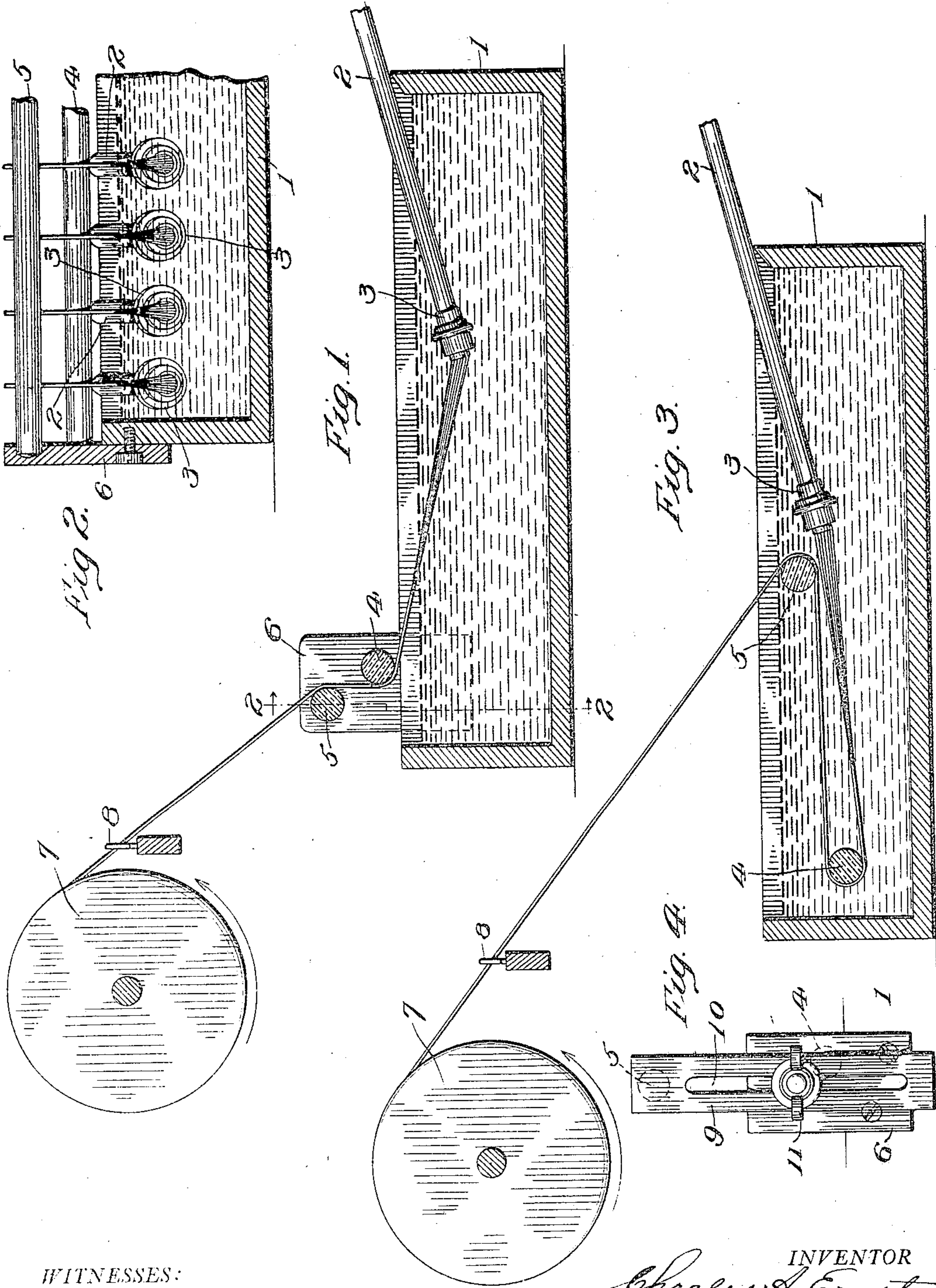


No. 808,149.

C. A. ERNST.

PATENTED DEC. 26, 1905.

APPARATUS FOR PRODUCING OR FORMING FILAMENTS FROM VISCOSE, &c.
APPLICATION FILED AUG. 5, 1905.



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APPARATUS FOR PRODUCING OR FORMING FILAMENTS FROM VISCOSE, &c.

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Specification of Letters Patent.

Patented Dec. 26, 1905.

Original application filed June 19, 1905, Serial No. 265,893. Divided and this application filed August 5, 1905. Serial No. 272,844.

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 Apparatus for Producing or 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.

This application is a division of my prior application, filed June 19, 1905, Serial No. 265,893, for improvements in spinning filaments from viscose.

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 filaments, 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 to the apparatus for 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 semiplastic condition, thereby imparting greater and more uniform strength and adding greater luster. In the apparatus heretofore employed 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, and 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 apparatus hereinafter more particularly described, and specified in the claims, two forms of apparatus for carrying my invention into effect being 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
 5 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
 10 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
 15 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
 20 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 fila-
 25 ment. 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
 30 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
 35 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
 40 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
 45 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 manu-
 50 facturing 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
 55 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 de-
 60 sirable 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, produc-

ing less friction. In the form shown in Fig. 65 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. 70

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 ad-
 75 justable 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 80 make the rods 4 and 5 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 85 my invention—as, for instance, by employing different forms of tension devices between the spinning-head 3 and the winding-spool 7—so long as the operation thereof is as above described. In my apparatus the perforated heads 90 may be stationary or they may be rotated to spin the threads together in the setting-bath, as desired, and by changing the perforations in the heads a flat or a round thread or a series of the same may be formed as desired. 95

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

1. In an apparatus for forming threads from viscose, or like material, the combination of a 100 receptacle for containing a fixing-bath, means for causing filaments of viscose, or like material, to issue into the bath, means for causing said filaments to traverse the length of the bath, means for winding the filaments directly 105 upon spools as they issue from said bath, and means for applying a minimum tension to the filaments nearest the spinning-head and for applying a maximum stretch to the filaments between the fixing-bath and the winding mech- 110 anism.

2. In an apparatus for spinning artificial silk, the combination of a tank for containing a fixing solution, a spinning-head located beneath the surface of the fixing solution, means 115 for winding the filaments as they issue from the bath directly upon spools, and means for applying progressively-increasing tensions to different portions of the filaments to stretch the same as they progress toward the winding 120 mechanism.

3. In an apparatus for manufacturing threads from viscose, or like material, a tank containing a fixing solution, a perforated discharge cap, or head, located at one end of the 125 tank, a tension device located at the other end of the tank and adapted to hold the thread in the solution until it is spun, and to stretch the

same between the tension device and the winding mechanism, and means to wind the spun thread directly on spools under tension.

4. In an apparatus for making artificial silk, the combination of a tank for containing a setting solution, means for forcing filaments of cellulose, or like material, into the solution, means for winding up the spun thread, and a tension device composed of parallel rods between which the thread is caused to pass for applying a definite predetermined tension to the thread.

5. In an apparatus for spinning viscose, or like material, a tank containing a setting solution, a series of perforated heads arranged on one side of the tank and discharging beneath the surface of the solution, tension-rods located at the other side of the tank, and means for winding up the spun thread as it is delivered from the tension-rods.

6. In an apparatus for making threads from viscose, or like material, a tank for containing a setting solution, means for winding up the thread delivered from said tank, and an adjustable tension device located between the spinning-head and the winding mechanism whereby a definite predetermined stretch is applied to the thread between said tension device and the winding mechanism.

7. In an apparatus for forming threads from viscose, or like material, a tank for containing a fixing solution, winding mechanism, and means for applying a certain predetermined stretch to the thread between the tank and the winding mechanism, and to prevent the tension on the thread from extending back to the filaments while they are being spun.

8. In an apparatus for forming threads from viscose, or similar material, the combination with a tank for containing a fixing solution, of a series of perforated heads arranged on one side of the tank, rods 4 and 5 located at the opposite side of said tank and transverse to

the direction of the axes of the said heads, and a winding mechanism to which the said threads are delivered.

9. In an apparatus for making threads from viscose or like material, a tank for containing a setting solution, means for winding up the thread delivered from said tank, and an adjustable tension consisting of smooth parallel rods located between the spinning-head and the winding mechanism, whereby filaments are drawn over and partly around said rods to apply a definite predetermined tension or stretch to the thread immediately before it is wound upon the spool.

10. In an apparatus for forming threads from viscose or like material, a tank for containing a fixing solution and winding mechanism and means for applying progressively-increasing degrees of tension to stretch the thread between the tank and the winding mechanism and for preventing more than a minimum tension from being exerted upon the thread back of said tension device.

11. In an apparatus for making thread from viscose or like material, a tank containing a setting solution, a series of perforated heads arranged on one side of said tank and discharging beneath the surface of said solution, means for winding up the thread and a tension device consisting of a plurality of smooth rods around and between which the filaments are passed to apply a minimum tension to the filaments between said tension device and said perforated heads, an increased tension between said rods, and a maximum tension between the tension device and the winding mechanism.

In witness whereof I have hereunto set my hand this 4th day of August, A. D. 1905.

CHARLES A. ERNST.

Witnesses:

FREDK. C. EBERHARDT,
ALSTON B. MOULTON.