

July 22, 1941.

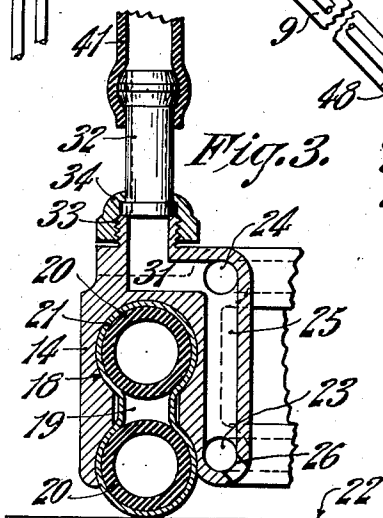
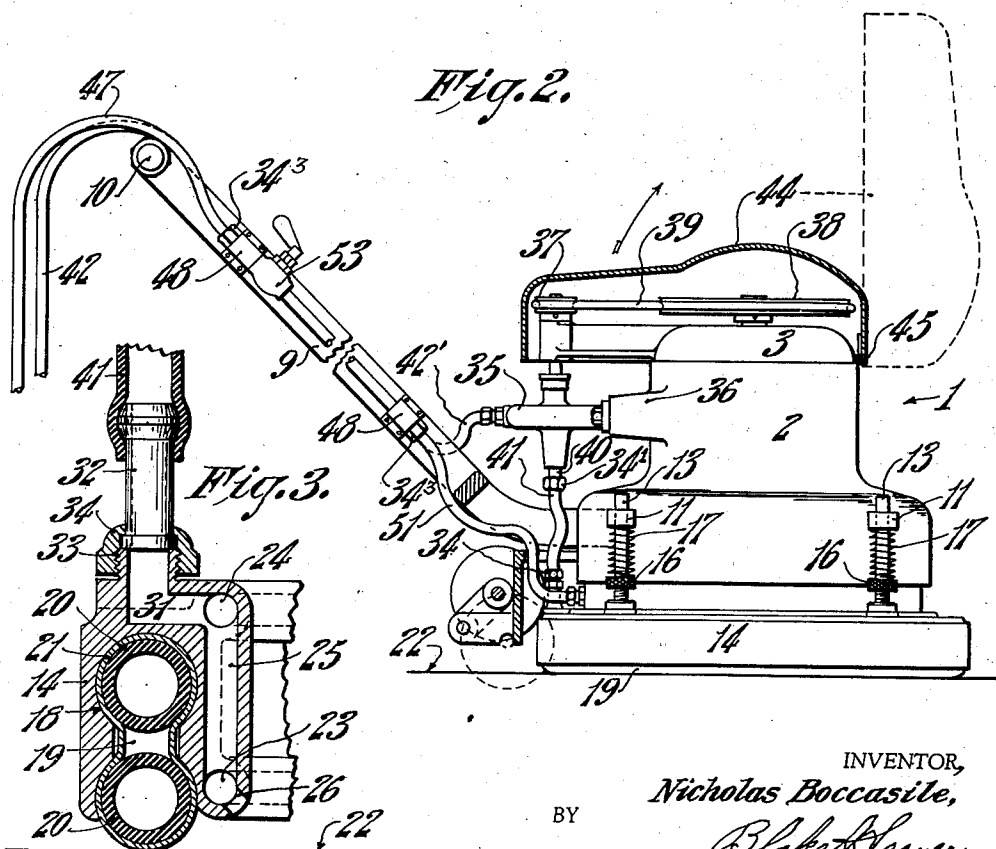
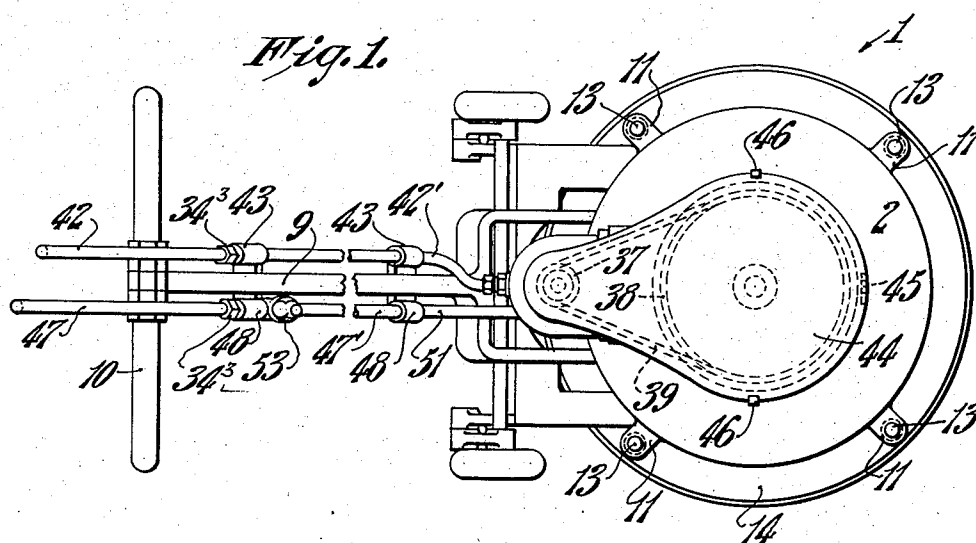
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2,250,177

FLOOR WASHING MACHINE

Filed Nov. 2, 1938

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

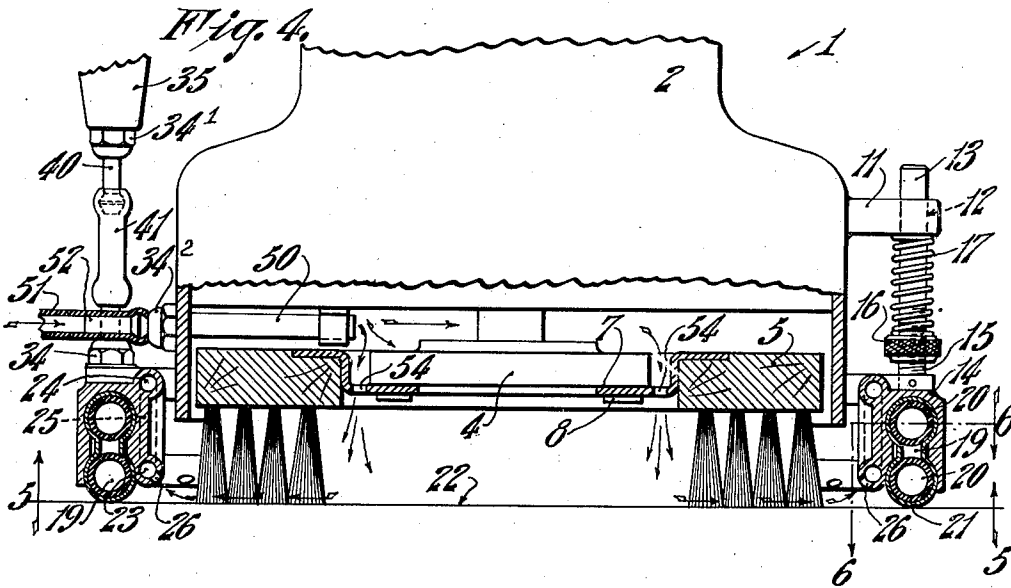


Fig. 5.

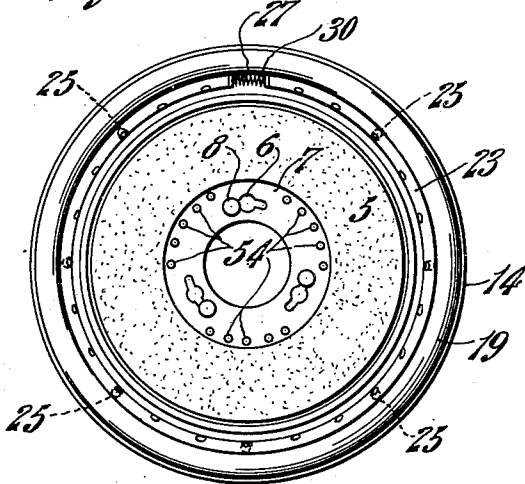


Fig. 6.

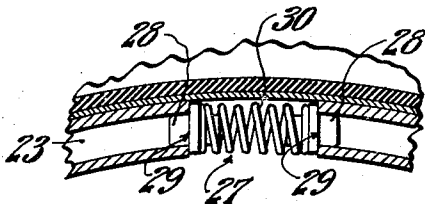
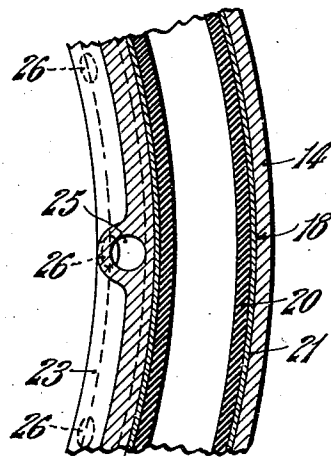


Fig. 7.

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UNITED STATES PATENT OFFICE

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FLOOR WASHING MACHINE

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6 Claims. (Cl. 15—50)

This invention relates to improvements in floor washing machines.

An object of this invention is to provide, in a floor washing machine, a suction ring for removing washing liquid and dirt, and means for removably supporting the suction ring on the machine frame.

Another object of this invention is to provide, in a floor washing machine, a combined suction and confining ring having sufficient inherent resiliency to adapt itself to any unevenness in the floor surface and thereby retain any and all of the washing liquid within the area encompassed thereby.

A still further object of this invention is to provide, in a floor washing machine, a removable suction and confining ring of the character described, including means for exerting pressure on said ring to force the same against the floor surface, means for automatically varying the pressure thus exerted to compensate for unevenness in the floor surface, and adjustable means for controlling the pressure thus exerted.

Another important object of this invention is to provide, in cooperation with a floor washing machine including a rotary brush, a confining and suction ring which is easily attached to and detached from the machine proper, whereby the machine may be used as a floor washing machine with the ring attached, or as a floor polisher with the ring removed.

These, and other objects and advantages of this invention, will be clearly and concisely disclosed and described in the following specification, the accompanying drawings, and the appended claims.

Broadly, this invention comprises, in combination with a floor washing machine having a rotary brush, a confining ring member for confining the washing liquid within the area encompassed by the ring, a resilient cushioning ring removably supported in the confining ring, the confining ring being provided with an annular suction chamber, means for introducing a washing liquid to the floor area within the rotary brush, means for creating a suction within the suction chamber for drawing the washing liquid and dirt from the outer periphery of the brush into the suction chamber, and means for exhausting the suction chamber.

A preferred embodiment of this invention is illustrated in the accompanying drawings, in which:

Fig. 1 is a plan view of a floor washing machine,

Fig. 2 is a side elevational view, partially in section, of the same,

Fig. 3 is a cross sectional view, at an enlarged scale, of the confining and suction ring member,

Fig. 4 is a cross sectional view of the lower part of the floor washing machine, with the suction ring attached,

Fig. 5 is an underside plan view, taken on the line 5—5 of Fig. 4,

Fig. 6 is a partial sectional view of the suction ring, taken on the line 6—6 of Fig. 4 and

Fig. 7 is a partial sectional view illustrating the cleaning gap in the suction chamber and the removable closure therefor.

Referring now to the drawings in detail, in which like numerals refer to like parts throughout.

A floor washing machine 1 including a casing 2 and motor 3, is provided with the usual plate 4 operatively connected to the motor 3, to which a cleaning or polishing brush 5 may be removably secured by cooperation of slots 6 in the back plate 7 of the brush 5 and studs 8 on the plate 4. The motor 3 may be connected, in any suitable manner, to a source of electric energy by means of the usual flexible electric cable, (not shown). A handle 9, provided with a cross bar 10, and attached on the casing 2, serves as a convenient accessory by means of which an operator may push or pull the cleaning machine 1 over a floor surface, or other surface to be cleaned. All of the above construction may be considered as common to the art involved.

The invention herein described comprises attachments to the above described construction, and cooperating therewith to accomplish new and useful results supplementing the operation of the revolving brush 5.

The casing 2 is provided with a plurality of outwardly extending bosses or lugs 11 having bores 12 in which posts 13 are slidably guided. The posts 13 are secured in a ring 14, and are threaded at 15 to receive adjusting nuts 16. A compression spring 17 is mounted on each of the posts 13 between the lug 12 and nut 16. By means of this construction, the ring 14 may be detached from the machine 1 by lifting the machine 1 until the lugs 12 are clear of the posts 13. The ring 14 is attached to the casing 2 by lowering the machine 1 into the ring 14 until the posts 13 are engaged in the lugs 11. Normally, when the machine 1 is operating without the ring 14, all the weight of the machine is transferred onto the brush 5. With the ring 14 attached on the casing 2, a part of the weight of

the machine is transferred to the ring 14 by means of the lugs 11 and springs 17. The degree of pressure thus exerted upon the ring 14 may be adjusted to suit conditions by manipulation of the adjusting nuts 16, to increase or decrease the compression on the springs 17.

The ring 14 is formed with an annular cavity or recess 18, in which a resilient confining member 19 is removably supported. The member 19 comprises two tubular rings 20, preferably of soft rubber, one superposed above the other, and both enclosed within a casing 21 of leather. The member 19 projects below the ring 14 into contact with a floor surface 22, and the leather casing 21, when wet, provides a smooth, slippery surface in contact with the floor, thus reducing the friction to be overcome in pushing the machine over the floor to a minimum. When the portion of the leather casing 21 in contact with the floor becomes worn, the member 19 may be removed, reversed, and replaced, thus presenting a new surface to the floor. The double feature of the member 19 provides a particularly resilient confining ring around the brush 5 which closely hugs the floor and automatically adjusts itself to unevenness in the floor surface. The confining member 19 and ring 14 completely enclose the brush 5, and confine the washing liquid and dirt loosened by action of the brush 5 within the member 19. Thus, the objectionable spread and splash of dirty liquid over adjacent floor areas, walls, and furniture, caused by the centrifugal action of the usual unguarded rotary brush, is entirely eliminated.

The ring member 14 is also formed, at its inner and lower rim, with an annular suction chamber 23 and at its inner upper rim with a second annular chamber 24. The chambers 23 and 24 are connected by a plurality of vertical passages 25. The suction chamber 23 is provided with a plurality of openings 26 directed toward the floor surface 22, and is also formed with a cleaning gap 27, normally closed by plugs 28 engaged in openings 29 and held in position by means of a compression spring 30. If bristles from the brush 5, or other foreign substances, are drawn into the chamber 23 through the openings 26, the chamber 23 may be cleaned by removing the spring 30 and plugs 28 and running a cleaning wire through the chamber 23.

The chamber 24 is connected by means of a passage 31 to a nipple 32 which is removably secured on a threaded boss 33 on the ring 14 by a coupling nut 34. A suction pump 35, secured on a boss 36 on the casing 2 and driven by means of pulleys 37 and 38 and belt 39 operatively connecting the pump 35 and motor 3, is provided with a nipple 40 similar to the nipple 32, and the nipples 32 and 40 are connected by a flexible conductor 41. As shown in Fig. 3 and Fig. 4, the nipples 32 and 40 are long enough to permit sliding movement of the conductor 41 thereon to compensate for relative movement between the ring 14 and the casing 2, which may be caused either by unevenness in the floor surface or by wear on the bristles of the brush 5. When it is desired to remove the ring 14 from the machine 1, the connection between the ring 14 and the pump 35 is easily broken by unscrewing either of the coupling nuts 34 or 34', or by pulling the flexible conductor 41 off of either the nipple 32 or the nipple 40. A discharge tube 42 is connected to the pump 35 and secured on the handle 9 by any suitable means, such as clips 43, and provides means for conveying the discharge from

the pump 35 to any convenient disposal system (not shown), such as a soil or waste pipe or collection tank. The pulleys 37 and 38 are normally guarded by a hood 44 which is hinged at 45 on the casing 2 and held in place by spring clips 46. When it is desired to operate the machine 1 as a polishing machine, without the ring 14, the hood 44 may be swung back into the dotted position shown in Fig. 2 and the belt 39 disengaged from the pulleys 37 and 38.

Fresh water or washing liquid is injected into the brush 5 and deposited upon the floor surface 22 within the brush 5 by means of a pipe, tube, or conductor 47, secured on the handle 9 by clips 48, and connected to a pipe 50 secured on the casing 2 by a flexible conductor 51, nipple 52, and coupling nut 34'. A shut-off and reducing valve 53 on the pipe 47 provides means for shutting off the supply of washing liquid and for adjusting the pressure thereof to properly balance the exhaust of the pump 35. The pipe 50, (see Fig. 4), directs the inflow of washing liquid onto the back plate 7 of the brush 5. This back plate 7 is provided with a plurality of holes 54, through which the washing liquid drops to the floor surface 22 within the brush 5. Centrifugal action of the rotating brush 5, as the machine 1 is moved over the floor, forces the washing liquid outwardly to the periphery of the brush, and the scouring action of the brush loosens the dirt on the floor. The loosened dirt is picked up by the washing liquid, and the liquid and dirt are sucked into the chamber 23 of the ring 14, thence through the passages 25 into the chamber 24, thence through the passage 31, nipple 32, and tube 41 into the pump 35, from which they are exhausted through the pipe 42.

When it is desired to use the machine 1 for a polishing machine, the tube 41 is disconnected from the pump 35, the belt 39 disengaged from its pulleys 37 and 38, and the machine 1 is then lifted out of the ring 14. If desired, the pipes 42 and 47 may also be disconnected from the conductors 42' and 47', and thus disengaged from the handle 9, by release of the coupling nuts 34' adjacent the upper clips 43 and 48.

It will thus be understood, by those skilled in the art, that by means of this invention, all washing liquid, soil, dirt, and the like are efficiently confined within the ring 19 and exhausted therefrom through the pump 35, and, as the machine is moved over the floor surface, the floor is left clean and reasonably dry, without any deposit of unsightly residue.

What I claim is:

1. In a machine of the character described, a ring member encircling and enclosing the brush of the machine for confining and exhausting the washing liquid used in said machine, said ring member being formed with an annular channel open at the bottom, a resilient tubular ring removably supported in said annular channel, said ring member being also formed with an annular suction chamber adjacent its lower, inner rim and a plurality of downwardly directed openings communicating with said chamber, guide posts on said ring for slidable and removable engagement in bored lugs on the casing of said machine, communicating means between said suction chamber and a pump on said machine including a detachable coupling, whereby said ring member may be attached to and detached from said machine at will.

2. In a machine of the character described, an exhaust ring formed with an annular chan-

nel open at the bottom, a hollow resilient cushion removably supported in said channel, said ring being also formed with two annular suction chambers vertically spaced apart on the inner wall of said ring and a plurality of passages 5 connecting said chambers, the lower of said suction chambers being provided with a plurality of circumferentially spaced openings directed toward the bottom of said ring, means for removably attaching said ring to said machine, 10 said ring being provided with an exhaust port communicating with the upper of said suction chambers, detachable communicating means between said exhaust port, and the pump of said machine.

3. An attachment for a floor washing machine having a rotary brush enclosed in a cylindrical casing, comprising a metallic ring encircling said brush, vertical posts on said ring for slidable engagement on said casing, said ring being 20 formed with an annular recess open at the bottom of the ring, a resilient confining member removably supported in said recess and comprising two resilient tubes, one superposed above the other and both enclosed in a leather casing.

4. A removable attachment for a floor washing machine having a rotary brush enclosed in a casing and an exhaust device, comprising a metallic ring for encircling said brush, means for slidably supporting said ring on said casing, said 30 ring being formed with an annular recess open at the bottom of the ring, a resilient confining member removably supported in said recess and comprising two resilient tubes, one superposed above the other and both enclosed in a smooth surfaced, flexible casing, said ring being pro-

vided with communicating exhaust ports, a nipple on said ring communicating with said exhaust ports, and disconnectible communicating means on said nipple for connecting said exhaust ports to said exhaust device.

5. An attachment for a machine of the character described, comprising a ring member formed with an annular channel open at the bottom, a resilient confining ring removably supported in said channel and including two resilient tubes, one superposed above the other and both enclosed in a leather casing, said ring member being formed with an annular suction chamber adjacent its lower, inner rim, said ring member being provided with a plurality of circumferentially spaced openings communicating with said suction chamber, means for removably securing said ring member on said machine, and means for removably connecting said suction 20 chamber to an exhaust device on said machine.

6. An attachment for a floor washing machine having a rotary brush, comprising a ring member for encircling the brush, a resilient tubular cushion removably supported in said ring member and projecting below the bottom edge of said ring member, said ring member being formed with an annular suction chamber adjacent its lower, inner edge, said ring member being provided with a plurality of spaced openings communicating with said suction chamber, said suction chamber being formed with a cleaning gap, removable means for closing said gap including plugs inserted in the ends of the suction chamber and a compression spring for holding said 35 plugs in position.

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