Aug. 12, 1969 J. M. LECOUTURIER ET AL 3,460,178

SHOESHINE MACHINE

Filed Sept. 25, 1967 3 Sheets-Sheet 1

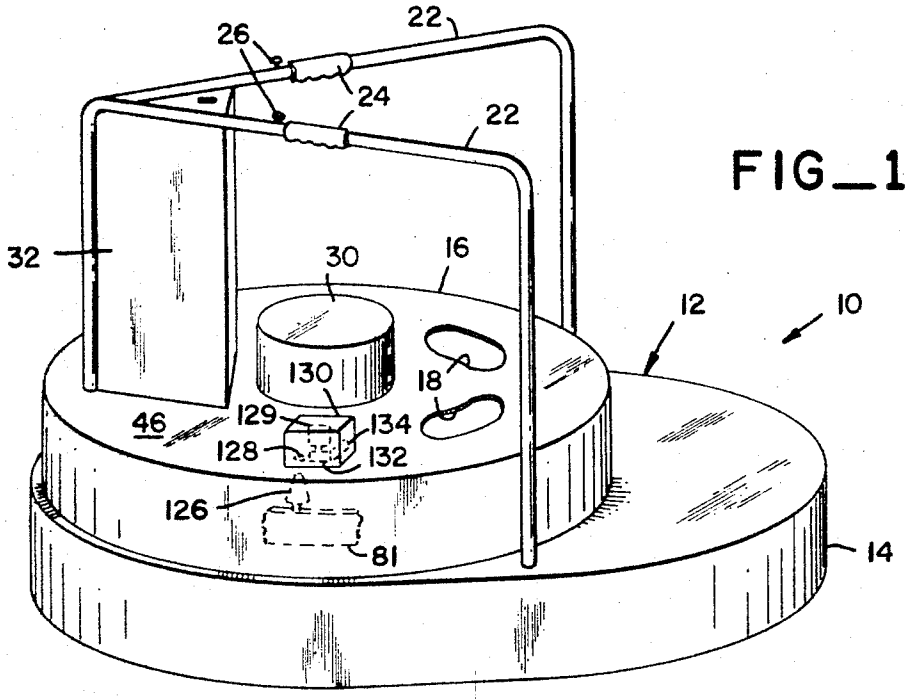


FIG_1

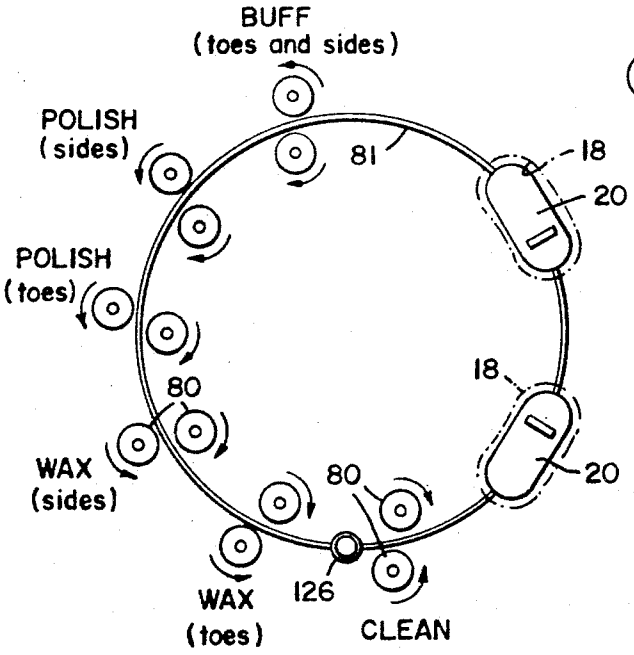


FIG_2

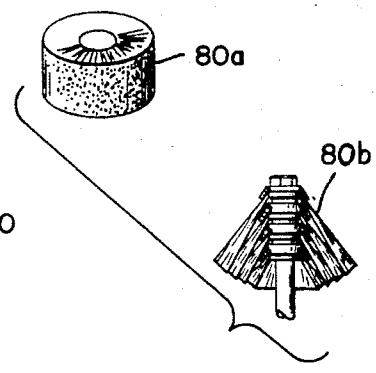


FIG_3

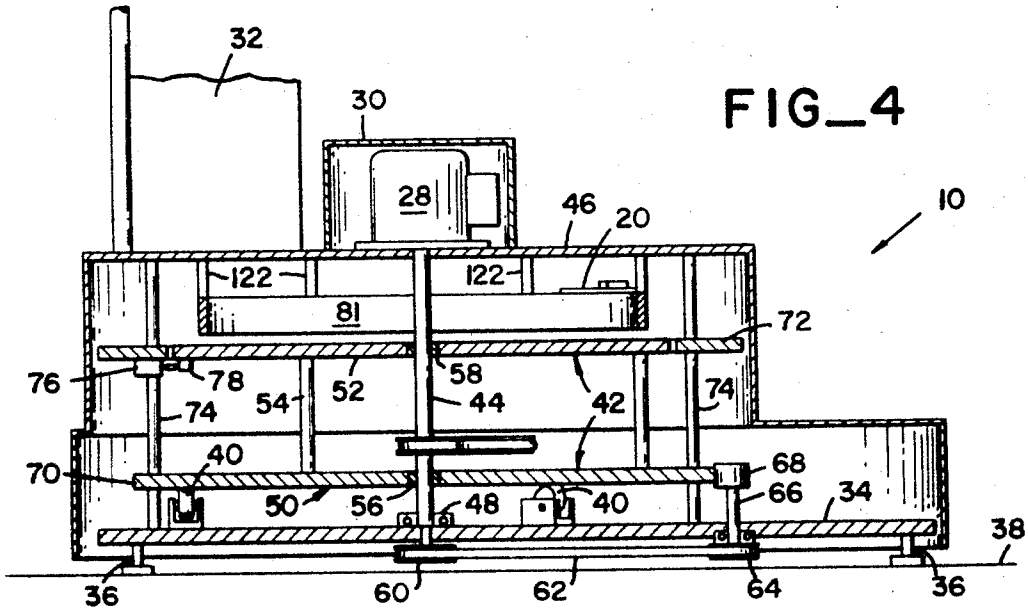
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SHOESHINE MACHINE

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FIG_4



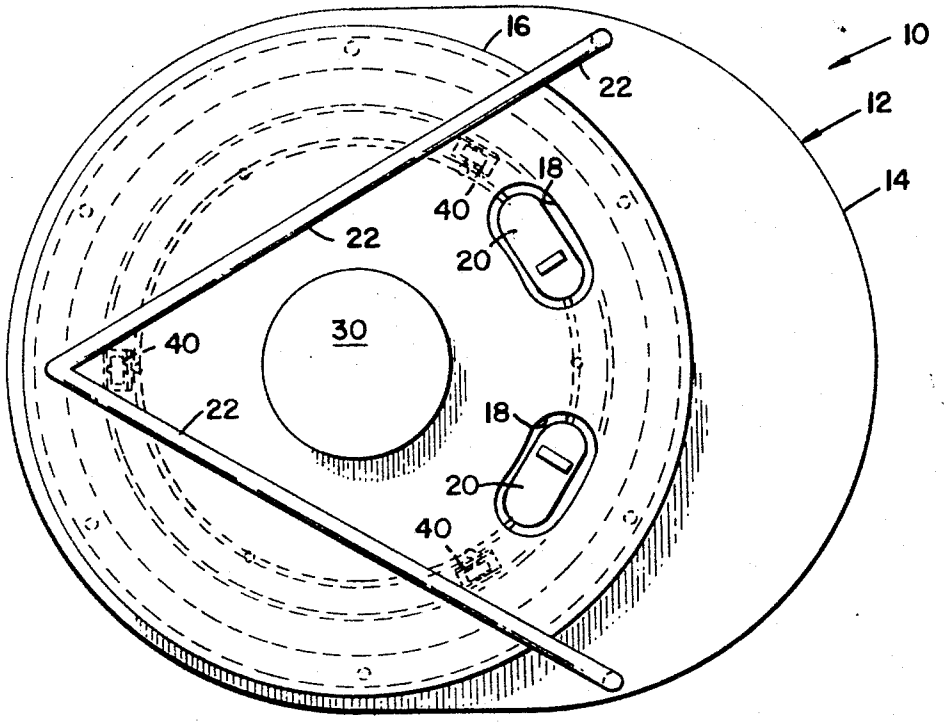


FIG_5

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SHOESHINE MACHINE

Filed Sept. 25, 1967 3 Sheets-Sheet 3

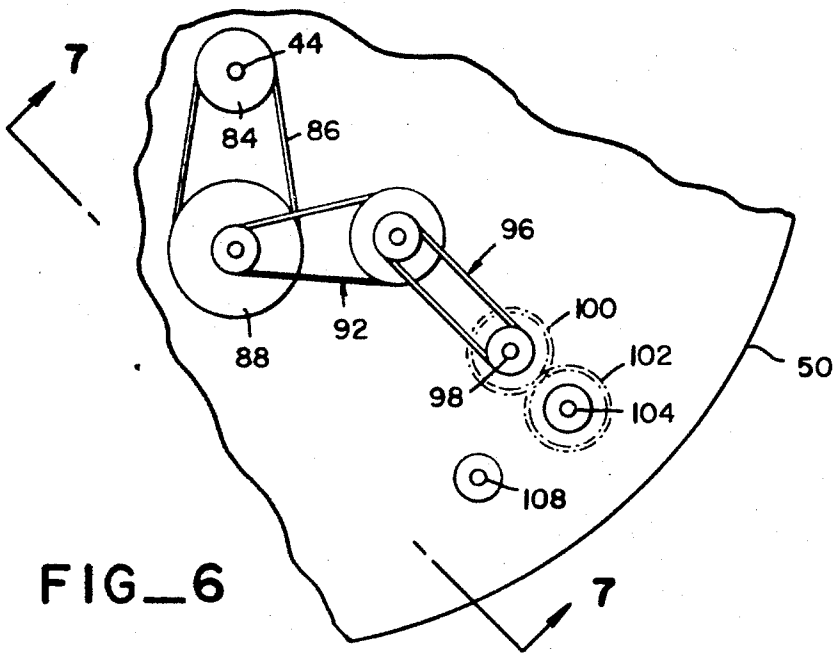


FIG_6

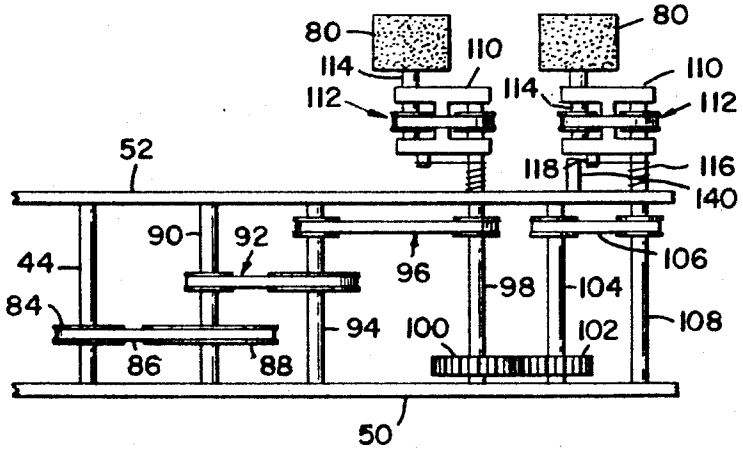


FIG_7

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SHOESHINE MACHINE

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Int. Cl. A47l 23/02, 23/18
U.S. Cl. 15—31 13 Claims

ABSTRACT OF THE DISCLOSURE

A shoeshine machine having a plurality of rotatable brushes mounted on a turntable for rotation therewith along a circular path. Means is provided to position each of a pair of shoes along a circumferential line closely adjacent to such circular path so as to be engaged one after another by successive brushes as the latter move with the turntable. The brushes are divided into a number of pairs for engaging opposite sides of the shoes and the brushes of each pair are staggered relative to each other so as to be as close as possible to the shoes while rotating in a manner to maintain the shoes on the circumferential line.

This invention relates to improvements in automatic shoeshine machines and, more particularly, to a shoeshine machine having only a single group of brushes for shining a pair of shoes one after the other in one cycle of operation.

The present invention is directed to an automatic shoeshine machine which is capable of successively and uninterruptedly performing, with one group of brushes and in one complete cycle of operation, the various functions required for shining a pair of shoes while the shoes remain on the feet. Among these functions are such steps as cleaning the shoes, applying polish or wax thereto, then polishing and finally buffing the shoes. The present machine accomplishes these steps by the use of a plurality of rotatable brushes mounted on a turntable adjacent to the outer periphery thereof so that the brushes traverse a generally horizontal, substantially circular path as the turntable rotates. The pair of shoes to be shined are positioned by supporting means above the turntable and on a circumferential line directly adjacent to the path of the group of brushes so that the brushes will successively contact the shoes one after another to perform the requisite functions to shine the shoes. Also, the shoe supporting means allows the shoes to be disposed at an angle relative to each other in an essentially natural position while the shoes are disposed on the aforesaid circumferential line, the latter being defined with reference to the axis of rotation of the turntable.

Automatic shoeshine machines in the past have been constructed in one of several ways. One type of machine uses a turntable having brushes thereon and provides for shining only one shoe at a time. This is because the shoe is disposed within the region circumscribed by the circular path along which the brushes move. This type of machine, therefore, requires that one shoe be shined and then lifted out of position, whereupon the other shoe can then be inserted in the region surrounded by the path of the brushes. Such structure requires the shoeshine operation to be interrupted so that the machine must go through two complete cycles, one cycle for each shoe respectively.

Another type of shoeshine machine utilizes two complete sets of brushes which move past a pair of shoes positioned parallel to each other. Since two sets of brushes are required, the machine requires two complete drive units for the brushes and a complicated control apparatus to synchronize the movements of the brushes.

The present invention avoids the problems of the prior machines by providing the particular structure for positioning a pair of shoes and by utilizing a single group of brushes which move successively past the shoes so that the latter are shined one after another as they remain on the feet. The placement of the shoes on a circumferential line with respect to the axis of rotation of the turntable which moves the brushes gives the unexpected results by means of which a pair of shoes can be shined in a minimum of time, using the aforementioned single group of brushes, and regardless of the size of the shoes to be shined.

A further advantage of the machine of this invention is the way in which the brushes are mounted for engaging not only the front and rear of each shoe but also the sides of the shoe. To this end, the single group of brushes are divided up into two sets with one set being movable along one side of the shoes and the other set of brushes being movable along the other side of the shoes. To accomplish this, the circumferential line along which the shoes extend is in close proximity to the paths of the two sets of brushes.

Another feature and advantage of this machine is the way in which the brushes of the two sets rotate relative to a shoe to be shined. Such brushes are rotated in opposite directions such that the shoes are brought into alignment with the circumferential line and thereby properly positioned during the shoeshine operation.

Still a further object and advantage of this invention is the provision of means for locating the feet of the wearer of the shoes at an angle which is not unnatural yet still allows the machine to utilize only a single group of brushes for shining both shoes. To this end, the wearer places the feet in the machine in a slightly toed-out relationship such that the shoes are located on the above-mentioned circumferential line and thereby in position to be properly engaged by the brushes as the latter rotate under the influence of the turntable.

A further feature and advantage of the machine of this invention is the provision of staggered brushes whereby the brushes can be located as closely as possible to the circumferential line along which the shoes extend. This construction allows the brushes to engage the front and back portions thereof. With respect to this way of mounting the brushes, it is to be noted that the brushes are further mounted for lateral movement relative to the aforesaid circumferential line to compensate for the width of each shoe to be shined. Spring bias means and the direction of rotation urge the brushes toward the line.

It is the primary object of this invention to provide an improved shoe shine machine which utilizes only a single group of brushes movable along a circular path and means for positioning a pair of shoes along a circumferential line adjacent to the path of the brushes whereby the brushes move past the shoes and shine the same one after another without requiring a second set of brushes or a recycling of the machine as is required by machines of the prior art.

Another object of this invention is to provide a shoeshine machine of the type described with the brushes being divided up into two sets which move along the aforesaid circumferential line so that the brush sets engage opposed sides of shoes as well as the front and back portions of the shoes as the brushes move relative to the shoes themselves.

A further object of this invention is to provide a machine of the aforesaid character wherein the brushes are rotated as they engage and move past the shoe with the

direction of rotation of the brushes being such that the shoes are brought back into or caused to remain in alignment with the circumferential line so as to be properly positioned at all times during the shoeshine operation.

Yet another object of this invention is to provide a shoeshine machine which allows the wearer to stand in a substantially natural position as the shoes are being shined while at the same time the machine requires only a single group of brushes to effect the shining of a pair of shoes as the latter extend along a circumferential line.

Other objects of this invention will become apparent as the following specification progresses, reference being had to the accompanying drawings for illustration of a preferred embodiment of the machine.

In the drawing:

FIG. 1 is a perspective view of the shoeshine machine of this invention;

FIG. 2 is a schematic view of the turntable of the machine showing the relative positions and directions of rotation of the brushes thereon;

FIG. 3 is a view of a pair of brushes of the type used in the machine, one of the brushes being shown in perspective and the other brush being shown in section;

FIG. 4 is a vertical section through a portion of the machine with the brushes removed;

FIG. 5 is a top plan view of the machine;

FIG. 6 is a fragmentary, horizontal section of the machine showing the drive means for a pair of the brushes; and

FIG. 7 is a side elevational view taken along line 7—7 of FIG. 6.

Shoeshine machine **10** includes a support or housing **12** provided with a lower section **14** and an upper section **16**. For purposes of illustration only, housing **16** has a pair of foot receiving openings **18** which are aligned with shoe supporting members **20** (FIG. 5) disposed within section **16**. A pair of L-shaped rails **22** are carried on housing **12** in positions to be grasped by the user of machine **10** for support when placing the feet in openings **18**. Each rail **22** has a handgrip **24** adjacent to a push-button safety switch **26**. Each switch **26** forms a part of the electrical circuitry of machine **10** which also includes a drive motor **28** within an enclosure **30** (FIGS. 1 and 4) on section **16**.

A second enclosure **32** extends upwardly from **16** and houses the control structure (not shown) for actuating and deactuating machine **10**. Such control structure may be coin-actuated and be provided with electro-mechanical devices for operating machine **10** through a complete cycle of a shoeshine operation. Suitable coin-control apparatus can be attached to enclosure **32** so that the machine can be actuated when the user is standing with his shoes supported on members **20**.

Within housing **12**, a base plate **34** is provided, plate **34** having feet **36** for engaging the floor surface **38** therebeneath. Plate **34** has a number of support rollers **40** mounted in any suitable manner on its upper surface, rollers **40** being disposed for supporting a turntable **42** for rotation about the drive shaft **44** of motor **28**. The rollers are circumferentially disposed relative to the axis of rotation of the turntable and are tapered to minimize friction effects.

Motor **28** is supported on the top wall **46** of section **16** and shaft **44** extends through top wall **46**, turntable **42**, and base plate **34**. A bearing **48** allows shaft **44** to rotate relative to base plate **34**.

Turntable **42** includes a lower plate **50** and an upper plate **52** connected together by spacers **54** so that plates **50** and **52** rotate as a unit about shaft **44**, there being suitable holes **56** and **58** through plates **50** and **52** to allow for such rotation. Shaft **44** has a pulley **60** on its lower end and an endless, flexible belt **62** connects this pulley to a second pulley **64** on the lower end of a suitable shaft **66** journaled on and extending upwardly through plate **34** (FIG. 4). The upper end of shaft **66** has a friction drive element on shaft **68** which normally engages the outer peripheral face **70** of plate **50**, whereby turntable **42** is caused to rotate when shaft **44** is rotated under the influence of motor **28**.

A ring **72** surrounds plate **52** (FIG. 4) and is carried by spacers **74** which extend upwardly from plate **34** and are coupled to top wall **46**. Ring **72** carries a limit switch **76** forming a part of the circuitry of machine **10**. A projection **78** on the underside of plate **52** is disposed to open switch **76** at a predetermined location of the turntable relative to housing **12** and thereby break the electrical circuit associated with this switch, whereby the machine is deactuated. This action occurs at the end of the shoeshine cycle of operations. A suitable holding circuit is preferably used to bypass switch **76** when machine **10** is again actuated, such holding circuit to be energized at least until projection **78** is sufficiently clear of switch **76** to allow the latter to again close and maintain machine **10** in operation until another shoeshine cycle has been completed.

Turntable **42** carries a number of pairs of brushes broadly denoted by the numeral **80** which, as shown in FIG. 2, are circumferentially spaced apart and move with the turntable into and out of engagement with a pair of shoes positioned on members **20**. Each pair of brushes performs a specific function on the shoes and the functions are performed successively and at a speed determined by the speed of rotation of the turntable. The brushes of each pair are staggered relative to each other so that they will not engage each other yet be sufficiently close to a circumferential line hereafter described along which a pair of shoes extend. The brushes actually cross each other when not engaged with the shoe in order to insure complete coverage of the toes and heels. For purposes of illustration only and as shown in FIG. 2, there are six pairs of brushes which perform the following functions: the first pair cleans the shoes, i.e., removes dust and dirt; the second pair applies wax or polish to the toes and tops of the shoes; the third pair applies wax or polish to the sides of the shoes; the fourth pair initially polishes the toes and tops of the shoes; the fifth pair initially polishes the sides of the shoes; and the sixth pair provides a final buffing of the shoes which completes the shoeshine operation. The brushes of each pair are disposed for engaging opposite sides of the shoes so that the function of each pair of brushes is performed simultaneously on the opposite sides of the shoes.

The pair of shoes to be shined are disposed on a circumferential line with respect to the axis of rotation of turntable **42**. This circumferential line is directly adjacent to the paths of travel of the brushes of each pair so that one brush will engage one side of a shoe and the other brush will engage the opposite side of the shoe. Thus, the brushes are further divided up into two sets, one set for engaging one side of each shoe and the other set for engaging the opposite side of each shoe. To this end, members **20** are positioned substantially between the paths of travel of the two sets of brushes and are mounted on a ring **81** secured to and spaced below top wall **46** (FIG. 4). Specifically, members **20** are located circumferentially of each other so that one member **20** is in advance of the other member **20** with respect to the movement of the brushes. Thus, a pair of shoes supported by members **20** will be in position to be engaged by the rotating brushes as the turntable moves under the influence of motor **28**. The shoe on the lower member **20** of FIG. 5 will, of course, be the first to be engaged by the rotating brushes, assuming counterclockwise rotation of the turntable.

One brush of each pair is rotated in the opposite direction relative to the other brush of the pair in the manner denoted by the arrows in FIG. 2. The purpose of this feature is to bring each shoe on the corresponding member **20** into circumferential alignment with the brushes or to cause the shoe to remain in such alignment during the time when the brushes of each pair engage the shoe, and

to provide for better contact between the brushes and shoes due to centrifugal force tending to swing brushes in direction of rotation. To effect this action, the brushes adjacent to the inner side of ring **81** rotates in a clockwise sense for counterclockwise rotation of the turnable. The brushes adjacent to the outer side of ring **81** also rotate in a counterclockwise sense. Both brushes of each pair cooperate to keep a shoe centered on its member **20**, whereby the shoe is properly positioned to be engaged by both brushes.

The brushes of the various pairs may differ from each other so that they will more effectively perform their respective functions on the shoes. In FIG. 3, two different types of brushes are shown, brush **80***a* being suitable for waxing and polishing the sides of the shoes and brush **80***b* being suitable for waxing and polishing the toes and tops of the shoes. The brushes for cleaning and for the final buff of the shoes can be common to the toes, tops and sides of the shoes and can be a combination of brushes **80***a* and **80***b*.

Each pair of brushes is coupled to drive shaft **44** of motor **28** for rotation in the direction shown by the arcuate arrows of FIG. 2. Thus, only a single power source, namely motor **28**, is required to rotate the brushes as well as rotate the turntable. However, additional power sources can be used, if desired.

Structure of any suitable type may be used to connect the various brush pairs to the motor drive shaft. To illustrate how this can be done, the drive structure for the first pair of brushes is shown in FIGS. 6 and 7 wherein shaft **44** has a pulley **84** coupled to an endless belt **86** which in turn is coupled to another pulley **88** on an idler shaft **90** journaled for rotation in plates **50** and **52**. A second belt and pulley assembly **92** couples shaft **90** with another idler shaft **94** and a third belt and pulley assembly **96** couples shaft **94** with a brush drive shaft **98**, the latter having a spur gear **100** at its lower end in mesh with another spur gear **102** on a shaft **104**. Shaft **104** is coupled by another belt and pulley assembly **106** to a second brush drive shaft **108** which is offset circumferentially of plate **50** as shown in FIG. 6 to cause the brushes of each pair to be staggered relative to each other. The purpose of this offset is to allow the brushes of each pair to overlap the ring **81** and thereby to be as close as possible to the shoe positions.

The various belt and pulley assemblies give a predetermined speed or rotation to each pair of the brushes. It may be deemed necessary or desirable to have the various pairs of brushes operating at different speeds, in which case the pulley ratios of the various drive structures will be different. Also, the spur gears **100** and **102** cause the brushes to rotate oppositely of each other.

It is desirable that the brushes be able to rotate laterally of the shoes so that the brushes will yield or shift due to the widening of the shoes without preventing the brushes from normally being as close as possible to ring **81**. To allow for this lateral movement, each brush is rotatably mounted on an H-shaped carrier **110** which, in turn, is rotatably mounted on the upper end of a corresponding brush drive shaft. For purposes of illustration, carriers **110** in FIG. 7 are pivotably mounted on the upper ends of shafts **98** and **108** so that the carriers can rotate toward and away from ring **81**. A belt and pulley assembly **112** couples the upper end of the corresponding brush drive shaft with a stub shaft **114** and the corresponding brush **80** is secured to the upper end of this stub shaft for rotation therewith. Each carrier **110** is biased by a coil-spring **116** surrounding its brush drive shaft **108** (FIG. 7), the bias force of the spring being in a direction sufficient to cause the corresponding brush to be biased toward ring **81** and thereby toward the circumferential line along which the shoes extend. Each carrier **110** has a projection **118** which is engaged by one end of coil-spring **116** to cause the necessary bias force. The projection **118** serves also as a stop to limit the inward swing of the brush carrier **110** by seating against brush stop **140** secured to plate **52**.

Means is provided to apply shoe polish or wax to the second and third pairs of brushes as they rotate with the turntable. While a number of different structures can be used for this purpose, a preferred manner of dispensing such polish is to utilize a conical element **126** mounted on the upper edge of ring **81** (FIG. 1) in alignment with an aperture **128** through top wall **46**. A container **129** of liquid polish or wax carried within a housing **130** on top wall **46** is coupled to a fluid dispenser **132** having shiftable parts and operated by a solenoid **134** to direct a measured amount of the polish into and through aperture **128** where it will gravitate onto the outer surface of element **126** aligned therewith. This will occur after the cleaning brushes have moved past element **126** on the way toward the first of the shoes. Thus, the second pair of brushes will engage element **126** and polish will be transferred to these brushes. The conical shape of element **126** allows the polish to be substantially uniformly applied along the outer face of each brush. The third pair of brushes will thereafter engage element **126** and additional polish can be supplied to the element for this third brush pair if deemed necessary or desirable.

The polish applied to the second and third pairs of brushes may be sufficient for both shoes. In the alternative, however, a second polish dispenser similar to that described above may be provided in a position to apply polish to the waxing brushes immediately before the brushes contact the second shoe. It is to be noted that the solenoid in the polish dispenser forms a part of the circuitry of the machine and is actuated at a predetermined time in the cycle of operation of the machine.

OPERATION

When machine **10** is properly positioned on the floor, and the turntable is essentially in a position with the brushes disposed as shown in FIG. 2 relative to members **20**, the machine is ready for operation. It will be assumed that sufficient polish is provided in the dispenser or dispensers and that electrical power is coupled to the machine circuitry.

To use the machine, the wearer of the shoes walks onto housing **12** and places his feet in openings **18** so that the shoes will be supported on members **20**. The shoes are then in position to be contacted by the brushes and the feet are in an essentially natural position although the feet are slightly toed outwardly. Thus, the wearer of the shoes suffers no discomfort or is not inconvenienced due to the placement of the feet.

The user then energizes the machine by pressing on switches **26** located adjacent to hand grips **24**. For a coin-actuated machine, it will also be necessary to insert the proper coins in the machine before the machine will operate.

Assuming that both switches **26** have been pressed downwardly and motor **28** has been actuated, the machine will be in operation and immediately turntable **42** will rotate to advance the pairs of brushes successively into and out of contact with the first shoe, and thereafter, with the second shoe. The polish dispenser will be actuated at the proper time to deposit shoe polish on element **126** at a time when the waxing brushes are approaching the elements and after the cleaning brushes have passed element **126**. The shoe treating functions of the brushes will continue until the second shoe has been finally buffed by the sixth pair of brushes and until projection **78** opens switch **76**, whereupon the operation of the machine will be halted with the brushes again in positions similar to those shown in FIG. 2. The wearer then lifts his feet out of openings **18** and steps off housing **12**. The machine is then ready to accept another pair of shoes and will be immediately actuated upon closing of the proper switches.

Provision can be made for utilizing different colors of shoe polish so that shoes of more than one color can be shined by machine **20**. One way of doing this is to utilize two different sets of waxing brushes where, for example, black and brown polish or wax is supplied. To this end, each set of brushes could be used for applying wax or polish to the toes, tops and sides of the shoes rather than having two pair of brushes for this purpose. This would, therefore, minimize the number of brushes required.

For a two-color machine, one set of waxing brushes could be retracted and remain inoperable while a second set of such brushes was in use. There would, of course, be two couplete dispensing units, each dispensing a polish or wax of a particular color corresponding to the brushes. The choice of colors by the user would be made before the machine is put into operation so that the proper brush set would immediately move into an operative position when the machine was actuated.

Machine **10** provides a simple and rugged structure for shining shoes in a minimum of time and without operator attention. The machine requires a minimum of maintenance and can be placed in any suitable location. It requires a minimum number of parts because the turntable and the brushes can be rotated from the same power source.

What is claimed is:

1. In a shoeshine machine: means for positioning a pair of shoes along a circumferential line with the shoes being angularly disposed relative to each other; a plurality of brushes; means mounting the brushes for movement along a circular path adjacent to and extending along said circumferential line, a first set of said brushes being movable along one side of said positioning means and a second set of brushes being movable along the opposite side of said positioning means, whereby the brushes successively engage a pair of shoes on said positioning means one after the other as the brushes move along said path, said mounting means including first structure for mounting each brush for rotation relative to said path, second structure for mounting the first structure for movement laterally of said path and in a direction sufficient to maintain the axis of rotation of the corresponding brush substantially constant relative to the axis of said path, and means biasing said brushes toward said path.

2. In a shoeshine machine as set forth in claim **1**, wherein is provided means coupled with said brushes for moving the same along said path.

3. In a shoeshine machine as set forth in claim **1**, wherein said circumferential line defines a portion of the circumference of a circle having a central axis, said brush mounting means being rotatable about said central axis to cause said path to be substantially concentric thereto, and wherein is included means coupled with said mounting means for rotating the same and thereby said brushes about said central axis.

4. In a shoeshine machine as set forth in claim **1**, wherein said second structure includes a rotatable shaft, said first structure including a brush carrier rotatably mounted on said shaft, said biasing means including a spring on said shaft and coupled to said carrier.

5. A shoeshine machine comprising: a support; a turntable mounted on said support for rotation about a generally vertical axis; a plurality of brushes; means mounting the brushes on said turntable for rotation about respective, substantially vertical axes in spaced relationship to said turntable axis, whereby the brushes move along a path with the turntable circumferentially of said turntable axis, said mounting means including structure for mounting each brush for substantially horizontal movement relative to said path with the axis of the brush being maintained substantially vertical, and means biasing said brushes toward said path; means adjacent to the path of travel of said brushes for positioning a pair of shoes along a circumferential line relative to said axis, a first set of said brushes being movable with the turntable along one side of said positioning means and a second set of said brushes being movable with the turntable along the opposite side of said positioning means, whereby the brushes successively engage a pair of shoes disposed on said positioning means for shining the same; means coupled with said turntable for rotating the latter relative to the positioning means; and means coupled with said brushes for rotating the same relative to said turntable.

6. A shoeshine machine as set forth in claim **5**, wherein the brushes are divided into a number of pairs with one brush of each pair being in said one set and with the other brush of the pair being in the second set, the brushes of each pair being rotatable relative to each other in directions sufficient to maintain the shoes on said supporting means as the brushes move with the turntable.

7. A shoeshine machine as set forth in claim **5**, wherein the brushes are divided into pairs with one brush of each pair being in said one set and the other brush of each pair being in said second set, a first brush of each pair being circumferentially in advance of the other brush of said pair, whereby the brushes are staggered relative to each other to permit the same to be as close as possible to said circumferential line.

8. A shoeshine machine as set forth in claim **5**, wherein said positioning means includes a pair of shoe supporting members arranged at an angle relative to each other, an arcuate structure disposed above the turntable and in at least partially surrounding relationship to said axis for mounting the shoe supporting members in spaced relationship above the turntable, said structure defining said circumferential line.

9. A shoeshine machine as set forth in claim **8**, wherein said structure includes a ring concentric to said axis and mounted on said support above and in spaced relationship to said turntable, said members being mounted on the top extremity of said ring in positions to locate the shoes in a toed-out relationship.

10. A shoeshine machine as set forth in claim **5**, wherein is included a power source common to said turntable rotating means and said brush rotating means, said source being mounted on said support and having a drive shaft coupled to said turntable for rotating the same, said brush mounting structure including a first, generally vertical shaft, a carrier rotatably mounted on and extending laterally from said first shaft, and a second shaft rotatably mounted on said carrier and substantially parallel to said first shaft, said brush rotating means including drive structure coupling the drive shaft of said source with each first shaft respectively, and a drive assembly interconnecting each first shaft and its respective second shaft.

11. A shoeshine machine comprising: a first set of brushes; a second set of brushes; means mounting said brush sets for movement along first and second circular, generally horizontal paths respectively, with the paths being substantially concentric with each other, each brush being rotatably secured to said mounting means for movement relative thereto about a respective, generally vertical axis, said mounting means including structure permitting movement of the brushes laterally of said path with the axes of the brushes being maintained substantially vertical, and means bearing the brushes toward said path; means adjacent to said paths for positioning a pair of shoes along a circumferential line disposed substantially between and extending along said paths, said brushes being successively engageable with a pair of shoes one after another positioned by said positioning means as the brushes move relative thereto along said paths; and means coupled with said brushes for moving the same relative to said positioning means along said paths and for rotating the same relative to said mounting means about respective axes.

12. A shoeshine machine as set forth in claim **11**, wherein each brush of said first set is adjacent to a corresponding brush of said second set, the brushes of said first set

being rotatable in the opposite direction from the brushes of said second set and being circumferentially in advance of the corresponding brushes of said second set, whereby the brushes are staggered relative to each other.

13. A shoeshine machine as set forth in claim **11**, wherein is provided means adjacent to said paths for applying shoe polish to at least one brush of each of said sets, whereby shoe polish will be transferred from said one brush of each set to a shoe positioned by said positioning means.

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