Aug. 20, 1946. E. A. LINK 2,406,085

SECTIONAL CANOE OR THE LIKE

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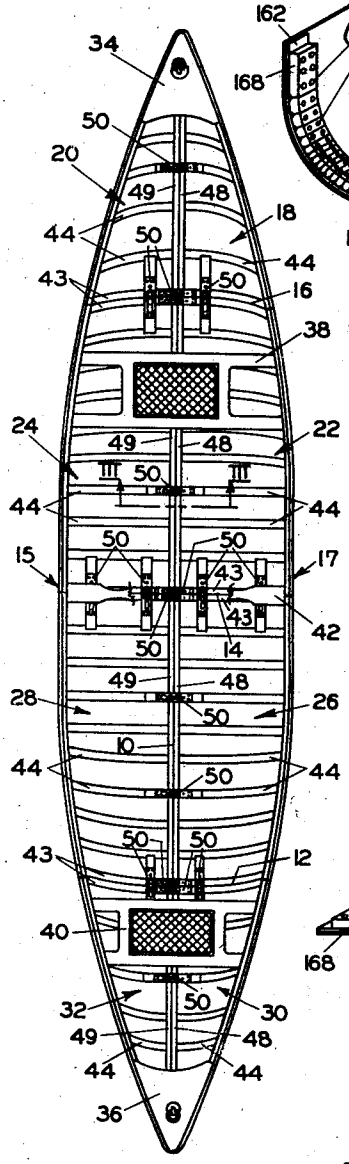



FIG. 1

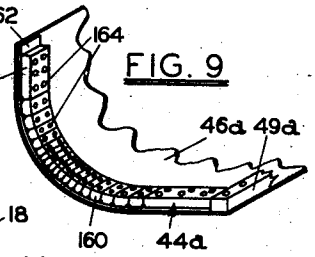



FIG. 9




FIG. 6

FIG. 7




FIG. 10a

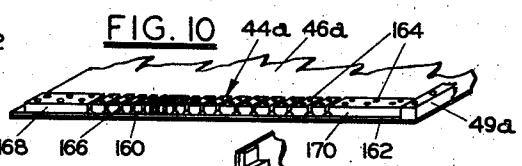



FIG. 10

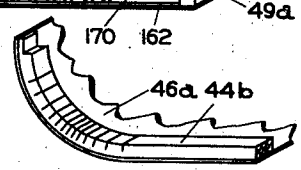



FIG. 11

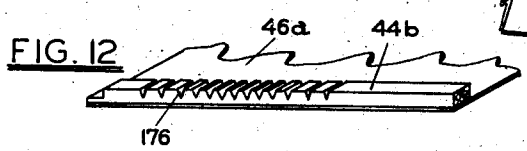



FIG. 12

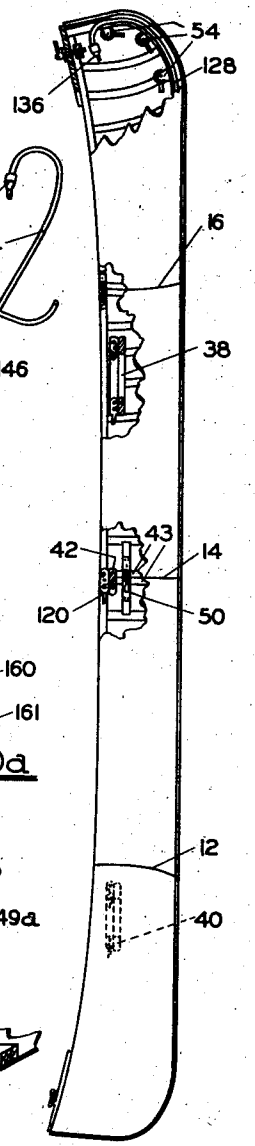



FIG. 2

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FIG. 3

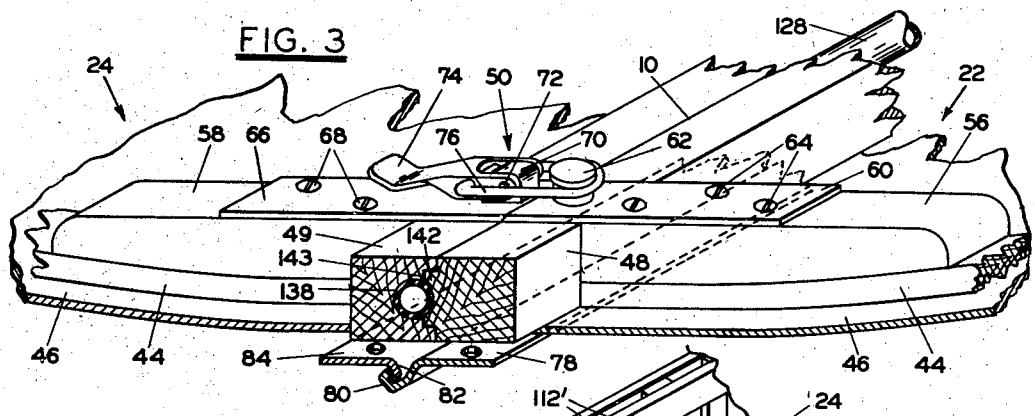



FIG. 8

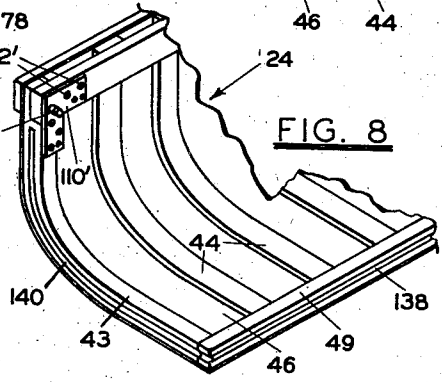



FIG. 4

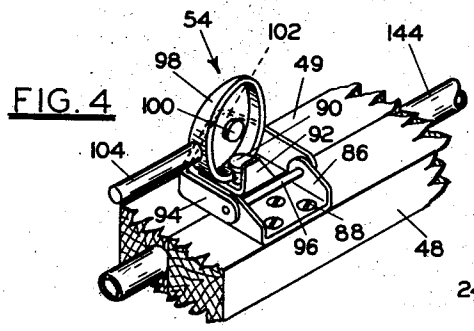
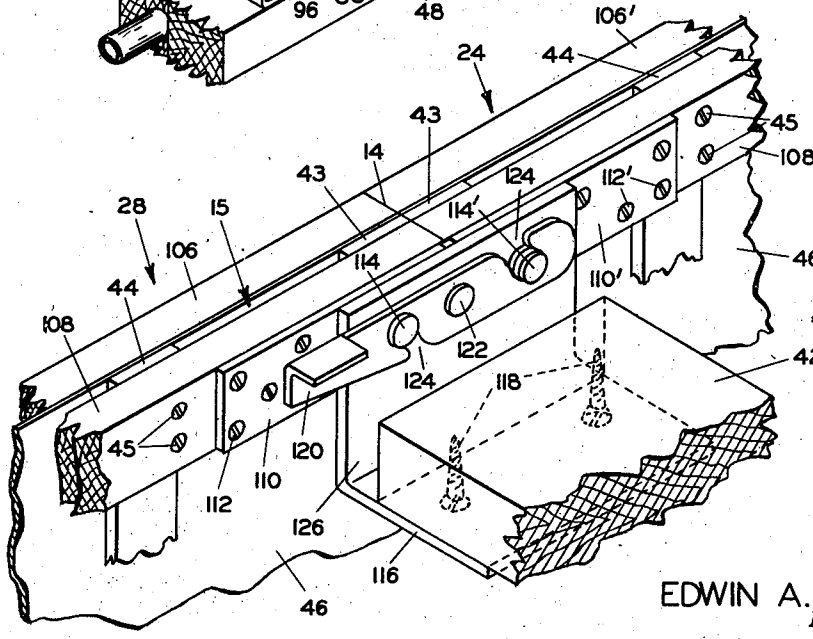



FIG. 5




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## SECTIONAL CANOE OR THE LIKE

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Application May 19, 1944, Serial No. 536,293

5 Claims. (Cl. 9—2)

1

This invention relates to a sectional boat, canoe or the like of the type wherein the main sections of the device may be readily taken apart and after being so taken apart may, when desired, be readily assembled in its usable state, suitable clamps being provided to hold the various parts of the structure in their proper relative positions. The prime purpose of providing such a device is to render it when disassembled, more easily handled and transported to and from the point of use.

However, this type of boat or canoe has not become widespread in use hitherto because no completely satisfactory means of rendering the adjacent sections watertight, when assembled, have been known to the prior art.

It is a principal object of my invention to provide novel means for forming a watertight seal between the various sections of the hull of the device when the sections are assembled to form a usable device.

More particularly, it is an object of my invention to provide an inflatable gasket which may be placed between the abutting surfaces of the sections of the device in order that a watertight seal may be obtained.

It is a further object of this invention to provide a plurality of inflatable gaskets which may be placed between the abutting surfaces of the sections of the device in order to secure a watertight seal.

Another aim of my invention is to provide novel clamping means for holding the parts of the device together when in assembled form.

Still another object of the invention is to provide a novel rib construction whereby the various sections of the canoe may be made flat when disassembled.

Other objects of this invention will become apparent as the description proceeds, reference now being made to the accompanying figures which show a preferred embodiment of the invention. In the figures,

Fig. 1 is a plan view of the device shown in assembled condition.

Fig. 2 is an elevation of the canoe, certain parts being cut away for the purpose of illustration.

Fig. 3 is a view partly in cross section taken along the line III—III of Fig. 1, showing in detail one type of the preferred clamping means.

Fig. 4 is a detailed view of another of the forms of clamping means which may be used with my invention.

Fig. 5 is a detailed view of another means used in my invention for holding the main sections

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of the hull as well as the thwart in proper position.

Fig. 6 is a view of one form of the gasket which may be used to produce a watertight seal.

Fig. 7 shows the relative arrangements of the various gaskets when a plurality of inflatable gasket are used.

Fig. 8 is a perspective view of a section of the device showing the receiving means for the gasket.

Figs. 9, 10, 10A, 11 and 12 illustrate a novel rib construction which forms a part of my invention.

My invention will be illustrated when incorporated in a sectional canoe of the type shown in Fig. 1 but it should be borne in mind that it may be used in other types of water-going craft. In that figure the longitudinal center line of the canoe is designated 10, the center line of course dividing the device equally. Transverse of the center line are the lines 12, 14 and 16 which extend from the port gunwale 15 to the starboard gunwale 17 of the canoe.

The longitudinal center line 10 and transverse lines 12, 14 and 16 divide the canoe into eight major sections designated generally 18, 20, 22, 24, 26, 28, 30 and 32, and the canoe is preferably built so that each of these eight sections may be detached from the neighboring sections or attached to the neighboring sections, as the case may be. When detached the various sections may be "nested" in the usual manner.

The fore and aft decks are designated 34 and 36 and they may be detachably connected to the associated stem and stern hull sections in any conventional manner.

A forward seat 38 and a rearward seat 40 are also provided as is a central thwart 42. The seats may be detachably connected to the hull sections in any suitable manner and the thwart is detachably connected to the hull sections in a manner which will be hereinafter disclosed.

Each of the hull sections has a plurality of rigid ribs 44 which extend transversely of the canoe and are suitably curved to properly shape the canoe. Suitable outside covering material 46 is attached to the ribs, and this covering material may be of any suitable type such as canvas, plywood or plastic material.

Still referring to Fig. 1, it will be seen that each of the main eight sections of the canoe has a longitudinal keel piece 48 or 49, the numbers 48 designating the keel pieces of the four starboard sections 18, 22, 26 and 30 and the numbers 49 designating the keel pieces of the four

port sections 20, 24, 28 and 32. The keel piece of each section abuts the keel piece of the transversely adjacent section. Further, each of the main eight sections has a rib 43 at its extreme end or ends which abut another section of the device. It will be seen in Fig. 1 that a plurality of clamps 50 extending transversely on the inside bottom of the canoe are provided to hold the sections of the canoe tightly against the transversely opposite sections. Also, a plurality of the same types of clamps 50 are provided to hold the various sections tightly against the longitudinally adjacent sections.

Referring now to Fig. 2, it will be seen that certain of these clamps 50 are provided along the inside of the canoe near the gunwales 15 and 17 to hold the adjacent longitudinal sections together. Also, there is shown in Fig. 2 at the stem a second type of clamp 54, three in number, which are used to hold the adjoining transverse sections of the canoe in proper relative positions. Similarly, three of these same type of clamps 54, although not shown, are correspondingly placed in the stern of the canoe for the same purpose.

Reference is now made to Fig. 3 which shows in detail the previously-mentioned clamps 50. Shown in Fig. 3 is the watertight covering material 46 and the ribs 44 to which the covering material is attached. Rigidly attached to the upper surface of the ribs 44 are a pair of filler blocks 56 and 58. Block 56 is rigidly affixed to starboard keel 48 in a suitable manner and the keel 48 is also rigidly affixed to the starboard rib 44. At the same time, the port keel 49 is rigidly affixed to filler block 58 and to the port rib 44. A stud plate 60 having a stud 62 rigidly attached thereto is affixed upon filler block 56 by means of screws 64 and clasp plate 66 is rigidly affixed to filler block 58 by means of screws 68. Bracket 70 is rigidly affixed to plate 66 in a suitable manner and pivot 72 is provided so that the clasp lever 74 may pivot therearound. Clasp 76 is pivotally connected to clasp lever 74 and may encircle stud 62 as shown, stud 62 being grooved for receiving clasp 76. When clasp lever 74 is raised clasp 76 may be disengaged from stud 62, and when clasp lever 74 is depressed with clasp 76 encircling stud 62, as shown in Fig. 3, it will be understood that keel section 48 will be drawn tightly against the keel section 49.

Still referring to Fig. 3, there is disclosed the outside keel clamp 78 having a hooked end 80 adapted to engage the lip 82 of the keel plate 84. Keel plate 78 is rigidly affixed by screws (not shown) to the section 22 of the canoe to the right of longitudinal center line 10 while keel plate 84 is similarly attached to the section 24 of the canoe on the other side of the center line. The interlocking keel plates not only provide a rugged keel for the canoe but when interlocked, as shown in Fig. 3, before the tightening of the clasp 50 the keel plates assure a better fitting between the transversely opposite members of the canoe. Keel plates 78 and 84 extend substantially the entire length of the canoe and are sectioned in accordance with the transverse divisions of the canoe.

Reference is now made to Fig. 4 which shows the type of clamp previously mentioned and designated in Fig. 2 by 54. As seen, cam hinge bracket 86 is rigidly affixed to starboard keel section 48 by means of screws 88 and the stud 90 is integral with angle 92 which is suitably rigidly affixed to port keel section 49. Cam support bracket 94 is pivotally mounted upon pin 96 which



is held by cam hinge bracket 86 and cam 98 is rotatably mounted by means of stud 100 held by flange 102 integral with bracket 94. Arm 104 is integral with cam 98. When arm 104 is turned 180° from the position shown in Fig. 4, cam 98 becomes disengaged from stud 90 and it will be realized that bracket 94 may be moved to the vertical position whereupon keel members 48 and 49 may be separated. Similarly, with arm 104 in that position, it will be realized that when keel member 48 is placed adjacent member 49, bracket 94 may be moved to the position shown in Fig. 4 and the movement of arm 104 through 180° to the position shown in Fig. 4 pulls keel members 48 and 49 together thus providing a tight fit. This type of clamp designated 54 is used in the stem and stern of the device because at those positions lack of space prohibits the use of the type of clamp designated 50 and disclosed in detail in Fig. 3.

Fig. 5 discloses the detailed means of affixing the thwart 42 to the main hull sections of the canoe and at the same time providing a clamp for holding the longitudinally adjoining sections 22 and 26, on the one hand, and 24 and 28 on the other, in proper relative position.

As seen in Fig. 5, the gunwale 15 of each section 24 and 28 is shown to comprise an outer member 106 or 106' and an inner member 108 or 108', the latter numbers designating the part of section 24. Ribs 43 and 44 are fixedly held therebetween by means of screws 45. Plate 110 is rigidly affixed to inner gunwale 108 of section 28 by means of screws 112 and stud 114 is fixedly attached to plate 110. A second plate 110' is rigidly affixed by means of screws 112' to the inner gunwale member 108' of section 24. Stud 114' is rigidly affixed to plate 110'.

Angle bracket 116 is provided and thwart 42 is rigidly affixed to angle bracket 116 by means of screws 118 while thwart clamp 120 is pivotally mounted with respect to angle bracket 116 by means of stud 122 which is rigidly affixed to angle bracket 116. A pair of clearance holes (not shown) are provided in angle bracket 116 to allow the passage therethrough of grooved studs 114 and 114' and a pair of curved slots 124 are provided in clamp 120.

With the just described construction it will be appreciated that when thwart 42 is detached from the sections 24 and 28 it may be properly positioned with respect to sections 24 and 28 by having clamp 120 clockwise 90° from the position shown in Fig. 5, this positioning of clamp 120 being possible by virtue of the clearance 126 between the end of thwart 42 and the vertical component of angle bracket 116. Then, by positioning studs 114 and 114' with respect to angle bracket 116 as shown in Fig. 5, the counterclockwise rotation of clamp 120 to the position shown in Fig. 5 not only draws the longitudinally adjoining sections 24 and 28 together so that they closely abut along the line 14, but at the same time, inasmuch as an arrangement like that shown in Fig. 5 is provided at the port end of thwart 42 and where sections 22 and 26 adjoin, thwart 42 is positioned by the just described arrangement to hold the starboard and port gunwales in their proper relative positions. Also, sections 22 and 26 are pulled together.

Reference is now made to Fig. 6 which shows one form of inflatable gasket preferably made of rubber which may be used to seal in a watertight fashion the abutting surfaces of the eight main sections of the hull when they are assem-

bled to form a usable device. As shown the gasket has a long central member 128 approximately equal in length to the combined lengths of the keel sections. Three transverse inflatable members 130, 132 and 134 are integrally connected with central member 128 so that the entire length of member 128 as well as of the three transverse members may be inflated by connecting a suitable pump to the valve 136. The inflation, of course, expands all of the parts of the gasket. The transverse members are spaced in accordance with the lengths of the main sections of the canoe. Reference is now made to Fig. 8 which is a perspective view of a part of the section 24 of the canoe. It will be seen that keel section 49 has a longitudinal groove 138 in the middle of the inner wall thereof. Furthermore, the rib 43 along the rear most end of section 24 has a groove 140 which curves in accordance with the shape of rib 43. It should be noticed that this rib 43 is thicker than the ribs 44 which are not adjacent the ends of the sections. The port and starboard keel sections of all of the other main parts of the canoe are grooved like the illustrated section as are all of the end ribs 43 of the parts which abut corresponding ribs 43 of longitudinally adjacent parts. All of the end ribs compare in thickness with the ends rib illustrated in Fig. 8. With this arrangement, therefore, the tree shaped gasket shown in Fig. 6 may be fit into the grooves of the various sections of the canoe as they are assembled, and the previously described clamping means not only securely hold the various sections in place but also securely position the tree shaped gasket. When finally assembled, by attaching a pump to valve 136, the position of which is shown in Fig. 2, the gasket may be inflated and the air pressure within the gasket will cause its exterior surface to press tightly against the insides of the channels formed by the previously described grooves. The pressure of the gasket seals the abutting surfaces of the sections of the hull and keel in a watertight fashion.

The grooves in the keel sections 48 and 49 may be of equal size, but preferably, as shown in Fig. 3, the groove 138 in one of the keel sections may be larger than the groove in the other keel section. The same off-center arrangement may be used insofar as the ribs are concerned. It should be noted that when this off-center arrangement is used the larger groove has a circumference greater than half the circumference of the gasket, and the opening of the groove is less in width than the diameter of the gasket. This off-center arrangement has the advantage that the corresponding part of the gasket may be fit in the larger groove where it will remain without attention, and then the adjoining section of the device, transverse or longitudinal, may be more easily placed in relation thereto.

When the off-center grooves are used all of the keel sections on the same side of the canoe preferably have the larger groove.

Further, the larger grooves in the rib sections should be placed in accordance with the order in which it is desired to assemble the canoe. For example, if it is desired to assemble the canoe from stem to stern, if the larger groove is placed in keel 49 of stem section 20 and in the rib 43 at the rear end of section 20, the gasket may be fitted into the larger grooves in section 20 and then the sections 18 and 24 may be easily fitted with relation to section 20 with much greater ease than if the larger groove were in the forward end rib of section 24. Also, if it is desired to assemble



the canoe from stem to stern, placing the large groove in the rear rib of section 18 is preferable to having it in the forward rib of section 22. It therefore is clear that when the off-center grooves for receiving the gasket are provided, it is preferable to have the larger grooves in the same keel section of all of the parts and in the rib at the end of the section toward the unassembled end of the canoe.

As also seen in Fig. 3 one of the keel sections may be provided with a tongue 142 adapted to fit into a groove 143 in the other, this arrangement further facilitating the fitting together and holding in proper position of the keel sections.

Reference is now made to Fig. 7 which shows another form of gasket comprising independent sections 144, 146, 148 and 150, each having a valve 152 corresponding to valve 136 seen in Fig. 6. With these independent gaskets, gasket 144 may be permanently inserted in the grooves which are provided in section 18, gasket 146 in the grooves in section 24, gasket 148 in the grooves in section 26 and gasket 150 in the grooves in section 32. The grooves in each of the sections which holds the corresponding gasket are preferably of the off-center type disclosed in Fig. 3 and described above, so that they may permanently hold the gasket therein. The abutting surfaces of the sections not holding the gaskets may be flat, as shown in Fig. 4, or grooved, as seen in Fig. 3.

When these independent gaskets are used, they are preferably arranged as seen in Fig. 7 so that a part of one of the gaskets is between all of the longitudinal and transverse abutting surfaces of the main canoe sections. Also, at the points designated 151 in Fig. 7, the seal will be produced by the gaskets pressing against one another. The use of several independent gaskets preferably permanently held in relation to the various canoe sections further facilitates assembling the device and has the added advantage that when disassembled the gaskets do not require separate care.

Reference is now made to Figs. 9 and 10 which disclose a novel rib construction which may be used to great advantage in sectional canoes in order that, when disassembled, the various main sections may be flattened so that they may be stored in a more compact manner.

As seen in Figs. 9 and 10 the ribs 44*a* comprise a plurality of separate pieces 160 which extend transversely of the ribs and longitudinally of the center line 10 of the canoe. As seen in Fig. 10 each of the pieces 160 is affixed to a rugged flexible member 162 by means of rivets 164. Flexible member 162 in turn is attached to flexible covering material 46*a*. When flattened it will be seen a slight space 166 is present between each piece 160. A solid member 168 is provided to the left of pieces 160 in Fig. 10 and a corresponding solid member 170 is provided at the other end of rib 44*a*, member 170 being affixed to keel 49*a*. Both of these members are affixed to flexible member 162, also by rivets 164. Further, as seen in Fig. 10A, the tops and bottoms of pieces 160 are parallel but the sides thereof are cut at a predetermined angle. The bottom corners of the pieces are chamfered, as shown at 161. When it is desired to assemble the canoe, the rib 44*a* may be bent into the shape seen in Fig. 9, which shape, it will be recognized, is that of the rib of a conventional canoe. The angular sides of pieces 160 allow the rib 44*a* to be bent into proper shape, and in so doing the pressure of the sides of the pieces 160 against the sides of the adjacent pieces provides a rigid rib construction. The chamfering of the pieces allows

flexible member 162 to be bent into a smooth curve. Decks, thwarts and seats as previously described may be provided to hold the gunwales of the canoe together when this type of rib construction is used, and in so doing they cause the pieces 160 to be compressed together to provide a rigid device. It should be noted that the pieces 160 are provided only at the points of the ribs having a substantial curvature when the ribs are assembled.

Well known dowel pin and dowel hole arrangements may be used to properly position the main sections of canoe relative to one another, and the clamps designated 50 and 54 described above may be employed to hold the sections together.

When this type of rib construction is used a canvas cover (not shown) such as that disclosed in United States Patent 1,493,918 issued May 13, 1924, may be used on the outside of flexible covering 42, when the sections are completely assembled, to prevent a leakage of water into the canoe, or the inflatable gasket arrangement above described may be employed by providing flexible end ribs thick enough to properly hold the gasket or gaskets.

Figs. 11 and 12 show another type of rib construction which allows the main sections of the canoe to be flattened when disassembled. In these figures the ribs are designated 44*b*, and in place of a plurality of independent pieces 160, rib 44*b* is made of a rugged flexible material and has a plurality of notches 176 cut therein, shaped as seen in Fig. 12. This construction not only allows the sections to be flattened when disassembled, but may be bent to the shape seen in Fig. 11 to the desired rib shape. The flexible ribs 44*b* are attached to the flexible covering material 46*a*. The canvas cover illustrated in the previously mentioned United States patent may also be used with this type of construction, and the gunwales may be held together as pointed out above, thereby producing the necessary rib rigidity.

It will be understood that numerous changes may be made in the arrangement and location of the parts shown in the preferred embodiment of my invention, and also, that many structural changes may be made without departing from the spirit thereof. The term "canoe" in the claims is to be understood to include boats and other watergoing craft.

I claim:

1. A sectional canoe comprising a plurality of separable transversely opposite hull sections, means within said hull sections for securing said transversely opposite hull sections in their proper relative positions when the sections are assembled, and a member hook-shaped in cross-section and extending substantially the entire length of one of said hull sections attached to the outside of one of said hull sections and arranged to cooperate with a member hook-shaped in cross-section and extending substantially the entire length of the transversely opposite hull section and attached to the outside of the transversely opposite hull section for forming a keel and at the same time holding said hull sections in their proper relative positions when the sections are assembled.

2. A sectional canoe comprising a plurality of separable hull sections, a plurality of ribs forming a part of certain of said sections, a flexible covering material attached to said ribs, said ribs being made of a rugged flexible material and having a plurality of notches in the upper surfaces thereof.

3. A sectional canoe comprising a plurality of separable hull sections, a plurality of ribs forming a part of certain of said sections, said ribs comprising a rugged flexible member and a plurality of independent pieces extending transversely of said member, each of said pieces being attached to said flexible member, the sides of said pieces being cut at an angle to the tops and bottoms of the pieces and the corners of said pieces adjacent said flexible member being chamfered.

4. A sectional canoe comprising a plurality of separable longitudinally adjacent and separable transversely opposite hull sections, means for securing said sections together with their edges in abutting relation to form an assembled canoe, a groove in one of each pair of longitudinal and transverse abutting surfaces and an inflatable gasket in each of said grooves, said grooves having an opening less in width than the diameter of said gasket, each of said longitudinal grooves being in the members upon one side of said canoe and each of said transverse grooves being in the ends of the sections toward one end of the canoe.

5. A sectional canoe comprising a first and a second pair of separable longitudinally adjacent hull sections, the said second pair being transversely opposite the said first pair, a readily disengageable thwart extending transversely of the canoe for connecting the transversely opposite sections, positioning means on each of one pair of longitudinally adjacent sections adapted to cooperate with positioning means on the adjacent end of said thwart, and manually operable clamping means for simultaneously drawing the positioning means on the longitudinally adjacent sections toward one another and fastening the positioning means on the longitudinally adjacent sections relative to the positioning means on said thwart.

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