F. H. WARREN.

EDGE SETTING MACHINE.

APPLICATION FILED SEPT. 5, 1905.

943,207. Patented Dec. 14, 1909.

2 SHEETS—SHEET 1.

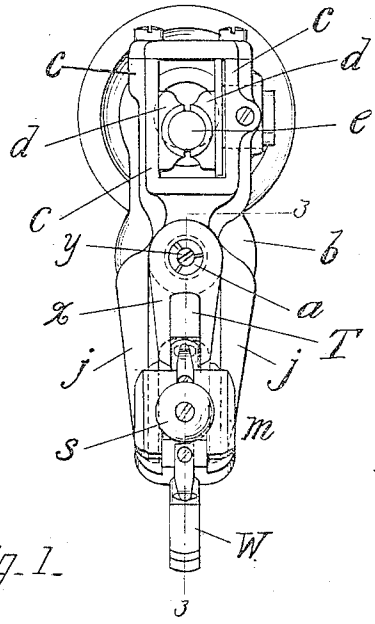

Fig. 1.

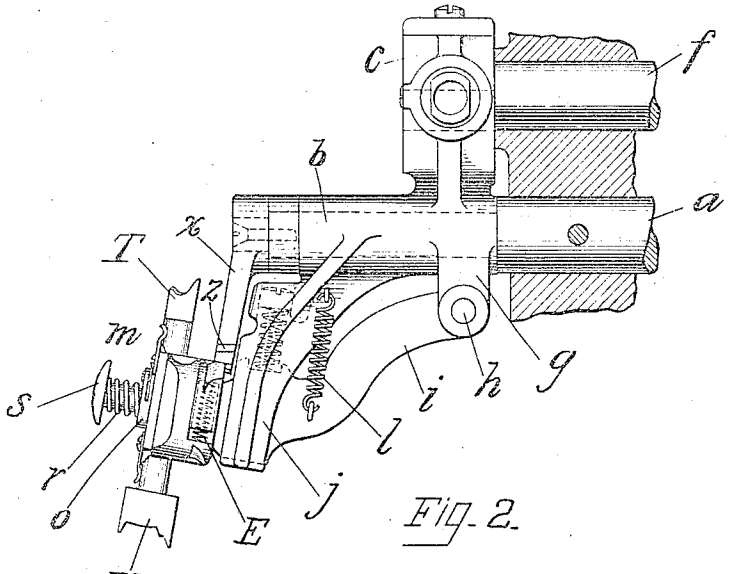

Fig. 2.

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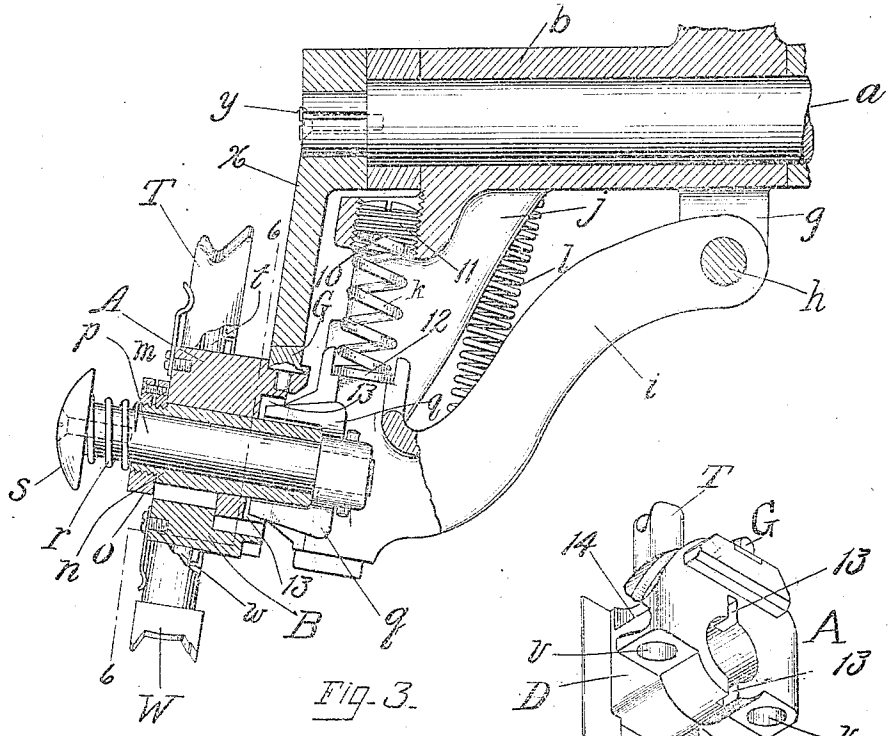

Fig. 3.

Fig. 4.

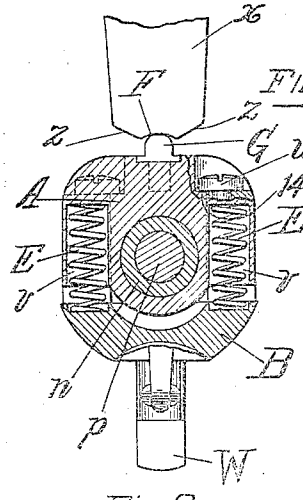

Fig. 6.

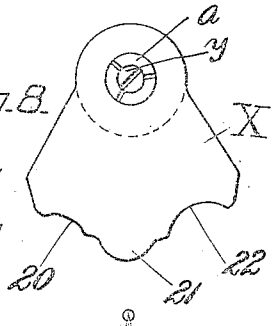

Fig. 8.

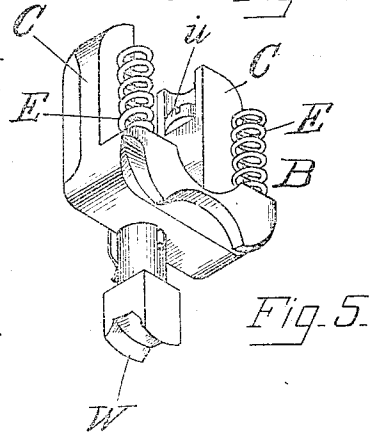

Fig. 5.

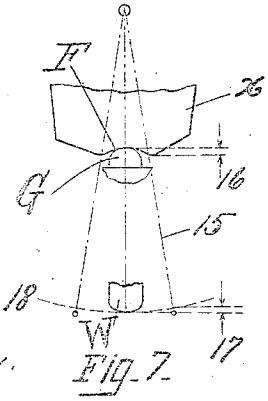

Fig. 7.

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EDGE-SETTING MACHINE.

943,207. Specification of Letters Patent. **Patented Dec. 14, 1909.**

Application filed September 5, 1905. Serial No. 276,996.

To all whom it may concern:

Be it known that I, FRANK H. WARREN, a citizen of the United States, residing at Swampscott, in the county of Essex and Commonwealth of Massachusetts, have invented certain Improvements in Edge-Setting Machines, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to edge setting machines for setting or burnishing the edges of shoe soles, and is designed to provide means whereby an edge setting tool may be moved relatively to a sole edge in different paths appropriate to the varied outlines presented by different parts of the sole edge.

Various types of edge setting machines are already known in the art, and for the purposes of this discussion, they may be grouped in two classes, (1) those having a tool which travels in a curved path, and (2) those having a tool which travels in a straight, or nearly straight, path. A machine possessing either of these characteristics has certain advantages peculiar to itself. For example, when it is desired to set a shank edge it is obviously preferable to have the tool travel in a convex curve to conform to the concave curve of the shank edge, and this preference may be supplied by machines of the first class; but it is evident that a tool moving in a greater curve or in a straight line is superior for setting a forepart edge which is, in part, nearly straight, and this superiority exists in machines of the second class. Among other objects, the present invention is designed to provide a machine which combines the desirable features of both the above-indicated classes.

This invention consists, in part, in providing a movable edge setting tool and means for changing the path of movement of the tool. Also the invention contemplates an edge setting machine having edge setting means arranged to act upon a sole edge in a plurality of paths of any desired curvatures, (including a path of zero curvature, *i. e.*, a rectilinear path). Other features of the invention will be disclosed hereinafter and will be defined in the claims.

The invention will be described as embodied in a machine wherein the edge setting tool is mounted on a tool-holder supported upon a carriage which oscillates in a substantially vertical plane about a fixed axis. Normally the tool-holder is stationary relative to its carriage and the acting face of the tool is oscillated in an arc. When it is desired to give the tool a straight path, a device is brought into operation which maintains the acting tool-face in a straight line substantially tangent to its normal curved path. All discussion of possible modifications will be postponed until the specific mechanism shown in the drawings has been fully described.

In the accompanying drawings, Figure 1 is a front elevation of those parts of an edge setting machine which are necessary to be shown in connection with the present description. Fig. 2 is a side elevation of the parts shown in Fig. 1, a portion of the frame of the machine being shown in section. Fig. 3 is a vertical section along a line 3—3 of Fig. 1. Fig. 4 is a view in perspective of the body member of the tool-holder. Fig. 5 is a view in perspective of the auxiliary member of the tool-holder. Fig. 6 is a section along a line 6—6 of Fig. 3. Fig. 7 is a diagrammatic view showing the manner of operation of a straight-line device. Fig. 8 shows a modified form of one of the parts shown in connection with a straight-line device.

A non-rotatable stud *a*, mounted on the frame of the machine, supplies a fixed axis on which a tool-holder carriage *b* is oscillated through its two upwardly projecting arms *c c* embracing between them two oppositely disposed twin blocks *d d* (see Fig. 1). The blocks *d d* are free to slide vertically between the arms *c c* and have semi-cylindrical recesses on their adjacent faces which constitute a bearing for an eccentric pin *e*. Said pin *e* is preferably integral with the power shaft *f* of the machine and is eccentric on said shaft so that the rotation of the latter effects a gyration of the pin *e* which moves the blocks *d* and arms *c* to oscillate the carriage *b*. The carriage *b* has a downwardly projecting bifurcated lug *g* to which a tool-holder supporting arm *i* is pivoted by means of a pin *h*. The outer end of the arm *i* fits snugly between the lower ends of two parallel guide arms *j j*, integral with the carriage *b*, and is capable of motion toward and from the ends of said arms. The arm *i* is held yieldingly in position by

means of the oppositely acting depressing spring *k* (see Fig. 3) and elevating springs *l l*. The depressing spring *k* is conveniently given the form of a coil spring which abuts at its upper end upon a seat 10 supplied by the bottom of an adjusting screw 11 which threads into a part of the carriage *b*; and at its lower end upon a seat 12 provided by the arm *i*. The elevating springs *l l*, one on each side of the arm *i*, are attached at one end to the carriage and at the other end to said arm. A tool-holder *m* is supported on the outer end of the supporting arm *i*, and is arranged to partake of such yielding as the arm *i* may have under the influence of the springs *k* and *l l*.

A cylindrical sleeve *n* rigid with the arm *i* constitutes the immediate support for the tool-holder which is so mounted as to be rotatable on said sleeve. The outer end of the sleeve *n* is screw-threaded to accommodate a nut *o* which serves to prevent displacement of the tool-holder lengthwise of the sleeve. The tool-holder being rotatable about the sleeve *n*, it is desirable that some means be supplied for holding it in one or more predetermined positions. To this end a non-rotatable pin *p* is provided, extending through the sleeve *n*, and having on its inner end rigid stops *q q* which project into appropriately positioned recesses 13 on the tool-holder to secure the latter against rotation. The stops *q q* are held in engagement with the recesses 13 by means of a spring *r*, encircling the outer end of the pin *p*, which abuts at one end against the sleeve *n* and at the other end against a head *s* on the pin *p*. When it is desired to rotate the tool-holder, the head *s* is pressed inwardly to move the pin *p* and withdraw the stops *q q* from the recesses 13, whereupon the holder is released and may be rotated at will.

For purposes presently to be elucidated the tool-holder comprises a body member A and an auxiliary member B. The body member A supplies the hub of the tool-holder which rides on the sleeve *n*, and also provides the recesses 13 for the stops *q q* (see Fig. 4). A stud *t* projects from the body member to afford means for attaching an edge setting tool T as shown in Fig. 3. The auxiliary member B is bifurcated having two parallel fingers C C arranged to fit easily in appropriately formed ways D D in the body member. (See Fig. 5). Thus the auxiliary member B is permitted to move relatively to the body member A. This movement is limited in one direction by the crotch of the fingers C C contacting with the body member A, and in the opposite direction by the heads of screws *u u*, carried by the fingers C C, which overlie steps 14 on the body member as shown in Fig. 6. Springs E E are interposed between seats provided respectively on the body member and the auxiliary member to cushion the movement of the latter relative to the former (see Figs. 5 and 6). For convenience these springs are positioned in sockets *v v* on the body member. The effect of said springs E E is to offer a yielding resistance to movement of the auxiliary member toward the sleeve *n*. A stud *w* for attaching a second edge setting tool W is carried by the auxiliary member diametrically opposite to the corresponding stud *t* on the body member. By rotating the holder through one hundred eighty degrees from the position shown in Fig. 3, the tool W on the stud *w* will be removed from its lowermost station, which is the operative position for either tool, and will be replaced by the tool T. It is customary to use different tools for setting shank edges and forepart edges and for the purposes of this particular machine it is preferred to attach the forepart tool W to the stud *w* and the shank tool T to the stud *t*, and either may be brought readily into operative position as already described. When the shank tool T is in use the tool-holder is stationary on the carriage *b*, (except as it may be moved immaterially under the influence of the springs *k* and *l l*), and the tool-face moves in a convex curved path to suit the concave outline of the shank edge; but when the forepart tool W is in use it is desired to give the tool a straight path. To this end a straight-path device is employed comprising a concave cam-face F and a co-operating lug G. The cam-face F is conveniently supplied upon an edge of a plate *x* rigidly secured to the outer end of the non-rotatable stud *a*. The end of said stud *a* may be split and provided with a screw-threaded aperture to receive a screw *y* having a frusto-conical head which, when screwed inwardly on the stud *a*, serves to spread its split end to grip the encircling walls of the plate *x* (see Fig. 3). The lug G, as shown in the drawings, projects upwardly from the surface of the body member A and is rigid therewith. The lug is so positioned that its upper face contacts with the cam F when the stud *w* is lowermost and the forepart tool is in operative position (see Fig. 3). The lower face of the plate *x* is inclined on both sides of the cam F to supply cams *z* which serve an end presently to be disclosed. (See Fig. 6.)

The operation of the machine is as follows: In setting a shank edge the shank tool T is lowermost. The lug G is out of engagement with the cam F which therefore has no office and the tool oscillates in a curved path. The springs *k* and *l l* permit the tool to yield in response to irregularities on the shank edge and also serve to absorb some of the vibration occasioned by the rapid movement of the tool. When it is desired to set the forepart edge the tool-holder is

rotated, as already described, to bring the forepart tool W into operative position and to bring the lug G into engagement with the cam F. In the rotation of the tool-holder the lug G strikes one of the inclined cams *z z* which, being rigid, causes said lug as it is further rotated to be depressed, thereby depressing the entire tool holder and its supporting arm *i* against the tension of the springs *l*, *l*, until the lug G leaves the cam *z* and enters the concavity of the cam F, whereupon said lug is forced into close contact with said cam F by the springs *l l* acting through the supporting arm *i* and the tool-holder *m*. Thus when the tool-holder has been rotated through one hundred eighty degrees from its initial position the forepart tool W has been carried into operative position and the straight-path device has been properly assembled for giving the tool the rectilinear motion which ensues from the following causes. The cam F remains stationary as the lug G oscillates by reason of the oscillation of the guide arms *j j* embracing the tool-holder between them. As the tool-holder approaches an extreme of its travel (indicated diagrammatically by a line 15, Fig. 7), the lug G is carried along a gradually descending portion of the cam face F. This forces the tool-holder and arm *i* to slide outwardly toward the ends of the guide-arms *j j* against the tension of the springs *l l*. When the lug G reaches the extreme of its movement it will have been depressed to the position indicated by the line 16 (Fig. 7), and at the same time the tool W will have been depressed to the position shown by line 17. The line 17 is substantially tangent to the curved path 18 which would be taken by the tool, in the course of normal oscillation with the arms *j j*, if the straight-line device were eliminated. As the tool-holder leaves its extreme position and begins its return movement the tool returns gradually to its initial position relative to the guide-arms *j j*. In moving to its other extreme, the lug G is again depressed, the acting face of the tool W being maintained all the while in the path indicated by the line 17, except as it may be removed therefrom immaterially by the springs E E yielding as hereinafter described. The tool is thus given a reciprocating movement, and by the term "reciprocating movement", as used in this specification and the appended claims, is meant a backward and forward movement in a right line. By again rotating the tool-holder about the sleeve *n* the shank tool may be brought into action and the straight-path device disorganized so as to be of no effect. When the parts are in proper position for setting a forepart edge it is evident that the tool-holder itself is prevented from yielding upwardly by the rigid plate *x* engaging the lug G; but the springs E E, interposed between the body member A and the auxiliary member B of the tool-holder, serve as a yielding cushion for the forepart tool and in that regard perform the same office for the forepart tool which is performed for the shank tool by the springs *k* and *l l*.

The specific mechanism shown in the drawings has been presented for illustrative purposes only, and shows but a single embodiment of the invention. Obviously a tool of any sort could be attached to the stud *w*, and the cam F might be so shaped as to give to said tool any desired path. Several cams of different sorts might be provided as shown, for example, on a plate X in Fig. 8. Said plate X might be substituted for the plate *x* shown on the machine in the drawings, and the cams 20, 21 and 22 (carried by said plate X) could be introduced respectively, into engagement with the lug G, or other device, by loosening the screw *y*, moving the plate X so as to bring the desired cam into proper station and then tightening the screw *y*. Of course other means for securing the plate X in position might be employed. For example, some such arrangement as the non-rotatable pin *p* with its stops *q* could be arranged to engage properly positioned recesses on the plate X. Also the cam might be carried otherwise than on a plate of this sort. Although it is thought more convenient to employ two tools of different varieties it is evident that one tool could be omitted, and with the arrangement of the plate X just described the remaining tool could be given any desired paths of movement. All such modifications as are here suggested, and many others which will be readily apparent to those skilled in the art, are to be considered as included within the proper scope of this invention as it is defined in the subjoined claims.

I claim as my invention:—

1. An edge setting machine, having, in combination, an edge setting tool; means for moving the tool; and a straight-line device for causing said tool to move in a substantially rectilinear path, said device comprising a relatively movable concave cam face and lug arranged to coöperate with each other.

2. An edge setting machine having, in combination, a tool-holder; two tools on the holder; means for moving the holder; and means for causing the holder to move in paths of different curvatures.

3. In an edge setting machine, the combination with a tool holder arranged for movement into different operative positions, of means for oscillating said holder when it is in one position, and means for causing said holder to reciprocate in a straight line when it is in another position.

4. In an edge setting machine, the combination with a tool holder arranged for movement into different operative positions, of a plurality of tools on said holder, means for imparting to said holder an oscillating movement when one tool is in operative position, and means for imparting to said holder a reciprocating movement when another tool is in operative position.

5. In an edge setting machine, the combination with a fixed support, of a tool holder, means for oscillating said holder about said support as a center, and a straight line device for causing said holder to move in a substantially rectilinear path, said device comprising a cam face secured to said fixed support and a coöperating lug mounted on said holder.

6. In an edge setting machine, the combination with a fixed support, of a carriage mounted on said support, means for oscillating said carriage upon said support, a tool holder mounted on said carriage for oscillation therewith, and means on the fixed support to cause the holder to reciprocate in a straight line.

7. In an edge setting machine, the combination with a fixed support, of a carriage mounted on said support, means for oscillating said carriage upon said support, a yielding arm on said carriage, a tool holder rotatably mounted on said arm, means for locking said holder in different positions relatively to said arm, a lug on said holder, and a cam face on said fixed support, said lug and said cam face being arranged to coöperate when said holder is locked in one position.

8. In an edge setting machine, the combination with a carriage, of a yielding arm on said carriage, a two-part tool holder having a body part rotatably mounted on said arm, and an auxiliary part yieldingly mounted on said body part, means for locking said holder in different positions relatively to said arm, and a plurality of tools on said holder, said tools being arranged to yield through said yielding arm when said holder is in one position and through said auxiliary part when said holder is in another position.

9. An edge setting machine having, in combination, a tool holder arranged for movement into different operative positions, a plurality of tools on said holder, means for giving said holder a to-and-fro movement when it is in one position, and means for giving said holder a to-and-fro movement in a path of different curvature when it is in another position.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FRANK H. WARREN

Witnesses:

LAURENCE A. JANNEY,

CATHERINE SCHILLING.