Nov. 29, 1938. A. E. SUNDERLAND 2,138,216

AFTER TREATMENT OF PACKAGES OF SPOOL SPUN SILK

Filed May 5, 1937

Fig. 1.

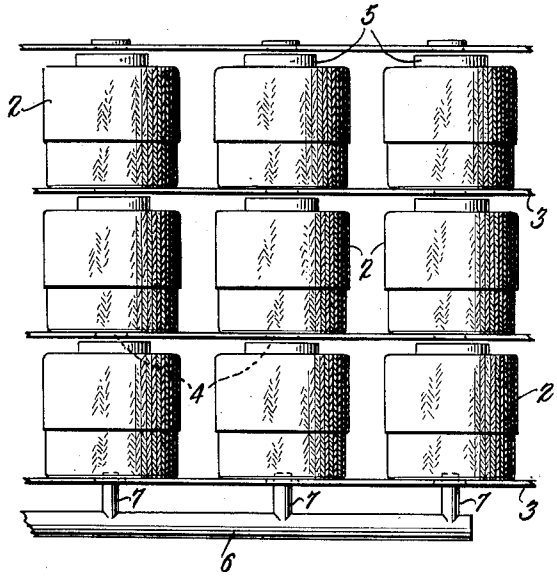


Fig. 2.

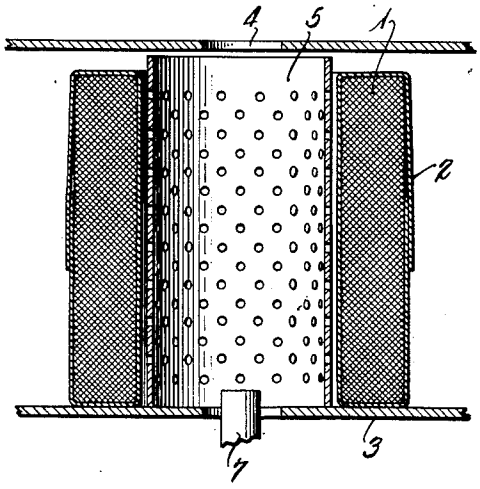
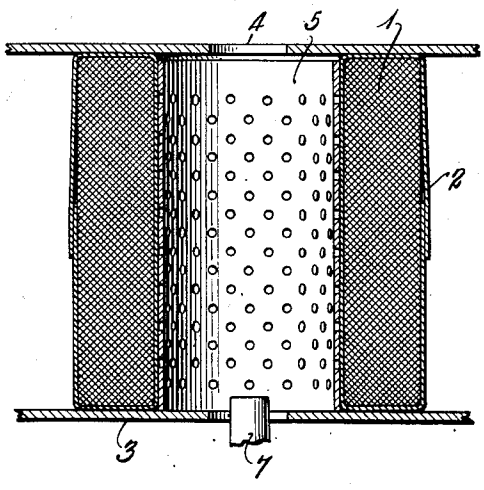


Fig. 3.



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AFTER TREATMENT OF PACKAGES OF SPOOL SPUN SILK

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2 Claims. (Cl. 8—154)

The present invention relates to a process and apparatus for the wet treatment of wound bodies of artificial silk threads and more particularly to washing and bleaching packages of threads that have been previously collected on a bobbin or the like.

It is an old expedient to pressure or vacuum treat cakes of artificial silk produced according to the centrifugal or pot spinning method. However, in this type of package the wet threads are twisted as they are collected in the rotating bucket. Moreover, owing to the centrifugal force created and the crosswind developed by the movement of the spinning funnel, a compact cake is produced which is self-supporting and not subject to deformation. As shown in the Engel Patent 1,957,328, such cakes can be successfully processed by forcing liquids through the thread bodies. This is accomplished by assembling the cakes on trays and passing the treating liquids from the inside to the outside of the cakes. The dimensions of the walls of the cakes are such that they provide sufficient stability to resist deformation. In addition, the freshly spun cakes are wet and because of this, substantially no swelling or expansion occurs.

As distinguished from the foregoing, my invention concerns the after treatment and more specifically the bleaching of packages of dry artificial silk. These packages have been previously wound on supports such as bobbins, washed, desulphurized and dried in the normal manner. After drying, the threads are twisted while being rewound on a twisting bobbin. In the past it has been impractical to pressure bleach these dried packages because of their softness and instability. When the packages are moistened, they swell to an extent that it is impossible to process them on trays in a similar manner to the one above described for the treatment of wet cakes. For instance, if such packages were placed on a tray having no inner support, the last wound convolutions would have a tendency to fall inwards and also a tight joint could not be made between the packages and the top and bottom trays. In an effort to overcome these problems dried threads have been rewound on a perforated spool and the joints between the packages and trays made tight by means of rubber gaskets. This has also proved unsatisfactory because the packages are not allowed to dry uniformly, or, in other words, uneven tension and shrinkage is set up throughout the bodies of the packages. Moreover, uniform bleaching can not be effected at the extreme top and bottom of each package.

The object of my invention is to provide a system for the wet treatment of previously dried packages of artificial silk, whereby they can be assembled and processed on trays in a manner similar to that conducted in the Engel Patent 1,957,328.

It is further contemplated to provide a method that will produce a finished rayon thread having uniform shrinkage from end to end of the package.

Another object involves the use of special type inserts for supporting the interior of each package, whereby the Engel apparatus may be employed.

Still another object of my invention is to conduct a series of thread treating steps that, in their proper sequence, permit practical pressure bleaching of bobbin spun packages of artificial silk.

Other advantages and objects will be apparent from the following detailed description when considered in connection with the accompanying drawing wherein:

Figure 1 illustrates an elevation showing several dried packages containing circular inserts and in position for wet treatment;

Figure 2 is a cross-section taken through one of the packages prior to the bleaching operation; and

Figure 3 is a view similar to Figure 2 showing the package in a swelled state shortly after the treating liquid has come in contact with the said package.

Referring to the drawing, the numeral 1 indicates a plurality of dried packages of artificial silk having a protective covering 2 of a nature to be explained later. These packages are positioned between trays 3 having perforations 4 to correspond with the thread-free interiors of the packages. Each of the trays acts as a support for a number of packages on which they rest when they are in position for wet treatment. The trays are spaced equidistantly apart by any suitable means such as that shown in the Engel patent, Figure 1.

As each layer of packages is positioned over corresponding openings in the trays, a foraminated spool 5 constructed of a suitable hard material such as metal or bakelite is inserted in each of the packages. The height of these spools is about 7½ per cent greater than that of the package and slightly less than the distance between two trays. Water and/or a bleaching liquid such as a hypochlorite solution may be intro-

duced into the interiors of the packages by means of a pipe line 6 having branch pipes 7.

In operation the dried artificial silk package is prepared by winding on an arbor which is covered with a cotton sleeve or a wrapping of perforated paper. In some cases this covering may even be a perforated metallic wrapper. This covering permits the package to be removed readily from the arbor and the dimensions are such that it can be folded back over the outer walls of the cake and overlap from the top and bottom as shown in the drawings. The covered packages are thereupon placed on trays and the foraminated spool positioned inside the same. The diameter of the spool is less than the diameter of the thread-free interior of the package, preferably to the extent of about 11 per cent. After arranging each layer of the packages and fitting the trays in position, water may be first introduced through the pipe lines. As soon as the water is allowed to enter the interiors of the packages through the openings in the trays, the packages swell in every direction thereby effecting tight joints between the packages, spools and trays, as shown in Figure 3. The diameter of the spools being less than that of the packages, allows the thread to swell inwardly unrestricted, thus equalizing the tension throughout the thread bodies. At the same time the spools prevent the inner convolutions of the packages from falling inwardly during the initial wetting operation.

As soon as the thread packages have been completely wetted out and the swelling action completed, the bleaching operation may be immediately conducted. The entire swelling and wetting operation consumes only several minutes. In some cases it may be desirable to eliminate the water wetting operation and directly introduce and force the bleaching solution through the dried package.

Upon the completion of the bleaching step the foraminated spools can be easily removed and the uniformly bleached packages can be immediately subjected to the subsequent steps of hydroextracting and drying.

It is apparent that various modifications may be made in my invention without departing from the scope thereof and the inventive concept must be limited only as set forth in the appended claims.

What I claim is:

1. A method of treating rewound bodies of artificial silk yarn which comprises positioning in substantial alignment and spaced apart relation a plurality of unsupported, rewound dry bodies of artificial silk yarn having thread free interiors so that said thread free interiors of the bodies form an interrupted composite passageway, loosely arranging foraminous core means within the interiors of the respective bodies, conducting a treating liquid within the core means and delivering said liquid into contact with the interiors of the yarn bodies with a resultant swelling of the yarn sufficient to fill all of the space between a stop above each yarn body and a support below each yarn body and which upon continuing liquid treatment is such that the bodies are each so swollen that a substantially uninterrupted combined passageway formed primarily by the bodies is provided and the core means in each body is engaged by the inner wall thereof to permit a reasonably uniform strain throughout each body, whereby all of the yarn is subjected to uniform treatment and the treating liquid is caused to flow evenly through the yarn bodies only from the interiors to the exteriors thereof.

2. In the treatment of dried twisted threads of artificial silk in porous package form, a method which consists of the steps of winding the dried threads onto covered supports to form packages, removing the porous packages and coverings together and folding the coverings back over the outer walls of the packages to provide a protection against wet treating operations, arranging the interiorly unsupported packages on a perforated tray, loosely positioning hollow foraminated inserts in each package so that each insert is located above each perforation, placing another perforated tray over the packages so that each perforation is correspondingly above each insert, swelling each package in all directions by forcing a wetting and bleaching solution through the bodies of the packages to bleach the same and simultaneously effecting the formation of liquid-tight joints between the packages and trays and between the packages and inserts.

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