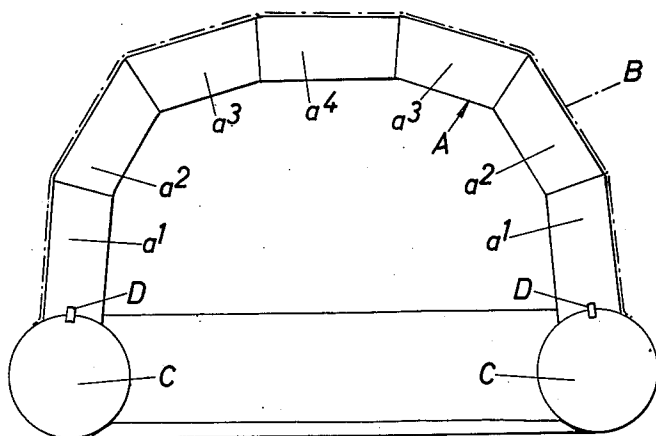


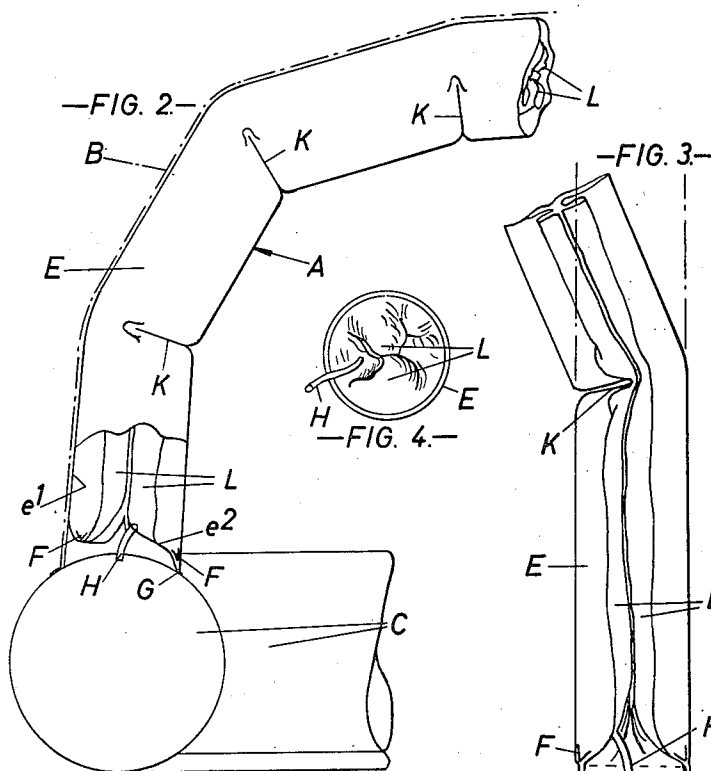
Sept. 18, 1962

J. SILVERSTONE
INFLATABLE STRUCTURES
Filed Nov. 10, 1958

3,054,124



—FIG. 1.—



Joseph Silverstone INVENTOR

BY

Harbiman
ATTORNEY

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3,054,124

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Joseph Silverstone, Mellor Hall, Marple Bridge,
Marple, England

Filed Nov. 10, 1958, Ser. No. 772,807

Claims priority, application Great Britain Nov. 13, 1957
8 Claims. (Cl. 9-11)

This invention relates to inflatable structures, and is particularly, though not exclusively, concerned with life-rafts of the type in which a flexible impermeable floor is outlined by an inflatable tubular gunwale, opposed parts of the latter being connected by at least one inflatable tubular arch adapted to support a protective canopy above the occupant or occupants of the raft.

At the present time the usual practice in constructing such a canopy arch is to unite end-to-end three or more tubular sections each formed by cementing together opposite longitudinal edges of a rubberized fabric or like panel, the ends of the several sections being accurately shaped so that the complete arch, when united to the gunwale sides and inflated, will assume a half-hexagonal or other angular profile involving somewhat less complicated pattern development than is required for a smoothly curved arch.

The object of the present invention is an improved method of producing an inflatable arch for supporting a life-raft canopy or other flexible shelter, which method, although possibly calling for more material than the known procedure, will result in a substantially cheaper construction in as much as it greatly simplifies the cutting-out of the constituent panels.

According to this invention an inflatable member for supporting a flexible shelter, and required to exhibit an arcuate or angular bend when inflated, comprises a single length of tube with outer and inner walls united together at corresponding ends to form an inflation chamber of annular cross-section, such tube being mounted between two other structural members connected by the flexible shelter and situated at relatively defined positions whose distance apart is less than the length of such tube.

Experience shows that the latter will, on inflation of its double wall, automatically assume a bent formation dictated by the cut of the flexible shelter supported thereby and will thereafter retain such bent formation.

In the accompanying drawings:

FIG. 1 is a schematic cross-sectional view of a life-raft incorporating an inflated canopy arch of known construction,

FIG. 2 is an enlarged view corresponding to the left-hand part of FIG. 1 but showing the arch constructed in accordance with the present invention,

FIG. 3 is a fragmentary sectional side elevation of an inflated tube as shown in FIG. 2 and illustrates the effect of introducing an angular bend therein, and

FIG. 4 is a typical end view of the tube shown in FIG. 3.

As hereinafter particularly described, the invention is applied to an inflatable arch A disposed transversely of an inflatable life-raft for supporting a protective canopy B which is marginally united to the gunwale C of such raft and adapted to be stretched taut by inflation of the arch.

Normally, the arch A will be constructed, as shown in FIG. 1, from a plurality of short single-walled tubular sections a^1 , a^2 , a^3 , a^4 mitre-jointed each to the next, the terminal sections a^1 of the assembly being suitably shaped at their outer ends for greater convection to the sides of the gunwale C, which latter communicates with the arch A, usually by way of a non-return valve D, and

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assumes a half-polygonal profile when inflated, the canopy B also connecting the gunwale sides being appropriately shaped and united to the periphery of the arch A.

The improved arch constructed in accordance with the present invention and illustrated in FIG. 2 consists of a double-walled tube E whose unstressed length corresponds to that of an equivalent multi-sectional arch measured around its outer periphery.

The outer and inner skins e^1 , e^2 of the double-walled tube E are hingedly united at corresponding ends by internal taping F, and the two ends of the tube are hinged to opposed parts of the gunwale or supports C by means of tape connections G, preferably confined to those portions of the tube end peripheries which lie nearest to the centre of the raft.

The double wall of the tube E may be inflated simultaneously with the gunwale C, as by means of a pipe H connecting the latter to one (or each) end thereof, or alternatively the tube E may carry its own inflation means such as a gas-storage "bottle."

The construction of the double-walled tube E is a relatively simple matter as compared to the mitre-jointing of several single-walled sections as shown in FIG. 1, and the tube ends do not require accurate shaping in conformity with the curvature of the gunwale C since a mere anchorage, and not a gas-tight connection, is required at these points.

On inflation, the canopy B has its periphery attached to the gunwale C externally of the ends of the tube E, which, accommodates itself to the constraint imposed by such canopy and automatically develops kinks K at its inner periphery in a manner predetermined by the canopy shape.

The inner skin e^2 of the tube E forms itself, during inflation, into longitudinal corrugations L whose crests touch one another (as shown in FIGS. 3 and 4) immediately adjacent the axis of the tube, the latter thus acquiring adequate rigidity between the kinks or angular bends K but without any tendency for these to straighten out or shift their position along the tube.

It will be appreciated that, if the canopy is cut so as to exhibit a smoothly curved or "bubble" form on inflation of the supporting structure, the double-walled arch will readily conform to the requisite curvature as regards its outer periphery, its inner periphery of course assuming a number of closely-spaced and relatively small kinks.

As an alternative to permanent attachment of the tube E to the gunwale C by the hingeing method previously described, the ends of such tube may be located in a temporary manner; for example, by means of a snap-hook mounted upon a reinforced part of either of the skins e^1 , e^2 and engaged with a ring or loop on the gunwale C, or alternatively by drawing through such ring or loop a cord attached to the tube E and making such cord fast to a button or the equivalent on the gunwale C.

Although particularly described above with reference to a life-raft-canopy arch, the invention is equally applicable to inflatable supporting members, not necessarily of arched form, for other flexible shelters such as tents.

I claim:

1. An inflatable member adapted to support a flexible shelter comprising a double-walled substantially straight tube providing an annulus between the walls, a pair of supports for said tube, the length of said tube being greater than the distance between said supports, the ends of said tube being closed, an inlet to said annulus for the entrance of gas for inflation, and means for securing said ends of said tube to said supports, said tube when inflated assuming an arched position with kinks on the inside of said arch, and a flexible shelter marginally

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united to said support and adapted to be held on said tube by inflation of said tube.

2. An inflatable member according to claim 1 characterized in that there is provided a liferaft having an inflatable gunwale, said gunwale constituting said supports. 5

3. An inflatable member according to claim 1 characterized in that there is provided a liferaft having an inflatable gunwale, said gunwale constituting said supports, and said tube having no gas communicating connection with said gunwale. 10

4. An inflatable member according to claim 1 characterized in that said securing means is a hinged member.

5. An inflatable member according to claim 1 characterized in that said tube has inner and outer members, the ends of said members being sealed together to form an inflatable chamber therebetween. 15

6. An inflatable member according to claim 5 charac-

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terized in that said inner member provides central corrugations adjacent to the axis of said outer tube.

7. An inflatable member according to claim 6 characterized in that said inlet communicates with said gunwale.

8. An inflatable member according to claim 5 characterized in that said inlet communicates with a gunwale.

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