July 14, 1936. G. SCHNEIDER 2,047,230

WEARING APPAREL AND METHOD OF MAKING THE SAME

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Fig. 1.

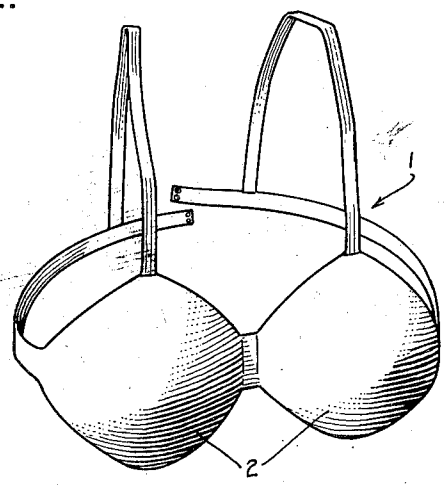
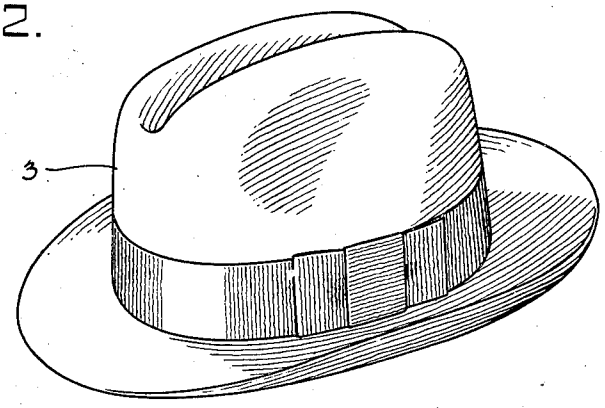


Fig. 2.



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WEARING APPAREL AND METHOD OF MAKING THE SAME

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16 Claims. (Cl. 18—56)

This invention relates to wearing apparel and relates more particularly to the formation of wearing apparel by shaping textile materials comprising thermoplastic derivatives of cellulose by the use of heat.

An object of my invention is to form wearing apparel in an economical and expeditious manner by shaping textile materials comprising filaments of thermoplastic derivatives of cellulose with the aid of heat. Other objects of this invention will appear from the following detailed description.

The formation of wearing apparel, such as brassières, caps, hats, suspensories, etc. having shapes in three dimensions is relatively complicated, since in order to obtain the desired shape, it is necessary to form them from a relatively large number of small pieces of fabric, usually by sewing.

I have found that such wearing apparel can be formed very simply and expeditiously by shaping with the aid of heat relatively flat textile materials, such as fabrics, comprising filaments of thermoplastic derivatives of cellulose. Under the influence of heat, the filaments of the thermoplastic derivatives of cellulose become sufficiently soft or plastic to assume the shape of the forming device, and upon cooling harden into such shape. Because of the moulding effect of such operation, the articles so formed retain their shape substantially permanently and therefore do not become distorted when exposed to the elements or when subjected to repeated washings. This method of forming such wearing apparel also avoids the necessity of sewing together of small pieces of fabric.

In accordance with my invention, then, I form wearing apparel from textile materials comprising filaments of thermoplastic derivatives of cellulose by imparting the desired shape to such textile materials under such conditions that the filaments are rendered at least partially plastic.

Any suitable wearing apparel may be made by this invention. However it is of particular importance in connection with the formation of wearing apparel that have shapes in three dimensions. Examples of such wearing apparel are brassières, suspensories, men's and women's hats or hat shapes, caps, girdles and the like.

The filaments contained in the textile material to be treated may be made of any suitable thermoplastic derivative of cellulose particularly organic derivatives of cellulose such as organic esters of cellulose and cellulose ethers. 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 filaments may be present in substantially continuous lengths or they may be in the form of short or staple lengths associated together to form "spun" yarn. The textile material may consist wholly of such filaments or yarns containing such filaments, or it may contain in addition yarns of other fibres such as natural silk, reconstituted cellulose, silk or wool.

The textile material may be a suitable fabric which may be woven, circular knitted, warp knitted or netted and may contain yarns of fine filaments of organic derivatives of cellulose. On the other hand the textile material may be heavier material such as may be made by weaving or braiding heavier filaments, such as artificial hair, bristles or straws of the organic derivative of cellulose.

The shaping of the textile materials is done while they are heated to such a degree that they are at least partially plastic under the prevailing conditions. The temperature of treatment will vary not only with the nature of the particular thermoplastic derivative of cellulose present in the textile material but also with the prevailing conditions, such as the amount of water present. Thus if a fabric made of yarns of acetone-soluble cellulose acetate is shaped between or on forming devices in the absence of water or steam, the temperature of such devices should preferably be above 125° C., while the upper temperature limit should be below 180° C. if it is desired to avoid coalescence of the cellulose acetate filaments and the consequent stiffening of the material, while temperatures above 180° C. but below the temperature of decomposition may be employed when coalescence of the filaments and stiffening of the material is desired.

I have found that the presence of water in the form of liquid or vapor reduces the temperature required to obtain the degree of plasticity of the thermoplastic derivative of cellulose required for imparting permanent shape to the textile material. If steam is present during the shaping operation, temperatures of about 100° C. are generally sufficient. If the textile material is wet with water during the shaping operation, temperatures of 90 to 100° C. will produce the desired result.

In carrying out the shaping operation any suitable devices and expedients may be employed. For instance the flat textile material may be placed between the male and female members of

mold-like devices of desired shape which may be heated internally or externally by ordinary steam, superheated steam, steam under pressure, electrical resistance, flames and the like. Such devices may be provided with means, such as perforations or jets, to supply steam to the textile material in order to facilitate the shaping of the same. Alternatively, the flat textile material may be placed over a heated form and drawn under suitably applied tension over such form until the desired shape is imparted.

When the textile material is shaped while wet with water, it may be immersed in hot water and then shaped between the mold-like members or over the forms. In this case, the molds or forms need not necessarily be provided with independent heating means, since after the placing of the textile material between the mold-like members or over the forms, the assembly may be immersed in hot water and permitted to remain for the period of time required to impart the relatively permanent shape to the textile material.

If it is desired to impart stiffness to the wearing apparel, such as in the case of hats or hat forms, being made, this may be done in several ways. Thus if the temperatures employed during the shaping are high enough to cause coalescence or melting of the thermoplastic derivative of cellulose, stiffness is imparted. Other expedients for imparting stiffness are the use of active solvents which coalesce the filaments, examples of such solvents for cellulose acetate being acetone, methyl acetate and dioxan. Solutions of the derivatives of cellulose which may be the same or different from the thermoplastic derivative of cellulose present in the textile material dissolved in liquids having a solvent action on such thermoplastic derivative of cellulose may also be applied to the textile material to impart stiffness.

However, when it is desired to retain completely the original fabric-like structure or appearance of the textile materials, I prefer to impart stiffness by applying to the textile material either prior to, during, or subsequent to the shaping operation, sizes or stiffening agents comprising suitable solids dissolved in liquids that have no appreciable action on the thermoplastic derivative of cellulose present in the textile material, such as dammar, copal, elemi, or other resins dissolved in turpentine, solutions of gelatine in water, or solutions of cellulose nitrate or other cellulose derivatives having different solubility characteristics from the thermoplastic derivative of cellulose present in the textile material dissolved in solvents having no solvent action on the thermoplastic derivative of cellulose.

Reference is had to the accompanying drawing, wherein

Figure 1 is a perspective view of a brassière, and

Figure 2 is a perspective view of a hat.

In Figure 1, the brassière 1 comprises the bulging portions 2 which are made of a fabric consisting wholly of cellulose acetate yarn and shaped in accordance with this invention.

In Figure 2, the hat 3 has its body portion shaped of fabric made of cellulose acetate yarn in accordance with this invention.

It is to be understood that the foregoing detailed description is given merely by way of illustration and 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. In the method of forming wearing apparel, the step of fashioning textile materials comprising filaments of thermoplastic derivatives of cellulose under such conditions as to render the thermoplastic derivative of cellulose at least partially plastic.

2. In the method of forming wearing apparel, the step of fashioning textile materials comprising filaments of cellulose acetate under such conditions as to render the cellulose acetate at least partially plastic.

3. In the method of forming wearing apparel, the step of fashioning textile materials comprising filaments of thermoplastic derivatives of cellulose at such elevated temperatures that under the conditions prevailing the thermoplastic derivative of cellulose is rendered at least partially plastic.

4. In the method of forming wearing apparel, the step of fashioning textile materials comprising filaments of cellulose acetate at such elevated temperatures that under the conditions prevailing the cellulose acetate is rendered at least partially plastic.

5. In the method of forming wearing apparel, the steps of fashioning a textile material comprising filaments of thermoplastic derivatives of cellulose by means of a heated device of required shape and then cooling, whereby relatively permanent shape is imparted thereto.

6. In the method of forming wearing apparel, the steps of fashioning a textile material comprising filaments of cellulose acetate by means of a heated device of required shape and then cooling, whereby relatively permanent shape is imparted thereto.

7. In the method of forming wearing apparel, the step of fashioning textile material comprising filaments of thermoplastic derivatives of cellulose at elevated temperatures in the presence of water.

8. In the method of forming wearing apparel, the step of fashioning textile material comprising filaments of cellulose acetate at elevated temperatures in the presence of water.

9. In the method of forming wearing apparel, the step of fashioning textile material comprising filaments of cellulose acetate at elevated temperatures in the presence of liquid water.

10. In the method of forming wearing apparel, the step of fashioning textile material comprising filaments of cellulose acetate at elevated temperatures in the presence of steam.

11. In the method of forming wearing apparel, the step of fashioning textile material comprising filaments of cellulose acetate between hot molding members.

12. In the method of forming wearing apparel, the step of fashioning textile material comprising filaments of cellulose acetate around a hot form.

13. In the method of forming wearing apparel, the steps of wetting a textile material comprising filaments of cellulose acetate and fashioning the same while wet with a hot shaping device.

14. In the method of forming wearing apparel, the steps of wetting a textile material comprising filaments of cellulose acetate, and fashioning the material by closely fitting the same over a form and immersing the assembly in hot water.

15. Fashioned wearing apparel containing filaments of thermoplastic derivatives of cellulose and molded into a predetermined shape.

16. Fashioned wearing apparel containing filaments of cellulose acetate and molded into a predetermined shape.

GEORGE SCHNEIDER.