Jan. 27, 1942. C. J. HAMLIN, JR 2,271,338

COLLAPSIBLE BOAT

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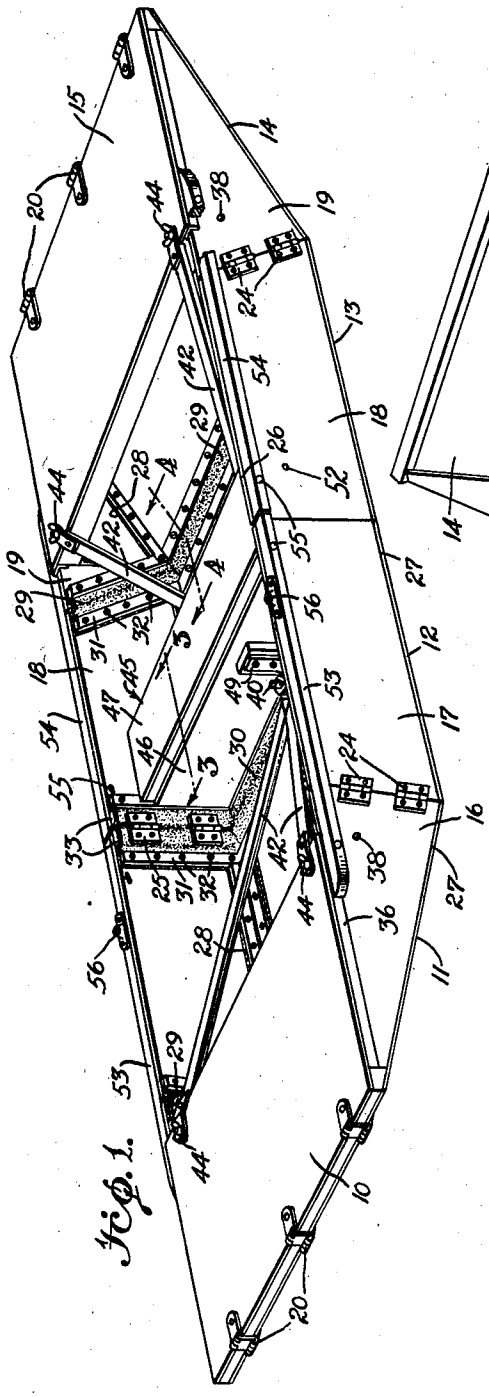


Fig. 1.

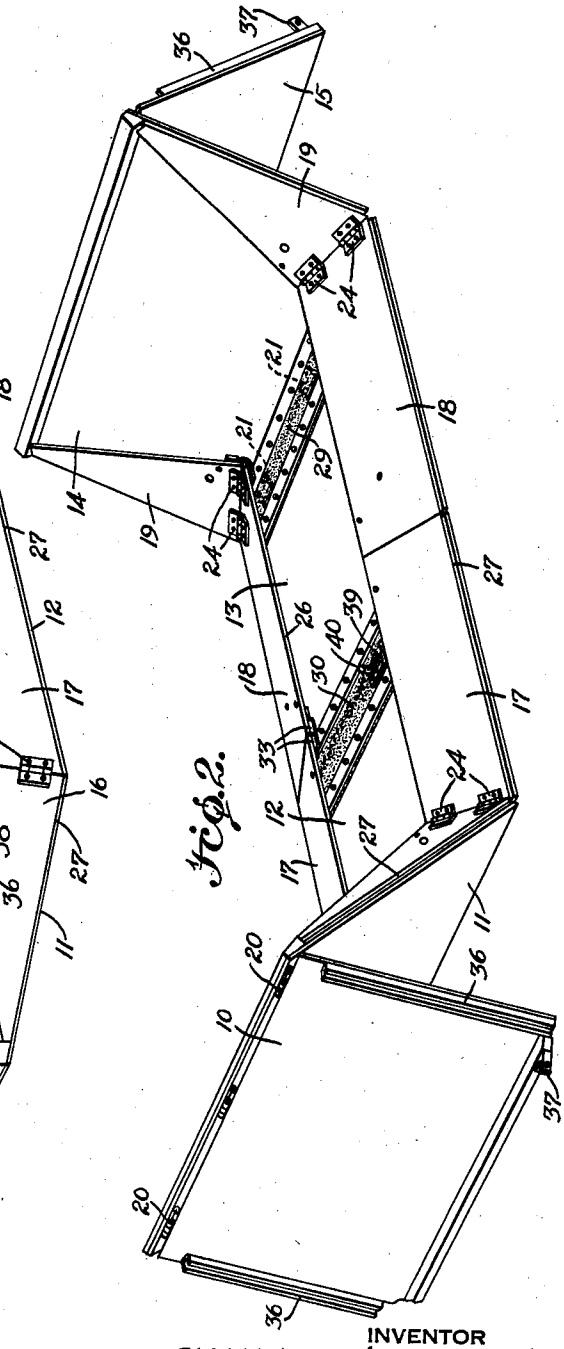


Fig. 2.

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Fig. 3.

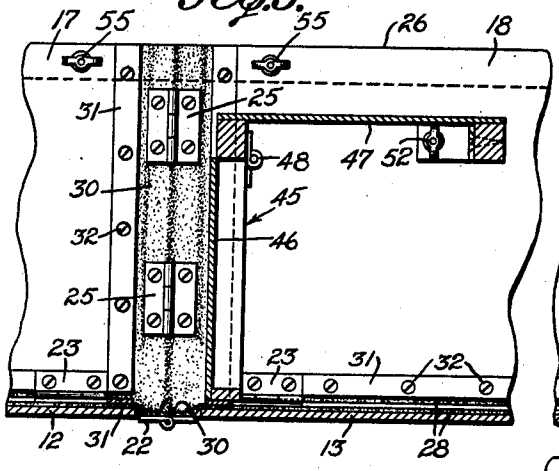
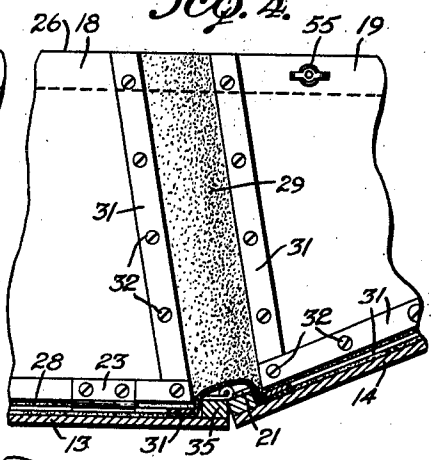


Fig. 4.



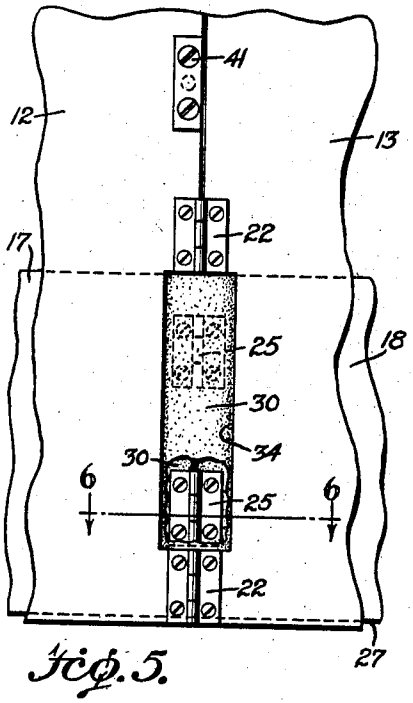


Fig. 5.

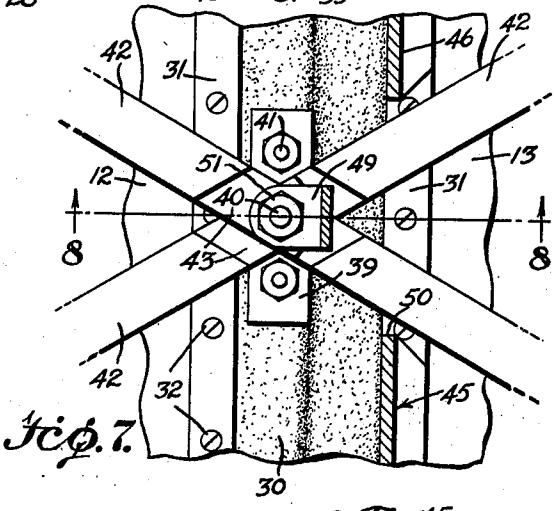


Fig. 7.

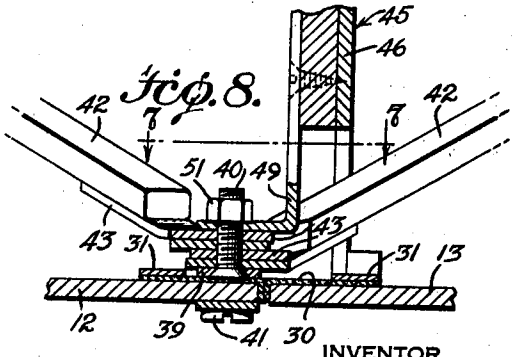


Fig. 8.

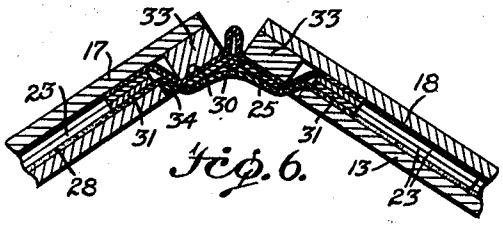


Fig. 6.

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2,271,338

COLLAPSIBLE BOAT

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Application February 24, 1941, Serial No. 380,168

7 Claims. (Cl. 9—2)

This invention relates to collapsible boats.

An object of this invention is to provide a collapisble boat in which the boat proper, except for braces, gunwales, oarlocks, fastenings, and a seat, is in one piece. These auxiliary parts, being relatively small, can be conveniently carried in a single small bundle. It is another object to provide such a boat made out of relatively rigid and strong material, such as plywood or sheet metal. It is a further object to provide such a boat in which the boat proper can be folded into a compact bundle. Other objects will appear hereinafter.

These objects are accomplished by means of the herein described invention, which will be more easily understood by reference to the accompanying drawings.

In the drawings, Figure 1 is a perspective view of the boat in completely set up position, with parts broken away for clearness in illustration. Figure 2 is a view similar to Figure 1, with the boat in partially folded position. Figure 3 is a fragmentary view, on a larger scale, along the line 3—3 of Figure 1. Figure 4 is a fragmentary view on the same scale as Figure 3, along the line 4—4 of Figure 1, with the deck section omitted. Figure 5 is a fragmentary plan view, with parts broken away for clearness in illustration, and also on the same scale as Figure 3, from the underside of the boat, with the sides of the boat in completely folded position. Figure 6 is a view taken along the line 6—6 of Figure 5, on a still larger scale, with the bottom of the boat in partially folded position. Figure 7 is a fragmentary top view of a portion of the center of the boat, partly in section, and taken along the line 7—7 of Figure 8. Figure 8 is a view taken along the line 8—8 of Figure 7.

Referring particularly to Figures 1 and 2, the hull of the boat consists of four substantially rectangular sections 11, 12, 13 and 14, hingedly connected to each other, and eight sections 16, 16, 17, 17, 18, 18, 19, 19, the four sections 16, 16, 19, 19 being substantially triangular in shape, and the four sections 17, 17, 18, 18 being substantially trapezoidal in shape. The sections 12 and 13 lie in a horizontal plane and constitute the central portion of the bottom of the boat; sections 11 and 14 slant upwards and constitute the end portions of the bottom of the boat. Four of the sections 16, 17, 18 and 19 are hingedly connected to each other and to the lateral edges on one side of the sections 11, 12, 13 and 14, respectively; the other four sections 16, 17, 18 and 19 are similarly connected to the opposite lateral edges of sections 11, 12, 13 and 14. Hingedly connected to the end sections 11 and 14 are deck members or sections 10 and 15. In order to provide for ease in folding, the hinges between successive sections 10, 11, 12, 13, 14 and 15 are on opposite surfaces of such sections. Thus, the hinges 20 between sections 10 and 11 are on the outer or water-contacting side of the hull, the hinges 21 between sections 11 and 12 on the inside, the hinges 22 between sections 12 and 13 on the outside, the hinges 21 between sections 13 and 14 on the inside, and the hinges 20 between sections 14 and 15 on the outside.

As the boat is approximately symmetrical, the remainder of the description, for the sake of simplicity and in order to avoid repetition, will be with reference to only one end and one side of the boat, insofar as is possible. The only exception to this is the provision of oarlocks and a seat, which are normally not provided at both ends of the boat. It is also possible to construct a modified form of boat in which the novel structure described herein is used at only one end of the boat, while the opposite end may be square, for example to provide for an outboard motor.

The side sections 16, 17, 18 and 19, as stated above, are hingedly connected to sections 11, 12, 13 and 14, these hinges 23 being on the inside of the boat. These sections are also, as stated above, hingedly connected to each other, the hinges 24 between 16 and 17 and between 18 and 19 being on the outside of the boat, and the hinges 25 between 17 and 18 being on the inside of the boat.

In completely set up position, as shown in Figure 1, the top edge 26 of the sections 16, 17, 18 and 19 is in a substantially straight line, so that the four sections are substantially disposed in a single plane. The bottom edge 27, on the other hand, is a broken line, so that the top edges 26 of each of the sections 16, 17, 18 and 19 must be shorter than the bottom edges. I have found that the angle formed by the bottom edge 27 at the juncture between sections 16 and 17 should be approximately bisected by the juncture line between said sections 16 and 17. By this means, the entire assemblage can be folded together easily and quickly without buckling. It will be seen that, by this structure, adjacent sections are permanently fastened together, although foldable upon each other.

Wherever the joints between such foldable sections are in contact with water, such joints are made permanently water-tight by providing strips of flexible water-proof water-impermeable ma-

terial 28, 29, 30 along the joints (see Figures 3 and 4). These strips are adhered along the edges of adjacent sections by any convenient means, such as a suitable cement, or screws or nails. In the drawings, the strips 28, 29 and 30 are held in place by means of two sheet metal strips 31 and screws 32. In many cases, however, a cement preferably is employed. The strips 28, 29, 30 themselves may be made of rubber, rubberized fabric, reinforced rubber, neoprene, etc. The strips are preferably on the inside of the boat, in order to minimize wear. Five such strips are required, two strips 28 each on the inside of the two bottom lateral edges 27, one strip 29 along the joint 16—17: 11—12: 16—17, one similar strip 29 along the joint 18—19: 13—14: 18—19, and one strip 30 along the joint 17—18: 12—13: 17—18. Strips 28 need only be sufficiently wide (e. g. the width of the hinges) to secure the proper support on the adjacent sections, with only a slight gap between such sections. Strips 29 and 30, however, are preferably wider than this and are fastened to the sections outside of the hinges. The reason for this is that hinges 25 and 21 are not mounted directly on sections 11, 12, 13, 14, 17 and 18, but on auxiliary strips, for reasons hereinafter explained. It would be impractical to mount strips 29 and 30 directly on these auxiliary strips.

When in folded position, it will be noted that side sections 17 and 18 lie directly over bottom sections 12 and 13. When the two bottom sections 12 and 13 are folded upon each other (see Figure 6), it will be noted that hinges 25 and 22 tend to fold together. In order to prevent distortion and breakage, hinges 25 and 22 should lie in substantially the same plane when in the positions shown in Figures 5 and 6. This is accomplished by mounting hinges 25 on auxiliary strips 33, of a thickness greater than the thickness of sections 12 or 13, to provide room for strips 30 and 31. This structure is shown in Figure 6. A cut-out portion 34 of sections 12 and 13, into which hinges 25, etc., fit, completes this assemblage.

When sections 13 and 14 are folded together, it will be noted that sections 18 and 19 lie between them (see Figure 2). In order to provide room for sections 18 and 19, hinges 21 are mounted on auxiliary strips 35, which are thicker than sections 16 and 19, to provide room for strips 29 and 31. This structure is shown in Figure 4.

Deck members 10 and 15 may be provided with channel irons 36 which fit over the top edges of sections 16 and 19, respectively. Angle irons 37, permanently attached to sections 10 and 15, provide means for detachably fastening sections 10 and 15 to sections 16 and 19 respectively by means of suitable fastenings 38.

Near the center of the boat, and attached to the inner edge of section 12, is a plate 39 provided with an upstanding bolt 40. This plate is permanently attached to section 12 by any convenient means, such as nuts and bolts 41.

Four detachable struts or braces 42 have at their ends metal fittings 43 with suitable holes in them. These holes, at one end, are adapted to fit over bolt 40, and at their opposite ends are adapted to be attached to corners of sections 10 and 15 by suitable fastenings 44.

A seat 45 is also detachable from the rest of the boat, and consists of an upstanding supporting member 46 and a horizontal seat member 47 hingedly connected together by means of hinges 48. Near the bottom edge of member 46 is an angle iron 49 provided with a hole which is adapted to fit over bolt 40 and over struts 42. Member 46 has a portion 50 near angle iron 49 cut out in order to provide a place for two of the struts 42. A nut 51 over angle iron 49 holds the entire assemblage together. Seat member 47 is detachably fastened to sections 18 by means of suitable fastenings 52.

Gunwale strips 53 and 54 are attached along the outside of edges 26 by means of suitable fastenings 55. Gunwale strips 53 are provided with oarlocks 56.

When in completely set-up position, as shown in Figure 1, the detachable parts, i. e. struts 42, seat 45, and gunwales 53 and 54, contribute strength and rigidity to the boat, as do also deck sections 10 and 15, which are partially detachable. The fastenings 38, 44, 52, 55, and also 40—51, may consist of bolts and wing nuts, as shown, or may consist of any suitable type of quick-acting fastening available on the market. The boat itself may be constructed of plywood, or sheet metal, or other rigid material, but is preferably constructed of plywood.

In actual operation, the oarsman sits on seat member 47, while other passengers may sit on the same seat, or on deck sections 10 and 15, provided they are sufficiently strong. The struts 42 do not substantially interfere with the comfort of the oarsman or passengers.

In folded condition, the main part of the boat forms a single compact bundle. The boat described herein folds into a bundle approximately 3 feet long (the width of the boat), 2½ feet wide, and less than 6 inches thick, with plywood ¼ inch thick. Seat 45, struts 42, gunwales 53 and 54, and the fastenings may be conveniently carried in a second smaller bundle. Both bundles may be easily stored in the back of an automobile. When ready to be operated, the entire boat may be set up in an exceedingly short time.

Although the hinges are described as being on the inside or the outside of the boat, it will be understood that the important factor is actually the position of the hinge pins, or axes of the hinges. Thus, T-shaped hinges might be used in which the horizontal stroke of the T is divided in the middle and on the inside of the boat, while the vertical stroke is of double thickness and passes through the boat, the pin or axis being at the bottom of the vertical stroke and on the outside of the boat.

As many other variations are possible within the scope of this invention, it is not intended to be limited except as defined by the appended claims.

I claim:

1. A collapsible boat comprising a rectangular central bottom section, a slanting bottom section permanently and hingedly connected to said central section, trapeozidal sections permanently and hingedly connected to the lateral edges of said central section, and triangular sections permanently and hingedly connected to the lateral edges of said slanting section and to said trapezoidal sections, said trapezoidal and triangular sections comprising the sides of the boat.

2. A collapsible boat comprising a rectangular central bottom section, a rectangular slanting bottom section permanently and hingedly connected to said central section, trapezoidal sections permanently and hingedly connected to the lateral edges of said central section, and triangular sections permanently and hingedly connected to the lateral edges of said slanting sec-

tion and to said trapezoidal sections, said trapezoidal and triangular sections comprising the sides of the boat, the sections of each of said sides being disposed in a substantially single plane.

3. A collapsible boat comprising two rectangular central bottom sections permanently and hingedly connected together, two slanting bottom sections each permanently and hingedly connected to one of said central sections, trapezoidal sections permanently and hingedly connected to the lateral edges of said central sections and permanently and hingedly connected to their adjacent trapezoidal sections, and triangular sections permanently and hingedly connected to the lateral edges of said slanting sections and to said trapezoidal sections, said trapezoidal and triangular sections comprising the sides of the boat.

4. A collapsible boat comprising two rectangular central bottom sections permanently and hingedly connected together, two rectangular slanting bottom sections each permanently and hingedly connected to one of said central sections, trapezoidal sections permanently and hingedly connected to the lateral edges of said central sections and permanently and hingedly connected to their adjacent trapezoidal sections, and triangular sections permanently and hingedly connected to said slanting sections and to said trapezoidal sections, said trapezoidal and triangular sections comprising the sides of the boat, the sections of each of said sides being disposed in a substantially single plane.

5. A collapsible boat comprising two rectangular central bottom sections permanently and hingedly connected together, two rectangular slanting bottom sections each permanently and hingedly connected to one of said central sections, two rectangular deck sections each permanently and hingedly connected to one of said slanting sections, trapezoidal side sections permanently and hingedly connected to the lateral edges of said central sections and permanently and hingedly connected to their adjacent trapezoidal sections, and triangular side sections permanently and hingedly connected to said slanting sections and to said trapezoidal sections, said trapezoidal and triangular sections comprising the sides of the boat, the sections of each of said sides being disposed in a substantially single plane.

6. A collapsible boat comprising two rectangular central bottom sections permanently and hingedly connected together, two rectangular slanting bottom sections each permanently and hingedly connected to one of said central sections, two rectangular deck sections each permanently and hingedly connected to one of said slanting sections, trapezoidal side sections permanently and hingedly connected to the lateral edges of said central sections and permanently and hingedly connected to their adjacent trapezoidal sections, triangular side sections permanently and hingedly connected to said slanting sections and to said trapezoidal sections, said trapezoidal and triangular sections comprising the sides of the boat, the sections of each of said sides being disposed in a substantially single plane, struts detachably connecting said deck sections to the bottom of the boat, a seat detachably connected to the bottom of the boat and to said trapezoidal sections, and gunwales detachably connected to said trapezoidal sections.

7. A collapsible boat having bottom sections, side sections, hinges connecting said bottom sections to said side sections and enabling said side sections to fold upon said bottom sections, hinges connecting said side sections together having their axes on the outer sides of said side sections, hinges connecting said bottom sections together having their axes on the upper sides of said bottom sections, the axes of said last named hinges being disposed upwardly from said bottom sections enabling said bottom sections to fold around said side sections.

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