United States Patent [19]

Alms et al.

[11] **3,726,098**

[45] **Apr. 10, 1973**

[54] **MODULAR DOCK FLOAT**

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[73] Assignee: **AFE Industries, Inc.,** Lake Zurich, Ill.

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[21] Appl. No.: **23,688**

[52] **U.S. Cl.** .....**61/48,** 94/27, 114/0.5 F

[51] **Int. Cl.**.....**E02b 3/06,** E02b 3/20

[58] **Field of Search** .....61/48, 67; 94/27, 94/13; 114/0.5 F; 9/11; 52/493

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Attorney—Hofgren, Wegner, Allen, Stellman & McCord

[57] **ABSTRACT**

A floating structure supported in water by floating pontoons and having a flat deck which can be used as a swim float and a plurality of floating dock sections interconnected to provide a floating dock are disclosed. The dock sections are interconnected by mating connectors having openings therethrough which slidably receive an elongated vertical rod secured to the bottom of a body of water on which the dock is floating. A rod-mating connector pair at each corner of a dock section prevents tipping of the dock section by unbalanced loads or the like while allowing for vertical motion of the dock.

6 Claims, 15 Drawing Figures

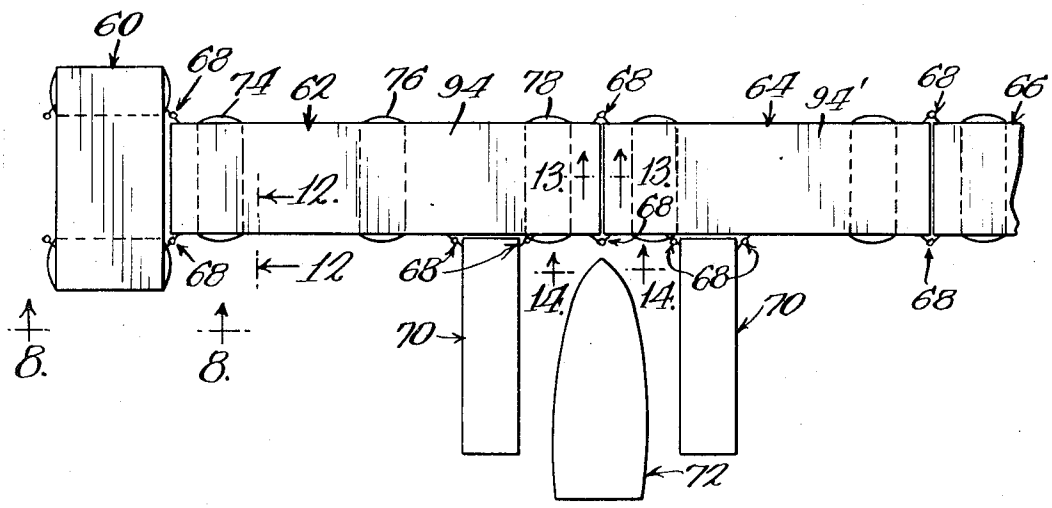


Fig. 1.

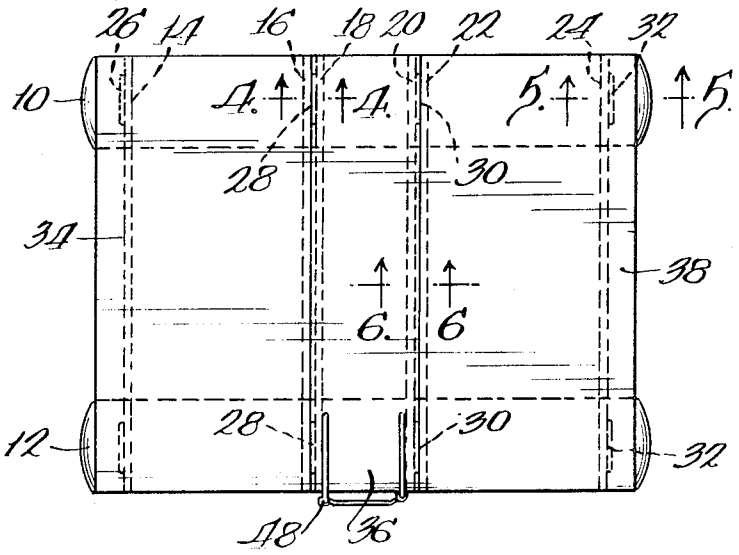


Fig. 2.

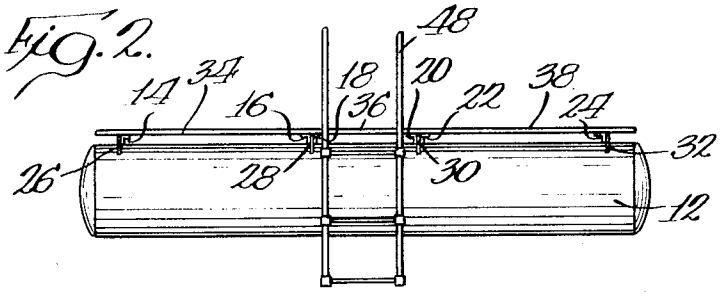
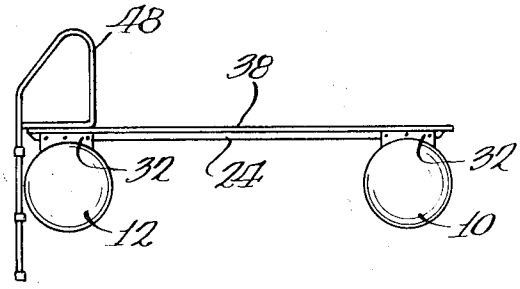


Fig. 3.



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Allen, Stellman & McCord Attys

Fig. 4.

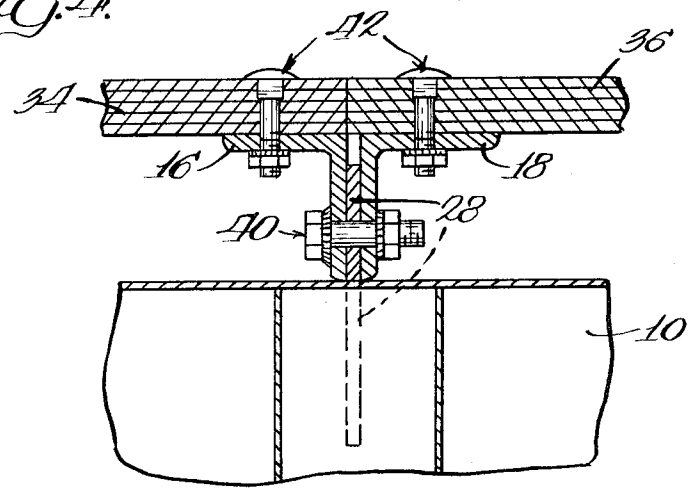


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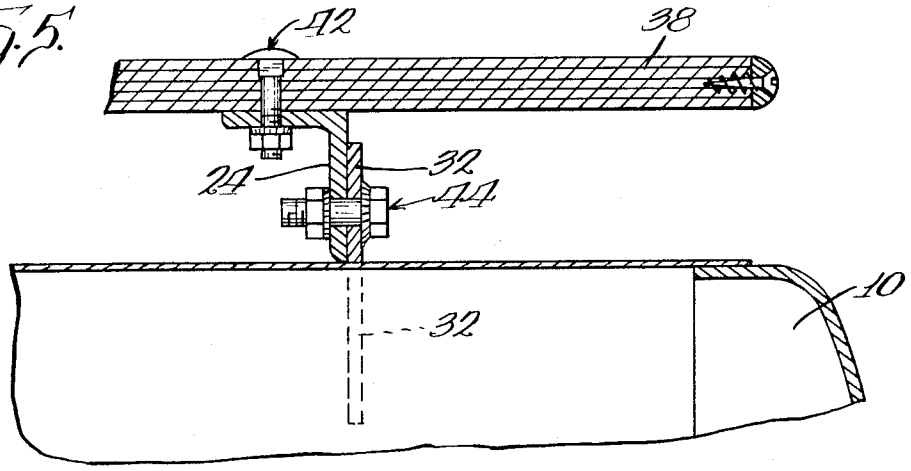


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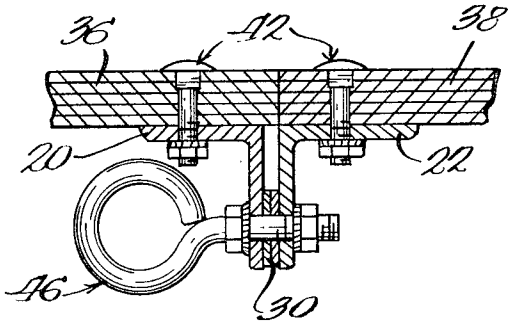
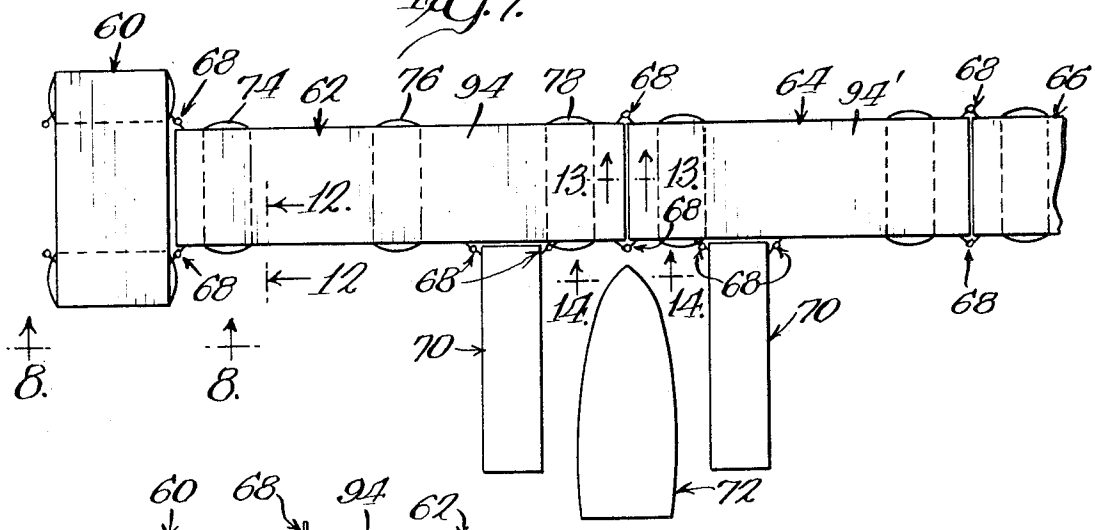


Fig. 7.



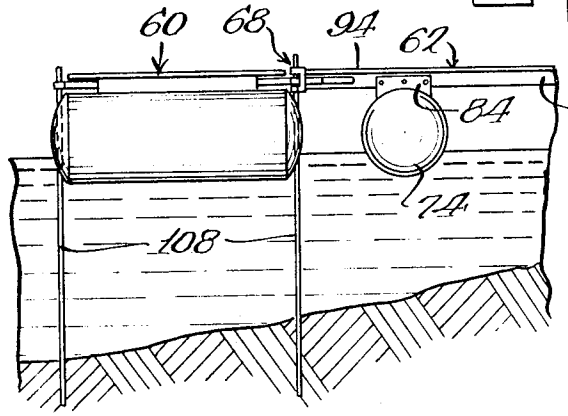
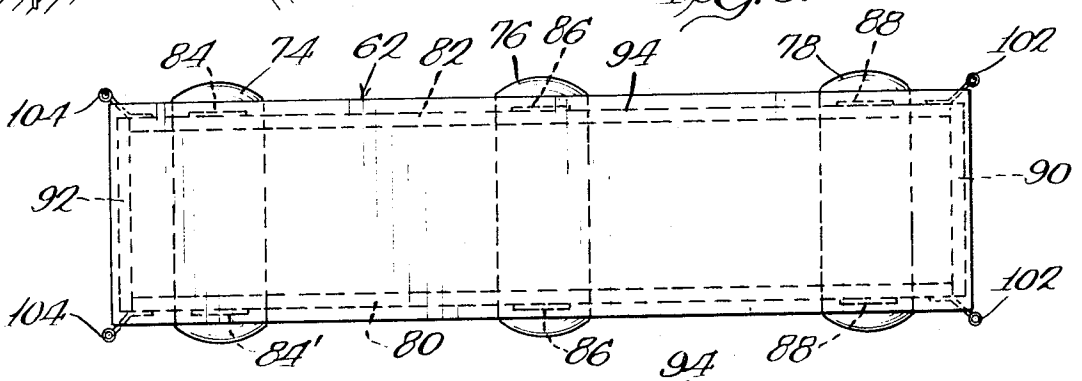


Fig. 8.

Fig. 9.



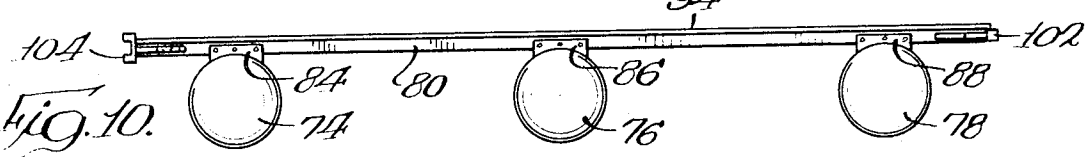


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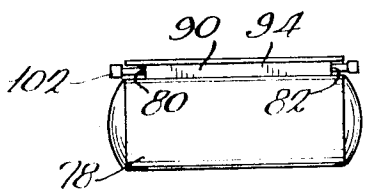


Fig. 11.

Fig. 12.

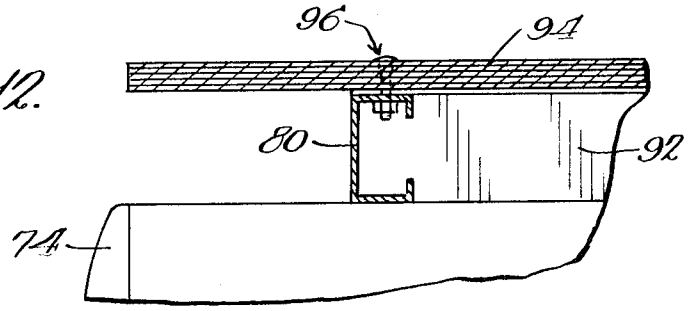


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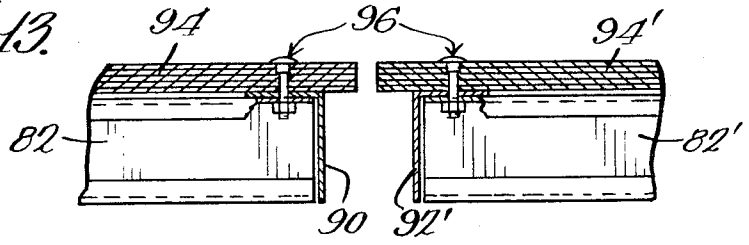


Fig. 14.

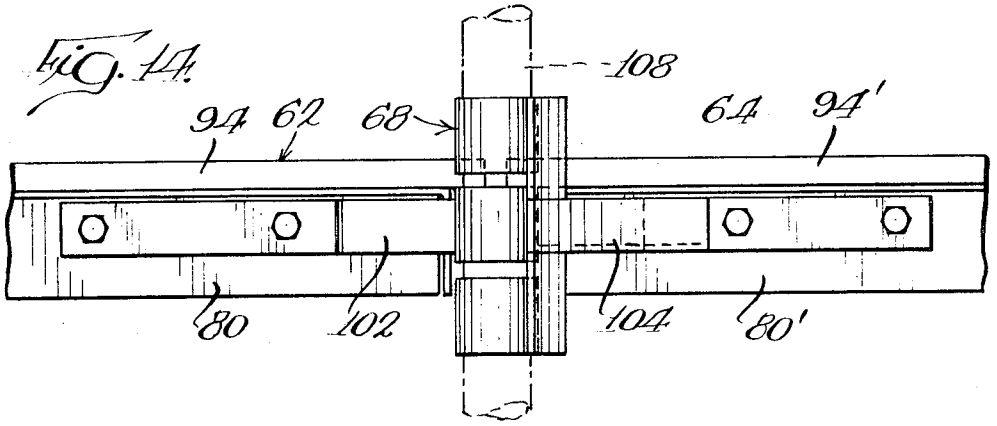
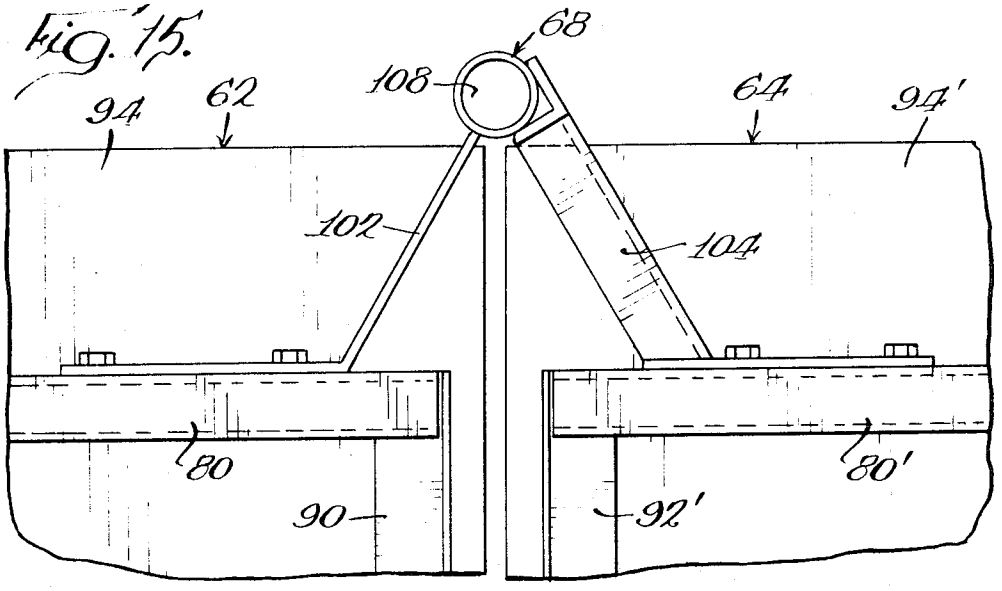


Fig. 15.



MODULAR DOCK FLOAT

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to structures having a flat deck supported by floating pontoons and in particular to a plurality of such structures which may be interchangeably connected to one another to make a dock and to a connecting means therefor.

2. Description of the Prior Art

In conventional pontoon supported structures manufacture thereof may be difficult and expensive. An example of this type of structure is a swim float which employs oil drums having a deck thereover on a supporting frame. Such a construction has proved heavy and clumsy.

Also, the joining of two or more floating structures together in order to form a dock is complicated by the narrow choice of the possible connection configurations that are available. Because of this, most dock section connections would have to be made so that all the sections would have their axes along the same lime. This is due to the fact that the means of connection were located only on certain sides of the structure thereby dictating that those sides be the ones which are connected. Further, a problem often encountered in floating docks is a tendency for the dock to tip under unbalanced loads or because of wave action of the water on which it floats.

SUMMARY OF THE INVENTION

The principal object of the present invention is to provide a pontoon supported water floatable structure which is simple and easy to manufacture.

The floating structure has a plurality of elongated pontoons over which a plurality of elongated support means are transversely secured. A flat deck is supported over the pontoons on the support means.

In one embodiment of the invention the flat deck is made up of three separate deck sections which are supported by a plurality of angle beams. The deck sections are secured to the angle beams which are in turn secured to the pontoons. The deck sections are held together by connecting the angle beams to one another. The structure so described also includes a ladder and means from which an anchor line may be secured.

Another embodiment of the invention contemplates the employment of a plurality of interchangeably connected floatable dock sections for use as a dock. Each dock is made up of a plurality of modular dock sections having means for connecting adjacent dock sections and for securing the dock in a substantially horizontally fixed relation to the bottom of the body of water in which the structure is floating.

The connectors may be located on any side of the dock sections and have an axis perpendicular to the plane of the deck. A vertically disposed rod is used for securing the connectors together while at the same time being secured in the water bottom. The connectors are so placed on the different dock sections so that any side of an adjacent dock section may be connected thereto.

An important feature of this embodiment of the invention is that the connectors of adjacent dock sections are mated to prevent relative vertical motion therebetween and have openings aligned along a common axis through which a portion of a rod extends to secure the connectors together thereby preventing motion of the dock section along the surface of the water while allowing joint motion of the connectors along the length of the rod.

The problem of tipping or pivotal motion of the dock is overcome in a novel manner by providing such a connector-rod combination at each corner of the dock sections. When the dock is so secured, each corner of the dock is restrained to move only in a vertical direction parallel to every other corner or side, and thus, the dock, while still being able to rise and fall with the tide or waves, may not pivot or tip.

Also there may be included in the above mentioned embodiment other dock sections extending transversely outwardly from the main dock body to provide a lateral stability to a boat secured to the dock.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a plan view of a floating structure employed as a swim float;

FIG. 2 is a side elevational view of the swim float of FIG. 1;

FIG. 3 is a side elevational view of the swim float shown in FIG. 2;

FIG. 4 is a vertical section of the swim float taken generally along the line 4—4 of FIG. 1;

FIG. 5 is a vertical section of the swim float taken generally along the line 5—5 of FIG. 1;

FIG. 6 is a vertical section of the swim float taken generally along the line 6—6 of FIG. 1;

FIG. 7 is a fragmentary plan view of a floating dock made according to the invention;

FIG. 8 is an enlarged side elevational section of the floating dock taken generally along the line 8—8 of FIG. 7;

FIG. 9 is a plan view of one of the dock sections employed in FIG. 1;

FIG. 10 is a side elevational view of FIG. 9;

FIG. 11 is a side elevational view of the dock section of FIG. 10;

FIG. 12 is a vertical section of the floating dock taken generally along line 12—12 of FIG. 7;

FIG. 13 is a vertical section of the floating dock taken generally along the line 13—13 of FIG. 7;

FIG. 14 is an enlarged vertical section of the floating dock taken generally along the line 14—14 of FIG. 7 and showing a side elevational view of pair of mating connectors; and

FIG. 15 is a plan view of the connectors shown in FIG. 14.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Turning initially to FIGS. 1–3, there is shown a floating structure suitable for use as a swim float. The structure includes a pair of elongated pontoons 10 and 12 disposed in parallel relation to one another over which six stringers 14, 16, 18, 20, 22 and 24 are transversely secured. The stringers 14, 16, 18, 20, 22 and 24 are steel angle beams. Stringers 14 and 24 run transversely across pontoons 10 and 12 at the opposite ends thereof. Stringers 16 and 18 and stringers 20 and 22 are each joined together respectively to comprise two members running transversely across the pontoons 10 and 12 in-

termediate stringers 14 and 24. The stringers are secured to the pontoons 10 and 12 by means of four pairs of steel plate pontoon brackets 26, 28, 30 and 32. Brackets 26 are secured to the end portions of stringer 14; brackets 28 are secured to and between the end portions of stringers 16 and 18; brackets 30 are secured to and between the end portions of stringers 20 and 22; and brackets 32 are secured to the end portions of stringer 24.

Three flat wooden deck sections 34, 36 and 38 comprising a flat deck are supported over the pontoons 10 and 12 on the stringers. More specifically, one end deck section 34 is supported on stringers 14 and 16; the middle deck section 36 is supported on stringers 18 and 20; and the other end deck section 38 is supported on stringers 22 and 24.

Exemplary connections between the stringers and the pontoons and deck sections are shown in FIG. 4 and FIG. 5. In FIG. 4 it can be seen that angle beams 16 and 18 are sandwiched about pontoon bracket 28 and fastened together by suitable nut and bolt means generally designated 40. The angle beams 16 and 18 are secured to the deck sections 34 and 36 by other suitable nut and bolt means generally designed 42. FIG. 5 shows the same kind of connections as in FIG. 4 except that nut and bolt means generally designated 44 fasten stringer 24 and pontoon bracket 32 together. The nut and bolt means 42 shown in FIG. 4 are that used to secure stringer 24 to deck section 38.

FIG. 6 shows the addition of an eye bolt 46 through stringers 20 and 22 to which a line may be attached. At the end of this line suitable anchoring means (not shown) are secured in order to anchor the swim float.

A ladder 48 is provided so that easy access may be effected between the water and the deck of the swim float. The ladder is supported in this embodiment on deck section 36.

Another embodiment of the invention is illustrated in FIGS. 7–15 and is seen to comprise a plurality of floatable dock sections, like parts which have been given the same reference numeral followed by a prime, which are generally designated 60, 62, 64 and 66. The dock sections are connected to one another by means of a plurality of connectors generally designated 68. Floatable slips generally designated 70 may be connected to the dock by means of connector 68 extending outwardly therefrom so that a small boat 72 may be safely secured to the dock. As can be seen, each of the dock sections may be of a different size, yet interchangeable with one another.

Turning now to FIGS. 8, 9, 10 and 11, dock section 62 will be described in greater particularity keeping in mind that all dock sections are built in the same manner as will be described in greater detail hereinafter. Dock section 62 represents a 4 × 16 foot dock section having three pontoons 74, 76 and 78. Transversely extending over the pontoons are two stringers 80 and 82 (see FIGS. 10 and 11). Each stringer is a channel beam which is secured to the pontoons 74, 76 and 78 by means of three pairs of steel plate pontoon brackets 84, 86 and 88 respectively.

Provided at each of the ends of the stringers 80 and 82 is a pair of angle beams or stiffeners 90 and 92 (see FIGS. 10 and 11) which, when joined to the ends of the stringers 80 and 82 form a rectangular box structure. This structure supports the deck 94. The deck 94 may be a one-piece wooden platform or, as the circumstances may dictate, may comprise a plurality of connected pieces of wood or any other suitable material. The deck 94 may be secured to the stringers 80 and 82 and stiffeners 90 and 92 by suitable bolt means generally designated 96 (see FIGS. 12 and 13).

FIGS. 14 and 15 are a detailed illustration of the connecting means 68 which are seen to comprise two mating connectors 102 and 104 respectively secured to adjacent channel stringers 80 and 80′ and extending outwardly therefrom. Connector 102 has at its end a formed single ring. Connector 104 has formed at its end a pair of rings adapted to engage the ring of connector 102 in a sandwich-like configuration when in a mating relation, as shown in FIGS. 14 and 15. When connectors 102 and 104 are so positioned, the vertical axes of the rings coincide, as can be seen in FIG. 15. Received through the openings of the rings while the connectors 102 and 104 are in mating relation, is an upper or first portion of a rod 108 which securely joins the connectors together, while a lower or first portion is securely embedded in the bottom of the body of water in which the dock is floating (see FIG. 2). By being secured in the water bottom, the rod 108 restrains from the dock moving along the surface of the water thereby anchoring the dock while allowing for vertical movement of the connected dock sections along the rods as the dock rises and falls with the waves or other undulation of the body of water.

The connectors 102 and 104 may be placed on the stringers of adjacent dock sections, as shown in FIG. 7, between dock section 60 and dock section 62 so that any two adjacent dock sections need not be in the same relationship as any other two. Accordingly, dock section 60 shown in FIG. 7 is seen to provide a suitable end to the dock by being secured to dock section 62 at the end thereof in a transverse manner.

We claim:

1. In a floatable modular dock having a plurality of interconnected adjacent dock sections for floatation of a body of water having a bottom,

means for interconnecting adjacent dock sections, comprising:

first and second mating connectors for mounting to first and second adjacent dock sections, respectively, said first and second mating connectors having portions which interfit with each other when in mating relation to prevent relative vertical motion between the adjacent dock sections to which they are connected; and

an elongated rigid member of sufficient length for having a portion for embedment in the bottom and another portion extending vertically therefrom to slidably engage both of the first and second mating connectors when in mating relation at a point spaced laterally from both adjacent dock sections, said other portion of the rigid member when slidably engaged with both of the mating connectors, securing them together in mating relation and restraining the adjacent dock sections to which they are connected from motion along the surface of the water while allowing vertical motion of both connected adjacent dock sections along the length of the member.

2. The dock section connecting means of claim 1 in which the interfitting portions of each of said first and second mating connectors has mating means, the mating means of said first connector interfitting with the mating means at said second connector and each of said mating means having an opening therethrough with an axis perpendicular to the dock section which is aligned with the opening at each of the other mating means when the first and second connectors are in mating relation for concurrently receiving said other portion of the elongated member to secure together the mating connectors.

3. In a floatable modular dock having

a plurality of interconnected adjacent dock sections for floatation on a body of water having a bottom,

means for interconnecting adjacent dock sections, comprising:

mating connectors on adjacent dock sections, each set of said mating connectors including

a first portion secured to a dock section and extending outwardly from a side thereof,

a second portion secured to an adjacent dock section and extending outwardly from a side thereof,

a pair of rings at the end of the first extending portion and having a space therebetween,

a third ring at the end of the second extending portion, said third ring being receivable in the space between the pair of rings when the connectors are brought into mating relation whereby vertical axes of all three rings coincide, the mating relation of said three rings preventing relative motion of the adjacent connected dock sections along said coincident axes, and

an elongated rigid member for both securing together the mating connectors and for restraining the connected dock sections from motion along the surface of the water while allowing motion of the mating connectors secured thereby along the length thereof.

4. The dock of claim 3 wherein said elongated member includes a rod having one portion received through all three rings to join the connectors and another portion for being embedded in the bottom to secure the dock sections to the bottom while allowing for vertical movement of said dock sections with respect thereto.

5. In a floatable rigid dock having a plurality of sides respectively meeting at a corresponding number of corners, means to secure the dock for preventing pivotal motion thereof, comprising:

connector means located adjacent each corner and secured to the dock, each connector having an axis substantially perpendicular to the dock; and

an elongated member associated with each connector having a first portion secured to the bottom of a body of water in which the dock is floating and a second portion extending along said axis, each connector being slidably secured to its associated elongated member portion for only vertical motion along the length thereof thereby restraining each side of the dock from other than parallel vertical motion and including means for mating in interfitting relation with a like connector means of another dock for securing the docks together to a common elongated member.

6. In a floatable rigid dock having a plurality of sides respectively meeting at a corresponding number of corners, means to secure the dock for preventing pivotal motion thereof, comprising:

connector means located adjacent each corner and secured to the dock, each connector having an axis substantially perpendicular to the dock; and

an elongated member associated with each connector having a first portion secured to the bottom of a body of water in which the dock is floating and a second portion extending along said axis, each connector being slidably secured to its associated elongated member portion for only vertical motion along the length thereof thereby restraining each side of the dock from other than parallel vertical motion and adapted to mate with a like connector means of an adjacent dock for securing the docks together to a common elongated member, one of said connector means having first and second spaced members for slidably engaging said vertical member and the other connector means having a third member for slidably engaging said vertical member and disposed between said first and second spaced members when said connector means are in mating relation, said mating relation of said three members preventing relative vertical motion between said adjacent connected dock sections along said vertical member.

* * * * *