Jan. 8, 1963 W. J. HOLT 3,071,785

COLLAPSIBLE BOATS

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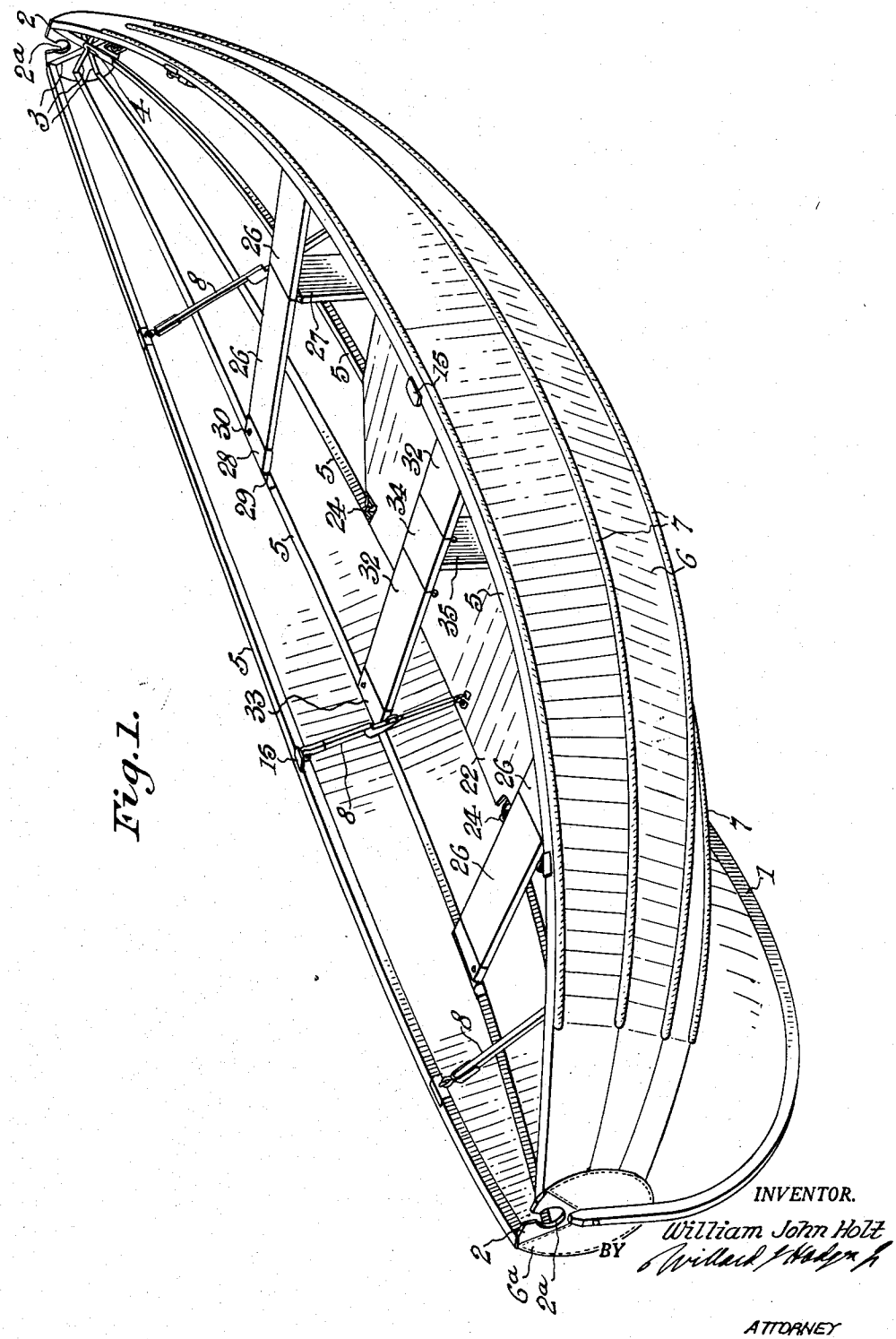


Fig. 1.

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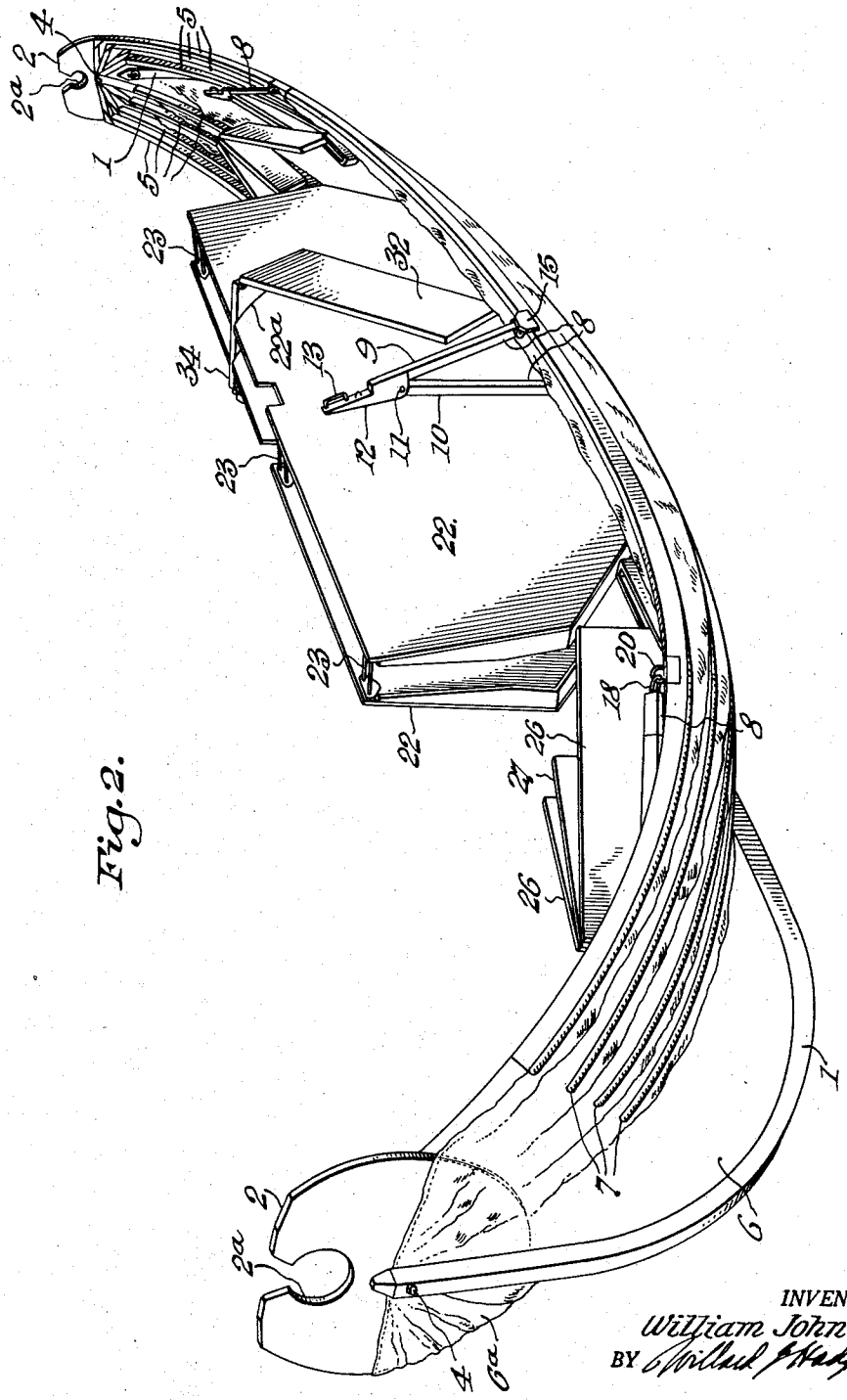


Fig. 2.

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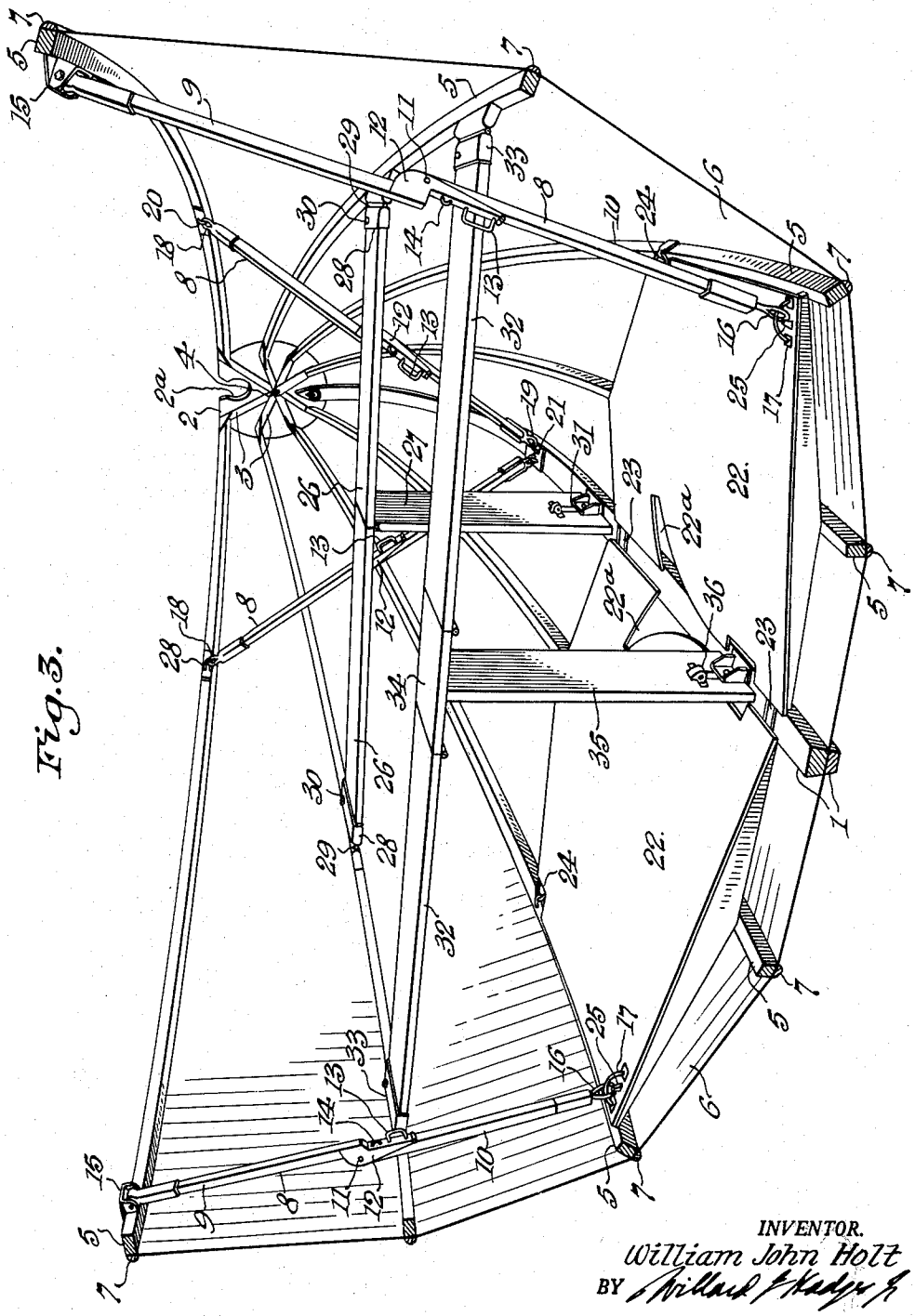


Fig. 3.

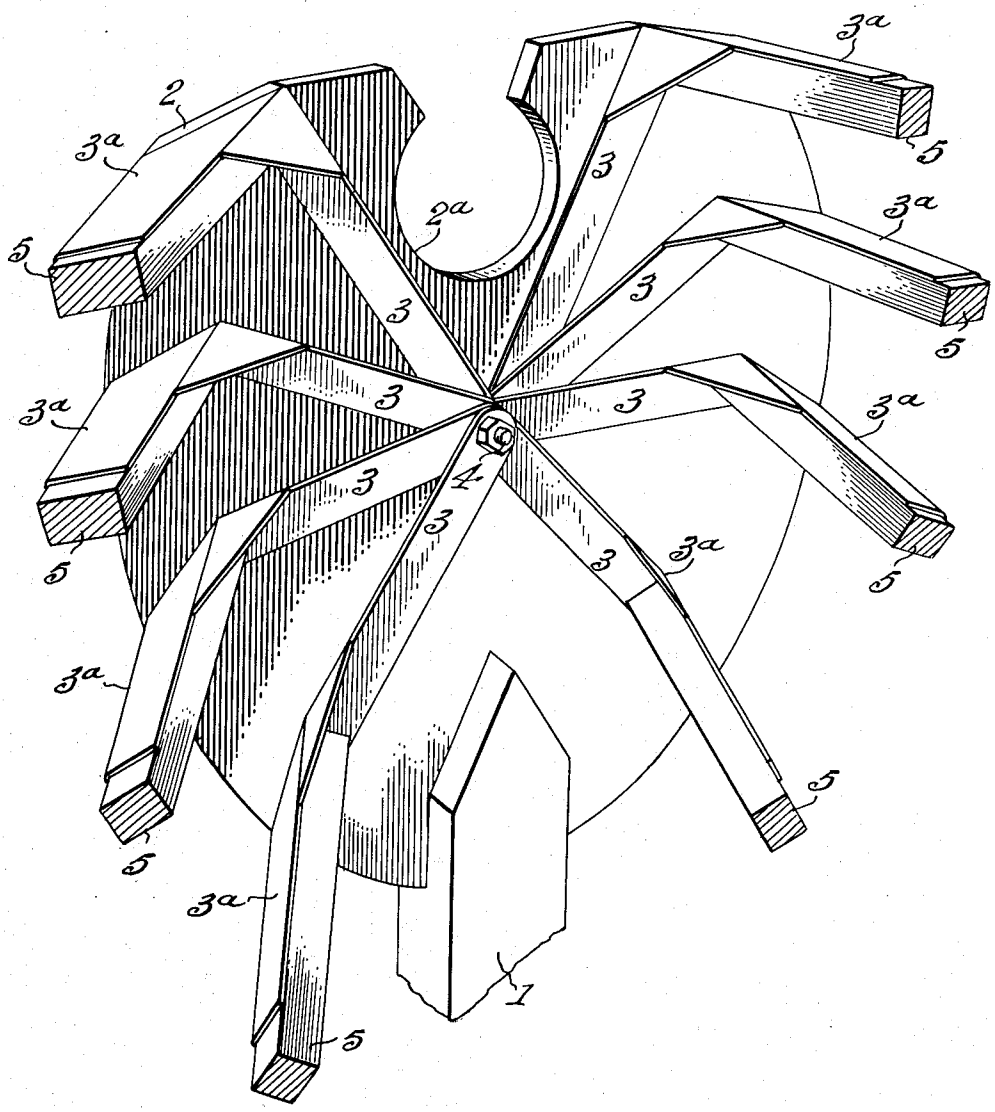
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Fig. 4.



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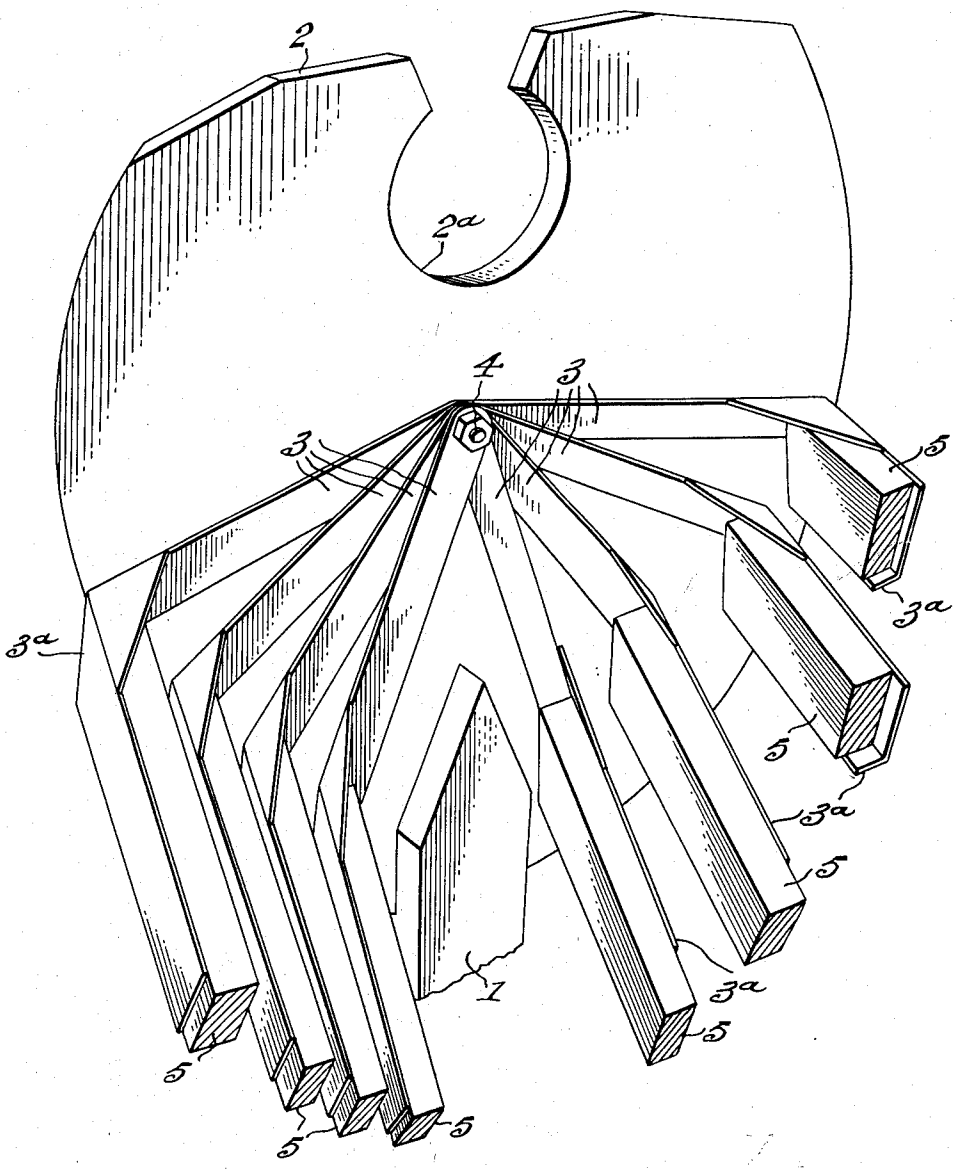
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Fig. 5.



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COLLAPSIBLE BOATS

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Filed May 29, 1957, Ser. No. 662,541

1 Claim. (Cl. 9—2)

This invention relates to collapsible boats, and its object is to provide an improved boat of this type capable of being constructed as a complete assembly occupying in its collapsed condition a space having relatively small lateral and vertical dimensions.

A collapsible boat according to the invention comprises a covering of waterproof canvas or like pliant material upon a framework comprising longitudinal stringers each pivotally connected at each end to a rigid keel or keel member by a tie (the ties forming a spider transverse to the keel at each end thereof), and stiffening means or stretchers for securing the framework in its erected condition so as to tauten the covering thereupon.

According to another feature of the invention the ties at either end of the boat are pivotally mounted on a common central pivot attached to the keel or keel member, and are unitary members each formed at its inner end as a plain strip having a pivot hole and at its outer end as an angled bracket for attachment to a stringer and shaped so as to allow a group of stringers to snug together at one side of the keel when the boat is collapsed; when the boat is unfolded or opened up laterally the unitary members form the spider, each member radiating non-co-planarly from a common bolt which serves both as a pivot for the members and to hold them in position on the keel or keel member to which they are connected.

According to a further feature of the invention, two transoms are fixed one to each end of the keel and the ties are pivotally connected to the transoms.

The stiffening means or stretchers consist preferably of toggle-jointed struts positioned transversely at intervals along the boat on either side of the keel, one end of each stretcher being hinged or swung from the stringer remote from the keel on that side (said stringer serving as a gunwale) and the other end hinged or swung from the keel or like rigid member of the boat.

Foldable bottom boards may be provided as an integral part of the boat, as may one or more foldable thwarts and thwart pillars. The bottom boards may comprise a pair of boards hinged together so as to straddle the keel in the erected condition of the boat and hinged at their outer sides to opposite stringers; such boards fulfil a double function in that, in addition to providing a firm floor, they assist in securing the boat in its erected condition by being pressed home with a toggle action and assuming the form of a shallow V, thrusting at three points against the keel and the opposite stringers. A foldable thwart may comprise two parts hinged together at the middle or to the respective ends of a third middle part (whence the pillar depends) and having their outer ends hinged to opposite stringers by a double hinge device having two hinge axes in mutually perpendicular planes, whereby the thwart can be folded upwards and turned longitudinally into a snug stowed position when the boat is collapsed.

The invention is illustrated by way of example with reference to the accompanying drawings in which:

FIGURE 1 is a perspective view of the boat erected and secured ready for use;

FIGURE 2 is a perspective view of the boat in its collapsed condition;

FIGURE 3 is an interior perspective view of part of the boat looking towards one end, and showing its main constructional features;

FIGURE 4 is a detail view showing the ties in opened position forming a spider; and

FIGURE 5 shows the same ties when the boat is collapsed.

Referring to the drawings, in which like parts are designated by like reference numerals in the various figures, a rigid keel **1** upturned at each end has a pair of similar transoms **2** affixed to it at each end. Each transom is formed with a shaped opening **2***a* at the top to serve as a scull rest. A number of ties **3** are severally pivoted on the centre of each transom by a common bolt **4**, the ties being formed at their inner ends as plain strips radiating non-co-planarly from the bolt **4** and at their outer ends as angled brackets **3***a* having a portion projecting lengthwise of the boat. Longitudinal stringers **5** are fixed to corresponding ties **3** at opposite ends and extend therebetween in a curved or bowed shape, forming, in the erected position, a spaced framework upon which a covering **6** of waterproof material is stretched. The covering **6** has end portions **6***a* attached to the transoms. Rubbing strips **7** upon the outer side of the covering **6** are secured therethrough to the stringers and serve to protect the covering from damage in use.

The covering is tautened and the boat secured in its erected position by means of toggle-jointed struts or stretchers **8** (shown in detail in FIGURE 3), arranged in pairs at three different sections of the boat, on opposite sides of the keel as shown in FIGURE 1. Each strut comprises an upper part **9** and a lower part **10** jointed together by a pivot pin **11** passing through a scarfed metal form **12** on the upper part **9** and through one end of the lower part **10**. A handle **13** is provided on the fork **12** for manipulating the strut and a projection **14** on the lower part **10** projects through the fork **12** in the opened position whereby the strut may be secured. The pair of struts near the midships of the boat section are hinged at their top ends to the gunwales by hinge members **15** (which may have holes for shipping rowlocks), and at their lower ends are provided with eyes **16** and swung thereby on staples **17** fixed to bottom boards hereinafter described. The struts positioned at the narrower sections of the boat towards the transoms are provided at their top and bottom ends with eyes **18** and **19** respectively, the eyes **19** being swung on staples **21** fixed to the keel.

In the centre of the boat a pair of bottom boards **22** is provided, hinged together in the middle by three double hinges **23** which straddle the keel in the open position. The boards at their outer sides are hinged to opposite stringers by hinges **24**.

The staples **17** already referred to are fixed to outer edges of the boards **22** as shown in FIGURE 3. Catches **25** beneath the staples **17** serve as points of anchorage for the lower ends of the struts in the opened position. Foldable thwarts with thwart pillars are provided, their construction being shown particularly in FIGURE 3. The two end thwarts each comprise two parts **26** hinged together at the centre to the top end of a thwart pillar **27**, and at their outer ends hinged to opposite stringers **5** by double hinge devices **28** having hinges **29** and **30** in substantially perpendicular planes. In the opened position shown in FIGURE 3 each thwart pillar **27** is secured to the keel by a socket and toggle **31**, while in the folded position shown in FIGURE 2, it will be seen that the thwarts have been folded upwards and then turned outwards to lie snugly against the bottom of the boat. A third centre thwart comprises two outer portions **32** hinged at their outer ends to opposite stringers by double hinge devices **33** similar to the devices **28**, and having their inner ends hinged to a centre portion **34** from which

depends a thwart pillar **35** secured, in the open position, to the keel by a socket and toggle **36**. In the collapsed condition shown in FIGURE 2 it will be seen that the centre thwart has been folded upwards and turned in the longitudinal plane so that its centre portion **34** lies snugly in two shaped openings **22***a* cut in the bottom boards **22** which now project upwards from the keel. The openings **22***a* are also seen in FIGURE 3.

The particular example described with reference to the drawings is a so-called double-ended boat which may be used for rowing or sculling and a single scull used as a rudder on either transom.

What is claimed is:

A collapsible boat comprising a collapsible framework including a pair of transoms, a keel, said transoms being affixed one to each end of said keel, a plurality of opposing ties pivotally connected to each transom in overlapping relation, and radiating in a spider transverse inwardly from said transoms, said ties comprising unitary members, each formed at its inner end as a flat strip having a pivot hole and connected thereby to one of said transoms at a common point, and at its outer end as an angle bracket for receiving a stringer whereby the boat may be collapsed by rotation of the ties toward the center line of the boat permitting said stringers to be disposed in adjacent overlapping relation on each side of said keel, longitudinal stringers fitting each into a pair of opposing ties, a cover for said collapsible framework and stiffening means for securing the framework in its erected position.

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