May 7, 1968 D. G. ROZZELLE 3,381,655

RESCUE BALLOON

Filed July 7, 1966 4 Sheets-Sheet 1



Fig. 1

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RESCUE BALLOON

Filed July 7, 1966 4 Sheets-Sheet 2

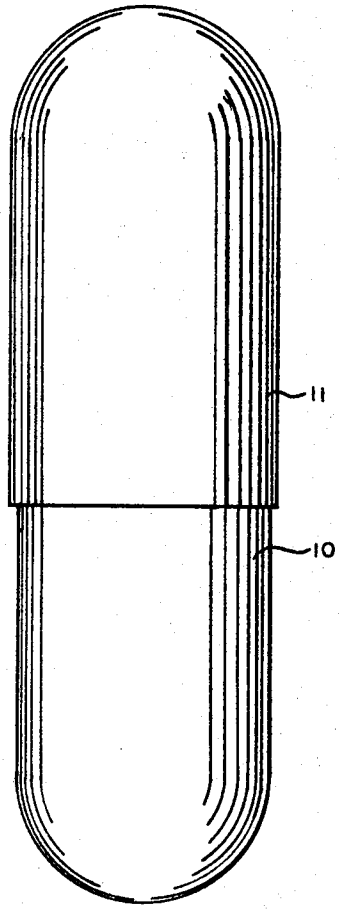


Fig. 2

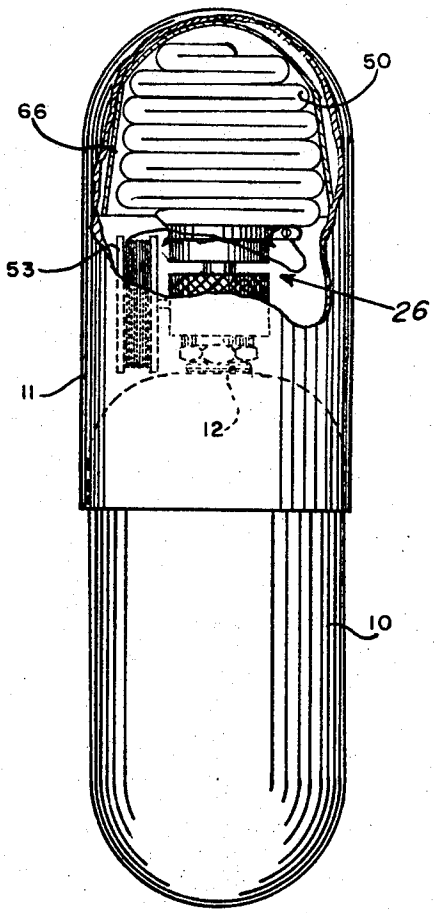


Fig. 3

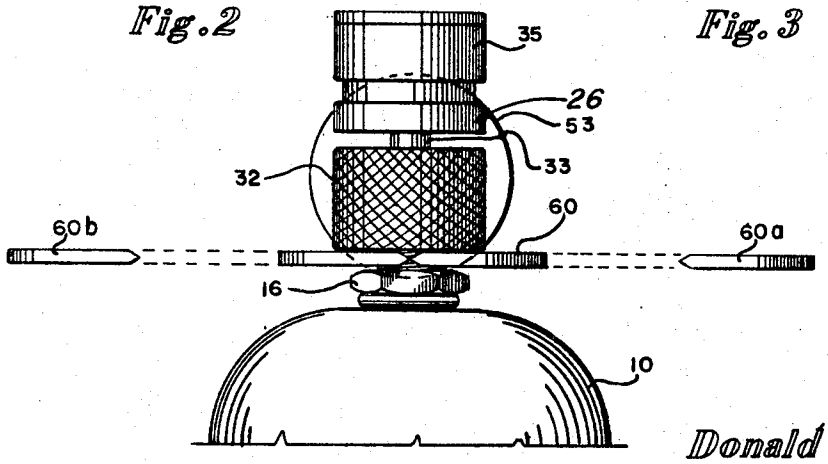


Fig. 4

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RESCUE BALLOON

Filed July 7, 1966 4 Sheets-Sheet 3

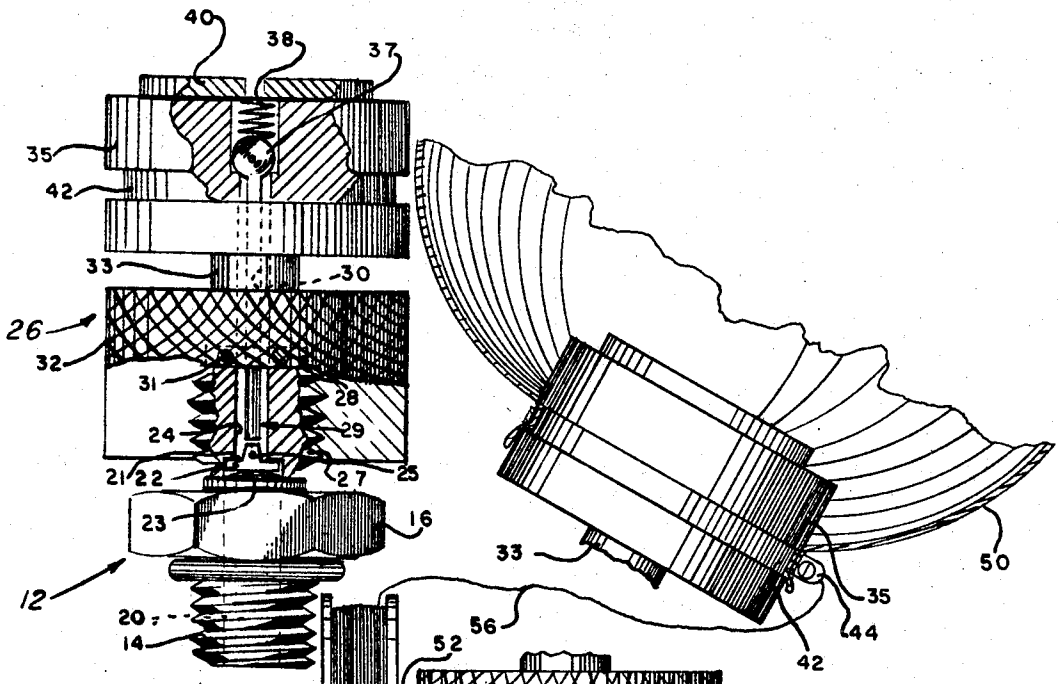


Fig. 5

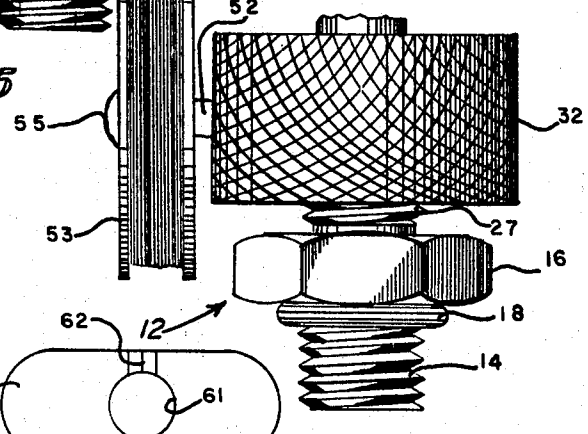


Fig. 6

Fig. 7

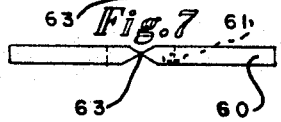


Fig. 8

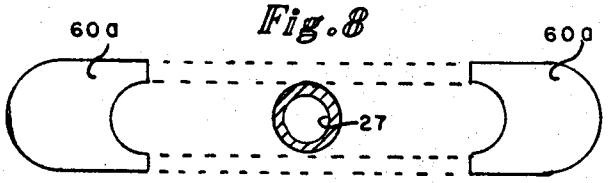


Fig. 9

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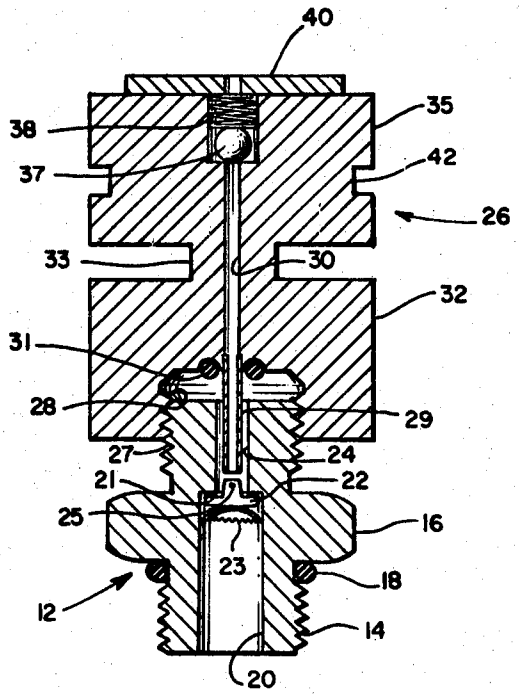


FIG. 10

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RESCUE BALLOON

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ABSTRACT OF THE DISCLOSURE

A complete rescue balloon assembly includes a gas tank having a valve assembly simply actuated by tightening two parts of the valve together. A frangible connector in the valve assembly permits a filled balloon to be severed from the tank and means associated with the balloon retains the gas therein. An anchor line connected to the balloon at one end and the tank at the other end permits the balloon to rise, tethered to the tank.

This invention relates to a lighter-than-air distress signal balloon which is initially arranged in a small, lightweight package and has an easy and quick release of the balloon when necessary.

In the past many different types of signal or rescue balloons have been proposed, each utilizing the basic concept of providing an unfilled balloon and a container of gas, means for filling the balloon with the gas, and means for anchoring the balloon as it floats in the air. The most successful units have been those which were secured as part of the survival kit for naval aviators or other aviators who frequently flew over large bodies of water. Little consideration for size and weight was necessary for the kit as it was stowed in the collapsible survival boat as part of the survival gear, and, of course, the aviators were highly trained in the operation of all parts of the survival gear. Many downed fliers in the water have been rescued because of, at least partially, such rescue balloons. Other proposed signal balloons have been far too bulky and heavy for use by hikers, particularly small children, or their mechanism has been so complicated that a person, lost in a wilderness area, being greatly distressed and disturbed is unable to operate the mechanism to fill and release the balloon. Under such conditions many persons are unable to comprehend extensive written instructions so they fail to operate the mechanism. Particularly small children have been unable to operate the mechanisms of the devices heretofore proposed in the prior art.

According to the present invention, I have provided a signal balloon kit which is very easily operated, is light and is contained in a very small package. Most important the unit has a very long shelf life, that is, it may be stored in its packaged condition for long periods of time and is still operable. Since the usual gas for the lighter-than-air rescue balloons is helium, extra precautions must be taken to prevent leakage of the helium from the storage tank. My device incorporates an easily broken seal, which when in position prevents accidental actuation of the balloon filling valve and release of the gas, but which can still be broken even by a small child for the purpose of actuating the mechanism to fill the signal balloon. In addition, the motions necessary to actuate the valve for filling the balloon are very simple, requiring only finger pressure to break the seal and a twist of the wrist. The release mechanism for the filled balloon is accomplished by breaking the valve body between the balloon and the tank by a very nominal pressure which releases the rescue balloon from the tank. The balloon is, of course, anchored by means of a line to the tank to prevent its escape and loss of value as a signal balloon.

Included among the objects and advantages of the present invention is a small lightweight kit containing an inflatable signal or rescue balloon which has a long shelf life and is economical to manufacture.

Another object of the invention is to provide a removable seal for a valve which effectively prevents actuation of the valve but is easily broken and removed for subsequent actuation of the valve.

A further object of the invention is to provide a frangible valve mechanism which permits filling a signal or rescue balloon from a tank and then a quick positive release of the balloon from the tank.

A still further object of the invention is to provide a signal or rescue balloon kit which is simply and easily actuated for releasing the valve mechanism, filling a lighter-than-air balloon and releasing the balloon from the tank.

These and other objects and advantages of the invention may be readily ascertained by referring to the following description and appended illustrations in which:

FIG. 1 is a schematic perspective view of the signal or rescue balloon of the invention in use;

FIG. 2 is a side elevational view of a rescue balloon kit shown in closed position;

FIG. 3 is a partially cut away view of the device of FIG. 2 showing the arrangement of a folded rescue balloon and the filling and release mechanism therein;

FIG. 4 is a partial detailed view of the valve seal arrangement of the invention showing the break away seal arrangement;

FIG. 5 is an enlarged detailed view of the balloon filling valve mechanism between the tank and the balloon;

FIG. 6 is an enlarged detailed view of a filled balloon release mechanism and its detachment from the tank following inflation of an inflatable balloon;

FIG. 7 is a top plan view of a tank valve seal according to the invention;

FIG. 8 is a side elevational view of the seal of FIG. 7;

FIG. 9 is a schematic view of the seal of FIG. 7 in broken and moved away position from the valve stem on which it normally resides; and

FIG. 10 is a side elevational view of the mechanism of FIG. 5, shown in section.

As illustrated in FIG. 1, a hiker **1** lost in the woods **2** has released a signal or rescue balloon **3** which floats above surrounding trees so that it is visible from a distance. The balloon may be marked with bright colors to attract attention and to be visible from long distances. As shown the tank **10** of the rescue balloon may be handheld, or it may be placed on the ground as the buoyancy of the balloon is not sufficient to raise the tank into the air. Thus even lying on the ground the balloon will be anchored in a single spot for rescue.

A dished head cylindrical tank **10**, preferably of aluminum or other lightweight metal, provides means for containing a supply of lighter-than-air gas, preferably helium. The helium tank is provided with a threaded valve, shown in general by numeral **12**, which fits by means of threads **14** into a threaded opening into the tank. The valve is provided with a hexagonal section **16** for manipulating the valve, and an O-ring seal **18**, of suitable material, between section **16** and the tank provides a gas tight seal. Internally of the valve body is a passage **20**, shown in FIG. 5 and FIG. 10, in which is seated a valve seat **22** retained in place by pronged washer **23** which is biased into the passage with a spring action with the prong ends biting into the wall of the valve body to positively hold the valve seat against shoulder **21**. The valve may, also, be seated against an O-ring seal mounted against shoul-

der 21 where desired. A small passageway 24 extends from the shoulder 21 above the passage 20 and provides means for accommodating an elongated extension 25 of the valve 22. The valve 12 is threaded into another valve, indicated in general by numeral 26, by means of a threaded upper end 27 into a threaded passage 28 of the valve 26. Extending into the threaded opening 28 is an extension tube 29 fitted in passage 30 in the valve 26. A body portion 32 surrounding the threaded passage 28 reduces to a narrow frangible neck 33 between the enlarged portion 32 and an upper enlarged portion 35. In one form the valve may be made of material which is frangible in thin section, such as frangible plastic, or the like, or a frangible thin section 33 may be sealed to both of the parts 32 and 35 which may be metal, for example. The passage 30 extends from tube 29 to a check valve including a ball 37 which seats on the shoulder of the passage 30 and is held securely in place by a spring 38. An apertured plate 40 covers the top of the valve and retains the spring in position and provides for passage of gas therefrom. The valve 26 is preferably made of a lightweight plastic, so that the neck 33 is frangible and may be broken by a relatively light pressure applied sideways on the body 35 while the body 32 is being held.

The upper body 35 has a groove 42 extending thereabout into which the neck of an inflatable balloon 50 may be placed and a ring clamp 44 thereover secures the balloon on the valve portion 35. The balloon 37 is preferably made of nylon or a similar resilient plastic, which when the balloon is filled with the gas it seats tightly against the shoulder of the passage 30 under the influence of the pressurized gas as well as the spring 38. A spindle 52 is securely attached to the body portion 32 and a spool 53 is rotatably mounted thereon. The spindle 52 is provided with a head 55 to prevent the removal of the spool. A monofilament nylon line 56 (or other similar line) is wound on the spool with one end of the line securely connected to the spool to prevent its release thereof and the opposite or free end is attached to the ring clamp 44 on the upper valve part 35. After the balloon is filled, the upper valve part is broken away and the balloon is permitted to rise in the air. It is anchored by the line 56.

The valve 22 is opened by moving it from its seat against the shoulder 21 to fill the balloon. This is accomplished by means of the tube projection 29 which extends downwardly from the passage 30 and into the passage 28. The extension 29 contacts valve extension 25 by screwing the tank into the upper valve assembly by twisting the tank clockwise tightening the valve 12 into valve 26 and opening valve 22.

To lock the actuating valve in place, a lock 60 is placed around threads 27 between the body 32 and the hexagonal shoulder of valve 12. The lock is preferably made of a friable plastic, in elongated form having a circular opening 61 generally centrally thereof. Scored or weakened areas 62 and 63 are provided at the sides of the lock extending from the circular opening to the edge thereof. The lock is removed by applying pressure as by bearing down on both or one end, as shown by the arrows in FIG. 4, to break the lock which may then be removed. After removal of the lock, the body 32 may be screwed down onto the hexagonal shoulder 16 forcing open the valve body 22 by means of the tube 29. The gas under pressure from the tank then pushes past ball 37 filling the balloon. When the balloon is filled the spring 38 holds the ball against the seat closing the valve and, when released from the tank prevents leaking of gas from the balloon.

The balloon 50 is fanfolded over the top of the valve 27, and is retained in position by a paper or other type of bag or sleeve 66. The entire valve and balloon assembly is enclosed in a cap 11 which fits tightly over the upper part of the tank 10. Where desired a small bag of dehydrator, such as silica gel, may be placed inside the cover with the remainder of the mechanism to keep it dry.

A cylinder about 5½ inches long and about 2⅓ inches in diameter is satisfactory for holding sufficient helium to inflate a 36 inch balloon. The balloon should preferably be made red, yellow or orange, or other very bright fluorescent color for easy spotting. A gas tight rubber or plastic inflatable balloon is satisfactory for use as a signal or rescue balloon. The balloon may generally be provided with a 100 yard line which will permit the balloon to float high enough above surrounding obstacles for good visibility at long distances. The completed package weighs approximately a pound and a half and is easily carried in a pocket, on a belt, in a tool kit or the like.

In use, the cover 11 is removed and discarded or used as a drinking cup or the like. The tab lock 60 is broken and removed after removing the balloon sleeve. After removal of the locking tab 60 the valve is turned so that the top of the valve 12 is seated against the O-ring 31, which prevents the escape of hydrogen gas through the threads between the two valve bodies. When the balloon is inflated the upper valve is broken, releasing the balloon. The upper valve is easily broken by curling three fingers around the bottom part of the plastic valve and pushing the top portion 35 with the thumb. With about five pounds pressure a thin plastic neck 33 can be easily broken by an enfeebled adult or a child.

With a nylon ball valve for the valve of a plastic balloon, actual tests have shown that such a balloon will remain inflated and floating for more than three weeks. The tank valve has been shown to hold helium under pressure for more than two years. Thus the kit has a long shelf life, and the inflated balloon has a long, floating, useful life. For use, three very simple operations fills the balloon and releases it as a signal for aid.

While the invention has been described by reference to a particular device, there is no intent to limit the spirit or scope of the invention to the precise details so set forth except as defined in the following claims.

I claim:

1. In a complete assembly for containing and subsequently releasing a rescue balloon including a single tank for storing lighter-than-air gas and a deflated balloon, the improvement of valve means disposed on said tank at said single opening inclusive of a first portion having a passage therethrough in communication with said single opening and valve seat means frictionally held in said passage closing said passage, and a second portion threadedly connected with said first portion and having a passage extending therethrough in communication with the passage in said first portion, and said second portion having an extending member in its passage arranged to contact and move said valve seat means to open position on tightening said portions together; removable seal means mounted over exposed threads between said two portions in position to prevent tightening of said two portions together, said removable seal arranged to be easily broken and removed to permit tightening of said two portions together and thereby open said valve seat means, a check valve containing member mounted on said second portion having a passage in communication with the passage in said second portion; a balloon attached to said check valve containing member and in communication with said passage therein; a frangible connector securing said check valve containing member to said second portion and arranged to be easily broken so as to sever said balloon from said valve means mounted on said tank; spool means secured to said second portion; and an anchor line attached at one end to said spool and to said balloon at the other end thereof.

2. The improvement of claim 1 wherein said removable seal means is a frangible plastic seal means.

3. The improvement of claim 2 wherein said seal means is an elongated plastic member having an aperture for telescoping over the threads between said two portions and includes weakened areas for facilitating removal.

4. The improvement of claim 1 wherein said frangible connector is a frangible plastic member connecting said check valve containing member to said second portion.

5. The improvement of claim 1 wherein said check valve containing member has a body portion made of plastic and said connector is integral therewith.

6. The improvement of claim 1 wherein said first portion of said valve means is mounted on said tank and includes a movable valve seat means frictionally held against a shoulder in the passage therein, and said second portion includes a hollow probe arranged in the passage thereof to open said valve seat means on movement of the two portions together and to conduct gas from said tank through said valve means into said balloon.

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