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UNITED STATES PATENT OFFICE.

LEROY SMITH CONVERSE, OF WILMINGTON, DELAWARE, ASSIGNOR TO ATLAS POWDER COMPANY, OF WILMINGTON, DELAWARE, A CORPORATION OF DELAWARE.

PROCESS FOR MANUFACTURING ARTIFICIAL-SILK THREADS OR OTHER CELLULOSE FIBERS.

No Drawing. Application filed March 21, 1923. Serial No. 626,596.

To all whom it may concern:

Be it known that LEROY SMITH CONVERSE, a citizen of the United States, residing at Wilmington, in the county of New Castle and State of Delaware, has invented certain new and useful Improvements in Processes for Manufacturing Artificial-Silk Threads or Other Cellulose Fibers, of which the following is a specification.

In the manufacture of cellulose artificial silk by the viscose, copper-ammonia, nitro or other processes, cellulose is dissolved in various agencies and the solution spun into a suitable precipitating bath. These threads are then treated by chemical agencies and washed with water to remove the agencies, and the resulting thread or fibre is essentially cellulose. In this condition the cellulose is soft and in a highly distended or swollen condition, due to the water with which it is associated, either in chemical combination or otherwise. The thread is then set by drying to remove the adhering and combined water, during which operation the thread shrinks. While the adhering water is quite quickly removed from the thread, that which is combined with the cellulose is much more difficult to remove.

To give a satisfactory lustre to the thread it is stretched, or prevented from shrinking, lengthwise, during drying. This drying takes considerable time and the stretching is more or less variable and is expensive.

I have found that the drying operation is simplified and the time necessary to complete the drying is materially reduced if the threads in the initial wet condition are subjected to freezing. Such freezing causes the water combined or held initially by the cellulose, to freeze, thus separating it from the cellulose and permitting more rapid, subsequent drying.

The freezing also accomplishes another thing. It is a well established principle that water upon freezing expands about 10% of its volume—so that in freezing the water which surrounds and which is in the body of the fibre subjects the fibre to a uniform stretching action, which in the finished thread gives the desired lustre. As a result of my freezing treatment the fibre is given a uniform stretch, without the necessity of keeping the thread under tension during drying. The treatment also aids in removing a considerable portion of the combined water in the thread with a consequent reduction in the time required for drying.

Having described my invention what I claim is:

1. A process for manufacturing artificial silk threads or other cellulose fibres in which the threads or fibres are subjected to freezing while in their initial wet condition.

2. A process for manufacturing artificial silk threads or other cellulose fibres in which the threads or fibres are subjected to freezing before the first drying operation.

3. A process for manufacturing artificial silk threads or other cellulose fibres in which the threads or fibres are subjected to freezing at some stage between the spinning operation and the first drying operation.

4. A process for manufacturing artificial silk threads or other cellulose fibres in which the threads or fibres are subjected to freezing at some stage between the spinning operation and the first drying operation, and removing the water of washing while in a frozen state.

5. A process for manufacturing artificial silk threads or other cellulose fibres in which the threads or fibres are subjected to freezing at some stage between the spinning operation and the first drying operation, and while the fibers are in a swollen and distended condition from the presence of water used in washing the same.

6. A process for manufacturing artificial silk threads or other cellulose fibers which are spun into a precipitating bath and then treated and washed with water, which consists of drying the same under tension by subjecting them to a freezing temperature while they still contain the water absorbed during the washing process.

In testimony whereof he affixes his signature in the presence of two witnesses.

LEROY SMITH CONVERSE.

Witnesses:
FREDERIC BONNET, Jr.
THOMAS J. LAFFEY.