United States Patent

Lacroix

[15] **3,654,632**

[45] **Apr. 11, 1972**

[54] CLOTHING SLEEVE

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[52] **U.S. Cl.** **2/125**

[51] **Int. Cl.** **A41b 1/00**

[58] **Field of Search** 2/125, 93, 105, 115, 108, 185

[56] **References Cited**

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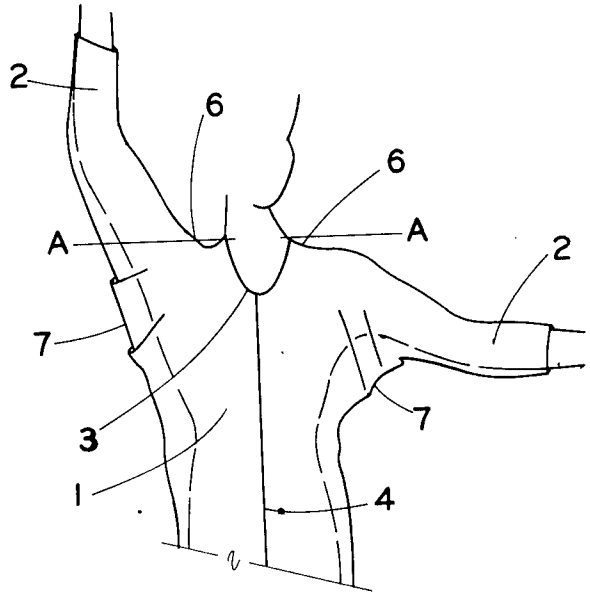
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Primary Examiner—Patrick D. Lawson

[57] **ABSTRACT**

The shoulder seam of the sleeve of a garment is formed from material cut upward at an angle of approximately 115° to 145° in relation to a horizontal line from shoulder-tip to shoulder-tip, and includes a front portion comprised of a shorter curved section, a second longer reversed curved section and a straight line section extending to the end of the sleeve, and a back portion comprised of a curved section and a straight line extending to the end of the sleeve, said curved sections having predetermined radii with the three front sections joined together at predetermined angles and the two back sections joined together at predetermined angles.

7 Claims, 13 Drawing Figures



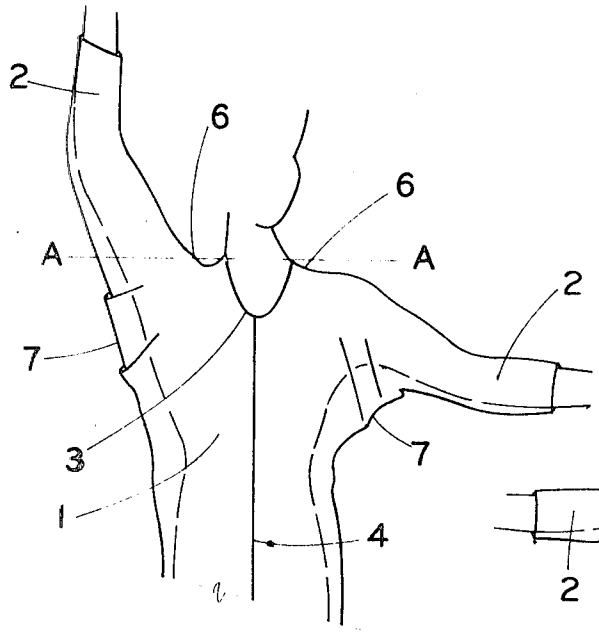


FIGURE 1

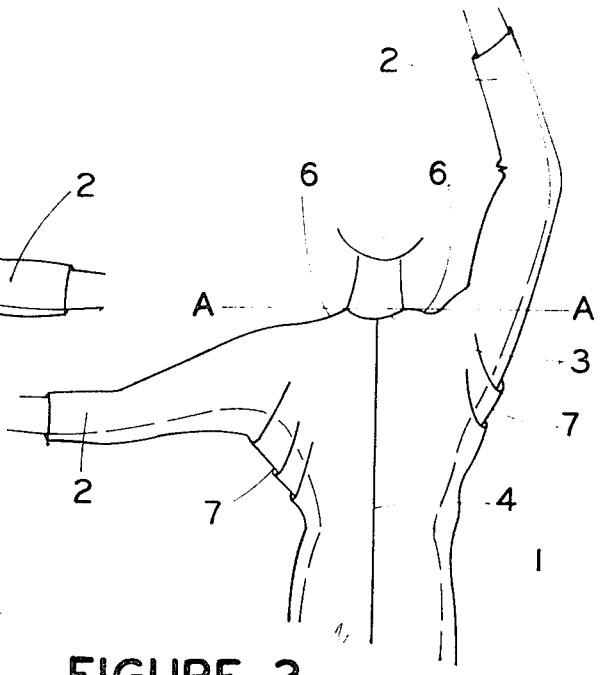


FIGURE 2

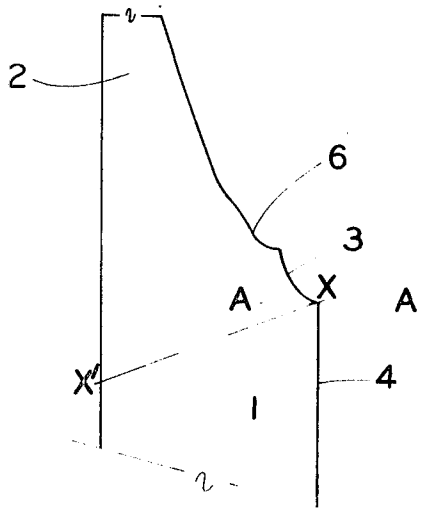


FIGURE 3

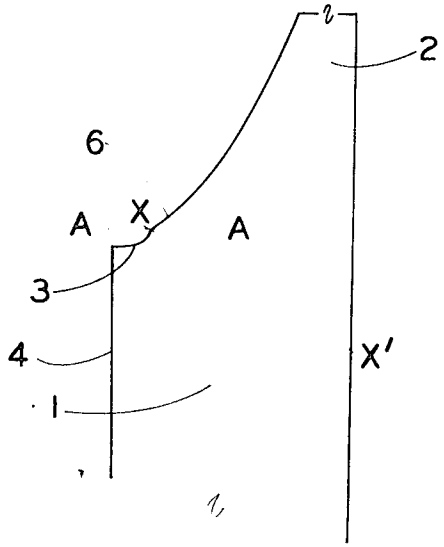


FIGURE 4

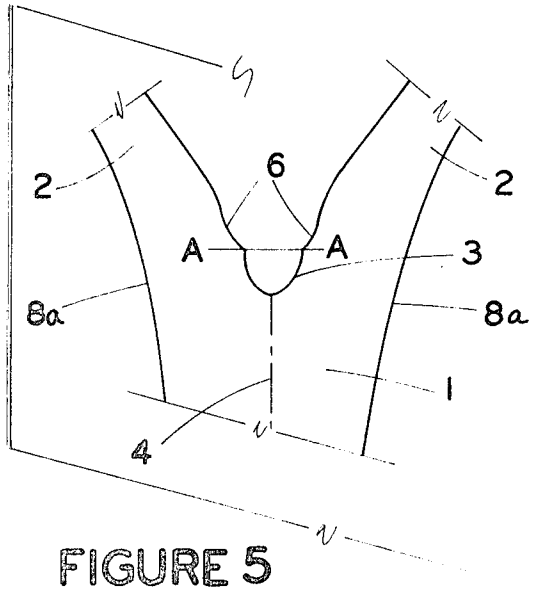


FIGURE 5

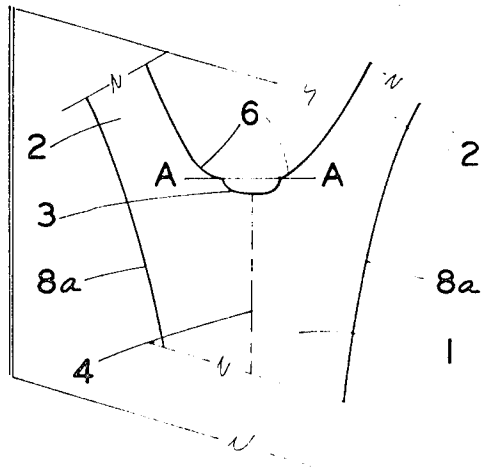


FIGURE 6

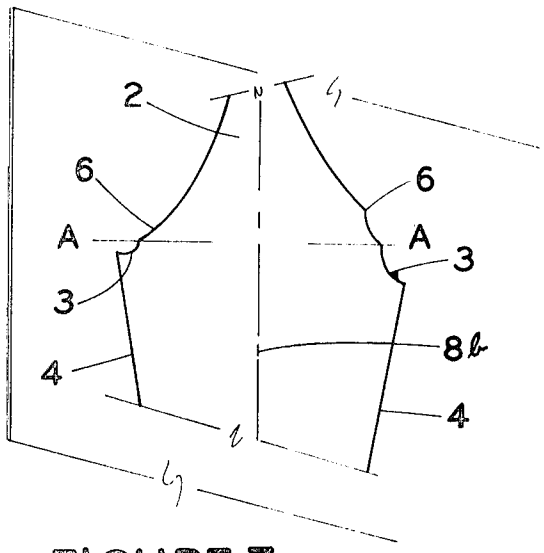


FIGURE 7

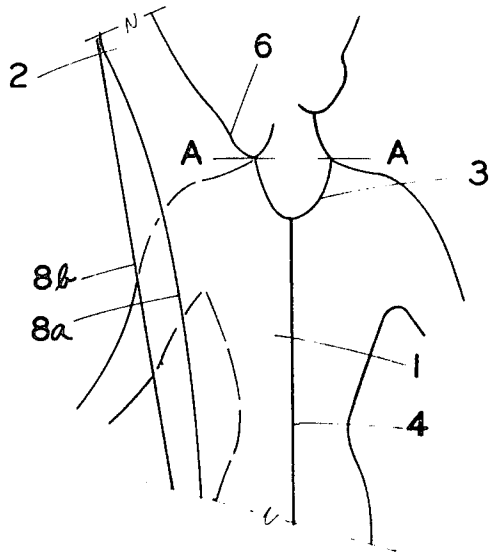


FIGURE 8

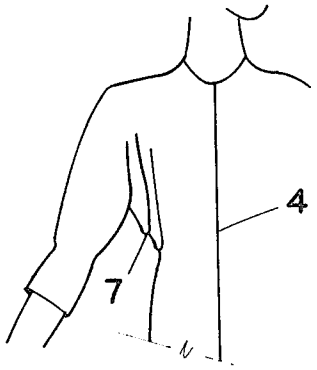


FIGURE 9

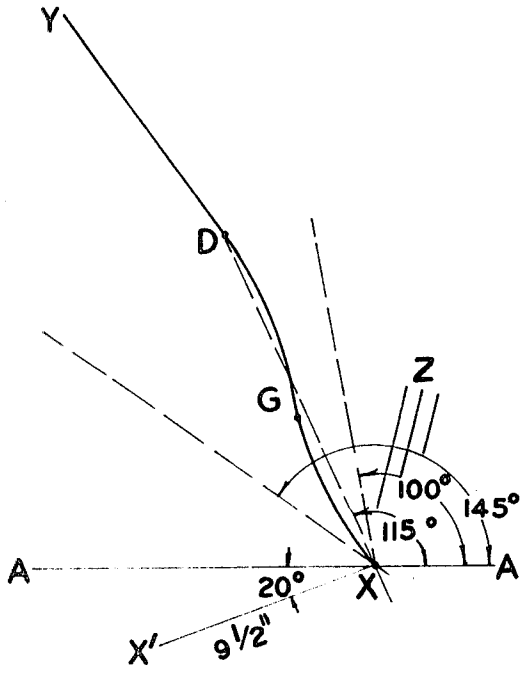


FIGURE 10

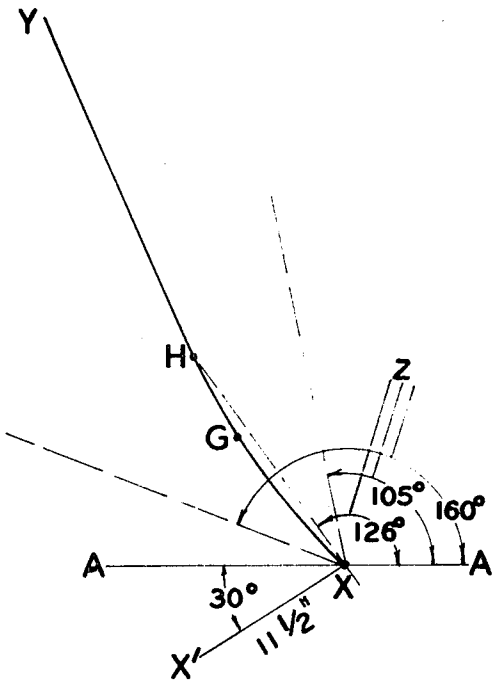


FIGURE 11

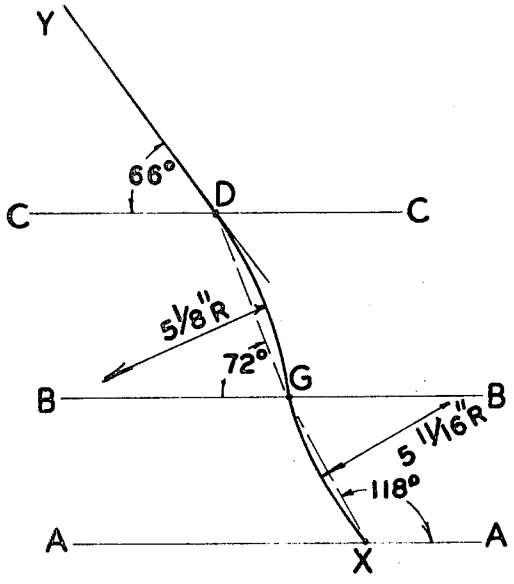


FIGURE 12

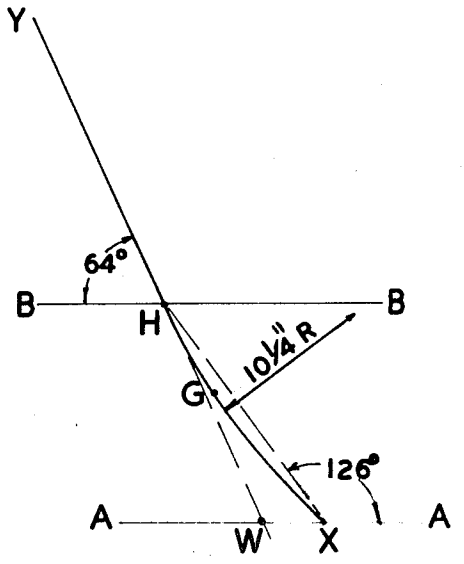


FIGURE 13

CLOTHING SLEEVE

This invention relates to wearing apparel and particularly to a sleeve for garments which will permit unrestricted arm movements in any direction for the wearer. The invention is useful, for example, in all outdoor and indoor sportswear, all garments for working trades such as mechanics, carpenters, nurses, etc., as well as for normal use and wear for womens', childrens and mens clothing.

The terms "totally unrestricted arm movement" and/or "-complete freedom of arm movement" as used herein shall be understood as the ability to flay the arms in any direction whatsoever without pulling, tearing or displacing the rest of the garment in any way, and said terms shall be used interchangeably.

Most sleeves used heretofore in wearing apparel are cut with an underarm seam and/or armhole in an effort to allow material for freedom of movement, but thus far no such patterns have resulted in complete or ever near complete freedom of movement.

The so-called Dolman sleeve and its variations which does not have a set-in armhole but is cut in one piece with the body of the garment, must rely on various square or diamond shaped inserts at the arm pit in order to allow a modicum of comfort and movement. The shoulder seam in relation to the neck lies in a horizontal direction, parallel with the natural human shoulder line. It is never possible to reach straight forward or upward without pulling the entire garment out of place and/or tearing the sleeve at the underarm in spite of the inserts, and this garment cannot be said to allow complete freedom of movement.

The so-called Raglan sleeve and its variations does not have a set-in armhole as such, but has a front and back seam from arm pit to neck at shoulder, and the sleeve proper is all in one piece to that point. The shoulder line, whether on a fold or seamed, lies in a horizontal direction parallel with the natural human shoulder line. With such a sleeve, it is never possible to reach straight forward or upward without pulling the entire garment out of place and/or tearing the sleeve at the back seam from armpit to shoulder, and this sleeve cannot be said to allow total freedom of arm movement.

The so-called Set-in sleeve and its variations requires a hole in the garment where the arm protudes and where a shaped tube, called a sleeve is inserted and attached to this hole. Gussets and pleats are sometimes added at the back at the armhole to provide extra material for a freer forward and/or upward movement of the arms such as may be needed for extra arm activity, but these forward and/or upward movements without incurring undue stress, pulling and tearing, are still very limited because no amount of pleats or gussets can release enough material for the complete and total freedom of arm movements. When a totally unrestricted movement is forced upon the Set-in sleeve, tearing occurs at the back seam and/or underarm seam, and this sleeve cannot be said to allow total freedom of arm movement.

It is the primary object of the present invention to provide a sleeve that will not have any of the disadvantages of the previously mentioned styles and patterns and thereby provide complete and total freedom of arm movements without stress, strain or tearing on any part of the remaining garment, while still maintaining complete styling flexibility.

In accordance with the present invention, the shoulder seam, starting at the point of the joining of neck and shoulder, is cut at an upward angle ranging from a minimum of 100° to a maximum of 160° on the right relative to the horizontal line A—A formed by the normal neckline from shoulder tip to shoulder tip, and said shoulder seam is engineered in such a manner as to fit the shoulder comfortably. The cut and angle of the shoulder seam and the width to the underarm fold or seam are maintained within certain minimums as more fully set forth hereinafter. Also by following the principles of the invention, the material required at the underarm or armpit for totally unrestricted arm movement, is automatically provided.

In one form of the invention, the shoulder seam remains the same while a seam can be made the length of the underarm for tighter fitting.

In another form of the invention, a band of varying widths on the straight or bias of the material may be run the length of the sleeve underarm and side of the blouse, shirt or jacket without changing the principle of the shoulder seam involved in this invention.

In still another form of this invention, a band may be run the entire length from neck to cuff in lieu of the shoulder seam as described while still maintaining the principle of this invention.

The invention will be more fully understood from the following descriptions read in connection with the accompanying drawings.

FIG. **1**- Is Front view showing the garment worn by a person with one arm upraised and one arm outstretched sideways. The sleeve is in same position as lying flat (FIG. **3**), therefore with arm upraised there is no stress on underarm or waist or any other part of garment. The human body constitutes a bulk which causes folds to form at the underarm which do not occur when the same piece of garment is lying flat as in FIG. **3**. With arm outstretched the resulting folds due to the lowering of the arm affords ample material for any forward movement without stress on any other portion of garment.

FIG. **2**- Is Back view showing the garment worn by a person with one arm upraised and one arm outstretched sideways.

FIG. **3**- Is a plan view of one half of front of garment with the sleeve laid flat.

FIG. **4**- Is a plan view of one half of back of garment with said sleeve laid flat.

FIGS. **5**- and **6**- Are plan views of front and back sleeve patterns respectively, laid on material to be cut with underarm seam, and centers front and back of garment on straight or fold of material.

FIG. **7**- Is plan view of the sleeve pattern to be cut with underarm on straight of material or fold as opposed to seamed underarm, (FIG. **5** and **6**) and showing one half of the front and one half of the back of garment all in one piece with the sleeve.

FIG. **8**- Is one half of front and one half of back put together as seen positioned in relation to a human body.

FIG. **9**- Is one half of front elevation of one half of garment as worn with arm in natural lowered position.

FIG. **10**- shows curves for the cut edge at the front shoulder part of the sleeve, angles of maximum and minimum degrees of said cut, sleeve depth and grading point.

FIG. **11**- Shows curves for the cut edge of the back shoulder part of the sleeve, angles of maximums and minimum degrees of said cut, depth of sleeve and grading point.

FIG. **12**- Shows the angles at which the curves and straight line shown in FIG. **10** follow one another and tolerances of said curves.

FIG. **13**- Shows the angles at which the curve and straight line shown in FIGS. **11** follow one another and tolerances of said curves.

REFERRING TO THE DRAWINGS:

FIGS. **1** and **2** show a dress or similar garment having a body portion **1**, sleeve **2**, neck **3** and front and back center seams **4**, as worn by a person with one arm extended upward and one arm extended side-ways and outward. If it is desired to open the garment, either center seam may be replaced with a zipper, buttons or other fastening means. The sleeves **2**, are preferrably an integral part of the garment, but can be pieced for styling or trimming purposes; such as multicolored effects using different colored materials, saddle stitching effects, cording, tucking, etc. The sleeves are always cut upward at an angle Z, from the neck **3**, (as shown in FIGS. **10** and **11**). Usually this angle is in the area of 115° with respect to a horizontal line A—A along the top of the shoulder, however, this angle can vary within certain tolerances as explained more fully in connection with FIGS. **10** and **11**.

FIGS. **3** and **4** are patterns showing one half of the front and one half of the back laid flat wherein the width of the sleeves X—X' are predetermined for size **12** as an example. X—X' is

shown as for size **12**, but may be increased or decreased according to size as is more fully explained hereinafter in connection with FIGS. **10** and **11**. The width X—X′ is calculated, as explained herinbefore, to give sufficient fullness at armpits for complete freedom of movement while reducing to a minimum underarm fullness when arm is extended upward as in FIGS. **1** and **2**, and avoiding undue fullness when arm is in a down position as in FIG. **9**. When the arm is down, the fullness **7**, at the underarm may be controlled, if desired, by seams, FIG. **5**.

FIGS. **5**, **6** and **7** show alternative methods of cutting the sleeve of the present invention. In FIGS. **5** and **6** a front and back pattern is laid flat on the material to be cut with the underarm line **8***a* to become the seam, and the center front and back **4**, in one piece without seam and the sleeves are shown as an integral part of the front and back. In FIGS. **5** and **6** the center front or back may be said to be laid on a fold for cutting purposes. In FIG. **7**, one half of the front and one half of the back are shown as an integral part of the sleeve **2**, and the center line **8***b*, becomes the underarm of the sleeve and may be said to lay on the fold, while the center front and center back **4**, become seams.

FIG. **8** shows the front and back halves of the pattern of FIGS. **5**,**6** or **7** put together and in association with the human body. In this figure the underarm is shown either as a seam **8***a*, or fold **8***b*, and center front line **4** is shown as a seam or fold as the case may be. For example — when the front and back halves of FIG. **7** are put together, the fold would be at **8***b* and the seam would be at **4**. When the front and back halves of FIGS. **5** and **6** are put together, the seam would be at **8***a* at the underarm, and the fold would occur at **4** of FIG. **8**. More underarm fullness is obtained with the use of pattern as shown in FIG. **7** where the underarm is on a fold **8***b*. Less and more controlled fullness is obtained with the use of pattern as shown in FIGS. **5** and **6** where the underarm is a seam, **8***a*. The uses of one or the other of these alternate patterns is dictated by such conditions as styling, but in either case the sleeve pattern principle of the shoulder cut **6**, of this invention, remains the same.

FIG. **9** shows the garment put together with the human arm in the arm hole. With the arm in such a lowered position fullness forms at **7**. Such fullness can be controlled by an underarm seam or seams if desired, as explained above in connection with FIGS. **5**,**6** and **8**.

Referring to FIG. **10** the short curve of the front shoulder cut from X to G is calculated (as explained hereinafter in connection with FIG. **12**) to accomodate the front of the upper trapezius muscle as it ties into the neck. The second and reverse curve G to D is calculated (also as explained in connection with FIG. **12**) to accomodate the front scapular region and acromion bone or shoulder tip of the human body. The line from D. to Y is the top of the sleeve portion, the length of D–Y being governed by the length of sleeve desired. The direction of Y is more fully explained in connection with FIG. **12**. For purposes of the present invention, point G is the point where the first and second curves meet and is the point at which grading according to size is accomplished. By bisecting the line X—Y at point G and adding or removing material equally in the direction of each curve at each side of point G, the size may be increased or decreased. For example, by standard practice, adding one-fourth inch, or one-eighth inch at the G point of each curve, produces one size increase or adding one-half inch to three-fourths inch at this point G produces a **3** size jump. For the purpose of this invention, D is selected 5 inches in a straight line from X for a size 12 and would be increased or decreased accordingly with sizing at point G.

Also according to the present invention X on line A—A is a point from which the arm depth is measured at a 20° angle from the straight line A—A as shown, and is preferrably 9½ inches long for size 12, but can vary from 8½ inches to 10½ inches or more depending on fullness desired. At the same time line X—X′ is increased or decreased for sizing at the rate of 1 inch per size or 2 inches to 3 inches per three size jumps. For example: size 14 would be increased by one-fourth inch at point G, making the line from X to D, 5¼ inches instead of 5 inches, and the width dimension of line X—X′ would be 10½ inches instead of 9½ inches.

Still referring to FIG. **10**, the angle Z at which the shoulder is cut upward in relation to the horizontal shoulder line A—A, may be within certain limits. The angle Z is predetermined according to the amount of underarm fullness desired. This angle is usually in the neighborhood of about 115°, but it may vary from a minimum of about 100° to a maximum of 145°. Above 145° the freedom of movement becomes. impaired, below 100°, too much fullness may occur at the underarm for comfort, though it may be acceptable for styling.

Referring to FIG. **11**, the curve for back shoulder cut is shown from X to H and is calculated to accomodate the upper part of back of the trapezius muscle and to fit over the omoplate or shoulder blade. The line H–Y is the top of the sleeve portion, the length of H—Y being governed by the length of sleeve desired. X is the point from which arm depth is measured at 30° angle from straight line A—A. The length of X–X′ is preferrably 11½ inches for size **12**, but may vary between 9½ inches to **12**½ inches or more depending on fullness desired. The back shoulder in FIG. **11** may be sized at point G in the same manner as explained above for the front shoulder of FIG. **10**. The angle Z is predetermined according to the amount of underarm fullness desired, and is usually in the neighborhood of about 126° but it may vary from a minimum of about 105° to a maximum of 160°. Above 160° freedom of arm movement becomes impaired, below 105° too much fullness may occur at the underarm for comfort, though it may be acceptable for styling.

Referring jointly to FIGS. **10** and **11**, preferably but not necessarily, the 115° angle Z of FIG. **10** or front of sleeve, is slightly less than the 126° angle of Z of FIG. **11** or back of sleeve. If an increase or decrease of angle is desired for reasons hereinbefore stated, both front and back should be increased or decreased proportionatly. Again referring to FIGS. **10** and **11** jointly, when the front of FIG. **10** and the back of FIG. **11** are put together and joined in a seam, the curves X–G and G–D applied to X–H and H–Y cause the sleeve to fit snugly in place on the shoulder, and at the same time the angle Z shown in relation to line A—A allows complete and total freedom of arm movement in any direction.

FIGS. **12** and **13** show the angles at which the curves X–G and G—D and straight line D–Y of FIG. **12** are joined, and curve X–H and straight line H–Y are joined in FIG. **13**. The chords of each arc or curve at these points are for purposes of determining the angles with respect to lines A—A and B—B respectively.

In FIG. **12**, and for the size **12** used as an example, the chord of arc X-G is 2 5/16 inches long with a radius of 5 11/16 inches. The chord of arc G–D is 2 ¾ inches long and G–D has a radius of 5 ⅛ inches. The angle of the chord X–G to line A—A is 118°. The angle of the chord G–D to line B—B is 72°. The direction of Y is found as the tangent to the second and reversed curve G—D and the angle of D–Y to line C—C is 66°.

In FIG. **13**, for the same size **12** used as an example herein, the chord of arc or curve X-H is 4 13/16 inches long with a radius of 10¼ inches. The angle of X—H in relation to line A—A is 126°. The direction of Y is determined by drawing a straight line from W, which is three-fourths inch from X on line A—A, through H. This direction is a constant and will not vary with sizing. The angle of line H—Y in relation to line B—B is 64°.

Again referring jointly to FIGS. **12** and **13**, the chords will vary as sizing occurs as shown heretofore in FIGS. **10** and **11**. The radii of the curves may also vary for specific fitting purposes or within a maximum or minimum of 2 ½ inches either way. The angles of the chords in relation to lines A—A, B—B and C—C may vary, but only within tolerances which will maintain the axis X—Y within the maximums and minimums as defined in FIGS. **10** and **11** by Z.

IN PRACTICING the invention, alternate examples may now be given corresponding to the alternates herinbefore mentioned and shown by patterns in FIGS. 5,6 and 7.

When using the pattern of FIG. 5 having the center front in one piece or on the fold and with underarm shown as seam 8*a*, the shoulder material is cut upward along a line according to the preferred angle from line A—A selected from FIG. 10. FIG. 6, which is the back of FIG. 5 is then used as a pattern for the back to be cut according to the preferred angle selected from FIG. 11. It is preferrable that both front and back shoulder seam cuts be cut at the same angle from line A—A. The front and back patterns of one sleeve are laid flat upon one another, and starting at the neck point X, as shown in FIGS. 5 and 6, the two front curves and the one back curve of shoulder are joined together in a seam, shown as line 6, to the extent of the desired length of the sleeve. The shoulder line 6 of the other sleeve is then joined in the same manner. Starting at either the top or bottom end of the underarm line 8*a* of FIGS. 5 and 6, both front and back halves of the garment are joined in a seam at the side or underarm so that the sleeves are completed, as well as the upper portion of the garment.

When using the pattern of FIG. 7, the back and front of the sleeve as well as the upper part of the garment are in one piece because the underarm of sleeve 8*b*, lies on the fold and the center of the front and center of back 4, are a seam as shown in FIG. 7. Two pieces of material corresponding to such a pattern are cut identically. Taking first either one of these two pieces and starting at neck point X, as shown in FIG. 7, front and back shoulder line 6 are folded together and joined in a seam 6, to form a sleeve of desired length. The other identically cut piece is also put together in the same manner. The two center lines 4 for the fronts, one from each piece, are joined together. Then the two center lines 4, for the backs, one from each piece are also joined together. The top of the garment including the sleeves is now completed. Tucks, pleats or various fullness controlling seams may or may not be made at underarm 8b as desired or as dictated by styling.

I claim:

1. A garment comprising a lower body portion having a neck opening in the top and two sleeve portions, the outer edges of said sleeve portions continuing upwardly in divergent curves from the outer edges of the body portion and the inner edges of said sleeves cut upwardly from the neck opening to form a first curve section with the open portion of the arc facing upwardly, a second curve section with the open portion of the arc facing downwardly, said curve sections providing shoulder portions, and a straight line section extending from said second curve section to the end of the sleeve, the angle at which said inner sleeve edges slope upwardly and the depth of the sleeve being predetermined to provide sufficient fullness for total freedom of arm movement.

2. A garment according to claim 1 wherein the inner edges of the sleeves from the neck opening to the end of the sleeves are seams.

3. A garment according to claim 1 wherein the sleeve and body portions are front and back sections sewed together by seams at the outer edges.

4. A garment according to claim 1 wherein the sleeve and body portions are halves folded over at the outer edges and sewed to form seams in the center of the front and back of the body portion.

5. A pattern for a garment comprising a front portion having outer edges to define the sides of the body and sleeve portions with the outer edges of the sleeve portions curving upwardly from the outer edges of the body portion, an arcuate section at the top to define the front half of the neck opening, inner edges extending upwardly from the neck opening, each of said inner edges having a first curve section with arcuate sections facing upwardly, a second curve section with the arcuate section facing downwardly and a straight line section extending to the end of the sleeve, and a back portion having outer edges and neck opening to match said front portion and inner edges of the sleeves extending upwardly from the neck opening having a long curve section to match the curves sections of said front portion with the arcuate section facing upwardly and a straight line portion extending from the curve to the end of the sleeve.

6. A pattern for a garment comprising two identical portions corresponding to the sides of the garment with edges to form vertical seams along the front and back center of the garment when the portions are folded, each of said portions containing a body portion with outer edges diverging in straight lines toward the neck opening, sleeve portions cut upwardly from the neck opening having on one edge a first curve portion with the arcuate section facing upwardly and a second curve section cut upwardly from the first curve with the arcuate section facing upwardly and a straight line portion extending from the second curve to the end of the sleeve, and having on the other edge a long curve portion to match the first and second curve portions of the first mentioned edge with the arcuate section facing upwardly and a straight line portion extending from the long curve to the end of the sleeve.

7. A pattern according to claim 6 wherein the inner edges of the sleeves extend upwardly from the neck opening in a direction having the angle on the right between the edge and a horizontal line through the neck opening of about 100°–160°.

* * * * *