United States Patent [19]

Freixas

[11] **3,777,311**

[45] **Dec. 11, 1973**

[54] **METHOD OF MANUFACTURING GARMENT COLLARS**

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[21] Appl. No.: **238,575**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 849,201, Aug. 11, 1969, abandoned.

[30] **Foreign Application Priority Data**

Aug. 12, 1968 Spain 357197

[52] **U.S. Cl.** **2/143,** 264/229

[51] **Int. Cl.** **A41b 3/08**

[58] **Field of Search** 112/121.15, 121.12, 112/262, 121.26, 121.27, 413, 414, 440, 441; 2/143, 132, 131, 129, 243, 236; 264/134, 136, 257, 258, 324, 229, 295, 339

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Primary Examiner—James R. Boler
Attorney—Robert E. Burns et al.

[57] **ABSTRACT**

A method of manufacturing garment collars comprises molding a flexible collar stiffener having the configuration of the desired garment collar, flattening the collar stiffener into a planar configuration and sewing a fabric covering on the flattened collar stiffener while the fabric covering is maintained in a tensioned condition, and then allowing the flattened collar stiffener to return to its original configuration thereby defining a garment collar.

6 Claims, 14 Drawing Figures

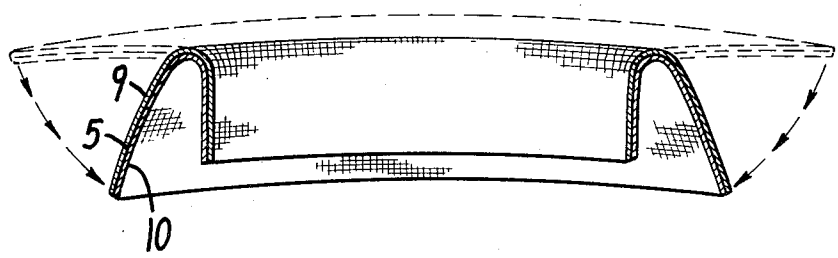


FIG. 1
(PRIOR ART)

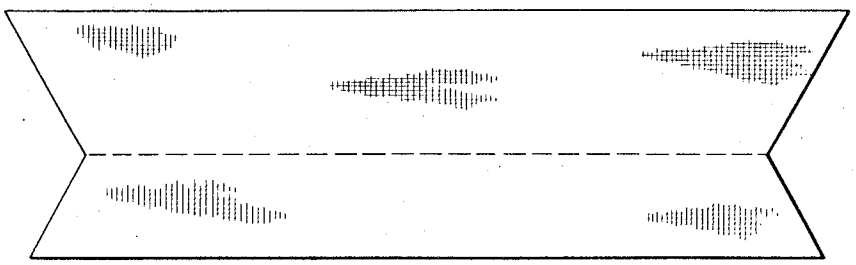


FIG. 2

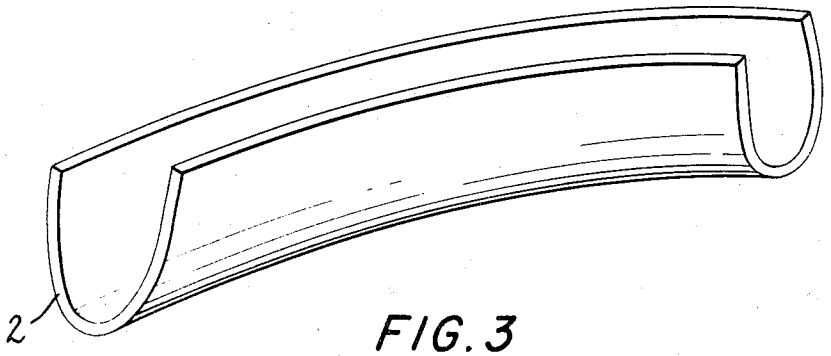


FIG. 3

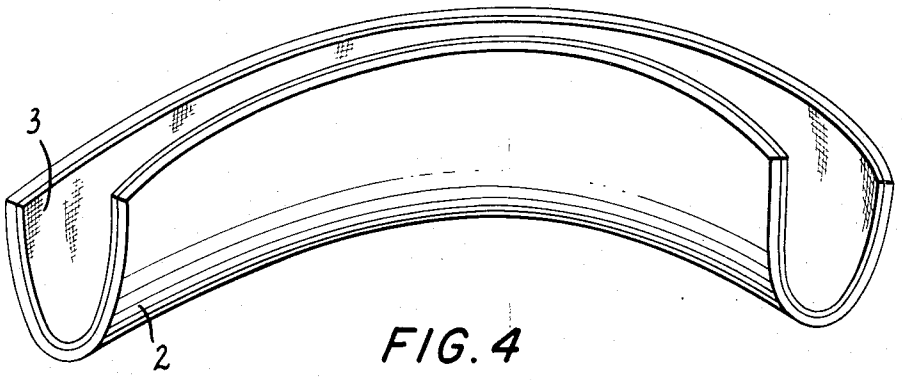


FIG. 4

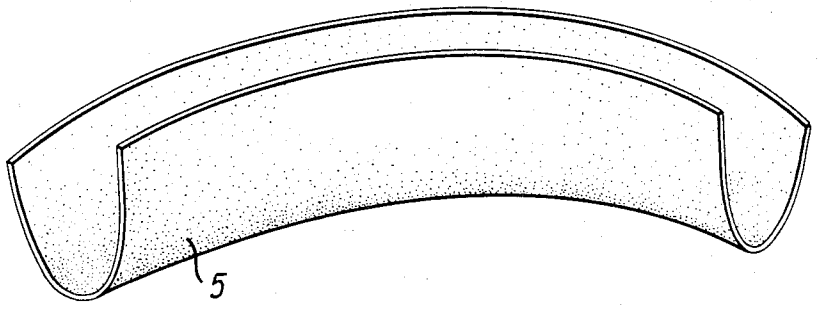


FIG. 5

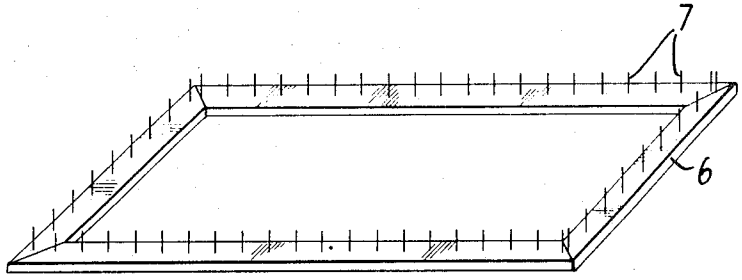


FIG. 6

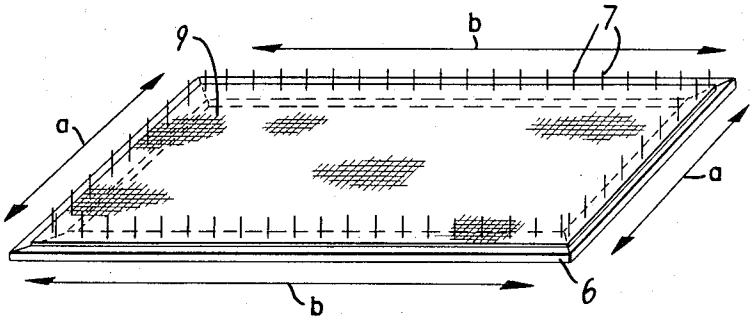


FIG. 7

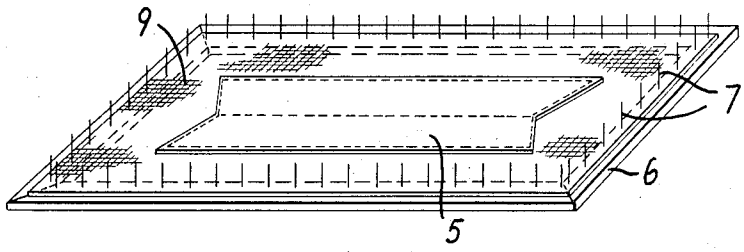


FIG. 8

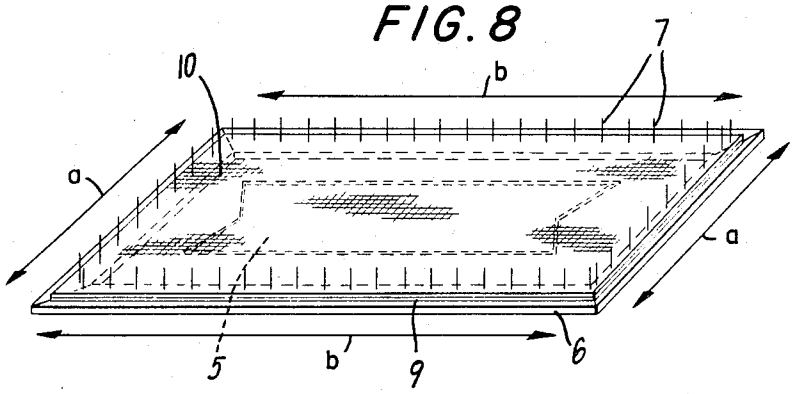


FIG. 9

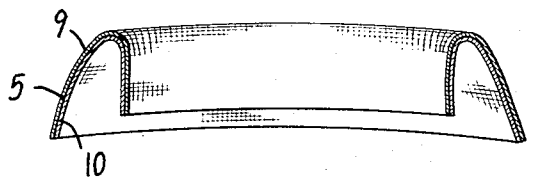


FIG. 10

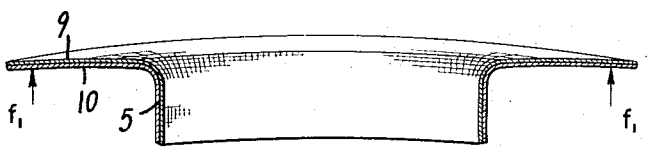


FIG. 11

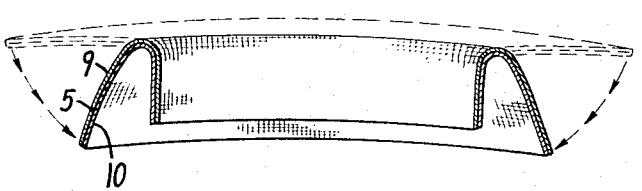


FIG. 12
(PRIOR ART)

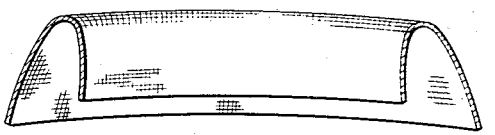


FIG. 13
(PRIOR ART)

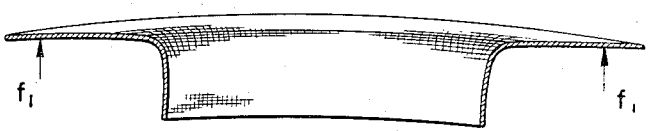
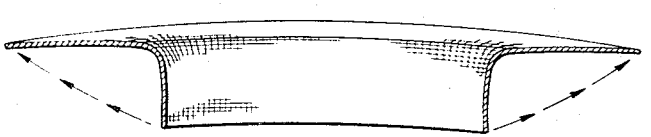


FIG. 14
(PRIOR ART)



METHOD OF MANUFACTURING GARMENT COLLARS

This is a Continuation-In-Part of application Ser. No. 849,201, filed on Aug. 11, 1969, now abandoned.

The present invention relates to a method for manufacturing garment collars and more particularly, relates to a method of manufacturing garment collars having a three-dimensional configuration.

Garment collars are well known in the art which comprise a flexible interlining covered with a covering fabric. The interlining is used to strengthen the collar and various manufacturing methods have been employed to obtain a garment collar which is sufficiently stiff to prevent wrinkling but which still feels comfortable to the wearer.

It is known in the art to strengthen the interlinings by impregnating them with a liquid or a laminated plastic material followed by polymerizing or vulcanizing the interlinings to impart to them the desired stiffness. Such techniques have not been entirely satisfactory since they do not provide the interlinings with a permanent stiffness. The prior art garment collars are also desadvantageous in that the interlinings are often too stiff and therefore lack sufficient resiliency to revert back to their original shape after undergoing temporary deformation.

Garment collars, particularly those used for dress shirts, are frequently subjected to buckling, depressing, and other deforming forces during normal wear. The garment collars heretofore available tend to retain their deformed condition even after the deforming force is removed. It is usually not possible to restore such collars to their original shape and smart appearance until the entire article of clothing is laundered or until at least the collar itself is ironed.

It has been a common practice in the art to refrain from placing any filling or interlining at the pointed tips of the collar and therefore the collar tips often become buckled, upturned and wrinkled and such destroys the appearance of the collar and accordingly reflects upon the smartness of the wearer. Many attempts have been made to solve this problem and some degree of success has been obtained by the use of removable collar stays which are inserted into pockets provided in the collar tips or by the use of the more cumbersome metal collar stays.

It is therefore a primary object of the present invention to provide a method for manufacturing garment collars having a permanently pressed appearance.

It is another object of the present invention to provide a method for manufacturing collars having crease-resistant properties.

It is a further object of the present invention to provide a method for manufacturing garment collars having sufficient resiliency to enable the collar to be temporarily deformed yet spring back to its original configuration upon removal of the deforming forces.

It is still another object of the present invention to provide a method for manufacturing garment collars having collar points which resist buckling, upturning and wrinkling during normal wear.

The aforementioned and other objects of the present invention are accomplished by the method of the present invention which comprises providing a flexible collar stiffener having a normally curved three-dimensional configuration substantially in the shape of the desired garment collar, applying sufficient force to the flexible collar stiffener to temporarily deform same into a planar two-dimensional configuration, providing a fabric covering to be fastened to the collar stiffener, fastening a layer of the fabric covering while maintaining same in a preselected tensioned condition to each side of the temporarily deformed planar collar stiffener, and terminating the application of force to the fabric-covered collar stiffener to allow same to flex back to its normally curved three-dimensional configuration defining the finished garment collar.

Other features and advantages of the method of manufacturing garment collars in accordance with the principles of the present invention will be made apparent from the following description and appended claims when taken in conjunction with the following drawing in which:

FIG. 1 is a plan view of a collar interlining constructed in accordance with the principles of the prior art;

FIG. 2 is a perspective view of a mold for use in molding the garment collar stiffener in accordance with the present invention;

FIG. 3 is a perspective view of the mold shown in FIG. 2 containing therein the collar interlining;

FIG. 4 is a perspective view of the molded collar stiffener for use in garment collars in accordance with the principles of the present invention;

FIG. 5 is a perspective view of a frame assembly for tensioning the covering fabric;

FIG. 6 is a perspective view of the frame shown in FIG. 5 containing thereon one tensioned layer of covering fabric;

FIG. 7 is a perspective view of the frame assembly shown in FIG. 6 containing thereon one tensioned layer of covering fabric and the collar stiffener;

FIG. 8 is a perspective view of the frame assembly shown in FIG. 7 containing thereon two layers of tensioned covering fabric having sandwiched therebetween the collar stiffener;

FIGS. 9–11 are explanatory views of a garment collar constructed in accordance with the present invention showing how same reacts in response to externally applied deforming forces; and,

FIGS. 12–14 are explanatory views showing how the prior art garment collars react when subjected to externally applied deforming forces.

The typical art garment collar for a shirt and the like is shown in FIG. 1 and it may be seen that the garment collar normally lies in a planar configuration and has a two-dimensional configuration. The garment collar is shown by itself and such is the normal condition of the collar interlining prior to being covered with a covering fabric and attached to a finished article of clothing.

In accordance with the present invention, the collar stiffener or interlining is formed in an arcuate shape substantially corresponding to the shape of the garment collar as same appears on the finished article. This is accomplished by providing a mold 2, as shown in FIG. 2, and molding the collar stiffener in the mold. The mold may be formed of any suitable mold material capable of withstanding the temperature and pressure conditions during the molding operation.

FIG. 3 shows the mold 2 containing therein the collar interlining 3 prior to the actual molding operation. The collar interlining 3 comprises a strip of textile material covered on either one face or on both faces with an elastomer. The elastomer may be either a natural or

synthetic elastomeric material and is applied to the textile material in order to impart both stiffness and resiliency to the resulting collar sitffener. The textile material and elastomer coating are polymerized or vulcanized while in the mold **2** to produce the flexible collar stiffener **5** shown in FIG. **4.**

The flexible collar stiffener has an arcuate three-dimensional configuration and possesses the shape of the desired garment collar. The flexible collar stiffener has sufficient stiffness to retain its molded configuration under normal conditions and possesses sufficient resiliency to always flex back and restore itself to its normal configuration.

In accordance with the present invention, the collar stiffener **5** is temporarily deformed into a planar two-dimensional configuration and while in this state, a covering fabric is suitably pretensioned and mechanically bonded to the collar sitffener. FIGS. **5–8** show an embodiment of apparatus which may be used to attach the covering fabric to the collar stiffener. As seen in FIG. **5,** the apparatus comprises a rectangular frame **6** having a hollow center portion and a plurality of retaining pins **7** connected to the frame in circumferentially spaced-apart relationship and projecting upwardly from the frame. The retaining pins **7** are used to temporarily retain the covering fabric in a tensioned condition on the frame during the fastening of the covering fabric to the collar stiffener.

FIG. **6** shows one layer of the covering fabric **9** positioned on the frame **6** and suitably tensioned by the retaining pins **7.** The double-headed arrows *a* and *b* indicate that the covering fabric is suitably tensioned in the directions of the arrows. For the sake of simplicity, the details of the tensioning means have not been disclosed since such does not comprise part of the present invention and various tensioning techniques are known throughout the art.

One type of tensioning means which is particularly well suited for use in practicing the present invention comprises mounting each of the four legs of the frame **6** for sliding movement relative to each other in such a manner that the size of the rectangle defined by the four legs may be selectively adjusted. Suitable cams are rotatably mounted at each of the four corners of the frame and function to slidably extend the legs in response to angular displacement of the cams. By such an arrangement, the rectangular frame is first adjusted to its smallest size after which the covering fabric is positioned over the retaining pins and then the cams are angularly displaced to accordingly extend the legs thereby tensioning the covering fabric.

The degree of tensioning or stretching of the covering fabric is preselected in dependence upon the shape of the garment collar, the index of molding, the elasticity and recovery of the flexible collar stiffener, and the index of elasticity of the covering fabric. In any event, the covering fabric is never tensioned beyond the maximum elasticity of the fabric itself whereupon the covering fabric retains a certain amount of elasticity. This ensures that the covering fabric may further stretch when the collar stiffener flexes back to its normal configuration and also enables the covering fabric to be further stretched during wear of the garment collar without being permanently deformed.

In accordance with the present invention, the collar stiffener **5** is temporarily deformed into a planar shape and then mechanically bonded to the tensioned layers of covering fabric. The flattening of the collar stiffener **5** into a planar shape may be accomplished by either of two techniques. One technique comprises placing the collar stiffener over the tensioned covering fabric **9** and then applying sufficient force to the collar stiffener to temporarily deform same into a two-dimensional configuration. The force is maintained on the collar stiffener during the mechanical bonding of the stiffener to the covering fabric and the resulting product is shown in FIG. **7.** Then another layer of covering fabric **10** is superposed over the fabric-and-stiffener composite and suitably tensioned and then mechanically bonded to the collar stiffener. The mechanical bonding preferably comprises stitching or sewing the covering fabrics to the collar stiffener.

Another technique of flattening the collar stiffener **5** into a planar shape while mechanically bonding the layers of covering fabric thereto comprises attaching both layers **9, 10** of covering fabric to the frame **6** and then inserting the three-dimensional collar stiffener **5** between the fabric layers. The frame **6** is then extended to simultaneously tension both layers of covering fabric while effecting deformation of the collar stiffener into a two-dimensional planar configuration. According to this technique, the collar stiffener is deformed into a two-dimensional configuration by the sandwiching action of the tensioned layers of covering fabric. The tensioned layers of covering fabric are then sewn to the collar stiffener.

After both layers of covering fabric are attached to the collar stiffener, the partially formed garment collar is removed from the frame **6** and the excess fabric is trimmed off the collar to produce the finished garment collar. As soon as the flattening pressure is removed form the garment collar, the collar stiffener **5** flexes back to its normal configuration shown in FIG. **4.**

Since the covering fabric is sewn on the collar stiffener while being maintained under tension, the covering fabric will not wrinkle or buckle after attachment to he stiffener nor will wrinkles appear on the fabric surface during wear. Moreover, since the particular stretch tension of the covering fabric is calculated in dependence upon its own elasticity and the elasticity of the collar stiffener, the covering fabric retains sufficient elasticity to enable same to temporarily yield in response to buckling forces applied to the garment collar during use and return back to its original condition whenever the buckling forces are removed.

Since the garment collar is subjected during wear to varying degrees of tension along the lenght and breadth of the collar, it is desirable to insert an elastomer filling into the pockets formed between the interlining and the covering fabric at the collar points. The collar points are then again polymerized or vulcanized to set the elastomer filling with the attendant result that the collar points remain straight, stiff and possess sufficient resiliency to always return to their normal configuration upon removal of any deforming forces. The resultant garment collar is then ready for stitching to an article of clothing.

FIGS. **9–14** diagrammatically show a comparison of the garment collar constructed in accordance with the present invention and a typical prior art garment collar when each is subjected to an externally applied force which temporarily deforms the collar. FIG. **9** shows a cross-section of the collar garment of the present invention having a normally arcuate three-dimensional

configuration. FIG. **10** shows the application of an external force f_1 applied to the collar points to effect upturning of the collar, and as shown in FIG. **11,** upon removal of the force f_1, the collar automatically flexes back to its original configuration.

In contrast to the garment collar of the present invention, a prior art garment collar is shown in FIG. **12.** When this collar is subjected to an external force f_1 which upturns the collar, as seen in FIG. **13,** the collar remains in its upturned and deformed configuration upon removal of the force, such as shown in FIG. **14.** Thus, it may be appreciated that the prior art collar garments do not possess a resilient flexible collar stiffener having a size and configuration substantially the same as those of the finished collar garments and therefore do not automatically revert back to their normal configuration. Of course, the prior art collars employ collar stays or other suitable elastomeric filling at the collar points but they do not interline the entire collar with a flexible collar stiffener and cover same with a tensioned covering fabric in the manner in the present invention.

The method of the present invention produces a garment collar having desirable qualities not found in the prior art collars and the garment collars produced in accordance with the present invention retain their newly made and ironed appearance irregardless of how often the collar is washed and worn.

What I claim is:

1. A method of manufacturing finished garment collars comprising: providing a flexible collar stiffener having a normally curved three-dimensional configuration substantially in the shape of the desired garment collar; applying sufficient force to said flexible collar stiffener to temporarily deform same into a planar two-dimensional configuration having opposed sides; providing two layers of covering fabric to be fastened to said collar stiffener; tensioning each layer of said covering fabric to a preselected tensioned condition; fastening a layer of the tensioned covering fabric while maintaining same in said preselected tensioned condition to each side of the temporarily deformed planar collar stiffener; and terminating the application of force to the fabric-covered collar stiffener allowing same to flex back to its normally curved three-dimensional configuration defining a finished garment collar.

2. A method according to claim **1**; wherein said fastening step comprises sewing said fabric covering to and around the edges of said temporarily deformed planar collar stiffener.

3. A method according to claim **1**; wherein said step of providing a flexible collar stiffener comprises providing a collar interlining, applying an elastomer to at least one side of said collar interlining, and molding together said collar interlining and elastomer to form said flexible collar stiffener.

4. A method according to claim **1**; wherein said applying and tensioning steps comprise loosely positioning a layer of covering fabric on each side of said collar stiffener, and tensioning each layer of covering fabric to effect temporary deformation of said collar stiffener into said planar two-dimensional configuration while placing each layer of covering fabric in said preselected tensioned condition.

5. A method according to claim **1**; wherein said applying, tensioning and fastening steps comprise, in the listed sequence, tensioning one layer of covering fabric to said preselected tensioned condition, placing said flexible collar stiffener on the tensioned layer of covering fabric, applying sufficient force to said flexible collar stiffener to temporarily deform same into a planar two-dimensional configuration overlying said tensioned layer of covering fabric, fastening together said tensioned layer of covering fabric and said collar stiffener, tensioning the other layer of covering fabric tosaid prelselected tensioned condition and overlying same on the exposed side of said collar stiffener, and fastening said other layer of covering fabric to said collar stiffener.

6. A method according to claim **1**; wherein said tensioning step comprises applying forces to the periphery of each layer of covering fabric to stretch and tension same to said preselected tensioned condition.

* * * * *