Oct. 4, 1955 C. L. NOTTEBOHM 2,719,803

STIFFENED WASHABLE GARMENTS AND GARMENT PARTS

Filed Dec. 22, 1951

FIG.2

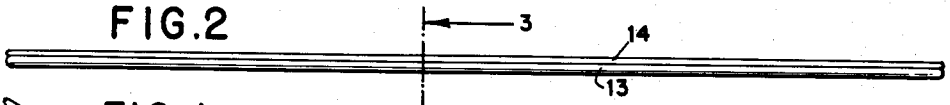



FIG.1

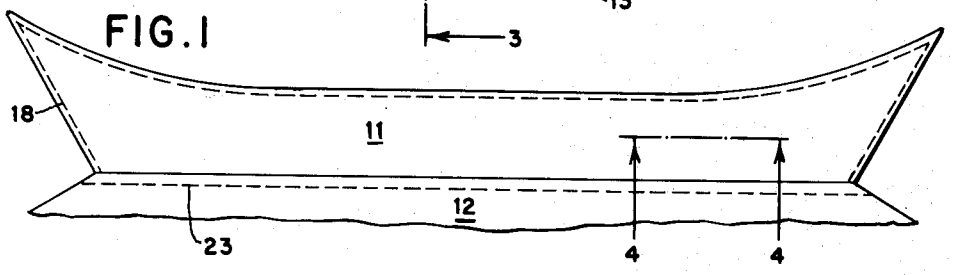



FIG.3

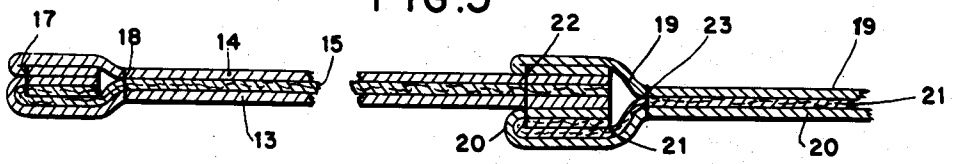
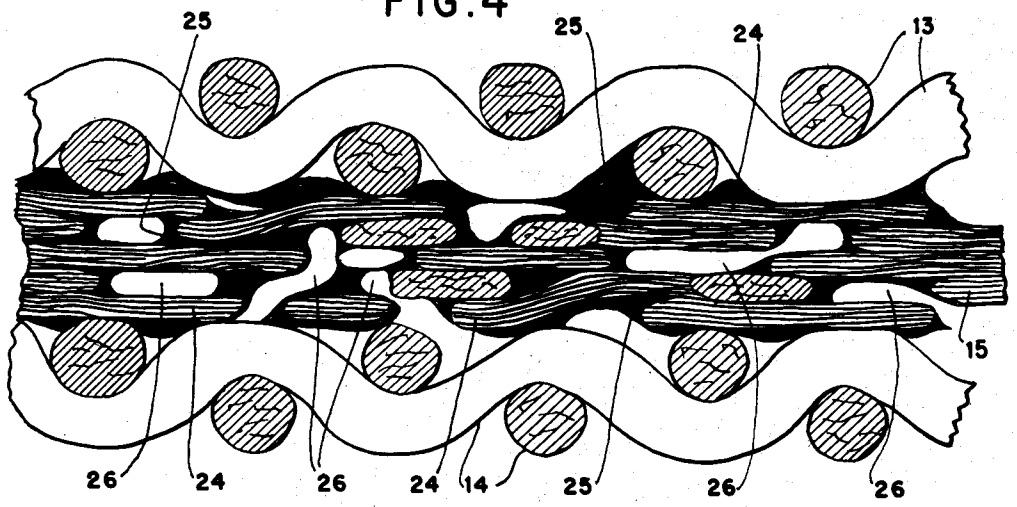



FIG.4




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# STIFFENED WASHABLE GARMENTS AND GARMENT PARTS

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Application December 22, 1951, Serial No. 262,945

Claims priority, application Germany October 1, 1948

4 Claims. (Cl. 154—46)

The present invention relates to stiffened washable garments and garment parts, such as men's shirts, collars, shirt cuffs, women's blouses, etc.

This application is a continuation-in-part of my abandoned United States application Serial No. 102,423, filed on June 30, 1949.

One object of the invention is to produce a stiffened washable garment or garment part, which is crease-resistant, but permanently air and water permeable, and which has a light weight.

Another object of the invention is to provide a washable garment with a stiffening interlining which does not consist of woven material but of a thin layer of in random directions arranged cardable fibers cemented together at their crossing points by a thermoplastic binder material.

Still another object of the invention is to provide a washable garment with a stiffening interlining which can be firmly and smoothly adhered to the surfaces of the fabric layers between which it is arranged by hot ironing or pressing.

A further object of the invention is to render washable garments and parts thereof shrink-proof or at least shrink-resistant.

A still further object of the invention is to provide a washable garment with a stiffening, light, air and water-permeable, non-woven interlining which will not be permanently damaged when the garment is washed in hot water or ironed.

Known crease-resistant interlinings for washable garments may consist of woven fabrics which are or may be stiffened by application to the interlining or to the garment of either an ordinary water-soluble cereal starch or a so-called permanent thermoplastic starch. Ordinary water-soluble starches are, of course, washed out of the fabric and must be re-applied after each laundering of the garment. Woven fabrics, starched with permanent starches, on the other hand, have the disadvantage that the pores in the woven material are mostly obstructed by the starch, and garments or garment parts, such as shirts, collars and similar articles of clothing, which have been treated with permanent starch may therefore frequently be uncomfortable to wear. Woven interlinings have a tendency to ravel at the cut edges and must therefore be used with special precautions. Moreover, the weaving of the fabric and the application thereto of the desired permanent starch makes garments of this type relatively expensive.

On the other hand, stiffening sheet materials or the like made of short, uncardable fibers by paper-making methods lack air permeability and pliability. Such materials are also easily damaged by stitching and sewing.

The present invention is based on the discovery that a very thin and light sheet material having a thickness of only about 0.14 to about 0.8 mm., a weight of about 45 to about 240 g. per square m. and a binder content of about 25% to about 60% by weight, can be used successfully and with extraordinary advantages as a stiffening



interling for washable garments. Such sheet material consists of an open skeleton of intermingled, fine, cardable fibers which are polyposed or arranged in random directions, said skeleton having deposited on its surfaces and uniformly distributed therethrough and adhering to the fibers, small, filmy, lamella-shaped particles of a flexible solid thermoplastic binder material cementing adjacent fibers together at their crossing points with preservation of numerous, relatively large interstices between the fibers.

Sheet materials have been produced heretofore which were made by applying to unwoven fiber fleeces or felts consisting of cardable fibers disposed in random directions, a binder material such as a thermoplastic resin or the like. Such known leather-type sheet materials, however, were not suitable as interlinings for washable garments because they were so strong and contained so much binder material that they had practically no air and water permeability and their specific weight was too high for the purpose in question.

It has been found that the light, thin, porous sheet material used as an interlining in articles according to the present invention, if secured between an outer layer and an inner layer of washable woven fabric, is protected by the two woven fabric layers sufficiently to prevent tearing of the interlining under ordinary stresses or deterioration of the heat-sensitive interlining due to washing in hot water or hot ironing.

On the other hand, washable garments according to the present invention have a number of outstanding advantages.

One advantage is that the interlining material used according to the present invention is less expensive than any heretofore known stiffening interlining for washable garments.

Garments according to the present invention can also be produced at a lower cost because the interlining material employed can be die cut in superposed layers without the layers sticking together and without danger of ravelling at the cut edges. The material can be tightly adhered to one or both of the woven fabric layers by a simple hot ironing or pressing operation. The required ironing or pressing times are relatively short and the material is ready for use almost immediately after completion of the pressing operation. The workers who attach the interlining to the woven layers are not exposed to noxious fumes or other inconveniences. If the material is treated with a liquid to produce an even stronger adhesion to the fabric, drying takes place uniformly and rapidly.

The garments according to this invention are form-holding and crease-resistant, and their edges can be made uniformly smooth and even. Due to the uniformly smooth surfaces of the interlining, the fabric surface remains entirely smooth and even when the fabric is pressed against the interlining surfaces.

Another important advantage is the light weight of the interlining which makes it possible to produce light weight garments and garment parts.

Still another advantage is the great porosity and permanent air and water permeability of the interlining, which makes garments according to the present invention comfortable to wear and easy to launder.

A still further advantage results from the fact that the interlining sheet materials used according to the present invention are shrink-proof and impart shrink-resistance to the garments according to the present invention.

In a preferred embodiment of the invention, the interlining consists of sheet materal of the type described and claimed in my United States patent application, Serial No. 262,942, filed December 22, 1951, which is a continuation-in-part of my abandoned United States patent applications Serial Nos. 102,423 and 102,425, both filed on June

30, 1949. Such sheet material has interstices in the form of flat pores extending substantially in planes parallel to the general plane of the sheet. It combines a very high porosity with relatively high tear resistance and tensile strength.

Sheet material of this type may be manufactured by the processes described in my U. S. patent application Serial No. 262,941, filed December 22, 1951, and particularly described and claimed in my above mentioned patent application, Serial No. 262,942, which is also a continuation-in-part of my abandoned patent applications Serial Nos. 102,423 and 102,425.

As described in these copending applications, the interlining material itself consists of a thin fleece of cardable fibers directed at random in intersecting directions and resilient thermoplastic adhesive means interconnecting the fibers at their points of intersection to form a fibrous web, interstices being maintained in the web for the circulation of air therethrough and portions of the fibers intermediate the points of intersection being exposed for the absorption of moisture.

For the purposes of the present invention, the fiber fleeces used as starting material in the manufacture of the interlining sheet material consist of cardable fibers. Synthetic fibers, such as rayon, casein fibers, and particularly thermoplastic fibers, such as the polyamide fibers, polyacryl fibers, polyvinyl fibers, polyvinylidene fibers, acetate fibers, etc., may be used either alone or in mixture with other fibers, with excellent results. Cotton, ramie, flax and also wool and other protein fibers and the like may be used as admixtures or alone if desired.

The binders which are used in producing the interlining sheet materials are thermoplastic synthetic resins, such as polyvinyl esters, polyacrylates, polystyrene, polyvinylidenes and copolymers of these substances and the like. Some elastic binder material, such as polybutadiene-styrene or the like may also be incorporated with the thermoplastic synthetic resin.

According to one embodiment of the invention, the interlining is secured to one or both of the outer fabric layers simply by hot ironing or pressing, which softens the thermoplastic binder material and causes it to stick to the surface of the fabric.

According to another, preferred embodiment of the invention, the interlining is attached to one or both layers of the fabric prior to the ironing of the product, by stitching, which prevents any displacement or wrinkling of the interlining between the two outer fabric layers.

The invention is further explained with reference to the accompanying drawings in which its application to a shirt collar is illustratively exemplified. In these drawings:

Fig. 1 is an elevational view of a shirt collar and attached neckband, both provided with an interlining according to the invention;

Fig. 2 is an edge view of the collar shown in Fig. 1 seen from the top of Fig. 1;

Fig. 3 is an enlarged cross-section taken on line 3—3 of Fig. 2; and

Fig. 4 is a further greatly enlarged cross-section taken on line 4—4 of Fig. 1.

Referring now to the drawings, and first to Figs. 1 and 2, 11 designates a man's shirt collar attached to a neckband 12. The edge view of Fig. 2 shows two layers of fabric 13 and 14.

As illustrated in Fig. 3, the interlining 15 is interposed between the outer layers 13 and 14 which consist, for instance, of washable cotton fabric. In manufacturing the collar, the three layers 13, 14 and 15 are cut to a pattern similar to but somewhat larger than that of the final collar and placed on top of each other with the layer 14 at the bottom and the layer 15 at the top. They are then stitched together at a short distance from the edge, except at the edge where the collar is to be secured to the neckband, by stitches 17. Not more than 8 stitches are used per cm. The three layers are then folded over along the stitching line, and finally the open pocket formed by the layers 13 and 14 is turned inside out so that the layer 14 is folded over upon layer 15, thereby hiding the inwardly folded marginal portions of the three layers, as shown on the left hand side of Fig. 3. Finally, the three layers 13, 14 and 15 are stitched along the margin at 18.

The neckband is secured to the free straight edge of the collar by placing a cotton fabric layer 19 on layer 14, and a fabric layer 20 and an interlining layer 21 under layer 13, in such a way that the edges of the six layers 19, 14, 15, 13, 20 and 21 are disposed in a common transverse plane. The six layers 19, 14, 15, 13, 20 and 21 are stitched together along the margin at 22, the stitches being spaced sufficient to eliminate any danger of tearing of the interlining material, and, thereafter, layer 19 is folded back upon itself and layers 20 and 21 are folded back together in such a way that beyond the fold, the layer 21 is disposed between the layers 19 and 20. Finally, the layers 19, 21 and 20 are stitched together at 23 (see right hand side of Fig. 3), and the finished material is pressed with a hot iron or ironing machine.

As shown diagrammatically in the further enlarged cross-section of Fig. 4, the outer layers 13 and 14 are woven cotton fabrics, while the intermediate layer or interlining 15 consists of an open skeleton of intermingled, fine, cardable fibers 24 arranged in random directions, said skeleton having uniformly distributed therethrough and adhering to the fibers 24, filmy, lamella-shaped particles 25 of a flexible, solid, thermoplastic resin. The binder particles 25 cement adjacent fibers 24 together at their crossing points with preservation of numerous relatively large interstices 26 between the fibers, said interstices having the form of flat pores extending substantially in planes parallel to the general plane of the sheet.

It will be seen that the interstices 26 between the fibers 24 provide innumerable tortuous air passages through the flexible interlining sheet 15, and that the binder solids 25 serve merely to give to the fiber skeleton sufficient cohesion and crease-resistance without obstructing these passages through the sheet. It will also be seen that, in the finished article, the upper surface of the interlining 15 has adapted itself to the configuration of the lower surface of the top fabric layer 13 under the pressure of the hot iron or ironing machine. A similar, though less conspicuous, adaptation of the lower surface of the interlining 15 to the upper surface of the bottom fabric layer 14 can also be observed. The intermediate layer or interlining 15 is protected against destruction or deterioration by heat, and its relatively low tear resistance is compensated for by the fact of its being interposed between and secured to the two layers 13 and 14 of woven material.

It will be understood, of course, that the intermediate layer 15, which in Fig. 2 occupies about 2½ cm., is actually only about 0.14 to 0.8 mm. thick, and weighs about 45 to about 240 g. per sq. m.

When the collar as shown in the drawings is washed in hot water or ironed, the thermoplastic binder material will become somewhat plastic. However, since the interlining 15 and its binder particles 25 are held securely in place between the two outer fabric layers 13 and 14, the plasticized binder material will retain its position, and when the hot washing or ironing operation has been completed, the binder will revert to its solid condition and resume its part as a cement for the fiber skeleton.

As compared to previously used starched, woven interlinings, the interlining to be used according to the present invention has the particular advantage of being shrink-proof in itself and of imparting shrink-resistance characteristics to the fabrics with which it is used.

It will be understood that the several embodiments of the invention described in the foregoing specification and illustrated in the drawings are given by way of example only. Various modifications and variations will readily occur to those skilled in the art. Accordingly, my inven-

tion is not to be considered as limited to the specific embodiments described in the specification and drawings.

I claim:

1. Stiffened washable garments and garment parts, comprising an outer layer of a woven washable fabric, an inner layer of a woven washable fabric, and secured to at least one of said layers of woven fabric, an intermediate layer of a fabric-like, porous, air and water-permeable, flexible, crease-resistant and shrink-proof sheet material consisting of an open skeleton of intermingled, fine, cardable, polyposed fibers, said skeleton having deposited on its surfaces and uniformly distributed therethrough and adhering to the fibers, small, filmy particles of a flexible, solid, at least predominantly thermoplastic synthetic resin binder material, said binder particles cementing adjacent fibers together at their crossing points with preservation of numerous relatively large interstices between the fibers, said intermediate layer having a thickness of about 0.14 to about 0.8 millimeters and a weight of about 45 to about 240 g. per square m. and containing about 25% to 60% by weight of solid binder material, the intermediate layer being protected against tearing and against physical deterioration due to washing in hot water or ironing by said outer and inner layers of woven fabric.



2. The combination according to claim 1, in which at least one of said inner and outer layers is adhered to said fleece by said thermoplastic resin.

3. The combination according to claim 1, in which at least one of said inner and outer layers is connected to said fleece by stitching.

4. The combination according to claim 1, in which a majority of said interstices are of generally flattened and shallow configuration extending parallel to the general plane of said sheet.

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