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L. P. FRIEDER ET AL

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LIFE RING

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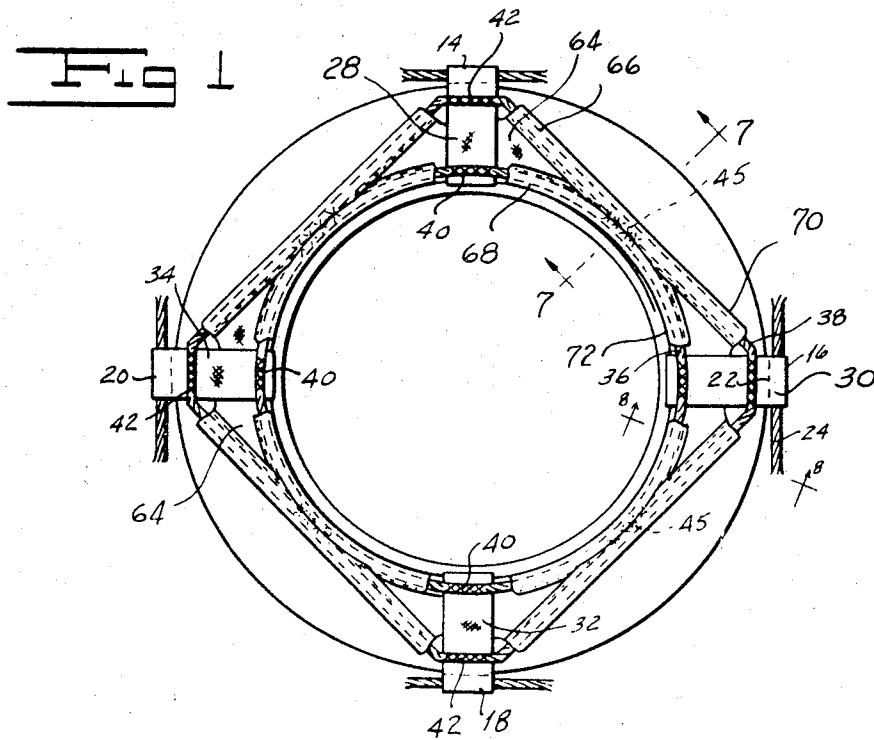
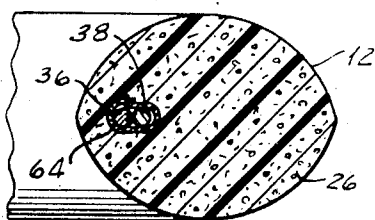
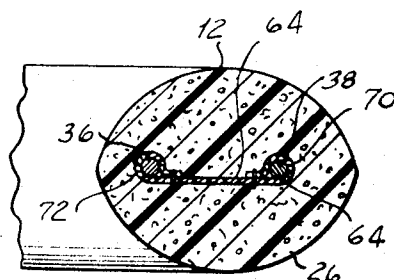


Fig 2

Fig 3

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LIFE RING

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Original application July 27, 1965, Ser. No. 475,185, now Patent No. 3,353,197, dated Nov. 21, 1967. Divided and this application June 27, 1967, Ser. No. 667,308

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U.S. Cl. 9—311

4 Claims

ABSTRACT OF THE DISCLOSURE

A life ring comprising an annular body of soft and resilient buoyant material surrounded by a line and having means for attaching the line to the body at spaced points therearound. First fabric tunnels extending between adjacent connecting means within the body receive a first continuous length of tension-resisting material. Second fabric tunnels extending between adjacent connecting means within the body receive respective second lengths of tension-resisting material. The lengths of tension-resisting material are secured to the attaching means.

This application is a division of our copending application Ser. No. 475,185, filed July 27, 1965, now Patent No. 3,353,197.

Our invention relates to a life ring and more particularly to an improved life ring which is soft and resilient and which has a relatively high resistance to tension applied to the ring.

There are known in the prior art life rings to which a surrounding length of line is secured to permit a person to hold the ring. Rings of this type must of course be buoyant so as to assist a person in remaining afloat. Moreover, if rings of this type are to achieve their intended purpose, they must be sufficiently strong to permit a person grasping the ring to be drawn through the water. Not only must they permit the person to be drawn through the water but they should have sufficient strength to permit the person grasping the ring to be drawn out of the water and up onto the deck of a rescue ship, for example, by means of the ring.

Rings of the type described above originally were machined from a material such as cork which not only is buoyant but which has sufficient structural strength to permit the rescue operations described above to be carried out. More recently, high density expanded vinyl plastic has been substituted for cork. When that material is used it is molded in a relatively small size and then expanded approximately 3 to 1.

Rings of the type described above have a generally elliptical cross section with a relatively sharp peripheral edge. Owing to the requirement for structural strength consistent with the buoyancy requirement, both the cork and the expanded vinyl resins of the prior art are hard and non-resilient. This characteristic is highly undesirable in that in use very often the ring is thrown to a person in the water and may strike his head resulting in some injury, if not in rendering the person unconscious. Moreover, owing to the hardness of the rings of the prior art, they are not readily grasped with the hand save by means of the peripheral line.

We have invented an improved life ring which overcomes the defects of rings of the prior art. Our ring is softer than are rings of the prior art and at the same time is resilient. While being soft and resilient, our ring has sufficient structural strength to permit a person grasping either the ring itself or the surrounding line to be drawn from the water by the ring. Our ring is highly resistant

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to tension applied to the ring at the inner edge thereof. Our ring also is highly resistant to tension applied to the ring through the surrounding line.

One object of our invention is to provide an improved life ring which is soft and resilient.

Another object of our invention is to provide a soft resilient life ring having sufficient structural strength to permit a person to be drawn from the water by means of the ring.

A further object of our invention is to provide an improved life ring which will not cause injury if it strikes a person in the water.

A still further object of our invention is to provide a soft, resilient life ring which is highly resistant to tension resulting from forces applied to the ring at its inner edge.

Yet another object of our invention is to provide an improved life ring which is highly resistant to tension applied to the ring through the line surrounding the ring.

Other and further objects of our invention will appear from the following description.

In general our invention contemplates the provision of a safety life ring in which we embed an endless loop of tension-resisting cord in a body of soft, flexible, resilient, buoyant material to resist tension forces applied to the inner periphery of the ring. We secure this loop to the external line surrounding the ring in such a way as to resist tension resulting from forces applied to the line surrounding the ring.

In the accompanying drawings which form part of the instant specification and which are to be read in conjunction therewith and in which like reference numerals are used to indicate like parts in the various views:

FIGURE 1 is a plan view of half of our safety life ring.

FIGURE 2 is a sectional view of the form of our safety life ring shown in FIGURE 1 drawn on an enlarged scale and taken along the line 2—2 of FIGURE 1.

FIGURE 3 is a sectional view of the form of our improved safety life ring taken along the line 3—3 of FIGURE 2 and drawn on an enlarged scale.

Referring to FIGURE 1 of the drawings, our improved safety life ring includes an annular body 12 of flexible resilient buoyant material such, for example, as unicellular foamed plastic. We provide the body 12 with, for example, four loops 14, 16, 18 and 20 at spaced locations around the periphery of the body. Each of the loops may be formed from a length of nylon webbing or the like, stitched on itself along a line 22 to form the loop and embedded in the body 12 in a manner to be described hereinafter. The loops 14, 16, 18 and 20 receive an endless line 24 to permit a person to hold onto the body 12 without difficulty. Line 24 may be made of any suitable material. It may be braided from nylon yarns. Alternatively, it might be braided from polypropylene yarns to afford a longer life in salt water. If desired we stitch the line 24 to the loops 14, 16, 18 and 20.

The body 12 of our ring may be made in two halves, one half 26 of which is shown in FIGURE 1. We secure four spaced lengths 28, 30, 32 and 34 of woven tape or webbing of nylon or the like to the flat surface of the half 26 by use of any suitable adhesive such, for example, as an epoxy resin. Before so doing, however, we preferably make a subassembly of the lengths and a first endless cord 36 and a second endless cord 38, each braided from nylon or from a suitable material of high tensile strength. We secure the cord 36 to the lengths 28, 30, 32 and 34 adjacent the inner edges thereof by stitching 40 for example. We secure the cord 38 to each of the tapes 28, 30, 32 and 34 at points adjacent the outer periphery of the ring half by stitching 42.

The outboard ends of the lengths 28, 30, 32 and 34 are folded back on the lengths to provide the loops 14, 16, 18 and 20 which are retained in the lengths by stitching 22. In the course of forming the loops, the line 24 is enclosed in the loops. While we have shown each of the cords 36 and 38 as being formed as continuous lengths, it will readily be understood that a loop could be formed from a length having ends with the ends stitched to the same length of webbing such, for example, as the length of webbing 28 or to each other.

We apply a thin fabric of nylon or the like 64 to the surface of the half 26 by means of a suitable adhesive. We fold over the edges of the fabric between adjacent pieces of webbing such as the pieces 28 and 30 and stitch the edge of the fabric as by lines of stitching 66 and 68 to form tunnels 70 and 72. The lengths of the respective cords such, for example, as cords 36 and 38 between the two pieces 28 and 30 extend through the tunnels 70 and 72. It will be appreciated that before forming the tunnels, we stitch the cords together as at 45. We repeat this procedure between pieces 30 and 32, between pieces 32 and 34 and between pieces 34 and 28. With this arrangement, after the two halves 26 are adhered to form the ring body 12 and when in a manner to be described the cords 36 and 38 are tensioned, they can move with relation to the body 12.

It will be appreciated by those skilled in the art that our article may be formed in various ways. While we have described an arrangement in which the ring is made in two halves which would be individually molded and then adhered, we could mold the ring body to its final shape, slit it around its inner periphery and insert the preformed assembly of the pieces 28, 30, 32 and 34 and cords 36 and 38 together with the fabric tunnels in the slit. The ends of the pieces 28, 30, 32 and 34 might then be drawn outwardly through openings burned or otherwise formed radially from the outer periphery into the slit. The slit could then be sealed.

In operation of the form of our life ring shown if the ring were thrown to a person in the water, if it should strike him it would not cause injury owing to the fact that the material of the body 12 is soft and resilient. If it became necessary to pull the person out of the water by means of the ring, the person might, for example, have his arm through the ring opening and the rescuer might be pulling also on the inner periphery of the ring. Under these circumstances, the ring would tend to stretch along a diameter so that appreciable tension would be applied to the ring. With our arrangement, this tension would be taken up almost entirely by the cord 36 so that the material of the ring body 12 would not be torn. Owing to the resilience of the material, when the forces were released, the ring would readily return to its initial shape.

Alternatively, if forces were applied to the ring through the medium of the line 24, for example, in the direction of the arrows A, the pieces 28, 30, 32 and 34 would transmit these forces to the cord 38 as indicated by the broken line in FIGURE 2. Cord 38 would be tensioned to absorb these forces and while the ring body 12 would temporarily be distorted, its material would not be damaged.

In operation of our ring cords 36 and 38 may readily shift with respect to the body material owing to the fact that they are disposed in the tunnels 70 and 72 extending between pairs of adjacent loop-forming pieces 28, 30, 32 and 34.

It will be seen that we have accomplished the objects of our invention. We have provided an improved life ring

which avoids the possibility of injury to a person being struck by the ring. Our ring is soft and resilient and yet has sufficient strength to permit a person to be lifted out of the water by means of the ring. Our ring resists appreciable tension resulting from the application of forces either directly to the ring or entirely through the surrounding line.

It will be understood that certain features and subcombinations are of utility and may be employed without reference to other features and subcombinations. It is further obvious that various changes may be made in details without departing from the spirit of our invention. It is, therefore, to be understood that our invention is not to be limited to the specific details shown and described.

Having thus described our invention, what we claim is:

1. A safety life ring including in combination an annular body of soft and resilient buoyant material, a line surrounding said body, means for attaching said line to said body at spaced points therearound, means forming first tunnels in said body extending between adjacent attaching means, a first continuous length of flexible tension-resisting material disposed in said first tunnels, means forming second tunnels in said body extending between adjacent attaching means, respective second lengths of flexible tension-resisting material in said second tunnels, said tunnels being located within said body so as to have walls of a closed transverse cross-sectional configuration, said lengths being of smaller diameter than the inside diameter of said tunnels and freely movable with respect to said tunnel walls, and means for securing said second lengths to said attaching means.

2. A life ring as in claim 1 in which said body comprises two halves and in which said tunnel-forming means comprises fabric sandwiched between said halves.

3. A life ring as in claim 1 in which said first and second tunnels have common regions and means for securing said second lengths to said first length in said regions.

4. A safety life ring including in combination an annular body of soft and resilient buoyant material, a line surrounding said body, respective means for attaching said line to said body at spaced points therearound, means forming respective tunnels in said body extending between pairs of adjacent attaching means, said tunnels being located within said body so as to have walls of a closed transverse cross-sectional configuration, respective lengths of flexible tension-resisting material disposed in said tunnels, said lengths being of smaller diameter than the inside diameter of said tunnels and freely movable with respect to said tunnel walls, and means for securing said lengths to said attaching means.

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