

No. 652,500.

Patented June 26, 1900.

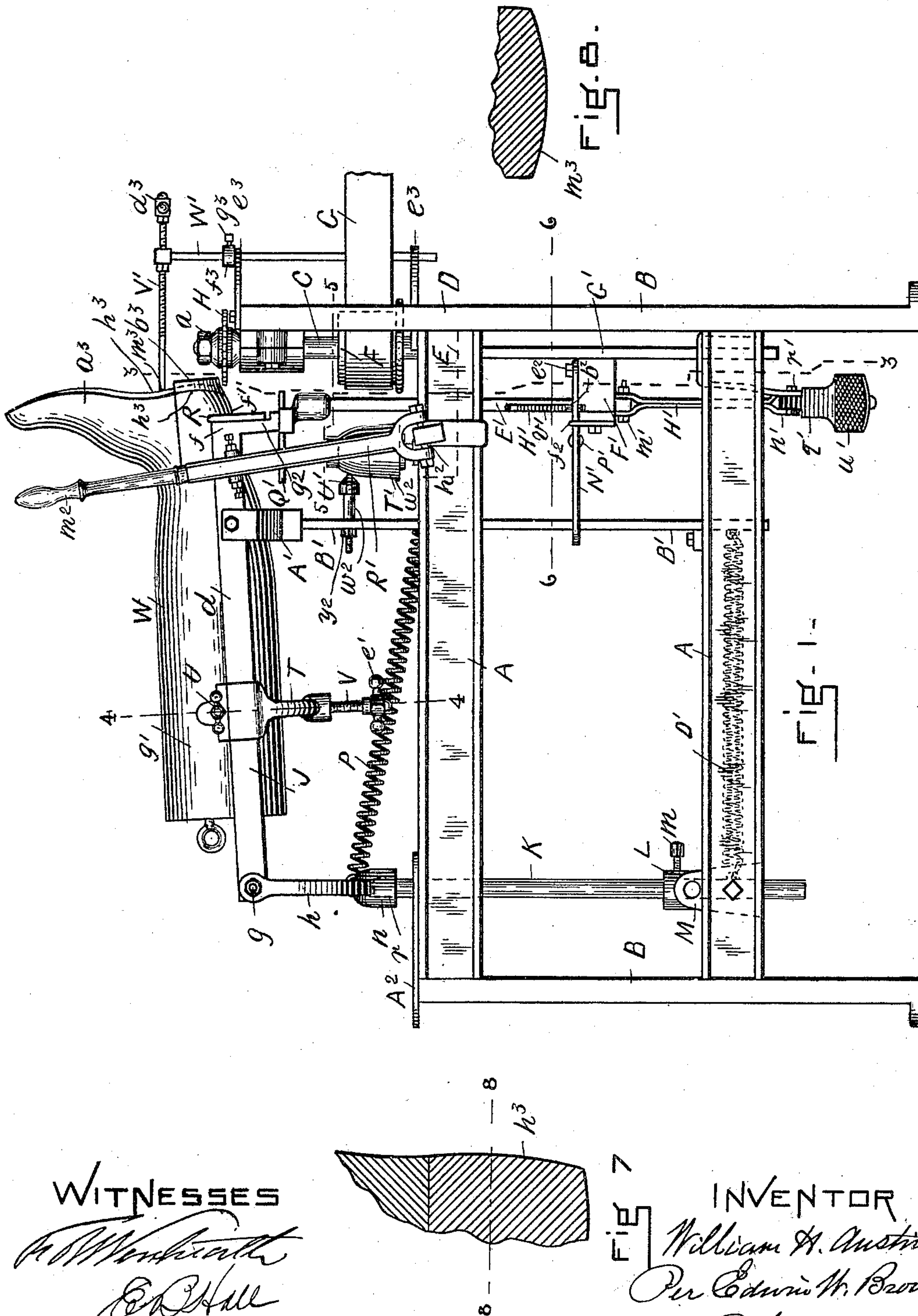
W. H. AUSTIN.

HEEL TRIMMING MACHINE FOR RUBBER BOOT TREES.

(Application filed July 16, 1897.)

(No Model.)

3 Sheets—Sheet 1.



WITNESSES

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FIG. 7

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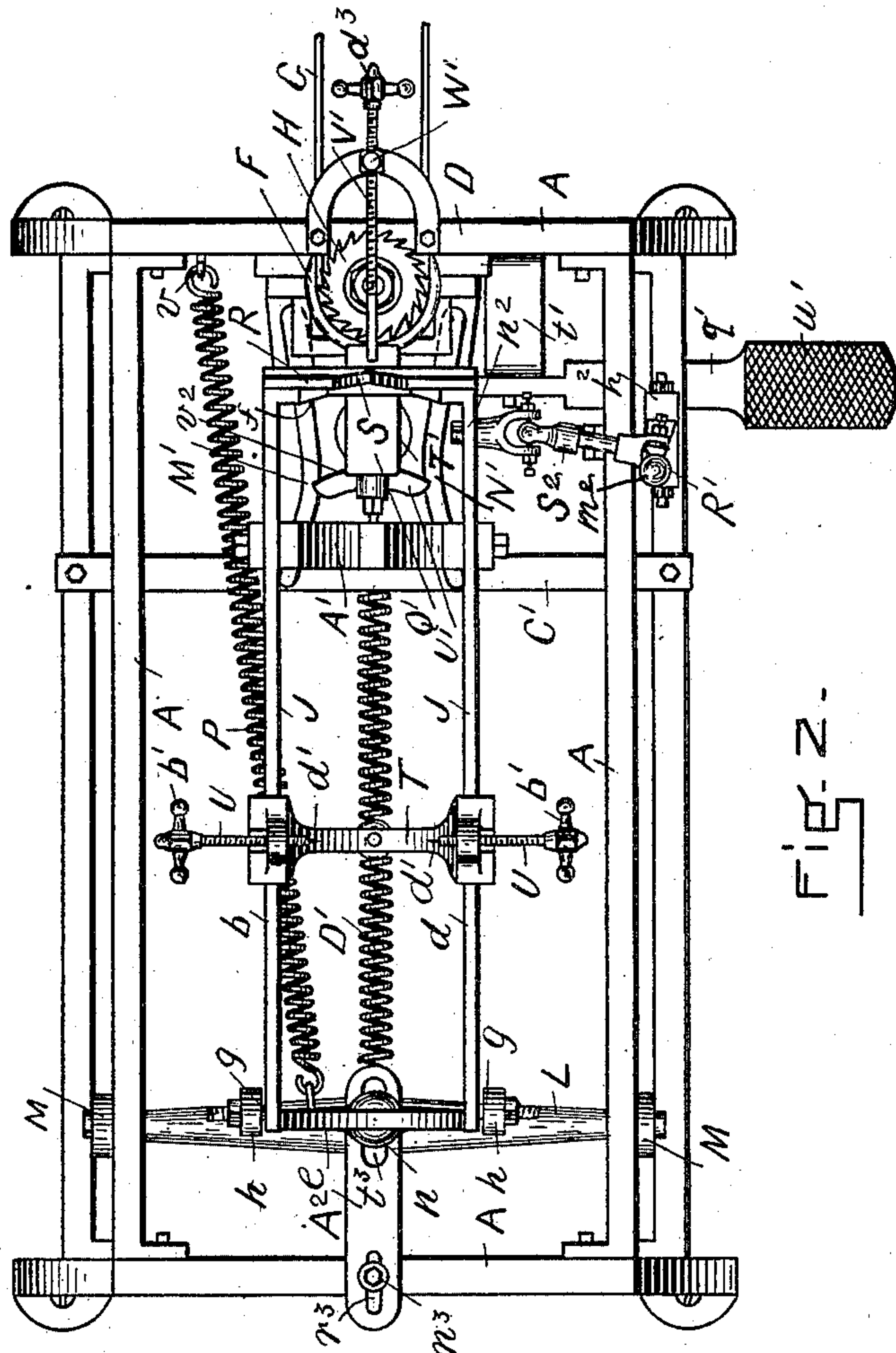


FIG. 2.

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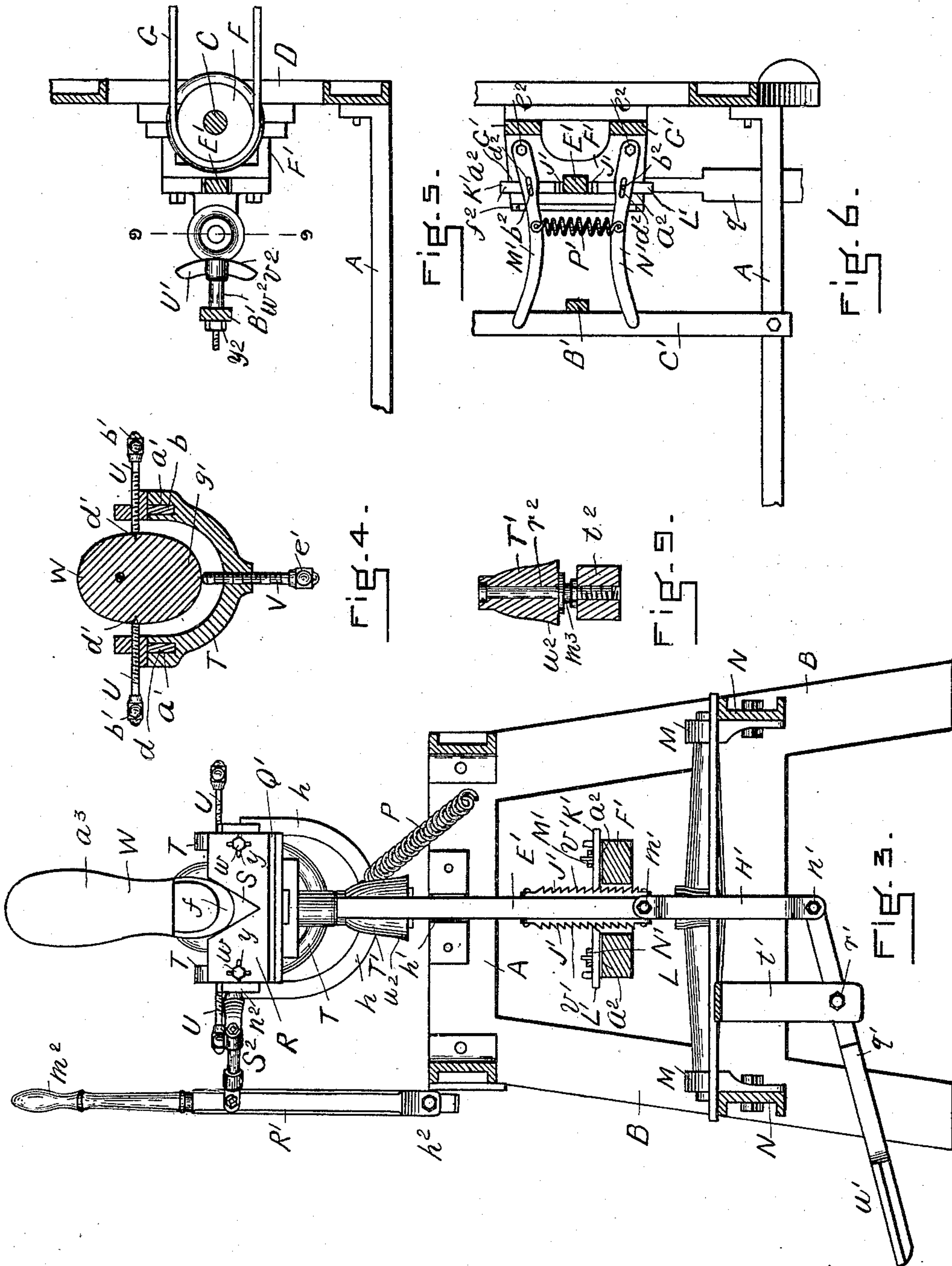
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3 Sheets—Sheet 3.



WITNESSES

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UNITED STATES PATENT OFFICE.

WILLIAM H. AUSTIN, OF BROCKTON, MASSACHUSETTS, ASSIGNOR OF TWO-THIRDS TO WILLIAM H. CARY AND AGUSTUS A. DELANO, OF SAME PLACE.

HEEL-TRIMMING MACHINE FOR RUBBER-BOOT TREES.

SPECIFICATION forming part of Letters Patent No. 652,500, dated June 26, 1900.

Application filed July 16, 1897. Serial No. 644,795. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. AUSTIN, of Brockton, in the county of Plymouth and State of Massachusetts, have invented certain new and useful Improvements in Heel-Trimming Machines for Rubber-Boot Trees, of which the following is a full, clear, and exact description.

Boot-trees for india-rubber boots have no heel—that is, no projecting piece—the tree being cut off on the line of the outer or treading surface of the foot at the shank; but in making the boot-tree in a machine a projecting piece at the heel is left on the boot-tree for use in holding the boot-tree in the machine during the process of its manufacture. This projecting piece after the boot-tree is otherwise finished has to be cut off; but heretofore it has been cut off and the surface of the heel portion trimmed and shaped by hand, which is not only a very slow process, but is very difficult to do on account of the hardness of the wood of which the boot-tree is made, the cut being against or across the grain. At the same time it is very difficult to make the heel-surfaces of two boot-trees alike, owing to the line of cut, which is convexly curved in two directions longitudinally and transversely in relation to the foot; and the object of this invention is to provide a machine that will cut off the projecting piece at the heel of the boot-tree quickly and satisfactorily and so that the heel-surfaces of all the boot-trees will be alike; and the invention consists of a machine for trimming the heel portion of a boot-tree for india-rubber boots constructed and arranged for operation, all substantially as hereinafter fully described, reference being had to the accompanying sheets of drawings, in which—

Figure 1 is a side elevation of the machine. Fig. 2 is a plan view. Fig. 3 is an end elevation back of line 3 3, Fig. 1. Fig. 4 is a detail vertical cross-section, line 4 4, Fig. 1. Fig. 5 is a detail plan view below section-line 5 5, Fig. 1. Fig. 6 is a detail horizontal cross-section on line 6 6, Fig. 1. Fig. 7 is a detail central longitudinal section of the heel portion of the boot-tree after having been operated

upon by this machine. Fig. 8 is a detail central cross-section of such heel portion on line 8 8, Fig. 1. Fig. 9 is a detail central vertical section of one of the parts of the machine hereinafter more particularly referred to.

In the drawings, A represents a framework having legs B, which supports and carries the parts of the machine.

C is a vertical shaft adapted to turn in bearings secured to the upright D and the portion E of the frame A at one end, having a horizontal pulley F secured thereto, which is operated by a belt G, connected to any suitable driving-pulley, the shaft having a horizontal circular saw secured to it by a set-screw *a*.

J is a rectangular frame consisting of side pieces *b d* and end pieces *e f*. The end *e* of this frame J is pivoted at *g* between the ends of two arms *h* of a block *n*, which has a socket *r* in its under side, fitting freely over the upper end of an upright rod K, on which rod it can swivel, the rod extending down through an opening in a cross-bar L, secured in such opening by a set-screw *m*, the bar being arranged by its two ends to rock in bearings in two lugs M, secured, respectively, to the side pieces N of the frame A. A spring P is secured by one end to the arms and to and by its other end to the frame at *v*, which acts to hold the frame J toward the saw end of the machine.

T is an upwardly-curved arm, (see Fig. 4,) having cross-openings *a'* therethrough in each end, which are arranged to slide over the frame side pieces *b d*, respectively, and each end having a horizontal screw U, which screws are in the same transverse and horizontal planes, their inner ends being toward each other and having handles *b'* for operating them, each screw having a sharp point *d'* on its end. Screwing up through the bottom of the lower part of the arm T is a vertical screw V, having a handle *e'* for operating it. On this rectangular frame J is supported the boot-tree W, its heel portion *f'* resting in the angular socket S of the end plate R and its leg *g'* on the screw V and secured by and between the two horizontal screws U, the points *d'* of the

screws U entering the side of the tree-leg preventing its turning, as shown in Figs. 3 and 4 more particularly.

Secured to the two side arms b d of the tree-frame J by its two ends is a curved arm A', having extending down from it a flat bar B', which is arranged to bear against the side of a cross horizontal bar C' of the frame A and being held to such by a spiral spring D', secured by one end to this bar and by its other end to the cross rocking bar L.

E' is a vertical bar adapted to slide up and down in a guideway secured to the frame and through a block F', secured to two upright bars G of the frame, its lower end connected by a pivot at m' to a pitman-rod H', in turn pivoted at n' to one end of a treadle q' , pivoted at r' to an arm l' of the frame and extending outward at the front for operation of the same by the foot at u' . On each edge of this bar E' is secured a ratchet-toothed bar J', (see Fig. 3,) the teeth v' of which are even; but the toothed bars are secured to the bar E' in such manner that the teeth on each side are opposite to the spaces between the teeth on the other side.

Adapted to slide transversely of the machine in a transverse groove a^2 in the block F' are two pawls K' L' opposite to each other, one each side of the bar E', which are adapted to engage, respectively, with the ratchet-teeth v' on the side of the bar E' next thereto, as shown in Fig. 3 more particularly. Each pawl is pivoted to a separate curved arm M' N', respectively, by a pin b^2 and slot d^2 in the arm, as shown in Fig. 6, these arms being respectively pivoted to the block at e^2 and projecting therefrom beyond the pawls sufficiently to extend beyond the bar B', as shown in Fig. 6 more particularly. These two curved arms are connected together by a spiral spring P', which pulls them toward each other and holds whichever pawl is engaged with the ratchet-toothed bar to its engagement therewith. The outward movements of the arms are limited by their abutment against shoulders f^2 f^2 , respectively, on the block F'. On the top of this ratchet-bar is a horizontal flat plate Q', on which rests the downwardly-extending portion g^2 of the tree-holding frame J, and on which plate it can freely slide back and forth.

R' is a lever pivoted at h^2 to the frame A, so that it can swing two ways, having a handle m^2 for operating it, and it is connected by a universal joint S' to one side of the tree-frame J, near its end n^2 , so that by pulling the lever forward and pushing it backward the end f of the boot-tree frame is moved back and forth on its rest-plate Q', it swinging on its pivot-rod K, and the frame can be moved longitudinally forward and backward by operating the lever in such direction, its cross-bar L rocking in its bearings. As the lever R' is moved from the operator, who stands facing the machine, as shown in Fig. 1, the tree-frame is swung backward, carrying with it the bar B',

which strikes against the curved arm M', moving it and its pawl K' in the same direction, releasing such pawl from its engagement, as shown in Fig. 3, with the ratchet-bar E' of the tree-frame, when the ratchet-bar E' and the tree-frame supported by it drop; but the other pawl L', being in proper position, is immediately forced forward by the operation of the spring P' on the curved arm N' toward the ratchet-bar, engaging with the next tooth on the opposite side of the ratchet-bar, preventing the bar falling any farther and supporting the bar and other parts in such position. Then pulling the lever forward the frame J is moved forward with its bar B', which allows the curved arm M' to move forward and its pawl K', and the bar B', striking against the other curved arm N', moves it forward, with its pawl L', releasing it from engagement with the ratchet-bar, allowing it and the frame to drop, when it is arrested and held by the engagement of the pawl K' with the ratchet-bar E', as before. This moving of the lever forward and backward swings the frame laterally with the bar B' forward and backward, the bar alternately striking the curved arms M' N' and alternately releasing the two pawls K' L', so that the ratchet-bar E', with the tree-frame, will fall step by step, resting alternately on the pawls K' and L'.

T' is a cone-shaped block arranged to rotate on a vertical spindle r^2 , secured to an arm l^2 of the frame, its sides being convex longitudinally, and near its lower end at w^2 slightly concave, as shown. Against the side of this cone T' is arranged to bear the outer curved edge v^2 of a transverse horizontal arm U', having a pin w^2 , which passes through the bar B' and is secured thereto by a set-screw y^2 , as shown in Fig. 5 more particularly.

The boot-tree is placed in the swinging frame, the back of its heel resting in the angular seat S in the plate R of the frame, its leg end g' resting on the screw V, which is adjusted for the proper height, and when the boot-tree is true in the frame, its foot portion a^3 being vertical and the leg portion g' at the right height, the two transverse screws U' are then screwed firmly against the leg of the boot-tree. In such position the boot-tree will be adjusted as to its height, &c., in the machine, as shown in Fig. 1 more particularly, so that the portion b^3 of the boot-tree to be cut off and the heel-surface at such place trimmed will be just above the edge of the circular saw.

To adjust the boot-tree longitudinally in the frame so the saw will not cut any farther toward the leg of the tree than is necessary, a horizontal rod V', having a handle d^3 , screws through the upper end of an upright rod W', adapted to turn in two supports e^3 of the frame A, a collar f^3 , secured on the rod by a set-screw g^3 , resting on the upper support e^3 , by which the height of the rod can be adjusted as desired and secured at such height by the set-screw. The rod V' can be screwed in and

out for it to project as desired, and it is arranged for the boot-tree when it has been cut as desired to bear by its shank h^3 against its end m^3 , as shown in Fig. 1, which prevents any more cut than is necessary. In these positions the machine is ready for operation, the treadle, however, being first pressed down for the tree-frame to be swung up to its highest point, where it is supported by the ratchet-bar on one of the pawls and the saw set in operation.

As shown, the ratchet-bar is supported by the pawl K' . The saw being set in motion and the operator taking hold of the lever moves it backward, which moves the tree-frame and its bar B' backward, the bar striking against the curved arm M' , releasing its pawl K' from the ratchet-arm, leaving it and the tree-frame free to fall, which is stopped by the other ratchet-pawl L' engaging with the ratchet-bar E' . The lever K' is then pulled forward, which moves the tree-frame and its boot-tree forward, and as the portion b^3 of the boot-tree is a little below the horizontal plane of and a little forward of the cutting side of the saw the saw cuts off part of the same, and when the bar B' reaches its forward position it has operated the curved arm N' , releasing its pawl L' , which lets the bar down, which is caught by the pawl K' . Then the lever is pushed back, swinging the tree-frame back, and as the uncut portion of the boot-tree has fallen below the horizontal plane of the saw as it is moved back it is sawed or trimmed off accordingly, and having passed by the saw the boot-tree is lowered by the release of the pawl from the ratchet-bar, so that then when pulled forward the next part of the portion is cut by the saw, and so on until all desired has been cut off, when the boot-tree is removed from its frame and another inserted for operation on it, as before, and so on. Before the next tree is operated upon the treadle is depressed, which raises the ratchet-bar E' up and the end f of the tree-frame into the position shown for the proper commencement of the saw upon the portion to be cut off.

In cutting and trimming the heel of the boot-tree the surface has two curves—a longitudinal curve in relation to the boot-tree, as shown at h^3 , Fig. 7, and a transverse curve, as shown at m^3 , Fig. 8—and these two curves are given by the shape of the surface of the cone-shaped block T' in connection with the swinging of the tree-frame horizontally on its pivots and its up-and-down swinging movement of its end on its cross-arm pivots. The longitudinal line h^3 of cut of the heel portion of the boot-tree can be made as desired, and such line of cut is controlled by the longitudinal line of the surface of the cone-shaped block. If this line is straight, the curve of the line of cut will be quicker, and if the cone is more or less curved the line of curve on the heel portion will be varied accordingly. The cross curve-line m^3 is governed by the swing-

ing back and forth horizontally of the tree-frame on its pivots. The cone is made to turn to prevent friction of the arm U' on its surface as it travels back and forth thereon. The cone rests on a collar secured by a set-screw on the rod r^2 , which rod can be screwed in and out of its block t^2 , so that it can be adjusted as to its height.

By this machine all boot-trees are trimmed alike. They can be trimmed much faster and far superior to the present method of doing the same by hand.

Secured by screws w to the end piece f of the frame J is a cross-plate R , having a bevel or angular cut S in its upper edge, the screws passing through cross-slots y in the plate, by which it can be adjusted somewhat as to its height and laterally on the frame and secured in such adjustment by the screws.

A^2 is a horizontal plate secured to the end cross-bar of the frame A by a screw n^3 passing through a longitudinal slot r^3 in its end, by which it can be adjusted longitudinally and secured in such adjustment, its other end having a longitudinal slot t^3 , through which the rod K of the tree-frame freely passes. The abutment of the rod K against the ends of the slot limits the movements of the tree-frame forward and backward beyond what is necessary for the proper operation of the machine.

The boot-tree frame when in its normal position for commencing to trim the boot-tree is adjusted so that its end where the tree-foot is is above the horizontal line of its pivoted bearing, so that as it falls in the operation of the machine the line of cut of the heel will be secured of the proper curve to the shank portion, notwithstanding the pushing back of the frame by the curved arm bearing upon the cone-guide as it moves down over its increasing diameter from top to bottom.

Having thus described my invention, what I claim is—

1. In a machine for trimming the heel of a tree for rubber boots, in combination, a frame or support for a boot-tree mounted to swing up and down, a guide or gage against which said frame is pressed longitudinally, a support for the frame at its free end, means permitting it to fall or drop intermittently, means for moving said frame in a lateral direction and a saw operated by suitable mechanism.

2. In a machine for trimming the heel of a boot-tree for rubber boots, in combination, a frame or support for a boot-tree mounted to swing up and down at one end, a cone-shaped guide or gage adapted to rotate in a suitable bearing, means for pressing said frame longitudinally against said guide, a support for the free end of said frame arranged to be moved up and down, and means for controlling it intermittently in its downward movement, means for operating said swinging frame and a saw operated by suitable mechanism.

3. In a machine for trimming the heel of a tree for rubber boots, in combination, a frame

or support for a boot-tree mounted to swing up and down at one end, a downwardly-extending bar of said frame, a guard on said bar having a curved guiding edge, a cone-shaped guide against which the curved guiding edge bears, a support for said tree-frame arranged to be moved up and down and swing longitudinally forward and backward, means for moving said tree-frame and a saw operated by suitable mechanism, said cone-shaped guide controlling the backward movement of the tree-frame.

4. In a machine for trimming the heel of a tree for rubber boots, in combination, a frame-support for a boot-tree mounted to swing up and down and to have lateral movement, a support for said frame arranged to move up and down in suitable guideways, ratchet-teeth on each side of said support, pawls adapted to engage with said ratchet-teeth, two swinging arms, each connected to a pawl, a spring connecting the two arms, a bar extending down from said tree-supporting frame between the two swinging arms, and means for operating said tree-frame.

5. In a machine for trimming the heel of a tree for rubber boots, in combination, a frame

or support for a boot-tree mounted to swing up and down and to have a lateral movement, a support for said frame arranged to move up and down in suitable guideways, ratchet-teeth on each side of said support, pawls adapted to engage with said ratchet-teeth, two swinging-arms, each connected to a pawl, a spring connecting the two arms, a bar extending down from said tree-supporting frame between the two swinging arms, a guide on said bar having a curved guiding edge and a cone-shaped guard, adapted to rotate on a suitable support against which the curved guide bears.

6. In a machine for trimming the heel portion of a boot-tree, in combination, a frame for the tree mounted to swing up and down, a movable support for the frame at its free end, and means for imparting a step-by-step downward movement to the said support.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

WILLIAM H. AUSTIN.

Witnesses:

GEORGE W. FOLSOM, Jr.,
JOSEPH A. ELWELL.