed and the latch bar released before the frame can be collapsed to the Figure 4 position.

It is contemplated that the boat according to the invention, will be provided with one or more suitable seats 50, Figure 5. Such seats 50, form no part of the present invention.

While I have shown and described what is now thought to be the preferred embodiment of the invention, it is to be understood that the same is susceptible of other forms and expressions. Consequently, I do not limit myself to the precise structures shown and described hereinabove, except as hereinafter claimed.

I claim:

1. In a frame for a collapsible boat, including a pair of laterally spaced and opposed side plates and two sets of graded U-shaped ribs, each rib including two legs and a connecting web, said legs including free ends pivoted to said pair of side plates for pivotal movement to and from extended positions in which corresponding ribs of each set extend from said side plates in similar angular relation but in opposite directions and folded positions in which all of said ribs depend from said side plates in substantially parallel relation, each set of ribs including an uppermost rib and subjacent second and third ribs; the improvement comprising a pair of floor boards for said frame adapted to be supported on the webs of some of said ribs between the legs thereof, hinge means hingedly connecting adjacent ends of said boards together for folding movement with said ribs to and from extended and folded positions wherein said boards are disposed respectively in end-to-end relation and face-to-face relation, a center rib of U-shaped form having two upstanding legs fixed to and depending from said side plates between said sets of ribs, said center rib having a web underlying said hinge means, a latch bar pivoted to one leg of said center rib for vertical swinging movement into and out of a locking position overlying said adjacent ends of said floor boards and clamping the same to said web of said center rib, and means on the other leg of said center rib for latching said latch bar in said locking position, whereby to prevent folding movement of said floor boards.

2. In a frame for a collapsible boat, including a pair of laterally spaced and opposed side plates and two sets of graded U-shaped ribs, each rib including two legs and a connecting web, said legs including free ends pivoted to said pair of side plates for pivotal movement to and from

extended positions in which corresponding ribs of each set extend from said side plates in similar angular relation but in opposite directions and folded positions in which all of said ribs depend from side plates in substantially parallel relation, each set of ribs including an uppermost rib and subjacent second and third ribs; the improvement comprising a pair of floor boards for said frame adapted to be supported on the webs of some of said ribs between the legs thereof, hinge means hingedly connecting adjacent ends of said boards together for folding movement with said ribs to and from extended and folded positions wherein said boards are disposed respectively in end-to-end relation and face-to-face relation, a center rib of U-shaped form having two upstanding legs fixed to and depending from said side plates between said sets of ribs, said center rib having a web underlying said hinge means, a latch bar pivoted to one leg of said center rib for vertical swinging movement into and out of a locking position overlying said adjacent ends of said floor boards and clamping the same to said web of said center rib, a spring latch mounted on the other leg of said center rib, said latch bar having a free end operatively engageable with said spring latch for releasably latching said latch bar in said locking position whereby to prevent folding movement of said floor boards.

3. In a frame for a collapsible boat, including a pair of laterally spaced and opposed side plates and two sets of graded U-shaped ribs, each rib including two legs and a connecting web, said legs including free ends pivoted to said pair of side plates for pivotal movement to and from extended positions in which corresponding ribs of each set extend from said side plates in similar angular relation but in opposite directions and folded positions in which all of said ribs depend from said side plates in substantially parallel relation, each set of ribs including an uppermost rib and subjacent second and third ribs; the improvement comprising a pair of floor boards for said frame adapted to be supported on the webs of some of said ribs between the legs thereof, hinge means hingedly connecting adjacent ends of said boards together for folding movement with said ribs to and from extended and folded positions wherein said boards are disposed respectively in end-to-end relation and face-to-face relation, a center rib of U-shaped form having two upstanding legs fixed to and depending from said side plates between said sets of ribs, said center rib having a web underlying said hinge means, a latch bar pivoted to one leg of said center rib for vertical swinging movement into and out of a locking position overlying said adjacent ends of said floor boards and clamping the same to said web of said center rib, a spring latch mounted on the other leg of said center rib, said latch bar having a bifurcated free end adapted to straddle said other leg of said center rib, said free end of said latch bar being formed with a latch detent operatively engageable with said spring latch for releasably latching said latch bar in said locking position whereby to prevent folding movement of said floor boards.

4. In a frame for a collapsible boat, including a pair of laterally spaced and opposed side plates and two sets of graded U-shaped ribs, each rib including two legs and a connecting web, said legs including free ends pivoted to said pair of side plates for pivotal movement to and from extended positions in which corresponding ribs

of each set extend from said side plates in similar angular relation but in opposite directions and folded positions in which all of said ribs depend from said side plates in substantially parallel relation, each set of ribs including an uppermost rib and subjacent second and third ribs; the improvement comprising a pair of floor boards for said frame adapted to be supported on the webs of some of said ribs between the legs thereof, hinge means hingedly connecting adjacent ends of said boards together for folding movement with said ribs to and from extended and folded positions wherein said boards are disposed respectively in end-to-end relation and face-to-face relation, a center rib of U-shaped form having two upstanding legs fixed to and depending from said side plates between said sets of ribs, said center rib having a web underlying said hinge means, a latch bar pivoted to one leg of said center rib for vertical swinging movement into and out of a locking position overlying said adjacent ends of said floor boards and clamping the same to said web of said center rib, a spring latch mounted on the other leg of said center rib, said latch bar having a free end operatively engageable with said spring latch for releasably latching said latch bar in said locking position whereby to prevent folding movement of said floor boards, said latch bar comprising a pair of sections, means hingedly connecting said sections together, and said spring latch comprising means for locking said sections against hinging movement.

5. In a frame for a collapsible boat, including a pair of laterally spaced and opposed side plates and two sets of graded U-shaped ribs, each rib including two legs and a connecting web, said legs including free ends pivoted to said pair of side plates for pivotal movement to and from extended positions in which corresponding ribs of each set extend from said side plates in similar angular relation but in opposite directions and folded positions in which all of said ribs depend from said side plates in substantially parallel relation each set of ribs including an uppermost rib and subjacent second and third ribs; the improvement comprising four toggle slides, there being two of said slides longitudinally slidable on the legs of said second rib of each set, an upper and a lower toggle link of each slide, said links having inner ends pivoted to said slides, said upper and lower links having outer ends pivoted respectively to said uppermost and third ribs of each set, said toggle slides being slidable away from said side plates to extend said uppermost, second and third ribs of each set from said folded to said extended positions, a pair of floor boards for said frame adapted to be supported on the webs of some of said ribs between the legs thereof, hinge means hingedly connecting adjacent ends of said boards together for folding movement with said ribs to and from extended and folded positions wherein said boards are disposed respectively in end-to-end relation and face-to-face relation, a center rib of U-shaped form having two upstanding legs fixed to and depending from said side plates between said sets of ribs, said center rib having a web underlying said hinge means, a latch bar pivoted to one leg of said center rib for vertical swinging movement into and out of a locking position overlying said adjacent ends of said floor boards and clamping the same to said web of said center rib, and means on the other leg of said center rib for latching

said latch bar in said locking position, whereby to prevent folding movement of said floor board.

6. In a frame for a collapsible boat, including a pair of laterally spaced and opposed side plates and two sets of graded U-shaped ribs, each rib including two legs and a connecting web, said legs including free ends pivoted to said pair of side plates for pivotal movement to and from extended positions in which corresponding ribs of each set extend from said side plates in similar angular relation but in opposite directions and folded positions in which all of said ribs depend from said side plates in substantially parallel relation, each set of ribs including an uppermost rib and subjacent second and third ribs; the improvement comprising four toggle slides, there being two of said slides longitudinally slidable on the legs of said second rib of each set, an upper and a lower toggle link for each slide, said links having inner ends pivoted to said slides, said upper and lower links having outer ends pivoted respectively to said uppermost and third ribs of each set, said toggle slides being slidable away from said side plates to extend said uppermost, second and third ribs of each set from said folded to said extended positions, a pair of floor boards for said frame adapted to be supported on the webs of some of said ribs between the legs thereof, hinge means hingedly connecting adjacent ends of said boards together for folding movement with said ribs to and from extended and folded positions wherein said boards are disposed respectively in end-to-end relation and face-to-face relation, a center rib of U-shaped form having two upstanding legs fixed to and depending from said side plates between said sets of ribs, said center rib having a web underlying said hinge means, a latch bar pivoted to one leg of said center rib for vertical swinging movement into and out of a locking position overlying said adjacent ends of said floor boards and clamping the same to said web of said center rib, means on the other leg of said center rib for latching said latch bar in said locking position, whereby to prevent folding movement of said floor boards, said floor boards having outer ends, and means pivotally connecting said outer ends to the webs of said third ribs whereby to anchor said outer ends of said floor boards to said frame.

7. In a frame for a collapsible boat, including a pair of laterally spaced and opposed side plates and two sets of graded U-shaped ribs, each rib including two legs and a connecting web, said legs including free ends pivoted to said pair of side plates for pivotal movement to and from extended positions in which corresponding ribs of each set extend from said side plates in similar angular relation but in opposite directions and folded positions in which all of said ribs depend from said side plates in substantially parallel relation, each set of ribs including an up-

permost rib and subjacent second and third ribs; the improvement comprising four toggle slides, there being two of said slides longitudinally slidable on the legs of said second rib of each set, an upper and a lower toggle link for each slide, said links having inner ends pivoted to said slides, said upper and lower links having outer ends pivoted respectively to said uppermost and third ribs of each set, and said toggle slides being slidable away from said side plates to extend said uppermost, second and third ribs of each set from said folded to said extended positions, a pair of floor boards for said frame adapted to be supported on the webs of some of said ribs between the legs thereof, hinge means hingedly connecting adjacent ends of said boards together for folding movement with said ribs to and from extended and folded positions wherein said boards are disposed respectively in end-to-end relation and face-to-face relation, means for locking said floor boards in said extended position, said floor boards having outer ends, and means pivotally connecting said outer ends to the webs of said third ribs whereby to anchor said outer ends of said floor boards to said frame.

8. In a frame for a collapsible boat, the combination with a rigid base and oppositely directed collapsible frame portions pivotally secured thereto, of a pair of floor boards for said frame, there being a floor board supported by each frame portion, hinge means hingedly connecting said boards together in end-to-end relation for folding movement with said frame portions to and from extended and collapsed positions, said boards in the region of said hinge means being supported by said base, a latch bar pivoted to said base for vertical swinging movement into and out of a locking position overlying said hinge means and clamping both of said boards to said base, and means for releasably locking said latch bar in said locking position, whereby to prevent folding movement of said floor boards.

FINN RONNE.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
217,527	Goddard et al.	July 15, 1879
236,002	Deline	Dec. 28, 1880
362,039	Pritchard	Apr. 26, 1887
842,908	Perring	Feb. 5, 1907

FOREIGN PATENTS

Number	Country	Date
599	Great Britain	of 1892
12,843	Great Britain	of 1898
46,939	Norway	Sept. 16, 1929
571,695	Germany	Feb. 16, 1933