

[54] **BRASSIERE**

[75] Inventors: **Jack J. LoCascio**, Bayonne; **Edward Astor**, Fort Lee, both of N.J.

[73] Assignee: **International Playtex Corporation**, New York, N.Y.

[22] Filed: **Mar. 30, 1972**

[21] Appl. No.: **239,434**

[52] U.S. Cl. **128/498**

[51] Int. Cl. **A41c 3/00**

[58] Field of Search..... 128/425, 443, 444,
128/489, 491, 498, 499, 517

[56] **References Cited**

UNITED STATES PATENTS

3,433,229	3/1969	Tuschman.....	128/498
2,888,930	6/1959	Coleman et al.....	128/489 X
2,969,067	1/1961	Smith.....	128/489
2,971,513	2/1961	Gingras.....	128/494
3,056,411	10/1962	Child	128/489
3,077,198	2/1963	Williamson	128/498 X

FOREIGN PATENTS OR APPLICATIONS

531,811	10/1956	Canada.....	128/498
1,163,166	9/1969	Great Britain.....	128/498

Primary Examiner—Werner H. Schroeder

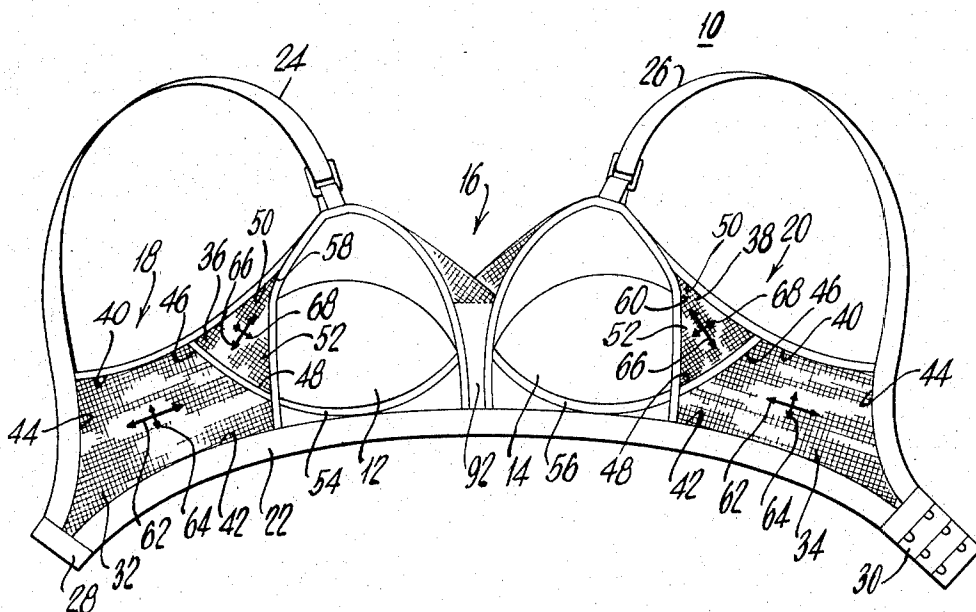
Attorney—Stewart J. Fried et al.

[57]

ABSTRACT

A brassiere is disclosed which includes first and second breast cups joined to one another and first and second dorsal panels joined to the first and second breast cups respectively, with each of the first and second dorsal panels comprising: a first segment consisting of material having at least one-way stretch characteristics oriented substantially in a horizontal direction when the brassiere is worn by the wearer, and a second segment joined to the first segment and to the outer side edge of the respective one of the breast cups, with the second segment of each dorsal panel consisting of material having primary stretch characteristics in one direction angularly oriented with respect to the said horizontal direction. With this arrangement, the first segment of the dorsal panels are principally subjected to tension when the brassiere is placed on the body of the wearer, and the horizontal tensile forces are channeled to the lowermost region of the first segment of the dorsal panel. When the arms are lifted, the distensible second segments of the dorsal panel are available to accommodate the ensuing body movements. The second segment of each dorsal panel cooperates with the selectively oriented stretch characteristics of a portion of the center arrangement which joins the breast cups to one another to permit relatively independent action of each breast cup in response to movement of one or both of the woman's arms.

17 Claims, 5 Drawing Figures



PATENTED JUL 17 1973

3,746,008

SHEET 1 OF 3

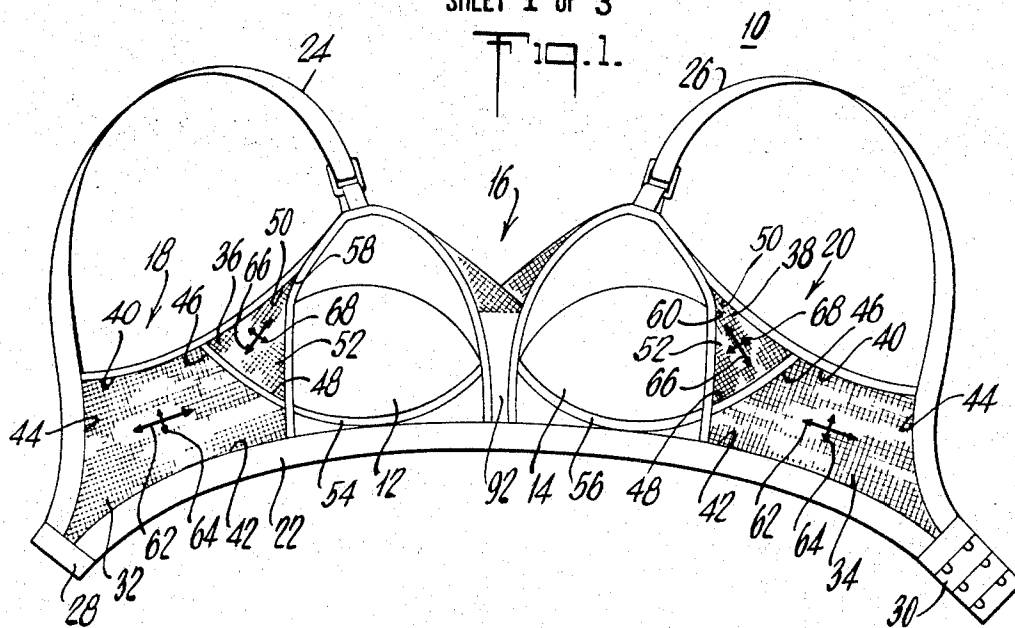
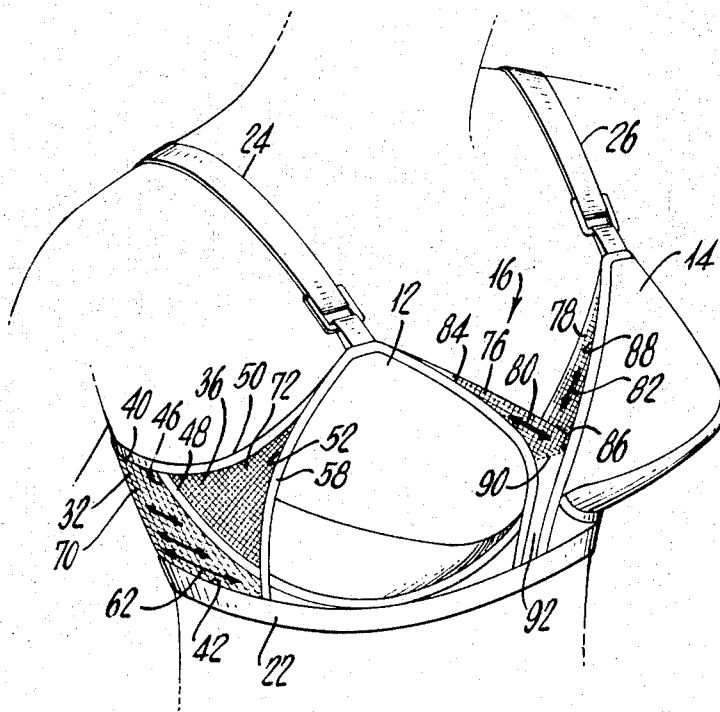


Fig. 2.



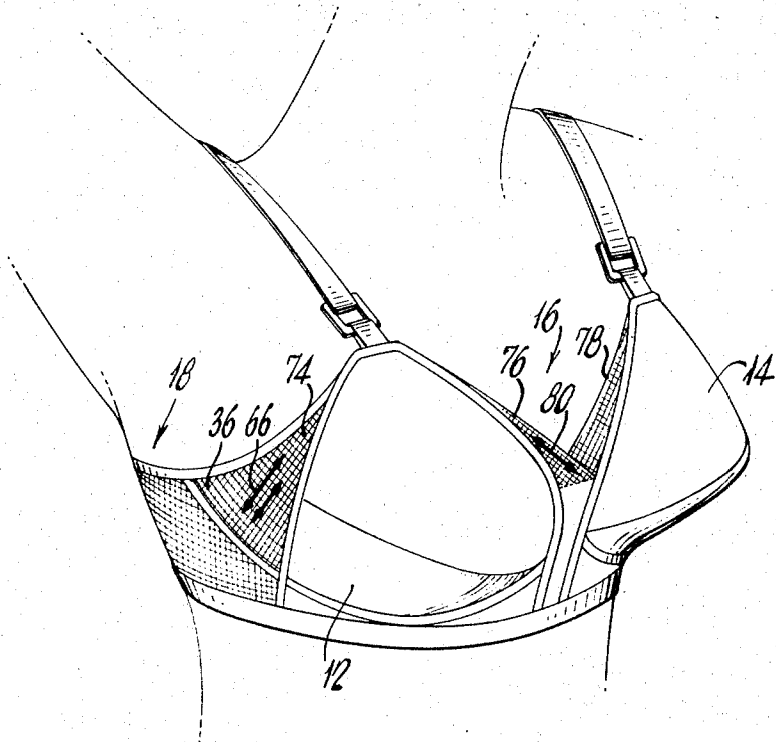
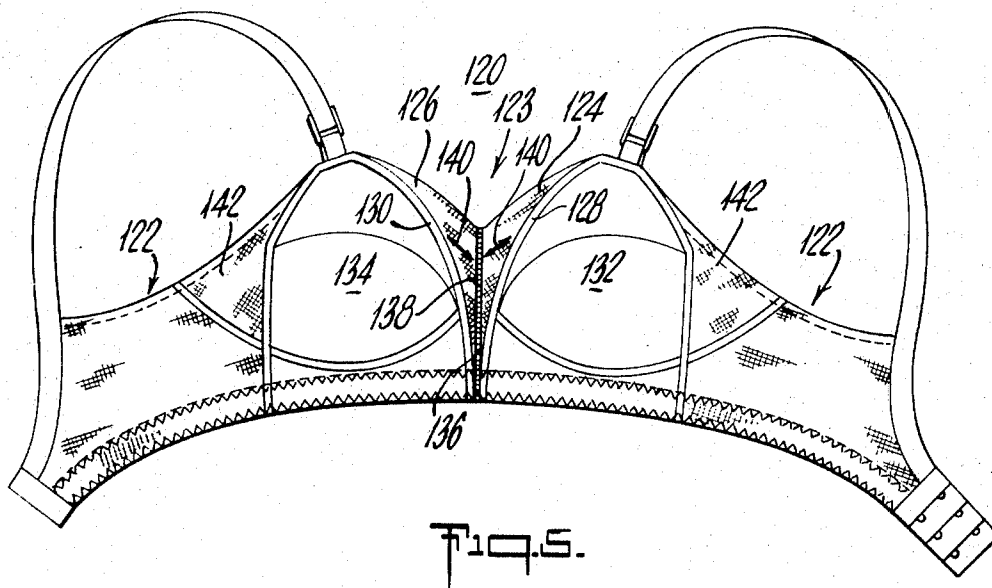
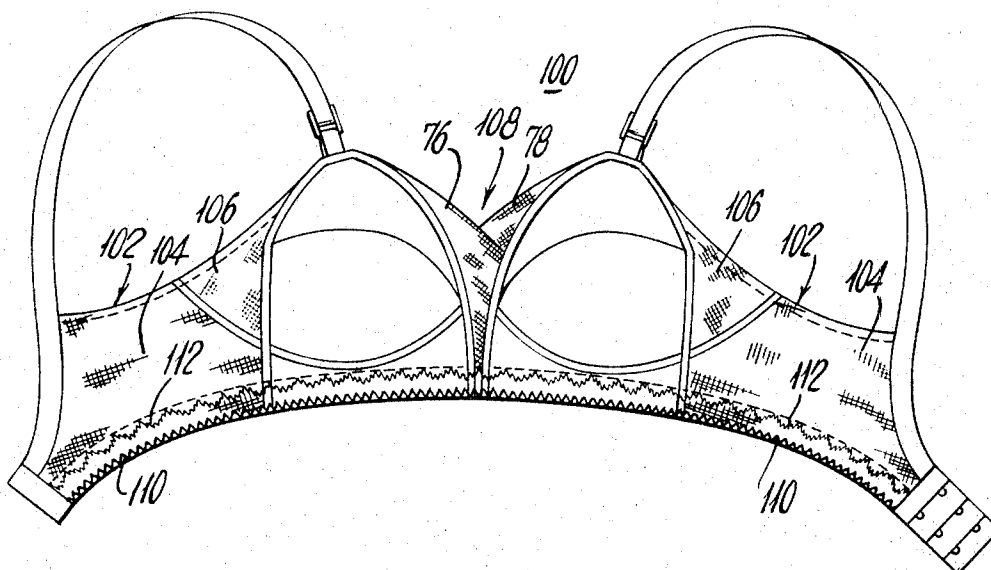


Fig. 3.

Fig. 4.



BRASSIERE**FIELD OF THE INVENTION**

This invention relates to brassieres and more particularly to an improved dorsal panel construction for a brassiere.

BACKGROUND OF THE INVENTION

The manufacturer or designer of brassieres is constantly confronted with satisfying various characteristics desired by consumers in the functioning of a brassiere. One of the more important of these characteristics deals with the functional interrelationship of the side portion of the brassiere (i.e., the dorsal panel) in responding to the movement and enlargement of the pectoral muscle and the adipose tissue of flesh lying over and associated therewith. Support of this tissue contributes greatly to the comfort of a brassiere, but too much restraint, particularly if unyielding, creates a protuberance which is unsightly and which may often be observed even though covered by a dress. Additionally, too much restraint can cause discomfort to the wearer; indeed the edge of a dorsal panel may dig into the flesh of the wearer, especially when the arms are moved upwards or sideways, or the trunk is turned. Conversely, the absence of adequate restraint provides an unsightly protuberance of flesh and inadequate tissue support.

In addition the entire brassiere must be "balanced," that is release of selective restraint in one area of the garment often times may result in an undesirable release in other areas. Accordingly, the problems associated with the construction of the dorsal panel have always centered around the somewhat conflicting requirements of providing a dorsal panel with horizontal distensibility for front to rear stress accommodation (i.e., when the garment is initially stretched as it is placed on the body and maintained thereon) and at the same time, providing distensibility in an upwardly angled direction so as to accommodate the enlarged pectoral muscles which result when the arms are lifted or rotated.

A solution to these conflicting design requirements was presented in the brassiere of U.S. Pat. No. 2,713,683 issued July 26, 1955 to L.I. Krieger, assigned to the assignee of the instant invention. In the Krieger patent, the main dorsal panels 20 (comprising the members 34 and 33) provide the elasticity necessary to accommodate the front to rear (horizontal) tension generated when the garment is placed on the trunk of the wearer, while overlapped elastic members 38, joined at one end to the main dorsal panel and at the other end to the outer upper edge of the respective breast cups, accommodate the enlargement of the pectoral muscles by virtue of the fact that the primary stretch characteristics of such overlapped elastic members are angularly oriented towards the top of the respective breast cup.

Although the principles of the Krieger patent are functionally sound, designers have been constantly attempting to improve thereon. Moreover, in view of the present market emphasis on deemphasizing the structured look of a brassiere, attempts have been made to achieve the multi-direction stress accommodation of the Krieger brassiere without the necessity of the additional overlapping elastic members identified, for example, as 38 in the aforementioned Krieger patent.

A proposed solution to this problem was to construct the dorsal panel as a one piece member of a power net material, with a substantially enlarged end joined to a respective breast cup so as to be co-extensive with the outer side edge of that breast cup. The major stretch axis of this one piece dorsal panel was then oriented at a slight angle intermediate the true horizontal of the main dorsal panel 20 of Krieger and the more severe angle of the overlapped elastic members 38 of Krieger. It was hoped that this "compromise" angle for the major stretch characteristics of the one piece dorsal panel would provide sufficient accommodation for both the horizontal stresses encountered when the garment was placed and maintained on the body and the upwardly angled stresses generated by the enlarged pectoral muscles when the arms were rotated or lifted. Although some stress relief is thus provided in both desired directions, because the dorsal panel is a single unit, the horizontal stresses limit the ability of the material to distend angularly and thus the stress relief provision is muted.

SUMMARY OF THE INVENTION

In contradistinction to the prior art attempts to duplicate or approach the multi-direction functions of the Krieger brassiere with a one piece dorsal panel, the dorsal panel of the instant invention is of segmented, two-piece (but not overlapped) construction, having one segment with stretch characteristics which will accommodate horizontal stress and a second, angularly oriented segment, the primary stretch characteristics of which are correspondingly oriented to accommodate stress in an upward and angled direction.

As employed herein, the terms "stretch," or "stretch characteristics" includes the ability of the chosen material to distend and may include not only materials which include elastomers such as power net but in addition materials which because of their knit, weave, orientation or otherwise, will distend under applied pressure.

When the brassiere is initially placed on the body and remains there with the arms in a relaxed position, the distensibility of the first segment of the dorsal panel accommodates the front to rear stresses, with the second angularly oriented segment experiencing relatively little stress. When the arms are lifted or rotated, the elongation and enlargement of the pectoral muscles is accommodated by the distensibility of the second segment along the predetermined stretch direction thereof.

In accordance with a feature of the instant invention, it has been found that the above described arrangement has the effect of channeling the horizontal forces accommodated by the first segment of the dorsal panel toward the lower extremities thereof. To counterbalance these concentrated horizontal forces, the brassiere of the instant invention may further include an underbust band having horizontal elasticity which is secured to the lower edges of the breast cups and the lower edges of the first segments of the two dorsal panels. However, as hereinafter described, satisfactory functionality may be obtained in embodiments absent such underbust band.

As a further contribution of the instant invention, the improved segmented dorsal panel hereof is advantageously employed in combination with a variation of the overlapped "butterfly" center section employed in the Krieger patent to join the first and second breast cups. Such "butterfly" assembly includes a pair of

overlapped elastic members each of which has a primary stretch direction angled upwardly and inwardly toward the top of the respective breast cup to which it is primarily secured. It has been found that the cooperation of the respective members of such overlapped, "butterfly" connecting arrangement with the respective second segments of the associated dorsal panel provides even greater freedom of the brassiere to accommodate itself to severe, upward movements of one or both of the wearer's arms.

Accordingly, it is an object of the instant invention to provide an improved segmented dorsal panel for a brassiere comprising first and second, non-overlapped segments which provide multi-direction stress accommodation.

Still another object of the instant invention is to provide such a segmented dorsal panel construction for a brassiere wherein the stress exerted on each of said first and second, non-overlapped segments is relatively independent of each other.

These and other objects of the instant invention will become apparent by referring to the following specification and drawings.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

FIG. 1 is a front plan view of a brassiere constructed in accordance with the instant invention;

FIG. 2 is a perspective view of the brassiere of FIG. 1 as worn, and further depicting the arms of the wearer in a downward relaxed position; and

FIG. 3 is a perspective view of the brassiere of the instant invention as worn, and further illustrating one arm of the wearer lifted in such a manner as to illustrate the principles of the invention hereof.

FIGS. 4 and 5 are front plan views of other embodiments of the instant invention.

DETAILED DESCRIPTION OF THE INVENTION

There is shown in FIG. 1, a brassiere 10 constructed in accordance with the principles of the instant invention. Broadly speaking, the brassiere 10 includes first and second breast cups 12 and 14 of conventional construction joined by an overlapping "butterfly" joining arrangement, broadly designated 16 to be described in greater detail. Dorsal panels 18 and 20; an underbust elastic band 22; straps 24 and 26; and a conventional fastening arrangement 28-30 make up the major components of the brassiere 10.

As noted previously, the dorsal panels 18 and 20 of the instant invention are of segmented, non-overlapped construction. Thus, the dorsal panels 18 and 20 include first segments 32, 34 and second segments 36, 38 which lie in essentially the same plane as the corresponding first segments 32 and 34 when the brassiere 10 is laid out in the manner shown in FIG. 1.

As can be seen in the drawings, the respective first segments 32 and 34 of the dorsal panels 18 and 20 are generally trapezoidal in configuration and thus include upper and lower edges 40 and 42 respectively and side edges 44 and 46. The second segments 36 and 38 are essentially triangular in configuration and include a base edge 48 and a pair of converging side edges 50 and 52.

It will be appreciated that the base edge 48 of the triangular segment 36 is joined to the side edge 46 of the first segment 32 along a line which is preferably an ar-

cuate extension of the lower edge 54 of the breast cup 12. Similarly the base edge of the segment 38 joins the side edge 46 of the segment 34 along a line which is preferably an arcuate extension of the lower edge 54 of the breast cup 14. It will be further appreciated that one of the converging side edges 52 of the second segments 36 is joined to the outer side edge 58 of the breast cup 12. In a like manner, one of the side edges 52 of the segment 38 is joined to the outer side edge 60 of the second breast cup 14.

Preferably the side edges 50 of the triangular second segments 36, 38 are approximately equal in length to the upper edges 40 of the first segments 32, 34. In such manner the effective operability for various wearers with varying anatomical make-up is provided for. As hereinafter described, the second segments 36, 38 which are subjected to lesser stress forces when the wearer's arms are in a relatively downward orientation provide selective release during enlargement of the pectoral muscles and the shifting of the adipose tissues associated therewith during various body movements, in particular upward arm extension or rotation. While brassieres are generally sized upon the basis of chest dimension, e.g., 32 inches, 34 inches, etc., and breast cup size, e.g., A, B, C, etc., it is known that relatively substantial anatomical variations may be present within a single size. For example two women both properly falling into the category of a 34B wearer may differ in terms of the overall shaping of the upper trunk of the body and the degree of development or excess flesh of the pectoral muscles and overlying tissue. It has been found that proper functioning of the brassiere is maintained and sufficient latitude for variances in wearer dimensions can be provided for when the aforesaid side edges 50 of the triangular segments 36, 38 are approximately equal in length to the upper edges 40 of the first segments 32, 34.

As indicated by the relative lengths of the crossed arrows 62 and 64, the first segments 32, 34 of the dorsal panels 18 and 20 consist of a material having stretch characteristics heretofore defined such as a power net material, the major stretch axis of which is substantially in a horizontal direction with respect to the vertical trunk of the wearer. As indicated by the relative lengths of the crossed arrows 66, 68, the second segments 36, 38 of the dorsal panels 18 and 20 consist of a similar material having primary stretch characteristics in a direction angularly oriented with respect to the horizontal stretch direction depicted by the stretch arrows 62 for the aforementioned first segments. The primary stretch direction for the segments 36 and 38 indicated by the arrows 66 is generally transverse to the base edge 48 of the respective second segments. Moreover, the preferred angular orientation between the major stretch axis of the second segments 36, 38 and the major horizontal stretch axis of the first segments 32, 34 respectively is in a range of 45° to 50°. It should be noted that in the act of an upward arm extension, it is generally at approximately 45° to 50° to the horizontal that the greatest muscle and tissue protuberance is encountered. Beyond that range, the tendency of the muscle to somewhat flatten the tissue is experienced.

With reference to FIG. 2, and as indicated by the relatively large interstitial spacing indicated at 70, when the brassiere 10 is placed on the body of the wearer, the front to rear horizontal tension is accommodated by the longitudinal stress characteristics of the first segments

32 and 34 of the dorsal panels 18 and 20. As suggested by the relatively smaller interstitial spaces 72, with the arms of the wearer in a relaxed or downward position, the second segments 36, 38 of the dorsal panels 18 and 20 are essentially in an unstressed, relaxed state (also graphically suggested in FIG. 2 by the absence of arrows of stress). It should also be noted that since the second segments 36, 38 of the dorsal panels are essentially unstressed (i.e., they are effectively absorbing very little any front to rear horizontal tension), the net result is that the horizontal forces depicted by the arrows 62 are effectively channeled to the lowermost regions of the first segments 32. Stated in other words, the construction of the instant invention has the effect of locating the greatest horizontal stresses at the lower termination of the first segments 32, 34; this phenomenon being graphically depicted by the ever increasing length of the arrows 62 in direct proportion to their proximity to the lower edges 42 of the first segments 32, 34.

In the embodiments of FIGS. 1-3 such accumulation of horizontal forces is additionally supported by the employment of the aforementioned horizontally elastic band 22 which is secured to the lowermost edges 42 of the first segments 32, 24 and the lower edges 54, 56 of the breast cups 12 and 14 respectively.

Turning to FIG. 3, and as mentioned previously, when the arm of the wearer is raised or rotated in a backward direction, the enlargement of the pectoral muscles and the shifting of the adipose tissues associated therewith dictate that the dorsal panel "give" in an upward angular direction with the dorsal panel construction of the instant invention, by virtue of the stretch characteristics (depicted by the arrows 66) of the second segments 36, 38 of the dorsal panels 18 and 20. As noted the primary stretch characteristics of the second segments 36, 38 are oriented at an upward and inward angularly direction toward the top of the breast cups 12 and 14. Thus, and as depicted by the enlarged interstitial areas 74 of FIG. 3, the second segments 36, 38 can easily accommodate the stresses generated as a result of the aforementioned arm movement.

As mentioned previously, the overlapped "butterfly" joining arrangement 16 cooperates in a particularly advantageous manner with the novel dorsal panel construction of the instant invention. With reference to FIG. 2, the joining arrangement 16 includes first and second generally triangular members 76 and 78 of suitable material, such as a power net material, having essentially one-way stretch characteristics depicted by the arrows 80 and 82. Member 76 is secured along one edge 84 thereof to the inner edge of breast cup 12 and is secured at a remote apex to the inner edge of the second breast cup 14. In similar fashion, one edge 88 of the second member 78 is secured to the inner edge of breast cup 14 and a remote apex (not shown in FIG. 2) is secured to the inner edge of the first breast cup 12. The common base edges 90 of the overlapped triangular members 76 and 78 are joined to a center cloth section 92.

With reference to FIG. 2, when the wearer's arms are in a downward position with very little stress (effectively no stress) applied to the second segments 36, 38, the corresponding overlapping triangular members 76, 78 are similarly in an unstressed condition. However, and with reference to FIG. 3, when the arm is raised, and the second segment 36 of the dorsal panel 18 is

subjected to elongating forces, the corresponding triangular member 76 of the front joining arrangement 16 is similarly subjected to an elongation in a direction corresponding to its primary stretch axis 80. Moreover the fact that the overlapping triangular members 76, 78 are essentially free to act independent of one another, permits the one member 76 to be stretched (in response to lifting of the right arm of the wearer and the elongation of the second segment 36 of the panel 18) without effecting the second member 78 or the location of the breast cup 14. Again, this phenomenon is depicted by the presence of the stretch arrow 80 in FIG. 3 and the absence of such stretch designation for the member 78 of FIG. 3.

FIGS. 4 and 5 illustrate other exemplary embodiments of the present invention. In FIG. 4, a brassiere 100 is illustrated which is similar to that illustrated in FIGS. 1-3. Such brassiere while including dorsal panels 102, first segments 104, second segments 106, and the overlapped construction 108 between the cups described with respect to FIGS. 1-3 does not include the underbust band 22 of such embodiment. Preferably, a horizontally elastic binding strip 110 extends along the rear face of the lower edge of the first segments 104 secured in a manner which allow for horizontal extension such as by zig zag stitching 112. Thus supplemental horizontal extension is provided along the lower portions of the first segments 104, where, as aforementioned the primary horizontal stress are channeled.

Referring to FIG. 5, the brassiere 120 similarly includes dorsal panels 122 constructed in accordance with the present invention and similar in construction to those described relative to FIG. 4. In lieu of the previously described construction between the cups, the construction 123 between the cups illustrated in FIG. 5 defines a "Y" shaped configuration generally including partially abutting first and second crescent members 124, 126 affixed along one of their respective sides to the inner edge 128, 130 of its respective breast cups 132, 124. The abutting edges 136 of the crescent members 124, 126 are joined such as by stitching 138 along the vertical medial line between the cups.

The crescent members are preferably of a material having the ability to stretch at least in the direction of the arrows 140. In operation the crescent members 124, 126 can distend in response to the lifting or extension of the arm of the wearer. Further the crescent members 124, 126 as well as the overlapping triangular members 76, 78 described with respect to FIGS. 1-4 act to conform the cups to the breast without undue pressure with such action being desirable in view of the very little stress to the cups which is applied by the second segments 36, 38, 106, 142 of the dorsal panels depicted in the various figures during non-arm extended positions.

Although this invention has been described with respect to a preferred embodiment, it should be understood that many variations and modifications will now be obvious to those skilled in the art, and it is preferred, therefore, that the scope of the invention be limited not by the specific disclosure herein, only by the appended claims.

What is claimed is:

1. A brassiere comprising:

first and second breast cups joined to one another, each of said breast cups including inner edges and outer side edges;

first and second dorsal panels joined to said first and second breast cups respectively, and terminating at a respective outer side edge thereof, each of said first and second dorsal panels comprising:

a first segment consisting of material having stretch characteristics oriented substantially in a horizontal direction when the brassiere is worn by the wearer, and

a second segment joined to said first segment and said outer side edge of the respective one of said breast cups, said second segment consisting of material having primary stretch characteristics in one direction, said second segment being angularly oriented with respect to said first segment wherein said one direction is angularly oriented with respect to said horizontal direction toward the top of said respective breast cup, said first and second segments cooperatively providing means for initial channeling of horizontal forces to said first segment and forces angularly oriented with respect to said horizontal direction to said second segment.

2. The brassiere of claim 1, wherein said first segment of each dorsal panel also has stretch characteristics in a second direction transverse to said horizontal direction.

3. The brassiere of claim 1, wherein the angular orientation of said one direction to said horizontal direction is within a range of 45°-50°.

4. The brassiere of claim 1, further including a member elastic at least in the horizontal direction, affixed along the lower surface of each of said first and second dorsal panels.

5. The brassiere of claim 1 and further including an underbust band having stretch in the horizontal direction secured to the lower edges of said breast cups and the lower edges of said first segments of said first and second dorsal panels.

6. The brassiere of claim 5 wherein said first and second breast cups are joined to one another by an arrangement between said inner edges including first and second overlapped triangular members substantially free to be stretched independent of one another, each of said members including material along a portion of said inner edge having primary stretch characteristics in one direction; said first member being situated with its said one direction angularly oriented with respect to said horizontal direction toward the top of said inner edge of said second breast cup.

7. The brassiere in claim 1, wherein said first and second breast cups are joined to one another by an arrangement including first and second overlapped triangular members substantially free to be stretched independent of one another, each of said members including material along a portion of said inner edge having primary stretch characteristics in one direction; said first member being situated with its said one direction angularly oriented with respect to said horizontal direction toward the top of said inner edge of said first breast cup; said second member being situated with its said one direction angularly oriented with respect to said horizontal direction toward the top of said inner edge of said second breast cup.

8. The brassiere of claim 4 wherein said first segment of each dorsal panel is of substantially trapezoidal configuration and includes upper and lower edges generally parallel to said horizontal direction and at least one angled side edge; and said second segment of each dor-

sal panel is of substantially triangular configuration having a pair of converging said edges and a base edge joined to said one angled edge of said first segment, said one direction of stretch of said second segment being transverse to said base edge; one of said pair of converging side edges of said second segment being secured to said outer side edge of the respective one of said breast cups.

9. The brassiere of claim 8, wherein the other of said pair of converging side edges of said second segment is approximately equal in length to said upper edge of said first segment.

10. The brassiere of claim 8, wherein said angled side edge of said first segment and said base edge of said second segment are joined along a line which is an arcuate extension of the lower edge of the respective breast cup.

11. The brassiere of claim 8, wherein said one of said pair of converging side edges of said second segment is approximately equal in length to the outer side edge to which it is secured.

12. The brassiere of claim 9, wherein said angled side edge of said first segment and said base edge of said second segment are joined along a line which is an arcuate extension of the lower edge of the respective breast cup; and wherein said one of said pair of converging side edges of said second segment is approximately equal in length to the outer side edge to which it is secured.

13. The brassiere of claim 7, wherein said first segment of each dorsal panel is of substantially trapezoidal configuration and includes upper and lower edges generally parallel to said horizontal direction and at least one angled side edge; and said second segment of each dorsal panel is of substantially triangular configuration having a pair of converging side edges and a base edge joined to said one angled edge of said first segment, said one direction of stretch of said second segment being transverse to said base edge; one of said pair of converging side edges of said second segment being secured to said outer side edge of the respective one of said breast cups.

14. The brassiere of claim 13, wherein the other of said pair of converging side edges of said second segment is approximately equal in length to said upper edge of said first segment.

15. The brassiere of claim 14, wherein said angled side edge of said first segment and said base edge of said second segment are joined along a line which is an arcuate extension of the lower edge of the respective breast cup; and wherein said one of said pair of converging side edges of said second segment is approximately equal in length to the outer side edge to which it is secured.

16. The brassiere of claim 1, wherein said first and second breast cups are joined to one another by an arrangement including partially abutting first and second members, each of said first and second members affixed along one edge thereof to the inner edge of its respective breast cup, said first and second members affixed to one another along the medial area between said cups to form a substantially "Y" shaped arrangement, each of said members having primary stretch characteristics in one direction angularly oriented with respect to said horizontal direction toward the top of its respective breast cup.

17. A brassiere comprising:

first and second breast cups, each of said first and second breast cups including opposed upper inner edges and cup joining means between said upper inner edges, said joining means including an arrangement of material along each of said respective upper inner edges having primary stretch characteristics in a direction angularly oriented with respect to the horizontal direction when the brassiere is worn by the wearer, and first and second dorsal panels joined to said first and second breast cups respectively: each of said first and second dorsal panels comprising; a first segment consisting of material having stretch characteristics oriented primarily in said horizontal direction, a member elas-

tic at least in the horizontal direction affixed along the lower surface of each of said first segments, and a second segment joined to said first segment and the outer side edge of the respective one of said breast cups, said second segment having stretch characteristics angularly oriented with respect to said first segment in a direction toward the top of said respective breast cup, said first and second sections cooperatively providing means for initial channeling of horizontal forces to said first segment and forces angularly oriented with regard to said horizontal direction to said second segment.

* * * * *