United States Patent

[11] 3,603,276

[72] Inventor **Gaston A. De Lisle**
Encino, Calif.

[21] Appl. No **843,078**
[22] Filed **July 18, 1969**
[45] Patented **Sept. 7, 1971**

[73] Assignee **Gaston A. De Lisle**
as trustee under a Declaration of Trust
dated March 5, 1970

[54] **FLOTATION DOCKING FACILITY FOR SMALL CRAFT**
15 Claims, 5 Drawing Figs.

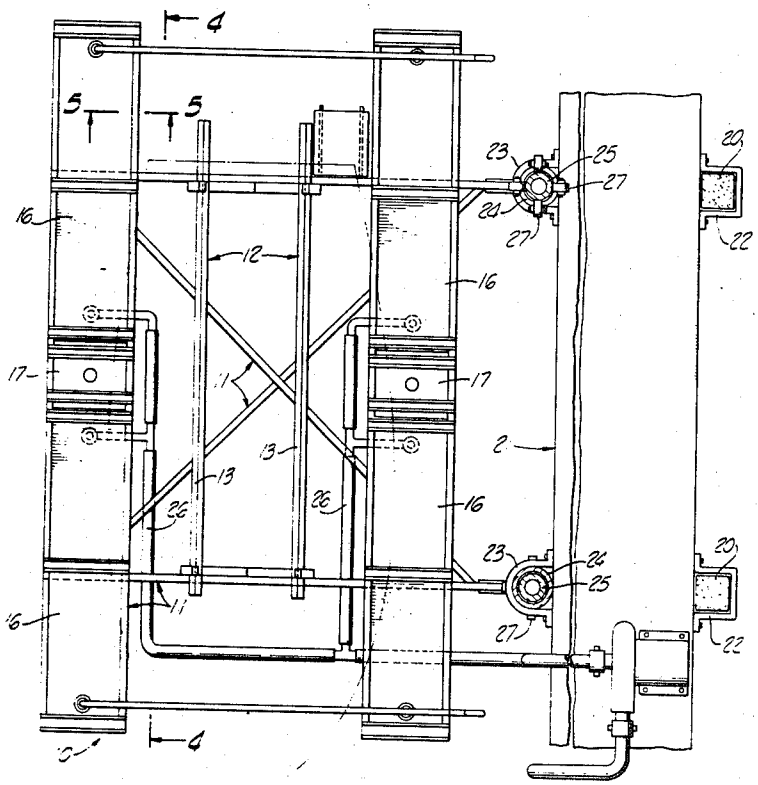
[52] **U.S. Cl.** **114/45,** 114/0.5
[51] **Int. Cl.** **B63c 1/02,** B63b 35/00
[50] **Field of Search** ..... 9/1; 114/0.5, 0.5 BD, 45, 48; 61/46.5

[56] **References Cited**
UNITED STATES PATENTS

2,576,928	12/1951	Engstrand	114/45
3,276,211	10/1966	Drake	114/45

Primary Examiner—Trygve M. Blix
Attorney—Sellers & Brace

ABSTRACT: A flotation docking facility for marinecraft slidable vertically of suitable bracket means with rise and fall of the tide and including pontoon-supported cradle means for lifting small craft clear of the water when the craft is not in use. The facility includes adjustable buoyancy means compensating for the weight of the docking facility and effective to support the latter submerged at a level intermediate the seabed and the underside of the hull.



PATENTED SEP 7 1971

3,603,276

SHEET 1 OF 2

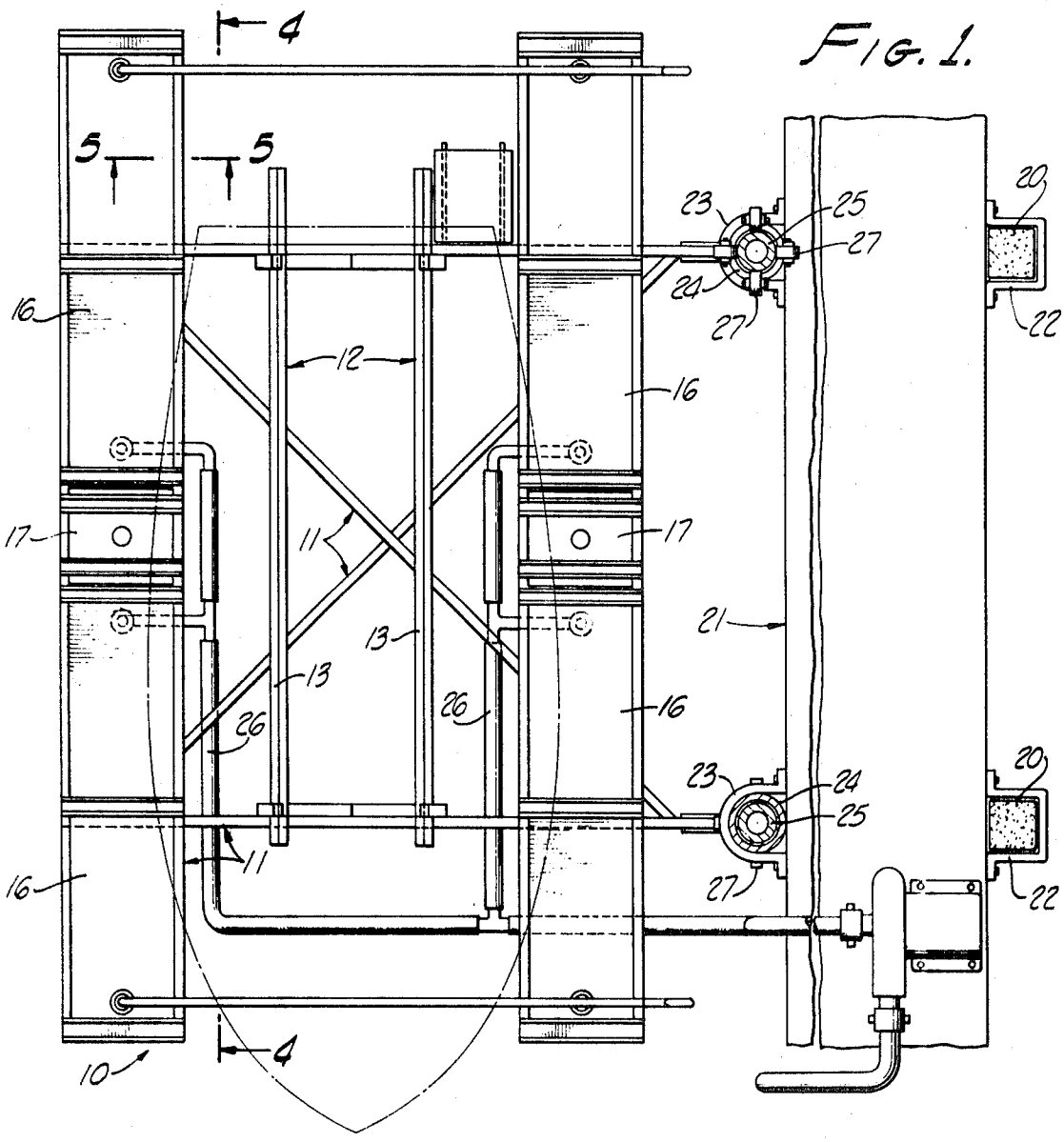


FIG. 1.

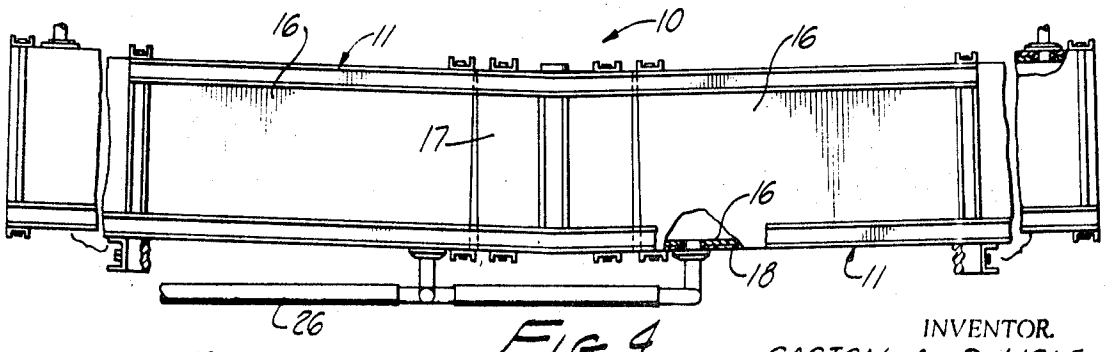


FIG. 4.

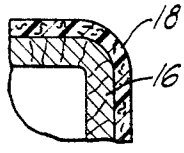


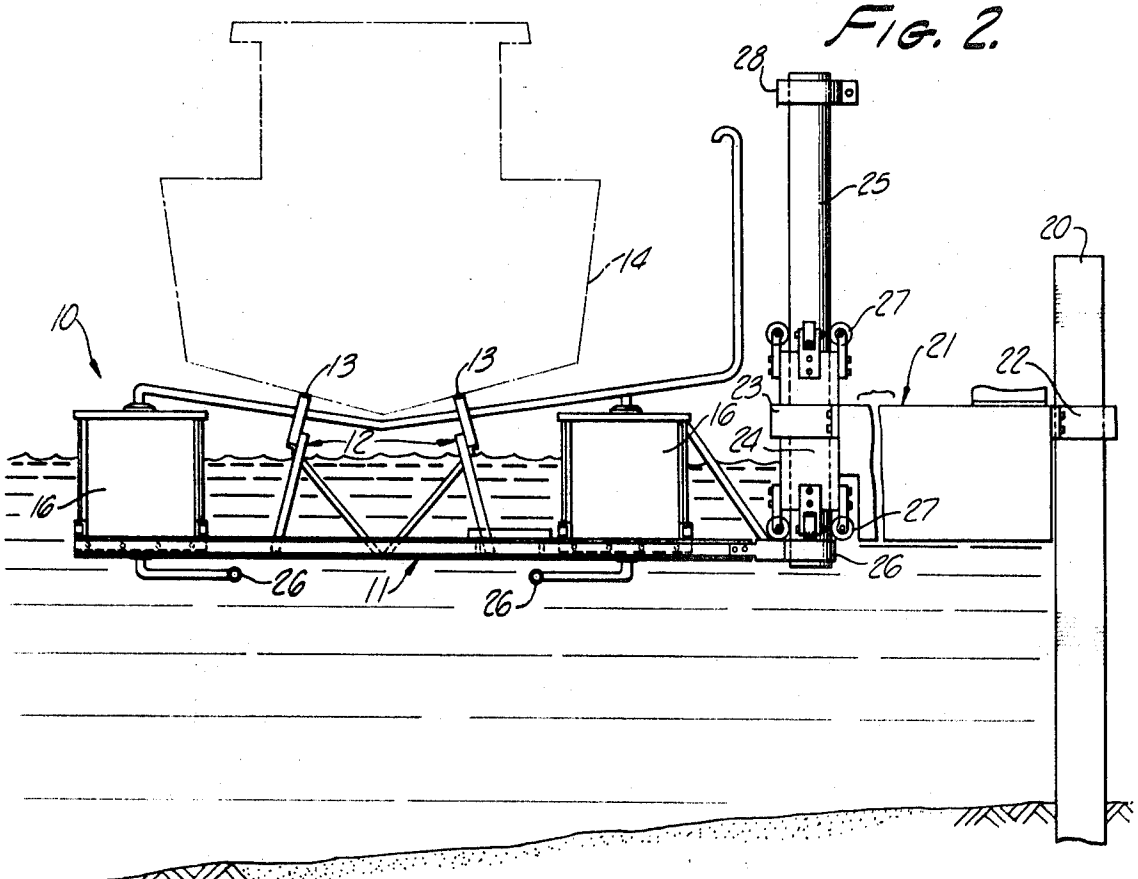
FIG. 5.

INVENTOR.
GASTON A. DeLISLE

BY

ATTORNEYS

FIG. 2.



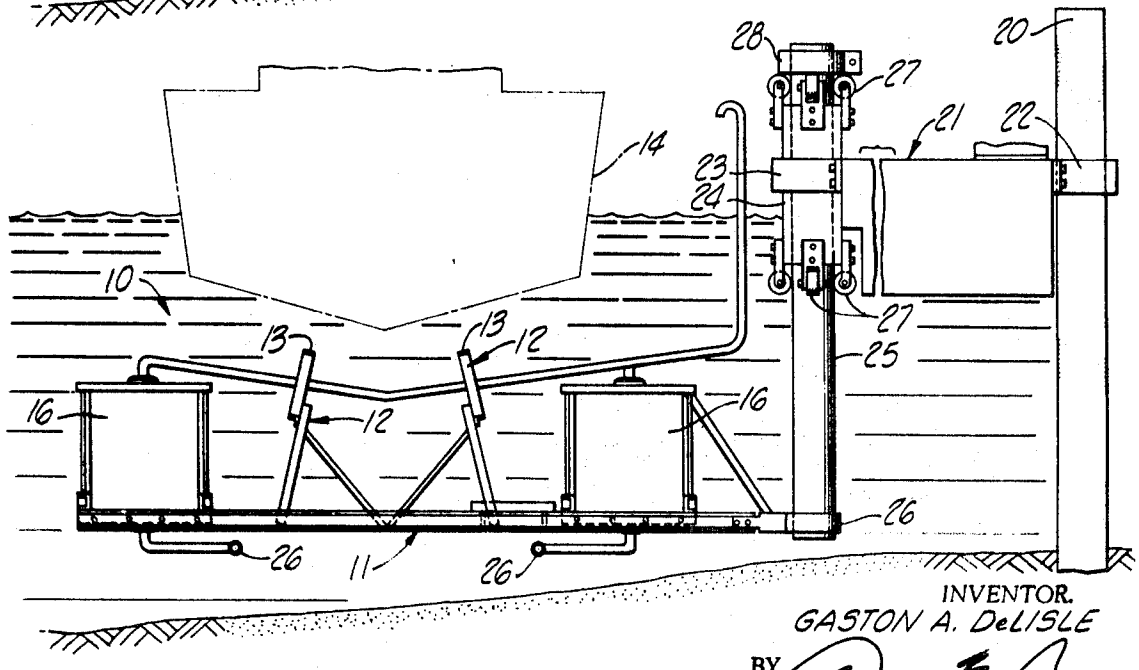


FIG. 3.

INVENTOR.
GASTON A. DeLISLE

BY

ATTORNEYS

FLOTATION DOCKING FACILITY FOR SMALL CRAFT

This invention relates to drydocks and more particularly to an improved flotation docking facility for use in supporting marinecraft out of contact with the water when the craft is not in use and readily submergible to a position free of the craft at other times.

The use of marinecraft in many bodies of water and more particularly sea water is attended by the vexatious accumulation of various types of plant and marine growth on submerged portions of the hull. Such accumulations impair the operation of the craft, are highly injurious thereto, and are difficult to remove. Owners resort to various expedients for withdrawing the boat from the water between periods of use but this is a laborious operation requiring expensive equipment and suitable storage space on shore or on a dock. Personnel and considerable power is required to operate the boat handling equipment.

It has also been proposed to provide drydocking equipment pivotally connected alongside a suitable mooring device. When not in use to support the boat, the drydocking facility is filled with water and pivots to a submerged position against the seabed and is subjected to buffeting by the turbulent water conditions prevalent along the shore areas due to tidal currents, wave action, swells, and the like. This buffeting can cause serious damage to the facility in a short period of time. These hazards are particularly severe in the presence of rocks and submerged foreign bodies. Not infrequently, the water bed is highly irregular and sloping with the result that the submerged docking facility does not settle against a level surface and, in consequence, it is subjected to severe strains and twisting and these hazards have aggravated effect in the presence of rocks and turbulent water conditions.

It is therefore a primary object of the present invention to avoid the foregoing and other serious shortcomings of prior small craft docking facilities featuring a receiving cradle supported by pontoons connected with pump means and suitable valving operable in accordance with the principles of this invention. This docking facility is slidably supported for movement vertically along a permanent anchorage, such as tubular bracket means. The pontoons include sealed air chamber means the effective buoyancy of which is regulatable to barely compensate for the weight of the facility. As a consequence, it is impossible to overcharge the main ballast tanks so that the facility submerges to and remains at a depth clear of the underside of the hull but out of contact with underlying foreign objects or the seabed.

It is therefore a main object of the present invention to provide a simple, rugged, inexpensive floating drydock for small water craft operable to support such craft out of contact with the water when the craft is not in use and equipped with foolproof means for submerging the dock to a level intermediate the bottom of the craft and the seabed when the craft is in use.

Another object of the invention is the provision of an improved floating drydock for small water craft having main and auxiliary ballast tanks, the auxiliary tanks being normally filled with sufficient air to compensate for the weight of the facility when the main tanks are flooded thereby to support the facility submerged to a depth above and out of contact with underlying foreign objects and the seabed.

Another object of the invention is the provision of a floating drydock for small craft arranged for vertical movement by flotation between a submerged nonoperating position and an elevated position supporting a water craft out of contact with the water.

Another object of the invention is the provision of a submergible drydock for water craft having a simple motor driven pump equipped with readily operated means for pumping water into or out of the dock ballast tanks depending on whether the dock is being submerged or raised, and so arranged that continued operation of the pump for either purpose is ineffective to raise or submerge the dock beyond predetermined levels.

These and other more specific objects will appear upon reading the following specification and claims and upon considering in connection therewith the attached drawing to which they relate.

Referring now to the drawing in which a preferred embodiment of the invention is illustrated:

FIG. 1 is a top plan view of a preferred embodiment of the invention drydock facility;

FIG. 2 is an end elevational view showing the drydock activated to support a craft above the water level;

FIG. 3 is a view similar to FIG. 2 but showing the drydock submerged at a flotational level below the boat but above the seabed;

FIG. 4 is a vertical sectional view taken generally along line 4—4 on FIG. 1 with portions of the structure broken away to show structural details; and

FIG. 5 is a fragmentary cross-sectional view on an enlarged scale taken along line 5—5 on FIG. 1 showing the protective covering for the ballast tanks.

Referring to FIGS. 1 to 5, there is shown a preferred embodiment of the invention docking facility, designated generally 10, having a main frame 11 formed of structural iron welded together and coated with suitable corrosion resistant material, as galvanizing. Secured to main frame 11 is a boat cradle extending centrally and longitudinally thereof with protective stripping 13 applied to the upper edges of the cradle 12 opposite points of contact with a boat hull 14. Enclosed within rectangular cubicles forming part of the opposite lateral sides of main frame 11 are pairs of main ballast tanks 16, 16 here shown as separated between their adjacent ends by an auxiliary tank 17. Each of these tanks is preferably coated with a suitable protective covering 18 of shock absorbing and corrosion resistant material immune to attack by salt water. Epoxy resins and various other plastic coating compositions, well known in the protective coating art are excellent and may be employed. If desired, this coating material may also cover the components of main frame 11.

The means for maintaining the drydock facility 10 moored preferably comprises a plurality of vertical anchorages such as two or more reinforced concrete piles 20. As here shown, these piles are also employed to moor the floating dock 21. Dock 21 is provided with strong bands or loops 22 anchored to the side of the dock and having a loose sliding fit about the exterior of the piles. As herein shown by way of example, drydock facility 10 is also provided with one or more similar retainer loops 23 encircling and rigidly clamping therein a guide tube 24 loosely seating a tube 25, having its lower end rigidly secured to main frame 11 at 26. The upper and lower ends of guide tube 24 are preferably equipped with antifriction rollers 27. These rollers engage a stop ring or other stop 28 fixed to the tops of tubes 25 to limit the submergence of facility 10. It is therefore evident that both dock 21 and drydock facility 10 are entirely flotation supported and moored to a common seat of telescopic guide bracket assemblies 23, 24 secured along one side of floating dock 21. Desirably, loops 22 include one or more rollers similar to rollers 27 suitably journaled in these loops for rolling contact vertically along the opposed faces of piles 20.

Main ballast tanks 16 are controlled by a suitable power driven water pump unit 25 located on dock 21 and having a flexible hose connection 26 extending to each of the main tanks. A second flexible hose 27 is suitably and captively supported with one end submerged in the water beside dock 21. Each of the hoses 26, 27 is provided with a suitable quick-disconnect coupling 28, 29 adapted for quick connection to either the pump inlet 30 or the pump outlet 31. As shown in FIG. 1, hose 26 is connected to the inlet and hose 27 is connected to the pump outlet. Accordingly, operation of the motor pump unit is effective to pump water from the ballast tank and discharge it back into the lake or ocean. The removal of water from the tanks results in raising the drydock and any craft supported on cradle 12. If the hose couplings are connected in the opposite mode, then the operation of the pump operates to fill the tanks with water, causing the drydock to

submerge, thereby lowering the water craft supported on the cradle into the water.

Referring to FIGS. 1 and 2, it is pointed out that each of tanks 16 is provided with an air vent comprising conduit 35 having a vertically extending outlet 36 in communication with the atmosphere at its upper end. When the tanks are fully filled with water any excess water will overflow through vents 35, 36. During removal of water from the tanks by the pump, the air vent functions to admit air back into the tanks, its inlet being at all times substantially above the water level, as is made clear by FIG. 3.

From the foregoing it will be apparent that continued operation of pump 25 cannot lead to any harm. This is because during filling of the tanks with water, any excess water escapes to the atmosphere through the vent pipes 35, 36. This avoids possibility of the drydock submerging to an undesirably low level likely to risk contact of the drydock with underground foreign objects or with the sea bed.

As has been explained, trimming of the drydock to limit its submerged level is accomplished by varying the amount of water present in auxiliary tanks 17. If the weight of the drydock should change at any time or if it is desired that its fully submerged level be altered, it is merely necessary to adjust the amount of water present in the auxiliary tanks 17. This having been done, the pump is operated until water overflows from the vent pipes thereby advising the operator that the drydock is fully submerged to its intended lower level. Likewise, raising of the drydock is limited by the capacity of ballast tanks 16. The pump is operated until all water ballast has been fully removed whereupon the dock rises to the preselected level wherein the hull of the craft is supported at a safe level out of contact with the water.

While the particular flotation docking facility for small craft herein shown and disclosed in detail is fully capable of attaining the objects and providing the advantages hereinbefore stated, it is to be understood that it is merely illustrative of the presently preferred embodiment of the invention and that no limitations are intended to the details of the construction or design herein shown.

I claim:

1. A flotation docking facility for supporting marinecraft out of the water when not in use, said docking facility comprising elongated boat supporting cradle means, pontoon means secured to and extending along either side of said cradle means having a generally horizontal upper surface at a level below the upper level of said cradle means whereby a boat may maneuver into and out of position on said cradle means from the side thereof while the latter is submerged slightly below the underside of the boat, a plurality of upright guide means carried by and spaced from one another along one side of said pontoon means, means carried by said pontoon means and having a loose sliding fit with each of said guide means and holding said pontoon means captive while permitting the same to rise and fall vertically along the length of said guide means between a depressed position clear of the underside of a boat hull and an elevated position effective to support a boat seated in said cradle means out of contact with the water, and pump-controlled means for regulating the quantity of water in said pontoon means and cooperating therewith to control the position of said pontoon means over the operating range thereof.

2. A docking facility as defined in claim 1 characterized in that the generally horizontal surfaces of said pontoon means are positioned to provide walkways along either side of a boat supported on said cradle means and lying above the water when the boat is raised and conveniently arranged for use by persons entering and leaving the boat.

3. A docking facility as defined in claim 1 characterized in that said pontoon means includes a plurality of compartments including at least one watertight compartment normally disconnected from said pump means and sized to be filled with sufficient air to compensate for the weight of said facility when the remainder of said compartments are filled and whereby said facility is submerged at a level wherein said cradle means is out of contact with the bottom of a boat hull.

4. A docking facility as defined in claim 1 characterized in that said pontoon means includes adjustable ballast means regulatable to compensate for the unsupported weight of said facility whereby said pump-controlled means can be operated until the water storage space within said pontoon means normally controlled by said pump controlled means is filled with water without risk of submerging said facility sufficiently to contact the seabed and submerged objects to avoid striking against rocks and the like submerged foreign bodies.

5. A docking facility as defined in claim 4 characterized in that said guide means are arranged in a row along one side of said facility, and floating dock means disposed along the remote side of said guide means from said docking facility and including means holding said floating dock means loosely and slidably captive to said guide means for rise and fall therealong with tidal changes.

6. A docking facility as defined in claim 4 characterized in that said adjustable ballast means comprises separate air chamber means centrally of the pontoon means aLong either side of said cradle means chargeable with a variable quantity of water as necessary to adjust the effective buoyancy thereof to compensate for the submerged weight of said docking facility.

7. A docking facility as defined in claim 1 characterized in the provision of adjustable ballast means cooperating with said pontoon means and effective when the latter are filled with water to support said docking facility at a submerged level wherein said cradle is below the hull of an overlying floating boat and substantially out of contact with the sea bed.

8. A docking facility as defined in claim 1 characterized in that said pump-controlled means includes a unidirectional pump having an inlet and an outlet, and means for quickly reversing the flow of water between said pump and said pontoon means.

9. A docking facility as defined in claim 8 characterized in that said means for reversing the flow of water comprises similar fast-action coupling means selectively securable to the inlet and to the outlet of said pump depending upon whether the user wishes to pump water into or out of said pontoon means.

10. A docking facility as defined in claim 5 characterized in that said means holding said floating dock means loosely captive to said guide means includes rollers rotatably mounted thereon for rolling movement vertically of the guide means as the tide rises and falls.

11. A docking facility as defined in claim 1 characterized in that each of said pontoon means have bottoms converging downwardly toward a low point intermediate the opposite ends thereof, partition means extending crosswise of the interior of said pontoons near said low points of said bottoms to prevent water from flowing freely from end to end of said pontoon means in response to irregular and nonlevel movement of said docking facility, and power driven pump means for withdrawing water simultaneously from each of the low points in said pontoon means.

12. A docking facility as defined in claim 11 characterized in that said partition means includes ballast tank means located between a pontoon chamber to either side thereof and the bottoms of which chambers converge downwardly toward one another, and said pump means being operable to pump water into and out of the lower adjacent ends of pontoon chambers.

13. A docking facility as defined in claim 12 characterized in that said pump means is a unidirectional centrifugal pump having an inlet and an outlet provided with couplings usable selectively to couple the bottoms of said pontoon chambers to the outlet or the inlet thereof.

14. A flotation docking facility for supporting small pleasure craft above water level when not in use and adapted for location alongside crowded docks lacking access to said flotation facility from its opposite ends, said flotation facility com-

prising: boat supporting cradle means, long pontoon means secured to and extending along either lateral side of said cradle means having adequate flotation capability to support a small boat located in said cradle means above water level, said pontoon means having bottom means converging downwardly from the opposite ends thereof toward water inlet and outlet means, and means effective to prevent rapid transfer of water between the opposite ends of said pontoon means.

15. A docking facility as defined in claim 14 characterized in the provision of centrifugal pump means having means for quickly selectively coupling the inlet or the outlet thereof to the lower midportion of the downwardly converging bottom means of said pontoon means.