July 22, 1941. C. G. BROSTROM 2,249,742

AUTOMATIC EDGE SETTING MACHINE

Filed Dec. 22, 1939 2 Sheets-Sheet 1

Fig. 1.

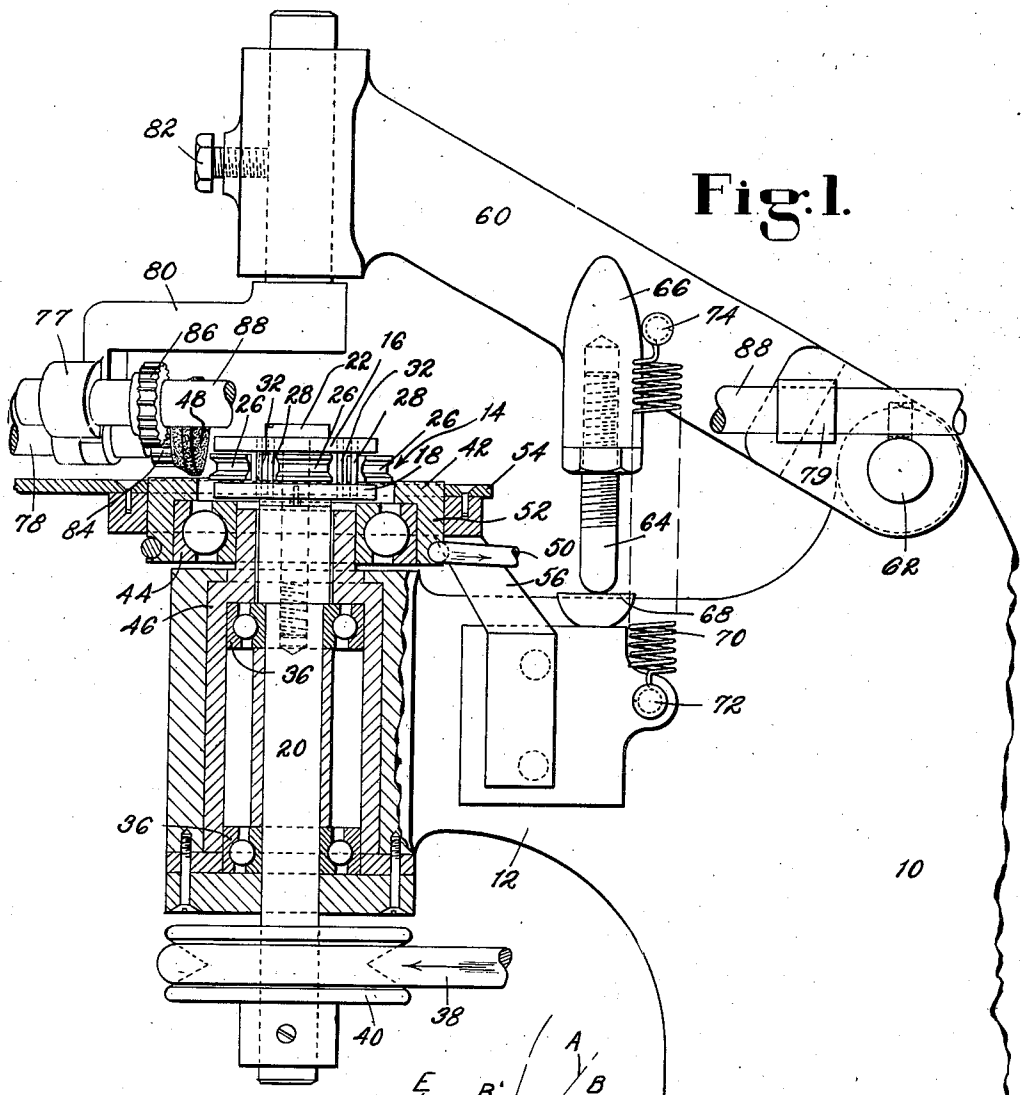
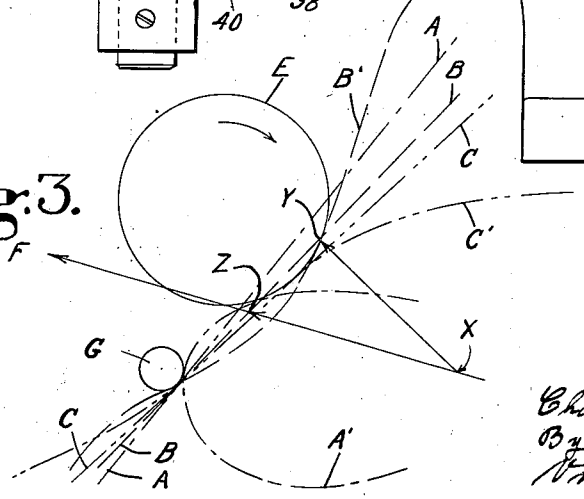


Fig. 3.



INVENTOR.
Charles G. Brostrom
By his Attorney
Victor Cobb.

July 22, 1941. C. G. BROSTROM 2,249,742

AUTOMATIC EDGE SETTING MACHINE

Filed Dec. 22, 1939 2 Sheets-Sheet 2

Fig. 2.

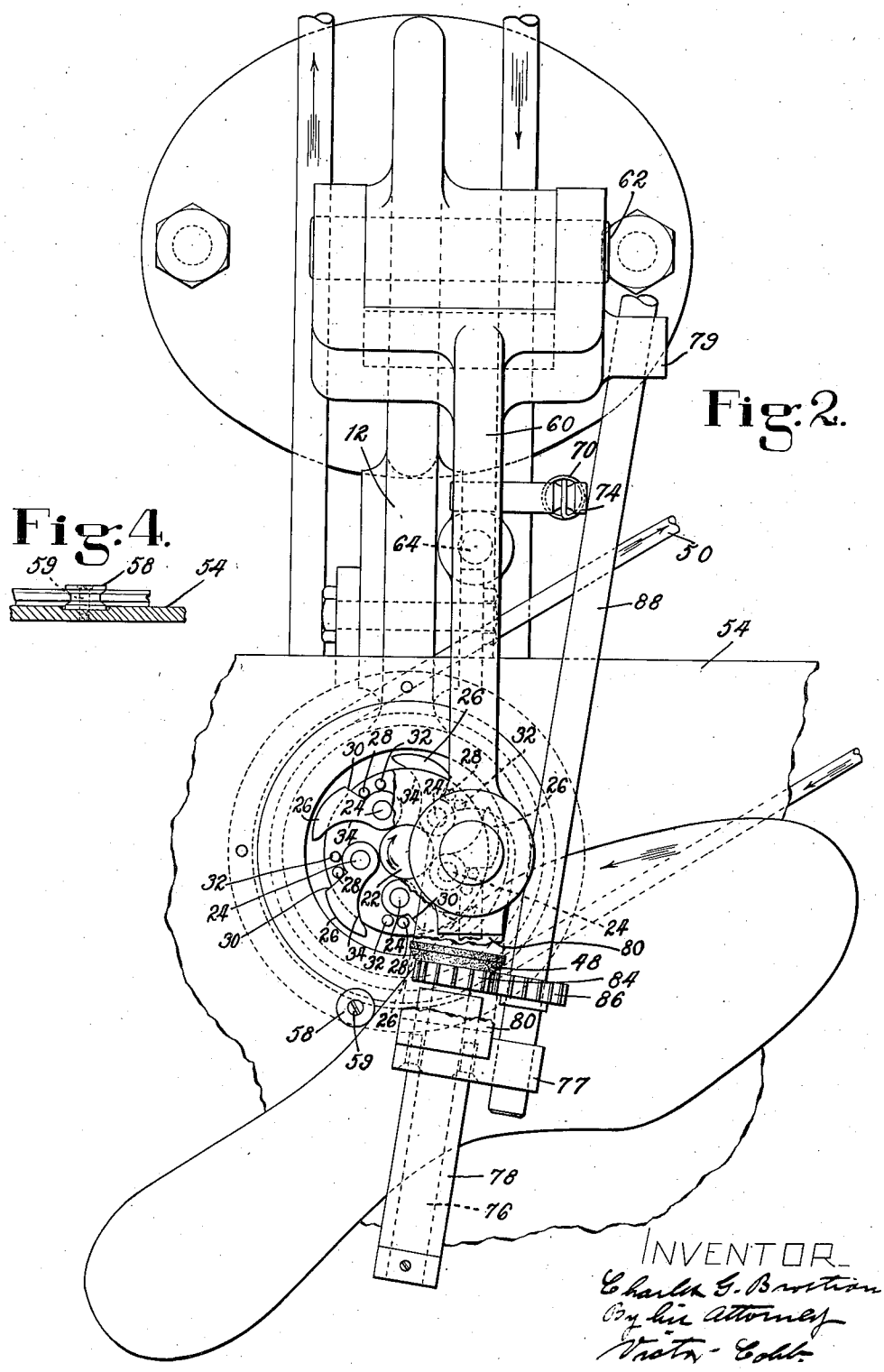


Fig. 4.

INVENTOR
Charles G. Brostrom
By his attorneys
Watson - Cole

Patented July 22, 1941 2,249,742

UNITED STATES PATENT OFFICE

2,249,742

AUTOMATIC EDGE SETTING MACHINE

Charles G. Brostrom, Salem, Mass., assignor to United Shoe Machinery Corporation, Borough of Flemington, N. J., a corporation of New Jersey

Application December 22, 1939, Serial No. 310,604

19 Claims. (Cl. 12—77)

This invention relates to improvements in edge finishing machines and is illustrated in a machine for burnishing the edges of unattached soles.

In the manufacture of certain types of shoes, such as shoes having cement attached soles, it is often the practice to burnish the edges of the soles before they are attached to the shoes. The burnishing operation is often carried out by an operator who moves the edge of the unattached sole past a rotating burnishing tool. The finish applied to the sole edge in this manner is frequently unsatisfactory due largely to the difficulty in applying sufficient force to the unattached sole to press it against the burnishing tool in the positive manner which is required for a good edge finishing operation. This difficulty is due in part to the tendency of an unsupported sole, especially a light one, to buckle when it is forced against the burnishing tool and in part to the operator who, in his desire to obtain a large output, has a tendency to move the sole edge past the burnishing tool without pressing the edge against the tool as hard as it should be pressed.

It is an object of the present invention to provide an improved simple and inexpensive automatic burnishing machine which is arranged to effece the application of a substantial amount of pressure between the sole edge and the burnishing tool while at the same time carrying out the operation in a rapid and efficient manner. To this end, the illustrated embodiment of my invention is provided with a rotary edge setting tool and an automatic work feeding means which is associated with the edge setting tool and is arranged to force the edge of the unattached sole against the edge setting tool as it moves the sole past the tool.

Invention is also to be recognized in the construction and arrangement of the sole edge guide which effects a wiping action on the sole edge subsequent to the edge setting operation and in the construction and operation of the work table which substantially eliminates scuffing action between the surface of the sole and the work table as the sole moves over the table.

With the above and other objects in view, the invention will now be described with reference to the accompanying drawings and will be pointed out in the appended claims.

In the drawings,

Fig. 1 is a side elevation partly in section of a machine embodying this invention;

Fig. 2 is a plan view of the machine shown in Fig. 1;

Fig. 3 is a schematic view showing the direction of the forces applied to a sole by the work feeding means, and

Fig. 4 is an elevational view showing the contour of the work engaging face of the guide roll.

The machine illustrated in the drawings is provided with a frame 10 which is adapted to be mounted on a table or other appropriate support and carries a projecting arm 12 upon which is rotatably mounted an edge setting tool 14. The edge setting tool 14 consists of a head comprising a pair of spaced plates 16, 18 (Fig. 1) between which are pivotally mounted a plurality of edge setting irons 26, each of the edge setting irons being pivoted at one end on a pin 24 that extends between the plates 16, 18. The result of the off-center pivoting of the edge setting irons 26 is that they are thrown outwardly from the plates 26 by centrifugal force when the head is rotated. The outward movement of the edge setting irons 26 is limited by pins 28 (Fig. 2) which extend between the upper and lower plates 16, 18 and are arranged to engage shoulders 30 on the irons when the irons reach a predetermined position. The inward movement of the irons is limited by pins 32 which are also mounted in the plates 16, 18 and are arranged to contact an inner face 34 on the edge setting tools. The edge setting tool 14 is attached by a screw 22 (Fig. 1) to the upper end of a spindle 20 which is in turn mounted in roller bearings 36 positioned in a recess in the frame arm 12. The spindle 20 is driven by a belt 38 which extends between a pulley 40 attached to the lower end of the spindle 20 and an appropriate source of power.

Surrounding the edge setting tool 14 is a small circular work table 42 which is rotatably mounted on a ball bearing 44 (Fig. 1) carried by the upper end of a sleeve 46, the sleeve 46 being mounted in the recess in the arm 12 which receives the spindle 20. The work table 42 underlies a feed wheel 48 and is rotated at approximately the speed of the work feed by a belt 50 which extends between a groove in the depending flange 52 of the work table and an appropriate source of power. By rotating the work table at approximately the speed of the work feed, the relative movement between the table and the work is kept at a minimum and in this manner scuffing of the surface of the work as it passes over the work table is practically eliminated.

Surrounding the work table 42 is a plate 54 which supports that part of a sole member that is not carried by the work table. The plate 54 is attached to a bracket 56 (Fig. 1) which is in turn fastened to the arm 12 of the frame 10. Located beyond the edge setting tool 14 in the direction of the feed (Fig. 2) is a guide roll 58 mounted on a pin 59 threaded into the plate 54. The work engaging face of the guide roll 58 is shaped similarly to the work engaging faces of the edge setting irons 26, so that the guide roll will exert a wiping action on the newly set sole edge thereby improving its finish. If it is desired to improve this wiping action, the guide roll 58 may be prevented from rotating by means of a suitable splined connection between it and the pin 59 which attaches the roll to the table 54.

The feed wheel 48 is supported by an arm 60 (Fig. 1) pivoted on the frame 10 at 62. The heightwise position of the feed wheel 48, with respect to the surface of the work table 42 when there is no work in the machine, is regulated by a stop 64 one end of which is threaded into a boss 66 on the arm 60 and the other end being arranged for engagement with an abutment 68 on the arm 12. The lower end of the stud 64 is held against the abutment 68 when there is no work in the machine by a spring 70 which is connected at one end to a pin 72 on the arm 12 and at its other end to a pin 74 on the arm 60.

The feed wheel 48 is fastened to a shaft 76 that is rotatably mounted in a housing 78 which is in turn supported by a member 80 that is fastened to the arm 60 by a set screw 82. The feed wheel 48 is rotated by a gear 84 on the shaft 76 which meshes with a gear 86 mounted on a shaft 88 that extends parallel to the shaft 76. The shaft 88 is journaled in bearings 77, 79 supported by the movable arm 60 and is connected to an appropriate source of power.

The feed wheel 48 (Fig. 2) is positioned between the edge setting tool 14 and the guide roll 58 where it exerts a cross-feed on a sole which forces the sole edge against both the edge setting tool and the guide roll as it moves the sole past those members. This action of the feed wheel can perhaps be better understood by referring to Fig. 3 which shows an analysis of the forces exerted on a sole by the feed wheel 48. In that figure, E represents the path traced by the edge setting irons 26, F the direction of the force applied by the feed wheel 48, and G represents the guide roll 58. A, B and C are lines passing between the point of contact between the sole edge and the feed wheel roll and the points of contact between the edge setting irons (which is otherwise known as the point of operation) and the sole edge when different parts of the sole are being operated upon. It will be noticed that the point of operation varies somewhat about the path E due to changes in the contour of the sole edge, but, regardless of the variations of the position of the point of operation, the line of application of the feeding force, as indicated by the line F, always forms an acute angle with the lines A, B or C. As a result of this angular relationship, the force F can be resolved into vertical and horizontal components, the vertical component representing the sum of the forces which press the sole edge against the edge setting tool and the guide roll 58 while the horizontal component is the force which moves the sole edge past the edge setting tool and the guide roll. As the horizontal component extends in the direction of the rotation of the edge setting tool the action of the tool on the sole edge will assist in feeding the sole.

For an example of the above analysis assume that a sole is in the position indicated by the outline B' and the feed wheel is exerting a force of a magnitude equal to X, Z. Then the vertical component of this force will be equal to X, Y and the horizontal component Y, Z. When the sole is in the position indicated by the outline B' the line of force F passes about midway between the point of operation and the point of contact between the sole and the guide roll 58 (G) so that approximately half of the force X, Y will be applied at each of those points. However, the proportion of the force X, Y which is applied at the point of operation and the guide roll, respectively, will vary as the point of operation moves closer to the line F when the sole moves to other positions such as A' and C'.

The variation in the magnitude of the force with which the sole edge is pressed against the edge setting tool at the point of operation is taken care of by the construction and arrangement of the edge setting irons 26. Thus, as these irons are thrown outwardly by centrifugal force they will have a yieldable or cushioning quality which will enable them to yield somewhat when the force increases and to move outwardly from the head when it decreases and thereby compensate for the variations in the force which presses the sole edge against the edge setting tool.

To review briefly the operation of the machine: when a sole edge is presented to the machine, the spring 70 will yield sufficiently to permit the sole to move beneath the feed wheel 48 after which the feed wheel moves the sole progressively past the point of operation of the rotary tool. As the sole edge is moved past this point, it is set and compacted by the edge setting iron 26 and is subsequently further burnished by the guide roll 58. After the operation progresses completely about the periphery of the sole it is removed and the operation repeated on a new sole.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. An automatic edge setting machine for operating upon unattached soles comprising an edge setting tool, and work feeding means associated with the edge setting tool and arranged to force the edge of an unattached sole against the tool as it moves the sole edge past the tool.

2. An automatic edge setting machine for operating upon unattached soles comprising an edge setting tool, a work support, and work feeding means arranged to force the edge of an unattached sole against the tool as it moves the sole edge past the tool, said work support and the work feeding means being arranged to grip the sole between them close to the point of operation of the tool thereby to support the sole in the area operated upon by the edge setting tool.

3. In a burnishing machine, a burnishing tool, a guide located beyond the burnishing tool in the direction of feed, and work feeding means arranged to force the edge of the work against both the burnishing tool and the guide as it moves the work past them.

4. An automatic edge setting machine for operating upon unattached soles comprising a rotatable edge setting tool, and work feeding means arranged to move an unattached sole toward and past the edge setting tool, the direc-

tion of the force applied to the sole by the work feeding means extending at an acute angle to a line extending between the axis of the tool and its point of operation so that one component of the feeding force presses the sole edge against the tool and the other component moves the sole past the tool in the direction of its rotation whereby the action of the tool assists the last mentioned component in feeding of the sole.

5. An automatic edge setting machine for operating upon unattached soles comprising a rotary member having an edge setting iron pivoted thereon and arranged to be moved outwardly by centrifugal force, and automatic work feeding means arranged progressively to present the edge of an unattached sole member to the edge setting iron and to force the sole edge against the edge setting irons.

6. An automatic edge setting machine for operating upon unattached soles comprising a rotary head, a plurality of edge setting irons pivoted respectively at spaced points about the edge of the rotary member, said edge setting irons being eccentrically pivoted so that they are moved outwardly from the head by centrifugal force when the head is rotated, and automatic work feeding means arranged progressively to present the edge of an unattached sole to the edge setting irons and to force the sole edge against the edge setting irons.

7. An automatic edge setting machine for operating upon unattached soles comprising a rotary member provided with a plurality of pivoted edge setting irons arranged to be moved outwardly by centrifugal force, means for limiting the outward movement of said irons, and automatic work feeding means arranged progressively to present the edge of an unattached sole to the edge setting irons and to force the sole edge against the edge setting irons.

8. An automatic edge setting machine for operating upon unattached soles comprising a rotary edge setting tool, and a rotary feed wheel arranged to move the edge of an unattached sole past the edge setting tool, the axis of said feed wheel being located substantially at right angles to the axis of the tool and offset therefrom whereby the forces exerted by said feed wheel will force the sole edge against the edge setting tool and will also move it past said tool.

9. In a burnishing machine, a burnishing tool, work feeding means arranged to engage and move a work piece past the point of operation of said burnishing tool, a work supporting table mounted for movement past the point of operation, and means for moving said work table past the point of operation at approximately the speed of the feeding movement of the work thereby to avoid scuffing the work as it is moved past the point of operation.

10. In a burnishing machine, a burnishing tool arranged for movement about an axis, a rotary work support arranged coaxially of the burnishing tool, work feeding means for moving the work across the work support and past the burnishing tool, and means for rotating the work support at approximately the speed of the work feeding means.

11. An automatic edge setting machine for operating upon unattached soles comprising a rotary edge setting tool, a rotary work table arranged to support a sole as it is presented to the point of operation of said edge setting tool, work feeding means coacting with the table to grip the work and arranged progressively to present the edge of an unattached sole to the point of operation of the rotary tool, and means for rotating the work supporting table at approximately the speed of the feeding movement of the sole thereby to avoid scuffing the surface of the sole.

12. An automatic edge setting machine for operating upon unattached soles comprising a rotatable edge setting tool, a rotatable work supporting table arranged concentrically of the rotatable tool, and a work feeding wheel positioned above the work supporting table with its axes extending substantially at right angles to the axes of the edge setting tool and the work supporting table.

13. In a burnishing machine, a burnishing tool, a guide located beyond the burnishing tool in the direction of feed, and work feeding means arranged to force the edge of the work against both the burnishing tool and the guide as it moves the work past them, said guide having its work engaging face shaped similarly to that of the burnishing tool whereby the guide will effect a wiping action upon the work surface operated upon by the burnishing tool.

14. An automatic edge setting machine for operating upon unattached soles comprising an edge setting tool, a guide positioned beyond said edge setting tool in the direction of the feed, said guide having its work engaging face shaped similarly to the work engaging face of the edge setting tool, and a rotatable feed wheel arranged to force the edge of an unattached sole against the edge setting tool and the guide and to move the sole past said tool and guide.

15. An automatic edge setting machine for operating upon unattached soles comprising an edge setting tool, a guide located beyond said tool in the direction of the feed, a rotatable work supporting table arranged for movement past the point of operation of the edge setting tool, a feed wheel positioned above the work supporting table between the point of operation of the edge setting tool and the guide, a carrier for said feed wheel arranged for heightwise movement with respect to the work table, and resilient means for urging said feed wheel toward said table.

16. An automatic edge setting machine for operating upon unattached soles comprising an edge setting tool arranged to move about an axis, a guide located beyond the tool in the direction of the feed, and work feeding means arranged to move an unattached sole relatively to the tool and the guide, the line of force applied to the sole by the work feeding means extending at an acute angle to a line passing between the guide and the point of operation of the tool whereby one component of the feeding force tends to rotate the sole about the guide as a center and force the sole edge against the edge setting tool and the other component of the feeding force tends to move the sole edge past the tool and the guide.

17. An automatic edge setting machine for operating upon unattached soles comprising a rotary edge setting tool, a guide roll located beyond the burnishing tool in the direction of feed, and a feed wheel disposed at an acute angle to the direction of feed and arranged to force a sole member against the guide roll and edge setting tool.

18. An automatic edge setting machine for operating upon unattached soles comprising a rotatable edge setting tool, a guide located be-

yond the tool in the direction of feed, a feed wheel positioned between the point of operation of the edge setting tool and the work engaging face of the guide, the direction of force applied to a sole by the feed wheel passing between the gage and the point of operation of the edge setting tool and extending at an acute angle to a line passing between said gage and the point of operation whereby one component of said force will press the sole edge against the gage and the edge setting tool and the other component will move the sole edge progressively past the point of operation of the edge setting tool.

19. An automatic edge setting machine for operating upon unattached soles comprising a rotatable member provided with a plurality of pivoted edge setting irons arranged to be moved outwardly by centrifugal force, a guide located beyond the rotatable member in the direction of the feed, and a feed wheel arranged to move an unattached sole toward and past the guide and the rotatable member, the direction of force applied to the sole by the feed wheel extending at an acute angle to a line extending from the guide to the point of operation of the edge setting irons so that one component of the feeding force tends to rotate the sole about the guide as a center and forces the sole edge against the edge setting irons and the other component of the feeding force moves the sole edge past the guide and the rotatable member.

CHARLES G. BROSTROM.