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D. F. EVANS

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SKEIN LACING

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FIG. 1.

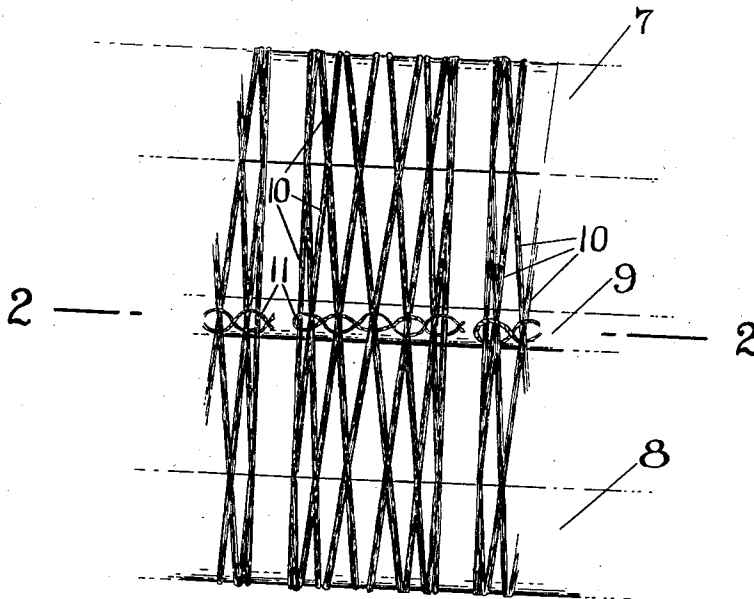
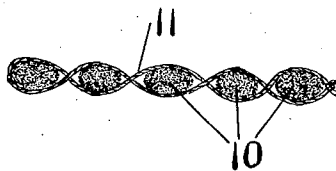


FIG. 2.



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UNITED STATES PATENT OFFICE

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SKEIN LACING

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1 Claim. (Cl. 28—21)

This invention relates to lacing yarns such as are used in the preparation of skeins of textile threads to enable the skein to hold its structure and to prevent tangling of the thread comprising the skein. More specifically, the invention is directed to a lacing yarn for skeins of artificial silk threads such as threads of regenerated cellulose or threads of cellulose esters or cellulose ethers.

In the manufacture of skeins, the yarn is wound on to a reel or fly under such conditions of traverse and winding speed that there are a plurality of open, diamond-shaped spaces or interstices throughout the skein. Before the skein is removed from the fly or reel, it is customary to twine or lace a short length of cotton yarn through certain of these interstices in order that the structure or form of the skein may be preserved. Usually, three or four, or more such lacings are inserted at substantially equally spaced points around the circumference of the skein. Skeins so laced may be subjected to the usual desulfuring, bleaching, dyeing or other finishing treatments and thereafter be mounted on swifts and wound from the swifts on spools or cones without tangling or snarling.

Cotton lacing yarn is, however, harsh as compared with artificial silk threads such as regenerated cellulose threads or the like, and in the subsequent handling of skeins containing lacings of this character the fine filaments of regenerated cellulose which make up the skeins are frequently cut, abraded or otherwise irreparably damaged by the rubbing action of the cotton lacing on the regenerated cellulose filaments. This is especially true when cotton lacings are used for regenerated cellulose thread of fine denier, i. e. 50 to 100 denier, and composed of very fine filaments such as of the order of from 1 to 3 denier per filament.

In order to avoid this degradation of artificial silk yarn, it has been proposed that the cotton lacing thread be softened by a suitable finish, but such lacings have not proved at all satisfactory inasmuch as when the skeins are wetted, for instance with a hot desulfuring solution, the finish is removed and the lacings regain their harsh abrasive characteristics. It has also been suggested that lacings be made from continuous filamentary regenerated cellulose threads, but such lacings are unsatisfactory because of their smooth surface which allows the lacing to slide along the skein during the processing steps with the result that the skein loses its formation and the regenerated cellulose thread or the like com-

prising the skein becomes tangled and can be rewound only with difficulty and with considerable loss in waste.

An object of my invention is to provide a lacing yarn suitable for lacing skeins of artificial silk such as of regenerated cellulose thread that will not cut or abrade the continuous filaments comprising the thread and will not slip along the skeins, but will well maintain the skein formation. Other objects of the invention will be apparent from the following description taken in connection with the accompanying drawing, in which:

Fig. 1 is a fragmentary front elevational view of a reel containing separated groups of threads wound thereon;

Fig. 2 is an enlarged sectional view showing the manner of separating groups of threads by means of a lacing.

My invention comprises a lacing yarn made from regenerated cellulose staple yarn which comprises short fibers of regenerated cellulose that are spun and twisted together in the manner similar to that by which cotton threads are produced. The lacing yarn may be prepared in a manner similar to that used for the preparation of cotton lacings and may be made in varying degrees of twist and with a varying number of plies. I have found, for example, that a yarn, corresponding in size to 12 count cotton, made up from two staple rayon threads having a twist of 13 to 15 turns per inch and twisted together with 6 or 7 turns per inch in either direction is satisfactory. It is, of course, to be understood that other constructions may be used to good advantage.

Referring to the drawings, 7 and 8 designate two fly-bars of a winding fly or reel. Reference character 9 designates the axle shaft of the fly on which are mounted spiders (not shown) for supporting the horizontal fly-bars in a conventional manner. Untreated threads of artificial silk, for example, regenerated cellulose are wound on the fly-bars in separated groups 10. After the desired amount of thread is wound on said fly-bars, lacings 11 are threaded through the interstices between groups of threads to maintain certain groups or plurality of groups of threads separated from each other.

It is readily apparent from the drawing that the lacing must be sufficiently soft to prevent abrasion of the threads in the various groups and yet it must not be so smooth as to slip or slide from the original position in which it is tied.

The lacing yarn may be made from various length regenerated cellulose staple, for instance, from staple varying from $1\frac{1}{4}''$ up to $1\frac{3}{4}''$, or more or less. It is preferable that the regenerated staple fiber be of small denier such as, for example, in the neighborhood of 1 to 2 denier per filament before it is cut although fibers of other sizes may be used depending upon the denier of the threads and filaments of the artificial silk comprising the skeins. Under certain conditions it may be desirable to crinkle or curl the fibers prior to spinning them into a thread in order that the lacing thread may better maintain its position in the laced skein.

Although lacing yarns are used primarily to preserve the formation of the skein, they also serve as means to identify the type of production. The yarn produced from staple fibers of regenerated cellulose is dyed easily in a large number of distinctive and fast colors to provide the necessary color combinations for use with numerous types of yarn production.

While I have described this invention in terms of lacing yarn made from regenerated cellulose staple and for lacing skeins of regenerated cellulose thread, it is obvious that this lacing may be used for lacing other types of artificial silk thread in skeins or the like, such as, for example, threads of cellulose acetate or of other cellulose esters or cellulose ethers. Furthermore, the lacing yarn may be made from other material having the requisite softness and non-slip qualities, for instance, staple fibers of cellulose acetate or short fibers produced from other cellulose esters, cellulose ethers, or other types of

regenerated cellulose, such as threads produced by the cuprammonium cellulose process, may be considered satisfactory.

Lacing yarn produced in accordance with my invention has proved very satisfactory as a lacing for artificial silk skeins and it has been demonstrated that it will not slip from its original position any more than will the usual cotton yarn lacing. Furthermore, since the fibers from which it is made are inherently soft and pliable, it does not cut or abrade the delicate artificial silk filaments with which it comes in contact and greatly assists in the production of a higher quality skein with greater freedom from fluff and abraded or broken filaments.

Since it is obvious that many changes and modifications of the invention can be made within the nature and spirit thereof, it is to be understood that the invention is not to be limited except as set forth in the appended claim.

I claim:

A skein of artificial silk thread of less than 100 denier and having a filament size of less than 3 deniers per filament, said skein being adapted to be subjected to liquid purification treatment, said skeins being laced with a lacing thread composed of artificial staple fiber, said lacing thread corresponding in size to 12 count cotton, made up from two staple rayon threads having a twist of 13 to 15 turns per inch and twisted together with about 6 or 7 turns per inch, said threads consisting of rayon fibers having a denier between 1 and 2 and a length between $1\frac{1}{4}$ inches and $1\frac{3}{4}$ inches.

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