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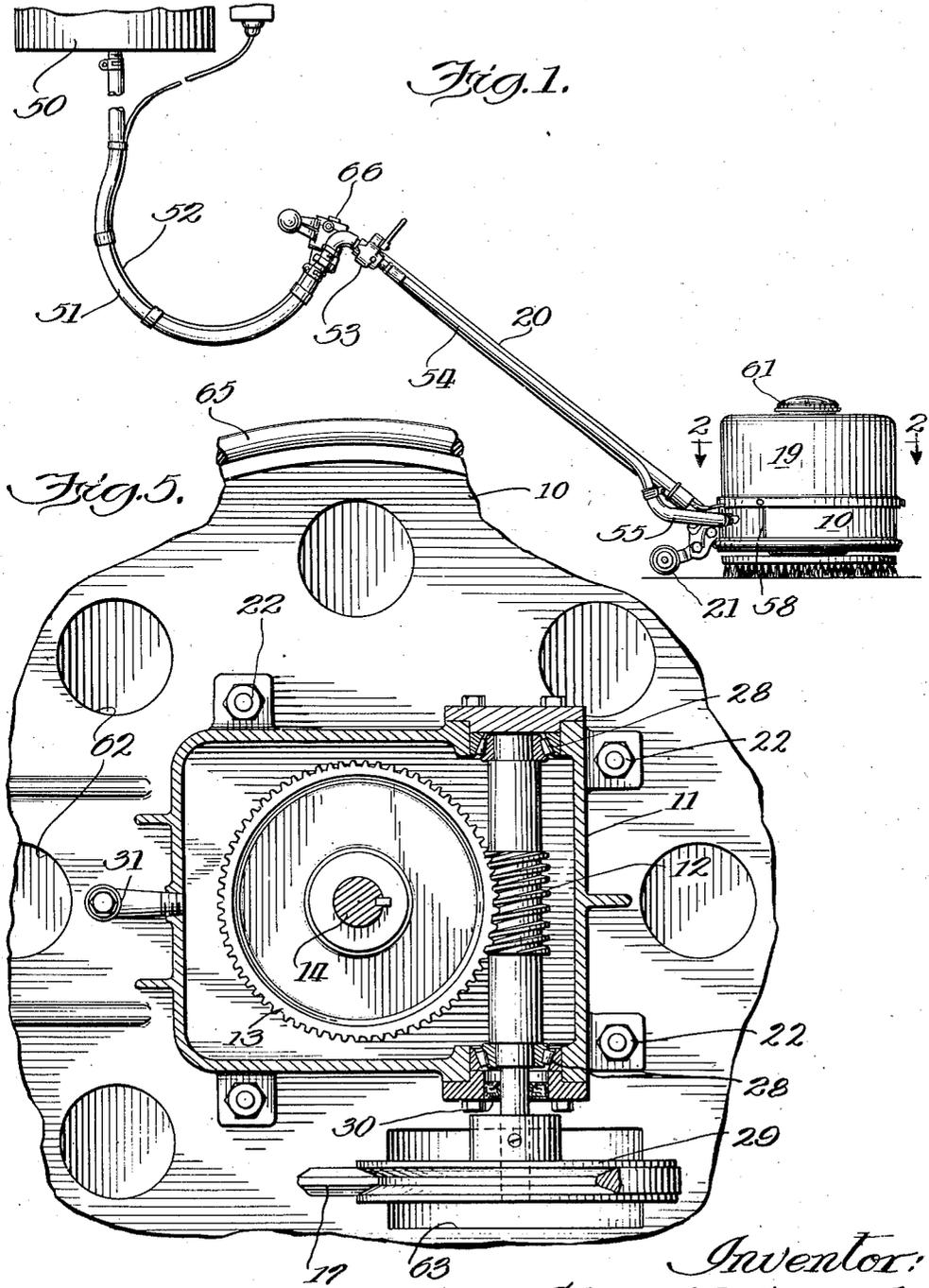
E. B. GRUENDEL

1,948,815

ROTARY FLOOR TREATING MACHINE

Filed Dec. 7, 1931

3 Sheets-Sheet 1



Inventor:  
Edward B. Gruendel  
By Williams, Bradbury,  
McCaleb & Shinkle,  
Attys.

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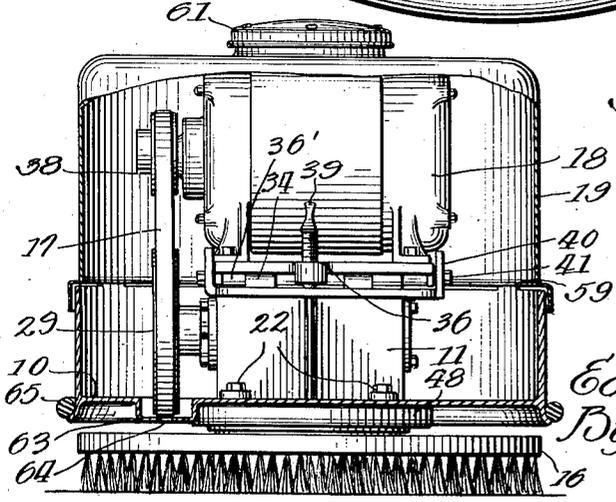
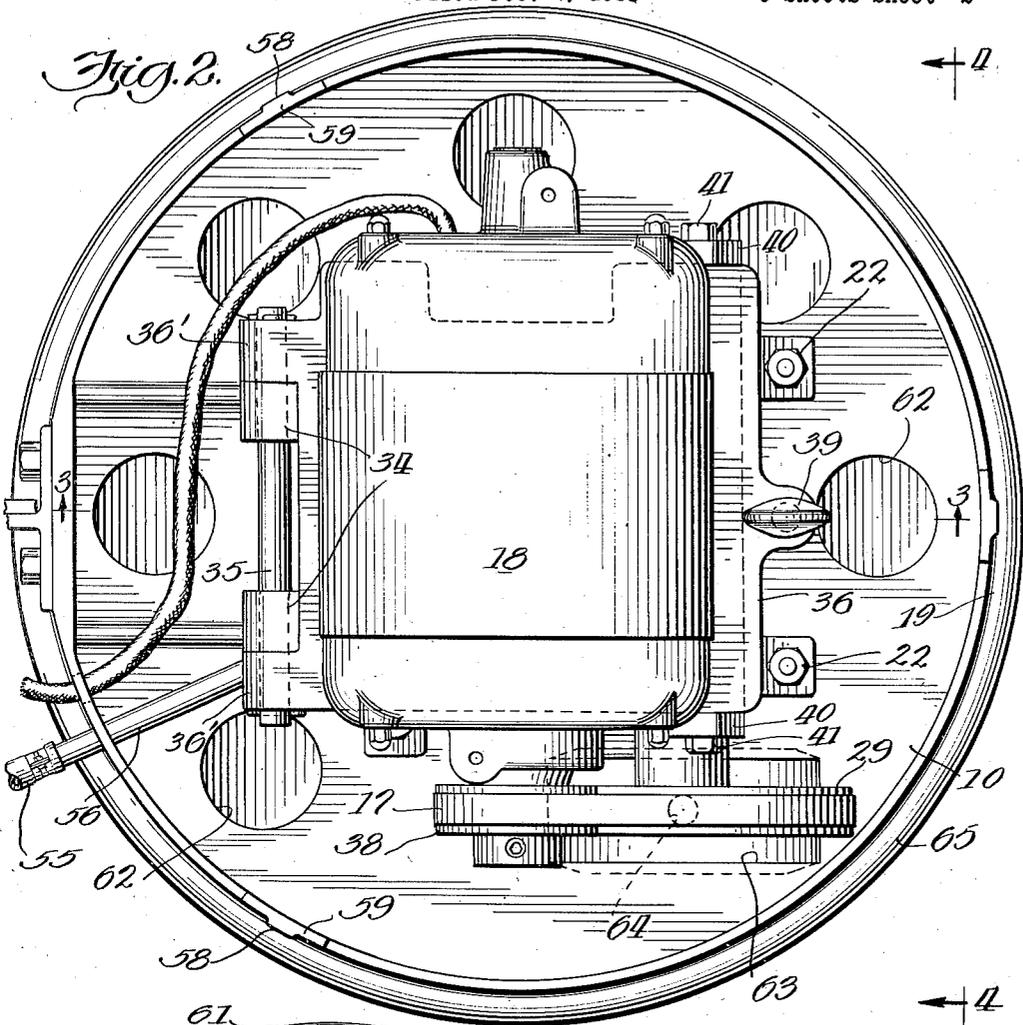
E. B. GRUENDEL

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ROTARY FLOOR TREATING MACHINE

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3 Sheets-Sheet 2



*Inventor:*  
 Edward B. Gruendel  
 By *Williams, Bradbury*  
*McCaleb & Shinkle*  
*Attys.*

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Fig. 3.

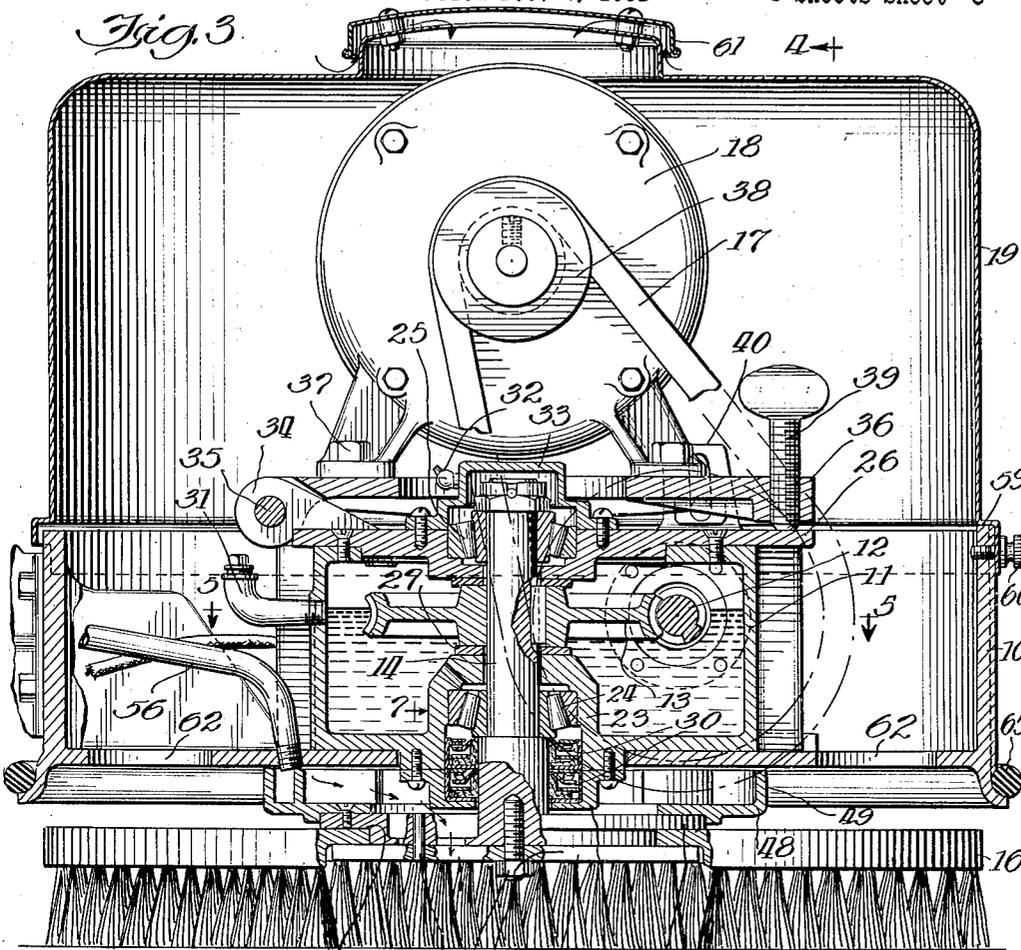


Fig. 6.

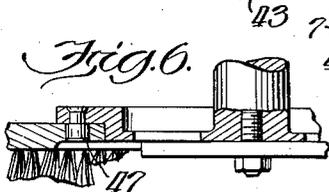


Fig. 7.

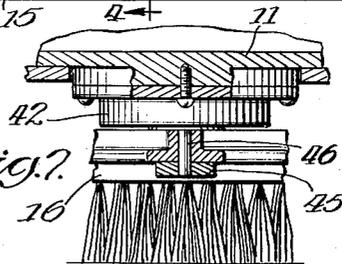


Fig. 8.

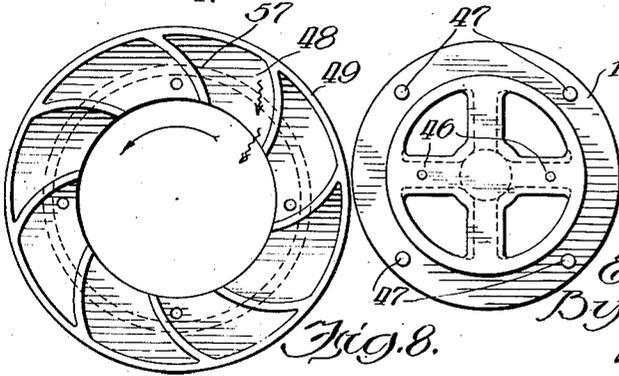


Fig. 9.

Inventor:  
 Edward B. Gruendel  
 By Killbome, Bradbury,  
 McCall & Hinkle, Attys.

# UNITED STATES PATENT OFFICE

1,948,815

## ROTARY FLOOR TREATING MACHINE

Edward B. Gruendel, Chicago, Ill.

Application December 7, 1931. Serial No. 579,407

3 Claims. (Cl. 15—50)

My invention relates to what is commonly termed a rotary machine—that is, a machine for washing, scrubbing, polishing, or grinding floors and other flat surfaces by means of a disc-like brush or other element which rotates upon a vertical axis and engages the work flatwise of the disc element.

One object of my invention is the utilization of the advantages of a horizontally mounted electric motor for driving the rotary machine. Another is a compact speed reducing machine which permits the use of a higher speed motor, together with convenient means for varying the speed of the rotary element in relation to the motor.

Another feature of my invention is the introduction of liquid soap or other material to the open center of an annular brush or other rotary element, without the necessity of an increase in the size and cost of bearings by providing a central feed bore through the drive shaft.

Other objects of my invention are improved lubrication, adjustment, ventilation, and ready accessibility.

These and further objects, features and advantages of my invention are set forth in the following description of a specific embodiment thereof, as illustrated in the accompanying drawings, wherein

Fig. 1 is a side elevation of the complete rotary machine;

Fig. 2 is a plan view of the machine with the cover removed, and can be considered as taken on the line 2—2 of Fig. 1;

Fig. 3 is a vertical section through the rotary machine in the plane of the handle along the line 3—3 of Fig. 2;

Fig. 4 is a front view of the rotary machine with portions of the cover and outer housing broken away, and can be considered as taken on the line 4—4 of Figs. 2 and 3;

Fig. 5 is a detail plan section on the line 5—5 of Fig. 3;

Fig. 6 is a section of the annular brush element and its mounting taken on a vertical plane radially spaced from the plane of Fig. 3;

Fig. 7 is a detail section taken on the line 7—7 of Fig. 3;

Fig. 8 is a plan view of the soap feed impeller ring; and

Fig. 9 is a plan view of the brush mounting plate.

Briefly described, my rotary machine comprises a circular pan shaped frame 10 on which is mounted a gear box 11 housing a worm 12 and

worm wheel 13 for driving the vertical shaft 14 which carries a mounting plate 15 at its lower end below the frame 10 and is adapted to receive the brush or other rotary element 16.

The worm 12 is driven through a belt 17 by a horizontal motor 18 adjustably mounted on top of the gear box 11. The motor is housed by a circular cover 19. A handle 20 is pivoted to the frame 10. The frame 10 also carries a small wheel or pair of wheels 21 whereby the machine may be rocked upwardly to lift the brush from the floor.

To describe the machine of my invention in greater detail, the frame 10 is in the form of a circular pan having a flat disc bottom and up-standing marginal walls. The gear box 11 is mounted on the bottom of the pan by bolts 22.

The bottom of the gear box 11 at its center includes a bearing housing 23 for a roller bearing 24 which journals the lower end of the vertical shaft 14. The upper end of the shaft is journaled in roller bearings 25 mounted in a cover plate 26 for the open top of the box 11. The worm wheel 13 is keyed upon the shaft 14 and disposed between the housings for the roller bearings 24 and 25. Washers 27 are interposed between the hub of the worm wheel and the bearing housings. As shown in Fig. 5, the worm 12 is journaled at its ends in the lateral side walls of the gear box 11 by roller bearings 28, 28, the shaft extending through one lateral wall and carrying a pulley wheel 29. The shaft 14 and the shaft of the worm 12, where they pass through the walls of the gear box 11, have suitable oil seals or packings such as the Gitts type of oil seal 30, here shown.

The gear box 11 is filled through the elbow fitting 31 with lubricating oil up to the level of the worm 12. Rather than rely upon splash lubrication for the upper roller bearing 25, I prefer to use a greasing nipple 32 in the cap 33 which completes the housing for the upper roller bearing 25.

The cover plate 26 for the gear box 11 carries at its rearward edge a pair of hinge ears 34 constituting the stationary bearings for a pintle 35 whereby a motor mounting plate 36 is hingedly mounted through corresponding hinge ears 36'. The motor is secured to the mounting plate 36 by cap screws 37. The motor armature shaft carries a pulley 38 which drives the pulley 29 on the shaft of the worm 12 by means of the belt 17. The motor and its mounting plate 36 may be rocked upwardly about its pintle 35 by a thumb screw 39, at the forward edge of the mounting

plate 36, which engages the top or cover plate 26. Tension on the belt 17 is thus adjustable by the thumb screw 39.

For further positioning the motor mounting plate 36, the cover plate 26 of the gear box carries a pair of upstanding lugs 40, each having a vertically arranged slot—or more properly a slot arranged arcuately about the pintle 35. A cap screw 41 extends through the slot in each lug 40 and is threaded into the margin of the motor mounting plate 36. While normally the weight of the motor will hold the plate 36 from rocking about its pintle, there is a danger that in tipping up the machine in use or in shipping the motor plate would be swung up, putting undue strain on the belt 17 and perhaps injuring the cover 19. If the cap screws 41 are tightened following adjustment of the thumb screw 39, the plate is definitely locked in position against swinging and also against swaying from side to side.

The lower end of the shaft 14 passes through the oil seals 30 to the bottom cap 42 for holding the oil seals and extends down below the bottom of the gear box 11 and the base 10 where it carries the mounting disc or plate 15. The lower outer edge of the plate 15 is shouldered as at 43 for the reception of the annular backing ring of the brush 16. The brush is held in its seat in the plate 15 and in driving relation to the plate by a cross bar 44 which extends diametrically across the plate 15 and overlaps the inner margin of the annular backing ring of the brush 16. The clamping bar 44 is secured to the shaft 14 by a cap screw 45 and is further secured rotatably with the plate 15 by stud pins 46 mounted in the plate 15 and extending through holes in the bar 44. A positive driving connection between the mounting plate 15 and the brush 16 is preferably insured by stud pins 47 carried by the plate and extending into the backing of the brush, as detailed in Fig. 6.

If liquid soap is to be fed to the rotary brush or an abrasive compound is to be fed to a grinding element, it is preferable that the soap or other material be fed to the central opening in the annular brush or other working element. The most direct way, of course, of accomplishing this is to feed it through a central hollow shaft. This, however, increases the size of the shaft and consequently the bearings and other parts through which the shaft has to pass. I prefer, therefore, to feed the liquid soap to the center of the brush from without the shaft. One problem encountered in doing this is to counteract the centrifugal action of the rapidly rotating brush which would tend to send the liquid soap outwardly before it was fed to the desired point. To solve this problem I prefer to utilize the feed disc 48 having an upstanding marginal wall 49. Liquid soap is fed on to this disc from a reservoir 50 through a flexible hose 51, which may conveniently be arranged to extend side by side with the electric conductor 52 to the motor, through a soap feed valve 53 at the upper end of the handle 20, through a rigid conduit 54 extending along the handle, through a flexible coupling hose 55 at the region of the pivotal connection of the handle to the frame 10, and through a pipe 56 which discharges on to the upper surface of the feed disc 48 just within the marginal wall 49, as shown in Fig. 3.

Impeller blades 57 extend upwardly from the feed disc 48 and are so arranged (Fig. 8) relative to the direction of rotation that they force the liquid radially inwardly against centrifugal action. Liquid soap discharged past the inner margin of the feed disc 48 gravitates through

openings between the spider-like spokes between the hub and rim of the mounting plate 15, whence it drops to the floor and within the central opening of the annular brush.

The cover 19 is stepped outwardly adjacent its bottom edge so as to fit over the upstanding marginal wall of the base 10. The outer surface of the latter wall carries beads 58 at spaced intervals. At the same region the upper edge of the wall carries elevated portions 59. At these regions thumb screws 60 pass through the edge of the cover and are threaded into the wall of the frame. In this manner a space is provided, as shown on the left side of Fig. 3, for the inflow of a stream of ventilating air. A ventilating cap 61 is also preferably provided on the top of the cover 19. The centrifugal force of the air set in rotation by the rapidly rotating brush 16 tends to throw air outwardly, which is drawn down through the ventilating openings 62 in the bottom wall of the frame 10. The air which is thus sucked down through the openings 62 from the motor space enclosed by the cover is replaced by fresh air drawn into the interior of the cover through the opening surrounding the ventilating cap 61 and through the previously described annular opening at the bottom edge of the cover 19, the air entering at the ventilating cap cooling the motor and that entering below the cover cooling the gear box.

To provide for a large size pulley 29, the bottom wall of the frame 10 preferably carries a sump-like depression 63 for the accommodation of the lowermost edge of the pulley. In the bottom of the depression 63 there is a small opening 64 to permit the discharge of any water or soap which might be thrown up through the openings 62 into the frame 10.

The bottom edge of the frame 10 is preferably conformed to receive a rubber bumper bead 65.

The operation of the device is as follows: The operator starts the motor by throwing a conveniently located switch 66 on the end of the handle 20. The motor drives the pulley 29 through the belt 17. The pulley 29 drives the worm 12 which engages the worm wheel 13, which in turn drives the shaft 14 which carries the brush 16 on its lower end. The weight of the device, as is customary with these rotary machines, is carried upon the brush, and the brush is pushed about the floor. When liquid is to be fed, the operator opens the feed valve 53, and the soap flows through the hose and conduits 51, 54 and 55 to the upper side of the feed plate 48. The vanes 57 on the rotating feed plate force the liquid soap inwardly, where it passes through the spider-like mounting plate 15 to the center of the brush. If the machine is to be transferred some distance or lifted over an obstruction, the operator pushes down on the handle 20 to rock the machine up on the wheels 21. Tension of the belt 17 is adjusted by loosening the clamping screws 41 and adjusting the thumb nut 39 to swing the motor mounting plate 36 about its pintle 35, when the screws are again locked.

To remove the brush, the cap screw 45 is unscrewed and the clamping bar 44 removed, permitting the brush 16 and its backing ring to be pulled out of its seat in the mounting plate 15. The same brush, or another brush, may be put back in it, and the clamping plate 44 again secured by the cap screw 45.

By my invention I am enabled to utilize a motor of the horizontal type, with its lowermost and more rugged construction and longer life, and I

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am also enabled to use a higher speed motor than heretofore has been utilizable in the vertical type of motor because of the large amount of space which would be required to incorporate a mechanism giving the same speed reduction.

While I have thus described this specific embodiment of my invention, I contemplate that changes and substitutions may be made without departing from its scope or spirit.

I claim:

1. A rotary machine comprising a frame, a shaft vertically journaled therein, a brush mounting ring on the lower end of the shaft, an annular brush carried thereby and means for securing the brush on the mounting ring comprising a clamping bar disposed diametrically of the mounting ring and detachably secured thereto and studs depending from said ring and engageable with said bar, the ends of the bar engaging the brush to hold it against the clamping ring, means for drivingly connecting the ring and brush, and soap feed passage means discharging soap to the central region of the brush from above the brush and radially within the ends of said bar but outside of said shaft.

2. A rotary machine comprising a frame, a shaft vertically journaled therein, an annular

brush carried on the lower end of the shaft, and means for feeding liquid soap or the like to the center of the brush comprising a feed plate disposed above the brush and concentric with and rotated by the shaft, vanes on the shaft adapted to feed inwardly upon rotation against centrifugal action, and a conduit leading the liquid soap on to the feed plate, the feed plate being an annular ring, discharging the liquid soap through its central opening.

3. The combination with a rotary machine comprising a frame having a bottom plate, a motor above the frame, a vertically journaled horizontally disposed brush below the frame, speed reducing drive connections between the motor and the brush, a cover complementing the frame and enclosing the motor and drive connections and a ventilating system for the motor space comprising air passages in the bottom of the frame communicating with the motor and discharging adjacent the upper side of the brush whereby the centrifugal force of air set in motion by the rotating brush sucks air downwardly through said passages and other passage means constituting an air inlet to the motor.

EDW. B. GRUENDEL.

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