(No Model.)

R. M. MACINTOSH.

MACHINE FOR MAKING WAX ENDS.

No. 479,093. Patented July 19, 1892.

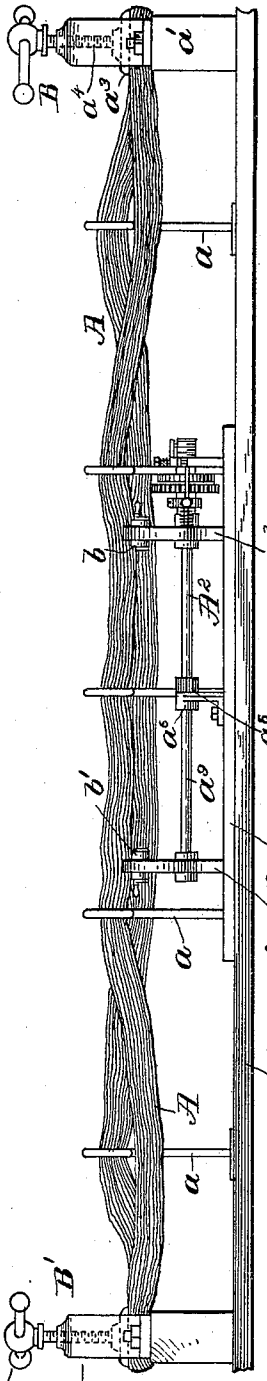

Fig. 1.

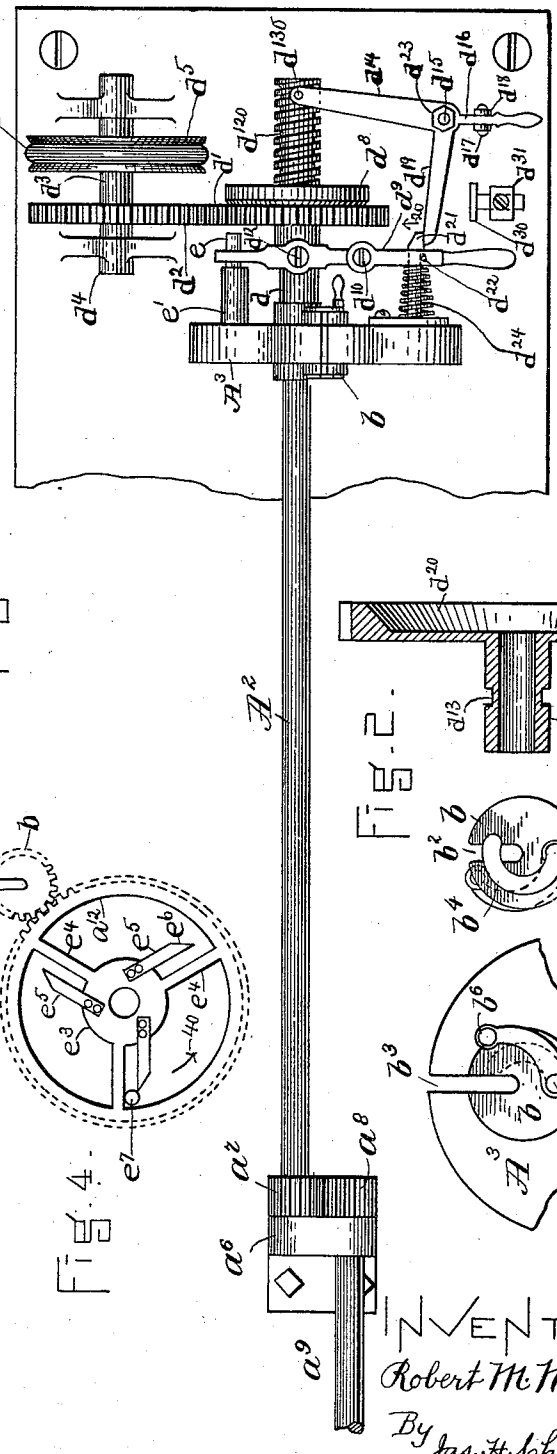

Fig. 2.

Fig. 4.

Fig. 3.

Fig. 5.

WITNESSES

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MACHINE FOR MAKING WAX-ENDS.

SPECIFICATION forming part of Letters Patent No. 479,093, dated July 19, 1892.

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To all whom it may concern:

Be it known that I, ROBERT M. MACINTOSH, residing in Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Methods and Apparatus for Producing Tapering Threads, 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 a novel method and apparatus for producing tapering threads, such as now commonly known as "waxed-ends" and used in the manufacture of boots, shoes, and harnesses.

In accordance with my invention a thread composed of a plurality of strands twisted together is firmly secured or clamped at two points separated the desired or required distance to give to each end of the thread when severed or broken the desired or required taper. That portion of the thread between the clamps is untwisted and the individual strands broken at different points between the clamps, so that two tapered ends may be formed by one operation.

The apparatus with which the tapered ends may be formed is preferably constructed as will be described, whereby that portion of the thread between the clamps may be untwisted in opposite directions, so that the thread may be untwisted with a less number of turns than it has twists, as will be described; thereby permitting a substantially large number of tapers to be made in a given time.

The apparatus is also constructed as will be described, whereby it may be automatically stopped when the clamped portion of the thread is untwisted.

The particular features in which my invention consists will be pointed out in the claims at the end of this specification.

Figure 1 is a front elevation of an apparatus with which to practice my invention; Fig. 2, a top or plan view, partially broken out and on an enlarged scale, of the apparatus shown in Fig. 1; Fig. 3, details, on an enlarged scale, to be referred to; Fig. 4, a detail of the gearing by which the thread is untwisted, and Fig. 5 a sectional detail to be referred to.

A represents a hank of threads, each of which is to be subdivided into suitable lengths and provided with tapering ends. The hank A is preferably held above a table or foundation A′ by suitable supports, herein shown as forked arms *a*. The hank A is preferably fastened or secured between suitable devices (shown as presses B B′) of any usual or well-known construction and herein shown as consisting of a stationary base or block a', resting upon and secured to the table or bench A′, and a movable portion or platen a^3, operated by a screw a^4 after the manner of the well-known press. The presses B B′ are preferably located on the table or bench A′ at a distance apart substantially equal to one-half the length of a finished thread. The table A′ has located on it between the presses B B′ the untwisting portion of the apparatus, which is preferably made as will now be described.

A^2 represents a shaft having one end extended through a hollow case or frame A^3, supported at one end of a supplemental base a^5 and having its other end supported in an upright a^6, located substantially near the longitudinal center of the base a^5. The shaft A^2 has fast on it, near the upright a^6, a pinion or gear a^7 in mesh with a like pinion or gear a^8 on a shaft a^9, having one end supported in the bracket a^6, as herein shown, and having its other end supported in a hollow case or frame a^{10}, secured to the base a^5. The shafts A^2 a^9 within the hollow cases or frames A^3 a^{10} have mounted thereon substantially large gears a^{12}, only one of which is shown in Fig. 4. The gears a^{12} mesh with and rotate hubs b b', extended through the frames A^3 a^{10} and provided on their periphery, within the hollow frames, with teeth in mesh with the gears a^{12}. The hubs b b' are each provided with a longitudinal slot b^2, which normally co-operates or registers with a slot b^3 in the top of the cases or frames A^3 a^{10}. The hubs b b' are each provided with a thread-clamping device, one form of which may be made as herein shown, it consisting of a curved arm or hook b^4, fast on a shaft b^5, extended through the hub, and provided at its opposite end with a crank or arm b^6. Each hook b^4 is made of sufficient length to permit it to be brought over a thread laid in the slot b^2, and thereby clamp the said thread between the said hook and the end of the hub.

The operation of the apparatus as thus far

specified may be described as follows, viz: A thread of the hank A is passed through the slots b^3 in the frames or cases A^3 a^{10} and laid in the slots b^2 in the hubs b b', after which the hooks b^4 are turned over the thread, so as to firmly clamp the thread between the said hooks and the ends of the hubs b b'. The main shaft A^2 is then rotated, as will be described, in a direction to untwist that portion of the thread between the clamping-hooks b^4. When the thread between the clamping-hooks has been untwisted, the individual strands are broken or pulled apart by the operator and the different strands of the thread are broken or pulled apart at different points—that is, at different distances between the clamping-hooks. For example, let it be supposed that the thread is composed of five strands. In this case the operator breaks one strand near one end of the clamped portion—as, for instance, near the hollow case a^{10}—to form a short and a long end, and then breaks the next strand a greater distance from the case a^{10} to form one end a little longer and the other end a little shorter. The operator continues to thus break the strands in succession at different distances from one of the clamped portions as a starting-point. After the thread has been broken, as described, to form two tapers or two sections or pieces of thread having tapering ends the clamping-hooks are turned back to their starting position away from the slots in the hubs to thereby uncover the said slots and permit the pieces of thread to be removed from the hollow frames or cases.

In order that the rotation of the shaft A^2 may be stopped automatically when the clamped portion of the thread has been untwisted, an automatic stopping device is employed, preferably constructed as herein shown, and which will now be described. The main shaft A^2, beyond the case A^3, has loosely mounted on it a hub d, having secured to or forming part of it a gear d' in mesh with a gear d^2, fast on a shaft d^3, having bearings in suitable uprights d^4, supported by the base. The shaft d^3 has mounted on it a pulley d^5, connected by a belt d^6 to a driving-pulley on a driving-shaft. (Not herein shown.) The gear d', loose on the shaft A^2, may be rotated continuously and may be coupled to the shaft A^2 by a clutch mechanism (shown as a beveled disk d^8) fast on said shaft, and with which the gear d', preferably beveled on one side, as at d^{20}, is adapted to be brought into engagement by a clutch-lever d^9, pivoted at d^{10} and provided with a stud or pin d^{12}, extended into an annular groove or slot d^{13} in the hub d. The shaft A^2, beyond the disk d^8, is provided with a worm d^{120}, with which engages a pin d^{130} on one arm d^{14} of an elbow-lever pivoted, as at d^{15}, to one arm of a lever d^{16}, pivoted, as at d^{17}, to a standard or upright d^{18}, the other arm d^{19} of the elbow-lever being adapted to engage a locking device for the clutch-lever d^9, which locking device is herein shown as a spring-bar d^{21}, fastened to the frame A^3 and provided with a shoulder or notch, with which engages a pin d^{22} on the under side of clutch-lever d^9. The elbow-lever referred to is secured on its pivot d^{15}, made as a pin or stud on the lever d^{16}, as herein shown, by a nut d^{23}, so that the said elbow-lever may be lifted bodily by depressing the handle of the lever d^{16} to disengage the pin d^{130} from the worm d^{120}. The clutch-lever d^9, when disengaged from its locking device, as will be described, is turned on its pivot by a spring d^{24}, herein shown as encircling the spring-bar d^{21}. Normally the elbow-lever is turned so as to engage the pin d^{130} with the worm d^{120} near the disk d^8, the arm d^{19} of the said lever at such time resting against the back-stop d^{30}. (Shown as a bar secured to an upright d^{31} on the base a^5.) The clutch-lever d^9 is then turned toward the left in Fig. 2 to engage the gear d' with the disk d^8, and when the gear d' is thus engaged the shafts A^2 a^9 are rotated, the clutch-lever being locked in its operative position by the pin d^{22} engaging the notch in the spring-arm d^{21}. As soon as the shaft A^2 commences to rotate the pin d^{130} is carried by the worm d^{120} toward the right and the elbow-lever is turned on its pivot d^{15}. The shaft A^2 continues to rotate until the arm d^{19} of the elbow-lever strikes the spring-arm d^{21} and forces it forward, or in the direction indicated by arrow 20, Fig. 2, until the said arm is disengaged from the pin d^{22} on the clutch-lever d^9, which is then acted upon by the spring d^{24} and turned on its pivot to disengage the gear d' from the disk d^8. The rotation of the shaft A^2 is stopped after the clutch-gear d' is disengaged from the disk d^8 by a stopping device, herein shown as a rod e, secured to the clutch-lever d^9 and extended through a hub e' on the hollow case or frame A^3, the said rod or bar being adapted to enter openings in the gear a^{12} within the hollow case A^3.

In order that the gear in the hollow frame A^3 may be stopped in its rotation, so as to bring the slot b^2 in the hub b in line with the slot b^3 in the hollow frame A^3 when the clutch is moved by its spring d^{24} to disengage the loose gear d' from the disk d^8, as described, the gear a^{12} is preferably constructed substantially as shown in Fig. 4, it consisting of a toothed rim joined to a hub e^3 by spokes e^4, preferably three in number, and the said hub has secured to it three spring arms or dogs e^5, provided with beveled ends e^6, extended toward the rims a slight distance beyond a hole or opening e^7 in the side of the hollow case A^3 and in line with the hole in the boss or hub e'. When the clutch-lever d^9 is moved by its spring d^{24} to disengage the loose gear d' from the disk d^8, the pin or rod e is pushed into the case A^3 and enters the space in the gear between two of its spokes, and as the gear continues to rotate in the direction of arrow 40, Fig. 4, one of the spring-arms e^5 strikes the pin and is pushed aside or bent

sufficiently to permit it to pass by the pin, which engages the spoke and stops the rotation of the gear in the direction of arrow 40. The spring-arm, after passing by the pin, returns to its normal position and prevents the gear rotating backward or in a direction opposite to that indicated by arrow 40, thereby holding the gear stationary, and thus bringing the slot b^2 in the hub b in line with the slot b^3 in the case A^3. In this way a considerable saving in time is effected, as the operator is not required to turn the hub by hand into position to bring the slots into coincidence.

I have herein shown both clamps as rotatable, but I do not desire to limit my invention in this respect, as one of the said clamps may be stationary; but I prefer to make both rotatable in opposite directions to enable the tapered ends to be more quickly formed. So, also, I prefer to couple the clamp-rotating gears a^{12} in opposite directions by means of the shafts A^2 a^9 geared together; but I do not desire to limit my invention in this respect, as the said gears may be rotated in opposite directions by independent mechanisms under the control of the operator.

I prefer to assemble the threads before being provided with tapering ends into the form of a hank, which may be composed of any desired number of threads, for by this means I am enabled to insure all the threads being of the same length when tapered, and thereby obtain a uniformity in the length of the tapered threads composing the hank.

I claim—

1. In an apparatus for providing threads with tapering ends, the combination of the following instrumentalities, viz: two clamps or thread-holding devices, one of which is rotatable, a driving mechanism for said rotatable clamp, a clutch to engage the rotatable clamp with its driving mechanism, a locking device to hold the clutch in its operative position to produce rotation of the rotatable clamp, and an automatically-operated stopping mechanism actuated by the driving mechanism to act on the lock and release the clutch, and means to act on the clutch after it has been thus released and disengage the rotatable clamp from its driving mechanism, substantially as described.

2. In an apparatus for providing threads with tapering ends, the combination of the following instrumentalities, viz: a shaft A^2, provided at one end with a worm, a shaft a^9, connected to the shaft A^2 to rotate in an opposite direction, a rotary thread-holding device or clamp connected to each shaft, a main or driving shaft, a clutch to couple the driving-shaft with the shaft A^2, a locking device for the clutch, a pivoted lever having one arm d^{14} provided with a pin or stud to engage the worm on the shaft A^2 and having its other arm d^{19} adapted to engage the locking device for the clutch, substantially as described.

3. In an apparatus for providing threads with tapering ends, the combination of the following instrumentalities, viz: two clamps or thread-holding devices, one of which is rotatable, a shaft to which the rotatable clamp is connected, a driving-shaft, and a clutch mechanism to couple the driving-shaft to the clamp-rotating shaft, means to lock the clutch mechanism in engagement with the clamp-rotating shaft, and an automatically-operated stopping mechanism to disengage the clutch from the clamp-rotating shaft and stop the rotation of the rotatable clamp, substantially as described.

4. In an apparatus for providing threads with tapering ends, the combination of the following instrumentalities, viz: two clamps or thread-holding devices rotatable in opposite directions, a driving-shaft for said rotatable clamps, a clutch to couple the driving-shaft with the rotatable clamps, and an automatic stopping mechanism actuated by the driving-shaft when the latter is coupled to the rotatable clamps to act on the clutch and disengage the driving-shaft from the rotatable clamps, substantially as described.

5. In an apparatus for providing threads with tapering ends, the combination of the following instrumentalities, viz: two clamps or thread-holding devices, one of which is rotatable, a shaft A^2, to which the rotatable clamp is connected, a driving-shaft, and a clutch mechanism to couple the driving-shaft to the clamp-rotating shaft, a gear a^{12}, mounted on the shaft A^2, a toothed hub b in mesh with said gear and provided with a slot b^2, and a clamping device secured to said hub, substantially as described.

6. In an apparatus for providing threads with tapering ends, the combination of the following instrumentalities, viz: two clamps or thread-holding devices, one of which is rotatable, a shaft A^2, to which the rotatable clamp is connected, a driving-shaft, and a clutch mechanism to couple the driving-shaft to the clamp-rotating shaft, a gear a^{12}, mounted on the shaft A^2, a toothed hub b in mesh with said gear and provided with a slot b^2, a clamping device secured to said hub, and an automatic stopping device to disengage the shaft A^2 from the driving-shaft and stop the rotation of the gear a^{12}, substantially as described.

7. In an apparatus for providing threads with tapering ends, the combination of the following instrumentalities, viz: a shaft A^2, a shaft a^9, connected to the shaft A^2, to rotate in an opposite direction, a rotary thread-holding device or clamp connected to each shaft A^2 a^9, a main or driving shaft, and a clutch to couple the driving-shaft with one of the shafts A^2 a^9, substantially as described.

8. The combination, with hank-holding devices, of a thread-untwisting mechanism interposed between the said devices and consisting of two clamps or thread-holding devices, one of which is rotatable, a driving-shaft for the rotatable clamp, a clutch to couple the driving-shaft with the rotatable

clamp, a lock to hold said clutch in engagement with the driving-shaft, and an automatic stopping mechanism to act on said lock and release the said clutch and stop the rotation of the clamp, substantially as described.

9. In an apparatus for providing threads with tapering ends, the combination of the following instrumentalities, viz: two clamps or thread-holding devices, one of which is rotatable and consists of a slotted hub, through which the thread is passed, means to lock the said thread in the slot of the hub, a gear a^{12} to rotate said slotted hub and consisting of a toothed rim, a hub e^3, and arms connecting said hub and rim, spring-arms e^5, secured to the hub e^3, an inclosing case in which said gear is located, a shaft A^2, extended through the said case and upon which the said gear is mounted within the case, the said case or shell being provided with an opening e^7, a rod e, adapted to enter said opening, a clutch-lever to actuate said rod, a driving-shaft, and a clutch operated by the said clutch-lever to connect the shaft A^2 with the driving-shaft, a pivoted lever having one arm adapted to engage the locking device and having a second arm provided with a stud or pin, a worm on the shaft A^2, with which the said stud or pin engages, and means to act on the clutch-lever and move the rod e into the case or shell to be engaged by one of the spring-arms e^5, 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,
SADIE C. FEARING.