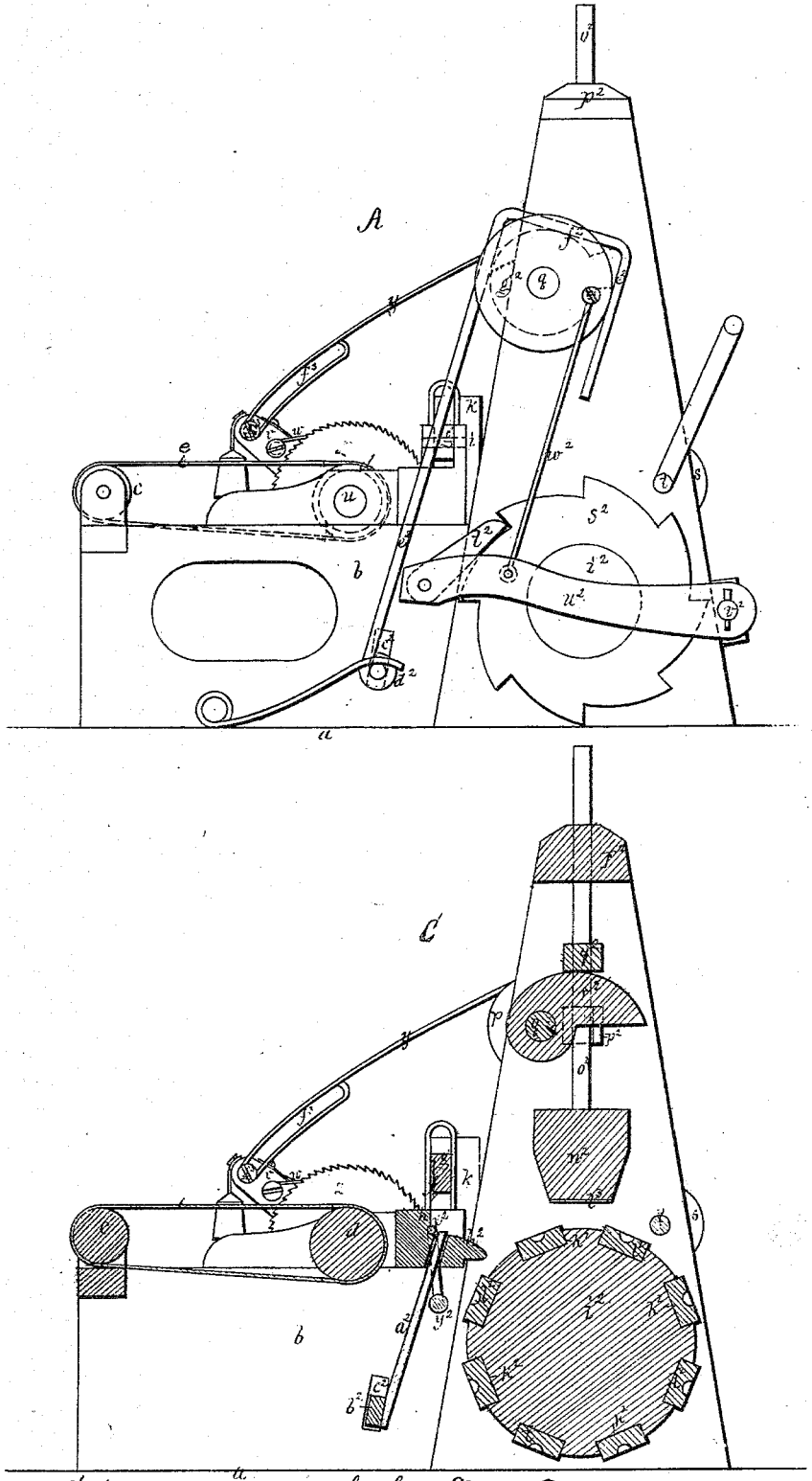
2 Sheets—Sheet. 1.

S. MOORE.

MANUFACTURE OF SHOE SHANKS.

No. 111,863. Patented Feb. 14, 1871.



Witnesses.
L. B. Hidden.
M. W. Frothingham.

Stephen Moore
by his attys.
Crosby, Halsted & Gould

2 Sheets—Sheet 2.

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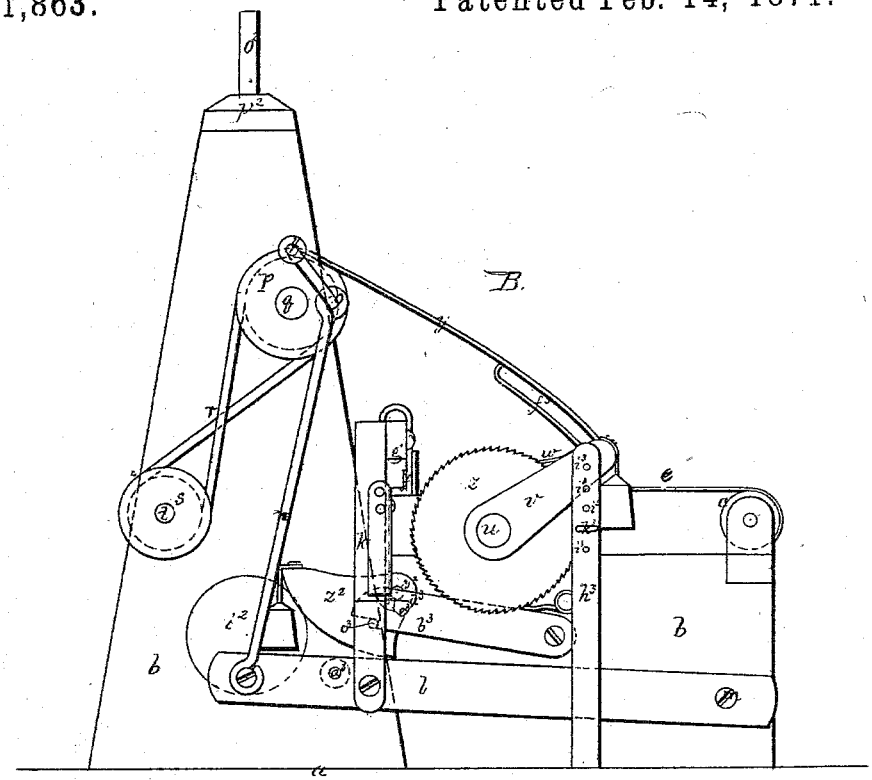

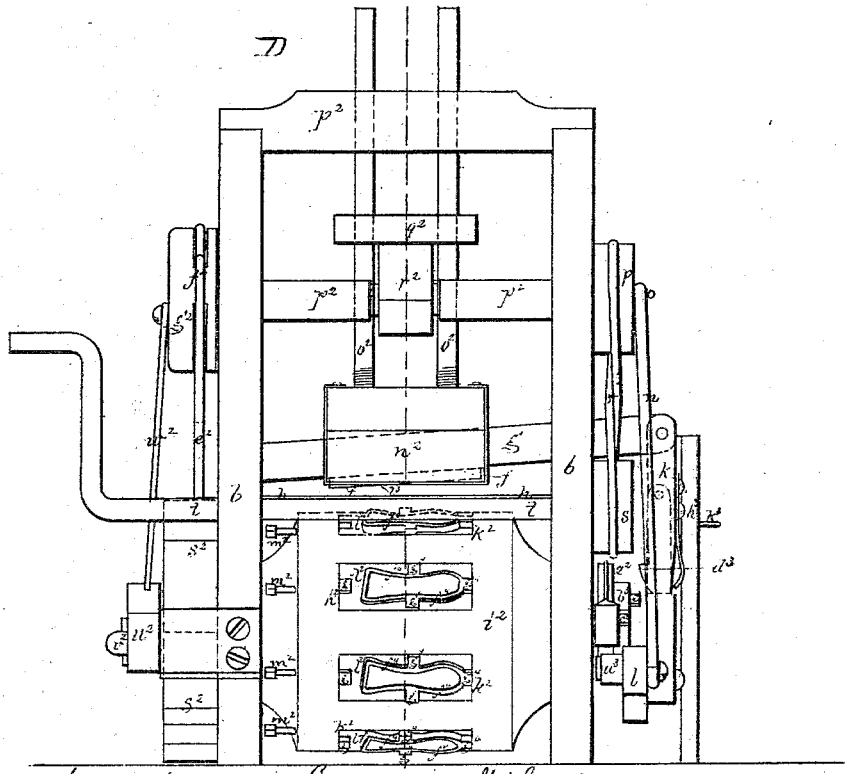

Witnesses:
S. B. Kidder
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United States Patent Office.

STEPHEN MOORE, OF SUDBURY, MASSACHUSETTS, ASSIGNOR TO HIMSELF AND HOMER ROGERS, OF SAME PLACE.

Letters Patent No. 111,863, dated February 14, 1871.

IMPROVEMENT IN THE MANUFACTURE OF SHOE-SHANKS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, STEPHEN MOORE, of Sudbury, in the county of Middlesex and State of Massachusetts, have invented an Improvement in the Manufacture of Molded Shoe-Shanks; and I do hereby declare that the following, taken in connection with the drawing which accompanies and forms part of this specification, is a description of my invention sufficient to enable those skilled in the art to practice it.

United States Letters Patent No. 102,401, were granted April 26, 1870, on the invention of Houghton, Moore, & Rogers, for an improved molded shoe-shank.

The present invention has particular reference to the manufacture of such patented shanks, the invention consisting in the general combination of mechanism for cutting the shank-forming material into blanks, and shaping such blanks in suitable molds, and in specific details of construction and arrangement of the parts for effecting the successive operations in the formation of the molded shanks.

The drawing represents a machine embodying my improvements.

A shows a side elevation of the machine.

B, an opposite-side elevation.

C, a vertical longitudinal section.

D, an end view.

a denotes a suitable bed, upon which are erected uprights, *b*, for supporting the operative mechanism.

c d denote two rolls, around which travels an endless belt or apron, *e*, by which the material, in sheet-form or strips, is fed to the action of a guillotine-knife, *f*, the material being of a width corresponding to the length of the shanks to be molded.

The knife *f* is attached to a lever, *g*, and operates in connection with a bed-knife or table, *h*, the top of which is on a line with the top of the apron *e*.

The lever *g* is fulcrumed at one end, as seen at *i*, and its opposite end is connected, by a link, *k*, to another lever, *l*, fulcrumed at *m*, and connected at its opposite end, by a pitman, *n*, with a crank-pin, *o*, extending from a pulley, *p*, on the end of a cam or wiper-shaft, *q*, connected, by a cross-belt, *r*, with a pulley, *s*, on a driving-shaft, *t*.

The shaft *u* of the front roll *d* has on one end a ratchet-wheel, *z*, to which an intermittent rotative movement is imparted, as follows:

On the shaft *u* is a loose rocker-arm, *v*, to the outer end of which is jointed a pawl, *w*, that engages with the teeth of the ratchet-wheel, the pawl being held to the periphery of the wheel by a suitable spring.

The pawl-arm *v* is connected to a crank-pin, *x*, of the pulley *p* by a link, *y*, and at each rotation of the pulley, the pawl-arm is first drawn forward, (carrying with it the ratchet-wheel, rotating the shaft *u*, and moving forward the material upon the belt,) and is then thrown back (the pawl slipping over the ratchet) into position for the pawl to again engage with and feed forward the ratchet-wheel, the feed-belt remaining still while the pawl is retreating. A continuous reciprocating movement is imparted to the knife, but the movements of the belt and knife are so timed that when the knife is rising the belt is traveling forward with the shank-forming strip, carrying the end of the strip over the bed *h* and under and beyond the blade *f*, the extent of each movement of the belt being sufficient, and just sufficient, to project beyond the blade *f* the length of material requisite to form one shank.

To hold the projected end of the material in horizontal position while being cut, or to prevent it from tipping over, I employ a lifter, a^2, operated as follows:

The lower end of the lifter is jointed to a cross-bar, b^2, which is hinged at one end to the frame *b*, and projects at its other end through a guide-slot, c^2, in the opposite upright *b* of the frame, the end projecting through the slot resting in a hook, d^2, the shank e^2 of which extends upward, and is bent over at top, and rests upon a peripheral cam, f^2, of a cam-wheel, g^2, fixed on the end of the wiper-shaft *q*. As the knife-blade begins to descend the cam f^2 raises the lifter a^2 and brings its top into position to support the blank as it is severed from the strip and prevent its being bent under by the cutter, the concentric surface of the cam holding the lifter stationary during the cutting operation.

As soon as the blank is cut off the lifter is released, and is thrown down by a suitable spring, leaving the blank upon an inclined table or receiving-block, h^2, from whence it is removed to the die or mold in which it is to be shaped.

The die apparatus is constructed as follows:

i^2 denotes a rotary die-cylinder, in the cylindrical surface of which is a series of recesses, k^2, for receiving the molds l^2, each mold being sunk in its recess, and held in place by a suitable screw, m^2. The hollow surface or matrix of the mold corresponds in shape to the irregular surface to be given to the under surface of the shank, while the whole length of the upper edge is in one plane, so that it will be met by a flat surface coming against the open face of the mold.

Over the mold is a drop-hammer, operated as follows:

The hammer n^2 is fixed upon the lower ends of two rods, o^2, that run through guide-holes in cross-beams, p^2.

The rods are connected by a cross-head, q^2, against which a wiper, r^2, (on the wiper-shaft q,) acts to lift the hammer.

The die-cylinder is hung in the frame by two gudgeons, on the end of one of which is a ratchet-wheel, s^2, through which an intermittent rotative movement is imparted to the cylinder, as follows:

A pawl, t^2, engaging with the ratchet, is hung upon the end of an arm, u^2, pivoted at v^2, and connected near its front end, by a link, w^2, to a wrist-pin on the cam-wheel g^2 of the wiper-shaft. As the shaft, in rotating, causes the wiper to lift the hammer, the movement of the cam-wheel g^2 raises the link w^2 and arm u^2, and causes the pawl to turn the cylinder a distance equal to the distance between the center-line of two adjacent dies, bringing the die coming uppermost directly under the hammer, and so that the upper edge of the mold or die is in a horizontal plane. As the die reaches this position, the forward movement of the pawl ceases, and the wiper passes the cross-head q^2, and lets the hammer drop upon the die.

The shank-forming blank is fed from the receiver into the mold by a finger, x^2.

The finger is attached to a rocker-shaft, y^2, upon one end of which is a weighted arm, z^2, which, when held in horizontal position, retains the finger in position just behind the lifter a^2, and which, when released from such horizontal position, is thrown down by the weight, and turns the shaft and drives the finger out, the finger lying close to the surface of the table h^2, and pushing from such table the blank lying upon it, carrying the blank directly into the open mold adjacent to the table and in line with the finger.

The finger is thrown forward just after the knife-blade has severed the blank, and as the blade begins to rise; and the arm z^2, at its descent, drops upon a pin or roll, a^3, on the inner side of the knife-operating lever l, and the rise of the lever thus causes the arm to be lifted, and the finger to be thereby moved back.

As the arm reaches its horizontal or normal position, a latch, b^3, falls in front of a pin, c^3, projecting from the arm, and locks the arm in position.

When the knife next descends, a hook, d^3, pressed in by a suitable spring, passes under a projection, e^3, on the side of the latch b^3, so that, when the knife next begins to rise, the hook raises the latch and releases the pin c^3, when the weighted arm again falls and drives the finger forward to throw the blank into the adjacent mold.

The progressive operation of the machine is as follows:

As the driving-shaft rotates, and while the upper part of the belt moves forward, to carry the end of the strip laid upon it under the knife, said knife rises, to let such end pass through. As the knife begins to descend, the feed-belt stops, and the knife severs the blank from the end of the strip, the lifter a^2 rising to support the cut-off piece. While the knife is descending the wiper raises the hammer, and the die-cylinder is rotated sufficiently to bring the last-charged mold under the hammer; and just as the knife completes its descent the cylinder stops, and the hammer is released and falls upon the material in the mold, compressing it into shape.

The stopping of the cylinder also brings the next empty mold into position to be filled, and just after the knife severs the blank, and the blank falls upon the table h^2, the finger x^2 is thrown forward and pushes the blank over the table into the open mold.

As the cylinder revolves, and when each charged mold comes face downward, the molded shank drops from the mold, and is removed to dry.

To cause the superfluous material to be severed from the formed shank, I make each mold with a blunt edge, f^4, by which the material struck by the hammer-face is cut off without injury to the hammer; and to preserve the edge from being battered, I leave projections, g^4, flush with the edge, these projections receiving the main force of the blow, and guarding the edge.

By combining the series of dies in the periphery of a cylinder with a mechanism for feeding a blank into each mold as the cylinder turns, and a hammer operating against each charged mold as it comes uppermost, the shanks can be very rapidly manufactured, and the machine is so far automatic in its operations that no skill is required to manufacture the shanks, supplying the belt with material, and removing the formed shanks being all that is necessary.

The extent of feed movement of material to the action of the cutter requires to be varied in accordance with the size of shanks to be molded, or the thickness of the material being fed; and to provide for such variation I use the following mechanism connected with the ratchet-and-pawl mechanism that effects the movement of the feed-rolls.

The link y is made with a long slot, f^3, through which extends the pin g^3 that connects the link with the pawl-arm v.

At the side of this pawl-arm is a post, h^3, erected upon the bed-plate, and in this post is a vertical series of holes, i^3, to receive a pin, k^3.

The pin g^3 slides sloosely in the slot f^3, and, when the link y is drawn forward, the pawl-arm is drawn forward by the link as soon as the end of the slot reaches the pin. When the link is thrown back, the pawl goes with it, (being weighted or drawn down by a suitable weight,) until the arm reaches and rests upon the pin k^3, and the extent of downward movement of the pawl, and the consequent point at which the pawl engages with the ratchet-wheel to feed it at the next forward movement of the link, is, of course, determined by the position of the pin, or the particular hole of the series through which the pin may project, as will be readily understood.

The drop-hammer is made of cast-iron, and, as the face, if of cast-iron, soon batters by contact with the molds, I form the face of a piece of sheet-steel, l^3, which is so applied that it may be easily detached and replaced, such construction insuring a face that endures well for months, whereas a cast-iron face becomes irreparably battered in one or two days.

The face of the hammer may be converted into steel, but I prefer to use the steel-plate.

The die-cylinder is, preferably, constructed of cast-iron, and the dies may be of cast-iron or of gun-metal, or other hard composition.

I claim—

1. In a machine for making shoe-shanks, the combination, with a shank-molding mechanism, of an intermittently-moving feed-apron and a cutting or severing mechanism, arranged to operate substantially as described.

2. In combination with the cutting or severing mechanism, the lifter a^2, for supporting the blank, substantially as described.

3. The combination with a rotating mold-cylinder, of the inclined table h^2, for directing the blank to the open mold, substantially as described.

4. In combination with the inclined table h^2, the finger x^2, for transferring the blank from the table to the mold, substantially as described.

5. In a machine for molding shoe-shanks, an intermittently-rotating mold-cylinder and a drop-hammer, arranged to operate together, substantially as described.

6. The die or mold, made with the blunt edge f^4 and the guards g^4, substantially as shown and described.

7. The combination of a mechanism for feeding the strip to the cutting or severing mechanism, mechanism for cutting the strip into blanks, and mechanism for molding the blanks into shanks, substantially as described.

8. In a machine for molding shoe-shanks, a die-cylinder, having a series of peripheral dies, adapted for molding the shanks, each fastened in the surface of the cylinder, substantially as described.

9. In combination with a machine for molding shoe-shanks, the mechanism for varying the feed of the blank-forming material substantially as described.

10. In combination with the dies, substantially such as described, a drop-hammer, provided with a steel facing, substantially as described.

Executed August 20, A. D. 1870.

STEPHEN MOORE.

Witnesses:

FRANCIS GOULD,

J. B. CROSBY.