

[54] **NOVELTY TEXTILE YARNS**

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[57]

ABSTRACT

A novelty core yarn comprising a continuous filamentary glass core, preferably texturized, provided with a sheath consisting of a roving of textile fibers having flame-resistant properties. The sheath may consist of a roving of modacrylic textile fibers having inherent, built-in flame-resistance and composed of a copolymer of acrylonitrile with vinylidene chloride, vinyl chloride or both.

4 Claims, No Drawings

NOVELTY TEXTILE YARNS

This invention relates to novelty textile yarns and to fabrics made from such yarns. An important object of the present invention is a novelty type yarn having improved flame-resistance properties and giving woven and knitted fabrics which are both flame-resistant and dimensionally stable.

Core yarns are already known in which a core yarn, for example a spandex type yarn (see for example U.S. Pat. No. 3,017,740) or a conventional continuous filament yarn such as a polyester yarn, is provided with a sheath in the form of a fiber roving, for example of viscose rayon staple fiber or cotton. The present invention is directed to novelty yarns of this known core type.

In accordance with this invention a novelty core yarn comprises a continuous filamentary glass core provided with a sheath consisting of a roving of textile fibers having flame-resistant properties.

For the purposes of the present invention, a fiber is defined as being flame-resistant when, in the form of a woven or knitted fabric composed entirely of the fiber, it satisfies the requirements of Clause 3 of British Standard 3120:1959 when tested according to British Standard 3119:1959, or, when tested by the AATCC Test Method 33-1962, is classified as Class 1(a) as defined in paragraph 9.1.1. thereof.

The flame-resistant fiber may be one having an inherent, built-in flame resistance, for example modacrylic fibers such as those based on copolymers of acrylonitrile with vinylidene chloride and/or vinyl chloride. Examples of such fibers are those based on acetone-soluble copolymers containing from about 45-55 parts by weight of acrylonitrile and from about 55 to 45 parts by weight of vinylidene chloride, and those containing from about 55 to 75 parts by weight of acrylonitrile and from about 45 to 25 parts by weight of vinyl chloride. Alternatively, the fiber may be a standard form of textile fiber, such as a viscose rayon or cellulose acetate fiber, containing a flame-proofing agent such as tri-chlorethyl phosphate or a tris-dibromopropyl phosphate, for example tris-2:3 dibromopropyl phosphate. Examples of such fibers are described in British Patent Specifications Nos. 958,120 and 1,158,231.

The glass filament core may be a yarn consisting of a bundle of substantially parallel continuous glass filaments but preferably the core consists of a bundle of filaments which have been texturized for example by passage through an air jet as described in U.S. Pat. No. 2,783,609. The use of a textured glass filament core gives improved cohesion between the core and the sheath roving. The glass fibers in the core yarn are preferably of low filament denier, that is to say less than 1 denier, although other glass fibers may be used. The glass fiber may be the commercially-available beta glass fibers of $\frac{1}{4}$ denier.

The core yarns of the present invention using flame-resistant fiber rovings are particularly suitable for making dimensionally-stable fabrics for use in making non-inflammable garments, for example overalls, fire-fighting apparel and safety apparel for use by foundry workers, welders, chemical and refinery workers, explosive industry workers, racing drivers and air-line workers. The particular combination of core and

sheath in the yarn ensures that the fabric has very good protection from flame, radiant heat and molten metal, and also chemicals, while at the same time preserving good textile properties of drape and flexibility. When flame is applied to such a fabric, neither component ignites and the glass core does not shrink from the flame; hence the glass core always provides a protective non-inflammable framework. The advantage of having a textile sheath on the core is that it protects the glass from abrasion and provides bulk, cover and other aesthetic properties such as fabric handle which a fabric composed of glass filaments only would not possess. It also enables the core yarn and fabrics made from them to be dyed easily to any shade. The fabrics can also be readily laundered and dry cleaned.

The invention is illustrated by the following Examples:

EXAMPLE 1

The yarn used as the core was a 300 denier continuous filament beta glass yarn (individual filament denier $\frac{1}{4}$) which had been texturized in an air jet as described in U.S. Pat. No. 2,783,609.

The sheath roving consisted of two ends of 2 hank, 2 denier 6 cm. staple fiber composed of a copolymer of approximately equal parts by weight of acrylonitrile and vinylidene chloride.

The sheath roving was spun on a ring frame with the glass core introduced at the front rollers of the apron drafting system. The composite yarn was twisted to give a yarn with a final count of 1/10's cotton count.

The core yarn obtained was woven using the yarn folded for warp and weft in both plain and twill weaves with approximately 17 ends per centimeter and 14 picks per centimeter. When a flame was applied to the fabrics, the fabric net-work remained intact and the flame did not penetrate the fabric. Similarly, when molten metal was dropped on to the fabric, the molten metal did not penetrate. The fabric had excellent stability to washing.

EXAMPLE 2

The fabric was a plain woven fabric consisting of a warp of 2/10's cotton count core-spun textured beta glass 300 denier core with a sheath roving as described in Example 1, and a 1/10's cotton count weft spun in the same manner as described in Example 1; the fabric had 17 ends per cm. and 16 picks per cm.

The fabric obtained has been successfully used for racing drivers' non-inflammable overalls.

EXAMPLE 3

The fabric in this case was made as described in 2 2 but, instead of using a doubled warp, a single 10's cotton count was used as the warp. The fabric so produced was more flexible and lighter in weight than that of Example 2 but had similar non-inflammable properties.

What is claimed is:

1. A novelty core yarn consisting essentially of a continuous filamentary glass core provided with a sheath of a roving of modacrylic textile fibers having inherent, built-in flame-resistance and composed of a copolymer selected from the group consisting of (a) acrylonitrile and vinylidene chloride, (b) acrylonitrile and vinyl

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chloride and (c) acrylonitrile and vinylidene chloride and vinyl chloride.

2. A core yarn as claimed in claim 1, wherein the core yarn consists of texturized glass filaments.

3. A novelty core yarn consisting essentially of a continuous filamentary glass core provided with a sheath of

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a roving of fibers composed of an acetone-soluble copolymer of acrylonitrile and vinylidene chloride.

4. A core yarn as claimed in claim 3 wherein the core yarn consists of texturized glass filaments.

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