Aug. 16, 1966 L. A. RUNTON 3,266,865

STRETCHABLE WOOL AND WOOL-BLEND FABRICS

Filed March 26, 1962 2 Sheets-Sheet 1

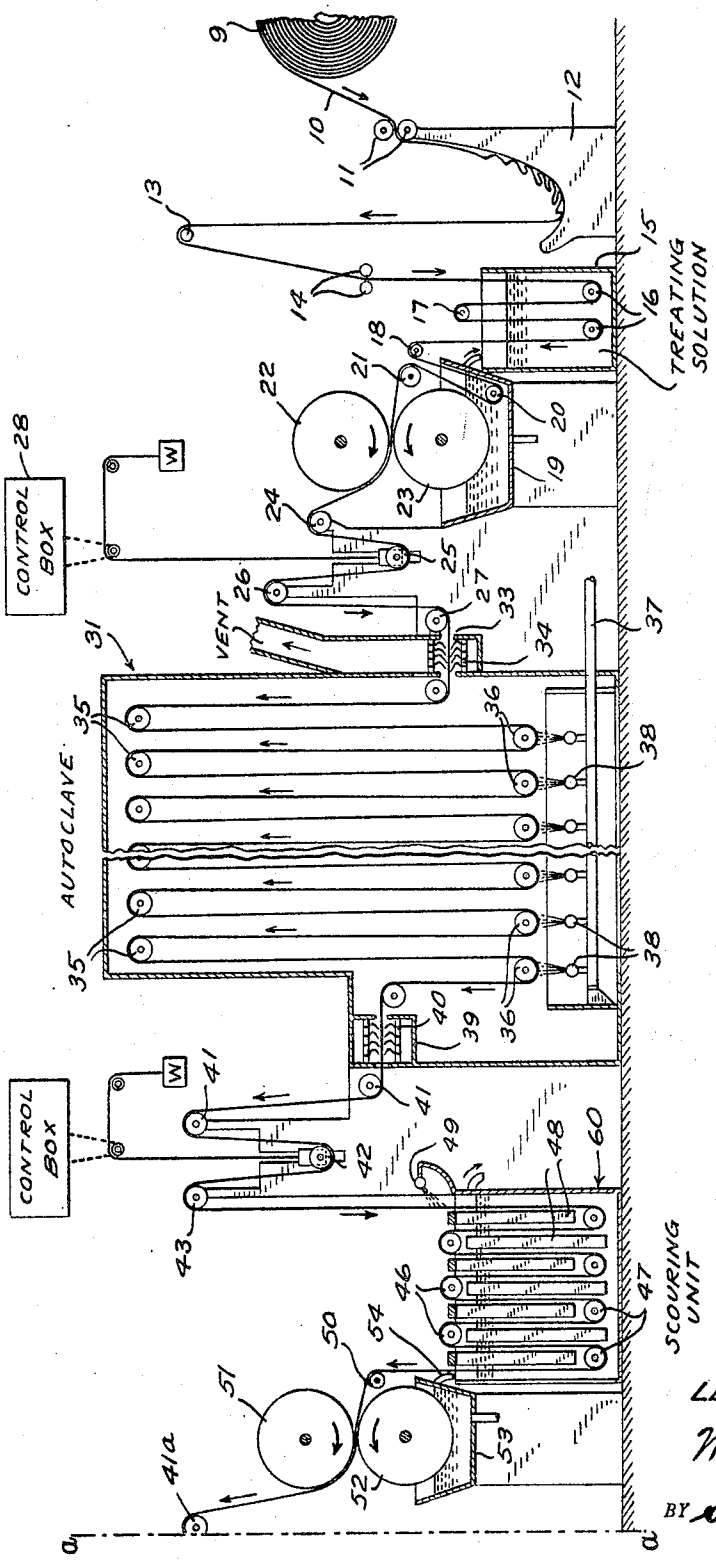


Fig. 1.



Fig. 3.

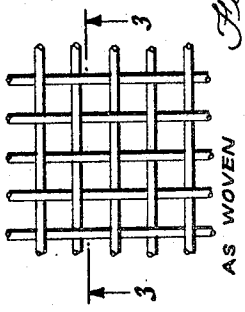


Fig. 2.

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STRETCHABLE WOOL AND WOOL-BLEND FABRICS

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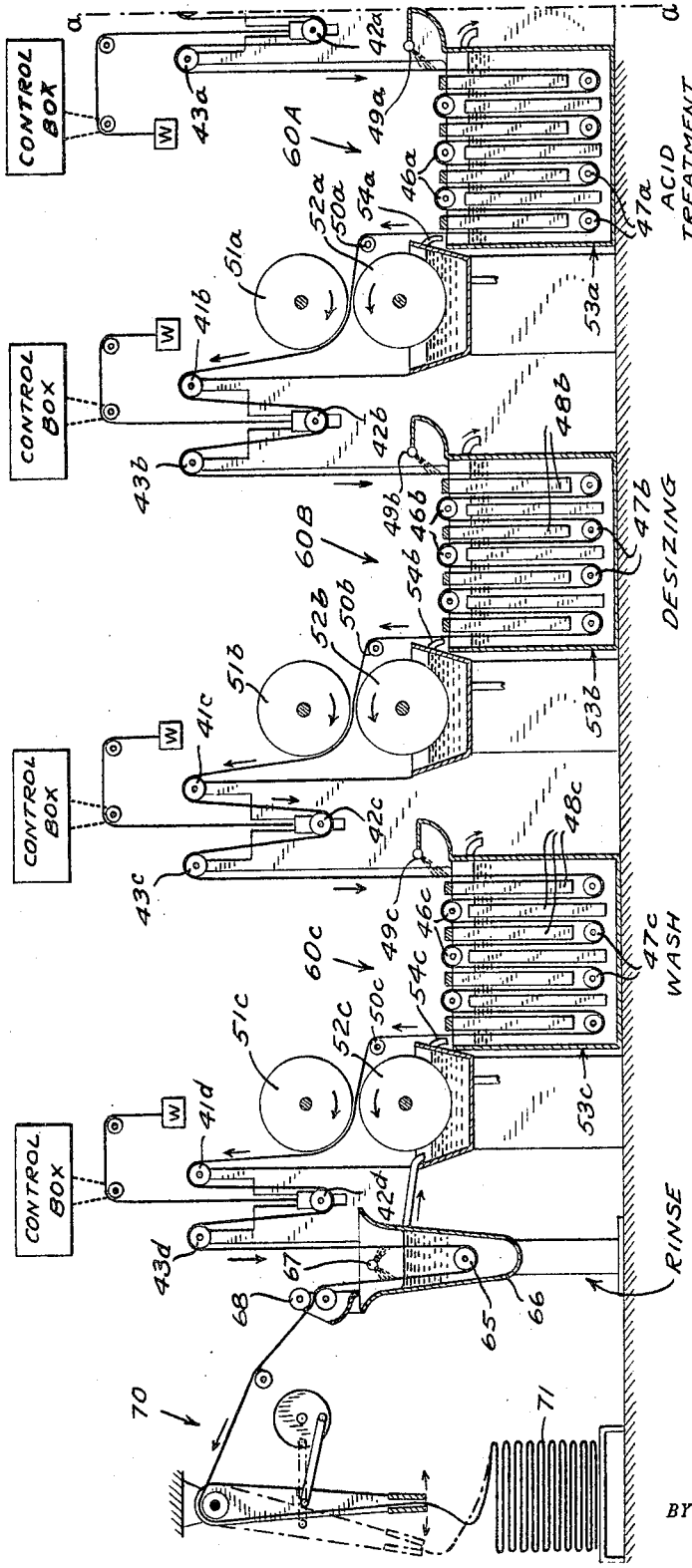


Fig. 1A.

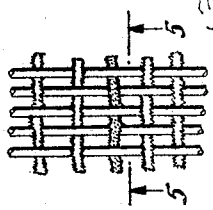


Fig. 4.



Fig. 5.

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3,266,865
STRETCHABLE WOOL AND WOOL-BLEND FABRICS

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Filed Mar. 26, 1962, Ser. No. 182,535
16 Claims. (Cl. 8—128)

This application is a continuation-in-part of copending applications Serial No. 75,394, filed December 12, 1960, now abandoned; Serial No. 118,217, filed May 9, 1961, now U.S. Patent 3,077,655, and Serial No. 151,827, filed November 13, 1961, now abandoned.

This invention relates to woven wool fabrics composed entirely or in part of wool which fabrics have characteristics hitherto unattainable and to methods of preparing the same.

An object of this invention is to provide fabrics composed wholly or partly of wool which possess recoverable stretch in at least one direction.

A further object of this invention is to provide fabrics composed wholly or partly of wool characterized by tailorability, excellent wrinkle recovery, good drape, shape retentivity, crease retention, and excellent hand.

A further object is to provide fabrics wherein fiber migration and fuzzing in the conventional wool finishing operation and in the laundering and dry cleaning of the garments made from these fabrics is minimized whereby a clear definition of the individual yarns constituting the fabrics is retained in superior measure.

A further object of this invention is to provide a method of making wool and wool-containing fabrics characterized by recoverable stretch in at least one direction, by superior tailorability, excellent wrinkle recovery, good drape, crease retention, and shape retentivity.

Other objects of this invention will be apparent from the following description, examples and claims.

In accordance with this invention, the fabric, which can consist entirely or partly of all-wool yarns or of yarn composed of a blend of at least 30% wool with other staple fibers as received from the weaving stage, and with or without size and in dyed or undyed state, is impregnated with a solution of a chemical relaxing agent, for example, by being passed through such a solution and thereafter squeezed to removed excess liquid. It is then heated, for example, by exposure to steam while free from constraint in at least one direction.

More specifically, the fabric is impregnated with a solution of the relaxing agent, and when the excess solution is removed by squeezing, it contains 100 to 130% of liquid on the dry weight of the fabric. In order to permit full relaxation of the impregnated fabric, it is heated, for example, by steaming at a temperature between about 210° F. and 225° F. for a time ranging from ½ to 4 minutes. If a lower steam temperature is employed, the time needs to be prolonged to effect full relaxation; and conversely, if a higher steam temperature is utilized, a shorter time is required.

When a fabric containing wool fibers is impregnated with a relaxing agent and is heated in the presence of moisture, the wool fibers relax to develop a high degree of planar crimp in the yarns, whereby the yarns, and consequently the fabric shrinks in the direction which is free from constraint. For example, if the fabric is free from tension or constraint in the filling direction, it can be shrunk weftwise in the heating step zone as much as 6 to 25% without appreciable shrinkage in the warpwise direction. The amount of shrinkage in the weft-wise direction, and consequently the amount of recoverable

stretch, can be regulated by controlling the amount of tension applied to the fabric in the warp direction while it is in the heating zone, for example, by increasing the amount of tension in the warp direction, the amount of shrinkage in the weft direction is increased.

On the other hand, if the fabric is free from constraint in both weft and warp directions, it can be shrunk as much as 20% in each of the two directions.

After the heating or relaxing step, it is desirable to cool the fabric immediately, such as by immersing it in cold water, by spraying with cold water, or by aspirating cool air through the fabric. The impact of this cooling action serves to set the wool fibers in their relaxed or crimped state. Further stabilization of the fabric can be accomplished by a subsequent treatment with any of the reagents known in the art for stabilizing relaxed keratin fibers.

Representative of the relaxing agents usable in the present invention are such well known reducing agents, for wool as the sulfites, bisulfites, sulfoxylates, and hydrosulfites. These can be used as the alkali metal, ammonium, or organic amine salts. Other such reducing agents are substituted mercaptans, for example, mercapto-acids or mercapto-alcohols, the alkali metal boro-hydrides, and the alkali metal stannites. However, the preferred relaxing agents are the aqueous solutions of organic amine sulfites (or bisulfites), such as those disclosed in U.S. Patent No. 2,437,965, and particularly a solution of monoethanolamine sulfite in about 5% concentration.

Representative of the stabilizing agents which can be employed following the relaxing and cooling steps in the present invention are dilute solutions of aliphatic carboxylic acids such as formic or acetic acid; mild alkalis such as dilute solutions of alkali metal carbonates; solutions of oxidants such as hydrogen peroxide or sodium persulfate; combinations of alkali and oxidants; solutions of multivalent metal salts, such as the water-soluble salts of zinc; or solutions or emulsions of alkaline dihalides of the type disclosed in U.S. Patent No. 2,434,562.

The particular stabilizing agent employed will depend upon the relaxing agent used originally in treating the wool or part-wool fabric in accordance with principles well known in the art. For example, if a sulfite or bisulfite is employed as the relaxing agent, then a dilute solution of a carboxylic acid or a dilute solution of an alkali metal carbonate will be the preferred stabilizing agent.

The relaxing reagents employed in the present process are well known in the art of imparting permanent set to all-wool fabrics in the flat, pleated and creased form. These reagents have also been employed to relax specially constructed wool fabrics composed of high-twist yarns so as to develop crepe effects. The high-twist worsted yarns which are necessary for making wool crepes have a singles twist factor (turns per inch per square root of the worsted count) greater than 4.5 and usually about 5.0. However, I have made the surprising discovery that when wool and wool-containing fabrics constructed of conventional twist yarns, that is, with a twist factor ranging from 1.5 to 4.0 are treated by the process of this invention, fabrics are obtained which are characterized (a) by possessing recoverable stretch in at least one direction; (b) by having a clear smooth surface rather than either a creped or fuzzy surface, and (c) by exhibiting highly desirable characteristics with respect to tailorability, hand, crease resistance, wrinkle recovery, and shape retention.

It will be apparent from the foregoing description that the process of this invention can be carried out either

as a continuous or a batch process. An apparatus suitable for carrying out the present invention by a continuous process is illustrated in the accompanying drawings wherein:

FIGS. 1 and 1*a*, when joined at the vertical lines *a*—*a*, together constitute a schematic sectional view of such apparatus;

FIG. 2 is a plan view showing the fabric as woven and prior to the shrinkage operation;

FIG. 3 is a section taken on the line 3—3 of FIG. 2;

FIG. 4 is a plan view similar to FIG. 2 showing the fabric in finished contracted form; and

FIG. 5 is a section taken on the line 5—5 of FIG. 4.

With reference to FIGS. 1 and 1*a* of the drawings, there is shown an apparatus for carrying out the present invention by a continuous process. A strip of fabric **10** of the type above described is fed from a supply roll **9** by feed rolls **11** into a J-box **12** where it forms a series of loose folds. It is withdrawn from the J-box **12** over a roll **13** and is introduced between guide rolls **14** into a tank **15** containing a relaxing solution of the type referred to above. The fabric strip **10** passes in a succession of folds under a set of lower rolls **16** and over a roll **17**, the former being immersed in the solution of tank **15**.

From the tank **15** the fabric **10** passes over a roll **18** into a tank **19** under a roll **20** which is submerged in the relaxing solution in the tank, thence over a roll **21** to the bite of a pair of squeeze rolls **22** and **23**. A drain returns solution from the tank **19** to the tank **15**.

The upper roll **22** is loaded so as to leave a pick up of about 100 to 130 percent of the fabric weight. The lower roll **23** dips into the solution in a tank **19**.

From the squeeze rolls **22** and **23** the fabric passes over a guide roll **24**, under a control roll **25**, over a guide roll **26** and under a guide roll **27** into an autoclave **31** through a vestibule **33** having a seal **34** to minimize the escape of steam. The control roll **25** actuates a control box **28** which is connected to control the drive of the rolls **22** and **23** in sequence to maintain the fabric strip entering the autoclave under a constant tension in the warp direction. In the autoclave **31** the fabric passes around a series of upper rolls **35** and a series of lower rolls **36** in the form of a series of vertical loops. Steam is supplied to the space below the lower rolls **36** from a supply pipe **37** through a series of headers **38**.

In the autoclave the steam, which is at a temperature of about 210° to 225° F., is maintained at a slight pressure above atmospheric which in conjunction with seal **34** prevents the entrance of any air. The fabric is unconfined laterally so that it is free to shrink in width during this treatment while the rolls **35** and **36** hold the fabric flat and in unwrinkled condition.

The rolls **35** and **36** in the autoclave are driven at a predetermined rate by a suitable adjustable variable speed driven mechanism not shown. The rate may be adjusted in accordance with the time which the fabric is to remain in the autoclave, which time is preferably in the range of ½ to 4 minutes.

The fabric passes from the autoclave through an exit vestibule **39** having a seal **40** around guide rolls **41**, under a control roll **42** and over a guide roll **43** into a full width cloth scouring unit **60**, known as a Williams unit, of standard construction having a series of upper rolls **46** and a series of lower rolls **47** around which the fabric passes in a series of loops between fixed plates **48** which lie closely adjacent the loops. A spray of cold water is supplied to the fabric in this scouring unit from a spray header **49**. This spray immediately cools the fabric to a temperature to stop the chemical action, and also removes a large portion of the treating agent.

The scouring liquid is maintained in the scouring unit at a level slightly below the rolls **46** so that the fabric advances through this liquid as it feeds through the unit. From the scouring unit **60** the fabric passes over a guide roll **50** into the bite of a pair of feed rolls **51** and **52**, the latter of which dips into the liquid in a tank **53** which drains into the scouring unit through an overflow **54**. The control roll **42** is adapted to control the rate of the feed rolls **51** and **52** so as to maintain the fabric under a constant tension in its passage through the apparatus.

From the feed rolls **51** and **52** the fabric passes through a series of units **60A**, **60B** and **60C** which are substantially identical with the unit **60** and the corresponding parts of which have been given similar reference numbers with the suffixes added. Each unit is followed by a pair of feed rolls **51***a*, **52***a*, **51***b*, **52***b*, **51***c* and **52***c* respectively. Each pair of feed rolls is followed by a control unit composed of fixed rolls **41***a*, **41***b* and **41***a*, **43***a*, **43***b* and **43***a* and a movable control roll **42***a*, **42***b* and **42***c* respectively. Each control roll is connected to control the rate of the preceding pair of feed rolls so as to maintain the fabric under a constant tension in the corresponding unit.

The unit **60A** can contain a stabilizing agent of the type described above. The unit **60B** can contain a desizing solution for removing any size remaining on the fabric. If the fabric is unsized or if it is not desired to remove the size, this unit may be omitted. The unit **60C** can contain wash water to remove the stabilizing and desizing solutions.

From the unit **60C** the fabric passes under a roll **65** in a tank **66** containing rinse water for a final rinse. Rinse water is supplied from a spray header **67** onto the fabric as it enters and leaves the tank **66**. From the tank **66** the fabric passes between a pair of squeeze rolls **68**, thence to a folder **70** which may be of standard construction and is adapted to lay the fabric in a series of folds **71**. The fabric is then taken to a drying stage such as a slack loop dryer, not shown, or a slack tray dryer or a hot air dryer of any standard type, wherein the cloth is dried in a relaxed state.

As already noted, this invention can be carried out by a batch process. For this purpose, several of the conventional wool finishing machines can be used. For example, the fabric can be impregnated with the relaxing solution and wound on the perforated drum of a decating machine together with a cotton leader cloth, care being taken to wind with a minimum of tension so that the fabric is free to shrink. Steam is then blown through the perforations in the drum for about 2–4 minutes, and the fabric is then cooled by aspirating air through it by means of a vacuum pump for several minutes. The fabric is then unwound, excess water is removed by hydro-extraction, and the fabric is dried in a tension-free state in a slack loop drier or slack tray drier of the conventional design.

Another conventional wool finishing machine which can be effectively employed for carrying out this invention by a batch process is a pressure piece-dyeing machine wherein the fabric is wound on a perforated roll with minimal tension without a leader cloth. The process can then be carried out in the same manner as described above for a decating machine. Alternatively, the fabric can be wound on the roll without being previously impregnated with the relaxing solution. In this instance, the wound roll of fabric in the machine is immersed in the relaxing solution which is then heated and circulated through the fabric to effect the desired relaxation. The fabric can then be cooled by replacing the relaxing solution with cold water, and thereafter a stabilizing solution can be circulated therethrough. The fabric can then be subjected to the further steps of extraction and drying as mentioned above in connection with the decating machine.

It is to be understood that whether a batch or continuous process is employed with the present invention, the fabric either before or after drying may be subjected to other standard finishing steps, such as dyeing or the like.

It is to be further understood that the present invention is applicable to all types of woven wool and part-wool fabrics, consisting of two sets of yarns, namely, weft and warp yarns, except creped fabrics, containing at least 30% wool in one set of yarns, the remainder being synthetic or natural staple fibers such as polyester, polyamide, acrylic, rayon, or cotton fibers. It will be evident that when stretch in only one set of yarns or in one direction is desired, the yarns in the other set can be composed entirely of the aforementioned synthetic or natural (non-wool) staple fibers.

Obviously the weft yarns and warp yarns may be woven under the same tension and may have the same number of yarns per inch if equal stretch is desired in both directions or the filler yarns may be woven under a greater tension than the warp yarns, and vice versa, depending on the product desired.

The following table gives further illustrative examples of specific yarn sizes and weaves which are suitable for the above purpose.

Turns per inch of S Twist Singles	Z-Ply	Yarn Size Worsted Counts	Warp Ends, per inch		Weft Ends, per inch	
			Before	After	Before	After
22	14	2/60s	49	60	42	51
18	20	2/60s	68	74	68	77
17	18	2/50s	68	72	52	64
16½	17½	2/46s	49	60	42	52
15	17	2/40s	53.5	59	48	59
12	8	2/20s	38	42	40	44

While the above examples have indicated two-ply yarns it will be evident that singles yarns of the equivalent sizes may be used for either warp or weft, or both, in place of the two-ply yarns specified, in which case the twist of the singles yarns will be within the ranges set forth for the equivalent singles yarns in the examples.

It is also contemplated by this invention that with fabrics of certain construction if complete relaxation is permitted to take place, the stretch will be greater than desired. Consequently, with such fabrics it will be desirable to limit the amount of contraction by holding to the desirable range of 6–25%. This can be accomplished, for example, by clamping it in a tentering frame in such a manner that the fabric is free to contract to the desired limited extent and subjecting the fabric to the heating step while in this condition.

The following examples will furher illustrate my invention and enable others skilled in the art to understand the invention more completely. However, it is to be understood that my invention is not limited to the particular conditions and materials recited in these examples.

Example 1

Four pieces of plain-weave, 7–7½ oz. tropical worsted men's suiting fabric, containing 48% wool and 52% Dacron polyester fiber, were woven from undyed ⅓₂'s worsted counts yarn with 18 turns per inch of twist in both warp and filling (twist factor 3.2). In two of these pieces, A and B, the warp yarn was spun on the worsted system, and the filling yarn on the cotton system. In the other two pieces, C and D, both sets of yarn were spun on the cotton system.

In the greige state, the width of all the pieces was 63 inches, and they contained 65 threads per inch in the warp and 54 picks per inch in the filling. All the pieces were rope-scoured in a conventional manner; piece A was then finished in a conventional manner, by beck-dyeing, tenter drying, shearing, decating, and pressing. Pieces B and C were treated by the process of this invention by the continuous method described above, the fabric being free from constraint in the filling direction with a warp tension of 30 pounds, using the apparatus shown in FIGS. 1 and 1*a*. The relaxing agent was an 18-to-1 aqueous solution of monoethanolamine sulfite, and the steaming time was 2½ minutes, the temperature in the autoclave being 212–218° F. In the stabilizing step, a 0.2% solution of formic acid was employed. The finishing was completed by beck-dyeing, drying in a slack tray dryer, and semi-decating. Piece D was treated by the process of this invention by the batch method described above, using a Burlington pressure piece-dyeing machine. The fabric was impregnated with a 20-to-1 aqueous solution of monoethanolamine sulfite containing a small amount of wetting agent, and passed through a pair of squeeze rolls to reduce the pick up to 110%. The wet piece was loosely wrapped on the perforated drum, and steam was then blown through it for 4 minutes, the machine being open to the atmosphere. When the steam was blown through the loosely wound fabric, there was sufficient freedom from constraint to permit the fabric to shrink extensively in the filling direction; and to a limited extent in the warp direction. Following steaming, the piece was cooled by filling the machine with cold water, which was then drained. The piece was unwound from the drum, extracted, and dried in a slack loop dryer. The whole process was then repeated. The finishing was completed in the manner described for pieces B and C.

The width of the fabrics was then measured, and their stretchability in both yarn directions was determined in the following manner: swatches of fabric were cut 24 inches long in the test direction and 8 inches wide in the other direction, and were exposed to standard atmosphere of 65% relative humidity, 70° F. for a minimum of 4 hours. Two marks, parallel to the short sides of each swatch were made 18 inches apart. One short edge of the swatch was then attached to a 6-inch-wide hanging clamp, and another clamp of the same width was attached to the lower, free-hanging, end of the swatch. A weight was then added to the lower clamp which, added to the weight of the clamp itself, created a total load of 5 lbs. The distance between the two marks in the fabric was then measured, and the percentage extension of the fabric calculated. The results obtained with the four fabrics are recorded in the table below, together with their finished widths.

	Finished Width (inches)	Stretch, percent	
		Filling	Warp
Fabric:			
A—Worsted warp, no treatment	60	3.9	2.8
B—Worsted warp continuous process	56	9.2	3.3
C—Cotton-spun warp, continuous process	57	7.2	3.6
D—Cotton-spun warp, batch process	57	7.2	3.6

The stretch was in all cases completely recovered when the load was removed from the swatch. The swatches were then subjected successively to three treating steps: (a) relaxation by 30 minutes immersion in water at 80–85° F.; (b) dry-cleaning, in accordance with Federal specification CCC–T–191b, CS–5944; and (c) laundering in a domestic agitator washer, at 105° F., with a 3 minute sudsing cycle, in a total load of 3 lbs. The stretch was redetermined after each of the three steps, and was found to be unchanged by the first two steps, and slightly reduced by the third.

Aftter relaxation, dry cleaning, and laundering fabrics had a smooth finish equal to Fabric A. Relaxation, dry cleaning, and laundering caused a considerable increase in the surface fuzziness and loss of clarity of finish in Fabric A. Fabrics B, C and D were less effected by these treatments than Fabric A.

It is well known that wool-containing fabrics composed wholly of yarns spun on the cotton system, when finished according to the prior art, have the undesirable characteristics of indistinct finish, with the yarns merging into each other, and having surface fuzziness. It is therefore particularly remarkable that Fabrics C and D, finished in accordance with my invention, were equal in clarity of finished Fabric A which was composed partly of worsted-spun yarns.

In addition to their stretch and superior surface finish, Fabrics B, C, and D possessed a softer hand, a better drape and a greater resistance to wrinkling at high relative humidity, than Fabric A. All these characteristics are conductive to the production of more easily tailorable, better fitting, more pleasing, and better wearing garments.

Example 2

Three stock-dyed, plain-weave, all wool worsted fabrics were woven and scoured. Their construction details are given in the table below:

	Pieces		
	E	F	G
Worsted yarn counts, warp and filling	2/57's	2/40's	2/50's.
Singles yarn twist, turns per inch, warp and filling	17	14	21.
Singles twist factor	2.1	2.2	3.0.
Threads per inch, greige	59	50	56.
Picks per inch, greige	55	45	49.
Width, inches, greige	70½	71	71.
Weight, ozs./yd. finished	8¼	9¾	8½.

The three pieces were treated according to the process of this invention by the batch method described above. The pieces were impregnated with a 20:1 solution of monoethanolamine sulfite containing a small amount of wetting agent, squeezed to a pick-up of 110%, and loosely wrapped with a cotton leader cloth on the perforated drum of a decating machine. Steam was blown outward through the roll for three minutes and the fabric was then cooled by sucking cold air inwards, by means of a pump, for two minutes. The pieces were unwound from the roll, extracted to about 60% pick-up, and dried in a slack tray dryer. The process was repeated, and the pieces were semi-decated. The finished widths and the recoverable stretch of the fabrics are given in the table below:

	Finished Width (inches)	Stretch, percent	
		Filling	Warp
Fabrics:			
E	61	11.9	3.6
F	62	10.6	3.1
G	62	9.2	4.2

The filling stretch remained essentially unchanged after relaxation, dry-cleaning, and laundering; the warp stretch was somewhat increased by the treatments.

In addition to their stretch characteristic, Fabrics E, F and G were also notable for their clear finish and for their soft hand, good drape, and resistance to wrinkling at high humidity.

Example 3

Four pieces of all-wool fabric were processed by the continuous process described above, using the device shown in FIGS. 1 and 1*a* and the treatment conditions given in Example 1 except that the warp tension was 25 pounds instead of 30 pounds. The composition and construction details of the fabrics are given below:

Fabric type	Pieces			
	H	I	K	L
	Men's suiting	Dress	Men's suiting	Women's flannel
Dyeing	Piece	Piece	Top	Piece
Weave	Plain	Plain	Plain	2/1 twill
Yarn counts:				
Warp	1/24's Wst	5½ run	2/50's Wst	4.4 run
Filling	2/50's Wst	1/20's Wst	2/50's Wst	4.4 run
Singles, yarn twist, tpi, warp	16	15	17	12½.
Singles yarn twist, tpi, filling	17	13	17	12½.
Worsted twist factor, warp	3.3	3.8	2.4	3.5.
Worsted twist factor, filling	2.4	2.9	2.4	3.5.
Threads per inch, finished	65	41	69	51.
Picks per inch, finished	52	40	52	33.
Width, inches, finished	59	58½	58	54.
Weight, ozs./yd., finished	9¼	9½	9	12.

The recoverable stretch of these fabrics is given in the table below:

	Stretch, percent	
	Filling	Warp
Fabrics:		
H	15.5	4.0
I	19.0	5.0
K	13.5	2.5
L	23.5	3.0

These fabrics, in addition to their stretch, exhibited a superior clarity of finish, a soft hand, good drape, resistance to wrinkling at high humidity, and a high degree of tailorability. The data of this example demonstrate that the benefits derived from this invention are applicable to a wide variety of wool-containing fabrics of conventional construction, made from either worsted-type yarns or from woolen-spun yarns, or from a combination of both.

While the illustrative embodiments of the invention have been described hereinbefore with particularity, it

will be understood that various other modifications will be apparent to and can readily be made by those skilled in the art without departing from the scope and spirit of the invention. Accordingly, it is not intended that the scope of the claims appended hereto be limited to the examples and description set forth herein but rather that the claims be construed as encompassing all the features of patentable novelty which reside in the present invention including all features which would be treated as patentable equivalents thereof by those skilled in the art to which the invention pertains.

What I claim is:

1. A fabric comprising
a set of warp yarns and
a set of weft yarns wherein
one of said sets of yarns includes wool, and
is highly crimped as it passes under and over yarns of the other set, and
is permanently set in the crimped state, the crimp being a planar crimp such that the fabric may be stretched by at least 6% and will return to its original state when the stretching force is released, said fabric having the stretch property in one direction only.

2. A fabric as set forth in claim 1 wherein
said yarns are 20s to 60s plied yarns having
a singles twist of from 12 to 22 turns per inch and
a ply twist of from 8 to 14 turns per inch,
the twist varying inversely with the yarn size.

3. The fabric set forth in claim 1 wherein
the fabric contains from 42 to 74 warp yarns per inch and
from 44 to 77 weft yarns per inch when in the relaxed state.

4. A woven fabric comprising
a set of weft yarns and
a set of warp yarns,
the yarns of one of said sets being composed essentially of wool,
said wool being in the highly crimped and bulked state characteristic of a yarn which has been highly twisted and shrunken in the presence of a stabilizing agent which is capable of reacting with the wool to set the yarn in its contracted state whereby the fabric is capable of stretching by at least 6% and of returning to its contracted state when the stretch force is released, said fabric having the stretch property in one direction only.

5. A chemically stabilized woven fabric having highly crimped wool yarns extending in one direction of the fabric, the crimp in said wool yarns being a planar crimp of a magnitude such that the fabric may be stretched by at least 6% in the direction of the crimp in said wool yarns and will return to its original state when stretching force is released, said fabric having the stretch property in one direction only.

6. The fabric as defined in claim 5 wherein said wool yarns have a worsted twist factor of about 1.5 to 4.0.

7. A fabric comprising a set of warp yarns and a set of weft yarns wherein one of said sets of yarns is composed essentially of wool and is highly crimped as it passes under and over yarns of the other set and is permanently set in the crimped state, the crimp being a planar crimp such that the fabric may be stretched by at least 6% in the direction of said one set of yarns and will return to its original state when the stretching force is released, said fabric having the stretch property in one direction only.

8. The fabric as defined in claim 7 wherein said wool yarns have a worsted twist factor of about 1.5 to 4.0.

9. The fabric as defined in claim 7 wherein said wool yarns form at least 30% by weight of the fabric.

10. The woven fabric as defined in claim 7 wherein the remainder of the fabric consists of thermoplastic fibers.

11. A woven wool fabric comprising a set of warp yarns and a set of weft yarns wherein one of said sets of wool yarns is highly crimped as it passes under and over yarns of the other set and is permanently set in the crimped state, the crimp being a planar crimp such that the wool fabric may be stretched by at least 6% in the direction of said one set of yarns and will return to its original state when the stretching force is released, said fabric having the stretch property in one direction only.

12. A wool fabric as defined in claim 11 wherein said planar crimp is such that the wool fabric may be stretched from 6 to 25% in one direction and will return to its original state when the stretching force is released.

13. The wool fabric of claim 11 wherein the wool yarns have a worsted twist factor of about 1.5 to 4.0.

14. A woven fabric having a substantially smooth surface and comprising a set of weft yarns and a set of warp yarns, some of the yarns in one of said sets being composed essentially of wool, said wool being in a highly crimped and bulked state and permanently set in said state, the crimp in said wool yarns being a planar crimp such that the fabric is capable of stretching from 6% to 25% and of returning to its contracted state when the stretching force is released, said fabric having the stretch property in one direction only.

15. A chemically stabilized woven fabric having highly crimped wool containing yarns extending in one direction of the fabric, the crimp in said wool containing yarns being a planar crimp of a magnitude such that the fabric may be stretched by at least 9.2% in the direction of the crimp in said wool containing yarns and will return to its original state when the stretching force is released, said fabric having the aforesaid stretch property in one direction only.

16. A chemically stabilized woven fabric having highly crimped wool containing yarns extending in one direction of the fabric, the crimp in said wool containing yarns being a planar crimp of a magnitude such that the fabric may be stretched by at least 13.5% in the direction of the crimp in said wool containing yarns and will return to its original state when the stretching force is released, said fabric having the aforesaid stretch property in one direction only.

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