G. S. SPENCER.

CORD TWISTING MACHINE.

APPLICATION FILED MAR. 21, 1907.

946,162.

Patented Jan. 11, 1910.

3 SHEETS—SHEET 1.

Fig. 1.

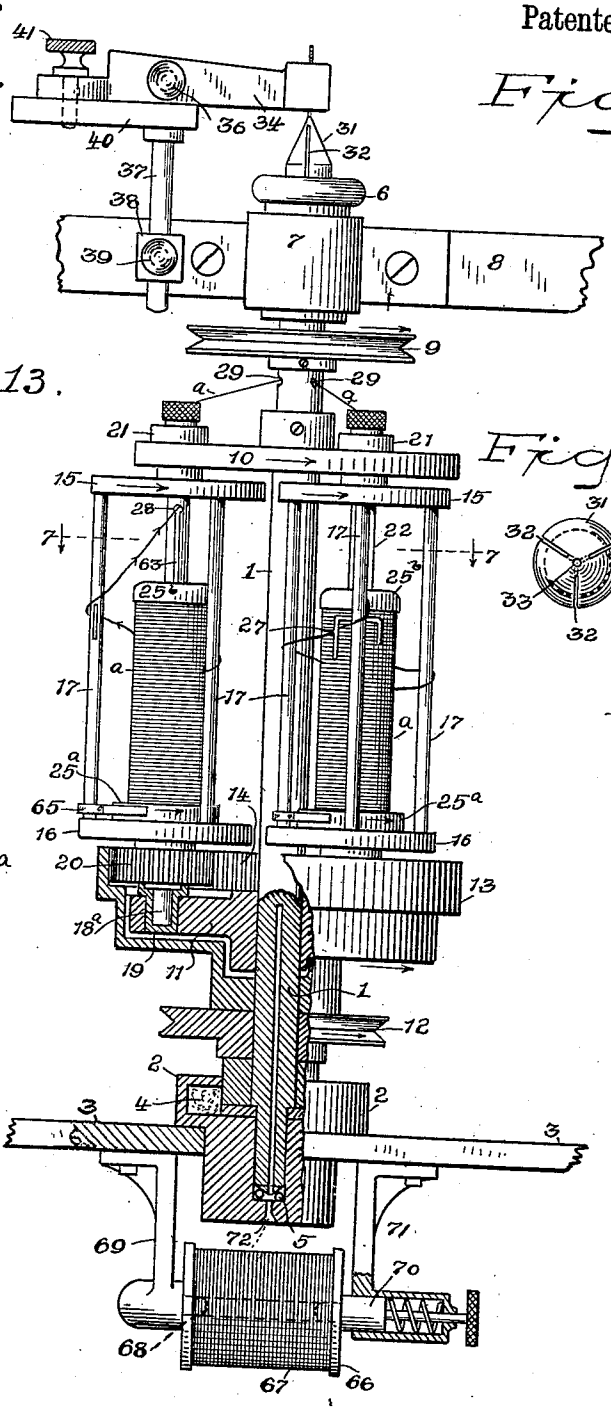


Fig. 13.

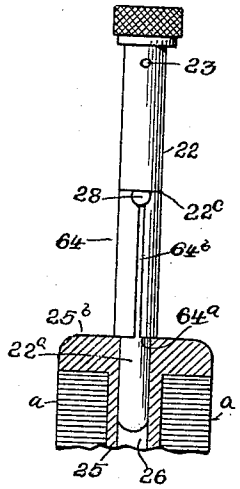


Fig. 10.

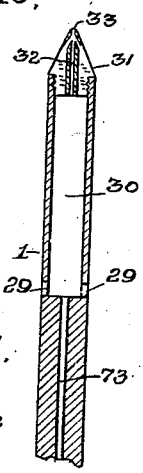


Fig. 11.

Fig. 14.

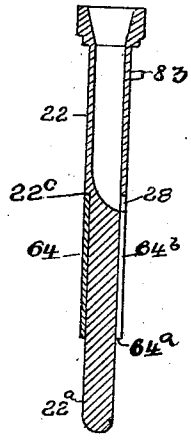


Fig. 15.

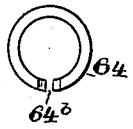
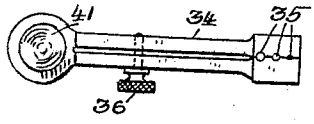


Fig. 12.



WITNESSES

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3 SHEETS—SHEET 2.

Fig. 2.

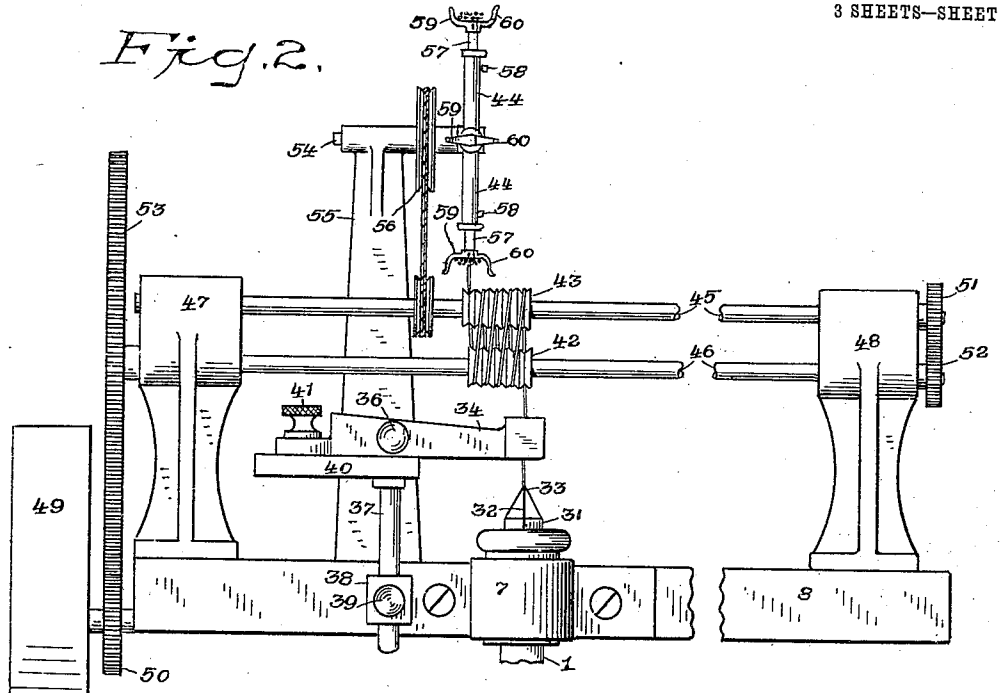


Fig. 7.

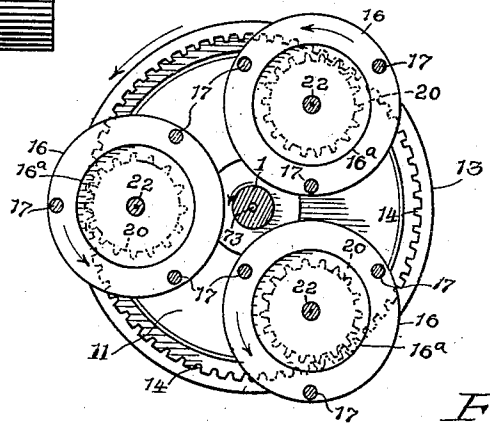


Fig. 8.

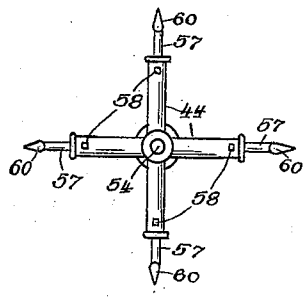
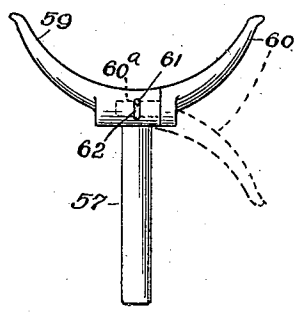


Fig. 9.



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3 SHEETS—SHEET 3.

Fig. 3.

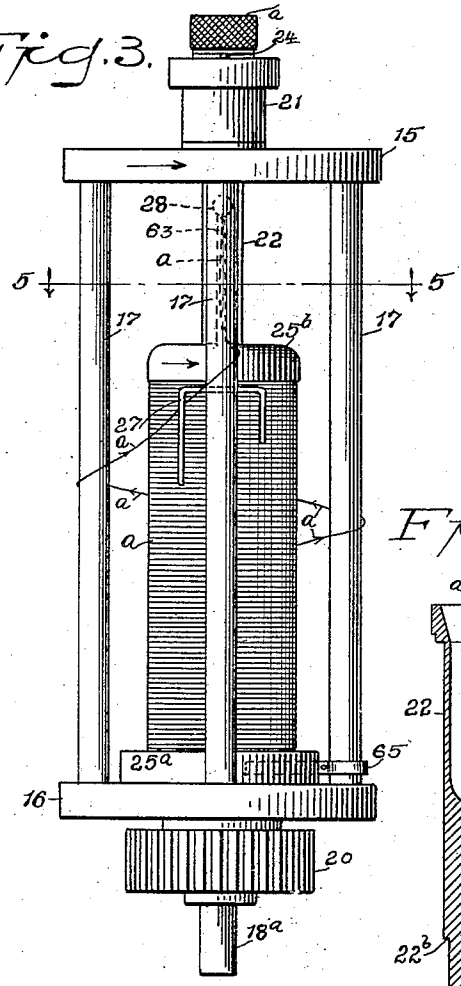


Fig. 4.

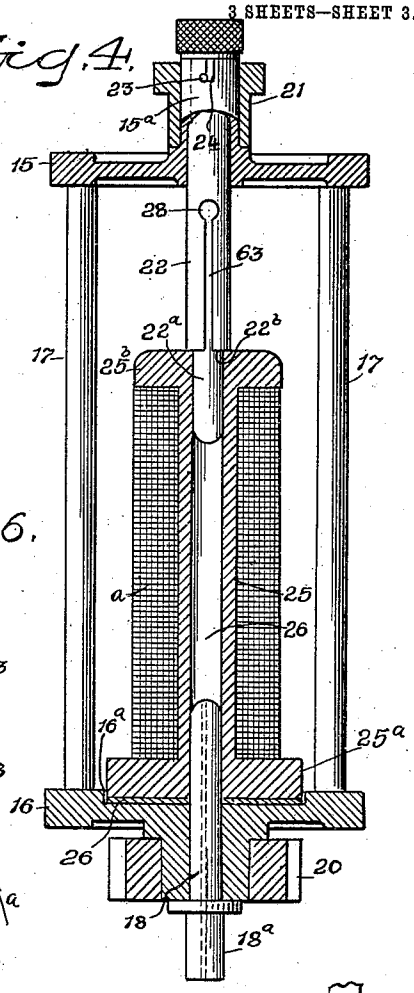


Fig. 6.

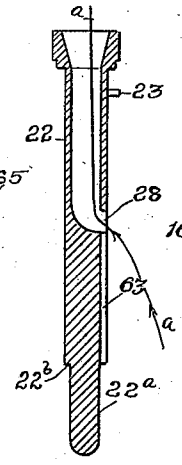


Fig. 16.

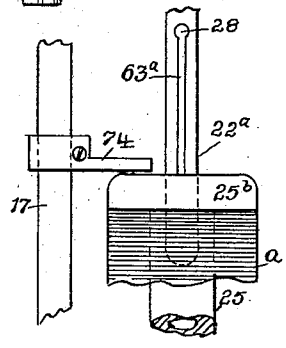
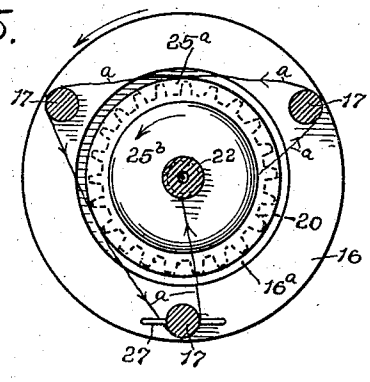


Fig. 5.



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UNITED STATES PATENT OFFICE.

GEORGE S. SPENCER, OF MOODUS, CONNECTICUT, ASSIGNOR OF ONE-THIRD TO FAIRFIELD SMITH, OF BRIDGEPORT, CONNECTICUT.

CORD-TWISTING MACHINE.

946,162. Specification of Letters Patent. **Patented Jan. 11, 1910.**

Application filed March 21, 1907. Serial No. 363,529.

To all whom it may concern:

Be it known that I, GEORGE S. SPENCER, a citizen of the United States, and a resident of Moodus, in the county of Middlesex and State of Connecticut, have invented certain new and useful Improvements in Cord-Twisting Machines, of which the following is a specification.

My invention relates to improvements in cord twisting machines and it consists in certain details of construction to be more fully set forth in the following specification.

To enable others to understand my invention reference is had to the accompanying drawings, in which:

Figure 1 is an elevation of a flier carrier partly in section with the fliers carrying bobbins mounted thereon, and broken view of that portion of the machine for supporting the flier carrier. Fig. 2 is a broken view of the machine showing the stretcher cones in operative position; reel to receive the finished cord, and broken view of the spindle connected with the flier carrier. Fig. 3 is an enlarged detail view of one of the fliers with a bobbin mounted thereon. Fig. 4 is an enlarged elevation partly in section of one of the fliers and sectional view of its bobbin. Fig. 5 is a section on line 5 of Fig. 3. Fig. 6 is a detail central sectional view of the quill for centrally guiding the strands of the cord, and journaling the upper part of the bobbin and maintaining the bobbin in its normal working position. Fig. 7 is a section on line 7 of Fig. 1. Fig. 8 is a detail front elevation of the reel on which the finished cord is wound. Fig. 9 is an enlarged detail view of one of the cord supports for the reel. Fig. 10 is a broken sectional view of the vertical spindle and sectional view of the laying block secured in its upper end. Fig. 11 is an enlarged detail upper plan view of the laying block. Fig. 12 is a detail upper plan view of the compress adapted to overlie the laying block. Fig. 13 is an enlarged detail view of a modified construction of the quill and enlarged broken section view of a bobbin. Fig. 14 is an enlarged detail sectional view of the quill shown at Fig. 13. Fig. 15 is an enlarged upper plan view of a detachable sleeve adapted to be used with the quill shown at Figs. 13 and 14. Fig. 16 is a detail view.

In the accompanying drawings only such portions of the machine are shown as are necessary to show my improved features and the relation of the same thereto.

The object of my several improvements is not only to secure an increased production, but also to improve the quality of the cord.

The principal feature of my invention relates to the fliers and the mechanism directly and indirectly connected therewith.

Referring to Fig. 1, 1 is a spindle whose lower end is stepped in the box 2 resting in the lower frame 3. This box is provided with the oil chamber 4 and also the anti-friction balls 5, the latter supporting the spindle. The upper end of the spindle is journaled in the bushing 6 mounted in the box 7 of the upper frame 8. The spindle is rotated through the medium of the pulley 9 secured thereto. 10 is an upper and 11 a lower plate both of which are secured to said spindle.

12 is a pulley journaled on the spindle 1 and is rotatably secured to the hub portion of the pan 13, which pan is also rotatably mounted on said spindle. The upper open mouth of the pan is provided with the internal gear 14, as seen more clearly at Fig. 7.

The spindle 1 carries a plurality of fliers, and as these are all constructed alike, they will be designated by the same figures of reference. Referring to Figs. 1, 3, 4 and 5, said fliers comprise the top plate 15, bottom plate or base 16 connected together by the studs 17. 18 is a pin secured in the base of the flier whose upper projecting end forms a pintle on which the bobbins, presently to be described, are journaled. The enlarged lower ends 18^a of said pins are journaled in boxes inserted in the bottom spindle plate 11, one of which, 19, is shown at Fig. 1. 20 is a pinion secured to the pin 18 of each flier adapted to mesh with the internal and independently driven gear 14 of the pan 13. The upper ends of the fliers are journaled in the upper spindle plate 10 as follows: Referring particularly to Fig. 4, 15^a is a projection or neck of the upper plate

of the flier, and 21 is a removable bushing embracing said neck and adapted to be journaled in the upper spindle plate 10 shown at Fig. 1. 22 is a locking quill having the small pin 23 projecting therefrom, which pin is adapted to enter the bayonet slot 24 of the neck 15^a whereby said quill is temporarily locked to said neck for the purpose presently to be described.

The bobbins are of common construction comprising the core 25 having the holes 26 therethrough, the lower head 25^a and upper head 25^b. The lower and reduced end 22^a of the locking quill 22 enters the central hole at the upper end of the bobbin which, together with the upper end of the lower pin 18, form journals for the bobbin while the shoulder 22^b of the locking quill prevents the bobbin rising while rotating on its journals. The lower head of the bobbin is rotatably inserted in the recess 16^a of the plate 16 of the flier so that, in case the hole in the lower end of the bobbin becomes enlarged by its rotatable engagement with the pintle end of the pin 18, this recess will always centralize the bobbin. If the bobbin is allowed to wabble or have any lateral play, the slack will be taken out of the thread, presently to be described, and cause kinking.

26^a is a felt washer on which the lower head of the bobbin rests in the recess of the flier.

Each flier carries a bobbin and each bobbin carries a thread to form one of the strands of which the finished cord is composed. The number of fliers may, of course, be increased or decreased if desired. The thread *a* is unwound from each bobbin, passed about each stud 17 of its respective flier, under the hook 27 and is entered into the hole 28 (Figs. 1, 3, 4 and 6) in the side of the quill 22 and up out through the top of said quill. In the upper end of the spindle 1 and just below the pulley 9 are the holes 29, one for each flier. These holes (see also Fig. 10) open into the chamber 30 in the upper end of the spindle. The mouth of the spindle is threaded to receive the threaded end of the laying block 31. This laying block is made tapering and is provided (see also Fig. 11) with the kerfs 32 corresponding in number to the number of bobbins. These kerfs extend nearly to the center of the laying block so as to leave but a small portion or tip of the block solid at the top, and 33 is a hole through this tip. The thread or cord strands pass from the respective quills of the fliers and each into its respective hole in the side of the spindle 1 and into the chamber 30 of said spindle. From this chamber they extend up each into its respective kerf of the laying block, and together pass out through the hole 33 of said block. The advantage of making the upper end of the laying block tapering, and forming the kerfs or thread guide grooves therein, is that the upper area of the block is reduced to such an extent that the cord is not abnormally stretched and thereby weakened as would be the case in proportion to the increase of the area at the top of the block. In other words, the tapered block with its central delivery hole and the thread guide grooves extending close to this central hole reduces the surface over which the threads are drawn to a minimum, thus eliminating all dragging strain tending to stretch the cord.

Another improvement consists in the vertically adjustable compress 34, seen at Figs. 1, 2 and 12. The compress consists of spring arms having in their outer meeting or clamping faces the various sized holes 35 adapted for different sizes of cord, and 36 is an adjusting screw to regulate the tension on the cord passing through any one of these holes. 37 is a pin adjustably mounted in the projection 38 and secured therein by the screw 39 and 40 is an arm of said pin to which the compress is secured by the screw 41. This adjustable feature of the compress enables it to be set in the proper position relative to the laying block that will give the best results in laying the strands for different sizes of cord.

After the cord leaves the compress (see Fig. 2) it passes around the stretcher cones or twist rolls 42 and 43 and from thence to the reel 44 presently to be described. These cones are mounted on the shafts 45 and 46 journaled in the standards 47 and 48, which shafts are rotated through the medium of the driving pulley 49, pinions 50, 51 and 52 and gear 53. The reel 44 is mounted on the short shaft 54 journaled in the standard 55 and is rotated by the pulley 56. I have provided a novel feature in connection with the reel whereby its contents can readily be removed. While I show the reel having four arms, as seen at Fig. 8, it will be understood that any number can be used. These arms are hollow and are adapted thereby to receive the shank 57 (see also Fig. 9) of the cord holding part of the reel. The shanks are adjustably supported in the arm by the set screws 58 so that the reel may be readily increased or decreased in size. The horn 59 is integral with the shank, while the other, 60, is adapted to be turned, as shown by the dotted position at Fig. 9, so that, when the reel is filled, its contents can readily be removed. The shank 60^a of the movable horn is journaled in a hole in the stationary part of the device, and 61 is a pin projecting from this shank through the elongated hole 62 whereby the horn is allowed to turn without being displaced.

To remove an empty bobbin from the flier and replace it with a full one, the quill 22 is unlocked and withdrawn far enough to lift the empty bobbin above the pintle end of the pin 18. The thread from the full bobbin is tied to the last end of the thread delivered from the bobbin removed so as not to break the continuity of the cord. To do this, the channel 63 (Figs. 4 and 6) is formed leading from the entrance hole 28 of the quill 22 so that, when the quill is drawn up into the neck 15^a, the thread will drop into this channel and not interfere with the movement of the quill in said neck, otherwise the thread would be cut off as soon as the hole 28 was drawn into said neck.

To permit the use of bobbins of different lengths in the same flier, the modification of the quill shown at Figs. 13, 14 and 15 can be used. In the other views of the quill, the main body thereof extended down to form the shoulder 22^b adapted to prevent the bobbin being lifted during its rotary movement. This construction permitted only one length of bobbin being used. The modification consists in carrying this shoulder back to about the upper edge of the entrance hole 28, which shoulder will now be designated, in Figs. 13 and 14, as 22^c. Against this shoulder is placed the shell 64 whose lower end 64^a will engage the upper head of the bobbin as shoulder 22^b formerly did. The slot or opening 64^b will be in line with the hole 28 and will serve the same purpose as the groove 63 shown at Fig. 4. By using shells of different lengths it will readily be seen that different lengths of bobbins can be used. Except the addition of this shell, the quill remains the same in both cases.

65 (Figs. 1 and 3) is a brake spring secured to one of the flier studs whose free end contacts with the lower head of the bobbin in order to maintain the same tension on the bobbin. As the thread is being delivered from the bobbin the weight of the bobbin is reduced and the tension on the thread is, therefore, proportionately less. This is fully counteracted by the brake spring.

My improved cord twister is also constructed to form the cord about a wire core without interfering with the cord twisting mechanism. Referring to Fig. 1, 66 is a reel carrying the fine wire 67 located just below the spindle 1. The reel is journaled on the projection 68 of the hanger 69, and the reduced end of the spring actuated bolt 70 of the hanger 71. When the wire core for the cord is used, the wire is carried from the reel 66 up through the hole 72 of the box 2 and into the small central hole 73 running up through the spindle 1 and into the chamber 30 (Fig. 10) where it joins the strands coming in from the fliers and passes with them up through the laying block 33. In the twisting process the several strands from the fliers are twisted or laid about the wire so that, when the cord is completed, the wire will be in the center thereof to give additional strength to the same.

It will readily be seen by one skilled in the art that my improved construction will not only greatly increase the output over the present constructions, but more perfect cord or twine is produced. The main feature in making perfect twine and increasing the output of the machine is in keeping the bobbin in place. If, in the present state of the art, the rotary speed of the bobbin is increased beyond a certain point, it will lift from its seat and cause a slackness in the thread delivered therefrom to the detriment of the twine when finished. This I have successfully counteracted by means of the locking quill which not only keeps the bobbin in place, but furnishes a short journal for the upper end of the bobbin so that the height of the flier can be reduced to a little more than the length of the bobbin.

Another advantage, as above described, is that the fliers are independently rotated at the same rate of speed by the internal gear 14, while they are also revolved about the central spindle 1 and by said spindle at a different rate of speed. By thus keeping the fliers positively rotating at the same speed, and revolving about the spindle at a different speed, the twist in each flier is uniform and the finished twine will not kink, in other words, is perfectly balanced when finished and removed from the wheel.

While I show a recess in the bottom plate of the flier to centralize the bobbin and keep it in place, I hold myself at liberty to employ any and all well known equivalents of said recess that will give the same result.

In place of enlarging the body of the quill to engage with the upper end of the bobbin to prevent the bobbin rising under an increase of speed, the adjustable finger 74 (Fig. 16) could be used, which finger could, of course, overhang either the top or enlarged base of the bobbin. In this construction, the diameter of the quill, outside of the bobbin, could be the same as the journal portion 22^a shown at Fig. 4, and the channel or thread groove 63^a could be formed therein.

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

In a cord twisting machine, a flier having upper and lower plates and connecting studs and adapted to carry bobbins of different lengths having central holes longitudinally therethrough, the non-rotatable pintle 18 secured to the lower plate to serve as a journal for the lower end of the bobbin, the locking quill 22 removably secured to the upper

plate, the lower end of said quill forming a journal for the upper end of the bobbin, said quill having a chamber in its upper end and the hole 28 leading thereto, and a channel leading from said hole to admit the thread when the quill is drawn up into the upper plate, for the purpose set forth.

Signed at Bridgeport in the county of Fairfield and State of Connecticut this 14th day of March A. D. 1907.

GEORGE S. SPENCER.

Witnesses:

F. C. SMITH,

H. D. HODGE.