

- [54] **NON-SLIP WAISTBAND PRODUCT**
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Related U.S. Application Data

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- [52] U.S. Cl. **428/196; 2/76; 2/221; 2/237; 428/225; 428/262; 428/447**
- [51] Int. Cl.² **B32B 3/10**
- [58] Field of Search 117/37 R, 44, 161 ZA; 161/57, 60, 144, 146, 208, 209; 2/76, 221, 237; 427/256, 286, 288; 428/195, 196, 200, 447, 225, 262

[57] **ABSTRACT**

A new and improved waistband product having one face comprising a permeable fabric having a pattern of a specific silicone rubber elastomeric material on its surface. The waistband product is made by applying to a surface of a permeable fabric a silicone rubber elastomeric compound in a pattern, allowing the compound to seep into the permeable areas of the fabric, curing the compound and allowing the fabric and compound to age to drive off any irritating or toxic volatile materials.

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3 Claims, 2 Drawing Figures

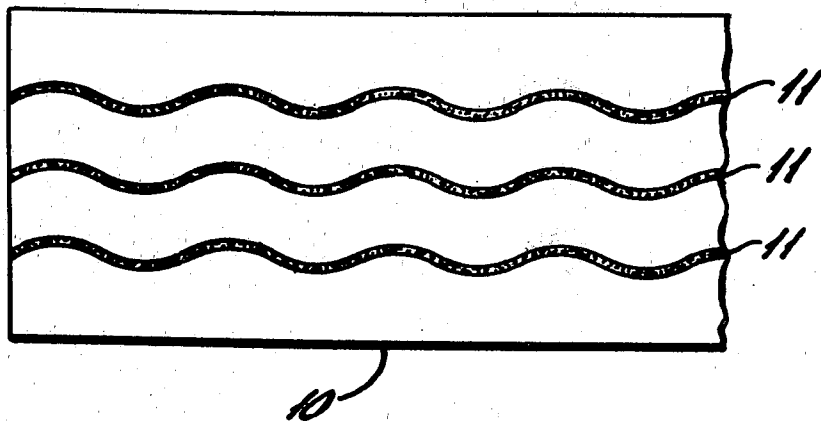


Fig. 1.

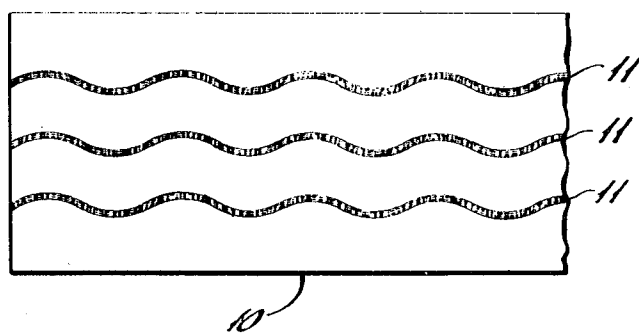
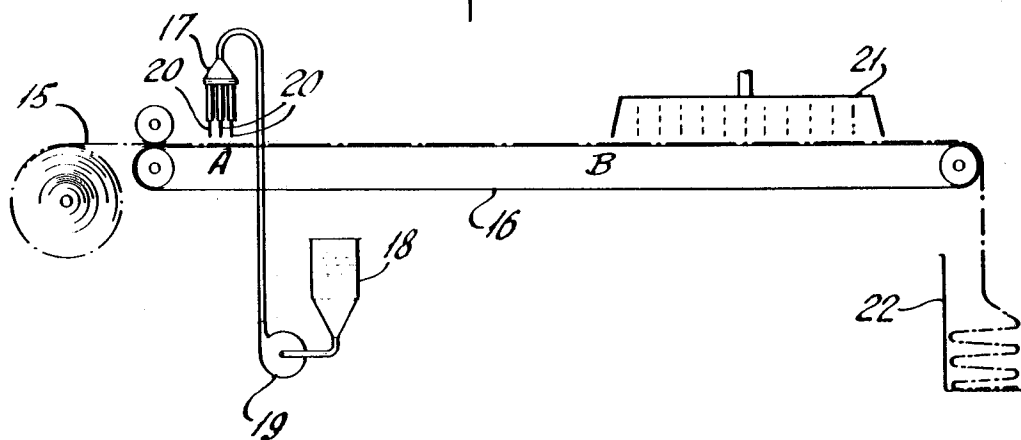


Fig. 2.



NON-SLIP WAISTBAND PRODUCT

This is a division of application Ser. No. 309,382, filed Nov. 24, 1972, now U.S. Pat. No. 3,854,978, issued Dec. 17, 1974.

This invention relates to new and improved non-slip waistbands for use in the waist encircling portions of trousers, pants, skirts and the like.

Waistbands generally comprise a laminate of different fabrics which serve different functions in the waistband. Waistbands may include a fabric which provides body to the waist encircling portion of the garment; a fabric which prevents roll-over of the waistband portion of the garment and so forth. Usually these fabrics are covered with a fabric generally termed a "curtain" fabric. The completed waistband is sewn to the upper edge of the garment to provide the final apparel waistband. In many instances, especially in sportswear the waistband is also used to aid in holding down a shirt or blouse and prevent the shirt or blouse from pulling out of a pair of trousers or a skirt. Various techniques have been utilized in the manufacture of waistbands to provide the waistband with frictional characteristics to aid in the holding down of the shirt or blouse. For example, bare rubber may be woven in the waistband to give it frictional properties, or polyurethanes or other polymers may be applied to the fabric in various patterns to give the waistband some frictional characteristics. These past techniques have all suffered from one or more of the following deficiencies: lack of dry cleanability, lack of washability, poor aging qualities in that the waistbands harden and crack and tend to abrade during use, poor frictional qualities, lack of colorfastness and the like.

We have now discovered a new product for use in waistbands which has none of the above mentioned deficiencies and has good frictional characteristics.

Our new waistband product comprises a permeable base fabric which has a pattern of a silicone rubber elastomeric material adhered to one surface.

To produce a product that has good washing and drying characteristics, withstands dry cleaning, does not discolor, does not crack, resists abrasion and has sufficient frictional characteristics so as to hold down a shirt or blouse, the silicone material should have the following properties:

- a. Shore A hardness of 20 to 45;
- b. tensile strength of 250 psi to 500 psi;
- c. a percent elongation of from 100 to 500 percent;
- d. a linear shrinkage of less than 2 percent; and
- e. be flexible at temperatures of from -30°F. to 250°F.

In manufacturing our new waistband product the base permeable fabric, which may be a woven knitted or nonwoven fabric, has applied to one surface the silicone rubber elastomeric compound in a pattern. The pattern may be a series of parallel lines or wavy lines or dots or other patterns as desired. The silicone material when applied must have a viscosity of from 12,000 centipoises to 25,000 centipoises and a tack-free time of less than 40 minutes. By "tack-free time" it is meant the time it takes (at 77°F. and 50% relative humidity) for the silicone material to form a skin on its surface so that it is not sticky to the touch. After the silicone material is applied it is allowed to seep into the permeable portions or areas of the fabric to provide good bonding. The silicone material is cured at a tem-

perature of from 90°F. to 185°F. in an atmosphere containing at least 7 grains of water per cubic foot. The cured silicone is allowed to age to remove volatile toxic materials such as acetic acid.

The invention will be more fully described in conjunction with the accompanying drawings wherein;

FIG. 1 is a perspective view of the new and improved waistband product of the present invention.

FIG. 2 is a schematic side view of apparatus for carrying out our new process for manufacturing the improved waistband product of the present invention.

Referring to the drawings in FIG. 1 there is shown a base fabric 10 having on the surface thereof the silicone rubber elastomeric compound. The silicone rubber is in a series of three wavy lines 11.

The base fabric may be of any of the known curtain fabrics made from woven, knitted, nonwoven materials and the like. The fabric must have air permeability and be non-water repellent. If a woven fabric is used the fabric should have a count of from about 40 to 120 threads per inch in the warp direction and 40 to 80 threads per inch in the filling direction. The fabric may have any of the various permanent press, wash-and-dry or other type textile finishes applied to it as desired. In no instances can a water repellent be applied to the waistband product as such will entirely disrupt the bonding of the silicone elastomeric material to the fabric.

The silicone rubber elastomeric material must be flexible at temperatures of from below freezing to those temperatures normally found in home or commercial washing machines and dryers. Hence temperatures of from about 30°F. below zero to temperatures of from 250°F. to 300°F. are required. The silicone material should have a Shore-A hardness of from 20 to 45 as measured by American Society of Testing Materials, ASTM-D-676. The silicone material should have a tensile strength of from 250 psi to 500 psi and a percent elongation of from 100 to 500 percent as measured by ASTM-D-412. The silicone should have a linear shrinkage of 2% or less.

In FIG. 2 of the drawings there is shown a schematic view of apparatus for carrying out the method of the present invention. In the method a roll of untreated "curtain" fabric 15 is carried by a conveyor 16 beneath a silicone applying and metering head 17. The silicone material is fed from a reservoir 18 through a pump 19 to the head. The head may comprise a plurality of nozzles 20 or hypodermic needles or other means for metering and feeding the silicone onto the fabric. The nozzles may be oscillated and/or fed intermittently to produce any desired pattern of the silicone on the fabric. The silicone material used must have a viscosity of from 12,000 centipoises to 25,000 centipoises. If it is not within this range of viscosities it will either flow too greatly or plug the needles or otherwise disrupt and make the process inoperable. After the silicone is applied to the fabric it is allowed to remain on the fabric for a fraction of a second up to a few minutes to allow it to seep into the permeable areas or portions of the fabric and produce adequate bonding. The reach of the conveyor from point A to B allows the time for the required seepage. The seepage may be carried out at room temperature and approximately 40% relative humidity and requires only a short period of time but a finite period of time.

After the silicone material is allowed to seep into the fabric the fabric is passed through an oven 21 and the

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silicone material cured. The silicone is cured at a temperature of from 90°F. to 185°F. for a period of time of from 5 to 30 minutes at a relative humidity of between 25 to 80 percent. The drying atmosphere which is preferably air should contain at least 7 grains of water per cubic foot for suitable curing. To produce suitable fabric for use in waistbands the silicone should have a tack-free time of less than 40 minutes. Approximately 1½ to 4 grams of silicone per linear yard of fabric is used to provide the requisite frictional characteristics in the waistband product.

After the fabric with the silicone thereon is cured it is aged for a period of a few hours to 24 hours or more. The aging is accomplished by placing the fabric with the silicone thereon after curing into cans or cardboard cartons in a more or less unconfined state to allow the silicone material to age, drive off the acetic acid or other volatile materials which might disrupt the final properties of washability, dry cleanability, color fastness and the like.

After the treated fabric is aged it is rolled onto spools or otherwise packaged and utilized in the manufacture of apparel such as trousers, skirts and the like.

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From the foregoing description it will be appreciated that the objects and advantages set forth in this invention have been fully achieved. Modifications will become apparent to those of ordinary skill in the art after reading this disclosure and it is to be understood that this invention is not necessarily limited to details described since the spirit and scope of the invention is defined by the appended claims.

What is claimed is:

1. A new waistband product comprising; a permeable base fabric having a pattern of an elastomeric silicone compound adhered to one surface thereof, said silicone compound being flexible at temperatures of from -30°F. to +250°F., having a Shore-A hardness of from 20 to 45, a tensile strength of from 250 psi to 500 psi, a percent elongation of from 100 to 500 percent and a linear shrinkage of less than 2 percent whereby the product is dry cleanable, washable, color fast, and has good frictional characteristics.

2. The waistband product according to claim 1 wherein the base fabric is a woven fabric.

3. The waistband product according to claim 1 wherein the silicone compound is in a pattern of parallel lines.

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