

[54] **RAFT ADAPTED FOR USE AS A WATER RESCUE OR RECOVERY LITTER**  
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**Related U.S. Application Data**

[63] Continuation-in-part of Ser. No. 320,103, Jan. 2, 1973, abandoned.  
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[51] Int. Cl. .... **B63c 9/04**  
[58] Field of Search..... **9/3, 11 R, 13, 14; 114/5 F, 66.5 F; 244/137 P**

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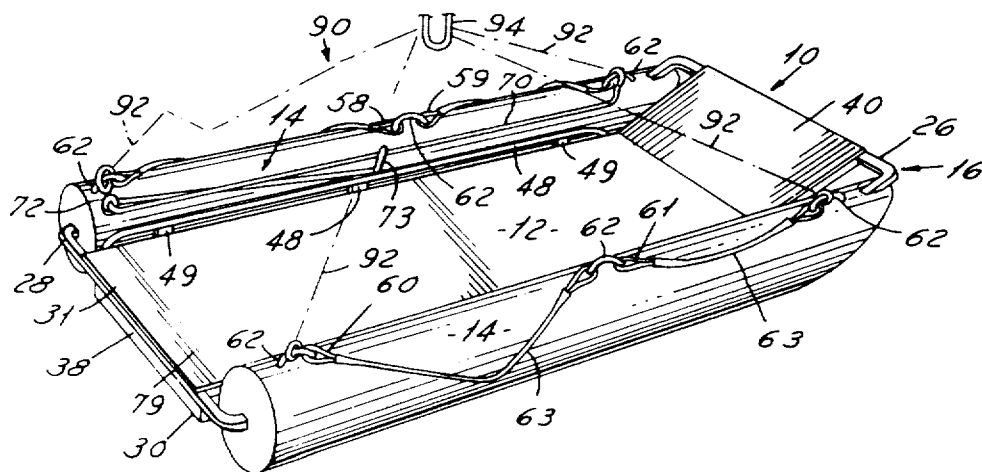
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[57] **ABSTRACT**

The raft has a body section large enough to support one or more persons. Pontoons extend along opposite sides of the body section, and a rigid frame connects the body section and pontoons together. The body section has a flat horizontal upper surface adapted to support a person. The body section is of substantial thickness and has opposite sides disposed in confronting relation to the pontoons, cooperating therewith to provide longitudinally extending slots for the free flow of water therethrough when the raft is pulled lengthwise through the water, thereby reducing any tendency of the raft to fishtail. The body section and pontoons are preferably formed of a plastic material which is hard, tough and shock resistant on its surfaces.

**9 Claims, 12 Drawing Figures**



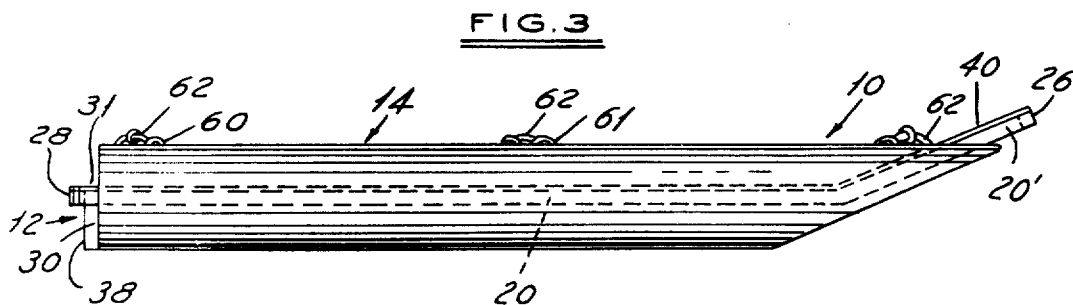
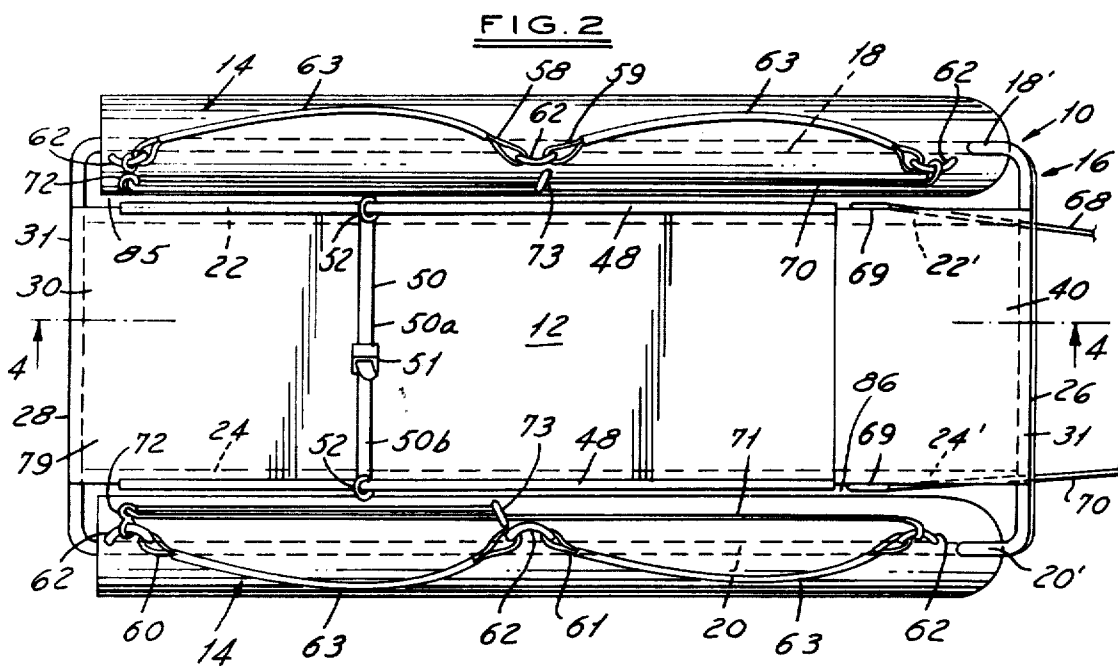
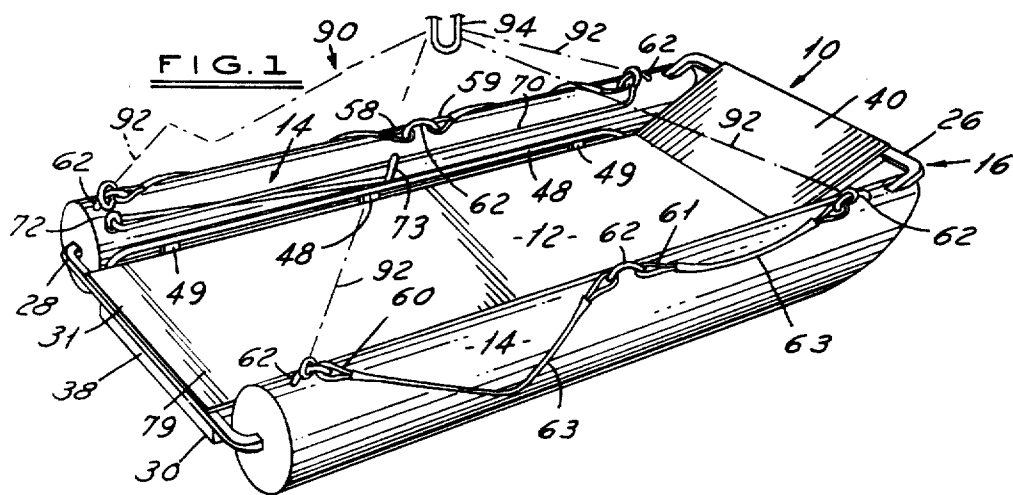


FIG. 4

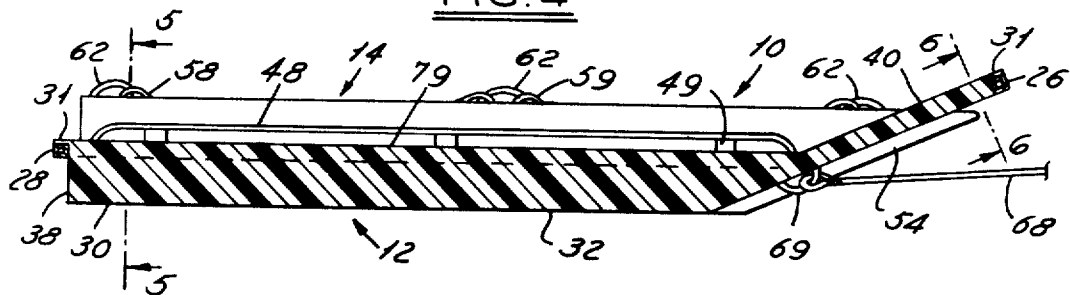


FIG. 5

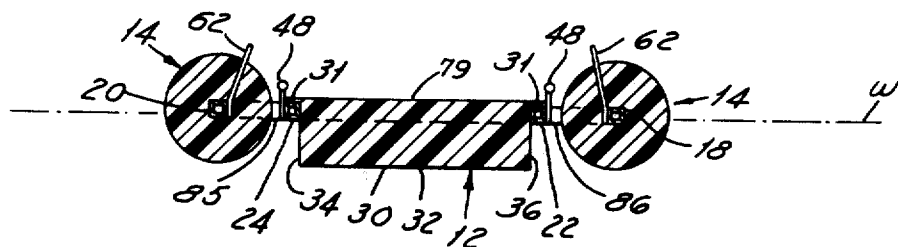
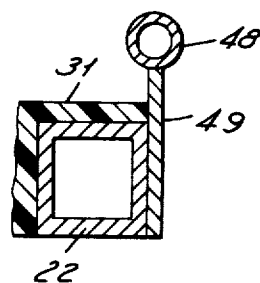
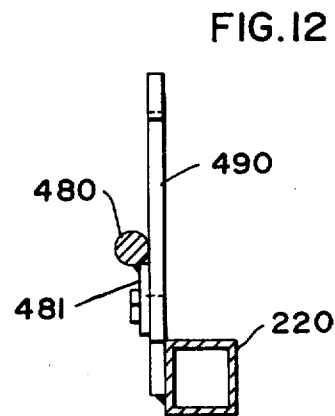
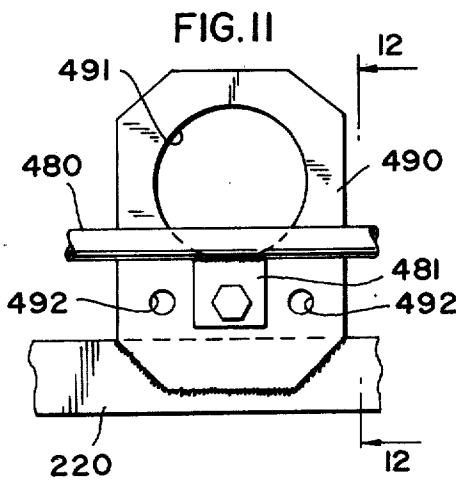
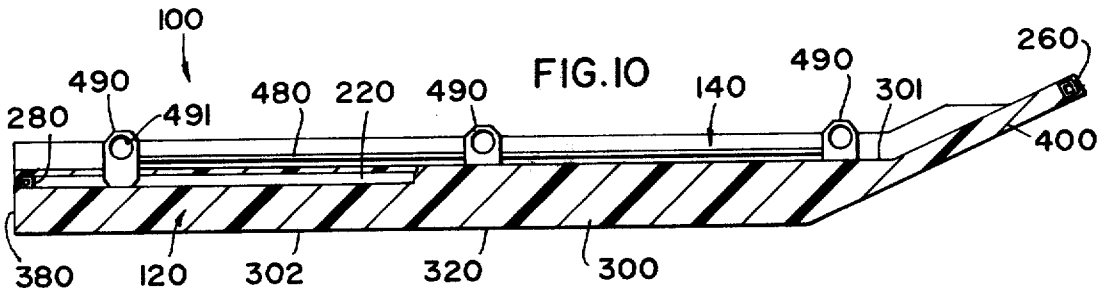
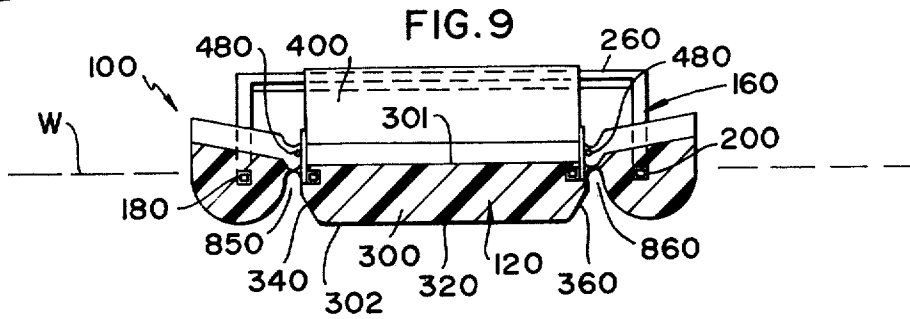
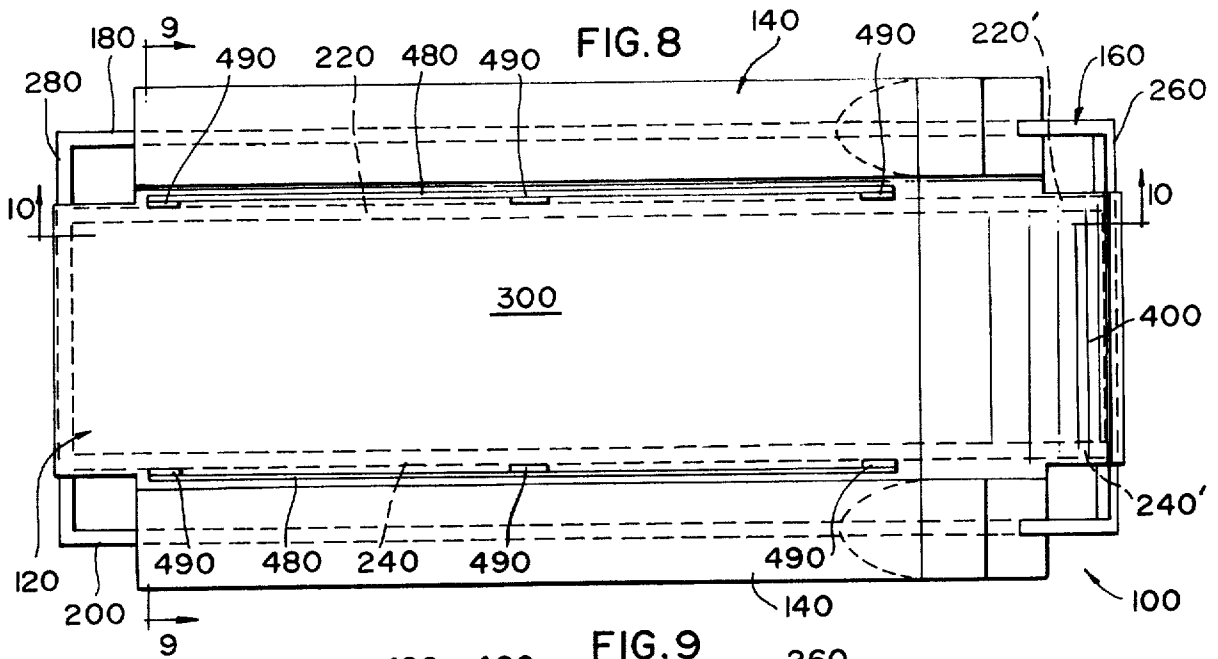


FIG. 6



FIG. 7





# RAFT ADAPTED FOR USE AS A WATER RESCUE OR RECOVERY LITTER

## REFERENCE TO RELATED APPLICATION

This application is a continuation-in-part of my co-pending application Ser. No. 320,103, filed Jan. 2, 1973 and now abandoned.

## SUMMARY OF THE INVENTION

The raft of my invention was originally intended for use primarily by standby units on duty at power boat races to facilitate the safe and speedy rescue of injured drivers. The raft may be used as a litter for the transfer of an injured person from the water to an ambulance or to the hospital. It may also serve as a piece of recreational equipment or as an island for scuba divers, for example.

The raft is relatively light in weight so that it may be easily manipulated in and out of the water and may be of a size to accommodate more than one person. The body section is disposed with its top surface close to the level of the water so that by slightly depressing the rear end, a person may be readily floated onto the raft. The raft is highly maneuverable in the water and easily manageable on shore so that a victim rescued from the water may be transferred to an ambulance and onto a receiving table at the hospital without removing him from the raft or transferring him to a stretcher or other carrying device.

The body section and pontoons are preferably constructed of a light weight plastic material such, for example, as polyethylene or polyurethane which provides more than adequate buoyancy and strength. A light weight rigid frame which might be of aluminum tubing is preferably used to tie the body section and pontoons together as an integral unit.

While the raft is not necessarily limited as to size or buoyancy, rafts have been constructed in accordance with this invention which easily support in excess of 350 lbs. and which may sustain as many as 16 people clinging to life lines provided along the sides of the raft. Obviously the raft may be constructed in smaller or larger sizes depending upon particular requirements and depending also upon whether it is to be used for rescue or recovery work or for some other purpose such, for example, as a diver's platform or general recreational use.

In the drawings:

FIG. 1 is a perspective view of a raft constructed in accordance with my invention.

FIG. 2 is a top plan view of the raft shown in FIG. 1 showing one transverse restraining strap, it being understood that more than one such strap may be and usually is used.

FIG. 3 is a side elevational view of the raft.

FIG. 4 is a longitudinal sectional view taken on the line 4—4 in FIG. 2, with the longitudinal restraining line and the transverse strap or straps removed for purposes of clarity.

FIG. 5 is a transverse sectional view taken on the line 5—5 in FIG. 4.

FIG. 6 is a sectional view taken on the line 6—6 in FIG. 4.

FIG. 7 is an enlarged fragmentary sectional detail of a side rail along one side of the body section of the raft to which the transverse straps are secured.

FIG. 8 is a top plan view of a raft of modified construction.

FIG. 9 is a transverse sectional view taken on the line 9—9 in FIG. 8.

FIG. 10 is a longitudinal sectional view taken on the line 10—10 in FIG. 8.

FIG. 11 is a fragmentary detail showing an anchor bracket mounted on a frame member and a rail mounted on the anchor bracket.

FIG. 12 is a sectional view taken on the line 12—12 in FIG. 11.

Referring now more particularly to the drawings, the raft is generally designated 10 and comprises a body section 12, pontoons 14 and a frame structure 16 of one piece or integral construction tying the body section 12 and pontoons 14 together as a unit.

The frame structure 16 may be of any suitable construction but preferably is made of lightweight durable aluminum tubing of square cross section. The frame structure includes the longitudinally extending, laterally spaced, outer parallel frame members 18 and 20, the longitudinally extending laterally spaced inner parallel frame members 22 and 24 which are also parallel to the frame members 18 and 20 and lie in the plane thereof, and the front and rear parallel transverse frame members 26 and 28 which extend at right angles to the longitudinal frame members. The longitudinal frame members, from the rear ends throughout the major portion of their length, lie in a common plane which is horizontal when the raft is afloat. The front end portions of such longitudinal frame members are upturned in a common plane at an angle which may be approximately 25°, such upturned portions being parallel and designated respectively 18', 20', 22' and 24'. The longitudinally extending frame members may be terminally connected as by welding to the front and rear frame members 26 and 28 to form the frame structure into an integral, rigid unit.

The body section 12 includes an elongated and generally rectangular box 30 having a flat horizontal bottom wall 32, side and end walls 34, 36 and 38 extending vertically upwardly from the bottom wall. At the front, the body section has a forwardly and upwardly inclined section 40 turned upwardly at approximately a 25° angle in the plane of the upwardly inclined portions of the longitudinally extending frame members and terminating in surface contact with the rear side of the front transverse frame member 28. The side walls 34 and 36 of the box are preferably disposed in surface contact with the inner surfaces of the longitudinal frame members 22, 22', 24 and 24', while the end wall 38 is disposed in surface contact with the inner surface of the end frame member 28. The top of the box 30 has a marginal outwardly extending flange 31 which extends beyond the margins of the side and end walls of the box so as to overlie the top surfaces of the longitudinal frame members 22 and 24 and the front and rear transverse frame members 26 and 28. The box 30 is preferably a molded body of a suitable plastic, preferably polyurethane, and its marginal flange 31 may be adhered to the frame members by any suitable adhesive such, for example, as epoxy glue.

When unloaded and afloat in the water, the top of the box is disposed substantially horizontally and in a plane preferably slightly above the water surface W (say about 1 1/2 inches) providing a support surface for the body of a person.

The extension 40 is an integral part of the box 30 and serves as a headrest for a person supported thereon.

Elongated rails 48 extend lengthwise along both sides of the body section 12 above the top surface of box 30, being secured to the frame members 22 and 24 by brackets 49. Transverse straps 50 extend across the top of the box 30 and have loops or rings 52 slidable on the rails 48. These straps, only one of which is shown in FIG. 2, have separable strap sections 50a and 50b releasably secured together by buckles 51. They are adapted to strap a person securely on the body section 12.

The pontoons 14 are elongated cylindrical members of uniform circular cross section. These pontoons are preferably molded of a suitable material such as polyurethane. It will be noted that the upturned portions 18' and 20' of the longitudinal frame members 18 and 20 project through openings in the top wall of each pontoon, whereas the longitudinal frame members 18 and 20 extend along the axis of the pontoons. Preferably the pontoons are longitudinally split in half, assembled or sandwiched on the frame members 18 and 20 and then welded or adhered together as by epoxy glue. The square cross section of the frame members helps to prevent the pontoons from rotating.

Life lines 58, 59, 60 and 61 are provided on the two pontoons. They may be of any suitable plastic such, for example, as polypropylene which has considerable strength in tension, having spliced loops at the ends engaging the anchor brackets 62 which are spaced apart longitudinally on each pontoon. Such brackets are generally U-shaped having their legs welded or otherwise rigidly secured to the frame members 18 and 20 and having their closed loop portions projecting outwardly through the surfaces of the pontoons. The lines 58-61 may if desired be covered with tubes 63 of a plastic such as polyethylene so as to be easier and more comfortable to grasp in the hands.

A tow line consisting of the sections 68 and 70 which extend forwardly from the raft to a point where they meet at a common point or junction and then extend forwardly as a single line for attachment to a towing vehicle such as a motor boat is provided to pull the raft through the water. The line sections 68 and 70 are connected by fasteners or bracket loops 69 welded or otherwise rigidly secured to the frame members 22 and 24 at a point at the level of the water when the raft is afloat. Thus the pull on the tow line will not have a tendency to cause the front end of the raft to nose down, as it might if the tow line were connected for example to the front transverse frame member 26.

The tow line will preferably be formed of a suitable material of high strength, such for example as nylon, which has a strong resistance to shock forces.

Additional lines 70 and 71 are provided to secure a person on the raft. These lines extend longitudinally having their front ends provided with a closed loop engaged with the forwardmost brackets 62 on the pontoons. The lines extend rearwardly slidably through a hole in the friction handle 73 and through the eye of a quick releasable fastener 72 clipped to the rearmost brackets 62 on the pontoons. The lines extend from the eye forwardly and their ends are secured to the friction handles. The friction handles are of the type used to hold a tent erect and when slid forwardly so as to make the lines taut obviously will bind on the portions of the lines sliding through the hole and thus frictionally pre-

vent the lines from becoming slack. The lines 70 and 71 are shown in the positions they assume when not being used. When used to tie down an injured person, the rear ends of the lines 70 and 71 are unclamped, the lines are crossed over the body of the person on the raft and the rear ends of the crossed lines are reclamped by fasteners 72 to the rearmost brackets 62 on opposite sides of the body section 30 but of course in reversed relation. The lines 70 and 71 may be formed of a suitable flexible yet strong material such as polypropylene.

It will be noted that the front ends of the pontoons are inclined in an upward and forward direction at the same angle as the upwardly inclined forward section 40 of the box 30 and in a plane very near to that of the forward section. Hence, when pulled through the water the raft will ride over the water surface and will not have a tendency to plow through the water or to nose under.

Preferably the pontoons 14 are spaced laterally outwardly from the body section 12 and the inner longitudinal frame members 22 and 24 to provide the elongated slots 85 and 86 which extend substantially the full length of the raft and are open at both ends. These slots provide channels for the flow of water when the raft is pulled lengthwise by the tow lines 68 and 70, to reduce or eliminate any tendency to fishtail.

As before stated, the pontoons 14 and the body section 12 are preferably formed of a plastic material, and the most preferred material is polyurethane. The polyurethane may be foamed or expanded to increase its buoyancy. However, to prevent the absorption of water into the cells of the polyurethane, it is recommended that a skin or coating of polyurethane in a dense or unexpanded non-cellular form be applied to provide a tough shock resistant water resistant exterior surface. The skin of non-cellular polyurethane may be sprayed on with a spray gun and need be no more than .030 inch thick.

Since polyurethane tends to deteriorate when exposed to sunlight, it is recommended that the pontoons 14 and the body section 12 be painted for example with a silicone paint which will filter out the ultraviolet rays of the sun and protect the plastic material.

As also previously noted, other plastic materials than polyurethane may be used although they should have a substantially lower specific gravity than water so as to be floatable. They should also be hard and tough on the surface. Polyethylene is a suitable material.

The raft when used as a rescue litter may be dropped from a helicopter at the site of the emergency. FIG. 1 shows in dotted lines a suspension system 90 by means of which the rescue litter may be picked up from the water by a helicopter. The suspension system shown in FIG. 1 comprises four lines 92 which are secured to and depend from a suspension ring 94 and which have their lower ends releasably connected by suitable means to the four brackets 62 at the front and rear ends of the pontoons. The suspension ring 94 may be at the lower end of a cable from the helicopter. The fasteners at the lower ends of the lines 92 should be of the quick-release type so that they can be readily secured to and released from the raft brackets 62.

One of the reasons for utilizing a plastic which is tough and shock resistant, such as a dense skin of polyurethane, for the surface material of the pontoons and body section is to resist the shock of impact when the

raft is dropped into the water from an elevation say of 100 feet or so.

In use, the top surface of the body section 12 of the raft provides a horizontal surface 79 for supporting the body of a person which floats very near to the surface W of the water when the raft is unloaded, as viewed in FIG. 5. Preferably the body supporting top surface of the body section will ride at about 1 1/2 inches above the water surface. The raft settles into the water only slightly when loaded with one or even two persons and seldom does the top horizontal body supporting surface 79 of the box descend much below water level.

It is possible to place an injured person on the raft rapidly and without jostling because the supporting surface 79 is completely open and unobstructed at the rear end of the raft to provide a rear loading deck section. The raft is merely depressed slightly at the rear end, preferably below water level, by the weight of one or two attendants applied at the rear of the pontoons so that the injured person may actually be floated onto the raft from the rear. Obviously, there is no need to lift the body of the person over the pontoons. However, the tops of the pontoons are above the supporting surface 79 to provide side rails and hence a degree of lateral confinement for the person upon the body section 30 of the raft. The lines 70 and 71 should be crossed over the person and tied in crossed relation to the rear end frame bars so that he will be secure on the raft while the raft is pulled ashore or to an emergency vessel. The person may be more securely tied down if straps 50 are used, as they should be if the raft is lifted to a helicopter for example. The injured person may be left on the raft during transfer to an ambulance and subsequent removal to a hospital. In other words, the raft serves as a litter for transfer of the person on shore, making it unnecessary to move him to another stretcher.

The use of the life lines 58, 59, 60 and 61 is primarily to assist persons hanging onto the raft around the sides. Obviously, the raft might be used as a life raft for a larger vessel and will support a large number of victims holding onto the side.

FIGS. 8 to 12 illustrate a raft having a slightly modified construction and generally designated 100. The raft 100 comprises a body section 120, pontoons 140 and a frame structure 160 of one piece or integral construction tying the body section 120 and pontoons together as a unit.

The frame structure 160 is the same as the frame structure 16 of the first embodiment except that the corners joining the front and rear transverse members 260 and 280 to the outer side frame members 180 and 200 are square rather than rounded.

The body section 120 is generally like the body section 12 of the first embodiment and includes an elongated and generally rectangular box 300 having a flat horizontal bottom wall 320, and side and end walls 340, 360 and 380 extending upwardly from the bottom wall. At the front, the body section has a forwardly and upwardly inclined section 400 turned upwardly preferably at approximately a 25° angle in the plane of the upwardly inclined portions of the longitudinally extending frame members. The longitudinal frame members 220, 240, 220' and 240', and the transverse frame members 260 and 280 are molded in and secured to the body section along the sides and ends thereof as shown. Preferably, the body section is a molded body of the same plastic material as the body section of the first embodi-

ment, namely, polyurethane. Desirably, the polyurethane is enclosed by top and bottom sheets or skins 301 and 302. The top skin 301 extends over the entire upper surface of the box, and the bottom skin extends over the entire bottom surface of the box as well as the side and end walls 340, 360 and 380. These skins may be of a suitable plastic such as ABS.

As in the case of the first embodiment, when the raft 100 is unloaded and afloat in the water, the top of the box 300 is disposed substantially horizontally and in a plane preferably slightly above the water surface W (about 1 1/2 inches) providing a supporting surface for the body of a person.

The extension 400 is an integral part of the box 300. It may serve as a headrest for a person supported on the raft. Oftentimes it is desirable however for the head of an injured person not to be elevated and for that reason the main horizontal top surface portion of the box should be long enough to support the full length of a person.

The pontoons 140 are similar to pontoons 14 previously described and preferably are molded of the same plastic material, namely polyurethane. Desirably, the polyurethane is covered with sheets or skins of a plastic such as ABS. The skins covering the pontoons on the top and bottom are actually in this instance lateral extensions of the top and bottom skins covering the body section 120 and it will be noted that these skins of the illustrated embodiment touch each other for the full length of the space between the pontoons and the sides of the body section. The pontoons are generally cylindrical throughout most of their length except for the top surface portions thereof which as seen are substantially flat and slope downwardly and inwardly from a level above the top surface of the box 300 at their outer longitudinal edges to about the level of the top surface of the box 300 at their inner longitudinal edges. This slope of the top surfaces of the pontoons presents a natural barrier to prevent a person on the body section of the raft from falling over the side. The outer longitudinal frame members 180 and 200 extend centrally through and are molded and secured within the pontoons as shown.

The undersides of front ends of the pontoons are inclined in an upward and forward direction at the same angle as the undersides of the upwardly inclined forward section 400 of the box 300 and in a plane substantially coinciding therewith. Hence when pulled through the water, the raft will ride over the water surface and not tend to plow through the water or nose under.

Referring to FIG. 9, it will be noted that the pontoons 140 are spaced laterally outwardly from the body section 120 so as to provide the elongated slots or grooves 850 and 860 in the underside which extend substantially the full length of the raft and are open at both ends. These slots or grooves provide channels for the flow of water as in the first embodiment when the raft is pulled in a lengthwise direction, to reduce or eliminate fishtailing.

Elongated rails 480 extend lengthwise along both sides of the body section 120 above the top surface of box 300, being secured to the frame members 220 and 240 by anchor brackets 490. These brackets are preferably welded to the frame members 220 and 240 at longitudinally spaced points and project vertically upwardly therefrom. The rails 480 have mounting tabs 481 secured thereto as by welding at spaced points

along their length which are adapted to be bolted to the anchor brackets. In the manufacture of the raft the anchor brackets are preferably welded to the frame members 220 and 240 before the frame is placed in the mold and the body section 120 and pontoons 140 molded thereon, with slits being cut in the top sheet of ABS to clear the anchor brackets. After the body section and pontoons have been molded to the frame, the rails 480 are bolted to the anchor brackets.

The anchor brackets have large openings 491 which may have life lines or lifting rings secured to them or additional lines to secure a person on the raft as in the first embodiment. Such holes may also be used with a suspension system by means of which the rescue litter may be picked out of the water, as in the first embodiment.

The other holes 492 in the anchor brackets may be used for any purpose. The front holes in the front brackets may for example be connected to tow lines. Tow lines from the front bracket should extend beneath the upwardly inclined front portion 400 of the body section 120 and for this purpose the body section should be formed with small holes to clear the tow lines. A stern line if desired might be connected to the rear hole in a rear anchor bracket. Transverse straps similar to the straps 50 in the first embodiment may be extended across the top of the box 300 and connected to rails 480 to strap a person securely on the body section 120.

The raft 100 may be used in the same manner as the raft 10, and for the same purposes.

What I claim as my invention is:

1. A raft adapted for use as a rescue or recovery litter, comprising an elongated body section, elongated parallel floatable pontoons on opposite sides of said body section, a frame structure connecting said body section and pontoons together, said body section having a flat horizontal upper surface adapted to support a person thereon, said upper surface being disposed below the tops of said pontoons and when said raft is afloat unloaded being disposed near water level, said upper surface extending continuously to the rear end of said raft to provide an unobstructed loading deck portion by means of which a person may be floated onto said upper surface, the undersurfaces of said body section and pontoons having upwardly and forwardly inclined front end portions to facilitate forward movement through the water, said pontoons being spaced laterally outwardly from said body section, said body section having opposite sides extending downwardly beneath said upper surface thereof in opposed confronting relation to said pontoons and cooperating with said pontoons to provide longitudinally extending slots in the underside open at the front and rear for the free flow of water therethrough when said raft is pulled lengthwise through the water, thereby to reduce any tendency of the raft to fishtail, said body section being relatively hard, tough and shock resistant on its surfaces.

2. The raft defined in claim 1, wherein brackets are rigidly secured to said frame structure, said brackets being adapted to have lifting rings or life lines or the like secured thereto.

3. The raft defined in claim 1, including side rails extending lengthwise of said body section along opposite sides thereof and rigidly secured to said frame structure, said side rails serving as anchors for transverse

straps adapted to extend across said body section to secure the body of a person thereon.

4. A raft adapted for use as a rescue or recovery litter comprising an elongated floatable body section, elongated parallel floatable pontoons on opposite sides of said body section, a frame structure connecting said body section and pontoons together, said frame structure being of unitary construction having laterally spaced parallel outer side frame members extending lengthwise through and secured to said pontoons, said frame structure also having laterally spaced parallel inner side frame members extending along opposite side portions of and secured to said body section, said body section having a flat horizontal upper surface adapted to support a person thereon, said upper surface being disposed below the tops of said pontoons and when said raft is afloat unloaded being disposed slightly above water level, said upper surface extending continuously to the rear end of said raft to provide an unobstructed loading deck portion by means of which a person may be floated onto said upper surface when said loading deck portion is depressed to or below water level, the undersurfaces of said body section and pontoons having upwardly and forwardly inclined front end portions to facilitate forward movement through the water, said pontoons are spaced laterally outwardly from said body section, said body section being of substantial thickness and having opposite sides extending downwardly beneath said upper surface thereof in opposed confronting relation to said pontoons and cooperating with said pontoons to provide longitudinally extending slots in the underside which are of uniform width throughout their length and open at the front and rear for the free flow of water therethrough when said raft is pulled lengthwise through the water, thereby to reduce any tendency of the raft to fishtail, said body section being relatively hard, tough and shock resistant on its surfaces.

5. The raft defined in claim 4, wherein said grooves are closed at the top throughout the length thereof.

6. The raft defined in claim 5, including side rails extending lengthwise of said body section along opposite sides thereof, means rigidly securing said side rails to said inner side frame members, said side rails serving as anchors for transverse straps adapted to extend across said body section to secure the body of a person thereon.

7. The raft defined in claim 6, wherein said means rigidly securing said side rails to said inner side frame members comprise brackets rigidly secured to said inner side frame members in spaced relation longitudinally thereof, said brackets being adapted to have lifting rings or life lines or the like secured thereto.

8. A raft adapted for use as a rescue or recovery litter, comprising a body section adapted to support a person, elongated parallel pontoons on opposite sides of said body section, frame structure connecting said body section and pontoons together, said frame structure being of unitary construction having laterally spaced parallel outer side frame members extending lengthwise through and secured to said pontoons, said frame structure also having laterally spaced parallel inner side frame members extending along opposite sides of and secured to said body section, said frame structure including transverse front and rear frame members respectively connected to the front and rear ends of said inner and outer side frame members, and

to the front and rear ends of said body section, said body section having a flat horizontal upper surface adapted to provide a support for a person, said pontoons being spaced laterally outwardly from said body section, said body section being of substantial thickness and having opposite sides extending downwardly beneath said upper surface thereof in opposed confronting relation to said pontoons and cooperating with said pontoons to provide longitudinally extending open ended slots for the flow of water when said raft is pulled lengthwise through the water, to reduce any tendency to fishtail, said upper surface being disposed below the tops of said pontoons and when said raft is afloat unloaded being disposed slightly above water level, said upper surface extending continuously to the rear end of said raft to provide an unobstructed loading deck section by which a person may be floated onto said upper surface when said loading deck section is depressed to or below water level, said flat upper surface extending horizontally from the rear end of said raft in a forward

direction and terminating at the front end of said raft in an upwardly inclined headrest portion, said body section and said pontoons having upwardly and forwardly inclined front end portions to facilitate forward movement through the water, brackets rigidly secured to said outer side frame members and projecting through the surfaces of said pontoons in spaced relation longitudinally thereof, said brackets being adapted to have lifting rings or life lines or the like secured thereto, side rails extending lengthwise of said body section along opposite sides thereof and rigidly secured to said inner side frame members, said side rails serving as anchors for transverse straps adapted to extend across said body section to secure the body of a person thereon, said body section being relatively hard, tough and shock resistant on its surfaces.

9. The raft defined in claim 8, wherein said body section and said pontoons are made of polyurethane.

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