(No Model.)

R. M. MACINTOSH.

WAX END MACHINE.

No. 384,700. Patented June 19, 1888.

Fig: 1.

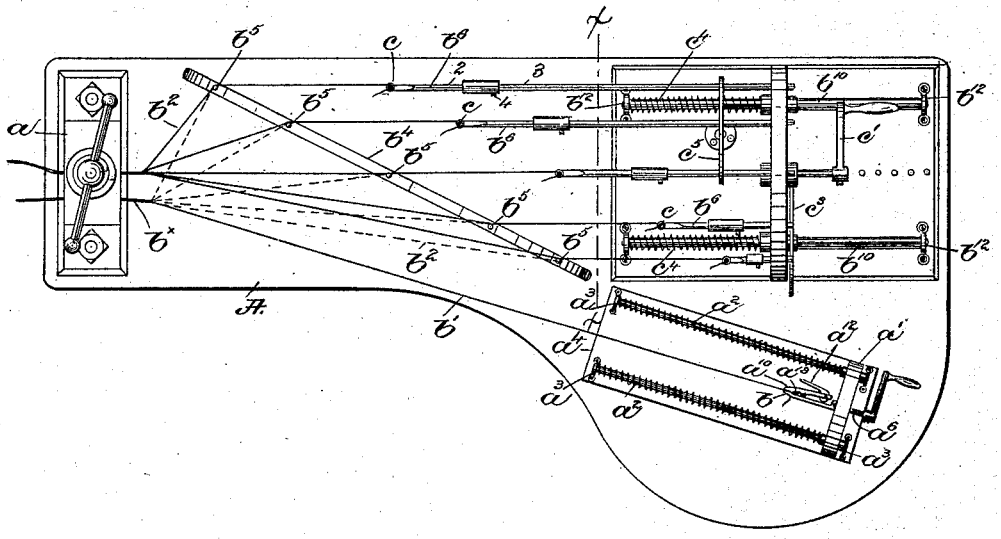


Fig: 3.

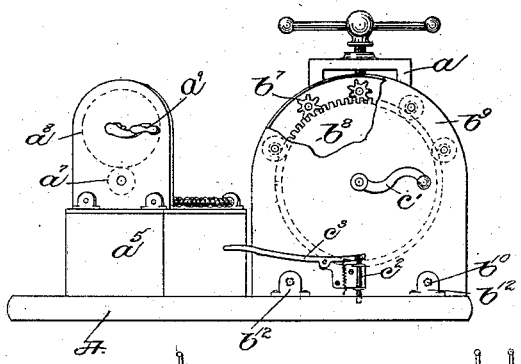


Fig: 2.

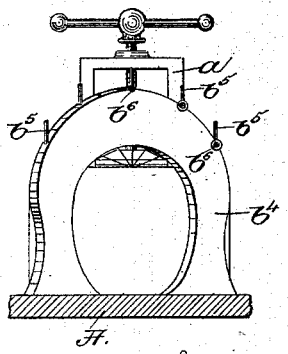


Fig: 4.

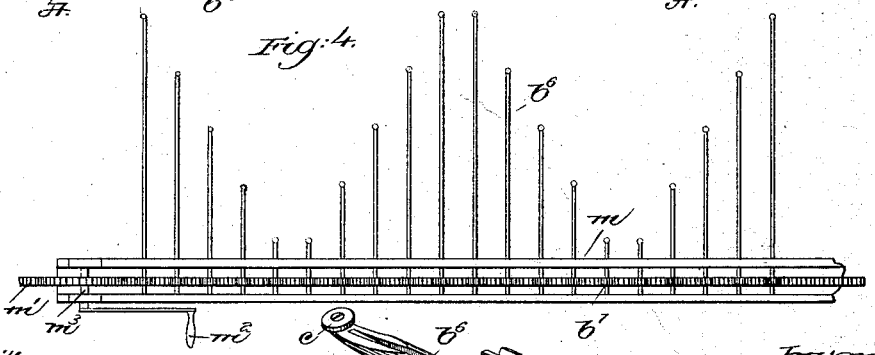
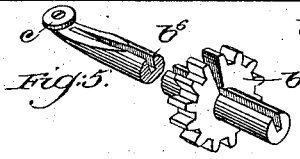


Fig: 5.



Witnesses.
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UNITED STATES PATENT OFFICE.

ROBERT M. MACINTOSH, OF BOSTON, MASSACHUSETTS.

WAX-END MACHINE.

SPECIFICATION forming part of Letters Patent No. 384,700, dated June 19, 1888.

Application filed January 12, 1888. Serial No. 260,510. (No model.)

To all whom it may concern:

Be it known that I, ROBERT M. MACINTOSH, of Boston, county of Suffolk, and State of Massachusetts, have invented an Improvement in Wax-Thread Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to mechanism for the manufacture of waxed ends for boots and shoes, harness, and other work, and is an improvement upon the mechanism shown and described in United States Patent No. 226,619, granted to me April 20, 1880.

With the mechanism shown in the patent referred to a single thread of flax, silk, cotton, or other material is first untwisted to resolve it into its component or individual strands, and each separate strand is then placed in a dent or space between the teeth of a comb to keep the said strands separate and distinct, and the end of each strand is secured to a spindle having a pinion in mesh with a gear, by which rotation is imparted to the said spindles to untwist all the strands alike. The strands are then broken by moving the frame carrying the gear and spindles away from the thread-holder, the ends of the said strands when broken being in a frayed or floss-like condition. The strands thus treated and having floss-like ends are all of substantially the same or equal length.

In accordance with my present invention the individual strands of the thread are untwisted for a portion of their length only, leaving the remaining portion of the strands twisted to retain their normal strength, the untwisted portions of the said strands being of unequal length, so that when broken or frayed and again united or brought together to form a single thread the diameter of the said thread will gradually diminish toward its point or end—that is, the said thread will have a gradually-tapering end.

This feature of my invention I accomplish, as herein shown, by placing a bridge-board or comb obliquely with relation to the thread holder or clamp and arranging the spindles, as will be described, so that the end of each spindle to which a strand is fastened will be in a line substantially parallel to the said bridge-board, the individual strands being secured to the bridge-board and untwisted between the said board and spindles, the portion of the strands between the bridge-board and clamp remaining in its normal condition.

Other features of my invention will be pointed out in the claims at the end of this specification.

Figure 1 is a top or plan view of a wax-end-forming machine embodying my invention; Fig. 2, a section of Fig. 1 on line *x x;* Fig. 3, an end view of the machine, partially broken out, looking toward the left in Fig. 1; and Figs. 4 and 5 are modifications to be referred to.

The bed A is provided at one end with the thread-holder *a*, and has at its opposite end a frame or case, *a'*, herein shown as movable on rods a^2, secured to lugs a^3 on a plate, a^4, fastened, as shown, to a base, a^5, secured to the bed A.

The frame or case *a'* forms bearings for a spindle or thread-holding device, a^6, having a pinion, a^7, driven by a gear, a^8, supported by the said case, and rotated, as shown, by a handle, a^9. The spindle a^6, as shown, has pivoted to it a movable jaw, a^{10}, operated by a cam-lever, a^{12}, pivoted in a slot in the end of the said jaw. The movable jaw is brought toward the fixed jaw *b* (herein shown as forming part of the spindle a^6) by moving the cam-lever a^{12} into the position shown in Fig. 1, the said movable jaw being removed from the fixed jaw by a spring, a^{13}, the lever a^{12} at such time being turned substantially upright. The thread to be treated is securely clamped in the holder *a'* and its end secured between the jaws a^{10} *b*.

The thread referred to is herein shown as a wire-covered thread, $b^\times$, it being composed of one or more wires, *b'*, covered by any desired number of strands or individual threads, b^2, which are twisted around the said wire. The wire-covered thread $b^\times$ is first clamped in the holder and in the jaws a^{10} *b* and the spindle a^6 rotated in the direction to untwist the strands from the wire. The individual strands are then separated from one another, and each separate strand, as herein shown, is secured to a bridge-board or support, b^4, (shown as placed obliquely with relation to the holder,) each of the said strands being shown as wound upon a stud, b^5, the thread being herein shown as composed of five strands. Each strand b^2 is fastened to the end of a spindle or thread-holding

device, b^6, having at its other end a pinion, b^7, in mesh with a gear, b^8, supported by a frame or case, b^9, movable on rods b^{10}, secured to lugs b^{12} on the bed A. Each spindle b^6 is provided, as shown, with a button, c, about which the strand is wound to more firmly attach the said strand to the spindle. The spindles b^6 are herein shown as made of unequal length, so that when mounted in the case or frame b^9 the ends of the said spindles will be in a line substantially parallel to the bridge-board. After the strands b^2 have been secured to their respective spindles, the latter are rotated through the pinions and gear by the handle c', secured to the shaft of the said gear, to untwist the individual strands, the said strands being untwisted back to the bridge or support, that portion of the said strand between the bridge and clamp remaining in its normal twisted condition, whereby the strands retain their normal strength. After the strands have been untwisted, as described, the frame may be moved away from the bridge, as herein shown, by releasing a locking device or catch, (shown as a rod or bar, c^2, loosely secured to a lever, c^3, pivoted to the case or frame b^9,) thus permitting springs c^4, encircling the rods b^{10}, to move the said frame toward the end of the bed A. As the frame b^9 is withdrawn from the bridge b^4, each strand is broken or parted between its needle and the said bridge.

In practice the untwisted strands may, and preferably will, be severed by hand without moving the frame b^9.

To obtain the parallelism between the end of the spindles and the bridge, the said spindles are herein shown of varying lengths, the larger spindles being shown as extended through and supported by an upright, c^5, secured to the bed.

It will be noticed that each individual strand is broken at substantially the same distance from the bridge, so that when taken off from the bridge the said strands will be of different lengths, the end of each broken strand being frayed or in a floss-like condition.

The strands, when put together and twisted to form a single thread, produce a thread having a gradual taper toward its end. This gradual taper is effected, as above described, by placing the bridge obliquely to the thread-holder and arranging the ends of the spindles substantially parallel to the bridge; but I do not desire to limit myself to this particular arrangement, as the holder may be placed obliquely to the bridge, the latter being substantially parallel to the ends of the spindles, which in this case may be of substantially equal length. Furthermore, the case or frame b^9 may be arranged obliquely on the bed—that is, substantially parallel to the bridge—and in this case the spindle b^6 may be of substantially the same length. Therefore I wish it to be understood that I consider as the essential and vital feature of my invention for the production of a tapering thread, the parallelism of the bridge and the ends of the spindles.

When a thread-covered wire $b^\times$ is used, as shown in the drawings, the uncovered wire b' is left in the jaws a^{10} b, and after the tapered thread has been formed the said tapered thread may be laid upon and secured at its end to the wire b', preferably by wax, and then the said wire and thread may be twisted together by turning the handle a^9, thus producing a thread-covered wire having a gradual taper, with a sufficient portion of the wire left exposed or uncovered to form the bristle, such a thread, among other things, being particularly adapted for harness-work.

I have herein shown in Figs. 1 and 3 the spindles b^6 as rotated by a gear, b^8, the said spindles being arranged in a circle about the said gear; but instead thereof the said spindles may be supported in a substantially horizontal line in a case, m, (see Fig. 4,) and rotated through their pinions b^7 by a rack-bar, m', made to travel, as shown, by turning a handle, m^2, on a shaft, m^3, having a pinion (not shown) in mesh with the under side of the said rack-bar.

By means of the rack-bar m' more than one set of spindles may be used, as shown in Fig. 4, thus enabling a number of tapered threads to be made at one time. Furthermore, by using slotted hollow spindles b^6 (see Fig. 5) with the rack-bar two tapered threads may be produced at one time, the strands of the second thread being extended through the hollow spindles.

To enable threads having varying lengths of taper to be produced, the spindle b^6 may be made in two parts, 2 3, adjustable one on the other and secured together, as shown, by set-screw 4. By moving the part 2 on the part 3 so as to bring the end of the spindle a greater or less distance from the bridge a greater or less taper will be formed.

I claim—

1. In a wax-end-forming machine, a thread holder or clamp to hold the thread at or near one end of the machine and a plurality of spindles or strand-holding devices, combined with a bridge or support intermediate of the said clamp and spindles, and to which the individual strands are secured, the said clamp, bridge, and spindles being arranged with relation to each other to obtain a substantial parallelism between the said bridge and spindles, the said strands being untwisted only between the said spindles and bridge, substantially as described.

2. In a wax-end-forming machine, a thread-holder and a bridge oblique or inclined with relation to said holder, combined with a plurality of spindles or thread-holding devices and means to rotate said spindles, the latter having their ends in a line substantially parallel to the said bridge, substantially as described.

3. In a wax-end-forming machine, a thread-holder and a bridge oblique or inclined with relation to said holder, combined with a plurality of adjustable spindles or thread-holding devices and means to rotate said adjustable spindles, the latter having their ends in a line substantially parallel to the said bridge, substantially as described.

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

ROBERT M. MACINTOSH.

Witnesses:
JAS. H. CHURCHILL,
J. C. SEARS.