

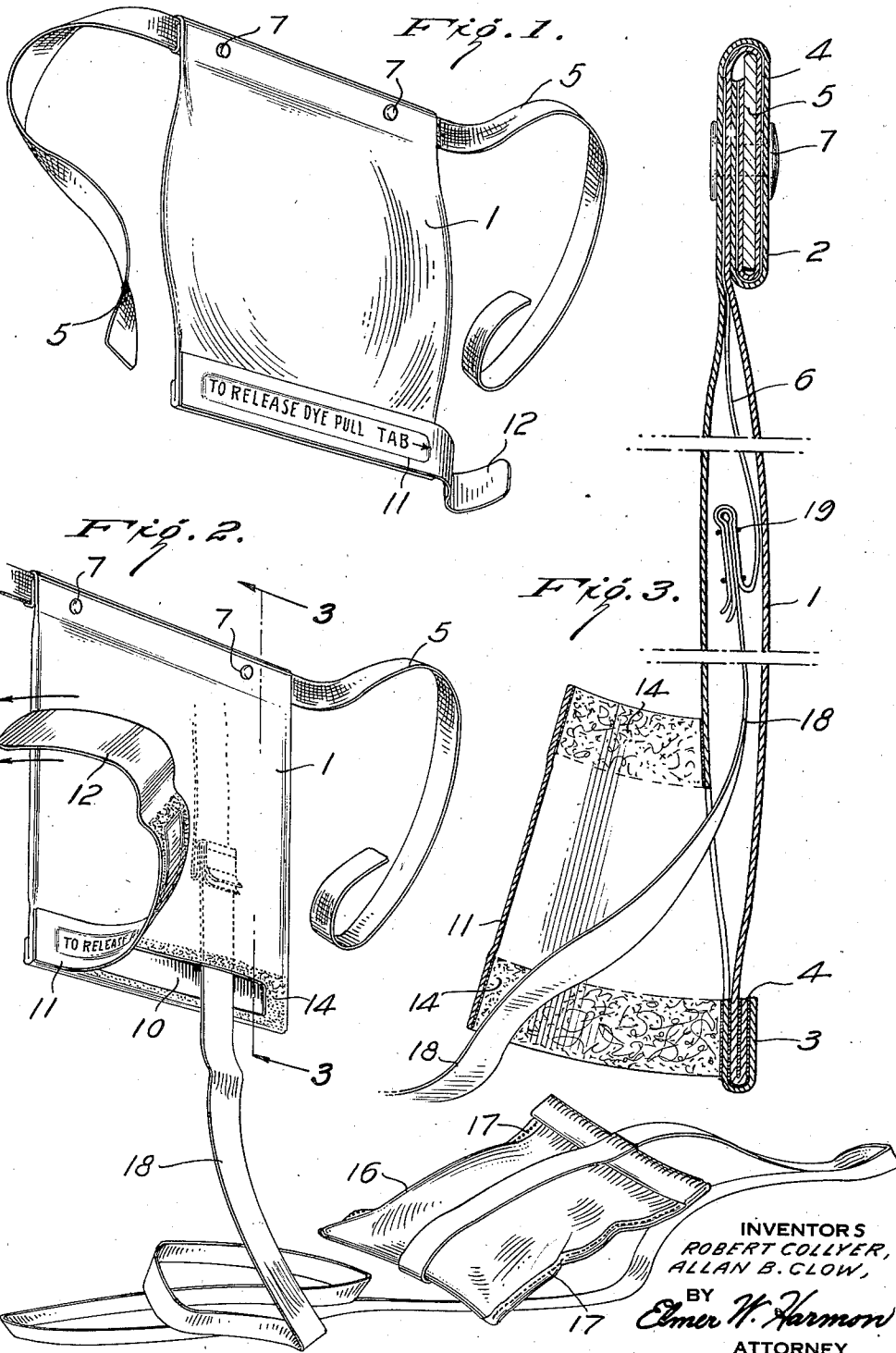
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R. COLLYER ET AL
LIFE JACKET DYE MARKER

2,418,397

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2 Sheets-Sheet 1



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2 Sheets-Sheet 2

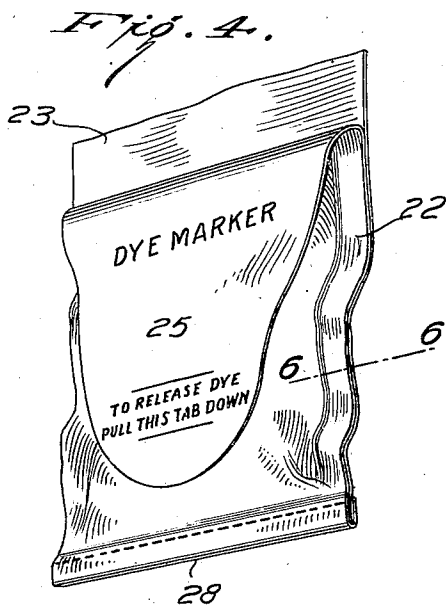
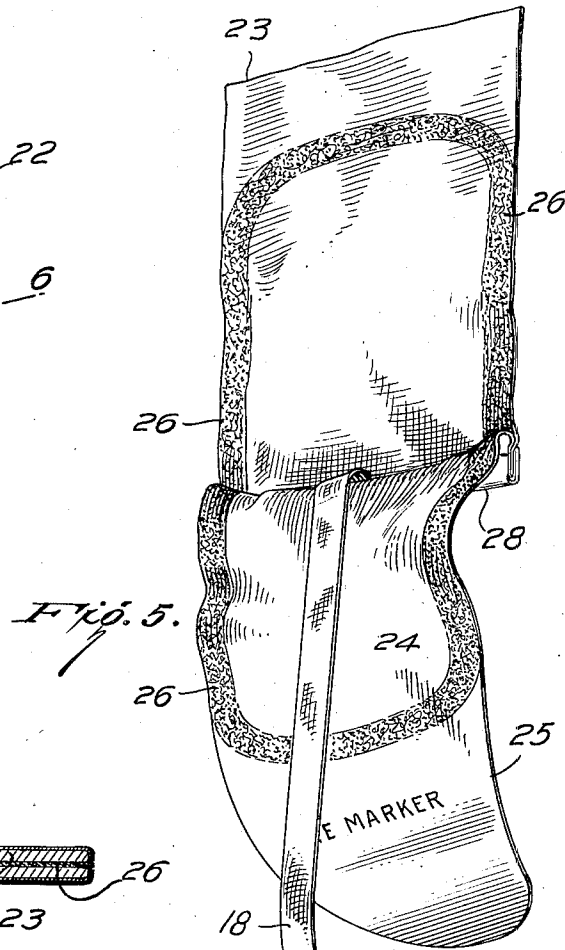
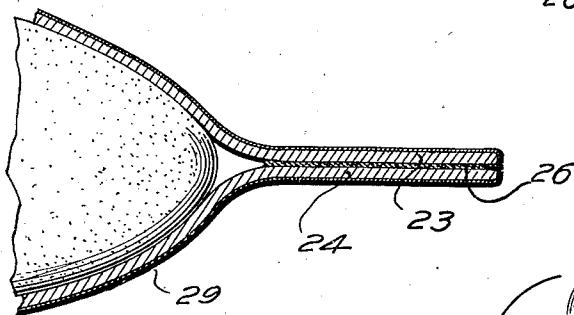
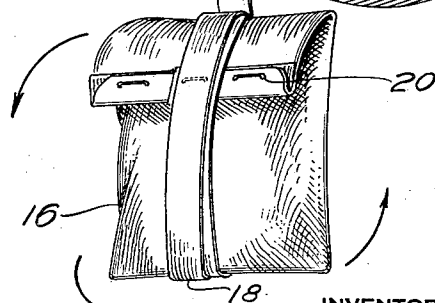


Fig. 6.



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LIFE JACKET DYE MARKER

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This invention relates to dye-markers adapted for use in conjunction with life jackets, life belts and the like. More particularly, the invention relates to an improved type of dye-marker whereby an isolated survivor afloat at sea in a life jacket may attract the attention of passing aircraft and thereby greatly enhance his chances of being seen and rescued.

Of the many hazards connected with transport over water, either by air or surface craft, one of the most difficult to overcome is that of the individual survivor of a disaster. Modern life jackets enable him to keep afloat quite easily, even for extended periods. The principal difficulty is not to keep afloat but to attract the attention of a rescue party.

Because they can quickly cover large areas, use of aircraft in searching has greatly increased the chance of being seen and rescued. However, even a life raft or boat is sufficiently difficult to see from the air so that a pilot may fly over them several times before they are noticed. When this is considered, the problem of spotting an object the size of a man's head may be fully appreciated. Actual tests show that a man in a life jacket is almost invisible from only a few hundred feet away on a clear day. Even a slight haze cuts down this short distance.

Boats or rafts may be equipped with various signal means such as lights, flags and even radio to assist rescue craft in locating them. In this way spotting and rescue may be greatly facilitated. Such means of attracting attention are too bulky to be available to an individual survivor who is dependent on the support of his life jacket. Nor has a wholly suitable means adapted to be carried on a life jacket and still perform the desired function been developed.

It is therefore a principal object of the present invention to provide an effective signaling means whereby a survivor afloat in a life jacket may also readily attract the attention of a plane pilot to his position. A still further object is to provide such a means which will be simple in operation, operable even after a storage period of years, simple enough in construction to be adapted for production in large numbers, and capable of withstanding considerable rough handling. Further, the means must be one which is small in size, and light in weight so as not to interfere with the normal wearing and use of the life jacket.

In general all the principal objects of the present invention are accomplished by providing the life jacket with a means whereby a survivor in

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a life jacket may quickly color a large area of the surrounding water. Broadly, this means comprises a small, waterproof envelope or bag inside which is a quantity of water-soluble dye in a water-permeable package resembling a "tea bag." The dye package is fastened to the outer envelope by a length of fabric tape. The envelope is provided with an easily opened flap and is attached to the outside of the life jacket, life belt or other supporting means.

Operation of the dye marker is both simple and efficient. A survivor has only to pull the closure flap, thus allowing the dye-package to fall into the water. The dye quickly and readily dissolves and sets up a contrasting color in the surrounding water. Actual tests have shown that the man and jacket are almost indistinguishable at a few hundred feet from a plane one hundred feet above the water. Only a few seconds after opening the envelope a brilliant contrasting circle of color forms. After one minute the circle is about forty feet in diameter and is visible from a distance of ten miles from a plane at ten thousand feet.

The invention will be more fully illustrated in conjunction with the accompanying drawings in which

Figure 1 shows an elevation in perspective of one type of dye marker with the envelope closed;

Figure 2 shows an elevation in perspective of the same marker with the flap open and the dye-package exposed;

Figure 3 is a vertical section of the same type of package; along 3—3 of Figure 2;

Figure 4 is an elevation in perspective of a different type with the flap closed;

Figure 5 is another view of the same package with the flap open; and

Figure 6 is a cross section through 6—6 of Figure 4, showing a sealing seam of the type of Figures 4 and 5.

In the drawings, the dye marker of Figures 1-3 comprises a tube 1 of waterproofed fabric, the ends of the tube being folded back to form upper and lower end seams 2 and 3. In order to insure watertight seams, the ends of the tube are ordinarily closed by a cementing layer 4 before being folded back. Folded into upper seam 2 is a fabric ribbon 5, used to fasten the marker to a life jacket and a fabric tape 6, the whole seam being further strengthened by some suitable means such as rivets 7. Staples or some like fastening means may be substituted for rivets 7 or the seam may be stitched if so desired.

The lower front face of tube 1 has an opening

or "mouth" 13. This opening is ordinarily closed by a flap 11 having an extended pull tab 12 at one end thereof. Flap 11 is held over the opening by a ring 14 of a non-hardening waterproof cement which has sufficient adhesive power to hold flap 11 in place but insufficient to prevent the opening being readily uncovered when tab 12 is pulled.

The dye package comprises an envelope 16 made from a water-permeable sheet material and contains the water-soluble dyestuff. The edges of envelope 16 may be closed in any desired manner, as by stitches 17 or if preferable by a suitable adhesive. Envelope 16 is attached to one end of a fabric tape 18, the other end of the tape being attached to tape 6 by stitches 19 or by any other suitable means. If preferred, tapes 6 and 18 may comprise a unitary tape but for ease in assembly it is simpler to form the waterproof envelope and the dye package separately and then join them. The tapes are wrapped around the dye package and placed within the outer envelope before sealing flap 11 over opening 10. A fabric tape has been found to be a particularly useful connecting means for the dye package and envelope. However, if necessary it may be replaced by any available flexible means such as a cord, wire or the like.

A somewhat different type of marker is shown in Figures 4, 5 and 6. A dye package 16, closed by staples 20 rather than stitches 17, is attached to one end of tape 18, the other end of the tape being worked into the bottom fold 28 of an envelope 22. The outer envelope 22 is made from a flat sheet, approximately one-third the length of which comprises a backing 23. The middle third 24 of this sheet is folded over the backing section to serve as the front of a pocket and the final third serves as a pull tab 25. If so desired for convenient assembly, the backing 23 may be a separate piece from the front and pull tab section. The pocket is normally held closed by an annular strip 26 of adhesive, which, as in the case of the ring 14, has sufficient adhesion to form a watertight seal, but insufficient to prevent the pocket being opened when a pull is exerted on opening tab 26. Tape 18 is wrapped around dye package 16, the latter placed within the pocket and the pocket closed.

A bottom seam 28 is formed by folding the edge of the envelope over itself and stitching through the fold. When made from a single strip of sheet material this seam may be eliminated if so desired, but is ordinarily useful since it imparts a certain amount of stiffness to the envelope, and it forms a convenient means of fastening in the tape. It is particularly useful when the pocket is constructed from two pieces, backing 23 being originally separate from the front and tab. This type of dye marker is attached to the life jacket by cementing the backing layer 23 thereto.

It is believed that the operation of the dye markers is self-evident from the description and drawings. As was noted above, the survivor in the life jacket who wishes to call attention to his position has only to pull the opening tab, whereupon dye package 16 falls out of the outer envelope and the dye therein is dissolved in the surrounding water. The flexible connecting means 18 serves several useful purposes. Primarily, it prevents the dye package from sinking before a sufficient amount of dye has been dissolved, but also it insures the dye package being retained close to the man in the life jacket in case he is being carried along by a strong current.

So far as the materials used are concerned, a wide latitude of choice is available. In the modifications shown in the accompanying drawings, the waterproof envelope was made from a cotton fabric which had been waterproofed before fabrication by applying an outer moisture-proof coating such as a rubber cement, a flexible lacquer, a resin coating or the like as is shown at 29 in Figure 6. The invention, however, is not necessarily intended to be limited thereto. If so desired, waterproofing may be done after fabrication or the envelope may be formed from a material which is waterproofed by being impregnated rather than coated. The envelope may also be made from some material such as a plastic or rubber sheet which in itself is impervious to moisture.

Adhesive strips 14 and 26 are preferably made from a pressure-sealable, non-hardening material. Various resin and/or rubber cements suitable for the purpose are commercially available. They must, however, be as free as possible from any tendency to lose their adhesion at temperatures below about 150° F., to become excessively hard or brittle at temperatures above about -50° F., and to become hard and brittle on ageing. On the other hand, permanent seams such as the bottom seam 28 in Figure 4 and seams 2 and 3 in Figure 3 were found to be best made with a resinous cement which, under the influence of heat and/or pressure, forms a permanent bond between the fabric layers.

Similarly, the dye package 16 may be made from any suitable water-permeable sheet material such as a woven fabric or a high wet-strength, porous paper. The latter was used in developing the two types of marker shown in the drawings because it is more easily handled and forms a better container when the dyestuff is present in a powdered form. As was noted above, the dye package may be closed by stitching, by stapling, or by the use of a suitable adhesive. It may conveniently be in the form of a bag, made on a conventional bag-forming machine. It was found that stitching or stapling is ordinarily preferable since it provides an easy way of permanently attaching the dye package to the flexible tape.

The nature of the dyestuff contained in the dye package may also be quite widely varied without departing from the scope of the present invention. The dyestuff should be one which is readily dissolved in water in order that the signaling device may be sufficiently rapid in operation. Since in daylight water ordinarily appears to be of either blue or green shades, a brilliant yellow dyestuff was found to present the greatest contrast and to be visible for the greatest distance.

One of the most suitable dyestuffs for the purpose was found to be Uranine. This dyestuff, in addition to being a brilliant yellow, has the property of fluorescing very strongly when subjected to the influence of ultra-violet light. Ultra-violet light from the sun penetrates most atmospheric haze, even one thick enough to very appreciably cut down radiation within the visual range. Therefore, the fluorescent property of Uranine enables it to be seen for a much greater distance than can many other dyestuffs when the atmosphere contains appreciable haze.

The invention, however, is not necessarily limited to the use of any particular dyestuff. A number of shades of yellow, red and orange dyestuffs may be used or may be blended with each

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other to present distinctive colors in case it is desired to use a color recognition signal designating the survivor as being from a particular group of air or surface vessels. Other shades of dyestuffs may be used if so desired, but ordinarily do not furnish a sufficient contrast with the color of the water surface to be particularly useful.

The dyestuff itself may be used as a powder or as a solid large piece. If desired, binders may be used and the dyestuff briquetted. When using briquettes or large pieces, containers for the dyestuffs may not be necessary. However, use of powdered dye and a porous package is ordinarily to be preferred. It insures the retention of all the dyestuff in the vicinity of the life jacket until dissolved and ordinarily more quickly produces a good dye concentration in the water.

It will be seen that from the foregoing description the essential features of the present invention are:

1. The provision of a flexible waterproof outer covering;

2. An opening in the covering such that when the latter is held in an operating position, a dye package can fall out;

3. A flap which normally closes the opening by means of a waterproof but easily-separable adhesive;

4. A pull means to facilitate opening the closure flap;

5. A package of water-soluble dyestuff;

6. A flexible means joining the dye package to the moisture proof covering when the latter is open; and

7. A means for attaching the outer covering to a life jacket or the like.

We claim:

1. A dye marker adapted to be attached to a life jacket or the like and comprising in combination a flexible waterproof covering, a dye package therein, said dye package comprising a water permeable envelope containing a water-soluble dye, a closure means adapted to hold the dye package within the covering, a waterproof adhesive seal adapted to hold the closure means in operative position, a full means adapted to facilitate opening of the closure means, and a flexible means joining the dye package to the waterproof covering when the latter is open.

2. A dye marker according to claim 1 characterized in that the outer, waterproof covering is formed from a strip of sheet material, approximately the center one-third being folded back over one end section, the peripheral portion of the middle section being sealed to the end section by a plastic, waterproof, non-setting adhesive, whereby a pocket adapted to hold the dye package is formed, the remainder of the strip comprising a pull means adapted to break the peripheral seal.

3. A dye marker adapted to be attached to a carrier, comprising in combination a flexible water proof sheet material forming a water impervious pocket, a dye package within the pocket and connected thereto by a tether, said dye package comprising a water pervious envelope con-

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taining a water-soluble dye, said pocket having front and back walls and being formed by securing together at their edges in a water proof seal, two sheets of the waterproof material, pull-tab means secured to the front wall of the pocket whereby the front wall may be ripped open sufficiently to free the package of dye.

4. A dye marker, adapted to be attached to a carrier, comprising the combination of flexible water-impervious sheet material normally secured by flexible waterproof sealing to form a flexible water-impervious pocket, with a water-pervious receptacle containing a water-soluble coloring substance, a flexible tether connecting said receptacle to the interior of said pocket, said receptacle and said tether being normally enclosed and sealed within said pocket, and a pull tab means whereby the waterproof sealing may be broken sufficiently to free said receptacle from said pocket.

5. A dye marker, adapted to be attached to a carrier comprising the combination of a flexible waterproof pocket, formed from two pieces of flexible water-impervious sheet material by securing the edges thereof in a flexible waterproof seal, with a water-pervious receptacle containing a water-soluble coloring substance, a flexible tether connecting said receptacle to the interior of said pocket, said receptacle and said tether being normally enclosed and sealed within said pocket, and a pull tab means whereby said waterproof sealing may be broken sufficiently to free said receptacle from said pocket.

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