Oct. 20, 1964 H. SILVERMAN 3,153,245

EMBOSSED SHOULDER STRAPS

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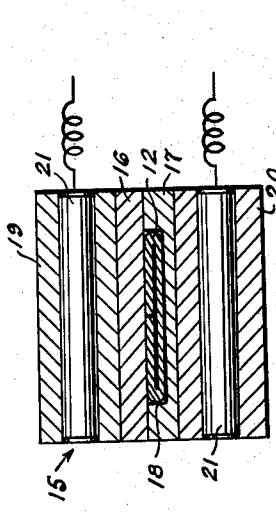


Fig. 4.

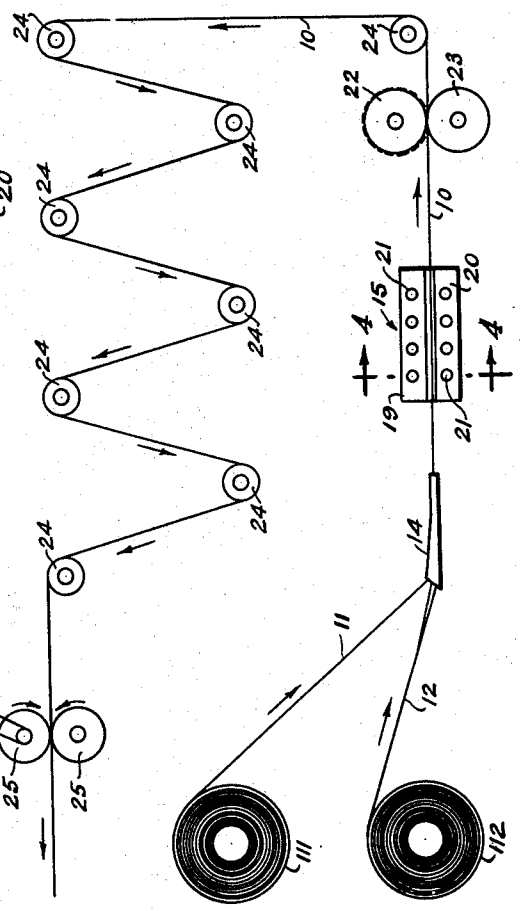


Fig. 1.

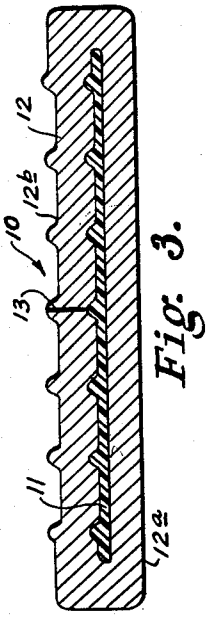


Fig. 3.

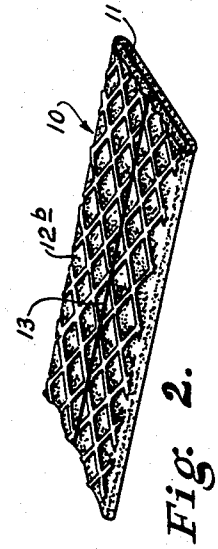


Fig. 2.

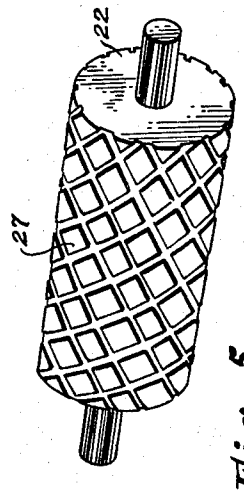


Fig. 5.

INVENTOR.
HAROLD SILVERMAN
BY
ATTORNEY.

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EMBOSSED SHOULDER STRAPS

Harold Silverman, Yonkers, N.Y., assignor to Maid-Rite Novelty Corp., Long Island City, N.Y., a corporation of New York

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1 Claim. (Cl. 2—338)

This invention relates generally to shoulder straps for brassieres, slips or other articles of feminine wearing apparel.

An object of the invention is to provide shoulder straps of the describe dcharacter with embossed decorative or ornamental designs to enhance the appearance thereof, and which may be correlated with the patterns of lace or other decorative fabrics included in the associated garments or wearing apparel.

Another object is to provide shoulder straps of the described character with permanent decorative embossing which is capable of withstanding the repeated launderings to which the straps and associated garments or wearing apparel are usually subjected.

A further object is to provide shoulder straps of the described character with decorative embossing which appears only on the outer or exposed surface of the strap while the inner surface of the latter, which is in contact with the wearer's body, remains smooth for optimum comfort to the wearer.

In accordance with an aspect of the invention, a laminated strap is produced by folding a textile fabric tape of cotton or other suitable fiber around a liner of thermoplastic material, such as, polyethylene or the like, so as to completely envelop the latter, and then embossing one surface of the laminated strap while the liner thereof is in a molten or plastic condition so that the embossed pattern is impressed through the outer fabric layer into the plastic material which, upon the setting thereof, forms an intimate bond with the outer fabric layer for securely retaining the tape in its folded condition with the embossed pattern permanently impressed therein.

In a preferred embodiment of the invention, the thermoplastic material is in the form of a continuous, relatively thin web around which the fabric tape is folded to form the laminated strap, and the latter is then fed through a heating unit to soften the thermoplastic material immediately prior to the feeding of the assembly between two pressure rollers, one of which has the desired design in intaglio on the surface thereof, so that the pressure rollers emboss a surface of the strap while exerting the pressure necessary for producing the desired permanent bond between the fabric tape and the thermoplastic liner.

The above, and other objects, features and advantages of the invention, will be apparent in the following detailed description of an illustrative embodiment thereof which is to be read in connection with the accompanying drawing forming a part hereof, and wherein:

FIG. 1 is a diagrammatic view illustrating an apparatus by which embossed shoulder straps may be produced in accordance with the present invention;

FIG. 2 is a perspective view of a fragment of a shoulder strap embodying the invention;

FIG. 3 is an enlarged cross-sectional view of the shoulder strap of FIG. 2;

FIG. 4 is an enlarged cross-sectional view taken along the line 4—4 of FIG. 1, and showing the details of a heating unit included in the apparatus by which an embossed shoulder strap may be produced in accordance with this invention; and

FIG. 5 is a perspective view of an embossing roller also included in the apparatus of FIG. 1.

Referring to the drawing in detail, and initially to FIGS. 2 and 3 thereof, it will be noted that a shoulder strap material embodying the present invention, and there generally identified by the reference numeral **10**, is of the laminated type and includes a relatively thin liner or core **11** of thermoplastic material, such as, for example, polyethylene or the like, which preferably has a thickness of between approximately .003 and .005 inch, and a woven textile fabric tape **12** of cotton or other suitable fiber longitudinally folded around the thermoplastic liner **11** so as to completely envelop the latter with the edges of folded tape **12** abutting to form a seam **13** along the longitudinal medial line of the exposed or upper surface of the strap material **10**. The folded woven textile fabric tape **12** forms an inner or bottom layer **12***a* (FIG. 3) and an upper or outer layer **12***b* integrally joined together along the opposite longitudinal edges of strap material **10** and being bonded together by the liner **11**. This bonding action can be achieved by pressing together the layers **12***a* and **12***b* while the thermoplastic material of liner **11** is in a plastic or molten condition so that the plastic of liner **11** impregnates the fibers of the fabric layers **12***a* and **12***b* and, upon setting thereof, forms a secure bond therewith.

In producing the laminated strap material **10**, the thermoplastic material intended to form the liner **11** may be applied, in molten condition, to the central portion of the woven textile fabric tape **12** which forms lower layer **12***a* and, thereafter, the longitudinal edge portions of the tape **12** may be folded upwardly and inwardly to form the upper layer **12***b* overlying the lower layer **12***a*. Finally, the folded tape enveloping the plastic liner may be passed between pressure rollers which cause the molten or plastic material of liner **11** to impregnate the textile fibers and, upon setting, form a secure bond therewith.

Alternatively, as illustrated in FIG. 1 of the drawing, the thermoplastic liner **11** may be in the form of a continuous web or film having a width approximately equal to one-half the width of the woven textile fabric tape **12** and being drawn from a supply roll **111** thereof simultaneously with the drawing of the tape **12** from a supply roll **112** of the latter. The thermoplastic web **11** is fed above the wider fabric tape **12** into a conventional folding device **14** which continuously operates to fold the longitudinal edge portions of tape **12** upwardly and inwardly over thermoplastic web **11**. After tape **12** has been folded around thermoplastic web **11**, the assembly passes continuously through a suitable heating unit **15** which is effective to heat the web **11** to a temperature of between 350 and 400° F., so that the same is rendered molten or at least plastic.

As shown particularly in FIG. 4, the heating unit **15** may include an upper plate **16** and a lower plate **17** formed with a shallow, longitudinally extending groove **18** opening upwardly against the upper plate **16** so as to define a passageway through which the tape **12** folded over the liner **11** is guided during the heating thereof. Metal blocks **19** and **20** are secured to the plates **16** and **17**, respectively, in a manner to provide good heat transfer therebetween, and such metal blocks have bores containing convention electric heating elements **21** supplied with electric current through a suitable thermostatically regulated circuit (not shown).

After the liner **11** of the strap material **10** has been rendered molten or at least plastic by the heating thereof, the strap material passes between pressure rollers **22** and **23** which compress together the textile fabric layers **12***a* and **12***b* so as to cause impregnation of the plastic material of liner **11** into the fibers of the textile fabric material, whereupon the strap material **10** is fed along a sinuous path around idler rollers **24** so that it is suitably cooled before passing between feed rollers **25** which are suitably driven by an electric motor **26**.

In accordance with the present invention, an embossed design is provided on the upper or exposed surface of the laminated strap material **10** by providing one of the pressure rollers, specifically, the upper pressure roller **22**, with an engraved surface **27** having the desired design in intaglio therein so that, as the strap material **10** passes between pressure rollers **22** and **23**, the engraved surface **27** of roller **22** produces a corresponding embossed design in the upper layer **12***b* of the folded tape **12**.

It has been found that, since the thermoplastic liner **11** underlies the upper layer **12***b* of textile fabric, the embossing of the latter is transmitted to the thermoplastic material, that is, the raised portions of the design in the upper fabric layer **12***b* are filled or supported by correspondingly raised portions of the thermoplastic liner **11**, as is clearly apparent in FIG. 3. Thus, when the thermoplastic liner **11** has set, the pattern or design embossed in the upper fabric layer **12***b* is permanently retained by the plastic of liner **11** even after repeated launderings of shoulder straps formed from the embossed strap material **10**.

Further, the lower pressure roller **23** preferably has a smooth surface so that, as shown in FIG. 3, the lower or inner fabric layer **12***a* of the strap material will have a smooth surface for comfortable contact with the wearer's body. It has been found that, in the absence of the thermoplastic liner **11**, embossing of the shoulder strap material is not permanently retained and further results in the transmission of the embossed pattern to the lower or inner surface of the strap material, and in weakening of the textile fabric. Thus, in the strap material **10** embodying the present invention, the thermoplastic liner **11** performs the multiple functions of retaining the embossed design or pattern in the upper or outer surface of the strap material, of permitting the restriction of the embossed design or pattern merely to the outer layer or surface of the strap material so that a smooth lower or inner surface can be maintained, and further of retaining the strap material in a relatively flat condition, that is, preventing curling of the shoulder strap during use.

It will be apparent from the above that the present invention makes it possible to provide shoulder straps cut from the strap material **10** which have permanently embossed decorative designs or patterns that may be correlated with the patterns of lace or other decorative fabrics

included in garments or wearing apparel to which the shoulder straps are affixed. Although the drawing illustrates a shoulder strap material **10** having a basket-weave design or pattern embossed in the upper or outer surface thereof, it will be obvious that the surface **27** of the roller **22** may be suitably engraved to form other desired embossed designs or patterns.

Although illustrative embodiments of the invention have been described in detail herein, it is to be understood that the invention is not limited to those precise embodiments, and that various changes and modifications may be effected therein without departing from the scope or spirit of the invention, except as defined in the appended claim.

What is claimed is:

A decoratively patterned, laminated shoulder strap for brassieres and the like, comprising a thin thermoplastic liner having a thickness in the range between approximately .003 and .005 inch, and a woven textile fabric tape having its longitudinal edge portions folded over said liner to form a butt seam along the longitudinal medial line of the strap, said folded edge portions of the tape having embossing therein which extends across said seam to define the decorative pattern of the strap, and said plastic liner having a corresponding overall embossed pattern in the surface thereof underlying said folded edge portions of the tape and which is impressed into the liner through said folded edge portions so that the liner retains the decorative pattern in the embossed textile fabric of the tape.

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