

Oct. 17, 1950

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2,526,523

YARN AND FABRIC AND METHOD OF MAKING SAME

Filed March 7, 1946

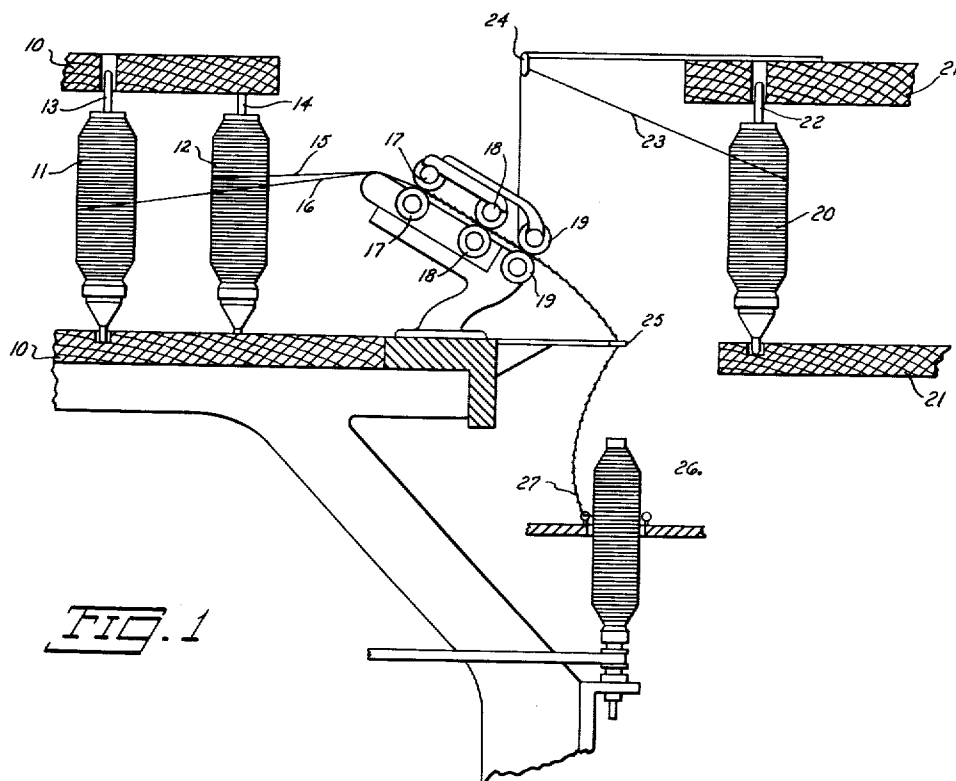


FIG. 1

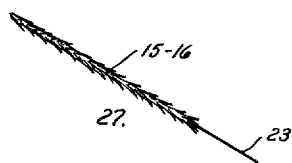


FIG. 3



FIG. 2

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2,526,523

YARN AND FABRIC AND METHOD OF
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Application March 7, 1946, Serial No. 652,563

20 Claims. (Cl. 57—140)

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This invention relates in general to yarns, and more particularly to yarns similar to or having the appearance of spun yarns, although formed at least in part, from continuous filaments of yarn material.

The invention is particularly suitable and useful in the production of light weight or sheer fabrics. One object thereof is the production or manufacture of a synthetic yarn, characterized by or having the property of high wet and dry strength; even though one of the components of the yarn such as, for example, rayon, may have a relatively low dry and wet strength. A further object is to make a yarn fabric comprising synthetic materials and resembling spun yarns, which will have dimensional stability, so that it cannot sag or, conversely, stretch, to the same extent as a fabric made wholly from spun yarn.

The present invention contemplates a synthetic yarn fabric of high wet and dry strength, that will be at least equally as stable as cotton fabrics that have previously been subjected to the process commonly known to the trade as "sanforizing," for shrinkage limitation or prevention. Another object is a dimensionally stable synthetic fabric having the appearance of spun yarn fabric and a soft wooly texture, but comprising in part a continuous filament, which is washable and can be dry cleaned. Still another object is the production of such a yarn in an efficient and inexpensive manner.

With the above and other objects in view, as will be apparent, this invention consists in the construction, combination, and arrangement of parts, all as hereinafter more fully described, claimed and illustrated in the accompanying drawings, wherein:

Fig. 1 illustrates schematically a conventional spinning frame equipped with the standard three roll drafting system, wherein the positions of the various elements during the spinning operation are shown; and

Figs. 2 and 3 are enlarged representations of the yarn embodying the present invention, showing its cross section and external appearance.

The instant invention contemplates the production or manufacture of a synthetic fabric characterized by high wet and dry strength and dimensional stability; and proposes to accomplish this by the composite association of a continuous filament core with a drafted yarn wrapping made from staple fibers. The material forming the core may be, for example, what is sold on the open market under the trade name of nylon. A copolymer of vinyl chloride and

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vinyl acetate is another commercially known example. Polyacrylonitrile fibers, formerly available for experimental purposes under the trade name "fiber A" and now sold commercially as "orlon," are also recommended for the core. Other threads made of polymerized polyamides are also considered suitable for the purpose, provided they possess the characteristics of dimensional stability and high wet and dry strength. Preferably, the continuous component should be thermoplastic. In any case, however, nylon and a copolymer of vinyl chloride and vinyl acetate have been found particularly suitable and satisfactory. The wrapper component may be one or more rovings of spun rayon, spun acetate, or a blend of both in any desired percentages. Other synthetic fibers, or wool, may also be blended in with the rovings of rayon, acetate or both.

As will be understood, one or more rovings made of one of the materials above indicated, are introduced into a conventional spinning frame, and submitted to the usual drafting operation. The filament core of nylon, a copolymer of vinyl chloride and vinyl acetate polyacrylonitrile, or other suitable material, which should be finer than the rovings, is set in under the front or delivery rollers, thereby escaping the attenuating action of the drafting rolls, to coact with the roving and form a composite twisted yarn, wherein the nylon forms a core around which the roving is twisted or wrapped. Among other properties, the resulting yarn or fabric will have the characteristics previously set forth. That is to say, it will not stretch as readily or sag as much as a fabric made from all spun material. Further, the continuous filament core of nylon or other material imparts a higher wet and dry strength than spun yarns made from short fibers of the same chemical description. It is also to be noted that when utilizing thermo-plastic yarns such as nylon, a copolymer of vinyl chloride and vinyl acetate polyacrylonitrile, cellulose acetate, etc., it is possible to shrink the filament core by means of heat treatments at high temperatures, to thereby fully set the filament yarn in a fixed position. As a result, despite the spun fiber content of the roving component or element, the composite yarn fabric is dimensionally stable and not subject to any substantial shrinking, sagging, or stretching. It is washable, can be dry cleaned, and is characterized by a wet and dry strength superior to that of a fabric made from spun yarns only, although there is very little difference in the finished appearance of both fabrics.

Reference being made more particularly to

the drawings, 10 designates a bobbin stand or creel forming the upper part of the center of a spinning frame. The bobbins 11-12 for the several strands of roving are mounted in the stand 10 by means of skewers 13-14, and are rotatable therewith to unwind the rovings 15-16 of rayon or other synthetic material from the bobbins 11-12. The rovings 15-16 then pass through pairs of nipping rollers 17-18, of which the pair 18 revolve at a rate of speed greater than that of the pair 17, to such an extent that in passing through the rollers 17-18, the rovings 15-16 are drawn out and attenuated to predetermined lengths. Thus the rovings 15-16 are extended or attenuated to an average length of approximately the distance between the several pairs of drafting rollers 17-18. After passing through the drafting rollers 17-18, the rovings 15-16 advance through a third pair of rollers, which for convenience may be termed delivery rollers 19, to coact with a continuous filament thread of nylon, a copolymer of vinyl chloride and vinyl acetate or other suitable material as will be described.

Positioned adjacent the rollers 17-19, is a third bobbin 20 for the fine nylon thread, or thread of other suitable material which is mounted in the rack 21 to rotate with the skewer 22. As the bobbin 20 rotates, the continuous filament nylon yarn 23 is fed through an aperture in the yarn guide 24 and between the pair of delivery rollers 19, to coact with the drafted staple fibers of rayon 15-16. Since the continuous filament yarn 23 does not pass through the nipping rollers 16-17, manifestly it is not subjected to any attenuation action and therefore retains its undrafted and continuous character.

The associated yarns 15-16 and 23 issuing from the delivery rollers 19 through the guide 25 are twisted by means of the ring spinning device 26, the heavier rovings 15-16 of rayon being twisted about the finer continuous filament 23 of nylon, to form a composite yarn 27 consisting of a nylon core having a drafted rayon wrapping of staple fibers.

The composite yarn 27 is materially strengthened by the continuity of its filament core 23, and, by reason of the spun rovings 15-16, presents an appearance like that of spun yarn, thus permitting the making of a fabric of woolly and soft texture. Furthermore, since the core 23 is thermo-plastic, it will be understood that by conventional heat treatment, it may be shrunk and fully set as desired. Thus a fabric made from such a composite yarn will have dimensional stability and high wet and dry strength. It is washable and can be dry cleaned, and is materially stronger than a fabric made from spun yarns only.

Although nylon, polyacrylonitrile and a copolymer of vinyl chloride and vinyl acetate have been cited herein as examples of material suitable for use as the core 23 of the composite yarn 27, it will be understood that any synthetic substance may be substituted, if it has the properties of high wet and dry strength and dimensional stability. A thermoplastic material for the core 23 is especially suitable. In like manner, spun acetate may be used in place of the rayon wrapping threads 15-16, or a blend of both, or other synthetic fibers, or wool, may be utilized. The term "staple fibers" as used above and claimed hereafter is intended to include discontinuous natural or synthetic fibers of any predetermined length, as for examples, spun rayon, spun acetate, cotton fibers, wool fibers, and other

natural or synthetic fibers or blends and mixtures thereof.

What is claimed is:

1. Composite yarn comprising a plurality of elements including a core of continuous filament nylon and a wrapping for the core of rayon staple fibers in separable relationship therewith.

2. Method of making a textile material which includes the steps of twisting a spun rayon wrapper about a core portion of continuous filament nylon to form a composite yarn and fabricating the same into textile material while preventing any permanent adhesion between the core and the wrapper.

3. A fabric produced according to the method of claim 2.

4. Method of making composite yarn resembling spun yarn which includes the steps of twisting staple fibers about a core portion of continuous filament nylon and shrinking the nylon core by means of heat while preventing any permanent adhesion between the core and the staple fibers.

5. A textile material produced according to the method of claim 4.

6. Composite yarn consisting essentially of a core portion made of continuous filament fibers selected from the group of polymerized synthetic resins consisting of nylon, polyacrylonitrile and a copolymer of vinyl acetate and vinyl chloride, and a wrapper for the core of staple fibers twisted about the core but not bonded thereto.

7. Method of making textile material which includes the steps of twisting a wrapper of staple fibers about a core portion of continuous filament fibers selected from the group consisting of nylon, polyacrylonitrile and a copolymer of vinyl acetate and vinyl chloride to form a composite yarn, fabricating the yarn into textile material and stabilizing the material by means of heat while preventing any permanent adhesion between the core and wrapper portions of said composite yarn.

8. Composite yarn comprising a core portion made of continuous filament polyacrylonitrile fibers and a wrapper of staple fibers twisted about the core, but free of any permanent adherence thereto.

9. Method of making composite yarn resembling spun yarn which includes the steps of twisting staple fibers about a core portion of continuous filament fibers selected from the group of polymerized synthetic resins consisting of polyacrylonitrile, nylon and a copolymer of vinyl chloride and vinyl acetate, and setting the core by means of heat while preventing any permanent adhesion between the core and the staple fibers twisted thereabout.

10. Method of making textile material which includes the steps of twisting a wrapper containing fibers of wool about a core portion of continuous filament nylon to form a composite yarn, fabricating the yarn into textile material and stabilizing the material by means of heat while preventing any permanent adhesion between the core and wrapper elements of said composite yarn.

11. Composite yarn comprising a wrapper of staple fibers of rayon twisted about a core portion of continuous filament nylon, but free of any permanent adherence thereto.

12. Composite yarn comprising a wrapper of staple fibers twisted about a core portion of continuous filament nylon, but free of any permanent adhesion therewith.

13. Composite yarn comprising a wrapper of staple fibers twisted about a core portion of continuous filament fibers made of a copolymer of vinyl chloride and vinyl acetate, but free of any permanent adhesion of the core to the wrapper.

14. As a new article of manufacture, a textile yarn comprising a plating of wool yarn associated with a core thread consisting of a continuous synthetic polyamide filament, and further characterized in that the plating of wool yarn is freely disposed on said core thread filament.

15. Composite yarn comprising a wrapper containing staple fibers of rayon twisted about a core portion of continuous filament polyacrylonitrile, but free of any permanent adherence thereto.

16. Composite yarn comprising a wrapper containing fibers of wool twisted about a core portion of continuous filament polyacrylonitrile, but free of any permanent adherence thereto.

17. Composite yarn comprising a wrapper containing staple fibers of rayon twisted about a core portion of continuous filament fibers made of a copolymer of vinyl chloride and vinyl acetate but free of any permanent adherence thereto.

18. Composite yarn comprising a wrapper containing fibers of wool twisted about a core portion of continuous filament fibers made of a copolymer of vinyl chloride and vinyl acetate but free of any permanent adherence thereto.

19. Method of making composite yarn resembling spun yarn which includes the steps of twisting wool fibers about a core portion of continuous filament fibers selected from the group of

polymerized synthetic resins consisting of nylon, polyacrylonitrile and a copolymer of vinyl chloride and vinyl acetate to form a composite yarn and setting the yarn by means of heat while preventing any permanent adhesion between the core and the wool fibers.

20. Method of making textile material which includes the steps of twisting a wrapper of staple fibers of rayon about a core portion of continuous filament fibers selected from the group consisting of nylon, polyacrylonitrile and a copolymer of vinyl acetate and vinyl chloride to form a composite yarn, fabricating the yarn into textile material and stabilizing the material by means of heat while preventing any permanent adhesion between the core and the wrapper portions of said composite yarn.

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