The invention relates in general to textiles and, in particular, to a method for stabilizing the structure and form of fabrics and to the stabilized textiles produced, and includes correlated improvements designed to enhance the characteristics and uses of such textiles.

In the conventional method of knitting and weaving fabrics, the yarns are subjected to tension. This is done to secure proper operation of the knitting and weaving machines and to secure uniformity in the finished product. The fibers and yarns constituting the fabric in its unfinished state (i.e., in greige goods) are in a condition of stress or stretch, and hence tend to shrink under any circumstances that permit or facilitate movement and contraction of the fibers.

Fabrics made in such a manner exhibit the tendency to shrink when subjected to wet treatment such as may be encountered in finishing operations. However, by the conventional methods of handling fabrics, part or all of the shrinkage so acquired may be offset or lost through mechanical strain and stretch that the fabric encounters in passing through these operations. Consequently, when the goods are again wet out, such as in laundering, they will again exhibit the tendency to shrink either in the warp direction or filling direction or both, dependent on the degree of stretch present after finishing. The tendency to shrink will continue until the stretched condition of both the warp and filling threads has been relieved or until a balanced state of weaving contraction is obtained.

It has been proposed to provide a method of treatment that will shrink the fabric in both directions, in a manner analogous to the shrinkage otherwise occurring in the laundering, washing or other cleaning processes. This method is predicated upon the determination that the causes of shrinkage in a fabric subjected to full laundry treatment are mostly mechanical in effect. The process is, therefore, adapted to mechanically rearrange the fibers and to alter (by crimp in the yarns of the fabric to the same extent that these fibers would rearrange themselves and the yarns be cramped if subjected to full laundry washing.

Basically, this process comprises the steps of determining the change in dimension that will take place in the fabric when it is subjected to washing, then mechanically shrinking the fabric down to the dimensions so indicated, and finally completing the finishing operation without disturbing these dimensions.

Moreover, prior methods of shrinking fabrics have never been entirely successful when the fabric has been composed in whole or in part of artificial fibers, in particular of cut staple rayon. Owing to the swelling and shrinking which artificial filaments undergo on being wetted and dried, fabrics made of such filaments do not retain the condition produced by the preshrinking operation. However, even with fabrics made of natural fibers, such as cotton, the prior methods of preshrinking have not given results which were entirely permanent.

Furthermore, the stresses which fabrics undergo during wear and laundering frequently produce objectionable distortions even though such fabrics have been preshrunk by prior methods. Therefore, it is desirable to provide fabrics which are characterized by having a substantial permanent resistance to distortions of all types in order to preserve a desired structure, form and character in the textile.

On the other hand, it is frequently desired to impart to fabrics a predetermined structure or shape designed to enhance its general utility or to render the textile adapted for some special uses. For example, it is desirable to provide a fabric having a predetermined and definite residual shrinkage so that the fabric will maintain its shape and structure during wear and laundering.

Accordingly, it is a general object of the present invention to provide a stabilized textile having a predetermined structure which is permanent.

It is another object to provide a method for setting and fixing the dimensions of fabrics in a predetermined manner.

It is another object to provide a method for fixing a predetermined structure, stretch and or shrinkage in fabrics.

It is a specific object to provide a method for establishing a permanent and predetermined residual shrinkage in textiles.

It is a further specific object to preshrink fabrics comprising artificial filaments, in particular, cut staple rayon, and to render the shrunk condition substantially permanent.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

In the practice of the invention, the permanently preshrunk fabrics are made by mixing together, before the completion of the spinning, textile fibers and at least one type of thermoplastic fibers having an inherent tackiness upon heating, and forming the mixture of fibers into a singles yarn, mechanically shrinking the fabric...
made therefrom, fixing the shrunk structure by heating the thermoplastic fibres to render them tacky while the fabric is in its shrunk condition to effect a substantially permanent adhesion of fibres in the fabric. The singles yarn may be prepared from the fibre mixture in accordance with the process disclosed in the co-pending U. S. applications Serial No. 157,018, filed August 2nd, 1937, now Patent No.2,283,000 and Serial No. 201,551, filed April 13th, 1938, now Patent No.2,252,999. Such singles yarn may be used for making plied yarn, thread, cords, and fabrics of all kinds. The shrinkage of the fabric may be partial or complete or to any predetermined amount, and may be effected on woven, knitted, netted or other fabrics in one or more dimensions. The expression "shrinking" is intended to include all physical or mechanical changes in fibre size, length and crimp and changes in yarn length, crimp and displacement in fabrics which produce a decrease in dimension or contraction in the fabric.

The invention accordingly comprises a process having the steps and the relation of steps one to another, and an article having the elements, relation of elements and the characteristics and properties all as heretofore described and the scope of the application of which will be exemplified in the claims.

For a more complete understanding of the nature and objects of the invention, reference should be had to the accompanying drawing in which,

Fig. 1 is a diagrammatical representation of suitable means for carrying out one embodiment of the process of the invention; and

Fig. 2 is a cross-sectional elevation of a fabric before and after shrinkage in the process of the invention; and

Fig. 3 is a cross-section of a fabric after shrinkage in one dimension in accordance with one embodiment of the invention.

For the non-adhesive textile fibre there may be used any suitable natural or synthetic fibres of textile-making length, for example cotton, flax, jute, and other vegetable fibres; wool, hair, silk and other animal fibres; asbestos, glass, mineral and artificial fibres or filaments, formed of cellulose compounds, such as regenerated cellulose or cellulose hydrate of all kinds, cellulose derivatives, such as the esters, the ethers, whether soluble in water, alkali or organic solvents, mixed cellulose ethers, mixed cellulose ester-ethers, hydroxy-alkyl and carboxy-alkyl ethers of cellulose and xanthates of the cellulose ethers, cellulose thio ethers, cellulose xanthates, cellulose xanthofatty acids, and fibres formed from natural or synthetic resins of all kinds, which resins are fibres should be of the type that will not be rendered tacky at the temperatures employed to render the thermoplastic fibres tacky.

The potentially adhesive fiber may comprise any thermoplastic synthetic resinous material or thermoplastic non-fibrous cellulosic material capable of being formed into fibres which have an inherent tackiness upon heating to a temperature below that at which the textile fibres are damaged or rendered tacky and which are non-tacky at room temperature such, for example, as the resins formed by the polymerization of various organic compounds such as cumarone, indene hydrocarbons, vinyl, styrene, sterol aldehyde, furfural, ketones, urea, thiourea, phenol-aldehyde resins, either alone or modified with oils, urea-aldehyde resins, amine-aldehyde resins, sulfonamide-aldehyde resins, polyhydric alcohol-polybasic acid resins, drying oil-modified atkyd resin, resin formed from acrylic acid, its homologues and their derivatives, sulfur-olefine resins, resins formed from dicarboxylic acids and diamines (nylon type); fibres formed from synthetic or artificial rubber such as for example as polymerized butadiene, chloroprene, e. g. "Thiokol", isobutylene polymers, chloroprene polymers and polyvinyl-halides, e. g. "Koroseal" fibres formed from a resin comprising the product of copolymerizing two or more resins, such, for example, as co-polymer of vinyl halide and vinyl acetate, co-polymer of vinyl halides and an acrylic acid derivative, co-polymers of vinyl compound and styrol compound; and also fibres formed from a mixture of resins, such for example as a mixture of vinyl resins and acrylic acid resins or methacrylic acid resins, a mixture of polyolefine resins and phenol-aldehyde resins, or a mixture of two or more resins from the different classes just named.

The thermoplastic resins above mentioned may be classified as:

(a) Heat-convertible resins such for example as glycol polybasic acid resins, vinyl resins and the acid type phenol-aldehyde resins, and the like.

(b) Heat-convertible resins such for example as a glycerol-polybasic acid resin, polyolefine resins, phenolaldehyde resins and the like.

(c) An element-convertible resin (which becomes infusible through the action of certain elements, such as oxygen and sulphur), such for example as glycerol-polybasic acid-drying oil resins and olefine sulphur resins.

In addition to the synthetic resins, there may be employed for the potentially adhesive fibre, a fibre formed from a thermoplastic cellulose derivative such, for example, as a cellulose ester, a cellulose ether, a mixed cellulose ester-ether, a mixed cellulose ether, a hydroxy-alkyl or a carboxy-alkyl ether of cellulose, a cellulose ether xanthate, or a cellulose thioethane. In particular, the thermoplastic cellulose derivative fibre may be a fibre of cellulose acetate, cellulose nitrate or an organic soluble cellulose ethyl ether, and the like; also fibres formed from cellulose carboxy-alkyl ethers of cellulose derivatives of cellulose derivatives of resins, for example as a fibre formed by extruding a mixture of cellulose nitrate and an oil soluble phenol-aldehyde resin, or a cellulose acetate and an acrylic acid resin, or an organic soluble cellulose ether and a vinyl resin; also fibres formed from polyamide resins such as those formed from polybasic acids and aliphatic diamines (nylon type), either unstretched or prestretched; and fibres formed from a natural or synthetic rubber and rubber derivatives.

For the thermoplastic fibre, it is preferred to employ a resin fibre because the resin fibres, as compared to the cellulose derivative fibres, are tougher and harder, become tacky at lower temperatures, and to form tough or pliable products. Moreover, the resin fibres are inert to acids, alkalies and dry cleaning fluids, and are not water-swelling. This latter property prevents distortion of the adhesive bond, tends to stabilise the twist and shrinkage of the fabric, and the adhesive is more permanent so that the wet and dry tensile strength of the adhesive bond will be substantially the same. Finally, the resin fibres exhibit, particularly when plasticized, a high tensile strength and a true elasticity, practically as great as that of natural silk.
The non-adhesive textile fibres and/or the potentially adhesive fibres may be prestretched fibres or filaments. In such cases the shrinking treatment advantageously includes treatment with a suitable chemical reagent or heat to effect a shrinkage of the prestretched fibre. The resulting fibrosis, stretching will produce yarn shrinkage and augment and decrease in fabric dimension.

The articles of the invention are fabricated from yarns comprising at least two dissimilar types of fibres at least one of which is potentially adhesive fibres.

The mixing of the dissimilar fibres may be carried out in a suitable manner such, for example, as by blending at least two types of fibres before and/or during carding, combing, drafting, but in the completion of the spinning of the fibres into a single yarn. Thus the two types of fibres may be mixed and fed together into a carding machine; or slivers are made from each type independently and the slivers combined by drafting and spinning into a yarn. Alternatively, a yarn containing the potentially adhesive fibres may be twisted or doubled with another yarn of similar type or with a yarn not containing potentially adhesive fibres.

The invention is particularly adapted for permanently controlling or mixing a shrunken condition in a yarn comprising yarns made from non-adhesive and potentially adhesive fibres mixed together before the completion of the spinning of the yarn.

The relative proportions of the non-adhesive textile fibres and of the potentially adhesive fibres may be varied according to conditions, with their properties, the nature of the treatment, the intended use of the finished product and the characteristics desired therein. The mixture of fibres may be spun into yarns and threads and fabricated into fabrics in a known manner.

In its broad aspects the process of the invention is applicable for permanently fixing the structures and forms of fabrics after they have been modified by shrinking.

It is to be understood that the invention is not limited to any particular method of apparatus for carrying out the shrinking of the present process. Suitable means for carrying out the shrinking operation involved in the present invention are shown in U. S. Patents Nos. 1,982,720, 1,986,976, 2,021,976, and 2,052,948. By way of illustration, but not by way of limiting the invention, the following methods may be employed for shrinking fabrics in accordance with the present invention:

1. Stretching a moistened fabric in one dimension while permitting or controlling the shrinkage in another dimension. In this embodiment a woven fabric is subjected to moisture and preferably a suitable activating agent and thereafter stretched in the direction of one of its constituent sets of yarns, either warp or weft, while leaving the other set free from tension or under a limited tension and drying the fabric maintaining the tension on the one set of yarns. The stretching of the one set of yarns causes a contraction and increased crinkle or undulation of the yarns in the other set. The shrinking is carried out while the thermoplastic fibres are in a tacky condition and the adhesive material is rendered non-tacky while the one set of yarns is maintained under tension. The increased crinkle or shrink structure is rendered substantially permanent by the adhesion of the fibres in the fabric. This method can be used for shrinking knitted fabrics in one dimension.

2. By moistening and stretching the moist fabric in one dimension while permitting or controlling the shrinkage of the fabric in the other dimension whereby the unstretched yarns acquire additional crinkle and drying the fabric under tension, again moistening the fabric while free of tension to cause a swelling of the yarns and a consequent shrinkage of the first stretched yarns, and again drying the fabric under pressure, but free of tension. In this embodiment the potentially adhesive fibres are preferably rendered tacky during or after the final drying step. By this method a fabric can be permanently shrunk in two dimensions.

3. By moistening a fabric, mechanically compressing the moistened and preferably activated fabric in one dimension whereby the yarns acquire additional crinkle, maintaining the fabric under pressure while drying the fabric. The activation of the potentially adhesive fibres may take place before, during or after the drying step, and the deactivation of the fabric may take place after the drying by cooling while the fabric is maintained in the pre-shrunk condition. One embodiment of suitable means for carrying out the shrinking in this process is disclosed in U. S. Patent No. 1,861,423.

4. By moistening a fabric while maintaining one yarn system under tension and permitting or controlling the shrinkage of the other yarn system, that is, by permitting the other yarn to crinkle, thereafter mechanically compressing the yarn system previously maintained under tension to shrink that system by increasing the yarn crinkle or undulation. One embodiment of suitable means for carrying out the shrinking in this process is disclosed in U. S. Patent No. 1,861,423. The activation of the potentially adhesive fibres may be effected before, during or after the drying step and the deactivation of the fabric after the drying of the fabric.

In the mechanical shrinking treatments described above a chemical swelling agent may be employed in place of or in addition to water and such agent may be used to facilitate rendering the thermoplastic fibres tacky and adhesively active.

The shrunk structure and form given the fabric by the shrinking treatments just described may be rendered permanent and the textile stabilized by activating the thermoplastic fibres to render them tacky before, during or after shrinking the fabric, preferably squeezing the fibres together as by pressing, and deactivating the fabric while in the shrunk condition and form to effect a substantially permanent adhesion between the fibres and to set the yarn relationships.

The thermoplastic fibres are rendered tacky by use of heat, hot air, hot water or by contact with hot surfaces, with or without the addition of a solvent or plasticizer, and with or without the use of pressure.

While the fibres are in an adhesive condition, the fabric preferably is subjected to a squeezing or compacting treatment to promote adhesion of the associated fibres at their points of contact as by passing the fabric between pressure rollers. The squeezing may be effected by the means employed for mechanically shrinking fabrics as described hereinafter.

Deactivation may be accomplished by heating to a higher temperature, as in the case of a heat-convertible resin fibre, or by cooling, as in the
a thermoplastic resin or cellulose derivative fibre. A plasticizer advantageously may be applied to the thermoplastic fibres and/or to the fabric before the activation of the fibres. The plasticizer may function to increase the flexibility of the fibres and, when employed with thermoplastic fibres, the plasticizer may serve, in addition, to modify the thermal softening point. The plasticized thermoplastic fibres can be rendered cementitious by heating to a temperature below that at which the non-thermoplastic textile fibres in the textile would be detrimentally affected by such heating. After the textiles have been shrunk and deactivated the plasticizer may be allowed to remain in the textile or it may be removed by suitable means such as washing and extraction. The removal of the plasticizer will raise the temperature at which thermoplastic material in the textile will again be rendered soft and cementitious, thus adapting the textile for use at elevated temperatures than would be the case if the plasticizer were present. The plasticizer may serve also as a shrinking agent or as a latent activating agent for the thermoplastic fibres.

The activation of the thermoplastic fibres takes place preferably before the shrinking operation occurs and the fabrics are subjected to the shrinking operations while the thermoplastic fibres are in an activated condition. The deactivation of the adhesive or adhesive fibres takes place while the fabric is maintained in the shrunk condition. If the fabric is to be shrunk in two dimensions, the deactivation of the adhesive or adhesive fibres preferably takes place after the completion of both shrinking operations while the fabric is in a relaxed state or under controlled tension. The shrunk structure should not be placed under distorting tensions during the deactivation treatment. For instance, if the deactivation is to take place by heating or cooling, the fabric may be passed over a heated or cooled drum in the manner just described or over a series of rollers which are heated or cooled by known means.

The properties of the finished product depend upon various factors, such as the nature and proportion of thermoplastic fibres; the extent of the activation thereof; and the tacky condition of the fibres during squeezing or pressing and the nature of the deactivation and the extent of shrinking. The extent of activation may be varied considerably, depending upon the relative proportions of the types of fibres, the properties of the thermoplastic fibres, and the effect desired in the product. The thermoplastic fibres may be rendered superficially adhesive; or rendered plastic and tacky without losing their fibrous form; or made to lose their fibrous structure and form an adhesive. The tacky thermoplastic fibres will cohere to each other and adhere to the other fibres to fix the position thereof to give a product having increased tensile strength and lower stretch and shrinkage. If the activation is such as to form an adhesive, the adhesive will cause the other fibres to be permanently adhered and the shrunk structure permanently set.

While a knitted fabric has, of course, only one yarn system, it may be shrunk in a manner similar to a woven fabric by one or more of the methods just described which are appropriate therefor and the present invention is intended to include fixing the shrunk structure of both woven and knitted fabrics.

By way of illustrating, but not by way of limiting the invention, there will be given a number of specific examples.

Example I

10 parts by weight of ethyl cellulose staple fibres of the thermoplastic type are admixed with 90 parts by weight of similar staple length. The fibres are admixed by blending during the carding operation, or the resin fibres and the rayon fibres may be carded separately and blended at the draw frame in a suitable manner, and the mixture spun into yarn and the yarns woven into fabric in a known manner. The fabric is then subjected to a shrinking operation to distribute the weaving contraction between the warp and the filling in a desired manner by one of the methods above described. While the fabric is held in such contracted condition the fabric is heated to render the ethyl cellulose tacky. While the ethyl cellulose is in a tacky condition, the fabric is subjected to pressure. While the fabric is held in the shrunk condition, the fabric is cooled thereby rendering the ethyl cellulose non-tacky and creating a permanent bond between the fibres in the fabric, thus stabilizing and rendering permanent the weaving contraction.

Example II

A fabric made from yarns formed from a mixture of 7 parts of resin staple fibres formed from a copolymer of a vinyl acetate and vinyl chloride and 93 parts of viscose rayon staple fibres of similar length is kier-boiled, bleached, washed and dried in a known manner and then subjected to a shrinking treatment by means of a suitable apparatus, such as for example as that shown in Fig. 1 of the drawing. Referring to the figure, the dry fabric I is passed between the pressure rolls 2 and subjected to tension between the rolls 2 and the calender 3 to cause a weaving contraction to take place in the direction of the filling. While the fabric is held to a desired width by means of a suitable tenter frame F, there is applied to it moisture and a plasticizer by means of sprays 4 and 4'. The plasticizer is any suitable substance which is miscible with the resin fibres and capable of reducing the temperature at which such fibres become tacky upon heating. The fabric containing moisture and plasticizer is now passed over the calender 3 which is heated to a temperature sufficient to render the resin fibres tacky. While the resin is in a plastic and tacky condition the fabric is shrunk by passing it between the applicator roll 7 and the heated ironer 8 which is curved to conform to the arcuate surface of the applicator roll 7 and fed between an endless blanket 5 moving in surface contact with a heated rotating drum 6. Between the calender 3 and the ironer 8 the fabric may again be moistened as with steam to keep the yarns pliable as necessary. Shrinking in a warpwise direction is effected as the fabric passes over the curved surface of the blanket passing about the roll 7. In passing between the blanket 5 and heated drum 6, the fabric is subjected to heat and pressure whereby the resin fibres are maintained tacky and the weaving contraction temporarily set.

As the fabric I emerges from the blanket 4 and the drum 3, at the point P, it is cooled by passage through the air around rolls 10 and 11 or preferably through the cooling chamber 14 through which cold air is passed. The cooling of the fabric renders the resin non-tacky, thus creating a strong and substantially permanent adhesion.
between the fibres in the fabric and permanently setting the weaving contraction. Additional pressure may be obtained on the blanket by use of ordinary means.

While the plasticizer may be allowed to remain in the fabric if it is a non-volatile type, it is desirable in most cases to remove the plasticizer thereby elevating the temperature at which the resin can again be rendered tacky. For this purpose, the fabric may be passed through a second shrinking apparatus similar to the first apparatus employed as described above and shown in Fig. 1 to correct any slight distortions in the weaving contraction created by passing the fabric through the solvent 12. When the solvent 12 is selected so that it has no swelling action upon any of the fibres in the fabric, little or no distortions will occur during the extraction of the plasticizer so that the second shrinking step just described may be dispensed with. The shrunk fabric may be passed to a reel or may be subjected to any conventional finishing treatments.

While the fabric is in the shrunk condition, such as that shown in Fig. 3 or in the lower view of Fig. 2, the deactivation of the previously activated adhesive fibres causes the component fibres of the yarn to adhere to each other. The adherence of the fibres renders permanent the crinkle imparted to the yarn by the shrinking operation and anchors the yarns to each other in their new relationship. The shrink condition thus rendered permanent by the deactivation need not be the same as the shrinking contraction produced by repeated launderings, but may be a shrunk condition intermediate between that of the untreated fabric and that of the ultimate shrinking after laundering. This effect is not obtainable by the use of the shrinking operation alone, but only by the use of the combination of the shrinking with the setting operation of the present invention.

Accordingly, the present invention provides, inter alia, that a fabric may be shrunk to a predetermined length of the shrunk condition, and such shrunk condition rendered permanent so that the fabric neither shrinks nor expands to any substantial extent upon laundering, dry cleaning or wearing. Thus, the present invention provides a method for setting and fixing the dimensions of fibres in a predetermined manner and for establishing a predetermined and residual shrinkage in textiles and these results may be obtained in fabrics made from artificial filaments, in particular, cut staple rayon, as well as in fabrics made from natural fibres.

The effect of the combined shrinking and setting operations of the present invention may be illustrated by reference to Figs. 2 and 3 of the drawing. The untreated fabric may be represented by the upper view of Fig. 2 in which the warp yarns 15 lie substantially in the same plane, while the warp yarns are given an increased crinkle and a decreased over-all length. If the fabric shown in Fig. 3 is subjected to warpwise shrinking as by mechanically compressing the warp yarns longitudinally by any suitable method, the warp yarns are given an increased crinkle thus bringing the weft yarns closer to each other. As a result of the longitudinal contraction in the warp and weft yarns, the final product will have the structure illustrated in the lower view of Fig. 2 in which both series of yarns have a substantial crinkle and the yarns lie relatively close together in contrast to the untreated fabric.

Since certain changes in carrying out the above process, and certain modifications in the article which embody the invention may be made without departing from its scope, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

The apparatus described herein is claimed in my co-pending application, Serial No. 453,285 filed Aug. 1, 1942, and the specific process of rendering the potentially adhesive fibres tacky by means of a solvent is claimed in the co-pending application of Roger Wallach, Serial No. 510,539 filed December 22, 1939.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A process of treating a fabric containing yarns spun from a mixture of textile fibres and thermoplastic fibres having an inherent tackiness upon heating, comprising shrinking the fabric, fixing the shrunk structure by rendering the thermoplastic fibres tacky by heating to effect adhesion between fibres in the fabric, and thereafter fixing the tacky material non-tacky.

2. A process of treating a fabric containing yarns spun from a mixture of textile fibres and thermoplastic fibres having an inherent tackiness upon heating, comprising heating said fabric to render said thermoplastic fibres tacky, shrinking said fabric while the fibres are tacky as a result of heating to a shrink condition less than that given by ultimate laundry shrinkage, and fixing the shrunk structure by rendering the tacky material non-tacky.

3. A process of treating a fabric containing yarns spun from a mixture of textile fibres and thermoplastic fibres having an inherent tackiness upon heating, comprising heating the fabric to render said thermoplastic fibres tacky, shrinking said fabric while the fibres are tacky as a result of heating to a shrink condition less than that given by ultimate laundry shrinkage, and fixing the shrunk structure by rendering the tacky material non-tacky.

4. A process of treating a fabric comprising forming a fabric from yarn spun from a mixture of textile fibres and thermoplastic fibres, heating said fabric to render said thermoplastic fibres tacky as a result of heating, shrinking said fabric and fixing the shrunk structure by rendering the tacky material non-tacky.

5. A process of treating a fabric containing yarns spun from a mixture of textile fibres and thermoplastic fibres having an inherent tackiness upon heating, comprising shrinking a fabric comprising thermoplastic resin fibres and fixing the shrunk structure by effecting adhesion between the fibres in the fabric by heating the fabric, and thereafter allowing the fabric to cool to render the tacky material non-tacky.

6. A process for treating pre-shrunk fabrics
-containing yarns spun from a mixture of textile fibres and thermoplastic fibres having an inherent tackiness upon heating, the steps comprising heating the thermoplastic fibres in the presence of a plasticizer therefor to effect adhesion between fibres in the fabric and thereafter cooling the fabric to fix the shrunk condition.

7. A process of treating a fabric comprising fabricating a fabric of yarns spun from a mixture of textile fibres and at least one type of thermoplastic fibres, shrinking said fabric, and fixing the shrunk structure by rendering the thermoplastic fibres tacky by heating said fabric to in the presence of a plasticizer and thereafter removing said plasticizer, and rendering the tacky material non-tacky.

8. A process of treating a fabric containing yarns spun from a mixture of textile fibres and thermoplastic fibres having an inherent tackiness upon heating, comprising moistening the fabric, stretching the moistened fabric in one dimension while allowing shrinkage of the fabric in the other dimension and maintaining the fabric in said stretched condition while heating the thermoplastic fibres to effect fibre adhesion in the fabric and thereafter cooling the fabric to fix the shrunk structure.

9. A process of treating a fabric containing yarns spun from a mixture of textile fibres and thermoplastic fibres having an inherent tackiness upon heating, comprising moistening the fabric, stretching the moistened fabric in one dimension while allowing shrinkage of the fabric in the other dimension, drying said fabric under tension, again moistening the fabric while the fabric is substantially free of tension to allow the unstretched yarns to swell and shorten thereby causing the stretched yarns to crinkle, heating the thermoplastic fibres to render them tacky and effect fibre adhesion in the fabric, and rendering the tacky material non-tacky to fix the shrunk structure.

10. A process of treating a fabric containing yarns spun from a mixture of textile fibres and thermoplastic fibres having an inherent tackiness upon heating, comprising moistening the fabric, heating the fabric to render the thermoplastic fibres tacky, longitudinally shrinking the fabric of the yarn components by compression while the thermoplastic fibres are in a tacky condition as a result of heating, and maintaining the fabric in said compressed condition while rendering said tacky material non-tacky to effect fibre adhesion in the fabric and fix the shrunk structure.

11. A process of treating a fabric containing yarns spun from a mixture of textile fibres and thermoplastic fibres having an inherent tackiness upon heating, comprising moistening the fabric, stretching one yarn component of the moistened fabric while allowing shrinkage of the fabric in the other yarn component, drying the fabric while in said stretched condition, longitudinally shrinking the previously stretched yarn component by compression, rendering said thermoplastic fibres tacky by heating to effect fibre adhesion in the fabric while the fabric is maintained in said shrunk condition, and rendering said tacky material non-tacky to fix said shrunk structure.

12. A process of treating a fabric containing yarns spun from a mixture of textile fibres and thermoplastic fibres having an inherent tackiness upon heating, comprising subjecting said fabric to combined heat and pressure to render the thermoplastic fibres tacky, thereafter shrinking the fabric while maintaining the thermoplastic material in a plastic condition as a result of heating and rendering the plastic material non-tacky while the fabric is maintained in its shrunk condition whereby to effect adhesion of fibres in the fabric.

13. A process of treating a fabric containing potentially adhesive fibres, comprising treating the fabric to render said fibres tacky, shrinking said fabric while said fibres are in a tacky condition, and fixing the shrunk structure by rendering the tacky material non-tacky to effect adhesion between fibres in the fabric.

14. A pre-shrunk woven fabric having its pre-shrunk structure rendered substantially permanent by adhesion between fibres in yarns of the fabric resulting from rendering tacky some of the fibres thereof, said fabric being characterized by having the yarn relation therein fixed and different from the yarn relation resulting from the weaving of the yarns.

15. A pre-shrunk woven fabric comprising yarns containing thermoplastic fibres and having a pre-shrunk structure rendered substantially permanent by adhesion between fibres in yarns of the fabric due to the thermal tackiness after heating of said thermoplastic fibres, said fabric being characterized by having the yarn relation therein fixed and different from the yarn relation resulting from the weaving of the yarns.

16. A pre-shrunk woven fabric having its pre-shrunk structure rendered substantially permanent by adhesion between fibres in yarns of the fabric resulting from rendering tacky some of the fibres thereof, said fabric being characterized by having the filling yarns positioned closer together than in the fabric as initially woven.

17. A pre-shrunk woven fabric having its pre-shrunk structure rendered substantially permanent by adhesion between fibres in yarns of the fabric resulting from rendering tacky some of the fibres thereof, said fabric being characterized by having a warp yarn crinkle greater than in the fabric as initially woven.

18. A pre-shrunk woven fabric having its pre-shrunk structure rendered substantially permanent by adhesion between fibres in yarns of the fabric resulting from rendering tacky some of the fibres thereof, said fabric being characterized by having the filling yarns positioned closer together and a yarn crinkle greater than in the fabric as woven.

19. A preshrunk woven fabric as claimed in claim 14 in which the fabric is formed of yarns spun from a mixture of textile fibres and thermoplastic fibres.

20. A preshrunk woven fabric as claimed in claim 14 in which the thermoplastic fibres are thermoplastic synthetic resin fibres.