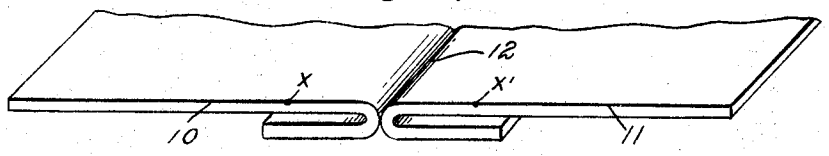
May 19, 1970 I. E. PENSA 3,512,285

ALTERATION OF PERMANENTLY SET GARMENTS

Filed Aug. 16, 1965

Fig.1



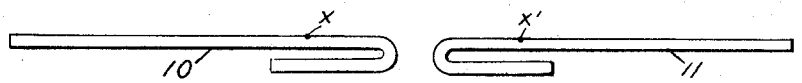
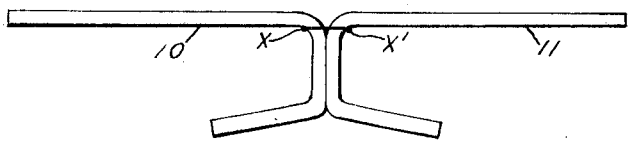


Fig.2

Fig.3



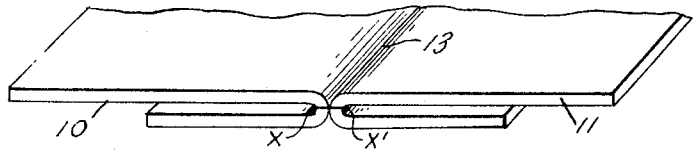


Fig.4

Fig.5

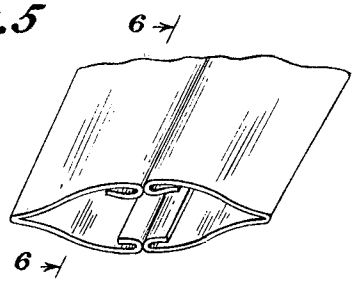


Fig.7

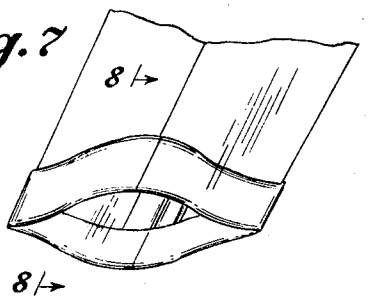


Fig.6

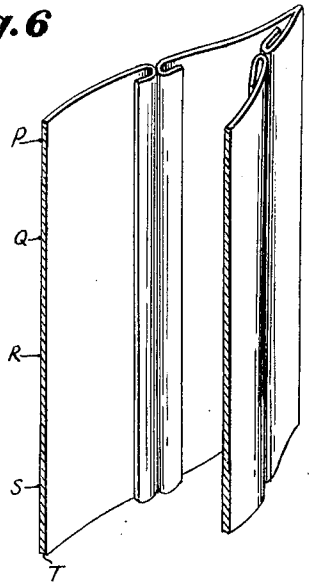
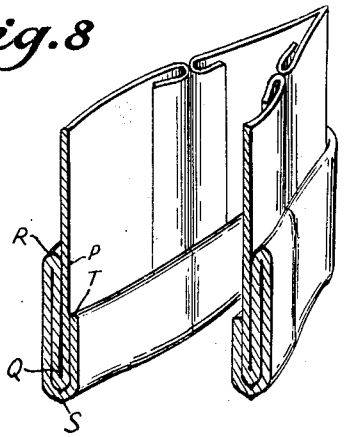


Fig.8



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ALTERATION OF PERMANENTLY SET GARMENTS

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U.S. Cl. 38—144 1 Claim

ABSTRACT OF THE DISCLOSURE

This invention concerns a method of resetting the configuration of a permanently set, cellulose fiber-containing garment having at least one permanent fold, comprising arranging said garment in a new configuration, including a change of said fold, treating the area of new configuration with acidic catalyst, and thereafter pressing and heating the arranged garment to reset the new configuration.

This invention relates to a method of altering permanently set garments. More particularly, this invention relates to removing or reversing a crease or fold in a permanently set garment and repositioning said crease or fold.

In recent years, a variety of procedures have been developed whereby a permanent shape is imparted to trousers, skirts, shirts, blouses and similar garments made from cellulosic fibers. Such permanent-set procedures have improved garment performance and appearance with regard to their susceptibility to wrinkling in laundering and in wear, and consequently have increased the demand for permanent-set textile materials containing such filters. While permanent shaping procedures have enhanced the wear and appearance characteristics of cellulosic textiles, these methods have not produced completely satisfactory results.

One major shortcoming of permanent-set techniques lies in the difficulty encountered in altering garments having permanent cuffs, pleats or other types of folds. Thus, since a garment set in a particular shape cannot be readily changed to a different shape, the garment cannot be altered to a different size or more exact customer fit, but rather the retailer is compelled to maintain an excessively large inventory in order to satisfy customer needs. It would be highly desirable, therefore, to devise a means for altering permanently set garments.

It is an object of this invention to provide a method for altering permanently set cellulose fiber-containing garments.

A further object of this invention is to provide altered cellulose fiber-containing garments, the new shapes of which are retained on laundering.

A still further object of this invention is to obviate difficulties previously encountered in attempting to alter cellulose fiber-containing garments having permanent cuffs, pleats or similar types of folds.

A particular object of this invention is to provide a method for cuffing permanently set cellulose fiber-containing trousers and also for removing and relocating the permanently set cuffs of cellulose fiber-containing trousers.

Other objects and advantages of this invention will be apparent from the following description when taken in conjunction with the accompanying drawings, wherein

FIG. 1 is a fragmentary view of a permanently set seam in a garment;

FIG. 2 shows the opened seam of FIG. 1;

FIG. 3 shows a take-up in the seam of FIG. 2 to a new position;

FIG. 4 shows the new seam after permanent setting according to the process of this invention;

FIG. 5 is a view in perspective of the lower part of an uncuffed leg of a pair of permanently set trousers;

FIG. 6 is a cross-sectional view taken along the line 6—6 of FIG. 5, showing the seams of the uncuffed trouser leg;

FIG. 7 is a view in perspective of the trouser leg of FIG. 5, cuffed and permanently set, and

FIG. 8 is a cross-sectional view taken along the line 8—8 of FIG. 7, showing the seams of the cuffed trouser leg.

As shown in FIG. 1, two panels **10** and **11** of a permanently set garment are joined along seam **12**. Points x and x' are positions selected at random along the surface of the garment in order to illustrate the resetting of the garment seam.

In FIG. 2, seam **12** has been opened and points x and x' are located on either side of the opened seam.

In FIG. 3, panels **10** and **11** have been sewn together in a new position such that points x and x' are now in closely abutting relationship.

FIG. 4, shows the panels **10** and **11** of the permanently set garment joined along new seam **13** after the garment has been treated according to the method of the invention.

FIGS. 5–8, illustrate the application of the method of this invention to the cuffing of uncuffed permanently set trousers.

In FIG. 6, points P, Q, R, S and T along the crease of the uncuffed trousers are selected in order to illustrate the formation of a cuff.

In FIG. 8, points P, Q, R, S and T are shown in the position they occupy in trousers cuffed according to the method of this invention.

In accordance with this invention a permanently set cellulose fiber-containing garment having at least one permanent fold is selected and a new configuration including a change in the fold position or direction is arranged. Thereafter, a solution of an acidic catalyst hereinafter described, is applied to the area of the new configuration of the garment, and the garment is pressed and simultaneously or subsequently heated to reset the new configuration. By the method of this invention the prior existing permanent fold is removed and a permanent fold is imparted to the garment in a new position.

In another embodiment of this invention, the acidic catalyst solution may be applied to the permanent-set garment before the garment is arranged in a new configuration. As before, the garment is then rearranged, pressed and heated to reset the new configuration.

The method of this invention is of particular utility in cuffing or recuffing permanently set trousers. In forming cuffs in permanently set trousers, the uncuffed trousers are folded so as to form a cuff at the bottom of each leg and the catalyst solution is applied to the folds in the trouser legs. The trousers are then pressed and simultaneously or subsequently heated, thereby forming the cuffed legs. If desired, the catalyst solution can first be applied to the trousers and thereafter the cuffs could be arranged and formed in the garment. It should be noted that the cuffing of permanently set, uncuffed trousers involves the repositioning of a fold (at the crease of the trousers) and the setting of a new fold. Such repositioning of a permanently set fold could not be satisfactorily effected by techniques formerly used.

In recuffing permanently set trousers, the trousers are folded so as to form a new cuff at the bottom of each leg and the catalyst solution is applied to the new folds as well as to the folds of the original cuffs. The trousers are then pressed and simultaneously or subsequently heated,

with the old cuff folds being removed and the new cuffs being formed. Of course, the old cuff could first be removed and the new cuff thereafter introduced and set in the trousers utilizing the method of this invention.

The acidic catalyst used in this invention can be an organic acid alone or in combination with the metal salt of an inorganic acid. The organic acids which are preferably used are water soluble, non-volatile, hydroxy acids yielding a pH of about 3.0 to about 5.0 in a 1 normal aqueous solution. Usually, these acids should have a boiling point higher than about 120° C. Among the suitable organic acids may be included citric, lactic, tartaric, glycolic and the like. The acid salts which are applicable are generally the metal salts of mineral aids. Such acid salts include magnesium chloride, magnesium nitrate, zinc chloride, zinc nitrate, calcium chloride and the like. It should be noted that, although the catalyst system is usually applied in the form of an aqueous solution, the use of non-aqueous solvents is sometimes preferred.

The extent of pressing and heating is important to the success of this invention. One common failing of prior art techniques was the inability to strike a proper balance between pressing times and temperature. Heretofore, when elevated temperatures were employed, the garment would often tear and disintegrate due to degradation of the fabric. On the other hand, prior art treatments employing lower tetmperatures without the aid of a catalyst system were unable to give durable creases. The method of this invention can accomplish recreasing of permanently set garments merely by pressing at temperatures of from about 220° F. to about 270° F. The duration of the pressing may be varied as desired and can range, for example, from 30 seconds to about 10 minutes. Also, cuffs and other folds can merely be pressed to impart shape to the folds and then cured in an oven maintained at a temperature of from about 200° F. to about 450° F. for from about 30 seconds to about 10 minutes. After the garment has been treated according to the process of this invention, the acid catalyst present on the garment may be neutralized by a buffering agent such as a weak base or a basic salt.

The acidic catalyst may be applied to the garment by any of the conventional means such as padding, dipping, spraying, and the like. Usually, when the catalyst employed is an organic acid alone, the catalyst solution contains from about 1% by weight of the acidic material to a saturated solution, and preferably from about 2.5% to about 15% by weight of the acid. When the catalyst is a mixture of an organic acid and an acid salt, the catalyst solution contains from about 1% acid: 0.1% salt, by weight to a saturated solution of the combination of acid and salt. Preferably, the solution of the catalyst mixture contains from about 2.5% to about 15% of organic acid and from about 0.25% to about 2.0% of salt. The weight pickup of the catalyst solution by the garment may be varied as desired.

The method of this invention is applicable to permanently set farments formed either completely from cellulose fiber-containing materials, such as cotton, rayon, linen, and the like, or blends thereof with other natural and synthetic fibers, such as wools, nylons, polyesters, acrylics, polyolefins and the like. Such garments are permanently set in any desired configuration by chemical reaction carried out between cellulose and a crosslinking agent or resin precondensate in the presence of an acid catalyst. The crosslinking reagents and resin precondensates include urea-formaldehyde, melamine-formaldehyde, methylol derivatives of cyclic ureas such as cyclic ethylene, urea-formaldehyde, dimethylol ureas and triazones, dimethylol carbamates, dimethylol imidazolidones, and the like. The acid catalysts may be any of those commonly used in crosslinking cellulose such as magnesium chloride, zinc nitrate, zinc fluoroborate, amine and ammonium salts of inorganic acids, and the like.

The following examples will further illustrate the embodiments of this invention. Unless otherwise indicated all parts given are by weight, and all garments or garment sections have previously been treated in accordance with a permanent-set procedure as set forth hereinabove.

EXAMPLE I

An aqueous solution was prepared containing 3.5 parts of citric acid and 1.5 parts of a 30% solution of magnesium chloride per 100 parts of solution. Garment sections made from 8 oz. all-cotton twill sewn in the form of uncuffed trouser legs and set creased (that is, pressed, creased and set) were wetted by spraying along the parts where the cuff folds were to be formed with the aqueous solution until these parts were impregnated to approximately 60–70% of their dry weight. The garment sections were then dried at room temperature and a cuff shape was introduced at the wetted and dried part according to the standard procedures known in the art for making cuffs on trouser legs.

The cuffed sections were then pressed on a leg-press of the type commonly used for garment manufacturing and garment pressing. The cuffs were pressed at a temperature of 220° F.–240° F. for 60 seconds, 90 seconds, 120 seconds or 150 seconds. Similar garment sections were cuffed without prior spraying. All cuffs were then laundered and tumble dried. After one such cycle the cuffs which had not been treated with the solution described above showed no shape retention except for that which was imparted by the sewing. On the other hand, the cuffs treated wtih the aqueous solution of the acid and metal salt retained the shape and flatness of the cuff even after ten wash cycles.

EXAMPLE 2

An aqueous solution was prepared containing 3.5 parts of glycolic acid and 1.5 parts of a 30% solution of magnesium chloride were 100 parts of solution. Garment sections were then processed as in Example 1 using the above solution. The resulting cuff creases were sharp and flat and the cuffs were durable to repeated laundering and tumble drying.

EXAMPLE 3

An aqueous solution was prepared containing 3.5 parts of tartaric acid and 1.5 parts of a 30% solution of magnesium chloride per 100 parts of solution. Garment sections were then processed as in Example 1, using the above solution. The resulting cuffs showed excellent cuff retention even after ten launderings.

EXAMPLE 4

An aqueous solution was prepared containing 3.5 parts of citric acid and 1.0 part of calcium chloride per 100 parts of solution. Garment sections were then processed as in Example 1, using the above solution. The resulting cuffs showed excellent crease retention even after ten launderings.

EXAMPLE 5

A treating solution was prepared by dissolving 3.5 parts of citric acid in 95.0 parts of isopropyl alcohol and then adding 1.5 parts of a 30% aqueous solution of magnesium chloride. Garment sections were then processed as in Example 1, using the above solution. The resulting cuffs were durable to repeated laundering and drying and did not require any ironing.

EXAMPLE 6

An aqueous solution was prepared containing 3.5 parts of citric acid and 0.6 part of aluminum chloride per 100 parts of solution. Garment sections were then processed as in Example 1, except that the impregnated secitons were dried in a forced draft oven set at 220° F. to a moisture content of 0% to about 8%. The cuffs were then pressed for 120 seconds, 180 seconds or 240 seconds. The resulting cuff creases were sharp and flat and

the cuffs were durable to repeated launderings and tumble drying.

EXAMPLE 7

Garment sections made from 8 oz. all-cotton twill sewn in the form of uncuffed trouser legs and set-creased were folded and sewn to form the cuff. These formed cuffs were wetted by spraying with an aqueous solution as described in Example 1. The impregnated cuff shapes were pressed until dry on a press of the type commonly used for garment manufacturing. Pressing was adjusted so that the press cycle achieved total dryness in two minutes, three minutes, four minutes or five minutes. Similar garment sections were also cuffed and impregnated with water only and pressed dry. All cuffs were laundered and tumbled dried. After one such cycle, the cuffs which had not been impregnated with the solution described in Example 1 showed no shape retention. However, the treated cuffs retained their shape even after twenty wash cycles.

EXAMPLE 8

Garment sections made from 65% polyester:35% cotton blend fabric, sewn in the form of uncuffed trouser legs and set-creased were processed as in Example 1, pressing the cuff for 150 seconds or 180 seconds. All cuffs processed by the method of the invention retained their shape even after repeated launderings.

EXAMPLE 9

Garment sections made from 50% polyester:50% cotton blend fabrics which had been dyed in a vat sand shade, in a vat olive shade, in a sulfur black shade and in a cross-dyed shade, were sewn in the form of uncuffed trouser legs and set-creased. These garment sections were processed as in Example 1, pressing the cuffs for 120 seconds, 150 seconds or 180 seconds. All processed cuffs retained their original shape even after repeated launderings.

EXAMPLE 10

Garment sections made from 55% polyester:45% rayon blend fabrics, sewn in the form of uncuffed trouser legs set-creased were processed as in Example 1, pressing the cuffs for 120 seconds, 180 seconds or 240 seconds. Similar garment sections were cuffed and pressed without prior treatment with the acid:acid salt solution. All the cuffs were laundered and tumble dried. After one cycle, the cuffs which had not been impregnated with the solution described in Example 1 showed no shape retention, while the treated cuffs retained their shape even after ten washing cycles.

EXAMPLE 11

Garment sections made from 8 oz. all-cotton twill sewn in the form of uncuffed trouser legs and set-creased were processed as in Example 1, pressing the air dried cuffs for only 180 seconds. The resulting modified garment sections were then treated by one of the following methods: rinse in cold water and dry, spray with a 1% aqueous solution of sodium acetate and dry, spray with a 1% aqueous solution of ammonium hydroxide and dry. All the treated garment sections were then laundered and tumble dried without noticeable change in appearance of the cuff form.

EXAMPLE 12

A garment in the form of a pair of uncuffed trousers made from a 50% polyester:50% cotton blend fabric was set-creased in all desired areas. One of the legs was sprayed along the area where the cuff would be formed, with an aqueous solution of 7.0 parts of citric acid per 100 parts of solution until this area was impregnated to approximately 60–70% of its dry weight. The other leg was sprayed in the same area with an aqueous solution of 5.5 parts of citric acid and 2.5 parts of a 30% aqueous solution of magnesium chloride per 100 parts of solution until this area was impregnated to approximately 60–70% of its dry weight. The flat cuff areas were air dried and cuff shapes were introduced according to the standard procedures known in the art for making cuffs on trouser legs. The cuffed sections were then pressed on a leg-press for 180 seconds. On repeated launderings, the cuffs kept their original shape and flatness.

EXAMPLE 13

A garment in the form of a pair of trousers made with a 36-inch waist from an 8 oz. all-cotton twill was set in all desired areas, as well as cuffed, at a crotch length of 32 inches. The back waist seam was opened and sewn again to a 34-inch waist. The newly sewn section was sprayed with an aqueous solution as described in Example 1, air dried and pressed for 180 seconds. Also, the cuffs were opened and the areas sprayed with the same aqueous solution as used above. The dried trouser legs were then re-cuffed to give a crotch length of 30 inches and then pressed for 180 seconds. The garment in the modified shape was subjected to repeated launderings without any evidence of loss in flatness of the waist and back seam or in the appearance of the cuffs.

EXAMPLE 14

Five aqueous solutions were prepared as follows: (1) 6.0 parts of citric acid per 100 parts of solution, (2) 4.5 parts of citric acid and 1.5 parts of a 30% aqueous solution of magnesium chloride per 100 parts of solution, (3) 7.5 parts of citric acid and 3.0 parts of a 30% aqueous solution of magnesium chloride per 100 parts of solution, (4) 4.5 parts of glycolic acid and 1.5 parts of a 30% aqueous solution of magnesium chloride per 100 parts of solution, and (5) 7.5 parts of glycolic acid and 3.0 parts of a 30% aqueous solution of magnesium chloride. Garment sections made from a 55% polyester:45% rayon blend fabric sewn in the form of uncuffed trouser legs and set-creased were treated with the above solutions and processed as in Example 1, pressing the dry cuffs for 180 seconds or 240 seconds. All of the resulting garment sections showed a durable cuff configuration even after repeated launderings.

EXAMPLE 15

Garment sections made from a 65% polyester:35% rayon blend fabric sewn in the form of uncuffed trouser legs and set-creased were processed as in Example 14. The new configurations were durable to repeated launderings.

EXAMPLE 16

Garment sections made from 55% acrylonitrile:37% rayon:8% rayon acetate blend fabric, sewn in the form of uncuffed trouser legs and set-creased were processed as in Example 14. The new configurations were durable to repeated launderings.

EXAMPLE 17

(a) A solution of 3.5 parts of citric acid and 0.5 parts of magnesium chloride in 96.0 parts of water was sprayed upon the lower legs of a pair of cuffed, permanently set cotton twill trousers. After the trousers had been air dried, a new cuff was arranged in the trousers and the trousers were then pressed at a temperature of about 240° F. for 180 seconds. After the pressing and heating step, the trousers possessed sharp, flat cuffs in the new position, with no trace remaining of the original cuffs. The newly formed cuffs retained their sharp creases upon laundering.

(b) A solution of 3.5 parts of citric acid and 96.5 parts of water was sprayed upon the lower legs of a pair of cuffed, permanently set cotton twill trousers. After the trousers had been air dried, a new cuff was arranged in the trousers and the trousers were then pressed at a temperature of about 240° F. for 180 seconds. After the pressing and heating step, the trousers possessed sharp, flat cuffs in the new position, with no trace remaining of the original cuffs. The newly formed cuffs retained their sharp creases upon laundering.

EXAMPLE 18

Garment sections made from 55% polyester: 45% rayon blend fabric, sewn in the form of uncuffed trouser legs and set-creased were folded and sewn to form the desired cuff. These formed cuffs were impregnated with an aqueous solution prepared with 4.5 parts of citric acid and 1.5 parts of a 30% aqueous solution of magnesium chloride per 100 parts of solution. The wet cuffs were dried on a press adjusted so as to effect further heat treatment of the cuffs in accordance with this invention. Similar garment sections were also cuffed and impregnated with water only and pressed as above. All the cuffs were laundered and tumble dried. After one such cycle, the cuffs which had not been impregnated with the solution described above showed no shape retention; however, the treated cuffs retained their shape even after ten wash cycles.

EXAMPLE 19

A garment section was made from an 8 oz. all-cotton twill sewn in the form of a trouser leg and set-creased. This garment section was then wetted with the aqueous solution described in Example 1 and folded so as to form a crease in a new, previously flat area. This garment section was then air dried. After air drying, the trouser leg was pressed in the new configuration for 150 seconds. After the resulting garment section had been laundered ten times, the old crease virtually disappeared wherein the new crease retained its shape and sharpness.

EXAMPLE 20

Garment sections made from 8 oz. all-cotton twill, sewn in the form of uncuffed trouser legs and set-creased were processed as in Example 1 except that the dried and cuffed sections were pressed slightly to impart the shape of the cuff and then exposed in a forced air oven to the following heat cycles: 1 minute, 5 minutes, 10 minutes at 240° F.; 1 minute, 3 minutes and 6 minutes at 275° F. and at 300° F. All of the resulting cuffed garment sections retained their new shape even after repeated launderings.

Any departure from the above description which conforms to the above description is intended to be included within the scope of the invention as defined by the following claims.

What is claimed is:

1. The method of resetting the configuration of a permanently set garment which comprises selecting a permanently set cellulose fiber-containing garment having at least one permanent fold, applying a solution of a mixture of citric acid and magnesium chloride dissolved in isopropyl alcohol to said garment in those areas where a new configuration involving a change in the position of said permanent fold is to be effected, arranging said garment in said new configuration, and thereafter pressing said garment in said new configuration and heating said arranged garment to reset said new configuration including said fold in said changed position.

References Cited

UNITED STATES PATENTS

2,957,746	10/1960	Buck et al.	8—129 X
3,268,291	8/1966	Mack et al.	8—116

G. F. LESMES, Primary Examiner

J. CANNON, Assistant Examiner

U.S. Cl. X.R.

2—269; 8—116.3, 115.7, 129