

June 3, 1930.

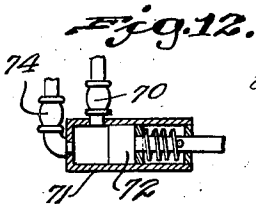
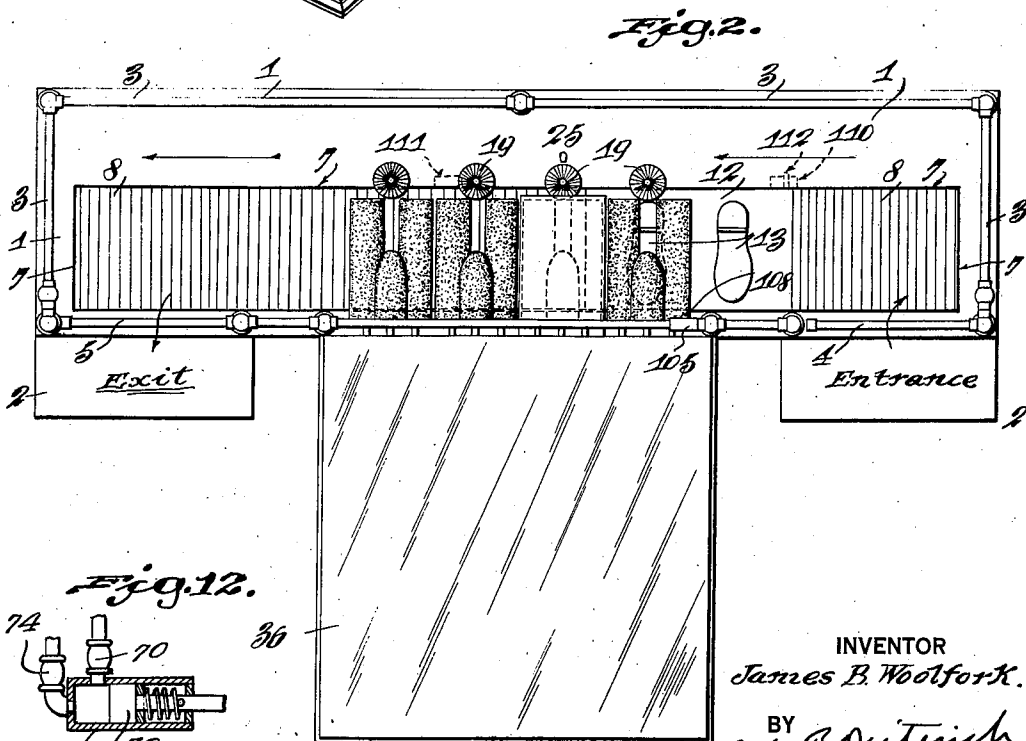
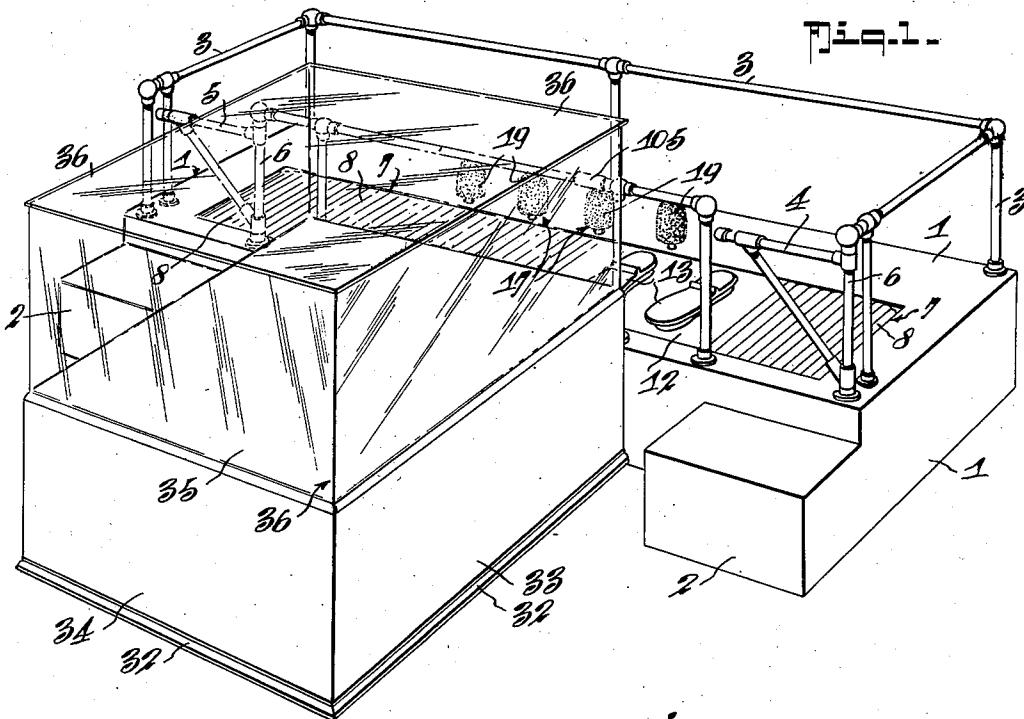
J. B. WOOLFORK

1,762,005

SHOE SHINING MACHINE

Filed Dec. 20, 1928

4 Sheets-Sheet 1



INVENTOR
James B. Woolfork.
BY
Albert B. Dieterich
ATTORNEY

June 3, 1930.

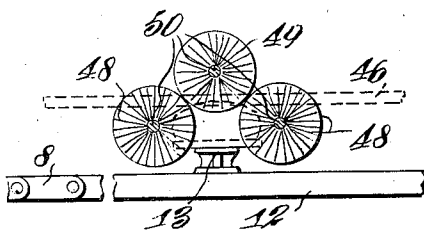
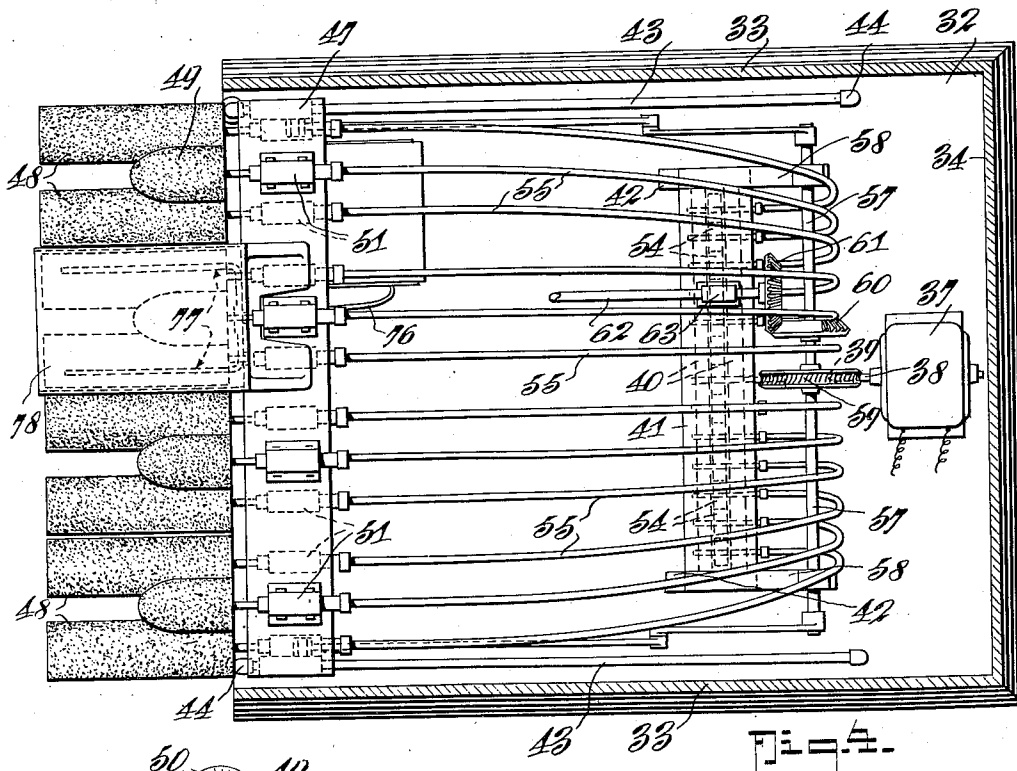
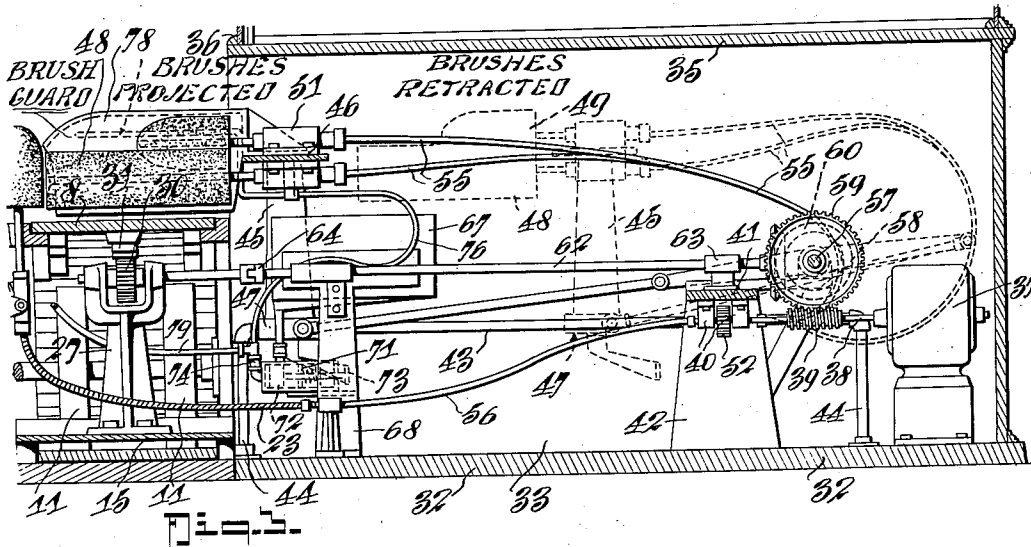
J. B. WOOLFORK

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SHOE SHINING MACHINE

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4 Sheets-Sheet 2



INVENTOR
James B. Woolfork.

BY
Albert D. Smith
ATTORNEY

June 3, 1930.

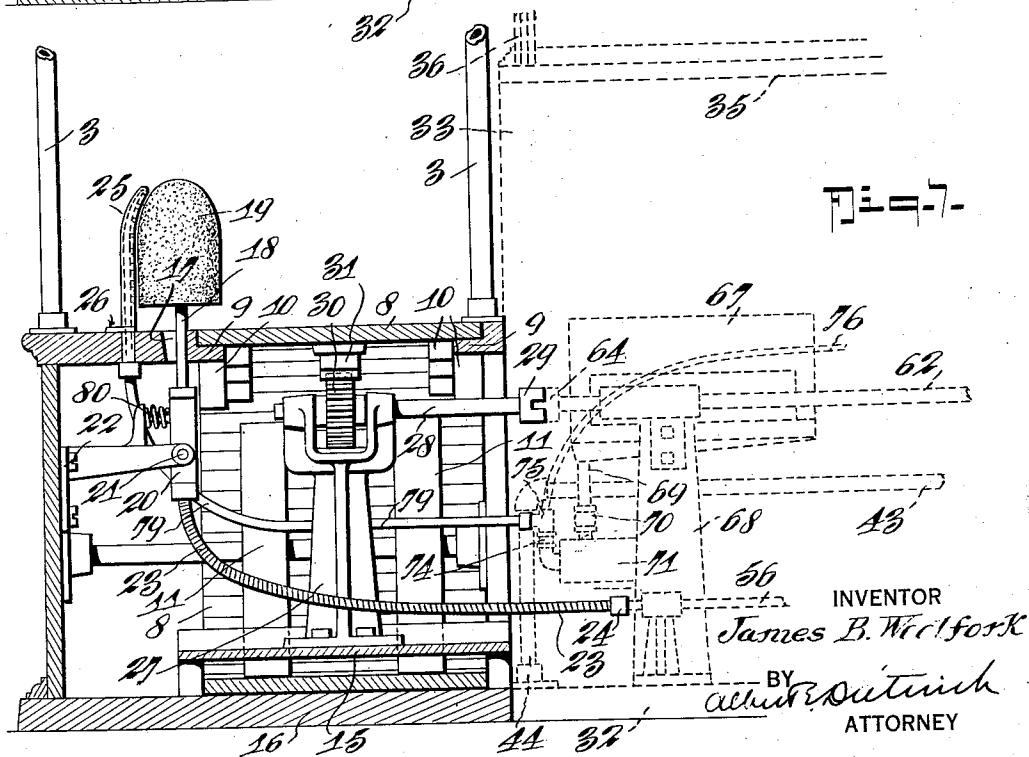
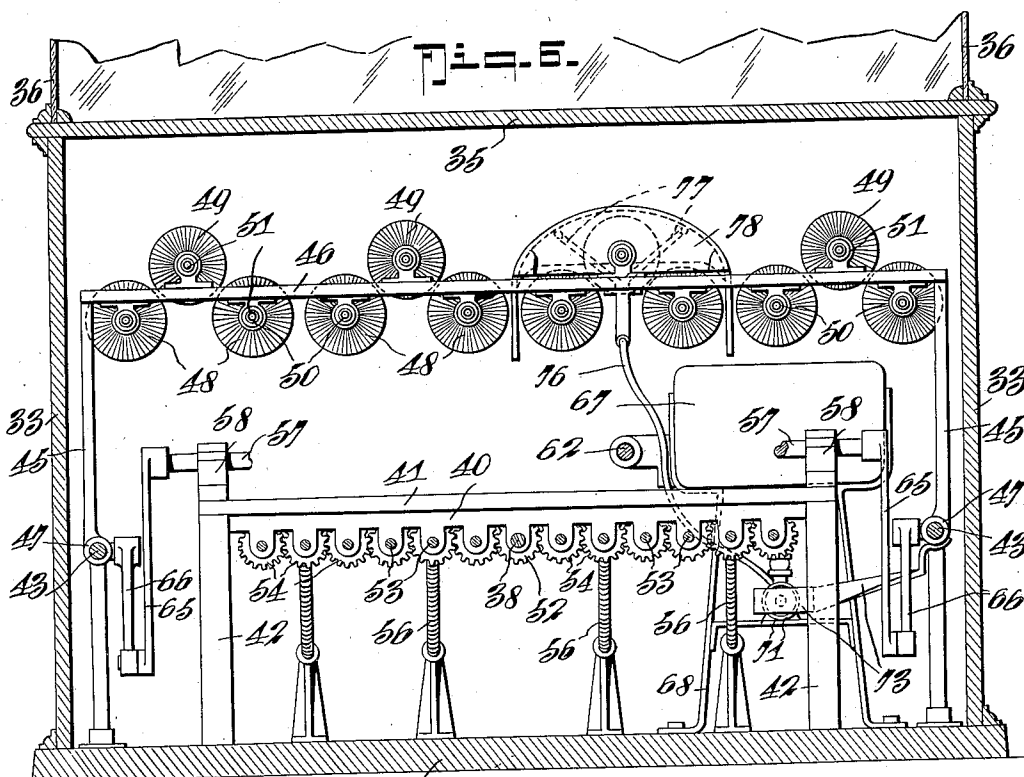
J. B. WOOLFORK

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SHOE SHINING MACHINE

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4 Sheets-Sheet 3



June 3, 1930.

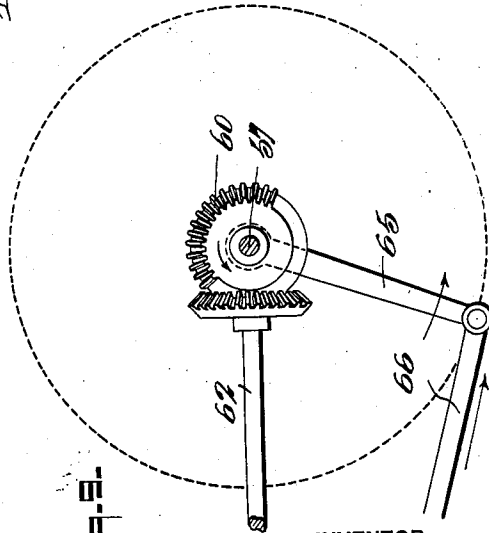
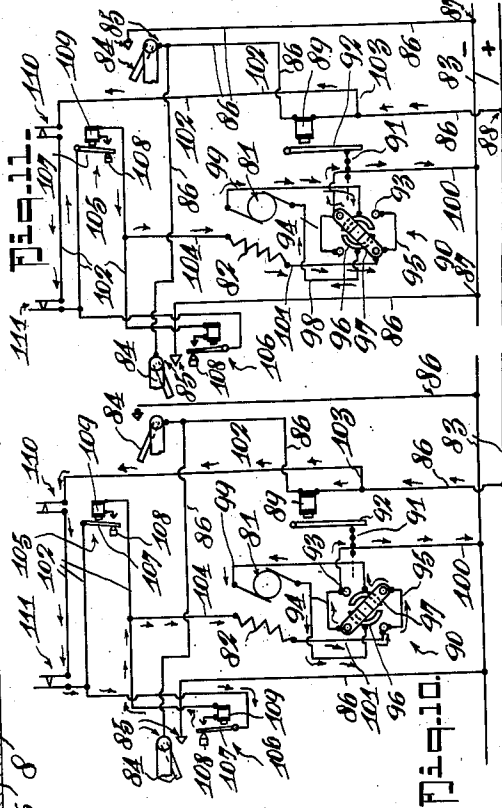
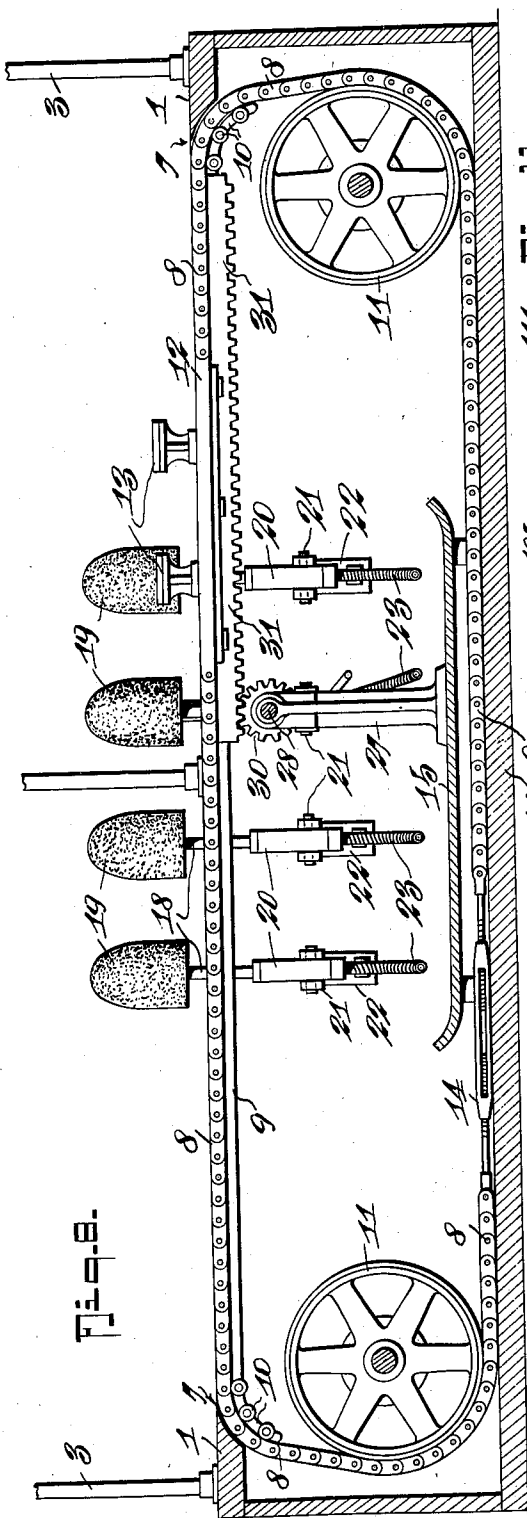
J. B. WOOLFORK

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SHOE SHINING MACHINE

Filed Dec. 20, 1928

4 Sheets-Sheet 4



UNITED STATES PATENT OFFICE

JAMES B. WOOLFORK, OF PHILADELPHIA, PENNSYLVANIA

SHOE-SHINING MACHINE

Application filed December 20, 1928. Serial No. 327,256.

The invention primarily has for its object to provide a novel shoe shining machine capable of mechanically dusting, daubing with polish and polishing the shoes of a patron in a quick, convenient, safe and practical manner.

In its more detailed nature the invention seeks to provide a shoe shining machine of the character stated in which is employed a plurality of sets of brushes movable into and out of operative positions, and a shiftable platform on which the patron may stand and be moved to various stations associated with the brush sets.

Another object of the invention is to provide a machine of the character stated having an entrance gate, an exit gate and a reversible motor to operate the shiftable platform and the brushes, and means operated by the motor when turning in one direction to move the platform progressively step-by-step in the operative direction and acting when the motor is reversed to return the platform to its initial position, and means automatically actuated upon passage of a patron through the entrance gate to set the motor circuit for operation of the motor in one direction when energized, means actuated by the patron on the platform to energize the motor circuit, means automatically actuated by the platform at each extreme position to break the motor circuit, and means automatically actuated upon passage of a patron through the exit gate to set the motor circuit for operation of the motor in the reverse direction and for re-energizing or closing the said motor circuit so that the return movement of the platform may be effected.

Another object of the invention is to so construct the machine as to enable its ready separation, for storing or transporting, into two parts, namely,—a power unit, and an escalator or movable platform unit, the power unit being so formed as to enable utilization of a part thereof for display case purposes.

With the above and other objects in view that will hereinafter appear, the invention still further resides in the novel details of construction, combination and arrangement of parts, all of which will be first fully de-

scribed in the following detailed description, then be particularly pointed out in the appended claims, reference being had to the accompanying drawings, in which:

Figure 1 is a perspective of the invention. 55

Figure 2 is a plan view.

Figure 3 is a vertical longitudinal section of the power unit, a portion of the escalator unit being also shown in associated relation therewith.

Figure 4 is a horizontal section of the power unit. 60

Figure 5 is a diagrammatic side elevation of a section of the escalator and a set of brushes, the associated relation of the parts when in operation being shown. 65

Figure 6 is a vertical cross section of the power unit.

Figure 7 is a vertical cross section of the escalator unit, a portion of the power unit being shown in associated relation therewith, in dotted lines. 70

Figure 8 is a vertical section of the escalator unit looking toward the heel brushes.

Figure 9 is a detail view illustrating the mutilated gear connections through which step-by-step movement is imparted to the escalator. 75

Figures 10 and 11 are diagrammatic views of the electric circuit and control devices for controlling the operation of the machine, the course of current flow in each of the different adjustments being indicated by the arrows on the figures. 80

Figure 12 is a detail longitudinal section of the pump. 85

In the drawings, in which like numerals of reference indicate like parts in all of the figures, the escalator unit is shown as comprising a longitudinal hollow body or platform 1, which said platform is provided with a step 2 extending laterally off each end thereof, and an edge railing 3 having the portions thereof at the positions of the steps omitted to provide an entrance and an exit, the said entrance being closed by a gate or turnstile 4 and the said exit being closed by a gate or turnstile 5. 95

Each of the gates 4 and 5 include the vertical standard 6, the lower end of which ex- 100

tends through the floor of the platform for a purpose later to be described.

The platform 1 is recessed longitudinally across the top thereof as at 7 to accommodate the upper flight of a slatted escalator 8, suitable runner rails 9 being provided for supporting the escalator in the recess and which turn down at their ends and are provided with anti-friction roller equipped portions 10 to guide the escalator at the respective ends of the said recess. Within the platform the ends of the escalator pass around idler rollers 11 having suitable bearing in the platform and the said escalator includes a solid platform 12 in its top flight which is equipped with foot rests 13 suitably raised above the said platform and spaced to conveniently receive the feet of a patron standing erect upon the escalator.

The spaced ends of the lower portion or lower flight of the escalator may be joined by turn buckles 14 to facilitate the taking up of slack in the escalator and provide for always holding the same taut. The said lower flight of the escalator passes under a raised support plate 15 mounted upon the floor of the platform and which serves the purpose later to be described (see Figures 1, 2, 7 and 8).

At four equi-distantly spaced intervals along the rear edge of the recess 7, transverse elongated apertures 17 are provided and through those passages the vertical shafts 18 project and have mounted on their projected ends suitably shaped heel brushes 19 for engaging the heels of a shoe of a patron. The shafts 18 are rotatable in sleeve bearings 20 which are equipped with trunnions and are rockably mounted at 21 in bearings 22 secured to the inside wall of the platform 1. The shafts 18 are rotated through flexible shaft connections 23 which, when the machine is assembled for operation, are connected by removable coupling connections 24 to drive mechanisms that will be described hereinafter.

One of the heel brushes has a dauber and a polish, paste or liquid delivery tube 25 is mounted at 26 in association with that brush for the purpose of applying the said paste or liquid to the brush.

A bearing standard 27 is supported on the support plate 15 and provides bearings for a shaft section 28 having a coupling head 29 at one end for convenient connection with a driving mechanism to be hereinafter described, and at its other end with a drive gear 30 adapted to engage a rack 31 secured on the under face of the upper flight of the escalator 8.

All of the parts described above relate to the escalator unit which is separable from but adapted for convenient connection with a power unit that I will now proceed to describe. By constructing the machine in two units it is possible to store and transport the

same with greater convenience than would be possible if the said machine was constructed as a single unit.

The power unit comprises a cabinet-like extension having a base 32, side walls 33, one end wall 34, leaving an open end and adapted to centrally abut the escalator unit, and a top 35 which may be utilized to form the floor of a show-case superstructure 36 (see Figures 1 and 3). By constructing the power unit as just described and illustrated in the figures mentioned it is possible to utilize the space above the power unit as a convenient display space or show-case.

A motor 37 is mounted on the floor of the power unit and its drive shaft 38 is equipped with a worm 39 and has bearing in the central one of the numerous equi-distantly spaced bearings provided in the bearing hangers 40 which depend from the bearing plate 41 supported as at 42 above the said unit base.

Parallel side guide runners 43 are supported as at 44 above the base 32 and the side arms 45 which depend from the brush carrier head 46 are provided with sleeves 47 which surround and slide on the said runners.

Four sets of brushes are supported on the head 46 in equi-distantly spaced relation and each set of brushes comprises a pair of bottom or side brushes 48 and a single or central brush 49 (see Figures 3, 4, 5 and 6). All of the shafts 50 of the brushes are mounted in bearings 51 secured to the head 46, those of the lower brush pairs 48 being secured to the bottom face of the head and those of the single upper brushes 49 being secured upon the upper face of the said head, as shown in Figures 3 and 6. The several sets of brushes normally lie retracted within the case 36.

In this illustration of the invention the hangers 40 are provided with thirteen depending bearings and in each of the said bearings, to either side of the central bearing in which the motor is mounted, and which carries a master gear 52, an individual power shaft 53 has rotatable bearing. Thus there are twelve depending bearing sets in addition to the central set and on each of the individual shafts 53 a gear 54 is mounted, the said gears meshing with each other and with the master gear 52.

The individual shafts 53 are connected in adjacent sets of three each by flexible shafting connections 55 with the brush shafts 50, so that the rotation imparted by the motor to the master gear 52 is imparted through the gears 54 and flexible connections 55 to the brushes 48 and 49.

The flexible connections 55 connect with the shafts 53 at their rear ends. Any selected four of the shafts 53 also have at their front ends a flexible shaft 56 connected with the flexible shaft sections 23 which drive the heel brushes 19.

A jack shaft 57 is rotatably mounted in

bearings 58 extended from the bearing plate 41 and on this shaft a worm wheel 59 is mounted which meshes with and has rotation imparted thereto by the worm 39. This shaft is also equipped with a mutilated bevel gear 60 which is adapted to impart rotation at regular intervals to the bevel gear 61 secured on the shaft 62 which is rotatably mounted in the bearing 63 supported on the plate 41 and which is provided with a coupling 64 to co-operate with the coupling head 29 in imparting rotation to the shaft section 28 of the escalator unit.

The jack shaft 57 is also provided at each end with a crank 65 which is pitman-connected with the respective one of the sleeves 47 so that when the shaft is rotated the brush head 46 will be reciprocated toward and from cooperative relation with the escalator unit, see Figures 3, 6 and 9.

A liquid or light consistency paste reservoir 67 is provided and is suitably supported as at 68 above the unit base. This reservoir delivers its contents through a delivery tube 69, check valve controlled as at 70, into the pump head 71 wherein is provided a reciprocable piston 72 normally spring-pressed to its retracted charge-drawing-in-position.

Each time the brush head is moved forwardly the projected piston rod is engaged by a cam 73 carried by one of the sleeves 47 and the piston is forced inwardly against the spring tendency to force a measured charge of paste or liquid through the check valve control delivery spout 74 into the Y-head 75 from which it passes through the flexible tubes 76 to the side brush applicators 77, which are supported in proper position in the cover head or shield 78 that is mounted over the dauber set of brushes, and through the single flexible tube 79 to the heel dauber applicator 25 (see Figures 3, 6 and 7).

The sleeve bearings 20 for the heel brush shafts may be spring-pressed as at 80, if desired, and this mounting in connection with the elongated apertures 17 makes it possible for the heel brushes to yield a bit in operation to facilitate proper engagement with the heel of the patron's shoe under all conditions.

In operation a patron enters the entrance gate 4 and stands upon the foot rests 13; his right foot will be in position for being dusted by the first cooperative set of brushes 48—49—19. As soon as the brush set 48—49 is moved outwardly and completed the dusting of the patron's right shoe the escalator moves toward the patron's right to position the right foot in associated relation with the next or dauber set of brushes and the left foot in associated relation with the set of brushes which have just functioned to dust the right shoe. This operation completed, the escalator next moves to position the left foot in associated relation with the dauber brush units and its step-by-step operation is con-

tinued through four stages or until the left shoe has been engaged and brushed by the last set of brushes. Movement of the motor then automatically stops and the patron passes out through the exit gate. As the exit gate is actuated the motor is again started and the escalator is returned and automatically stopped at its initial or starting position.

This operation of the machine may be controlled by any suitable mechanism.

I have diagrammatically illustrated one form of control in Figures 10 and 11 and will proceed to describe that form, it being understood, of course, that I do not mean to be limited to this particular control.

In these figures the motor is generally designated by the numerals 81 and 82, the armature winding being indicated at 81 and the field winding at 82. The flow of current through the field winding is always in the same direction and by reversing the direction of flow of current through the armature winding the direction of rotation of the motor may be reversed in the usual manner. The plus and minus current supply lines are indicated at 82.

Each vertical standard 6 of the entrance and exit gates is provided at its lower extended end with a contact crank 84 which, when the gates are swung inwardly, when making an entrance or outwardly, when making an exit, are adapted to bridge the contacts 85 and permit current communication at this point through the energizing circuit wires 86 which connect at the points 87 and 88 with the power lines 83 and in this energizing circuit 86 a switch actuating magnet 89 is connected. The gate moved crank contacts 84 are connected in parallel so that when one or the other of the gates is actuated the magnet will be energized.

Each time the magnet is energized it changes the position of the reversing switch 90. This switch may be of step-by-step unidirectional type usually designed, however, to actuate to cause a quarter turn position change of the connecting bar by the pull of a chain. The pull chain is diagrammatically indicated at 91 and may be connected to the free end of a pivoted armature bar 92 which will be attracted to the magnet when energized to impart the necessary pull to the chain and the shifting of the contact bar. Each time the magnet is de-energized the chain will return in the usual manner to its normal position for the next actuation.

The four contact points of the switch 90 are indicated at 93 and the upper pair of these contacts are connected together as at 94 and the power pair as at 95. The switch includes a pair of electrically disconnected segmental contacts 96, one at each side of the center, and each associated with one connected pair of the contacts 93. The switch

contact bar 97 comprises two contact making end portions separated by an insulating portion in the center and serves to connect one segment 96 with one pair of contacts 93 at each side of its center in one of its adjustments and when shifted to its other adjustment it serves to connect the reverse pair of contacts and segments at opposite sides of the center, see the two positions shown in Figures 10 and 11.

One connected pair of contacts 93 is connected as at 100 with the minus power line 83 and the other is connected as at 101 to the field winding.

A current control circuit 102 is also provided and is connected at 103 with the wire 86 leading to the plus power line 83 and at 104 with the other connection of the field winding 82.

A push button operated magnetically locked switch 105 is connected in the circuit 102 and is preferably positioned on the railing 3, as indicated in Figures 1 and 2 of the drawings so as to be in convenient position for being hand-actuated by a patron standing on the foot rests 13 and about to start operation of the machine for its designed purposes. A similar switch 106 is mounted in position for being actuated by the crank 84 connected to the depending portion of the exit gate. The switches 105 and 106 are of the push button magnetically locked type which include the contact bar 107 adapted to be pushed into position by the button 108 to close the circuit. A magnet 109 is included in the circuit adjacent the bar 107 and when the circuit is closed the magnet is energized and holds the bar 107 to the circuit closing or completing position until the circuit is again broken by an agency soon to be described.

Two circuit breakers 110—111 are connected in the circuit 102, the former being adapted to be engaged and to momentarily break the circuit when the escalator reaches its return or initial position after the operation of the machine, and the latter being adapted to be engaged to momentarily break the circuit when the escalator reaches the limit of its movement in the opposite direction. These breakers are of the spring type which, when engaged by the escalator carried finger 112, will be broken but momentarily and will again be spring closed to their normal closed position. The circuit breakers 110—111 are connected in series so that when either is actuated the circuit 102 will be momentarily broken. This momentary breaking of the circuit is sufficient to de-energize the magnets and allow the switches 105 and 106 to assume their normal open positions. The switches are connected in parallel so that when either thereof is actuated its magnet will be caused to hold. When the switch 105 is closed the motor will be caused to operate in a manner for moving the escalator in the operative di-

rection and when the switch 106 is closed the motor will be operated in the reverse direction.

Thus when a patron enters the entrance gate the contact crank 84 closes the circuit 86 and energizes the magnet 89 causing the switch 90 to be shifted to the position illustrated in Figure 11 of the drawings. When the patron has positioned his feet upon the rests 13 he presses the button 108 of the switch 105 and closes the circuit. The current flowing in the direction of the arrows on the said figure 11 will cause the motor to rotate in a direction for moving the escalator in the operative direction, as indicated by the arrows on Figure 2. As hereinbefore stated, the escalator moves step-by-step through the operations of the machine until the finger 112 carried by the escalator engages the circuit breaker 111 and momentarily breaks the circuit. The current being thus cut off the switch 105 opens, motor stops and the machine ceases to operate.

As the patron leaves the exit gate he causes the contact crank 84 to again first close the circuit 86 across the contacts 85 and then engage the button 108 of the switch 106 to close the said switch. This operation serves first to reverse the position of the switch 90 so that current is caused to flow through the motor armature winding in the reverse direction, as indicated by the arrows on Figure 10, and serves to return the escalator to its initial position. Upon return of the escalator the finger 112 engages the circuit breaker 110 and again momentarily breaks the circuit and brings the parts to rest ready for another operation.

From the foregoing description, taken in connection with the accompanying drawings, it is thought that the novel details of construction, the manner of use and the advantages of my invention will be readily apparent to those skilled in the art to which it relates.

What I claim is:

1. In a shoe shining machine, a plurality of brush sets, a movable platform having transversely disposed foot rests thereon and located to one side of the normal position of the brush sets, means to operate the brush sets, and means to move the platform to bring the foot rests into proper relation with the brush sets, said brush sets being rotatable on axes located substantially parallel to the plane of said platform and normal to its direction of movement.

2. In a shoe shining machine, a plurality of brush sets, a movable platform having transversely disposed foot rests thereon and located to one side of the normal position of the brush sets means to operate the brush sets, means to move the platform to bring the foot rests into proper relation with the brush sets, and means to move the brush sets

over the platform and into and out of associated relation with the foot rests.

3. In a shoe shining machine, a plurality of brush sets, a movable platform having transversely disposed foot rests thereon and located to one side of the normal position of the brush sets, means to operate the brush sets, and means to move the platform step-by-step to progressively bring the foot rests in cooperative relation with individual brush sets.

4. In a shoe shining machine, a plurality of brush sets, a movable platform having foot rests thereon, means to operate the brush sets, means to move the platform step-by-step to progressively bring the foot rests in cooperative relation with individual brush sets, and means to move the brush sets into and out of cooperative relation with the foot rests while said platform is stationary.

5. A shoe shining machine comprising a platform, an escalator movable on the platform and having foot rests thereon, said platform having an entrance and an exit, a plurality of brush sets, means to operate the brush sets, means to move the escalator step-by-step to bring the foot rests into cooperative relation with the brush sets, said brush and escalator operating means including a reversible motor, means for automatically setting the motor for operation in one direction upon entrance of a patron onto the platform, means manually actuated by the patron to set the motor in motion, and means automatically operable upon exit of a patron to reverse the motor and cause the escalator to move back to its initial position.

6. A shoe shining machine comprising a platform, an escalator movable on the platform and having foot rests thereon, said platform having an entrance and an exit, a plurality of brush sets, means to operate the brush sets, means to move the escalator step-by-step to bring the foot rests into cooperative relation with the brush sets, said brush and escalator operating means including a reversible motor, means for automatically setting the motor for operation in one direction upon entrance of a patron onto the platform, means manually actuated by the patron to set the motor in motion, means automatically operable upon exit of a patron to reverse the motor and cause the escalator to move back to its initial position, and means to automatically stop operation of the motor when the escalator has reached its initial position.

7. A shoe shining machine comprising a platform, an escalator movable on the platform and having foot rests thereon, said platform having an entrance and an exit, a plurality of brush sets, means to operate the brush sets, means to move the escalator step-by-step to bring the foot rests into cooperative relation with the brush sets, said brush and escalator operating means including a

reversible motor, means for automatically setting the motor for operation in one direction upon entrance of a patron onto the platform, means manually actuated by the patron to set the motor in motion, means to automatically stop operation of the motor when the escalator has travelled a predetermined distance, means automatically operable upon exit of a patron to reverse the motor setting and again set it into operation to return the escalator to its initial position, and means to automatically stop operation of the motor when the escalator has reached its initial position.

8. In a machine of the character described wherein is provided an entrance and an exit, a platform movable back and forth in a horizontal plane between extreme positions, means to move the platform including a reversible motor and power circuit, means automatically operable upon entrance of a patron through the entrance to set the motor for operation in a given direction, means operable by a patron on the platform to complete the circuit and start operation of the motor; means to automatically break the circuit and stop operation of the motor at each extreme position of the platform, and means automatically operable upon passage of the patron through the exit to reverse motor and reclose the circuit to cause the platform to return to its initial position, shoe brush sets, and means to operate said shoe brush sets in timed relation to the movements of the platform for the purpose specified.

9. In a shoe shining machine, a slatted escalator comprising a chain of slats having a solid platform portion and foot rests thereon, a rack secured to the escalator, a pinion to engage the rack and move the escalator, and means to impart intermittent rotation to the pinion to cause the escalator to move step-by-step.

10. In a shoe shining machine, a plurality of brush sets, a movable platform having foot rests thereon, means to operate the brush sets, means to move the platform to bring the foot rests into adjacent relation to the brush sets, and means to move the brush sets into and out of cooperative relation with the foot rests, one of said brush sets constituting a dauber brush set, and means operable each time the said dauber brush set moves toward the foot rests to apply dauber material to the dauber set brushes.

11. In a shoe shining machine, a plurality of brush sets, a movable platform having foot rests thereon, means to operate the brush sets, means to move the platform to bring the foot rests into adjacent relation with the brush sets, and means to move the brush sets into and out of cooperative relation with the foot rests, said last named means comprising guide runners, a brush set carrier slidable on the guide runners, a rotatable shaft,

and crank and pitman connections between the shaft and the carrier whereby when the shaft is rotated the carrier is moved forward and backward along the guide runners toward and from the foot rests.

12. In a shoe shining machine, a plurality of brush sets, a movable platform having foot rests thereon, means to operate the brush sets, means to move the platform to bring the foot rests into adjacent relation with the brush sets, means to move the brush sets into and out of cooperative relation with the foot rests, said last named means comprising guide runners, a brush set carrier slidable on the guide runners, a rotatable shaft, crank and pitman connections between the shaft and the carrier whereby when the shaft is rotated the carrier is moved forward and backward along the guide runners toward and from the foot rests, one of said brush sets constituting a dauber brush set, a polish applicator tube positioned in association with the dauber brush set, a polish reservoir, a charge measuring and expelling pump connected through a back check valve to the reservoir, a flexible tube communicating through a back check valve with the pump and connected to the applicator, means normally holding the pump in a charge measuring position, and means carried by the brush carrier and active each time the said carrier moves forwardly to actuate the pump for causing it to expel a measured charge of polish through the flexible tube and the applicator.

13. In a shoe shining machine, an escalator unit comprising a longitudinal platform having an entrance at one end and an exit at the other end, an escalator adapted to travel back and forth across the platform, means to support the escalator, rack and pinion devices to impart movement to the escalator, heel brushes rotatably mounted on vertical axes at equi-distantly spaced intervals along the escalator, foot rests on the escalator in associated relation with the heel brushes, means for imparting rotation to the heel brushes, and coupling means for connecting the rack and pinion devices and the heel brush rotation imparting means with a source of power.

14. In a shoe shining machine, a power unit comprising a housing, a motor in the housing, a bearing standard, a plurality of individual power shafts carried by the bearing standard, meshing gears on the shafts and driven by the motor, guide runners, a brush carrier slidable back and forth on the runners, brush sets carried by the carrier, power transmitting connections which include flexible shafts between the brush sets and the individual power shafts to rotate the said brush sets, a crank shaft, a pitman connection between said crank shaft and said carrier, means to rotate the crank shaft, an escalator power shaft, means to impart rotation to said escalator power shaft, heel brushes, flexible shafts, each

having one of its ends connected to one end of one of the individual shafts, and each having its other end connected to a heel brush.

15. In a shoe shining machine, a power unit comprising a housing, a motor in the housing, a bearing standard, a plurality of individual power shafts carried by the bearing standard, meshing gears on the shafts and driven by the motor, guide runners, a brush carried slidable back and forth on the runners, brush sets carried by the carrier, power transmitting connections including flexible shafts located between the brush sets and the individual power shafts to rotate the said brush sets, a crank shaft, a pitman connected between said crank shaft and said carrier, means to rotate the crank shaft, an escalator power shaft, means to impart rotation to said escalator power shaft, heel brushes, flexible shafts, each having one of its ends connected to one end of one of the individual shafts and each having its other end connected to a heel brush, and means functioning during each forward movement of the brush set carrier to apply polish to one of the brush sets.

16. In a shoe shining machine, a plurality of fixedly located sets of toe and side brushes, fixedly located heel brushes, a reciprocable platform for the patron, said platform being located in position between the sets of toe and side brushes and the heel brushes, means to impart motion to the platform to move it from brush set to brush set, means to advance and retract the brushes of each toe and side brush set to and from operation on the patron's shoes while said platform is stationary, and means to operate the heel brushes in engagement with the patron's shoes.

JAMES B. WOOLFORK.