Oct. 9, 1928. 1,687,387

N. M. RIEGER

COLLAPSIBLE BOAT

Filed Jan. 17, 1927 2 Sheets-Sheet 1

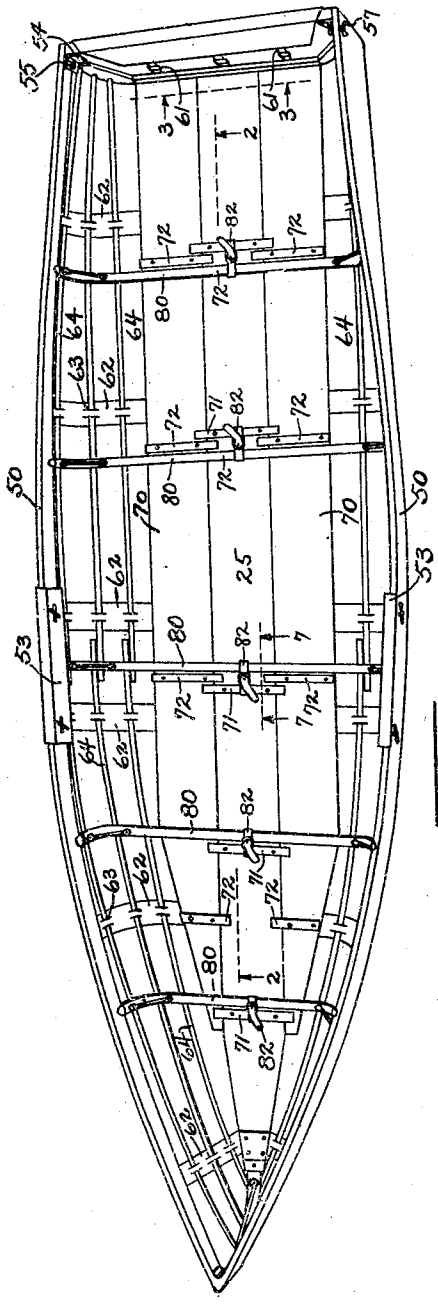


Fig. 1.

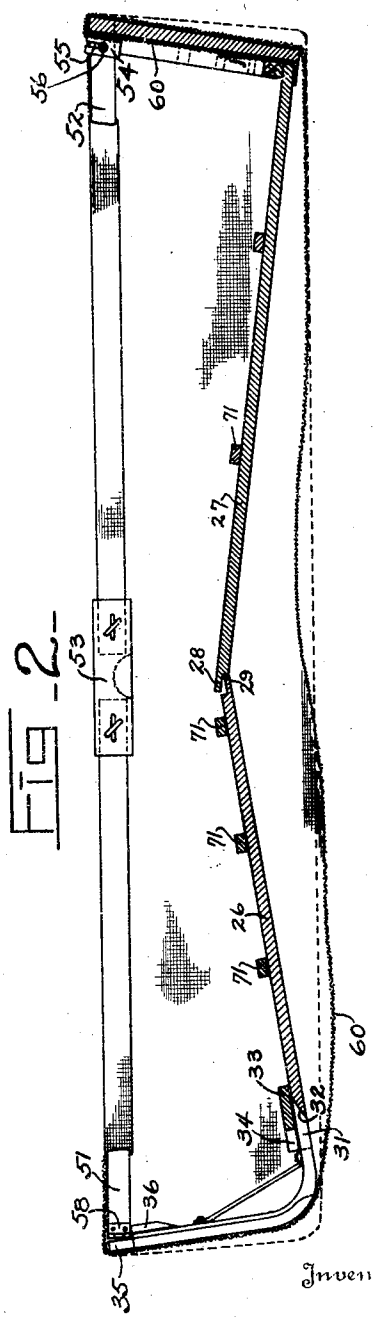


Fig. 2.

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Fig. 4.

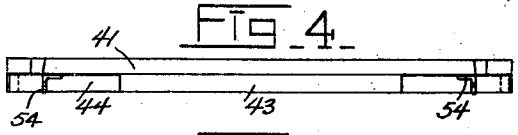


Fig. 3.

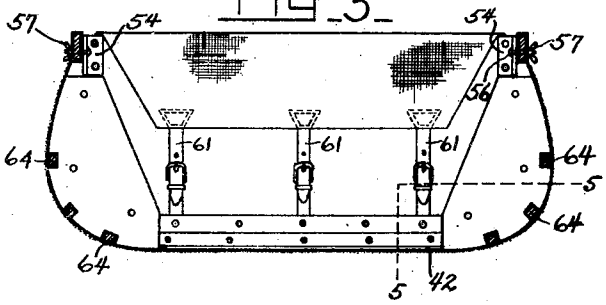
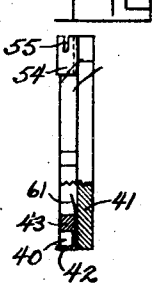


Fig. 5.



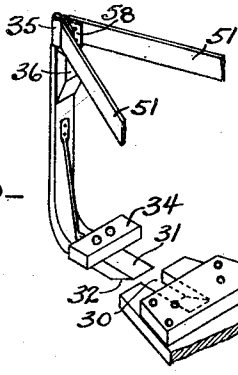


Fig. 8.

Fig. 7.

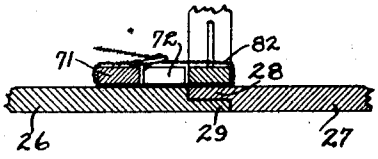


Fig. 9.

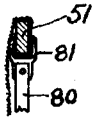
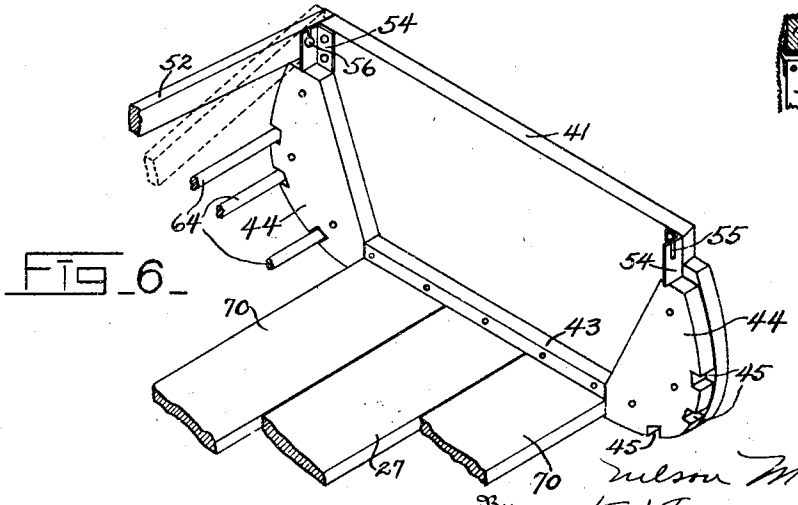


Fig. 6.



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Patented Oct. 9, 1928. 1,687,387

UNITED STATES PATENT OFFICE.

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COLLAPSIBLE BOAT.

Application filed January 17, 1927. Serial No. 161,573.

The present invention relates to collapsible boats, particularly of the type wherein a skin of fabric or other flexible material is given form by a knock-down frame.

The object of the invention, generally, is to provide a frame of improved strength and stability, and one which shall obviate all possibility of accidental collapse. In other words, the object is to make a collapsible boat which is substantially as sea-worthy as a non-collapsible boat of equal size and character. One particular object is to provide a collapsible boat with a stern construction adapted to carry a portable motor-propeller outfit, and another is to provide the after part of the boat with a large displacement.

I shall now proceed to describe my improved boat, referring in the description to the accompanying drawings, in which

Fig. 1 is a perspective view of my boat ready for use;

Fig. 2 is a vertical section on lines 2—2 of Fig. 1, showing the state of certain parts during the process of assembling or knocking-down the frame. This view is rather diagrammatic in character, the slats which are secured to the skin being omitted in the interest of clarity;

Fig. 3 is a section on line 3—3 of Fig. 1. The predominating feature of this figure is the transom-board which forms the stern member of the boat;

Fig. 4 is a view looking downward on the transom-board;

Fig. 5 is a view of the end of the transom-board, with a portion of the board cut away on line 5—5 of Fig. 3;

Fig. 6 is a perspective view of a portion of the stern structure, showing the association of a gunwale, the slats, the keel and the floor boards, with the transom-board;

Fig. 7 is a fragmental view showing the relationship of the keel with certain other parts, this view being a section on line 7—7 of Fig. 1;

Fig. 8 is a view of the bow portion of the frame, showing the manner of attaching the stem to the keel; and

Fig. 9 is a detail showing the manner of attaching the ribs to the gunwales.

For reasons which will appear presently, the keel of my boat, indicated generally by the numeral 25, is articulated. The keel comprises two members, 26 and 27, joined by a ship-lap formed by cutting rabbets in the ends of the keel members, producing tongues 28 and 29. The forward end of the member 26 is bifurcated, as at 30, Fig. 8, and adapted to receive the horizontal extension 31 of the stem. The end of this extension is beveled toward the bottom, as at 32, the throat of the slot 30 in the keel being complementarily beveled. A cleat 33 secured to the member 26, partially covering the slot 30, and, cooperating with the beveled throat, forms a sort of socket to receive the beveled end 31—32 of the stem. A cleat 34 secured to the extension 31 is adapted to lie on the keel when the extension is in place in the slot 30. Thus a very rigid connection is formed between the keel and the stem, while providing for easy disconnection of the parts. At the stern the member 27 of the keel is inserted in an elongate socket 40, formed on the lower edge of the transom-board 41. This socket is most clearly shown in Fig. 5, and comprises an angle iron 42 secured to the transom-board, with one leg extending upward, and the other leg flush with the lower edge of the board. Contiguous to the edge of the upwardly extending leg of the angle is a cleat 43, the space between this cleat and the lower leg of the angle constituting the socket 40 referred to. The transom-board is reinforced at each end by battens 44, which also serve to close the ends of the socket 40. Notches 45 in the edges of the battens 44 receive the ends of slats 63, as will be explained presently. The transom-board is preferably built up of a number of layers of wood with their grains running in different directions. In other words, it is what is known as ply wood. As this is well known it is not necessary to indicate on the drawing that the board is so constructed.

The gunwales of the boat, indicated generally by the numerals 50—50, in Fig. 1, comprise forward members 51 and after members 52, which members are joined by coupling members 53. See Fig. 2. The gunwales are secured to the transom-board by means of improved devices which serve also as hinges upon which the transom-board rocks during the assembling of the boat, as will hereinafter be explained. Each of these devices, or hinges, comprises a short piece of angle iron 54, secured in a vertical position at the upper corners of the transom-board. See Figs. 3, 5 and 6. The projecting leg of the angle is provided with an open vertical slot 55. A bolt 56 in the end of the gunwale

drops into the slot 55, and the bolt is provided with a thumb-nut 57, to be tightened after the boat is assembled.

Referring to Fig. 2, the manner of assembling the boat will now be described. As usual the skin 60 consists of water-proof fabric, or some other flexible water-proof material. This skin is made up into the form of a boat and the gunwale members 51 and 52 are permanently secured to the skin, by the latter being wrapped around the gunwale, and tacked in the usual way. This is well shown in Fig. 2, where portions of the skin covering the gunwales are cut away. It is also illustrated in Fig. 9. Having opened up the skin the members 51 and 52 of the gunwales are united by the coupling members 53 and thumb-nutted bolts. The upper end, 35, of the stem, is inserted in a pocket formed in the skin for the purpose, a block 36 on the stem being thereby brought under the juncture of the members 51—51, which members are united by a hinge 58. The transom-board is secured to the gunwale members 52—52 as previously described, altho the thumb-nuts are for the time being left slightly loose. The stern portion of the skin is brought over the upper edge of the transom-board and secured by means of straps 61—61—61, as in Fig. 3. The member 26 of the keel having been attached to the stem, in the manner already described, and the member 27 of the keel having been inserted in the socket 40, the tongue 29 of the ship-lap is placed in the rabbet forming the tongue 28, and the members 26 and 27 are then pressed downwardly, from the position they occupy in Fig. 2 to a position of alignment, as in Fig. 1. Thus the keel, acting as a toggle, stretches the skin longitudinally.

As previously explained the skin shown in Fig. 2 is not complete. So attention is directed to Fig. 1, where it is seen that strips 62 of fabric or other flexible material, attached to the gunwales, are slitted, as at 63, to form loops through which are passed longitudinally extending slats 64. To enable the skin to be folded with the slats in the loops, the slats are made in two pieces, overlapping amidships. When the transom-board is forced to its normal position by the keel, the ends of the slats 64 drop into the notches 40. The ends of the transom-board extend a substantial distance beyond the gunwales and are rounded. Thereby the after part of the boat is given a prominent bilge. This increases the displacement and enables the boat to carry a motor-propeller outfit. In Fig. 2, the skin is shown loose and flabby, but by dotted lines the position which the stem and stern are forced to assume by the toggle action of the keel is indicated. This illustrates the value of hinging the transom-board to the gunwales.

The alignment of the members 26 and 27 of the keel is maintained by floor-boards 70—70, as will now be explained. Secured to the top of the keel members are a number of cleats 71, the ends of which cleats overlie the boards 70 when they are in place on each side of the keel. On each board 70 there are a number of cleats 72, whose projecting ends overlie the keel. Thus the boards 70, which span the members of the keel, serve the double purpose of floor boards and stiffeners for the keel. At the stern the floor-boards enter the socket 40, whereby the outer edges of the boards are given vertical support. The boards are of sufficient thickness and rigidity to enable this support of their stern ends to prevent objectionable depression when weight is placed upon any part of the floor.

After the floor-boards are in place the ribs are put in place. The ends of the ribs are provided with bifurcated fixtures 81, preferably metal, which embrace the gunwales, as in Fig. 9. The coupling members 53 are cut away in the center to provide a seat for the forks 81 similar to that afforded for the other forks by the gunwales. The ribs lie on the floor-boards and keel and are secured to the several cleats by straps 82. The central rib lies on the tongue 28, thereby holding the tongue down on the tongue 29. A cleat 72 is secured to each floor-board in a zone contiguous to that of the ship-lap, and a cleat 71 is secured to the keel member 26 in a position such that it will be contiguous to these cleats 72. Thus the rib and three cleats may be snugly strapped together with the central strap 82.

I have described what I at present regard as the preferred embodiment of my invention, but it is not to be understood that my invention is limited in its scope to the particular details of construction shown. The scope of my invention is defined by the following claims.

I claim:

1. A transom-board for a collapsible boat, having at each upper corner a vertical slot open at its upper end and adapted to receive a bolt passing transversely through a gunwale; said board having at its lower edge a socket to receive the end of the keel and the ends of the floor-boards.

2. A collapsible boat having gunwales, a stem, a transom-board, and an articulated keel, one end of which keel is connected to the stem and the other end connected to the transom-board; said board being hinged to the gunwales, thereby permitting its lower edge to be forced rearwardly by the keel as the latter, acting as a toggle, is forced to a rectilineal condition.

3. A collapsible boat having gunwales, a stem, a transom-board and an articulated keel, one end of which keel is connected to the stem, the other end entering a socket formed on the lower edge of said board; said

board being hinged to the gunwales, thereby permitting its lower edge to be forced rearwardly by the abutting end of the keel as the latter, acting in the manner of a toggle, is forced to a rectilineal condition.

4. In a collapsible boat, a keel, a transom-board, and floor-boards; one on each side of the keel; the contiguous longitudinal edge of each floor-board being secured to the keel, the stern end of each being secured to and supported by the transom-board.

5. In a collapsible boat, a transom-board provided at its lower edge with a horizontal socket, a keel, the stern end of which extends into said socket, and floor-boards, one on each side of the keel, the rear ends of which extend into said socket, while one edge of each is secured to the keel.

6. In a collapsible boat, a transom-board, an articulated keel detachably connected to the lower edge of said board, and two floor-boards, each having one edge detachably secured to the keel, whereby the keel is maintained in a rectilineal condition, the stern end of each board being detachably secured to the transom-board; thereby affording support for the outer edges of the boards.

7. In a collapsible boat, gunwales, a transom-board hinged thereto, a stem, an articulated keel abutting said stem and transom-board, adapted to act as a toggle and force the stem forward and the lower edge of the transom-board rearward as the members of the keel are moved from an unaligned to an aligned condition; and floor boards, each attached by one edge to the keel, thereby securing the members thereof in alignment, said transom-board having a socket to receive the ends of the floor-boards, whereby said boards are prevented from tilting, and means for keeping the boards from moving forward and getting out of the socket.

8. In a frame for a collapsible boat, gunwales, an articulated keel, the joint in which consists in a ship-lap, two floor-boards, one on each side of and with their tops in the same plane as the top of the keel, a series of transversely disposed cleats secured to the keel with their ends overlying said boards, similar cleats secured to said boards with their ends overlying the keel, said boards forming stiffeners for the keel; a rib extending from one gunwale to the other, said rib crossing the keel in the zone of said ship-lap, and a transom-board to the upper corners of which the gunwales are removably secured, the lower edge of said transom being provided with a socket into which the keel and the ends of the floor-boards are inserted.

9. A collapsible boat, comprising gunwales, a keel, and a transom-board to which the gunwales and keel are detachably secured; the ends of said board being rounded and extending a substantial distance beyond the gunwales, thereby giving the after part of the boat a prominent bilge, said rounded extensions being low down, so as to make the bilge increase the displacement of the after part of the boat.

10. A collapsible boat, comprising gunwales, a keel, a transom-board to which the keel and gunwales are detachably secured, the ends of said board being rounded and extending a substantial distance beyond the gunwales, thereby giving the after part of the boat a prominent bilge; a skin, ribs secured to the gunwales and keel, and longitudinal slats between the ribs and skin, said slats being attached to the transom-board.

11. A transom-board for a collapsible boat, constructed of ply-wood, having at each upper corner a vertical slot open at its upper end and adapted to receive a bolt passing transversely through a gunwale; said board having at its lower edge a socket to receive the end of the keel and the ends of the floor-boards.

12. A collapsible boat having a frame comprising a keel, gunwales, and a transom-board extending from the keel up to the gunwales, a skin which envelopes the frame, and means for securing the gunwales to the transom-board, which means permits the board to rock on a horizontal axis for the purpose of stretching the skin.

13. A collapsible boat having a frame and a skin in which the frame is enveloped; said frame comprising an articulated keel, a stem attached to one end of the keel and a transom-board attached to the other end of the keel, said keel serving as a toggle as its members are forced to a rectilineal position, whereby to press the stem one way and the transom-board the other way, to stretch the skin longitudinally; gunwales to which said skin is attached, and a plurality of ribs connected to the keel and having their ends attached to said gunwales.

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