Sept. 9, 1952 C. P. KRUPP 2,609,549

PROTECTIVE CASE FOR INFLATABLE ARTICLES

Filed May 24, 1950 3 Sheets-Sheet 1

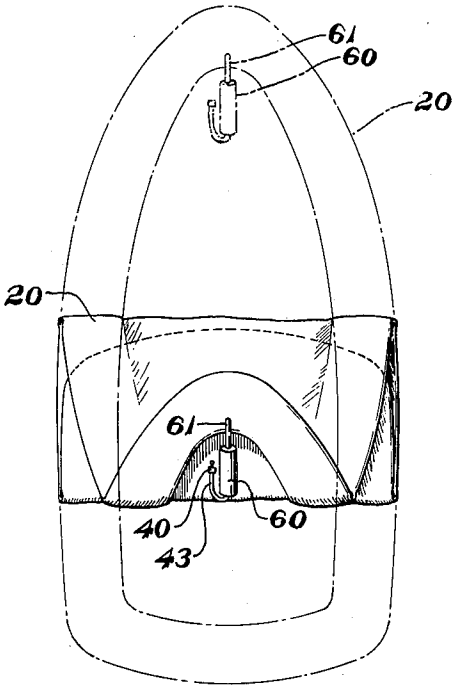


Fig-1

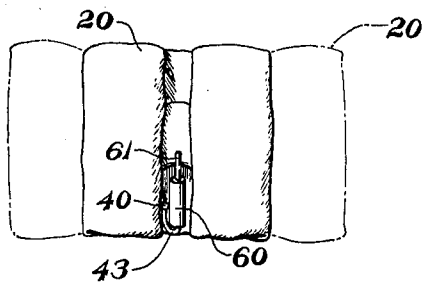


Fig-2

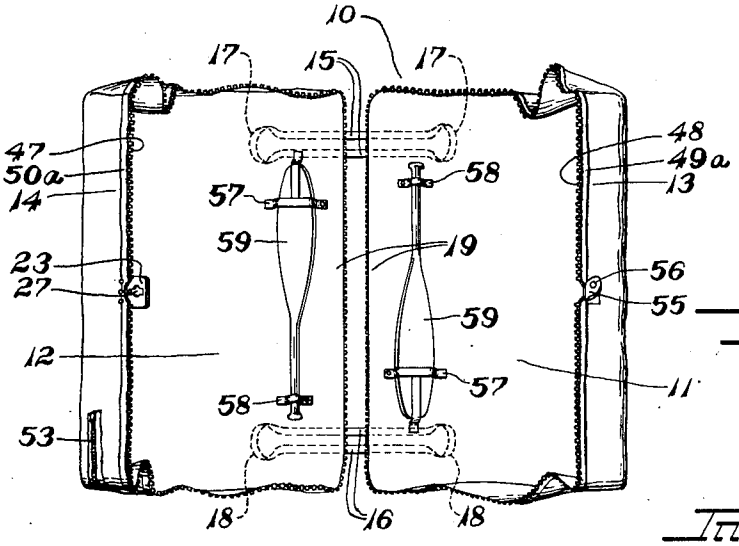


Fig-3

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PROTECTIVE CASE FOR INFLATABLE ARTICLES

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Fig-4

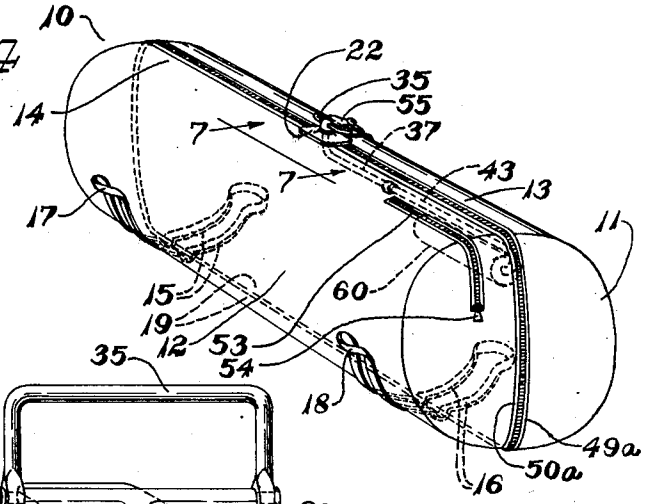
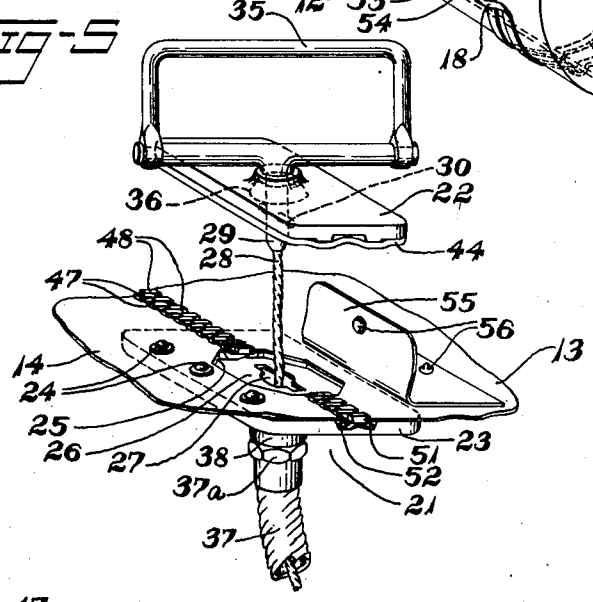


Fig-5



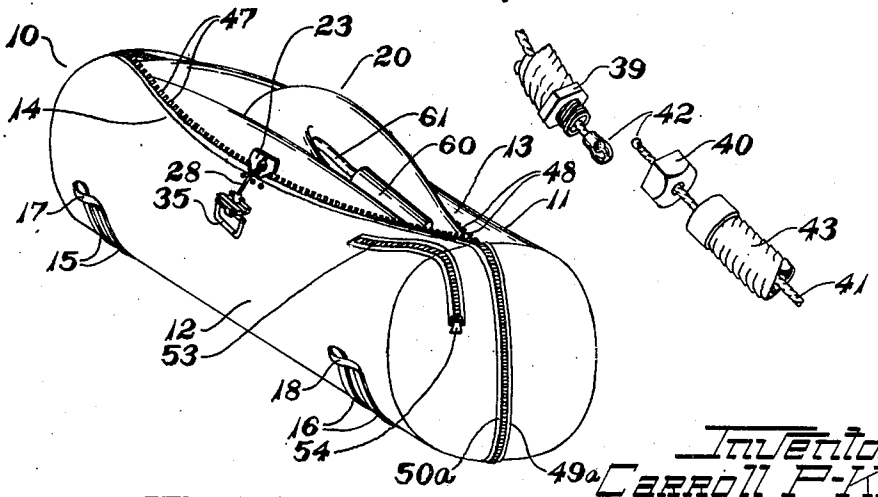


Fig-6

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PROTECTIVE CASE FOR INFLATABLE ARTICLES

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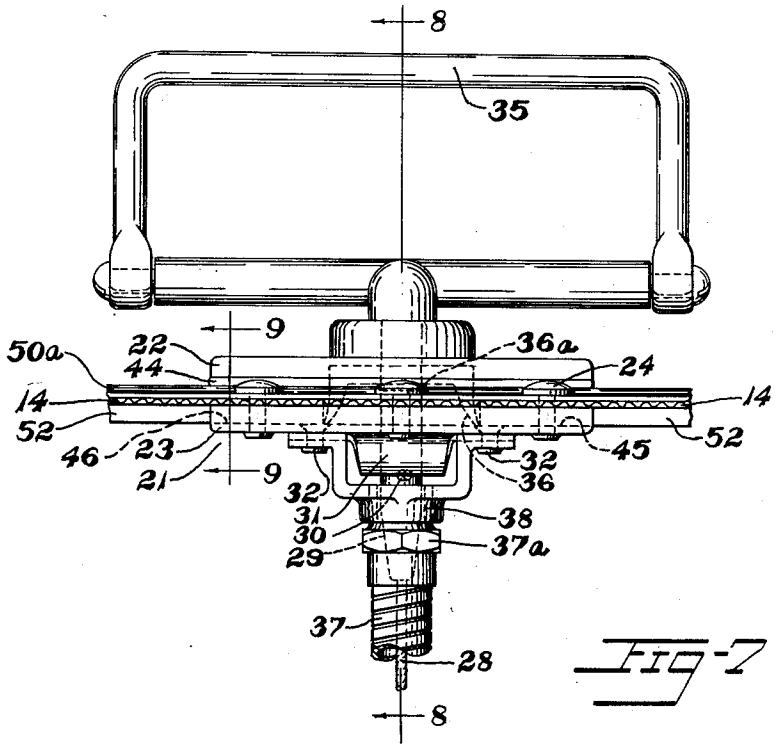


Fig-7

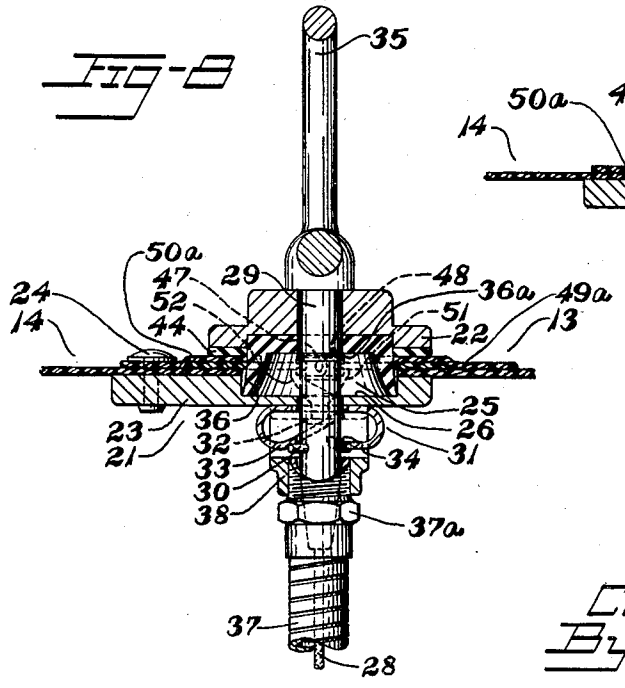


Fig-8

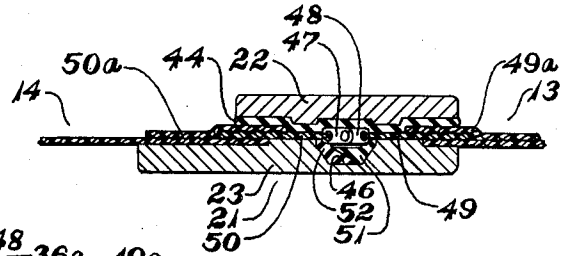


Fig-9

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UNITED STATES PATENT OFFICE

2,609,549

PROTECTIVE CASE FOR INFLATABLE ARTICLES

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Application May 24, 1950, Serial No. 164,019

9 Claims. (Cl. 9—11)

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This invention relates to protective cases for containing inflatable articles in their deflated condition, and having provision for quick-opening under inflation of the contained article such, for example, as a deflated life raft and the like.

Heretofore, life rafts of bulky, non-collapsible construction, with or without protective tarpaulins thereon, have occupied an objectionably large storage space on the deck of a ship and have required davits or other mechanical lifting devices for launching the rafts into the water, which launching has consumed an objectionable amount of time, especially under emergency conditions.

Life rafts of the inflatable type, generally stored in a deflated, folded condition and wrapped in a tarpaulin or other suitable covering, have necessitated removal of the tarpaulin, unfolding and inflation of the raft on the deck before launching the raft into the water. Under emergency conditions, for example, such storage and launching of the raft have been objectionable because considerable time is spent in uncovering and unfolding the raft, in inflating it, and in lowering the inflated raft from the deck into the water; because the inflated raft is awkward to handle during the launching, and because there is danger of accidental loss or lack of suitable inflating apparatus for the raft.

An object of the invention is to provide for overcoming the foregoing and other disadvantages.

Other objects of the invention are to provide for quick-opening of a protective case by the application of internal expansive force to a divided wall thereof; to provide for protecting effectively an inflatable article in the deflated condition; to provide for packing the deflated article compactly in the case and for releasing the packaged article by inflating the same; to provide for preventing the entrance of water or other liquid into the case in the closed condition thereof; to provide for maintaining buoyancy of the case with the deflated article therein; to provide for inflating the contained deflated article by operation from the exterior of the case; to provide for opening the case and inflating the article by operation from a position close to or remote from the case; and to provide for simplicity of construction, convenience of manufacture, storage and use, and for effectiveness of operation.

More specific objects are to provide for an improved flexible construction of a protective case for containing an inflatable life raft or like article in the deflated condition; to provide for separably joining sections of the case and for effective sealing of the joined sections; to provide for separability of the joined sections under the action of inflating pressure-fluid introduced into the deflated raft in the case; to provide for inflating the raft by operation from the deck of a ship or from the surface of the water in which the closed protective case is floating; to provide for flexibility, foldability and waterproofness of the case; to provide for reliability of inflating the raft while in the case; to provide for inspection and servicing of the contained raft and its accessories; to provide for minimizing the storage space required for the raft on the ship; to provide for convenience of launching the raft from the ship; and to provide for portability of the case and contained raft.

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These and other objects and advantages of the invention will be apparent from the following description.

In the accompanying drawings which form a part of this specification,

Fig. 1 is a view from above of an inflatable life raft in a deflated, partially folded condition, broken lines showing the raft in its extended or inflated condition,

Fig. 2 is a view from above showing the raft in a fully folded condition, broken lines indicating the partially folded raft as shown in Fig. 1,

Fig. 3 is a view of a protective case for containing the raft especially in the fully folded condition, the case being shown dissociated from the raft and fully opened and being constructed in accordance with and embodying the invention,

Fig. 4 is a perspective view of the protective case in its closed disposition having manipulating means connected with inflating means of the contained raft,

Fig. 5 is a perspective view of the case shown in Fig. 4 but having the manipulating means in disassembled relation and dissociated from the raft, parts being broken away,

Fig. 6 is a view like Fig. 4 but showing the protective case partially opened during an initial inflating phase of the contained raft,

Fig. 7 is a sectional view in an enlarged scale taken along line 7—7 of Fig. 4 showing the manipulating means mounted in assembled relation on the case with a handle in upraised position, parts being broken away,

Fig. 8 is a sectional view taken along line 8—8 of Fig. 7, parts being broken away, and

Fig. 9 is a sectional view taken along line 9—9 of Fig. 7, parts being broken away.

The protective case 10 shown in the drawings, is of divided or sectional construction including manipulating means for inflating a contained inflatable article 20 by operation exteriorly of the case, and including means for opening the case

quickly under the inflation of the article to release the same. The case is made of impervious, flexible material which may be strong, square-woven, textile fabric of cotton, nylon, rayon, or other suitable filamentary material coated or impregnated with a suitable material such as a natural or a synthetic rubber.

Although the protective case 10 may be made to accommodate the inflatable article such, for example, as a life raft 20 in the deflated, partially folded condition shown especially in Fig. 1, in the form illustrated, the case 10 is constructed and arranged to contain the life raft 20 in its fully folded condition shown especially in Fig. 2, for compact packaging and minimum occupied area on the supporting surface or deck of a ship or other vehicle carrying the lift raft.

The protective case comprises an entirely closed, elongated, hollow body or covering, as shown especially in Fig. 4, of divided form longitudinally thereof providing individual hollow sections 11 and 12, respectively, in separable relation one to the other, preferably fully separable, as shown especially in Fig. 3, which sections 11 and 12 have detachably united, adjoining margins or marginal portions 13, 14 extending longitudinally and peripherally thereof.

As shown especially in Fig. 4, the case case has a divided, flexible wall portion including the marginal portions 13 and 14 throughout most of the upper half of the case 10, which wall portion has an overall area coextensive with the maximum horizontal cross-sectional area occupied by the folded life raft. Thus, the flexible marginal portions 13, 14 constituting the divided wall at the upper region of the case have substantial area for facilitating passage of the raft therebetween by virtue of extensive inward or outward flexure of the marginal portions thereby promoting the insertion of the folded raft, or the release of the raft upon inflation thereof. The flexibility of the marginal portions 13, 14 together with the extensiveness of the divide longitudinally along the case facilitates a swinging movement of the sections 11 and 12 apart about a hinging zone at 19 along the lower region of the case upon inflation of the raft, which swinging of the sections advantageously further facilitates passage of the partly inflated raft outwardly between the marginal portions 13, 14 as shown especially in Fig. 6.

The invention provides manipulating means 21 disposed, as shown especially in Figs. 4, 5, 7, 8 and 9, on the margins 13, 14 desirably at the upper region of the case 10 and desirably at a position substantially centrally of opposite closed ends of the case for closing part of the margins 13, 14 of the longitudinal divide and for connection with the contained raft to facilitate inflating the same.

The manipulating means 21 includes a pair of clamping members or supporting plates 22, 23 of metal or other suitable strong, stiff material for disposition in mating, superimposed relation to one another, one of which plates 23 may be secured as by spaced-apart rivets 24, 24 to the margin 14 at its inside face, as shown especially in Figs. 5, 7 and 8. The plate 23 is mounted on the margin 14 so as to extend across the divide and substantially underlie and overlap the margin 13 for supporting locally both margins and for facilitating clamping the margins in edge-on relation between the plates 22, 23 for the engaged condition of the manipulating means.

The base plate 23 at its upper surface and at the divide, may have, as shown especially in Figs. 5 and 8, a shallow recess or depression at 25 of octagonal, circular or other suitable shape so as to provide a seating surface 26 substantially centrally of the plate, the margins 13, 14 being cut away at the depression. The plate 23, centrally of the depression at 25, has a keyed hole 27 through which a pull cable 28 of flexible, stranded wire, sheathed construction can be pulled.

The base plate 23 has grooves or channels 45, 46 in its upper surface, as shown especially in Figs. 5, 7 and 9, which channels extend longitudinally in the direction of the divide away from opposite sides of the depression at 25, that is, the channel 45 extends in one direction along the longitudinal divide from one end wall of the depression at 25 to one end of the base plate 23, while the channel 46 extends in the opposite direction along the longitudinal divide from the opposite end wall of the depression 25 to the other end of the base plate 23 and extends in alignment with the channel 45, as shown especially in Figs. 5 and 7. The functioning of these channels will be described more fully hereinafter. The upper plate 22, at its upper surface, may have a handle-mounting boss with an aperture for alignment with the hole 27 and, at its recessed under surface, may have relatively shallow, longitudinal channels for alignment with the channels 45, 46 and may be provided with a peripheral sealing gasket 44 of suitable rubber for accommodating variation in thickness of the margins 13, 14 where they overlie the base plate 23.

For quick engagement and disengagement of the upper plate 22 with the base plate 23, the manipulating means has separable engaging-clamping means which may comprise a metal stud 29 and cross pin 30 rotatively mounted in the aperture of the boss of the upper plate 22 and projecting downwardly therefrom for inserting through the keyed hole 27 and for engaging a hollow cage structure 31 fixedly secured to the under surface of the base plate 23 as by spaced-apart rivets 32, 33. The hollow cage structure 31 may be of sheet metal, bayonet lock type construction having indented cam portions 33, 34 upon which the cross pin 30 is adapted to ride and to seat in the indents for retaining separably the plates 22, 23 in their mating, clamping relation. The particular form of stud 29 and cage structure 31 shown in the drawings, is of the "cowl fastener" type generally used in aircraft.

The stud 29 is fixedly secured at its upper end to a suitable metal handle 35 and is secured at its lower end to the pull cable 28. A sealing washer 36 of resilient rubber having a dependent, tapered - in - cross - section, annular flange is mounted, as shown especially in Fig. 8, in the under recess of the upper plate as by a split locking ring 36a seating in a groove of the stud 29, whereby the flange of the washer 36 flexes and seals against the seating surface 26 to close the keyed hole 27.

A flexible sheath or cover 37 of spiral metal construction for the pull cable 28 may be attached to the base plate 23 by a nut type fitting 37a threadedly engaging an interiorly threaded boss of a suitable hollow, flanged support 38 secured also to the plate 23 by rivets 32, 32 as shown especially in Fig. 7. The flexible cover 37 at its lower end adjacent the engaging end of the pull cable 28 has, as shown especially in Fig. 5, an exteriorly threaded fitting 39 for

threaded engagement with a slidable nut 40 at the engaging end of a second pull cable 41. The adjacent engaging ends of the cables 28 and 41 have ball and socket means 42 for connecting separably the two cables. The second cable 41 has, desirably, a flexible sheath or cover 43 of suitable construction and suitably reinforced at its end nearest the nut 40.

For detachably uniting the margins 13, 14 of the hollow sections 11, 12, the invention provides separable fastener means, preferably slide fastener teeth 47, 48 of metal material mounted in series on flexible stringers 49, 50 of suitable impervious fabric material, suitably adhesively or otherwise secured to the margins 13, 14, preferably at their adjacent edges, the stringers being protected by impervious cover tapes 49a, 50a adhered thereto and to the margins 13, 14. The teeth extend peripherally and continuously around the margins, except that each series of teeth terminates at opposite sides of the recess or depression at 25 in the base pate 23, as shown especially in Fig. 5, to provide a short zone along which the margins are not joined to one another by the teeth.

All the teeth are fully disengagable from one another in a progressive manner along the margins beginning with each terminal end of the series of teeth at opposite sides of the recess at 25, which progressive disengaging action starting at the recess at 25 is compelled by the outward flexure of the margins and the separating force laterally of the margins resulting from the initial inflating and partial unfolding of the contained raft, as shown especially in Fig. 6, thereby facilitating the passage of the partially inflated raft outwardly between the disengaged parts of the margins. Upon continued inflation of the partially released raft, the teeth continue to disengage progressively around the ends toward the lower region of the case 10 facilitating the desired swinging movement of the sections 11, 12 relative to one another about the hinging zone at 19 so that the raft is fully released from the case. Full separation of the sections may even occur during the latter inflation stage.

Sealing elements or strips 51, 52 of resilient rubber material may be disposed at the inner face of the margins 13, 14 for preventing the passage of water or other liquid through the divide and for protection against accidental damage. The sealing elements may be mounted in part on the teeth 47, 48 and in part on the stringers 49, 50, and may be generally L-shaped in cross-section providing portions of the elements projecting toward one another and tapering to edges for disposition of the portions in overlapping contact with one another such that the edge of one tapered portion contacts the other portion in sealing relation therewith by lip-action flexure of the edge against such other portion.

The sealing elements are co-extensive with the series of teeth 47, 48 and terminate at the opposite sides of the recess at 25 of the base plate 23, as shown especially in Fig. 5, so that the sealing elements 51, 52 and the teeth 47, 48 in their engaged condition are, as shown especially in Fig. 9, positionable in the channels 45, 46 of the base plate 23.

The disposition of the sealing elements 51, 52 at the inner face of the margins 13, 14 provides for initial sealing at zero pressure i. e. without the application of supplemental pressure, and is advantageous in that for the closed condition of the case, the sealing elements increase their resilient sealing pressure, when the case is floating partially submerged in the water; since the resulting increase in pressure of contained air due to the water head thereon presses the sealing elements into tighter sealing relationship. This sealing action prevents effectively the entrance of water into the closed case and avoids full submergence of the case before the manipulating means can be operated to initiate the inflation of the raft.

The hollow sections 11, 12 may be interconnected by hinging straps 15, 15 and 16, 16 of suitable fabric material disposed at the lower or base region of the case 10 and secured to the flexible, rubberized fabric wall of each section 11, 12 as by sewing, or by a suitable air-curing rubber cement, or by both, which hinging straps advantageously prevent accidental loss of either section for the fully opened condition of the case, as shown especially in Fig. 3. Desirably, the straps 15, 15 and 16, 16 at their ends, are formed with looped portions 17, 17 and 18, 18 constituting flexible carrying handles. As shown especially in Fig. 4, the hinging straps have fullness across the divide for permitting separating movement of the sections entirely along the margins.

For inspection and servicing purposes, the wall of the hollow section 12 may have a longitudinal slit, for example, at one end of the case 10, as shown especially in Figs. 4 and 6, the slit being closed by a suitable sealing slide fastener construction 53. The slide fastener construction 53 is taped or otherwise suitably sealed at the ends of the slit and the teeth are engaged and disengaged by a runner 54 mounted permanently on the teeth; whereas in the slide fastener construction at the margins 13, 14, the runner (not shown) for engaging the teeth 47, 48 is removed entirely from the teeth 47, 48 after their engagement to permit the full separation of the teeth and the sections 11, 12.

The case may be provided with a flap 55 of suitable fabric material secured to the section 11 at the exterior thereof and adjacent the manipulating means, as shown especially in Fig. 5, the flap being of folded construction having, as shown in Fig. 5, an attaching portion which extends along and is suitably secured to the wall of the section 11, merging with a handle-engaging portion adapted to fold about a part of the D-shaped handle 35 in its depressed position and then extend along the attaching portion in overlapping superimposed relation thereto, as shown in Fig. 4, the portions being detachably fastened together in the superimposed relationship and at a position spaced from the fold by a separable snap fastener 56 so that the flap will hold the handle 35 in a depressed condition against the wall of the section 11, as shown especially in Fig. 4.

Strap fasteners 57, 58 may be secured at spaced-apart positions to the inside of the sections 11 and 12 adjacent the lower-region of the case, as shown especially in Fig. 3 for detachably holding paddles or oars 59, 59 at such region so that they act as weights promoting maintenance of the raft upright in the water.

To package the life raft, the protective case 10 may be disposed in the fully opened condition shown especially in Fig. 3, with the separated sections 11, 12 substantially flat upon the deck of a ship. The raft in the deflated, extended

condition shown in broken lines in Fig. 1, may have its aft portion folded over its central portion and then have its forward portion folded over the aft and central portions in the direction first toward the aft and second toward the bow of the raft, whereby the bow fold is uppermost as shown in full lines in Fig. 1. It is desirable that the bow fold be located substantially centrally of the folded raft whereby the inflating means or CO_2 inflating cartridge **60** having a conduit **61** in communication with the uppermost or bow fold, may be centrally disposed. The raft, folded compactly as described hereinabove, may be positioned in one section, for example, section **11** and the other section **12** placed about the raft and joined to the section **11** so as to enclose the raft entirely within the case.

Relatively large size rafts generally require further folding, as shown in full lines in Fig. 2, to provide more compactness of packaging and to minimize the amount of deck storage space needed. This may be accomplished by inwardly folding the opposite side portions of the folded raft of Fig. 1 into overlying relation with parts of the bow fold to provide space between the folded side portions for the CO_2 inflating cartride and to permit partial inflation and upward movement of the bow fold so as to compel swinging of the side portions of the raft upwardly and laterally away from one another.

With the raft folded as shown in Fig. 2, and contained in the engaged hollow sections **11**, **12**, the bow fold is disposed longitudinally of the case adjacent and underlying the manipulating means **21**. A suitable runner is used to engage the series of teeth **47**, **48** beginning at one terminal end portion thereof at one side of the manipulating means and terminating at the other terminal end portion at the opposite side of the manipulating means, after which the runner is entirely removed from the teeth at such other terminal end portion. The engagement of the teeth draws together and overlaps the sealing elements **51**, **52**, and joins the margins **13**, **14** throughout their periphery, except along the recess at **25**.

The longitudinally spaced-apart end portions of the engaged teeth and sealing elements are then disposed in the grooves **45**, **46** of the base plate **23**, as shown especially in Fig. 5, while parts of the margins **13**, **14** overlie the base plate **23**, so that the recessed and grooved upper plate **22** including its sealing gasket **44** can be mounted upon the engaged margins, teeth, and sealing elements and detachably secured to plate **23** in alignment therewith. To this end, the stud **29** is inserted through the keyed hole **27** and turned by the handle **35** so that the cross pin **30** seats upon the cam portions **33**, **34** of the cage structure **31** while the tapered flange of the sealing washer **36** resiliently presses against the seating surface **26** of the base plate, as shown especially in Figs. 7 and 8, whereby the keyed hole **27** is sealed. Also, the plates **22**, **23** are held tightly together such that the margins **13**, **14**, the teeth **47**, **48**, and the sealing elements **51**, **52** are clamped between the plates, as shown especially in Fig. 9, to seal effectively the divide along the spaced-apart terminal end portions of the teeth and sealing elements at the recess at **25**. The overlappingly engaged sealing elements are thus pressed sealingly against one another and against the walls of the grooves **45**, **46** continuously along the latter. The case **10** is now in its fully closed and sealed condition to protect the folded raft therein.

The protective case **10** can be opened by means of the slide fastener structure **53** in the section **12** to permit inspecting the contained raft and to facilitate connecting the flexible, sheathed, pull cable **28** to the flexible sheathed cable **41** which is in turn connected to the CO_2 inflating cartridge **60**, as shown especially in Fig. 4, the cable-to-cable connection being made by joining the ball and socket means **42** and threadedly engaging the fitting **39** and nut **40**. The flexible sheath or cover **37** of the pull cable **28** constitutes with the flexible sheath or cover **43** of the cable **41** a flexible hollow support column of determinant length extending between and bearing against the base plate **23** and the cartridge **60** for facilitating sufficient axial movement of the interconnected cables to open the cartride for inflation of the raft and for preventing objectionable movement of the cartridge toward the manipulating means under the pulling action of the interconnected cables. Subsequent closure of the slide fastener structure **53** returns the case **10** to its fully closed and sealed condition.

Although the case may be opened and the raft inflated on the deck of the ship, in emergency use of the raft, for example, the case **10** and the contained raft **20** are preferably thrown, shoved, dropped, or otherwise quickly lowered from the deck of the ship into the water. If desired, before the case is lowered into the water, a suitable rope, to be held by the operator, may be tied to the handle **35**, and the handle turned to release the stud **29** from engagement with the cage structure **31** and then lifting the handle for partially withdrawing the stud through the keyed opening **27** of the base plate for facilitating subsequent full separation of the stud and upper plate from the base plate.

The closed protective case and contained raft, with or without the rope secured to the handle, floats upon the surface of the water by virtue of its buoyancy and water-tight construction, and the engaged sealing elements retain the air within the case and resist the entrance of water through the divide.

When the handle **35** is turned to disengage the stud **29** from the cage structure **31** for removal of the stud through the keyed hole **27**, the handle **35** and plate **22** as a unit can be lifted subsequently upwardly of the case **10** to a position spaced from the margins **13**, **14**, as shown especially in Fig. 5, to pull both cables **28** and **41** sufficiently to open the CO_2 inflating cartridge **60**.

The opening of the CO_2 inflating cartridge inflates first the folded bow portion of the raft, which initial inflation causes outward or upward flexure of the margins **13**, **14** and lateral separating force thereon at the upper region of the case **10** and produces greatest flexure and force at the manipulating means **21**. Since the plates **22**, **23** of the manipulating means are now fully apart, as shown especially in Figs. 5 and 6, the upward flexure of the margins **13**, **14** causes the engaged teeth and sealing elements to be lifted out of the grooves **45**, **46** of the base plate **23**, whereby the flexure and lateral separating force of the margins produces the progressive disengagement of the series of teeth **47**, **48** beginning at their lifted, spaced-apart terminal end portions at the manipulating means **21** and in the longitudinal direction away from opposite sides of the manipulating means, as shown especially in Fig. 6. The flexibility of the wall at the upper region of the protective case **10** facilitates the

flexure and separating movement of the margins 13, 14 throughout the longitudinal extent of the upper wall.

The progressive separation of the margins 13, 14 along such upper region under initial inflation of the raft permits progressive outward or upward movement of the uppermost fold of the raft including the folded side portions thereof, as shown especially in Fig. 6. Upon continued inflation of the raft, the margins are further separated by the progressive disengagement of the teeth around the ends and toward the lower region of the case 10 facilitating the swinging and separating movement of the sections 11, 12 about the hinging zone at 19 along the remaining engaged parts of the margins 13, 14. The swinging movement of the sections widens the divide at the upper region of the case and thus permits continued outward movement of the raft between the margins to release the raft entirely from the case. The raft is then free and floats on the water while being fully inflated. If the teeth, during the inflation, are disengaged along the entire lower region of the case permitting full separation of the sections 11, 12, as shown especially in Fig. 3, the straps 15, 16 prevent accidental loss of either section so that the user of the raft can obtain the oars 59, 59 and can also disengage the connection between the pull cables 28 and 41. The protective case 10 may be recovered from the water and placed, if desired, in the inflated life raft.

The construction of the protective case 10 described hereinabove facilitates compact storage of the inflatable life raft 20 and has provision for quick-opening of the case under inflation of the contained raft by operation from the exterior of the case, which is advantageous, especially for emergency use. The construction facilitates the floatation of the case and its contained raft until inflation of the raft is started by the user who may be on the deck of the ship or swimming in the water. The construction advantageously protects the life raft while in storage against the effect of sunlight, salt-water spray and other harmful agents, and facilitates inspection of the contained raft as for replacement of the inflating cartridge, when desired, during storage.

Variations may be made without departing from the scope of the invention as it is defined in the following claims:

I claim:

1. A quick-opening protective case for releasably containing an uninflated inflatable article and its inflating means, said case comprising a hollow body for receiving the uninflated article and its inflating means and having a wall of divided form providing marginal portions at the divide for passage of the article, slide fastener elements on said portions disposed in series thereon, flexible closing strips on said portions at said elements coextensive with said series thereof each strip projecting laterally of said portions toward the other strip for closing said portions by overlapping contacting relation of said strips in the engaged condition of the fastener elements, said portions at a position along said series of fastener elements thereon having a narrow zone free of said fastener elements and said strips to provide spaced-apart adjacent end portions of said fastener elements and said strips, a pair of superimposed clamping plate members at said zone overlapping said end portions of said fastener elements and said strips and overlapping said marginal portions and separably holding the same in sandwiched disposition between said plate members, one of said members having an aperture extending therethrough from a face thereof at a position spaced from the ends thereof and at the divide and a recess in the other face of the member extending about said aperture with a depth less than the thickness of the member and said member having in said other face thereof a pair of spaced-apart aligned grooves each extending along the divide away from said recess to an end of the member and accommodating one of said end portions of the fastener elements and strips and one of said members being detachable relative to the other member and said end portions and said marginal portions and having an aperture therethrough in alignment with said aperture of the other member, and an engaging structure supported by and detachably clamping said members together, said structure including a pull element extending through said recess and through the aligned apertures in said members at said zone and having flexible cable means for connection with the inflating means of the contained article and being operable from the exterior of said case to operate the inflating means.

2. A quick-opening protective case for releasably containing an uninflated inflatable article and its inflating means, said case comprising an elongated hollow covering of flexible material having spaced-apart closed end portions and wall portions disposed opposite one another each extending longitudinally between said closed end portions, and said covering being of divided form longitudinally thereof throughout at least one of said wall portions and entirely across both said closed end portions providnig a pair of hollow sections having adjacent margins of said material in edge-on relation throughout the first said wall portion and both said closed end portions of the covering and said sections being hingedly connected one to the other along the other wall portion at the divide for swinging movement of said sections apart relative to one another for passage of the article between said margins, slide fastener elements in series on said margins, closing strips of resilient rubber on said margins at said slide fastener elements coextensive with said series thereof and each strip projecting laterally of said margins toward the other strip for closing said margins by overlapping contacting relation of the strips in the engaged condition of the slide fastener elements, a pair of superimposed apertured clamping plate members mounted on said margins at the divide and overlapping said margins and said slide fastener elements and said strips and separably holding the same in sandwiched disposition between said plate members, one of said members being detachable relative to the other member and to said margins, and an engaging structure supported by and detachably clamping said members together and having means extending through the apertures of said members for connection with the inflating means of the contained article to inflate the article by virtue of the operation of said engaging structure from the exterior of the covering in the closed condition thereof, said slide fastener elements being separable under separating force thereon provided by distension of said sections through partial inflation of the article to permit said swinging movement of said sections about their hinged connection along said other wall portion of the covering so as to open the divide for egress of the article.

3. A quick-opening protective case for releasably containing an uninflated inflatable article and its inflating means, said case comprising a closed hollow covering of impervious flexible material and of divided form throughout its extent in a direction along the covering providing a pair of individual hollow sections entirely separable one from the other having adjacent margins of said material in edge-on relation extending throughout the entire peripheral extent of the sections along the divide, slide fastener teeth in series on said margins, closing strips of resilient rubber on said margins at said teeth coextensive with said series thereof and having tapered portions projecting laterally of the margins toward one another for closing said margins by overlapping contacting relation of said strips in the engaged condition of said teeth, said teeth and said strips terminating in adjacent end portions peripherally spaced-apart at a position on said margins, said teeth being separable in a progressive manner beginning at each of said end portions thereof, a pair of superimposed clamping plate members mounted on and overlapping said margins at said position thereon and separably holding the margins in the edge-on relation in sandwiched disposition between said plate members and having aligned apertures therethrough at the divide, one of said members being detachable relative to the other member and to said margins, and an engaging structure supported by and detachably clamping said members together and having a movable pull element extending through said aligned apertures in the plate members for connection with the inflating means of the contained article to facilitate inflating the article by pulling said pull element from the exterior of the covering in the closed condition whereby the article in its initial inflation stage provides distension of said sections and separating force on said margins resulting in progressive separation of said teeth and closing strips and said individual hollow sections for progressive passage of the article between said margins under continued inflation of the article.

4. A quick-opening protective case for releasably containing an uniflated inflatable article and its inflating means, said case comprising a hollow covering of generally cylindrical shape and impervious flexible material having spaced-apart closed end portions and upper and lower wall portions interconnecting said closed end portions, said covering being of divided form longitudinally thereof throughout at least the upper wall portion and diametrically and entirely across both closed end portions to provide adjacent margins of said material in edge-on relation for passage of the contained article therebetween, slide fastener teeth on said margins in series along the same, closing strips of resilient rubber on said margins at the inner face thereof and at said teeth coextensive with said series thereof and having tapered portions projecting laterally of said margins toward one another for closing the margins by overlapping contacting relation of said strips in the engaged condition of the teeth, said margins at a position along the series of teeth on said upper wall portion having a narrow zone free of said teeth and said closing strips to provide spaced-apart adjacent end portions of the teeth and closing strips, said teeth being separable in a progressive manner beginning at said end portions under separating force on said margins resulting from initial inflation of the article to permit widening the divide and flexure of the margins for passage of the article under continued inflation thereof, a pair of superimposed apertured clamping plate members mounted on said margins at said zone overlapping said margins and said end portions of the teeth and closing strip and separably holding the same in sandwiched disposition between said members, one of said plate members having at a face thereof means for accommodating said end portions of the teeth and closing strips, and an engaging structure supported by and detachably clamping said plate members together and having means including a pull element extending through the apertures in said plate members for connection with the inflating means of the article and operable from the exterior of the covering to operate the inflating means.

5. Manipulating means for a protective case of divided form having at the divide adjacent margins in edge-on relation which case is adapted to contain an uninflated inflatable article and its inflating means, said manipulating means comprising a clamping plate member for attachment to one of said margins and disposition in separable underlying supporting relation to the other margin of the case and said plate member having an aperture extending therein from face to face thereof at a position spaced from the ends and the sides thereof, a second clamping plate member disposed in the engaged condition of said manipulating means in superimposed face-to-face separable relation to the first said member and having an aperture extending therethrough in alignment with said aperture of the first said member, and engaging means mounted on and clamping said members detachably together in the superimposed face-to-face relation for holding said other margin in its edge-on relation to the first said margin sandwiched between said members, said engaging means having a pull element detachably mounted on said second member and in said engaged condition of the manipulating means extending through both said apertures of said members in movable relation therewith, and said engaging means having means connected to said pull element for connection with the inflating means of the contained article so as to permit inflating the contained article by operation of said engaging means from the exterior of the case in its closed condition.

6. Manipulating means as defined in claim 5 in which the connection means of said engaging means comprises a flexible sheathed pull cable structure having its sheath attached to the first said clamping plate member and having its pull cable connected directly to said pull element of the engaging means, the sheath of said cable structure providing a flexible hollow support column of determinant length for extending between the first clamping plate member and the inflating means of the contained article to prevent movement of the inflating means toward the first said clamping plate member under a pulling force applied to said cable through said pull element of said engaging means.

7. Manipulating means for a protective case of divided form having at its divide adjacent margins in edge-on relation with slide fastener teeth in series and resilient closing strips on the margins and terminating at a narrow zone along the margins to provide spaced-apart adjacent end portions of the teeth and closing strips and said case being adapted to contain an uninflatable article and its inflating means, said manipulating means comprising a pair of clamping

plate members disposed in superimposed face-to-face separable relation one to the other in the engaged condition of said manipulating means for overlapping disposition relative to the margins and the end portions of the teeth and closing strips to hold said margins in the edge-on relation and said end portions separably clamped between said members, one of said clamping plate members being attachable to one of said margins and positionable in separable underlying supporting relation to the other margin and having an aperture extending therein from face-to-face thereof at a position spaced from the ends and the sides thereof and having in one face thereof a pair of spaced-apart aligned grooves each extending from a position adjacent said aperture to an end of the member for accommodating said end portions of the teeth and closing strips, the other clamping plate member having an aperture extending therethrough in alignment with said aperture of the first said plate member, and engaging means mounted on and clamping said members detachably together in the superimposed face-to-face relation, said engaging means having a pull element mounted on said other clamping plate member in said aperture thereof and in said engaged condition of the manipulating means extending through said aperture of the first said plate member in movable detachable relation thereto and means connected to said pull element for connection with the inflating means of the contained article so as to permit inflating the contained article by operation of said engaging means from the exterior of the case in its closed condition.

8. Manipulating means for a protective case of divided form having at its divide adjacent margins in edge-on relation with slide fastener teeth in series and resilient closing strips on the margins terminating at a narrow zone along the margins to provide spaced-apart adjacent end portions of the teeth and closing strips and said case being adapted to contain an uninflated inflatable article and its inflating means, said manipulating means comprising a pair of clamping plate members disposed in superimposed face-to-face separable relation one to the other in the engaged condition of said manipulating means for overlapping disposition relative to the margins and the end portions of the teeth and closing strips to hold said margins in the edge-on relation and said end portions separably clamped between said members, one of said clamping plate members being attachable to one of said margins and positionable in separable underlying supporting relation to both said margins and having an aperture extending therein from face to face thereof at a position spaced from the ends and the sides thereof and a recess in one of said faces of the member extending about said aperture with a depth less than the thickness of said member to provide a seating surface at the bottom of said recess, and said member having in said face thereof a pair of spaced-apart aligned grooves each extending away from said recess to an end of the member for accommodating said end portions of the teeth and closing strips, the other clamping plate member having an aperture extending therethrough in alignment with said aperture of the first said plate member, and an engaging structure mounted on said clamping plate members for detachably clamping the members together in the superimposed face-to-face relationship, said engaging structure having a movable stud element mounted on said other clamping plate member in said aperture thereof and in said engaged condition of the manipulating means extending through said aperture of the first said plate member in movable detachable relation thereto, and said engaging structure having flexible cable means connected to said stud element for connection with the inflating means of the contained article, and a sealing element mounted on said stud element in sealing relation therewith having a dependent annular flange of resilient rubber extending axially along and about the stud element in spaced-apart relation thereto and tapering to an edge seating against said seating surface of said recess in sealing relation therewith in the engaged condition of the manipulating means.

9. A quick-opening protective case for releasably containing an uninflated inflatable article and its inflating means, said case comprising a closed hollow body of impervious flexible material for receiving the article and its inflating means and having a wall of divided form providing marginal portions of said flexible material in edge-on relation along the divide for passage of the article between said portions, slide fastener elements in series on said portions, flexible closing strips of resilient rubber on said portions at said fastener elements coextensive with said series thereof and disposed on said portions at the interior of said hollow body, each closing strip projecting laterally of said portions toward the other closing strip and tapering to an edge for closing said portions by overlapping contacting relation of said strips with the edge of one closing strip pressing resiliently against the other closing strip in the engaged condition of the fastener elements so as to effect sealing at said edge under slight and zero fluid pressures and also under higher fluid pressures within said hollow body in its closed condition, a pair of superimposed apertured clamping members supported by and separably holding said portions together in edge-on relation and separably and sealingly contacting said closing strips in their over-lapping contacting relationship, and engaging means mounted on and detachably securing said members together and extending through the apertures of said members for connection with said inflating means to facilitate inflating the contained article by operation of said engaging means from the exterior of said hollow body in its closed condition, said slide fastener elements being separable from one another under separating force thereon provided by distension of said portions through partial inflation of the contained article to permit widening the divide and flexure of the disengaged marginal portions for outward passage of the article upon continued inflation thereof.

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The following references are of record in the file of this patent:

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