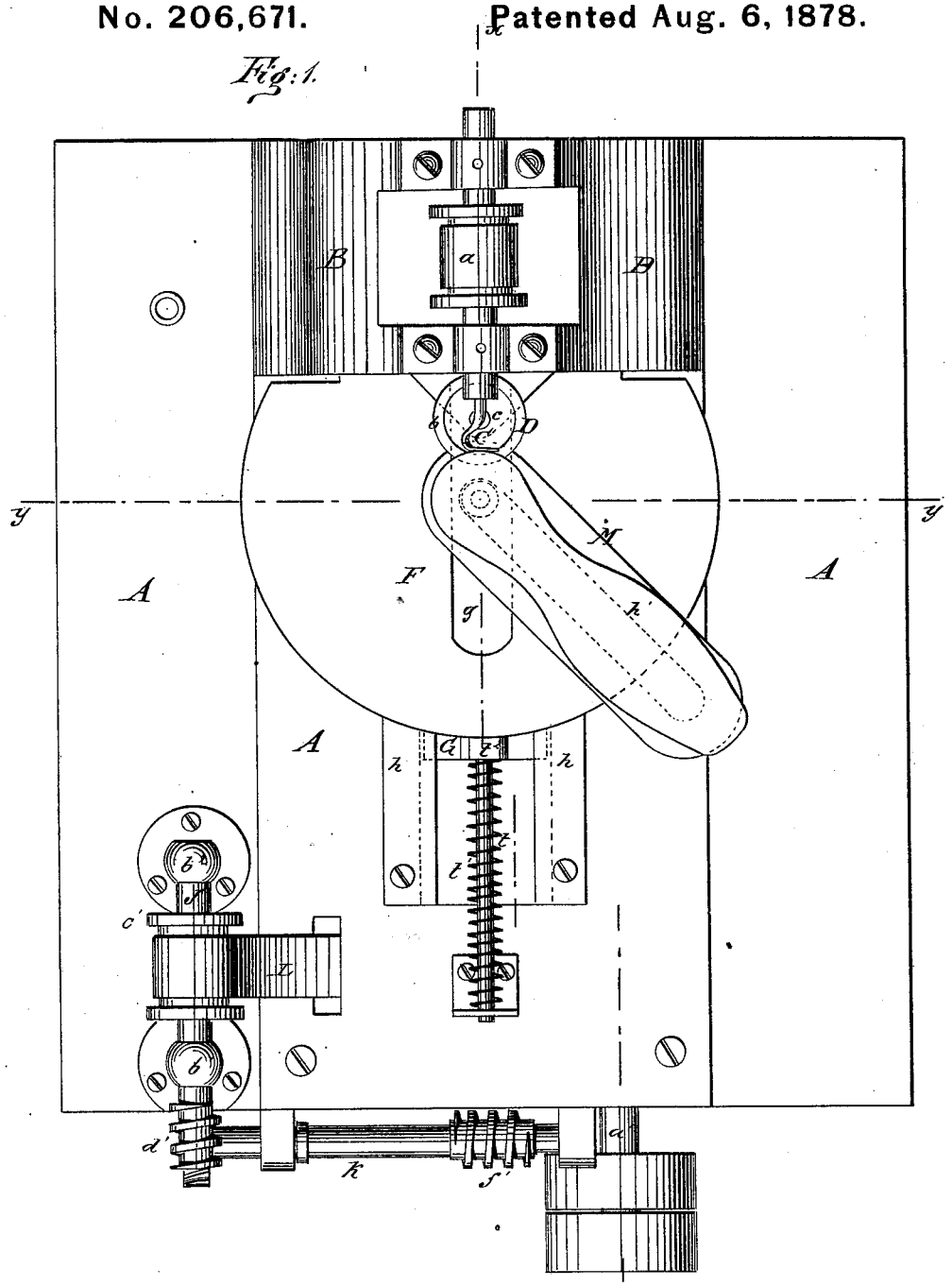
3 Sheets—Sheet 1.

C. H. HELMS.

Sole-Edge Trimming Machine for Boots and Shoes.

No. 206,671. **Patented Aug. 6, 1878.**

Fig: 1.



Witnesses:

H. L. Wattenberg

J. B. Thompson

Inventor:

Charles H. Helms

per

Wm Wymkoop

Atty

C. H. HELMS.

Sole-Edge Trimming Machine for Boots and Shoes.

No. 206,671. **Patented Aug. 6, 1878.**

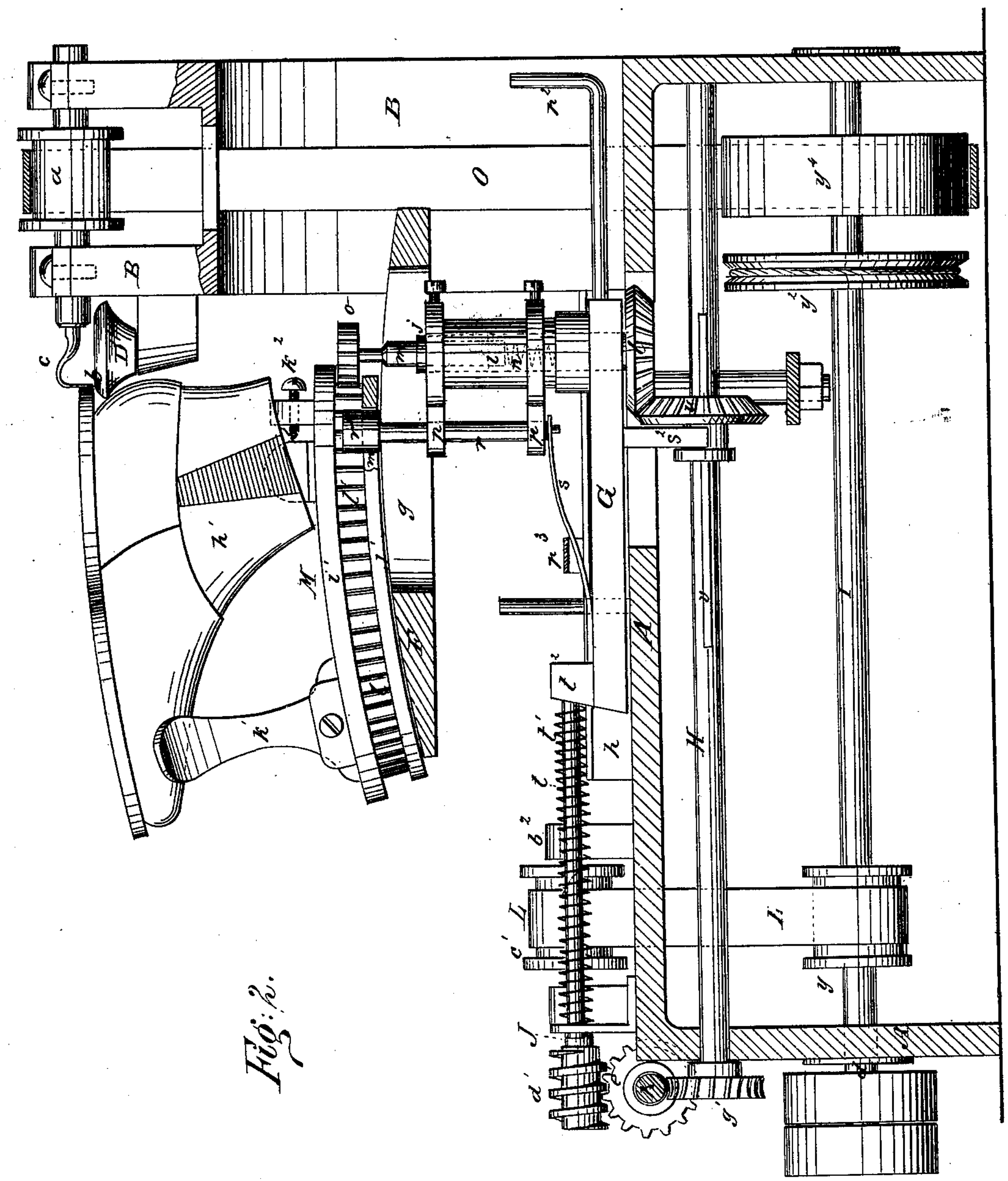


Fig: 2.

Witnesses:

H. L. Wattenberg

J B Thompson

Inventor:

Charles H. Helms

per [illegible] atty.

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

3 Sheets—Sheet 3.

C. H. HELMS.

Sole-Edge Trimming Machine for Boots and Shoes.

No. 206,671. **Patented Aug. 6, 1878.**

Fig: 3.

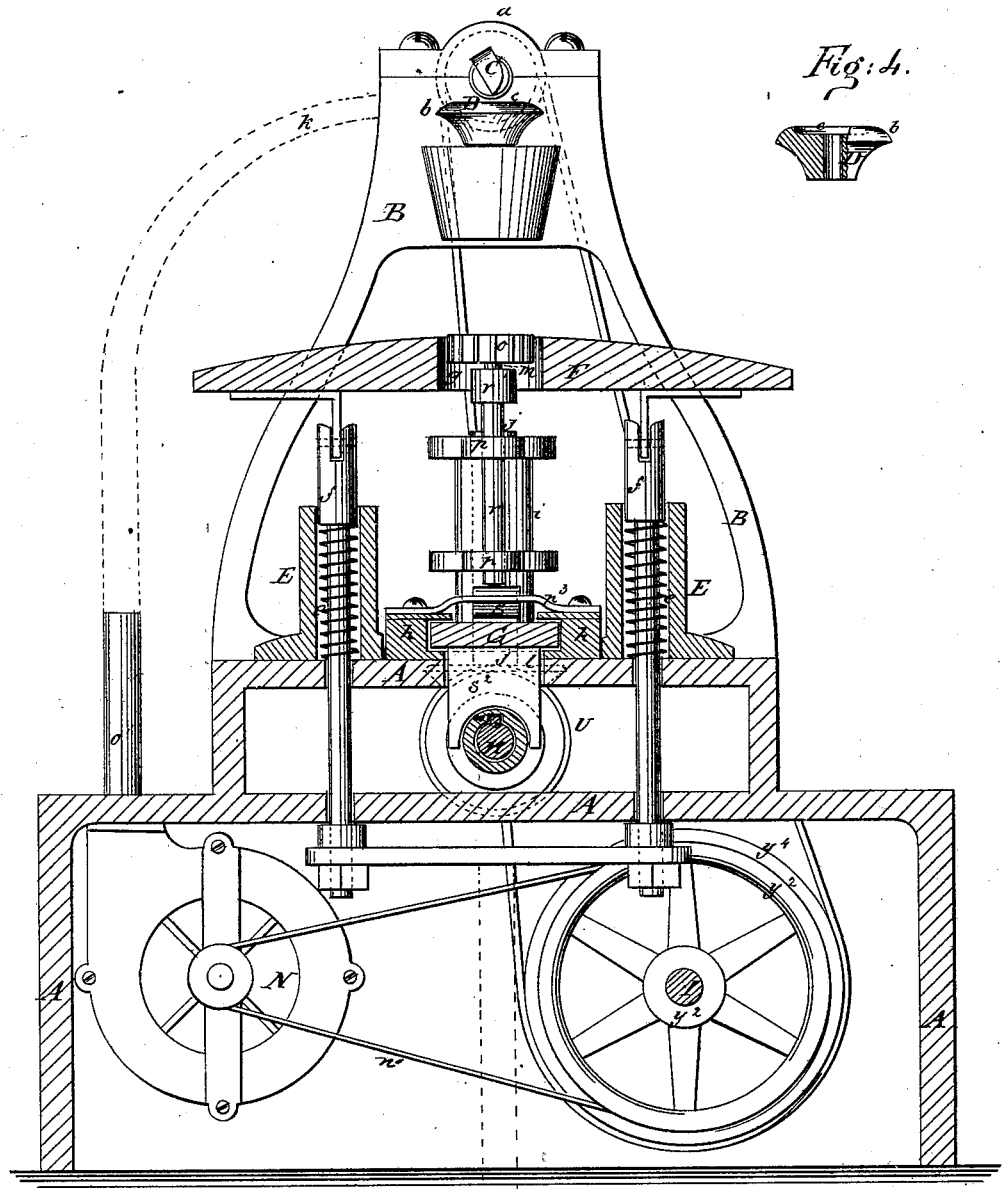


Fig: 4.

Witnesses:

H. C. Wattenberg

J. B. Thompson

Inventor:

Charles H. Helms

per

Munn & Co.

Attys.

UNITED STATES PATENT OFFICE.

CHARLES H. HELMS, OF POUGHKEEPSIE, ASSIGNOR TO THE N W ORK EDGE TRIMMER COMPANY, OF NEW YORK, N. Y.

IMPROVEMENT IN SOLE-EDGE-TRIMMING MACHINES FOR BOOTS AND SHOES.

Specification forming part of Letters Patent No. **206,671**, dated August 6, 1878; application filed January 5, 1878.

To all whom it may concern:

Be it known that I, CHARLES H. HELMS, of Poughkeepsie, in the county of Dutchess and State of New York, have invented a new and Improved Machine for Trimming the Edges of the Soles of Boots and Shoes; and that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making part of this specification.

This invention is in the nature of an improvement in machines for trimming the edges of the soles of boots and shoes; and the invention consists in a machine for trimming the edges of the soles of boots and shoes constructed with a conical revolving guide-roller with beveled edge and recessed upper surface, in combination with a cutting device, and also provided with a supporting-table adjustable vertically and horizontally, and a jack for supporting the last having rack-teeth on its sides and a slot in its under surface, and also with a guide-roller fitting into the slot in the jack and a feed-pinion gearing into the rack-teeth of the jack, the roller and the feed-pinion being fixed to a horizontally-adjustable sliding block.

In the accompanying sheet of drawings, Figure 1 is a plan or top view of my machine with jack, last, and shoe in position; Fig. 2, a longitudinal section of same; Fig. 3, a cross-section of machine; and Fig. 4, a detail side view, partly in section, of guide-roller, showing recessed face.

Similar letters of reference indicate like parts in the several figures.

In trimming the edges of the soles of boots and shoes it is important that the edges should be trimmed not only expeditiously, but also smoothly with a clean cut, leaving a square or other desired form of edge, and at the same time guard against the accidental cutting of the vamp or upper of the shoe during the process of trimming the edge of the sole. It is believed that these desirable results are accomplished by a machine constructed in accordance with the following description:

The base A of my machine may be of any convenient size or shape, and it may be constructed of any desirable material. To this base is affixed a support, B, to the upper part of which, and properly secured thereto, is a cutter, C. This cutter may be either constructed to revolve, in which case it will rest in suitable journal-bearings, and be provided with a pulley, *a*, as shown in Figs. 1 and 2, or the cutter may be fixed to the standard B so that it shall be stationary in its given position and not revolve; also, secured to the standard B, and immediately below the cutter C, is a guide-roller, D. This roller is generally conical in form, with a beveled edge, *b*, and a recessed upper surface or face, *c*, and it is secured to the standard B on an axis, around which it can revolve. To the base A are secured two upright hollow cylindrical posts, E E. Into these posts are placed spiral springs *e e*, and also into these posts, and resting on these springs *e e*, are plungers *f f*. To the upper ends of these plungers is secured, by hinge-joints, in any suitable manner, a table, F. This table has formed in it a slot, *g*, and its upper surface is convex; also, secured to the base A are slideways *h h*. Within these slideways is fitted a block, G, and to the front end of this block is fixed, in a vertical position, a cylindrical post, *i*, within which post is fitted a hollow cylindrical shaft, *j*, which shaft at its lower end is provided with a bevel-gear wheel, *l*. Into this shaft *j* is placed a spiral spring, *n*, and also within the shaft *j*, and resting on this spiral spring, is a shaft, *m*, to the upper end of which is fixed a feed-pinion, *o*. Adjacent to the cylindrical post *i*, and supported thereto by suitable lugs *p*, is a vertical stem, *r*, with a revolving head, *r'*, placed thereon. The lower end of this stem is secured to one end of a spring, *s*, which spring is also fixed to the sliding block G. To the rear end of this sliding block is attached a stem, *t*, surrounded by a spiral spring, t^1, and passing through a guide-lug, t^2.

Supported in suitable bearings in the base A, but beneath the upper surface of the same, is a shaft, H. This shaft has fitted to it a bevel-gear wheel, *u*, which is made to slide horizontally on the shaft H, but at the same time turns when the shaft does, which is accomplished by the fin *v* on the shaft and the

gate w in the bevel-wheel u. The gears of this last-mentioned bevel-wheel mesh into the gears of the bevel-wheel l, fixed to the lower end of the shaft j. Also, secured to the base A, and supported in suitable journals thereon, is a main or driving shaft, I. This driving-shaft has fixed to it a pulley, y, and a pulley-wheel, y^2; and, if the cutter C is designed to revolve, this shaft may also have affixed to it a pulley-wheel, y^4, as shown in Figs. 2 and 3. To one end, a', of the shaft I is fixed a crank, or a pulley-wheel for a driving-belt may be so secured, if desired. Also, fixed to the base A are two supports, b^1 b^2, to which, resting in suitable journals formed in the upper ends of the same, is a shaft, J, with a pulley, c', fixed to it, and a worm, d', formed on the end of the shaft. This worm meshes into the gears of a worm-wheel, e', which is secured to one end of a shaft, K. Also, onto the shaft K is formed a worm, f', which meshes into the gears of a worm-wheel, g', which last-mentioned worm-wheel is fixed to one end of the shaft H, before mentioned. Passing around the pulley c', and also around the pulley y, is an endless belt, L, and if the cutter is a revolving cutter, then will an endless belt, O, also pass around the pulley y^4 and around the pulley a.

The last h', on which is placed the boot or shoe the sole of which is to be trimmed, is fitted onto the upper surface of a jack, M. The last may be so fitted either by the devices k^1 k^2 or by any suitable devices for that purpose. The jack M consists of an upper curved plate, i', and a lower curved frame, j', the plate and frame being united by a series of rack-teeth, l'. Into the lower frame, j', is formed a slot, m', and into this slot (when the jack is in position) is placed the roller-head r', and into or between the rack-teeth l' mesh the gears of the pinion o. The frame j' of the jack M, as well as the plate i', is curved to a radius equal to the curvature of the convex surface of the table F.

Beneath the base A is secured a blower, N, which is operated by a belt, n', on the main shaft I. The nozzle of the blower terminates in a tube, o', to which may be fixed a flexible tube, k, opening immediately above the cutter C, as shown in Fig. 3.

Now, my machine, constructed as above described, is operated as follows: Power being applied to the driving-shaft I, it is made to revolve, and, if the cutter is a rotary one, the cutter is also made to revolve with great speed through or by means of the belt O, and as the main shaft is revolved motion is likewise imparted to the shaft J through the belt L; and through the worm d' on the end of this shaft, and the worm-wheel e' and worm f' and worm-wheel g', the shaft H is made to revolve; and through the bevel-wheel u affixed to it, and the bevel-wheel l affixed to the end of the shaft j', the feed-pinion o is caused to revolve. Now, when the jack M is placed upon the table F, with the guide-roller head r' inserted into the slot m' and the gears of the pinion o meshing into and between the rack-teeth l' of the jack, the vamp of the shoe or boot on the jack will be brought in contact with the beveled side of the guide-roller D, and the beveled edge b of the guide-roller will enter the channel between the sole and the upper, and the edge of the sole of the shoe or boot to be trimmed will project slightly beyond the beveled edge of the guide-roller D, and as the jack is moved or fed upon the surface of the table F by the action of the pinion o in the rack l' of the jack, the edge of the sole of the boot or shoe is brought in contact with the cutter C, which speedily cuts or trims the edge of the sole.

The beveled edge b, entering beneath the edge of the sole as it is trimmed, acts as a support to the sole against the action of the cutter, and the recess c in the face of the guide-roller insures the cutter making a clean cut, without leaving a burr, by permitting the cutting action to take effect as well below the under surface of the sole as any other part. As the jack with the shoe is fed to the action of the cutter the gears of the feed-pinion o, entering successively between the several rack-teeth l' extending around the perimeter of the jack, bring automatically the entire edge of the sole to the action of the cutter, where it is trimmed, as before stated.

Since the outline of a boot or shoe is irregular, as the vamp is pressed against the guide-roller D the shoe is forced outward, when its protruding parts are brought against the guide-roller, and it moves inward as its recessed parts or form are brought against it, this movement of the boot or shoe being automatic, as well as the feed, and it is produced by the action of the spiral spring t^1 and stem t, which permit the roller-head r' and the feed-pinion o to move toward or from the cutter as the outline of the shoe (or, more strictly speaking, the last within the shoe) shall require, since both the roller-head and pinion are fixed to the sliding block G, which is actuated by the spiral spring t^1 in the manner just described. In this way, or by means of this automatic adjustment, the edge of the sole of the boot or shoe is trimmed in exact conformity with the shape of the boot or shoe.

Besides the irregular outline of the sole of the shoe, the surface of the sole is also irregular to some extent. To accommodate such irregularities, the table F is hinged to its supports f f so that it can move freely thereon, or incline to the front or rear, and it also may be depressed vertically and be restored to its normal position by the action of the spiral springs e e in the vertical posts E E, so that the irregular surface of the sole itself automatically depresses and raises the shoe, and inclines it to the action of the cutter successively, as such irregularities are brought in contact with the guide-roller D.

As the jack is actuated or fed by the pinion o, the roller-head r' within the slot m' of the jack acts as a steady-pin with an adjustable

center, permitting the jack to be freely fed in every direction, but keeping its position and acting as an axis on which the jack travels in its irregular course. The under frame j' of the jack being curved to the same radius as is the convex surface of the table F, the action of the jack when being fed is facilitated and rendered more certain in its motion than would perhaps otherwise be the case.

The purpose of the slot g in the table F is to enable the pinion o and roller-head to be advanced and retracted as the irregular shape of the shoe shall require, in the manner before stated.

It is immaterial whether the cutter C is constructed to rotate or not, since it is obvious that the cutter may be fixed at a proper angle, so that as the edge of the sole is fed against it the cutter will shave off the requisite portion for trimming, similarly to the manner now employed by shoe-makers with their knives.

As the edge of the sole is trimmed the chips that are formed thereby, and which would interfere with the action of the cutter and the nice trimming of the sole, are blown away by a blast of air from the blower N, conveyed up and through the pipe k, opening immediately above the cutter. This blower is driven by an endless belt, n', which passes around the pulley-wheel y^2 on the main shaft I and a pulley on the axis of the fan of the blower.

The worm-gearing is adopted in the construction of my machine at present, since it seems to be the most positive in its action, and it feeds the shoe to the action of the cutter at a moderate speed, while the cutter itself may, if desired, revolve at a high rate of speed.

As the sliding block G is moved in and out by the irregular outline of the shoe and the action of the spiral spring t^1, a yoke, s^2, fixed to the under side of the block and spanning the collar of the sliding bevel-gear wheel u, forces this bevel-wheel to slide on the shaft H, and thereby preserves its connection with the bevel-wheel l, so that the feed is not interrupted by the horizontal adjustment to the irregularities of the outline of the sole, before mentioned and described.

To facilitate the placing and displacing of the jack on the table F, and in connection with the roller-head r' and the pinion o, a lever, p^2, is fixed to the front end of the block G, whereby the block may be pushed backward until the spring s, to which the lower end of the stem supporting the roller-head is fixed, comes in contact with a bridge-plate, p^3, which contact presses down the spring s, carrying with it the roller-head, until it is withdrawn from the slot m' in the under frame j' of the jack. This being done, the jack may be readily removed from or affixed to the table and pinion o. The lever p^2, upon being released, permits the spring s to throw the roller-head into the slot m', which insures the jack being in proper position and its rack-teeth meshed into the gears of the pinion o and ready for feed.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A machine for trimming the edges of the soles of boots and shoes, having in combination the following elements, viz: a hinged and vertically-adjustable table for supporting the jack, a feed-pinion, a guide-roller head, a jack with rack-teeth for the pinion and slot for the guide-roller head, and a cutting device, substantially as and for the purpose described.

2. In a machine for trimming the edges of the soles of boots and shoes, a conical guide-roller with beveled edge and recessed upper surface, substantially as and for the purpose described.

3. In a machine for trimming the edges of the soles of boots and shoes, a conical guide-roller with beveled edge and recessed upper surface, in combination with a cutting device, and a jack provided with rack-teeth for the gears of a feed-pinion and a slot for the reception of a guide-roller head, substantially as and for the purpose described.

4. In a machine for trimming the edges of the soles of boots and shoes, a hinged and vertically-adjustable table and a jack with rack-teeth to receive the gears of a feed-pinion and a slot for the reception of a guide-roller head, in combination with an automatic horizontally-adjustable feed-pinion and guide-roller head, substantially as and for the purpose described.

5. In a machine for trimming the edges of the soles of boots and shoes, a horizontally-sliding jack, in combination with a conical and bevel-edged guide-roller, substantially as and for the purpose described.

6. In a machine for trimming the edges of the soles of boots and shoes, a guide-roller head for the jack, combined with a device for withdrawing the guide-roller head from its slot in the under side of the jack, substantially as described.

7. In a machine for trimming the edges of the soles of boots and shoes, a table for supporting the jack, constructed with a slot to permit the horizontal adjustment of a feed-pinion, guide-roller head, and jack, substantially as and for the purpose described.

CHARLES H. HELMS.

Witnesses:
H. L. WATTENBERG,
G. M. PLYMPTON.