Dec. 18, 1962 P. W. DICKERSON 3,068,830

BOAT

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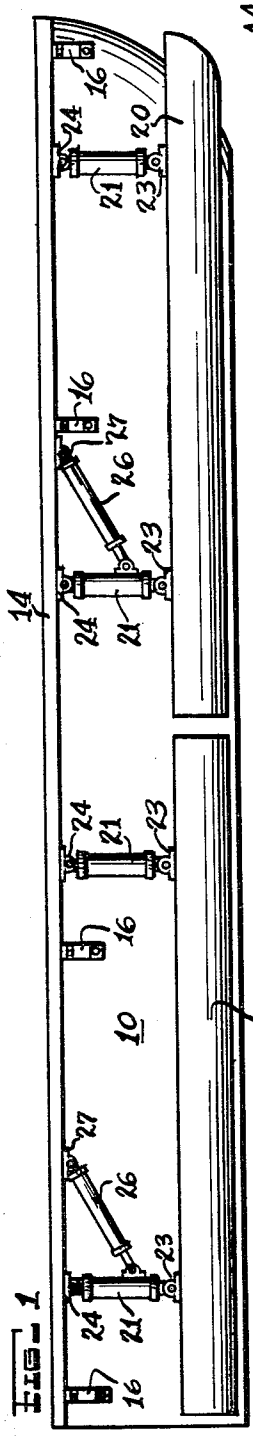


FIG. 1

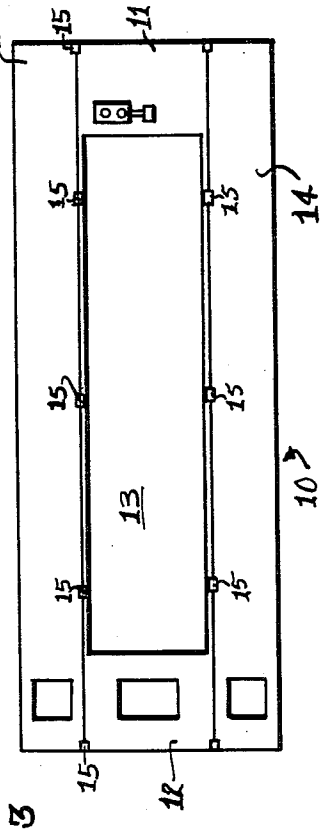


FIG. 3

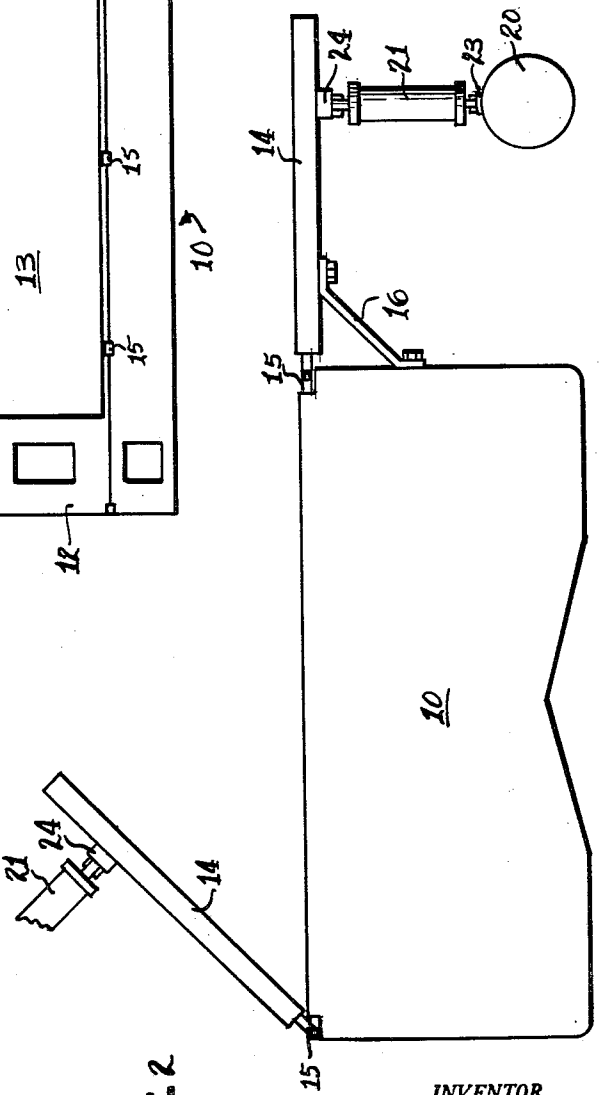


FIG. 2

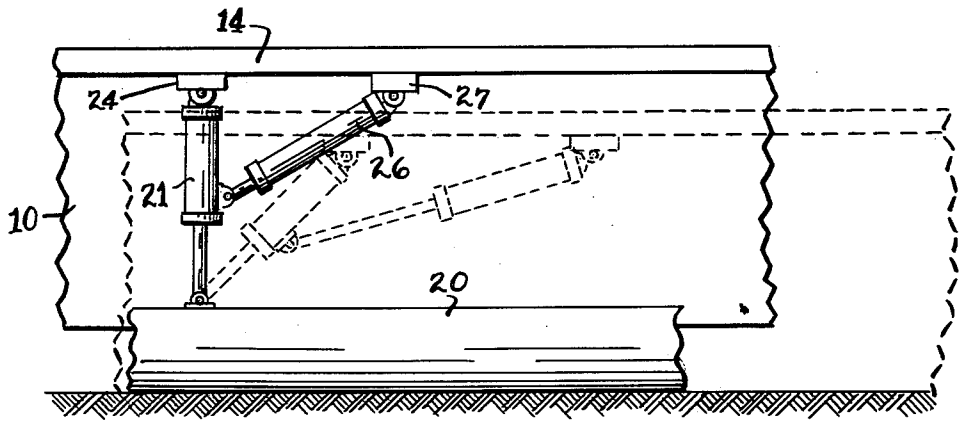
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FIG. 4



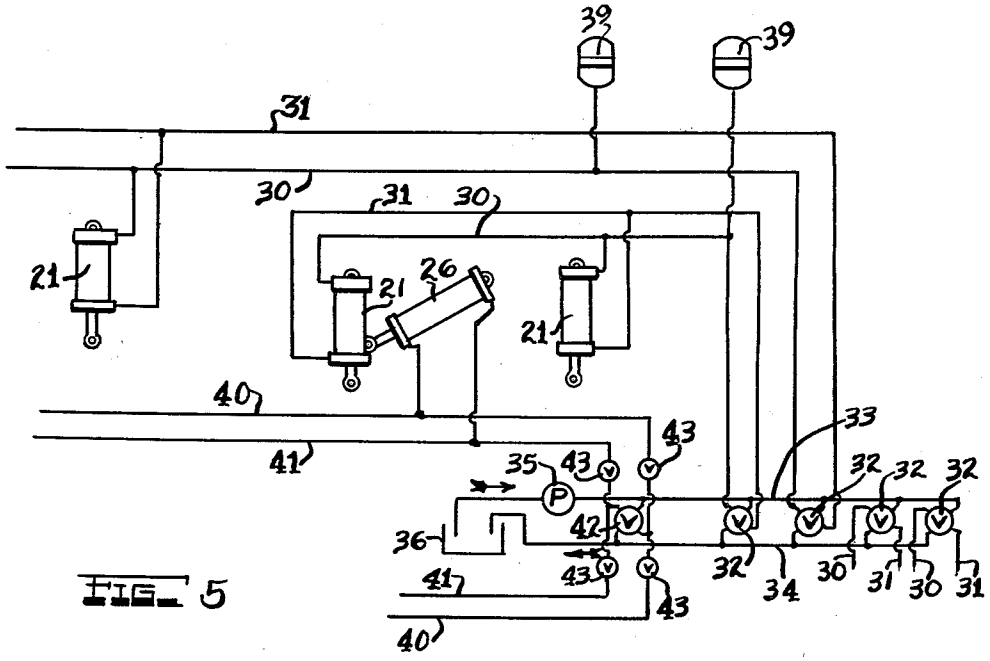


FIG. 5

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BOAT

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11 Claims. (Cl. 115—1)

This invention relates to a boat which, while not limited to such use, is primarily intended to contain a house trailer providing living quarters for occupants of the boat. Among the objects of the invention are to produce a boat which can operate satisfactorily, not only in deep water, but in water of any depth or even on land, thus making it possible to move the boat under its own power from the water to the land, or vice versa. Another object of the invention is to provide a boat which will be adequately stable in the water but which can be collapsed for transportation on land, as over highways.

In its preferred form, a boat embodying my invention comprises a hull having a well large enough to contain the trailer or other load to be transported. To the opposite sides of such hull, wings are pivoted or hinged for swinging movement between positions overlying the hull and positions extending generally horizontally therefrom. Each of such wings carries on its underside one or more pontoons to which the wing is connected through hydraulic jacks so that the relative elevations of the wings and pontoons can be varied when the wings are extending outwardly from the hull. The jacks acting between the pontoons and the wings are pivotally connected thereto on axes extending transversely of the hull; and certain of the jacks are connected to their associated wings by additional jacks through the operation of which the angular disposition of the first mentioned jacks can be controlled. In shallow water or on land, the first mentioned jacks may be operated to lower the pontoons into contact with the bottom or with the land and to raise the hull, thereby transferring the weight of the hull and its contents to the pontoons. With the hull thus elevated, the other jacks may be operated to move the hull either forwardly or rearwardly, the first mentioned jacks serving as parallel links which, in their swinging movement, will eventually bring the hull again into contact with the bottom or the land, whereupon both sets of jacks may be operated in the reverse to raise and advance pontoons, thus making it possible to manipulate the boat into any desired position.

Further objects and features of the invention will become apparent from the following more detailed description and from the accompanying drawings in which:

FIG. 1 is a side elevation of a boat with the wings in extended position;

FIG. 2 is an end elevation of the boat showing one of the wings extended and the other collapsed;

FIG. 3 is a plan view of the boat;

FIG. 4 is a fragmental view similar to FIG. 1, but on an enlarged scale, illustrating the manner in which the jacks may be operated to move the boat in shallow water or on land; and

FIG. 5 is a diagrammatic view illustrating one possible form of a hydraulic system for operating the jacks.

The boat illustrated in the drawings comprises a hull 10, conveniently of a generally rectangular shape and preferably decked fore-and-aft as indicated at 11 and 12 to leave a central well 13 of the desired dimensions. Wings 14 are pivotally connected to the opposite sides of the hull, as by means of hinges 15, to provide for movement of each wing between the extended position illustrated at the right of FIG. 2 and, as illustrated at the left of such figure, a collapsed position in which it lies over the hull. Removable braces 16 are provided to hold the

wings firmly in their extended positions in which their upper surfaces conveniently lie flush with the fore and after decks 11 and 12.

Each of the wings is equipped with one or more pontoons 20 which extend parallel to the hull and which lie under the wings when the latter are in extended position. Each pontoon is connected to its associated wing by a plurality of hydraulic jacks 21 through the operation of which the relative elevations of the pontoon and its associated wing can be controlled. Brackets 23 and 24 on the pontoons and wings, respectively, provide for the pivotal interconnection of each jack to the pontoons and wings on parallel axes extending transversely of the hull. For convenience, the jacks 21 will hereinafter be referred to as elevating jacks to distinguish them from other jacks now to be described.

Pivotally connected to at least one jack 21 of each pontoon, preferably near the lower end of the upper part thereof, is a jack 26 which, for convenience, may be designated as a walking jack. Each of the walking jacks extends obliquely upward from its point of connection with the associated lifting jack and is pivotally connected at its upper end to a bracket 27 secured to the underside of the wing 14. The axes of pivotal connection between each of the jacks 26 and its associated jack 21 and bracket 27 are parallel to the axes on which the jacks 21 are connected to the wings and pontoons.

While the hydraulic system embodying the jacks 21 and 26 may be arranged in a variety of manners, one suitable arrangement is illustrated in FIG. 5. That system embodies a pair of conduits 30 and 31 for each pontoon. All the jacks associated with any one pontoon have their upper cylinder ends connected to the conduit 30 and their lower cylinder ends connected to the conduit 31. For each pair of conduits 30 and 31 there is a four-way valve 52 controlling the connection of the conduits between a pressure line 33 and a return line 34. As shown, the pressure line receives pressure liquid from a pump 35 which draws liquid from a sump or reservoir 36 into which the return line 34 discharges. There is thus one valve 32 for each pontoon, and by proper manipulation of that valve the pontoon can be raised or lowered relative to the wing 14 which carries it. Since the upper cylinder ends of the jacks 21 of each pontoon are interconnected through the conduit 30 while the lower cylinder ends are interconnected through the conduit 31, and since it is contemplated that the jacks 21 will all have the same cross-sectional area, the load carried by each pontoon will be equally distributed among the jacks connected to that pontoon and the pontoon can freely assume positions of non-parallelism with the associate wing, as may be necessary should the bottom engaged by the pontoon be inclined. Desirably, each of the lines 30 has connected to it a closed chamber 38 only partially filled with the hydraulic liquid in order to provide an air cushion in its upper portion. Such air cushions are desirable, since they lessen the shock imposed on the pontoons and the jacks 21 should waves in the water cause the pontoons to strike bottom. Any suitable means may be provided for maintaining the air cushion in each chamber, and the chambers may be provided with pistons 39 separating the liquid and air and serving to prevent escape of air from the chambers when the liquid pressure is lowered.

For each side of the boat there is a pair of conduits 40 between which the walking jacks on that side of the boat are similarly connected. A four-way valve 42 controls the connection of the conduits 40 and 41 between the pressure line 33 and the return line 34. To permit the jacks 26 on one side of the boat to be operated independently of those on the other side of the boat, the conduits 40 and 41 may contain valves 43.

To explain the operation, it will be assumed that the

boat is afloat with the wings 14 extended and that it is desired to transfer the boat to land. To effect the transfer, the boat, with the pontoons 20 raised, is headed into the shore until the hull grounds. By suitable control of the valves 32, pressure liquid can be supplied to the jacks 21 through the conduits 30, thus lowering the pontoons until they strike the bottom and thereafter causing elevation of the hull 10 above the bottom, as indicated in full lines in FIG. 4. When the jacks associated with the pontoons engaging the bottom have been extended to their limit, or when the hull has been raised as far as desired, the valves 32 may then be closed and the jacks 26 operated by a suitable adjustment of the valve 42. If it is desired that the boat be moved forwardly without any swinging, the valves 43 are all opened and the valve 42 adjusted to supply liquid to the upper ends of the jacks 26. The resultant extension of the jacks 26 will swing the jacks 21, which will act as parallel links carrying the hull forwardly and downwardly until it engages the bottom. After the hull has engaged the bottom, the valves 32 and 42 are reversed to collapse all the jacks, thus transferring the weight of the boat to the hull, raising the pontoons and moving them forwardly relative to the hull. A subsequent extension of the jacks 21 will lower the advanced pontoons again into contact with the bottom and elevate the hull, which can be swung forwardly another step by again extending the jacks 26. To turn the boat as it is thus being manipulated, the valves 43 can be adjusted so that the walking jacks 26 on only one side of the boat are extended after the weight of the hull has been transferred to the pontoons. By repeatedly stepping the hull and the pontoons alternately in the appropriate direction, the boat can be completely removed from the water.

To move the boat in the reverse direction, the pontoons are lowered with the walking jacks 26 extended, such lowering of the pontoons being continued until they engage the land and the weight of the boat has been transferred to them. Thereafter, if the jacks 26 are collapsed, the hull will be moved rearwardly.

I claim as my invention:

1. A boat, comprising an elongated hull, wings pivotally mounted on longitudinal axes at opposite sides of said hull, each of said wings being swingable about its axis of pivotal mounting between a collapsed position over the hull and an extended position in which it projects generally horizontally from the hull, elongated, buoyant pontoons carried by said wings and disposed therebeneath generally parallel to and spaced outwardly from the hull when the wings are in extended position, a pair of elevating jacks operatively interconnecting each pontoon with its associated wing and pivotally connected thereto on parallel axes transverse to said hull, said lifting jacks being spaced apart a substantial distance longitudinally of the associated pontoon walking jacks, each of said walking jacks being pivotally connected to an elevating jack at a point spaced downwardly from the associated wing and to the wing at a point spaced longitudinally of the hull from such elevating jack on axes parallel to said first named axes, and power driven means for selectively operating said jacks.

2. A boat as set forth in claim 1 with the addition that the elevating jacks of each pontoon are hydraulic and include cylinders the corresponding ends of which are interconnected for the free flow of liquid therebetween.

3. A boat, comprising an elongated hull, wings pivotally mounted on longitudinal axes at opposite sides of said hull, each of said wings being swingable about its axis of pivotal mounting between a collapsed position over the hull and an extended position in which it projects generally horizontally from the hull, elongated, buoyant pontoons carried by said wings and disposed therebeneath generally parallel to and spaced outwardly from the hull when the wings are in extended position, a pair of elevating jacks operatively interconnecting each pontoon with its associated wing and pivotally connected thereto on parallel axes transverse to said hull, said lifting jacks being spaced apart a substantial distance longitudinally of the associated pontoon, and means for controlling the angular disposition of the elevating jacks about their respective axes of pivotal connection to the wings.

4. A boat as set forth in claim 3 with the addition that said hull has a deck, said wings when in extended positions being substantially coplanar with said deck.

5. A boat, comprising an elongated hull, wings projecting laterally from said hull at opposite sides thereof, elongated, buoyant pontoons carried by and beneath said wings in positions generally parallel to and spaced outwardly from the hull, a pair of elevating jacks operatively interconnecting each pontoon with its associated wing and pivotally connected thereto on parallel axes transverse to said hull, said lifting jacks being spaced apart a substantial distance longitudinally of the associated pontoon, walking jacks, each of said walking jacks being pivotally connected to an elevating jack at a point spaced downwardly from the associated wing and to the wing at a point spaced longitudinally of the hull from such elevating jack on axes parallel to said first named axes, and power driven means for selectively operating said jacks.

6. A boat, comprising an elongated hull, wings projecting laterally from said hull at opposite sides thereof, elongated, buoyant pontoons carried by and beneath said wings, a pair of elevating jacks operatively interconnecting each pontoon with its associated wing and pivotally connected thereto on parallel axes transverse to said hull, said lifting jacks being spaced apart a substantial distance longitudinally of the associated pontoon, and means for controlling the angular disposition of the elevating jacks about their respective axes of pivotal connection to the wings.

7. A boat as set forth in claim 5 with the addition that the elevating jacks of each pontoon are hydraulic and include cylinders the corresponding ends of which are interconnected for the free flow of liquid therebetween.

8. A boat as set forth in claim 6 with the addition that the elevating jacks of each pontoon are hydraulic and include cylinders the corresponding ends of which are interconnected for the free flow of liquid therebetween.

9. In combination with an amphibious vehicle having a hull, a pair of buoyant members supported for vertical movement at opposite sides of the hull and spaced outwardly therefrom for movement between upper and lower positions relative to the hull, hydraulic jacks for moving said members between said positions, means including supply conduits for supplying liquid under pressure to said jacks to force said members downwardly relative to the hull, and shock absorbing means associated with said conduits, said shock absorbing means comprising closed chambers connected to said conduits and containing a cushion of gas compressible in response to the application of fluid pressure to said conduits.

10. In a vehicle, an elongated centrally disposed load-carrying member, a pair of wings projecting outwardly from the opposite sides of said member and extending longitudinally thereof, a runner located below each of said wings and extending longitudinally of the vehicle, a pair of hydraulic lifting jacks acting between each runner and its associated wing, said jacks being pivotally connected at their upper and lower ends to the wing and runner on parallel axes, both the upper and lower ends of the jacks being equally spaced apart longitudinally of the vehicle, a walking jack for swinging the lifting jacks associated with each runner about their respective axes of pivotal connection to the wing, power operated means for operating all said jacks, said means being controllable to operate the lifting jacks of each runner jointly with

each other and independently of the walking jack for such runner and also independently of the jacks associated with the other runner.

11. A vehicle as set forth in claim 10 with the addition that there are two runners and two sets of lifting and walking jacks for each wing, said runners being located substantially in alignment with each other.

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