June 28, 1938. A. J. STEINBERGER 2,121,836

WEARING APPAREL

Filed Dec. 4, 1935 2 Sheets-Sheet 1

Fig. 1.

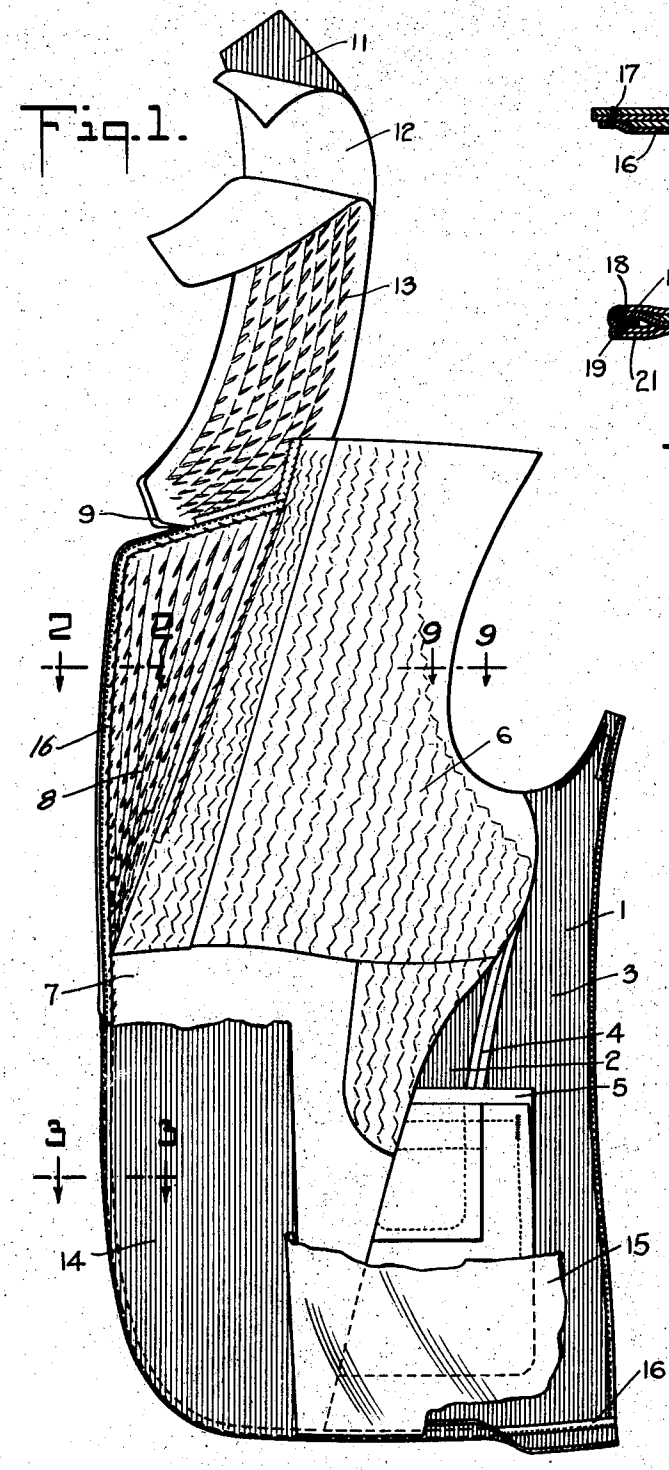


Fig. 2.

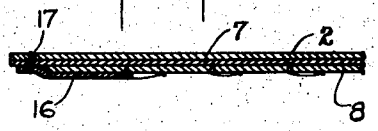


Fig. 3.

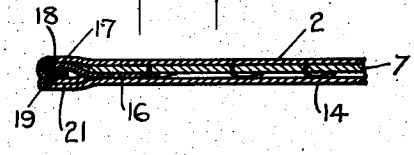


Fig. 4.

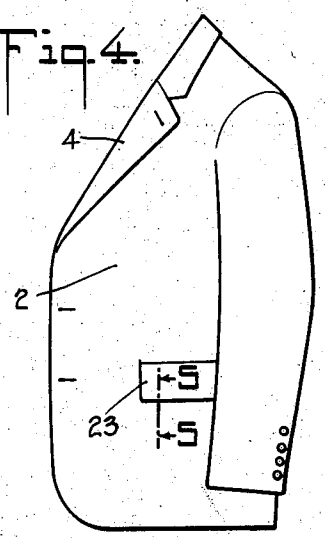
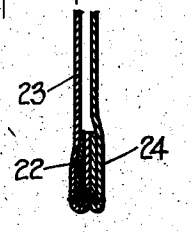


Fig. 5.



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Fig. 6.

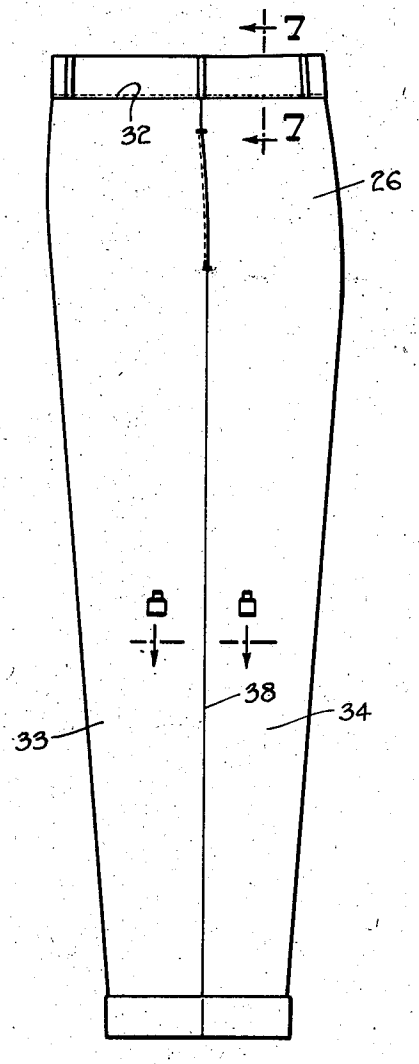


Fig. 7.

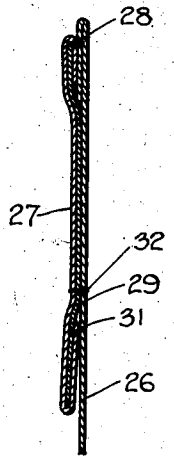


Fig. 8.

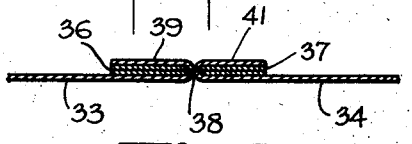
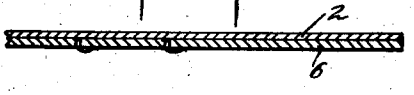


Fig. 9



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UNITED STATES PATENT OFFICE

2,121,836

WEARING APPAREL

Alfred J. Steinberger, Jamaica, N. Y., assignor to Celanese Corporation of America, a corporation of Delaware

Application December 4, 1935, Serial No. 52,774

4 Claims. (Cl. 2—93)

This invention relates to improvements in wearing apparel and more particularly to improvements in garments making up men's and women's outerwear such as suits, dresses and the like.

An important object of the invention is the provision of an improved method of making wearing apparel in which wrinkling and puckering of the material at the seams is eliminated and in which the lining, padding and stiffening material of the coat are made more durable, non-shifting and form-fitting.

Another important object of this invention is the production of garments which retain their original appearance and shape for a longer period of time than those heretofore made and which have enhanced wearing qualities.

In one aspect this invention comprises the provision in garments of a reinforcing member of fabric which is united to the fabric of the garment at the hems, seams, or other places where the edges of the garment have been stitched in place or one to the other. The employment of reinforcing members at the hems, seams, etc., prevents the puckering of the material and the formation of wrinkles.

In another aspect this invention comprises the provision in garments of a padding structure in which the padding is shaped and united to the fabric of the garment. By this expedient, the padding does not shift during the life of the garment, thereby retaining in the garment its original appearance and fit.

Other objects and advantages of this invention will be apparent from the following detailed description and will be pointed out in the appended claims.

While this invention is applicable to the manufacture of men's and women's outer apparel in general, it will be described in connection with a man's suit, for example, as is shown in the accompanying drawings wherein

Figure 1 shows a cross-section of a section of a man's coat with parts thereof broken away;

Figure 2 is a cross-sectional view taken on line 2—2 in Figure 1, showing the construction of the edging of the coat made in accordance with this invention;

Figure 3 is a cross-sectional view taken on line 3—3 in Figure 1, showing the edging and facing of the coat made in accordance with this invention;

Figure 4 is a side elevational view of a man's coat;

Figure 5 is a cross-sectional view taken on line 5—5 in Figure 4, showing the pocket edge made in accordance with this invention;

Figure 6 is a side elevational view of a pair of trousers;

Figure 7 is a cross-sectional view taken on line 7—7 in Figure 6, showing the waist-band in accordance with this invention;

Figure 8 is a cross-sectional view taken on line 8—8 in Figure 6, showing a side-seam made in accordance with this invention; and

Figure 9 is a cross-sectional view taken on line 9—9 of Figure 1, showing the thermoplastic layer attached to the material of the garment.

Like reference numerals designate like parts throughout the several views of the drawings.

In the manufacture of men's suits, a number of sections of cloth of predetermined shape or pattern are sewed together, there being added padding and stiffening materials, a facing of the same or different material and a lining, when required, for the purpose of shaping and finishing the garment. For example, in making a man's coat, such as shown in Figure 4 of the drawings, two sections of suiting material, previously cut to pattern, are sewed together to form that part of the coat which comprises one-half of the front and one side of the finished garment. Such a part is shown in Figure 1 of the drawings, a portion of the collar being also shown in said Figure 1. For the purpose of giving shape to the finished garment, to each forward or front section of the coat is usually attached what is known as an inner front which comprises one or more layers of a stiffening material such as hair cloth, buckram and the like. The various sections of the coat body are sewed together in the normal manner to form the finished garment. For instance, the edge of the coat forms a hem and the facing is attached to the body of the coat by means of a flat-felled seam.

Heretofore, it was necessary to exercise extreme care in the construction of the seam and also in the pressing or cleaning of the garment for the reason that careless handling of the garment caused the material thereof to be pulled apart at the seams, thus causing wrinkling and puckering of the fabric at the pulled seams. In accordance with this invention, however, a reinforcing member of thermoplastic material is inserted in or along the seam and is coalesced to the fabric of the garment. By this construction, the fabric of the garment, under all conditions of use, such as wear and cleaning, is prevented from wrinkling and puckering.

The inner front of coats as heretofore made

was also a source of difficulty since not only did this inner front have a tendency to shift after the garment was worn for some time, but also in the dry-cleaning or washing of the coat, the stiffening material of the inner front lost its stiffness, thus causing the garment to lose its original shape and appearance. Where hair cloth was used, the individual hairs thereof often become loose and worked their way out of the hair cloth and through the fabric or lining of the coat, thus reducing the efficacy of the hair cloth as a stiffening material. In accordance with this invention, the inner front is made by laminating a number of layers of suitable fabric at least one of the layers being of a thermoplastic material and then coalescing the inner front and the body of the coat. A coat having an inner front in accordance with this invention may be washed or dry-cleaned and subjected to conditions of wear without loss of original shape or appearance.

Waistcoats and trousers, especially the waistbands, cuffs and leg seams and creases of the latter, may also be made in accordance with this invention.

This invention is not only applicable to the manufacture of men's suits, but also to the manufacture of men's overcoats, robes, windbreakers, women's dresses, suits, coats, jackets, as well as articles, such as hassocks, boudoir pillows, and, in fact, to any garment or article where stiffening materials and/or open or flat-felled seams are employed.

According to this invention, strips of thermoplastic material are placed in or along the seams it is desired to reinforce and/or at least one outer layer of the inner front is made of thermoplastic material. The thermoplastic material and the material of the garment or article are then coalesced by subjecting the assembly to heat and pressure.

Any suitable thermoplastic material may be employed in this invention. For the purpose herein described fabrics made of or containing organic derivatives of cellulose, such as organic esters of cellulose and cellulose ethers, have been found to be eminently suitable. Examples of organic esters of cellulose are cellulose acetate, cellulose formate, cellulose propionate and cellulose butyrate, while examples of cellulose ethers are ethyl cellulose, methyl cellulose and benzyl cellulose. The thermoplastic material may be present in the reinforcing or lining material as yarns or filaments or the reinforcing material may be a non-thermoplastic base with a coating or film of thermoplastic material on one or both surfaces thereof.

The invention will now be described in greater detail with reference to the drawings, but it is to be understood that the following description is given by way of example only and is in no way limitative.

In Figure 1 is shown a part or section of a man's coat cut away to show the construction thereof, particularly with respect to the materials employed in the making of same. The coat comprises an outer body 1 made of any desirable suiting material. The coat is built up from a number of sections cut to pattern to fit the form of the body of the person who is to wear the same. The part of the coat shown in Figure 1 is adapted to form one-half of the front and one side of the finished coat and comprises a forward section 2 and a side section 3 joined together by an open seam. This open seam may be formed in accordance with this invention, as will hereinafter be described in connection with Figure 8.

To the inner side of the part of the coat illustrated in Figure 1 may be attached a pocket 5 in any well known manner, and a shaping and stiffening body commonly known as the inner front. This inner front comprises a layer of thermoplastic material 6, which replaces or may be attached to the Hymo, hair cloth or buckram heretofore used, attached to an intermediate layer 7, usually made of canvas, the assembly being then sewed to the coat in the manner normally employed in coat-making. However, the stiffening material may comprise Hymo, hair cloth, buckram and the like through which yarns or filaments of thermoplastic material are woven. The inner front assembly may be molded to predetermined shape by means of heat and pressure before or after the assembly is placed in position in the garment where it is coalesced by means of a thermoplastic layer 6 to the material of the garment. While in Figure 1 layer 6 is shown stitched to canvas layer 7, the stitching may be dispensed with and the two layers joined by heat and pressure. Also attached to the canvas layer 7, as by stitching, is a layer of felt 8 which is adapted to form the inner portion of the lapel and roll of the finished coat. The collar of the coat is attached to forward section 2 and to the lapel by means of a flat-felled seam 9 and comprises a fabric 11 of the same type as the suit or of a different type. To this collar fabric may be attached an intermediate layer of canvas 12 and a shaping fabric 13 comprising a thermoplastic material. The layers comprising the collar may be joined together by stitching or by subjecting the same to heat and pressure. In this collar construction the positions of layers 12 and 13 may be interchanged.

A facing 14, running from the bottom of the coat to the edge of the lapel and forming the outer face of said lapel, is attached to forward section 2 by means of a flat-felled seam. This facing may be of same or different material. A lining 15 is attached to the facing 14.

In accordance with my invention, I place a tape 16 containing thermoplastic material around the marginal edge of the forward section 2 and side section 3, which tape extends all around the marginal edge and along the bottom of the coat to the side seam as shown in Figure 1. Referring to Figures 2 and 3, wherein the seam construction is shown in cross-section, it will be seen that tape 16 is sewed to the fabric 2 by means of stitches 17 and then the facing is sewed to the forward section 2 and the tape 16 by means of stitches 18. After the forward section 2 and the facing 14 are turned, a finishing stitch 19 is applied. Upon subjecting this seam to heat and pressure, the tape 16 is caused to soften, causing the layers adjacent thereto to adhere to the same. By this construction, that is, the coalescence of the fabrics and the tape, the seam will not pull apart except by the use of unusual force and, therefore, the puckering and wrinkling of the fabric along the edge of the coat will be prevented. Instead of forming the outer edge of the coat as shown in Figures 2 and 3, the tape fabric 16 may be placed between the forward section 2 and the layer of stiffening material 6 or, as another modification, the tape fabric 16 may be placed between the forward section 2 and the layer 6 and an additional tape fabric placed against the facing

14 in such a manner as to contact both sections of the fold shown at 21 in Figure 3.

In Figure 5 is shown an open felled seam formed in accordance with this invention and with which seam the pocket is formed in the coat. This seam may be made by inserting a tape 22, similar to tape 16, between the outer fabric of the pocket flap indicated by reference numeral 23 and the lining of the garment 24. The pocket assembly may be stitched together in any conventional manner and then subjected to heat and pressure, thus causing all the layers of fabric forming the pocket to coalesce. By this construction the wrinkling and puckering of the fabric is prevented and stitching around the edge of the pocket flaps and the seam around the edge of the pocket may be eliminated.

In Figures 6, 7 and 8 this invention is shown as applied to trouser construction, Figure 7 showing a cross-section of the waist band construction and Figure 8 a construction of the leg seam. In the construction of the waist band the fabric 26 of the trousers has attached thereto a duck or muslin band by means of stitching 28. A strip of fabric 29 having thermoplastic properties is stitched, as at 31, to the duck or muslin band which is then doubled over so that the thermoplastic strip 29 is adjacent to the fabric 26 and stitched to said fabric 26 as at 32. The assembly is then subjected to heat and pressure, the thermoplastic fabric effecting adhesion between the outer or trouser fabric 26 and the inner duck or muslin band 27. This construction produces a stiffened waist band which is resistant to wrinkling or rolling and, moreover, prevents the edge of the waist band from rolling over and from losing its original flat and neat appearance.

The leg seams of the trousers may be formed in accordance with this invention as is shown in Figure 8. In this case the two pieces of trouser material indicated at 33 and 34 may have placed adjacent the edges thereof tapes 36 and 37 of thermoplastic material and the assembly sewn together as shown at 38. The free edges 39 and 41, respectively, of the trouser material 33 and 34 are doubled over and the assembly subjected to heat and pressure, thus causing the coalescence of the folded section 41 and the fabric 34. This construction reinforces the material of the trouser leg along the leg seam and prevents the same from wrinkling and puckering. This construction also strengthens the said seam. If desired the legs of the pants may be formed having a tape of a thermoplastic fabric joined to legs at those places where creases or pleats are to be formed. By this means permanent creases and pleats may be formed.

The material of the garment may be of wool or of any other suitable material. The present invention is also applicable to garments made of cotton, artificial silk, natural silk or linen. However, this invention is of particular importance in the manufacture of men's suits of so called tropical materials, for example, linen and tropical worsted fabrics. The lining material may also be of any suitable fabric such as, for example, silk, cellulose acetate, linen, cotton or mixtures of these materials.

In order that the desired degree of stiffening and adhesion be obtained upon heat pressing the assembly formed of several layers of fabric, either in the presence or absence of water, it is of importance that there be present in the said assembly a plasticizer, softener or swelling agent for the derivative of cellulose of the thermoplastic material employed in the assembly. Where the body or exposed portion of the garment or article being made is of non-thermoplastic material, the plasticizer or softener may be applied to the assembly after it is formed by dipping the same into a solution containing a plasticizer or softener. However, it is preferable to apply the plasticizer to the reinforcing strip or to the material of the inner front and, in this case, no wetting of the exposed layers of the garment or article is necessary. While it is preferable to apply the plasticizer to the fabric containing the derivatives of cellulose, it may be present in any of the layers of fabric which contact the fabric containing the derivatives of cellulose. However, if the exposed surfaces of the outer layers of the garment or article are not to be modified, the plasticizer may be absent from those layers and be applied to the inner layers only.

Any suitable plasticizer for the derivative of cellulose may be employed, which plasticizer may or may not be soluble in water. The plasticizers may be any of the high boiling solvents or softening agents as, for example, the aryl sulphonamides such as para ethyl toluol sulphonamid, the alkyl phthalates such as dimethyl phthalate, the dialkyl tartrates such as dibutyl tartrate, the alkoxy esters of polybasic organic acids such as diethoxy ethyl phthalate, the polybasic esters of the mono alkyl ethers of polyhydric alcohols such as diethylene glycol ethyl ether ester of phthalic acid, the alkyl esters of phosphoric acid such as triethylglycol phosphate, the aryl esters of phosphoric acid such as tricresyl phosphate, the mixed alkyl and aryl phosphates such as ethylglycol dicresyl phosphate, and camphor.

The amount of plasticizer present is preferably relatively large and on the order of from less than 40% to 150% or more of the weight of the derivative of cellulose present in the assembly of fabrics. Where the article comprises a derivative of cellulose body portion and an inner layer of cotton fabric, the amount of plasticizer applied to the cotton fabric may be as much as the cotton fabric will absorb and retain, i. e. the cotton fabric is saturated with the plasticizer.

Where the garment or article is to be formed of a textile material containing thermoplastic yarns of filaments of an organic derivative of cellulose as the outer or body portion, the reinforcing material such as the tape 16 may be any suitable fabric containing a plasticizer. However, where the body portion of an article is formed entirely of non-thermoplastic material, reinforcing tapes 16, 22, 29, 37, etc. must necessarily contain a thermoplastic material. If desired, however, both the outer or body portion of the garment or article and the tape may contain yarns and filaments of an organic derivative of cellulose.

To obtain good adhesion and stiffening properties, it is preferable to have water present during the application of heat and pressure, but it is to be understood that this is not essential to the successful working of this invention. Any aqueous liquid or steam may be applied to the assembly of fabrics in any suitable manner. Thus, water may be applied by spraying or brushing the fabric with water or by padding the material with water or by dipping the assembly in water. Where the outer or body portion of the garment or article does not contain organic derivatives of cellulose, in place of water there may be employed as an aid in coalescing

the layers of fabric together an aqueous solution of alcohol with or without a plasticizer. If steam is employed, it is preferable to employ a wet steam and the same may be injected into the material during the pressing operation in a manner similar to that of pressing a woolen fabric.

Any suitable device may be used for pressing the assembled fabrics to cause them to adhere together. For instance, the fabrics may be pressed with hot irons, or the fabric may be passed between pressure rollers, one or both of which are heated, or between a heated pressing iron or plate and a cold board or surface. The heating device may be heated to a desired temperature, for instance, 80° C. to 180° C. or more, and the pressure may be of any desired degree, for instance, from 10 to 600 pounds or more per square inch.

It is to be understood that the foregoing detailed description is given merely by way of illustration and that many variations may be made therein without departing from the spirit of my invention.

Having described my invention, what I desire to secure by Letters Patent is:

1. A coat comprising an outer material and having a stiffened front structure, said front structure comprising a stiffening of thermoplastic material at least locally coalesced to the outer material of the garment.

2. A coat comprising an outer material and having a stiffened front structure, said front structure comprising a stiffening of thermoplastic material containing yarns of cellulose acetate at least locally coalesced to the outer material of the garment.

3. A coat comprising an outer material and having a stiffened front structure, said front structure comprising a stiffening of thermoplastic material preformed to a predetermined shape and at least locally coalesced to the outer material of the garment.

4. A coat comprising an outer material and having a stiffened front structure, said front structure comprising a stiffening containing cellulose acetate yarns of thermoplastic material preformed to a predetermined shape and at least locally coalesced to the outer material of the garment.

ALFRED J. STEINBERGER.