

Feb. 13, 1934.

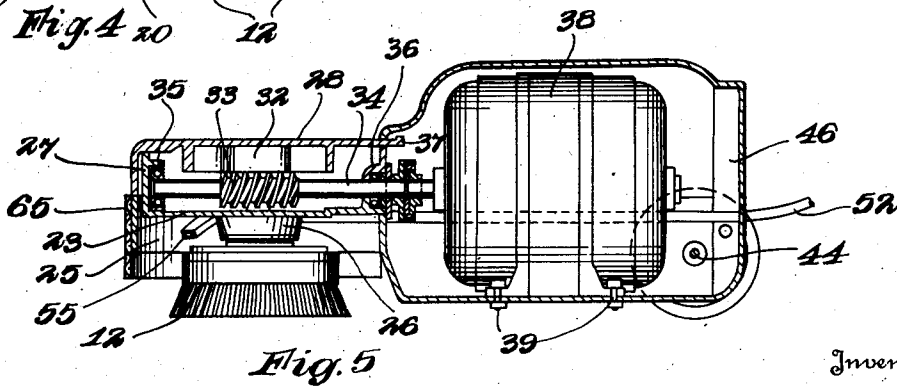
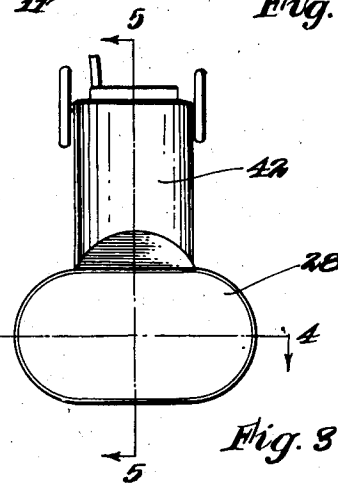
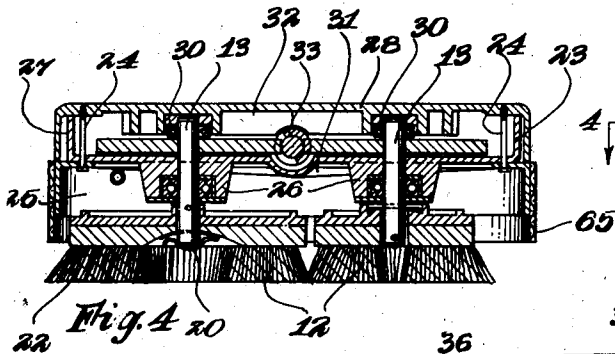
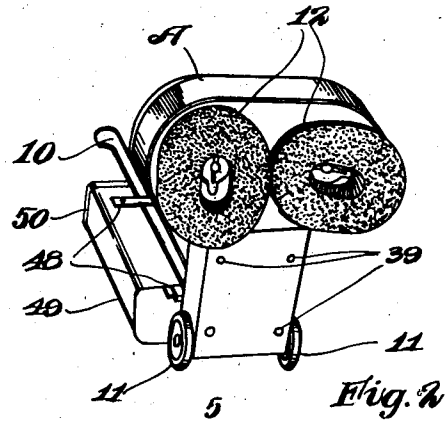
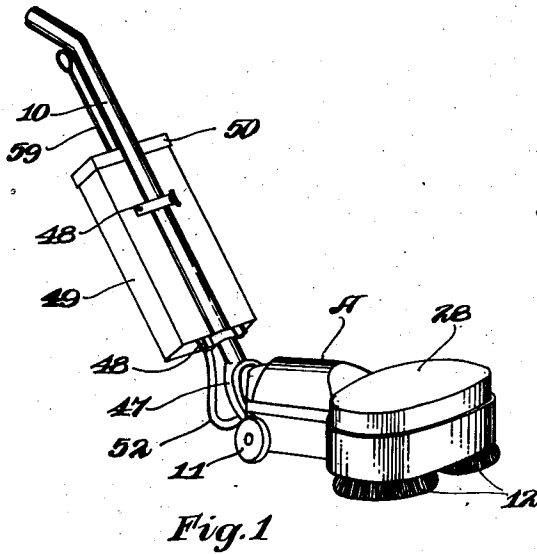
B. I. RICHMOND

1,947,435

ELECTRIC SCRUBBING, WAXING, AND STEEL WOOLING MACHINE

Filed May 26, 1930

3 Sheets-Sheet 1



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ELECTRIC SCRUBBING, WAXING, AND STEEL WOOLING MACHINE

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3 Sheets-Sheet 2

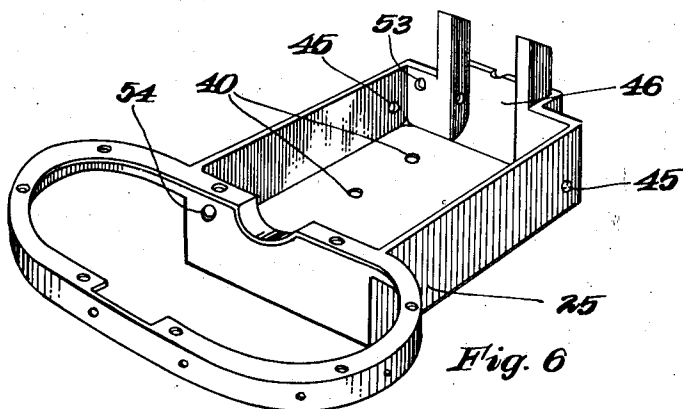


Fig. 6

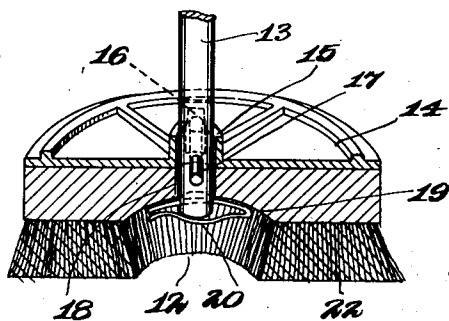


Fig. 7

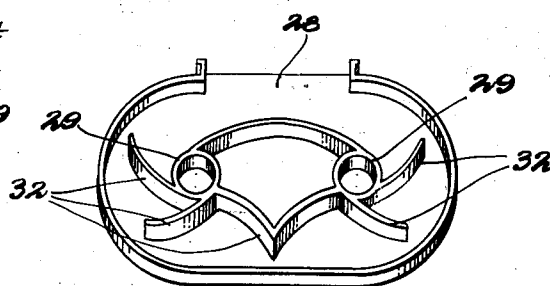


Fig. 8

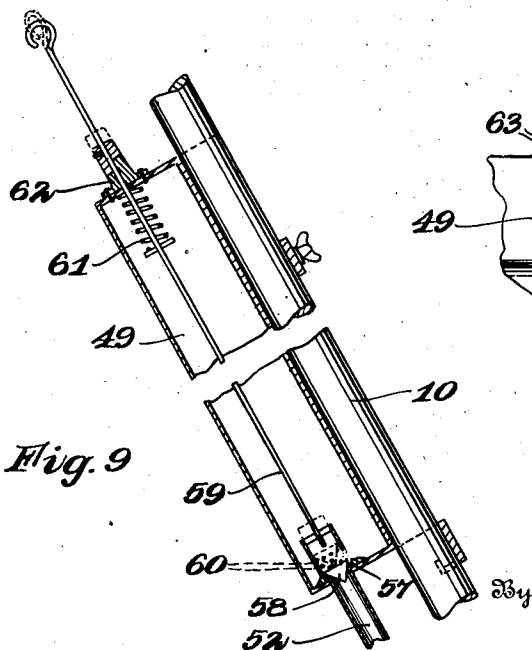


Fig. 9

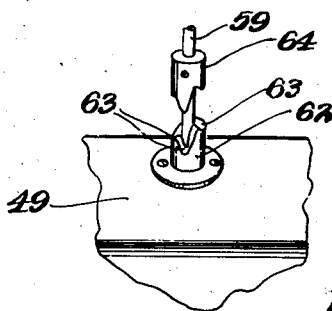


Fig. 10

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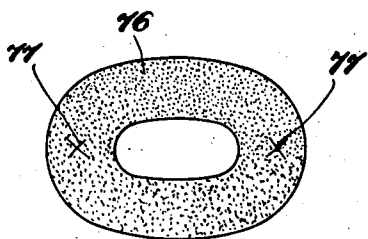
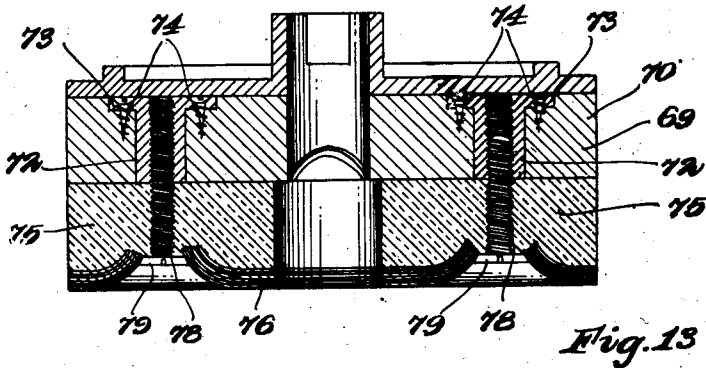
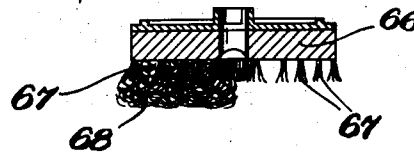
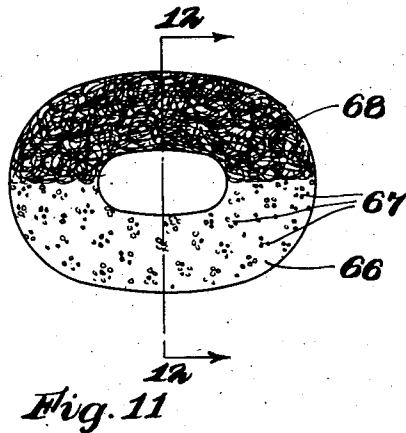
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ELECTRIC SCRUBBING, WAXING, AND STEEL WOOLING MACHINE

Filed May 26, 1930

3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

1,947,435

ELECTRIC SCRUBBING, WAXING AND
STEEL WOOLING MACHINE

Burton Ira Richmond, St. Paul, Minn., assignor
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Application May 26, 1930. Serial No. 455,650

2 Claims. (Cl. 15—50)

My invention relates to an improvement in electric scrubbing, waxing, and steel wooling machine adapted for a number of uses and valuable for a plurality of purposes in the proper treatment and care of floors of all kinds.

It is the object of my invention to provide an electric machine having a wide range of utility and suitable in the construction and maintenance of floors and flooring. My machine is suitable for grinding and polishing terrazzo and concrete floors, steel wooling and waxing floors of all kinds, as well as scrubbing the finished floors to keep them free from dirt. My machine is thus useful for practically every task in the proper formation and maintenance of floors and flooring.

It is my purpose to form the floor scrubbing brushes of my machine to intermesh, so that the entire surface of the floor covered by the brushes will be thoroughly scrubbed, leaving no path between the brushes which is untouched by either brush. This is advantageous over the scrubbing machines which merely rotate in circular set paths, one brush rotating beside the other, and, especially when slightly worn, leave a path between the brushes which is untouched by either brush. My brushes are formed of oval or elliptical shape, and when inserted in my machine, the longitudinal axis of each of the brushes is at right angles to the longitudinal axis of the other. The brushes fit closely together, so that in rotation, that portion of the floor between the brushes when the brushes are in one position will be scrubbed by one or the other of the brushes as they revolve.

It is an important feature of my invention that the scrubbing brushes are so attached that they may be utilized until the bristles are virtually worn off entirely from the same. This is accomplished by employing a special means of countersinking the attaching means for securing the brushes to the drive shafts. By this means all danger of injuring the floor by means of scratching the same with the brush attaching means is obviated, and it is possible to wear the brushes until the bristles are very short without danger of injuring the floor.

It is my object to provide a floor scrubbing machine which will be sufficiently low and compact to allow it to be used under desks and furniture. By such structure the floors may be scrubbed, waxed, or polished without the necessity of removing all the furniture from the floor, and without disturbing the arrangement of the same. This is accomplished by suspending the various

parts of the machine in a special underslung frame, and centering the weight of the same between a pair of caster wheels and the scrubbing brushes to cause the brushes to bear down upon the floor.

It is a feature of my machine to provide a gear casing for the drive gears which is adapted to be packed with grease or oil. It is a novel feature of my invention to provide arcuated grease directing ribs upon the inner surface of the gear chamber which act by the revolving of the gears to force the grease toward the gear shafts and thrust bearings, so that the revolving of the gears acts to lubricate the shafts of the same in a simple and efficient manner.

It is an object of my invention to provide a tank for liquid which is attached adjacent the guiding and operating handle of the machine, which tank is provided with a valve operable at a point adjacent the upper end of the handle, to allow liquid to issue through a nozzle near the scrubbing brushes. It is also a feature of my invention to provide a means of setting this valve at a predetermined opening, so that the amount of liquid passing through the valve may be regulated to the desired flow.

These, together with other objects and novel features of my invention, will be more clearly and fully set forth in the following specification and claims.

In the drawings forming a part of this specification:

Figure 1 is a perspective view of my floor scrubbing, waxing, and steel wooling machine.

Figure 2 is a perspective bottom view of the same.

Figure 3 is a plan view of my machine, the handle and tank having been removed.

Figure 4 is a section on the lines 4—4 of Figure 3.

Figure 5 is a cross-sectional view on the lines 5—5 of Figure 3.

Figure 6 is a perspective view of the frame of my machine.

Figure 7 is a perspective longitudinal cross-sectional view through the center of one of the floor scrubbing brushes, illustrating the method of connecting the same.

Figure 8 is a perspective bottom view of the gear casing cover.

Figure 9 is a cross-sectional view longitudinally through the center of the liquid tank.

Figure 10 is a perspective view of the adjusting means for regulating the liquid valve.

Figure 11 is a bottom view of the steel wooling

means, the steel wool on a part of the same being removed to show the holding means.

Figure 12 is a section on the lines 12—12 of Figure 11.

Figure 13 is an enlarged sectional view through my sanding block.

Figure 14 is a bottom view of a sheet of paper abrasive used in conjunction with my sanding block.

My floor scrubbing machine A is adapted to be moved along the floor, guided by the handle 10 and partially supported by the caster wheels 11. The scrubbing brushes 12 are positioned in the front of the machine, and the weight of the various parts of the same is suspended in an underslung frame between the caster wheels 11 and the brushes 12.

The brushes 12 are elliptical or oval in shape, and are secured to the driving shafts 13 in such a manner that the longitudinal axis of one of the brushes is at right angles to the longitudinal axis of the other at all times. Thus, the brushes intermesh together so that as the machine A moves forwardly, there is no path between the brushes 12 with which one or the other of the brushes has not come in contact. The arrangement of the two brushes is clearly illustrated in Figure 2 of the drawings.

The brushes 12 are secured to the shafts 13 in a novel manner. The plate 14 on the top of the brushes to which the brushes are attached, is provided with a boss 15 extending crosswise on the top of the same. Within this boss 15 is formed a channel or groove 16. A pin 17, extending through the shaft 13, fits into this groove 16 when the brush 12 is inserted on the shaft, the shaft passing through the hole 18 which is formed through the brush 12, the plate 14, and the boss 15, in the center thereof. The brush is in this manner keyed to the shaft and prevented from turning with relation to the shaft 13. To secure the brush 12 against slipping from the shaft, I form an arcuated groove 19 in the lower surface of the brush back, said groove 19 being positioned in line with the longitudinal axis of the brush, or at right angles to the groove or channel 16. As may be seen in Figures 4 and 7 of the drawings, a key 20 is inserted in a hole formed in the shaft 13, the key 20 thus being countersunk into the brush back, and the end of the shafts 13 not extending lower than the lower surface of the brush back. The key 20 is formed of spring metal in the form illustrated in Figure 7, and is held removably in place under spring tension. In this manner, the bristles 22 may be entirely worn from the brush back before the ends of the shafts 13 will scratch or injure the surface of the floor on which the machine is used.

The holes 18 are drilled sufficiently large to provide play between the shafts 13 and the brushes 12. The grooves 16 are formed with an arcuated bottom, as illustrated in Figure 4, so that the brushes 12 may tilt or tip slightly to insure a contact with an uneven floor. Thus, one of the brushes 12 may be sloping at an angle while the other is flat, as the connection between the brushes 12 and the shafts 13 is in reality a modified universal joint.

The shafts 13 are operated by means of a pair of gears 22. These gears are set within a casing 23 which is secured in a manner to be described later, by bolts 24 to the frame 25 of the machine. This casing 23 is provided with bosses 26 extending downwardly from the same, which bosses 26 are drilled to accommodate the shafts 13, and en-

close a ball bearing for the same to keep the shafts in vertical alignment. The casing 23 is formed with side walls 27, upon the upper edge of which rests the cover member 28. The cover 28 is held in place by the bolts 24 which pass through the casing 23 and screw into the cover 28, clamping the casing 23 securely against the frame 25. Cup-like formations 29 on the lower surface of the cover 28 accommodate ball thrust bearings 30 for the tops of the shafts 13, so that the weight of the machine upon the brushes 12 may be taken care of without excessive loss of power due to friction. Arcuated ribs 32, illustrated in Figure 8 of the drawings, act to guide the grease in which the gears 22 are packed toward the tops of the shafts 13 so that the rotation of the gears 22 forces the grease against the ribs 32 and guides it toward the center of the gears. A portion 31 of the floor of the gear casing 23 slopes toward the center of the same, to allow the oil and grease to flow in this direction. This construction insures constant and steady lubrication for the gear shafts.

The gears 22 are operated by means of a worm gear 33 acting upon both of the gears 22 simultaneously, and being positioned between them. The worm gear 33 is keyed upon a drive shaft 34, which terminates adjacent the front end of the gear casing 23, and which is provided with a ball thrust bearing 35 mounted on the inner surface of the gear casing. The shaft 34 projects through a packing joint and bearing 36 formed in the rear side of the gear casing 23, and is connected by means of a flexible joint 37 to the electric operating motor 38 which furnishes the power for revolving the brushes. This formation is illustrated in Figure 5 of the drawings.

The motor 38 is mounted upon the frame 25, which is illustrated in Figure 6 of the drawings, and is secured thereto by the bolts 39 which pass through holes 40 in the frame. A suitable cover 42 fits over the motor compartment of the frame, and also fits over the projecting lip portion 43 of the cover 28 of the gear compartment 23. This forms a tight joint through which the grease of the gear compartment is not permitted to enter the motor compartment of the machine.

The caster wheels 11 are mounted upon a shaft 44 which passes through holes 45 in the frame. Thus, the weight of the motor 38, and the various gears and parts, is centered between the caster wheels 11 and the brushes 12.

Pivotaly secured to the rear end 46 of the frame 25 I attach the forked end 47 of the operating handle 10. Removably secured by suitable brackets 48 to the handle 10 is suspended the tank 49, in which is placed the solution to be used in the scrubbing of the floor, or in the grinding of the same. This tank 49 is provided with a cover 50, by means of which the tank may be filled, and at the lower end of the tank 49 a tube 52 projects. The liquid contained within the tank 49 is conveyed through the tube 52, which passes through the holes 53 and 54 in the frame, and terminates at a nozzle 55, positioned adjacent the brushes 12. The flow of liquid through the tube 52 is regulated by means of a valve 56. This tube 52 is enlarged within the tank and is formed with a beveled seat 57 adapted to fit a complementary conical end 58 upon the rod 59. Drawing the end 58 upwardly in the tube 52 uncovers rows of holes 60 through which liquid is allowed to pass into the tube 52. Each successive row of holes is formed with an

increased number of holes 60, and so the flow is increased as the rod 59 is pulled upwardly. A coil spring 61 tends to keep the valve 56 closed at all times. The rod 59 extends to a point near the upper end of the handle, and may be held in various positions to hold the valve 56 open or closed as desired by means of a collar 62, illustrated in Figure 10, having graduated notches 63 thereupon whereby the rod 59 may be pulled out and turned, a complementary notched collar 64 on the rod 59 engaging in the desired notch to hold the valve open the correct degree. The valve 56 is illustrated in closed position in Figure 9, while the dotted lines in this figure show the valve in extreme open position.

In order to prevent the machine from injuring any furniture or wall against which it is accidentally pushed, and avoid scratching, denting or otherwise marring the legs of desks or other objects with which it may come in contact, I provide a fabric bumper member 65, which is secured to the frame 25 and extends about the entire front portion or gear casing 23 of the machine. This fabric bumper 65 is held to the frame 25 by means of countersunk bolts, so that the fabric will be the portion of the machine first to come into contact with an object against which the machine is pushed.

Polishing means, grinding stones, sanding or waxing blocks, or steel wooling means may be secured to the shafts 13 in the place of the scrubbing brushes 12, and may be attached in the same manner. Illustrated in Figures 11, 12, 13, and 14 of the drawings are a steel wooling means and a sanding block suitable for use in place of the brushes 12. The steel wooling means is provided with a brush 66 having short bassine bristles 67 spaced relatively far apart. Impregnated throughout these bristles 67, and extending about them is steel wool 68, held in place by the bristles 67. The spacing apart of the bristles allows the steel wool to become firmly embedded in the same.

For sanding, or grinding with a paper abrasive, I form the sanding block 69 in the manner shown in Figure 13. Under the plate 14, attached to the wooden block 70, I provide internally threaded sleeves 72 having flanges 73 through which screws 74 may pass to hold the sleeves in place. A pad of sponge rubber 75 or other suitable material is secured to the lower surface of the block 70. Abrasive sheets 76, provided with slits 77 are secured to the sleeves 72 by means of bolts 78. Because of the slits 77, the bolts 78 may be screwed until the heads 79 of the same are countersunk into the rubber 75, the edges of the slits 77 under the heads 79 holding the abrasive sheets 76 in place.

Thus, my machine is suitable for a great number of purposes, and may be used for virtually every task in the formation and maintenance of

floors and flooring. While I have described my machine as being particularly adaptable for use upon floors, I desire to have it understood that my machine may be used for the sanding of marble, granite, or any other type of stone or metal.

In accordance with the patent statutes, I have described the principles of operation of my electric scrubbing, waxing and steel wooling machine, and while I have endeavored to set forth the best embodiment thereof, I desire to have it understood that this is only suggestive of a means of carrying out my invention, and that obvious changes may be made within the scope of the following claims without departing from the spirit of my invention.

I claim:

1. A floor finishing device including, an electric motor, a frame and housing for inclosing said motor, caster wheels on one end of said housing for supporting the same on the floor, an operating finishing head projecting from said housing opposite to said supporting wheels, finishing brush members carried by said head adapted to be rotated in a horizontal plane, shafts for supporting said brushes, bearings for said shafts, gears carried by said shafts in the upper part of said head, a worm gear operable by said motor interposed between said gears operating said brushes, a cover for said gears and worm, and reinforcing and grease directing ribs formed on the inner surface of said cover adapted to cause the grease to work toward said supporting shafts and the center of said gears.

2. An electric floor finishing device including, an electric motor, a housing for inclosing said motor, a long operating shaft for said motor extending out of said housing, a gear operating head secured to said motor housing and projecting from one side of the same into which said shaft is adapted to extend, bearings in said head for said motor shaft, a worm gear carried between said bearings, horizontal gears supported within said head in a gear compartment to provide a grease-tight compartment for all of said operating gears, a cover for said head having means for directing the grease toward the gears, vertically disposed shafts operated by said horizontally disposed gears, floor finishing members adapted to be supported by said vertically disposed shafts in a manner to permit different finishing members to be readily attached to said shafts, means for pivotally supporting said motor housing and operating head to tilt the floor finishing members toward or away from the floor, an operating and steering handle for said device, and a supply tank carried by said handle for floor finishing material having valve regulating means operable at the end of the steering handle.

BURTON IRA RICHMOND.