BRASSIERE WITH YIELDABLE SIDE PANEL CONSTRUCTION

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References Cited
UNITED STATES PATENTS
2,966,785 1/1961 Goff et al. 66/176
3,393,681 7/1968 Sachs 128/494 X

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ABSTRACT
The present invention relates to the application of yieldable fabrics to the side or dorsal panels of brassieres to provide many of the advantages of elastic materials without the need for major elastic components. The present invention teaches the selective orientation of such yieldable fabrics in such side or dorsal panels in a manner which positions the yieldable characteristics relative to those areas of the brassiere where selective strain relief acts to deter undesirable distortion and further provides sufficient retentive qualities to reproportion selective flesh areas of the body.

12 Claims, 5 Drawing Figures
BRASSIERE WITH YELDABLE SIDE PANEL CONSTRUCTION

Brassieres generally comprise a frontal portion which includes two breast cups with some form of medial connection between the cups; side or dorsal panels which extend from the outermost edges of the cups to provide a body encircling band; and shoulder straps extending from the upper portion of each cup over the shoulder of a wearer to the back of the brassiere. Depending upon the particular design of the brassiere, subsidiary features such as, supporting stays or wires, cup paddings and the like may also be included. Similarly, the side panels may each be a separate unit meeting in a rear closure arrangement or may be provided as an integral, unbroken arrangement between the outer edges of the respective cups with the closure arrangement between the cups. Additionally, some brassieres have been designed absent any closure member in the nature of step-in types. Irrespective of these various modifications in structure, with limited exceptions, a feature common to all of these garments is the presence of a form of dorsal or side panel construction and it should be appreciated that as referred to herein "side or dorsal panels" is deemed to include a single unit or two separate units.

While each of the various elements of the brassiere is designed to perform a particular independent function, i.e., the cups retain, support, separate and shape the breasts; the shoulder straps help support the cups, etc., the individual portions of the garment interact as a single unit. That is, particular movements or stresses exerted at the frontal area of the body in turn have a correlative reaction in the side panels and vice versa.

The construction of side panels has been the subject of much work by designers in the field. Initially most side or dorsal panels were of a non-distensible material such as woven cotton broadcloth. Due to the inability of such panels to elongate to an appreciable degree, problems of discomfort and/or undesirable restriction of movement were encountered.

Such rigidity not only might effect a distortion of the backs themselves, but additionally the distortional forces were oftentimes transmitted to the frontal portion of the garments undesirably effecting fit and/or causing discomfort. Attempts to alleviate these problems took many forms. For example, improvements were developed to more positively anchor the back portions to the body such as shown in U.S. Pat. No. 3,078,851 to Sachs. Alternatively, some form of adjustable release for the back was developed, such as the elastic rear closure configuration of U.S. Pat. No. 3,066,654 to Sachs.

Many of these problems were alleviated with the advent of elastic fabrics, progressing from heavier fabrics to the lightweight materials known as "power net." While the use of these fabrics has gone a long way in terms of alleviating the problems presented by the rigid cotton broadcloth back constructions, the materials are more expensive than the broadcloth and oftentimes are limiting in terms of design aesthetics since there may be a color discontinuity as between the fabrics employed for the cups and the backs of the garment.

There has thus evolved three basic types of dorsal or side panel constructions: those of a rigid, non-stretchable fabric; those of a true elastic nature; and hybrid combinations of elastic and non-stretchable materials.

It should be noted that in defining their contributions in this field, many prior workers were relatively imprecise in terms of their definition of terms. Terms such as "stretch," "stretchable," "elastic," "elastic qualities" and "yeldable" were oftentimes employed interchangeably in describing a material or its attributes.

As employed herein, "elastic" or "elastic qualities" relate to a fabric which includes an elastomer which truly distends upon the application of a given force and additionally provides for a rapid recovery upon removal of the applied force.

On the other hand "stretch," "stretchable" and "yeldable" refer to a fabric, which due to its mode of construction, such as by providing a spatial relationship between loops or stitches, provides an elongation or distensible quality to the fabric, at least in one direction, upon the application of a force in such yeldable direction, but does not include elastic recovery features.

Many woven fabrics are truly two-way elastics, that is, they have elastomers in both the vertical and horizontal directions. On the other hand knitted "power net" which is oftentimes referred to as a two-way stretch material is, in fact, truly elastic in only one direction with the so-called "stretch" in the second direction provided through the yeldable characteristics of the fabric.

As distinguished from such elastic fabrics, the present invention relates to the application of yeldable fabrics to the side or dorsal panels of brassieres to provide many of the advantages of elastic materials without the need for major elastic components. In particular, the present invention teaches the selective orientation of such yeldable fabrics in such side or dorsal panels in a manner which positions the yeldable characteristics relative to those areas of the brassiere where selective strain relief acts to deter undesirable distortion and further provides sufficient retentive qualities to reposition selective fleshly areas of the body.

Such has long been recognized that certain non-elastomeric fabrics elongate in a given direction or directions. For example, warp knits such as tricot have available elongation in the weft direction. Similarly, simplex (two-faced warp knits) or single or double circular knits have a particular orientation of greatest elongation which in general is in the width direction.

However, the prior art use of the elongation characteristics of various materials in areas of the garment where the body exerts constantly varying degrees of forces such as in side or dorsal panels has not been attempted, no doubt, because elongation alone does not solve the problem. With the absence of an elastomer in the fabric structure, the ability of the material to recover and/or to provide a degree of shape maintenance by the application of a given force at a given area of the body is absent.

Thus, for example, while knitted tricot has recently obtained a measure of popularity in brassieres, especially with respect to cup structures, it is of note that the tricot has been positioned in a generally vertical direction relative to the girth of the body. In this latter case, the tricot, while yeldable vertically, is substantially non-yeldable or rigid in the horizontal direction and, in this regard, is equivalent to and presents the
same problems as previously discussed cotton fabric side panels.

Absent sufficient recovery characteristics, the elongation characteristics rather than performing a gentle shaping and release function only serve to accentuate fleshy areas by bulges. Without the "muscle" characteristics of an elastomer or the rigidity of an inherently non-elongation fabric, selective control is absent.

While in the past the yieldable but non-elastic characteristics of a fabric have been employed in a brassiere such as in the central insert in the U.S. Pat. No. 3,818,689 to Sachs, such yieldable constituent is relatively small in relation to the garment and is positioned in the sternum area where any appreciable fleshy portion of the body does not directly contact and apply sustained stress to the material.

According to the present invention yieldable fabrics such as above described having relatively minimum inherent recovery factors are employed as side or dorsal panels of a brassiere in a manner which imparts comfort and control features.

Such features are imparted through implementation and selective channeling of existing stress forces exerted by the body along various given directions to impart a flattening effect to the side panel with respect to the body and through the initial control of elongation such as by placing an immediate stress of elongation upon the back positions upon initial implantation on the body so as to employ a portion of such elongation under the immediate working load.

The manner in which the same is accomplished and other aspects of the present invention will become apparent by reference to the accompanying description and figures wherein,

FIG. 1 is an isometric view of a brassiere including the side panels of the present invention as viewed when worn;

FIG. 2 is a perspective view of a brassiere of FIG. 1;

FIG. 3 is a front plan view of the brassiere of FIG. 1 shown when laid flat; and

FIG. 4 is a rear plan view of the side panel of FIG. 3 further including a broken-line indication of the action of the side panel when emplaced on the body.

FIG. 5 is a plan view of an alternate side panel construction illustrating a portion of the cup and one side panel.

Referring now to the various figures where like reference numeral denote like parts.

As illustrated in FIG. 1, a brassiere 10 is shown on the body. The brassiere generally includes a frontal portion 11 having two cups 12 and a pair of shoulder straps 13 extending from the apex or platform areas of the respective cups so that they may be positioned over the shoulders of a wearer. The shoulder straps terminate along the rear portion of two side panels 14. While the brassiere 10 includes other features such as an under-bust band 15 and crossed front tapes 16, the brassiere 10 is merely exemplary of a frontal portion of a garment, and it should be understood that the side panel constructions hereinafter detailed have applicability to frontal portions of brassieres generally, and the particular brassiere 10 shown should not be deemed to a limiting feature of the invention.

The brassiere invention is of the type having a rear closure arrangement 17 between two separate side panels 14. As hereinbefore described, while this arrangement is one of the present invention also contemplates the application of its teachings to step-in type garments and front closure type garments wherein the body encircling means is a single panel unit extending from the outer cup edges 18 of the cups so as to form a circumferential arrangement with the frontal portion of the brassiere, about the body of a wearer.

As illustrated in FIG. 2, the side panels 14 generally begin along the outer edge 18 of the cups 12 and extend under the arms of a wearer to overlay the generally fleshy underarm portion, and then extend further to the rear of the brassiere. As can be appreciated, depending upon the orientation of the body of the wearer and the particular movements that the wearer goes through during periods of wear, such as arm extensions (e.g., FIG. 2), bending, stooping, sitting, etc., there is a repositioning or reorientation of the flesh, caused by distortion or relaxation of the various muscle tissue.

Thus, the brassiere and the side panels are regularly subjected to varying degrees of forces.

Referring now to the side panels, FIGS. 3 and 4 illustrate a side panel construction in accordance with the teachings of the present invention. The side panels 14 generally include, as their major unit, a somewhat trapezium-shaped member 19 of a yieldable material, such as tricot, positioned so that its ability to elongate, as hereinbefore defined, will be generally along the horizontal with respect to the position of the side panel on the body of the wearer, when the garment is worn. This is illustrated by arrow A. It should be noted that when laid flat, the side panels 14 are somewhat pitched relative to the frontal portion of the garment. However, such as shown in FIGS. 1 and 2, when the side panels are wrapped around the circumference or trunk of the body, they will assume a generally horizontal position relative to the body. In the FIGS. 3 and 4 embodiment, elastic boarding tapes 20, 21 extend along the upper and lower edges, respectively, of the trapezium 19. The upper elastic boarding tape 20 is a true elastic having uni-directional stretch and recovery in the direction of the double headed arrows B and might be generally referred to as being, with respect to the garment as worn, horizontally elastic. Similarly, the lower portion of the trapezium 19 included an uni-directional elastic boarding tape 21, having its elasticity as shown by the double headed arrows C, also in a manner which might be termed horizontally elastic.

As illustrated in FIG. 4, the rearward edge 24 of the trapezium 19 is also bordered by an elastic boarding tape 22 which is also preferably a uni-directional elastic, having its elasticity in the direction of the double headed arrows D, with respect to bordering tape 21 is at a somewhat vertically oriented arcuate angle. The forward edge 25 of the trapezium 19, which is in juxtaposition to the outer cup edge, includes a vertically oriented boarding tape 23, which is illustrated in this embodiment as being rigid, that is, without any appreciable stretch in any direction.

As will be thus appreciated, the outer elastic bordering tapes 20, 21 and 22 will impart a degree of recovery to the basic trapezium 19. However, due to the relatively minimum inherent recovery of the trapezium material, e.g., tricot, and in view of the relatively substantial area over which the trapezium lies, the bordering tapes 20, 21 and 22 are insufficient in and of themselves to affect an adequate recovery at a relatively
controlled rate to accord the side panels sufficient control for both shaping and comfort. In order to effect this additional control, the basic trapezium 19 has been patterned such that under its initial load, exerted by the implantation of the garment on the body, a degree of its inherent ability to elongate is immediately taken up. In other words, the trapezium is slightly shorter in its relaxed condition than its initial requirements dictate in fitting. This is shown by broken lines in FIG. 4 where the initial load exerted by the wearer in a relaxed position distends and repositions the side panel exerting an immediate force not only to the trapezium 19 but additionally to the bordering tapes 20, 21. In addition, the angular orientation of the bordering tape 22 is somewhat modified. While many all elastic side panel constructions made employ a technique similar to that just described in terms of providing a back portion slightly shorter in its relaxed state than under initial load of the body, such a technique is effected primarily to effect a "holding in" by the elastomer in the major dorsal panel. This is to be distinguished from the present invention where the trapezium 19 is devoid of any elastomer.

For example in a garment designed to fit a wearer having a 34 inch chest dimension, the side panels 12 are made such that the girth of the entire garment is slightly smaller than the 34 inch circumference of the wearer would normally dictate if, for example, the same garment were to be made employing a cotton broadcloth back. Thus, when the wearer initially places the garment on her body, some of the inherent distensibility of the fabric employed for the trapezium 19 must elongate. While the ability to elongate is still retained, the degree of elongation available is lessened. This initially imparts a degree of "holding-in" control to the side panels, places an immediate load on and repositioning to the bordering tapes, and additionally lessens the degree of recovery necessary to maintain the trapezium 19 in a relatively flat controlled relationship with the body.

Thus, an exemplary tricot which would have a normal 60 percent elongation factor and a minor degree of recovery factor in the wet direction, when employed as a side panel constituent, when worn initially and placed under its initial working load has a substantially lesser elongation factor than 60 percent.

Additionally, aside from imparting a degree of recovery, the bordering tapes 20, 21, 22 and 23 are operably linked to various other constituents of the garment so that forces exerted on such other constituents aid in the flattening of the entire side panel and in particular the trapezium 19.

Since the bordering tapes are only peripheral, it must not be supposed that upon retraction or elongation, such tapes would have an immediate effect upon that portion of the trapezium 19 in close relationship therewith, but little effect upon the greater central area of the trapezium 19 where control must also be effected. However, the bordering tapes have been so constructed so as to interact with each other to create lines of force in various directions, all tending to maintain the trapezium 19 in a relatively controlled position along the body.

This is further illustrated by referring to FIGS. 3 and 4 where the general tension exerted by the wearer on the shoulder strap 13 is transmitted to the bordering tape 22, which is shown as preferably arcuately formed.

The forces thereby exerted tend to keep the rear periphery of the trapezium 19 in flat alignment with the body.

At point E, where there is a juxtaposition of the lower elastic bordering tape 21 and the rear elastic bordering tape 22, there is provided a definitive anchor which exerts along the lower portions of the trapezium 19 radiating flattening forces such as illustrated by line I, emanating not only from Point E but also along the entire line of the bordering tape 22, again to maintain flatness as against the body. The lower bordering tape 21 is under the influence of the forces from front to back, affected by the circumference of the body at the same time the rear bordering tape 22 as aforementioned is under the influence of the forces effected through the shoulder straps. Similarly, the area denoted as point F which is located at the juxtaposition of the upper, preferably arcuate bordering tape 20 and the rear, preferably elastic bordering tape 22, both of which are under initial stress by forces exerted by the body, additionally tend to maintain the trapezium 19 in the flat, moderately tensioned position.

Similar anchorage is effected along points G and H where the upper bordering tape 20 meets the forward vertical tape 23 and the lower bordering tape 21 meets the forward vertical tape 23, respectively.

Therefore, in addition to the direct forces exerted by the bordering tapes as shown by the arrows B, C and D, there are additional forces exerted at points E, F, G and H, all of which serve to relatively distribute, throughout the extend of the trapezium 19 the recovery forces exerted by the bordering tapes.

It is also preferable that the elongation characteristics of the trapezium 19 be in the horizontal direction only, with little or no elongation available in the vertical direction, since vertical elongation would have a greater tendency to allow a bulging out of the trapezium 19 along its central portions. The inelastic bordering tape 23 thus not only acts as a strain relief between the side panel and the cups to mute the forces between these two constituents, but further acts to deter any vertical distensibility of the trapezium 19.

While the rear bordering tape 22 has been discussed as elastic in the direction of the arrow D, it should be noted that such bordering tape may, if desired, be non-elastic with the rear bordering tape 22 maintained in this position by an interaction of the straps 13 and the forces exerted by the body along the rear closure or circumferentially from cuff edge to cuff edge, depending upon the construction of the garment.

It should also be noted that the arcuate or bias orientation of the rear bordering tape 22, where such tape is elastic, accords such tape the ability to elongate and recover to some degree. By and large, when elastics are sewn to a non-distensible fabric (even by stitching which allows elongation and recovery, such zig-zag stitching), the non-distensible characteristics of the fabric prevent the elastic material sewn thereto from elongating. However, the arcuate orientation of the rear bordering tape 22 essentially puts a portion of that bordering tape at a bias to the direction of elongation shown in arrow A, and as such, some elongation and recovery of the bordering tape 22, is available although it is not as great as that for bordering tapes 20 and 21. While as aforementioned, not critical to invention, an elastic bordering tape 22 along the rear edge, provides an additional strain relief to the shoulder straps 13, es-
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especially against the upward pull effected during the sitting position where the distance from the neck to the base of the spine is longer than in the standing position.

While the embodiment depicted generally illustrates a vertical border (bordering tape 23) between the outer cup edge and the side panel, it should be noted that the present invention additionally contemplates the employment of its teachings in brassieres having modified constructions such as that illustrated in FIG. 5 where the side panel 26 is directly affixed to the arcuate outer edge of the cup 27 along line 28. This is only one variant form wherein the basic shape and construction of the frontal portion of the garment somewhat modified the shape of the side panel.

It may thus be appreciated that the terms and expressions employed above are used as terms of basic description, it being recognized that various modifications are possible within the basic teachings described.

Having thus described certain forms of the invention in some detail, what is claimed is:

1. A brassiere including: two cups; body encircling means; and shoulder straps extending from a point in juxtaposition to said cups to said body encircling means;

said body encircling means including a main panel portion constructed of yieldable, but substantially inelastic material over a major extent thereof, said main panel portion operably connected to the outer edges of said cups, said main panel portion oriented such that the predominant direction of elongation of said yieldable material is in a substantially horizontal direction with respect to the body of a wearer when the brassiere is worn;

said brassiere when off the body of the wearer being of a length less than the circumference of the torso of said wearer with the yieldable material of said main panel portion distending when emplaced on the body of the wearer such that said body encircling means fits the circumference of the torso and a portion of the ability of said yieldable material to distend is immediately employed upon emplacement of said brassiere on the body, said yieldable material retaining the further ability to distend in response to chest expansion of the wearer and elastic means along preselected peripheral areas of said main panel to impart a degree of recovery and positional stability to said yieldable material.

2. A brassiere as claimed in claim 1 wherein said elastic means includes bordering tapes along the periphery of at least the portion of upper and lower edges of said main body panel.

3. A brassiere as claimed in claim 1 wherein said main panel portion comprises a first side panel extending from a line of juxtaposition to the outer ledge of one of said cups to a point along the back of a wearer and a second side panel extending from a line of juxtaposition to the outer edge of the other of said cups to a point along the back of a wearer; each of said side panels having an upper edge, a lower edge, a forward edge in juxtaposition to said outer cup edge; and a rear edge; and means to operably connect said first and second side panels to form said main panel portion.

4. A brassiere as claimed in claim 3 wherein said elastic means includes bordering tapes along the periphery of at least a portion of said upper and lower edges of each of said side panels.

5. A brassiere as claimed in claim 4 wherein said upper edge of each of said side panels is arcuate and said lower edge of each of said side panels is relatively straight.

6. A brassiere as claimed in claim 5 wherein said rear edge of each of said side panels is arcuate.

7. A brassiere as claimed in claim 6 wherein said rear edge of each of said side panels includes a bordering tape operably linked to a said shoulder strap of said brassiere.

8. A brassiere as claimed in claim 7 wherein rear edge bordering tape is elastic along the direction of said rear edge.

9. A brassiere as claimed in claim 1 wherein said main panel portion is connected to said outer edges of said cups along an inelastic border.

10. A brassiere as claimed in claim 1 wherein said yieldable, but substantially inelastic material has the ability to elongate in one direction and is substantially non-yieldable in a direction 90° to said yieldable direction.

11. A brassiere as claimed in claim 10 wherein said material is tricot.

12. A brassiere including: two cups, a first side panel extending from the outer edge of one of said cups; a second side panel extending from the outer edge of the other of said cups; each of said side panels including an upper edge, a lower edge, a forward edge in juxtaposition to its respective outer cup edge, and a rear edge; closure means adapted to operably connect said first and second side panels to form a body encircling band;

shoulder straps extending from an operable connected relationship to a respective one of said cups to a respective rear edge of said side panel;

a substantial portion of each of said side panels including a yieldable, but substantially inelastic material, said material oriented such that its predominant direction of elongation is in a substantially horizontal direction with respect to the body of a wearer when the brassiere is worn;

said upper and rear edge of each of said side panels being arcuate;

bordering means along the upper, lower and rear edges of each of said side panels; said bordering means along said upper and lower edges being elastic in the direction of its respective edge;

each is said rear edges operably linked to its respective shoulder strap;

said brassiere when off the body of the wearer being of a length less than the circumference of the torso of said wearer with yieldable material being stressed when emplaced on the body of the wearer such that a portion of the ability of said yieldable material is immediately employed such that said brassiere fits the circumference of the torso, said yieldable material retaining the further ability to distend in response to chest expansion of the wearer.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,817,255 Dated June 18, 1974

Inventor(s) Jack J. LoCascio

It is certified that error appears in the above-identified patent, and that said Letters Patent are hereby corrected as shown below:

ATTORNEY, AGENT or FIRM:
Delete "Lew Schwartz; Wayne A. Sivertson" and insert in its place -- Stewart J. Fried; Jeffrey A. Schwab; Michael A. Caputo --

Signed and sealed this 18th day of February 1975.

(SEAL)
Attest:
C. MARSHALL DANN
Commissioner of Patents and Trademarks

RUTH C. MASON
Attesting Officer