

(No Model.)

T. J. CAIN.

BOBBIN WINDER FOR SEWING MACHINES.

No. 301,088.

Patented July 1, 1884.

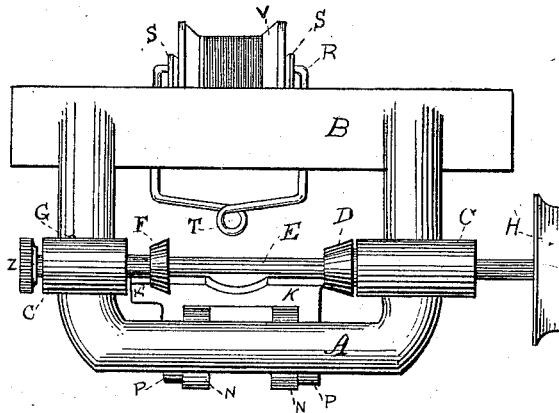


Fig. 1,

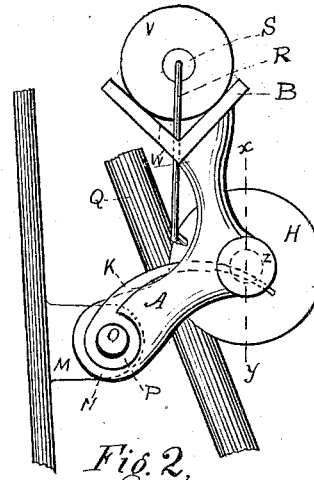


Fig. 2,

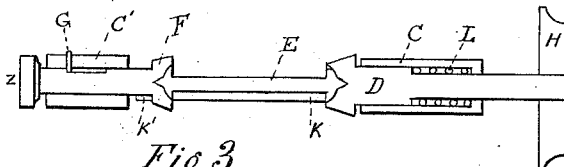


Fig. 3,

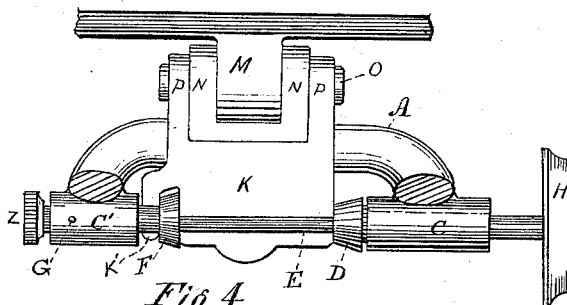


Fig. 4,

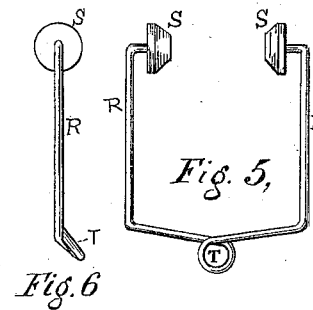


Fig. 6

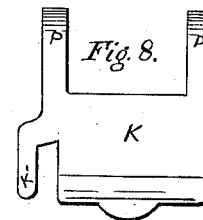


Fig. 8.

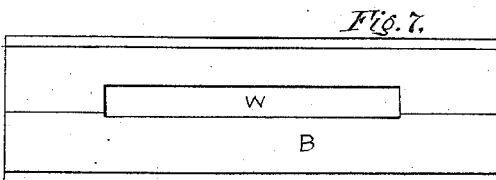


Fig. 7.

WITNESSES

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# UNITED STATES PATENT OFFICE.

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## BOBBIN-WINDER FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 301,088, dated July 1, 1884.

Application filed June 22, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS J. CAIN, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Bobbin-Winders for Sewing-Machines; and I do hereby declare that the following is a full, clear, and exact description of my invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, in which similar letters refer to similar parts throughout the several views.

My invention relates to the class of bobbin-winders known as "automatic" bobbin-winders, in which, by the operation of the several parts, the winding of the bobbin is accomplished without requiring the attention of the operator, and is discontinued automatically at the moment the bobbin is filled; and my invention consists in an improved method of forming a tension upon the thread as it is wound upon the bobbin, and leading it to the bobbin in such manner as to cause it to wind evenly and smoothly upon the bobbin, securing an increased amount of thread upon the bobbin and a more equal and perfect stitch when the bobbin is used in the shuttle. I accomplish these objects by mechanism illustrated in the accompanying drawings, in which—

Figure 1 represents in front elevation a view of my improvement with the parts in the position which they occupy while in operation. Fig. 2 is a side elevation of the same with the parts in the same position as in Fig. 1. Fig. 3 is a sectional view on the line *x y* of Fig. 2. Fig. 4 is a top view of the winding mechanism as it would appear with the trough B removed. Fig. 5 is a front view, and Fig. 6 a side view, of the tension-clamp and guide. Fig. 7 is a top view of the trough removed in the view shown in Fig. 4; and Fig. 8 is a detached top view of the latch K, shown in Figs. 1, 2, and 4.

A is a frame adapted to be attached to a lug, M, projecting from the arm of a sewing-machine, or otherwise so attached as to be firmly fixed, and placed so that when the parts of the

mechanism are in the position shown in Figs. 1 and 4 the wheel H will be in contact with the driving-belt of the sewing-machine at its curved surface.

B is a trough attached to the frame A in a horizontal position, and should be true and smooth upon its inner surface, and provided with a longitudinal slot, as shown in Fig. 7.

C and C' are hollow bearings attached to the frame A in a true line with each other, below the trough B and parallel with it. Through the bearing C is journaled a carrier, D, with a friction-wheel, H, at its outer end, and a recess formed in its inner end to receive and fit one end of a bobbin, thus forming a live-center to carry and revolve the bobbin E. The journal of the live-center D is so formed as to permit a spring, L, to be placed around it within the bearing C, and to bear against a shoulder on the journal or against a pin in the journal in such manner as to press the journal toward the bobbin; and the journal should be so formed as to be movable endwise in its bearings for about one-quarter inch. In the other bearing, C', is journaled a sliding center, F, fitted to carry the other end of the bobbin with as little friction as possible, but so as to prevent all lateral play of the bobbin. In the journal of the center F a slot is cut, into which a pin, G, passes through the shell of the bearing C', and thus prevents the center F from revolving, but allows it to move endwise in its bearings. Thus when a bobbin is placed between the two centers D and F it is held firmly in place—as in a lathe—by the pressure of the spring L; and to avoid any slipping and insure the revolution of the bobbin the center D is provided with a small projecting lug or a pin, to enter a slot or a hole in the end of the bobbin; or any other suitable device for that purpose may be used.

In order to hold the wheel H in contact with the belt of the sewing-machine while the bobbin is being wound, a latch, K, is hinged to the frame A in such a position that when it is brought up against the shaft of the bobbin the bobbin and the centers which carry it will be forced into the position shown in Figs. 1, 3, and 4, in which position the curved surface of

the wheel H, by the location of the frame A upon the sewing-machine, must press against the belt, and thus motion will be imparted to the wheel H and the bobbin will be revolved.

5 To permit the disengagement of the wheel H from the belt, the centers D and F at the inner ends, which carry the bobbin, are each provided with a shoulder or projection formed in the shape of a truncated cone, with the base  
10 toward the wheel H, as shown in Figs. 1, 3, and 4, and so proportioned that the truncate tops of the cones will be of the diameter of the end of the bobbin, by means of which device, as the thread winds upon the bobbin, it forces the  
15 latch K downward and outward, and as soon as the layers of thread have filled the bobbin the latch K reaches the conical side of the centers, and the force of the spring L drives the centers and bobbin away from the belt,  
20 the conical centers easily sliding upon and bearing down the latch, and as soon as the wheel H is out of contact with the belt the winding instantly stops.

If desired, the latch K may be held up against  
25 the bobbin by a light spring suitably applied; but in practical application this will be found unnecessary, as the latch will be held in place by the pressure of the spring L.

The above-described parts, aside from the  
30 trough B, are those by which the winding of the thread and the disengagement of the mechanism from the driving-belt are effected, and are not of my invention, except in so far as they are combined with the trough and tension-clamp and guide, now to be described.

35 To insure the even winding of the thread on the bobbin, I apply a tension, which consists of the trough B and a tension-clamp. (Shown in Figs. 5 and 6.) The tension-clamp consists of  
40 a spring-clamp, R, having a guide-loop, T, and two conical plugs, S S, so formed as to enter the hole in a spool, as shown in Fig. 1, into which they are pressed by the spring-clamp R, thus holding the spool between them  
45 and offering resistance to its revolution. The guide-loop T is so placed that when the tension-clamp is applied to the spool and the thread passed through the guide-loop T it will run from the spool through the guide-loop with-  
50 out chafing upon any part of the apparatus; and the tension-clamp should be so constructed and adjusted that the thread will pass from the guide-loop to the bobbin at the point where the latch K bears against the bobbin, and pref-  
55 erably should be as low as practicable without striking upon the latch K or any other part of the mechanism; and the guide-loop T, which may be of any suitable shape or construction, should be smooth and polished on its inner sur-  
60 face, in order that the thread may run evenly through it and be guided to the bobbin without chafing or catching upon any flaws or irregularities in either the loop or thread.

The trough B, which, together with the ten-  
65 sion-guide or tension-clamp and guide-loop, in combination with the other parts described, or their equivalents, constitutes my invention,

consists of a slotted trough of suitable length to allow of the traversing therein of the spool and tension-clamp, as hereinafter described,  
70 and deep enough to hold the spool securely, and may be of any desired shape, semicircular or angular, but preferably angular in transverse section, similar to the shape shown in Fig. 2, since sufficient friction is gained with  
75 such shape. The trough B is provided with a longitudinal slot, W, in the bottom, as shown in Fig. 7, of sufficient length to allow the traversing therein of the tension-clamp for a sufficient distance to completely fill the bobbin  
80 from end to end, as hereinafter described.

The operation of my improvement is as follows: The bobbin-winder being so secured to a sewing-machine that when the bobbin is placed between the centers D and F, and the  
85 centers and bobbin are pushed toward the end carrying the center D and wheel H far enough to permit the latch K to be brought up against the shaft of the bobbin, the wheel H will be in firm contact at its curved surface with the  
90 driving-belt of the sewing-machine. The spool from which the thread is to be wound upon the bobbin is placed between the conical plugs S S of the tension-clamp R, which is so constructed that the spring of the arms R will press the  
95 plugs S S into the hole in the spool, so that the spool turns upon them as upon two lathe-centers. The thread is passed from the spool through the guide-loop T, and the guide-loop and thread being passed through the slot W  
100 in the trough B, the spool is laid in the trough B, as shown in Figs. 1 and 2. It will be found that by now pulling upon the free end of the thread in the direction of the bobbin the spool is pressed against the sides of the trough B,  
105 while the pressure of plugs S S upon the spool offers sufficient resistance to the revolution of the spool to create a smoothly-acting tension, and the free end of the thread being placed between the center D and the end of the bob-  
110 bin, when the bobbin is placed between the centers by pressing in the milled head Z, the centers and bobbin are moved along, and the latch K, which is provided with an arm, K', fitted to pass behind and bear against the  
115 shoulder of the center F, between the shoulder and the bearing C', is brought up against the shaft of the bobbin, which it should touch throughout the whole length of the bobbin, fitting closely but not tightly between the ends  
120 of the bobbin. This brings the wheel H in contact with the belt, and the arm K' of the latch, passing between the shoulder F and the bearing C', holds the parts in the position in which they are thus placed, which is the position  
125 shown in Figs. 1, 3, and 4, the spring L acting, together with the pressure of the belt on the wheel H, to hold the parts in position, as shown. In this position the motion of the belt will re-  
130 solve the wheel H by friction, and the bobbin, being held in the center D by a lug or pin, as described, is also revolved with the wheel H and center D, while the center F remains stationary. The revolution of the bob-

bin winds the thread upon it between it and the latch, and the friction of the spool on the plugs S S and trough B causes a tension on the thread tending to retain the spool in place; but as the pressure of the latch K against the bobbin forces the thread to wind in a single layer toward the other end of the bobbin, the progress of the layer of thread draws the tension-clamp and spool along the trough in the direction in which the layer is winding until it reaches the end of the bobbin, when the thread is forced to wind back in the opposite direction, and the spool is drawn back along the trough, and thus as the winding proceeds the spool, with its tension-clamp, is drawn back and forth along the trough, the tension acting to guide the thread in such manner that the thread is forced to wind upon the bobbin in close, firm, even layers, in which effect the pressure of the latch co-operates, until, when the bobbin has been filled with thread, the latch is so far pressed out as to pass upon the conical sides of the centers D and F, when the spring L at once throws the centers and bobbin in the direction of the center C' and draws the wheel H out of contact with the belt and the winding stops, while the motion of the sewing-machine need not be interrupted.

The tension-clamp R may be made adjustable, so as to permit varying degrees of pressure upon the spool, according to the size of thread used, and the plugs S S may be constructed to revolve on the arms R; but in practice it will be found that a tension-clamp made of spring-wire, with the plugs S S fastened to it, is entirely sufficient, and by bending slightly the arms R of the tension-clamp the desired variability of pressure can be obtained.

In the drawings, N N are lugs projecting from the frame A, by which the bobbin-winder is firmly attached, by means of a screw or bolt, O, to a lug, M, projecting forward from the arm of a sewing-machine; but this, although a desirable method of construction, is no part of my invention.

P P are arms or lugs on the latch K, by which it may be hinged to the frame A by means of the same bolt or pin used to fasten the frame to the lug M; or any other equivalent device may be used.

Q in Fig. 2 represents a part of the belt operating the mechanism.

V represents a spool of thread lying in the trough B, as in the operation of winding. Z is a milled head on the outer end of the journal of the center F, by means of which the centers and bobbin are more easily pressed into the position shown in Figs. 1 and 4.

The frame A, trough B, and bearings C and C', and the lugs or other device for the attachment of the winder to the sewing-machine may all be cast in one piece or composed of separate parts suitably attached together.

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

1. In a bobbin-winder for sewing-machines, the combination of a slotted trough, in which the spool from which the thread is to be wound is placed, with the thread-spool and a spring-clamp applied to the spool, and a guide loop or eye, for the purpose of creating a tension on the thread and guiding it in its passage to the bobbin, substantially as shown and described.

2. The combination of the slotted trough B with the spool V, from which the thread is to be wound, and the tension-clamp R, seated within the slot of the trough, and carrying the conical plugs S, substantially as and for the purposes specified.

3. The combination of the slotted trough B with the tension-clamp R, seated within the slot of the trough and carrying conical plugs S, guide-loop T, and thread-spool V, substantially as and for the purposes described and specified.

4. The combination of the slotted trough B, the tension-clamp R, seated within the slot of the trough and carrying plugs S, the spool V, and latch K, with the bobbin E, wheel H, spring L, and sliding centers D and F, all arranged and operating to wind the bobbin evenly and discontinue the winding when the bobbin is filled, substantially as described.

THOMAS J. CAIN.

Witnesses:

S. D. HOWELLS,  
J. VENSKE.