My invention relates more particularly to improvements in shoe shining machines of the type which operate to automatically first brush the shoes to prepare them for receiving the polish, and thereafter apply the polish and brush the shoes to produce the desired polished surface; and my primary objects are to render machines of this type better adapted for performing their functions and to provide a comparatively novel, simple and inexpensive construction of machine and one which will be positive and effective in operation; and other objects, as will be manifest from the following description.

Figure 1 is a view in rear end elevation of the machine. Figure 2 is a plan sectional view of the machine, the section being taken at the line 2—2 on Fig. 3 and viewed in the direction of the arrows. Figure 3 is a vertical sectional view of the machine taken longitudinally thereof, at the line 3—3 on Fig. 2 and viewed in the direction of the arrows. Figure 4 is a section taken at the line 4—4 on Fig. 3 and viewed in the direction of the arrows. Figure 5 is a section taken at the line 5—5 on Fig. 2 and viewed in the direction of the arrows. Figure 6 is a section taken at the line 6—6 on Fig. 7 and viewed in the direction of the arrows. Figure 7 is a section taken at the irregular line 7—7 on Fig. 6 and viewed in the direction of the arrows, this figure being a continuation of Fig. 3 and showing the upper portion of the machine omitted from the last-referred-to figure; and Fig. 8 is a section taken at line 8—8 on Fig. 7 and viewed in the direction of the arrows. The frame of the machine is represented at 10, this frame supporting the various operating mechanisms as hereinafter detailed, the machine being formed with a shoe-rest represented at 11 conforming generally to the shape of the bottom of a shoe and providing the upper substantially horizontal plate-like portion 12 carried by the vertically-disposed plate-like portion 13 provided at its forward and rear ends with shafts 14 extending laterally in opposite directions beyond the plate-portion 13 and carrying rollers 15 which extend into, and are movable along, channeled guide bars 16 secured to the frame of the machine and extending longitudinally thereof, whereby the shoe-rest 11 is adapted to be reciprocated, the means shown for this purpose comprising a link 17 preferably of the shape shown in Fig. 3 which is pivotally connected at 18 with the rear end of the plate portion 13, a crank 19 pivotally connected at 20 to the other end of the link 17, this crank being carried by a shaft 21 journaled in a bearing 22 carried by the frame of the machine, and means for rotating the shaft 21, these means comprising a worm-wheel 23 secured to the shaft 21 and meshing with a worm 24 secured to a shaft 25 journaled in a bearing 26 on the frame of the machine, the shaft 25 being provided with a worm wheel 27 which meshes with a worm 28 fixed on the main drive shaft 29 journaled in bearings 30 and 31 on the frame and driven in any suitable way as through the medium of an electric motor 32 mounted on the frame of the machine and connected with the shaft 29 through the medium of sprockets 33 and 34 on the shaft 29 and armature shaft of the motor 32 respectively, and a sprocket chain 35 connecting these sprockets together, the motor 32 being started and stopped in any suitable manner, as through the medium of a switch (not shown). It will be understood from the foregoing that when the motor 32 is operated, the shoe-rest will be reciprocated, the gearing between the motor and the shoe rest being preferably such that the latter will be given a relatively slow movement.

The machine also comprises a series of brushes, two represented at 37 and 38, respectively, being arranged at opposite sides of the shoe-rest which latter is preferably coincident with the center line of the machine, another adjacent the toe end of the shoe rest and represented at 39 comprising a toe brush, and a fourth brush represented at 40 located adjacent the heel end of the shoe rest and forming a heel brush.

The brush devices 37 and 38 are of the same construction, each comprising an endless flexible brush proper 41 formed of an endless strip or web 42 supporting the bristles 43, which are preferably so arranged as to afford spaces 45 at intervals, each web 42 being mounted upon and surrounding a pair of grooved rollers 44 and 45 fixed on the upper ends of studs 46 and 47 journaled in bearings 48 projecting laterally from members 49, the members 49 being rotatably mounted, independently of each other, on the shafts 50 mounted in upwardly-extending brackets 51 carried by the frame of the ma-
machine, the members 49 being provided with fins 52 projecting lengthwise of the machine, the fins 52 of each set of the arms 49 extending in a direction toward each other but being spaced apart as represented more clearly in Fig. 4.

The members 49 at the right-hand side of the machine in Fig. 3, while rotatably mounted on the shaft 50 are prevented from sliding lengthwise of the latter by any suitable means such as for example by pins 49, one for each of said members 49, which extend into annular grooves (not shown) in the peripheries of shafts 50, whereas the others of the members 49 are not only rotatable on shaft 50 but are slideable thereon lengthwise of this shaft.

Extending between the members 49 at each side of the machine, are bars 53 the ends of which are bifurcated as represented at 54, at which portions they loosely straddle the adjacent fins 52, the bars 53 being pivotally connected between their ends as indicated at 55 to bars 56 which are confined, to extend crosswise of the machine, in guides 57 carried by the frame of the machine, the inner ends of these bars being provided with rollers 58 cooperating with cams 59 provided on the plate portion 13 of the shoe-rest. The brush devices 37 and 38 are thus supported in a manner to permit them to rock independently of each other toward and away from the center of the machine, springs 60 connected with the guides 16 and with the members 49 serving to yieldingly swing these brush devices toward the center line of the machine except as restrained by the engagement of the rollers 58 with the cam surfaces 59 or with the sides of the shoe, during the operation of the machine, as hereinafter described, it being also understood from the foregoing that by reason of the connections between the bars 56 and the members 49 and the supporting of the latter independently of each other on the shafts 50, each brush is capable of deforming to cause it to conform to the surface of the shoe traveling against it.

The upper ends of the sets of members 49 cooperate with springs 61 confined therebetween as shown in Figs. 2 and 3, these springs serving to force the sliding ones of the members 49 of each set thereof in a direction away from those of the members 49 containing the pins 49, and thereby maintain the webs 40 in taut condition to permit them to be driven as though the medium of pulleys 62 mounted on the lower ends of the shafts 47, these pulleys being connected with pulleys 63 on the shaft 29, as by means of the belts 64, the operative driving connections referred to being such that the brushes 37 and 38 will be driven in the direction of the arrows 65 and 66 (Fig. 2). The toe brush 39 is of general cylindrical shape, it being mounted on a shaft 67 supported in bearings 68 provided on the outer ends of a pair of arms 69, the other ends of which are rotatably mounted at 71 on a shaft 70 which latter is journaled in bearings on the frame of the machine, the shaft 67 carrying a pulley 72 connected by a belt 73 with a pulley 74 connected with the shaft 70 and driven by a belt 75 engaging the pulley 74 and a pulley 76 on the drive shaft 29, the parts being so arranged that the brush 39 is rotated in the direction of the arrows 77 in Figs. 2 and 3. The support for the brush 39, and comprising the arms 69, is thus swingingly mounted, and springs 78 connected at their upper ends with the frame of the machine and at their lower ends with the respective arms 69, are preferably provided for preventing the brush 39 from swinging below the position shown in Fig. 3.

The heel brush 40 is also of general cylindrical type, it being supported on a shaft 79 journaled at its ends in spaced arms 80 which are swingingly mounted at their lower ends on a shaft 81 journaled on the frame of the machine. The shaft 79 is provided with a pulley 82 driven by a belt 85 from a double pulley 84 on the shaft 81, this double pulley being driven by a belt 86 from the pulley 80 on the main drive shaft 29, the parts being so arranged that the brush 40 will be rotated in the direction of the arrow 86 in Fig. 3. Connecting the arms 80 is a cross-piece 88 which with the arms forms a rigid member in the form of a frame, this frame being connected with one end of a spring 87, the rear end of this spring being connected with the shoe rest 11 and operating to swing the supporting frame for the brush 40 to the right in Fig. 3. The frame last-referred to engages at its cross-bar 88, in the normal position of the machine (Fig. 3) with a surface 89 on the heel end of the shoe rest which normally carrying the brush 40 in the position shown in Fig. 3, it being understood that as soon as the shoe-rest starts to move to the right in Fig. 3 toward the rear end of the machine, this brush will follow up the movement of the shoe-rest to cause it to operate in contact with the heel portion of the shoe to be cleaned and polished. In the particular construction illustrated the machine is provided with means whereby either black or tan polishing fluid may be applied to the shoe, as desired, the tanks in which these fluids are contained being represented at 90 and 91, these tanks being connected at their lower ends with outlet pipes 92 and 93, respectively, said pipes being equipped with valves 94 and 95 respectively. These valves are shown as of the slide type, and the stems of the valves proper thereof are represented at 96 and 97, and have enlarged ends as represented at 98 and 99, respectively.

Mounted on the frame of the machine adjacent the valves 94 and 95 is a casing 100.
containing a block 101 which is slidable lengthwise of this casing and is also movable transversely thereof, this block being backed up by coil springs 102 confined between the block and the wall of the casing and operating to normally hold the block in the position shown in Fig. 8. The block is of such proportions that it may be shifted to extend opposite either of the valve stems 96 and 97, it being shown opposite the stem 97 in Fig. 8, the means provided for thus shifting the block comprising a lever 103 of bell-crank shape pivoted at its angle on a shaft 104 mounted on the frame of the machine, one end of this lever containing an elongated slot 105 into which a pin 106 on the block 101, extends, the opposite end of this lever being accessible for actuation by the operator who by rocking the lever 103 shifts the block 101 lengthwise either to extend opposite the valve stem 96 or 97 depending upon the direction in which the lever is rocked, the purpose of this part of the construction being to so position the block that when the block is actuated transversely of its length and against the action of the springs 102, as hereinafter described, the one of the valve stems 96 and 97 desired to be operated, is actuated to permit polish from the tank controlled by this particular valve, to flow through the outlet of the tank into the pipe system hereinafter explained. The mechanism shown for operating the block 101 against the action of the springs 102 comprises a reciprocating bar 107 extending through a slot 108 in the casing 100, the lever 103 also being shown as extending through this slot, one end of the bar extending through an elongated slot 109 in the block 101, the inner end of this bar being headed as represented at 110. The other end of this bar is pivotally connected at 111 with the upper end of a lever 112 fulcrummed between its ends, at 113, on a stud 114 mounted in a bracket 115 dependingly secured to the stationary frame of the machine, the lower end of the lever 112 extending into the path of movement of a roller 116 journaled in a bracket 117 mounted on one face of a disk 118, this disk being fixed on the end of a shaft 119 journaled on the frame of the machine and provided with a sprocket 120 connected by a sprocket chain 122 with a sprocket 121 fixed on the shaft 21, it being understood from the foregoing that each revolution of the disk 118 causes the roller 116 to engage the lever 112 with the result of rocking it in the direction in Fig. 6, on its pivot 113, thereby forcing the block 101 to the left in Fig. 8 against the action of the springs 102 and opening the particular one of the valves 94 and 95, which it opposes, these parts being preferably so constructed and arranged that the particular valve opened will remain open for a length of time sufficient to permit of the desired amount of the polish contained in the particular tank it controls, to discharge therefrom past the valve.

The pipes 92 and 93 open into a pipe 123 which opens into a distributing tube 124 in communication with pipes 125 and 126, the pipe 125 terminating in a nozzle portion 127 which extends across the periphery of the heel brush 40, the nozzle portion of this pipe containing a series of perforations (not shown) which open toward the brush whereby the polish discharging from this nozzle will be sprayed upon the brush preferably substantially throughout the width of the latter. The pipe 126 terminates in a similar nozzle portion 128 which extends across the periphery of the toe brush 39 for supplying polish to this brush.

The pipe 125 has branch portions 130 which terminate in nozzle sections 131 secured to the discharge ends of these branches, these nozzles, which may be of the same construction as that above described of the nozzle 127 extending crosswise of the brushes 37 and 38, respectively for supplying polish to these brushes.

The machine also comprises means for introducing into the pipe 123 blasts of air for forcing the polish through the pipe system described and out through the said nozzles, and also for the purpose of exerting a drying action on the brushes after the polish has been applied to the shoes, these means, in the particular construction shown comprising a tank 132 supported on the frame of the machine and connected with a pipe 133 leading from the discharge end of an air compressor 134 also mounted on the frame of the machine and driven from the drive shaft 29 as through the medium of a sprocket chain 135 passing over sprockets 136 and 137 connected with the shaft of the compressor and with the shaft 29, respectively. A pipe 138 communicates at its opposite end with the pipe 123, the pipe 138 containing a valve 139. The valve 139 is of the same type as the valves 94 and 95, and extends into the path of movement of a series of rollers 140 journaled in brackets 141 mounted on the face of the disk 118 opposite that carrying the bracket 117, the rollers 140 being spaced apart and so arranged that they will not engage the valve 139 to open it, until the shoe-cleaning operation has been effected, which latter, in the particular construction illustrated, involves a complete reciprocation of the foot-rest.

The operation of the machine is as follows:

Assuming that the machine is in the normal position shown in the drawings where-in the shoe-rest occupies its extreme position to the left in Fig. 2, and the cams 59 have engaged the rollers 58 and forced them out-
wardly in opposite directions in Fig. 4, to cause the brushes 37 and 38 to be relatively widely spaced apart as shown particularly in Fig. 5, the operator places his foot upon the shoe rest 11 and thereupon starts the machine, as by closing switch 36 which starts the motor 32 into operation for driving the drive shaft 29. Thus starting the machine, the motor 32 causes the various brushes referred to to rotate, the compressor 134 to be started into operation, the disk 118 to be rotated, and the shoe-rest to move rearwardly at relatively slow speed. As the shoe-rest moves rearwardly the cam 59 move therewith permitting the springs 60 to swing the side brushes 37 and 38 into engagement with the opposite sides of the shoe and the heel brush 40 is also permitted, under the action of the spring 87 to swing to the right in Fig. 5 and into engagement with the heel portion of the shoe, the toe brush 99 being yieldingly supported, riding upon the toe portion of the shoe as the shoe travels rearwardly, the various brushes referred to operating, in the first complete reciprocation of the shoe rest, to thoroughly brush off the shoe preparatory to the application of the polish thereto. During this first complete reciprocation of the shoe rest, the roller 116 is caused, by the rotation of the disk 118 to engage the lever 112 for opening the one of the valve devices 94 and 95 opposing the block 101, the operator having previously, through the medium of the lever 103 positioned this block for operating the desired one of these valves. A charge of the polish is thus permitted to discharge from one or the other of the tanks 90 and 91 from which it runs down into the pipe 123. Preferably immediately following the swinging of the side brushes into engagement with the shoe upon the next rearward movement of the shoe-rest following the shoe-cleaning operation, one of the rollers 140 engages the valve 139, opening the latter and permitting a blast of air from the tank 132 to flow through the pipe 138 which forces the polish supplied to this pipe, as hereinbefore stated, out through the various nozzles referred to and against the faces of the various brushes, and thus during this second complete reciprocation of the shoe-rest, the various brushes apply polish to the various surfaces thereof to be polished.

During the next and last complete reciprocation of the shoe-rest, the brushes operate to polish the surfaces to which the polish was applied. The rollers 140 are provided in a series, to successively actuate the valve 139, not only to insure the blowing of all of the polish from the pipes, but also for the purposes of exerting a drying action on the shoe after the latter has rotaryly applied the polish to the shoe. In the particular arrangement shown this drying action is commenced before the shoe has returned to normal, starting position in its second complete reciprocation, but it will be understood that the timing of the blasts may be varied as desired.

It will be noted from the foregoing that in the particular construction illustrated the side-brushes 37 and 38 swing outwardly, away from the shoe after having contact with the shoe each time the shoe rest nearer the end of its return movement and thus tendency of these brushes to heat the shoe is minimized. The feature of providing the spaces 42a at intervals along the bristle-surface thereof also reduces the tendency to heating of the shoe.

While I have illustrated and described a particular construction embodying my invention, I do not wish to be understood as intending to limit it thereto as the same may be variously modified and altered without departing from the spirit of my invention. What I claim as new, and desire to secure by Letters Patent is:

1. In a shoe-shining machine, the combination of a reciprocating shoe-rest and side brushes located at opposite sides of the shoe-rest for engagement with the shoe in the movement of the later with said shoe-rest, and heel and toe brushes, mounted in the path of movement of a shoe on said rest for bodily movement toward and from said shoe rest.

2. In a shoe-shining machine, the combination of a shoe-rest reciprocable in a direction lengthwise thereof, a movable heel brush extending in line with the foot-rest, and means for causing said heel brush to follow up the movement of the shoe on the rest and act against the heel of the shoe.

3. In a shoe-shining machine, the combination of a shoe-rest reciprocable in a direction lengthwise thereof, a member supported to swing in the direction of movement of said shoe-rest, a heel brush operatively mounted on said member, and means for swinging said member in a direction to cause the brush to follow the heel of the shoe and brush against it in the movement of said shoe-rest.

4. In a shoe-shining machine, the combination of a shoe-rest reciprocable in a direction lengthwise thereof, a member supported to swing in the direction of movement of said shoe-rest, a heel brush operatively mounted on said member, and spring means for swinging said member in a direction to cause said heel brush to follow the heel of the shoe and brush against it in the movement of said shoe-rest.

5. In a shoe-shining machine, the combination of a shoe-rest reciprocable in a direction lengthwise thereof, a member supported to swing in the direction of movement of said shoe-rest, a heel brush operatively mounted on said member, means for rotating said brush, and means for swinging said member in a
direction to follow the heel of the shoe and brush at its heel portion against it in the movement of said shoe-rest.

6. In a shoe-shining machine, the combination of a shoe-rest reciprocable in a direction lengthwise thereof, a member supported to swing in the direction of movement of said shoe-rest and located across one end of said shoe-rest, a brush operatively mounted on said member, and means for swinging said member in a direction to cause said brush to move responsive to the movement of the shoe on the shoe-rest.

7. In a shoe shining machine, the combination of a shoe-rest reciprocable in a direction lengthwise thereof, a frame supported to swing in the direction of movement of said shoe-rest, a heel brush journaled on said frame, and means for swinging said frame in a direction to cause the brush to follow the heel of the shoe and brush against it in the movement of said shoe-rest.

8. In a shoe-shining machine, the combination of a reciprocating shoe-rest, a heel brush supported to move in the direction of movement of said shoe-rest, means for causing said brush to follow up the movement of said shoe-rest and engage the heel of the shoe, and means, operating automatically, to move said brush in the opposite direction upon the return movement of said shoe-rest.

9. In a shoe-shining machine, the combination of a shoe-rest and a brush device for brushing a side of the shoe comprising an endless bristle-equipped web, spaced-apart members upon which said web is supported, said members being capable of independent movement toward and away from said shoe-rest, and means for driving said web.

10. In a shoe-shining machine, the combination of a shoe-rest and a brush device for brushing a side of the shoe comprising an endless bristle-equipped web, spaced-apart members upon which said web is supported, said members being capable of independent movement toward and away from said shoe-rest, means operating to yielding force said bristle-equipped web against the shoe, and means for driving said web.

11. In a shoe-shining machine, the combination of a shoe-rest and a brush device for brushing a side of the shoe comprising an endless flexible bristle-equipped web, rotatable members spaced apart and supporting said web, said members being capable of independent movement toward and away from the shoe-rest, means for yieldingly forcing said members toward said shoe-rest, and means for driving said web.

12. In a shoe-shining machine, the combination of a shoe-rest and a brush device for brushing a side of the shoe comprising a bristle-equipped endless flexible web, rotatable members spaced apart lengthwise of the shoe-rest and on which said web is supported, said members being pivotally supported to swing toward and away from said shoe-rest, means for yieldingly forcing said members toward said shoe-rest, and means for driving said web.

13. In a shoe-shining machine, the combination of a reciprocating shoe-rest, a side brush located at one side of said shoe-rest for brushing the side of the shoe, said side brush being movable toward and away from said shoe-rest, means tending to force said side brush toward said shoe-rest, and means, operating automatically, in the movement of said shoe-rest to one position, to force said side brush away from said shoe-rest.

14. In a shoe-shining machine, the combination of a reciprocating shoe-rest, side brushes located at opposite sides of said shoe-rest for brushing the opposite sides of the shoe, said side brushes being movable toward and away from said shoe-rest, means tending to force said side brushes toward said shoe-rest, and means, operating automatically, in the movement of said shoe-rest to one position, to force said side brushes away from said shoe-rest.

15. In a shoe-shining machine, the combination of a reciprocating shoe-rest, a side brush located at one side of said shoe-rest for brushing the side of the shoe, said side brush being formed of an endless flexible bristle-equipped web, spaced members supporting said web, means for driving said web, said members being supported in a manner to render them capable of movement independently of each other toward and away from said shoe-rest, means tending to independently move said members toward said shoe-rest, a member operatively engaging said first-referred-to members and operating, when actuated in one direction, to force said members in a direction away from the shoe, and means for operating said last-named member in timed relation to the movement of said shoe-rest.

SIMEON W. CROY.