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PROCESS OF FORMING FILAMENTS FROM VISCOSE, &c.

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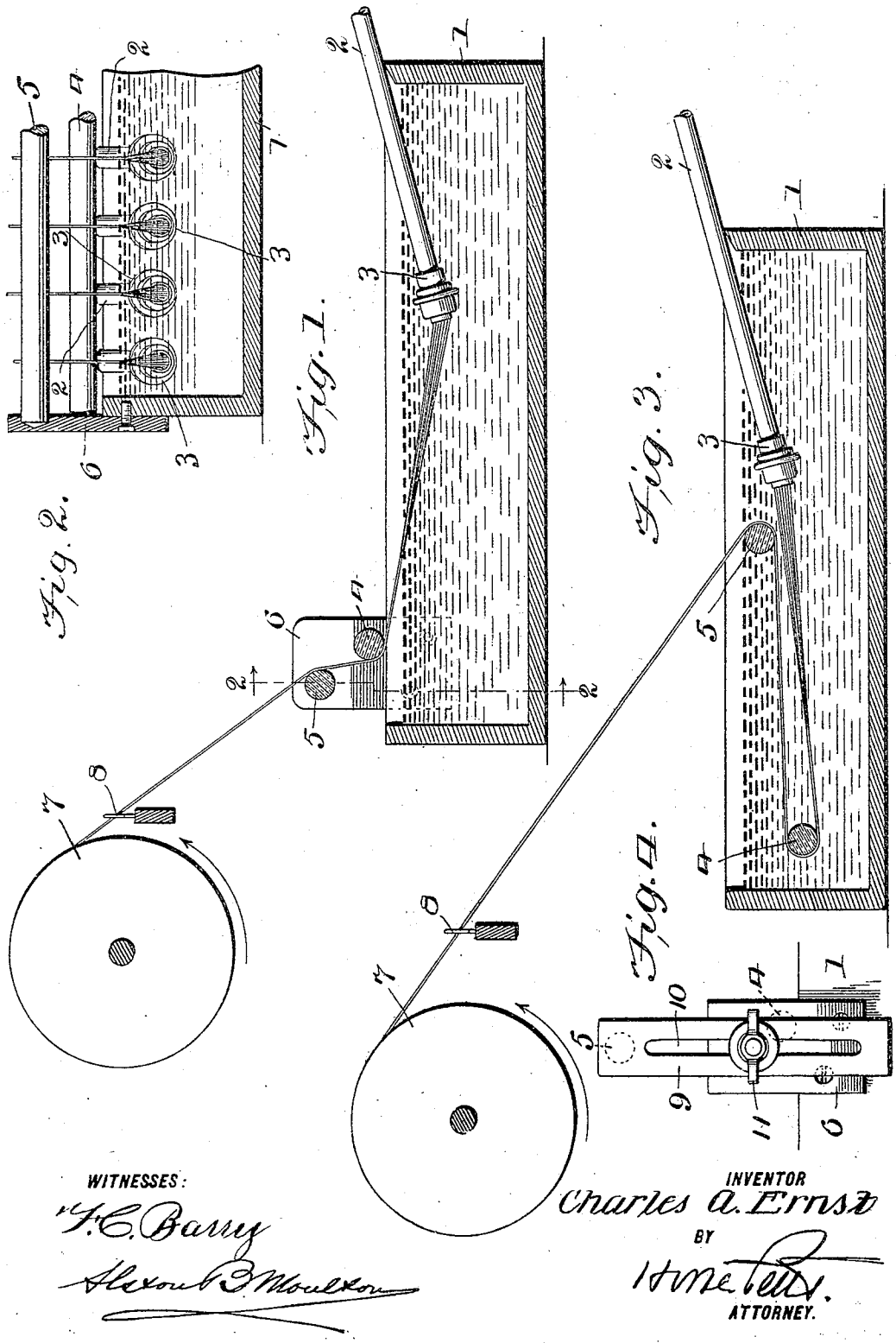

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PROCESS OF FORMING FILAMENTS FROM VISCOSE, &c.

No. 808,148. Specification of Letters Patent. Patented Dec. 26, 1905.

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To all whom it may concern:

Be it known that I, CHARLES A. ERNST, a citizen of the United States, and a resident of Lansdowne, State of Pennsylvania, have invented certain new and useful Improvements Relative to the Process of Forming Filaments from Viscose, &c., of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to the manufacture of what is commonly known as "artificial silk" and filaments from viscose and like material, and has for its object the giving to the threads or filaments greater strength and luster, and generally the production of a superior article of manufacture.

In the manufacture of threads and filaments from viscose it is advantageous to spin the thread directly onto spools and to treat the thread in all the further stages of reverting, washing, and drying while it remains on the spool. In order to obtain a luster to the thread or filament, such as made from viscose, it is necessary to dry them while under tension. The degree of tension is also a very important element in the drawing stage of the process, and my present invention relates mainly to the method of subjecting the threads in the drawing stage of the process at a certain portion in their length between the spool and the perforated cap to an unevenly-distributed tension while the threads are still in a semi-plastic condition, thereby imparting greater and more uniform strength and adding greater luster. In the methods heretofore practiced in the manufacture of threads of this character from viscose and like material the tension upon the threads has been produced by drawing the filaments through the setting-bath directly from the perforated cap; but this tension is incidental and insufficient to produce the best results. In the methods heretofore practiced it has been impossible to exert upon the filaments the desired amount of tension, as the greatest strain is upon that portion of the thread where it is the most plastic, which is of course the point where the plastic material first enters the setting-bath from the perforated cap, or the point where the threads first enter the setting-bath. Therefore a limited amount of tension only can be exerted. This is sufficient to produce practical results for some sizes, but not the best results, as I have discovered in my practical experience.

In carrying out my invention for giving additional strength and luster to the threads I subject the threads in a portion intermediate in their length between the spool and the cap or perforated head to an increased tension after this portion has become partially solidified substantially evenly in this portion of its length by passing through the setting-bath.

My invention consists in the method hereinafter more particularly described, and specified in the claims.

The operation of my process and two forms of apparatus for carrying the same out are illustrated in the drawings forming part of this specification.

Figure 1 represents a longitudinal section of apparatus. Fig. 2 is a cross-section taken on the line 2 2 of Fig. 1. Fig. 3 illustrates a modified form in section. Fig. 4 is a detailed view of construction for adjustably supporting the bars or rods 4 and 5 with respect to each other upon the tank of the setting-bath.

The tank of the setting-bath is indicated by 1, which is kept filled with ammonium sulfate and bisulfite of soda or similar solution.

2 represents one of a series of tubes through which the viscose or like solution is forced under pressure, as is usual in an apparatus of this character, the details of which are not shown.

3 represents a perforated head with either round or elongated perforations secured to the tube 2, through which the cellulose is ejected into the setting-bath within the tank 1 either in the form of a round thread or a series of round threads or in the form of a flat thread or tape or a series of the same. Sufficient material is forced or ejected through the cap or head into the setting-bath to allow the ends to be secured to one of the series of spools 7 after passing between the rods or bars 4 and 5, as shown in the drawings. The spool 7 is then given a rotary motion in the direction of the arrow, which draws the filaments through the setting-bath at a desired predetermined tension. By the interposition of the rods 4 and 5, arranged as indicated in Figs. 1 and 3 or in a substantially like manner and crosswise of the tank, the greatest tension upon the filamentous material may be exerted upon that portion of the threads

which extends between the spool 7 and the rod 5, which portion having passed through the setting-bath is more solid and substantially evenly so throughout that portion of its length. Less tension is upon that portion of the threads or filaments which extends between the rods 4 and 5, and the least tension is upon the more plastic portion which extends between the rod 4 and the cap of the perforated head 3. The weakest and most ductile portion, it will be observed, is of course that portion of the threads as it emerges in the semiplastic condition from the perforated cap and before it has been in the setting-bath any length of time. If the same tension should be exerted upon this portion of the threads as may be exerted upon the portion between the spool 7 and the rod 5, it would either break off the threads or draw them entirely too finely and either weaken or destroy the thread or filament. After the thread has passed the rod 5 on its passage to the spool 7 while it is substantially still very ductile the amount of tension which is capable of being exerted upon the thread at this stage without drawing the thread or filament is much greater than that which may be exerted at the primary stage, and therefore the threads or filaments at this portion may be subjected to a much greater tension, adding greater luster to the thread as well as imparting to it greater strength.

While the drawings only represent one set of tubes and perforated caps and threads or filaments and spools, a series are preferably arranged of similar character side by side at proper intervals apart throughout the width of the tank, as indicated in Fig. 2.

8 represents a vibrating thread-guide by means of which the strands are laid in layers or courses upon each spool.

The tank 1 is filled with suitable solution, such as ammonium sulfate and bisulfite of soda and such as is commonly used in manufacturing filaments of this character from viscose and like material. By the action of this solution the filaments of viscose are rendered insoluble and substantially solid after passing through the bath. The amount of friction on the rods 4 and 5 and the tension on the threads may be varied by changing the relative position of the rods. As shown in Fig. 3, the rods may be so placed that the strands wrap around a considerable portion of the periphery of each rod. Such an arrangement is desirable where it is preferred to put a considerable amount of stretch into the thread. In the form shown in Fig. 1 the rods are closer together, and the threads contact with a less portion of the periphery of the rods, producing less friction. In the form shown in Fig. 3 the threads are subjected to a considerably longer period of immersion in the bath, and in this case both of the rods are submerged. It is clear that one or both may be or neither, if desired.

In the detailed drawing shown in Fig. 4 the upper rod 5 is mounted at one end of the movable support 9, while the other rod 4 is mounted in the fixed support 6. The support 9 is adjustable by means of the slot 10 and thumb-screw 11. By this means the rods 4 and 5 can be readily and accurately adjusted relatively to each other to produce the proper tension for any character of thread.

In my preferred form of the invention I make the rods 5 and 6 of glass; but ebonite, rubber, or other suitable material could be readily substituted.

It is clear that the construction of apparatus may be considerably varied without departing from the spirit of my invention and that my process may be carried out by various forms of apparatus employing suitable tension devices between the spinning-head 3 and the winding-spool 7, operating in the manner hereinbefore described for carrying out my improved method.

In carrying out my process the threads or filaments may be spun together in the setting-bath or not, as desired. A flat, as well as a round, thread or a series of the same may be formed, as desired.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The herein-described process of making filaments from viscose, and like material, consisting in causing the viscose, or like material, to pass through a perforated cap into and through a setting-bath directly to the winding-spool, and subjecting the different portions of the length of the threads between the spool and the perforated cap to different degrees of tension to apply a definite predetermined stretch to the filaments between the bath and the winding-spool.

2. The herein-described process of making filaments from viscose, or like material, consisting in causing the viscose, or like material, to emerge into a setting-bath in the form of a filamentous thread, passing the same through said setting-bath directly to the winding-spool, and subjecting the portion of the thread nearest the emerging-point to a minimum stretch, and the portion of the thread nearest the winding-spool to a maximum stretch.

3. The process of making filaments from viscose and like material, which consists in applying a definite predetermined stretch to the filaments as they emerge from the setting-bath and winding the said filaments, under tension, directly upon spools.

4. The manufacture of threads from plastic material formed by ejecting the plastic material under pressure in the form of finely-divided filament, or thread, into a setting-bath, winding the threads directly upon a spool

under tension, and subjecting the most plastic portion of the thread in the setting-bath to a minimum stretch, and the more solidified portion nearer the winding-spool to a greater stretch.

5. The manufacture of threads from plastic material, consisting in forcing the plastic material in a finely-divided state under pressure into a setting-bath, and passing the same through the setting-bath to and upon a winding-spool, exerting friction upon the said thread at a point intermediate in its length between the spool and where the divided plastic material enters the setting-bath, and applying a greater tension upon the portion of the threads between the spool and the tension medium, and a less tension between the friction medium and the point of entry of the divided plastic material into the setting-bath.

6. The herein-described process of making filaments from viscose or like material, consisting in causing viscose or like material to emerge in a setting-bath in the form of a filamentous thread, passing the same through said setting-bath, and through a tension device to a winding-spool and subjecting the portion of the thread nearest the emerging-point of a minimum tension, subjecting that portion of the thread passing through the tension device by a greater tension than the first portion of the thread is subjected, and subjecting that portion of the thread between said tension device and the winding-spool of a maximum tension.

7. In the manufacture of filaments from viscose or similar material, in which the viscose is ejected in a setting-bath and wound directly upon spools, the process of subjecting different portions of the thread between the spinning-heads and the spools to three different tensions, whereby the minimum strain is applied to that portion of the filaments nearest the spinning-head, maximum tension is applied to that portion nearest the winding-spool and a medium tension is applied to a third portion of the thread located between the portions under maximum and minimum tensions.

In witness whereof I have hereunto set my hand this 16th day of June, 1905.

CHARLES A. ERNST.

Witnesses:
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