

June 8, 1954

N. J. DANIELSSON ET AL  
SCRUBBING MACHINE WITH ROTATING  
BRUSH FOR SCRUBBING SURFACES

2,680,260

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2 Sheets-Sheet 1

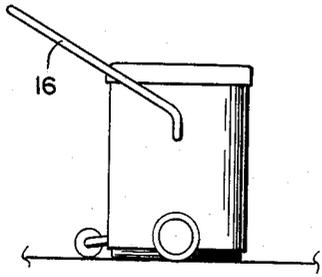


FIG. 2

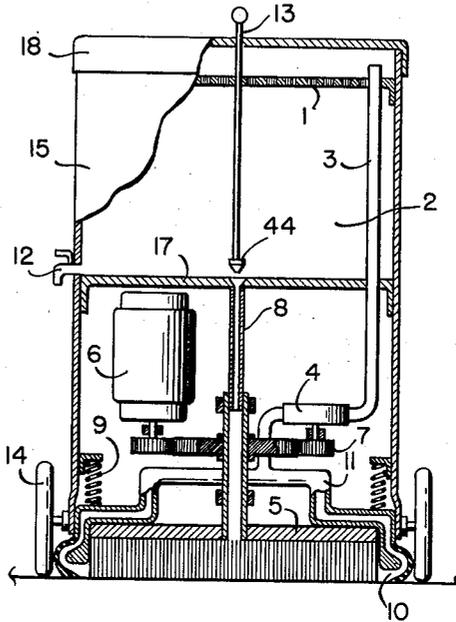


FIG. 1

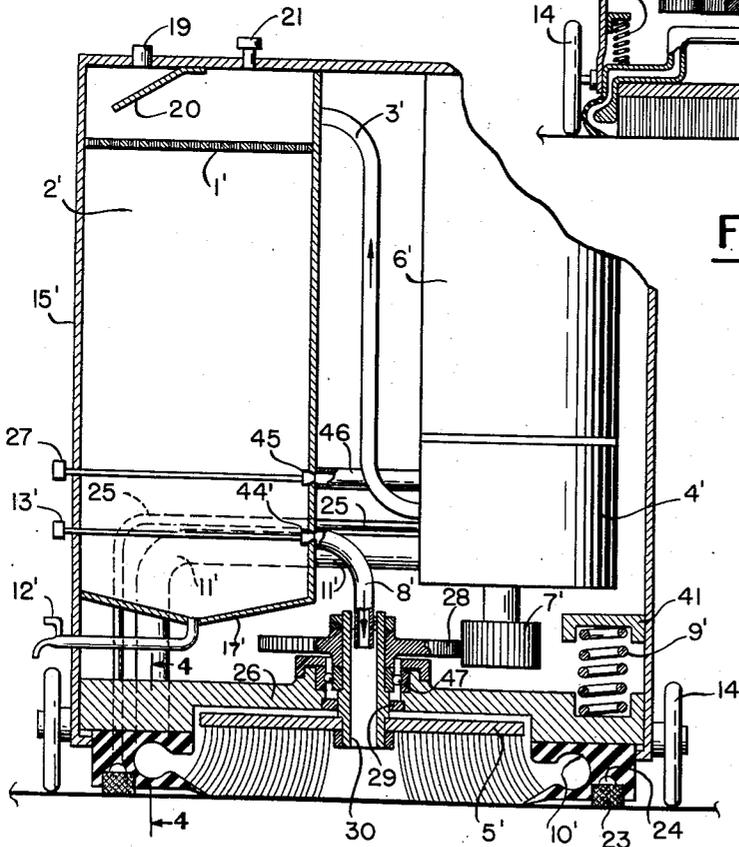


FIG. 3

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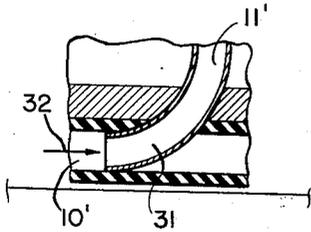


FIG. 4

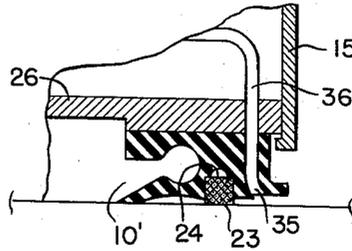


FIG. 6

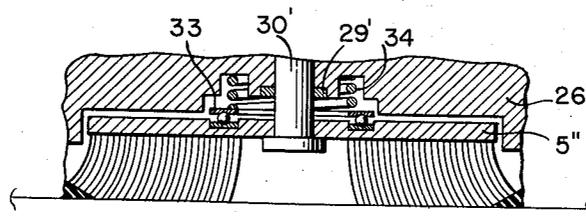


FIG. 5

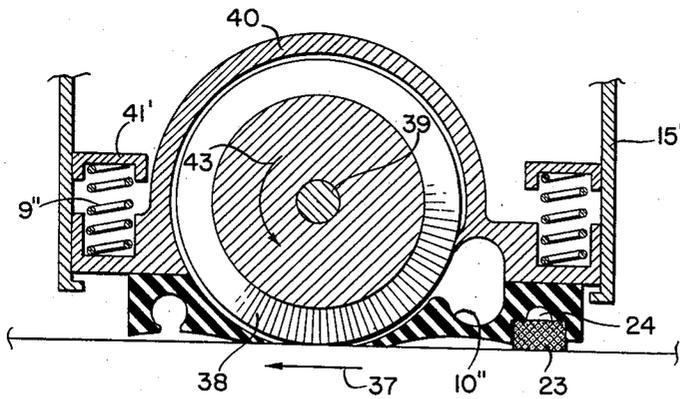


FIG. 7

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## SCRUBBING MACHINE WITH ROTATING BRUSH FOR SCRUBBING SURFACES

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3 Claims. (Cl. 15—50)

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This invention relates to scrubbing machines, and more particularly to a scrubbing machine of the type in which a cleaning liquid, for instance clean water or soapy water, is supplied to the surface to be scrubbed, and the scrubbing is effected by means of a rotating brush.

One object of the invention is to improve the removal of the used water from the scrubbed surface and to prevent leaving a portion of the water on said surface.

Another object is to provide a good contact of the scrubbing brush with the surface to be scrubbed.

Other objects will be in part obvious and in part pointed out hereinafter.

A scrubbing machine according to the invention comprises a casing, a liquid tank, a rotatable brush, means for rotating said brush, means for supplying liquid from said tank to the surface to be scrubbed, a mouth-piece facing the periphery of said brush in close proximity thereof and formed so as to collect the liquid hurled by said brush, and suction means connected to said mouth-piece.

For a better understanding of the invention, reference is had to the following description taken in connection with the accompanying drawing, in which:

Fig. 1 is a vertical section through one form of the improved scrubbing machine; Fig. 2 is a side elevation thereof; Fig. 3 is a vertical section through another form of the scrubbing machine according to the invention; Fig. 4 is a fragmentary section through the plane 4—4 in Fig. 3 showing the connection of a suction pipe to the mouth-piece; Fig. 5 is a fragmentary detail in section showing a modified form of the arrangement of the rotatable brush; Fig. 6 is another fragmentary detail in section showing the combination of a vacuum cleaner pipe with the mouth-piece of the scrubbing machine, and Fig. 7 is a fragmentary vertical section showing a modified arrangement of the rotatable brush and a correspondingly modified form of the mouth-piece.

Referring now more particularly to Figs. 1 and 2, the scrubbing machine there represented comprises a casing 15 mounted on wheels 14 and adapted to be pushed along the surface to be scrubbed by means of a bifurcated handle 16 fixed to the casing 15. A horizontal partition 17 divides the casing into an upper compartment 2 serving as liquid tank and into a lower compartment containing a rotatable brush 5, a centrifugal pump 4, an electromotor 6, and gears 7 for driving the brush and the pump by the motor.

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The brush 5 is surrounded by a circular mouth-piece 10 facing the periphery of the brush in close proximity thereof and serving to collect liquid outwardly hurled by the brush. To this end, the lower portion of the mouth-piece has an internal peripheral groove and ends in an inwardly turned ring the sharp edge of which is springy in vertical direction and adapted to engage the surface to be scrubbed at an acute angle. In order to secure an intimate contact between the mouth-piece and the surface to be scrubbed, the mouth-piece is preferably made of an elastic material such as rubber, and is supported in the lower end of the casing 15 by springs 9 so as to be vertically movable in said casing.

Pipes 11 connect one side of the pump 4 with various points of the groove formed by mouth-piece 10 and a pipe 3 connects the other side of the pump with the upper portion of the tank 2 which is separated from its lower portion by a filter 1 and covered by a removable lid 18. In the bottom 17 of the tank 2 there is a valve 44 the opening of which communicates with a pipe 8 which leads to the center portion of the brush 5. The valve can be operated by a handle 13 on the top of the casing 15. The tank 2 can be drained by means of a tap 12 provided in the casing 15 near the bottom of the tank.

In operation of the scrubbing machine, the lid 18 is removed and water containing a cleansing compound or solution is filled into the tank 2. Then the lid is put on again, the valve 44 is opened and the motor 6 is started for rotating the brush 5 and driving the pump 4. The machine is now pushed by the handle 16 over a surface to be scrubbed and cleansing solution will flow through the opening of valve 44, the pipe 8 and the center portion of the brush 5 to the surface to be scrubbed. As the cleansing solution is thrown outwardly by the rotating brush, it will be collected by the groove of mouth-piece 10 surrounding the brush and directed thereby to the pipes 11, thus returning through the pump 4, the pipe 3 and the filter 1 to the tank 2, whereupon it may be used again.

The scrubbing machine shown in Fig. 3 is generally similar to that of Fig. 1, and corresponding parts thereof are designated by the same reference characters though primed. In this modification, there is a separate liquid tank 2' within the casing 15', and the motor 6' is arranged beside the tank. The tank has a conical bottom 17' and the tap 12' communicates with the lowest point of this bottom, thus facilitating the discharge of the tank. The valve 44' for supplying

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cleansing liquid from the tank to the surface to be scrubbed is in the side wall of the tank and can be operated by a handle 13' arranged at the side of the casing 15'.

The rotary brush 5' is fixed to a rotary pipe 30 forming a center shaft of the brush and communicating with a stationary pipe 8' connected to the valve 44'. The pipe 30 is rotatable in a ball-bearing 47 arranged in a plate 26 which is vertically movable in the lowest portion of the casing 15' and is pressed downwards by springs 9' bearing against a support 41 attached to the casing 15'. In order to protect the ball-bearing 47 from the liquid thrown by the brush, a packing 29 is provided between the plate 26 and the rotary pipe 30. The mouth-piece 10' is attached to the plate 26 and is in so close proximity of the brush 5' that the periphery thereof touches the sharp edge of the lower portion of the mouth-piece, which is again provided with an internal peripheral groove and a comparatively sharp contact edge thus throwing the liquid particles from the scrubbed surface right into the groove of the mouth-piece.

The pump 4' is here coaxial with the motor 6' and is preferably of a type adapted to suck air as well as liquid. The shaft of the pump supports cog wheel 7' meshing with a second cog wheel 28 fixed to the rotary pipe 30 for rotating the brush 5'. The height of the cog wheel 7' is substantially larger than that of the cog wheel 28 so that these wheels remain in meshing position, even when the plate 26 moves upwards or downwards.

The mouth-piece 10' is connected with the suction side of the pump 4' by one or more suction pipes 11'. As shown in Fig. 4, the end portion 31 of these pipes communicating with the mouth-piece is preferably arranged so that the inlet opening of each pipe faces the liquid drops hurled by the brush in the direction of the arrow 32. This means that the aforesaid end portion of the pipes 11' is substantially tangential to the circular opening of the groove of the mouth-piece.

As it is possible that due to some unevenness of the surface to be scrubbed, in spite of the advantageous configuration and position of the mouth-piece 10', liquid particles may be thrown by the brush 5' beyond the mouth-piece, a circular absorbing filter 23 is fitted in the underside of the mouth-piece. In order to improve the effect of this filter, it is advantageous to arrange this filter in a circular groove 24, and to connect this groove to the suction side of the pump 4' by means of suction pipes 25.

A pipe 3' connects the pressure side of pump 4' with the portion of the tank 2' situated above the filter 1'. In order to prevent the development of an air pressure in the tank 2 which would impair the sucking effect of the pump 4, an air outlet 19 is provided in the cover of the tank. A baffle 20 is arranged beneath this air outlet.

The tank can be filled with liquid through an opening in its cover which opening can be closed by a plug 21. A pipe 46 connecting the pump 4' with the tank 2' and closable by a valve 45 having a handle 27 serves to supply starting liquid to the pump.

The operation of the machine shown in Fig. 3 is generally similar to that of the machine illustrated in Figs. 1 and 2. Of course, prior to the starting of the motor not only the valve 44' but also the valve 45 has to be opened.

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According to the arrangement of Fig. 5, the adjustability of brush 5' relative to casing 15' is further increased by mounting the brush axially slidable on the lower portion of pipe 30'.

The brush is biased downwardly by a spring 34 abutting against the plate 26' and a bearing 33 secured to brush 5'.

If so desired, the scrubbing machine can be combined with a vacuum cleaner, by arranging a vacuum cleaner nozzle 35 near the outer periphery of the mouth-piece, as shown in Fig. 6. This nozzle can be connected, by means of a pipe 36, to the pump 4' or to a separate air suction pump, not shown.

Fig. 7 shows a modification of the scrubbing machine in which the horizontally rotatable brush is replaced by a cylindrical brush 38 rotatable jointly with a horizontal axle 39 in the direction of the arrow 43. A straight internally grooved mouth-piece 10'' is arranged on the side of the brush to which the brush hurls the liquid from the surface scrubbed by it. Otherwise, the configuration and the position of the mouth-piece with respect to the brush are the same as described in connection with the machines shown in Figs. 1 to 3. The mouth-piece 10'' is held in position, and partly formed, by a semi-cylindrical case 40 surrounding the upper portion of the brush and supported in the casing 15' by springs 9 bearing against supports 41'.

While there have been described what are at present considered to be the preferred embodiments of the invention, it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from the invention, and it is, therefore, aimed in the appended claims to cover all such changes and modifications as fall within the true spirit and scope of the invention.

What is claimed is:

1. A scrubbing machine for scrubbing surfaces comprising a casing, a tank for liquid mounted within said casing, conduit means for supplying liquid from said tank to the surface to be scrubbed, a circular brush rotatable about a vertical axis and means for rotating said brush disposed within said casing, the said brush having a portion protruding outwardly from the casing for engagement with the surface to be scrubbed, a circular mouth-piece made of elastic material facing the periphery of said brush in close proximity thereto and having an internal peripheral groove formed so as to collect the liquid thrown off by said brush, said groove forming in the mouth-piece an inwardly turned ring adapted to engage the surface to be scrubbed at an acute angle relative to the said surface and to touch the latter with a comparatively sharp edge springy in vertical direction, absorbing filter means supported by the mouth-piece so as to extend from the side of the mouth-piece facing the surface to be scrubbed, a plate vertically movable in said casing and supporting said mouth-piece, springs yieldably supporting said plate in said casing, and suction means communicating with said groove in said mouth-piece.

2. A scrubbing machine as defined in claim 1, wherein said mouth-piece is formed with an annular groove in its bottom face, and wherein said absorbing filter means are fitted in said annular groove protruding therefrom for engagement with the surface to be scrubbed.

3. A scrubbing machine as defined in claim 2, in which said suction means comprises pump

means having a pressure side and a suction side and adapted to pump liquid and air, and conduit means connecting the pressure side of said pump means to said tank for liquid and the suction side to said grooves formed in the mouth-piece.

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