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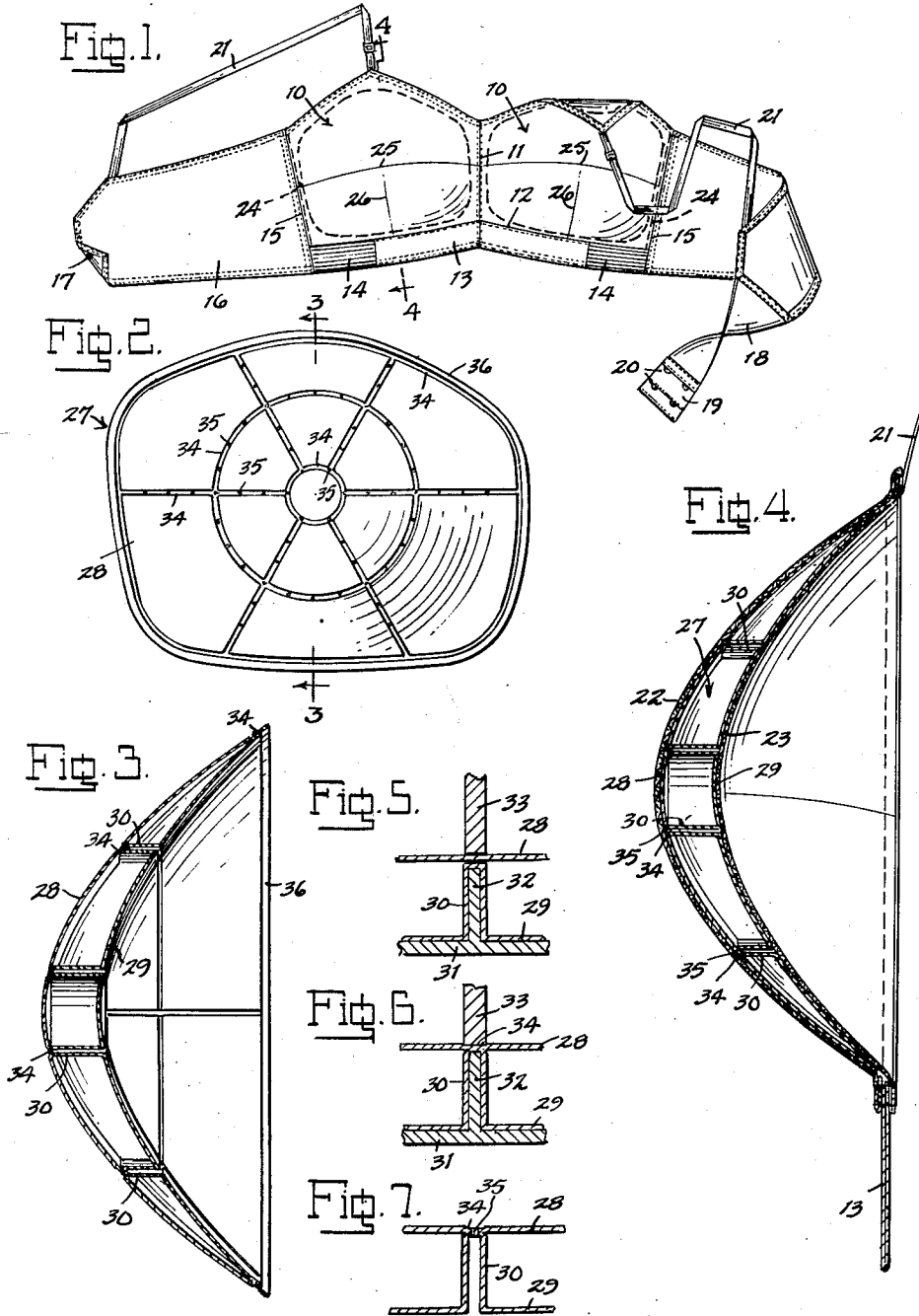
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2,864,372

BRASSIERE

Filed Aug. 4, 1955

2 Sheets-Sheet 1



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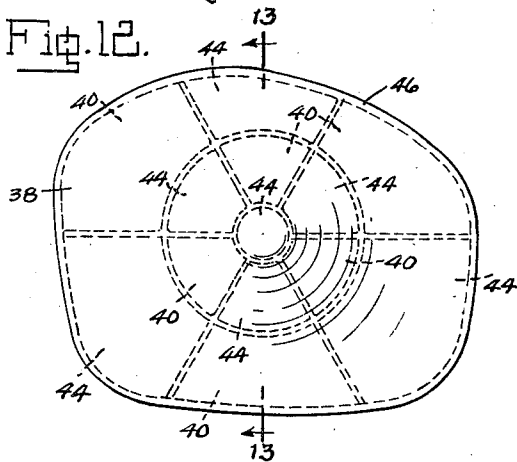
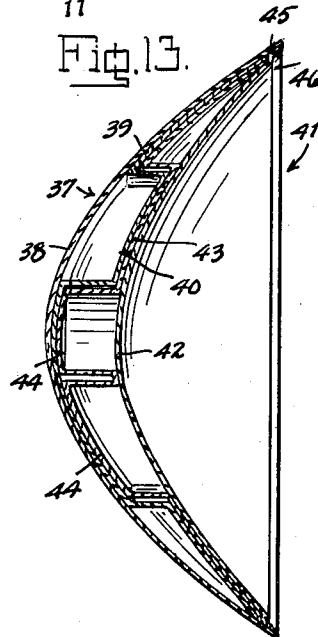
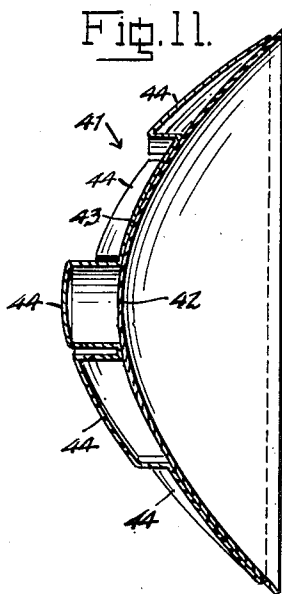
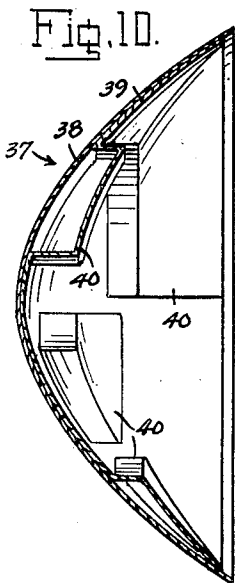
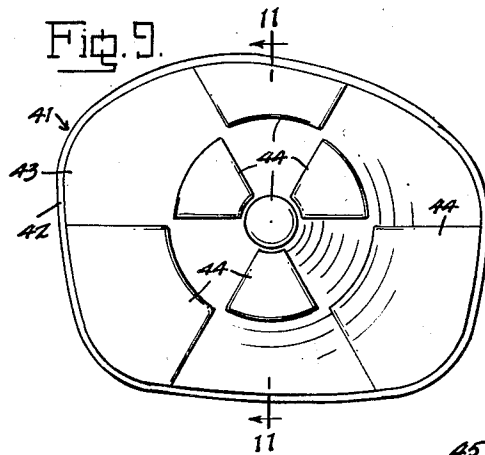
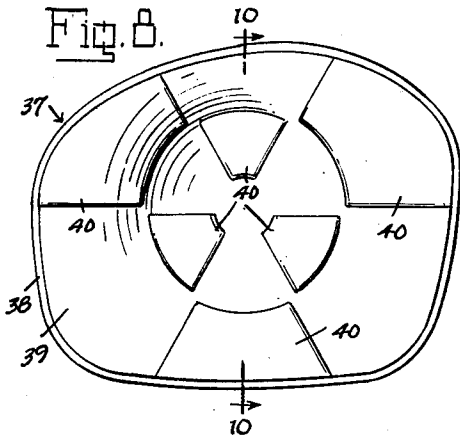
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2,864,372

BRASSIERE

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2 Sheets-Sheet 2



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BRASSIERE

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8 Claims. (Cl. 128-481)

The present invention relates to brassieres, and particularly to an improved pneumatic pad structure therefor.

It is an object of the invention to provide a pneumatic pad having a plurality of air-tight air cells, so arranged as to give to the pad a desired predetermined external shape, and an internal shape to comfortably fit the wearer, the cells having a cross-sectional shape providing a pad of substantial thickness at its central portion, and tapered to a relatively thin or feathered marginal portion.

It is further proposed to provide a pneumatic pad having a plurality of cells in each of which a relatively small amount of air is contained, the surface area of the respective cells being so proportioned with respect to their thickness that the volume of air contained in each of them will be substantially the same. Thus, under conditions where the entrapped air is subjected to expansion, as at high altitudes, the improved arrangement minimizes the effect of such expansion, the expansion in the individual cells being of such a small order that even under the most severe conditions it will not materially affect the overall shape of the pad structure, or subject it to the possibility of rupture.

A further object is to provide a pneumatic pad structure in which the separation walls between the cells are arranged to provide a grid-like frame structure which, while being flexible, will provide substantial internal support to maintain the desired shape of the pad.

Other objects and advantages of the invention will become apparent from a consideration of the following detailed description taken in connection with the accompanying drawings wherein a satisfactory embodiment of the invention is shown. However, it will be understood that the invention is not limited to the details disclosed but includes all such variations and modifications as fall within the spirit of the invention and the scope of the appended claims.

In the drawings:

Fig. 1 is a front elevation of a brassiere provided with pneumatic pads according to the invention;

Fig. 2 is a front elevation on an enlarged scale, of one of the pads employed, this being the left hand pad as seen in Fig. 1;

Fig. 3 is a vertical sectional view on a further enlarged scale, taken along the line 3-3 of Fig. 2;

Fig. 4 is a vertical sectional view, also on a further enlarged scale, taken along the line 4-4 of Fig. 1 and showing the pad incorporated in the brassiere;

Fig. 5 is a sectional fragmentary view showing a portion of the outer and inner layers in relation to be adhered together, the layers being shown in engaged relation with the assembly dies;

Fig. 6 is a similar view showing the dies as brought into relation to the layers to cause them to be adhered by a heat produced seam;

Fig. 7 is a sectional view showing the parts as connected in Fig. 6, and with a ventilating opening provided in the seam portion;

Fig. 8 is a rear elevation of one of the members for forming a pneumatic pad according to a modified form of the invention;

Fig. 9 is a front elevation of the other member adapted to be interengaged with the member shown in Fig. 8;

Fig. 10 is a vertical sectional view on an enlarged scale, taken along the line 10-10 of Fig. 8;

Fig. 11 is a vertical sectional view taken along the line 11-11 of Fig. 9;

Fig. 12 is a front elevation showing the completed pneumatic pad formed by the assembly of the parts shown in Figs. 8 and 9; and

Fig. 13 is a vertical sectional view, on an enlarged scale, taken along the line 13-13 of Fig. 12;

Referring to the drawings, the brassiere comprises a pair of bust-receiving pockets 10 joined together along a center seam 11 and secured along their lower edges 12 to a diaphragm band 13 provided with horizontal elastic inserts 14-14, the side edges of the bust pockets and the end edges of the elastic inserts being connected by seams 15-15 to the forward edges of the back strap sections 16-16, one of which is provided at its free end with hook fasteners 17, while the other is provided at its free end with a horizontal elastic band 18 provided at its end with a tab 19 having eye fasteners 20 for engagement by the hook fasteners 17. Shoulder straps 21-21 are connected between the upper edges of the bust pockets and the back strap sections.

The bust pockets 10 each consist of a porous outer fabric layer 22 of full fashioned form, and a porous inner fabric layer 23, also full fashioned and substantially conforming to the outer layer at its peripheral edge, and having substantially less rounded projection, so as to provide a pneumatic pad receiving space between them in their assembled relation, this space converging at the margins where the edges of the layers are brought together. Along the inner side of the seam 15, the edge of the inner layer 23 is suitably finished by hemming or the like, and is unattached with respect to the seam 15 to provide a slit opening 24 to the space between the layers for the purpose of inserting or removing the pneumatic pad, as will presently more fully appear.

The fabric of the outer layer 22 may be of any suitable porous material, as for instance, marquisette, satin, cotton, nylon or the like, which material is relatively thin and flexible, but is substantially non-stretchable so that the predetermined form given to the outer layer will be the external form of the brassiere. While the full-fashioning of the layers 22 and 23 may be carried out in any of the usual ways, the same is shown as formed of upper and lower sections seamed along a transverse outwardly curved line 25, the lower section being provided substantially centrally with an upwardly and outwardly curved dart seam 26. The inner layer 23 may be of similar material to the outer layer or it may be of a porous lining material especially suited for soft engagement with the skin.

The pneumatic pads, indicated generally as 27, are engaged within the pocket spaces between the layers 22 and 23 of the two bust pockets 10-10, being inserted therein through the slit openings 24. The pads are formed of an air-impervious non-elastic very thin light weight flexible sheet material, a suitable material for this purpose being a thin plastic sheet or film, for instance, one of the vinyl plastics, such as produced by the Bakelite Company of New York, N. Y. under the name "Vinylite," this material being a copolymer of vinyl chloride and vinyl acetate. This material is capable of having two layers seamed together by the application of heat to form an air-tight bond between them.

The pad is formed of two pieces of plastic sheet material adhered together by heat produced seams, as will presently more fully appear. The outer sheet 28 is full-fashioned into cup shape so as to impart thereto a similar shape to that provided by the full-fashioning of the fabric layer 22 of the brassiere pockets 10, this full-fashioning being preferably carried out by suitably molding the plas-

tic sheet material to give it the desired shape. The inner piece of sheet material 29 is molded to shape and consists generally of a cupped wall having substantially less curvature than the outer sheet 28, so that when fitted together the space between the two sheets is relatively wide at the center portion and is tapered or feathered to the marginal edge.

Upon the forward side of the sheet 29 there is provided a framework of forwardly projected wall portions 30 which are adapted, as will presently more fully appear, to be secured at their forward ends to the inner side of the sheet 28 to constitute partition walls of a plurality of air cells. The pattern of the framework preferably consists of a substantially central circular wall, a circular wall in concentric outwardly spaced relation thereto, and a series of radial walls extending from the center circular wall to the periphery of the sheet, the height of these walls tapering from the central circular wall to the periphery. The separating walls are preferably of U-shape in cross section, being formed upon a suitable mold having projecting ribs about which the U-shaped walls are formed.

The mold upon which the sheet 29 is formed may consist of suitable metal and be employed directly as the means for heat-seaming the two layers together, or a separate seaming die 31 corresponding in shape to the mold may be employed, the ribs 32 thereof being engaged within the U-shaped wall 30 of the sheet 29, as seen in Fig. 5. The outer sheet 28 is thereupon placed over the sheet 29 and a heat-seaming die 33 of suitable form to oppose the ends of the walls 30 and the periphery of the two interengaged sheets is brought into relation with the sheet 28. Thereupon the two dies are pressed together and by means of high frequency or electronic current passed between the dies the two sheets which are pressed together, as seen in Fig. 6, are heat sealed together, the material being substantially homogeneously bonded at the seams 34 in air tight relation.

During the joining of the two sheets the air in the air space between them is preferably placed under pressure so that the entrapped air in the cells formed by the joining of the two sheets is under pressure to maintain the cells in inflated relation. As seen in Fig. 7 ventilating holes 35 may be provided along the seams 34. The pneumatic pad, when engaged in the pocket 10 as seen in Fig. 4, provides an inflated support between the fabric layers 22 and 23 and because the air is confined within a plurality of relatively small cells any expansion that may occur is of such a relatively small order that no appreciable pressure will be exerted upon the wearer. Also, the tapering cross-sectional shape of the pad is such that the relatively small area cells at the central portion contain substantially the same amount of air as the relatively large area cells at the margin.

If desired, the pad may be stitched or otherwise secured directly into a brassiere structure in place of the fabric pockets 10, and for this purpose the marginal edge portion of the outer layer 28 preferably projects slightly with respect to the marginal edge portion of the inner layer 29 to provide a flexible rim portion 36 for convenient attaching by stitching to adjacent parts of a brassiere. Also, it is pointed out in this connection that the material of the outer layer 28, as well as the inner layer 29, if desired, may be of an air-impervious type having nylon or other suitable fabric incorporated as a lamination or covering of a thermoplastic sheet.

In Figs. 8-13 there is illustrated a modified form of the invention in which the outer member 37 consists of a molded cup-shaped layer 38 having secured to its inner side by heat produced bond an inner layer 39 having a plurality of embossed spaced cell-forming projections 40 molded therein, these adapted to be disposed between air cells carried upon the inner member 41, and which consists of a cupped layer 42 upon the forward side of which there is secured by a heat produced bond a molded layer 43 having a plurality of spaced air cell producing projec-

tions 44 arranged to fit within the spaces between the projections 40 of the member 37.

The two pieces are interengaged, as seen in Fig. 13, and are secured at the marginal portion by a heat produced seam 45. The peripheral margins of the cupped sheets 38 and 42 preferably project slightly beyond the edges of the molded sheets 39 and 43, respectively secured thereto, so that when the two pieces are bonded together a relatively thin peripheral rim portion 46 is provided. As in the case of the pneumatic pad shown in the first embodiment, the air within the cells is under pressure to inflate the cells and the pads may either be inserted in pockets 10 of the brassiere, as seen in Fig. 1, or they may be directly secured in a brassiere structure in place of the pockets 10 by stitching adjacent parts of the brassiere to the marginal rim 46 of the pad. Also, the material of the layer 38, as well as the layer 42, may be of an air-impervious type having nylon or other similar fabric incorporated as a lamination or covering of a thermoplastic sheet.

What is claimed is:

1. For use in a brassiere, an air-inflated pneumatic pad comprising an outer sheet of flexible, air-impervious material having a permanent cupped contour normally presenting a convex front surface simulating the contour of a bust of predetermined size and shape, an inner sheet of flexible, air-impervious material substantially conforming in peripheral outline to said outer sheet and having a cupped contour presenting a concave rear surface of less rounded curvature than said outer sheet and providing a pocket for receiving the bust of a wearer, said sheets being joined at their peripheral portions by an air-impervious seal to provide an air containing space between said sheets, and wall means connected between said layers partitioning said air space into a plurality of air-containing cells, each of said cells being individually air-sealed to retain the air contained therein independently of the other cells, said wall means being of gradually decreasing height from the center to the periphery of said pad.

2. The invention as defined in claim 1, wherein said outer sheet is non-elastic.

3. The invention as defined in claim 1, wherein said inner and outer sheets and said wall means are non-elastic.

4. The invention as defined in claim 1, wherein said cells include a substantially centrally disposed cell in the portion of the pad of greater cross sectional thickness and a plurality of marginal cells in the portion of the pad of lesser cross-sectional thickness, the latter cells being of greater exposed surface area than the former whereby the volume of air in said respective cells is substantially the same.

5. The invention as defined in claim 1, wherein said wall means comprise forwardly projected integral portions of said inner sheet air sealed at their forward edges to said outer sheet.

6. The invention as defined in claim 1, wherein said wall means comprise forwardly projected integral U-shaped portions of said inner sheet air sealed at the forward bight of the U-shape to said outer sheet.

7. The invention as defined in claim 1, wherein said wall means comprise forwardly projected integral U-shaped portions of said inner sheet air sealed at the forward bight of the U-shape to said outer sheet, said air seal connection of said bight of at least some of said walls having ventilating openings extending therethrough and through said outer sheet.

8. The invention as defined in claim 1, wherein said outer sheet has a plurality of spaced air cells upon its rearward side, said inner sheet having a plurality of spaced air cells upon its forward side, the cells of one sheet being engaged in the spaces between the cells of the other sheet.

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