J. L. MACFARLANE.

TEXTILE TWISTER.

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1,233,593. Patented July 17, 1917.

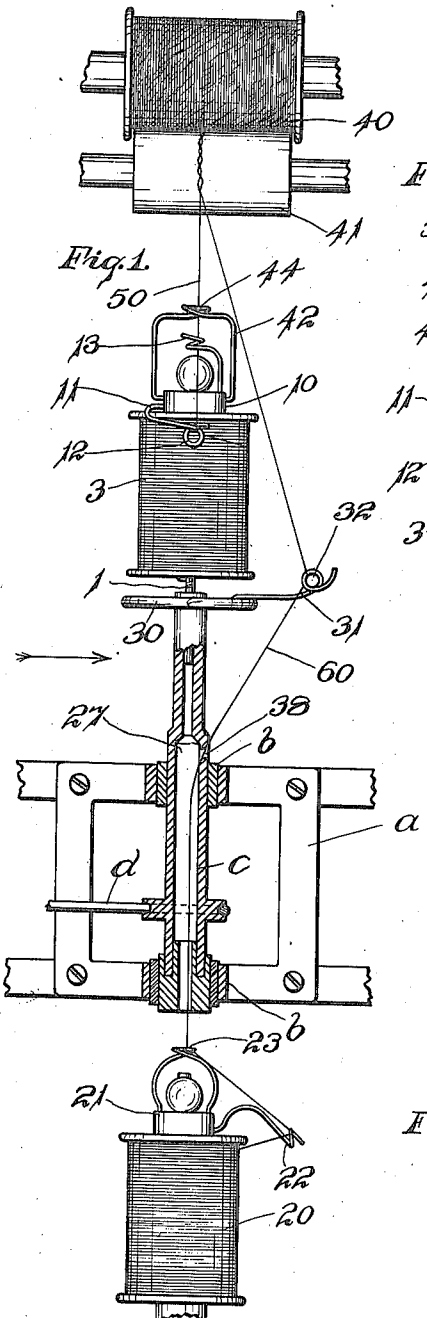


Fig. 1.

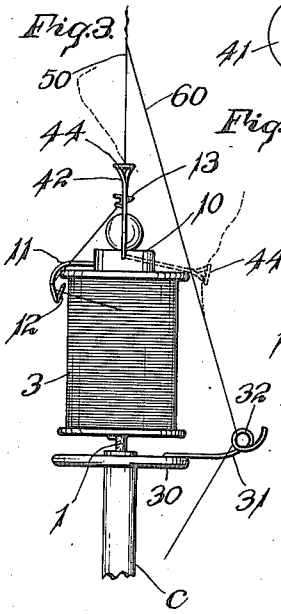


Fig. 3.

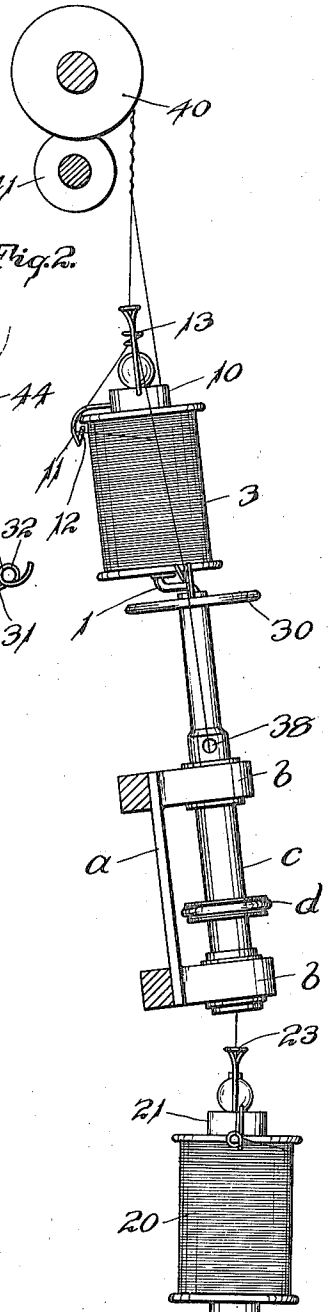


Fig. 2.

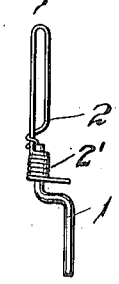


Fig. 4.

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TEXTILE-TWISTER.

1,233,593. Specification of Letters Patent. Patented July 17, 1917.

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To all whom it may concern:

Be it known that I, JAMES LLOYD MACFARLANE, a citizen of the United States, and a resident of Atwoodville, in the county of Tolland and State of Connecticut, have invented certain new and useful Improvements in Textile-Twisters, of which the following is a specification.

The present invention is concerned with an improved mechanism for twisting together fine strands of textile material. The machine forming the subject matter of this application was developed for handling the primary strands of silk which are extremely delicate in their nature and require to be handled with the utmost care and delicacy in order to prevent the breakage of either strand. The machine is peculiarly adapted for the manufacture of what is known as organzine, which is a thread composed of two or more primary strands of raw silk twisted together to be used as warp in the manufacture of silk fabric. It is possible that the machine may be adapted for the handling of other fine textile strands for the manufacture of thread, but it is to be understood that the machine is designed and intended for use on this fine textile work as distinguished from cord or rope machinery or wire covering machinery, since this machine is no more adapted to that type of work than is rope or wire winding machinery adapted for handling fine textile strands.

The present practice in the manufacture of organzine is substantially as follows: The primary strands are first spun backward any desired number of turns to the inch, for instance, 16 turns. The two strands thus spun are then twisted together in the opposite direction, 14 turns to the inch. The present method of twisting the strands causes them to spin, but since they have been already spun in a reverse direction, the spinning which is incident to the twisting results in taking out the original spin, although it is desirable to leave a spin of about two turns to the inch in the thread. The twisted thread is then steam-stretched to avoid any possibility of its kinking. If two strands were twisted together under the present practice without the preliminary reverse spinning, each strand would be spun on its own axis, and the resulting thread, in spite of any steam-stretching which might be given it, would kink and snarl to such an extent that it could not be used. This practice, of course, necessitates the use of an additional set of spinning machines and a resulting increase in power used and floor space required and so materially increasing the cost of the product.

The object of my invention is to produce a machine for twisting together two or more primary strands of silk or other fine textile material to produce a thread in such a way as to obviate the necessity of resorting to this preliminary operation and still produce a straight solid thread with no tendency to kinking or snarling.

I have illustrated my invention in a very simple form in which it is used in the manufacture of two thread organzine, but it will be understood that it will be adapted for use in any case where it is desired to twist together two strands of silk or light textile material and that beyond this the invention is not concerned with the nature or character of the resulting thread or the use to which it is to be put.

Referring to the drawings—

Figure 1 is a front view of the machine embodying my invention.

Fig. 2 is a side view thereof.

Fig. 3 is a detail view of the stop motion.

Fig. 4 is a detail view of the bobbin spindle.

Before proceeding to describe the machine forming the subject matter of this invention, I desire to call particular attention to the fact that any twister handling these fine textile strands must operate at a very high rate of speed in order to produce the resulting thread in sufficient quantities to bring the cost of manufacture, a material part of which is the power required to drive the machine, down to the lowest possible point. The speed of rotation which it is desired to attain is from ten to fourteen or fifteen thousand R. P. M. And when the very fragile nature of the strands which are being dealt with is considered, it will be realized that a very careful and particular organization of the machine is required to do the work satisfactorily. Lightness of the parts, balance, absence of vibration, a minimum of bearing points, and other features of construction, are of great practical importance in the successful operation of a machine of this character.

Referring to the drawings *a* denotes the frame of the machine, *b b* are shaft bearings; *c* is the shaft supported thereby and adapted to be driven in any suitable manner as by a belt *d*. Supported in the upper end of the shaft, but not rotatable therewith, is the bobbin spindle 1 which has a stem 2 to receive the bobbin 3. The material feature of this construction is that the bobbin carried by the stem 2 shall be yieldingly connected with the bobbin spindle 1 in order to eliminate vibration of the bobbin and to reduce the frictional contact between the bobbin spindle and the flier spindle. As shown, this yielding connection is constituted of the spring 2′, which connects the spindle 1 with the stem 2, this spring 2′ absorbing such vibration as the bobbin may be subjected to. It will be seen from the drawings that the shaft is inclined slightly and the spring stem is offset slightly so as to normally cause the bobbin to occupy the same position and prevent its rotation. Rotarily mounted on the top of this bobbin is a flier 10 having an arm 11 with an eye 12 at its end through which the strand from this bobbin is passed up to another eye 13 arranged about in alinement with the axis of the bobbin.

Located underneath the shaft is the second bobbin 20 suitably supported and provided at its top with a rotatable flier 21 having an arm 22 with an eye at its end through which the strand from this bobbin is passed and from this to another eye 23 located substantially in alinement with the axis of the bobbin.

The shaft is bored out to provide a passage 27 beyond each bearing so that the thread from the lower bobbin can be passed into the shaft below the lower bearing and out through an aperture 38 in the side of the shaft at a point above the upper bearing. Secured to the shaft just below the upper bobbin is a twister or winder 30 provided with an arm 31 having an eye 32.

A spool 40 is operated by the friction roll 41 and on this the twisted thread is wound up, this spool acting to draw the strands of the two bobbins 3, 20.

50 denotes the strand drawn from the upper bobbin 3 and 60 the strand drawn from the lower bobbin 20. If the tension on these two strands is uneven that strand which is more tightly drawn will form a core about which the other strand winds. If the tension on the two strands is uniform one will not wind about the other but both will be evenly twisted together. In the drawings, the lower strand is shown as wrapped about the upper strand which forms a core, but it is to be clearly understood that these conditions can be exactly reversed by changing the tension and the lower strand can constitute the core while the upper strand is wound about it, and that by equalizing the tension on both strands they can be evenly twisted together to produce the best quality of thread. Another pecularity and an essential in the construction of my machine, in order to permit of twisting the two unspun strands together without spinning during the twisting operation, is that the lower strand is carried by the twister 30 in a path which entirely incloses the upper bobbin, so that in effect the upper bobbin is inclosed by the path of movement of the lower strand during the twisting operation. The structure illustrated which makes this possible is the supporting of the upper bobbin by the shaft and carrying the strand from the lower bobbin through the shaft. When the machine is in operation and running at the high speeds at which machines of this character operate, the upper bobbin is in effect wholly inclosed by the strand from the lower bobbin and is absolutely inaccessible in any way and from any direction.

When the bobbins are arranged in upright position as shown in the drawings, and which is the usual arrangement in machines of this character, neither one rotates on its own axis or revolves about an axis outside of itself. To rotate either or both of the bobbins on their own axes under such conditions would put a spin in the thread, the very thing which this machine is designed to prevent, and the same result would follow if the lower bobbin revolved about an axis outside of itself. Such an arrangement, however, is not necessary to permit of drawing the thread off the bobbin without twisting. However the bobbins are arranged in this respect my machine provides means for twisting two unspun strands together without spinning either strand or the resulting thread during the twisting operation. This obviates the necessity of performing the preliminary operation of spinning the individual strands in a direction opposite to that in which the twisting operation takes place, thus saving the cost of the spinning machines and the power to run them and the time consumed in the spinning operation, and so materially decreasing the cost of the product. The two bobbins might be arranged so that they do rotate, but they are not to be arranged so that their rotation will assist in the twisting operation.

Owing to the fact that the strand 60 from the lower bobbin sweeps entirely around or revolves about the upper bobbin, it is necessary to provide some stop motion to be operated when the strand 50 from the upper bobbin breaks, which stop motion must be located inside of the path of movement of the strand 60 from the lower bobbin. A simple form of device is illustrated comprising a bale 42 pivotally supported on the flier 10

and which is normally held up in the position indicated in the drawings by the strand 50 from the upper bobbin. When this strand breaks the bale drops with its eye 44 extending beyond the edge of the bobbin flange and the strand 60 from the lower bobbin catches in this eye and is broken.

To prevent the strand 60 from catching on the flier arm 11 and eye 12 of the upper bobbin, I bow the arm and form the eye on the inside of the arm toward the bobbin, with the result that the bowed part of the arm operates as a guard.

While I have illustrated the invention as used for winding but two strands together, it is apparent that it will operate with any number of strands or bobbins in the same way.

The spring stem 2 for the bobbin 3 is provided so as to eliminate as far as possible the vibration due to the operation of the machine, thus tending to hold the bobbin steady and prevent its rotation.

It is, of course, apparent that the strands can be carried on other devices than the bobbins illustrated, and I do not wish to be understood as being limited to the use of the exact structure illustrated and described herein. The terms used herein are terms of description and not of limitation.

I claim as my invention:

1. In a machine of the character described for twisting together strands of silk or like textile material, bearings, a spindle supported therein at one end and having a passage through it from one side of said bearings to the other, means for driving said spindle, a flier mounted on the free end of said spindle, a non-rotatable bobbin-holder yieldingly supported by and unbalanced with respect to said rotating spindle, a bobbin mounted therein, a second bobbin mounted at the opposite side of said bearings from the first mentioned bobbin and with its strand extended through the passage in said spindle outside of said first mentioned bobbin, and engaged by said flier, and a receiving carrier to which the strands from both bobbins are attached.

2. In a machine of the character described for twisting together strands of silk or like textile material, bearings, a spindle supported therein at one end and having a passage through it from one side of said bearings to the other, means for driving said spindle, a flier mounted on the free end of said spindle, a non-rotatable bobbin-holder yieldingly supported by and unbalanced with respect to said rotating spindle, a bobbin mounted therein, a second bobbin mounted at the opposite side of said bearings from the first mentioned bobbin and with its strand extended through the passage in said spindle outside of said first mentioned bobbin and engaged by said flier, a receiving carrier to which the strands from both bobbins are attached, and a stop motion between said first mentioned bobbin and said carrier and with which the strand from said first mentioned bobbin is engaged.

3. In a machine of the character described for twisting together strands of silk or like textile material, a spindle inclined from the vertical position, bearings therefor, driving means therefor, a disk secured to the upper end of said spindle, a non-rotatable unbalanced holder wholly supported from its lower end by said spindle, a carrier mounted on said holder, a receiving bobbin located above said carrier, a second carrier located at the opposite side of said bearings from the first mentioned carrier, the strand therefrom passing through said bearings and driving means outside of said disk and first mentioned carrier to said receiving bobbin, and an eye on said disk engaging the strand from the lower carrier to wrap it about the strand from the upper carrier.

4. In a machine of the character described for twisting together strands of silk or like textile material, a spindle, means for supporting and rotating it, an end of said spindle being recessed, a disk secured to the recessed end of, and rotatable with said spindle, a non-rotating unbalanced support yieldingly connected with a stem located in the recessed end of the spindle, a strand carrier mounted on said support, a second strand carrier located at the opposite side of the spindle bearings from the first, the strand therefrom passing through said bearings and outside of said disk and first mentioned carrier, a receiving bobbin to take the strand from both carriers, and an eye on said disk engaging the strand from the second carrier to wrap it about the strand from the first carrier at a point between it and said receiving bobbin.

5. In a machine of the character described for twisting together strands of silk or like textile material, bearings, an upright spindle with one end supported in said bearings, driving means for the spindle, a flier mounted on the upper free end of said spindle, a non-rotating unbalanced support mounted in the upper end of said spindle, a bobbin mounted on said support, a second bobbin located at the opposite side of said bearing from the first mentioned bobbin with its strand passing through said bearings and outside of and engaged by said flier and around said first mentioned bobbin, a receiving carrier to take the strands from said bobbins, the strand from the first mentioned bobbin being free and unconfined between the bobbin and carrier whereby it is free to move with and follow the strand from the second mentioned bobbin which is being wrapped about it.

6. In a machine of the character described for twisting together strands of silk or like

textile material, a rotatable flier, a spindle at the upper end of which said flier is mounted, bearings and driving means for the spindle, a strand carrier located below the bearings, a bobbin spindle non-rotatably supported in the upper end of said flier spindle, a bobbin receiving stem spring connected to said bobbin spindle, a carrier mounted thereon, a strand from the lower carrier passing through said bearings and spindle and engaged by said flier to wrap it onto the strand from the upper carrier, and a receiving bobbin for the twisted thread.

7. In a machine of the character described, for twisting together strands of silk or like textile material, a flier spindle with means for supporting and driving it, a flier mounted thereon at one side of said supporting and driving means, a non-rotatable bobbin spindle supported at one end by said flier spindle above said flier, the other end of said bobbin spindle being offset, a carrier supported on the offset end of said bobbin spindle, a resilient device forming a portion of said carrier support, a second carrier located at the opposite side of said spindle supporting and driving means from the first carrier, the strand therefrom passing through said supporting and driving means and outside of said first carrier, and adapted to be engaged by said flier to wrap it on the strand from the first carrier, and a receiving bobbin for the completed thread.

JAMES LLOYD MACFARLANE

Witnesses:
J. S. MACFARLANE,
M. E. O'NEILL.