Oct. 2, 1956 J. F. BOYLE ET AL 2,764,766

INFLATABLE LIFE RAFT

Filed July 22, 1953 4 Sheets-Sheet 1

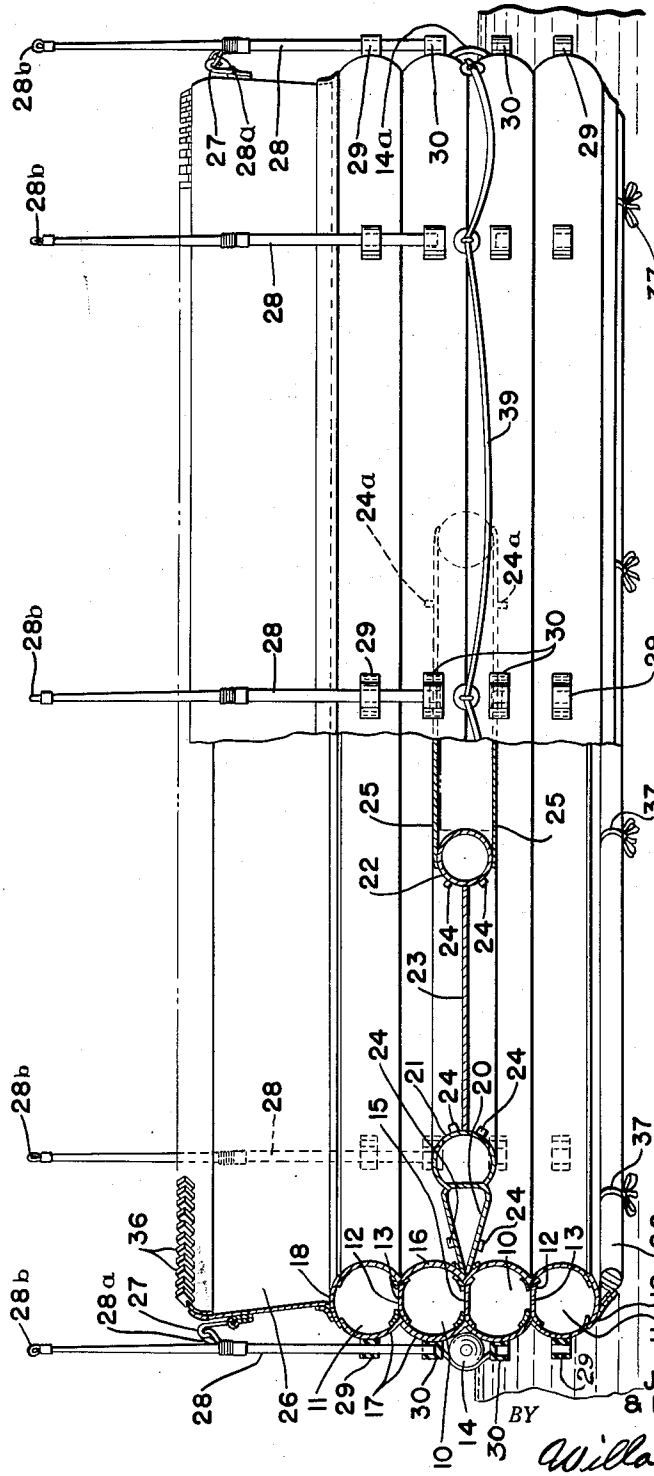


FIG. 1

INVENTORS
JAMES F. BOYLE
& MYRON L. TAYLOR
BY
Willard D. Eaton
ATTORNEY

Oct. 2, 1956 J. F. BOYLE ET AL 2,764,766

INFLATABLE LIFE RAFT

Filed July 22, 1953 4 Sheets-Sheet 2

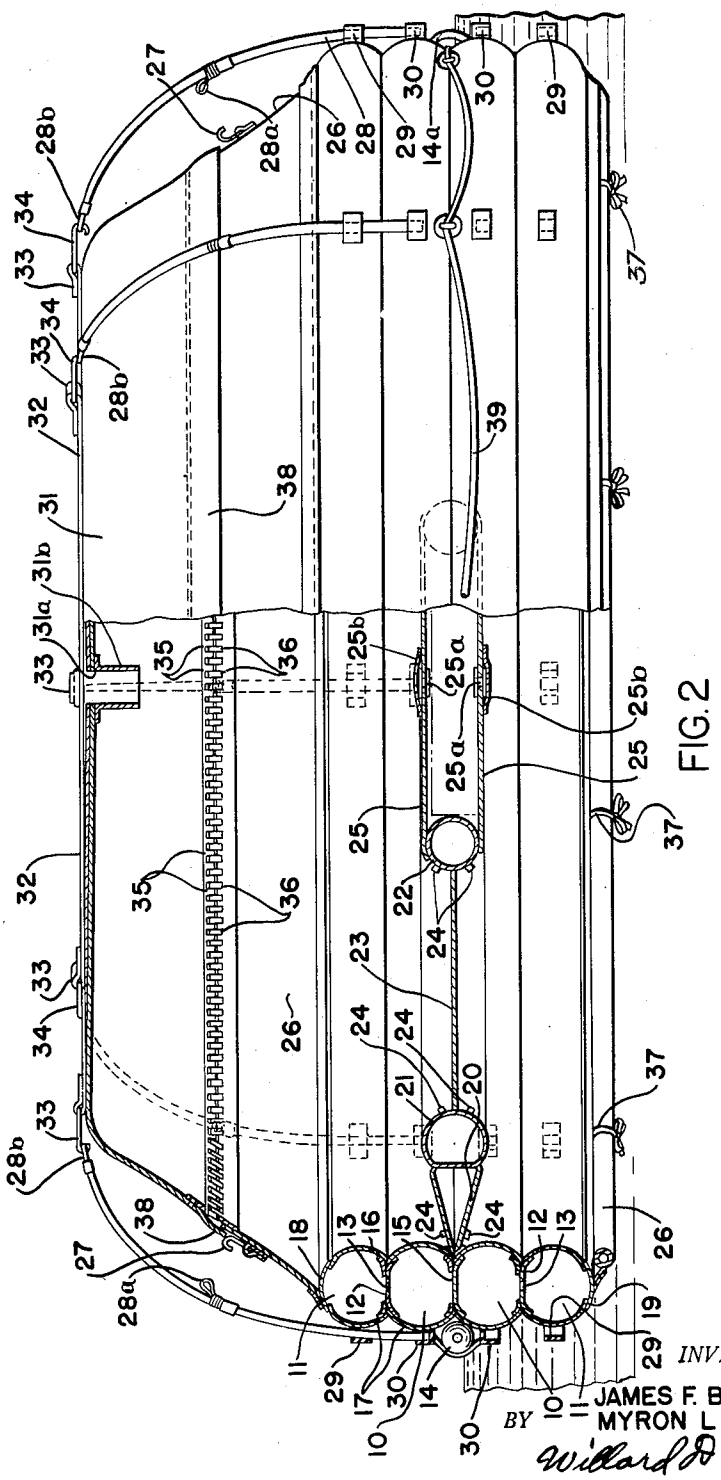


FIG. 2

INVENTORS
JAMES F. BOYLE &
MYRON L. TAYLOR
BY Willard D. Eakin
ATTORNEY

Oct. 2, 1956 J. F. BOYLE ET AL 2,764,766

INFLATABLE LIFE RAFT

Filed July 22, 1953 4 Sheets-Sheet 3

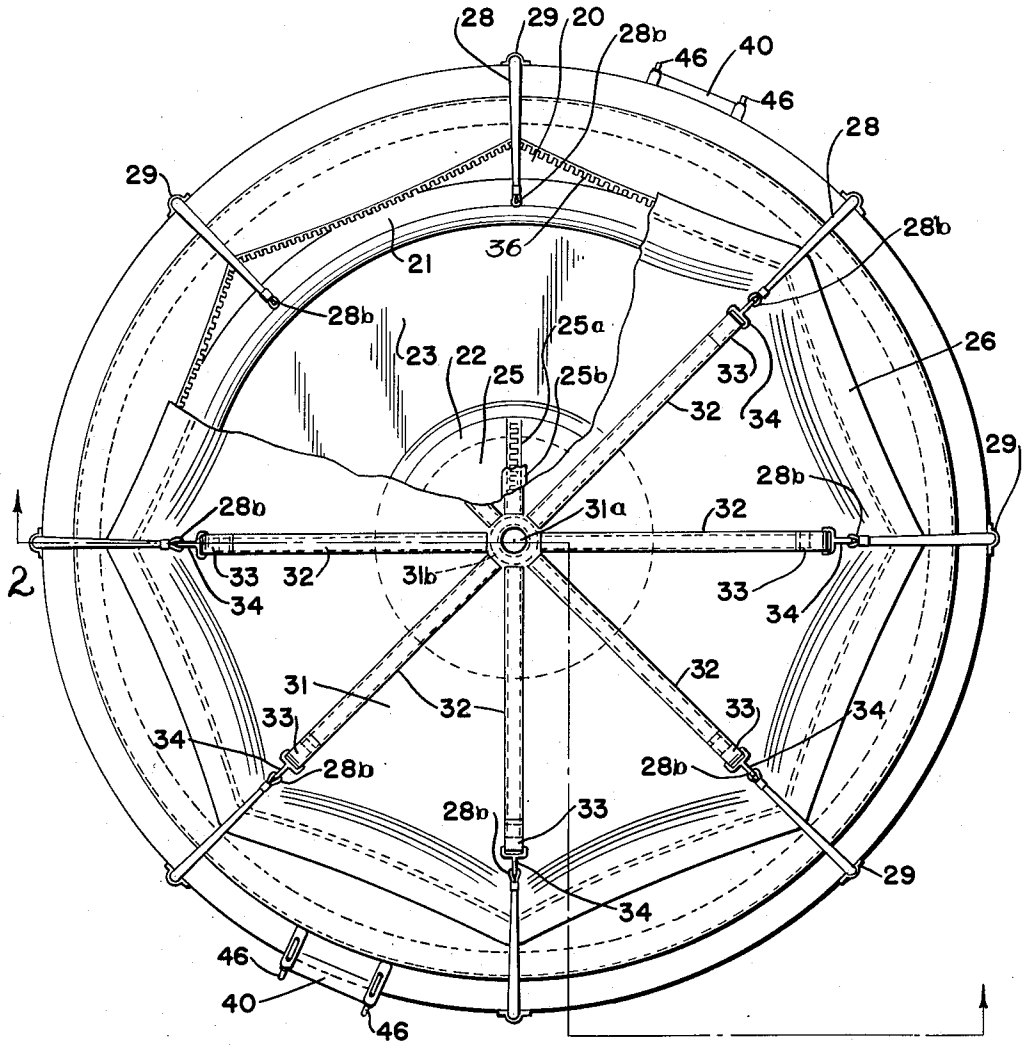


FIG. 3

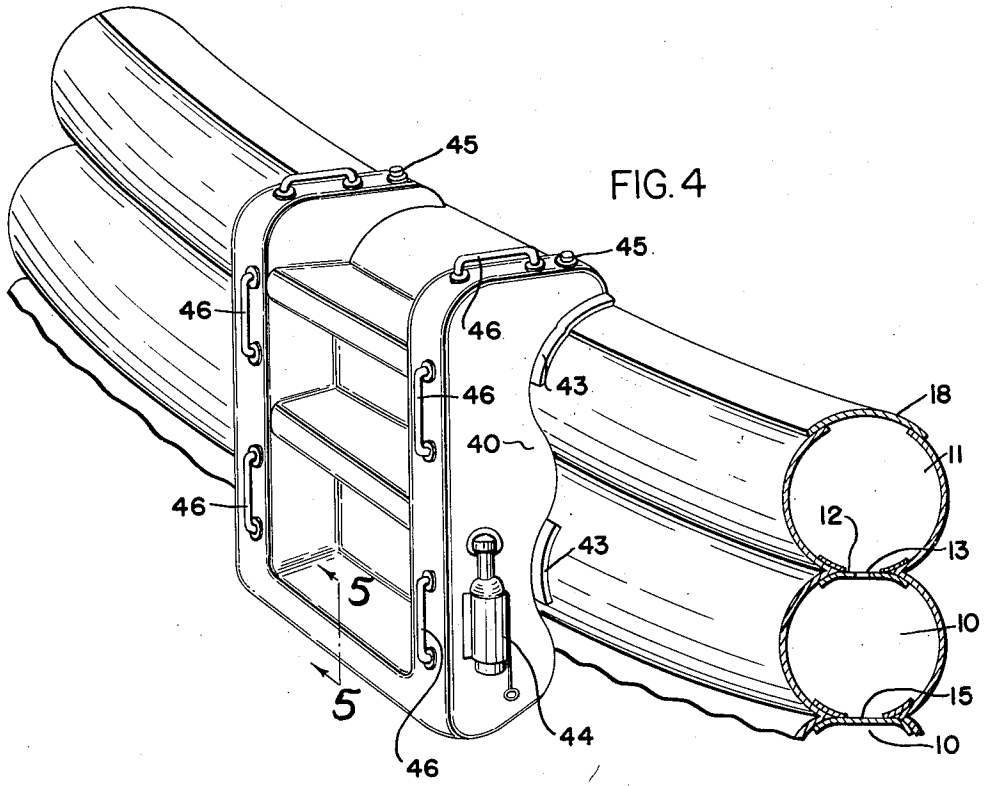
INVENTORS
JAMES F. BOYLE &
MYRON L. TAYLOR
BY
Willard D. Eaton
ATTORNEY

Oct. 2, 1956 J. F. BOYLE ET AL 2,764,766

INFLATABLE LIFE RAFT

Filed July 22, 1953 4 Sheets-Sheet 4

FIG. 4



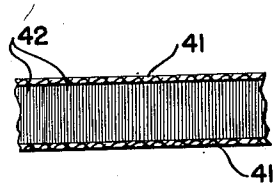


FIG. 5

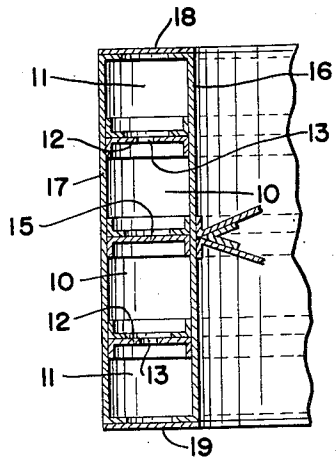


FIG. 6

INVENTORS
JAMES F. BOYLE &
MYRON L. TAYLOR
BY Willard D. Eaton
ATTORNEY

United States Patent Office

2,764,766

Patented Oct. 2, 1956

2,764,766

INFLATABLE LIFE RAFT

James F. Boyle, Teaneck, and Myron L. Taylor, Sea Girt, N. J., assignors, by mesne assignments, to The Garrett Corporation, Los Angeles, Calif., a corporation of California

Application July 22, 1953, Serial No. 369,652

8 Claims. (Cl. 9—11)

This invention relates to inflatable lift rafts and particularly those of the type in which the flotation part of the raft comprises one or more endless fluid-distensible elements surrounding the occupant-receiving space, with a fabric floor joined to the said flotation part in an annular zone at or near the middle plane of the latter, so that the raft can be inflated, with substantially the same serviceability, with either of its sides up.

Our chief objects are to provide a raft of this type adapted to have high freeboard, for comfort and protection of the occupants; to provide an endless, flexible, fluid-distensible buoyancy element having desirable uniformity of inflation-produced tension in horizontally disposed zones of its wall; to provide for economical manufacture of the flotation element or elements of such a raft from a small number of pieces of water-proof fabric of simple form, with a minimum of tailoring of the fabric; to provide a comfortable seat structure for the occupants; to provide a well supported floor for the raft; to provide convenient stowage of accessories; to provide an improved spray shield and means for supporting it; to provide an improved canopy and means for supporting it; to provide an improved combination of spray shield and canopy, each usable independently of the other but adapted to be joined to each other to provide a substantially complete enclosure of the raft's occupants; to provide for quick and easy mounting and dismounting of the spray shield and of the canopy; to provide improved supporting and tensioning means for each of the two; to provide for quick and easy partial disconnection of the canopy and spray shield at a selected leaward or windward position, as for ventilation or for observation; to provide conveniently for collection of rain water; and to provide improved boarding means to facilitate boarding or entrance of the raft from the water.

More specific objects will be manifest in the following description.

Of the accompanying drawings:

Fig. 1 is an elevation, with parts sectioned and broken away, of a raft embodying our invention in its preferred form, with the spray shield, but not the canopy, in service position.

Fig. 2 is an elevation of the same with the canopy and the spray shield in service position and joined to each other for substantially complete enclosure of the occupants.

Fig. 3 is a top plan view of the raft with the canopy and spray shield in position as in Fig. 2, a part of the canopy being broken away.

Fig. 4 is a fragmentary perspective showing the boarding means.

Fig. 5 is a fragmentary section of inflatable sheet material that preferably is used in the boarding means shown in Fig. 4.

Fig. 6 is a fragmentary section showing the preferred structure of the main inflatable flotation elements of the raft.

Referring to the drawings the main flotation or buoyancy elements of the raft comprise, each way from the horizontal middle plane of the raft, inflation chambers **10** and **11** partially defined by a horizontal water-proof fabric bulk-head **12** between them and formed with one or more apertures **13**, so that each chamber **11** is in communication with the adjacent chamber **10** and is adapted to be inflated therefrom by means of the usual compressed-gas cylinder device **14**, with the usual equalizer tube **14a** connecting the two chambers **10**, **10**.

The two chambers **10**, **10** are separated by an imperforate horizontal bulk-head **15**.

The preferred manner of constructing the water-proof fabric assembly that defines the main buoyancy chambers is shown in Fig. 6, in which **16** and **17**, constituting respectively the peripherally inner and outer walls of the assembly, are strips of fabric, either cut with the weave or bias, made endless by seaming. The fabric pieces **12**, **12** and **15**, constituting the bulk-heads of Figs. 1 and 2, and pieces **18** and **19**, constituting the top and bottom elements of the structure, are so cut from the flat fabric that they have appropriate curvature in their own planes. Economy of fabric is provided as compared with former types of construction.

These several pieces are seamed to one another while in the simple form in which they are shown in Fig. 6 and upon inflation the structure assumes the shape shown in Figs. 1 and 2.

The horizontal bulk-heads cause the structure to assume a shape in which it has greater height than it would have if, with the same amount of outer wall fabric, the bulk-heads were not present, and this provides greater free-board, for protection of the occupants and for a high back-support for occupants seated with their backs against the top-side part of the structure.

In strength, appearance and raft capacity for a given amount of fabric the type of construction just described is superior to rafts as heretofore made by assembling and seaming to one another a plurality of straight tubular elements in such manner as to produce a flotation assembly of polygonal form.

The floor or deck of the raft comprises a tubular seat element **20** seamed to the main flotation structure along the middle line of the latter's inner periphery and so seamed at its inner periphery to an endless tubular auxiliary flotation member **21**, and thus connected to other deck structure, that it, the seat element, assumes approximately triangular cross-sectional form upon inflation, with its inner periphery of approximately the same vertical dimension as that of the auxiliary flotation member **21**, which serves along with the triangular element as a part of the seat.

This construction provides a seat that slopes backwardly with relation to an occupant having his back against the two upper cells of the main flotation structure, which provides comfort and also prevents sliding of the occupant toward the center of the deck in case of a heavy sea.

These same advantages are contributed to also by an endless tubular auxiliary flotation member **22** of which the outer periphery, at its middle plane, is connected to the member **21**, at the middle plane of the latter's inner periphery, by an annular deck sheet of fabric **23**, the tubular member **22** serving as a foot rest and having other functions as will be hereinafter described.

The proportions preferably are such that the deck sheet **23** has only a comparatively short radial dimension from the annular flotation member **21** to the annular flotation member **22**, so that the deck sheet is not badly subject to depression by weight imposed upon any part of it, and the proportions also preferably are such that the deck sheet **23** is held tensioned between those two flotation members so that both of them, by resisting increase

of their great diameters, supplement the stretch resistance of the deck sheet for holding the seat member **20** to its approximately triangular form.

The flotation seat element **20** and the auxiliary flotation deck tubes **21** and **22** preferably are provided with inflating valve stems **24, 24** on each side of the deck, for pump or mouth inflation, from whichever side of the deck is uppermost, at the convenience of the occupants, after the main flotation structure has been inflated by the compressed-gas cylinder device **14**.

Air or gas in the seat elements insulates the occupants from the cold of the water under the deck.

In the central region of the deck a water-tight stowage chamber for accessories is provided by circular sheets of water-proof fabric **25, 25** joined to the flotation tube **22** in annular seams at the opposite, upper and lower sides of the latter. Each sheet **25** is formed with a diametric slit closed, except when required to be opened, by a slide fastener **25a** (Figs. 2 and 3) which is sealed by a removable strip **25b** of permanently adhesive water-proof tape. Each of the closure sheets **25** preferably is provided with an inflating valve-stem **24a**, so that the accessory chamber can also be employed as a flotation element.

Secured in a water-proof annular seam to the side of each cell **11** that is farthest from the horizontal middle plane of the raft is an annular, water-proof fabric spray-shield **26** provided near its other margin with circumferentially spaced hooks **27, 27** adapted to be hooked into respective rings or loops **28a, 28a** mounted respectively upon a circumferentially spaced set of resiliently flexible supporting rods **28**, preferably telescopic, for stowage, which are frictionally mounted, on occasion, in respective sets of loops **29** and sockets **30** which are suitably secured to the outer periphery of the main flotation structure. When held up in this manner the annular fabric sheet **26** serves, without the canopy, as a spray shield.

The mounting of the rods **28** on the outer periphery of the main buoyancy structure gives the raft large internal capacity, and their resilience keeps the spray shield and the canopy tensioned.

The water-proof fabric canopy, **31**, Figs. 2 and 3, is provided with a central hole **31a** and a sleeve **31b** extending downwardly therefrom to serve as a spout for directing rain water caught upon the canopy.

The canopy is reinforced by radial seam strips **32, 32** each having mounted in a looped-back and seamed portion **33** at its outer end a hook **34** adapted to be engaged, on occasion, in an eye **28b** mounted upon the outer end of the respective flexible rod **28**.

The lower annular margin of the canopy is provided with a succession of sets of slide-fastener jaws **35, 35**, adapted to be engaged respectively with mating sets of slide-fastener jaws **36, 36** mounted upon the upper margin of the spray-shield **26**.

Preferably the spray shield **26** is first put up as shown in Fig. 1 and then after the canopy has been mounted, the hooks **27** of the spray shield are disengaged in succession from their anchorage rings **28a** as the adjacent parts of the canopy and spray shield are in succession joined by the respective slide-fasteners **25—26**.

The two spray shields **26, 26** preferably are joined permanently to the main flotation structure and for stowage they are furled and held by ties **37, 37**, as shown with regard to the lower spray shield in Figs. 1 and 2.

Preferably the slide-fastener elements **35** are mounted by the securing of their tape to the inner face of the canopy near its margin **38**, with the margin of the canopy extending in rain-shedding relation over the slide fastener, as shown clearly in Fig. 2.

With a succession of individual slide fasteners, one or more of them can be disengaged, as for ventilation, or for observation, while the others are left engaged.

The construction described provides for simple, quick and easy mounting and dismounting of the spray shield and of the canopy.

The raft is shown as being provided with the usual life-line **39**.

For easy boarding of the raft it is provided, preferably at diametrically opposite positions, with respective inflatable ladders **40, 40** for alternative inflation and use according to which side of the raft is uppermost in the water when the main buoyancy structure has been inflated.

Each ladder is tailored of what is well known in the rubberized fabric art as "mattress fabric," shown in section in Fig. 5 and consisting of imperforate, air-tight, spaced apart surface sheets **41, 41** connected by a multiplicity of closely spaced threads **42, 42** of equal length from surface sheet to surface sheet, so that the surface sheets will remain substantially flat and evenly spaced apart throughout their extent, with the exception of seams, when an article tailored of the material is inflated.

Each ladder preferably is shaped to fit the contour of the adjacent cells **10** and **11** when it and they are in inflated condition and preferably the ladder is permanently anchored to them as by means of anchorage patches **43, 43**.

Each ladder preferably is provided with its own compressed-gas-cylinder inflating device **44**, Fig. 4, with deflation valves **45, 45** and with handle loops **46, 46**.

Various modifications are possible without sacrifice of all of the advantages set out in the above statement of objects and without departure from the scope of the invention as defined in the appended claims.

We claim:

1. A raft comprising an endless side-wall structure and a flexible deck secured and sealed along its outer margin to said side-wall structure throughout an endless, horizontally extending zone of said side-wall structure, said deck comprising a radially-outer flexible deck element and, secured and sealed along its outer margin to the inner margin of said element, a flexible-walled, endless, fluid-distensible, tubular member surrounding a stowage space, a flexible end closure member, for each end of said space, secured and sealed at its outer, endless margin to the adjacent face of the said tubular member, each of said closure members being formed with an access opening, and means for sealing said opening in closed condition.

2. A raft as refined in claim 1 in which the means for sealing the access opening of the end closure member comprises a slide fastener for joining opening-defining margins of the end closure member that define said opening.

3. A raft comprising a flexible, fluid-distensible, side-wall member and a boarding ladder mounted upon said side-wall member in position to be used for boarding of the raft, said ladder comprising a pair of flexible-walled, fluid-distensible side-rail members and rung members connecting said side-rail members.

4. A raft comprising a flexible, fluid-distensible, side-wall member and a boarding ladder mounted upon said side-wall member in position to be used for boarding the raft, said ladder comprising a pair of flexible-walled, fluid-distensible side-rail members and rung members connecting said side-rail members, each of said rung members being a flexible-walled, fluid-distensible member.

5. A raft as defined in claim 3 in which each of the recited side-rail members comprises internal tie means, holding it, against internal fluid pressure, to wide and thin cross-sectional shape.

6. An inflatable raft comprising a tubular, circumferentially disposed, fluid-distensible, main buoyancy element, upstanding posts directly secured only to the said element, and protective means supported by said posts, the said protective means having anchorage to the respective posts at positions on the outboard side of the circumferentially extending medial line of the said buoyancy

element, and the posts being mounted upon the outer periphery of the said buoyancy element.

7. A raft as defined in claim 6 in which the defined protective means comprises a spray shield having its lower margin permanently secured and sealed to the defined buoyancy member along a zone that is inward, toward the center of the raft, from the defined posts, and including fastening means for detachably securing the upper margin of the spray shield to the recited posts.

8. A raft as defined in claim 7 and including a canopy, means for securing said canopy to the recited posts, and means for securing the outer margin of the canopy, in substantially water-tight relation to the upper margin of the spray shield.

References Cited in the file of this patent

UNITED STATES PATENTS

1,686,366	Boyle	Oct. 2, 1928
2,334,072	Cooper	Nov. 9, 1943
2,367,902	Taylor	Jan. 23, 1945
2,407,666	Kearney	Sept. 17, 1946
2,413,226	Hallward	Dec. 24, 1946
2,413,985	Manson	Jan. 7, 1947
2,421,679	Bingham	June 3, 1947
2,508,304	Sturtevant	May 16, 1950

FOREIGN PATENTS

19,769	Great Britain	of 1898
78,855	Austria	Oct. 25, 1919
238,417	Great Britain	Aug. 20, 1925
636,776	Great Britain	May 3, 1950
673,417	Great Britain	June 4, 1952

OTHER REFERENCES

Popular Mechanics, July 1951, pp. 84 and 85, 9—2.1.