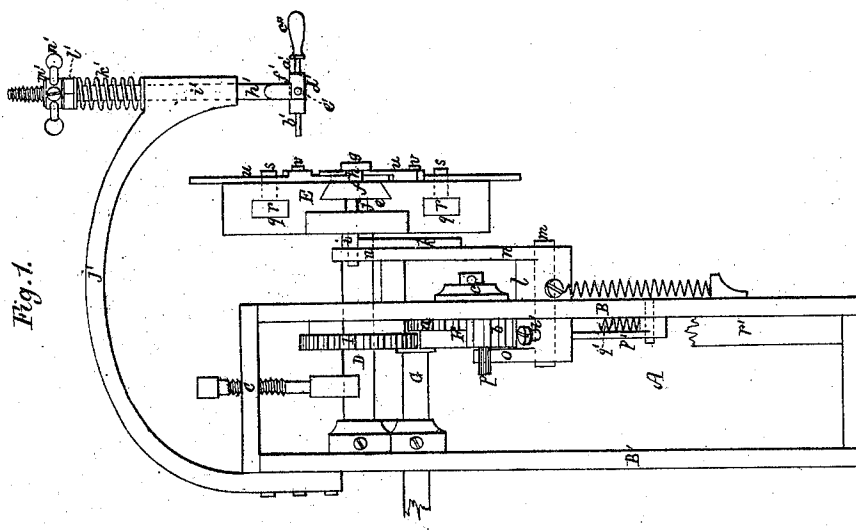
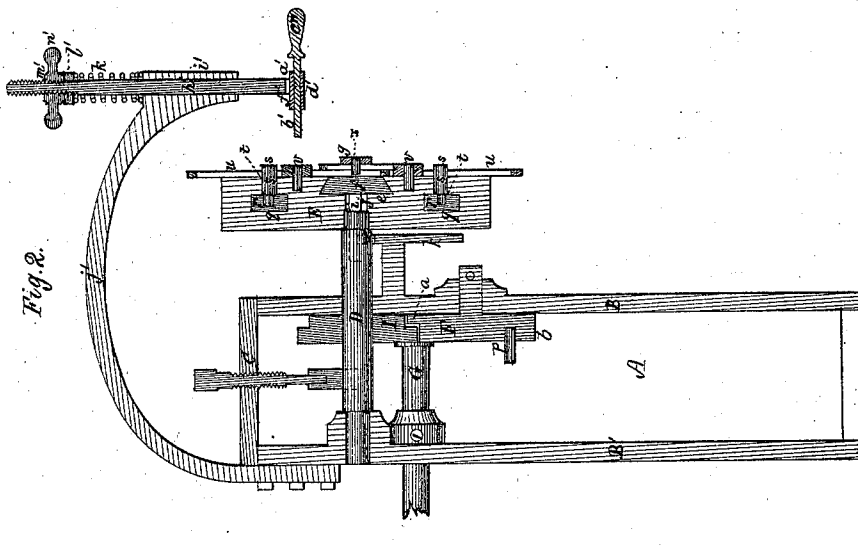


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Machinery for Finishing the Sole-Edges of Boots
and Shoes.

No. 141,997.

Patented August 19, 1873.



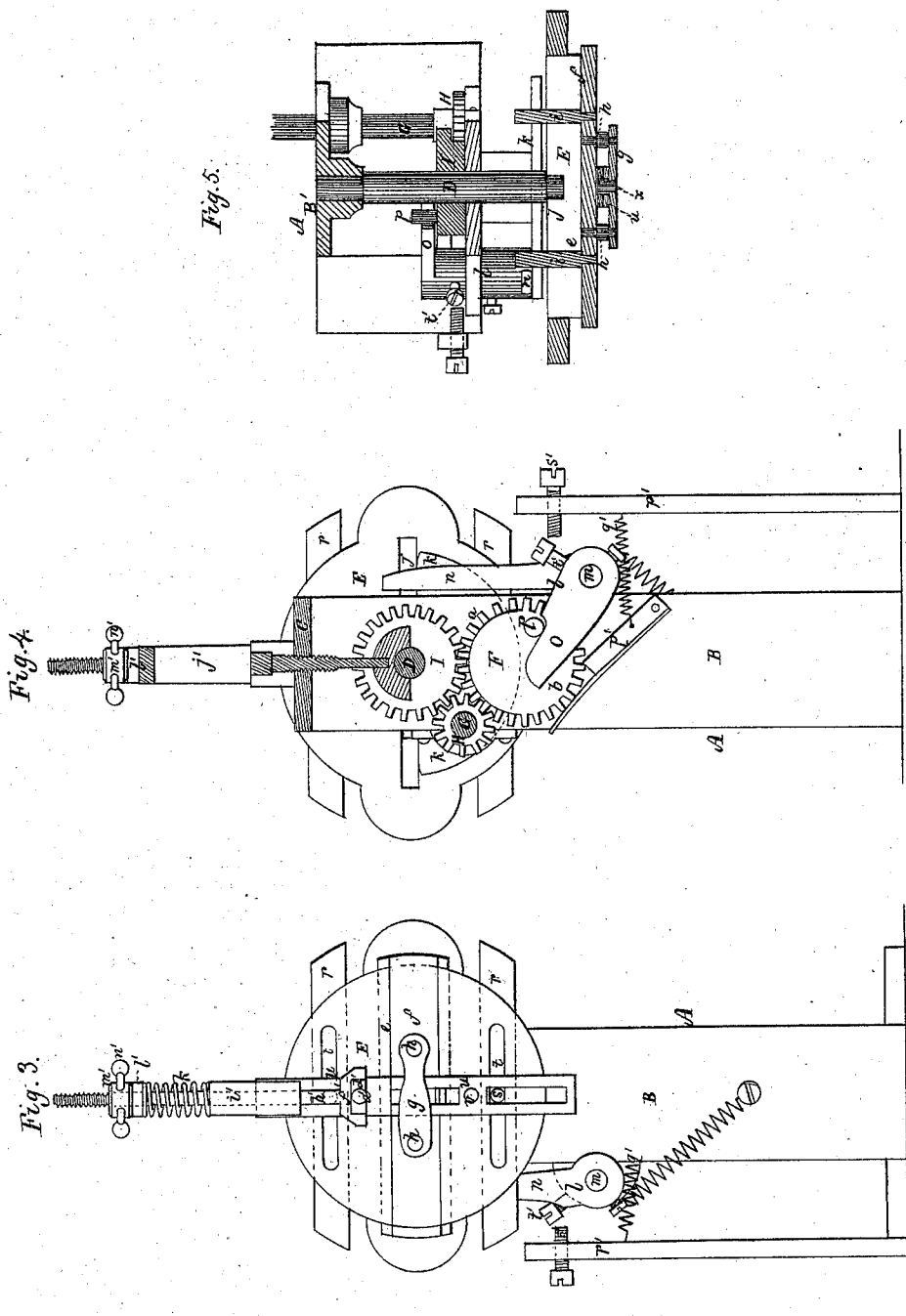
Witnesses.
H. E. Boardman
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UNITED STATES PATENT OFFICE.

CHARLES M. CHASE, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO FREDERICK CURTIS, OF SAME PLACE.

IMPROVEMENT IN MACHINERY FOR FINISHING THE SOLE-EDGES OF BOOTS AND SHOES.

Specification forming part of Letters Patent No. **141,997**, dated August 19, 1873; application filed April 29, 1873.

To all whom it may concern:

Be it known that I, CHARLES M. CHASE, of Boston, Suffolk county, Massachusetts, have invented certain Improvements in Machinery for Trimming and Setting the Edges of Boot and Shoe Soles, of which the following is a specification:

This machine is intended to perform the work of trimming, and in some instances setting, the edges of boot and shoe soles or heels, and is of that class in which a jack is employed placed upon edge and supported upon a sliding plate or carriage, which plate, in turn, is mounted upon a rotary disk or head, the jack carriage and head being so arranged and operating in relation to each other, and to a boot applied to the jack, that when the head rotates upon its axis the jack and boot are stationary upon such head, and the heel or toe of the said boot, as the case may be, describes a semicircular movement in the arc of a small circle, of which the axis of the head is the center, this semi-rotary movement enabling the edge of said heel and toe to be trimmed or set by the action of a suitable tool held against it. The purpose of my present invention is, first, to enable the movements of the jack and its carriage, and of the rotary head, to be carried out in a simple and inexpensive manner; and, secondly, to obtain a desirable method of suspending the trimming or setting tool over the jack or a boot upon such jack; and I carry out these objects as follows:

The accompanying drawings represent, in Figure 1, a side elevation, in Fig. 2 a vertical and central section, in Fig. 3 a front elevation, in Fig. 4 a vertical and transverse section, and in Fig. 5 a horizontal section, of a machine embodying my invention.

I provide a suitable support or frame, A, which upholds the working parts of the machine, such frame, in the present example, consisting of two upright plates or standards, B B', whose upper ends are spanned by a horizontal head or cross-bar, C. Within the upper part of the frame thus constituted I mount a horizontal shaft, D, which finds its bearings in said standards B B', and to the outer end of such shaft I affix a vertical rotary disk or

head, E, which travels in intermittent semi-rotary movements in a circular path upon the shaft as an axis. Upon the inside of the outer or front standard B I mount, upon a stud, c, a rotary cylindrical drum, F, the periphery of which is converted into two toothed racks, one, a, being a continuous one, and encircling such periphery, and the other, b, being a segmental one, and occupying about one-half, or slightly less than one-half, of said periphery. In rear of the drum F, and on a level with its top, or thereabout, I dispose a second horizontal shaft, G, which is the driving-shaft of the machine, this shaft revolving in bearings within the standards B B', and bearing a pinion, H, which engages and drives permanently the rack or gear a and drum F. Above the F I mount, upon the shaft D, a spur-gear, I, which engages, at certain regular intermittent intervals of time, with the segmental rack b, the said gear being fixed to the shaft D, and being the means whereby, as a power derived from the said gear b, the shaft D and head E are driven in intermittent movements in the arc of a circle. The front face of the head E is scored by a dovetailed groove, e, which intersects the center of such head, and within this groove I dispose a plate or carriage, f, whose length is about equal to the diameter of the head, though this relative size is of no especial consequence. To the outer face of the carriage f, and centrally thereof, or practically so, I affix the jack g, which, in this instance, is a plate of the form of the sole of a boot, supported edgewise upon lateral studs h h departing from the head E. To the rear side of the carriage f I affix two horizontal arms, i i, which extend rearward through a slot, j, created in the head E, and centrally of the groove e, these arms at times sliding together upon and across the upper edge of a segmental guide plate or slide, k, disposed in rear of the head E, and between it and the standard B, and at times singly, one describing a semicircular movement about the periphery of such plate, and the other describing a like movement about the shaft D, but in the arc of a very small circle, or about that described by the periphery of the shaft, the movement of the two in company across the plate, as stated,

determining the sliding transverse movement of the carriage *f* across the face of the head *E*, and the semi-rotary movements of the two allowing the head to describe a semi-rotation and carry the carriage through a like movement, without effecting any endwise sliding movement of such carriage within or upon the disk. The sliding transverse movement of the jack across the head, while the latter is motionless, carries the side portions of the sole-edge along beneath the trimming or setting tool, the functions of the arms *i i* at such time being, by sliding together upon the top of the guide-plate, to estop rotation of the head *E* and compel the jack-carriage to travel in a horizontal plane across such head, and, when traveling in semi-circular arcs, by and with the head, allowing the carriage to remain at rest upon the head while the latter is describing a semi-rotation, and carrying the heel or toe portion of the jack or of a boot-sole in a semicircular path about the axis of the shaft *D* and beneath the trimming or setting tool, in order that such heel or toe portion, as the case may be, may be acted upon by such tool. The carriage *f* is driven across the face of the head *E* by means of a bell-crank lever, *l*, which is mounted upon a horizontal rock-shaft, *m*, supported by the outer standard *B*, the outer and upright arm *n* of such lever rising to such a position as to abut against one or the other of the arms *i i* as they describe a semi-rotation about the curved portion of the periphery of the guide-plate and arrive at its upper edge, the said arm *n* immediately advancing and serving, by advancing the arm *i* nearest it, to advance the carriage *f* through the lateral traverse, which, as before stated, effects the trimming or setting of the sole-edge. The inner and horizontal arm *o* of the bent lever *l* is disposed inside of the drum *F*, and is of such a length and disposition, with respect to such drum, as to be wiped against and depressed by a pin or wiper-stud, *p*, projecting from the inner face of the drum, this pin or wiper being so situated with respect to the segmental rack that soon or immediately after the latter parts company with or is disengaged from the gear *I* said pin wipes against such arm and depresses it, and therefore advances the upright arm *h*, and with it the carriage *f*, as stated. As the lateral or horizontal traverse of the carriage *f* effects the trimming or setting of the side portion of the sole-edge, it becomes necessary to provide some means of regulating the distance thus traveled by the carriage, in order to correspond to various sizes of boots and shoes; and to effect this I change the "throw" of the arm *n* by changing the position of the wiper-stud *p*—that is to say, by carrying such stud nearer to or farther from the axis of rotation of the drum, the various elements of the machine being so timed or adjusted that, as the stud is acting upon and advancing the upright arm *h*, and effecting the horizontal traverse of the jack-carriage, the free or plain portion of the drum *F* is presented to the gear *I*. The moment the wiper-stud *p* leaves the

arm *o*, and the lever *l* is returned by the action of a spring suitably combined with it, the segmental rack *b* engages the gear *I*, and puts the head *E* in rotation, and continues such rotation until such head describes a semicircular movement, and the arms *i i* both stand at the upper edge of the guide-plate *k*, and at opposite ends thereof, one of such arms being in readiness to travel across such upper edge, and the other to describe a sweep about the curved concentric portion of such guide-plate.

In order to balance or equalize the power exerted upon the sliding carriage *f*—or, in other words, to compensate for the application of power in one direction thereupon, and thus provide a perfect mechanical action—I create in the head *E*, and upon opposite sides of the carriage *f*, two grooves or channels, *q q*, of like size and disposition, and within these channels I dispose sliding bars *r r*, each of which carries a stud, *s*, which protrudes through a slot, *t*, created in the head, each of these studs being straddled by a furcated or slotted lever, *u*, disposed against the front face of the head *E*, and pivoted thereto by a horizontal fulcrum, *v*, the inner ends of the said levers meeting and overlapping one another, and both embracing a common stud, *x*, which is secured to the rear side of the jack, the said meeting ends of the levers playing freely between the said jack and the head.

As the carriage *f* travels in one direction the levers *u u* become virtually toggles to force the bars *r r* in the opposite direction, and thus provide a counter-balance to the power exerted upon and resisted by the carriage.

The trimming-tool is shown in the accompanying drawings at *a'* as a knife, whose shank or blade is shown at *b'*, and its handle at *c'*, the said shank being inserted within a block or plate, *d'*, suspended, by horizontal trunnions *e' e'*, within a gimbal, *f'*, such gimbal compassing the lower part of an upright rod, *h'*, which is supported within a box or bearing, *i'*, of an arched beam or goose-neck, *j'*, which spans the machine, and whose base is secured to the rear standard *B'* of the machine-frame, the outer end of such goose-neck being situated over, and somewhat in front of, the head *E*. A spiral or other spring, *k'*, envelops the rod *h'*, and serves, by the stress exerted between the gimbal *f'* and a nut or cap, *l'*, affixed to the upper part of such rod, to elevate the trimming or other tool, and maintain it above the jack, or a boot thereon.

The upright rod *h'*, with its spring *k'*, allows of the necessary vertical and horizontal play of the tool; while the union of the tool-shank *b'*, block *d'*, and gimbal *f'* permits of the vertical tilting variations, and the horizontal swinging movements of the tool. I thus obtain a universal freedom of motion for the tool, which allows it to be brought, at any desired angle, upon the sole or heel edge.

Upon the top of the rod *h'* I screw a nut or head, *m'*, and I form this nut or head with a horizontal handle, *n'*, by which the workman is

enabled to vary the tension of the spring at pleasure, should he desire to do so.

It is desirable that the machine should be so organized that the rotation of the head E may be reversed in order to rotate the heel or toe of the shoe in an opposite direction to that originally started upon, as it often occurs that the work of the trimming or setting tool is imperfectly accomplished and must be repeated. I prefer, however, for some reasons, that the head should not effect an entire reverse revolution, and the drum F affords a convenient means of enabling such head to be partially rotated in a reverse direction.

It will be seen that I pivot to the inner face of the front standard B, and at its lower part, a dog or pawl, p' , the upper or idle end of which bears against the inner edge of the periphery of the drum, but free from contact with its continuous rack or gear a , such pawl being pressed in contact with the drum by a spring, q' , applied to it and to a post, r' , erected in front of the two-armed lever l , before named.

It will be at once apparent that, when the head E is rotating in its primary or original direction, the pawl will slip over the periphery of the drum without effect upon it, while, upon a reverse motion of the driving-shaft, and of the head and drum, the pawl will slip over, but will take into or abut against the first tooth of the segmental rack b which reaches it. This segmental rack or gear is so adjusted to the movements of the head E that, while the jack is traveling horizontally, the pawl slips over the teeth of such rack or gear; and, while the jack is effecting a semi-rotary movement, and carrying the heel or toe of the boot in a circular path beneath the action of the tool, the pawl passes over the smooth portion of the drum. Therefore, the head is allowed to effect a semi-rotary reverse movement upon its axis, while the jack-carriage is in such a position as to rotate with it, and thus allow the knife to retrace its steps, and go a second or third or more times over the edge of the sole at any point between the heel and toe.

The machine may be so organized as to allow of a free and complete revolution of the head in either direction; but, for some reasons, I prefer, as before stated, that it should be susceptible of a partial reverse revolution.

In order to govern the extent of the swaying motion of the upright arm or actuator of the lever l to correspond to the length of movement of the jack, I screw through the post r' a screw, s' , and I also screw into the head of said lever a screw, t' , which abuts against the screw s' and estops the rearward movement of the lever.

The operation of a machine organized as above explained is as follows: The various elements of the machine being in the respective positions shown in the drawings—that is, with the heel portion of the jack at or nearest the center of the head, and said jack about to

begin a lateral traverse of such head by the action of the stud p , wiping against and depressing the arm o of the lever, the segmental rack or gear b being out of engagement with the gear I—the driving-shaft being in motion, the pinion rotates the drum F without effect upon the gear I or the head E, the said drum, by its rotation, effecting, by means of the stud p , the depression of the arm o of the lever l , and a consequent inward swaying movement of the arm or actuator n ; the drum continuing to rotate and actuate the lever, as explained, until the latter has driven the carriage and jack across the face of the disk or head E, and the advance arm of such carriage has passed beyond the upper edge of the guide-plate and completed the first horizontal traverse of said jack, the knife a' being held against the sole-edge closely up to the heel at starting, the result being that the edge of such sole is trimmed by the knife, or burnished, if a burnishing-tool is employed. As the jack-carriage completes its horizontal traverse, as last stated, the stud p parts company with the arm o of the lever l , and the latter returns to its original position, while simultaneously, or thereabout, with this cessation of the horizontal movement of the jack and release of the lever l , the segmental rack b , which, by the rotation of the drum E, has reached the gear I, takes into the teeth of the latter, and puts it and the head, and with them the jack-carriage, in rotation, the advance arm of the jack-carriage f describing a semicircular sweep about the curved-under portion of the plate k , while the uppermost arm i of such carriage describes a like movement about the shaft D; these movements continuing until the first-named arm arrives at the upper edge of the front of the plate k and the last-named arm descends upon the said upper edge of the plate, the toe portion of the last now occupying the position which the heel occupied at starting—that is, at the center of the head—the knife having, during the semi-rotary movement of the head and boot, trimmed the edge of the toe of the last. The jack now executes a second traverse movement in the same direction, by means above stated, the head being stationary, and the knife trims the sole-edge up to the heel. When the head describes a second semi-rotary movement, the circuit of the sole is completed, and we are brought to our starting-point, the last semi-rotary movement of the head causing a like movement of the heel of the boot. If it is intended that the heel portion of the sole shall be trimmed or burnished, the tool is to be held against it while describing the last-named sweep in a circular path; but, if not, the tool is removed from contact with it.

The suspension of the operative tool by means of the arched bar or crane j' enables me to dispense with the comparatively cumbersome and expensive modes before adopted, and presents a neat and compact appearance.

I claim—

1. In combination, the disk or head E, the jack-carriage *f* with its arms *i i*, the plate *k*, and the lever *l*, substantially as and for purposes stated.

2. In combination with a disk or head and a jack-carriage sliding transversely thereupon, a trimming or setting tool suspended above such head and carriage by means of a rod and spring, as herein shown and explained, the same being substantially as and for purposes stated.

3. The operative tool suspended from a curved bar or goose-neck which is attached to the frame of the machine, and disposed above the working parts thereof, substantially as and for purposes stated.

4. The combination of the tool *a'*, tilting block *d'*, gimbal *f'*, shank or rod *h'*, and spring *k'*, the whole being suspended above the jack, and from or by a suitable support, substantially as and for purposes stated.

5. As a means of effecting the traverse of the jack-carriage upon the disk or head E, the two-armed lever *l*, actuated by the drum F and its wiper-stud *p*, substantially as and for purposes stated.

6. The drum F, with its continuous or annular rack *a*, segmental rack *b*, and stud *p*, in combination with head E, jack-carriage *f*, and lever *l*, substantially as and for purposes stated.

7. In combination, the drum F and its segmental rack *b*, and the pawl or dog *p'*, substantially as and for purposes stated.

8. The sliding bars *r r*, playing within the head E, and connected with the jack-carriage by the levers *u u*, and operating substantially as and for purposes stated.

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Witnesses:

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W. E. BOARDMAN.