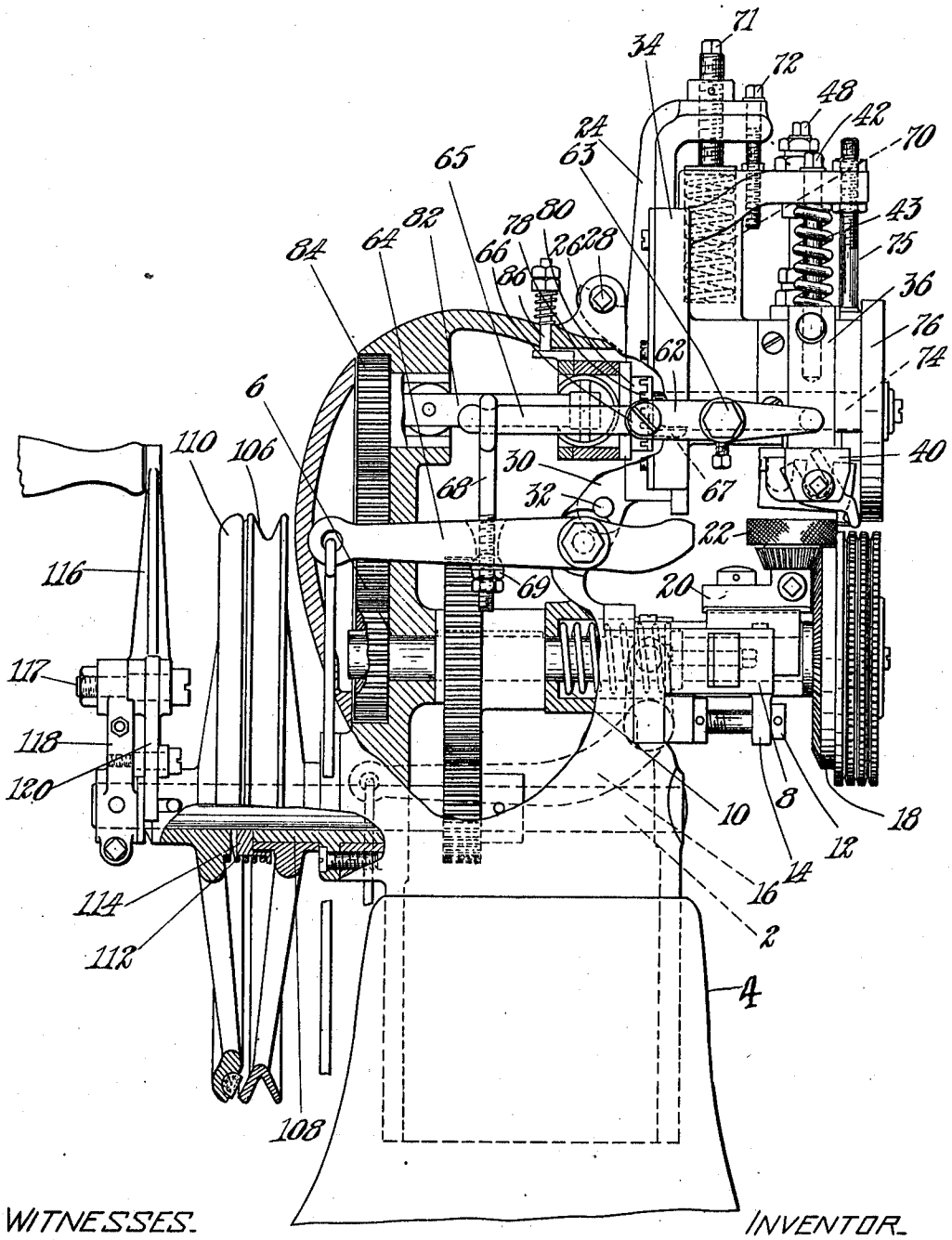
H. W. WINTER.

MACHINE FOR OPERATING UPON SOLES.

APPLICATION FILED SEPT. 28, 1908.

1,004,614. **Patented Oct. 3, 1911.**

3 SHEETS—SHEET 1.



WITNESSES.

Elizabeth C. Coupe

Edith C. Holbrook

Fig. 1.

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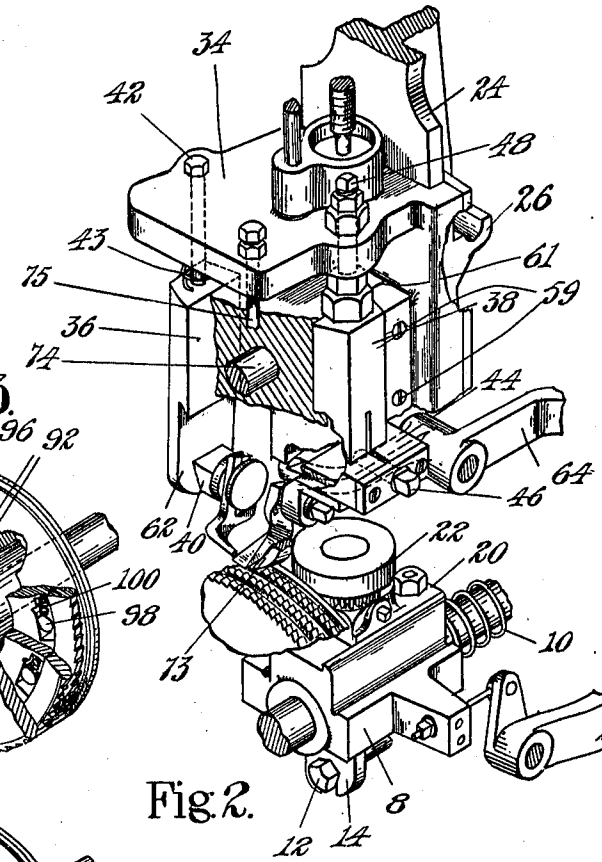

Fig. 3.

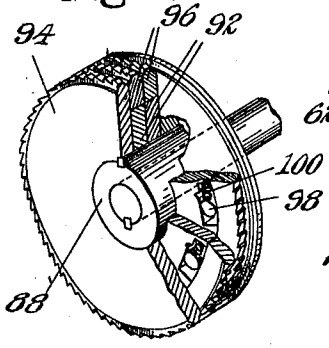

Fig. 2.

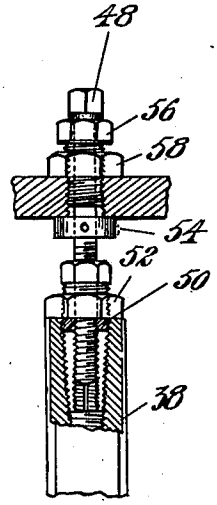

Fig. 4

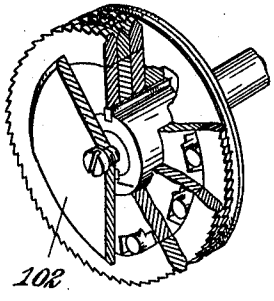

Fig. 5.

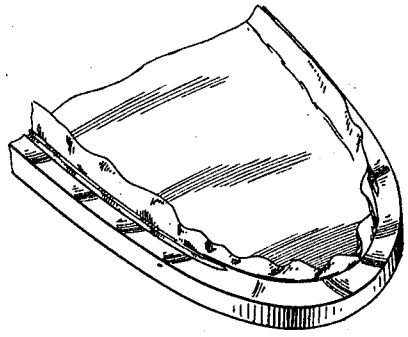

Fig. 7.

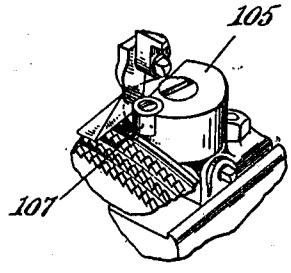

Fig. 6.

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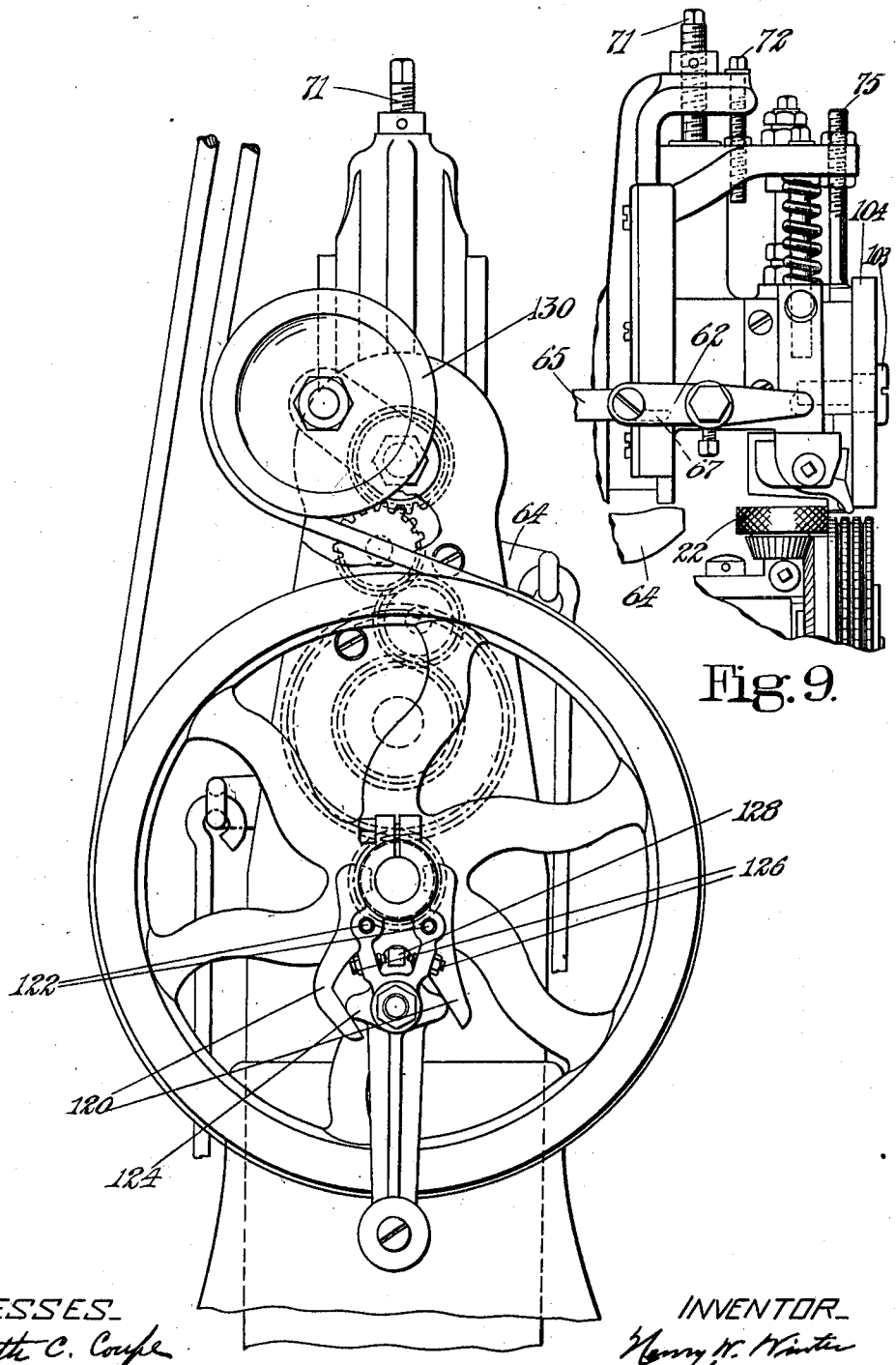

Fig. 8.

Fig. 9.

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UNITED STATES PATENT OFFICE.

HENRY W. WINTER, OF METHUEN, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY COMPANY, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

MACHINE FOR OPERATING UPON SOLES.

1,004,614. Specification of Letters Patent. Patented Oct. 3, 1911.

Application filed September 28, 1908. Serial No. 455,113.

To all whom it may concern:

Be it known that I, HENRY W. WINTER, a citizen of the United States, residing at Methuen, in the county of Essex and Commonwealth of Massachusetts, have invented certain Improvements in Machines for Operating Upon Soles, 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 machines for operating upon soles and is shown embodied in a channeling machine.

Machines for performing various specific operations upon soles are in use in which the marginal part of a sole is progressively gripped by feeding mechanism and advanced against a tool for performing the desired operation. For example, the feeding agency in machines of this class is frequently a toothed wheel, engaging the margin of the sole and against which the sole is pressed by coöperating devices. While this arrangement is effective where it is possible to use a wheel of very small width, or in operating upon those portions of a sole which require a substantially rectilinear movement, it is not satisfactory where a wheel of appreciable width is required to operate upon the sole in a curved line. In working along a curve, the swinging movement of the sole necessary to bring successive portions into the line of feed is resisted by the teeth of the feed wheel which sink more or less into the leather. This not only occasions objectionable mutilation of the sole in turning a curve, but also makes the operation upon abrupt curves, such as in going about the toe, quite a difficult one, thus preventing machines from being operated with the speed desired and endangering the quality of the work performed.

The primary object of the present invention is to provide feeding mechanism for use in machines of the class described, which shall render such machines more easily operated, and improve the quality of their output.

To this end an important feature of the invention consists in the provision, in a machine for operating progressively along the edge of a sole, of a movable device for advancing the sole against a tool by engagement with successive portions of its margin, having provision for variation in surface speed from point to point in its width to accommodate the irregular contour of the sole. The construction contemplated is such that the surface speed at different points in the width of the device is determined by the action of the work itself upon the device, said speed conforming to whatever requirements may be occasioned by the contour of the line in which the work is operated upon. In the embodiment of the invention herein illustrated there is provided a plurality of toothed feeding sections arranged for continuous rotatory engagement with the work and mounted side by side. These sections are normally driven at the same rate of speed, the arrangement being such, however, that individual forward movement of the sections at an increased speed is freely permitted. In going about a curve, the swinging movement of the sole is thus accommodated by forward movement of one or more of the sections with relation to the remaining sections. For example, in going about the toe the sole may be turned about a section removed from the sole edge as a fulcrum, and the sections adjacent to the sole edge moved forwardly different amounts to conform to the movement of the sole. If the curve is a reëntrant curve, such as occurs at the shank of a sole, a section adjacent the sole edge may constitute the fulcrum and the sections toward the interior of the sole advanced.

According to the arrangement herein described, a portion, or all, of the feeding sections are free to be moved forwardly by the work. The construction is preferably such, however, that the movement imparted to said sections by their driving mechanism is positive in character. This is of particular importance where the nature of the operation performed by the machine occasions considerable resistance to the feeding movement of the sole, as for instance, in a channeling machine wherein it is desirable that the driving movement imparted to the feeding agency be positive regardless of the resistance encountered.

In the particular embodiment of the invention shown, a plurality of peripherally toothed sections are mounted side by side upon a rotatory shaft. Between the shaft and a part or all of the toothed sections is arranged mechanism for transmitting move-

ment from the shaft to the sections, constructed to permit forward movement of the sections upon the shaft and to arrest rearward movement thereof. The construction shown is such that no rearward movement of the sections upon their supporting shaft is permitted, but it would be within the present invention to permit a certain amount of rearward movement, provided said movement were finally arrested.

The invention also consists in certain novel features of construction and arrangements of parts which will be hereinafter particularly described and thereafter defined in the claims.

In the drawings,—Figure 1 is a view in front elevation with parts in section of a machine embodying the present invention; Fig. 2 is a view in perspective with parts in section of a portion of the machine shown in Fig. 1; Fig. 3 is a perspective view, partly in section, of the feed wheel shown in Fig. 1; Fig. 4 is a vertical sectional detail view of an adjusting device for the channel knife holder; Fig. 5 is a view similar to Fig. 3 showing a slightly modified form of wheel; Fig. 6 is a perspective view showing a modified form of edge gage; Fig. 7 is a perspective view of a portion of a sole illustrating the nature of the operation performed by the machine shown in the preceding views; Fig. 8 is a view in side elevation, looking from the right in Fig. 1; Fig. 9 is a view in front elevation with parts in section of a portion of the machine showing a modified arrangement of a presser wheel.

Referring to the drawings, the reference character 2 indicates a driving shaft journaled in a frame 4 and transmitting motion to a shaft 6 through suitable gears. The frame 4 is provided at one side with a horizontal guideway in which is arranged a slide 8 having a bore and suitable bushing to receive the shaft 6. A coiled spring 10 is arranged about the shaft 6 at the rear of the slide 8 within a recess in the frame 4 to press the slide outwardly, its movement in this direction being limited by an adjustable stop 12 engaged by a lug 14 upon the slide. The movement of the slide 8 is in a line parallel with the shaft 6 and said shaft is also arranged to move therewith. A lever 16, actuated by a treadle, not shown, is mounted upon the frame in a position to move the slide 8 inwardly. Fixed upon the outer end of the shaft 6 is a feed wheel provided with a toothed periphery and including an inner section 18, upon the inner side of which are cut beveled gear teeth. A groove is formed in the upper face of the slide 8 to receive adjustably a block 20 held in fixed position therein by a screw. Extending vertically from the block is a stud upon which is rotatably mounted an edge roll 22, said edge roll being provided upon its lower part with beveled gear teeth meshing with the teeth upon the feed wheel. It will be observed that since both the feed wheel and the edge roll are mounted for movement with the slide 8, the engagement between the gears formed upon said parts is not altered by movement of the slide. It will be understood that the shaft 6 is arranged for longitudinal movement in its bearings, the gears mounted therein at its rear end being splined thereto to permit this movement.

Upon the frame 4 a head 24 is secured by devices permitting it to be readily detached. To this end the head is provided with a hook 26 which passes beneath and has engagement with a rod 28 fixed upon the frame 4. The head 24 has at its lower end a lug 30 formed with an eye entered by a removable pin 32 carried by the frame. It will be seen from Figs. 1 and 2 that by removing the pin 32 the head 24 may be swung laterally to disengage the hook 26 from the rod 28, and thus free the head from the frame of the machine.

The head 24 constitutes a guide for a vertically movable carrier 34, said carrier being provided with vertical guideways for a groover knife block 36 and a channel knife block 38. The groover block 36 is formed at its lower end with a horizontal guideway in which is received a groover knife holder 40 provided with suitable clamping means for securing the groover knife in fixed position. Vertical adjustment of the block 36 is effected by a screw 42 which also limits downward movement of said block, the block being held yieldingly downwardly by a spring 43. The channel knife block 38 carries at its lower end a channel knife holder 44 arranged for adjustment in a direction parallel with the line of feed by means of a screw 46. Vertical adjustment of the channel knife block 38 is effected by mechanism shown in detail in Fig. 4 comprising a screw 48 entering a conical split sleeve 50 which is threaded in a conical bore in the block 38 and has threaded engagement with the screw 48. The sleeve 50 is secured in fixed position by means of a check nut 52. It will be seen that by tightening the sleeve 50 any backlash between the screw 48 and the channel knife block may be taken up since the sleeve 50 is thereby forced into rigid engagement with the screw. The screw 48 is mounted for turning movement in the carrier 34 so that adjustment of the channel knife block may be secured by rotatory adjustment of the screw 48. Said screw is provided with a shoulder 54 engaging the lower face of the horizontal plate constituting the upper part of the carrier. Surrounding the screw 48 is a sleeve 56 entering from above a threaded orifice in the carrier and held in

fixed position by means of a check nut 58. It will be obseved that with this arrangement any lost motion between the screw 48 and the carrier may be prevented since, by adjustment of the sleeve 56, the shoulder 54 upon the screw 48 may be forced into rigid engagement with the carrier. At the same time adjustment of the channel knife block by turning the screw 48 is not interfered with. To prevent lateral movement of the channel knife block 38 in its guideway the wall of said guideway is slotted at 61 and screws 59 are provided by the adjustment of which the inner side wall of the guideway may be forced against the block 38, the slot 61 permitting a slight yielding movement of said side wall.

Upon the carrier 34, as will appear from Fig. 1, is mounted a lever 62 fulcrumed at 63. The forward end of this lever has engagement with the groover knife block 36 to raise the same. To the rear end of the lever is pivotally connected a rod 65 by a screw 66. The rod 65 is provided with a shoulder 67 which, in the position of the parts shown in Fig. 1, has engagement with a portion of the lever 62 and prevents movement in one direction of said rod upon the lever. This form of connection between the rod 65 and the lever 62 is of advantage in that it permits said rod to be folded over the lever 62 when the head 24 is removed from the machine. The head 24 may thus be handled more conveniently than would be possible if the rod 65 projected from its rear end. The rod 65 is connected to a lever 64 by a link 68, the effective length of which can be varied by adjustment of a nut 69. The forward end of the lever 64 is arranged to have engagement with the lower end of the carrier 34, as shown in Fig. 1. The carrier 34 is pressed yieldingly downwardly by a spring 70 arranged in a socket formed in the carrier, the upward pressure of said spring being resisted by a screw 71. Downward movement of the carrier 34 is limited by engagement of an adjustable stop 72 with the head 24. The lever 64 is actuated from a suitable treadle. It will be seen that during the first portion of the downward movement of the treadle rod the outer end of the lever 62 will be raised to elevate the groover knife block, this movement of the groover knife block occurring before movement is imparted to the carrier 34. After a predetermined movement of the lever 62, the lever 64 comes in contact with the carrier 34 and imparts vertical movement thereto. This arrangement thus permits the groover knife to be raised independently of the channel knife whenever desired, for example, in going about the toe of a sole. It will also be observed that this arrangement provides a single agency for actuating the groover knife and the carrier 34 upon which are mounted the channel knife and the work pressing devices hereinafter mentioned. If it should be desired to raise and lower the groover knife and carrier 34 simultaneously, this result may be secured by adjustment of the stop 69 since by lowering this stop the lever 62 may be rendered ineffective to raise the groover knife block.

To press the work into operative engagement with the feed wheel, and position the knives in proper relation to the face of the sole, there is mounted upon the carrier 34 a presser 73, said presser being secured to the lower end of a vertically adjustable rod 75. As will appear from Fig. 2, the presser 73 engages the work upon a line with the channel knife and groover knife. The carrier also sustains a rotatable shaft 74 provided at its outer end with a presser wheel 76, said presser wheel being arranged at one side of the presser 73, as will appear from Fig. 1. The presser wheel shaft 74 has at its inner end a clutch member 78 meshing with a corresponding member 80 pivotally connected to a shaft 82, the shaft 82 being driven by and pivotally connected to a gear 84 actuated from the shaft 6. As will appear from Fig. 1, the connection between the gear 84 and the clutch member 80 permits vertical movement of the member 80 to be effected without interfering with the rotatory movement imparted to said clutch member, said connection constituting a universal joint. To sustain the member 80 when the member 78 is disengaged therefrom, said member 80 has secured thereto a spring-sustained pin 86 supported by the frame of the machine.

The feed wheel mounted upon the shaft 6 comprises a hub 88 keyed to said shaft and a series of disks secured to the hub and arranged side by side. The innermost disk, which is directly adjacent to the edge roll 22 and which constitutes the section 18 above referred to, has a smooth periphery and supports the extreme marginal portion of the sole. In the wheel shown in Fig. 3, two intermediate disks 92 are arranged next to the section 18, said disks 92 being of less diameter than the outermost disk 94 or the section 18. Each disk 92 sustains rotatably thereon a peripherally toothed ring 96. Each ring 96 is free to move forwardly upon its supporting disk 92, but movement in a rearward direction is prevented. To this end each disk 92 is provided at a plurality of points in its periphery with recesses in which are arranged cylindrical rolls 98. The bottom of each recess is inclined slightly forwardly toward the axis of the wheel, and in each recess is arranged a spring 100 pressing rearwardly the roll therein. It will be seen that while this arrangement permits free forward movement of the rings 96 upon their supporting disks,

it positively prevents rearward movement thereof since any rearward movement causes the rolls 98 to be wedged into locking engagement with the rings and said disks.

In the feed wheel shown in Fig. 3, the outermost section constituted by the disk 94 is formed in a single peripherally toothed piece keyed to the hub 88. In Fig. 5 I have shown a feed wheel in which the outermost three sections are identical in construction. In this arrangement a washer 102 is secured to the end of the shaft to serve as a cover for the recesses in the outermost disk.

In the construction shown in Fig. 9 the presser wheel 104, instead of being positively rotated, is rotated by the work, the driving mechanism for this wheel shown in the preceding views being omitted. As shown the presser wheel 104 rotates freely upon a stud 103 entering the carrier 34. This arrangement may be used where such work-advancing action as is possessed by a positively rotated presser wheel is not required. Its use not only simplifies the construction of the machine, but is also advantageous in that a wheel so arranged freely conforms to the speed of the work and thereby facilitates the turning of the sole in going about the toe.

In Fig. 6 is illustrated a modified arrangement of edge roll. Where a sole has an abrupt inward deflection or curve at the shank, the formation of a channel at the desired distance from the edge may be interfered with at this point, where an edge roll of the usual form is employed, by the presence of that portion of the roll in advance of its center. In the construction shown in Fig. 6, this portion is cut away, the edge gage 105 being substantially semicircular in form and mounted in stationary position upon its holder. To reduce friction, a small freely rotatable roll 107 is journaled at the corner of the gage.

As will be obvious, any suitable driving mechanism may be employed to actuate the machine above described. I have shown, however, an improved form of mechanism comprising a driving pulley section 106 mounted upon a sleeve 108 arranged about the shaft 2 concentrically therewith but secured to the frame 4. A driven section 110 is pinned to the shaft 2 for limited movement longitudinally thereof, and a coiled spring 112 seated on a washer 114 is arranged between the sections to move them apart. The washer 114 is pressed against the end of the sleeve 108 and does not exert pressure upon the driving section 106. The driven section 110 is forced into engagement with the driving section 106 by a crank 116, said crank being pivotally mounted upon a stud 117 secured to an arm 118 fixed upon the shaft 2. The outer end of the hub of the driven section 110 is beveled and is engaged by levers 120 pivoted at 122 upon the arm 118, the arrangement being such that by approaching movement of the inner ends of the levers 120 the driven section 110 is forced into operative engagement with the driving section 106. The levers 120 are engaged by a cam 124 upon the crank 116, a slight swinging movement of the crank serving to press the levers 120 into operative engagement with the hub of the driven section 110. Pivotal movement of the crank upon the arm 118 is limited by screws 126 which are engaged by a lug 128 formed upon the crank. An idle pulley 130 may be provided, if desired, to maintain a suitable tension on the driving cord or to keep the cord out of the way of the operator controlling the machine. It will be seen that in the driving mechanism shown the driving section 106 is sustained independently of the shaft 2, and moreover in the inoperative position of the parts has no frictional engagement with the driving section 110. This is of advantage in that it renders the control of the driving mechanism more sensitive and also because it insures that when the machine is idle the shaft 2 and the crank mounted thereon will not be in rotation.

In the operation of the machine above described, a sole having been inserted in the machine is advanced against the channel knife and groover knife by the feed wheel and the coöperating presser mechanism, and is guided in its movement by the edge gage. The position of the channel with relation to the edge of the sole is controlled by manipulating the lever 16 which throws the edge roll and feed wheel inwardly and thus causes the channel to be formed farther away from the edge of the sole.

In channeling those portions of a sole which are substantially straight, there is little, if any, relative movement of the sections composing the feed wheel. In working along a straight line, each section is positively driven, the toothed rings 96 being locked in rigid engagement with their supporting disks. In going about a convex curve, such as occurs at the toe for instance, when the sole is swung about by the operator the outer section 94 of the feed wheel constitutes a fulcrum and the remaining toothed sections are advanced by the work with relation to the section 94 in order to conform to the swinging movement. When the swinging movement of the sole ceases, the movable sections of the feed wheel are immediately locked from rearward movement upon the wheel, and each toothed section thus becomes effective in advancing the sole. In practice the most difficult part of a channeling operation is going about such a curve or abrupt change in direction as occurs at the toe of a sole. It will be seen that the wheel shown in Fig. 3 freely accommo-

dates the movement of the sole that is thus occasioned. When desired, the feed wheel of the present machine may be constructed to freely accommodate also the movement of a sole occasioned in channeling about a reëntrant curve such as occurs at the shank part of a sole. In channeling along a line of this contour, it is necessary to swing the sole more or less in a direction opposite to that required in channeling about the toe. To accommodate this swinging movement freely, the feed wheel may be made, if desired, in the manner shown in Fig. 5 in which the outer toothed section of the feed wheel is arranged for free forward movement as well as the inner toothed sections. The sole may thus be turned about an inner section as a fulcrum and the outer sections advanced to accommodate such movement.

It will be observed that in a feed wheel of the type herein described, the teeth on the sections may be made sharper and indent the work more deeply than has heretofore been possible. This is of particular advantage where considerable force is required to advance the sole, as in the channeling machine herein illustrated.

In the machine above described, the movement of the knives and the presser foot is absolutely vertical. This is advantageous in that it prevents a change in elevation of the carrier 34 from changing the relation of the channel knife and the presser 73 to the work. In machines now in common use, in which movement of the knives and the presser is in a curved path, a change in elevation of the presser due to variation in thickness of the sole prevents even contact of the presser with the sole and also changes the angle of cut made by the channeling knife.

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

1. A machine for operating progressively along the edge of a sole, comprising a tool and a movable device for advancing the sole against the tool by engagement with successive portions of its marginal part, having provision for free variation in surface speed in the forward direction only from point to point in its width to accommodate the irregular contour of the sole.

2. A machine for operating progressively along the edge of a sole comprising a tool, a plurality of toothed feeding sections for advancing the sole against the tool, and means for normally driving the sections positively at the same surface speed constructed and arranged to permit relative movement thereof in the line of feed to accommodate action of the machine upon the sole in a curved line.

3. A machine for operating upon soles, having in combination, a stationary tool, a plurality of toothed feeding sections for advancing a sole against the tool, means for moving said sections positively in the direction of feed constructed to permit relative movement of the sections in the line of feed under the action of the work, and means for pressing the work into operative engagement with said sections.

4. A machine for operating upon soles, having in combination, a stationary tool, a plurality of rotary toothed feeding sections for advancing a sole against the tool, means for rotating said sections positively in the direction of feed constructed to permit individual forward movement of the sections under the action of the work, and means for pressing the work into engagement with said sections.

5. In a machine of the class described the combination with a rotary shaft, of a plurality of feeding sections arranged side by side upon said shaft, and arranged for free movement in one direction only upon said shaft, means for pressing the work into engagement with said sections, and a tool arranged in the path of the work.

6. In a machine of the class described, a feeding device comprising a rotary hub, a plurality of peripherally toothed sections mounted upon said hub for free individual forward turning movement, and means for arresting rearward movement of the sections upon the hub.

7. A machine for operating upon stock having, in combination, an operating tool and a feeding device for advancing said stock to said tool by engagement of successive portions of its marginal portion with said stock having provision for freely permitting increase in surface speed from point to point and for opposing decrease in surface speed.

8. A machine of the class described, having in combination, a frame, work-feeding means mounted upon the frame, a head detachably secured to the frame and provided with a presser wheel for holding the work in contact with said feeding means, and a divided shaft for rotating said wheel having one of its sections mounted upon the head and a second section mounted upon the frame, and means for detachably connecting said sections.

9. A machine of the class described, having in combination, a knife arranged in the path of the work, a guideway arranged transversely to the line of feed, a slide mounted in said guideway, a rotary edge roll mounted upon the slide, a feed wheel arranged to impart motion to the edge roll and carried by the slide, and means under the control of the operator to advance and retract said slide.

10. A channeling machine, having in com-

bination, a work supporting and feeding device arranged to advance the work in a horizontal path, a vertical guideway, a carrier arrranged for movement upon said guideway, a channeling knife, a grooving knife and a presser foot mounted upon said carrier in position to act upon the margin of a sole sustained by said device, and means for raising and lowering said carrier.

11. In a machine of the class described, a tool sustaining block having a threaded conical bore, an externally and internally threaded conical sleeve arranged in said bore, and an adjusting screw for the block threaded in the sleeve.

12. In a machine of the class described, a tool sustaining block, a headed screw having its shank inserted in the block, a support provided with a tapped hole and an externally threaded sleeve arranged in said hole and formed to receive the screw and have engagement with the head thereof, and a shoulder formed upon the shank of the screw for engagement with the support.

13. A machine of the class described, having in combination, a frame, work feeding means mounted upon the frame, a head detachably secured to the frame and provided with a presser wheel for holding the work in contact with said feeding means, a shaft for rotating said wheel divided intermediate its ends and having its outer section mounted upon the head and its inner section mounted upon the frame, means for detachably connecting said sections and means for supporting the inner section while the head remains detached.

14. A machine of the class described having, in combination, a knife located in the line of feed, a slide movable transversely of said line, a rotary edge roll movable with said slide, a feed wheel similarly movable and a driving connection between said roll and wheel.

15. A machine of the class described having, in combination, a tool for operating upon stock, a sectional feed wheel for advancing said stock to said tool, a rotary member upon which the sections of said wheel are mounted, and a one-way clutch between one of said sections and said rotary member.

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

HENRY W. WINTER.

Witnesses:

BERNARD BARROWS,

ALLAN H. BARROWS.