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B. F. WINSHIP

INFLATABLE BAG

Filed Nov. 1, 1924

Fig. 1

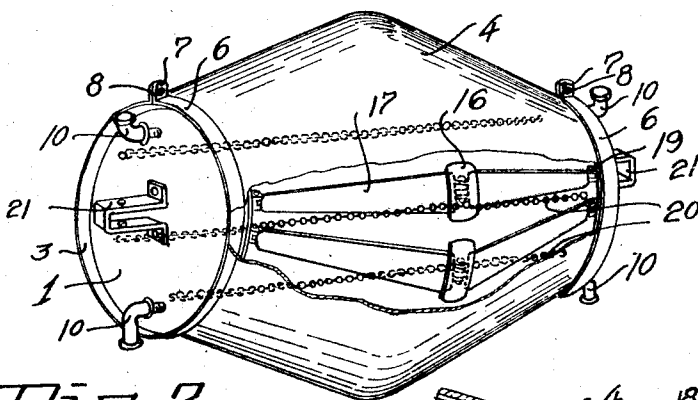


Fig. 2

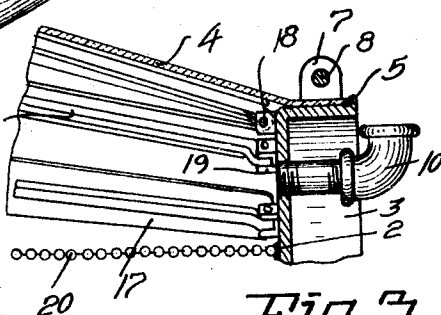
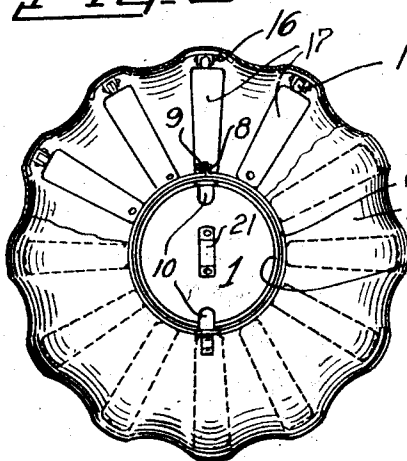


Fig. 3

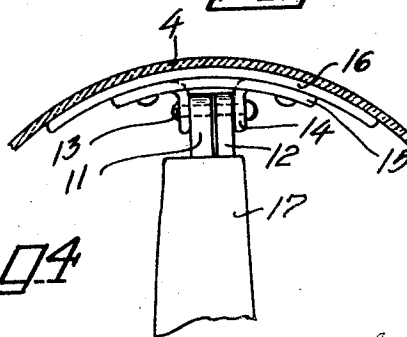


Fig. 4

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UNITED STATES PATENT OFFICE.

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INFLATABLE BAG.

Application filed November 1, 1924. Serial No. 747,180.

To all whom it may concern:

Be it known that I, BENJAMIN F. WINSHIP, a citizen of the United States, residing at Spokane, in Spokane County, and State of Washington, have invented certain new and useful Improvements in Inflatable Bags, of which the following is a specification.

The present invention relates to improvements in inflatable bags or receptacles for containing air, and adapted especially for submarine use, as for instance to be attached or secured to or in sunken vessels when empty or deflated, and by inflation raise the same by buoyancy. The device of my invention is not limited however to this specific purpose, and it will be understood that it may be utilized in numerous other modes for under water operations in addition to salvaging.

The primary object of the invention is the provision of a device of this character which is simple in construction and operation, is strong, durable, and well braced, and which may with facility be inflated or deflated as required.

The invention consists in certain novel features of construction and combinations and arrangements of parts as will hereinafter be more specifically set forth and claimed.

In the accompanying drawings I have illustrated one complete example of the physical embodiment of my invention wherein the parts are combined and arranged in accordance with the best mode I have thus far devised for the practical application of the principles of my invention.

Figure 1 is a perspective view of the bag of my invention shown in inflated position, and with parts broken away for convenience of illustration.

Figure 2 is an end view of the bag, partly broken away to disclose the interior construction, with the bag in deflated and folded position, for storage, or for immersion or submersion below the water surface.

Figure 3 is an enlarged detail sectional view showing a portion of one head and parts connected therewith.

Figure 4 is a detail sectional view at a portion of the longitudinal center of the bag, showing a pivoted or toggle joint between sections of longitudinally disposed, foldable, braces or ribs for the bag.

In carrying out my invention I utilize

two rigid metallic heads 1 and 2 preferably in the form of circular disks to form closed ends for the receptacle, and each of these heads has an annular, outwardly extending flange 3. The casing or cover 4 of the bag is made up of suitable flexible, elastic material as rubber and fashioned in tubular form with two circular end openings complementary to the size of the annular flanges on the heads.

The edges 5 of these circular openings are clamped over the exterior faces of the annular flanges of the heads, each by means of a split clamping ring 6. Each of the split rings is fashioned at its adjoining ends with perforated outwardly projecting flanges 7, and clamping bolt 8 passing through the flanges and nut 9 are utilized for securing the edges of the bag-ends to the flanges for the purpose of forming air tight and water tight joints around the heads.

When in deflated and compacted position, the bag may be inflated by forcing air, as from a suitable pump, to the interior of the casing through pipes or hose attached to the several elbow couplings 10 which are threaded into the two heads of the bag and communicate with the interior thereof.

For distending and bracing the bag as it is inflated, I employ a series of longitudinally disposed, foldable ribs which connect the two ends or heads of the bag, and are spaced equidistant around the interior face of the casing.

Each of these foldable ribs comprises a pair of arms 11 and 12 of strong but light material, which are pivoted with a knuckle joint at their adjoining ends by a bolt 13 in the perforated ears 14 on a joint plate 15, which plate limits the outward movement of the jointed ends of the arms at the pivot point 13. The joint plate is rounded as shown in Figure 4 and is secured, as by rivets, at the inner side of a curved shield-plate 16 which latter plate assists in supporting the walls of the bag when it is inflated and protects the material of the casing from wear from the jointed parts of the ribs.

Each of the arms 11 and 12 of each rib is also provided with a longitudinally disposed web 17 integral with or rigidly secured thereto at its outer edge and extending from end to end of the arm for con-

tact with the inner face of the casing wall when the bag is inflated, and to assist in reinforcing and retaining the bag when in distended position.

5 The outer ends of each arm of the foldable ribs are pivoted at 18 in pairs of perforated lugs 19 arranged in an annular series at the inner side of each head and near the outer edge thereof.

10 To prevent excessive distension of the bag and to reinforce and brace the structure when the bag is distended I utilize flexible connections, as chains 20 having their ends anchored at the inner sides of each head.

15 These chains are slightly shorter than the length of the foldable ribs when they are extended or partially straightened, and the chains prevent the bag being distended to the full length of the straightened ribs.

20 On the outer faces of the heads, and on the longitudinal axial line of the bag, are provided attaching yokes 21 rigidly secured to the heads and adapted for coupling with chains or other devices in connection with a
25 sunken vessel when the latter is being salvaged, or these yokes may be utilized in various other ways for attaching the bag to an object to be raised or lifted under the water.

30 When collapsed and deflated the two heads of the bag are brought toward one another and the foldable ribs, on their intermediate joints 13, are bent or flexed to bring the arms of each rib into substantial
35 parallelism, or in a radial position with respect to the longitudinal center of the bag, as indicated in Figure 2. When air is forced into the bag through the couplings 10 the casing is distended, the heads are forced
40 apart, and the movement of the heads causes the folded ribs to unfold. As indicated in Figure 1 the ribs are not permitted to unfold to a straight position, but the arms of each rib are permitted by the chains 20 to

45 assume an obtuse angle, and the plates 16 which are of arcuate shape form an intermediate, transverse, annular brace for the bag. The bag thus formed in the shape of a double cone with truncated ends is buoyant on the surface of the water or under the
50 water when submerged, and may be utilized for purposes above indicated. The foldable ribs which form an inner framework provide a substantial bracing structure against

pressure of water on the exterior of the bag 55 when the latter is submerged to prevent collapsing of the bag.

Due to the elasticity of the rubber casing, when the bag is deflated, the rubber casing exerts a substantial pressure on the 60 shield plates 16 at the intermediate joints in the ribs and this pressure assists in distending the ribs or opening or unfolding them as the bag is inflated.

As the bag is being deflated while submerged, the water pressure upon the rigid 65 end walls or heads forces them toward the center of the bag to fold the ribs, and the chains 20 which had previously been held taut in the inflated bag, collapse and remain 70 within the bag.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is—

1. The combination in an inflatable bag 75 with a pair of heads, of an elastic casing and means for securing the ends of said casing to said heads, an annular series of foldable ribs within the casing pivotally connected to said heads, means for inflating 80 the bag, and flexible means within the bag for limiting the straightening movement of said ribs.

2. The combination in an inflatable bag 85 with a pair of heads each having an annular flange, of an elastic casing, clamping rings co-acting with said flanges for securing the ends of the casing, an annular series of foldable ribs within the casing pivotally connecting said heads, and chains 90 connecting said heads within the casing for limiting the straightening movement of said ribs.

3. The combination with a pair of flanged, circular heads, an elastic casing, and clamp 95 rings securing the ends of said casing to the flanged heads, of an annular series of foldable ribs comprising hinged arms and pivotally connected with said heads, shield 100 plates on the hinged arms, longitudinal webs on said arms for contact with the casing, means for inflating said casing, and chains connecting said heads within the casing for limiting the straightening movement of the foldable ribs. 105

In testimony whereof I affix my signature.

BENJAMIN F. WINSHIP.