Aug. 23, 1960 R. DESANGES 2,949,616

COLLAPSIBLE BOATS

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Fig. 1

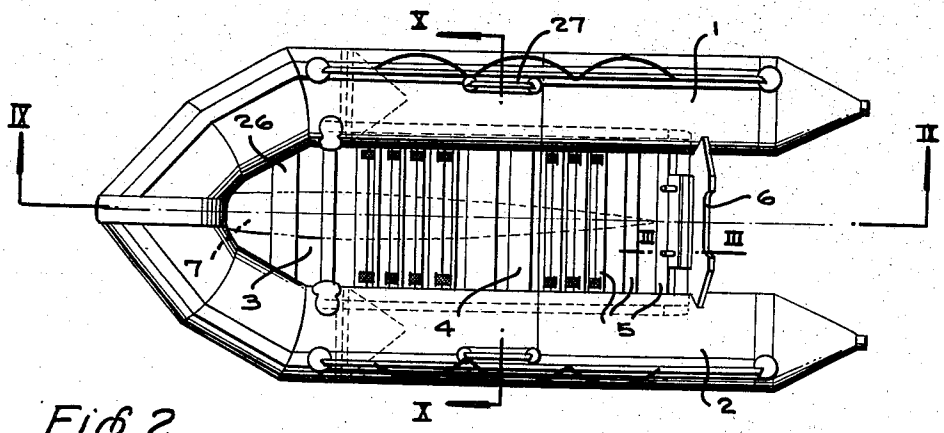


Fig. 2

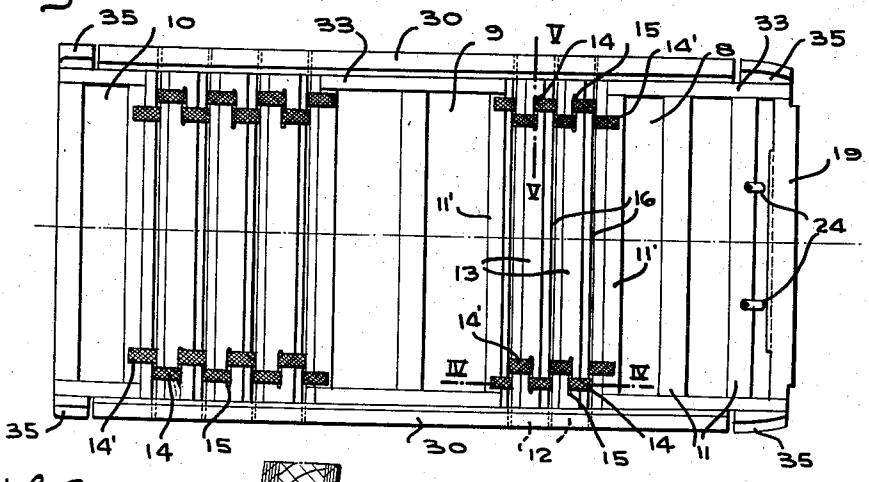


Fig. 3

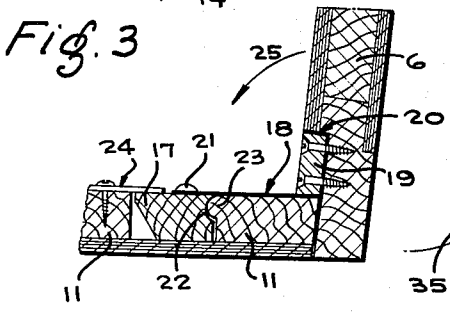
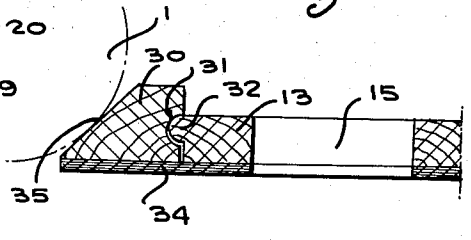


Fig. 5



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COLLAPSIBLE BOATS

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Fig. 4

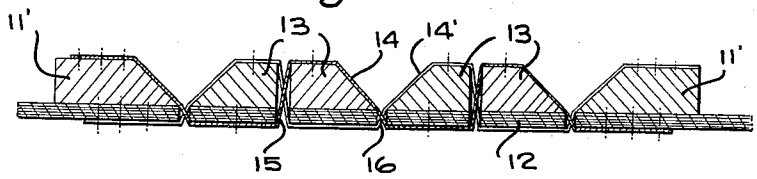


Fig. 6

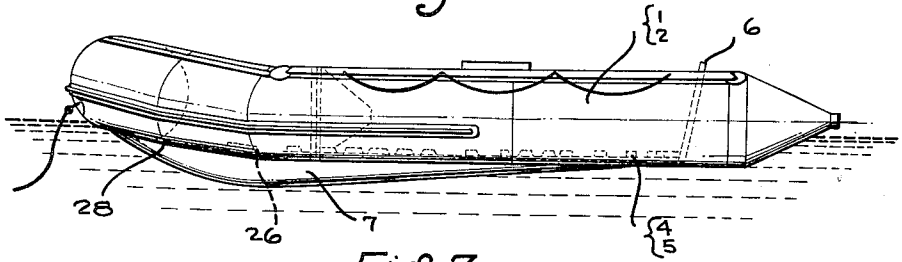


Fig. 7

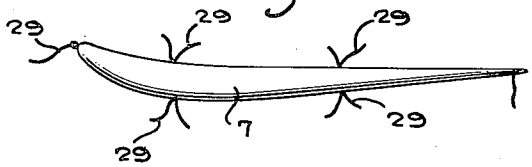


Fig. 7a

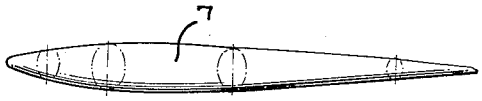
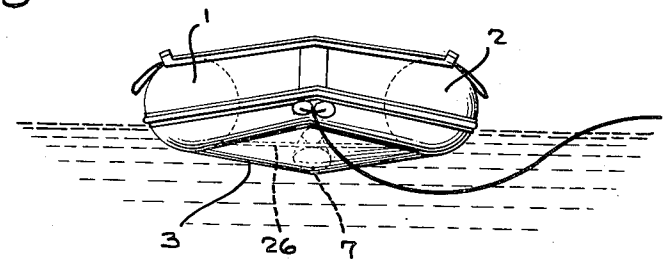


Fig. 8



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Fig. 9

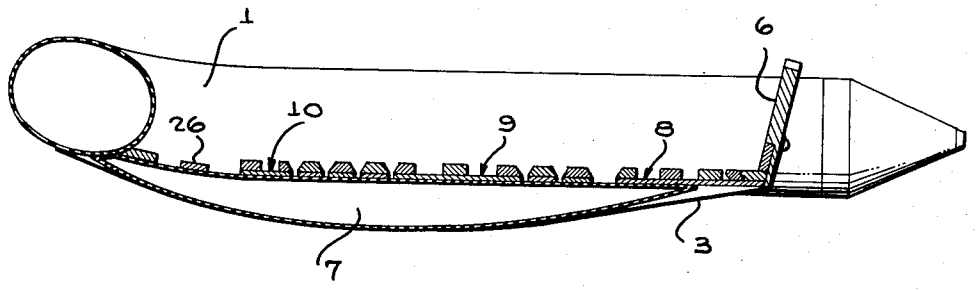
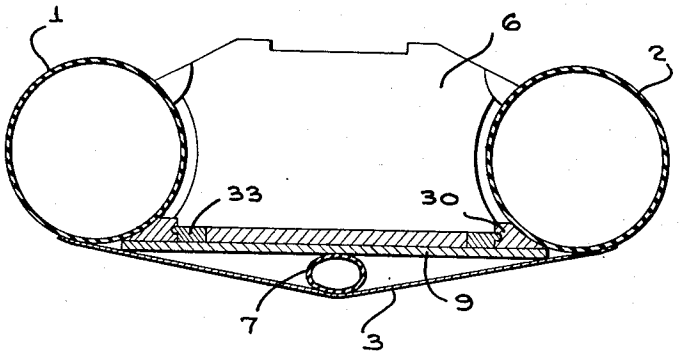


Fig. 10



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2,949,616

COLLAPSIBLE BOATS

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Filed July 29, 1957, Ser. No. 674,870

Claims priority, application France Aug. 3, 1956

5 Claims. (Cl. 9—2)

This invention relates to collapsible boats and has specific reference to collapsible boats of the inflatable type wherein the sides consist of rubber tubes or the like which are connected by a cloth forming the bottom of the boat.

Boats of this general character are known and generally comprise a detachable, hinged floor or slatted structure which is rigid when in an assembling position; a keel fitting between the floor and the bottom cloth so as to impart thereto suitable tension and contour; and finally a rear inclined panel secured permanently between the inner lateral walls of the side tubes and preferably anchored to the floor structure when the latter is in an assembled position.

However, the presence of detachable or rigid component elements is objectionable not only because these elements make it impossible to fold up the boat in the form of a complete, readily inflatable unit, but also because, in certain cases, these elements necessitate handlings which are generally inconvenient and difficult since their object is to impart a certain tension and stiffness to the boat. This drawback is particularly serious when the boat is intended for use as a lifeboat, for, under these circumstances, the emergency boat is generally thrown onto the water surface, whereafter these elements must be properly positioned upon completion of the pneumatic inflation of the envelope.

Now it is the object of the present invention to facilitate the assembling of boats of this general character.

This invention consists essentially in so arranging the component elements listed hereabove as to render them interdependent and collapsible with the envelope so as to obtain a self-contained, quickly inflatable and readily usable unit.

According to a preferred embodiment of this invention the boat comprises essentially a floor assembled with the rear panel and consisting of hinged slats so that it can be wound with the envelope on the rear panel when the boat is being folded up.

In addition the keel, in order to permit this folding operation, is in the form of an inflatable tubular envelope disposed on the bottom-forming cloth and extending from the stem of the boat along the longitudinal axis thereof so as to bear against the floor during the inflation and thus impart adequate stiffness and contour to the aforesaid bottom cloth.

In order to afford a clearer understanding of the present invention and of the manner in which the same may be carried out in practice, reference will now be made to the accompanying drawings forming part of this specification and illustrating diagrammatically by way of example a typical embodiment of a collapsible boat constructed according to the teachings of this invention. In the drawings:

Figure 1 is a top plan view of the boat;

Fig. 2 is a fragmentary top plan view showing on a larger scale the floor of the boat;

Figure 3 is a detailed vertical section taken on the line III—III of Fig. 1 and showing on a larger scale the assembling of the rear panel;

Figures 4 and 5 are detailed longitudinal sections showing structural details of the floor, the sections being taken on the lines IV—IV and V—V of Fig. 2;

Figure 6 is a side elevational view of the boat afloat;

Figures 7 and 7*a* are a side view and a plane view from beneath of the inflated keel with its various cross-section;

Figure 8 is a front view of the boat;

Figure 9 is a longitudinal vertical sectional view taken on line IX—IX of Figure 1, and,

Figure 10 is a transverse, vertical sectional view taken on line X—X of Figure 1.

Referring firstly to Fig. 1, it will be seen that the collapsible boat, according to this invention, consists essentially of a pair of inflatable rubber tubes **1**, **2** interconnected by a bottom-forming cloth **3**, of a floor proper **4** comprising hinged transverse slats **5**, of a rear panel **6** and of an inflatable keel **7** disposed symmetrically to the longitudinal axis of the boat between the floor and the bottom-forming cloth.

The floor, shown more in detail in Fig. 2, consists of a plurality of hingedly assembled panels or boards **8**, **9** and **10**, for example of plywood or other adequate material, on which the transverse slats **11** are supported.

The hinged connection between these floor panels **8**, **9** and **10** may be obtained, for example, by providing intermediate floor elements **12** supporting bevelled cross members **13** through hinges consisting of interlaced fabric straps **14** disposed laterally on either sides of the floor and interconnecting the end cross-member **11'** of each pair of adjacent panels.

Fig. 4 shows the detailed structure of this hinged connection between the end cross-members **11'** of panels **8** and **9**, for example, and notably the reverse interlacing of the fabric straps **14** and **14'** passing through slots **15** formed in the bevelled cross members **13** and also through the interstices **16** existing either between the intermediate floor elements **12**, or between the latters and the adjacent panels. From the foregoing it will be readily understood that the bevelled edges of the cross members **13** permit of folding one panel on the adjacent panel, the number of intermediate floor elements **12** being subordinate to the resulting thickness of the folded assembly.

Besides, the hinged-slats and floor-panel structure is assembled with the rear panel **6**. This assembly may be permanent, for example of the hinge type, and comprises in this case a connection intended primarily to permit a quick disassembling of the floor from the rear panel, in view notably of permitting the cleaning of the boat interior.

This assembly comprises a movable cross member **17** connected to the rear inclined panel **6** and interposed between the rearmost pair of rear cross members **11** of panel **8** where it may be locked in position after its assembling with one of them.

The hinged connection between this movable cross member **17** and the rear inclined panel **6** consists of a band of fabric **18** secured in a recess formed at the lower edge of the rear panel under a clamping lath **19** by means of screws or the like, as shown in Fig. 3.

This fabric band is secured on the cross member **17** by being clamped under a moulding **21** of semi-circular cross-section.

Thus, when the floor is pushed backwards against the panel **6** the movable cross member **17** may be assembled—by virtue of its rear groove **22**—with the last cross member **11** of the floor in which a corresponding

rib 23 is formed. Two or more lugs 24 pivotally mounted on the penultimate cross member 11 lock the movable cross member 17 in its assembled position.

From the foregoing, it is evident that the deflated boat may be folded up as follows:

The rubber envelopes or side tubes 1, 2 are folded up on the floor, the rear panel 6 is then folded up on the panel 8 in the direction of the arrow 25 (Fig. 3) by pivoting about the lower front edge of the clamping lath 19. This movement is permitted by the slackness of the bottom cloth 3 secured on the rear face of the panel when the boat is deflated.

Then the assembly comprising the rear inclined panel 6 and floor panel 8 is folded up in turn on the panel 9, the hinged connection between these two panels being designed as a function of the thickness of these three superposed elements. Finally, the panel 10, having a front extension consisting of one or more cross members 26 for a purpose to be defined presently, may be folded up in turn on the assembly by virtue of the hinged connection provided between this panel and the aforesaid panel 9, this hinged connection being also calculated as a function of the thickness of the three elements superposed beforehand.

Thus, a compact unit is obtained which may be readily utilized by inflating the rubber tubes. On the other hand, it is evident that this folding procedure renders the boat particularly suitable for being thrown on to the water surface as an emergency lifeboat, where it will unfold to assume the form illustrated in Fig. 1 and be ready for use, the propulsion being effected for example by using oars. The oars may be fitted in and attached to the coiled unit resulting from the folding step, rowlocks or like devices 27 being provided on the lateral rubber tubes and registering with the central floor panel 10 in order not to interfere with the folding operation.

One or a plurality of cross members 26 are disposed at the front of the floor structure to constitute an adequate support or bearing for the inflatable keel 7. Such cross members 26 are preferably secured permanently on the envelope by their ends, for example with the assistance of fabric corner-elements glued or cemented by means of a suitable adhesive along the line formed at the junction of the rubber tubes with the bottom cloth so as to position them as shown in Fig. 6.

The inflatable keel 7—which may be dispensed with if desired if the boat is to be propelled by oars only—is inflated after the side tubes so as to bear against the underside of the cross member or members 26 as well as of the floor retained by the tubes, and impart the necessary tension and contour to the bottom cloth as shown in Figs. 6 and 8. This arrangement, while improving the behaviour of the boat against streams or waves, increases very considerably the efficiency of the boat when the latter is propelled by an engine.

This keel consists of a substantially tubular envelope disposed symmetrically on the longitudinal axis of the boat and extends from the lower end of the stem 28 consisting of the joint between the two lateral tubes to the rear panel. Its construction and any necessary repairs are facilitated in that it is detachable. This keel is illustrated separately in Figs. 7, 7*a* and comprises an adequate number of fixation lugs 29. The purpose of these lugs 29 is not only to fix the keel in the longitudinal direction, as in the case of the front and rear lugs to which correspond similar lugs carried by the envelope, but also to maintain it edgewise in the boat axis. As the development of this keel is facilitated preferably in the vertical direction during the inflation, it will be noted that the central lugs 29 are double so as to connect the keel transversely to corresponding lugs of the envelope in the case of the lower portion of the keel, and to attach it in a similar manner at its upper portion through orifices (not shown) provided for this purpose in the floor structure. It is evident that this keel does not interfere with the folding of the deflated boat as explained hereinabove.

Moreover, the rear panel is adapted to receive an outboard engine. It is apparent that due to its assembling with the floor (see Fig. 3) it bears efficiently for this purpose against the upper rear edge of the last cross member 11 of the floor.

In the case of engine propulsion it is also necessary to give an adequate stiffness to the hinged floor, at least on the length corresponding to the plane by which the boat glides on water, with due consideration for its front lift.

A pair of detachable longitudinal beams 30 are provided in this case and adapted to fit without difficulty under the inner wall of each tubular float (see Fig. 2). In Fig. 5 it is apparent that the outer upper edge of each longitudinal member 30 is bevelled, as at 35, and that its inner side is formed with a longitudinal groove 31 adapted to receive a corresponding rib 32 formed at the ends of the hinged cross members 13 and longitudinal members 33 of each panel.

Then, each thus assembled longitudinal member is urged against the lateral surface of the relevant adjoining side float by the lateral edges 34 of the floor panels. In addition, these beams are locked against longitudinal movement for example by means of end blocks 35 (Fig. 2) permanently secured on the edges 34 of the floor panel and level with the slat structure. When the assembly is about to be folded up, these beams may be inserted in the resulting roll as already suggested with reference to the oars.

Of course, the embodiment shown and described herein is given by way of illustration only and should not be construed as limiting the field of the present invention as many modifications and alterations may be brought thereto without departing from the spirit and scope of the invention as set forth in the appended claims. Thus, the relative dimensions, shapes and sizes of the component elements may be altered to a large extent without departing from the principles of the invention.

I claim:

1. A collapsible boat comprising a pair of inflatable tubes disposed in spaced, side by side fashion to form the sides of the boat and connected at one end to form the bow of the boat and spaced laterally apart at the other end to form the stern of the boat, a flexible member connected to and extending between the tubes and defining the bottom of the boat, a plurality of floor panels arranged transversely between the tubes and hingedly connected together to constitute the floor of the boat, a rear panel hingedly connected to the floor panels and disposed laterally between the tubes at the stern, locking means locating said rear panel in a fixed, substantially vertical position, an inflatable tubular member forming the keel of the boat and interposed between the bottom and the floor of the boat and extending symmetrically along the longitudinal axis of the boat, a cross member secured to the lower end of the rear panel and said locking means including an adjoining removable cross member at the rear transverse end of the floor panel and an interlocking tongue and groove connection between said cross member on the rear panel and said adjoining removable cross member.

2. A collapsible boat comprising side portions defined by inflatable tubes, a flexible member transversely extending between and joining the side portions and forming a bottom, a rigid floor overlying the flexible member and formed from hingedly connected rigid panels arranged transversely of the boat, rigid longitudinal beams extending along the inner surfaces of the inflatable tubes, means locating the beams against upward movement, means connecting the panels to the longitudinal beams, a rear panel at the rear end of the floor, locking means for locating the rear panel in a substantially vertical position and an inflatable tubular member forming the keel of the

boat and interposed between the bottom and the floor and extending symmetrically along the longitudinal axis of the boat.

3. A collapsible boat as claimed in claim 2, wherein said tubular keel member is provided with fastening means for securing it in position against axial and lateral movement and permitting the tubular keel member to be inflated to stretch the flexible bottom.

4. A collapsible boat as claimed in claim 2, wherein said floor panels are provided with opposing transverse ends having cross members connected thereto, said cross members having confronting beveled faces adapted to overlie each other as the panels are folded one on top of the other and strap elements hingedly connecting the cross members.

5. A collapsible boat comprising side portions defined by inflatable tubes, a flexible member transversely extending between and joining the side portions and forming a bottom, a rigid floor overlying the flexible member and formed from hingedly connected rigid panels arranged transversely of the boat and disposed in spaced hingedly connected relation, means disposed at the opposing sides of the rigid floor and engageable with the inflatable tubes for locating the floor in a position against

upward movement relative to the inflatable tubes, a rear panel at the rear end of the floor, locking means for locating the rear panel in a substantially vertical position and an inflatable tubular member forming the keel of the boat and interposed between the bottom and the floor and extending symmetrically along the longitudinal axis of the boat.

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