

1

2,933,752

SHOE CLEANING APPARATUS

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Application December 10, 1956, Serial No. 627,197

4 Claims. (Cl. 15—311)

This invention relates to shoe cleaning apparatus particularly designed for use by persons upon entering a home to prevent tracking of dust, dirt and mud into the home.

It is the primary object of this invention to provide a shoe cleaning apparatus which is convenient, efficient, reliable and trouble-free in operation, readily cleaned and maintained, and economically manufactured.

A further object of this invention is to provide shoe cleaning apparatus which will accumulate and store the material removed from shoes without discharging the same into the atmosphere.

According to this invention brushes are disposed on a turntable rotatable about a generally vertical axis and a platform is disposed above the turntable, the platform having at least one opening therethrough to allow engagement between the shoes of the user and the brushes. With this arrangement, the brushes are thus moved in a direction transverse to the direction in which the bristles extend, and dirt which falls into the brushes will be thrown radially outwardly therefrom by centrifugal action, rather than being thrown upwardly. A housing is preferably disposed about the turntable to receive the dirt thrown radially outwardly from the brushes.

According to a further feature, suction means are arranged to produce a downdraft of air through the opening in the platform. Thus, dust dislodged from the shoes will be pulled downwardly into the housing, rather than out into the atmosphere.

A further feature of the invention is in the provision of filter means for preventing discharge of the dust into the atmosphere.

Additional features of the invention reside in the use of a single motor to drive both the brushes and the suction means, preferably with fan blades being disposed on the turntable; in the provision of a compact reliable drive for the turntable; and in the provision of means for automatically initiating operation of the apparatus when a person steps on the platform; and in various structural features by which the apparatus is reliable in operation, easily constructed, and readily cleaned and maintained.

This invention contemplates other objects, features and advantages which will become more fully apparent from the following detailed description taken in conjunction with the accompanying drawings which illustrate a preferred embodiment and in which:

Figure 1 is a top plan view of a shoe cleaning assembly constructed according to the principles of this invention;

Figure 2 is a view similar to Figure 1 but with the cover or platform of the assembly removed;

Figure 3 is a cross-sectional view taken substantially along the line III—III of Figure 1; and

Figure 4 is a sectional view taken substantially along the line IV—IV of Figure 3.

Reference numeral 10 generally designates shoe cleaning apparatus constructed according to the principles of this invention.

The apparatus 10 comprises brushes 11 mounted in an

2

annular formation on a turntable 12 which is rotatable about a generally vertical axis. A platform 13 is disposed over the turntable 12 and has a pair of openings 14 and 15 therein, in the form of sectors of an annulus, to allow engagement between the shoes of the user and the brushes 11.

To use the apparatus, a person steps upon a central portion 16 of the platform 13 and faces to the left as viewed in Figure 1. Then while supporting his weight on his right foot, he may insert his left foot through the opening 14 into engagement with the brushes. The brushes are, of course, rotated, the rotation preferably being automatically initiated when the person steps on the platform. After the left shoe is cleaned, the user supports his weight on the left foot, from the central portion 16, and inserts his right foot through the opening 15 into engagement with the brushes.

The platform 13 forms the cover for a box-like housing having a bottom wall 17, a semi-circular front wall 18 and side walls 19 and 20. It will be appreciated that dirt which falls into the brushes 11 is thrown outwardly by centrifugal force to be collected within the housing.

An important feature of the invention is in the provision of suction means for producing a downdraft of air through the platform 13 and to the housing. According to a specific feature of the invention, the suction means is provided by forming fan blades on the turntable 12 outside the brushes 11. The turntable 12 may preferably be formed of sheet metal and the fan blades, indicated by reference numeral 21, are preferably formed as integral struck-out portions of the platform 12. The fan blades 21 may serve as a means for limiting outward movement of the brushes 11, and may be recessed to receive the bases of the brushes 11 to prevent upward movement thereof. The brushes 11 may preferably be formed as a plurality of annular segments, and spring metal clips 22 are provided for releasably engaging the bases of the brushes to hold the same in position.

To insure removal of dust and dirt from the brushes, it may be desirable to produce a flow of air radially therethrough. For this purpose a plurality of radially extending vanes 23 are secured to the upper surface of the turntable 12 radially inside the brushes 11.

It may be here noted that the central portion 16 of the platform 13 may be formed with a plurality of openings 24 therethrough, to allow flow of air to the region inside the vanes 23. This also serves to remove some dust and dirt from the shoes of the user, and to prevent accumulation of dust and dirt on the central portion 16.

To rotatably support the turntable 12, a hub member 25 is provided having a flange portion 26 underlying and secured to the underside of the turntable 12 and a sleeve portion 27 which is journaled on a vertical shaft 28. The shaft 28 is integrally secured to a flange 29 which is secured to a channel member 30 secured at its opposite ends to the side walls 19 and 20. A ball thrust bearing assembly 31 may be provided between the flanges 26 and 29. To limit upward movement of the turntable 12, a nut 32 is threaded on the upper end of the shaft 28 with a washer 33 between the nut 32 and the upper end of the hub.

To drive the turntable 12, an electric motor 34 is secured to the bottom 17 of the housing and has a drive shaft 35 to which a wheel 36 is secured. An idler wheel 37 engages between the wheel 36 and the underside of the turntable 12 at a point spaced outwardly from the axis of rotation thereof. The idler wheel 37 is journaled on a pin 38 which is carried by an arm 39 pivoted on a pin 40 which is supported by a bracket 41 secured to the housing bottom 17. A coiled tension spring 42 is connected between the arm 39 and a bracket 43 on the housing bottom 17 to bring the idler wheel 37 into en-

gagement with the wheel 36 and the underside of the turntable 12. The motor shaft 35 is rotated in a clockwise direction, as viewed in Figure 4, and the wheel 37 is so arranged that through the transmission of torque from the wheel 36 to the turntable, the idler wheel 37 is urged into tight engagement with the wheel 36 and the turntable 12 by torque reactions. Accordingly, the spring 42 need exert only sufficient force to bring the wheels into light pressure engagement.

It will be appreciated that through the action of the fan blades 21, air pressure will build up in the housing, and the housing is open at its rearward end, that is, the right-hand end as viewed in Figures 1-3 to allow flow of air therefrom. According to a specific feature of the invention, means are provided for filtering the air. For this purpose, a filter screen 44 of the type commonly employed in heating and air conditioning systems is arranged to define the rearward side wall of the housing. The filter screen 44 is held in place by means of inwardly turned flanges 45 and 46 on the rearward ends of the side walls 19 and 20, and brackets 47 and 48 secured to the inside surfaces of the side walls 19 and 20.

The dust removed from the shoes of the users will collect in the filter screen 44 and it may be periodically replaced by merely lifting it out of the apparatus and inserting a new screen.

The heavier particles of dirt, mud and the like will collect within the housing. To allow removal of such material, a false bottom 49 is provided which is downwardly inclined toward the rearward end of the apparatus with the rearward end of the bottom of 49 being in overlying relation to a pan 50 in which the material may collect. A knob is provided on the pan 50 to permit periodic removal of the same.

It is important to emphasize that the apparatus will remove heavy clods of dirt, mud and the like as well as dust and light particles, and such will not clog up the brushes due to the centrifugal action of the apparatus.

The presence of moisture will not impair operation of the apparatus. In fact the brushes may be readily cleaned merely by pouring a soap or detergent solution onto the brushes, or through the holes 24 in the central portion of the platform, and the solution will work its way through the brushes to be thrown by centrifugal action against the side walls of the housing, from which it may flow into the pan 50, to be readily removed. Due to the direction of the centrifugal action, and also due to the suction draft, there will be no splattering of water or the cleaning solution outside the housing.

To protect the drive mechanism from dirt, dust and the like, an annular shroud 52 is secured to the false bottom 49 about the motor 34 and wheels 36 and 37. In order to cool the motor 34 and also further prevent flow of dust-laden air into the space surrounding the motor, a plurality of vanes 53 are secured to the underside of the turntable 12 to provide a centrifugal blower action, and openings 54 are provided in the side walls. Thus air will be drawn in through the holes 54 to flow past the motor 34 and thence out into the housing through the action of the vanes 53.

In many circumstances, the apparatus will be used only intermittently, and the provision of cooling means for the motor 34 will not be necessary.

A further feature of the invention is in the provision of means for automatically initiating operation of the apparatus when a person steps on the platform 13. In accordance with this feature, the platform 13 is pivotally supported at its rearward end, that is the right-hand end as viewed in Figures 1-3, and the forward end thereof is arranged to rest on a spring 55 with a micro-switch 56 being supported on the side wall 19 in a position to be closed when a person steps on the platform 13, the

micro-switch 56 being connected in series with the motor 34.

The spring 55 is in the form of an inverted L-shaped member having a vertical leg portion 57 secured against the outside of a forward wall 18 and a horizontal leg portion 58 projecting inwardly. The portion 58 is engaged by a channel member 59 which provides reinforcement for the platform 13. The rearward end of the channel member 59 is welded or otherwise secured to an angle iron member 60 and the opposite ends of one leg of the angle iron 60 are engaged in notches in the side walls 19 and 20 to provide the pivotal support. The platform 13 may be additionally reinforced by means of angle irons 61 and 62 extending inwardly from the opposite ends of the angle iron 60 to an intermediate point of the channel 59.

The micro-switch 56 has an actuating button 63 which is engaged by the end of a screw 64 threaded through the platform 13. This screw 64 may be adjusted to obtain actuation of the switch 56 when a predetermined weight is placed upon the central portion 16 of the platform 13. It may be adjusted in a manner to require a weight of 50 lbs., for example, to prevent small children from playing with the apparatus.

It will thus be appreciated that this invention provides shoe cleaning apparatus which is convenient, efficient, reliable and trouble-free in operation, economically manufacturable, readily cleaned and maintained, and which will accumulate and store the material removed from shoes without discharging the same into the atmosphere.

Although I have herein set forth and described my invention with respect to certain specific principles and details thereof, it will be understood that these may be varied without departing from the spirit and scope of the invention.

I claim as my invention:

1. In a shoe cleaning apparatus, a turntable, means for rotating said turntable about a vertical central axis thereof, a brush structure extending around said turntable in predetermined radially spaced relationship to said central axis, a platform above said turntable for supporting a user of the shoe cleaning apparatus and having an opening providing brushing contact between the shoe of the user and said brush structure continuously during rotation of the turntable, said platform defining air inlet means in above the area of said turntable within the inner boundaries of said brush structure, and means for continuously directing a supply of air from said air inlet means beneath said platform and radially outwardly through said brush structure to clean the brush structure during the rotation of the turntable.

2. In a shoe cleaning apparatus, a turntable, means for rotating said turntable about a vertical central axis thereof, a brush structure extending around said turntable in predetermined radially spaced relationship to said central axis, a platform above said turntable for supporting a user of the shoe cleaning apparatus and having an opening providing brushing contact between the shoe of the user and the said brush structure continuously during rotation of the turntable, said platform defining a plurality of air inlet apertures in above the area of said turntable within the inner boundaries of said brush structure, and means for continuously directing a supply of air from said air inlet apertures beneath said platform and radially outwardly through said brush structure to clean the brush structure during the rotation of the turntable, said means including a plurality of angularly spaced blades extending inwardly a predetermined distance from the inner boundary of said brush structure and a plurality of blades extending radially outwardly around the outer boundary of said brush structure.

3. In shoe cleaning apparatus, a turntable rotatable about a generally vertical axis, brushes on said turntable, a platform above said turntable having at least one opening therethrough to allow engagement between a shoe of

5

the user and said brushes, a motor beneath said turntable centrally thereof for driving said turntable, fan blades on said turntable radially outside said brushes arranged to produce a downdraft of air through said opening, and maintaining said brushes in a predetermined radially spaced relationship to said vertical axis, and sidewalls cooperating with said platform to form a housing for said turntable, said radial vanes serving to build up pressure in the housing and said housing having an opening at one side thereof to evacuate air pressure resulting from the action of said vanes.

4. In shoe cleaning apparatus, a housing, a turntable supported in said housing for rotation about a vertical axis, brushes on said turntable, vanes on the periphery of said turntable for producing a down flow of air into said housing, a motor below said turntable arranged to drive the same, a shroud within said housing about said motor and spaced from said motor, and a plurality of radially spaced vanes on the underside of said turntable

5

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arranged to produce a flow of air radially outwardly and away from said motor above said shroud.

6

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