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YARN AND THE FABRIC PRODUCED THEREFROM

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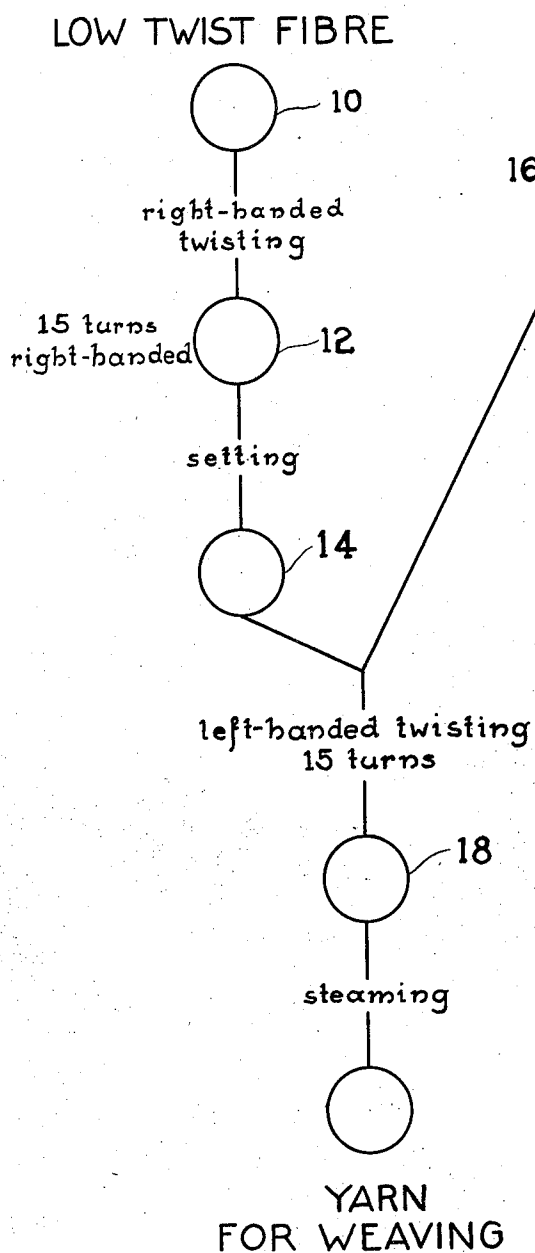


Fig. 1.

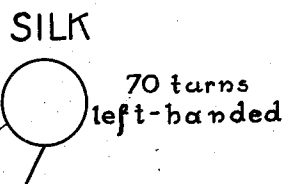


Fig. 2.

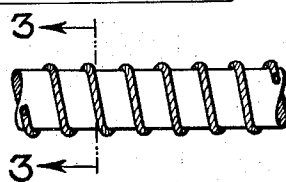


Fig. 3.



Fig. 4.

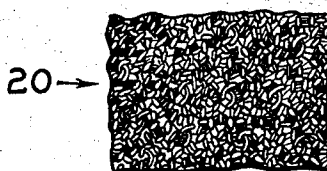


Fig. 5.



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YARN AND THE FABRIC PRODUCED THEREFROM

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12 Claims. (Cl. 117—2)

This invention relates to yarns and fabrics produced therefrom.

As is well known, to obtain the highly desired pile effect of crepe fabrics, the yarn woven to form the fabric has imparted to it, in its spinning, an extremely high twist. Then, after the cloth has been woven and the fibres of the yarn are no longer under the tensions applied during weaving, the highly twisted yarns act to draw the fabric together. There results the surface contouring of a pile effect inherent in crepe fabrics.

For this production of fabrics of this type, it thereby becomes requisite to have a yarn capable of being twisted severely so that, when woven, the consequent release and piling will be produced. Certain yarns, which have inherent properties making them highly desirable for crepe fabrics, have not hitherto been applicable for that purpose. Among the reasons for this condition is the fact that such yarns may not have imparted to them any considerable twist. Among these yarns are specifically included the artificial silk or rayon yarns of the acetate classification, and particularly, one known commercially as "Celanese". This property has hitherto made it practically an impossibility to produce with such yarns any fabric having the effects of a crepe fabric.

It is an object of the invention to provide a yarn, especially for use in making crepe fabrics, that yarn having as a base element, fibres of artificial silk of the acetate classification. In one of its applications, the invention utilized a yarn which, as finally constructed, had a core of fibres of "Celanese". About that core, a thread or threads of silk were twisted. The "Celanese" fibre itself was practically without any twist, while the silk thread was in a state of a very high degree of twist. When a yarn, thus formed, is woven into a fabric and the weaving tension, and any other tensions on the threads released, the highly twisted silk thread immediately tends to contract, exerting a tensioning force upon the fabric acting to reduce the effective length of the fabric. As the yarn, by its spinning, places the silk and "Celanese" fibres in a definite relationship to each other, it results that, even though the "Celanese" fibre continues in substantially a condition of having no twisting torque applied thereto, the silk fibre, by its twisted relationship to the "Celanese" fibre, in contracting, will be effective to draw the "Celanese" fibres along with it, "creping" those fibres into the effect of a crepe fabric.

Other objects of this invention will hereinafter be set forth, or will be apparent from the descrip-

tion and the drawing, in which are illustrated certain features in connection with applications of the invention.

The invention, however, is not intended to be restricted to any particular construction or arrangement of parts, or to any particular application of any such construction, or to any specific method of operation, or manner of use, or to any of various details thereof, herein shown and described, as the same may be modified in various particulars or be applied in many varied relations without departing from the spirit and scope of the claimed invention, the practical embodiments herein illustrated and described merely showing some of the various features entering into the application of the invention.

On the drawing, in which the same reference characters refer to the same parts throughout:

Fig. 1 illustrates diagrammatically certain steps in the production of a yarn, embodying certain features of the invention;

Fig. 2 is an elevational view of a portion of yarn made in accordance with certain details of the invention, to enlarged scale;

Fig. 3 is a transverse cross-sectional view, on the line 3—3 of Fig. 2;

Fig. 4 is a plan view, and

Fig. 5 is a view in vertical cross-section, on the line 5—5 of Fig. 4, of a portion of a fabric woven from yarn made as herein provided.

The invention will be described in connection with the production of one specific embodiment, a yarn produced from "Celanese" fibres the twist of which, as delivered from its manufacturers, is normally about five turns twist per inch, right-handed. Such fibres are subjected to a twisting operation in which they are excessively twisted, for that grade of thread, for instance, in the case here noted, to the number of fifteen turns twist per inch, right-handed, to provide yarn indicated at 12 on the diagram of Fig. 1. The yarn so produced, while still on its bobbin, is immersed in water at low temperature, being maintained preferably at about 10° C. Immersion is continued for a period of about two and one-half hours, after which the yarn is dried and rewound, providing the yarn indicated 14 on the diagram.

For this particular embodiment, there is prepared a silk thread having about seventy turns twist per inch, left-handed, indicated at 16 on the diagram. Yarn 14, twisted and set in the manner indicated, and silk yarn 16 are now twisted together, and the composite yarn, so produced and indicated as 18 on the diagram, is

wound on a bobbin. The composite twisting, in this case about fifteen turns twist per inch, left-handed, while effective to twist the silk yarn, which is capable of receiving such excessive twist, additionally and approximately up to eighty-five turns twist per inch, left-handed, becomes effective to reduce the twisted condition of the "Celanese" yarn substantially to a condition of zero twist.

10 This composite yarn was then set by a steaming operation, the yarn being subjected to the hot vapor for a time not longer than one hour. After the yarn has been processed in this manner, it is dried and rewound, whereupon it is ready for use in weaving.

Specific characteristics of the yarn are found in the fact that the silk fibres are twisted approximately twenty-five turns per inch above their normal condition before weaving. When woven, the fibres will sharply contract. Being tightly bound up with the "Celanese" fibres about which they are twisted, the contraction of the silk fibres will exert a force upon the "Celanese" fibres, drawing them along in the general contraction of the fabric. As indicated in Figs. 2 and 3, while "Celanese" yarn 14, after being brought to the substantially untwisted condition of yarn 18, extends practically in a straight line without having any torque of twist acting thereon, silk yarn 16 is essentially wrapped helically around the "Celanese" yarn. The thickness of the "Celanese" may be many times that of the silk yarn, yet the torque and contractive effort resulting from the silk yarn will be sufficient to draw down the "Celanese" yarn, and force it to assume the full effect of a crepe fabric.

With a yarn of the character finally produced, fabrics may be woven having pile characteristics varying from that of crepe fabrics to that of an imitation velvet, such factors as proportion of float determining this characteristic. A piece of fabric 20, having some of the latter characteristics, is shown in Figs. 4 and 5.

Many other changes could be effected in the particular features of yarn and fabric designed, and in methods of operation set forth, and in specific details thereof, without substantially departing from the invention intended to be defined in the claims, the specific description herein merely serving to illustrate certain elements by which, in one embodiment, the spirit of the invention may be effectuated.

What is claimed as new and useful is:

55 1. In a process of producing yarn for the manufacture of crepe fabrics, wherein one of the constituents of the yarn is a fibre of cellulose acetate not elastically responsive when subjected to a high degree of twist, the steps of: twisting the cellulose acetate fibre slightly in excess of the degree to which it is normally twisted, setting the fibre in that twisted condition by immersing it in cold water, twisting to a high degree and in the direction opposite to the twist of the cellulose acetate fibre a fibre capable of sustaining such a high degree of twisting and remaining substantially elastically responsive when so twisted, and then twisting together the two fibres by twisting them in the direction of twist of the highly twisted fibre.

70 2. In a process of producing yarn for the manufacture of crepe fabrics, wherein one of the constituents of the yarn is a fibre of cellulose acetate not elastically responsive when subjected to a high degree of twist, the steps of: twisting the

cellulose acetate fibre slightly in excess of the degree to which it is normally twisted, setting the fibre in that twisted condition by immersing it in water at about 10° C., twisting to a high degree and in the direction opposite to the twist of the cellulose acetate fibre a fibre capable of sustaining such a high degree of twisting and remaining substantially elastically responsive when so twisted, and then twisting together the two fibres by twisting them in the direction of twist of the highly twisted fibre.

3. In a process of producing yarn for the manufacture of crepe fabrics, wherein one of the constituents of the yarn is a fibre of cellulose acetate not elastically responsive when subjected to a high degree of twist, the steps of: twisting the cellulose acetate fibre slightly in excess of the degree to which it is normally twisted, setting the fibre in that twisted condition by immersing it in water, drying the fibre, twisting to a high degree and in the direction opposite to the twist of the cellulose acetate fibre silk fibre capable of sustaining such a high degree of twisting and remaining substantially elastically responsive when so twisted, and then twisting together the two fibres by twisting them in the direction of twist of the silk fibre.

4. In a process of producing yarn for the manufacture of crepe fabrics, wherein one of the constituents of the yarn is a fibre of cellulose acetate not elastically responsive when subjected to a high degree of twist, the steps of: twisting the cellulose acetate fibre slightly in excess of the degree to which it is normally twisted, setting the fibre in that twisted condition by immersing it for about two and one-half hours in water at about 10° C., drying the fibre, rewinding the fibre, twisting to a high degree and in the direction opposite to the twist of the cellulose acetate fibre silk fibre capable of sustaining such a high degree of twisting and remaining substantially elastically responsive when so twisted, and then twisting together the two fibres by twisting them in the direction of twist of the silk fibre.

5. In a process of producing yarn for the manufacture of crepe fabrics, wherein one of the constituents of the yarn is of cellulose acetate not elastically responsive when subjected to a high degree of twist, the steps of: twisting the cellulose acetate yarn to about fifteen turns per inch, setting the yarn in that twisted condition by immersing it for about two and one-half hours in water at about 10° C., drying the yarn, rewinding the yarn, twisting silk yarn to about seventy turns per inch and in the direction opposite to the twist of the cellulose acetate yarn, and then twisting together the two yarns by twisting them in the direction of twist of the silk.

6. In a process of producing yarn for the manufacture of crepe fabrics, wherein one of the constituents of the yarn is of cellulose acetate not elastically responsive when subjected to a high degree of twist, the steps of: twisting the cellulose acetate yarn to about fifteen turns per inch, setting the yarn in that twisted condition by immersing it for about two and one-half hours in water at about 10° C., drying the yarn, rewinding the yarn, twisting silk yarn to about seventy turns per inch and in the direction opposite to the twist of the cellulose acetate yarn, and then twisting together the two yarns by twisting them about fifteen turns per inch in the direction of twist of the silk yarn.

7. In a process of producing yarn for the manufacture of crepe fabrics, wherein one of the con-

stituents of the yarn is of cellulose acetate not elastically responsive when subjected to a high degree of twist, the steps of: twisting the cellulose acetate yarn to about fifteen turns per inch, setting the yarn in that twisted condition by immersing it for about two and one-half hours in water at about 10° C., drying the fibre, rewinding the yarn, twisting silk yarn to about seventy turns per inch and in the direction opposite to the twist of the cellulose acetate yarn, then twisting together the two yarns to produce a yarn by twisting them about fifteen turns per inch in the direction of twist of the silk yarn, and setting the yarn.

8. In a process of producing yarn for the manufacture of crepe fabrics, wherein one of the constituents of the yarn is of cellulose acetate not elastically responsive when subjected to a high degree of twist, the steps of: twisting the cellulose acetate yarn to about fifteen turns per inch, setting the yarn in that twisted condition by immersing it for about two and one-half hours in water at about 10° C., drying the fibre, rewinding the yarn, twisting silk yarn to about seventy turns per inch and in the direction opposite to the twist of the cellulose acetate yarn, then twisting together the two yarns to produce a yarn by twisting them about fifteen turns per inch in the direction of twist of the silk yarn, and setting the yarn by steaming.

9. In a process of producing yarn for the manufacture of crepe fabrics, wherein one of the constituents of the yarn is of cellulose acetate not elastically responsive when subjected to a high degree of twist, the steps of: twisting the cellulose acetate yarn to about fifteen turns per inch, setting the yarn in that twisted condition by immersing it for about two and one-half hours in water at about 10° C., drying the yarn, rewinding the yarn, twisting silk yarn to about seventy turns per inch and in the direction opposite to the twist of the Celanese acetate yarn, then twisting together the two yarns to produce a yarn by twisting them about fifteen turns per inch in the direction of twist of the silk yarn, and setting the yarn by steaming.

10. In a process of producing yarn for the manufacture of crepe fabrics, wherein a Celanese

cellulose acetate yarn is one of the constituents of the yarn, the steps of: twisting the cellulose acetate yarn to about fifteen turns per inch, setting the yarn in that twisted condition by immersing it for about two and one-half hours in water at about 10° C., drying the yarn, rewinding the yarn, twisting silk yarn to about seventy turns per inch and in the direction opposite to the twist of the cellulose acetate yarn, then twisting together the two yarns to produce a yarn by twisting them about fifteen turns per inch in the direction of twist of the silk yarn, and setting the yarn by steaming for about an hour.

11. In a process of producing yarn for the manufacture of crepe fabrics, wherein a cellulose acetate yarn is one of the constituents of the yarn, the steps of: twisting the cellulose acetate yarn to about fifteen turns per inch, setting the yarn in that twisted condition by immersing it for about two and one-half hours in water at about 10° C., drying the yarn, rewinding the yarn, twisting silk yarn to about seventy turns per inch and in the direction opposite to the twist of the cellulose acetate yarn, then twisting together the two yarns to produce a yarn by twisting them in the direction of twist of the silk yarn until the degree of twist of the cellulose acetate yarn is reduced substantially to zero, and setting the yarn by steaming for about an hour.

12. In a process of producing yarn for the manufacture of crepe fabrics, wherein one of the constituents of the yarn is of cellulose acetate, the steps of: twisting the cellulose acetate yarn to about fifteen turns per inch, setting the yarn in that twisted condition by immersing it for about two and one-half hours in water at about 10° C., drying the yarn, rewinding the yarn, twisting silk yarn of much smaller cross-sectional area than the cellulose acetate yarn to about seventy turns per inch in the direction opposite to the twist of the cellulose acetate yarn, then twisting together the two yarns to produce a yarn by twisting them in the direction of twist of the silk yarn until the degree of twist of the cellulose acetate yarn is reduced substantially to zero, and setting the yarn by steaming for about an hour.

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