4 Sheets--Sheet 1.

# M. BRAY & F. EDMANDS.

## Machines for Cutting Boot and Shoe Heels.

Improvement in
No. 129,093.

Patented July 16, 1872.

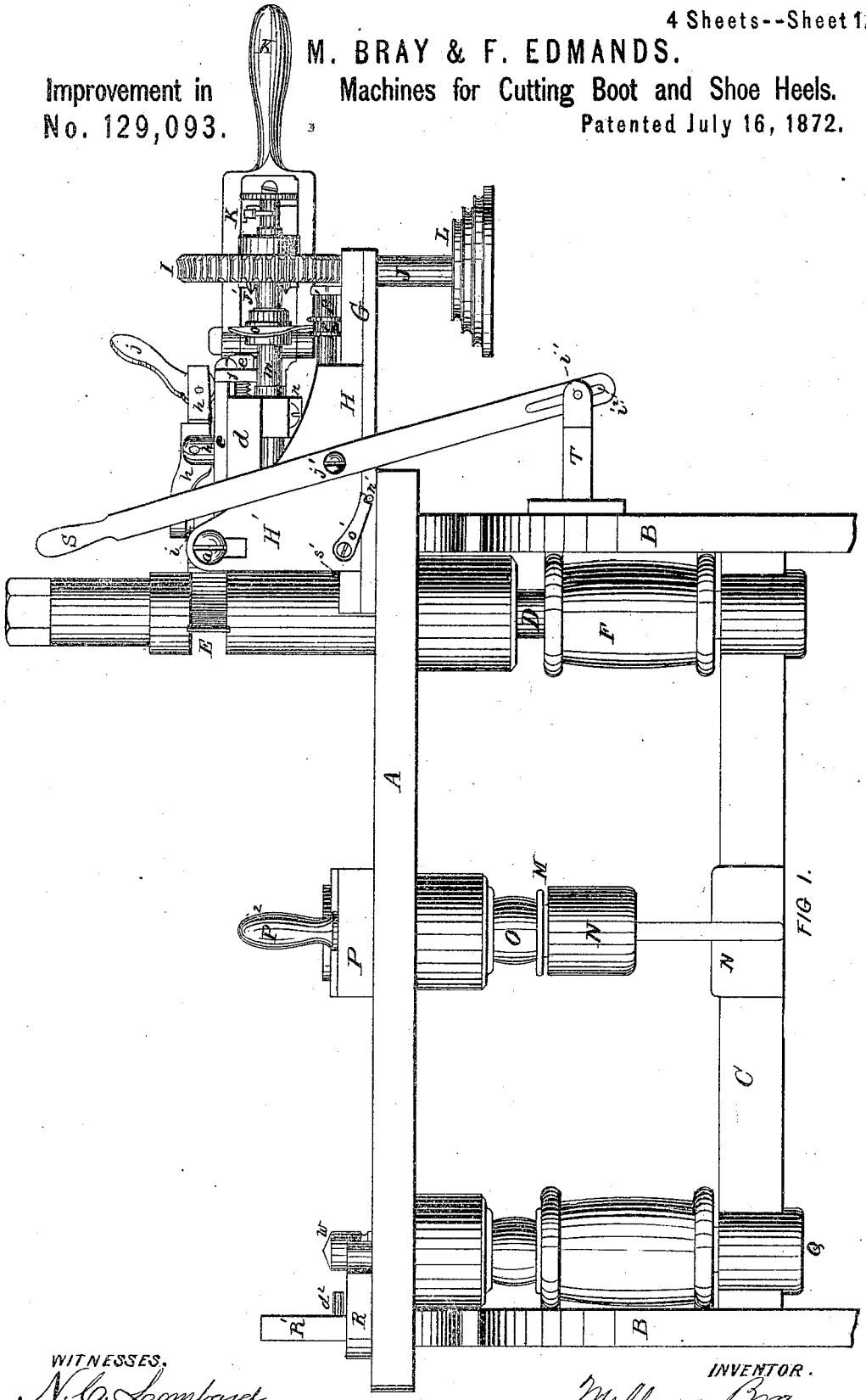

FIG 1.

WITNESSES.

N. C. Lombard

F. H. Rogers.

INVENTOR.

Mellen Bray

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# M. BRAY & F. EDMANDS.

## Improvement in Machines for Cutting Boot and Shoe Heels.

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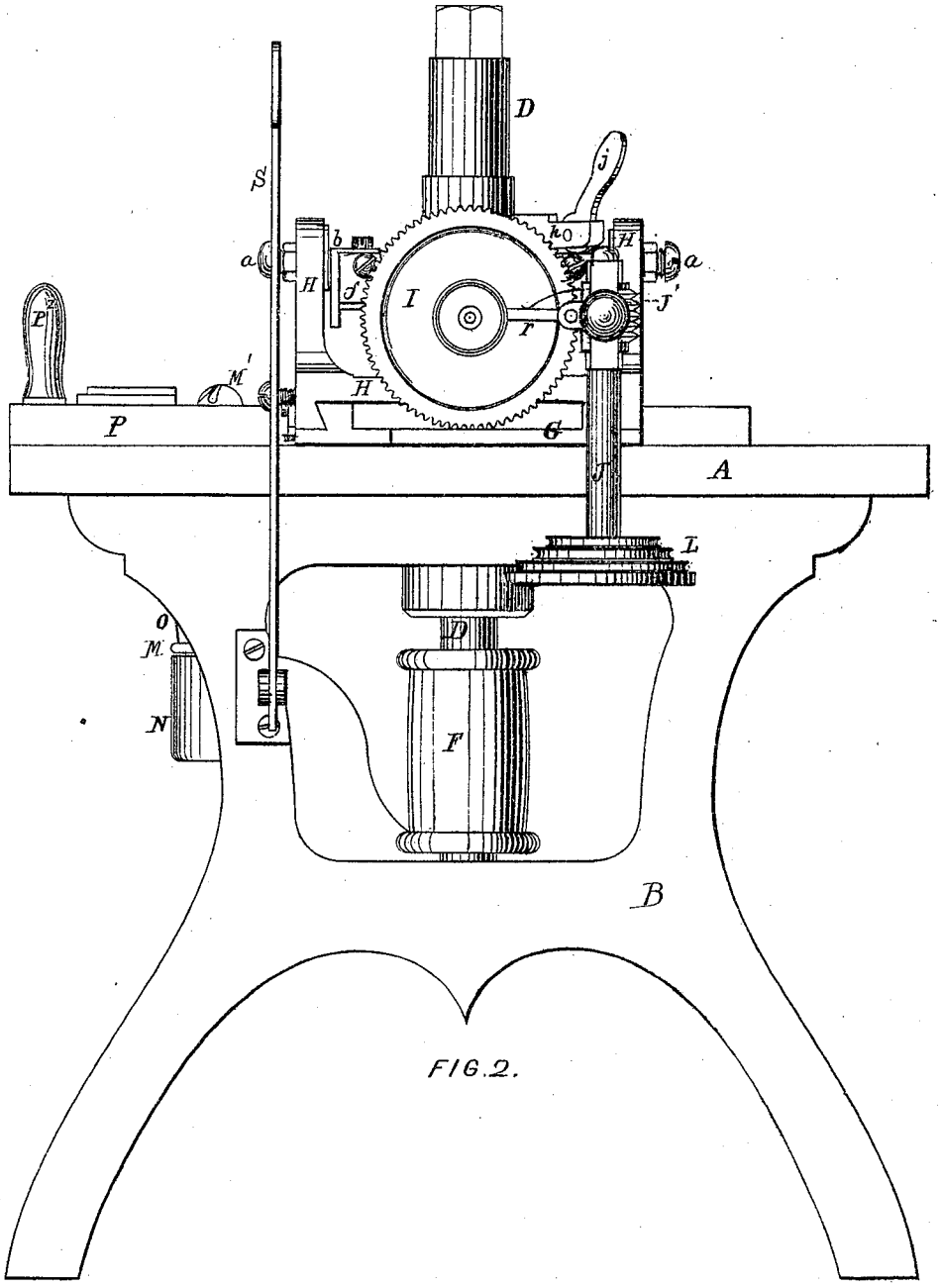


FIG. 2.

WITNESSES.

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4 Sheets--Sheet 3.

# M. BRAY & F. EDMANDS.

## Machines for Cutting Boot and Shoe Heels.

Improvement in
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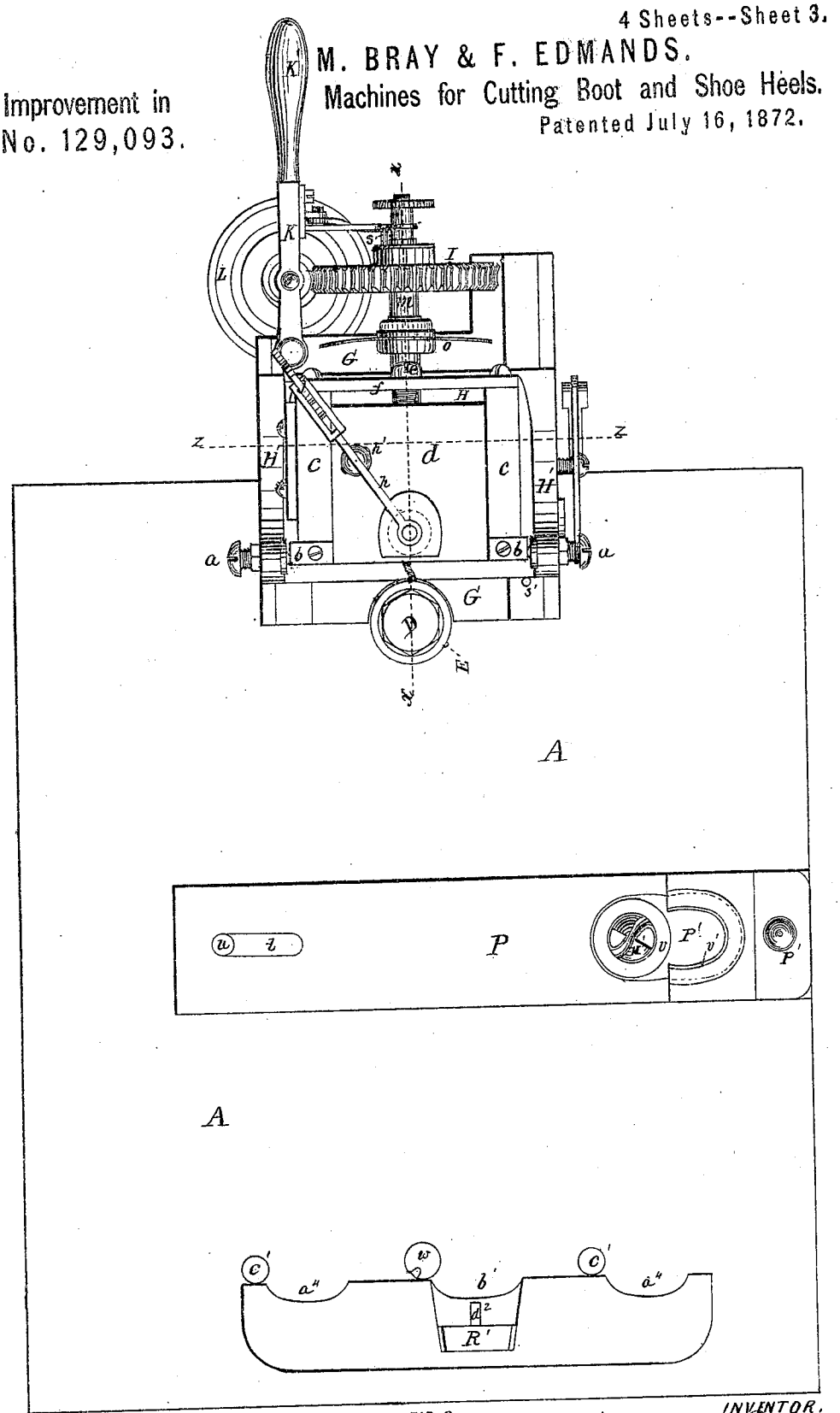


FIG. 3.

WITNESSES.

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4 Sheets--Sheet 4.

# M. BRAY & F. EDMANDS.

## Improvement in Machines for Cutting Boot and Shoe Heels.

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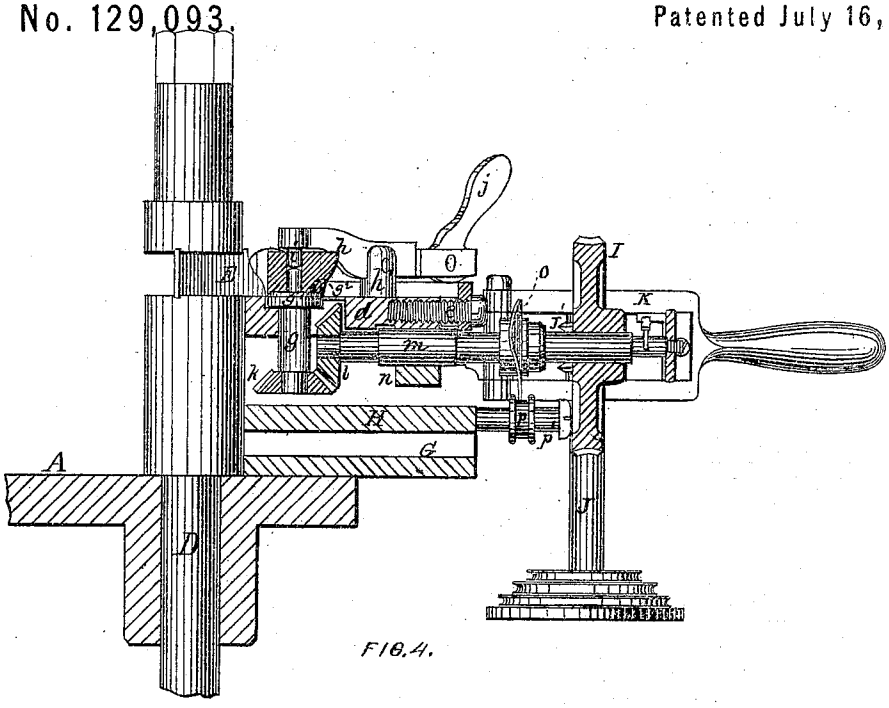


FIG. 4.

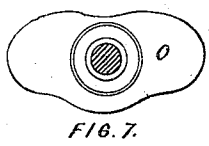


FIG. 7.

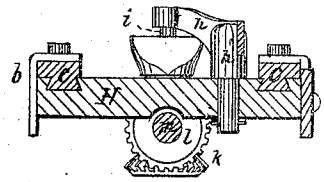


FIG. 5.

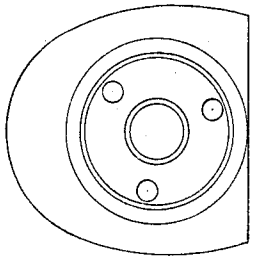

FIG. 8.

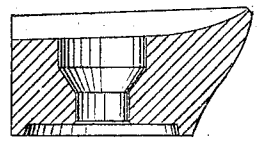

FIG. 9.

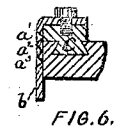


FIG. 6.

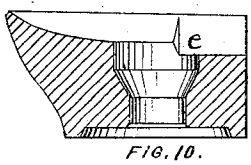


FIG. 10.

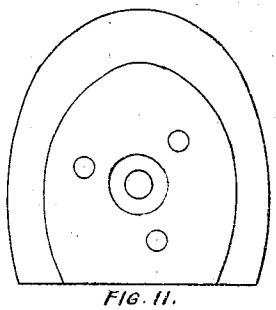

FIG. 11.

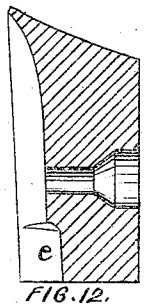


FIG. 12.

WITNESSES.

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F. K. Rogers

INVENTOR.

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# UNITED STATES PATENT OFFICE.

MELLEN BRAY AND FRANK EDMANDS, OF NEWTON, MASSACHUSETTS.

## IMPROVEMENT IN MACHINES FOR CUTTING BOOT AND SHOE HEELS.

Specification forming part of Letters Patent No. 129,093, dated July 16, 1872.

Specification describing a new and useful Machine for Cutting Boot and Shoe Heels to form, invented jointly by MELLEN BRAY and FRANK EDMANDS, both of Newton, in the county of Middlesex and State of Massachusetts.

Our invention relates in the first place to the means employed to cut away the surplus stock from the edge of a heel-blank and give it the desired form; and it consists, first, in the employment of a rotary cutter the cutting-edge of which conforms to the desired shape of the side or rear end of the heel, said cutter revolving on an axis outside of and independent of the heel-blank, while the heel is also revolved on its own axis in a plane at times parallel with the plane of the revolution of the cutter, and at other times in a plane at a varying angle to the plane of the cutter, said blank being revolved at a slow rate of speed to feed the material to the cutter as fast as it is cut away. It also consists in securing the heel-blank to a bed-plate or collar on a shaft so mounted in a sliding and pivoted bed or table that it may be placed nearer to or further from the cutter-shaft, and also be tilted to any desired angle thereto, and at the same time be capable of being revolved in said table. It further consists in controlling the position of said table, and, consequently, the shape of the heel cut, by a pattern-cam and by an adjustment of the position of the heel with relation to the centers on which said table is pivoted, or rather adjusting said centers with relation to the heel, as will be more fully described. It further consists in the use, in combination with a rotating heel-bed and its shaft mounted in a pivoted bed operated by a pattern-cam, of a worm-wheel on the cam-shaft operated by a worm upon the driving-shaft so arranged and mounted in a swing-frame that it can readily be thrown into or out of gear with said worm-wheel. It further consists in the employment of a latch for locking said worm in gear with the worm-wheel, in combination with a means of automatically tripping said latch so as to allow the belt to throw the worm out of gear. The second part of our invention relates to the means employed to finish the upper side of the heel, or that part which fits to the sole of the boot; and it consists in the employment of a cutter-head nearly hemispherical in shape on the upper end of a vertical shaft, and protruding through the table or bed of the machine a suitable depth, for the purpose intended, in combination with a hand-guide and heel-holder, arranged to slide on a pin inserted in the table and carry the heel secured thereon over said cutter, the extent of the cut made thereby being limited by the size and form of a pattern-slot in said holder, the edge of the slot being held firmly against a collar on the table and surrounding said cutter. Our invention relates in the third place to a device for making a secondary cut on the upper side of the heel to adapt said heel to a cut-off sole, or to a boot or shoe whose outer sole extends but a short distance under the heel; and it consists in the use of a cylindrical cutter projecting through the table or bed of the machine, in combination with a heel-holder arranged to slide by said cutter, being guided by two pins set in the table in line with the cutter, and on either side thereof, working in curved slots or against curved surfaces in the edge of the heel-holder.

Figure 1 of the drawing is a side elevation of a machine embodying our invention. Fig. 2 is an end elevation; and Fig. 3 is a plan of the same. Fig. 4 is a vertical longitudinal section of that portion of the machine which forms the outer edge of the heel taken on line *x x* on Fig. 3. Fig. 5 is a section of the pivoted table on line *z z* on Fig. 3, showing the slides on which it is moved to and from the cutter-shaft. Fig. 6 is a section of one corner of said table and slide, showing the center sockets on which it is pivoted. Fig. 7 is an elevation of the cam which controls the tilting of the table and determines in part the shape of the heel. Figs. 8 and 9 are respectively a plan of the under side and a vertical longitudinal section of a heel designed to be secured to the shoe by means of a screw and a nut attached to and forming a part of a metallic plate, which is securely attached to the sole of the shoe, said heel having a round tread, while its upper face has its rear end oval and its front end square, the curved edge of which is all cut with one and the same cutter by a single revolution of the heel-blank past the cutter while in motion. Fig. 10 is the

same heel having an additional cut on its upper face to adapt it to a cut-off sole. Figs. 11 and 12 are respectively a plan of the under side and a vertical longitudinal section of a heel having a tread the rear end of which is oval-shaped, and the forward end is square, or nearly so, while the upper face is oval, like the first-mentioned heel.

In the drawing, A is the table proper of the machine, supported upon suitable legs B connected together by the girt C. D is a vertical shaft mounted in bearings on the girt C and table A, and carrying the cutter E secured thereto in any well-known manner. Said shaft is also provided with the pulley F, by which it is made to revolve. G is a metal plate secured to the table A at one side of the cutter-shaft, having upon its upper side two dovetailed ribs upon which the bed or frame H is fitted to slide in a well-known manner. The frame H has two ears, H′, formed thereon, in which are set the center pivots *a a*, so arranged that they may be adjusted in a vertical direction for purposes that will be hereinafter described. The points of the pivots *a a* fit into countersunk recesses $a^1$, $a^2$, and $a^3$, formed in the brackets *b b*, which are secured to the dovetailed slides *c c*, on which the table *d* is fitted to slide, and upon which it may be adjusted by the screw *e* fitted to and revolving in the bar *f*, which is secured to the ends of the slides *c c*. In the edge of the table *d*, next to the cutter-shaft D, is mounted a vertical shaft, *g*, on the upper end of which is formed the heel-rest $g^1$ provided with spurs $g^2$, projecting from the upper side thereof, which enter the heel-blank to insure its revolving with the shaft, the heel-blank being held firmly in place thereon by the clamping-lever *h* pivoted to a stud, *h′*, set in the table *d* in such a manner that said clamp-lever may vibrate either in a vertical or horizontal direction, one end of said lever being provided with a pin, *i*, projecting downward therefrom to fit into a hole in the center of the heel-blank, and on which said blank revolves, while the other end is provided with an eccentric or cam-lever, *j*, by means of which the opposite end of the lever *h* is forced down upon the heel. The lower end of the shaft *g* has mounted thereon the miter-gear *k*, into which meshes a corresponding miter-gear, *l*, secured to the horizontal shaft *m* mounted in the bearing *n* on the under side of the table *d*, and having secured thereon the pattern-cam *o* and the worm-wheel I. The edge of the cam *o* rests upon the truck *p*, mounted upon the stud *p′*, set in the edge of the frame H, and by its rotation thereon determines the angle at which the heel-blank is presented to the action of the cutter E, said angle constantly varying as the blank is revolved. J is a vertical shaft mounted in bearings in the swinging frame K, and having formed thereon the worm J′, which may be thrown into or out of gear with the worm-wheel I, at the will of the operator, by means of the handle K′. The worm-shaft J is made to revolve by means of a round belt leading from a counter-shaft to the cone-pulley L, secured on the lower end of said shaft, and the worm J′ is kept in gear with the worm-wheel I after being thrown into gear by the operator by means of the hook-catch *r*, which hooks onto the shaft *m*, where it remains until it is thrown out by the pin *s* set in the side of the worm-wheel I, when the strain of the belt on the shaft J will cause the swinging frame K to be moved away from the worm-wheel a sufficient distance to withdraw the worm from the worm-wheel, in which position it will remain until thrown into gear again by the operator, the swinging frame K being provided with a stop to prevent it from being moved too far by the strain of the belt. M is a vertical shaft fitted to bearings in the table A and the stand N, and provided with a pulley, O, by which it is made to revolve, and also carries at its upper end a hemispherical cutter-head, M′, provided with suitable cutters for the purpose of cutting away the surplus stock from the upper surface of the heel-blank to give it the desired form to fit to the holding-plate, which is nailed to the sole of the shoe. P is a guide-bar and heel-holder, having a slot, *t*, near one end, which fits onto the pin *u* set in the table A, and a larger slot, $P^1$, near the other end, through which the cutter-head M′ passes in such a manner that the edge of the metal bounding said slot may rest against a collar, *v*, projecting from the table A and surrounding the cutter-head M′. A narrow ledge, *v′*, projects from the inner edge of the metal, surrounding about one-half of said slot $P^1$, upon which the heel is placed and held in an inverted position, and the bar P is moved back by the handle $P^2$, the bar being pressed hard against the collar *v* until it can be moved no further back, when the bar is pressed against the collar *v* upon the other side and drawn forward till the other extremity of the slat $P^1$ strikes the collar *v*. Q is another vertical shaft fitted to bearings in the table A and the girt C, and having a cutter, *w*, attached to its upper end above the table A. R is a guide-bar and heel-holder, having curved recesses $a^4$ $a^4$ and *b′* cut in its edge, the recesses $a^4$ $a^4$ being fitted to rest against the pins *c′ c′* set in the table A on either side of the cutter *w*, and in a line therewith, while the cutter *w* revolves in the recess *b′*. The guide-bar R is provided with an ear, R′, projecting upward therefrom, in which is set the pin $d^2$ projecting horizontally therefrom toward the cutter *w*, said pin to be inserted in the hole in the center of the heel with the square end of the heel resting on the bar R, with the upper surface of the heel toward the cutter, and the bar being moved endwise while being pressed against the guide-pins *c′ c′* till the heel passes the cutter, the recess *e* in the front end of the heel will be formed as seen in Figs. 10 and 12. S is a hand-lever, the lower end of which is attached to the stand T by means of the fulcrum-pin $i^1$ and the slat $i^2$, and connected at *j′* to the bed H, said lever

being used to move the bed H to or from the cutter E. The bed H is retained in position while the heel is being shaped by the pawl *o'* pivoted to the bed H and resting against the pin *n'* set in the plate G.

The operation of our invention is as follows: If it is desired to shape a heel with a round tread the table *d* is adjusted upon the slides *c c* by means of the screw *e*, so that the center of the shaft *g* will be just half the diameter of the bottom of the heel distant from the circle described by the point of the cutter E, and the centers *a a*, on which the table is pivoted, are adjusted to bring them in line with the bottom of the heel, and also in a line tangent to the circle described by the point of the cutter E. The hand-lever S is then operated to move the mechanism contained on the bed H away from the cutter, and the heel-blank is placed on the heel-rest *g'*, and the clamp-lever *h* is swung over the blank, and the pin *i* thereon inserted in the hole in the center of the blank, and the cam-lever *j* is operated to clamp the same and hold the heel firmly on the rest *g'*. The bed H is then moved toward the cutter till it strikes the stop-pin *s'*, when the pawl *o'* engages with the pin *n'* and holds the bed firmly in position, and at the same time the worm J' is thrown into gear with the worm-wheel I by means of the handle K on the swinging frame K, the hook-catch *r* engaging with the shaft *m* to hold said worm in gear while the blank is rotated thereby. When the cutter begins to act upon the blank the table *d* is very nearly horizontal, but as the blank revolves the cam *o*, being rotated at the same time, causes the table to be raised or tilted toward the cutter while it is operating on the side of the heel, gradually falling again as the cutter approaches the other end of the heel, and rising and falling again as the cutter passes the other side of the heel; and as the whole height of the heel is above the point on which the table is pivoted, it follows that more material will be cut away at the top on the sides, than from the ends, and while the bottom of the heel will be round the top will be oval, as shown in Fig. 8.

To shape a heel, the bottom of which as well as the top is oval, it is only necessary to drop the centers on which the table *d* is pivoted to a point some distance below the bottom of the heel, the height of the table remaining the same with relation to the cutter, so that the whole heel will approach nearer to the cutter while the sides of the heel are passing the cutter than while the ends of the heel are passing the same.

To shape a larger or smaller heel the table *d* is moved to or from the cutter by means of the screw *e*. The cam *o* may be varied in form to shape various styles of heel.

The operation of the devices for finishing the upper surface of the heel may be understood from the previous description without further explanation. This machine is equally well adapted to shaping wood or leather heels, and may be applied to shaping various other articles.

What we claim as new, and desire to secure by Letters Patent of the United States, is—

1. In an organized machine for trimming and shaping the edge of a boot or shoe heel, we claim a cutter the cutting-edge of which is shaped to the desired vertical curve to be given to the heel-edge, and arranged to revolve in a plane parallel or nearly so to the plane of the revolution of the heel, in combination with mechanism for holding the heel-blank and giving it a positive movement of revolution upon its axis, substantially as described.

2. In combination with a rotary cutter the cutting-edge of which is shaped to the desired vertical curve to be given to the edge of the heel, we claim the table *d* hung on centers or their equivalents, arranged in a line at right angles to the axis of the cutter, and tangent to the circle described by the point of the cutter, so that said table may be tilted to any desired angle to the axis of said cutter, substantially as described.

3. In combination with a cutter revolving in a plane parallel or nearly so to the plane of revolution of the heel, we claim the arrangement of the heel-revolving mechanism upon a table capable of being adjusted toward or from said cutter, and at the same time tilted to any desired angle to the axis of the cutter, substantially as described.

4. In combination with the table *d*, arranged as set forth, we claim the cam *o*, constructed and arranged substantially as shown and described.

5. In combination with the table *d* and cam *o*, we claim the stud *p'* and the anti-friction truck *p* arranged to slide on said stud, in order to adapt itself to the position of the cam, substantially as described.

6. The swinging frame K, in combination with the worm J', arranged and operating substantially as described, for the purpose specified.

7. In combination with the worm J', the swinging frame K and the worm-wheel I, we claim the hook-latch *r*, arranged and operating substantially as described.

8. The pivot-bearings *a a*, arranged substantially as specified, that they may be adjusted in a vertical direction in the frame H and also in the brackets *b b*, so that without changing the height of the table *d* it may be pivoted on a line with the bottom of the heel, or at any desired point below said heel to vary the style of the heel to be cut, substantially as described.

9. The rotary cutter-head M' and the heel-

holder and guide-bar P, constructed and operating in combination as herein set forth, for the purpose specified.

10. The guide-bar and heel-holder R, constructed as herein set forth, and arranged to work in combination with the cutter *w*, and guided by the pins *c' c'* or their equivalents, substantially as described.

In testimony whereof we have signed our names to this specification before two subscribing witnesses.

MELLEN BRAY.
FRANK EDMANDS.

Witnesses:
N. C. LOMBARD,
F. K. ROGERS.