

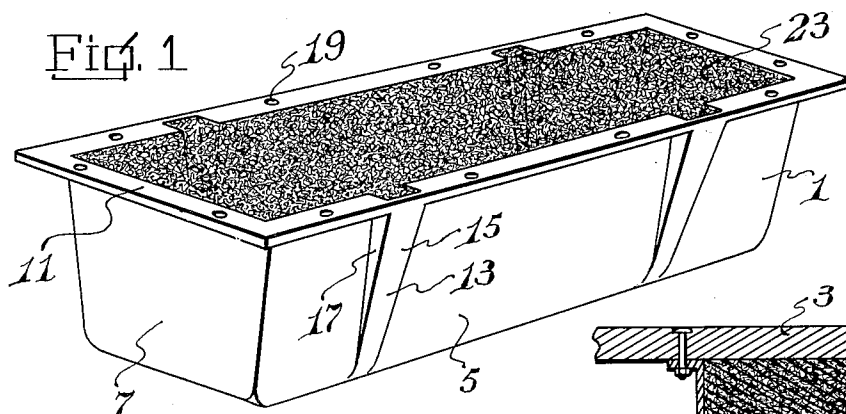
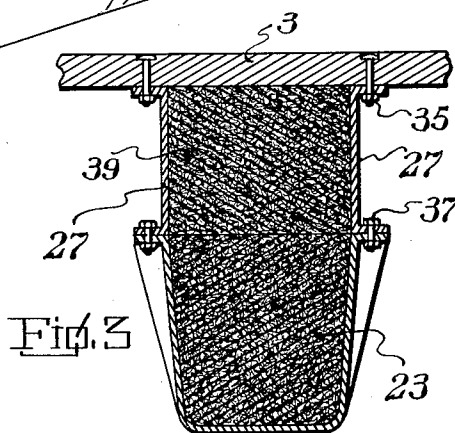
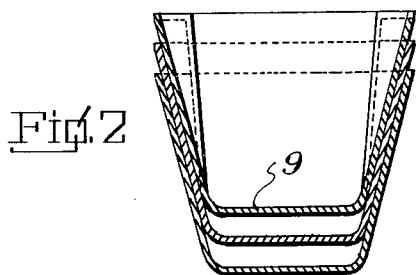
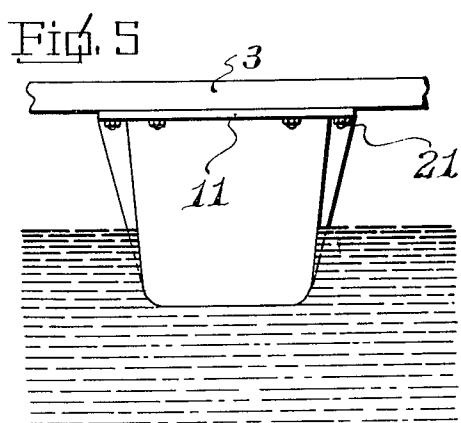
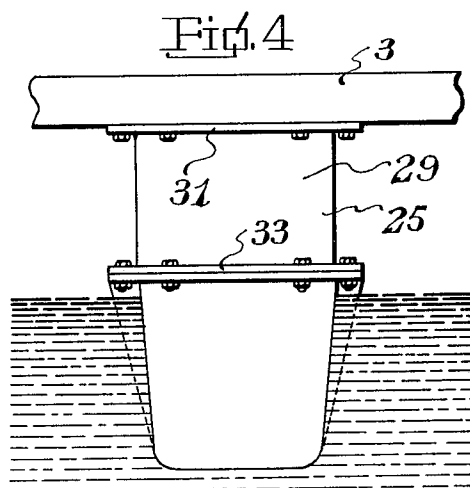
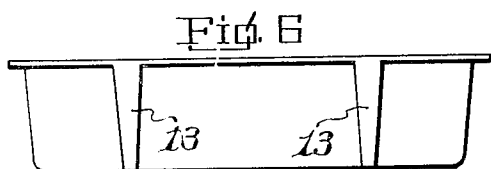
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AQUATIC FLOAT AND ASSEMBLY

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AQUATIC FLOAT AND ASSEMBLY

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1 Claim. (Cl. 9-11)

The present invention relates to aquatic floats and assemblies, of the type designed to support members on water by virtue of the buoyancy of the floats. Aquatic floats according to the present invention can be used to support assemblies comprising piers, decks, platforms, docks, boats, rafts, and other members used as aquatic devices.

An object of the present invention is the provision of an aquatic float which will be light in weight but leakproof.

Another object of the present invention is the provision of an aquatic float the size and buoyancy of which can be regulated at will.

Finally, it is an object of the present invention to provide an aquatic float and assembly that will be relatively simple and inexpensive to manufacture, easy to assemble, disassemble, maintain and repair, and rugged and durable in use.

Other objects and advantages of the present invention will become apparent from a consideration of the following description, taken in connection with the accompanying drawing, in which:

FIGURE 1 is a perspective view of an aquatic float according to the present invention;

FIGURE 2 is a view in cross section of a plurality of shells for aquatic floats stacked during an intermediate stage of manufacture;

FIGURE 3 is a cross-sectional view of an assembly of an aquatic float according to the present invention and a member to be supported thereby;

FIGURE 4 is an elevational view of the structure of FIGURE 3 in the water;

FIGURE 5 is a view similar to FIGURE 4 but showing an assembly according to the present invention when less buoyancy is needed; and

FIGURE 6 is a side elevational view of the float in FIGURE 1.

Referring now to the drawing in greater detail, there is shown an aquatic float indicated at 1, adapted to be releasably secured to the underside of a member 3 to be supported on water, such as any of the various members described above. Preferably, the lateral extent of the underside of member 3 is substantially greater than the lateral extent of the upper side of float 1.

Float 1 is comprised of a pair of opposite generally upright sidewalls 5 and a pair of opposite generally upright end walls 7 and a generally horizontal bottom 9. The top of float 1 is open and the upper edges of side and end walls 5 and 7 are provided with an outwardly extending generally horizontal uniplanar flange 11. Sidewalls 5 of float 1 are also provided with outwardly extending hollow ribs 13 having outer sidewalls 15 that diverge upwardly from sidewalls 5 proper of float 1, so that flange 11 at the top of sidewalls 15 of ribs 13 is substantially narrower than elsewhere. Connecting sidewalls 17 interconnect sidewalls 15 with sidewalls 5 proper. A plurality of openings 19 are formed through flange 11 for the reception of fasteners 21 by which float 1 is releasably secured to the underside of member 3, with member 3 closing the open upper end of float 1.

Float 1 is filled with plastic foam which is in solid state as distinguished from liquid state. It should be noted that foam 23 extends up to the top of float 1 and is flush with the upper surface of flange 11.

Foam 23 may take any of a variety of forms. A preferred form, however, is an expanded cellular polystyrene

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foam, for example, that which is sold by Dow Chemical Company under the trademark "Styrofoam." However, other plastic foams may be used. Included in the term "plastic foam" is sponge rubber. The foam should be waterproof and self-supporting. It can be rigid or resilient, so long as it is in solid phase. Like all such foams, it comprises a solid latticework within which is entrapped a multiplicity of bubbles of gas, which can be an inert gas such as carbon dioxide, or air, or other gases useful in the expansion of plastic materials for the production of foam, either by chemical evolution of the gas or by mechanical entrainment.

During manufacture, the shells of float 1 are first formed as by pressing or stamping or the like, from any suitable material either metallic or plastic in nature. Suitable metals are aluminum and stainless steel and other non-corrosive metals or alloys. However, it is preferred that the shells of floats 1 be formed of plastic, which may be either polyethylene in the case of small inexpensive floats, or resin-impregnated glass fiber in the case of larger and stronger floats. For example, a very suitable material is glass fiber cloth or random-oriented glass fiber, impregnated with thermoset epoxy resin. Of course, other resins than epoxide may be used, such as polyesters and phenolics; but epoxide is preferred for its water resistance. The formation of a float 1, of course, comprises first the formation of the shell and then the filling of the shell with foam by any of the usual techniques for foam production.

FIGURE 5 shows the device of FIGURE 1 in use attached directly to the underside of a member 3 to be supported on water. It will be seen that the fasteners 21 secure flange 11 flat against the underside of member 3, and that member 3 extends outwardly a substantial distance on all sides of float 1. Member 3 also closes the open top of float 1, but the joint between float 1 and member 3 need not be watertight at all. Indeed, float 1 cannot leak, because there is no place for water to go. Despite the fact that float 1 is open at its top, the filling which is foam 23 prevents the entry of water into the interior of float 1, so that float 1 is a buoyant waterproof body that need only be loosely joined to the underside of the member it is to support. At the same time, there is no problem of manufacturing float 1, such as would be introduced were float 1 closed at its top in the manner of known constructions, for all that is necessary in order to produce float 1 is to form a pan-like receptacle and then fill it to its top with foam.

Another advantage of float 1 having an open top is that it can be attached to nonplanar surfaces. It is not necessary to attach it to flat uniplanar surfaces because flange 11 is relatively narrow, compared to the length and width of float 1, with the result that flange 11 can be attached to a surface of almost any shape. Moreover, it is unobjectionable if the undersurface of member 3 projects a small distance downwardly into float 1, for the foam 23 will ordinarily yield sufficiently to accommodate irregularities in the undersurface of member 3. By the same token, irregularities in the contour of the undersurface of member 3 are unobjectionable from a standpoint of permitting the floats to leak, because, as was pointed out above, the floats are leakproof.

Still another advantage of float 1 having an open top with the foam 23 exposed is that the foam 23 exposed by the open top of float 1 is protected by the underside of member 3 to which it is attached. There is thus no exposed foam when the assembly shown in FIGURE 5 is completed. The only thing that foam 23 is exposed to is water, and this is harmless to the foam.

The omission of a top wall from float 1 also reduces the weight and increases the buoyancy of the float, and moreover decreases the vertical height of the float.

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There is shown in FIGURE 4 further structure according to the present invention, for use with the structure previously described. FIGURES 3 and 4 illustrate an assembly by which the buoyancy of the float may be regulated at will, in effect by increasing the size of the float without losing any of its advantages, and without requiring the employment of entirely different float structures. To this end, an extension float section 25 is provided which is bounded by opposite sidewalls 27 and end walls 29, but which is open both at its top and at its bottom. The purpose of extension 25 is to fit between float 1 and member 3, and there may be as many extensions 25 stacked vertically as are desired, having regard for the stability of the assembly as a whole when submerged. Extensions 25 may be used in any desired number to support structures of any buoyancy and to regulate the height by which structures thus supported will extend above the water.

Thus, extensions 25 are provided with horizontal uniplanar top flanges 31 at their upper ends and horizontal uniplanar bottom flanges 33 at their lower ends, flanges 31 and 33 extending outwardly from sidewalls 25 and 27. Flanges 31 and 33 are preferably parallel to each other and perpendicular to walls 25 and 27. Of course, as in the case of float 1, sidewalls 27 of extensions 25 may be provided with ribs (not shown) for rigidifying the float structure as a column. Fasteners 35 and 37 pass through openings in top and bottom flanges 31 and 33, respectively, to secure extensions 25 in assembly with and between members 3 and floats 1, respectively. The top flange 31 of extension 25 in FIGURES 3 and 4 thus takes the place of the flange 11 of float 1 in FIGURE 5, while bottom flange 33 interengages and is releasably connected to flange 11 of the subjacent float 1.

Like float 1, extension 25 is filled with plastic foam 39 which is flush with top and bottom flanges 31 and 33. The opposite upper and lower surfaces of foam 39 are thus exposed, and these exposed surfaces are parallel to each other.

When an assembly of a plurality of floats is used, the bottom float will preferably always be a float 1, while the intermediate and uppermost floats will be extensions 25. In effect a continuous column of plastic foam fills the interior of the float assembly. The joints between extensions 25, or between the lowermost extension 25 and the float 1 at the bottom of the assembly, will not necessarily be liquid tight, for seepage of water between the flanges is harmless: the foam occupies the interior of the float assembly and is waterproof and there is no room for water to enter the float assembly.

It is therefore unnecessary to drain or dry the floats in any way between uses. Moreover, there is no need to replace the floats, because they are chemically inert and are waterproof and are of a tough material having some resiliency, so that they are not readily subject to damage.

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If the fasteners 21, 35 and 37 are made of corrosion-resistant material, then the float assembly should last at least as long as the entire aquatic assembly itself.

From a consideration of the foregoing disclosure, therefore, it will be evident that all of the initially recited objects of the present invention have been achieved.

Although the present invention has been described and illustrated in connection with preferred embodiments, it is to be understood that modifications and variations may be resorted to without departing from the spirit of the invention, as those skilled in this art will readily understand. Such modifications and variations are considered to be within the purview and scope of the present invention as defined by the appended claim.

What is claimed is:

An aquatic assembly comprising a member to be supported on water and having an underside of substantial extent, a float comprising a plurality of separable superposed sections including a lowermost section and at least one upper section, all the sections being filled with plastic foam, the lowermost section having a closed bottom and an open top, and the foam in the lowermost section having its upper surface exposed to the foam in said at least one upper section, said at least one upper section having an open top and an open bottom with the foam adjacent the underside of said member being exposed to the underside of said member, the foam in said lowermost section being substantially flush with the open top of said lowermost section and the foam in said at least one upper section being substantially flush both with the open top and with the open bottom of said at least one upper section, outwardly extending interengaging flange means on the top of the lowermost section and on the bottom of said at least one upper section, means releasably securing the interengaging flange means together, outwardly extending flange means on the top of said at least one upper section, and means releasably securing the last-named flange means to the underside of said member.

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