United States Patent

[11] 3,613,097

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[54] **AUTOINFLATING SEA TARGET**
1 Claim, 8 Drawing Figs.

[52] **U.S. Cl.** ..... **343/18 B,** 244/142, 9/8 R, 273/105.2
[51] **Int. Cl.** **F41j 9/12**
[50] **Field of Search** ..... 273/102, 105.2, 105.3; 9/8; 244/1.42, 145; 138/133; 343/18 B

[56] **References Cited**

UNITED STATES PATENTS

D.143,998	2/1946	Shreeve	9/8
3,234,503	2/1966	Wojciecwowski	9/8
2,490,793	12/1949	Fleming	273/105.2
2,954,802	10/1960	Duff	138/133
3,328,750	6/1967	Gimber et al.	244/142
3,469,805	9/1969	Craig et al.	244/145
3,500,408	3/1970	Daughenbaugh	9/8

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ABSTRACT: A sea target formed of a bag of thin, flexible, reflective material. The bag is provided with a centrally depending sleeve having a weighted airscoop at its lower end. It may be airdropped and during descent the scoop inflates the bag through the sleeve and upon water landing a column of water within the sleeve prevents loss of air. The weighted scoop and sleeve also provide a sea anchor.

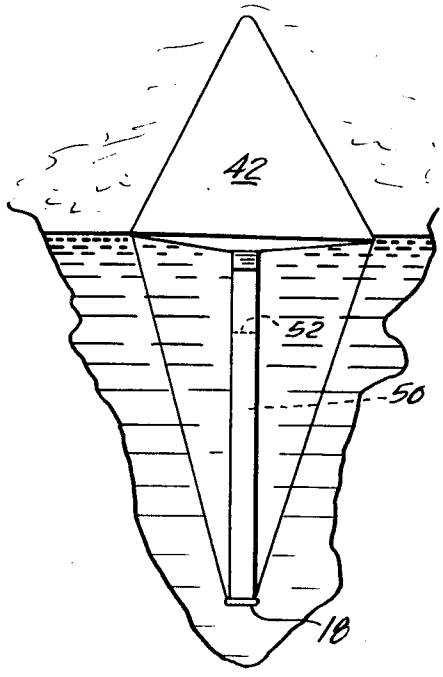

Fig. 2

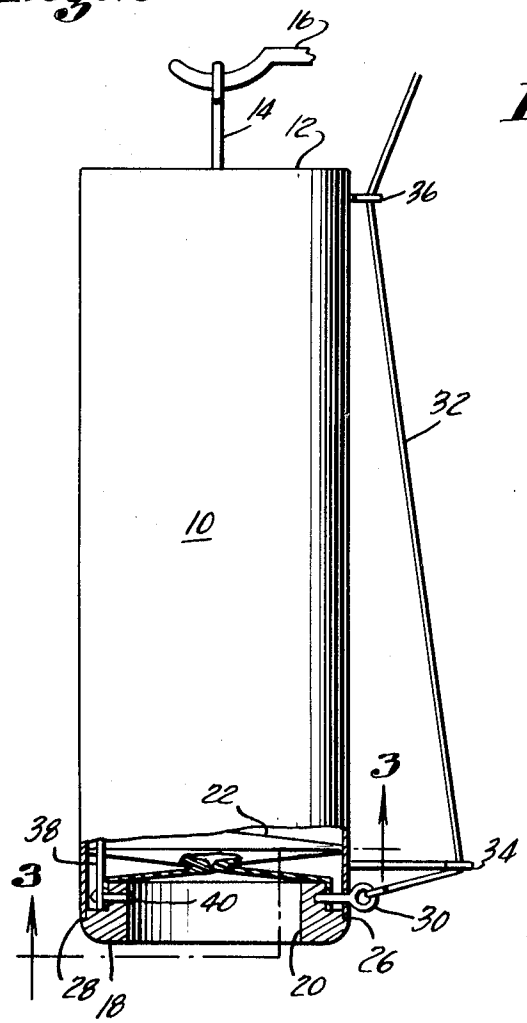

Fig. 1

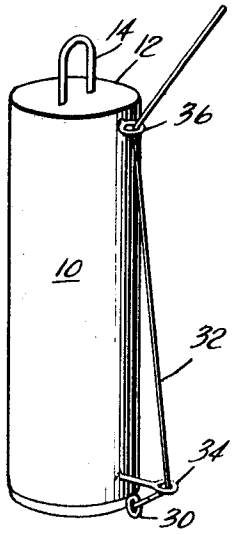

Fig. 4

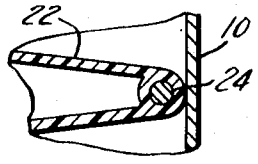

Fig. 3

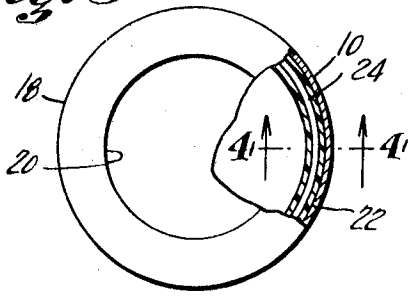

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Fig. 5

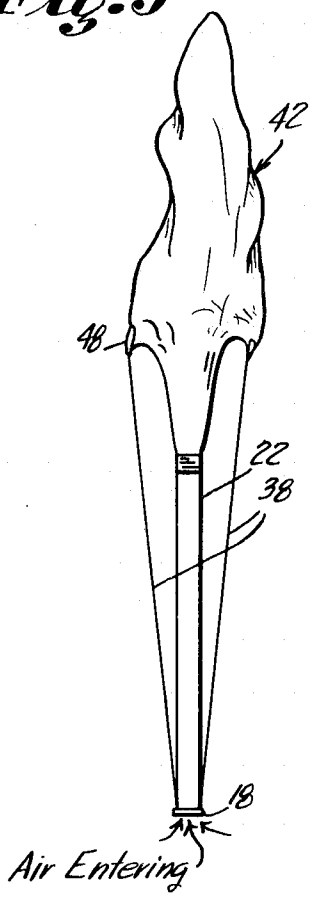


Fig. 6

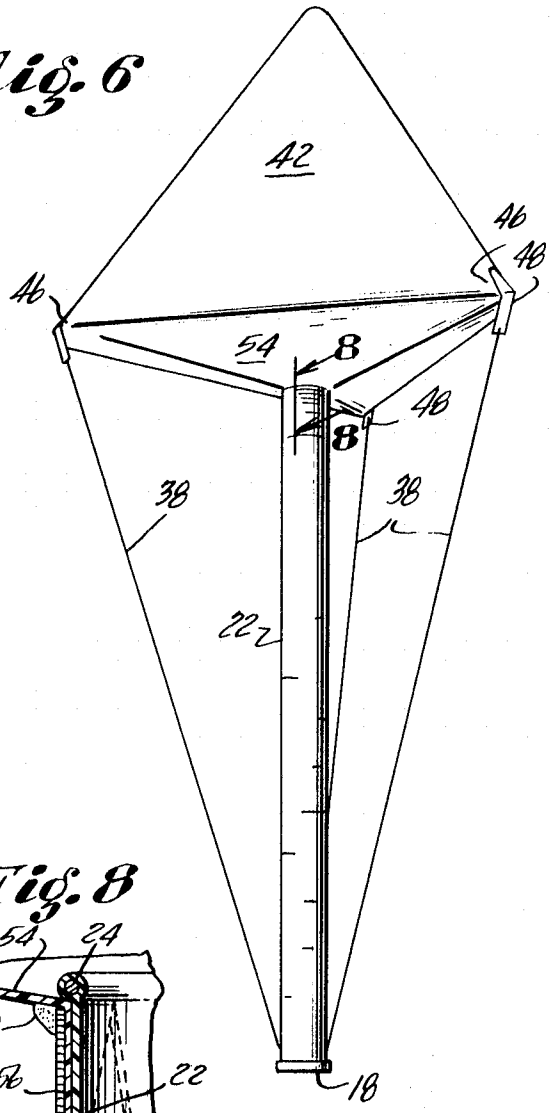


Fig. 7

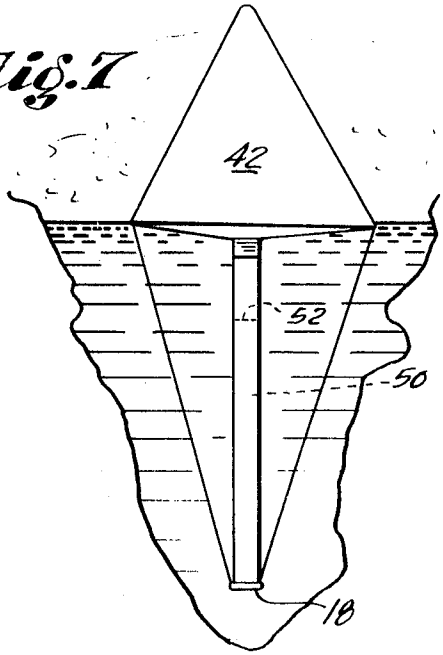
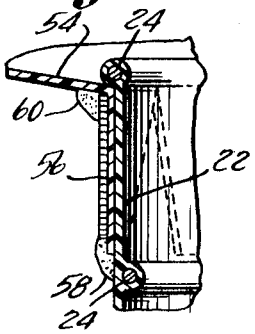


Fig. 8



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AUTOINFLATING SEA TARGET

STATEMENT OF GOVERNMENT INTEREST

The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

BACKGROUND OF THE INVENTION

Heretofore floating targets for missile or gunfire practice have been expensive, bulky barges which must be towed to the target area, and require navigation lights, foghorns and mooring so that they do not drift into shipping lanes. After use they must be removed or destroyed.

SUMMARY OF THE INVENTION

An inexpensive sea target comprising a bag of flexible sheet material which can be compactly folded into a small container for stowage and transportation and can easily be inflated through an open sleeve. The outer or lower end of the sleeve has a weighted airscoop and when the target is deployed in an airdrop, air is scooped into the bag through the sleeve so that the target is inflated when it strikes the water. Shroud lines interconnecting the scoop and points about the periphery of the bag encourage a parachutelike descent. Upon water landing the column of water entering the sleeve prevents egress of entrapped air and compresses such air slightly so that the bag is fully distended.

STATEMENT OF THE OBJECTS OF THE INVENTION

An object of the invention is to provide a lightweight, easily stored, flexible target which may quickly be inflated for use.

A further object is to provide a sea target which is low in cost, readily erected and even in large sizes does not constitute a hazard to navigation.

A further object is to provide a quickly erected sea target which does not require navigation lights, and is expendable and hence need not be retrieved.

A further object is to provide an inflatable target with a novel inflating and sealing means by which the target may be inflated during an airdrop.

Other objects, advantages, and novel features of the invention will become apparent from the following detailed description of the invention when considered in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a target stowing and deploying structure.

FIG. 2 is a side elevation slightly enlarged of the structure shown in FIG. 1 with a portion broken away to show details of the airscoop and lower end of the inflation sleeve.

FIG. 3 is a bottom view partially broken away and taken along a line substantially corresponding to line 3—3 of FIG. 2.

FIG. 4 is an enlarged detailed sectional view along line 4—4 of FIG. 3 showing a fragment of the inflation sleeve folded accordion fashion within the canister.

FIG. 5 is a pictorial representation of a target just after release from its support canister and before it is filled out by the air entering through the inflation sleeve.

FIG. 6 is a view similar to FIG. 5 illustrating the appearance of an inflated target having a tetrahedron shape.

FIG. 7 is a diagrammatic showing of the device after water entry showing the manner in which a water column within the inflation sleeve prevents air egress.

FIG. 8 is an enlarged sectional view taken along a line substantially corresponding to line 8—8 of FIG. 6 showing the details of the junction between the target bag and inflation sleeve.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings in detail, FIG. 1 shows a circular target storage and shipping canister **10** which has a closed top **12** mounting a U-shaped handle **14**. Handle **14** may be employed to manually manipulate the canister and when the target is deployed from a crane or similar contrivance **16** for an airdrop, as from a helicopter or blimp, the handle serves to provide a support member from which the canister may be suspended.

As shown in FIG. **2** the canister **10** may be provided at its lower end with a weighted airscoop **18** which is essentially in the form of an annulus and is provided with a central aperture **20** through which air may be scooped into the inflation sleeve **22** when the weighted scoop is released and the target is withdrawn from the canister. The airscoop may be constructed of or weighted with iron so that a sunken target may, if desired, be retrieved by a magnetic grapple.

The inflation sleeve **22** is essentially tubular in configuration and includes a plurality of peripherally located rings **24** which keep the sleeve from collapsing. When stored in canister **10** the flexible sleeve material between adjacent peripheral rings **24** may be folded in reentrant or accordion fashion as shown.

The periphery of the weighted airscoop **18** may have an outwardly directed ledge **26** which mates with the lower edge **28** of the canister in the fashion depicted in FIG. **2**. To prevent premature separation of the scoop and canister and to retain the parts in their stacked, compacted condition one or more anchor pins **30** may be provided as illustrated. Upon deployment this pin may be manually extracted or it may be withdrawn by a suitable lanyard **32** extending through a lower and an upper eyelet **34** and **36**.

The lower ends of shroud lines **38** may be anchored to the weighted airscoop by any suitable means such as rivets **40** which also serve to strengthen the bond between the lower end of the inflation tube **22** and the upper edge of the airscoop **18**.

It will be obvious that upon extraction of the folded target assembly from its canister it may readily be inflated by the introduction of air through the inflation sleeve into the hollow bag. Several means may be employed for this purpose. Thus when the target is being deployed over the side of a surface ship the airscoop may be directed toward the prevailing wind, or it may be artificially subjected to air under pressure so that the introduced air fills the flexible bag to its inflated condition as shown in FIG. **6**. Thereafter upon dropping the target into the sea, airscoop first, water will be admitted into the inflation tube and, since the weighted airscoop also serves to provide a heavy sea anchor a column of air is driven upwardly through the inflation tube and into the flexible bag to more fully complete the inflation process.

When dropped from a more substantial height as from a helicopter or blimp the act of removing the anchor pin **30**, as by a pull on lanyard **32**, permits the weighted airscoop **18** to drop downwardly withdrawing the inflation sleeve from the canister followed by the target bag. At the same time shroud lines **38** are pulled taut and the target assumes the shape illustrated generally in FIG. **5** with air rushing into the central opening **20** of the weighted airscoop **18** and through the inflation tube **22** into the interior of the target bag **42**. Because of the relatively large airscoop opening **20** and the generous dimensions of the inflation tube **22** the target bag expands rapidly and, after a relatively short drop, assumes the fully inflated contour illustrated in FIG. **6** and floats downwardly in parachutelike fashion. As shown the weighted airscoop is supported centrally below the inflated target bag **42** by means of inflation tube **22** which tube is retained in distended condition by reinforcing rings **24**. In FIG. **6** the bag **42** is shown to be tetrahedron in shape and the depending shroud lines extend upwardly from the periphery of the weighted airscoop to the outermost corners **46** of the inflated bag to which points they may be anchored by any suitable means such as cemented shroud line anchoring straps **48**.

As heretofore mentioned the weighted airscoop **18** depending from the lower end of the inflation tube **22** forms a sea anchor (FIG. **7**) so that the enlarged target bag floats upright on the surface of the sea and the capsizing effect of wave action due to high-sea states is minimized.

It will be noted that upon water entry a water column **50** is formed within the distended inflation tube having an upper surface **52** substantially below the bottom surface **54** of the target bag. The air within the target bag is thus maintained under a slight pressure due to the hydrostatic head within the inflation tube and this insures that the exterior contours of the target are fully filled out and provide a proper light and radar reflecting surface.

Though the upper end of the inflation tube **22** may be joined to the undersurface **54** of the target bag by any of several suitable means I have elected to utilize the strength and rigidity provided by the uppermost reinforcing ring **24** to assist at this point of junction. As shown in FIG. **8** a central opening is provided in the bottom target bag wall **54**. This opening is in the form of slits which form depending fingers **56**. The sleeve **22** lying within the ring of downwardly directed fingers **56** is then cemented in place with the reinforcing ring **24** overlying the edge of this opening. To further reinforce this joint threads, strands or tape may be wound about the assembled parts and cemented in place while additional cement may provide fillets at points **58** and **60**.

From the foregoing description it will be apparent that the device of this invention provides an extremely lightweight, easily and compactly stored, inflatable target assembly which may be readily deployed either from waterborne or airborne vehicles and which automatically inflates to its full intended configuration before water entry.

Furthermore it will be apparent that an effective sea anchor is provided which combines means to maintain a slight internal air pressure upon the flexible target bag assembly and thus retain the parts fully filled out in their properly shaped configuration.

A target so provided will deflate and sink punctured, as when struck by a missile, and hence need not be retrieved after use. Furthermore being so light in weight it does not constitute a menace to navigation and affords no hazard if left adrift in its inflated condition.

Of course by providing a controlled, very small leak arrangement for the entrapped air it is possible to control with adequate accuracy the waterborne life of the target. Thus a very small leak might permit the target to remain afloat a week or so while a larger leak could insure that it sinks within 24 hours or any other suitable selected time.

What is claimed is:

1. A highly visible self-destructing target for weapon practice at sea, said target being designed to be brought from compact, folded, collapsed condition to a large, radar-reflective, highly visible inflated condition by motion through the atmosphere, and when so inflated to settle on and float in a self-stabilizing fashion upon the surface of the sea, said target comprising:

an inflatable bag composed of lightweight, flexible, nonporous material, said bag when fully inflated being of greatly enlarged configuration having a width substantially equal to its height and presenting, when floating on the surface of the sea, a large flat base to such surface and at least three large essentially planar radar-signal-reflective and visible surfaces to the atmosphere;

an air intake tube secured to said bag and communicating with the interior thereof;

said air intake tube being composed of flexible nonporous material and lengthenable from a collapsed to an extended condition;

a plurality of reinforcing rings each essentially equal in diameter to the inner diameter of said tube when extended and located therewithin in coaxial relationship thereto;

said rings being substantially contiguous when said tube is collapsed in accordionlike fashion but spaced-apart when said tube is extended to its maximum length, said rings thereby acting to maintain an open air passageway through said tube even when said tube is in said collapsed condition;

an airscoop in the form of a rigid annular member characterized by the possession of negative buoyancy and attached to the far end of said air intake tube, said scoop being in open condition at all times by virtue of its rigidity, with said scoop acting to gather in air as it undergoes motion through the atmosphere, the air so gathered in passing through said intake tube into said bag to substantially inflate the latter;

the weight of said rigid annular member as said scoop undergoes motion through the atmosphere acting to bring said air intake tube to its fully extended condition; and

a set of shroud lines connecting the lowermost corners of the distended bag with said annular member;

said scoop by virtue of its negative buoyancy acting to entrap a column of water to fill said air intake tube a substantial distance, and said bag when floating upon the surface of a body of water while so inflated with the air intake tube projecting downwardly and retained in open condition because of the negative buoyancy possessed by said airscoop, trapping air inside said tube to impose pressure upon the air within the bag and further inflate it with a pressure in excess of the surrounding atmosphere, and also maintain the elongated inflated bag in an upright position.