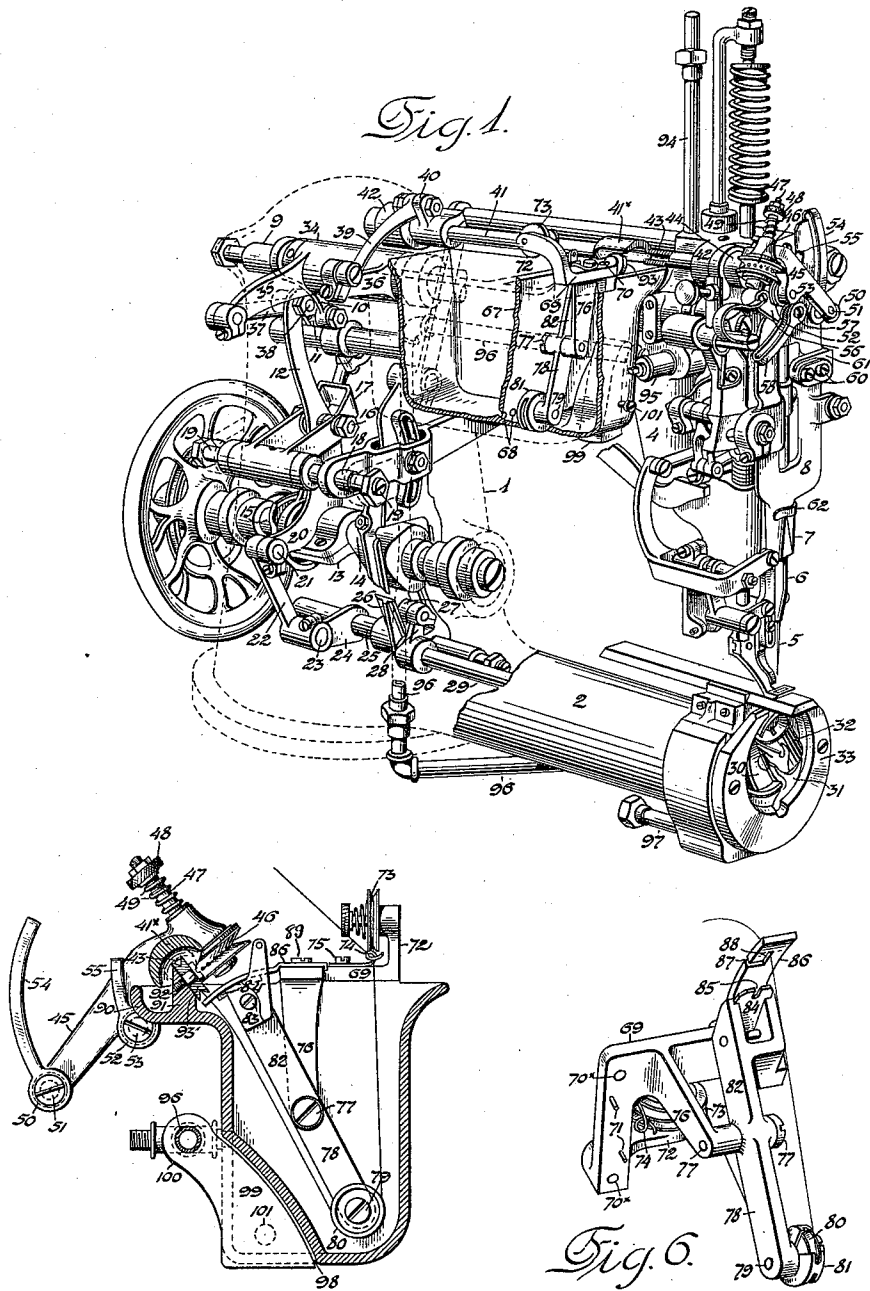


O. E. BROWN.
 THREAD WAXING DEVICE FOR SEWING MACHINES.
 APPLICATION FILED MAR. 4, 1910.

1,008,947.

Patented Nov. 14, 1911.

2 SHEETS-SHEET 1.



WITNESSES: *Fig. 5*
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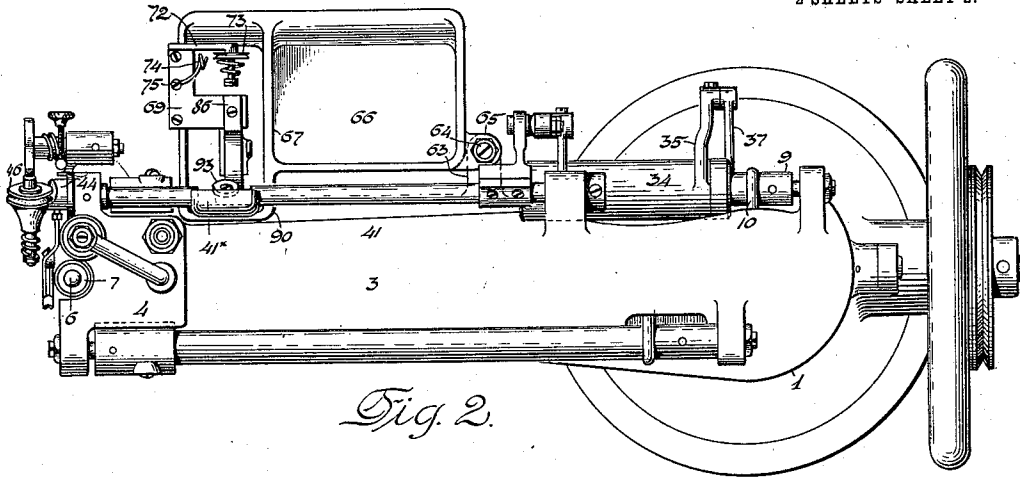


Fig. 2.

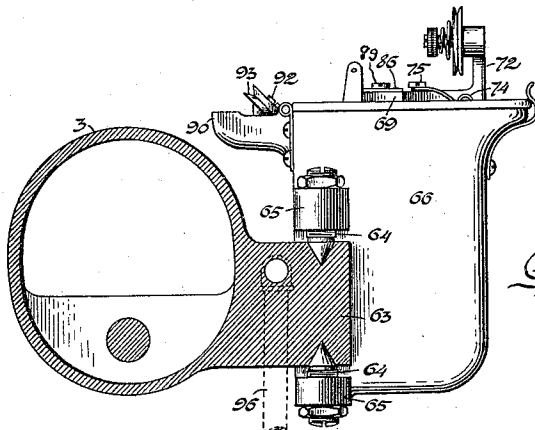


Fig. 3.

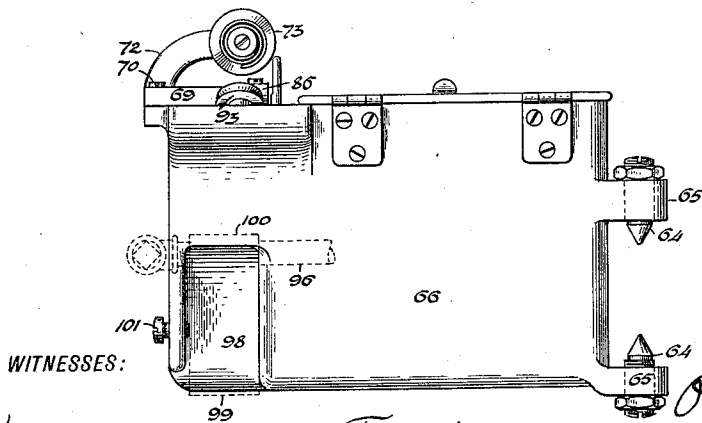


Fig. 4.

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UNITED STATES PATENT OFFICE.

OTIS E. BROWN, OF BROCKTON, MASSACHUSETTS, ASSIGNOR TO THE SINGER MANUFACTURING COMPANY, A CORPORATION OF NEW JERSEY.

THREAD-WAXING DEVICE FOR SEWING-MACHINES.

1,008,947.

Specification of Letters Patent.

Patented Nov. 14, 1911.

Original application filed February 27, 1909, Serial No. 480,338. Divided and this application filed March 4, 1910. Serial No. 547,244.

To all whom it may concern:

Be it known that I, OTIS E. BROWN, a citizen of the United States, residing at Brockton, in the county of Plymouth and State of Massachusetts, have invented certain new and useful Improvements in Thread-Waxing Devices for Sewing-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This application is a division of my application Serial No. 480,338, filed February 27, 1909, and the present invention has for its object to provide a simple and efficient waxing device for the needle-thread and heating means for maintaining the wax at the proper consistency.

In its preferable form, the wax-pot comprises two compartments having a connection at the bottom, one of which contains a vibratory lever having its fulcrum within the same and carrying at its lower end a peripherally grooved thread-wheel and at the other end a movable stripper-blade formed with a thread-notch and adapted to cooperate with a fixed stripper-blade arranged in shearing relation with the movable stripper-blade and provided with a thread-guiding aperture through which the thread is led in passing over a primary thread-guide, beneath the said thread-wheel and through the guiding aperture of the fixed stripper-blade. As the thread passes through tension devices previous to entering and subsequent to emerging from the wax-pot so as to be maintained taut at all times, the action of the stripper upon the thread is determined by the pull of the latter, and the coating or permeation of the thread by the wax is kept uniform under different conditions.

To insure the temperate heating of the wax-pot so that its contents will be kept softened without being burned, the wax-pot is formed with an external recess in which is clamped in metallic contact a conducting block which is mounted upon a steam or other heating pipe with which the machine-frame is provided to keep the wax upon certain of the moving parts softened.

In the drawings, Figure 1 is a perspective view of the machine with the frame indicated mainly in dotted outline, and with the

rear side of the wax-pot broken away to expose its internal construction. Fig. 2 is a plan of the machine. Fig. 3 is a transverse sectional elevation of the bracket-arm, showing the wax-pot in rear end view, Fig. 4 a front side view of the wax-pot, Fig. 5 a transverse section of the same through the thread waxing chamber, and Fig. 6 a perspective view of the thread-leading and stripping means contained within the wax-pot.

As represented in the drawings, the frame of the machine comprises the hollow standard 1 with cylindrical work-supporting arm or horn 2 and hollow overhanging bracket-arm 3 terminating in the head 4. The needle 5 is mounted in the reciprocating needle-bar 6 journaled in upper and lower bearings 7 of the laterally movable needle-frame 8. The needle-bar is operatively connected by suitable or wellknown means with the forward end of the longitudinal rock-shaft 9 which is provided at its rearward end with a depending crank-arm 10 connected by means of a link 11 to the upper end of a link-bar 12 whose lower end is provided with a strap 13 embracing the actuating crank 14 formed in the driving shaft 15 journaled within and transversely of the standard 1 parallel with the needle-actuating rock-shaft 9. The link-bar 12 is journaled intermediate its ends upon the transverse fulcrum-pin 16 mounted in the swinging yoke 17 which is journaled upon the rock-shaft 18 supported by the center-screws 19 carried by the frame of the machine. In following the rotary movements of the actuating crank 14 of the driving shaft, the link-bar 12 moves bodily upon the axis of oscillation of the yoke 17, whereby the upper end of the link-bar connected with the link 11 is moved in a substantially elliptical path with a nearly vertical major axis adjacent the rock-shaft 9.

The lower portion of the link-bar 12 is provided with a rearward offset or extension 20 carrying a stud-screw 21 embraced by one end of a pitman 22 whose opposite end embraces a similar stud-screw 23 carried by a lateral crank-arm 24 of a rock-shaft 25 which is provided with a forked arm 26 embracing a roller-stud 27 carried by the crank-arm 28 upon the rearward end of the shuttle actuating rock-shaft 29 suitably journaled

within the work-supporting arm 2 and carrying at its forward end the shuttle-driver 30. The shuttle 31 is of the wellknown Singer oscillating type, provided with the barrel thread-case 32 and fitted to oscillate within the race 33 at the forward end of the cylinder-arm 2. By the particular arrangement of the link connection 22 with the link-bar 12 described above, the shuttle movements are timed to cooperate with the needle in the manipulation of the upper thread so as to seize and distend the needle-thread loops while the needle-eye is beneath the work, thus obviating any undue strain upon the thread in the loop-seizing and casting operations which would be produced in case the rise of the needle were hastened or the action of the shuttle upon the needle-thread were delayed.

Loosely mounted upon the rock-shaft 9 is a rocking sleeve 34 having two rearwardly projecting and angularly disposed arms 35 and 36, the former of which is connected by means of the link 37 with the upper end of the link-bar 12 by means of the stud-screw 38 to which the link 11 is connected. The crank-arm 36 is connected by means of a bent link 39 with a crank-arm 40 fixed upon the take-up rock-shaft 41 mounted in suitable bearings 42 upon the bracket-arm 3. The rock-shaft 41 is provided intermediate said bearings, for a reason presently to be described, with an offset portion 41* between which and its extreme forward end it is formed with an axial thread-aperture 43.

Upon the forward end of the rock-shaft 41 is fixed the hub 44 of the take-up arm or lever 45 carrying the grooved tension-wheel 46 one side of which is disposed substantially in alinement with the thread-aperture 43 of the take-up rock-shaft, the tension-wheel being journaled upon the pin 47 fitted to a suitable bearing in the take-up arm with its head normally resting upon the outer face of the tension-wheel and its threaded opposite end provided with a nut 48 between which and the bearing of said pin is interposed a tension-spring 49. The take-up arm carries at its outer end a grooved thread-wheel 50 mounted upon the stud-pin 51 and intermediate its ends a similarly grooved thread-wheel 52 mounted upon the stud-pin 53, each of said thread-wheels being embraced between the ends of the guard-loops 54 and 55, respectively. Mounted upon the fixed supporting member 56 carried by the head of the bracket-arm is the stud-screw 57 which is provided in practice with a grooved thread-wheel embraced by one end of the guard-loop 58 extending backwardly therefrom.

The needle-thread is led from the hollow forward end of the take-up rock-shaft 45 around the tension-wheel 46, thence beneath a guide-roller upon the take-up arm adja-

cent the tension between suitable guide-rollers mounted upon the stud-screws 60 in the bracket-piece 61 secured to the needle-frame 8, and thence through the guide-strap 62 embracing the lower needle-bar bearing 8 to the eye of the needle 5. Between the tension wheel and the guide-rollers upon the stud-screws 60 the thread is confined against disarrangement by passing through the guard-loops 55, 58 and 54.

The take-up arm assumes its lowest position just after the point of the shuttle has seized the needle-thread loop, and starts its rising movement without any immediate effect upon the thread extending from the tension 46 between the stud-screws 60 until the shuttle has reached its most advanced position and the eye of the needle has risen above the work when the grooved rollers 50 and 52 engage the thread below and upon opposite sides of the stationary guide-roll supporting pin 57, when the continued rise of the take-up arm causes the bending of the thread around such pin for taking up the slack needle-thread and setting the stitch, the latter being effected as the take-up arm and the needle reach their highest positions. As the take-up arm descends, slack needle-thread is given up to permit the seizure and expansion of the needle-thread loop by the shuttle for the succeeding stitch.

The rearward side of the bracket-arm 3 is provided with an apertured projecting lug 63 embraced by the alined center-screws 64 carried by the spaced lugs 65 projecting from one end of the wax-pot 66 formed in two compartments separated by a vertical partition 67 with a series of apertures 68 near the bottom for communication between the same. The larger of these compartments constitutes a reservoir in which the lumps or pieces of wax are deposited, and the smaller compartment is that into which the thread is led for the waxing operation.

As herein shown, the thread-guiding devices are mounted upon a bracket 69 secured to a suitable seat upon one edge of the waxing compartment by means of screws 70 entering holes 70* therein and dowel pins 71. The bracket 69 is provided with an arm or standard 72 carrying the disk tension device 73 of wellknown construction, the thread being led to the same through an eyelet 74 whose shank is secured to the bracket by means of a screw 75. The eyelet 74 serves as a leading-in guide through which the needle-thread is properly directed into the waxing chamber. Depending from the body of the bracket 69 is a rigid arm 76 carrying a fulcrum-screw stud 77 upon which is journaled a rock-lever having mounted upon its lower arm 78 a shouldered stud-screw 79 affording a bearing for the grooved thread-wheel 80 mounted within a peripherally slotted cylindrical housing 81.

To the upper end of the other arm 82 of the rock-lever is secured by means of a screw 83 the shank of the movable stripper-blade 84 provided with a thread notch 85 in its forward edge and curved concentrically with the pivotal stud 77 to cooperate with the similarly curved fixed stripper-blade 86 formed in one edge with a thread-receiving slit 87 having longitudinal thread-engaging portion 88 in alinement with the thread notch 85 of the blade 84. The blade 86 is secured by means of a screw 89 upon a seat formed therefor on the bracket 69.

The waxing compartment is provided near the top with a forward extension or lip 90 extending beneath and beyond the offset portion 41* of the take-up rock-shaft 41, and from the bottom of this extension rises a post 91 upon which is mounted by means of the shouldered screw-pin 92 the grooved thread-guiding roller or leading-out guide 93, one side of which is in substantial alinement with the inner end of the thread slit 88, while the other side of said roller is in substantial register with the thread-aperture 43 of the take-up rock-shaft 41.

The needle-thread is led from the source of supply through the guide-eye 74, between the tension-disks 73, thence downwardly around the rotary thread-wheel 80, upwardly through the thread slit 88, over the guide-roller 93 and through the forward portion of the rock-shaft 41 to the rotary tension-wheel 46, whence it passes to the needle as before indicated. The several parts just described are so arranged and proportioned that when the movable stripper-blade 84 is in retracted position, in which the inner portion of its notch 85 is out of register with the closed end of the thread-slit 88, as represented in Fig. 6, the lead of the thread between the slit 88 and the thread-wheel 80 is nearly parallel with the rock-lever 78, 82, while the lead of the thread between the thread-wheel 80 and the initial tension device 73 is inclined to the length of the rock-lever. Hence, when the thread is drawn through the waxing chamber or compartment to the stitch-forming mechanism, the tendency is for the thread passing around the thread-wheel 80 to draw the same rearwardly, thereby advancing the stripper-blade 84 into engagement with the thread leading through the slit 88, so as to itself press upon one side of the thread and force the other side of the thread against the closed forward end of the slit 88, the feed of the thread causing the stripping of superfluous wax from the same by this means, the roller 80 being normally submerged in the softened wax. It will be further observed that the greater the tension upon the thread, the greater will be the de-

gree of engagement of the stripper-blades 84 and 86 with the opposite sides of the thread.

As in other machines employing hard wax with which the thread is coated or permeated, portions of the frame are in the present machine made hollow to form chambers for steam or other heating fluid. As represented in the drawings, the inlet pipe 94 serves to convey the supply of steam to the steam chamber in the head of the bracket-arm, and circulation in this chamber is established by leading the steam therefrom through an exhaust fitting 95 tapped into the rearward side of the head 4 and through a tubular circulation rod or pipe 96 passing horizontally intermediate the arm 3 and the wax-pot and downwardly and then forwardly where it enters a steam chamber provided at the outer end of the work-supporting arm 2 adjacent the shuttle race. The steam passes from the last mentioned steam chamber outwardly through the exhaust pipe 97.

The waxing chamber is formed in the lower portion of its forward side with an external recess or cavity 98 to receive a heating block 99 which is formed with an upwardly and forwardly extending portion 100 having a transverse aperture fitted to the horizontally extending portion of the pipe 96 by which it is supported. The end wall of the recess 98 is provided with a set-screw 101 which passes through the same and engages the side of the block 99 so as to press the same against the opposite end wall of the recess or cavity in order to establish a firm metallic contact between the two. As the transverse aperture in the block 99 is fitted quite closely to the surface of the steam pipe 96, heat is readily conducted from the latter to the former, this heat being further conveyed to and through the contiguous wall of the wax-pot by contact of the block therewith as before described. By this arrangement, no special steam fittings are required for heating the wax, which latter is in practice kept of the required degree of consistency for permeating the needle-thread without injury through overheating. As will be evident, the wax may be introduced into the receiving compartment or reservoir of the wax-pot in the required quantity in lumps of the usual commercial form, and as it becomes softened by contact with the walls of the wax-pot it works through the apertures 68 in the dividing wall into the waxing chamber entered by the thread, which insures its being homogeneous where it touches the thread.

Having thus set forth the nature of the invention, what I claim herein is:—

1. In a sewing machine, the combination with stitch-forming mechanism including a

needle and a cooperating loop-taker and means for actuating them, of a wax-pot, a guide therein over which the thread is led to the needle, a wax stripper movable toward and from the path of movement of the thread between said guide and the needle, and actuating means therefor controlled by the tension of the thread.

2. In a sewing machine, the combination with stitch-forming mechanism including a needle and a cooperating loop-taker and means for actuating them, of a take-up device, a primary tension device, a wax-pot, a thread-guide within said wax-pot, a secondary tension device through which the thread passes from the source of supply around the thread-guide within the wax-pot, a thread-guide over which the thread passes from the guide within the wax-pot to the primary tension device, and a thread-stripper intermediate said thread-guides and controlled in its action by the tension of the thread.

3. In a sewing machine, the combination with stitch-forming mechanism including a needle and a cooperating loop-taker and means for actuating them, of a take-up device, a primary tension device, a wax-pot, a vibratory lever fulcrumed within said wax-pot and carrying at one end a movable thread-guide and at the other end a movable stripper-blade, a fixed stripper-blade disposed adjacent the path of movement of the movable stripper-blade and provided with a thread-aperture, a thread-guide through which the thread passes from the source of supply to the movable thread-guide, and a thread-guide over which the thread is led from said movable thread-guide and through the stripper to the primary tension device.

4. In a sewing machine, the combination with stitch-forming mechanism comprising a needle and loop-taker with means for actuating the same, of a wax-pot, fixed leading-in and leading-out thread-guides adjacent thereto for guiding the thread into and out of the wax-pot to the needle, a fixed stripper-blade having a thread-aperture adjacent the second-named thread-guide, a vibratory lever fulcrumed within said wax-pot, a movable thread-guide carried by the lower end of said lever, and a movable stripper-blade carried by the upper end of said lever adjacent the fixed stripper-blade and provided with a thread-receiving notch

adapted to register with the thread-aperture of said fixed blade.

5. In a sewing machine, the combination with stitch-forming mechanism comprising a needle and loop-taker with means for actuating the same, of a wax-pot provided with an external cavity, thread-guides for directing the thread to and through the wax-pot to the needle, a heat conducting rod disposed adjacent said wax-pot, a metallic block formed with an aperture to embrace said heat conducting rod and having its body portion extended within said external cavity of the wax-pot, and means for forcing said block into metallic contact with the wall of said cavity, whereby the heat of said rod is conducted to the walls of the wax-pot for softening the wax.

6. In a sewing machine, the combination with stitch-forming mechanism comprising a needle and loop-taker with means for actuating the same, of a wax-pot provided at one end with an external cavity and having at the opposite end a vertical pivotal connection with a fixed support, thread-guides mounted upon said wax-pot for directing the thread from the source of supply to and through the wax-pot to the needle, a heat conducting rod extending adjacent and longitudinally of said wax-pot, a metallic block formed with an aperture to embrace said heat conducting rod and having its body portion extended within said external cavity of the wax-pot, and means for detachably securing said block forcibly in metallic contact with the wall of said cavity.

7. In a sewing machine, the combination with stitch-forming mechanism including a needle and a cooperating loop-taker and means for actuating them, of a wax-pot, a guide therein over which the thread is led to the needle, a wax-stripper comprising oppositely directed stripping members of which one is movable toward and from the path of movement of the thread between said guide and the needle, and actuating means for the movable stripping member controlled by the tension of the thread.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

OTIS E. BROWN.

Witnesses:

HENRY J. MILLER,
H. A. KORNEMANN, Jr.