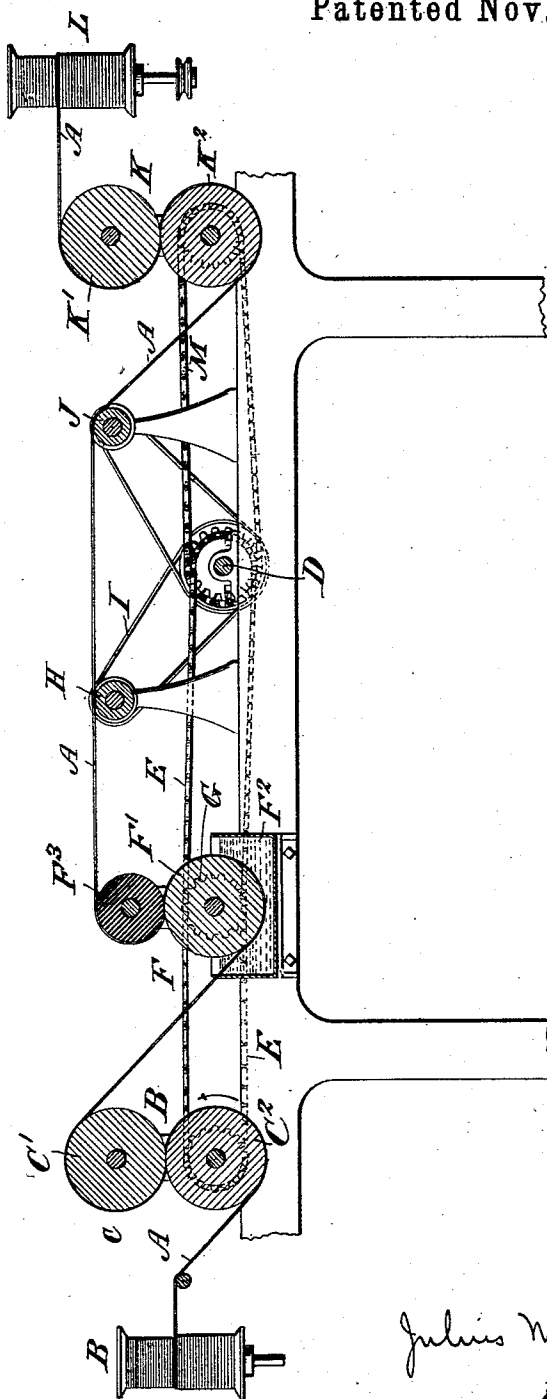


(No Model.)

J. M. WEAVER.
APPARATUS FOR LEVELING SILK THREAD.

No. 570,691.

Patented Nov. 3, 1896.



Witnesses:-

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JULIUS MYRON WEAVER, OF FALL RIVER, MASSACHUSETTS.

APPARATUS FOR LEVELING SILK THREAD.

SPECIFICATION forming part of Letters Patent No. 570,691, dated November 3, 1896.

Application filed August 1, 1895. Serial No. 557,855. (No model.)

To all whom it may concern:

Be it known that I, JULIUS MYRON WEAVER, a citizen of the United States, and a resident of the city of Fall River, county of Bristol, and Commonwealth of Massachusetts, have invented a new and useful Improvement in Machines for Leveling Silk Thread; and I do hereby declare that the following is a full, clear, and exact description of the same.

10 Silk thread as ordinarily made will stretch to a widely-varying extent at different parts of its length, so that it cannot be spooled evenly by means of an automatic spooling or winding machine like linen and other threads, but can be spooled evenly only by manual labor. Further, ordinary silk thread will, it is well known, kink when drawn through the eye of a needle, as on a sewing-machine. This constitutes a great disadvantage compared with the manner in which other threads and fibers are used, and a treatment has long been sought whereby this peculiar defect in silk could be overcome and a perfectly smooth and "level" silk obtained and its spooling be accomplished by machinery. It has long been known that if the silk were stretched while moist almost or quite to the limit of its elasticity, each strand would be drawn out until in a twisted thread they would be more even than when they had not been so treated. I have discovered that if the stretching be practically a uniform percentage of the length of the strand, to be determined in the case of each kind of silk by previous experiment, and if it be accomplished by an infinitesimal number of short pulls, the total sum of which will not bring the thread near to its elastic limit, the thread will be stretched much more evenly and uniformly than has heretofore been common; but I have also discovered that the elasticity of the thread is so great that there is a constant tendency for it to resume or partially resume its former condition and that unless some means be found to set or fix it while stretched to the extent desired no advantage would be obtained by merely stretching it without so doing. I have discovered that almost any glutinous material, such as common size, may be used to effect this purpose in the following manner: If the thread while being stretched is passed through a bath of sizing, it will take up a portion of the

material and become wholly or partly saturated with it, so that the sizing will fill the pores and minute interstices in the thread. Now if while the thread is still subjected to the predetermined stretching the sizing be dried by any suitable means, the pores and interstices of the thread being thus filled with the dried size, the thread is prevented from returning to its original condition and its uniform, even condition is preserved and perpetuated. I have found also that with some silks the amount of natural gum present is so large that by simply moistening the thread while under the tension required to stretch it this gum is wholly or partly dissolved and will be evenly distributed throughout the length of the thread, and will when dried accomplish the same purpose as the artificial sizing above referred to.

In the accompanying drawings, forming part of this specification, I have illustrated the essential parts of an apparatus I employ to facilitate the treatment of silk by my invention.

Referring by letters to the drawing, I lead the silk thread A to be leveled—that is, stretched, fixed, and smoothed—from the supply device (here represented by a loose bobbin B) to a feeding device C, which I prefer to constitute of an upper loose roll C', resting on and driven by a lower roll C², which is driven positively at a certain speed from a main driving-shaft D by means of a chain and sprocket-gear E.

The thread A is led forward beneath the lower roll C², thence rearward between the rolls C' and C², and thence forward again over the upper roll C', so that the lower roll C² being revolved in the direction indicated by the arrow the thread, being gripped between the rolls, will be fed forward positively over the upper roll C'.

From the upper roll C', I lead the thread A to a thread-moistening device F, for which I prefer to employ a moistening-roll F', mounted to revolve in a vat F², in which the liquid is contained, the thread being led beneath the roll F' and through the liquid, and I place on the moistening-roll F' a loose wiping-roll F³, preferably of soapstone, between which and the moistening-roll F' the thread is led rearward and thence forward over the wiping-

roll F^3 , so that the superfluous liquid will be removed from the thread and returned to the vat F^2 .

I connect the moistening-roll F' , as by means of a chain and sprocket-gear G , with the main driving-shaft D , preferably in such a manner that the moistening-roll F' and its superposed wiping-roll F^3 will be revolved slightly faster peripherally than the feeding-rolls C' C^2 , and the thread thus slightly stretched between the feeding and moistening devices in the process of moistening.

From the wiping-roll F^3 the moistened and wiped thread is led, by preference, over a smoothing-roll H , which I at present make of wood, having a peripheral groove to fit each thread. I in practice arrange the machine to treat as many as eighty or more threads simultaneously. I connect the smoothing-roll H , as by means of a belt-and-pulley gear I , with the main shaft D , so that the roll H will be driven forward in the same direction as the thread runs, but at a much higher peripheral speed, so that the thread will be not only smoothed, but to some extent dried, by the friction of the rapidly-revolving roll H . I further lead the partially stretched, smoothed, and dried thread from the roll H over a succeeding roll J , which I prefer to make smooth and of a hard wood, such as lignum-vitæ, and which I connect with the main shaft D , so that it will be driven in the same direction as but at a much greater peripheral speed than the thread runs. The roll J will thus completely smooth and dry the thread.

From the drying-roll J , I lead the thread to a drawing device K , which I constitute of a loose drawing-roll K' , superposed on a driven roll K^2 , the thread being led beneath the lower roll, thence rearward between the drawing-rolls, and thence forward over the upper roll to a winding device, which is herein represented as a spindle-driven bobbin L , mechanically traversed in a well-known manner so as to wind the finished thread evenly thereon.

I connect the lower drawing-roll K^2 , as by means of a chain and sprocket-gear M , with the main shaft D in such a manner that its periphery will travel at a rate somewhat greater than that at which the periphery of the positively-driven feeding-roll C^2 travels,

the difference in rate being adjustable in accordance with the character of the thread, so that the thread will be uniformly stretched to a corresponding degree between the feeding device C and the drawing device K , and consequently to a somewhat less extent between the moistening device F and the drawing device K . The liquid will thus be applied to and permeate the thread while stretched and the thread smoothed, dried, and finished before the tension is relaxed, so that the stretch of the thread will be set, fixed, and substantially maintained when the tension is removed, and the thread will be of a uniform elasticity, smoothness, and finish throughout its length.

It is evident that in the use of my improved machine or apparatus the silk thread may be moistened either prior to or during its stretching by the machine.

In practice I prefer to use a liquid containing a glutinous substance, such as sizing, with which to moisten the thread, for reasons before set forth, which will materially increase the inherent strength of the thread.

I claim as my invention—

1. In a machine for leveling silk thread, the combination of the instrumentalities described as follows, to wit: a thread-feeding roll and means for driving the same, a thread-drawing roll and means for driving the same peripherally faster than the thread-feeding roll, and a thread-drying device between the thread feeding and drawing rolls.

2. In a machine for leveling silk thread, the combination of a thread-feeding roll, a thread-moistening device, a thread-smoothing roll over which the silk thread is drawn, means for driving the smoothing-roll in the same direction as, but peripherally faster than the thread is drawn thereover, so as to smooth and dry the thread, a thread-drawing roll, and means for driving the thread-drawing roll peripherally faster than the thread-feeding roll.

In testimony whereof I have hereunto set my hand the 20th day of July, 1895.

JULIUS MYRON WEAVER.

In presence of—

H. D. KLOTS,

ALVIN THOMAS.