

Machine for Trimming and Finishing Boot and Shoe Heels.

No. 122,462.

Patented Jan. 2, 1872.

Fig. 1.

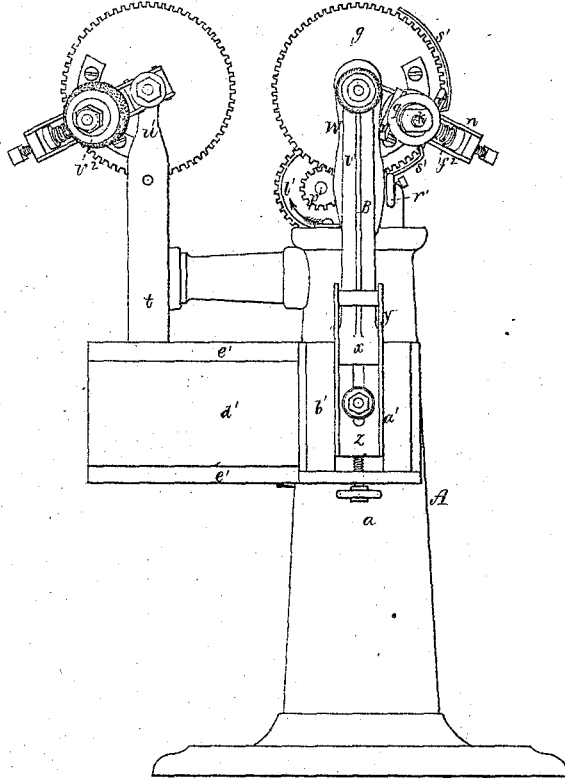
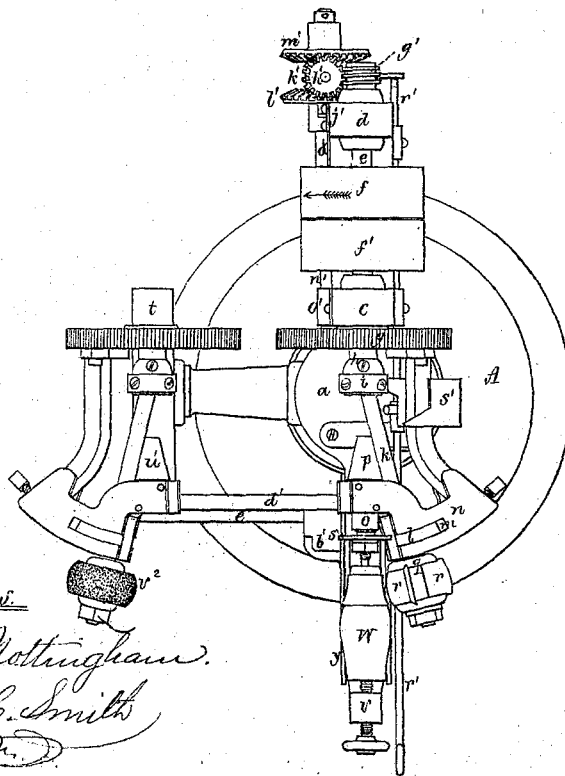


Fig. 5.



Witnesses.

Chas. B. Nottingham.

Thomas C. Smith

Gardner C. Hawkins.

by his attorney.

Stollor

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Fig. 3.

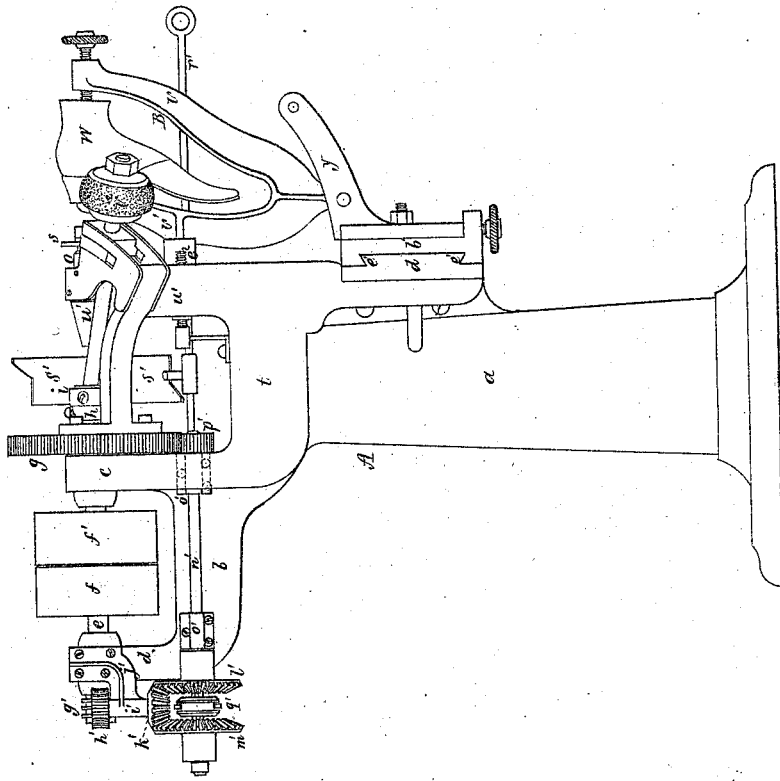
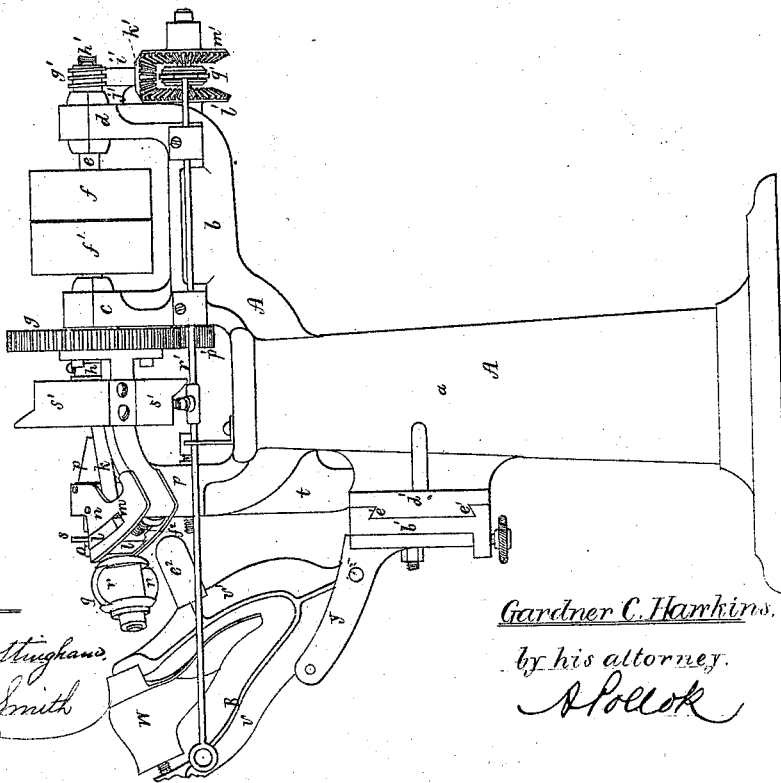


Fig. 2.



Witnesses.

Chas. B. Nottingham

Thomas C. Smith

Gardner C. Hawkins.

by his attorney.

A. Pollok

G. C. HAWKINS.

3 Sheets--Sheet 3

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Fig. 4.

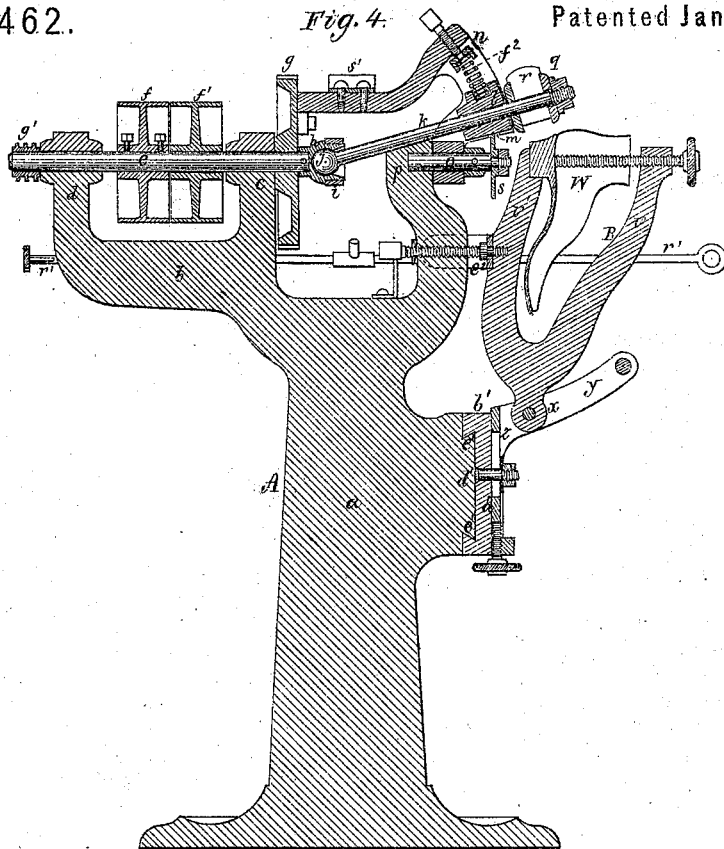
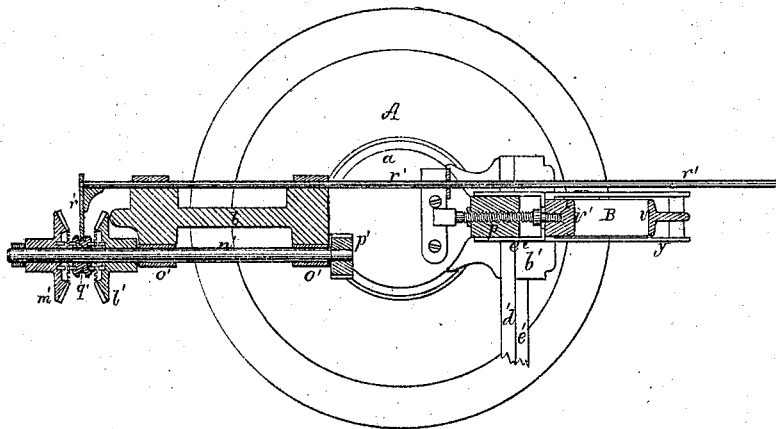


Fig. 6.



Witnesses

Chas. Nottingham
Thomas L. Smith

Gardner C. Hawkins.

by his attorney.

A. Pollok

UNITED STATES PATENT OFFICE.

GARDNER C. HAWKINS, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN MACHINES FOR TRIMMING AND FINISHING BOOT AND SHOE HEELS.

Specification forming part of Letters Patent No. 122,462, dated January 2, 1872.

To all to whom these presents shall come:

Be it known that I, GARDNER C. HAWKINS, of Boston, in the county of Suffolk and State of Massachusetts, have made an invention of certain new and useful Improvements in Machinery for Trimming and Finishing Boot and Shoe Heels; and do hereby declare the following to be a full, clear, and exact description thereof, due reference being had to the accompanying drawing making part of this specification, and in which—

Figure 1 is a front view; Figs. 2 and 3, opposite side elevations; Fig. 4, a vertical and longitudinal section; Fig. 5, a plan; and Fig. 6, a horizontal section of a machine embodying my improvements, the latter being taken through the reversing mechanism to be explained.

The purpose of this invention is to perform the labor of shaving or trimming and finishing the edges of boot and shoe-heels; and its elementary features consist of a jack or carriage for supporting the boot or shoe and a suitable cutter for reducing the heel of such boot or shoe to a given edge and form by operating upon the curved edge thereof; while in combination with such boot-supporting and heel-reducing mechanism I have employed an abrading-wheel for finishing the surface which has been left by the cutter. In detail, my invention consists, first, in mounting the boot-supporting jack upon a suitable carriage sliding upon ways properly placed and susceptible of two-fold bodily adjustment, one in a horizontal and the other in a vertical path, the purpose of the horizontal adjustment being to accommodate the jack and boot first to the reducing mechanism and thence to the finishing-wheel, while the purpose of the vertical variation is to adapt the heel to the cutter according to the particular angle or slope to which the outer end of the heel-edge is to be reduced; and, secondly, my invention, in detail, consists, in combination with the variable attachment of the jack, of stationary pattern-plate or guide for defining the path in which the cutting mechanism shall travel about the heel, the form of this pattern-plate and its position with respect to the jack being such that I am enabled to automatically vary the angle or shape of different portions of the heel-edge, a result hitherto unattained and which is of great importance in machinery of this

character, since the slope of the rear portion of the heel should approach more nearly an acute angle than the sides of the heel, especially in women's and misses' boots and shoes; and thirdly, these improvements, in detail, consist in the employment of a revolving cutter or cutter-head mounted upon the outer end of an obliquely-sloping shaft, whereof the rear end is swiveled to the outer extremity of a horizontal arbor revolved by suitable mechanism, the outer and free end of the cutter-shaft revolving in a carrier or slider which plays within a traveling sectoral carriage or cutter-stock surmounting the pattern-plate before named, and having for its point of support and vibration the base or center of the said pattern-plate, the traveling cutter-stock being upheld by and projecting from a partially-revolving gear-wheel or its equivalent, carried by the arbor before named and driven by a pinion or its substitute, to which a reversing mechanism is added, by which, when the cutter has traveled entirely about the curved edge of the heel and performed the functions of reducing the latter, the mechanism which actuates the said cutter-carriage ceases its functions and remains idle until an unfinished boot is applied to the machine. Minor features of the invention will develop themselves as we proceed with the explanation of the machine.

In the accompanying drawing, the frame or main support of the machine is represented at A as composed of an upright pedestal or column, *a*, and at the rear upper part thereof a lateral bracket or shelf, *b*, carrying two upright standards, *c d*, the said brackets and standards with the arbor above named resembling the "head-stock" of a turning-lathe, the said arbor being represented at *e* as mounted and revolving in said head-stock and carrying a fast and loose pulley, *f* and *f'*. Upon the outer end of the arbor *e*, and occupying the position of the "face-plate" of a lathe, I mount and affix a spur-gear wheel, *g*, the extreme end of the arbor as it protrudes beyond the gear being formed into a female socket or cup, *h*, which constitutes one half of a universal ball-and-socket joint, *i*, the male portion or ball *j* of which is created upon the extremity of a revolving shaft, *k*, this shaft departing from the arbor in an oblique direction and capable of assuming any angle radiating from the universal joint *i*. The outer portion of the cutter-

shaft *k* finds a bearing within a curved block, *l*, which plays in a channel or passage, *m*, formed in a sectoral or curved carriage or cutter-stock, *n*, the base of this carriage being affixed to the outer face of the gear-wheel *g* before named, and at some distance from its center, while the outer lower termination of the carriage *n* is pivoted to a horizontal stud, *o*, projecting outward from an upright post, *p*, which is erected upon the front upper portion of the column *a*, the said stud being in axial alignment, or substantially so, with the axis of revolution of the arbor *e*. The gear-wheel *g* has reciprocating semi-rotary movements in the arc of a circle imparted to it by mechanism hereinafter described, and these movements of the gear produce corresponding reciprocations or lateral vibrations of the cutter-stock or carriage *n* upon its center or point of vibration of the carriage, carry the cutter-head *q*, which is attached to the outer and free extremity of the shaft *K*, in corresponding sweeps entirely about the curved portion of the heel-edge, the cutters *r r*, &c., which are attached to the cutter-head serving in the act to reduce the heel to a form indicated and determined by the pattern-plate hereinbefore named, and shown in Figs. 2, 3, and 4 of the drawing, at *s*, as affixed to the stud *o*, which forms the pivot of the cutter-carriage *n*, since the sliding block which supports the outer end of the cutter-shaft and the cutter-head rests upon and is supported by this pattern-plate; consequently, the movements of the reciprocating cutters must adapt themselves to the outline of the said plates, and every heel reduced to a size corresponding to it. For heels which vary considerably in size and form different pattern-plates are to be employed, and they should be attached to their supporting-stud in such manner as to be expeditiously detached therefrom. The pattern-plate *S* is disposed with its face at right angles to the path traveled by the sectoral carriage *n*, and is of the form which a given heel is to assume when reduced by the cutters.

The angle or slope of the edge of the heel is in this machine determined or varied in two ways: First, by the elevation of the outer end of the cutter-shaft at the hands of the pattern-plate, for the reason that this elevation increases the size of the sectoral path described by the vibrations of the cutter-head about the axial line of the arbor *e* and stud *o*, and substantially, also, of the boot-heel, and by this means increases the slope of the cutting-faces of the cutters *r r*; and secondly, by the shape of the said cutters *r r*, as the angle of their cutting-edges determines to a certain extent that of the heel-edge reduced by them.

As the height of the cutters is governed by the size of the pattern-plates, and the pattern-plate itself varies in size with different heels, it becomes necessary to accommodate the position of the boot-heel to that of the cutter-head, and I effect this adjustment as follows: The device which supports the boot or shoe while in the machine is usually termed a "jack," and in the present instance is simply an upright

fork, *B*, between the upper extremities of whose prongs *V V* the boot *W* is clamped, the base *X* of this fork being pivoted to or within a bracket, *y*, which projects outwardly from and makes part of a vertical plate, *z*, this plate sliding in an upright groove or channel, *a'*, formed in the front face of a sliding block, *b'*, the said block in turn sliding upon suitable ways or guides *e' e'* formed in or upon a horizontal bar, *d*, affixed to the front of the pedestal of the machine and the whole being so disposed that the jack and its boot may be canted forward from the immediate vicinity of the cutters, or may be adjusted vertically or horizontally, as the case may be.

In order to insure the exact position of the jack and boot, as it is thrown up to the cutters, in alignment with the axis of the arbor, I prefer to employ a slotted block or clasp, *e'*, applied to the rear side of the jack, and which shall tightly embrace the post *p* of the machine hereinbefore alluded to as supporting the pattern-plate and the pivot of the cutter-stock. The vertical position of the jack is determined by a clamp-nut and bolt and a feed-screw, as shown in the drawing, and a suitable spring, *f²*, is placed between the curved block *l* and the upper part of the carriage *n*, in order to obtain a yielding connection between the two and depress the latter toward and upon the pattern-plate.

We have now seen how the boot is "jacked" and advanced to the cutters *r r* and how the revolving cutter-head carrying the cutter is compelled to travel about the edges of the heel and reduce the latter; and I will now explain the mechanism for estopping the movement of the cutter-head about the heel-edge, or of reversing the direction it takes when thus moving. The arbor *e* is the driving-shaft of the machine, and carries at its extreme rear end, outside of the standard *d*, a horizontal worm or screw, *g'*, which engages with a worm-gear, *h'*, affixed to the upper end of a short vertical shaft, *i'*, this shaft in turn being supported and revolving within a tubular bracket or hanger, *j'*, affixed to the rear side of the standard *d*, while to the lower extremity of the said shaft *i'* is secured a beveled pinion, *k'*, which meshes into two twin-shaped and oppositely-disposed beveled gears, *l' m'*, mounted loosely upon a long horizontal shaft, *n'*, mounted within suitable boxes *o' o'* applied to the rear side of the head-stock *b*, the forward end of this shaft *n'* carrying a fixed pinion, *p'*, which meshes into the gear-wheel *g* before mentioned as supporting and actuating the cutter-stock *n*. Between the two beveled gears *l' m'* I mount upon the shaft *n'* a double faced clutch, *q'*, which is capable of interlocking or engaging with either gear, and is confined to the shaft by a spline and groove connection in the ordinary manner of such devices, a suitable shipper, *r'*, being combined with the clutch to control its movements, and this shipper to be carried forward to a position in front of the cutter or of the jack, in order that it may be readily accessible to the operator. It will be seen that when the

driving-shaft is in revolution the beveled gears $l'm'$, through the agency of the worm g' , worm-gear h' , and beveled pinion k' , are also in revolution about the shaft, but in directions opposite to one another; consequently, if the clutch is engaged with the forward gear l' , the shaft n' and pinion p' are driven by and in the same direction with it, and, as a natural consequence, the cutter-stock or carriage n and cutter-head q advanced in a path opposite to that described by the pinion. The shipper being reversed, the clutch is engaged with the rearmost gear m' ; and through the same instrumentalities last named the cutter-carriage and cutter-head are driven in opposite directions. Allowed to stand equidistant between the two gears, the clutch remains motionless and affects neither.

The operation of a machine organized as above explained is as follows: Assuming as a starting point that the cutter-stock n is at its extreme lowest position at the right of the operator and of the pattern-plate, the jack being in coincidence with the axis of the driving-shaft, but thrown forward into a position to receive a boot, the operator now places a boot within the jack and properly secures it therein, with its face forward and uppermost, as shown in the drawing, and next pushes back the jack until the heel is immediately adjacent to or alongside of the cutter q and its cutters, the latter being in rapid revolution by the rotation of the driving-shaft or arbor e . Seizing the shipper, the operator now pulls it forward and locks the clutch q' to the forward gear l' , which is at all times revolving in the direction indicated by the arrow thereon, the driving-shaft also being driven in the direction of its arrow. The locking of the clutch to the gear l' puts the shaft n' and pinion p' in revolution in company with the said gear l' and drives the gear g and cutter-stock n in an opposite direction and compels the said carriage n and the cutter-head q to describe a sweep about the heel, the cutters in the mean time serving to reduce the heel to the size and form indicated by the pattern-plate S . When the cutter-head has traversed the entire curved surface of the heel-edge and reduced the same, the operator pushes back the shipper to such an extent that the clutch stands between the two gears and the movement of the cutter-carriage and its adjuncts ceases. To return the said carriage and its cutters to the normal or starting point, should this be desired, without adding a fresh boot to the jack, the operator may do it instantaneously by hand or by pushing back the shipper until the clutch engages with the rearmost gear m' , the rotations of the shaft n' and pinion p' are reversed, and the said carriage and cutters caused to retrace their movement by the action of the machine. In practice, however, a fresh boot should be applied to the jack and the return movement of the cutters suffered to shave or reduce the heel. The reversal of the shipper, and consequently of the direction taken by the cutter-carriage, may be effected automatically by a double-wiper cam affixed to

the cutter-stock or carriage, as shown at s' in the drawing, or to the gear g , which shall impinge at the proper time against the shipper and effect the throw of the latter; but this automatic reversal of the shipper is a matter of ordinary use, which would suggest itself in various ways to any good mechanic.

In consonance with one of the primary features of my present invention, as hereinbefore premised, I dispose alongside of the column a of the machine, and secured thereto in a suitable manner, or upon a pedestal of its own, a head-stock or frame, t , which resembles the upper part of the said column a and has a post, w' , precisely similar to the post p of the said column. With the last-named head-stock or frame t I combine precisely the same mechanism as that which actuates the cutter-head q , the only difference being that in place of such cutter-head, which reduces the heel to a given size, I employ a revolving wheel, shown at w^2 , covered with sand-paper, emery, or other suitable abrasive substance, which shall finish the edge of the heel.

After the cutters have traversed and reduced the heel as above stated, the operator throws forward the jack, which removes the boot-heel from the immediate vicinity of the cutters, and next slides the block b' and jack B along the bar d' until the jack and heel coincide with the axis of the shaft which carries and drives the abrading-wheel, when the jack is pushed rearward until its clasp e' embraces the post w' , and the heel assumes the same position with respect to the said wheel that it did in starting to the cutter-head.

The finishing-wheel having been described, a sweep about the heel in manner and by means similar to that of the cutters, is in readiness to receive an unfinished boot.

One invaluable and characteristic feature of my present machine is that the angle or slope of the heel-edge may be varied at different points to suit any style or taste, as in many classes of boots, especially for ladies and children, the rear portion of the heel-edge falls away much more rapidly than the sides.

In my present machine, when the cutter-head or the free end of its shaft approaches the top or apex of the pattern-plate the tangent described by the said shaft is of greater angle with respect to the axis of the driving-shaft and the pivot or point of vibration of the sectorial carriage than when the said cutter-head is alongside the side of the heel; consequently, the cutting-edges of the cutters $r r$ are so tilted or inclined as to slope much more at rear than at the sides, the fact being noted that the bearing or block which supports the outer end of the cutter-shaft should at all times bear closely upon and follow the outline of the pattern-plate.

For some styles of heels it may be found desirable, as before stated, to employ a cutter whose cutting-edges are of a peculiar angle, especially in such heels as have nearly a uniform slope, as in men's brogans.

I do not in any sense confine myself to precise details of mechanism or to instrumentalities such as are herein described in detail, as these may be varied by any good mechanician without affecting the principal features of my invention.

Claims.

I claim as novel and original with myself the following points:

1. In an organized machine for trimming and finishing boot and shoe heels, the combination, with mechanism for reducing the heel to a given size or pattern and mechanism for finishing the heel-edge after such reduction, of a sliding boot-support or jack arranged upon the frame of the machine, substantially as set forth, so as to be readily transposed from one to the other of said mechanisms, for the purposes stated.

2. In machinery for shaving or reducing boot and shoe heels, the stationary pattern-plate *s* or its equivalent in combination with the cutting mechanism, under the arrangement substantially as shown and described, whereby the slope or angle and position of the cutter is varied at different points, for purposes stated.

3. The stationary pattern-plate *s* or its equivalent and the cutting mechanism in combination with the jack for supporting and present-

ing the boot to the action of the said cutting-mechanism, substantially as herein shown and described.

4. In combination with the cutting and finishing mechanisms, the boot-jack or support constructed and arranged to move from one to the other and to have a vertical and vibratory longitudinal adjustment with respect to each of said mechanisms, as shown and set forth.

5. The movable boot-jack or support provided with a clasp or guide, *e'*, in combination with a stop or stops on the frame of the machine, with which the clasp or guide engages, in order to insure the coincidence of the heel and driving-shaft of either the cutting or finishing mechanism.

6. The mechanism herein described for operating the cutting or shaving device, the same consisting of the cutter-head *q* and cutters *r r* carried by the tangential shaft *k* and the sectoral carriage *n* and its block or carrier *l* and spring *f'*, the said tangential shaft being driven by the arbor *e*, and carriage *n* by the gear *g* or its equivalent, and the whole operating as stated.

GARDNER C. HAWKINS.

Witnesses:

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(16)