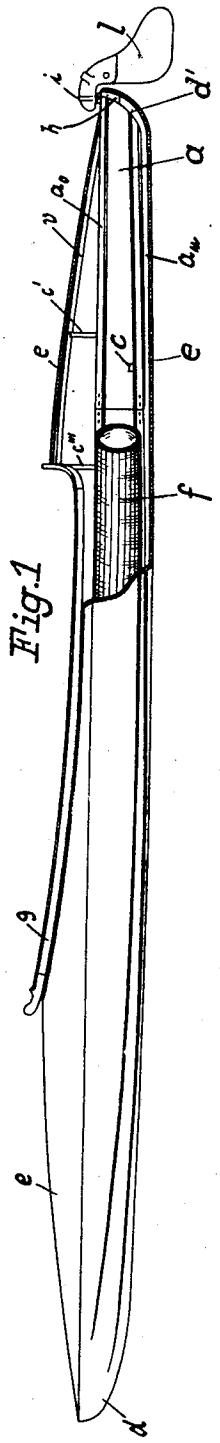
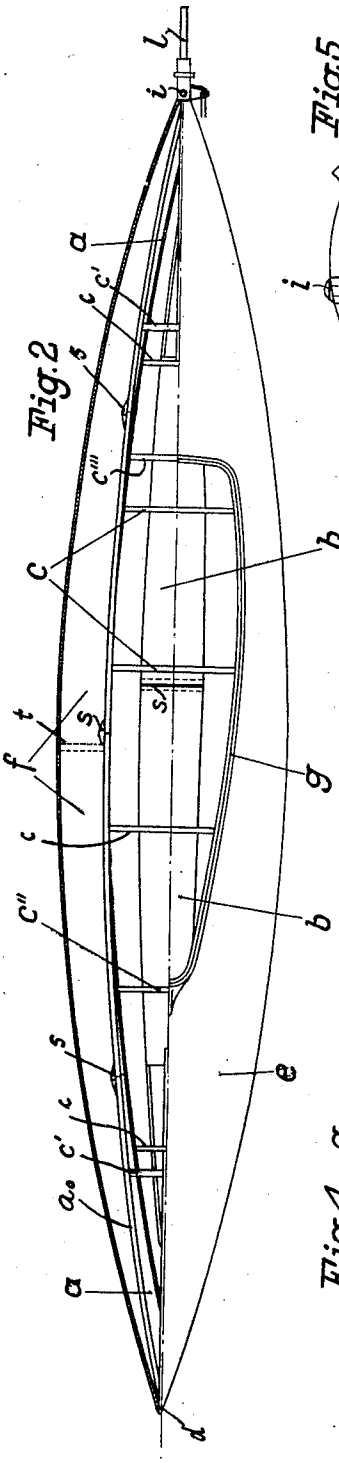
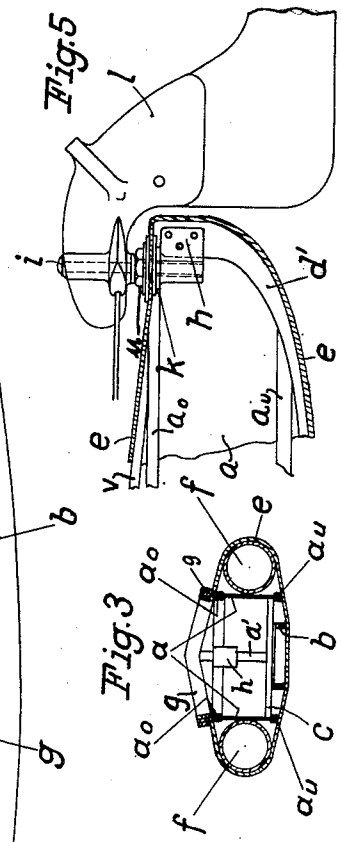
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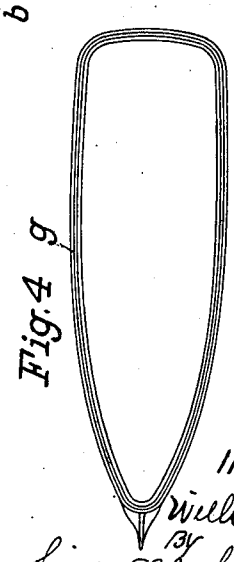
COLLAPSIBLE BOAT

Filed July 7, 1939 2 Sheets-Sheet 1









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COLLAPSIBLE BOAT

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Fig. 6

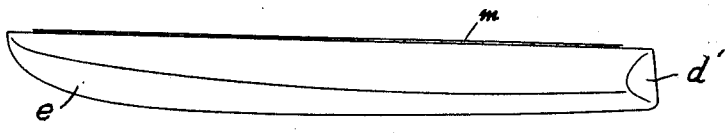


Fig. 7

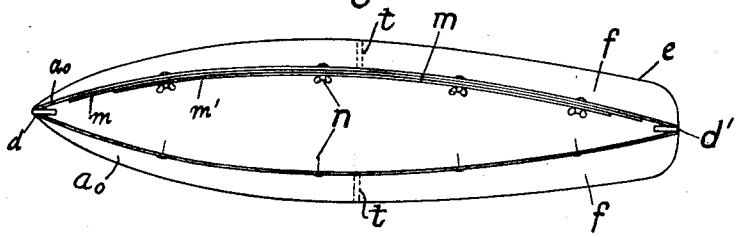


Fig. 8

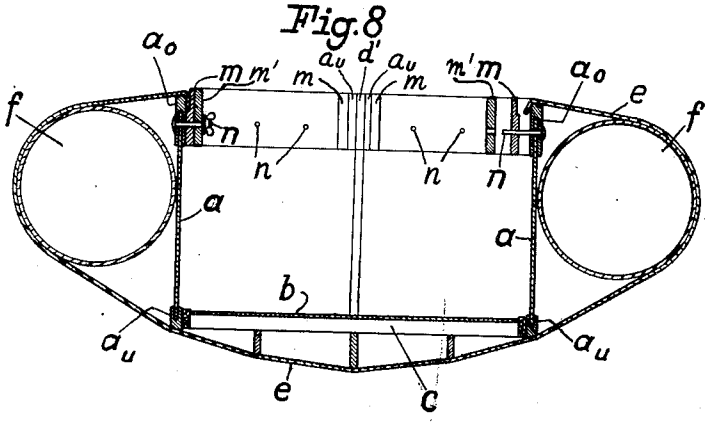
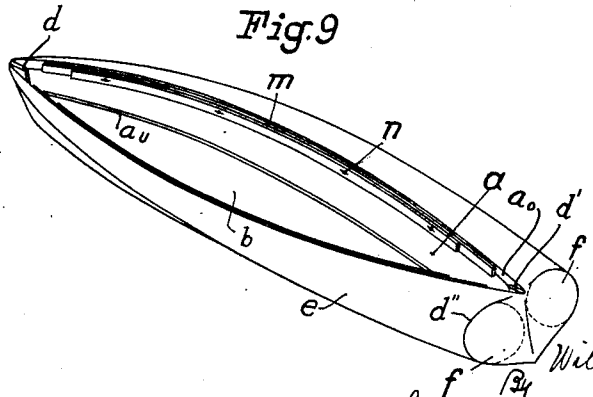


Fig. 9



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UNITED STATES PATENT OFFICE

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COLLAPSIBLE BOAT

Willi Schütte, Berlin, Germany; vested in the Alien Property Custodian

Application July 7, 1939, Serial No. 283,290
In Germany July 8, 1938

3 Claims. (Cl. 9—2)

The usual collapsible or folding boats consist of a watertight covering of rubber cloth or impregnated canvas, and an inner skeleton which may be taken to pieces. This skeleton consists of frames which are not taken to pieces, and stringers or bottom parts which may be taken to pieces and are shaped like rods, or are connected by hinges so that they can be folded, and are shaped like boards. It is difficult to pack the frames and the longitudinal members or stringers and the like, impart only limited strength to the boat longitudinally. Erecting such a boat is tedious and requires great care, as otherwise the skeleton will occupy an oblique position in the cover. The usual small air reservoirs of rubber cloth afford but little safety against sinking of the boat when the boat becomes leaky.

Collapsible boats are also known in which the skeleton includes lateral structures subdivided by a longitudinal partition and connected by hinges. Under the pressure of inflatable rubber tubes arranged between the lateral structures and the covering, the structures act on the bottom of the boat and the deck bracing, and exert tension on the covering. The side structures do not extend as far as the stem and the stern post, but they only extend for one or more pitches of the frames and are not connected longitudinally to each other, so that the longitudinal strength of the boat is poor.

These drawbacks are eliminated according to the present invention which relates to a collapsible or folding boat with a foldable inner skeleton, a covering, and inflatable air tubes between the skeleton and the covering. According to the invention, the skeleton consists in substance of two elastic longitudinal members which are curved in their longitudinal direction, and solid throughout their height from the bottom to the deck of the boat. The longitudinal members extend from the stem to the stern of the boat, and bracing members are inserted between them. Arranged between the skeleton and the water tight covering are air tubes which extend throughout the length of the boat. In this manner, the inner skeleton consisting of longitudinal members, transverse bracing members, and bottom boards, makes up a stiff body of rectangular cross-section which does not require transverse frames, is very strong in its longitudinal direction, and light. The covering is readily placed in the proper position on the body in untensioned condition and is imparted tension and the proper boat shape by inflation of the air tubes.

The longitudinal members, the bottom parts, and the longitudinal stringers—if any—below the bottom are subdivided, in the usual manner, by transverse partitions, and the individual units thus obtained are connected by hinges or turnbuckles of usual kind, so that their ends are in close engagement after they have been assembled.

Preferably, the air tubes are subdivided into compartments by suitable, air tight transverse partitions, so that a sufficient amount of buoyancy is present even if one of the compartments is damaged, preserving the transverse stability of the boat and preventing sinking.

All fittings, and especially the stern post, are preferably attached to the skeleton, so that the covering is clear of fittings.

The construction which has been described, with bracing members arranged transversely between the longitudinal members, is preferred for comparatively small boats. For larger boats, transverse members at the level of the deck are dispensed with by making the said longitudinal members at their upper sides with a plurality of bracing rails superimposed in the manner of lamellae, which are curved to the curvature of the longitudinal members and are then firmly connected to the longitudinal members under high friction, holding such members in the curved condition.

When it is desired to design the collapsible boat for the reception of an engine, the cross-sections of the air tubes may be adapted at the rear to a wide stern braced by a board.

In the accompanying drawings, boats of the two types aforesaid are illustrated by way of example.

In the drawings, Figs. 1 to 5 illustrate the first type, and Figs. 6 to 9 illustrate the second type.

More particularly

Fig. 1 is an elevation of the boat, partly in longitudinal section.

Fig. 2 is a plan view of the boat, with the covering removed at the right for exposing the corresponding longitudinal member and the bracing members extending transversely thereto.

Fig. 3 is a cross-section of the boat.

Fig. 4 is a plan view of its cockpit frame, and

Fig. 5 is a sectional elevation of the boat's stern, drawn to a larger scale and showing the stern post and the rudder.

Fig. 6 is an elevation, and

Fig. 7 is a plan view, of the larger boat embodying the second type.

Fig. 8 is a cross-section of the boat, drawn to a larger scale.

Fig. 9 is a perspective illustration of the boat, viewed from the aft and from above, and showing the motor-supporting wide stern board.

Referring now to the drawings, and first to Figs. 1 to 5, a pair of longitudinal members *a* extend all over the length of the boat and are connected at their ends to the stem *d* and the stern *d'* by screws or other detachable means. The longitudinal members *a* are arranged in vertical, or substantially vertical, position, and are made of thin plywood or some other suitable material. The upper edge of each longitudinal member *a* is reinforced by a wooden rail a_o, and its lower edge is reinforced by a wooden rail a_u. Lower bracing members *c* are placed on the lower rails a_u and equipped with tenons at both ends. The tenons are inserted in holes in the two longitudinal members *a* and the bracing members *c* hold the elastic longitudinal members *a* spread apart in curved configuration, as shown in Fig. 2 for the longitudinal member *a* at the right. A bottom *b* including stringers and bottom boards is arranged below the lower bracing members *c* and secured by screws, turnbuckles, hooks, or the like, of usual kind. Upper bracing members *c'* are placed on the upper rails a_o of the longitudinal members *a* fore and aft of the cockpit frame *g* for holding apart the upper portions of the longitudinal members, and supporting the deck of the boat.

The longitudinal members *a* and the bottom parts *b* are subdivided into individual sections transversely, and the sections are preferably connected by hinges *s*, as shown. The connecting means must be so made that the edges of the sections forming the longitudinal members *a* or the bottom *b* are abutted squarely when assembled, and the sections cannot bend at the joints. Preferably, the joints are staggered in the longitudinal members *a* and in the bottom *b*.

A tight covering of textile material *e* is placed on the skeleton comprising the elements *a*, *b*, *c*, *c'*, *d*, and *d'*.

The deck portion of the covering *e* has a central cockpit aperture with a wooden cockpit frame *g* which is divided and whose sections are connected in the usual manner. The sides of the cockpit frame *g* are supported by the upper rails a_o of the two longitudinal members *a*. The fore and aft ends of the cockpit frame *g* are supported by the longitudinal members *a* through roof-shaped cant rails *c''* and *c'''*, respectively. Ridge beams, as shown at *v*, Fig. 1, for the aft portion of the boat, extend to the stem *d* and the stern *d'* from the respective cant rails, and the ends of the beams are suitably connected to the corresponding elements in any well known way.

Inserted between the outer sides of the longitudinal members *a* and the covering *e* are inflatable tubes *f* of rubber or the like, with pointed ends. The tubes extend from the stem to the stern and are subdivided into any number of airtight compartments by partitions one of which is shown in dotted lines at *t* in Fig. 2 and which are provided with suitable check valves, not shown. The air tubes can be inflated by a blower.

A rudder bearing *h* is secured to the stern *d'*, Fig. 5, and a rudder pivot *i* is screwed into the bearing through a hole *k* in the covering *e*. When the pivot *i* has been inserted in the fitting *h* it is locked by a lock nut *u* and the boss of the rudder *l* is placed on the pivot *i*, the lock nut *u* acting in the manner of a step bearing.

When it is desired to assemble the boat, the sections of the longitudinal members *a*, the bottom *b*, and the stem and stern *d* and *d'* are inserted into the covering *e* and the tubes *f* are placed between the longitudinal member sections and the covering. The several sections are now connected, and the transverse bracing members *c* at the bottom, and *c'* at the deck, are inserted and secured, bending the longitudinal members *a* into the desired curvature. The cockpit frame *g* and the cant rails *c''* and *c'''* are now assembled and the tubes *f* are inflated. The rudder pivot *i* is threaded into the fitting *h*, and the boss of the rudder *l* is placed on the pivot. The rudder *l* is operated in the usual way by a yoke and cables.

Since the covering *e* becomes taut only upon inflation of the tubes *f*, the boat is very conveniently assembled. The skeleton makes the boat very strong longitudinally but at the same time the skeleton is light, as it is without frames. The tubes *f* afford great safety against capsizing and sinking of the boat, give the boat a taut and smooth skin and are very resistant to lateral shocks. The rudder reactions are absorbed directly by the skeleton, and the covering *e* cannot be damaged by the rudder.

Referring now to Figs. 6 to 9, the general construction of this boat is similar to that which has been described with reference to Figs. 1 to 5, and similar parts are provided with the same reference numerals in all figures.

In this boat, which, as mentioned, is larger than the one previously described, the bottom boards *b* occupy the entire space between the longitudinal members *a*. The boards, which may be made of plywood, are placed on the upper edges of the lower bracing members *c* to whose lower edges stringers are secured in the usual manner by screws, or the like.

As mentioned, the upper bracing members *c'* are dispensed with here, and other means must be provided for imparting the desired curvature to the upper edges of the longitudinal members. Such means are a gunwale at each member *a* which consists of an outer strip *m*, and an inner strip *m'*, of elastic wood. The strips are placed side by side like lamellae (see Figs. 7 and 8), and are straight when free. When the longitudinal members *a* and the lower bracing members *c* have been assembled, the two strips *m*, *m'* for each longitudinal member *a* are bent to the curvature of the members *a* and then are connected with great friction to the corresponding upper rail a_o against which they are held by screw bolts *n* equipped with wing nuts and extending through holes in the rail and the two strips. The strips *m*, *m'* and the rails a_o now make up a substantially rigid, curved beam and the bracing members *c'* may be dispensed with. The upper edge of the covering *e* is clamped between the rails a_o and the strip *m* at each longitudinal member *a*.

If it is intended that the boat should be motor-driven, the aft ends of the tubes *f* are made with their full diameter, as shown in Fig. 9, and a board *d''* is secured to the broad stern thus produced. A motor, not shown, can be attached to this board.

Boats of this second type can be made 10 metres long, and even longer, and provided with an outboard motor at the stern board *d''*. Detachable seats or folding chairs may be used.

I claim:

1. A boat collapsible lengthwise and crosswise comprising a collapsible inner skeleton, a water-

tight covering consisting of cloth and projecting inwardly on the upper face of the boat, and inflatable air tubes arranged between said skeleton and said covering and extending through its length, said skeleton comprising in substance a bottom, narrow bracing elements disposed transversely of the boat and two elastic longitudinal side members which are curved in their longitudinal direction and are arranged each with its long cross-sectional dimension in vertical position and extending from the stem to the stern and from the bottom to the deck of the boat and being spaced by said transverse bracing elements, said bottom and said longitudinal members being subdivided into several detachable sections by seams lying transverse to the midship vertical plane so as to be collapsible, said sections being connectible to each other, fittings being provided and all fittings, including a rudder bearing, being secured directly to the skeleton, the covering being free from fittings.

2. A boat collapsible lengthwise and crosswise comprising a collapsible inner skeleton, a watertight covering consisting of cloth and projecting inwardly on the upper face of the boat, inflatable air tubes arranged between said skeleton and said covering and extending through its length, said skeleton comprising in substance a bottom, narrow bracing elements disposed transversely of the boat and two elastic longitudinal side members which are curved in their longitudinal direction and are arranged each with its long cross-sectional dimension in vertical position and extending from the stem to the stern and from the bottom to the deck of the boat and being spaced by said transverse bracing elements, said bottom and said longitudinal members being subdivided into several detachable sections by seams lying transverse to the midship vertical plane so as to be collapsible, said sections being connectible to each other, and detachable elastic strips and means to connect said strips to the upper edges of said longitudinal members, said longitudinal members being held in curved configuration at their upper edges by said detachable strips placed side by side lamellae fashion, which strips are bent to the curvature of the longitudinal members and are then connected to the members at high friction.

3. A boat collapsible lengthwise and crosswise comprising a collapsible inner skeleton, a watertight covering consisting of cloth and projecting inwardly on the upper face of the boat, and inflatable air tubes arranged between said skeleton and said covering and extending through its length, said skeleton comprising in substance a bottom, narrow bracing elements disposed transversely of the boat and two elastic longitudinal side members which are curved in their longitudinal direction and are arranged each with its long cross-sectional dimension in vertical position and extending from the stem to the stern and from the bottom to the deck of the boat and being spaced by said transverse bracing elements, said bottom and said longitudinal members being subdivided into several detachable sections by seams lying transverse to the midship vertical plane so as to be collapsible, said sections being connectible to each other, a broad stern board being provided, the cross-sections of the air tubes being adapted to said broad stern board, in order to use the boat as a motor boat.

WILLI SCHÜTTE.