May 10, 1932. F. H. TABER 1,857,170

COLLAR OR LIKE GARMENT PART

Filed Dec. 6, 1929 2 Sheets-Sheet 1

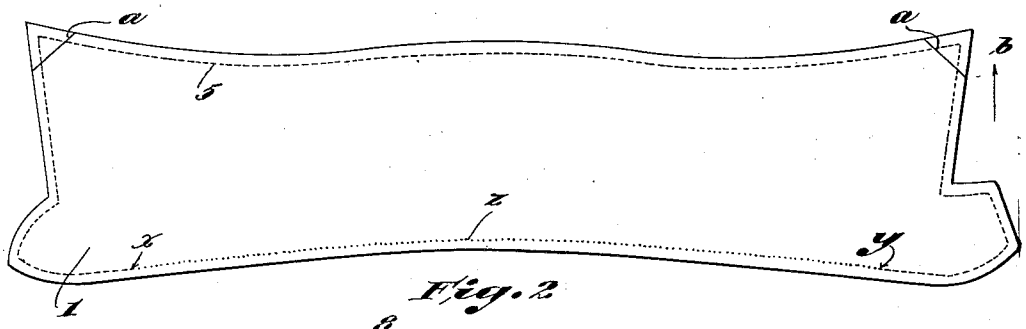

Fig. 2

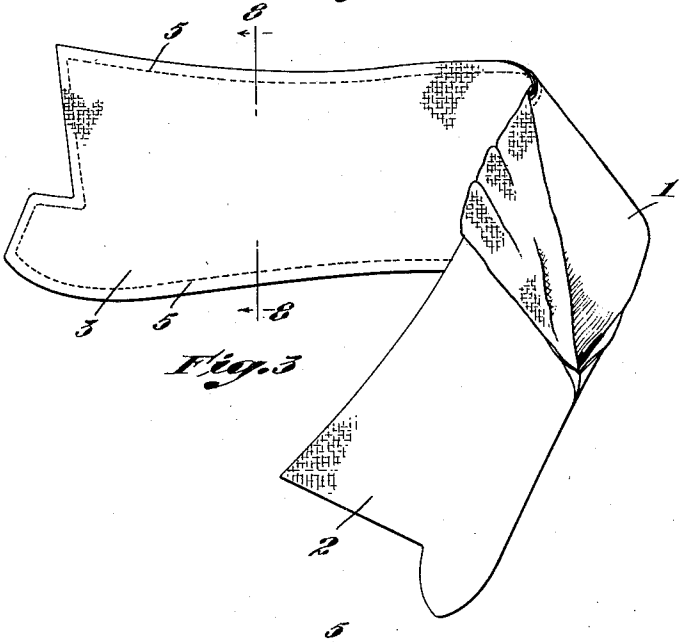

Fig. 3

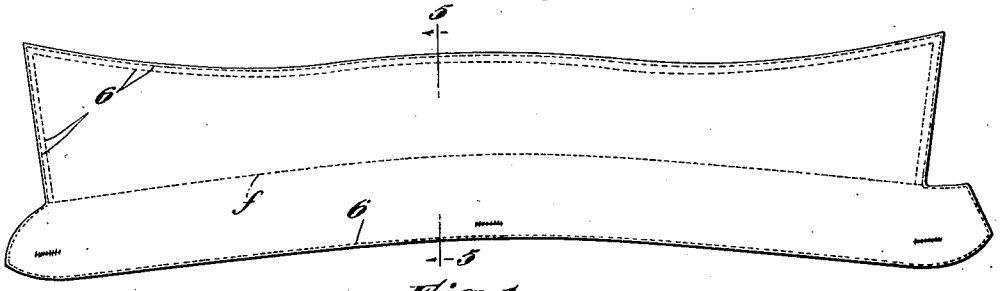

Fig. 1

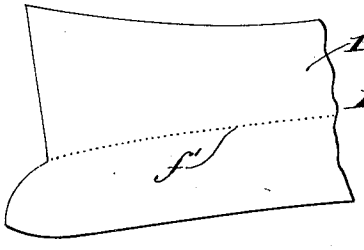

Fig. 9

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COLLAR OR LIKE GARMENT PART

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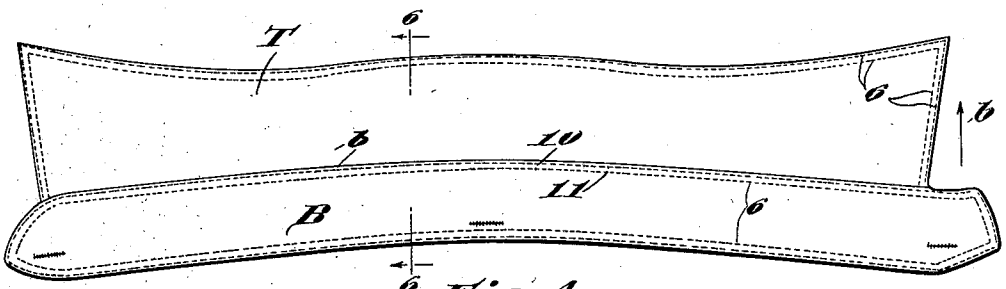

Fig. 4

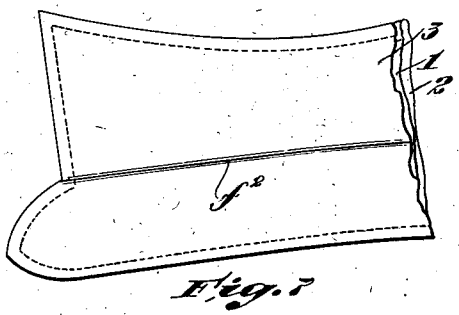

Fig. 7

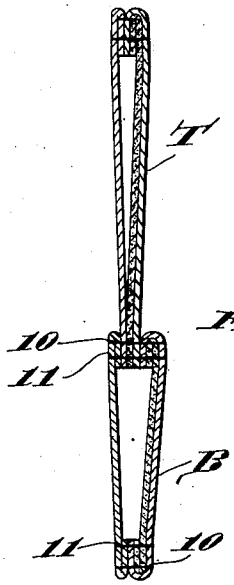

Fig. 6

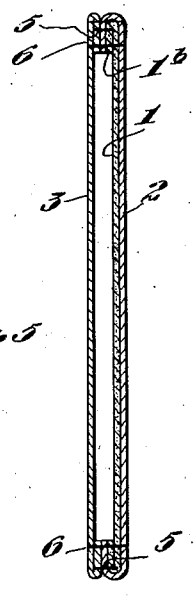

Fig. 5

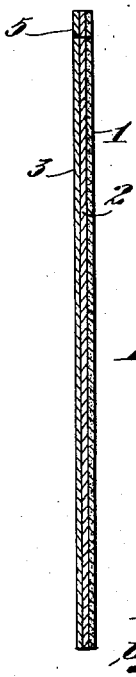

Fig. 8

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UNITED STATES PATENT OFFICE

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COLLAR OR LIKE GARMENT PART

Application filed December 6, 1929. Serial No. 412,234.

This invention relates to the manufacture of collars, cuffs, collar bands or other articles or parts of articles customarily used in a smooth or dressed condition, and has for one object the provision of an article of this class (for example, a collar or cuff) which, whether of the stand-up or single, or the doubled or fold-over type, shall, if desired, be self-stiffened at any or all desired points without the aid of starch or other periodically-applied stiffening material; which shall present to view facings or surfaces of textile material only; which as to such textile material may be washed, starched, ironed or glossed, if desired, but which may be worn unstarched, or trade-finished when new, as to its textile surfaces; which shall not lose its self-stiffening capacity on being washed; which shall be permeable to gases and vapors, and therefore as comfortable as a soft unstarched collar; and which may be reversible if desired.

The invention will now be explained with the aid of the accompanying drawings which show certain species only of the invention, by way of illustration of the genus described. In the accompanying drawings,

Fig. 1 is a view in elevation of a fold-over collar made according to this invention;

Fig. 2 is a rear elevation of an assembly of a stiffener blank and cloth blanks;

Fig. 3 is a view illustrating one stage of a mode of manufacture of an assembly comprising the stiffener blank and face and back cloth blanks;

Fig. 4 is an elevation illustrating a modification in which separately assembled parts are sewed together;

Fig. 5 is a section on the line 5—5 of Fig. 1;

Fig. 6 is a section on the line 6—6 of Fig. 4;

Fig. 7 is a view corresponding to Fig. 4 showing a further modification;

Fig. 8 is a section on the line 8—8 of Fig. 3 of a stiffener blank and cover blanks showing a stage of one preferred mode of manufacture; and

Fig. 9 is a detail view corresponding to Fig. 1 showing a modified construction of stiffener blank at the fold-line of a collar.

Referring to the drawings, a typical article of wearing apparel made according to the invention, shown as a collar by way of illustration, comprises a stiffener or reinforce blank 1, Fig. 2, which may be integral or divided, and which characteristically is enclosed by a front facing blank 2 and a rear facing blank 3 which surround the stiffener blank as a closed cover to conceal and protect the stiffener blank or blanks wherever it or they are used in the structure of the garment or garment-section.

The qualities characteristic of the collar or other article are appurtenant to a flexible but resilient and thin stiffener blank, preferaly of the same or nearly the same color as the cloth facing layers 2 and 3 attached at the margins to the stiffener blank, by usual means, such as the sewed seams 5 and 6, Figs. 1, 2 and 5, of which the seam 5 may be a conjoining sewed seam equidistant from the margins of the superposed blanks 1, 2 and 3, Figs. 2, 5 and 8, along and near at least three edges of the said blanks; and of which the seam 6 may be a finish seam parallel with the edge of the completed garment or article. Seam 6 may be a single or a double line of stitches.

The collar or other article is characteristically thin; thicker at its edges than in the center of its body, and adapted to be folded and set in its folded condition by ironing heat and/or pressure, and where intended to be flat, capable of being made flat by ironing pressures with or without starching or other dressing of its cloth components. The stiffener or reinforce blank may, if desired, be provided with a structure or contour for predetermining a place of fold, such as a line of perforations *f'*, Fig. 9, or other weakening line; the assembled garment or article, for example, may have a line of stitches through all of its plies as at *f*, Fig. 1.

I have found that the desired qualities can be reached when the cloth components are ordinary collar-cloths such as cotton muslins or cotton broadcloth (or any other customary facing-cloth material) by the provision of a stiffener blank attached at its edges to the muslin, which blank shall have a durably resilient quality, as a sheet material, in respect to return to form after bending, shall

be capable of receiving and holding sewing stitches, and shall be capable of moldable shaping, for example, under hot ironing pressure, without sacrifice of its resilience as a sheet and without necessarily displaying any quality of adhesion to the cloth cover by which it is surrounded and concealed. The preferred material is repellant to penetration by water but relatively porous to gases and vapors.

These qualities for material for a stiffener or reinforce blank in the construction herein explained are attained by the manufacture of a cement-integrated unwoven fibrous material suitably constructed and treated so as to present the qualities of durability, resilience and lack of adhesiveness relied upon. A recommended mode of making this material comprises first making a sheet, bat or aggregate of fleeces of bleached cotton from a Garnett machine or card, or suitable relatively-even mass of fibre to the unit area of which the surface may be dressed with a gum or starch and dried, to prevent adhesion together of folds of the bat; this bat is impregnated under rolling pressure with a viscous cement, recommended to be a solution of rubber gum including usual proportions of filling material in a volatile solvent, for example prepared by dispersing compounded rubber gum in about 300% of its weight of refined gasoline or petroleum naphtha. The cementitious impregnant is recommended to contain an admixture in suspension of about 2½% on the rubber gum content of sulfur in a finely divided state and also a suitable proportion of a vulcanization accelerator; for example one of the organic accelerators such as an aryl substituted guanidine, e. g. diphenyl guanidine, in which case the accelerator is recommended to be used in proportions of about ½% of the weight of the pure rubber gum content. Other accelerators in suitable proportions might be used instead. As an activator for accelerators, the compound may contain about 5% on the pure rubber content of zinc oxide. The fibrous material, having been impregnated with the cement under pressure, is allowed to expand by the inherent resilience of its fibres to an open state and dried in a current of hot air at about 150° Fahrenheit, during which drying vulcanization may be avoided; in practice the material is cooled by the rapid evaporation of the rubber cement solvent until the last stage of the drying; maintenance at 150° during a brief time does not appreciably begin the cure.

The impregnated fibrous sheet is thereafter subjected after drying to a temperature of 260° Fahrenheit more or less for about ten minutes, or until solidification after expansion and melting of the rubber compound begins to appear, and is then hot calendered at 260° or nearly that temperature under heavy transverse pressure to compress the fibres together and cause their now highly viscous and adhesive rubber coatings to hold them in that state; and is thereafter subjected to curing heat of 260° more or less for about twenty minutes, more or less, or to any other suitable treatment reliably to secure a resilient cure of the cementitious impregnant.

I am not to be understood as excluding other fibrous sheets than an unwoven carded fleece of cotton; other cellulosic materials, for example, such as wood-pulp fibres or the fibres of vegetable textile plants are capable of formation as bibulous papers or sheet aggregates into resilient cement-integrated sheets of fibre and resiliently-cured rubber compound. In some cases, a fibrous bat of any of the kinds indicated may be impregnated with rubber latex and vulcanizing agent, and suitably coagulated, dried calendered and cured; or a rubber gum or latex cement may be employed in admixture with a low-temperature vulcanizing agent and a bat or bibulous sheet of any suitable texture impregnated therewith, calendered, and dried; the mode of manufacture of the material, while it may be varied, as suggested, should be such as to secure a uniform thin sheet having its fibres held together by a resilient integrating material in a flat state of compression, so that the sheet resulting is resiliently capable of restoration to its set form condition under heat and pressure after having yielded to bending stresses in use. Suitable thin woven cloths are also capable of being impregnated and cured to form a suitable thin resilient material, and are not excluded.

The preferred result of the manufacture is a white thin resilient sheet having a high modulus of elasticity and having greater stiffness in the direction of the predominant lay of the fibres than in a direction at right angles thereto; having a uniform thickness, and having the capacity under customary ironing heats of restoration to flat condition without loss of resilience at places which may have been subjected to bending or creasing exceeding the tensile resistance to fatigue of the resilient vulcanized cementitious element of the sheet. While substantially waterproof, a sheet so made is permeable to gases and vapors, and therefore comfortable for wear as an element of a collar or other garment. This unspun, unwoven rubber integrated fibrous sheet when properly vulcanized as described and made up into a garment, for example a collar, will withstand repeated laundry treatments, including washing and ironing, without losing its initial resiliency and self-stiffening capacity and under laundry treatment equivalent to the aggregate of launderings received by such a garment during its nor-

mal period of usefulness, this resilient stiffener blank shows no substantial tendency to discolor the outer facings or to disintegrate. I do not herein claim the said sheet material or its mode of manufacture.

One preferred mode of assembling the garment section, a collar or cuff as hereinabove referred to will now be explained with the aid of the drawings. Referring to Figs. 2 and 8, the fold-over collar, for example (or cuff or band) may be made of three blanks 1, 2 and 3 laid together in the order shown in Fig. 8. As illustrated, all of the blanks are of the same size and shape, except that the stiffener blank 1 is cut away as shown in Fig. 2 at *a* at any sharp corners. These blanks may be cut, after piling, from superposed larger sheets of the cloth elements 2 and 3 and of the stiffener blank material 1 by any suitable die or pile-cutting device. The blanks are now attached together by the sewed seam 5, except that a portion of one side, as shown in Fig. 2 at a gap between the ends of the seam 5 between *x* and *y*, may not be completed.

The stiff resilient quality of the stiffener blank 1 is such that the garment may now be formed by turning the cloth bag made by seaming together the cloth blanks over the stiffener blank inside out, through the gap left from *x* to *y*, as illustrated in the lower part of Fig. 3 and in Fig. 5. Upon completing the turning operation, which may be finished by a smoothing pressure, the illustrative collar may be completed by sewing the seam 6, Figs. 1 and 5, within the margin comprised of the inturned fold between the blanks 2 and 3. Preferably the seam 6 is so close to the edge as to engage the inturned margins of the blanks 2 and 3, including the place occupied by the gap in the seam 5. The edge of the stiffener blank between the seam 5 and its structural edge will turn over on the line of sewing of the seam 5. As shown in 1^b, Fig. 5, this down turn is preferably included in the material punctured by the sewing needle when making the seam 6. The part of the stiffener blank 1 represented by the gap between the ends of the seam 5, Fig. 2, may, if desired, be cut away to the line which would have been defined by said seam if it had been continued; or as illustrated, the lines of the seam 5 may be continued at *z*, Fig. 2, from *x* to *y* on the blank 1, not cut away, so as to perforate without making sewing stitches the blanks 1, 2 and 3 between the points *x* and *y*, Fig. 2, and provide a mark for infolding said blanks, which are infolded on this line before sewing the seam 6.

As shown in Fig. 4 the invention may be carried out in two-part articles; the band portion B, for example, of the collar shown in Fig. 4 may be made according to the explanation above for the manufacture of the collar shown in Fig. 1, but without completing the seam along the inner or band margin of the top T, whereas the band portion may be made according to the explanation of the structure of Fig. 1 without completing the seam along the top edge *b* of the band portion B. The edge of the portion T may then be entered within the open seam of the band B and there fastened by stitches of seams 10 and 11. Either the band portion B or the top T may, if desired, in some cases, be made without any resilient stiffener blank.

As indicated in Fig. 7 the stiffener blank 1 and the remaining blanks may be creased or folded with the aid of heat or pressure on a suitable line f^2; or as shown, Fig. 9, the blank 1 may be or may have been perforated at the fold line *f'* to diminish its resilient resistance to folding on said line.

In any of the described instances suitable buttonholes may be cut and stitched after the making operations above explained.

The invention may be embodied in a permanently attached band, cuff or other portion of a garment, in which case the edge of the garment to be finished may be inserted between and covered by the edge inturned fold of the blank 2 or 3, and the attaching sewed seam may hold these blanks and the blank 1 in place, in lieu of the seam 6.

When, as in the preferred nature of the resilient sheet for the blank 1, there is a predominant fibre trend in one dimension of the material, the lengthwise dimension of the blank for the collar or other garment is preferably across the trend of said fibres, to occasion a greater resilient resistance to bending stresses and more energetic return to imposed form when the assembly is bent in respect to a crosswise dimension of the assembly. For example, as shown in Figs. 2 and 4, the fibre trend in the blank 1 is parallel with the arrow *b*, and resistance to bending is greater crosswise than lengthwise of the completed collar. This tends to preservation unwrinkled of the pressed form in use.

The garments or garment-sections, for example collars, made according to this specification have the good appearance of wholly-textile fabric articles.

I claim:

1. Garment section comprising a stiffener blank of unspun and unwoven fibres held together in a thin resilient sheet in a state of transverse compression by rubber cement in a state of resilient vulcanization, surrounded and faced by a cut and sewed cover of thin, flexible textile fabric attached to said stiffener blank at its edges, the whole capable of being washed and set in a state of flatness and smoothness and set folds by ironing at customary pressures and heats.

2. Garment section comprising a stiffener blank made as a thin sheet of unspun and unwoven textile fibres held together in a state of transverse compression by a gummy cem-

entitious interstitial impregnant in a state of resilient vulcanization, said sheet having a high modulus of elasticity, and a seamed covering of textile fabric.

3. Garment section comprising a stiffener blank made as a thin sheet of unspun and unwoven textile fibres held together in a state of transverse compression by a gummy cementitious interstitial impregnant in a state of resilient vulcanization, said sheet having a high modulus of elasticity, and a seamed covering of cut and sewed textile fabric free from attachment to said stiffener blank except at and near the folds and edges of the master blank.

4. Fold-over garment section comprising a stiffener blank made as a thin sheet of unspun and unwoven textile fibres held together in a state of transverse compression by a gummy cementitious interstitial impregnant in a state of resilient vulcanization, said sheet having a high modulus of elasticity, and a seamed covering of cut and sewed textile fabric free from attachment to said stiffener blank except at and near the folds and edges of the stiffener blank, the stiffener blank being set in a fold at a fold line for said garment section.

5. Fold-over garment section comprising a stiffener blank made as a thin sheet of unspun and unwoven textile fibres having a predominant trend in one direction held together in a state of transverse compression by a gummy cementitious interstitial impregnant in a state of resilient vulcanization, said sheet having a high modulus of elasticity, and a seamed covering of cut and sewed textile fabric free from attachment to said stiffener blank except at and near the edges of the stiffener blank, the stiffener blank being set in a fold at a fold line for said garment section lying crosswise of said direction of fibre trend.

6. Fold-over garment section comprising a stiffener blank made as a thin resilient sheet of unspun and unwoven fibres having a predominant trend in the direction of the width of said blank, and held together in a state of transverse compression by a gummy cementitious interstitial impregnant vulcanized to a resilient state, and a textile fabric cover for said stiffener blank.

7. Garment section comprising a thin, resilient stiffener blank of unwoven material comprising fibre integrated by a vulcanized rubber compound attached by a sewed seam around a plurality of its edges to the superposed inturned edges of textile fabric blanks together constituting a facing, the said seam being internal with respect to the exposed faces of said facing blanks and penetrating an inturned edge of said stiffener blank.

8. Stiffener blank for collars or other wearing apparel made as a shaped section of a sheet of unwoven and unspun fibre held together in a state of transverse compression by interstitial inclusions of resiliently vulcanized rubber compound.

9. Stiffener blank for collars or other wearing apparel made as a shaped section of a sheet of unwoven and unspun fibre held together in a state of transverse compression by interstitial inclusions of resiliently vulcanized rubber compound, said sheet surrounded near its margins by perforations for sewing stitches.

10. Stiffener blank for collars or other wearing apparel made as a shaped section of a sheet of unwoven and unspun fibre held together in a state of transverse compression by interstitial inclusions of resiliently vulcanized rubber compound, said sheet surrounded near its margins by perforations for sewing stitches and having margins inturned on the lines of said perforations.

11. Collar or cuff made in two parts, one of said parts comprising a thin resilient stiffener blank of unspun, unwoven fibre integrated by a rubber compound vulcanized to a resilient state and textile fabric facings covering and concealing the stiffener blank, one of said parts having an edge entered between plies of the other part, and a conjoining seam penetrating each of said parts and the stiffener blank of one of them.

12. Collar or cuff made in two parts, one of said parts comprising a thin resilient stiffener blank of fibrous material interpenetrated by a resiliently-cured vulcanized rubber compound, and textile fabric facings sewed to said stiffener blank by a concealed seam, said facings covering and concealing the stiffener blank, one of said parts having an edge entered between plies of the other part, and a conjoining seam of sewed stitches penetrating each of said parts.

13. Art of making multiply garment sections comprising assembling an inherently resilient sheet stiffener blank and superposed cover blanks of substantially the same size and form, sewing these plies together at a line of stitches forming a seam near their peripheral margins, leaving unattached a gap at a portion of the peripheral margins, turning one of the plies outwardly through said unattached marginal gap about the other plies on the line of attachment, permitting the resilient stiffener blank to assume its original form everywhere except between a fold at said line of stitches and the adjacent margin of the blank, and closing the gap left in forming said sewed seam.

14. Art of making multiply garment sections comprising assembling an inherently resilient sheet stiffener blank and superposed cover blanks of substantially the same size and form, sewing these plies together at a line of stitches near their peripheral margins, leaving unattached a gap at a portion of the peripheral margins; turning one of the

plies outwardly through said unattached marginal gap about the other plies on the line of attachment; permitting the resilient stiffener blank to assume its original form everywhere except between a fold at said line of stitches and the adjacent margin of the blank, and sewing the everted cover and interior blank so formed together along a marginal line extending around the entire periphery of the garment section.

15. A collar or like garment section comprising a stiffener blank made as a thin sheet of unspun and unwoven textile fibres held together in a state of transverse compression by a gummy, cementitious, interstitial impregnant in a state of resilient vulcanization, said sheet having a high modulus of elasticity, and a facing blank of textile fabric attached to said stiffener blank at its edges.

Signed by me at Boston, Massachusetts, this 3rd day of December, 1929.

FREDERIC H. TABER.