Oct. 21, 1969 S. F. JAMES 3,473,707

METHOD AND APPARATUS FOR SHAPING CLOTH

Filed July 21, 1967 2 Sheets-Sheet 1

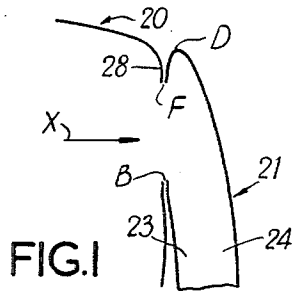


FIG.1

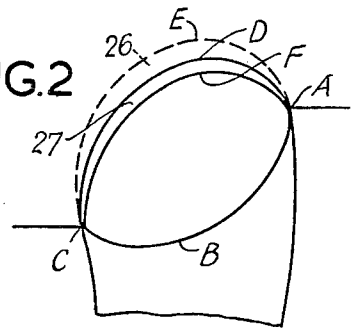


FIG.2

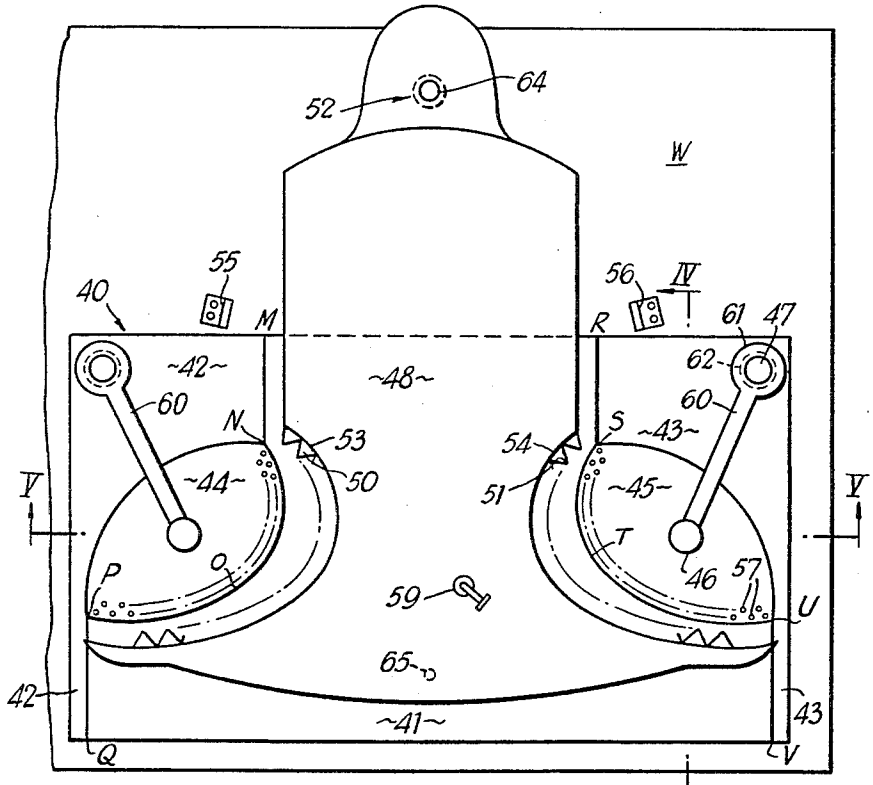
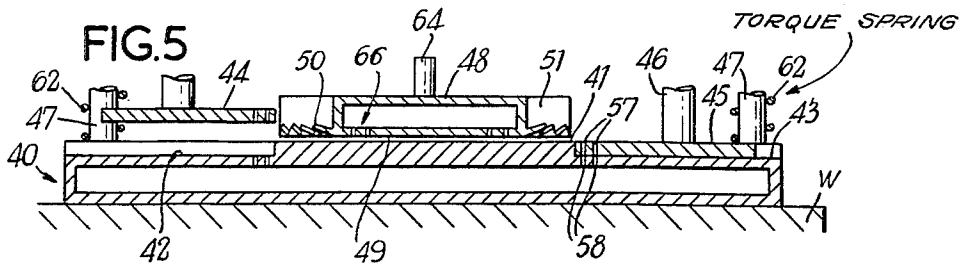


FIG.3

FIG.5



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METHOD AND APPARATUS FOR SHAPING CLOTH

Filed July 21, 1967 2 Sheets-Sheet 2

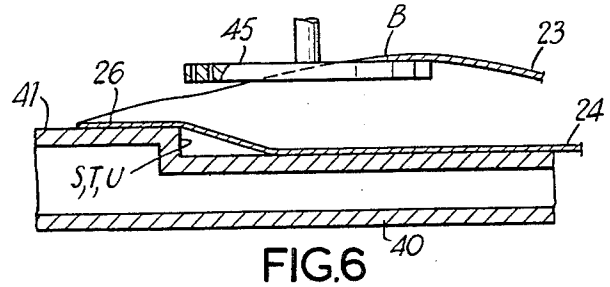

FIG.6

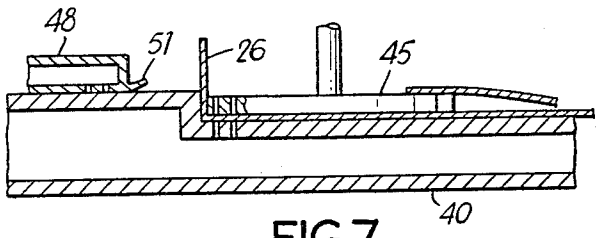

FIG.7

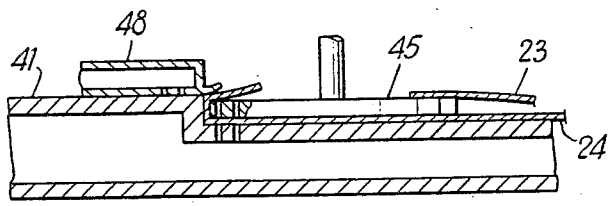

FIG.8

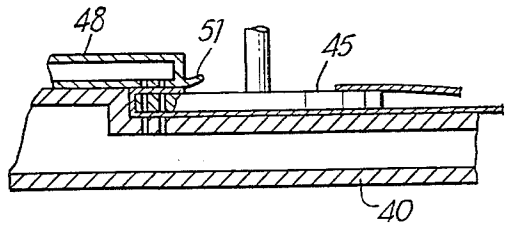

FIG.9

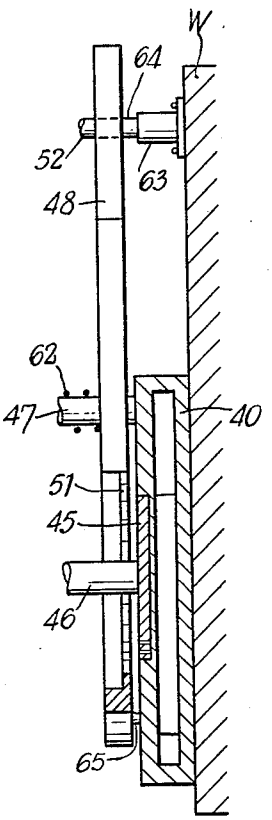

FIG.4

United States Patent Office 3,473,707 Patented Oct. 21, 1969

3,473,707

METHOD AND APPARATUS FOR SHAPING CLOTH

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Filed July 21, 1967, Ser. No. 655,149
Claims priority, application Great Britain, July 21, 1966, 32,877/66
Int. Cl. D06c 15/00
U.S. Cl. 223—57 7 Claims

ABSTRACT OF THE DISCLOSURE

The invention is a device for shaping the material at the shoulder end of a coat sleeve or the like. The upper forward portion of the sleeve is clamped in a former which bends it inwardly 90° along a curve matching that of the receiving armhole in the coat body. The sleeve is so positioned in the former that a portion of its upper forward edge extends therefrom. This extended portion is ironed into the sleeve by a concave arcuate iron. The iron first engages the material at the extremities of the former, then progressively engages the remainder of the material from each end toward the center of the curved edge of the former. Guiding teeth protruding from the leading edge of the iron position the material during the ironing process so that wrinkles produced by the inward bending of the material are evenly distributed along the curved surface of the former. Steam passing through the iron and into the former sets the shape of the material to complete the forming process.

The present invention relates to a method and apparatus for shaping a garment part to doubly concave shape.

The invention is particularly, although not exclusively, suitable for use in the tailoring trade for preparing the upper end of a sleeve so that it may be inserted into the body of a jacket by less skilled workers and with a higher degree of finish than has normally been the case hitherto. However, the invention has application for finishing other parts of garments which require a doubly concave shape.

According to the invention there is provided apparatus for shaping a garment part to doubly concave shape comprising a base having a raised step in an upper horizontal surface thereof, said step having a concave horizontal outline, a plane former having a convex edge matching said concave horizontal outline and a thickness equal to or slightly less than the height of said step, said former being mounted on or adjacent said base for movement between a raised position disengaged from said base and an operating position in which it fits adjacent said step, a smoothing iron having a lower ironing surface and means for heating said surface to ironing temperature, said ironing surface having a generally concave horizontal edge of similar or slightly greater extent than, but more sharply curved than said curved horizontal outline, said generally concave edge of said ironing surface being broken to provide a row of teeth which are directed generally towards the centre of curvature of said concave ironing surface edge, said iron being mounted on or adjacent said base to allow a horizontal ironing movement from a disengaged position over said raised step, towards the centre of curvature of the curved edge of said step to an operative position overlapping and embracing the curved edge of said step, so as to perform an ironing action over the curved edge of said former when the latter is in its operative position, and resilient means normally urging the iron upwards to a position out of contact with said step but allowing the iron to be pressed upon said former during said ironing movement. Preferably, said iron is pivotably

mounted about a vertical axis to allow said horizontal ironing movement.

The preferred form of the iron comprises two said concave outlines on said step arranged in mirror image relationship and two respective formers having respective matching outlines, said iron having correspondingly two said generally concave edges in mirror image relationship, whereby the iron is capable of a horizontal swinging movement about said vertical axis to iron as desired over one former or the other. Preferably also the iron comprises a steam chamber and steam exit apertures in the ironing surface adjacent the curved edges, and wherein said base is hollow, the upper surface of said base being formed adjacent the step, and the formers being formed adjacent their curved edges with apertures to allow egress of steam from the iron into the interior of said base.

A preferred form of the invention will now be described with reference to the accompanying drawings, in which:

FIGURE 1 is a vertical section through a portion of a jacket and sleeve,

FIGURE 2 is a view of the armhole of the sleeve viewed along the line X of FIGURE 1,

FIGURE 3 is a plan of apparatus according to the invention,

FIGURE 4 is a section on the line IV—IV of FIGURE 3,

FIGURE 5 is a section on the line V—V of FIGURE 3, and

FIGURES 6 to 9 illustrate steps in the use of the machine of FIGURES 3, 4 and 5.

The principal problem solved by the present invention is illustrated in FIGURES 1 and 2. Here is shown a portion of a jacket **20** and a portion of a sleeve **21**, the latter being made up of inner and outer portions **23** and **24** respectively. FIGURE 2 is a view of the armhole in the sleeve, looking in the direction of the arrow X and assuming that the jacket has been taken away from the sleeve, but that the sleeve has not been moved. (In this figure, the broken line indicates the cloth before it is folded.) Clearly there is no difficulty in sewing the bottom half of the sleeve to the jacket, along the line ABC, because over this portion of the armhole the sleeve and the jacket are both nearly flat and therefore can be placed one against the other and can then be sewn with an ordinary machine.

But this is not the case at the top half or forward shoulder portion ADC of the armhole. Here, along the line ADC, the edge of the sleeve has to be turned in, or rolled over, at an angle of nearly 180°, before it is sewn to the top half of the jacket armhole. In FIGURE 2, the edge is shown in broken lines at **26** before it is turned in, and at **27** after it has been turned in. The edge of the jacket, to which the sleeve edge **26** has to be sewn, is shown at **28** in FIGURE 1.

Before the sleeve edge **26** has been turned in, it has a simple curvature, that is to say is curved in a plane, but after it has been turned out of its original plane, its curvature is compound and, in fact, doubly concave, since it is approximately partly toroidal in shape.

The expression "doubly concave" is used in this specification to cover such a shape and other similar shapes which are curved in two planes, including an outside portion of a simple toroid segment and shapes in which the toroid is distorted from the circular with respect to either or both toroid axes.

It can be seen that the top edge of the armhole before being turned in, i.e. the line AEC, is longer than the edge AFC, after being turned in. Cloth therefore has to be lost during the turning-in process. At the present time, this may be done either by a skilled, highly paid sewing machinist, but, owing to the limitations of known sewing machines, this can produce only a very crude result, quite

unsuitable for the better class type of jacket. Alternatively, the job can be done by a skilled, highly paid tailor who, by hand sewing, can produce a quite good result, but only at the cost of a time-consuming hand operation. The machine produced result is cheaper but inferior, whilst the hand sewn result is better, although often far from perfect, but relatively expensive.

The present invention provides apparatus with the aid of which the cloth can be easily and quickly made to assume the necessary curvature.

In United Kingdom patent specification No. 943,329 there is described a simple apparatus with the aid of which a sleeve end can be turned over in the way described above and the present invention employs the basic idea of that earlier apparatus, but provides substantial improvements on it.

The preferred form of apparatus in accordance with the present invention is illustrated in FIGURES 3, 4 and 5. It comprises a generally flat hollow base **40** defining a chamber or plenum through which steam can be passed or from which suction can be effected. The base **40** may be constructed of welded steel plates, and is shown resting on an operating bench or table W. The upper surface of the base **40** has a central raised step **41** bordered by the lines MNOPQ and RSTUV, the two lower outer portions on either side of the step being indicated at **42** and **43**. The step is rectangular in vertical section and one outer portion is the mirror image of the other, in plan view. One outer portion **42**, **43** is used to prepare the armhole of a right sleeve and the other a left sleeve; only one will be described in detail. The concave shape of the step STU corresponds exactly with the curve ADC of the sleeve portion shown in FIGURE 2.

Fitting into the curved outlines of the step are a pair of formers **44** and **45**. These may be of metal, wood or plastics material but should be stable at normal ironing temperature. Again one is the mirror image of the other; each is in the form of a flat plate carried by a stem such as that shown at **46**. The thickness of each plate is equal to, or slightly less than the height of the step.

Each stem **46** is itself attached to an arm **60** carried by a sleeve **61**, the latter being slidably mounted on a post **47** which is itself mounted to one side of the plate. Preferably each former is spring-urged by, for example, a spring **62** surrounding each post **47** to the raised or disengaged position shown by former **44** in FIGURE 5 and can be pressed downwards and if desired sideways, against the spring **62** to the operative position shown by the former **45** in FIGURE 5. The formers **44**, **45** can be mounted for vertical movement only, in which case this movement may be effected with the aid of a foot pedal.

Slidably mounted on the raised step **41** of the base **40** is a hollow steam-iron **48**, which may be of welded steel construction, and provided with conventional heating means (not shown). The under surface of the iron is formed as a flat shoe **49** having two sets of teeth **50** and **51**. The iron is pivotally mounted at **52** to a post **64** itself bracketed at **63** to the table W.

The front of the iron rests on a spring loaded plunger **65**, which may be a freely rotatable ball or roller, to normally lift the iron off the surface of the raised step in the base **40**.

The sides of the iron are formed with a pair of mirror-image, curved recesses **53** and **54** at the bottom of which lie the teeth **50** and **51** respectively. The recesses **53** and **54** are more sharply curved than the steps STU, NOP so that when the iron is moved towards and over each such step, the teeth at the ends of the appropriate recess approach the step before those teeth lying at the centre of the recess.

If desired the shape and dimensions of the co-operating parts may be such that the teeth at one end of the recess first reach the step, then the teeth at the other end, and finally the teeth at the centre of the recess.

Neither the size nor the direction of the teeth is critical, but each tooth should point in a direction across the step.

The angular movement of the iron is limited by two stops **55** and **56** which are secured to the table, so that the iron can be moved through equal angles on either side of its symmetrical position. Thus, when the iron has been moved to bear against the stop **56**, for example, the teeth have passed completely across the curved edge STU of the step, so that the body of the iron rests partly on the former **45**, when this is in its operative position against the base **40** (FIGURE 9). In this position, a series of small apertures indicated at **66** on the underside of the iron adjacent the curved edge are in register with a similar series of apertures **57** formed along the edge of the former **45** and these apertures in turn are in register with a third similar series of apertures **58** formed in the top of the base **40**, so as to allow the egress of steam from the steam chamber of the iron into the hollow interior of the base **40**. It will be apparent that if the apertures are numerous and small, that is if they approach a mesh surface, exact alignment of the respective apertures of each series is not necessary. Furthermore, the apertures are shown larger than their scale size, in the drawings, for the sake of clarity.

The apparatus is used in the following way:

In the disengaged or rest position, the iron is in the central symmetrical position (FIGURE 3) and resting on the plunger **65**, above the surface of the raised step. The two formers **44** and **45** are raised a little above the base **40**. Right and left coat sleeves, for example, are then slipped over the formers **44**, **45** respectively, so that each lies in the position shown in FIGURE 6 with the extreme edge **26** of the top half or front shoulder portion of the armhole of the sleeve lying on the raised portion **41** of the table and with the inner part of the sleeve on top of the former **45**. The former **45** is then moved downwardly into the position shown in FIGURE 7, so as to cause the edge **26** to stand upright against the curved step outline STU. Then the iron **48** is pivoted to the right with respect to FIGURE 3, so that the teeth **51** approach the curved edge STU of the step.

At the same time, hand pressure on the iron against the spring plunger **65** brings it down against the ironing surface constituted by the step and the top of the former **45**.

The teeth on the lower end of the recess **54** (that is, the end removed from pivot **52**) engage the edge **26** first and begin to push the edge downwardly into the position shown in FIGURE 8; then the teeth on the upper end of the recess **54** engage the cloth and similarly begin to fold it over; finally the teeth on the centre of the recess **54** engage the cloth and fold it down into the position shown in FIGURE 9.

An important feature of this invention is that the teeth ensure that the edge **26** assumes a series of wrinkles which are at least approximately of uniform size and are at least approximately uniformly spaced along the edge. In other words, the teeth ensure that no large wrinkle is formed which might develop into a pleat and thus completely spoil the finished armhole.

Another important feature of this invention is the fact that the curved recess **54** in the iron has a greater curvature than that of the curved outline of the step STU with the result that the two ends of the recess **54** approach the edge **26** of the cloth before the centre of the recess, so that there is no fear of the cloth being, as it were, crowded along to one end of the recess.

Finally, the iron is moved right across the curved edge STU of the step until the iron bears against the stop **56** and the body of the iron comes to lie over the edge **26** of the sleeve in the position shown in FIGURE 9. When the iron reaches this position, a valve **59** in the iron is opened to allow steam to be passed from the iron through the edge **26**, through the holes **57** in the former **45**, again through the cloth of the sleeve and finally through holes

58 in the base 40. If desired, suction may be applied at the same time to the hollow interior of the base 40 by any conventional means to draw the steam through the cloth.

The undersides of the teeth are preferably curved upwardly towards the points as illustrated to ensure that the iron rides up on to the cloth smoothly.

Many modifications may be made; for example, it is not necessary that a single apparatus be constructed for ironing both sleeves as shown. Two single apparatus may be employed and the invention embraces such a single apparatus. Furthermore, adequate results may be obtained without the use of a steam chamber in the iron, the cloth being moistened in a conventional manner before ironing, and even if a steam iron is used, the apertures for egress of steam may be omitted for the sake of cheapness. While the curved outlines are adapted to the garment part to be shaped, the shape of the remaining parts of the base and iron are dictated largely by the desired appearance and the mounting posts for the various parts may be fitted to the table or the base, as desired.

What I claim is:

1. Apparatus for shaping a garment part to doubly concave shape comprising a base having a raised step in an upper horizontal surface thereof, said step having a concave horizontal outline, a plane former having a concave edge matching said concave horizontal outline and a thickness equal to or slightly less than the height of said step, said former being mounted on or adjacent said base for movement between a raised position disengaged from said base and an operating position in which it fits against said step, a smoothing iron having a lower ironing surface and means for heating said surface to ironing temperature, said ironing surface having a generally concave horizontal edge of similar or slightly greater extent than, but more sharply curved than said curved horizontal outline, said generally concave edge of said ironing surface being broken to provide a row of teeth which are directed generally towards the centre of curvature of said concave ironing surface edge, said iron being mounted on or adjacent said base to allow a horizontal ironing movement from a disengaged position over said raised step, towards the centre of curvature of the curved edge of said step to an operative position overlapping and embracing the curved edge of said step, so as to perform an ironing action over the curved edge of said former when the latter is in its operative position, and resilient means normally urging the iron upwards to a position out of contact with said step but allowing the iron to be pressed upon said former during said ironing movement.

2. Apparatus as claimed in claim 1, wherein said iron is pivotably mounted about a vertical axis to allow said horizontal ironing movement.

3. Apparatus as claimed in claim 2 comprising two said concave outlines on said step arranged in mirror image relationship and two respective formers having respective matching outlines, said iron having correspondingly two said generally concave edges in mirror image relationship, whereby the iron is capable of a horizontal swinging movement about said vertical axis to iron as desired over one former or the other.

4. Apparatus as claimed in claim 3, wherein said iron comprises a steam chamber and steam exist apertures in the ironing surface adjacent the curved edges, and wherein said base is hollow, the upper surface of said base being formed adjacent the step, and the formers being formed adjacent their curved edges with apertures to allow egress of steam from the iron into the interior of said base.

5. Apparatus as claimed in claim 4, wherein the apertures respectively in the iron, the base and the formers are arranged to be in alignment in the said operative position.

6. Apparatus as claimed in claim 3, wherein said formers are mounted pivotally to allow a horizontal swinging motion and resiliently to allow them to be pressed down into the operative position and afterwards released.

7. Apparatus as claimed in claim 1 wherein said matching concave outlines of said base and former correspond to the outline of the forward shoulder portion of a garment sleeve.

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