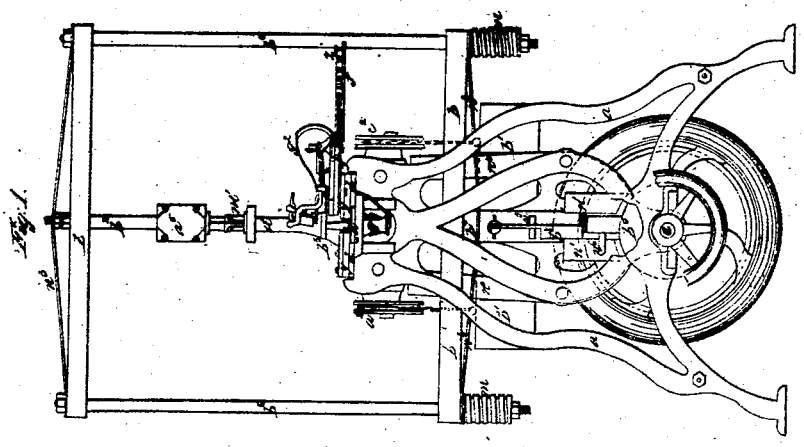
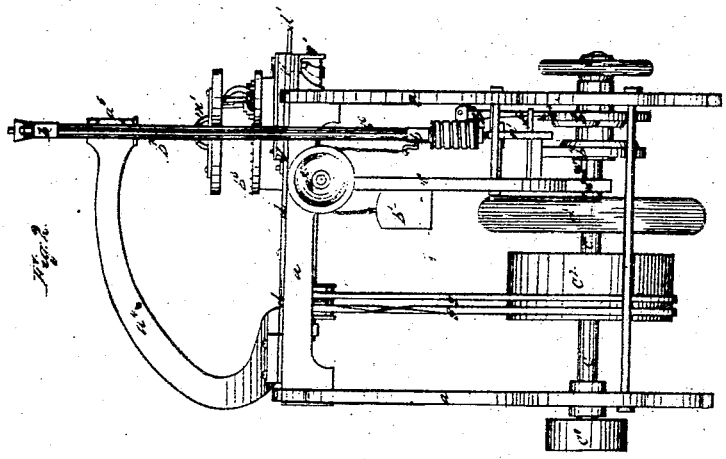
Sheet 1, 2 Sheets.

W. Duchemin.

Boot and Shoe Mach.

No. 109,500. Patented Nov. 22, 1870.





Witnesses:

Henry P. Richmond

Geo. Sumner

Inventor:

Wm. Duchemin

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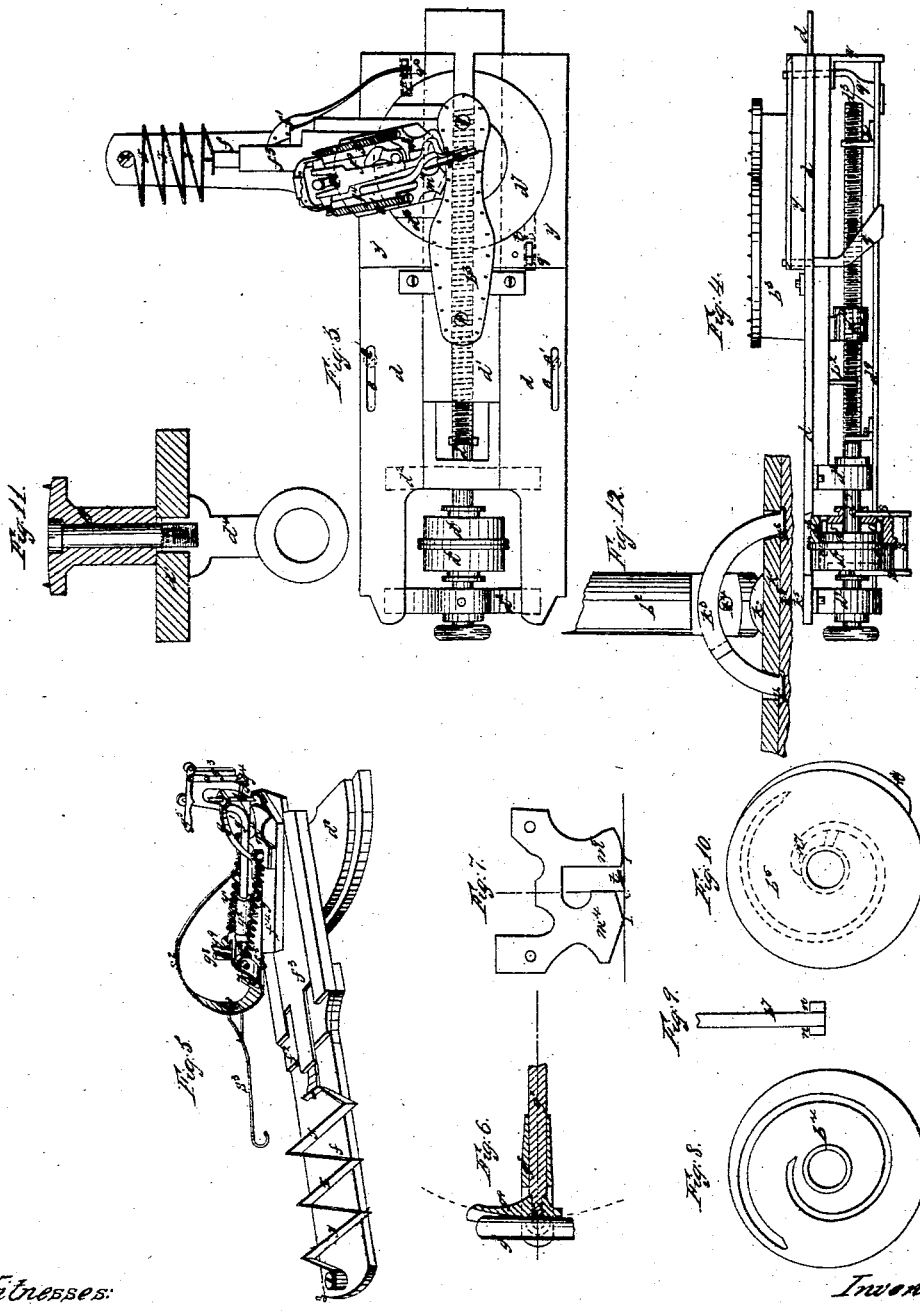

Witnesses:

Henry P. Richmond
Geo. Bowman

Inventor:

Wm. Duchemin

United States Patent Office.

WILLIAM DUCHEMIN, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO GEORGE B. BIGELOW, TRUSTEE, OF SAME PLACE.

Letters Patent No. 109,500, dated November 22, 1870.

IMPROVEMENT IN MACHINES FOR MOLDING, ROUNDING, AND CHANNELING BOOT AND SHOE-SOLES.

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, WILLIAM DUCHEMIN, of Boston, in the county of Suffolk and Commonwealth of Massachusetts, have invented a new and useful Improvement in the Manufacture of Boots and Shoes, namely, a Machine for Molding, Rounding, and Channeling the Soles thereof, previous to their being applied to the uppers; and I do hereby declare that the following is a full, clear, and exact description of the same, due reference being had to the drawing accompanying and forming part of this specification.

Figure 1 is a front elevation.

Figure 2 is a side elevation.

Figure 3 is a plan of the bed-plate or table of the machine.

Figure 4 is a vertical central longitudinal section of the same.

Figure 5 is a perspective view of the segmental rotating block and lever-arm, with the cutting head-block and carriage attached thereto.

Figures 6, 7, 8, 9, and 10 will be referred to and explained as the description of the invention may require.

Figure 11 is a transverse section of the forming-last.

Figure 12 is a longitudinal section of self-adjusting joint.

The object of my invention is to perform with one machine, and at the same time, work, which, by the present mode, requires three, and sometimes four, machines, namely, molding, rounding, and channeling, technically so called, the soles of boots and shoes previous to their being secured to the uppers.

The first operation consists in molding the soles in such a manner that the under surface will conform to the shape of the bottom of the last used; the second in cutting round the edge of the sole to the required shape; the third in cutting a groove or channel to receive the stitches, if sewed; if pegged or nailed, the channel can be altered to suit the work.

The frame of the machine is made in four parts, as shown in fig. 2, one front, one back, and two side pieces, marked *a a a*, secured together in the usual manner.

On each side of the frame is a pulley, a^2, over which passes a chain, having one end fastened to the lower cross-bar of the molder-frame *b b*, and the other to the weight or counterpoise b^1. This counterpoise is made of sufficient weight to draw up and keep the frame *b b* in the position shown in fig. 1.

At the back or inner end of the top side the curved bar or goose-neck is secured, marked a^4, having on its outer end the box-bearing a^5, through which the upright or molder-shaft b^2 passes.

On the top of the frame *a a* rests the bed-plate or table *d d*, having a central longitudinal recess in its upper surface for the reception of the sliding bar or carriage d^1, to which is attached the forming-last or bed b^3. This forming-last is shaped on its upper surface or face like the ordinary last used in the manufacture of shoes, but here the resemblance ends, its outlines being the form of the outer sole of a shoe, and at right angles with the level of the upper surface, thus forming a continuous vertical plane or bearing, against which the rounding-knife *t*, (see fig. 5,) presses while shaping the sole. This plane, in practice, should be about three-eighths of an inch wide.

Beneath this plane, extending down to the bed d^1, (see fig. 11,) it assumes the form of a narrow deep bar, square in outline, its extremities reaching sufficiently near the ends of the form to allow of the holes being drilled through for the reception of the fastening-bolts.

On its outer end a is raised block marked *y y*, (see fig. 3,) square in outline, cut through the center longitudinally in such proportion, that the base of the forming-last may pass through, and provided on its upper surface with a circular groove, d^7, in which, fitted so that it may traverse freely, is the segmental block d^8.

To the face of this block, at right angles with its inner or straight edges, is affixed the arm or lever *f*, provided at its outer end with the handle *z*, and fitted at its inner end for the reception of the carriage, to which is attached the cutting-head and carrier, as will be hereinafter explained.

At the inner end, on the lower surface, are secured the hangers d^2, (see fig. 4,) provided with box-bearings in which the screw d^3 revolves, having, on its outer end, the traversing-nut d^4. This nut passes up and through the table *d d* into a slot made for its reception in the carriage d^1, as shown in fig. 11.

On its outer end is secured a circular collar, d^5, through which, at equal distances from each other, pass the bars *o o*, (see fig. 4,) and project equally from either face.

On each side, their inner sides meeting in the center outside of the collar, are the belt-pulleys d^6. In and through the outer side of each are two segmental apertures, made in such proportions that they will clutch on the projecting bars *o o*, when required.

Directly under the screw d^3, having its bearings in the hanger d^2 on the inner end, and in the post q^1, on the outer end, is the shipping-bar d^9.

This bar serves the double purpose of shipping the pulleys d^6 in and out of gear, when required, and keeping them in working position, which is done by means of the two uprights and cross bar S S S, the upper ends of these uprights being made to fit in the grooves let into the outer ends of the pulleys for that purpose.

On the outer end of the shipping-bar are two crooked right-and-left rods *q q*.

These bars extend up and through the bed-plate *d d* and raised block *y y* through inlets made for that purpose, until they project far enough over the surface to be operated on by the spring f^1.

This spring is placed on the side of the lever-arm *f*, (see fig. 3,) and is so adjusted that it will, by its action on the rods *q q*, set the pulleys d^6 d^6 alternately in gear.

At each end of the shipping-bar d^5, between the inner hanger d^2 and post q^1, are two tripper-blocks, *p* and p^1, (see fig. 4,) extending upward until they pass the center of the screw d^3, there being a circular cavity in the upper end of each to prevent the screw from coming in contact therewith.

On the inner end of the carriage d^1 is fastened the clutch p^2. This passes down till its lower end passes the center of the screw in same proportion of the tripper-block *p*. This clutch and the tripper-blocks, in conjunction with the traversing-nut d^4, run the belt-pulleys d^6 out of gear.

On each side of the bed-plate *d d*, fig. 3, are the adjusting slots *e e*, through which, into the side pieces of the frame, pass the screws e^1. By means of these adjusting slots and screws the operator is enabled to set the machine in any position to suit the work.

In the center of the carriage d^1, at the outer end, is a female or hollow screw, into which the fastening-bolt, seen in the outer end or heel of the forming-last b^3, passes, thus securing the outer end.

In the inner end is a central slot, into which the upper end of the traversing-nut d^4 passes, as shown in fig. 11.

In the center of the upper end of this nut there is a corresponding female screw, into which the fastening-bolt, seen at the inner or toe end of the forming-last b^3, passes, thus securing the forming-last or bed to its carriage d^1.

To find the position of the outer hollow screw, the carriage d^1 must be brought in line with the outer end of the bed-plate *d d*, when the center of the circular groove d^7 is its position.

To find the position and dimensions of the slot in the inner end of the carriage, it will be necessary to find the extreme difference in the length of the work; that is to say, if the shortest forming-last or bed be six inches long and the longest be ten, the slot will have to be four inches long, to which must be added the space taken up by the traversing-nut d^4. If the nut be two inches wide, the slot must be six inches long, and its inner end be five inches from the center of the hollow screw in the outer end of the carriage d^1.

To find the positions of the tripper-blocks *p* and p^1 on the shipping-bar d^5, (see fig. 4,) place the outer end of the carriage d^1 in line with the front of the bed-plate *d d*, and place the pulleys d^6 out of gear; then the tripper-block *p* must be so placed that its outer face will touch the inner face of the clutch p^2, and the distance between the inner face of the tripper p^1 and the outer face of the traversing-nut d^4 will be the same as the distance between the centers of the fastening-bolts in the forming-last b^3.

c c is the driving-shaft of the machine, (see fig. 2,) c^0 being the driving-pulley, c^1 the fly-wheel, c^2 the belt-pulley for driving the belt-pulley d^6, for which purpose it is provided with two belts, *g g*. The outer belt is open, the inner crossed, thus giving, when in gear, a right or left motion to the screw d^3.

On the outer end of the shaft *c c*, between the front *a* and brace n^0 n^0, (this brace rests at its lower end on the shaft *c c*, and reaches upward till it fits firmly against the bottom of the bed-plate *d d*, thus forming a Sampson post or brace when under pressure; its upper sides move freely up and down in recesses made for that purpose in the side pieces of the frame *a a a*; its lower sides are bolted to the front frame *a*,) are the scroll-cams b^4 and b^5, figs. 8 and 10, fastened firmly together face to face. These cams are so fitted on the shaft that they can play freely back and forth, but are prevented from rotating by the spline or key *w*, set firmly in the shaft for that purpose: b^5 gives the pressure to the molders; b^4 releases it from the work.

The molder-frame (see fig. 1) consists of two cross-bars, *b b*, fastened together at their ends by the upright rods b^6 b^6. On the ends of the rods, under the lower cross-bar, are two rubber springs, surrounded and strengthened by a steel spiral spring marked *m*. These springs graduate the pressure, giving heavy or light, as they are compressed by nuts placed beneath them for that purpose.

In the center of the upper cross-bar *b* is fixed the upright shaft b^2. This shaft passes through the box-bearing a^5, and terminates at its lower end in a self-adjusting joint, to which is attached the molder, as shown in figs. 1 and 2, marked m^1. It is, in fact, the molder-shaft. The self-adjusting joint is peculiar in its action, inasmuch as it will adjust itself to any inequality that may occur in the material to be molded; that is to say, if the leather be thicker one end than the other, or one side than the other, it will adjust itself to such irregularities, its central and longitudinal position remaining the same. It is shown in fig. 12 in detail.

b^2 is the molder-shaft, on the sides of which, near the bottom, are formed two faces parallel with each other.

k^3 is a semicircular strap, having a recess in the top of such proportions that, when fitted on the shaft b^2, the sides will fit close and traverse against the parallel faces before named; endwise there is room for play. Its lower ends pass through sockets made for their reception in the molder-plate k^1, at the lower side of which they are confined by the action of the projecting spurs k^5 k^5. These spurs, in conjunction with the projecting pins k^4, keep the bottom of the shaft b^2 concaved for that purpose against the convex surface *k*, the common center of which is at k^5, the bottom side of the molder k^2. The sockets through which the ends of k^3 pass fit close at the bottom and widen upward transversely, thus giving the molder-plate room to move up and down sidewise. The length of the recess endwise permits the same motion from heel to toe, while the action of the sides against the parallel faces on the molder-shaft b^2 keep it in the same position longitudinally.

In the center of the lower cross-bar (see fig. 1) *l*, extending down, is a flat bar or tongue *l'*, provided at its lower end with two projecting lips, as shown in fig. 9, marked *n n*, one on each face. These projections are made the proper shape and proportions to enter and lock into the scrolls made on the faces of the cams b^4 and b^5. Its edges are made the suitable shape and proportion to enter and traverse the grooves made for that purpose in the bearings n^1 n^1. These bearings are attached to the brace n^9 n^9.

The flat rods n^2, on the top and bottom of the molder-frame *b b b*, are intended to strengthen the frame, and are made in the usual manner for that purpose.

To a stud projecting from the outer face of the tongue or bar b^7, attached by a working joint, is the scroll-cam shipper b^8. Below the working joint is another projecting stud, n^5, having a slot in the end to receive the shaft of the shipper b^8. This stud, while it allows the shipper to move back and forth freely, acts as a brace against any side motion or strain in shipping or otherwise. Projecting out from the left-hand bearing n^1 is a bar, n^6, bent in such a form that its outer end runs parallel with its face; this braces the shipper while performing its work. On the lower end of the shipper b^8 is a wide plate, on the inner face

of which is an inclined plane, made in such proportion that it will act in unison with the inclined plane n^4 on the outer face of the cam b^5. The crooked bar n^6 passes far enough to the right to retain the wide part of the shipper b^3 without touching the shaft.

When the machine is in work the frame $b\ b\ b$ is brought down till it assumes the position shown in fig. 2, the shipper b^3 being inside, and braced by the crooked bar n^6 in such a manner as to prevent any outward movement when the action of the two planes throw the projecting lips n in gear with the projecting scroll on the face of the cam l^5, thus giving the molder the desired pressure.

At the end of the scroll on the face of the cam l^5 is a chip, n^7, its front end being wedge-shaped, shown at l^5, fig. 10. This chip or block, acting against the projecting lip n on the end of the bar l^7, throws the cam l^5 out of gear and the cam l^4 in gear, thus relieving the pressure, when, by the action of the counterpoise b^1, the molder-frame is drawn up and assumes the position shown in fig. 1.

f^3, fig. 5, is a perspective view of the cutting-head carriage affixed in working order to the arm f, as heretofore described. To the outer end is affixed a zigzag spring marked $x\ x$, having its terminus at the handle z. This spring presses with sufficient force to keep the carriage f^3 in its proper position. To the inner end of this carriage, attached by a pivot-joint which allows it to rotate freely to right and left, is the carrier f^4, in which the cutting-head f^5, governed by the spiral springs $y^1\ y^1$, moves back and forth. On the inner end of the carrier, raised a trifle above the surface, are the fingers $m^4\ m^5$. By the action of these fingers the rounding-knife t is kept in line with the work. In position the extreme end of the fingers m^4 m^5 must be in line transversely with the center of the pivot-joint. The inside edge of the leading finger m^4 must be the same at right angles as shown in fig. 7. The faces of the fingers are a little ovaling in form, the greatest prominence on each being at equal distances from the edge of the rounding-knife t, as shown in fig. 7, marked by two dots, From the dot to its inner side the leading finger m^4 is made a little angling. This is done to ease the knife when turning round the toe end of the sole, the angle of which is sometimes very acute.

The follower m^5 is the width of the rounding-knife narrower than the leading finger m^4. This is done to allow the knife to be drawn back, and thus give the molder room to perform its work.

At the inner end of the cutting-head f^5 is a slot or recess, and in the extreme end of the goose-neck g, fastened to its upper surface, is a corresponding slot. These are for the reception of the rounding-knife. These slots commence at and run back from the center of the pivot-joint aforenamed, and a little out of line of the fingers, that the cutting-edge of the knife may project a little, as shown at t, fig. 7.

On its outer end is the tail-stock g^7 of the rocking shaft g^1, provided on each side with a circular hollow bearing, in which the journals of the plummer-block g^2 rotate.

In the outer end of this plummer-block is the hollow bearing of the rocking-shaft g^1. Near its outer end the rocking-shaft g^1 is bent in the form of a double curve, its extreme outer upper end running parallel with the body of the shaft.

On this outer end is affixed the carrier g^3, in which the channel-cutter g^4 is placed, there being for this purpose a dovetailed groove let into the carrier, in which the channel-cutter is fitted in such a manner that it will traverse freely.

At the upper end, on the face, and having its fulcrum on the outer side of the carrier g^3, is the arm or lever g^8, to which, by means of a connecting-link, is attached the channel-cutter.

On the inner side is a projecting pin or stop, on which the lever g^8 rests when the channel-cutter is not at work. When in work, this pin serves as a stop to keep it in position.

At the bottom, on the inner side, at right angles with the face, is the channel-gauge g^6. This gauge, while it determines the depth of the channel, also keeps the sole firm down on the points in the face of the molding-last b^3 while it is being rounded up or shaped, and the channel-cutter in line with its work.

On the inner end of the rocking-shaft g^1 is a long journal, which passes through the hollow-box bearing in the plummer-block g^2, and into a seat prepared for it in the segmental upright rocker g^9, in which it is confined by a cross-pin in such a manner that it may rotate freely, but cannot get away, as shown in fig. 6.

g^8 is an upright shaft, against which, being kept in position by a spring at its lower end, the rocker g^9 travels, having a circular cavity in its outer face for that purpose.

The inner side of the upright shaft g^8 must be in line with the center of the journals of the plummer-block g^2. This plummer-block is in fact nothing more than a hollow box-bearing, having two lugs extending from the end out, each lug having a journal at right angles with and extending horizontally out from the center, thus forming a recess for the upright g^8 and rocker g^9.

On each side of the cutting-head f^5 is a spiral spring, $y^1\ y^1$, the outer ends of which are secured to the journals of the plummer-block g^2, the inner ends to the fingers $m^4\ m^5$.

These springs, it is intended, shall keep the knife t up to the work.

With its outer end fast to the under surfaces of the cutting-head, its inner end resting on the rocking-shaft g^1, is the semi-oval spring s^2. This spring gives the required pressure to the channel-cutter, to insure its work.

s^3 is a hook, which, when clutched on the stem of the handle z, keeps the rounding-knife clear of the molder.

On the right-hand side of the rocking-shaft, close in the rear of the finger m^5, not seen in the drawing, is a stop, by means of which the rocking-shaft is kept clear of the work, when required.

To find the required curve for the rocker g^9, draw a central horizontal line through the rocking-shaft g^1, as in fig. 6. The distance between the center of the channeling-tool or cutter and the inside face of the upright shaft g^8 will be the curve.

The gauge g^6 must also touch this line, the channeling-cutter the depth of the channel below it, with its cutting-point a little in the rear of the rounding-knife t.

In the square block $y\ y$, at opposite ends, just below the surface, are two longitudinal slots. These are for the reception of the locking-bolts t^1, (see fig. 3.) These bolts are fitted tightly on the shipping-rods $q\ q$, so that when the rods move a like motion is communicated to them.

Their points are V-shaped, and, when in gear, one fits into a recess made for that purpose in the segmental rotating block d^6, and thus keeps it from moving, till, by the action of the shipping-rods $q\ q$, the bolt is withdrawn.

When out of gear their points or inner ends are in line with the outside diameter of the circular groove d^7.

These bolts serve, also, as a stop, to prevent the premature action of the shipper. That this may be perfectly understood, it will be necessary to give a description of the shipping apparatus when in work.

When the machine is in position for commencing work the lever-arm f is brought in line with the machine, projecting outward, the belt-pulleys d^9 out of gear, and the screw d^2 stationary. The arm is now sent forward a quarter of a revolution, thus bringing

the spring f^1 in contact with and pressing against the outer or right-hand shipping-rod q, thus forcing the shipping-bar d^9 in gear, that is, the segmental apertures in the end of the pulleys d^6 pass on and gripe the pins $o\ o$ projecting from the collar d^5, and giving a right-hand motion to the screw d^3, thus causing the advance of the forming-last or bed-carriage d^1 until the traversing-nut d^4 presses against the trip-bar p^1, and runs the pulley out of gear, and the carriage d^1 becomes stationary, and the outer locking-bolt t^1 out of the recess in the rotating block d^8.

The lever-arm f is now sent forward a full half revolution from right to left, thus bringing the spring f^1 in contact with and pressing against the inner or left-hand shipper-rod q, forcing the cross-belt pulley into gear, and giving a left-hand motion to the screw d^3, causing the carriage d^1 to recede until the clutch p^2 on it inner end, pressing against the tripper p, runs the pulley d^6 out of gear and the bolt t^1 out of the recess in the rotating block d^8.

The arm is again brought forward a quarter of a revolution and the circuit is complete.

Now, it will be seen that the spring f^1, pressing, as it does, against the shipping-rod q before the rotating block d^8 is in its proper position, would cause, if not prevented, the premature working of the screw d^3. This is prevented by the bolt t^1, its inner end being in line with the outside diameter of the circular groove d^7, into which the rotating block enters and passes the point of the bolt t^1 before the spring f^1 comes in contact with the shipping-rod q, thus retaining it, the bolt, in the same position until the recess for its reception in the rotating block d^8 is brought forward, which is not done till the block has reached its destination, when the bolt t^1, urged by the tension of the spring f^1, shoots into its place, thus securing the block d^8 and setting the pulley d^6 in gear.

The advantage gained by this mode of shipping is that it is instantaneous and thorough in its operation.

On the face of the forming-last or bed b^3, near its edges, is a series of sharp steel points. These, it is intended, shall retain the sole in position while it is being rounded up or cut in shape.

The zigzag spring $x\ x$ is intended to keep the fingers $m^4\ m^5$ pressed against the edges of the forming-last or bed b^3. This it does by communicating its pressure through the pivot-joint, thus keeping the fingers firmly in place, the pivot-joint allowing them to accommodate themselves to the different curves that occur in the work. The cutting-edge of the knife t, being placed exactly in the center of these fingers, is always in line with the curve at its center.

The spiral springs $y^1\ y^1$ are intended to keep the knife t to its work, and allow it to accommodate itself to the different curves that occur between the fingers in passing round the sole. In practice, they should be made lighter than the zigzag spring $x\ x$, say one to ten.

In setting the machine to work, it being in position as hereinbefore described, the operator places the blank sole, previously tempered, on the face of the forming-last b^3, and brings the molder-frame $b\ b$ down till it locks in gear. When it has performed its work, he brings the cutting-head forward, placing the channel-gauge g^6 on the upper surface of the sole; then gives the lever-arm f a quarter of a revolution to the right, when, by the mechanism already described, the forming-last b^3 is brought forward to the proper position for forming the toe, and remains stationary. He then gives the arm f a half revolution from right to left, when, by the same means, the forming-last is drawn back and remains stationary. The arm is again brought forward a quarter of a revolution, and the sole is finished. The cutting-head is then drawn back and secured, the sole removed, and the machine is ready for work again.

The improvement in this invention is that it does simultaneously the work of three machines, namely, the dinker, the channeler, and rounder, and does it more perfectly, inasmuch as the sole is the exact shape required, and molded the precise form. It does the work more accurately, as I will show.

The dink, technically so called, and as used in the present mode to stamp or punch out the soles, being a long continuous cutter made in the shape of a sole, is so difficult to make that it is almost impossible to get two alike, even if they be made so in the first place, as they are almost certain to spring in tempering, as all curved surfaces are. The same objections may be applied to half-dinks; neither of them giving, as a general rule, better than an uneven outline of the shape of the sole, nor do they cut all the soles the same shape or size. If the leather stock be firm, the dink, by reason of its extreme thinness, is liable to spring. If the leather stock be soft, it is apt to gather it in, thus making the sole larger than required when beat out.

It is true that rolling the leather remedies this somewhat, but does not do away with the evil. In fact, so great is the disparity at times that a rounding-machine is sometimes used to remedy the defect. Besides these objections, the dinks are very expensive and apt to break.

The molder at present used gives the same form to several sizes; that is, they are molded pretty near the form wanted, and depend on a pressing-machine to bring to the proper shape after the shoe is made. This might do for the manufacturer, but is not profitable to the consumer, as the shoe subjected to a great pressure assumes a form in which it was not made, and the sole molded to excess (this is done that all the sizes may fit at the outer edges,) not fitting the inner sole properly, fails to have the solidity required for wearing well and the sole being in temper, when molded and dry when pressed, the pressing not only partially destroys the nature or firmness of the leather, but overstrains the sewing. To remedy these evils by the present mode would be so expensive that it would place the machines entirely out of the reach of small manufacturers.

These evils are remedied by my invention, the forms being so easily and cheaply made that a full set of one size can be made for the cost of one dink, so that every sole can have its own form, and be made to fit solid against the inner sole, thus making the sole firm and in shape, and do away in a great measure with the need of a pressing-machine.

While the knife forced against the form will give the exact outline or shape required.

I do not say anything about channeling, any more than that the time of doing it is saved entirely, it being done simultaneously with the rounding, thus doing away with the need of the machine (channeling) entirely.

By the present process of dinking, only a plain sole can be cut out, and, if a tap-sole is required, the tap has to be tacked on after the sole has been dinked, and rounded up afterward by hand.

By my machine, the tap, having been first tacked to its sole, the tap-sole can be molded, rounded, and channeled by one and the same process as easily as a single or plain sole, thus doing what has never been done by machinery yet.

I desire it distinctly understood that my machine, as at present organized, can finish both inner, plain, and tap-soles for sewed, pegged, and nailed work.

My machine is also more compact, thus saving room, and centralizes the work, enabling one man to do the work of three by the present mode, and very nearly in the same time, and does away with the necessity of changing from one machine to another. In fact it does the work cheaper, quicker, and more accurately

for the manufacturer, and much better for the consumer than any other machine at present existing.

What I claim as novel and original in my present invention, and desire to secure by Letters Patent of the United States, is as follows:

Claims.

1. In a machine for rounding the soles of boots or shoes, a reciprocating bed or support for the sole, in combination with a rotating head-block and knife or cutter for trimming the edge of the sole, said cutter being mounted upon and carried by the head-block.

2. In a machine for channeling the soles of boots and shoes, the combination of a reciprocating bed or support for the sole, a rotating head-block, and a channeling-tool, mounted upon and carried by the head-block.

3. In a machine for rounding and channeling the soles of boots and shoes, a bed or support for the sole, in combination with a head-block, a rounding cutter, and a channeling-tool, both of which are mounted upon a carriage or slide having a reciprocation independent of the head-block.

4. In a machine for rounding and channeling the soles of boots and shoes, a reciprocating bed or support for the sole, in combination with a rotating head-block, a rounding-tool and a channeling-tool.

5. In a machine for rounding or channeling the soles of boots and shoes, as a means for supporting the sole, a bed provided with a series of pins or spurs, operating as set forth.

6. The automatically-reciprocating molder k^2, in combination with the supporting-bed or form b^3, substantially as set forth.

7. The combination, in an organized machine, of mechanisms for rounding, and molding, and channeling a sole, substantially as set forth.

8. The guide-fingers m^4 m^5, constructed substantially as shown, and mounted upon sliding plate, f^3, in such manner that one finger may rest against the pattern-plate or head-piece b^3 in front of the rounding-knife, and the other one in rear of said knife.

WILLM. DUCHEMIN.

Witnesses:

HENRY B. RICHMOND,

GEORGE BANNERMAN.