April 30, 1935. J. BRUGGEMAN 1,999,585

METHOD OF DRYING

Filed April 20, 1931

Fig. 1.

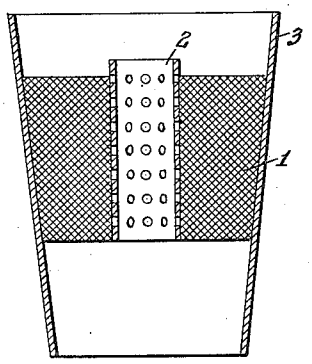
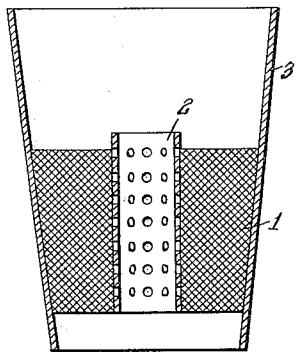


Fig. 2.



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METHOD OF DRYING

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8 Claims. (Cl. 34—24)

This invention relates to drying packages of thread. More particularly, it relates to a process of drying packages of artificial thread, whereby a yarn of more uniform characteristics is produced.

When packages of thread, such as freshly spun artificial thread of regenerated cellulose wound on bobbins or in the form of cakes obtained in the bucket spinning process, are subjected to the common drying operation, such as by being stored at an appropriate temperature for the necessary period of time, it has been found that the characteristics of the various layers of the package are non-uniform and irregular. This is probably due to the fact that the various layers of the thread in drying offer different resistances to shrinking.

It has now been found that, if during the drying of a package of freshly spun artificial thread the evaporation or removal of the moisture from the outer part of the package is retarded so that the outer windings dry last, as hereinafter more fully described, a yarn of substantially uniform shrinkage will be secured and, the above-mentioned disadvantage considerably reduced.

It is therefore an object of this invention to provide a method of drying a package of freshly spun artificial thread wherein evaporation of the moisture from the outer windings is retarded whereby the outer windings dry last and are free to shrink during the operation.

Another object of this invention is to provide a method which consists in drying a covered package of thread, such as a package of artificial thread, disposed in a casing whereby the evaporation or removal of the moisture from the outer surface is retarded, permitting the outer windings to dry last and to be free to shrink during the process.

A further object of this invention is to provide a method which comprises first impregnating the outer surface of a package of freshly spun artificial thread with a hygroscopic material and then subjecting the package to a drying operation, whereby the inner windings dry more rapidly than the outer windings with the result that the outer windings dry last and are free to shrink during the operation.

A still further object of the invention is to apply moisture to the exterior surface of the package prior to or during the drying operation.

Other objects will appear from the following description, appended claims and accompanying drawing forming a part of this specification and illustrating one modification of the method constituting this invention.

Figure 1 is a section illustrating the disposition of a cake in a casing as, for example, at the beginning of the drying operation.

Figure 2 illustrates a section of the tube showing the position of the cake during some stage or at the termination of the drying operation.

The present invention, as is apparent from the foregoing, contemplates a method of drying a package of freshly spun artificial thread after it has been subjected and undergone all the necessary liquid treatments. The package may consist of artificial thread wound on a bobbin as produced in the bobbin spinning process. If desired, the bobbin may be of the extensible or collapsible type. The package may also be in the form of cakes of artificial thread such as are obtained in the bucket spinning process. The cake may be provided, if desired, with a perforated insert, said insert being more or less flexible.

In accordance with one of the procedures proposed by the present invention, a truncated conical cake of freshly spun artificial thread, such as is produced from viscose in the bucket spinning process, and after it has been subjected to the necessary liquid treatments, viz., washing and purifying is disposed in a rigid or elastic and more or less correspondingly shaped casing, so that the entire, or at least a portion of the peripheral surface, of said cake engages and contacts with the inner peripheral surface of the casing. Preferably, the length of the casing is greater than the height of the package. The casing and the cake disposed therein are then subjected to a drying operation. As the diameter of the cake decreases during drying, the package will descend, due to its own weight, in the casing. The dimensions and contour of the casing are such that the peripheral surface of the package will not lose contact with the casing at least not until the end of the operation.

Referring now to the drawing wherein the immediately preceding process is described, the reference numeral 1 designates a cake of artificial thread obtained in the usual bucket spinning process after it has undergone the necessary liquid treatments, i. e. washing and purifying. It is provided with a perforated insert 2, and the cake is passed through and disposed adjacent the large end of a truncated conical casing 3 of any suitable material. As is apparent from the drawing, the casing 3 is of greater

length than the height of the cake 1. Though the precise length of the casing is not essential for the successful operation of the process, it is preferred to make the casing about twice as long as the height of the cake. Preferably, the taper of the casing 3 is of such an angle that, as the cake shrinks during drying, it will permit the cake to slide by its own weight and without any effort and descend in the casing. The contour of the casing 3 is such that the cake will not lose contact therewith until at least the end of the operation. It is apparent that the inner surface of the tube should be as smooth as possible and of such a nature that it will not injure the thread which it engages and with which it contacts.

Instead of carrying out the drying operation, as hereinbefore described, substantially the same results may be secured by impregnating the outer surface of the cake with a hygroscopic material, such as, for instance, glycerin, prior to the drying operation. In accordance with this procedure, the exterior surface of the package is impregnated in any suitable manner with the hygroscopic material and then subjected to a drying operation. In the preferred form of this modification, the drying is effected by passing a hot gas through the core or interior of the cake.

Another alternative procedure for attaining the results desired contemplates maintaining a certain more or less definite moisture content on the exterior of the package of the thread during the drying operation. In accordance with this process, moisture is applied to the exterior surface of the cake in any suitable manner or by appropriate means, such as, for example, spraying prior to and/or during the drying operation. As in the case of the second described method, it is preferred to dry the instant cake by passing a hot gas through the core thereof.

If desired, any two or more of the methods described above, may be combined.

The methods of drying hereinbefore described dry the inner windings at a greater rate than the outer windings. As a consequence, the outer windings dry last and are free to shrink during the process.

The yarn constituting the package resulting from the instant invention has a substantially uniform shrinkage. By a yarn having a substantially uniform shrinkage I mean a yarn which, when reeled into a number of small skeins and in this form treated with hot water and dried without tension, will shrink substantially the same amount in said skeins. The yarn is furthermore characterized in that it has a low maximum shrinkage.

Since it is obvious that various changes may be made in the specific details hereinbefore described without departing from the nature or spirit of the invention, the invention is not restricted thereto except as set forth in the appended claims.

I claim:

1. A method of preparing a dried package of artificial thread wherein the thread has a substantially uniform shrinkage which comprises disposing a package of freshly spun artificial thread in an upwardly disposed casing having contact with at least a portion of the outer surface of the package, subjecting said casing and package to a drying treatment, and permitting the package to descend in the casing as the package shrinks during the treatment.

2. A method of preparing a dried package of artificial thread wherein the thread has a substantially uniform shrinkage which comprises disposing a package of freshly spun artificial thread in a casing and passing a heated gas through the core of the package, whereby the inner windings are dried at a greater rate than the outer windings, thus drying the outer windings last and permitting the said outer windings to be free to shrink during the operation.

3. A method of preparing a dried package of artificial thread wherein the thread has a substantially uniform shrinkage which comprises impregnating the outer surface of a package of freshly spun artificial thread with a hygroscopic material and then drying said package.

4. A method of preparing a dried package of artificial thread wherein the thread has a substantially uniform shrinkage which comprises impregnating the outer surface of a package of freshly spun artificial thread with a hygroscopic material and then passing a heated gas through the core of said package.

5. A method of preparing a dried package of artificial thread wherein the thread has a substantially uniform shrinkage which comprises applying moisture to the outer surface of a package of freshly spun artificial thread and drying said package.

6. A method of preparing a dried package of artificial thread wherein the thread has a substantially uniform shrinkage which comprises applying moisture to the outer surface of a package of freshly spun artificial thread and then passing a heated gas through the core of said package.

7. A method of preparing a dried package of artificial thread which comprises disposing a package of freshly spun artificial thread in a casing and subjecting the yarn package and casing to a drying treatment, whereby the inner windings of the yarn package are dried at a greater rate than the outer windings, thus drying the outer windings last and permitting said outer windings to be free to shrink during the operation.

8. In a process for drying artificial yarn which has been collected on a foraminous holder, the step of covering the outer surface of the yarn body and applying a drying medium to the inner side of the holder so that the yarn dries from the inner side of the package.

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