July 10, 1962 W. S. HOWE 3,042,942

AMPHIBIOUS PONTOON BOAT

Filed March 25, 1960 2 Sheets-Sheet 1

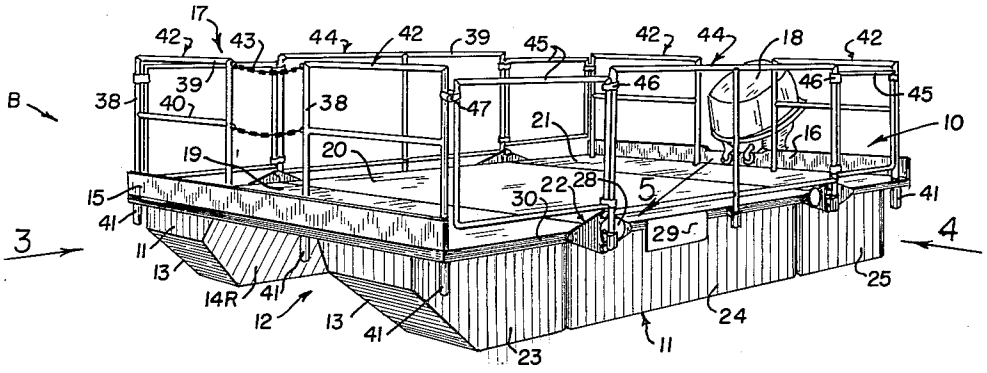


Fig. 1

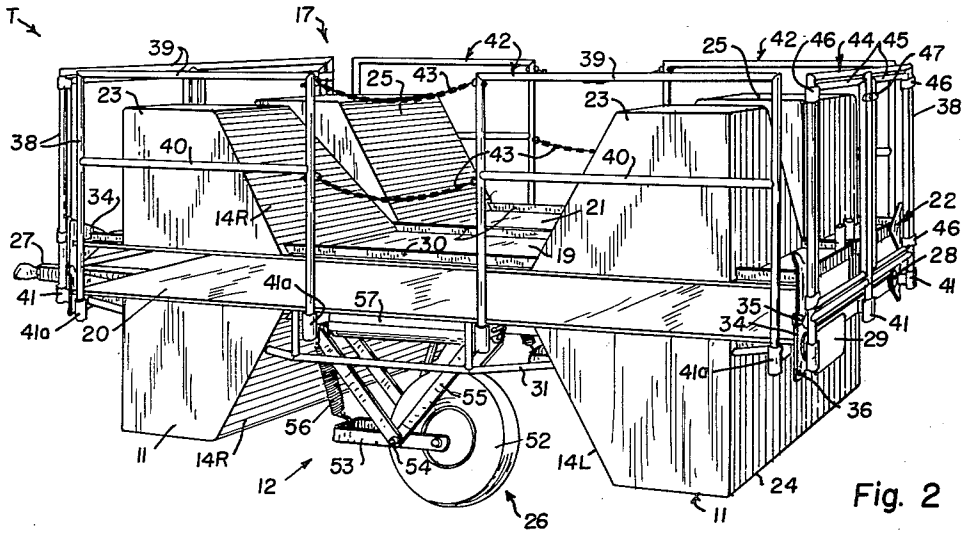


Fig. 2

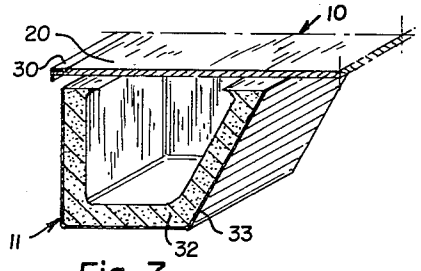


Fig. 7

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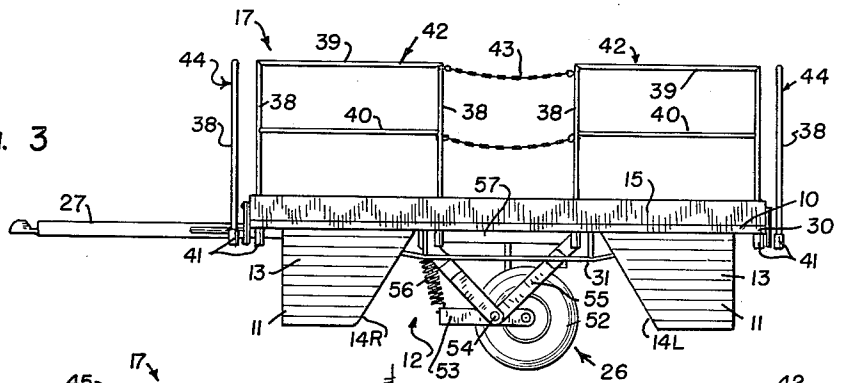
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AMPHIBIOUS PONTOON BOAT

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Fig. 3



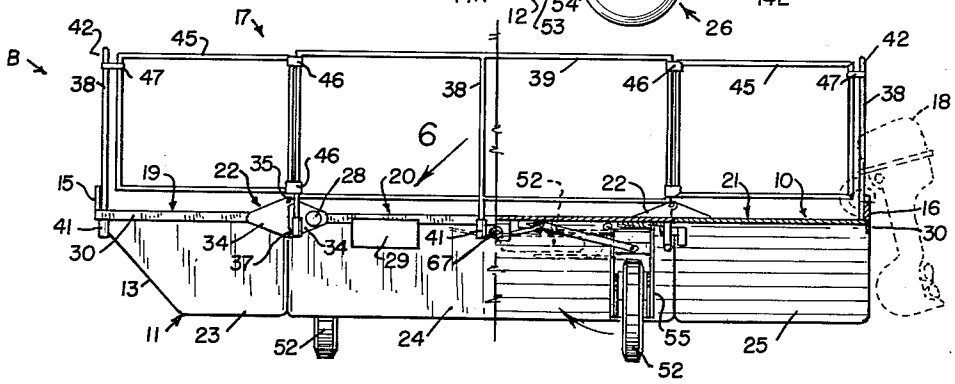


Fig. 4

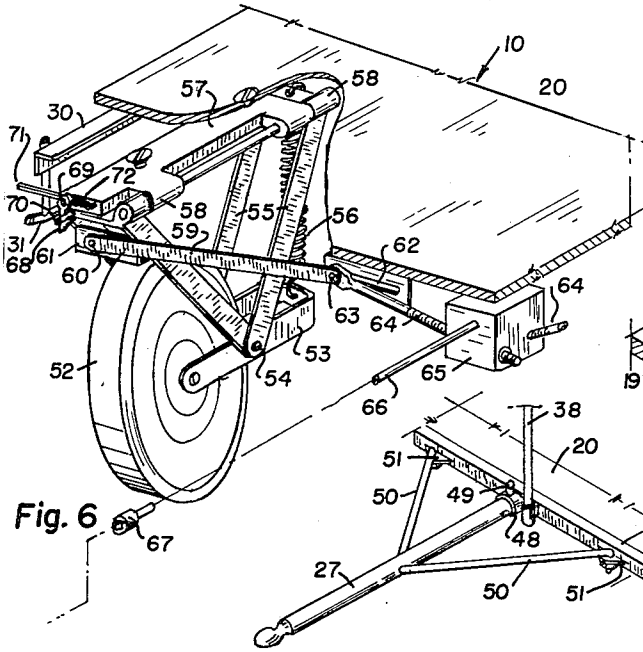


Fig. 6

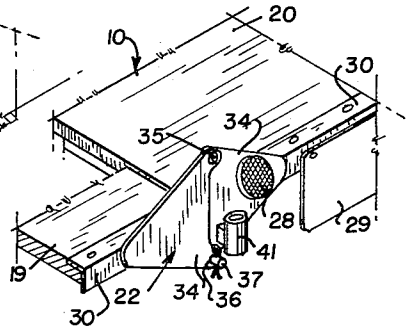


Fig. 5

Fig. 8

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AMPHIBIOUS PONTOON BOAT

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6 Claims. (Cl. 9—1)

This invention relates to pontoon boats and more particularly to amphibious boats, a primary object of the invention being to provide a novel and improved amphibious pontoon boat which serves as a flat-decked boat or a raft in the water and is appropriately wheel-mounted to be conveyed over land as a trailer.

Another object of the invention is to provide a novel and improved amphibious pontoon boat having a flat-decked surface of sufficient area to safely and comfortably accommodate small groups of people and which may be also folded into a compact unit as a wheel-mounted trailer of a size which may be easily, safely and lawfully towed over highways and roads by a standard automobile.

Another object of the invention is to provide a novel and improved amphibious pontoon boat which is of a size especially suitable for family and small group use, as for vacationing boating purposes, and as a supplement to swimming, boating and like activities.

Another object of the invention is to provide a novel and improved flat-decked pontoon boat which may serve as an anchored raft but is especially suitable to be propelled and moved about as by an outboard motor.

Yet another object of the invention is to provide, in an amphibious pontoon boat which may be folded into a compact trailer unit, an improved arrangement of protective railings which are adapted to fold with the boat to form side rack members to assist in holding any additional luggage that may be placed on the trailer unit.

Another object of the invention is to provide in an amphibious pontoon boat, a novel and improved structural arrangement for combining light-weight, foam-type plastic materials with structural sheets and bars, all to form a complete unit having comparatively a minimum weight and a maximum structural strength and rigidity.

Yet other objects of the invention are to provide an amphibious pontoon boat which is an easily constructed, low cost, neat appearing, versatile, rugged and durable unit.

With the foregoing and other objects in view all of which more fully hereinafter appear, my invention comprises certain novel and improved constructions, combinations and arrangements of parts and elements as hereinafter described, defined in the appended claims, and illustrated in preferred embodiment in the accompanying drawing in which:

FIGURE 1 is a perspective view of my amphibious pontoon boat in its extended position and ready for floating, with the viewer looking toward a front end and a side of the boat, and including an outboard motor mounted at the rear end of the boat for propelling it.

FIGURE 2 is a perspective view of the boat in its folded position and with the support wheels lowered to convert the unit into an overland trailer.

FIGURE 3 is an elevational view of the unit in its extended position as from the indicated arrow 3 at FIG. 1 but with the trailer wheels being lowered and the trailer tongue extended, the view looking towards the front end of the pontoon boat and towards the side of the trailer-forming elements.

FIGURE 4 is an elevational view of the unit in its extended position as from the indicated arrow 4 at FIG. 1 but with the trailer wheels being lowered, the view looking towards the side of the pontoon boat or towards the

rear end of the trailer organization, with portions of the unit being broken away to show elements otherwise hidden from view, with broken lines indicating the position of an outboard motor and with other broken lines indicating the raised position of a trailer wheel.

FIGURE 5 is a fragmentary detail of a connective locking arrangement interconnecting the deck sections of the unit as taken substantially from the indicated arrow 5 at FIG. 1.

FIGURE 6 is a fragmentary detail showing a portion of the deck with a wheel frame and wheel mounted therebelow, and showing further, somewhat diagrammatically, a mechanical arrangement for retracting the wheels, the view appearing as from the indicated arrow 6 at FIG. 4 but on an enlarged scale.

FIGURE 7 is a fragmentary detail of a typical section through a pontoon portion of the unit to illustrate a preferred construction of the pontoon.

There has been a steady increase in the popularity of individually owned boats which are carried on specially-designed auto-drawn trailers and which may be transported to resort sites and the like where there are substantial bodies of water and where boating may be enjoyed. While this activity has been concerned with small, high speed boats, there has also arisen a parallel need for rafts and pontoon-type boats having much larger deck surfaces and which may be used for different types of activities such as fishing, swimming and even as supplementary equipment for other boating activities. This need has generally been met in the past, if at all, by log or drum-type rafts which might be available and which are usually unsatisfactory for the needs at hand. There is especially a need for a reliable and safely constructed pontoon type boat or raft, which is large enough to comfortably accommodate a small group of people such as a family and which may be transported overland by an automobile in the same manner as an ordinary trailer.

The basic problem lies in the fact that a pontoon boat or raft large enough to meet these needs is much too large to be pulled overland as a trailer, especially by an ordinary automobile. With such factors in view, the present invention was conceived and developed and comprises, in essence, an amphibious pontoon boat of a simple light-weight construction consisting of foldable sections which may be folded into a compact wheel-mounted unit of a size that may be properly towed behind an automobile without violating width regulations of standard highways and roads. It is to be noted, as hereinafter set forth, that the problem of obtaining a pontoon boat of sufficient size and a folded wheel mounted unit of sufficient compactness was solved by orienting the longitudinal axis of the pontoon boat transversely to the longitudinal axis of the trailer-formed folded unit.

Referring more particularly to the drawing, the illustration at FIG. 1 shows my improved unit extended to form a pontoon boat B. The flat deck 10 is rectangular with the longitudinal axis thereof extending from the front to the rear of the boat. The deck is supported upon a pair of longitudinally disposed pontoon floats 11 which extend underneath the deck with each float being adjacent to a lateral side of the deck with a longitudinally extended corridor 12 between the floats. The front of each pontoon float 11 slopes rearwardly and downwardly to form an inclined buffer surface 13 and the inner opposing side walls 14R and 14L of the floats are inclined to provide a broader deck-connecting section at the top of each float and to give the corridor 12 a generally trapezoidal cross section, such providing desirable buoyant and wave-damping action when the boat is afloat as well as being preferred structurally.

Other features which complete this unit as a pontoon boat include a batter board 15 upstanding from the front

edge of the boat, a similar batter board **16** upstanding from the rear edge of the boat, a railing assembly **17** which fences in the deck and an outboard motor **18** which is mounted upon the rear batter board **16** with its propeller extending downwardly into the corridor **12** to propel the boat B.

To convert this pontoon boat B into a compact trailer unit T, the illustration at FIG. 2, the deck **10** is folded upon itself at transversely disposed hinging axes. To accomplish this, the deck **10** is divided into transverse sections including a front section **19**, a central section **20** and a rear section **21** with the normally abutting edges of the several sections being interconnected by lock hinges **22**, hereinafter described. It is contemplated that the front and rear deck sections **19** and **21** will fold upwardly, over and upon the central deck section **20** and that the desirable proportions of these deck sections will be such that the aggregate length of the front and rear sections will be the same, or slightly less, than the length of the central deck section, and preferably that the length of the front section will be substantially the same as the length of the rear section. The pontoon floats **11** are also necessarily divided into corresponding sections **23**, **24** and **25** which abut against each other when the unit is extended but which separate when the deck sections are folded over each other. When so folded, the front pontoon sections **23** and the rear pontoon sections **25** will be inverted and on top of the unit while the central pontoon sections **24** will remain in their normal position underneath the central deck section **20**.

Other features which complete this pontoon boat include a pair of retractable wheel units **26** mounted underneath the central deck section **20** in the corridor **12** adjacent to each transverse edge of the central deck section **20** and with the plane of the wheels being oriented normal to the longitudinal axis of the boat for side movement of the boat unit when on wheels. A trailer pull-tongue **27** extends from one side of the central deck section along the transverse central axis of the boat unit and suitable signal lights **28** and license plate **29** are mounted at the opposite lateral side of the central deck section **20**. Also, the rail assembly **17** is arranged in such a manner as to be set up and used with the trailer unit to provide restrictive siderails to facilitate holding items on the trailer which may be conveniently laid in the corridor portions of the front and rear sections on top of the central section.

It is to be noted that the longitudinal axis of the unit as a pontoon boat B becomes a transverse axis of the unit as a trailer T and that the central transverse axis of the boat B becomes the central longitudinal axis of the trailer T. It was discovered that with this arrangement of folding the sections over each other the size of the pontoon boat B would be suitably large and also, the size of the trailer T satisfactorily small and compact. For family and small group use where several activities may be involved, it is desirable, and practically necessary, for the pontoon boat B to have a deck surface not less than 8-feet wide and at least 12-feet long. A pontoon boat having a deck surface 10-feet wide and 16-feet long may be considered large and fully adequate for most small group purposes. On the other hand, it is essential to keep the trailer unit T down to a size which may be safely, easily and lawfully towed on the open highways by an ordinary automobile. A satisfactory trailer size is no more than 8-feet long and 6-feet wide while the maximum trailer size that can be reasonably towed is 10-feet long and 8-feet wide. Thus, by overfolding the front and rear portions of the pontoon boat as described, with the trailer axis being transverse to the boat axis, and with the boat movement on land being essentially sidewise, these conflicting size limitations can be easily attained.

Referring more specifically to the details of construction, the deck sections **19**, **20** and **21** are formed of water-

resistant plywood sheets or the like whose peripheral edges are reinforced by angle members **30** suitably affixed to the edges of the sheets. The angle members **30** also serve as a means for attaching other elements to the deck as hereinafter described. Longitudinal rigidity of the deck sections is obtained by the pontoon sections **25**, **23** and **24** attached to the underside of their respective deck sections while transverse rigidity of the sections is obtained by truss bars **31** extending underneath the central deck section adjacent to the transverse fold edges.

The individual pontoon sections are in the form of tank-like units and are preferably formed with comparatively thick walls **32** of a light-weight, water-resistant, foamed plastic material, which has considerable buoyancy. Such thick-walls provide a safety factor should a pontoon tank be accidentally ruptured. These thick foam-like plastic walls **32** are encased in shell **33** of harder material, preferably of fiber-glass-reinforced plastic material which is completely water-resistant and of substantial strength and toughness. Several specific materials are used for such construction which are well known to the art and which need not be listed herein.

Each lock hinge **22** is formed as a pair of flat triangular leaves **34** with each leaf being rigidly attached to the edge of its deck section as to an angle member **30** and with corners thereof lapping corresponding corners of the mating leaf. In overfolding the front and rear deck portions upon the central deck portion **20**, it is desirable to keep the overfolded deck portions spaced above the central portion a distance which corresponds with the height of the batter boards **15** and **16**. Therefore, each triangular hinge leaf **34** includes a corner which upstands above the deck surface to lap with a corresponding corner of the mating hinge leaf. A hinge pin **35** interconnects these lapping corners to thereby locate the hinge axis above the level of the deck. Each hinge leaf **34** also includes a corner which extends below the deck surface and which laps with the corresponding corner of the mating hinge leaf when the decks are in their extended position. Orifices **36** are located in the lower corners which are in registration when the decks are in the extended position. The leaves may then be interlocked in this position with a lock pin **37**. Removal of the lock pin **37** permits folding of the deck sections upon each other.

The rail assembly **17** is designed to fence in the boat deck and to serve as confining siderails when the boat is folded to the trailer T form. This rail assembly consists of a plurality of wickets, with each having two or three vertical posts **38**, a top horizontal rail **39** and, if desired, an intermediate or lower rail **40**. These wickets are mounted in tubular sockets **41** which are appropriately attached to structural members of the deck such as the edge reinforcing angles **30**, with each socket being adapted to receive the base of a post **38**.

The front and rear end sections of the rail assembly each include a pair of two-post, wickets **42** having top and intermediate rails therein which are normally mounted in suitable sockets **41** at the front and rear ends of the pontoon boat with each pair of wickets being in a common alignment with a central space between them, above the corridor **12** between the pontoons. This space may be enclosed by simple chain latches **43** but the space at the rear of the boat will ordinarily be open to permit the outboard motor **18** to be appropriately mounted upon the rear batter board **16** between the wickets **42**. In addition to the sockets **41** at the front and rear ends of the boat which normally contain these wickets, a supplemental set of sockets **41***a* is provided at each transverse edge of the central deck section to contain these wickets when the unit is folded upon itself to form the trailer T, the wickets **42** and interconnecting chains **43** then forming confining rails to facilitate holding luggage and the like on the trailer between the pontoon sections **23** and **25**.

Each side section of the rail assembly includes a three-

post wicket 44, having top and bottom rails thereon, which spans the side edge of the central deck 20. A rectangular gate 45 is hingedly mounted upon each side post of this wicket 44, on simple hinges 46, to swing outwardly to connect with the end posts of the adjacent end wickets 42 or to swing inwardly to connect with the central post of the side wicket, as illustrated at FIGS. 1 and 2. Suitable clips 47 are used to hold the gates at either selected position.

Because of its transverse position with respect to the axis of the pontoon boat B, the pull tongue 27 must be removed when the unit is extended for floating use. This may be accomplished in several ways such as, for example, by providing a transverse socket through the body of the unit into which the tongue may be telescopically retracted. Another suitable arrangement for disconnectively mounting the tongue is illustrated at FIG. 8. A collar 48 is affixed to the side of the central deck member 20 which receives the end of the tongue 27 and suitable registering orifices are formed through the sides of the collar and end of the tongue to receive a lock pin 49. Lateral brace bars 50 extend from an intermediate point on the tongue to each side of the deck member where they may be removably secured thereto into angle clips 51 outstanding from the sides of the deck section. With this arrangement, removal of the tongue is a simple matter, involving disconnection of the tongue by removing the lock pin 49 and disconnecting the brace bars 50 at the angle clips 51.

Because the wheels of the wheel units are transverse to movement of the pontoon boat when in water, it is essential that some retraction means be provided for them and the wheels 52 are preferably folded upwardly against the underside of the central deck section 20 as indicated by broken lines at FIG. 4. In normal use the pontoons 11 will be only partially submerged with the deck and wheels being above the water surface, and offering substantially no resistance to movement of the boat through water.

Each wheel 52 is axially mounted to one end of a yoke-shaped rocker arm 53. Transversely disposed pivots 54 at the center of this arm 53 connect it to the apex of a doubled inverted triangular frame 55. A spring 56 is connected to the opposite end of the arm 53 to extend upwardly for connection to the frame 55. This spring functions to balance the weight of the unit when on the wheel with the arm it is held in a substantially horizontal position and also, to permit the arm to rock as the wheel yields to irregularities of the road surface. Other conventional shock absorbing means, not shown, may also be used in the assembly.

With each wheel being disposed near the transverse edge of the central deck section 20, it is desirable to fold the wheels upwardly and inwardly toward each other and toward the center of the deck section. To accomplish this each frame 55 is connected to a face plate 57 at the underside of the central deck section 20 by a pivot assembly 58. The pivots 58 of the assembly are thus at the inner side of the frame 55 and at the inner edge of the face plate 57 so that the inner side of the frame 55 will be against the deck section when in its retracted position.

Retraction of the wheels by folding them on the pivots 58 may be accomplished by several mechanisms. One type of such retraction means, as generally illustrated at FIG. 6, includes an arm 59 having one end connected to a pivot 60 which is mounted onto a clip 61 between the members of the frame 55. This pivot 60 is below and is offset to one side of the folding pivot assembly 58 to avoid any position where the pivots might come into alignment with the pull of the rod. The arm 59 extends to a slot 62 underneath the deck portion 20 and includes a pin 63 which slideably fits into the slot 62.

The end of a threaded pull rod 64 is also connected to the pin 63 and this rod extends to a gear box 65 at the underside of the deck section 20 substantially at the center of the unit. The gear box 65 is illustrated as being a doubly acting unit, being adapted to receive a pull rod 64 from each side of the deck, to thereby retract or extend the wheels simultaneously. The gear box 65 is of any conventional type and may be manually operated as by a shaft 66 which extends to the side of the unit to terminate as a socket 67 which may receive an ordinary crank.

A safety latch 68 may be included in the wheel frame assembly to permit the wheels to be retracted only when the side sections are extended. The latch is carried by a pivot 69 on the face plate 57 with the hook thereof contacting a pin 70 on the edge of the frame 55. A detent 71 extends from the latch to contact a side deck section 19 or 23 which releases the latch only when the deck section is lowered.

While a double unit has been illustrated and described it is also possible to have individual wheel retracting units or units of other types such as lever-operated mechanisms.

Operation of the unit is manifest from the foregoing description. When extended, with the deck sections locked into position by locking hinges 22, the unit serves as a pontoon-boat for water use. When it is retracted from the water, the wheels are first lowered, the tongue is connected to the side of the unit and to a towing vehicle. Once on land the side-wickets 42 are removed, the sections folded together and the side wickets 42 are then replaced in sockets 41*a*. The latch 68 then holds the wheels in the lowered position and the trailer is then ready for overland movement.

While I have now described my invention in considerable detail it is obvious that others skilled in the art can devise alternate and equivalent constructions which are nevertheless within the spirit and scope of my invention. Hence, I desire that my protection be limited not by the constructions illustrated and described, but only by the proper scope of the appended claims.

I claim:

1. An amphibious pontoon boat comprising a rectangular deck having its longitudinal axis extending from the front to the rear of the boat and along the normal direction of movement of the boat in water, a pair of longitudinally extending pontoon floats underneath the deck with each float being adjacent to a lateral side of the deck and with a longitudinally extended corridor between the floats and underneath the deck, said deck being divided into three sections, a front, center and rear section, which connect together at abutting transverse edges of adjacent sections, a transversely-axised hinge means at the abutting edges interconnecting the sections together and being adapted to permit the front and rear sections to be overfolded upon the center section, each said pontoon float being divided into three sections, a front, center and rear section corresponding with the deck sections, and with the front pontoon sections being affixed to the front deck section, the center pontoon sections being affixed to the center deck section and the rear pontoon sections being affixed to the rear deck section, the front and rear pontoon sections being adapted to be overturned above the deck sections when the front and rear deck sections are overfolded and upon the center deck section, a lock means adapted to lock the front and rear sections in their extended positions, a pair of transversely-directed, retractable trailer wheel mounts, having trailer wheels thereon, mounted at the underside of the center section of the deck in the corridor between the floats, and being adapted to be normally retracted to lie against the underside of the deck, in the corridor as when the boat is used in water, and to be lowered to depend therefrom with the wheels below the pontoons when the boat is being moved on land in a direction transverse to the longitudinal axis of the boat and with the front and rear deck and pontoon sections overfolding the center section, and a trailer pull-tongue adapted to outstand from

a lateral side of the center section for pulling the unit on land in a transverse direction.

2. In the organization defined in claim 1, said hinge means and said lock means including a hinge leaf at each abutting corner of each section, lapping the adjacent mating hinge leaf at two spaced points, a hinge pin interconnecting the mating leaves at one lap point and a lock pin normally interconnecting the mating leaves at the other lap point.

3. In the organization defined in claim 1, said hinge means axes being above the deck surfaces of the sections whereby to permit the sections to move apart at the normally abutting edges when the front and rear sections are folded upwardly.

4. In the organization defined in claim 1, the length of the center section being substantially as great as the aggregate length of the front and rear sections whereby to permit the overfolded front and rear sections to be completely overturned when overfolded to lie over the center section.

5. In the organization defined in claim 1, a railing about the boat, including removable railing end wickets mounted across the front and rear ends of the boat, a fixed railing center wicket member mounted at each side of the center section including a post upstanding from each corner thereof and with the front and rear deck

sections being adapted to lie between the center wickets when they are overfolded upon the center deck section and a swing gate mounted on the post adapted to swing outwardly from the center of each corner wicket to normally connect with the adjacent corner of an end-wicket when the boat is extended as for water use and to swing inwardly to be folded against the center wicket when the end sections of the boat are overfolded upon the center deck section as for land use.

6. In the organization defined in claim 1, a wheel-mount lock at each wheel unit adapted to prevent the unit, when extended, from retracting and a release detent associated with the lock adapted to be shifted for release of the lock when the sections are in a normal extended position.

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