V. K. SPEAR.

Heel-Breasting Machines.

No. 139,273. Patented May 27, 1873.

Fig. 1.

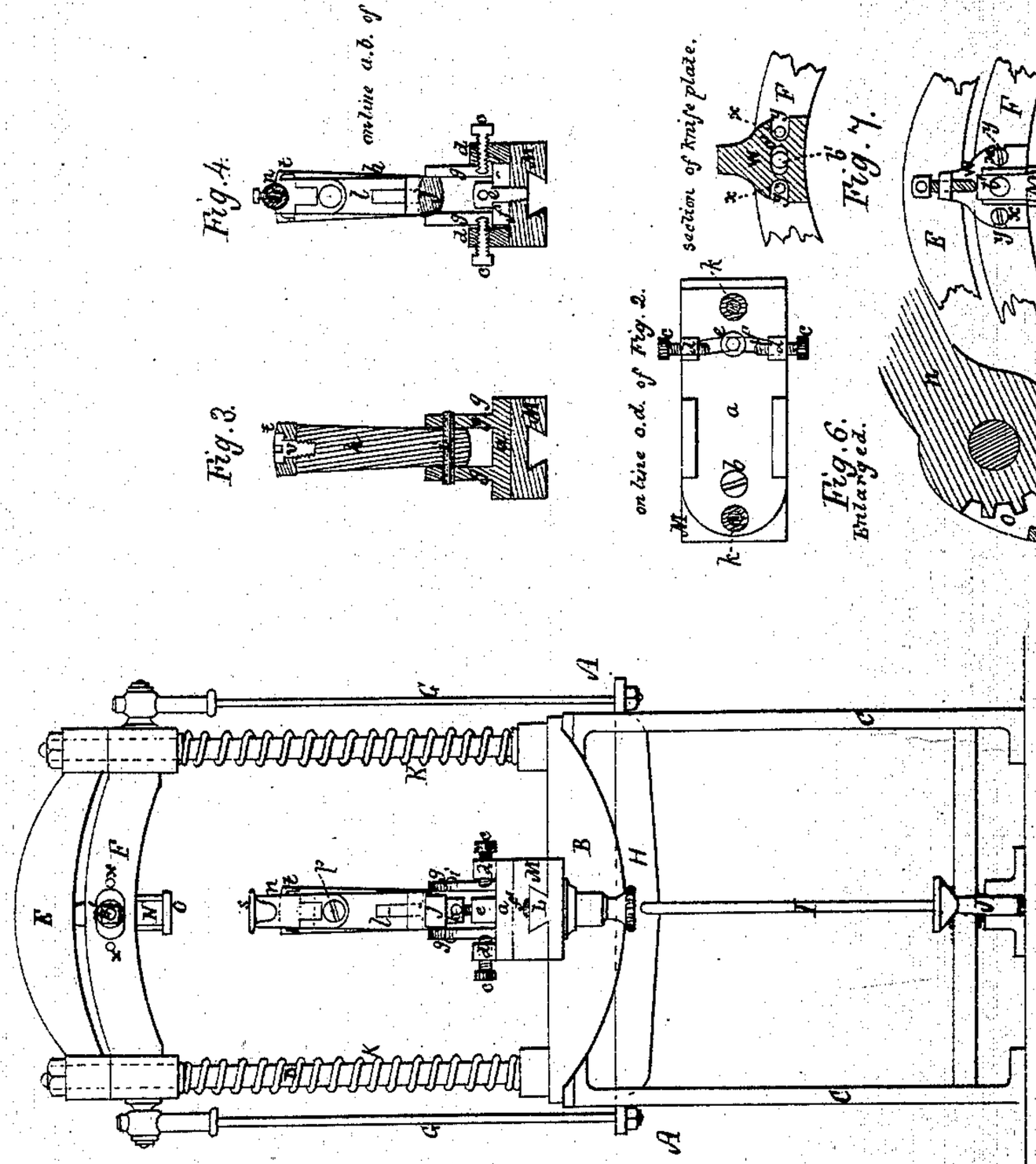


Fig. 2.

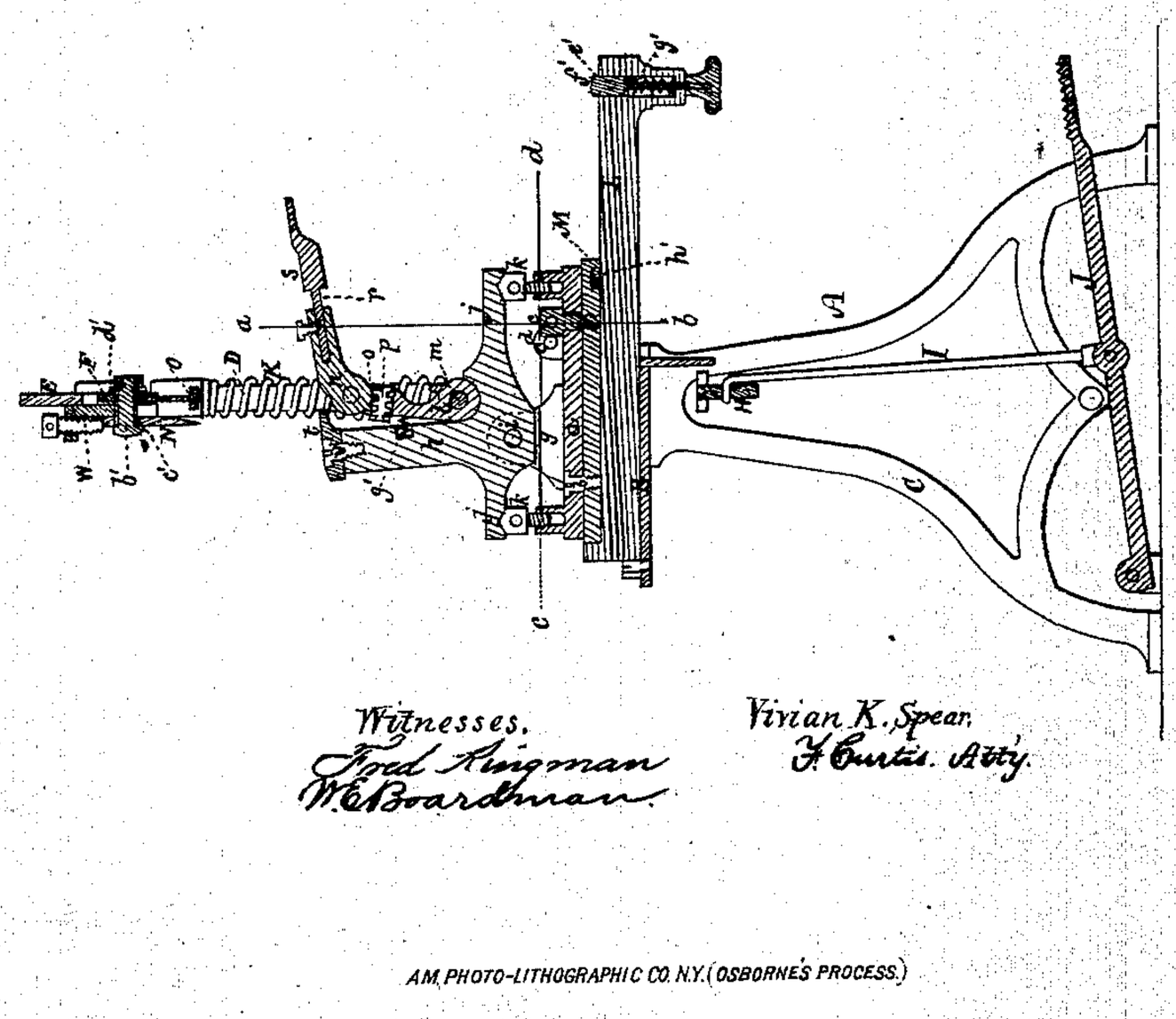
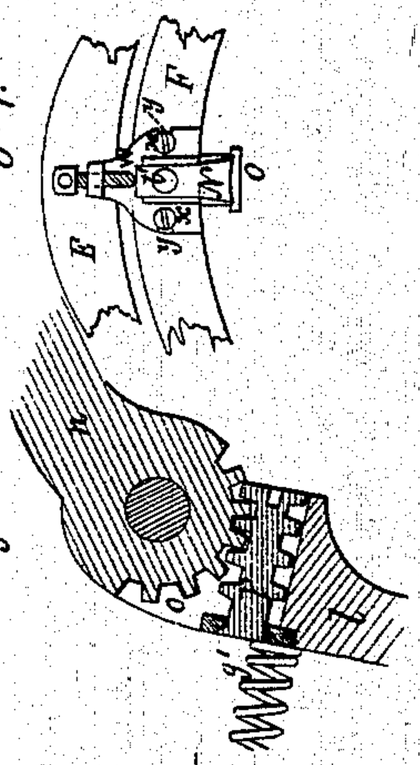


Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.
Enlarged.



Witnesses.
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UNITED STATES PATENT OFFICE.

VIVIAN K. SPEAR, OF LYNN, MASSACHUSETTS.

IMPROVEMENT IN HEEL-BREASTING MACHINES.

Specification forming part of Letters Patent No. **139,273**, dated May 27, 1873; application filed April 3, 1873.

To all whom it may concern:

Be it known that I, VIVIAN K. SPEAR, of Lynn, Essex county, State of Massachusetts, have invented certain Improvements in Heel-Breasting Machines, of which the following is a specification:

These improvements are based upon a class of machines for performing the work of "breasting" heels, so called, the main elements of which are a table supported upon a suitable frame; a "jack," for holding the boot, sliding to and fro of the said table; a knife for effecting the said operation of "breasting" the heel; and, finally, a depth-gage or guard to control the depth of cut of the knife with respect to the sole of the boot, to prevent injuring the latter, as hereinafter explained; the said knife, and gage or guard, being applied to a cross-head, making part of a frame which slides vertically with respect to the table and jack, and is lowered toward the jack, or the boot which may be upon the latter, by a treadle suitably arranged.

An example of the class of machines above cited appears in Letters Patent of the United States No. 44,453, and issued to W. H. Pitkin, of Providence, Rhode Island, on the 27th day of September, 1864, as also in Letters Patents of the United States No. 43,183, and issued to O. G. Critchett, June 21, 1864.

In all heel-breasting machines heretofore devised, so far as my experience extends, the jack for holding the boot or shoe has been an inflexible one, sliding to and fro of a guide affixed to the table of the machine, and without means of changing its position with respect to such boot outside of the said to-and-fro motion.

I. I have devised my improvements to meet wants existing in the present use of these machines, the first of which is a means of varying or adjusting the position of the jack obliquely upon the table of the machine, in order to "breast" or trim the front edge of the heel on an angle with respect to the longest plane of the sole, as in right and left boots this angle is not a right angle, but more or less oblique; that of the right sloping in a direction opposite to that of the left; this object being carried out by pivoting the base-plate of the jack upon and to the rear part of the carriage which slides to and fro of the table of the machine, this pivoting of the jack enabling its longitudinal position to be varied with respect to the knife, in order that the latter, as it descends, shall cut or trim the front edge of the heel at an obtuse angle to the longest plane of the sole, the extent of movement of the jack in this respect, being governed by two set-screws, which screw horizontally through ears erected upon the top of the base-plate, and abut at their inner ends alternately against a stop-screw which is screwed into the sliding jack-carriage, and secured within a segmental slot formed in said base-plate; such stop-screw further serving, by means of its head which overlaps the side boundaries of the slot, to lock the base-plate, and consequently the jack, in an immovable position upon its carriage, which becomes necessary when "straight" boots are being trimmed or breasted.

II. These improvements relate to means for enabling the vertical slope or angle of the breast of the heel, with respect to the bottom of the sole, to be varied, to accommodate differing styles in this respect; this object being accomplished, in the present instance, by pivoting the upright post or block of the jack at its extreme lower end, to standards erected upon the base-plate before named, by a transverse horizontal rock-shaft or journal which passes through the whole in such manner as to allow of rocking or swaying motions of said post, in a path at right angles to the cut effected by the knife in breasting the heel; a set screw being screwed into the base-plate, and below each extremity of the post or arms making part of the latter, by which the position of the post is maintained at any desired angle.

III. These improvements embrace means whereby I am enabled to so adjust the curvature of the "last" of the jack that it shall conform to the curvature of the bottom of the sole, especially at the shank, as this curvature varies very greatly in different styles of work; and I carry out this portion of my improvements by pivoting, to the lower front part of the base or post of the jack, an upright arm, which rises to nearly a level with the top of the said post, and being provided with a spring to give the required elasticity to jack the boot, as hereinafter explained, a

second horizontal arm or horn being pivoted at one end to the top of such upright arm, and extending outward toward the operator into such a position that a boot or shoe may be readily slipped heel first over the two, an adjusting-screw being employed in connection with the two to vary the slope of the horn, as hereinafter explained.

IV. These improvements relate to means for adjusting the jack to extreme variations in sizes of boots and shoes—that is to say, from children's to misses', misses' to women's, and women's to men's—as, although my jack will receive all the sizes of children's or any one class, it is not intended to embrace the whole range of manufacture; since, although I am enabled, by the employment of an independent toe-piece, and by the yielding union of the arm and post, to vary the length of the compound last considerably, one width of the heel-seat would not suffice for all. Hence this portion of my invention consists in the employment, in combination with the upright post or block of the jack, of an adjustable or removable heel-seat, which may be detached at pleasure, the requisite number and size of these heel-seats being provided to adapt the machine to such styles or class of work as may be required of it.

V. My improvements contemplate the employment of means for governing the position of the paring or breasting-knife to compensate for improper grinding of the latter, and to present its cutting edge in parallelism to the bottom of the sole shank, this result being accomplished by pivoting the knife to the cross-head or beam in such a manner that it may be adjusted vertically from an upright to an oblique position, according to the departure of the cutting edge of the knife from a line at right angles to its sides, which frequently results from hasty or careless grinding, and also that it may be moved laterally upon the cross-head to compensate for the side displacement of the knife, which its oblique adjustment entails.

In the drawings acccompanying this specification—

Figure 1 is a front view, and Fig. 2 a vertical, central, and longitudinal section of a machine embodying my improvements; Figs. 3 and 4, transverse sections of the jack; Fig. 5, a horizontal section of the jack; Fig. 6, a vertical section of the joint between the horn and arm of the jack, to be hereinafter explained; and Fig. 7, a face view of the breasting-knife and its supports.

The drawings above named represent at A the main structure of the machine, consisting in brief of a table or bed, B, supported upon two standards, C C, and bearing, upon two upright rods, D D, erected upon its opposite ends, an arched cross-bar, E. Sliding upon the upper portion of the rods D D is a cross-head, F, or knife-stock, of a form substantially that of the bar E, and in position parallel with it, a pitman, G, being attached at one extremity to one of the two ends of the cross-head, and at the opposite and lower end to one of the two ends of a horizontal beam, H, disposed below the table B, and parallel with it, this beam H being in turn connected by a rod, I, to the pedal J, disposed below the said bed B, and at right angles to its longest or transverse plane, the foot-rest of the pedal extending forward into such a position below and with respect to the horn of the jack that the operator, while managing the jack with his hands, readily operates the treadle with his foot, a spring, K, being coiled about each rod D and between the ends of the cross-head or knife-stock F and the table B to elevate the cross-head and the knife borne by it, and raise the latter above the work, when pressure upon the pedal is removed. The breasting-knife of the machine is shown at N as a gouge-shaped blade, applied to the cross-head or knife-stock F, in manner as hereinafter explained, the shear or cutting edge of this knife being at the bottom and arranged at right angles to the path of movement of the sliding carriage M and of the longest plane of the jack. O in the accompanying drawings represents a depth-gage or indicator, which is applied to the knife-stock F, and alongside of and in front of the knife N, this depth-gage being applied to the said knife-stock in such manner as to be adjusted vertically to accommodate heels which vary considerably in thickness, and its chief purpose being, by resting upon the sole, to prevent the knife from cutting into and injuring or disfiguring the latter, the knife being set in such a position with regard to the gage that its cutting-edge coincides with or extends slightly below the lower face of the gage. Upon the top of the table B is secured a dovetailed guide, L, which is disposed centrally thereof and at right angles to the longest plane of the cross-head F, and the knife carried by the latter, while sliding upon the dovetailed guide L is a carriage, M, composed of a flat plate with a dovetailed groove to embrace the spline of the said guide L, the said carriage M supporting the jack, to be hereinafter explained, and in the detailed construction of which my present improvements will be found to consist.

The above description embraces the organization of a machine for breasting heels, such as has heretofore been in use, and substantially as shown in Letters Patent hereinbefore alluded to.

I. In carrying my improvements into practical effect I employ a flat plate, *a*, which is the base-plate or foundation of the jack, this base being laid upon the top of the carriage M and pivoted at its rear end to the said carriage by an upright pin, *b*, in such manner that the forward end of the base-plate may play in a short arc of a circle upon the carriage, the extent of this play, in each direction, being governed by a set-screw, *c*, which is screwed through a stud, *d*, erected upon the base-plate *a*, at each side thereof, each of

such screws operating in connection with a second and intermediate screw or bolt, *e*, which passes through a segmental slot or channel, *f*, created in the said base-plate, and described upon a line struck from the pivot *b* as a center, the head of such stop, screw, or bolt *e* overlapping each side of the slot and constituting not only a rigid stop against which the screws abut to effect the lateral adjustment of the base-plate and jack, but serving also, by screwing down upon the said plate, to clamp the latter firmly to the carriage M and maintain the jack in a fixed position, while the heel is being breasted. The screws *c c* are not indispensable to the adjustment of the jack, as the bolt *e* would effect the purpose; but after long service such bolt and the sides of the slot would become worn, and, in any event, would be less effective than the screws. The mode of applying the plate *a* and its accompanying jack to the carriage M enables me to readily vary the position of said jack with respect to the breasting-knife, and consequently vary the transverse slope of the breast of the heel, which in "rights and lefts" is usually oblique in opposite directions, and in "straights" is square. In obtaining this result I carry out the first portion of my present improvements.

II. Proceeding with my improvements I erect upon opposite sides of the base-plate *a*, and about in the longitudinal center thereof, two upright cheeks, *g g*, and between these cheeks I dispose the lower end of an upright post, *h*, and connect the three by a horizontal shaft, *i*, which passes through them. The post *h* is practically of the form of an inverted T, and below each foot or branch *j j* thereof, I dispose a jack-screw, *k*, which screws into the base-plate *a*, these screws giving me means whereby to vary the upright position of the post *h* and its boot-supporting horn, and consequently of the breast or front edge of the heel of the boot carried by the jack, and enables me to breast or trim such heel at any desirable vertical angle with respect to the sole. In so doing I carry out the second portion of these improvements.

III. In the accompanying drawings, *l* represents an upright arm, situated in advance of the post *h* and pivoted at its lower part to the lower part of such post by a fulcrum *m*, the upper end of said arm rising to a level, or thereabouts, with the top of the post, and being pivoted at such upper end to the inner extremity of a horizontal horn, *n*, which departs from it over the front end of the base-plate *a*, as shown in Fig. 1 of the drawings, a spring, *q*, being interposed between the arm *l* and post *h*, the stress of which forces the former away from the latter, and provides an elastic or yielding connection between the two, which accommodates small variations in sizes of boots, and enables the jacking to be performed with greater ease and celerity. The joint which unites the arm *l* and horn *n* is a very peculiar one—that is to say, the male portion or tongue thereof is converted at its lower edge into a sectoral rack, *o*, which engages with the threads of a screw, *p*, which is screwed through the said arm *l* from front to rear and so as to intercept the teeth of said sector. By this means I obtain a powerful and firm means of varying the horizontal slope of the horn *n* upon the arm *l*, and in so doing, adapt the curvature of the jack to the horizontal curvature of the sole of the boot, which, as before stated, varies, to a very wide extent, in different classes of work.

In this manner I greatly improve former constructions of these machines, and carry out the third portion of these improvements.

The outer end of the horn *n* is tubular, and within its bore is inserted the shank *r* of a toe-rest or plate *s* of a suitable shape to enter and conform to the interior of the toe of a boot, the longitudinal play of this toe-rest, within or upon the horn, enabling me to adjust the jack to any size of children's boots or any other one class, without substituting a different rest.

IV. I carry out the fourth element in these improvements by applying to the top of the post *h* a movable heel-seat, so called, composed of a block, *t*, of a form in horizontal area to conform to that of the interior of the heel-seat of the boot, this heel-seat being confined to the post *h* by a screw, *v*, or other method, which permits of its ready removal and the substitution of another. As, in the case of the toe-rest before named, one size of this heel-seat will suffice for all the sizes of one class of work, but each class must possess its own. In the employment of this independent or detachable heel-seat will be found, as before stated, the fourth element in these improvements.

V. In order to be able to vary the vertical position of the knife, when necessary, to present its shear to the sole-shank in such manner that the two shall meet throughout, I apply the knife to the knife-stock F in an adjustable manner, as shown in the drawings—that is to say, I apply to the rear face of the knife-stock and centrally thereof a flat plate, *w*, and confine this plate to the knife-stock by two screws, *x x*, the shanks of which pass through notches *y y* created in each side of the plate, the heads of the screws overlapping the plate and thereby serving to confine the latter to the cross-head or knife-stock. The notches *y* are of somewhat greater width than the screw which enters them; and by this means I am enabled to tilt the plate in either direction, somewhat out of a vertical line, and, as before stated, adapt its cutting edge to the bottom of the sole. The knife, which is substantially of the form of a carver's gouge, is shown at N in the drawing, as disposed within a channel created in the outer face of the plate *w*, and confined therein by a bolt, b^1, which passes through a vertical oblong slot, *c'*, in the knife, as well as through a similar and coinciding slot, *d'*, of the plate

w, and screws into the knife-stock F, thus allowing the knife to be raised or lowered slightly with respect to the gage *o*, and to be varied in position laterally to compensate for its "out of cutter" movement when throwing it into a sloping position. The mode of swiveling the knife and plate last-above described embodies the fifth portion of these improvements.

An additional and by no means insignificant detail of my present improvements consists in disposing within a vertical orifice, *e'*, created in the front end of the guide L a bolt, *f'*, whose upper extremity protrudes slightly above the surface of such guide, and is maintained in such position by a spring, *g'*, placed below or about it, as shown in Fig. 2 of the drawings, the lower end of the bolt terminating in a knob by which it may be readily lowered. In the under surface of the carriage *a* and at its front end I produce a small socket, *h'*, which intercepts the bolt *f'*, thus locking the jack in its extreme outer position, and maintaining it firmly in place thereat while a boot is being slipped over such jack. Without this stop pin or bolt or its equivalent the jack recedes when a boot is jacked and causes much inconvenience. A boot being applied to the last the bolt is lowered and the jack and boot pushed back until the breast of the heel reaches a position immediately below the knife N.

I shall not herein describe the functional operations of this machine, for the reason that it is well understood, as the same in general form has been in common use, and shown and explained in several patents, as before stated.

Claims.

1. In a heel-breasting machine, the combination, with the vertically-moving breasting-knife, of a jack or jack-carrier movable upon a vertical pivot and adjusting devices, whereby the said jack when moved on its pivot may be adjusted and held in position to adapt the machine to the breasting of rights and lefts or straights, substantially as set forth.

2. In combination with the jack and the carriage *a*, to which the jack is jointed at *i*, as described, the jack-screws *k*, under the arrangement substantially as and for the purposes shown and set forth.

3. In machinery of the kind specified, a jack having a last portion constructed and mounted, substantially as described, so that the horizontal slope of the fore part may be varied, with respect to the heel seat or post to adapt the jack to varying curvatures of soles, as set forth.

4. The combination of post *h*, arm *l*, and horn *n*, said parts being constructed and arranged for joint operation, substantially as herein shown and set forth.

5. In a heel-breasting machine, a jack provided with a detachable or removable heel-seat, substantially as and for the purposes set forth.

6. The combination, with post *h*, arm *l*, and horn *n*, of the movable or adjustable heel-seat *t* and movable or adjustable toe-rest *s*, substantially as and for the purposes shown and set forth.

7. The breasting-knife, combined with and applied to its stock, substantially in the manner shown and set forth, whereby either the vertical slope or lateral bodily adjustment of the said knife is varied, substantially as and for the purposes stated.

8. The combination, with the guide L and carriage *a*, of the stop-bolt *f'*, or its equivalent, essentially in manner and operating as stated.

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Witnesses:
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