United States Patent [19]

Brill

[11] **3,780,686**

[45] **Dec. 25, 1973**

[54] **FLOAT**

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[22] Filed: **Sept. 24, 1971**

[21] Appl. No.: **183,316**

[52] **U.S. Cl.** ..... **114/0.5 F,** 9/8 P, 9/11 R

[51] **Int. Cl.** **B63b 35/58**

[58] **Field of Search** ..... 114/0.5 F, 0.5 R, 114/0.5 BD, 121, 123, 66.5 F; 9/8 R, 8 P, 11 R, 6

[56] **References Cited**

UNITED STATES PATENTS

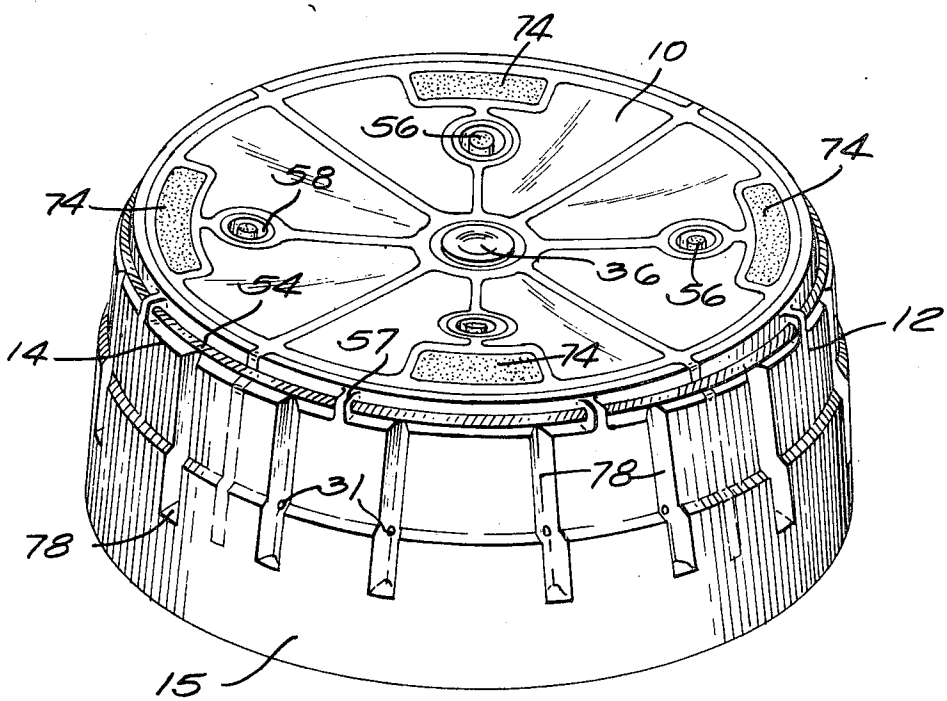
1,339,321	5/1920	Crouch	9/8 R
1,821,320	9/1931	Plummer	114/0.5 F
2,792,164	5/1957	Cauffiel	9/11 R X
2,858,790	11/1958	Russell	114/0.5 F
3,035,286	5/1962	Brill	9/11 R
3,073,271	1/1963	Brill	114/0.5 F
3,013,021	9/1963	Browning	9/11 R
3,110,046	11/1963	Fischer	9/8 R
3,276,209	10/1966	Mosdell	114/0.5 F X
3,426,716	2/1969	Hackworth	114/0.5 R X
3,435,470	4/1969	Krenzler	9/6

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[57] **ABSTRACT**

A float comprising a deck component has an upper deck wall and, in one embodiment, generally conical supports for said wall, the space about said supports being filled or partially filled either with air or buoyant material. Air is vented to atmosphere, preferably centrally through a port or ports to which air is guided either by a conical bottom surface of the deck component, or by channel means of progressively decreasing depth. A depending flaring skirt has a buoyancy preferably no greater than the weight of the float so that the float when unloaded rides with the bottom of the central vent substantially at water level. Water between the central vent and the peripheral skirt is trapped. A weight tending to tilt the float is opposed because water thus trapped within the skirt is lifted above normal level at the high side of the float. The moment arm of a superimposed weight carried on the float is less than the moment arm of the lifted water because the superimposed weight is limited in position by the form of the deck. The difference in dimension between the skirt and the deck component not only provides increased stability but facilitates nesting.

19 Claims, 13 Drawing Figures

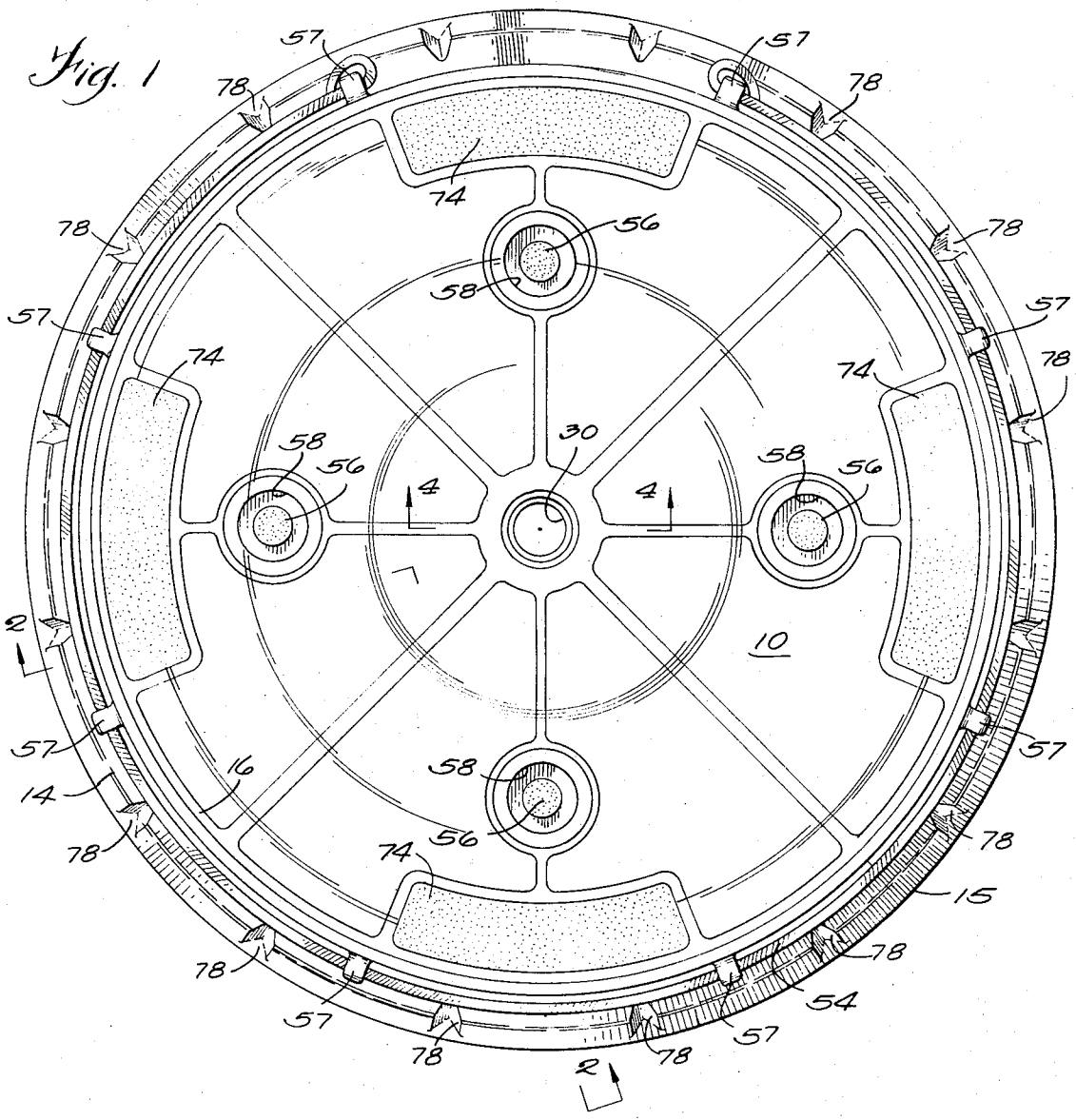


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SHEET 1 OF 5

Fig. 1



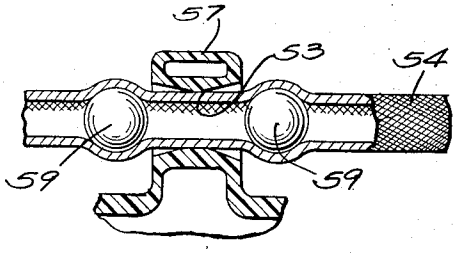
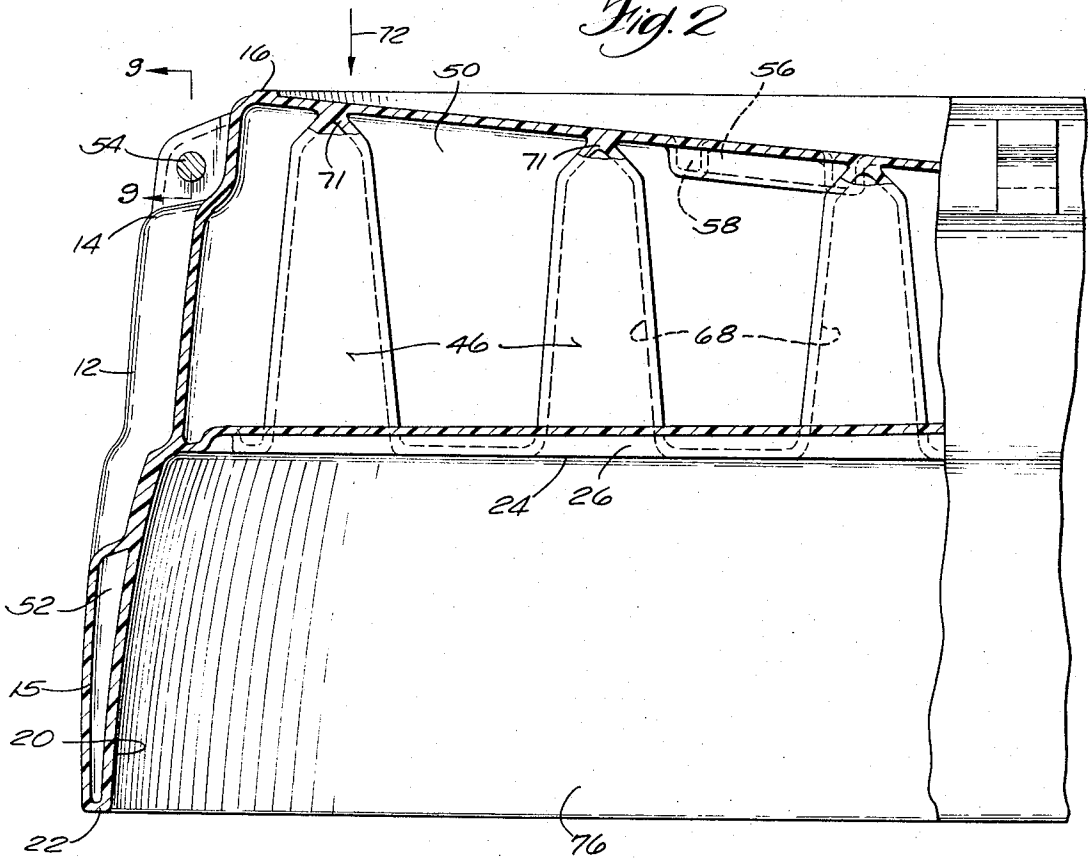


Fig. 9

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Fig. 2



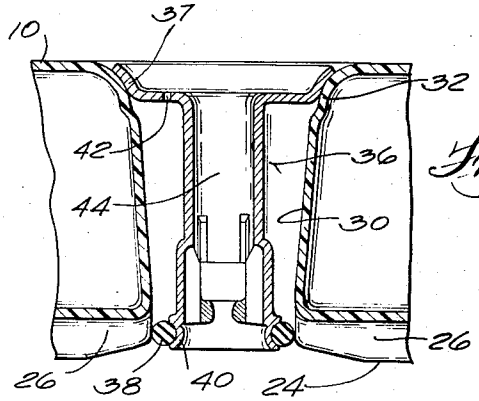


Fig. 4

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Fig. 8

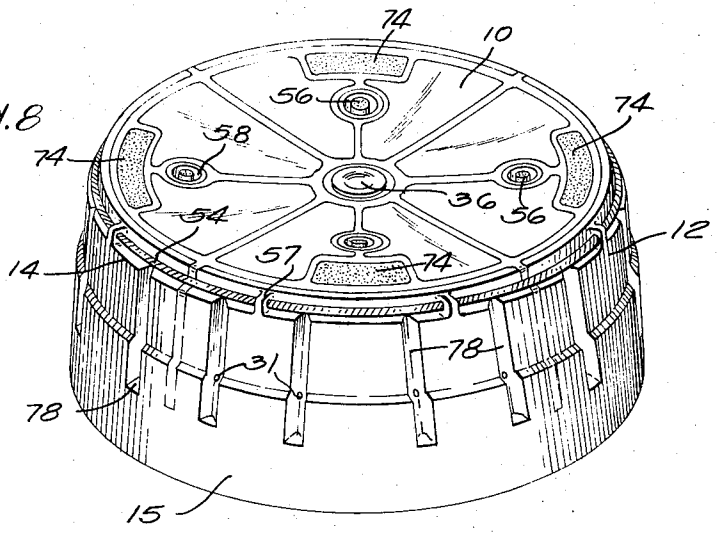


Fig. 3

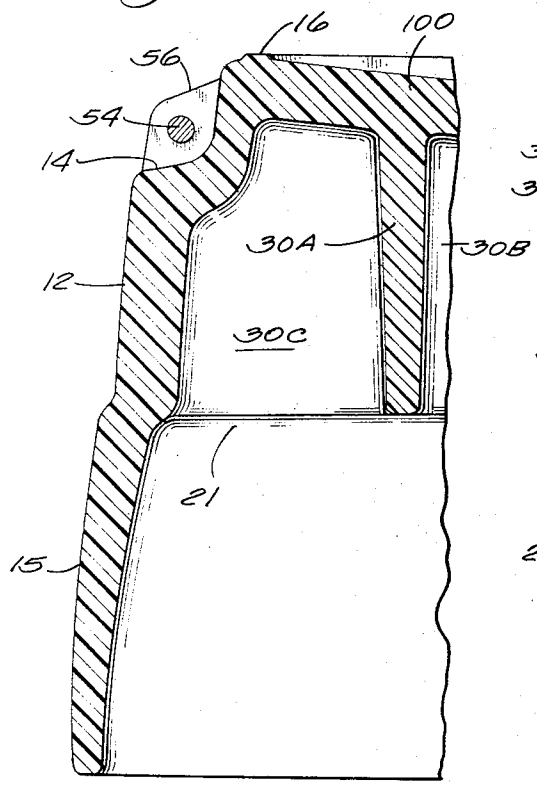
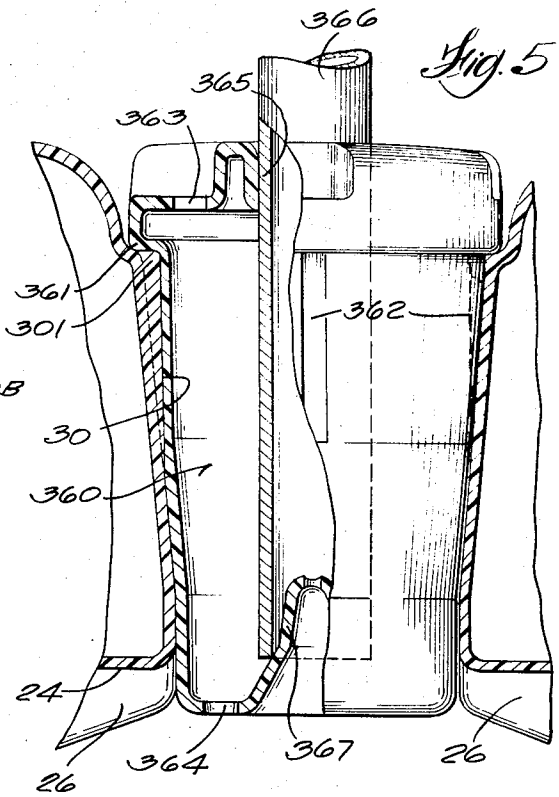


Fig. 5



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Fig. 6

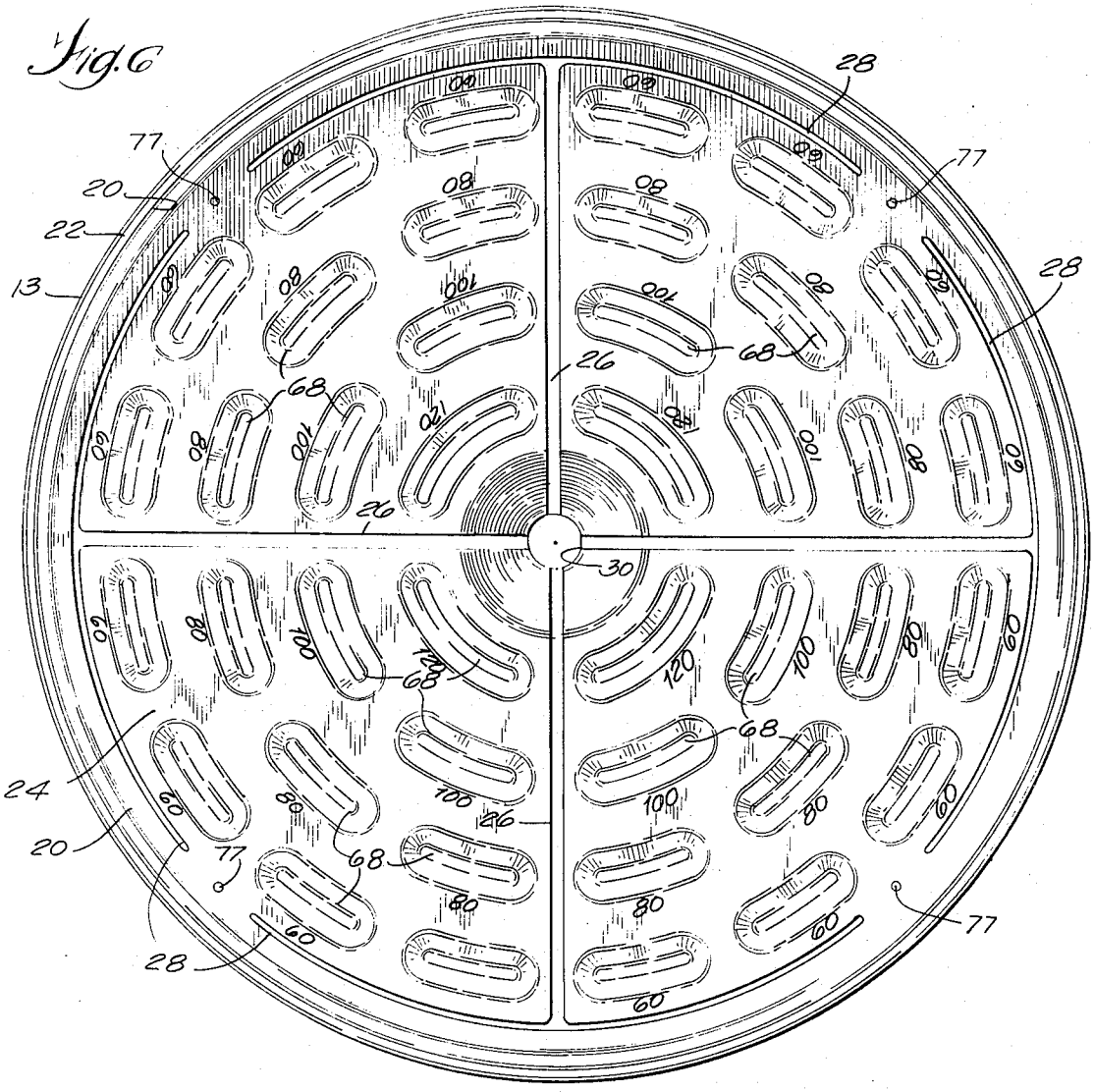
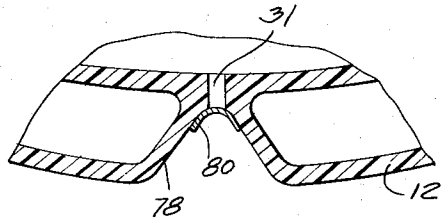


Fig. 7



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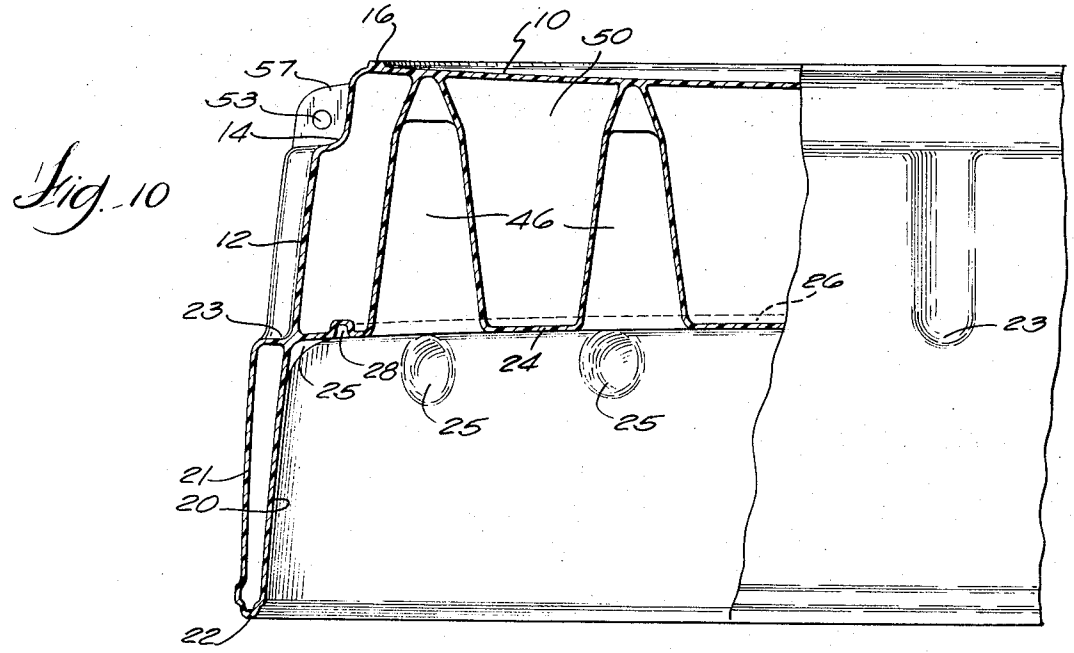


Fig. 10

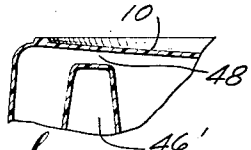


Fig. 13

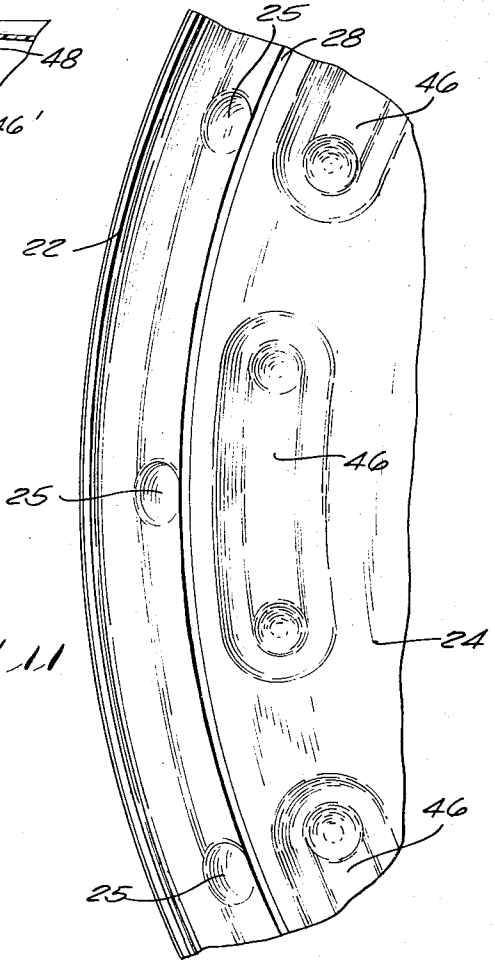


Fig. 11

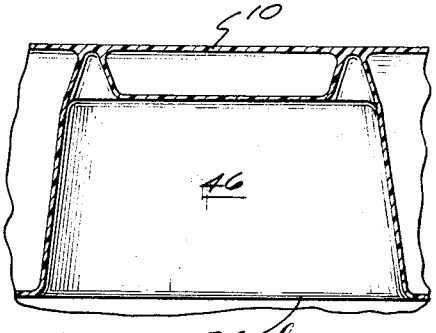


Fig. 12

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FLOAT

BACKGROUND OF INVENTION

The closest references known to me are Russell U.S. Pat. No. 2,858,790 and my own patent 3,035,286.

SUMMARY OF INVENTION

The float has a deck portion, which is preferably hollow, and has a central vent and is provided with a depending flaring skirt, the latter being preferably sufficiently buoyant either because of contained air or because of the foam or other buoyant material from which it is made, so that the deck is usually supported with the lower end of its vent substantially flush with the water level. If the deck has either a lower wall or has its vent terminus approximately at water level, it will retain air. The lower wall, unlike the preferred top surface, need not usually be continuous. It may be merely a web having apertures opening into the lower ends of the preferably tubular spacing means hereinafter mentioned, or it may be even more skeletonized to comprise, in effect, merely the lower margins of such means. Arrangement is made for venting air from the space enclosed within the skirt, the vent or vents opening from the space below the lower surface of the deck and the air being guided thereto. The vent is desirably central so that if the float tilts while in use the water trapped beneath the deck is lifted at the high side of the float to oppose the tilting thereof. The location and/or flaring form of the skirt portion of the float gives the buoyant skirt a considerably greater outward position than the upper deck surface, resulting in further stability, and also facilitating nesting.

In one embodiment a central fitting toward which the deck top is preferably downwardly concave drains off water from the deck and permits the venting of air and at the same time provides a guide for an anchor line, if such a line is used. The fitting is preferably mounted in a tapered socket molded in the deck. It may not only guide an anchor line, or seat a mast, but it may also be used to wedge the line for holding an anchor in an elevated position, free of the bottom of the water course.

In a preferred embodiment the hollow deck has its upper surface supported at intervals by generally tapered supports, which may be tubular and arranged in annular series, and desirably extending upwardly from the ends of lozenge-shaped cavities elongated circumferentially, and desirably staggered in successive series, each support preferably having relatively slight upward convergence of its sides throughout most of its height and thence converging abruptly to the top wall of the deck. These supports are all open through the bottom wall of the deck (if any) and are sealed thereto and may be sealed to the top wall although this is not a required structure. If this is done, the interior of the deck between supports may be a sealed space filled with buoyant structural material or with air and providing increased buoyance to aid in support of the load to which the float is subjected when in use.

Integral means may be formed in the top surface of the deck to provide hand holds to assist a user in climbing onto the float. For secure footing on the top surface of the deck, this may desirably have a texture pattern as shown, for example, in the hand hold areas 74, FIGS. 1 and 8. Also, from an appearance standpoint, as well as convenience of manufacture, it is preferred to use a segmental mold as illustrated in FIG. 6.

Since nesting of these floats is a desirable feature, and since it is also desirable to provide a rope or the like which may be grasped by a person climbing onto the float from the water, and since it is also desirable to offset inwardly on the deck a load borne by the float to decrease its moment arm as compared with that of the skirt, it is noteworthy that all three of these objectives are achieved by providing an inward offset about the margin of the deck surface and providing rope positioning means in this offset.

BRIEF DESCRIPTION OF DRAWINGS

FIG. 1 is a plan view of a float embodying my invention.

FIG. 2 is a greatly enlarged fragmentary detail view thereof partly in side elevation and partly in section on the line 2—2 of FIG. 1, parts being broken away.

FIG. 3 is a fragmentary detail view in cross section similar to FIG. 2 but showing a modified embodiment in which the lower wall of the deck section is generally frustoconically tapered and the interior space in the deck section contains foamed plastic.

FIG. 4 is an enlarged fragmentary detail view on the line 4—4 of FIG. 1, parts being broken away.

FIG. 5 is a view of a modified vent and drain plug on a section comparable to that of FIG. 4.

FIG. 6 is an inverted plan view of the float.

FIG. 7 is a fragmentary horizontal section through a portion of the side wall of the hollow deck.

FIG. 8 is a view in perspective showing the completed float on a reduced scale.

FIG. 9 is a detail view on an enlarged scale taken in section on the line 9—9 of FIG. 2.

FIG. 10 is a fragmentary detail view similar to FIG. 2 but showing a modified embodiment.

FIG. 11 is a fragmentary detail view similar to FIG. 6 but showing a modified embodiment.

FIG. 12 is a fragmentary detail view similar to FIG. 10 but showing a modified embodiment.

FIG. 13 is a fragmentary detail view similar to FIG. 10 but showing a further modified embodiment.

DETAILED DESCRIPTION

The round version of the float comprises a deck having a top 10 which is preferably concave, and has a side wall 12. The side wall may be offset outwardly by a shoulder 14 so that the wear strip 16 near the perimeter of top 10 is spaced inwardly at a radius materially less than the over-all radius of the deck portion of the float. The side wall 12 flares somewhat in a downwardly direction. Below the deck portion it extends as a skirt 15. The skirt in general, and the rest of side wall 12, is desirably convex in radial section, thereby having compound curves both inside and outside, for stiffness and strength and added stability in use. The interior radius of the skirt exceeds the maximum exterior radius of the deck portion. This gives the water ballast effect of the skirt a much greater moment arm than that of the load which may be imposed on the deck. As will be explained, greater stability results and also the float may readily be nested with other like products.

The skirt 15 is preferably buoyant, either as being foamed, as shown in FIG. 3, or, preferably, double walled, as shown in FIGS. 2 and 12, to trap a buoyant substance, such as air. Foamed skirt 15 of FIG. 3 has substantial thickness, thus to form inner and outer walls and a bottom wall which enclose the buoyant foam sub-

stance. The preferred embodiment has an inner wall **20** extending upwardly from the lower margin **22** to the generally horizontal bottom wall **24** of the deck portion of the float. Preferably an annular corner **25** is formed where the two walls join. In some instances, the skirt may be made of other materials and even of sheet metal but it is desirable that it be buoyant.

The deck portion of the float preferably has a bottom wall **24** which, however, is not necessarily a continuous web. In fact, it may be skeletonized, even to the extent of constituting merely the lower margins of the supports **46** for the deck top **10**, as hereinafter described. To the extent that the bottom wall **24** includes a web, it preferably has plural radial inverted channels **26** (FIG. **2**, **4** and **6**) of a height which may increase toward the center to direct, to a preferably central vent **30**, excess air which would otherwise be trapped beneath the float and within the space **76** defined by annular skirt **12**, **20**. The outer ends of radial channels **26** may be extended circumferentially by channel means **28** (FIG. **6**). While lateral vents are possible, they have to be quite restricted to avoid undue flow every time the float is tilted. Therefore I greatly prefer a large central vent through which air escapes rapidly when the float is put in the water but which still opens at water level so that it permits air and water to be trapped at opposite sides of the tilted float. If peripheral vents are used, they may be as shown at **31** in FIGS. **7** and **8**.

In the embodiment with foamed deck **100**, as shown fragmentarily in FIG. **3**, the bottom "wall" **21** is shown generally conical so that it slopes upwardly toward the central vent **30**. The space between walls **100** and **21** may be divided by waffle-like partitions such as those shown in FIG. **3** at **30A** and **30B** to make downwardly opening, air-trapping pockets **30C**.

Escape for trapped air is provided via a vent **30** shown as comprising a tapered seat which opens through the center of the float and is integrally connected with the top deck **10** and with the lower wall **24** or **21**, and to which the vented air is displaced. Near its top the vent **30** has a shoulder **32** for supporting anchor line guide fitting **36**. The fitting **36** may, for example, be made of metal or plastic. In either case, it desirably may have a top **37** desirably nearly flush with the deck top **10**. This member **36** may also support a flagpole or the like. A metal type has O-ring **38** in a groove **40** of the line guide **36** which takes lateral thrust to which such a pole seated in socket **44**, or an anchor line, may subject the guide. Vent orifices **42** lead air past the O-ring **38**. In the absence of plug **36**, water on the concave top or deck **10** flows by gravity through the tapered vent **30**.

Particularly if the plug **36** is made of buoyant material such as synthetic resin, it may be in the nature of a conical plug **360** in the tapered vent **30**. The plug **360** may have a shoulder **361** resting on the complementary shoulder **301** of the deck. The loose fit and the ribs **362** between the plug and the vent **30** meter air flow and permit drainage of water from the top surface of the deck. Note also the preferred provision of vent and drain apertures **363** in the top of the plug and **364** in the bottom thereof.

When the plug has an anchor rope opening, it is possible, when it is desired to move the float, to pull the anchor line and the fitting upwardly through the vent **30** and then, while holding the line, to wedge the plug down against the rope to confine it in the tapered vent, thus suspending the anchor free of the bottom.

In a preferred embodiment, what might otherwise be a plug has a central opening **365** for positioning a mast, flagstaff, seat post or the like **366** (FIG. **5**) which is tubular and has its lower end engaged on the interior boss **367**.

In the embodiment shown in FIG. **2**, in which there is air space **50** between the top deck wall and the bottom wall **24**, I may provide closed-end generally conical air trapping supports **46** for the top deck wall **10**. These open downwardly through the lower wall **24**. These supports as shown in FIG. **2** may have integral connection peripherally with the bottom wall **24** and centrally with the deck top **10**. However, for some purposes, there may be a slight clearance **48** between the support **46'** and deck top **10** as shown in FIG. **13**. By reducing the rigidity of support of the deck top, resilient yieldability is provided and particularly young people using the float seem to enjoy this.

It is to be observed in FIG. **10** that the buoyant skirt **20** has an outer wall **21** joined at **23** to the peripheral portion **12** of the deck wall, this juncture being preferably reinforced as by web **25**.

In any event, there is a large open cavity **50**, which supplements the space **52** within the side wall to provide additional buoyancy when the raft is loaded. The buoyancy of the skirt is carefully related to the total weight of the float. Its buoyancy supports the float with its deck component, or at least the lower end of the air vent **30**, substantially at water level when the raft is unloaded. In a 5 foot float even 1 inch of extra submergence means that the float deck is roughly 100 pounds too heavy. This is incompatible with the desired objective of light weight. On the other hand, the float loses stability if the water level is materially below the level of the lower wall of the deck. Accordingly, it is preferred that the unloaded float have just the right buoyancy so that the bottom **24** of the deck portion is at water level. It is also desirable that it reach this position rapidly due to rapid venting of excess air when the float is first put in the water.

If desired, a rope **54** may substantially encircle the entire raft above shoulder **14**. Access to the raft is readily gained by a swimmer as a result of the rope and desirably the hand grips **56** in recesses **58** and approximately at deck level. As best shown in FIG. **9**, it is preferred to mount the rope **54** by providing a hole **53** through each of the bosses **57**. The portion of the braided rope which extends through each hole **53** is opened up to receive rope expanders such as balls or taper pins **59** which hold the rope to a cross section larger than that of the hole **53**, thereby tending to securely hold the rope fixed with reference to the respective boss **57**.

One particular reason for the downwardly outward flare of the skirt portions **12** and **20** below the wall **24** of the float has to do with the geometry which relates to moment of lift and loading and produces balance. However, it also has the incidental advantage that rafts so made can be nested one inside of another for convenience in shipment or storage. Additionally, the resulting cove **14** recesses and the rope **54** without interfering with nesting.

The float is desirably made from a synthetic resin material such as polyethylene, or foamed materials such as polystyrene which, in themselves, provide substantial

flotation, since they are buoyant, comprising innumerable pores sealed by an external skin. There are many different methods by which such a float can be made. Rotational molding is a preferred method which involves the incorporation of the resinous material between the opposing walls of a mold and the heating of the mold while rotating it about more than one axis so that the resinous material coats the entire inner surface and fuses to provide the necessary continuity of wall. Instead of rotational molding, I may use Sheet-blow or trap molding, or other procedures.

The circumferential elongation of cores 68 arranged in annular series is a desirable structure to form the spacers or supports 46, the interiors of which open downwardly through the wall 24 at their lower ends. The spacers are desirably hollow and closed at their tops and may be integrally joined with the top 10 at their upper ends. They may be conical but in any event are preferably elongated laterally and consequently are lozenge-shaped in horizontal section. If the cones have at least one side which is concave, they tend to pull free of the cores which form them, thus facilitating core withdrawal. It will be noted that in most of their height above the bottom wall 10 their taper is gradual but at their upper ends they taper abruptly preferably to full junction with each other, FIG. 13, or with the top wall or deck (FIGS. 2 10 and 12) at 71.

The material used should be as light as is possible consistent with strength. A float 5 feet in diameter and 15 inches in over-all height may weigh about 50 pounds. Not only is this easily within the capacity of one person to lift but it can readily be rolled on edge from place to place.

In embodiments preferred for light weight and low cost, when the float is unloaded its weight is nearly identical with, or somewhat in excess of, the buoyancy of the skirt with its air-filled chamber 52. Thus the bottom wall 24 of the deck rests substantially at water level, substantially all air being expelled from the interior cavity 76.

Previous attempts to make skirted floats which release trapped air have been such that operativeness cannot be achieved except after a long interval to vent trapped air or water. In the instant float, the interior spaces to be vented are wide open to the water and there is provision for the free escape of air through a large central hole to which the air is guided so that venting takes place virtually instantly, leaving substantially the entire area within the skirt and below the bottom wall 24 full of water with substantially all air vented. When the float is removed from the water, the water flows from it with equal facility, and almost instantly. It is desirable that this vent be central so that loading on one side of the deck when the float is in use will simply pivot the float on a transverse axis without substantial movement of air or water in either direction through the vent.

One of the problems in designing such a float is to get rid of substantially all air beneath the bottom wall 24. This is accomplished as above described by venting such air through the center. Another problem in a small raft is to have maximum moment of resistance to tilt. It is for this purpose that the skirt is offset radially outwardly well beyond the point at which a person can stand on the deck top 10. A person using the float for diving purposes will stand at about the radius of the ring 16, beyond which buoyant portions of the float extend radially.

With a maximum design load imposed at the location indicated by the arrow 72, the float will only tilt about 10°. Since there is not supposed to be any substantial amount of air trapped within the skirt portion of the float, most of the volumetric capacity of the space beneath the deck will be filled with water. The effective mass being diametrically opposite the load 72, it will exert a counterbalancing effect.

The well-supported concave top 10 not only makes for strength but also improves stability in use. It will be apparent that if the float is tilted by a user standing in the location indicated at 72, there would be a tendency for him to slide from the float if the top deck of the float were planiform. By reason of its concavity, it tends to assume a position in which the portion of the deck on which the user stands is nearly horizontal beneath his feet. In practice, it is preferred to texture the deck surface by putting (for example) a textured surface in the mold. The texture is indicated at 74 in FIG. 1.

In the embodiment of FIG. 1 and FIG. 2, the interior of the deck is all open around the "cones" 46. One or more plugs 77 (FIG. 6) may be provided to afford access to this air space for convenience of manufacture or to permit removal of water if any leaks into the interior.

Connection of the outer side wall 12 to the inner side wall 20 is preferably designed to provide vertical grooves 78 spaced around the perimeter (FIGS. 1 and 8) and provides strength.

While the float is shown to be circular in plan, it may have other configurations to facilitate its use as a unit in a larger assemblage.

The inverted float may be used for many purposes, for instance to play games involving introduction of balls or bean bags into the numbered pockets formed by the conical spacers 68 when the float is inverted as shown in FIG. 6.

I claim

1. A nestable float comprising a deck component and a skirt joined with and extending downwardly below the deck component and having at least its major portion offset outwardly therefrom and peripherally enclosing downwardly open space beneath said deck component, said deck component having an upper wall and a side wall and having a cove shoulder offset inwardly from the side wall and downwardly from the upper wall, boss means projecting across the shoulder and provided with apertures, a rope trained along said shoulder and extending through said apertures, and means for anchoring the rope against material displacement with respect to the apertures through which it passes, said rope being provided interiorly with expanders constituting said anchoring means and disposed at each side of each boss means, said expanders increasing the over-all dimension of the rope adjacent said apertures to a size such that the rope cannot pass through the apertures, said shoulder accommodating said rope when another float is nested over the float on which the rope is mounted.

2. A nestable float comprising a deck component and a skirt joined with and extending downwardly below the deck component, said skirt having at least its major portion offset outwardly from the deck component and peripherally enclosing downwardly open and unob-

structed space beneath said deck component, said skirt having a greater interior dimension than the exterior dimension of the deck component whereby the deck component of one float will nest within the skirt of another like float, the upper edge of the deck component being offset inwardly of the skirt to dispose edge loading of the float inwardly of the greatest periphery of the float, and an air vent passage from said space to the atmosphere, said air vent passage being substantially at the center of said space and leading upwardly through said deck component, said deck component having at least a partial lower wall having inverted channels of depth progressively increasing toward the vent passage for guiding to said vent passage air which is trapped within the skirt when the float is put in the water.

3. A nestable float comprising a deck component and a skirt joined with and extending downwardly below the deck component, said skirt having at least its major portion offset outwardly from the deck component and peripherally enclosing downwardly open and unobstructed space beneath said deck component, said skirt having a greater interior dimension than the exterior dimension of the deck component whereby the deck component of one float will nest within the skirt of another like float, the upper edge of the deck component being offset inwardly of the skirt to dispose edge loading of the float inwardly of the greatest periphery of the float, and an air vent passage from said space to the atmosphere, said air vent passage being substantially at the center of said space and leading upwardly through said deck component, said deck component having a well-defined lower wall slightly pitched toward said vent passage.

4. A nestable float comprising a deck component and a skirt joined with and extending downwardly below the deck component, said skirt having at least its major portion offset outwardly from the deck component and peripherally enclosing downwardly open and unobstructed space beneath said deck component, said skirt having a greater interior dimension than the exterior dimension of the deck component whereby the deck component of one float will nest within the skirt of another like float, the upper edge of the deck component being offset inwardly of the skirt to dispose edge loading of the float inwardly of the greatest periphery of the float, and an air vent passage from said space to the atmosphere, said air vent passage being substantially at the center of said space and leading upwardly through said deck component, said air passage including a seat, and a fitting disposed in said seat, said fitting having a drain and air venting duct means and a central bore, said fitting having a top substantially flush with the upper wall.

5. A nestable float comprising a deck component and a skirt joined with and extending downwardly below the deck component, said skirt having at least its major portion offset outwardly from the deck component and peripherally enclosing downwardly open and unobstructed space beneath said deck component, said skirt having a greater interior dimension than the exterior dimension of the deck component whereby the deck component of one float will nest within the skirt of another like float, the upper edge of the deck component being offset inwardly of the skirt to dispose edge loading of the float inwardly of the greatest periphery of the float, and an air vent passage from said space to the atmosphere, said skirt having side and bottom walls enclosing a buoyant substance.

6. A float according to claim 5 in which the skirt and deck component progressively increase in dimension downwardly.

7. A float according to claim 1 in which the deck component has a somewhat concave upper surface.

8. A float according to claim 5 in which said air vent passage is substantially at the center of said space and leads upwardly through said deck component.

9. A float according to claim 5 in which the deck component has a lower wall spaced beneath the upper wall, the space between such walls being at least partially filled with buoyant material.

10. The float of claim 5 in which said deck component has a side wall with circumferentially spaced vertical reinforcing channels.

11. The float of claim 5 in which said skirt has a buoyancy no greater than the weight of the float whereby the unloaded float has said deck component substantially above water level and its skirt substantially therebeneath.

12. A float according to claim 11 in which said buoyant skirt imposes its buoyancy on the deck component at a materially greater moment arm than that of any load to which the deck component may normally be subjected in use.

13. The float of claim 5 in which the deck component has an upper wall and a side wall joined to the upper wall and means constituting at least a skeletonized lower wall joined to the side wall, and spacers extending from said lower wall toward said upper wall and providing support therefor.

14. A float according to claim 13 in which the upper ends of the spacers terminate short of the deck and contact therewith to provide support therefor only when the deck is loaded and flexed toward the spacer.

15. A float according to claim 13 in which the spacers are fused at their upper ends with the under surface of the deck.

16. A float according to claim 13 in which said spacers are generally tubular and have closed upper ends supporting the upper wall and have lower ends opening into said space and marginally connected with the lower wall.

17. A float according to claim 16 in which said tubular spacers provide game pockets exposed when the float is inverted.

18. A float according to claim 16 in which said tubular spacers are elongated horizontally and have at least one side concave.

19. A float according to claim 16 in which said tubular spacers taper gradually throughout most of their height and have abruptly increased taper in approaching their closed upper ends.

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