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C. A. HORTON

METHOD OF MAKING COLLARS AND LIKE ARTICLES

Filed June 17, 1922

Fig. 1.

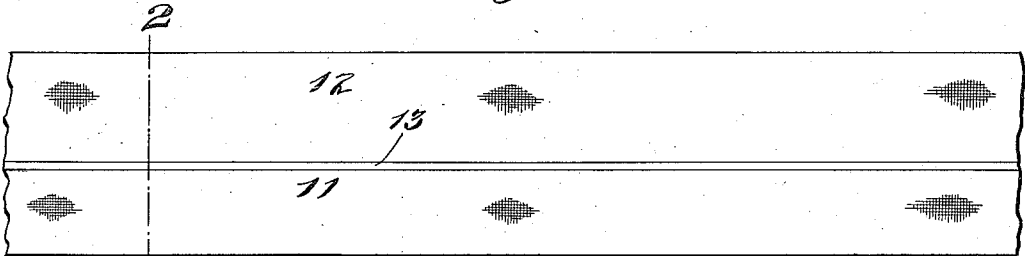


Fig. 2.

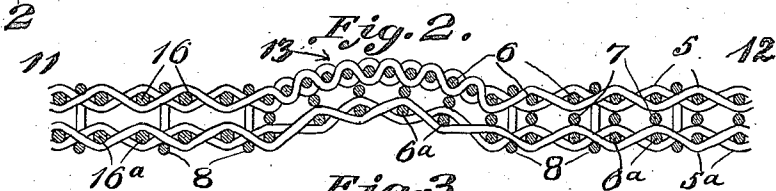


Fig. 3.

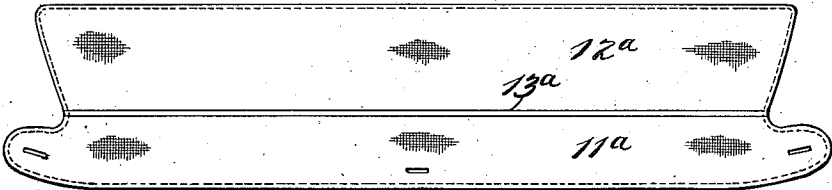


Fig. 4.

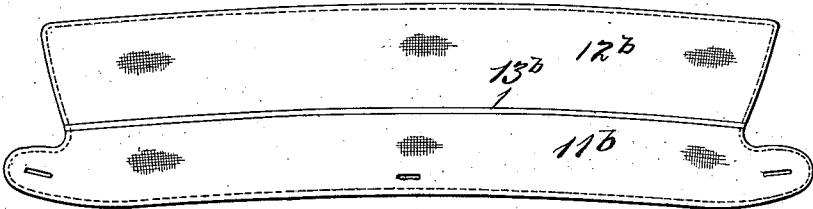
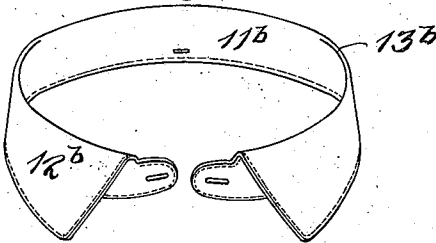


Fig. 5.



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UNITED STATES PATENT OFFICE.

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METHOD OF MAKING COLLARS AND LIKE ARTICLES.

Application filed June 17, 1922. Serial No. 569,016.

To all whom it may concern:

Be it known that I, CHARLES A. HORTON, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Methods of Making Collars and like Articles; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to the manufacture of articles of cloth that are of non-rectangular outline, and particularly to the fabrication of collars or like articles that are curved in the plane of the cloth when flattened out.

It has been heretofore proposed to make folded collars of one piece of fabric curved in the weaving operation and having a curvilinear, weakened fold line. In the patent to Morgan, No. 1,254,340, dated January 22, 1918, there is disclosed a folded collar made of one piece of multiply interwoven fabric, which has been woven in a continuous curve by feeding the warp threads, or groups of them, progressively faster proceeding from the concave to the convex edge, said collar having a fold line or zone that is weaker than the remainder of the fabric. From cloth so woven one-piece folding collars may be made of sufficient stiffness to retain their form without the necessity of starching. These collars fit the neck properly because of the curvature of the fold line; they have the outer panel suitably offset from the neck band to enable a tie to slip or render between the neck band and outer panel by reason of the greater length of the warp in the outer panel than in the neck band to the same number of picks to the inch.

It has also been proposed heretofore to make folding collars of two or more pieces of woven fabric, one or both of which has been similarly woven on a curve corresponding to the desired curve of the fold line; the neck band portion and outer panel being overlapped and stitched together at one edge. One example of a two piece folding collar thus constructed is disclosed in patent to Van Heusen 1,309,379, dated July 8, 1919.

Webbing, the warp threads of which

curve in the plane thereof (when the webbing is flattened out) can be readily woven on narrow ware or webbing looms as described in said patent to Morgan No. 1,254,340. An ordinary webbing loom may be adapted to produce webbing with a curvilinear warp by equipping it with a set of conical take-up rolls and a conical or inclined guide on the edge of the breast beam for each piece of webbing being woven, and with an additional number of warp beams in order to cause the warp threads that are woven into the webbing adjacent the convexed outer edge to feed faster than those that are woven into the webbing adjacent the concaved edge. In a webbing loom operating, say, twenty to thirty shuttles, the expense of installation of the additional warp beams, conical take-up rolls and special guides greatly increases the loom cost as compared with the original cost of looms fitted to weave straight warp webbing. Furthermore, the stretching to which a large proportion of the warp threads must be subjected in order to be properly woven into a curved fabric results in more frequent breakage of the threads and more frequent stoppage of the loom in order to tie in the broken warp ends than is the case when weaving straight fabric with equal feed of warp threads. Therefore the cost of producing fabric curved in the weaving process, it will be apparent, is much higher than the cost of producing straight fabric of the same dimensions, weave, weight and quality of yarn.

In accordance with this invention I am able to produce strips of cloth, or cloth blanks on either webbing or broad cloth looms, by weaving them with straight warp and filling so as to produce different areas with predetermined different shrinkage capacities, and thereafter moisten said strips or blanks uniformly thereby causing them to assume the desired shape by the differential shrinking of the different areas: In the manufacture of collars, for example, I may weave strips of cloth with straight warp and filling, having zones adapted to shrink longitudinally different percentages, cut the panels of folding collars therefrom, and thereafter impart the desired curvature to the panels and fold line; and effect the required off-setting of the outer panel by the usual washing, bleaching or dyeing op-

erations commonly applied to the cloth before manufacturing it into collars. The curvature imparted by the washing, bleaching, dyeing or other moistening operation is due to the make-up of the cloth, which is woven of such differing structure or such different materials in different adjacent parallel areas or zones that one area or zone will shrink a different percentage than another when equally moistened.

In practicing this invention no process is necessary additional to the usual finishing operations by which woven fabrics, bleached or dyed in the piece, are subjected. But increased savings result from the facts (1) that the articles may be made from unbleached fabrics and the soiling received by them during manufacture may be removed in the one bleaching or other liquid treatment; (2) that less bleaching or other treating material is consumed because the cuttings and waste are discarded before liquid treating; (3) that the article and its parts can be more easily manipulated during manufacture because they are of straight woven cloth. These economies are additional to those secured by reason of the fact that the fabric used is woven straight.

The principal objects of the invention, therefore, are to make articles such as collars from straight edged webbing or strips of cloth and thereafter impart to the articles a predetermined different form by differential shrinkage; and to make collars or the like from fabrics in which the threads of the two systems or series of threads are straight, and thereafter impart a curve to the collar in the direction of the threads of one system by unequal shrinking of different longitudinal areas thereof.

The invention consists of the method described hereinafter, exemplified in the drawings and defined in the appended claims.

In the accompanying drawing, which serves to illustrate diagrammatically the manufacture of one piece and two piece folding collars;

Fig. 1 represents a piece of unbleached webbing adapted for use in making one-piece folded collars;

Fig. 2 is a diagrammatic cross section of a fragment along the line 2—2 of Fig. 1;

Fig. 3 represents a collar cut from the straight unbleached fabric of Fig. 1.

Fig. 4 shows the collar of Fig. 3 after having been subjected to a washing or bleaching operation; and

Fig. 5 is a view of the collar shown in Fig. 4, folded.

The diagrammatic cross sections of the drawings are merely exemplary of fabric structures that may be made use of in carrying out this invention. Different relative shrinkage capacity,—that is, susceptibility of contracting, when moistened, different per-

centages,—may be imparted to adjacent longitudinal areas or zones on a strip of cloth by many different expedients, without departing from the principle of this invention. The weft or filling of the fabric illustrated, is preferably of the same material, count and structure throughout the same piece of fabric and has the same number of picks to the inch everywhere. But the warp is shown as of different structure in different parts of the same piece of fabric, whereby to provide known and definitely controllable differences in relative capacity to shrink in the direction of the warp in different longitudinal areas, zones, or panels. The relative shrinkage capacities of the warp yarns may be varied progressively from one edge or division line to the other of one piece of fabric or they may be varied progressively in groups of warp threads, zones, or bands of a fabric or webbing from which it is desired to manufacture one piece collars. The relative amount of shrinkage is susceptible of accurate control by careful construction of the warp and the radius of curvature may be predetermined with accuracy.

It is not practicable to illustrate all of the expedients by which different relative shrinkage capacities may be imparted to different longitudinal areas or different strips of fabric. Susceptibility of contracting different percentages may be imparted to adjacent zones, by using fiber of different kinds for the warp threads of the different zones or strips, or by variations in the warp structure, or by both. Warp structure may be varied in many ways in order to yield the desired results; the warp threads of one zone may be of a different count (size) than those of another; they may be composed of multiply strands twisted together with a different number of turns to the inch; or one zone may be provided with straight, uninterlaced warp threads that are absent from another, or more numerous in one zone than in another; or other differences of structure may be introduced along different areas to produce the desired effect. Similar variations in the filling threads may be utilized to produce cloth susceptible of assuming a precalculated non-rectangular outline; and combinations of both warp and filling, varied as described, may be adopted for the purpose of producing cloth articles of predetermined form, as will be apprehended by persons skilled in the textile arts. It is to be understood, therefore, that the invention is not dependent upon any particular means whereby one area, zone, or panel in a collar or like article is adapted to shrink a greater or less percentage than another.

Fig. 1 diagrammatically illustrates a strip of cloth or webbing woven straight, with equal feed of warp threads, and divided into

two panels 11 and 12, united by a narrow fold zone 13 along which the strip is adapted to be folded more easily than elsewhere. In Fig. 2, which is a cross section of the webbing shown in Fig. 1, 5 indicates the filling of the face ply of a two ply interwoven fabric, 5^a the filling of the back ply, 6 the warp threads in the face ply of the panel 12 and fold zone 13, 6^a the warp threads of the back ply, 7 straight stuffing warp threads, and 8 binder threads interweaving the face ply and back ply and clamping between them the straight stuffing warp threads 7. In the panel 11, 16 indicates the warp threads of the face ply and 16^a the warp threads of the back ply. The panel 11 is devoid of stuffing warp, as shown. In order to compensate for the absence of stuffing warp, in case it is desired that the panel 11 be of the same weight to the square inch as panel 12, the warp threads 16, 16^a may be made heavier or of lower count than the warp threads 6, 6^a of the panel 12. For example: The panel 12 and the fold zone 13 may be woven of 60/2 yarn throughout while the panel 11 may have the warp threads in face and back ply of 40/2 yarn.

It will be perceived that, after moistening equally the panels 11 and 12 and fold zone 13, panel 11 will shrink a greater relative amount than panel 12 because of the absence of the stuffing warp from said panel 11.

A collar may be cut out of the webbing or other strip of fabric illustrated in Fig. 1, in its unbleached condition, the collar be suitably bound or otherwise finished and have the button holes formed therein. This collar, in an unbleached condition, will have straight panels 11^a and 12^a and a straight fold zone 13^a. After the collar has been completed of unbleached material, as illustrated in Fig. 3, it may be subjected to the washing and bleaching operation whereafter the collar assumes the form indicated in Fig. 4, with the panels 11^b, 12^b and fold zone 13^b curved as indicated in said Fig. 4. This curvature has been imparted by reason of the greater shrinkage capacity of the neck-band portion as compared with the outer panel or fold portion. As the shrinkage capacity of both panels has been carefully predetermined correct allowances can be made for amount of shrinkage in the manufacture of different sizes.

Although I have illustrated one way in which a one piece collar may be made and have shown the outer panel portion of uniform structure throughout and the neck-band portion of a different uniform structure but of greater relative shrinking capacity than the outer panel, yet it will be understood that either or both of the panels or strips may be of variable warp structure from one edge to the other in order to impart a progressive shrinking capacity to suc-

cessive warp yarns or groups of warp yarns; or that the variable shrinkage may be produced by making the warp of various different structure, or of different counts, or by using suitable different fibers; and it will be apparent to those skilled in the art of cloth finishing and familiar with the properties of textile fibers that the principles of this invention may be applied in many other ways than those illustrated and specifically described.

As has been pointed out, the fabric is straight woven. In all weaving operations, the yarns are customarily and necessarily, under the present state of the weaving art, set in the looms under considerable tension, and this tension necessarily tends to stretch the yarns. When the tension is removed, there is necessarily a counter-action of contraction. When the fabric is of substantially the same construction throughout, the shrinkage or contraction in the fabric after it has been taken from the loom is substantially the same throughout the fabric which therefore remains substantially straight as it was woven. When, however, the fabric is made in accordance with the present invention, that is to say of varying construction in adjacent panels, the natural or normal contraction of the fabric after it has been taken from the loom is such as to impart a slightly curvilinear effect to the fabric. This curvilinear effect is not very pronounced in a short section of fabric but is readily discernible in a long piece and is an advantage rather than a disadvantage inasmuch as the direction of subsequent curvature of the fabric is readily perceived.

The principle of this invention is obviously applicable to making articles of single ply fabric as well as of multiply interwoven fabric although, in the case of single ply fabrics, stuffing threads cannot be used in the manner illustrated with reference to multiply fabrics. But it will be apparent that different relative shrinking capacities may be given to different areas by using, in one or both of the systems of interlaced threads, threads of different twists or different counts or different kinds of fiber or by combinations suitable for the purpose. By this method, one piece collars with curved fold zones and correspondingly curved warp yarns may be made from broad webs or from narrow webbing. Broad cloth for one piece collars may be woven on a fly shuttle loom, in a plurality of connected bands, or relatively narrow strips, of the character exemplified herein; the lines of demarkation between the bands or strips may be indicated by any suitable expedient such as by inserting a colored warp thread between them or omitting one or several warp threads. The broad fabric may then be cut into strips along the demarkation line and

the strips thus severed made up into collars.

Having thus described my invention, what I claim is:—

1. The method of making fabric articles having a fixed curvature as a finished product consisting in forming a one-piece blank of fabric composed of unshrunk threads so as to include different areas having different relative shrinking capacities, then moistening said article equally throughout thereby causing said areas to shrink different percentages to effect said curvature.

2. The method of making fabric articles having a fixed curvature as a finished product consisting in forming a one-piece blank of fabric comprised of unshrunk threads so as to include therein different areas one of which has the capacity of shrinking a different percentage than another in the direction of the threads of that system which are parallel to the threads of the same system in the other and thereafter moistening said blank equally throughout, thereby causing one area to shrink a greater percentage than another to effect said curvature.

3. The method of making fabric articles having a fixed curvature as a finished product consisting in forming a one-piece blank of woven fabric comprised of unshrunk threads so as to include adjacent areas, the warp threads in one of which are substantially parallel with the warp threads of another, one of said areas having the capacity of shrinking a greater percentage than another in the direction of the warp, then moistening said blank equally throughout, thereby causing one area to shrink a greater percentage than another to effect said curvature.

4. The method of making fabric articles having a fixed curvature as a finished product consisting in forming a one-piece blank of cloth comprised of unshrunk threads so as to include in said blank adjacent areas of different shrinkage capacity, the system of threads in one area which is parallel to the corresponding system in another having a different structure from that of another as to impart to one area the capacity of shrinking, in the direction of the threads of said system, a greater percentage than the other, then moistening said article equally throughout thereby causing one area to shrink a greater percentage than the other to effect said curvature.

5. The method of making collars and like articles which consists in forming them of cloth so as to include in each article adjacent zones extending longitudinally of one system of threads, said system in one of said zones having a different structure than in that of another, in that said system in one zone includes straight stuffing threads tending to restrain the shrinkage of such zone as compared with another, then moistening said article equally throughout thereby causing one zone to shrink a greater percentage than the other.

6. A collar or like article having adjacent elongated zones extending side by side longitudinally of one system of threads, said system of threads in one zone including straight stuffing threads, corresponding threads being absent in another zone, the latter of which is shrunken a greater percentage than another.

In testimony whereof I affix my signature.

CHARLES A. HORTON.