P. H. BONNER.

SILK THROWING MACHINE.

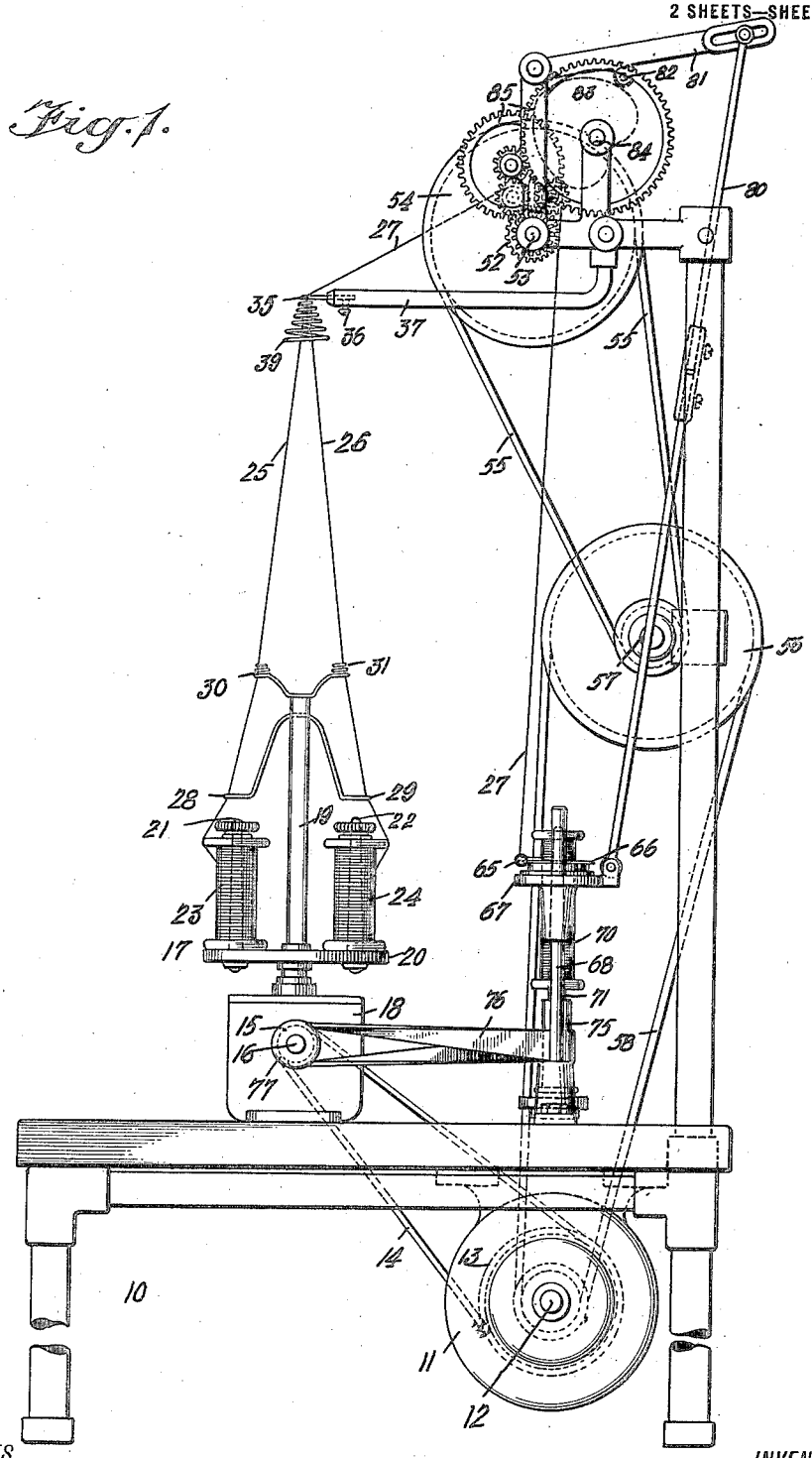
APPLICATION FILED JULY 31, 1920.

1,390,081.

Patented Sept. 6, 1921.

2 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

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2 SHEETS—SHEET 2.

Fig. 2.

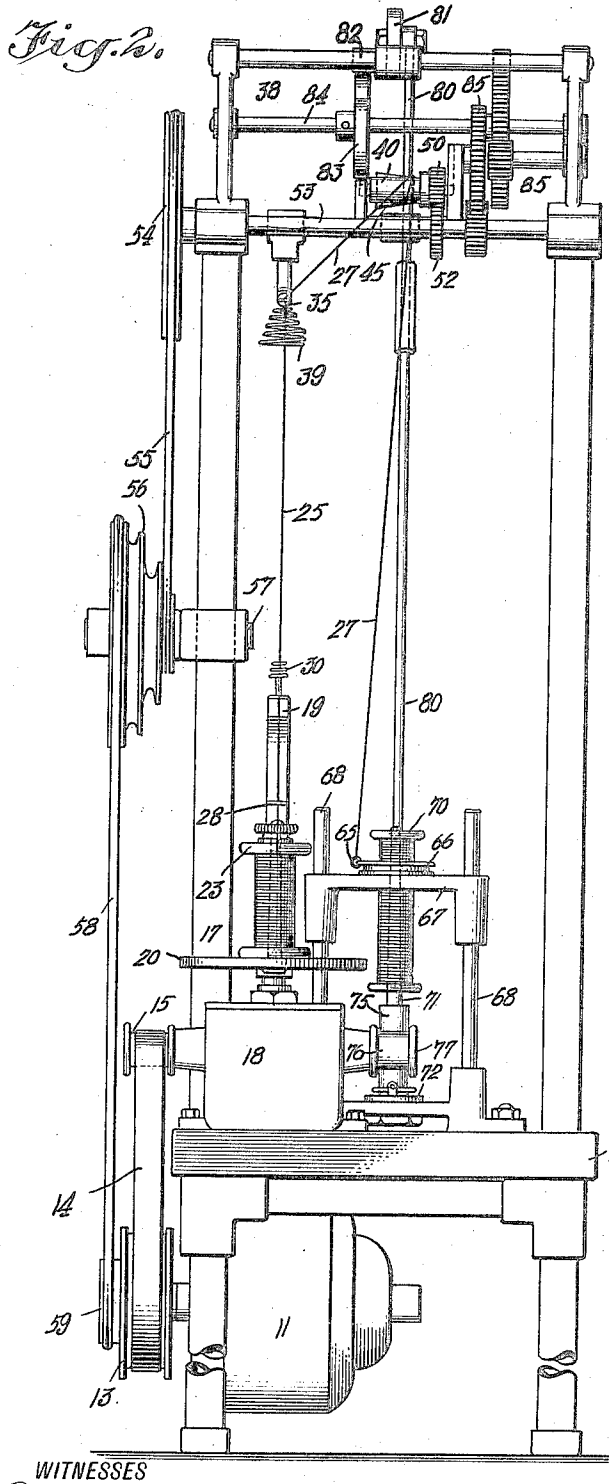
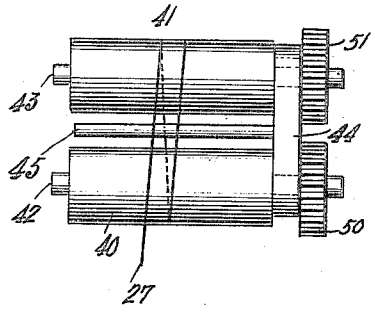


Fig. 3.



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UNITED STATES PATENT OFFICE.

PAUL HYDE BONNER, OF NEW YORK, N. Y., ASSIGNOR TO STEHLI SILKS CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

SILK-THROWING MACHINE.

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To all whom it may concern:

Be it known that I, PAUL HYDE BONNER, a citizen of the United States, and a resident of the city of New York, borough of Manhattan, in the county and State of New York, have invented a new and Improved Silk-Throwing Machine, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved silk throwing machine arranged to form from two or more raw silk ends a crape or high twist thread in one continuous operation on a single machine.

Another object is to produce a large amount of crape thread in a comparatively short time, and one having a uniform twist throughout its length.

Another object is to provide a silk throwing machine which is exceedingly simple and durable in construction and not liable to get out of order easily.

With these and other objects in view, the invention consists of certain novel features of construction as hereinafter shown and described and then specifically pointed out in the claims.

A practical embodiment of the invention is represented in the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a side elevation of the improved silk throwing machine;

Fig. 2 is a front elevation of the same; and

Fig. 3 is an enlarged plan view of the take-up rolls.

In the manufacture of a crape thread for use in weaving crape, georgette or crêpe de chine and similar fabrics, as now generally practised, a number of raw silk ends or filaments are doubled on a doubler or winder, then the doubled ends are subjected to a first time spinning on what is known as a crape spinner to form a twisted thread which is wound upon a driven take-up bobbin, the twists being about thirty to forty per inch. The number of twists per inch in this thread as it is wound up on the driven bobbin gradually decreases owing to the increase in the diameter of the bobbin as the thread is wound thereon, and in order to equalize the number of twists throughout the length of the thread and to form a high twist thread a second spinning is given to the thread on another crape spinner. It is understood that each crape spinner is provided with a high speed spindle and a take-up bobbin having a positive drive to pull the thread from the first bobbin and hence a number of twists, say from 30 to 40, is given to the thread. From the foregoing it will be seen that in order to produce a crape thread having say from 60 to 75 twists or turns per inch, it is necessary to resort to three distinct operations on a corresponding number of machines. It is understood that when a crape thread is woven into cloth and degummed a crinkly effect is produced owing to the large number of twists in the thread.

With my improved silk throwing machine, presently described in detail, the raw silk ends or filaments for any ply thread are spun together and given the desired number of twists or turns during a continuous operation on a single silk throwing machine, at the same time producing a larger amount of uniformly twisted thread in a given time in comparison with the output according to the above described previous mode of production.

The improved silk throwing machine is mounted on a suitably constructed frame 10 supporting a motor 11 of any approved construction, preferably, however, of the electrical type. On the shaft 12 of the motor 11 is secured a pulley 13 connected by a belt 14 with a pulley 15 secured on the driving shaft 16 of a multiple spindle head 17 of any approved construction. As shown, the multiple spindle head 17 is provided with a casing 18 in which is journaled a shaft 19 driven from the shaft 16 by the usual gearing (not shown), and on the said shaft 19 is secured a disk 20 supporting, at least, two spindles 21 and 22 carrying bobbins or spools 23, 24 from which unwind raw silk ends 25, 26 to be spun together to form a thread 27, as hereinafter more fully explained. The raw silk ends 25, 26 after leaving the bobbins at their upper ends pass through guides or eyes 28, 29 and then through eyes or guides 30, 31 all mounted on the upper end of the shaft 19 to rotate with the same. The raw silk ends 25, 26 after leaving the guides 30, 31 converge and pass through an eye 35 adjustably secured by a set screw 36 to a bracket 37 forming part of an overhead frame structure 38 of the main frame 10. It is understood that at the guide or eye 35 the two silk ends 25,

26 are spun together. A spiral guide 39 depends from the eye 35 to properly guide the raw silk ends 25, 26 to the eye 35.

The thread 27, formed by spinning the raw silk ends 25, 26 together at the eye 35, extends sidewise and upward and passes several times around take-up rolls 40, 41 having their shafts 42, 43 journaled in a bracket 44 attached to or forming part of the overhead frame structure 38. Between the take-up rolls 40, 41 extends a tapering bar 45 to prevent the windings of the thread 27 from slipping endwise off the take-up rolls 40, 41. On the take-up roll shafts 42, 43 are secured gear wheels 50, 51 in mesh with a gear wheel 52 secured on a horizontal shaft 53 journaled in the overhead frame structure 38. This shaft 53 is driven at a comparatively slow speed from the motor shaft 12 to rotate the take-up rolls 40, 41 at a slower speed than that given to the multiple spindle head 17. It will be noticed that the thread 27 during its passage from the eye 35 to the winding up rolls 40, 41 is twisted, that is, about thirty to forty twists per inch are given to the thread 27. It will also be noticed that by the use of the take-up rolls 40, 41 a traveling motion is given to the thread and the thread prevented from piling up and becoming entangled. According to the difference in the speed between the take-up rolls 40, 41 and the multiple spindle head 17 the desired number of twists per inch is initially given to the thread 27. Thus if a large number of twists (say 40 per inch) is desired, the speed of the take-up rolls 40, 41 is decreased relative to the speed of the multiple spindle head 17, and if a less number of twists (say 30 per inch) is desired the speed of the take-up rolls 40, 41 is correspondingly increased, but the speed of the take-up rolls 40, 41 is in either case considerably less than that of the multiple spindle head 17. In practice, the multiple spindle head 17 rotates at about 6,000 revolutions per minute while the take-up rolls rotate at approximately 150 revolutions per minute. On the shaft 53 is secured a pulley 54 connected by a belt 55 with a step pulley 56 journaled on a stud 57 arranged on the said frame structure 38. The pulley 56 is connected by a belt 58 with a pulley 59 attached to the motor shaft 12 so that the rotary motion of the latter is transmitted by the device above described to the shaft 53 to rotate the latter at a low speed.

The low twist thread 27 after leaving the take-up rolls 40, 41 is fed downward and passes through the traveler eye 65 of a traveler ring 66 mounted to turn on a traverse bar 67 adapted to slide up and down on guideways 68 arranged on the main frame 10. The thread after leaving the eye 65 extends inward and winds on a spool 70 held on a spindle 71 extending centrally through the traveler ring 66, and the said spindle 71 is journaled in a suitable bearing 72 arranged on the frame 10. The spindle 71 is provided with a pulley 75 connected by a belt 76 with a pulley 77 secured on the shaft 16 of the multiple spindle head 17 to rotate the said spindle 71 at a high rate of speed, say about 11,500 revolutions per minute. It will be noticed that by the arrangement described the low twist thread 27 is again twisted during its passage from the take-up rolls 40, 41 to the traveler eye 65 to form a high twist thread, that is, a thread having a large number of twists, say 60 to 75 twists per inch. It is understood that the twisted yarn or thread cannot be wound upon the spool 70 faster than it is given off by the take-up rolls 40, 41 and hence the revolving traveler eye 65 compensates for the difference in the speed of the take-up rolls 40, 41 and that of the bobbin 70. Subtracting the revolutions of the take-up rolls from the revolutions of the bobbin 70 gives the revolutions per minute of the traveler eye 65, and a corresponding twisting of the yarn or thread between the take-up rolls 40, 41 and the traveler eye 65 takes place. Subtracting the revolutions of the traveler eye 65 from that of the bobbin 70 indicates the speed at which the thread is wound up on the bobbin 70.

The traverse bar 67 is moved up and down to evenly feed the twisted yarn or thread onto the bobbin 70, and for this purpose the traverse bar 67 is pivotally connected by a sectional link 80 with a lever 81 carrying a friction roller 82 traveling on the peripheral face of a heart-shaped cam 83 secured on a shaft 84 connected by a train of gear wheels 85 with the shaft 53, previously mentioned, and driven from the motor 11. By the arrangement described a swinging movement is given by the heart-shaped cam 83 and friction roller 82 to the lever 81 whereby the link 80 imparts an up and down movement to the traverse bar 67 to move the traveler up and down and thus cause the twisted thread to be evenly fed onto the spool 70.

The operation is as follows:

When the machine is running, the multiple spindle head 17, the take-up rolls 40, 41 and the winding-up spool 70 are rotated and the raw silk ends 25, 26 unwind from the spools 23, 24 and are spun together at the eye 35 to form the thread 27, which receives an initial twisting. A comparatively slow traveling motion is given to this thread 27 by the take-up rolls 40, 41 during its travel from the take-up rolls 40, 41 to the traveler eye 65, the desired high twist being given to the thread 27 owing to the difference in the speed of the spool 70 and that of the take-up rolls 40, 41. It will be noticed that by the arrangement described, the silk ends 25,

26 are spun together to form a thread having an initial number of twists and to which a traveling motion is imparted by the take-up rolls. The thread is next given another number of twists per inch between the take-up rolls 40, 41 and the traveler eye 65, and then this thread is wound on the bobbin 70. The twist in the thread is subsesuently set in the usual manner, after which the thread is ready for weaving into a fabric. The woven fabric after a subsequent boiling and degumming assumes a crape or crinkly effect owing to the action of the highly twisted thread.

It will be noticed that by the arrangement described, the take-up rolls 40, 41 can be run at a fairly high speed to insure a large output of properly twisted thread in a given time. It will further be noticed that by the use of the take-up rolls 40, 41, the traveler and the driven bobbin 70 a uniform number of twists is given to the thread throughout its length, that is, about one-half of the twists is given to the thread between the multiple spindle head 17 and the take-up rolls 40, 41, and the remaining number of twists are given to the thread between the take-up rolls 40 and 41 and the bobbin 70.

It is expressly understood that the speed of the multiple spindle head 17, the take-up rolls 40, 41 and the single spindle 71 can be varied according to the desired number of twists to be given to the yarn, by correspondingly changing the relative proportions of the driving means for the said parts.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:—

1. A silk throwing machine comprising twisting means for twisting at least two silk ends together to form a low twist thread, take up rollers for taking up and imparting a traveling motion to said threads, means for operating the said rollers at considerably less speed than that of the said twisting means, twisting and winding means receiving the thread from the take up rollers and twisting it to form a high twist thread and winding it onto a spool, and means for operating the twisting and winding means at considerably greater speed than the low twisting means.

2. A silk throwing machine, comprising a revoluble twisting head adapted to carry at least two spools each having wound thereon a raw silk end, a fixed guide between which and the said twisting head the silk ends are twisted to form a low twist thread, take-up rollers rotating at less speed than the twisting head and around which passes the said thread to impart a traveling motion thereto, said rollers being spaced apart and having their axes in the same horizontal plane and a revoluble twisting and winding means receiving the thread from the said take-up means to twist the same to form a high twist thread and to wind the same on a spool, the said twisting and winding means rotating at greater speed than the twisting head.

3. In a silk throwing machine, a vertically slidable member, a traveler ring mounted on the member, a spindle extending through the traveler ring, means for operating the spindle, a spool on the spindle, a driven shaft, a counter shaft operated from the driven shaft, a cam on the counter shaft, a pivoted lever carrying a roller engaging the cam, and a link connecting the pivoted lever with the slidable member.

4. A silk throwing machine, comprising a revoluble multiple spindle head adapted to carry at least two spools each having a raw silk end wound thereon, a fixed guide engaged by the said silk ends to spin the same together thereby forming a thread, take-up rolls around which passes the said thread received from the said guide, a revoluble single spindle head carrying a winding-up spool, a traveler coacting with the said winding-up spool, and receiving the thread from the said take-up rolls to again twist the thread and to wind the same onto the said winding-up spool, and driving means for the said spindle heads, a vertically slidable support for the carrier, a pivoted lever having a roller at one end, a cam engaging the roller, and a link connecting the other end of the lever with the support, and the said take-up rolls to rotate the spindle heads at a higher rate of speed than the said take-up rolls.

5. In a silk throwing machine, the combination with twisting means for twisting threads together to form a low twist thread, and twisting and winding means for twisting the threads to form a high twist thread and winding it on a spool, of a shaft driven at low speed, take up rollers over which the twisted thread passes from the first twisting means to the second twisting means, means for operating said rollers from the said driven shaft, a counter shaft, means for operating the counter shaft from the driven shaft, a cam on the counter shaft, a pivoted lever carrying a roller engaging the cam, a traverse bar for feeding the twisted thread on the said spool, and a link connecting the traverse bar with the pivoted lever.

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