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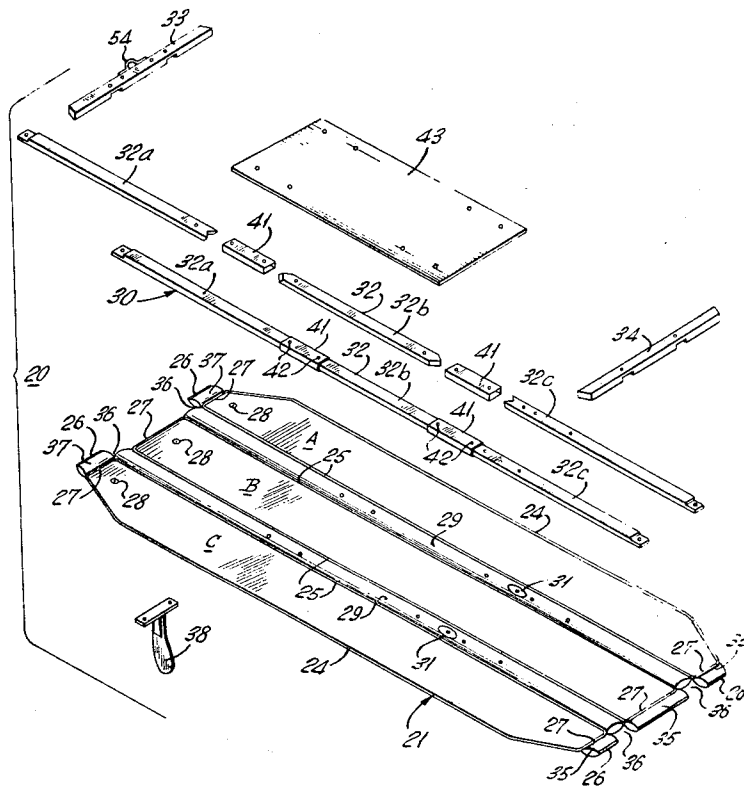
[54] **COLLAPSIBLE SURFBOARD OR SAILBOAT**
9 Claims, 13 Drawing Figs.

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9/310, 114/39
 [51] Int. Cl..... **B63b 7/00,**
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 [50] Field of Search..... **9/2, 2 (1),**
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ABSTRACT: The present invention relates to a collapsible vessel having an inflatable hull which is suitable for use as a surfboard or sailboat. The inflatable hull is formed of a flexible sheet material such as polyvinyl chloride and incorporates inflatable air and watertight compartments therein which are interconnected by chambers or pockets to receive and hold rigid reinforcing elements in place relative to the hull.

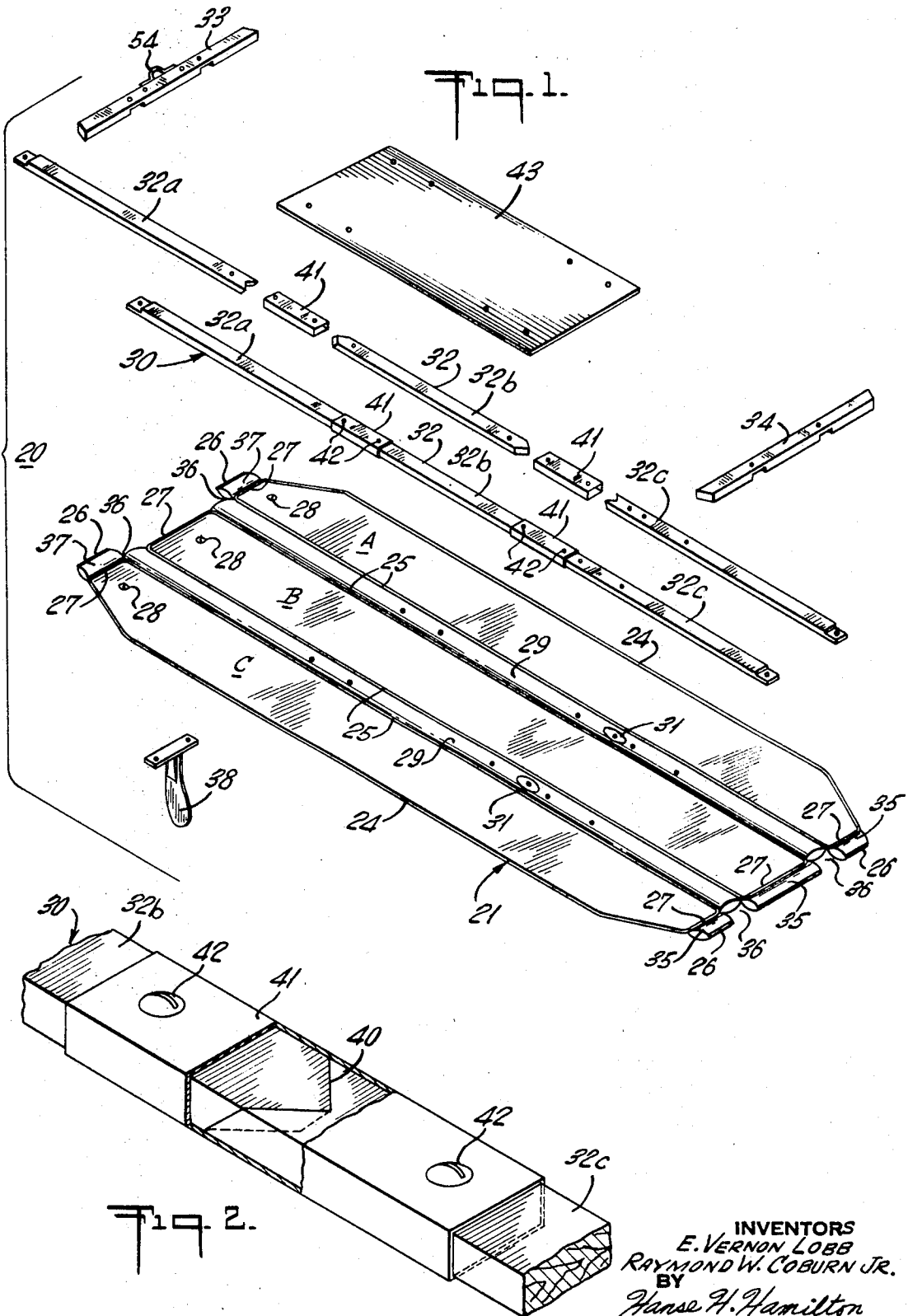
The reinforcing elements extend lengthwise of the hull and may be interconnected by crossmembers to form a rigid reinforcing frame. Both the hull and the reinforcing elements are collapsible for purposes of transportation and storage. Components which enable the hull to be utilized as a sailboat are attached to and are supported by elements of the reinforcing frame.



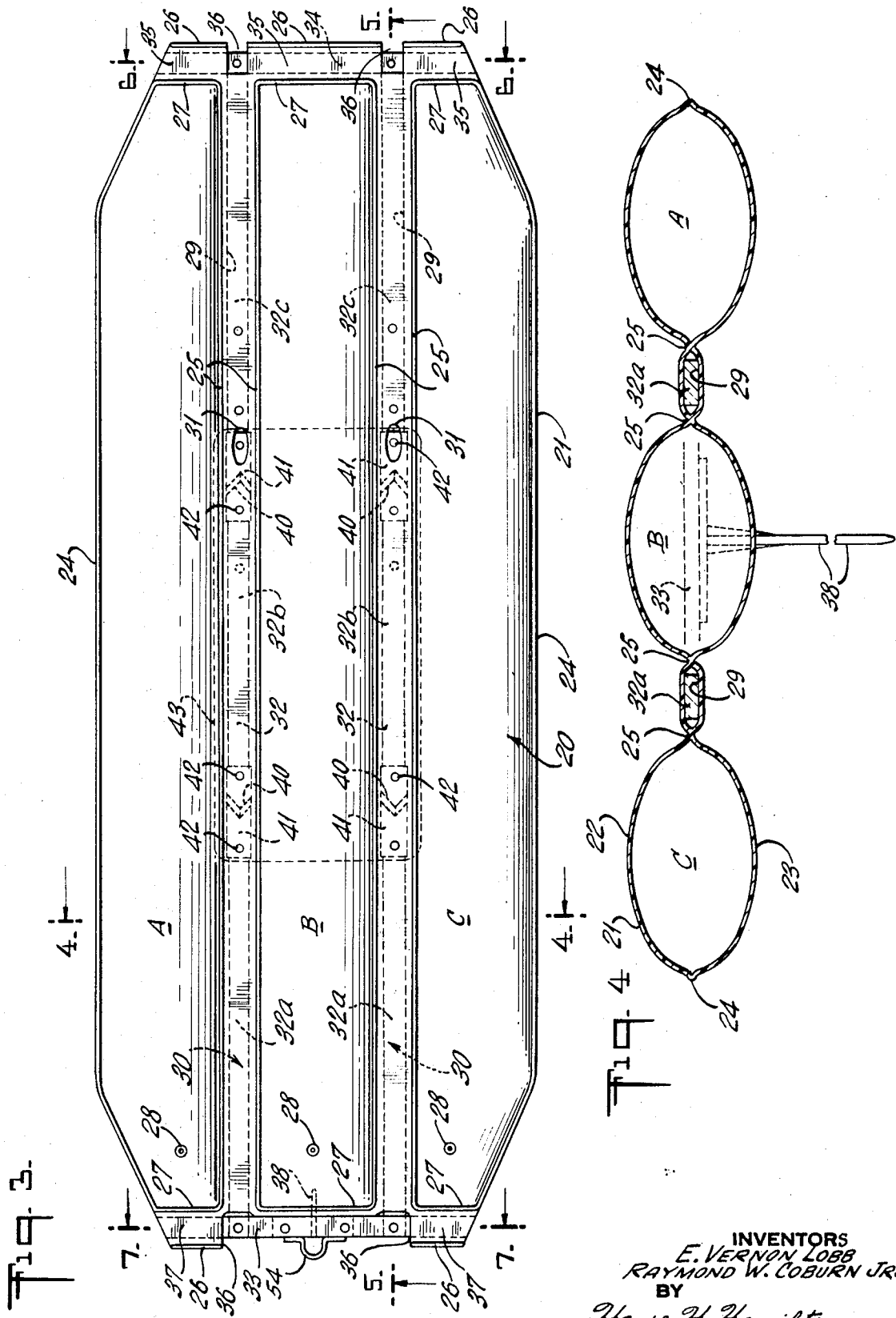
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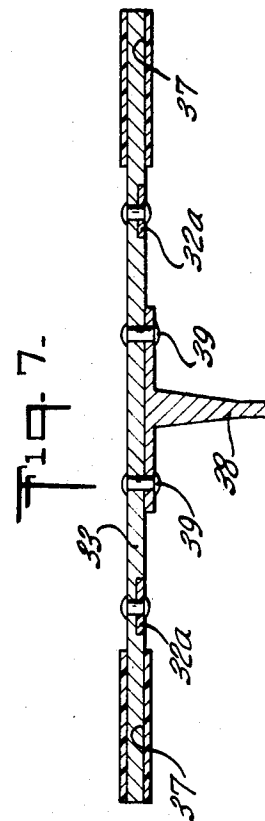
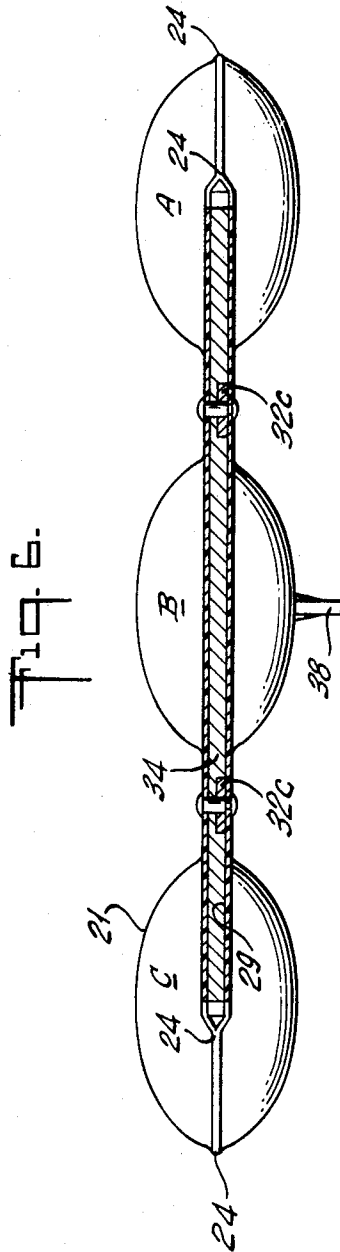
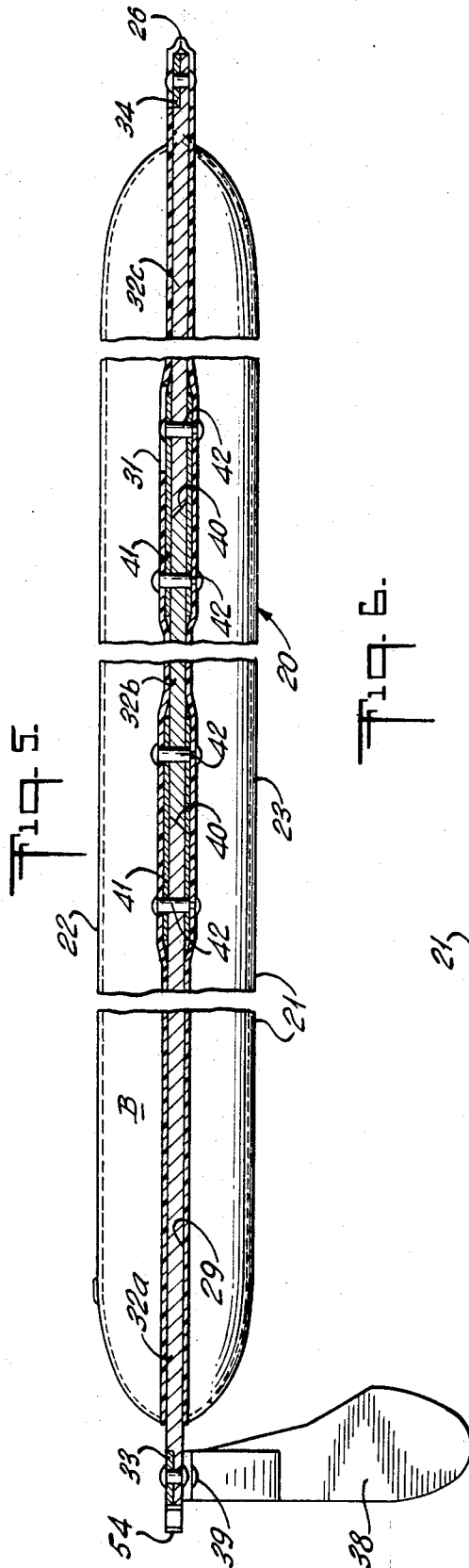
SHEET 1 OF 5



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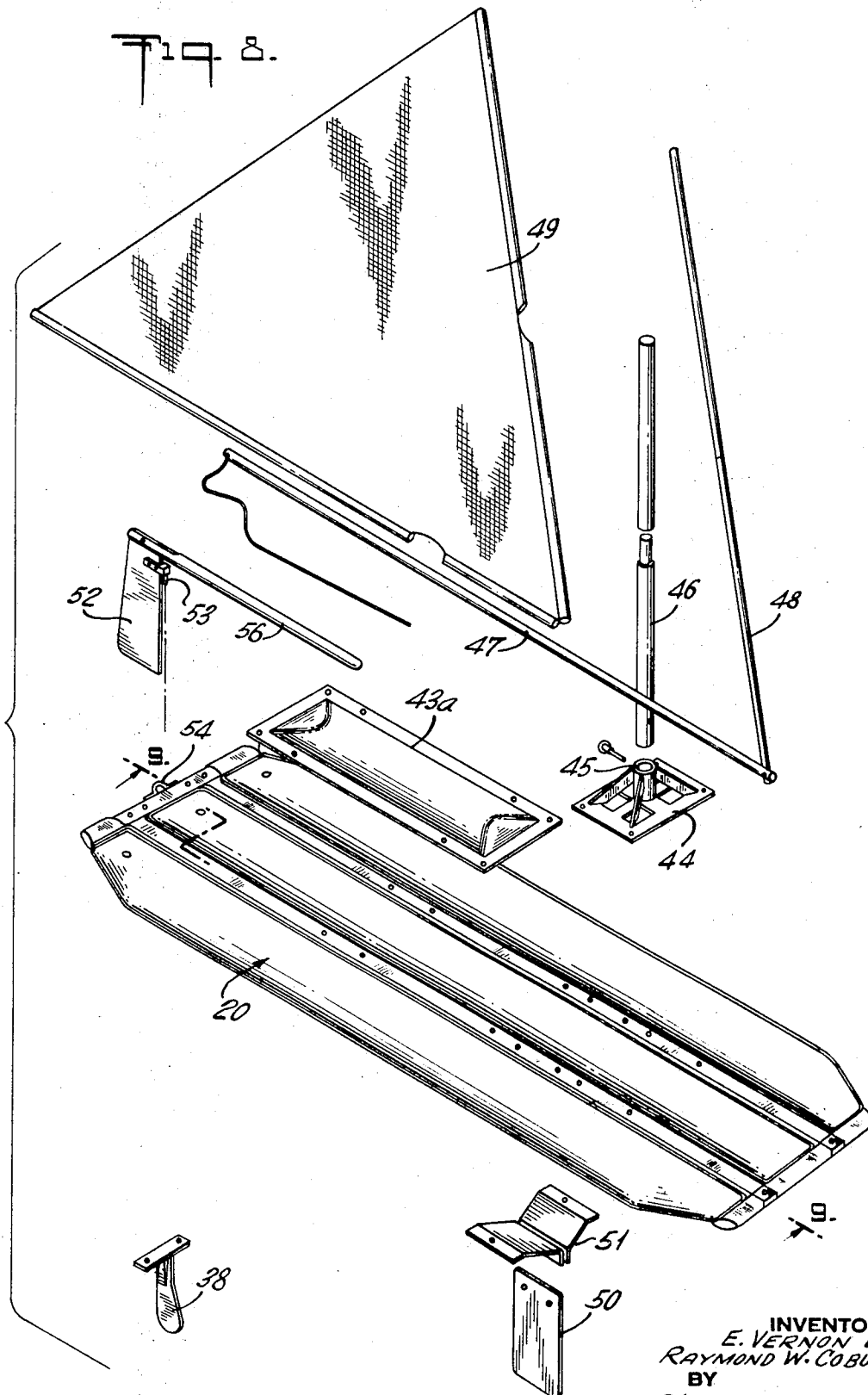


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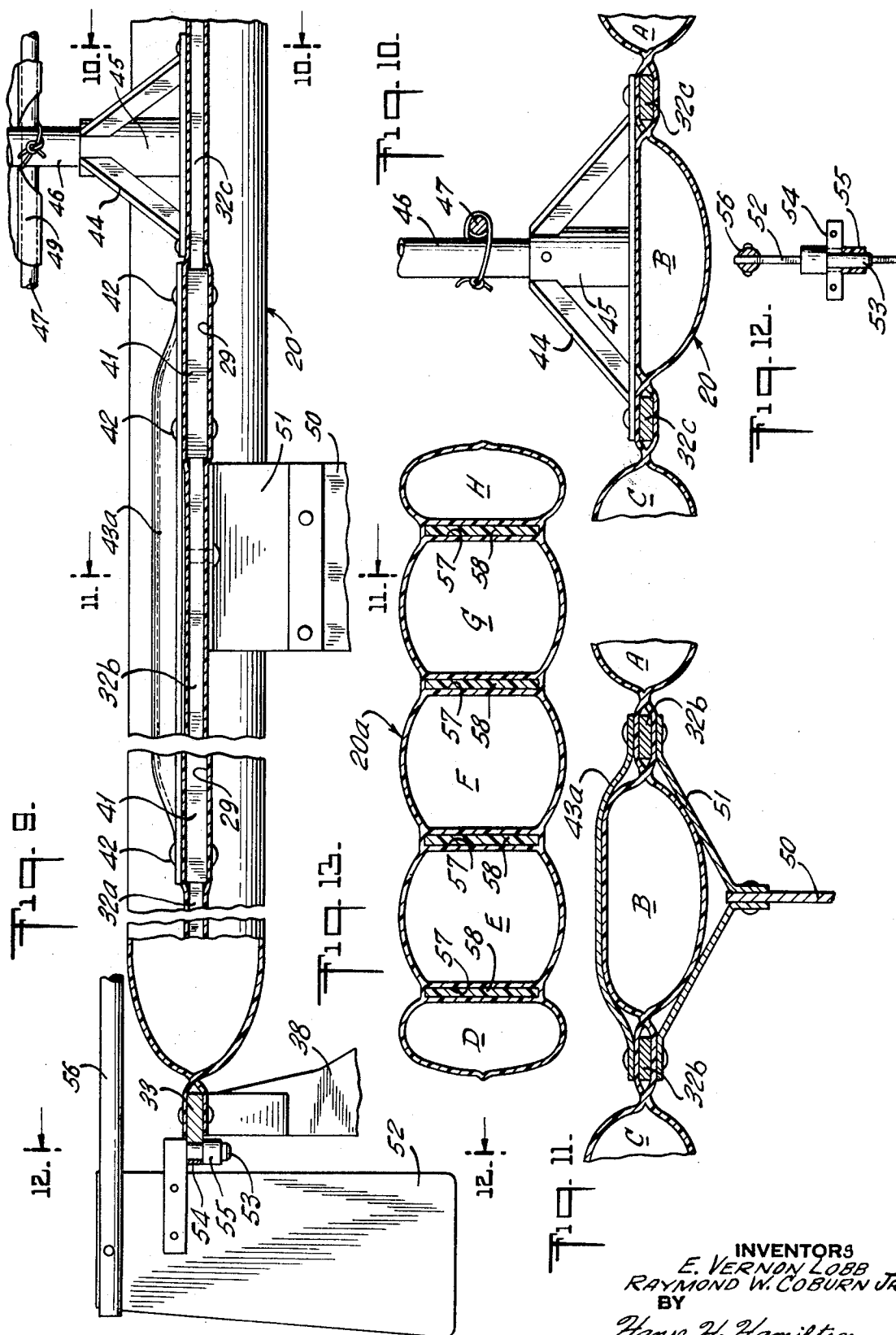
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COLLAPSIBLE SURFBOARD OR SAILBOAT

The present invention relates to a collapsible vessel having an inflatable hull which can be employed either as a surfboard or as a sailing craft.

An object of the present invention is to provide a vessel having an inflatable hull containing a plurality of airtight compartments which are interconnected by pockets which receive and hold reinforcing elements in such a way that the hull and reinforcing elements can be quickly assembled or disassembled. When disassembled, the hull and the reinforcing element may be collapsed so that they will occupy a minimum of space for transportation and storage purposes.

A further object of the invention is to provide a vessel having an inflatable hull which may be readily converted for use as a surfboard or a sailing craft.

Still another object of the invention is to provide a collapsible vessel having an inflatable hull formed of a flexible material which is relatively inexpensive to manufacture and which is not apt to cause injury or damage on striking a person.

Other objects and advantages of the invention will be better understood from the following description and the accompanying drawings in which:

FIG. 1 is an exploded view in perspective illustrating a collapsible vessel embodying the invention with components for assembly as a surfboard;

FIG. 2 is a fragmentary view in perspective illustrating the construction of reinforcing elements for the collapsible vessel shown in FIG. 1;

FIG. 3 is a plan view of a collapsible vessel shown in FIG. 1, with the parts thereof being assembled in the form of a surfboard;

FIG. 4 is a view in vertical section taken along the line 4-4 of FIG. 3;

FIG. 5 is a view in vertical section taken along line 5-5 of FIG. 3;

FIG. 6 is a view in vertical section taken along line 6-6 of FIG. 3;

FIG. 7 is a view in vertical section taken along line 7-7 of FIG. 3;

FIG. 8 is an exploded view in perspective illustrating the collapsible vessel embodying the invention with the components for assembly as a sailing craft;

FIG. 9 is a fragmentary view in vertical section taken along line 9-9 of FIG. 8 with the components being assembled in the form of a sailing craft;

FIG. 10 is a fragmentary view in vertical section taken along line 10-10 of FIG. 9 which illustrates the mast support and its attachment to the hull;

FIG. 11 is a fragmentary view in vertical section taken along line 11-11 of FIG. 9 which illustrates the centerboard support and its attachment to the hull;

FIG. 12 is a fragmentary view in vertical section taken along line 12-12 of FIG. 9 which illustrates the rudder and its attachment to the hull; and

FIG. 13 is a view in vertical section taken transversely of a modified form of hull in which the reinforcing elements are positioned vertically.

Referring now to the drawings in detail, FIG. 1 illustrates the components of a collapsible vessel for assembly in the form of a surfboard 20.

The surfboard 20 includes a compartmented, inflatable hull 21 of a flexible material. For example, the hull 21 may be formed of superimposed layers or sheets 22 and 23 of a durable flexible material which is impervious to air or water such as a heavy duty polyvinyl chloride. The layers of flexible material are welded together by heat sealing or other suitable manner along their lengthwise extending outer side edges 24 and also, along two sets of spaced lines 25 which extend lengthwise of the hull at points spaced inwardly relative to the outer side edges thereof.

The layers 22 and 23 are also heat sealed or welded together at their forward and rear ends along lines 26 and along lines 27

which are spaced inwardly from the ends. The sealed portions extending along the inwardly spaced lines 27 join with the sealed portions extending along the outer edges 24 and the sealed portions extending along the spaced sets of lines 25 thereby forming three inflatable compartments A, B and C which are bounded by sealed portions of the layers extending along lines 24, 25 and 27. The compartments A, B and C extend lengthwise of the hull and each compartment is provided with a suitable valve 28 for inflation thereof.

The welding or heat sealing of the two layers forms a homogeneous layer of double thickness at the sealed portions which will resist tearing or damage to the flexible material.

The portions of the layers which extend between the two sets of spaced sealed lines 25 connect the sealed compartments A, B and C and also, form chambers or pockets 29 which extend lengthwise between the compartments to receive and hold elements of a reinforcing frame 30. The lengthwise extending pockets 29 are open at their ends and have openings 31 intermediate their ends to permit the insertion therein of lengthwise extending elements 32 of the reinforcing frame 30. At the forward and stern ends of the hull, portions of the layers forming the connecting pockets 29 are cut away as indicated at 36, and the rear ends of the reinforcing elements 32 extend beyond the connecting pockets to a point where they are joined to a cross element 33 which extends transversely of the hull at the stern.

The forward ends of the lengthwise reinforcing elements 32 are likewise joined to a cross element 34 at the bow or forward end of the hull. The forward cross element 34 extends into pockets 35 formed at the forward ends of the outer compartments A and C.

The ends of the rear cross element 33 extend into pockets 37 formed at the rear of the outer compartments A and C with the center portion of the rear cross element 33 being exposed. A skeg 38 is attached by suitable fastening devices 39 to the exposed center portion of the rear cross element 33 and extends downwardly therefrom.

The rear and forward ends of each of the lengthwise reinforcing elements 32 are joined to the rear and forward cross elements 33 and 34 by means of half lap joints and suitable fastening devices such as bolts which lend rigidity and strength to the reinforcing frame 30.

To enable the frame 30 to be readily disassembled and placed in a collapsed condition, each of the lengthwise reinforcing elements 32 are jointed, each having three sections 32a, 32b and 32c, as shown best in FIG. 1. The abutting faces at ends of the adjoining sections may be formed with V-shaped and angled mating faces 40, as shown in FIG. 2, to provide an interlock between the jointed sections which will resist angular movement of the sections relative to each other. In addition, a connecting sleeve 41 of a rigid plastic material extends over each of the joints. The sleeves 41 are secured to reinforcing elements 30 by means of bolts 42 or other suitable fastening means and thus, hold the abutting faces of the sections in engagement.

The sections 32a, 32b and 32c forming the lengthwise extending elements 32 of the reinforcing frame may be formed from wood or other suitable material and the connecting sleeves 41 may be extruded from a rigid plastic material. Lightweight or buoyant materials are preferably employed.

A platform 43 extends over the upper surface of the center compartment C and is secured at its outer edges by the bolts 42 to the spaced lengthwise extending elements 32 of the reinforcing frame 30. The platform 43 is located centrally relative to the hull at a position where it can be knelt or stood upon. The platform also lends strength and rigidity to the vessel.

The platform 43 may be formed of a wood laminate treated for marine use or it may be molded of a rigid plastic material having a curved shape to provide the desired strength.

When the hull is to be used as a sailing craft, it will resemble the well-known sailfish or sunfish types of sailboats. As illustrated in FIGS. 8-13, the construction and assembly of the inflatable hull 21 with the reinforcing frame 30 remain the

same and hence, the description thereof need not be repeated. However, as will be described, additional components are secured to the reinforcing frame 30 for conversion into a sailing craft.

For example, a mast step in the form of a bracket 44 extends between the lengthwise reinforcing elements 32 and is secured thereto at a point forward of the platform 43.

As shown best in FIGS. 9 and 10, the mast-supporting bracket 44 has a socket 45 which is positioned to receive the end of a tubular collapsible mast 46. The mast 46 has telescoping or jointed sections which permit it to be collapsed to a compact size for transportation. A boom 47 which is also jointed, has a gaff 48 attached to its forward end and both the boom and gaff are lashed to the mast for angular movement relative thereto. The gaff 48 is also jointed and a sail 49 is carried between the boom and the gaff. This is a conventional arrangement in a sailing craft of this type.

As shown best in FIGS. 9 and 11, a centerboard 50 in the form of a metal plate extends downwardly from the hull 21. The centerboard 50 is attached to the hull by means of a bracket housing 51 having outwardly extending upper ends which are secured to the lengthwise extending elements 32 of the reinforcing frame 30 at an appropriate location rearwardly of the mast.

As shown in FIGS. 9 and 12, a rudder 52 is pivotally mounted at the center of the rear cross element 33 of the reinforcing frame 30 and extends downwardly therefrom at a point rearwardly of the skeg 38. The rudder 52 has a pintle 53 riveted thereto which extends into a gudgeon 54 secured to the rear crossmember 33. A retaining member 55 in the form of a collar frictionally engages with the lower end of the pintle and prevents it from rising out of the gudgeon. A tiller 56 extends forwardly from the rudder.

In a sailboat, a platform 43a formed of a rigid plastic extends over and is attached to the lengthwise reinforcing element. The platform 43a has an upwardly curved contour at its center to resist bending or flexing under the weight supported thereon. This platform can also be used in the surfboard.

In connection with the foregoing description, it will be noted that the various components of both the surfboard and the sailboat may be secured to the reinforcing frame 30 by means of bolts which pass through preformed openings in the frame elements and are held in place by nuts. This permits such components to be readily assembled or disassembled as desired.

In the modification shown in FIG. 13, there is an inflatable hull 20a which is also formed of heavy duty flexible material, such as polyvinyl chloride, and which has five longitudinally extending inflatable compartments D, E, F, G and H, each of which is provided with a suitable valve for inflation thereof. The compartments D, E, F, G and H are connected or joined by vertically elongated chambers or pockets 57 which are shaped to receive lengthwise reinforcing members 58 which are positioned vertically relative to the upper and lower surfaces of the hull 20a.

In this construction, the vertical reinforcing members act as I-beams in conjunction with the upper and lower surfaces of the adjoining compartments and thus, provide greater resistance to bending or deflection of the hull in a transverse direction.

This form of construction is particularly suitable for use in a surfboard where stresses created by a sail are not present and if desired, the crossmembers may be eliminated.

It will be understood that various changes and modifications may be made by those skilled in the art in the embodiments of the invention which have been illustrated and described herein without departing from the scope of the invention as defined by the following claims.

We claim:

1. A collapsible vessel for use as a surfboard or as a sailing craft, which comprises:

- a. a hull formed of a flexible material which is impervious to air and water;
- b. said hull including a series of interconnected inflatable airtight compartments extending lengthwise thereof;
- c. pockets forming part of said hull and connecting said airtight compartments;
- d. said pockets having openings therein;
- e. reinforcing members extending through said pockets;
- f. said reinforcing members being held in laterally spaced relation to each other within said pockets; and
- g. a platform of relatively rigid material extending over an upper surface of at least one of said compartments and being secured to at least two of the laterally spaced reinforcing members.

2. A collapsible vessel as defined in claim 1, wherein:

- a. the reinforcing members have forward and rear ends extending beyond said pockets;
- b. a second set of pockets formed as part of the hull and extending across the hull at forward and rear ends of some of the airtight compartments;
- c. a rear crossmember extending into the lateral pockets at the rear of the hull; and
- d. a forward crossmember extending into the lateral pockets at the forward end of the hull;
- e. said crossmembers being detachably secured to the ends of said lengthwise extending reinforcing members and forming a rigid reinforcing frame therewith.

3. A collapsible vessel as defined in claim 1, wherein:

- a. the lengthwise extending reinforcing members are formed in sections; and
- b. the sections of the reinforcing members having abutting ends;
- c. said ends being detachably held in engagement with each other.

4. A collapsible vessel as defined in claim 3, which includes means in the form of removable sleeves extending over and detachably holding the abutting ends of the sections of the reinforcing members in engagement.

5. A collapsible vessel as defined in claim 2, which includes a skeg attached to and extending downwardly from said rear crossmember at the center thereof.

6. A collapsible vessel as defined in claim 2, which includes:

- a. a mast-stepping bracket removably secured to at least two of the spaced reinforcing elements at a point forward of the platform and extending over an upper surface of at least one of said airtight compartments;
- b. said mast-stepping bracket having a mast-receiving socket located centrally of the hull;
- c. a centerboard detachably secured to at least two of the lengthwise reinforcing members and extending downwardly from the hull at the center thereof;
- d. a rudder pivotally carried by the rear crossmember at the center thereof;
- e. said rudder being removable from said rear crossmember and having a tiller extending forwardly therefrom.

7. A collapsible vessel as defined in claim 1, wherein the lengthwise extending reinforcing members are positioned vertically in the pockets connecting the airtight compartments of the hull.

8. A collapsible vessel as defined in claim 1, wherein:

- a. the hull is formed of two superimposed layers of a flexible material; and
- b. opposing faces of said layers defining said airtight compartments are welded together along lines defining said compartments.

9. A collapsible vessel as defined in claim 8 wherein:

- a. the hull is formed from sheetlike layers of a heavy duty heat sealable material; and
- b. said layers are heat sealed together and into a homogeneous layer along lines defining said airtight compartments.