METHOD OF MAKING A CURVED PALM HAND COVERING
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ABSTRACT OF THE DISCLOSURE

Method of making a sewn hand covering having a curvature substantially corresponding to that of the hand at rest by forming the back portion thereof longer than the front portion and shirring the edges of the back portion along a portion of the sides thereof to make its length correspond with that of the front portion, then joining the front and back portions by stitching them together along their peripheral edges.

This invention relates to a method of making a curved palm sewn hand covering and more particularly to a method of making a curved palm sewn mitten shell or mitten having substantially the curvature of the palm of a human hand in its normal relaxed condition.

It has for some time been recognized that the normal relaxed position of the human hand comprises a substantial curvature of the fingers and palm portion of the hand. It is also well established that a hand covering such as a glove or mitten which is made to conform to the shape of the relaxed hand significantly reduces the muscular effort required in normal hand movements when work is performed with the covered hand. This advantage is derived from two related features of hand coverings which conform to the normal curvature of the relaxed hand. A first and most significant feature relates to the extra length which is provided in the back of the hand covering made to conform to the curvature of the relaxed hand. Since the vast majority of hand movements involve closing of the hand over an object thereby increasing the length of the back of the hand, a curved hand covering substantially reduces the muscular effort required to overcome the resistance of the hand covering to closing of the hand. In other words, since the hand covering already provides a built-in curve to accommodate a partially closed hand, further closing action may be accomplished with substantially less effort than would be required in the case of a more conventional flat hand covering. Further, such closing action will result in less compression of insulation over the back of the hand and, therefore, in better protection of the hand by a curved sewn hand covering than would result from the use of a flat sewn hand covering. Furthermore, a curved hand covering conforming to the shape of the hand in a relaxed condition will require no muscular effort while the hand is in such condition in contrast with such tendency of a conventional flat sewn hand covering to resist movement of the hand to its curved relaxed condition.

The second and related advantage of a hand covering constructed with a naturally curved shape pertains to the reduction in the surplus of material created in the palm area of the front of the hand covering as the hand is closed. Again, since the hand covering is conformed during manufacture to the partially closed relaxed position of the hand, further closure results in substantially less surplus material in the palm portion than would be the case with the more conventional flat hand covering.

The significance of these advantages may not be apparent to the majority of people who normally wear hand coverings for relatively brief periods of time. However, individuals who are required by their work to wear hand coverings for extended periods of time, the advantages of curved palm hand coverings become substantial. In the latter group, members of the Armed Forces are subjected to particularly difficult conditions frequently involving extreme environmental, physical and mental stress requiring the wearing of hand coverings for extended periods of time during which manual dexterity must be maintained as a matter of survival. Under such circumstances, advantages of curved palm handwear become truly significant.

In recognition of these advantages, hand coverings made by dip-coating a hand form in rubber or plastic material are now commonly manufactured over curved hand forms made in the shape of the normal relaxed hand. However, the process is too difficult to provide this feature in sewn hand coverings such as hand coverings or leathers or fabric or combinations thereof. The manufacture of this type of hand covering in the curved palm configuration has been accomplished through the use of special developed sawing machines and highly skilled operators but has not been widely adopted because of the difficult manufacture as compared with manufacture of flat hand coverings in these materials.

The method of the present invention provides an extremely simple and most efficient procedure for imparting a curvature to the palm portion of a sewn hand covering by constructing a hand covering in such a manner that it will tend to assume a longitudinally curved configuration. This configuration is attained by incorporating a predetermined amount of extra length in a portion of the back thereof as compared with the length of the corresponding portion of the front or palm of the hand covering and shirring the longitudinal edges of the back along the portion of the extra length to produce a back of substantially the same length as the front along the edges thereof. The assembly of the front and back is then accomplished by stitching the peripheral edges together. The hand covering thus formed will assume a longitudinally curved figure as a result of the greater length of the back thereof.

It is therefore an object of this invention to provide an improved method of making a sewn hand covering having a curved shape characteristic of the shape of the human hand in relaxed condition.

Another object of this invention is to provide a method of making sewn hand coverings having the shape of the human hand in relaxed condition which can be performed on readily available equipment by operators requiring no special skills.

A further object is to provide a method for making a sewn hand covering having the shape of the human hand in a relaxed condition which will enable manufacture of such hand covering at a minimum increase in cost over conventional flat sewn hand covering.

Other objects and advantages will be apparent from the following description of one embodiment of the invention, and the novel features will be particularly pointed out hereinafter in connection with the appended claims.

In the accompanying drawings:

FIGURE 1 is a plan view of the back of a mitten shell made in accordance with the present invention and having a wrist strap for drawing the mitten shell tightly around the wrist of the wearer at the entrance end of the mitten shell.

FIGURE 2 is a side view, taken from the thumb side of the mitten shell of FIGURE 1, showing the curvature of the completed mitten shell.

FIGURE 3 is a plan view of the die cut section of the backpiece of a mitten shell, such as is shown in FIGURES 1 and 2, prior to shirring.
FIGURE 4 is a plan view of the backpiece of FIGURE 3 after shirring along the sides thereof to reduce its length to correspond with the length of the frontpiece. FIGURE 5 is a plan view of the die cut section of the backpiece of a mitten shell to be joined to the shirred backpiece shown in FIGURE 4 by seaming along the edges thereof as shown in FIGURES 1 and 2.

In the illustrated embodiment of the invention, the mitten shell 10 comprising a frontpiece 11 and a shirred backpiece 12 which are seamed together along their outer edges, except along the rear portion 3 of the mitten shell, which is left open to permit insertion of a mitten or gloved hand into the mitten shell. In mitten shells used by the Armed Forces, the frontpiece 11 is customarily made of a pliable leather while the backpiece 12 is customarily made of a heavy eight-ounce, flexible woven fabric (e.g., an 8.5 ounce nylon-cotton sateen). Knitted woolen or other insulating materials or mittens are usually worn on the hands, the mittens being worn over the insulating gloves or mittens. The mitten shell is provided with a wrist strap 14, which includes a buckle 15, by means of which the rear portion of the mitten shell is tightened so that the mitten shell is in place and to reduce the possibility of dirt, snow or other material entering the mitten shell.

In the manufacture of a hand covering in accordance with the present invention a die cut section of the backpiece 16 as shown in FIGURE 3 and a die cut section of the frontpiece 11', as shown in FIGURE 5 are cut in a conventional manner from the desired material. In the particular embodiment described, the die cut section of the backpiece 16 is cut from a nylon-cotton sateen fabric while the die cut section of the frontpiece 11' is cut from the desired leather. In addition, a thumbpiece and a thumb seam are cut from leather. The thumbpiece and a thumb seam are not shown separately in the drawing as they are of conventional construction.

As can be readily determined by a comparison of FIGURES 3 and 5, the die cut section of the backpiece 16 is cut to a significantly greater length, on the order of 1 inch in a medium size mitten, than the die cut section of the frontpiece 11'. In designing the patterns for cutting these pieces, this greater length is provided in that portion of the die cut section of the backpiece 16 which will lie over the metacarpophalangeal joint of the hand extending longitudinally to either side of his area toward the ends of the mitten shell and terminating at points spaced from the ends of the mitten shell. In the cutting operation, a pair of spaced projections 17 or "notches," as they are called in the handwear trade, preferably formed along each longitudinal edge of the backpiece to indicate the limits of the portion thereof which is of greater length than the corresponding portion of the die cut section of the frontpiece 11'. Other forms of indicia such as small cuts or "chisels," as they are called in the handwear trade, may be used in lieu of projections or "notches."

The longitudinal edges of the die cut section of the backpiece lying between each pair of notches 17 are then shirred by stitching along the edge using a thread tension sufficient to reduce the length of the edge lying between notches 17 to the length of the corresponding portion of the die cut section of the frontpiece. This shirring step is preferably accomplished by applying a so-called over-edging stitch more particularly described in paragraph 1.1.5, section 1, part II of Federal Standard No. 751a, "Stitches, Seams and Stitchings," dated Jan. 25, 1965. This stitch may be readily applied using a model 176-35 sewing machine manufactured by the Singer Corporation, a machine which is in wide use in the glove industry. As will be readily understood by those skilled in the glove making art, the proper thread tension to achieve the requisite degree of shirring may be readily ascertain for any particular machine and glove size by the simple expedient of adjustment of the machine to produce a shirred backpiece having longitudinal edges of the same length of the frontpiece. Once the appropriate thread tension has been established the shirring operation becomes an extremely simple and efficient procedure involving applying the over-edging stitch to the longitudinal edges of the backpiece between the notches 17.

The shirred backpiece 12 as shown in FIGURE 4 is then ready for joining with the frontpiece 11 to which the thumbpiece and thumb seam will be joined in a conventional manner. The peripheries of the shirred backpiece 12 and the frontpiece 11 are placed in register and stitched in the same manner as in the assembly of conventional flat handwear. As is well understood in the art, this stitching will be accomplished with the desired exterior surface of the frontpiece and backpiece in face-to-face relation forming the mitten in inside out condition. Thereafter, when the mitten shell is turned right side out, the peripheral seam will present a smooth exterior surface.

Seaming of the exposed edges of the frontpiece and backpiece at the opposite end of the mitten shell and application of the wrist strap are accomplished at any desired point in the manufacturing process in a conventional manner. As will be apparent, the hand covering so formed will embody a substantial additional length of material longitudinally of the back thereof which will cause the hand covering to readily assume a curved palm configuration with the advantages noted above. Using the method of the present invention, this highly desirable characteristic can be obtained by the addition of but a single manufacturing step, the shirring step, which is suitably performed on readily available sewing machines by operators requiring no special skills with the result that the highly desirable curved palm characteristic may be embodied in sewn hand coverings at a relatively insignificant increase in manufacturing costs.

The method of the invention is adaptable to making different sizes of hand coverings, including mittens and gloves of varied types, to obtain the optimum degree of curvature of a hand covering for a particular type of hand or for a particular shape and size of hand requiring protection. For example, while the embodiment described provides extra length and seaming in certain portions of the back of the hand covering, such extra length and shirring may be extended to other portions of the back or even to substantially the entire length of the back. It will, in any event, extend over the area covering the metacarpophalangeal joint of the hand since this is the area where the need for fullness in the back of the hand covering is most important. Since the use of hand coverings is not limited to protection against cold ambient conditions, it is to be understood that the method of the invention is not limited in application to cold weather hand coverings, but is generally applicable to impart a curvature to a sewn hand covering for any purpose whatever.

It will be understood that various changes in the details, steps, materials and arrangement of parts, operating conditions and apparatus, which have been herein described and illustrated in order to explain the nature of the invention, may be made by those skilled in the art within the principle and scope of the invention as expressed in the appended claims.

I claim:

1. A method of making a curved palm hand covering having an opening therein for insertion of a hand thereof comprising
(a) forming a frontpiece of predetermined outline,
(b) forming a backpiece of predetermined outline substantially corresponding to the outline of said frontpiece except for a portion thereof having substantially
greater length than the corresponding portion of said frontpiece,
(c) providing reference idicia along each of the longitudinal edges of said backpiece at point corresponding to the ends of the said portion of greater length,
(d) shirring the longitudinal edges of said portion of greater length to reduce the length thereof by a predetermined amount to substantially the same length as the corresponding portion of said frontpiece,
(e) placing said shirred backpiece and said frontpiece in superposed relation while maintaining the said longitudinal edges of said portion of greater length in shirred condition and,
(f) joining said frontpiece and said shirred backpiece together along the longitudinal edges and one end thereof to form said hand covering.
2. The method of making a hand covering as in claim 1 wherein said shirring is performed by stitching the longitudinal edges of said portion of greater length while maintaining the stitching thread under tension sufficient to cause the desired degree of shirring.

3. A method of making a hand covering as in claim 1 wherein said portion of greater length is spaced from the ends of said backpiece.
4. A method of making a hand covering as in claim 1 wherein said portion of greater length extends over the area of said backpiece which covers the metacarpophalangeal joint of the hand.

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