May 12, 1936. G. P. GREEN 2,040,373

SECTIONAL BOAT

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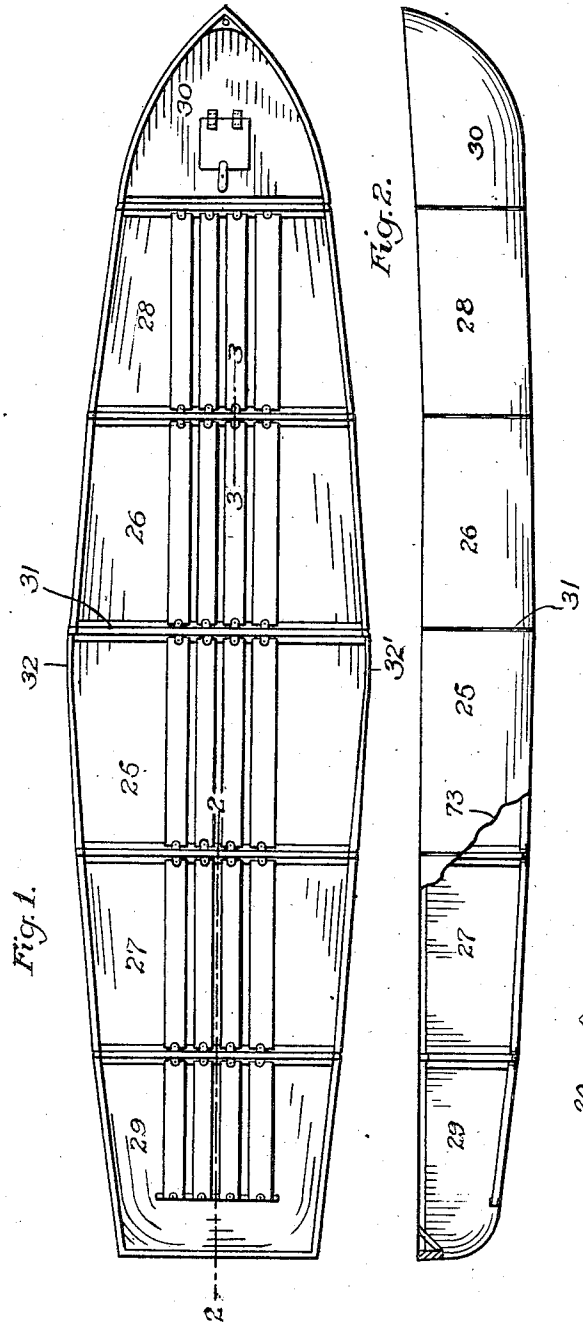


Fig. 1.

Fig. 2.

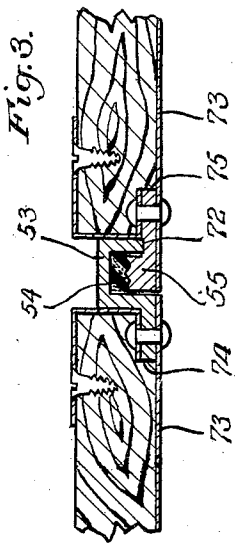


Fig. 3.

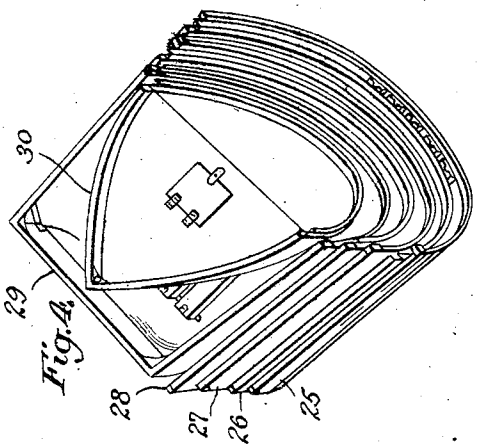


Fig. 4.

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Fig.5

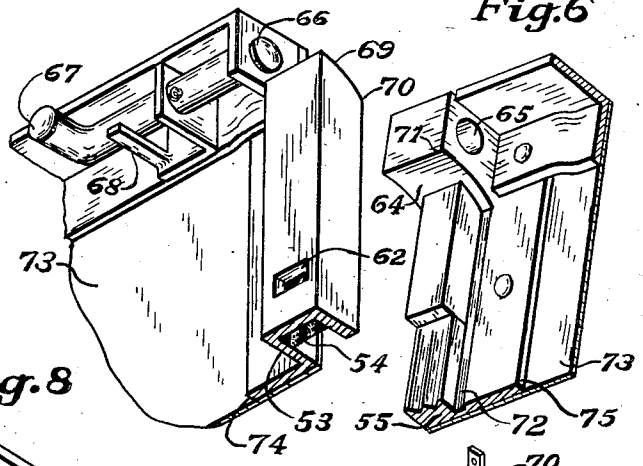


Fig.6

Fig.7

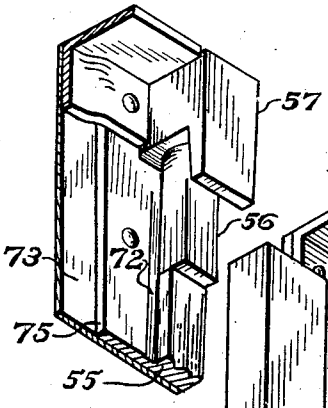


Fig.8

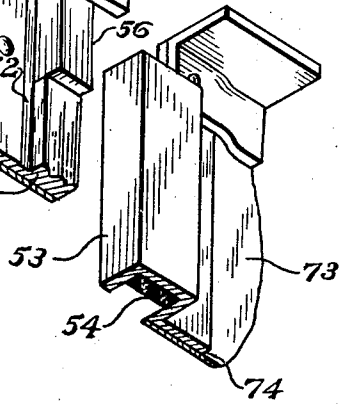
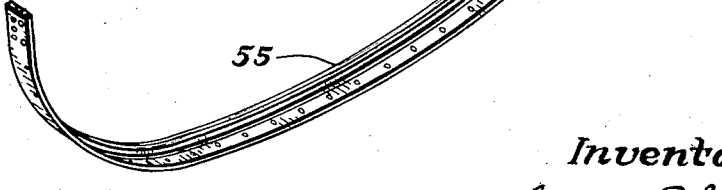


Fig.9

Fig.10



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Fig.11

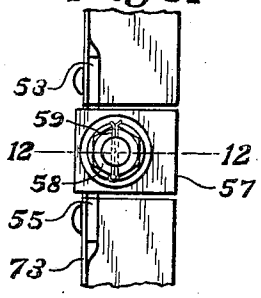


Fig.13

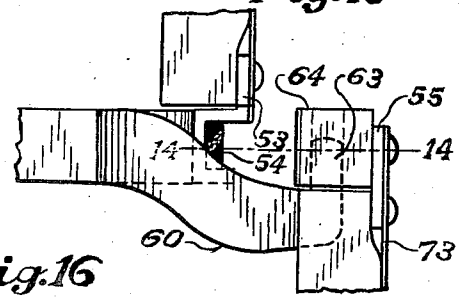


Fig.15

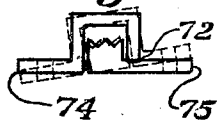


Fig.16

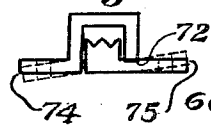


Fig.12

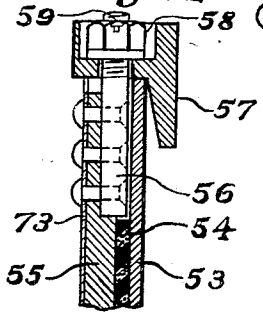


Fig.14

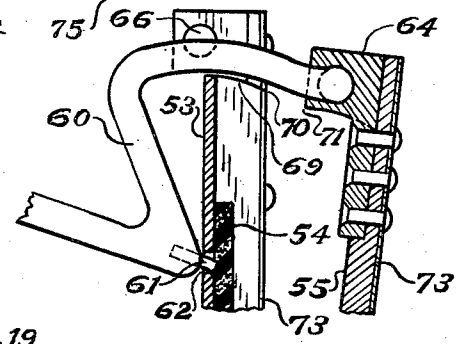


Fig.17



Fig.18

Fig.19

Fig.20

Fig.21

Fig.22

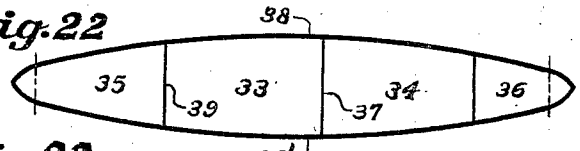


Fig.23

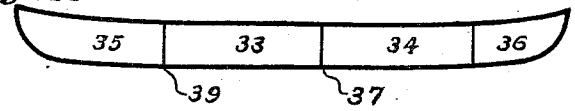
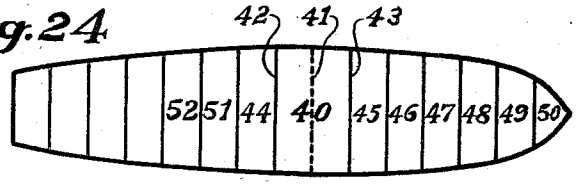


Fig.24



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UNITED STATES PATENT OFFICE

2,040,373

SECTIONAL BOAT

George P. Green, Portales, N. Mex.

Application April 17, 1935, Serial No. 16,836

2 Claims. (Cl. 9—2)

This invention relates to collapsible or "knock down" sectional boats which can be conveniently assembled for use, or readily detached and reduced in size for transporting or storing.

The object of this invention is not only to provide a boat which is readily assembled or detached and placed in a compact arrangement, but also one having features adaptable to the design of canoes, row boats, and motor boats, making a rigid, strong, safe, simple, and well balanced structure, eliminating obstructing partitions between sections, and providing the usual advantages of boats of its class and size.

Other objects and advantages will hereinafter appear.

In the accompanying drawings:

Figure 1 is a plan view of a boat involving this invention.

Figure 2 is a side elevation of Figure 1 with a section view in the stern along line **2—2**, Figure 1.

Figure 3 is a section view showing a joint member along line **3—3**, Figure 1.

Figure 4 is a perspective view of the boat placed in compact arrangement for transporting or storing.

Figure 5 is a fragmentary perspective view showing one end of a component and its adjacent parts, of a joint member between two sections.

Figure 6 is a fragmentary perspective view showing the end of the other joint member component and its adjacent parts, which matches the portion shown in Figure 5.

Figure 7 is a fragmentary perspective view showing the opposite end of the same joint member component and its adjacent parts referred to for Figure 6.

Figure 8 is a fragmentary perspective view showing the opposite end of the same joint member component and its adjacent parts referred to for Figure 5, and matching the portion shown in Figure 7.

Figure 9 is a perspective view of the component of the joint member referred to for Figures 5 and 8.

Figure 10 is a perspective view of the other component of the joint member, which matches the one shown in Figure 9, and referred to for Figures 6 and 7.

Figure 11 is a fragmentary plan view of the end of the joint member and its adjacent parts, referred to for Figures 7 and 8, when the components are in their relative position to each other.

Figure 12 is an elevation section along line **12—12**, Figure 11, of the same portion of joint member shown in Figures 7 and 8.

Figure 13 is a plan view showing the end portions of joint member components and adjacent parts, referred to for Figures 5 and 6, with portion of a detachable lever in place ready to bring them in their relative positions to each other.

Figure 14 is an elevation section of the joint member only, along line **14—14**, Figure 13, and showing same portion of the detachable lever in the same position as shown in Figure 13.

Figures 15 and 16 are cross section sketches of a joint member at some point, showing how same is shaped to obtain a smooth uniform hull surface at said point.

Figures 17, 18, 19, 20, and 21 are cross section sketches of the canoe, Figure 22, being taken in the order enumerated above, from left to right as indicated by lines in said Figure 22.

Figure 22 is a plan view sketch of a canoe illustrating another application of this invention.

Figure 23 is an elevation sketch of the canoe shown in Figure 22.

Figure 24 is a plan view sketch of another modified application of the invention.

Similar numerals refer to similar parts throughout the several views.

Some features and accessories relating to boat design, such as floor slats, air chambers, bracing, etc., are included in the drawings of this disclosure to show that the invention is applicable in conjunction with same.

Referring to the drawings, a boat comprising six sections, designated by numerals **29**, **27**, **25**, **26**, **28**, and **30**, from stern to bow respectively, is shown in Figure 1. These sections have a curved shape and join together at right angles to the longer axis of the boat, without partitions or other obstructions between them. The details of the joint members will be described hereinafter, the preceding discussion relating to the sections in general.

The sections composing the boat are of such relative size that they will fit into each other in order of size. Referring to Figure 1, section **25** will contain section **26** which will contain **27** which will contain **28** which will contain **29** which will contain section **30**, larger dimensions matching larger and smaller dimensions matching smaller, respectively. It will be noticed that sections **25** and **26** necessarily have similar dimensions at their common joint member **31**, and section **26** fits into section **25**. This is made possible by having section **26** enough shorter than section **25** that its end which is common to that

of section 25, will lay at some position between the joint ends of said section 25, preferably merely missing its portion of the said joint member at some position 32—32', Figure 1. At these critical points 32 and 32', the width of said section 25 is slightly greater than the corresponding width at the said joint 31. Also the dimensions of the extending flanges which form the boat's gunwale, are reduced at advantageous points near 32 and 32', giving an appreciable clearance for said section 26. And also the component of the said common joint member 31, forming the larger end of section 26 is flexible enough to give an appreciable advantage in that it can be bent, thus reducing the width of said section 26. It will be understood that it is not essential to resort to all the methods described above to accomplish the nesting of section 26 into section 25, but some one or more may be employed, depending on the extremes of shapes and sizes of the two sections. It is obvious that the other ends of the referred to sections 25 and 26, need not be similar in size, and the remaining sections of the boat, Figure 1, will fit into each other in the order given above, when the relative dimensions of each succeeding section (in the order as placed in nesting arrangement) are diminished in width at least an amount equal to the sides including the gunwale, of the section into which it is placed, and the length of the section being preferably not greater than the length of the section into which it is placed. It will be understood that the individual sections of the boat are not necessarily of maximum relative dimensions, but may vary to give the desired shape so long as they are within limitations which makes possible a nesting arrangement of said sections.

The invention is applicable to symmetrically shaped canoes and other boats of various sizes and shapes. In Figure 22, is shown a plan sketch of a canoe in four sections. When "knocked down", section 33 contains 34 which contains 35 which contains section 36. The joint member 37, is located such that the outside width at this position does not exceed the inside clearance width at the middle of the boat 38 and 38', section 33. The length of section 34 does not exceed the length of section 33 from points 38 and 38' to its smaller end 39. Consequently the sections will fit into each other, being in accordance with the limitations of relative dimensions defined heretofore.

Figure 24 illustrates how the invention is applied in the form of a larger boat. The largest section 40, Figure 24, into which the others may be placed, is twice the length of any of the other sections which are of a uniform length. The dotted line 41, section 40, indicates its middle and widest clearance space, which is ample to contain the larger ends 42 and 43 of sections 44 and 45 respectively. When the boat is "knocked down" and placed in compact arrangement, section 45 is placed directly into its adjacent half of section 40, and thence section 45 contains section 46 which contains 47 which contains 48 which contains 49 which contains section 50. Likewise section 44 is placed directly into its adjacent half of section 40, and contains section 51 which contains section 52 etc. including the stern section. Thus it is obvious that any number of sections could compose the boat, providing the outside width at the smaller end of a section, same width being the outside width at the larger end of its adjacent smaller section, does not exceed the inside clearance width at the larger end of the first said section, and the length of the smaller section does not exceed that of the larger section into which it is placed. This form of the invention is more suitable for larger boats because the joint members which serve as rib braces are spaced closer relative to the size of the boat, and more variation is possible in the shape of same.

The said boat, Figure 24, when constructed with a pair or pairs of joint members correspondingly spaced from the middle 41, and similar in shape and size, and the corresponding components of said joint members being all in a similar relative position, it is possible to omit the middle section or sections between said joint members when assembling the boat, thus being variable in size.

The joint members between the sections of the boat are curved and consist of a rigid groove shaped component 53, which contains a seal gasket 54, and is fixed to one end of a section. And to the end of the adjacent section is fixed a flexible tongue shaped component 55, which matches the groove shaped component 53, pressing against seal gasket 54 in a water tight manner. The flexible tension component 55 of the joint member, has a threaded projection 56 suitably fixed to it on one end. A hook 57 is secured to the threaded projection 56 by a nut 58, which is locked by cotter pin 59, the position of hook 57 relative to component 55 being thus adjustable. Hook 57 is shaped to match and securely fasten to the corresponding end of joint member component 53.

Joint member components 53 and 55 are drawn to their relative position to each other against the pressure of seal gasket 54 by means of a detachable lever 60, while the opposite ends of said components are fixed by hook 57 as described above. Lever 60 has a projection 61 which is placed into depression 62, in component 53, which receives the forces from the lever 60. Another projection 63, of the lever transmits its forces to component 55 through rider shoulder 64 which is suitably fixed to the end of said component 55, opposite to which hook 57 is fixed. Rider shoulder 64 has a hole 65 at right angles to the direction of motion, which receives the forces of lever 60, the projection 63 extending partially through said hole 65. When the joint member components 53 and 55 are thus drawn to their intended relative positions, lock pin 66 is inserted into hole 65 of rider shoulder 64, the lever 60 being removed and the handle 67 of lock pin 66 being rotated to a position such that projection 68 is back of it and secures it in position. The lever 60 and conjunctive joint member parts are properly designed to produce and receive the necessary force and displacement. The radius of the contacting parts between rider shoulder 64 and the end 69 of joint member component 53, is less than the corresponding radius of the lever motion, which prevents corners 70 and 71 from hanging. The bringing together of the joint member components may be facilitated by placing one's weight upon upper component 53 with lower component 55 supported on a surface while the force is applied by the lever.

The components 53 and 55 of the joint member make a defined contact throughout their entire length, and a small portion of the flange of component 53 fits into a shallow groove 72, Figure 3, of component 55, for the purpose of adding rigidity; however this groove 72 is an optional feature, the said components fitting close enough

to insure rigidity. This precise fitting of the joint member components **53** and **55** is made possible by adjusting nut **58**, which rarely needs adjusting after once set. It is obvious that no relative motion is possible between the joint member components **53** and **55** when they are secured in their relative position to each other as thus defined.

There is an equalized balance in design between, the curvature, the resisting pressure of the seal gasket **54**, and the strength of all parts composing the complete joint member, allowing a safety factor.

Due to the fact that all contacting surfaces between the two joint member components **53** and **55** are parallel or at right angles to the longer axis of the boat, or parallel or at right angles to the boat's general hull surface at their respective positions, longitudinal and oblique stresses which exist in the boat's hull do not cause appreciable longitudinal stresses (at right angles to the boat's longer axis) in said components; and also the said joint member components **53** and **55** are fixed in relative length to each other and make a defined contact without being in an appreciable strain; the major longitudinal stresses in said joint member resulting from the compression of the contained seal gasket. Stresses in the hull of the boat, which are transmitted between the sections by their joint members, are distributed throughout the entire length of the components of said joint members because of their complete contact, as heretofore defined. These advantages in relation to the stresses which the joint members must withstand are obviously favorable conditions justifying the design of light joint members and maintaining a safe structure.

The groove shaped component **53**, of the joint members is purposely made of such shape as to render it resistant to flexure, in order that the joint members may serve as rib braces for the boat. Said joint members are spaced close enough to make sufficient rib bracing; however intermediate bracing could be added if desired.

The joint member components **53** and **55** form a uniform cavity when placed in their relative position to each other, which contains the seal gasket **54** uniformly compressed its entire length. Without this feature the said seal gasket would probably be over compressed at points, which would harden or destroy it, and other points would not be compressed sufficiently to provide a water seal, depending on the curvature of the member and the nature of said gasket. However the two said components being adjustable relative to each other, as heretofore described, an effective seal may be made by matching the two said components with contained seal gasket receiving all or part of the force between said member components, which would not be in their most extreme contacting positions in such case. This latter case would apply when using a new or oversize seal gasket.

The seal gasket is preferably elastic rubber; however cork, felt, or other pliable material may be used effectively. The said seal gasket is fixed into the rigid joint component **53**, the shape of which is advantageous in giving protection for the contained seal gasket from possible destructively striking objects, while the boat is "knocked down" as well as in use,

The portion of the flexible joint member component **55** which contacts the seal gasket **54**, is longitudinally corrugated to make the seal more effective.

Two methods are used to obtain a smooth uniform hull surface **73** from one section to the other at the joints. The joint member is twisted as a whole the proper amount to match the general lines of the hull surface at its specific position on the boat. This is illustrated by Figure 15, where the solid line portion represents the member before twisting, and the dotted line portion represents it after twisting to conform to some particular case. The other method is illustrated by Figure 16, wherein only the flanges, **74** and **75**, are made at the necessary angle, the remainder of the joint member remaining at right angles to the longer axis of the boat. This latter method is used in the boat which is variable in size by omitting middle sections between similar joints, as described heretofore, Figure 24.

It is preferred to use medium gage metal for the boat's hull **73** in conjunction with this invention; however it is similarly applicable to boats with a hull of wood, fiber or other suitable material.

The above descriptions and included drawings represent the preferred forms of my invention, but variations may be resorted to in the scope of the annexed claims.

I claim:

1. A sectional boat comprising a bow section, a stern section and at least one intermediate section, rib like joining members adapted to connect said sections together, said members consisting of flanged male and female parts radially facing and adapted to receive a gasket between said male and female parts to make them watertight, said sections being formed at their complementary edges to interfittingly receive the corresponding flanges of said members for permanent securement thereto and means on one of said members cooperating with a part on another of said members whereby said parts are drawn in a radial direction in cooperating watertight inter-engagement and a smooth unbroken exterior of the boat hull is formed.

2. The boat arrangement as claimed in claim 1 wherein the means comprises a lever fulcrumed on one of the said members and having a pin and socket connection with the adjacent member.

GEORGE P. GREEN.