June 2, 1964 A. W. CHRISTOFFERSON 3,134,994

BUOYANT BATHING SUIT

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FIG. 1

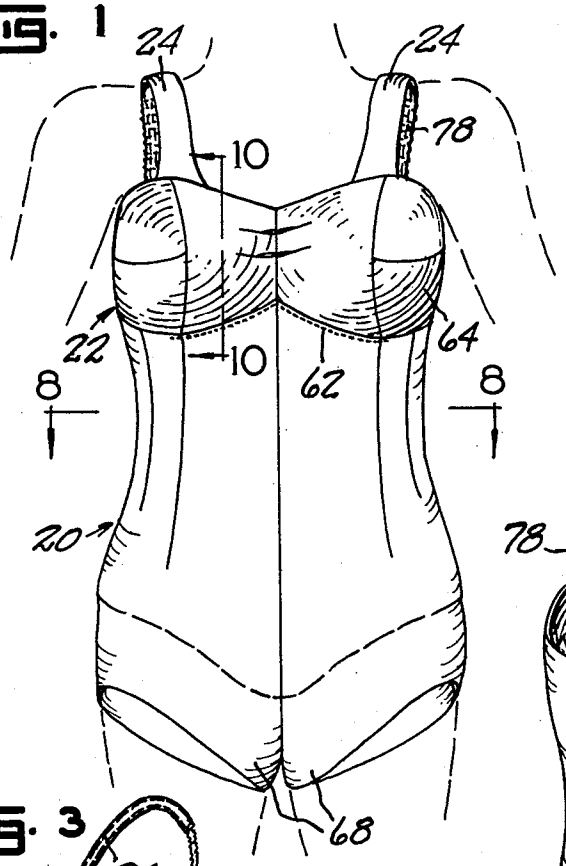


FIG. 2

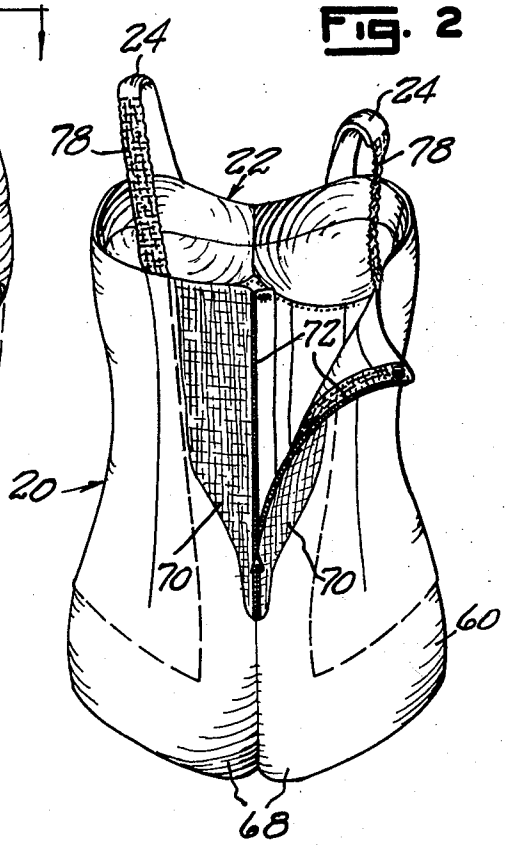
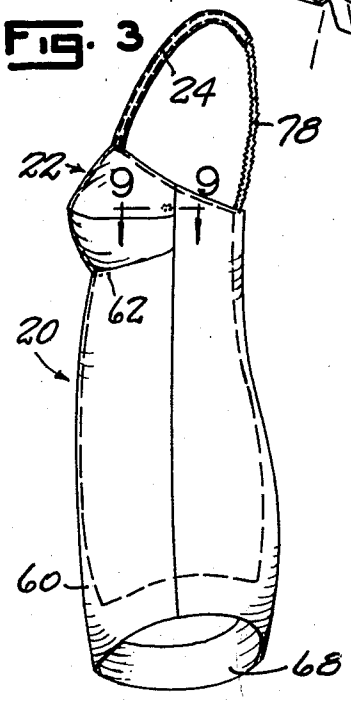


FIG. 3



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FIG. 4

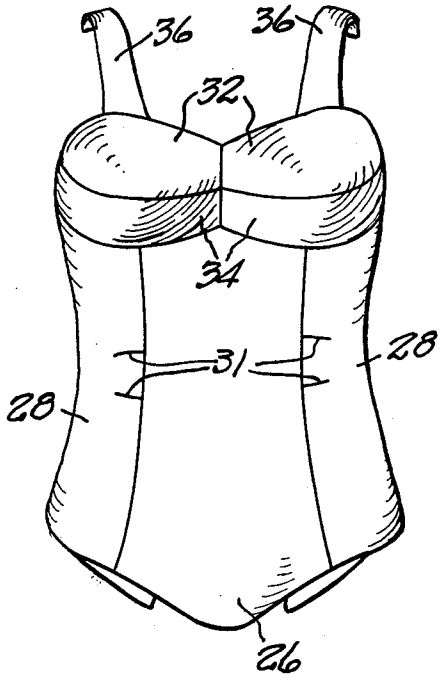


FIG. 5

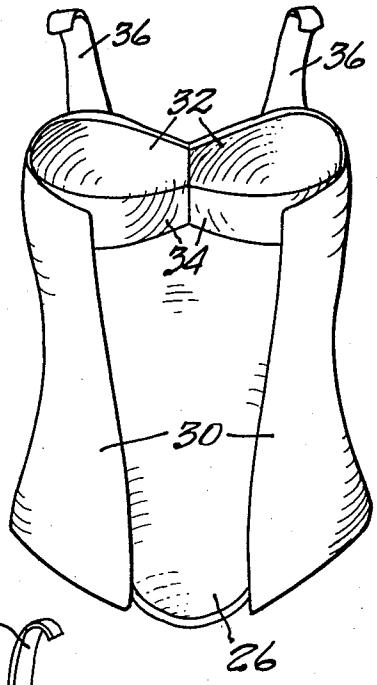


FIG. 6

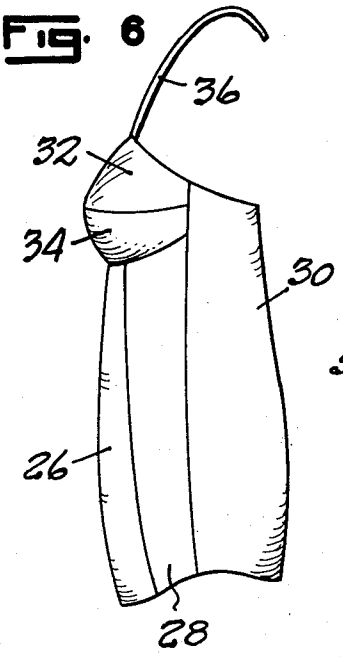
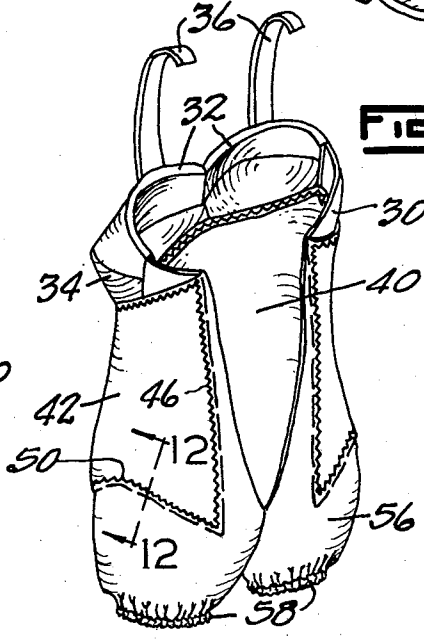


FIG. 7



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Fig. 8

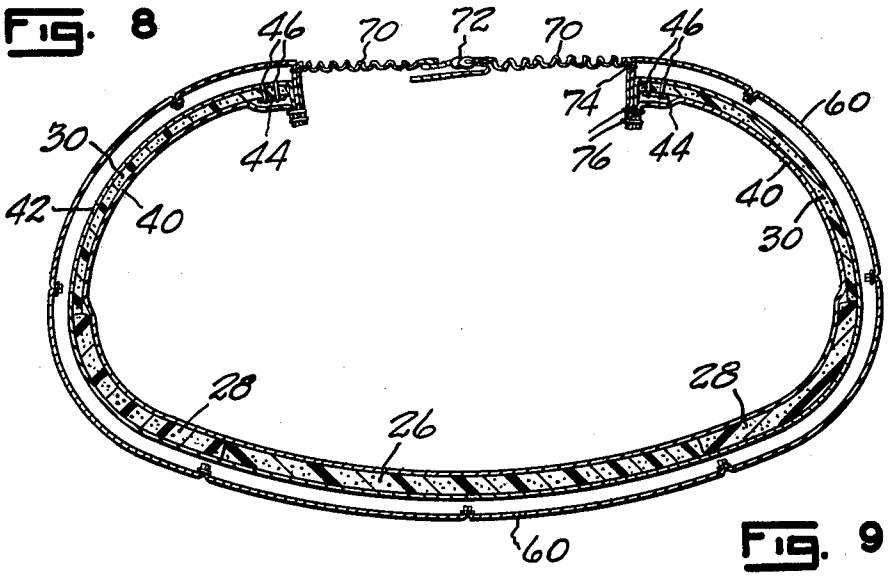


Fig. 9

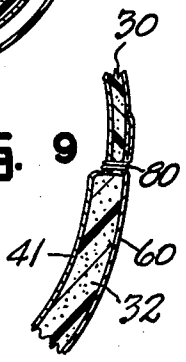


Fig. 10

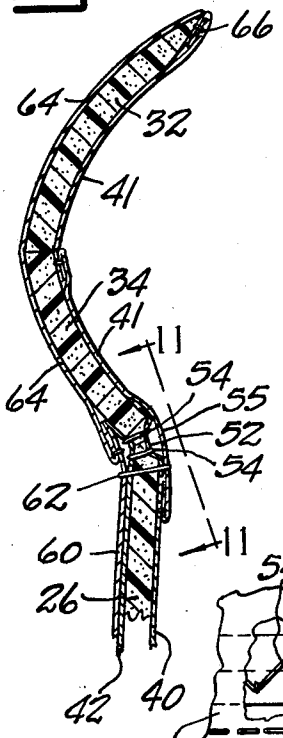


Fig. 12

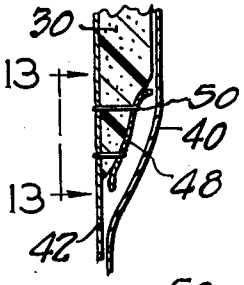
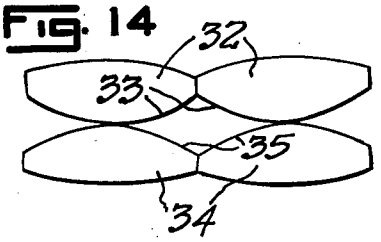


Fig. 14



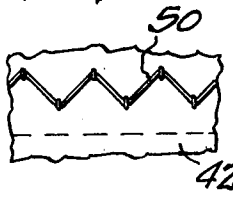
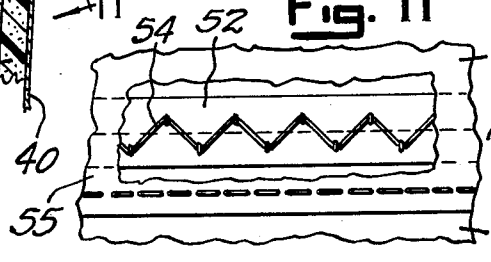


Fig. 13

Fig. 11



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3,134,994
BUOYANT BATHING SUIT

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Filed May 2, 1962, Ser. No. 191,823
10 Claims. (Cl. 9—334)

This invention relates to improvements in buoyant bathing suits, and more particularly to bathing suits of the type shown in Patent No. 2,897,821, dated August 4, 1959, and in the patent application of Lovie E. Lerner, Ser. No. 65,520, filed October 27, 1960, now Patent No. 3,094,722.

The primary object of this invention is to provide a novel construction of buoyant bathing garment having a buoyant shell portion formed of unicellular sheet material of greater thickness than fabric, and a fabric decorative sheath, which garment is so constructed as to provide buoyancy to float a wearer in water and to avoid the appearance of bulkiness when worn.

A further object is to provide a garment with a buoyant shell having portions of different thickness and novel shape united to provide a unit of a shape conforming to body contour, particularly at breast portions thereof.

A further object is to provide a garment of this character with a buoyant body-conforming shell formed of unicellular material and utilizing multiple portions joined together with means to reinforce the same at the joints and at margins to facilitate retention of the desired shape and configuration of the shell when the garment is worn.

A further object is to provide a garment with a prefabricated shell of unicellular buoyant material formed of multiple parts joined together to define a body-conforming contour maintained and reinforced in desired contour by fabric garment liner portions assembled therewith to define a unit which is incorporated within an external decorative fabric sheath anchored to said unit at limited portions only so as to facilitate natural draping of the garment in some sections thereof and to provide an overall attractive appearance of the garment when worn.

Other objects will be apparent from the following specification.

In the drawing:

FIG. 1 is a front view of the garment;

FIG. 2 is a back view of the garment in partially open form;

FIG. 3 is a side view of the garment;

FIG. 4 is a front view of a buoyant shell utilized in the garment;

FIG. 5 is a rear view of a buoyant shell utilized in the garment;

FIG. 6 is a side view of a buoyant shell utilized in the garment;

FIG. 7 is a rear view of a sub-assembly unit of the garment including a buoyant shell portion and a fabric inner liner portion;

FIG. 8 is a sectional view of the garment taken on line 8—8 of FIG. 1;

FIG. 9 is a fragmentary detail enlarged sectional view taken on line 9—9 of FIG. 3;

FIG. 10 is an enlarged vertical fragmentary sectional view of the garment taken on line 10—10 of FIG. 1;

FIG. 11 is an inner face view of a portion of the garment in the area indicated by lines 11—11 in FIG. 10;

FIG. 12 is an enlarged fragmentary detail sectional view taken on line 12—12 of FIG. 7;

FIG. 13 is an inner face view of a portion of the garment indicated by the arrows 13—13 in FIG. 12; and

FIG. 14 is a face view illustrating the shape of portions forming the breast portion of the shell.

Referring to the drawing which illustrates the preferred embodiment of the invention, the numeral 20 designates a garment fitting around the torso and upper portions of the legs of the body of a wearer, and including a brassiere portion 22 and shoulder straps 24. It will be understood that the shaped brassiere portion may be replaced by a plain upper garment portion in garments of small sizes designed to be worn by children.

The garment includes a shell of buoyant material and preferably a unicellular material formed of a synthetic resin, such as vinyl type plastic. Materials of this character are available in sheet form in different thicknesses and are characterized by a closed cell construction which imparts buoyancy thereto. Other physical properties of such material include flexibility, normal shape retention and resistance to flexing in more than one direction at one time. The material may also be molded to predetermined size, shape and thickness, if desired, but the use of molded parts in garments of different sizes presents problems of manufacturing economy and high mold costs because of the wide range of sizes and shapes necessary in garments, and particularly those of body-conforming configuration. One type of material particularly well suited for use in bathing garments is produced by the United States Rubber Company under the trademark "Ensolite." The unicellular material can be joined by cementing parts thereof and by stitching therethrough. Shaping of the unicellular material can be accomplished by skiving thereof.

One example of such a buoyant garment shell is illustrated in FIGS. 4, 5 and 6. In this shell structure the waist portion of the shell is shown as consisting of a plurality of panels, including a front center panel 26 of predetermined thickness and a contour as best seen in FIG. 4, having curved sides, a V-shaped bottom portion and a V-shaped top portion. A pair of substantially similar front side panel portions 28, preferably narrow and vertically elongated and provided with a contour or shape characterized by curved upper edges and curved vertical edges and are cemented or otherwise united at their vertical edges to the vertical edges of the central panel 26. Rear side panel portions 30 of selected shape characterized by curved edges are united to the vertical edges of the side panels 28. The panels 30 preferably extend above the level of the upper edges of the adjacent panels 28, as best seen in FIG. 6. Shaping of the various panels to facilitate bending thereof to desired contour may be accommodated by notching said panels and notching the edges of the notched panels as seen at 31 in FIG. 4 in the manner illustrated in the Lerner patent application, Ser. No. 65,520, filed October 27, 1960, mentioned above. The shell portion defined by the panels 26, 28 and 30 extends for the major portion of the circumference of the body of the wearer, but the free vertical edges of the rear panels 30 terminate in spaced relation, as seen in FIGS. 5 and 8. In the construction here illustrated as shown in FIG. 8, the panels 26 and 28 may be of one thickness, and the panels 30 may be of a lesser thickness.

The breast or brassiere portion of the buoyant shell preferably comprises four panels of the shape and configuration illustrated in FIG. 14. The breast-forming panels include two similar or complementary narrow elongated upper panels 32 and two similar or complementary narrow elongated lower panels 34. Each of these panels is characterized by a vertical dimension small compared to the horizontal dimension, and with end edges of limited extent. The upper edges of the upper panels 32 are preferably curved convexly and the lower edges of the upper panels 32 are also convexly curved, with the curvature of the lower edges preferably being greater than the curvature of the upper edges. The lower panels 34 are similarly characterized by short vertical edge portions and convexly curved upper and lower marginal edges, with the upper edges of the lower panels 34 being

of greater convexity or curvature than the lower edges. For purposes of convenience, the lower edges of the upper panels **32** are designated **33**, and the upper edges of the lower panels **34** are designated **35**. The inner edges of the two upper panels **32** and of the two lower panels **34** are either cemented together or the two panels **32** may be formed integrally and the two panels **34** may be integrally formed also. I prefer to form the panels separately, however, and to join them by cementing so as to define joints between the panels **32** and panels **34** which are stabilized by cementing or bonding and thereby provided with lesser extensibility or elasticity than characterizes the unicellular material per se. The edges **33** and **35** of the panels **32** and **34** are continuously joined as by cementing thereof along their length, whereby a brassiere portion is formed of pocketed character, as illustrated in FIGS. 3 to 7 and 10.

The breast or brassiere portion is joined to the waist portion by cementing or otherwise securing the lower edges thereof to the upper edges of the panels **26** and **28**, and the end edges thereof to the upper projecting part of the rear panel **30**. The buoyant shell may also include strap portions **36** formed of unicellular material and extending upwardly from the breast portion at the location at which the shoulder straps **24** will project from said breast portion in the finished garment.

The buoyant shell constitutes a sub-assembly with which is preferably assembled an inner garment liner to produce a unit as illustrated in FIG. 7. This inner liner includes an inner fabric layer **40** and an outer fabric layer **42**, which are secured to the buoyant shell, as at the panels **26**, **28** and **30** thereof, as illustrated in FIG. 8, to preferably fit therearound or around at least part thereof. At the margins of the shell portions **26**, **28** and **30**, reinforcing tapes preferably cooperate therewith and with the joints between selected portions of the shell to strengthen the shell. Thus at the free vertical margins of the panels **30**, fabric tapes **44** may be provided which are anchored to the shell panels **30** and to the outer fabric **42** by stitching **46**. At the lower margins of the panels **26**, **28** and **30**, said panels are preferably skived or tapered, as illustrated in FIG. 12, and tapes **48** may be secured or anchored to the skived margins of the panels and to the outer fabric **42** by stitching **50**. At the portion of the garment between the lower breast panels **34** and the upper ends of the body panels **26**, **28** and **30**, a reinforcement as illustrated in FIGS. 10 and 11 may be employed, the same preferably entailing the extension of the outer fabric **42** to a point in contact with the lower margin of the breast portion of the shell at the outer surface thereof. A reinforcing tape **52** is applied to the inner surface of the shell along the joint between the breast and body portions of the shell and is stitched to the shell at the breast and body portions and to the outer fabric **42** by stitching **54**. If desired, the stitching at **50** and **54** and elsewhere, as at **46**, may be diagonal stitching, as illustrated in FIGS. 11 and 13. The stitching **54** is preferably sufficiently tight to somewhat constrict the marginal portions of the panels of the body and breast portions of the garment, as illustrated in FIG. 10. The inner layer **40** may include portions extending in contact with the inner surfaces of the breast portion at **41**, said portions preferably being free from the tape **52** and the shell of the garment at **55**, as illustrated in FIG. 10. The layers **40** and **42** project below the lower part of the shell and may extend inwardly from the rear edges of the shell, as illustrated in FIG. 7. The lower part provides pant and leg portions **56** with elastic leg ends **58**, in cases where the shell is formed as illustrated in FIGS. 4, 5 and 6 to terminate at or adjacent the level of the hips of the wearer.

An outer fabric sheath **60** encloses the sub-assembly illustrated in FIG. 7. The sheath is anchored by stitching to the buoyant shell or the inner liner **40**, as illustrated at **62** in FIGS. 1 and 10, along a line following

the contour of the bottom of the brassiere portion. A contoured brassiere sheath portion **64** fits snugly around the upper shell buoyant portion in garments having a cupped upper shell portion and is stitched at **66** at its upper margin to the upper margin of the liner portion **41**. At its mid portion the sheath preferably has clearance with the mid portion of the body of the shell at parts **26**, **28** and **40** thereof, as best illustrated in FIG. 8. The lower portion of the sheath defines leg portions **68** fitting around the inner leg portions **56**.

At its back the sheath preferably includes panels **70** of elasticized material which mount slide fastener units **72** at their vertical free edges and serve to draw the sheath fairly snugly around the buoyant shell. The elasticized material **70** in garments for women preferably terminates spaced above the lower portions of the shell, as best seen in FIG. 2, so that the lower leg portions **68** are not drawn tight thereby but are permitted to hang or drape naturally below the shell portion so as to avoid revealing the outline of the shell portion. It will also be observed that the elasticized material **70** may extend for the major portion of its height substantially to the vertical edges of the rear portions of the shell, as seen in FIGS. 2 and 8. Observe also that the elasticized material is preferably stitched both to the outer sheath **60** at **74** and to the inner sheath **40** at **76**, and further that the inner sheath **40**, at the part stitched at **76**, is free from the shell panel **30** for a distance at least equal to the width of the tape **44**. It will be understood that the arrangement of elasticized material may be extended to a lower level in garments for small girls and that it may be eliminated in garments for men and boys.

The sheath preferably includes portions which encircle the buoyant shell shoulder parts **36** when such parts **36** are used, so as to define the shoulder straps **24** in conjunction with elasticized strips **78** which are anchored to the rear portion of the garment adjacent the opposite side margins of the top of the inner shell.

The garment is characterized by tight fitting of the sheath brassiere portion **64** with the breast or brassiere portion of the shell by virtue of the stitching at **62** and **66**, and also by virtue of stitching at **80** between the side margins of the brassiere portion and the adjacent rear panel portions **30**. Thus the contour of the brassiere portion is controlled by the shape of the buoyant shell at the brassiere portion while the remainder of the suit or garment has freedom from the buoyant shell except as it is somewhat constrictively drawn thereagainst at the upper part of the waist portion by the elasticized material **70**.

The garment is attractive in appearance, easy to don, effectively camouflages the bulk of the buoyant material of the shell which may be of thicknesses from three-sixteenth of an inch to one-half inch or more. It will be observed that the thickness of the shell may vary at different points thereof. Thus it will be noted that shell portions **28** and **30** are of different thicknesses, and that shell portions **32** and **30** are of different thicknesses, as viewed in FIGS. 8 and 9, respectively. The difference in thickness will preferably be such as to concentrate buoyancy at the front of the garment so as to permit the garment to assist in turning a wearer floating in the water, so that flotation will occur face up. It will also be understood that in children's garments and men's garments fewer anchors of the sheath and liner to the shell are required because style and body conforming shapes are of less importance than in an adult woman's garment here shown.

While the preferred embodiment of the invention has been illustrated and described, it will be understood that changes in the construction may be made within the scope of the appended claims without departing from the spirit of the invention.

I claim:

1. A bathing garment comprising

a shell formed of unicellular material and including a

breast portion and a waist portion of body-conforming shape having laterally spaced rear panel portions,
a fabric liner secured to said shell at the margins and at the junction of the breast and waist portions of the shell,
a fabric sheath secured to said shell and liner at the margin of the breast portion of said shell,
said liner having waist and leg portions,
said sheath having waist portion and leg portions encircling said liner waist and leg portions loosely.

2. A bathing garment comprising
a shell formed of unicellular material and including a breast portion and a waist portion of body-conforming shape having laterally spaced rear panel portions,
a fabric liner secured to said shell at the margins and at the junction of the breast and waist portions of the shell,
a fabric sheath secured to said shell and liner at the margin of the breast portion of said shell,
said liner having waist and leg portions,
said sheath having waist portion and leg portions encircling said liner waist and leg portions loosely,
said sheath including elasticized rear panel portions and a separable fastener connecting said elasticized panels.

3. A bathing garment comprising
a shell formed of unicellular material and including a breast portion and a waist portion of body-conforming shape having laterally spaced rear panel portions,
a fabric liner secured to said shell at the margins and at the junction of the breast and waist portions of the shell,
a fabric sheath secured to said shell and liner at the margin of the breast portion of said shell,
said liner having waist and leg portions,
said sheath having waist portion and leg portions encircling said liner waist and leg portions loosely,
said sheath including elasticized rear panel portions and
a separable fastener releasably connecting said sheath rear panels,
said sheath rear panels spanning the space between said spaced rear shell panels at their upper portions and terminating spaced above the lower edges of said shell.

4. A bathing garment comprising
a shell formed of unicellular material and including a breast portion and a waist portion of body-conforming shape having laterally spaced rear panel portions,
a fabric liner secured to said shell at the margins and at the junction of the breast and waist portions of the shell,
a fabric sheath secured to said shell and liner at the margin of the breast portion of said shell,
said liner having waist and leg portions,
said sheath having waist portion and leg portions encircling said liner waist and leg portions loosely,
said sheath including an elasticized rear panel portion extending between the rear panels of said shell at its upper end and tapering downwardly to terminate at a level above the bottom of said shell.

5. A bathing garment comprising
a shell formed of unicellular material and including a breast portion and a waist portion of body-conforming shape having laterally spaced rear panel portions,
a fabric liner secured to said shell at the margins and at the junction of the breast and waist portions of the shell,
a fabric sheath secured to said shell and liner at the margin of the breast portion of said shell,
said liner having waist and leg portions,
said sheath having waist portion and leg portions encircling said liner waist and leg portions loosely and
fabric reinforcing tape stitched to said shell at selected

portions thereof including the juncture of the waist and breast portions of said shell.

6. A bathing garment comprising
a shell formed of unicellular material and including a breast portion and a waist portion of body-conforming shape having laterally spaced rear panel portions,
a fabric liner secured to said shell at the margins and at the junction of the breast and waist portions of the shell,
a fabric sheath secured to said shell and liner at the margin of the breast portion of said shell,
said liner having waist and leg portions,
said sheath having waist portion and leg portions encircling said liner waist and leg portions loosely,
said shell breast portion constituting four panels of unicellular material each having convexly curved upper and lower edges,
said last named panels being arranged in pairs and cemented together at adjacent edges substantially full length to form two cup portions.

7. A bathing garment comprising
a shell formed of unicellular material and including a breast portion and a waist portion of body-conforming shape having laterally spaced rear panel portions,
a fabric liner secured to said shell at the margin and at the junction of the breast and waist portions of the shell,
a fabric sheath secured to said shell and liner at the margin of the breast portion of said shell,
said liner having waist and leg portions,
said sheath having waist portions and leg portions encircling said liner waist and leg portions loosely,
said shell being skived to define beveled marginal portions, and
fabric reinforcing tape secured to selected beveled shell portions and to said liner.

8. A bathing garment comprising
a shell formed of unicellular material and including a breast portion and a waist portion of body-conforming shape having laterally spaced rear panel portions,
a fabric liner secured to said shell at the margins and at the junction of the breast and waist portions of the shell,
a fabric sheath secured to said shell and liner at the margin of the breast portion of said shell,
said liner having waist and leg portions,
said sheath having waist portion and leg portions encircling said liner waist and leg portions loosely, and
fabric reinforcing tape secured to said shell and said liner between the breast and waist portions of said shell by diagonal stitching penetrating said shell at both said portions.

9. A bathing garment comprising
a shell formed of unicellular material and including a breast portion and a waist portion of body-conforming shape having laterally spaced rear panel portions,
a fabric liner secured to said shell at the margins and at the junction of the breast and waist portions of the shell,
a fabric sheath secured to said shell and liner at the margin of the breast portion of said shell,
said liner having waist and leg portions,
said sheath having waist portion and leg portions encircling said liner waist and leg portions loosely, and
fabric reinforcing tape secured to said shell and said liner between the breast and waist portions of said shell by diagonal stitching penetrating said shell at both said portions,
said stitching reducing the thickness of said shell.

10. A bathing garment comprising
a shell formed of unicellular material and including a breast portion and a waist portion of body-conform-

ing shape having laterally spaced rear panel portions,

a fabric liner secured to said shell at the margins and at the junction of the breast and waist portions of the shell,

a fabric sheath secured to said shell and liner at the margin of the breast portion of said shell,

said liner having waist and leg portions,

said sheath having waist portion and leg portions encircling said liner waist and leg portions loosely, and

fabric reinforcing tape secured to said shell and said liner between the breast and waist portions of said shell by diagonal stitching penetrating said shell at both said portions, said stitching reducing the thickness of said shell,

said sheath being anchored to the waist portion of said shell adjacent said tape and having clearance with the adjacent reduced thickness portion of said shell.

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