W. C. STEWART.

KNIFE GRINDER.

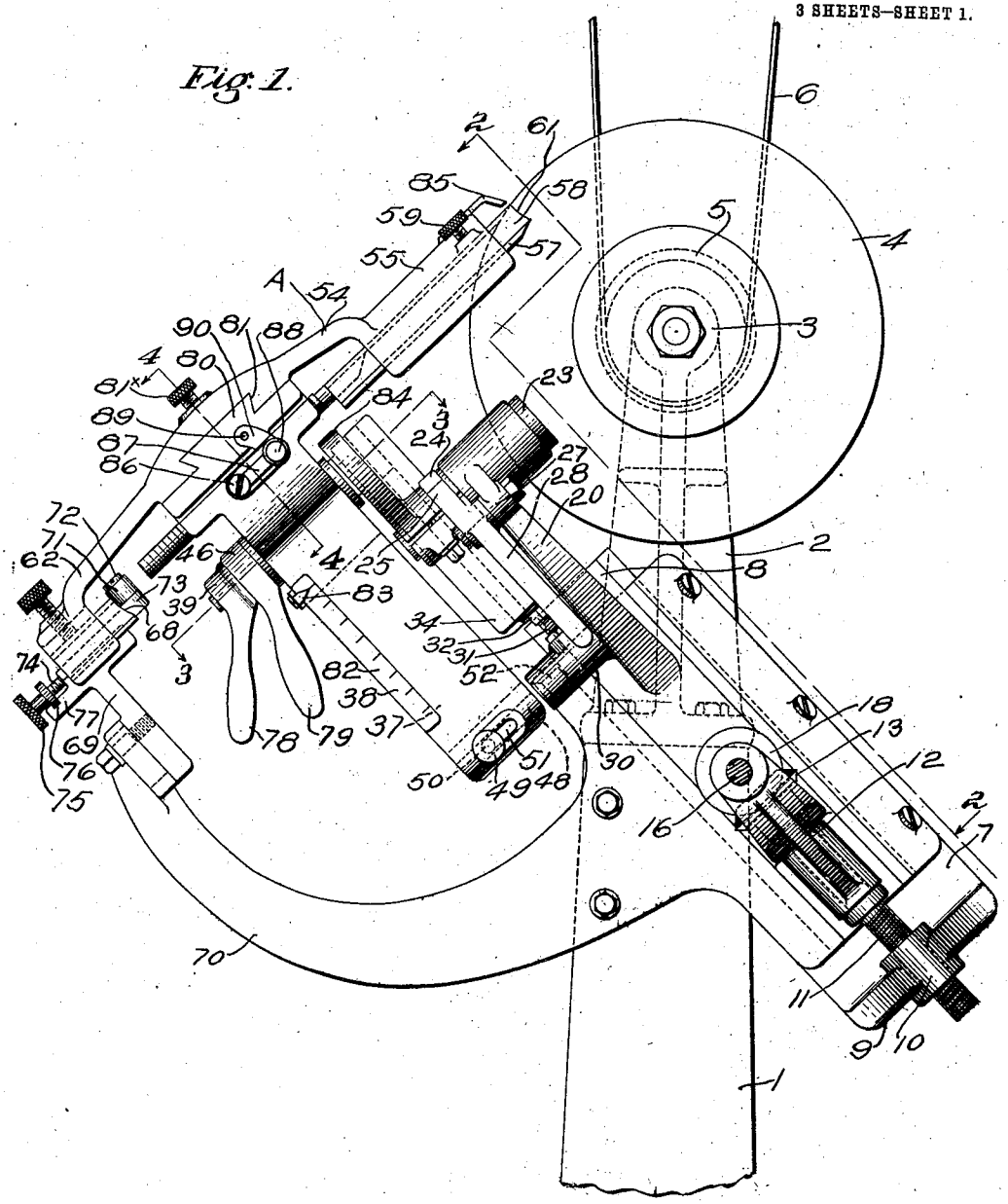
APPLICATION FILED JUNE 17, 1909.

1,049,619.

Patented Jan. 7, 1913.

3 SHEETS—SHEET 1.

Fig. 1.




Witnesses:
Roswell F. Hatch
Redfield A. Allen

Inventor
William C. Stewart
by Robt. O. Haines
Atty.

W. C. STEWART.

KNIFE GRINDER.

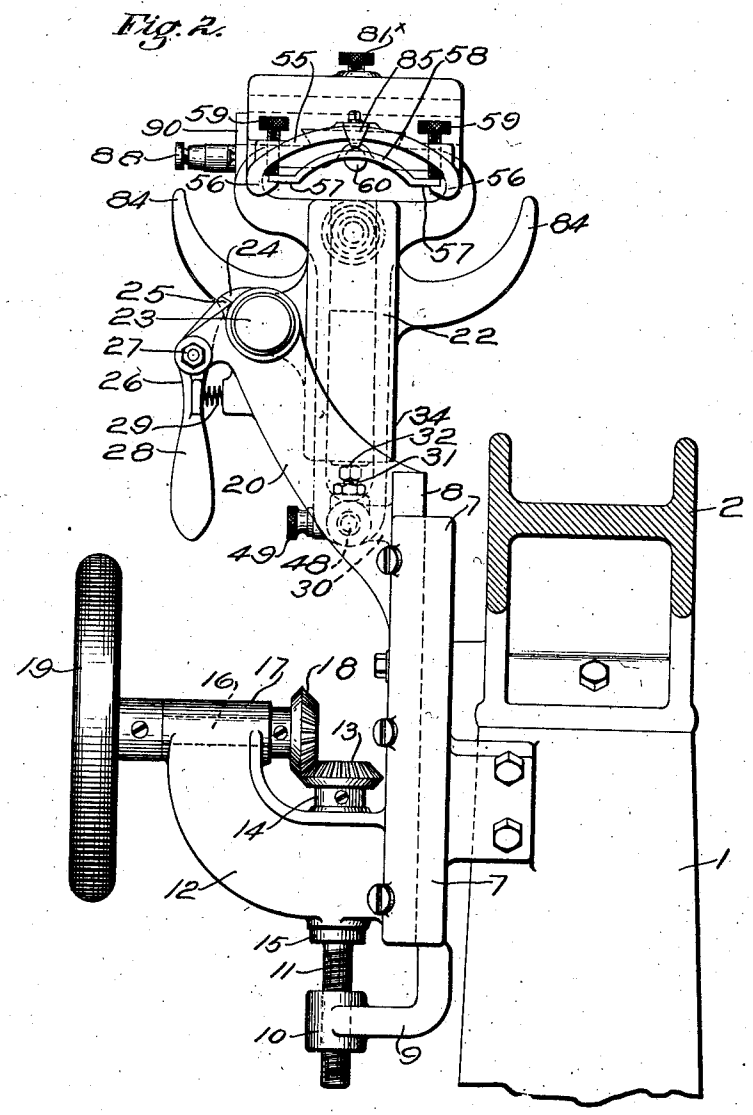
APPLICATION FILED JUNE 17, 1909.

1,049,619.

Patented Jan. 7, 1913.

3 SHEETS—SHEET 2.

Fig. 2.




Witnesses:
Roswell F. Hatch.
Redfield A. Allen

Inventor:
William C. Stewart
by Robt. D. Hains.
Atty.

W. C. STEWART.

KNIFE GRINDER.

APPLICATION FILED JUNE 17, 1909.

1,049,619.

Patented Jan. 7, 1913.

3 SHEETS—SHEET 3.

Fig. 3.

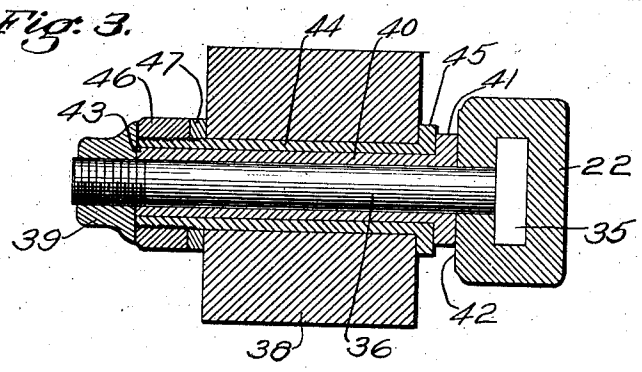



Fig. 4.

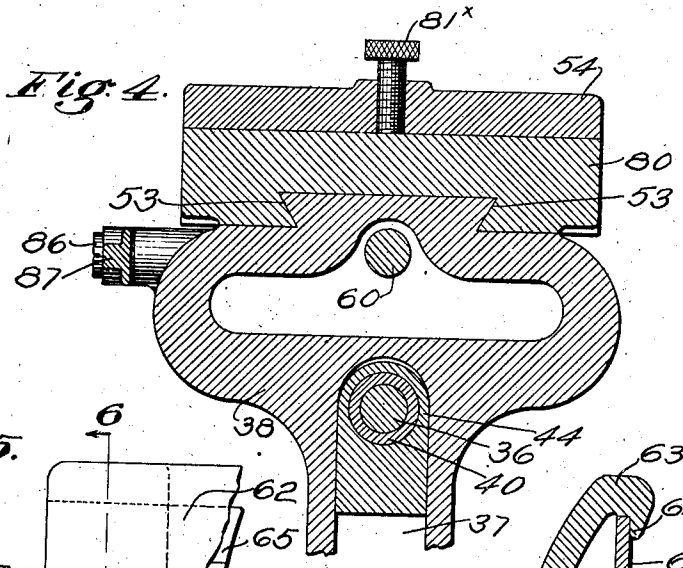



Fig. 5.

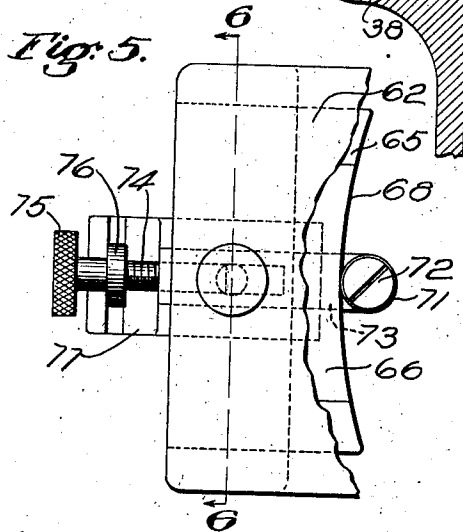
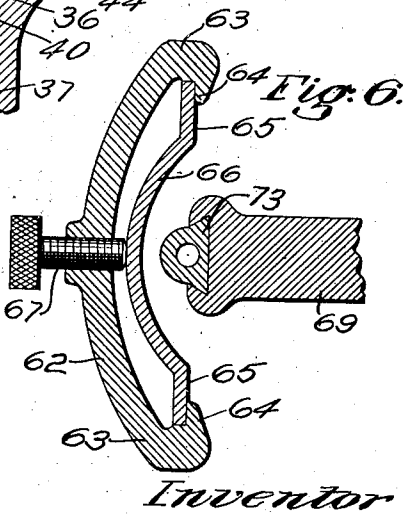



Fig. 6.




Witnesses:
Roswell F. Hatch.
Redfield K. Allen

Inventor
William C. Stewart
by Robt. D. Harris.
Atty.

# UNITED STATES PATENT OFFICE.

WILLIAM C. STEWART, OF LYNN, MASSACHUSETTS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO UNITED SHOE MACHINERY COMPANY, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

## KNIFE-GRINDER.

1,049,619. Specification of Letters Patent. Patented Jan. 7, 1913.

Application filed June 17, 1909. Serial No. 502,666.

*To all whom it may concern:*

Be it known that I, WILLIAM C. STEWART, a subject of the King of Great Britain, residing at Lynn, in the county of Essex and State of Massachusetts, have invented an Improvement in Knife-Grinders, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

The invention to be herein described relates to means for grinding blades or knives, and more particularly the knives employed in breasting machines designed to operate upon the heel breasts of boots and shoes, it being understood that the invention is not necessarily restricted in this respect.

The heel, as applied to a boot or shoe, is composed of superposed layers having rough and uneven or overlapping edges when positioned, and after this rough body of the heel has been formed, the toplift is secured thereto, it being a layer of leather having the proper contour for the finished heel. The rounded or outer edge of the heel body is then suitably shaped to conform to the shape of the toplift, and the breast of the heel is then shaped by a blade or knife, the face of which conforms to the shape of the heel breast and the edge of which is shaped to conform to the shoe shank. The breast of the heel is commonly concaved, although in certain types of shoes it is made straight. The shoe shank is generally more or less convex, and to this convex shape the edge of the knife should conform. Thus, the blade or knife commonly employed in cutting or shaping the heel breast has a convex face and a concave edge.

The aims and purposes of the present invention are to provide means for grinding the above generally described character of heel breasting knife, and will best be understood from the following description and accompanying drawings of one form of means for carrying the invention into effect, it being understood that the invention is not restricted to the details illustrated and described, but is definitely pointed out by the claims.

In the drawings: Figure 1 is a side elevation of a machine embodying the present invention, the lower part of the supporting standard being broken away; Fig. 2 is a section on the line 2—2 of Fig. 1; Fig. 3 is a section on the line 3—3 of Fig. 1; Fig. 4 is a section on the line 4—4 of Fig. 1; Fig. 5 is a detached detail view showing the pattern and coöperating roll which determine the edge contour grinding action; and Fig. 6 is a section on the line 6—6 of Fig. 5.

The machine frame 1, Fig. 1, may be of any desired or proper character and is illustrated as comprising a column to the upper portion of which are secured the risers 2 providing suitable bearings 3 for the support of the grinding wheel 4, having connected thereto a pulley 5 driven by a belt 6, or other means, from any suitable source of power. The grinding edge of the grinding wheel 4 may be of appropriate form, the wheel itself being formed of any desired character of grinding material.

Secured to the column 1 is a bracket 7, Figs. 1 and 2, having suitable guideways for a knife carrier slide 8 which serves to sustain an adjustable knife carrier and knife toward and from the grinding surface of the grinding wheel, as will hereinafter more fully appear. As one means for thus adjusting or feeding the knife carrier and knife, the bracket 7 has projecting from its lower portion an arm 9 having an interiorly screw-threaded lug 10 which is engaged by the screw-threaded portion of an adjusting screw 11 passing through a suitable supporting bearing in an arm 12 projecting from the slide 8, said adjusting screw having applied to its upper end a beveled pinion 13 and being held in its bearings by suitable collars 14, 15, Fig. 2. Secured to a shaft 16 contained in a suitable bearing 17 furnished by the arm 12 is a beveled pinion 18 operatively engaged with the pinion 13, a hand wheel 19 being provided on the end of the shaft 16 for conveniently manipulating said shaft and, through the gear connection described, to adjust the slide 8.

Projecting from the knife carrier slide 8 is an arm 20, Figs. 1 and 2, on which is pivotally mounted a knife carrier support 22, said support being pivotally connected to the arm 20 at 23, the construction being such that the knife carrier support 22 may, at times, as will presently appear, be swung about its pivotal support 23 to enable the

knife carrier or knife to be manipulated. To prevent such swinging movement of the knife carrier support 22 under ordinary conditions of use the hub portion thereof adjacent the pivotal support is provided with a stop 24 adapted to engage the end 25 of a pawl 26 pivoted at 27 and having a handle 28, said pawl normally being under the influence of a spring 29 which throws the end 25 of the pawl into engagement with the lug or stop 24. Projecting from the knife carrier slide 8 is a lug 30 into the top portion of which is screw-threaded an adjusting screw 31, said adjusting screw being held in position by means of a locking nut or other means, the head 32 of such adjusting screw furnishing a support for the lower end portion 34 of the knife carrier support, the construction being such that by the weight of the knife carrier support, it will normally rest with the end 34 on the head 32 of the adjusting screw 31, while the pawl 26 will lock the knife carrier support in such position, as indicated in Fig. 2.

The grinding wheel or element and the blade or knife support are adapted to have a relative bodily traverse imparted thereto, and preferably this traverse may be in a curved path or arc. As one embodiment of means to these ends the present invention contemplates the following construction, though obviously it may be variously changed. The knife carrier support 22 is provided with a T-shaped slot in which is adjustably mounted the head 35 of a pivotal support or bolt 36 passing through a suitable slot or opening 37 in an arm 38, having screw-threaded to its outer end a clamping nut 39, Figs. 1 and 3, said arm 38 at its upper portion carrying the knife to be ground, in a manner as will presently appear. From the construction thus far described it will be apparent that the arm 38 may be swung about the pivotal support or bolt 36 as a center to give to the knife edge its concave form, and that, by properly adjusting the support or bolt 36 in the slot 37 of the arm 38, the arc or swing of the knife carried by said arm may be appropriately changed to suit the convexity or curvature of said knife. Disposed about the pivotal support or bolt 36 is a sleeve 40 having a head 41, Fig. 3, bearing against the face 42 of the knife carrier support 22, the opposite end portion 43 of said sleeve bearing against the face of the clamping nut 39. Surrounding the sleeve 40 is the outer sleeve 44 having a head 45 bearing upon one face of the arm 38 and having screw-threaded to its opposite end a nut 46 a washer 47 being interposed between the said nut and the other face of the arm 38, the construction being such that when the clamp 39 and nut 46 are loosened, the pivotal support or bolt 36 and the sleeves surrounding it may be appropriately adjusted in the slot 37 of the arm 38, the head 35 of the pivotal support 36 moving in the T slot of the knife carrier support, and by said upper nut and clamp 46 and 39, respectively, the supports may be held in adjusted position with the arm 38 free to oscillate about its pivotal support 36. In order to prevent the arm 38 from swinging during the above described adjusting operation, it is provided at its lower end with a locking bolt 48, Fig. 1, and a hand piece 49 mounted on the end of a stud 50 projecting through a slot 51 in the arm 38, the construction being such that the bolt 48 may be projected and retracted. The outer portion of the lug 30 is provided with a recess 52, Fig. 1, adapted to be engaged by the end of the bolt 48 to hold the arm 38 in position during the described adjustment. The upper portion of the arm 38 is provided with dovetail ribs 53 which provide suitable adjusting ways for a knife carrier, Figs. 1 and 4, whereby the knife carrier may be moved to position the knife edge with respect to the grinding surface of the grinding wheel. The knife carrier, which for identification may be referred to as a whole by A, is thus mounted upon the end of the swinging arm 38 so that the knife carried thereby may be presented to the grinding wheel while the arm 38 is being swung about its pivotal support, previously adjusted into proper position to accord with the curvature or convexity of the breasting knife to be ground.

The knife carrier A is preferably formed as a member 54 having the forward wing portions 55 which furnish ledges or supports 56 for the edge portions 57, Fig. 2, of the breasting knife 58, the edge portions 57 of the breasting knife being held to their seats on the wing portions 55 of the knife carrier by suitable clamping screws 59, Figs. 1 and 2. The breasting knife 58, illustrated in the present embodiment of the invention, is provided with a screw-threaded stem 60 which projects rearward from the wing portions 55 but in no manner interferes with the proper manipulation of the knife carrier or the grinding operation. As hereinbefore pointed out, the cutting portion of the breasting knife is made to conform to the heel breast and the cutting edge is concaved, as indicated at 61, Fig. 1, to accord with the shape of the shoe shank. It thus becomes desirable that, as the knife carrier is given its transverse swinging movement relative to the grinding wheel by the arm 38 moving about its pivotal support, the concaved edge 61 of the knife be properly presented to the grinding action of the grinding wheel. As one means of securing this result the present invention contemplates moving the knife carrier relative to the grinding wheel by means of a pattern conforming to the shape of the cutting edge 61

of the breasting knife, and as one form of means to this end attention is directed to Figs. 1, 5 and 6.

The rear portion 62 of the knife carrier is provided with suitable wing portions 63, 63, similar to the wing portions 55 for supporting the breasting knife, said wing portions 63 being provided with bearing surfaces 64 for the edges 65 of a pattern 66, said pattern being suitably clamped in adjusted position by means of a set screw 67 threaded through the arm 62 of the carrier, Figs. 1, 5 and 6. The pattern 66 thus comprises a plate adjustably secured to the arm 62, said plate having an edge contour 68, Figs. 1 and 5, conforming to the edge contour 61 of the breasting knife to be ground.

Adjustably mounted on a bracket 69 supported by an arm 70 carried by the bracket 7 is a roll 71, Figs. 1 and 5, said roll being preferably mounted on a pin 72 extending upward from a slide arm 73 movable in suitable ways furnished by the bracket 69, as indicated in Figs. 1, 5 and 6. The slide 73 is screw-threaded to an adjusting screw 74 having a milled head 75 and supported by the adjustable bracket 69, said adjusting screw 74 being held from longitudinal movement of the bracket 69 by a collar 76 engaging a suitable recess in the arm 77 of the bracket 69, the construction being such that upon rotation of the adjusting screw 74 the slide 73 carrying the pin 72 and roll 71 will be appropriately moved with respect to the bracket 69 and adjusted with relation to the edge 68 of the pattern 66.

From the construction thus far described it will be apparent that as the arm 38 is moved about its pivotal support 36 to grind the face of the knife, as indicated in Fig. 1, the operative may move the knife carrier A forward until the edge 68 of the pattern contacts with the roll 71 carried by the bracket 69, so that as the arm 38 is swung laterally to traverse the knife over the grinding wheel, the concaved edge 61 will be appropriately presented to the grinding action of said wheel, as will be readily understood.

In order that the clamp 39 and nut 46 may be readily operated, they are provided with the hand portions 78 and 79, respectively.

It is sometimes desirable to grind a straight edge on a heel breasting knife, and in order to adapt the present construction to that end the knife carrier has interposed between its member 54 and the top of the arm 38 a transverse sliding connection. In the present form of the invention this sliding connection is indicated in Figs. 1 and 4 as comprising a transverse slide 80 having dove-tailed portions 81, Fig. 1, engaging suitable ways in the member 54 of the knife carrier, a set screw 81* serving to lock the member 54 and slide 80 together, and when unclamped to permit the knife carrier member 54 to be moved transversely, the construction being such that when the arm 38 is locked from swinging movement by means of the bolt 48, and the set screw 81* unclamped, in a manner hereinbefore stated, the operator can move the knife carrier transversely across the top of the arm 38, and thus grind the straight face portion while the edge 61 may still be made to conform to the convexity of the shoe shank by a suitable pattern, in a manner hereinbefore stated.

To facilitate the ready adjustment of the pivotal support 36 for the arm 38, said arm 38 is provided with a scale 82, Fig. 1, cooperating with a pointer 83 movable with the pivotal support or bolt 36.

As the knife carrier is swung about its pivotal support to grind the face thereof, it is desirable that it be not permitted to swing out of operative engagement with the grinding element or wheel 4, and to this end suitable stops 84 project from each side of the knife carrier support 22 to engage the knife carrier at each limit of its swing about its pivotal support 36.

As one form of means for properly positioning the cutting edge of the knife with relation to the knife carrier, the latter is provided with a pointer 85, Figs. 1 and 2, suitably held in place upon the knife carrier by means of a set screw, as will be readily understood, the construction being such that, the pointer 85 being adjusted in position to indicate the proper location of the cutting edge of the knife with relation to the knife carrier in order that it may be properly presented to the grinding wheel, the knife 58 may be brought into proper relation therewith and then clamped, as will be readily understood.

In order to maintain the knife carrier from movement longitudinally with respect to the arm 38 when the parts are not in use and the carrier is not held to its work by the operator, the upper portion of the arm 38 has pivotally mounted thereon at 86 an arm 87 in the end of which is mounted a locking pin 88 adapted to engage with an aperture 89 in the knife carrier, the construction being such that when the arm 87 is thrown upward to bring the locking pin 88 into position in engagement with the aperture 89 in the knife carrier, said knife carrier is held from longitudinal movement on the arm 38. That the locking pin 88 may readily move into and out of position, there is a guide or belt 90 leading from the aperture 89 on which the end of the pin 88 may rest as it moves into and out of locking relation with the aperture 89.

Should it be desirable at any time to have access to the knife or carrier, as, for instance, in taking out one knife and replacing

it by another, the knife carrier support 22 may be swung about its pivotal mounting 23 by simply tripping the pawl 26 from engagement with the lug 24, Fig. 2, and after the knife has been properly positioned in its carrier the knife carrier support may be swung back to its operative position, as indicated in Fig. 2.

Obviously many changes may be made in the details and general form and relation of many of the parts, it being understood that the invention is not restricted thereto but is definitely pointed out by the claims.

What is claimed is:

1. In a breaster knife grinding machine, the combination of sharpening means, a blade or knife support, means for pivotally sustaining said support that the blade or knife may be swung bodily in an arc relative to the sharpening means, means for changing the radius of arc movement to vary the curvature of the arc in which the blade or knife swings, and a pattern to bodily vary the position of the blade or knife in the same arc as it is swung therein.

2. In a breaster knife grinding machine, the combination of a grinding wheel, a blade carrier, means permitting bodily traverse to said blade carrier in a curved path to present the curved face of the breaster knife to the action of the grinding wheel, and a pattern to bodily vary the position of the blade in the same path as the said blade swings through said curved path.

3. In a breaster knife grinding machine, the combination of a grinding wheel, a blade carrier, means permitting bodily traverse to said blade carrier in a curved path to present the curved face of the breaster knife to the action of the grinding wheel, means for varying the curvature of the curved path of carrier movement, and a pattern to bodily vary the position of the blade in the same path as the said blade swings through said curved path.

4. In a blade sharpening machine, the combination of a sharpening means, a blade carrier, said sharpening means and blade carrier having capacity for relative traverse, connected means permitting said traverse to be effected in a curved path or a right line at will, and a pattern to bodily vary the position of the blade in the prescribed path of relative traverse.

5. In a blade sharpening machine, the combination of a grinding wheel, a blade carrier, means to impart bodily traverse to said blade carrier in a curved path extending about the grinding wheel to present the curved face of the blade to the action of the said grinding wheel, stops for limiting the traversing movement, and a pattern to define the grinding action along the edge of the knife during the said traverse of the blade carrier.

6. In a knife grinding machine, the combination of a grinding element, a knife carrier, a knife carrier support to which the knife carrier is pivotally connected at a point which is the center of the curve of the knife to be ground to enable the knife carrier to be traversed in a curved path to grind the concaved face of the knife, and means for pivotally sustaining the knife carrier support to enable the knife carrier to be swung out of operative relation with the grinding element.

7. In a knife grinding machine, the combination of a grinding element, a knife carrier, a knife carrier support to which the knife carrier is pivotally connected to enable the knife carrier to be traversed in a curved path to grind the face of the knife, means for pivotally sustaining the knife carrier support to enable the knife carrier to be swung out of operative relation with the grinding element, and means for locking the knife carrier support in operative position.

8. In a knife grinding machine, the combination of a grinding element, a knife carrier, a knife carrier support to which the knife carrier is pivotally connected to enable the knife carrier to be traversed in a curved path to grind the face of the knife, a pattern to determine the grinding action of the knife edge, and means including a lock for pivotally sustaining the knife carrier support to enable the knife carrier to be swung out of operative relation with the grinding element.

9. In a knife grinding machine, the combination of a grinding element, a knife carrier, a pivotally mounted slotted arm on which the knife carrier is sustained, and means for adjustably securing the slotted arm in position to permit the knife carrier and grinding element to be traversed in a curved path of variable radius.

10. In a knife grinding machine, the combination of a grinding element, a knife carrier, a pivotally mounted slotted arm on which the knife carrier is sustained, means for adjustably securing the slotted arm in position to permit the knife carrier and grinding element to be traversed in a curved path of variable radius, and a pattern to project the knife carrier with respect to the grinding element during the said traverse movement.

11. In a knife grinding machine, the combination of a frame, a grinding element, a knife carrier pivotally mounted to be traversed in a curved path with relation to the grinding element to grind the face of a knife, means for varying the curvature of the transverse movement, means for adjusting the knife carrier bodily to carry the edge of the knife toward and from the grinding element, and a pattern and coacting part, one connected to the knife carrier

and the other to the frame for bodily moving the knife longitudinally in the place of the transverse curved path.

12. In a knife grinding machine, the combination of a frame, grinding element, a knife carrier pivotally mounted to be traversed in a curved path with relation to the grinding element about an axis at one side of the knife carrier to grind the face of a knife, said carrier having wing portions to support the side edges of the knife, and clamping means to hold the knife on said wing portions.

13. In a knife grinding machine, the combination of a frame, a grinding element, a knife carrier pivotally mounted to be traversed in a curved path about the grinding element to grind the face of a knife, said carrier having wing portions to support the side edges of the knife, clamping means to hold the knife on said wing portions, and a gage to determine the grinding location of the knife edge.

14. In a knife grinding machine, the combination of a frame, a grinding element, a knife carrier pivotally mounted to be traversed in a curved path with relation to the grinding element to grind the face of a knife, means slidably connecting the knife carrier to its support, and a lock normally acting to prevent such sliding movement to maintain the carrier in position on its support during periods of rest.

15. In a machine for grinding the heel breasting knives of boot and shoe machines, the combination of a grinding wheel, a knife carrier movable transversely with relation to the peripheral surface of the grinding wheel, a pattern to move the knife longitudinally as the carrier is traversed in its prescribed path transversely of the grinding wheel, and means for permitting said traverse to be effected in a curved path or a straight line at the will of the operator.

16. In a machine for grinding the heel breasting knives of boot and shoe machines, the combination of a grinding wheel, a knife carrier mounted to move in a curved path extending transversely of the grinding wheel, and adjusting means for varying the curvature of the path of transverse movement to accommodate knives of varying contours.

17. In a machine for grinding the heel breasting knives of boot and shoe machines, the combination of a grinding wheel, a knife carrier mounted to move in a curved path extending transversely of the grinding wheel, means for varying the curvature of the path of transverse movement to accommodate knives of varying contours, and means for moving the knife carrier and knife in a direction longitudinally of the knife in the path of and during such transverse movement.

18. In a machine for grinding the heel breasting knives of boot and shoe machines, the combination of a grinding wheel, a knife carrier for presenting the concaved edge of the knife to the grinding wheel, said knife carrier being pivotally mounted on an axis disposed at the concaved side of the knife to cause the knife to be traversed in a curved path extending about the grinding wheel, and automatic means for moving the knife longitudinally as it is being traversed.

19. In a machine of the character described, the combination of a grinding element, a knife carrier, pivotally mounted means for moving the carrier in a curved path about the grinding element, devices for locking said means from pivotal movement, and mechanism permitting movement of the knife carrier in a right line transversely of the grinding element when said means is locked from pivotal movement.

20. In a machine of the character described, the combination of a grinding element, a knife carrier, pivotally mounted means for moving the carrier in a curved path about the grinding element, a carrier slide for supporting said means in varying positions of adjustment, devices for locking said means from pivotal movement, and mechanism permitting movement of the knife carrier in a right line transversely of the grinding element when said means is locked from pivotal movement.

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

WILLIAM C. STEWART.

Witnesses:
REDFIELD H. ALLEN,
ROSWELL F. HATCH.