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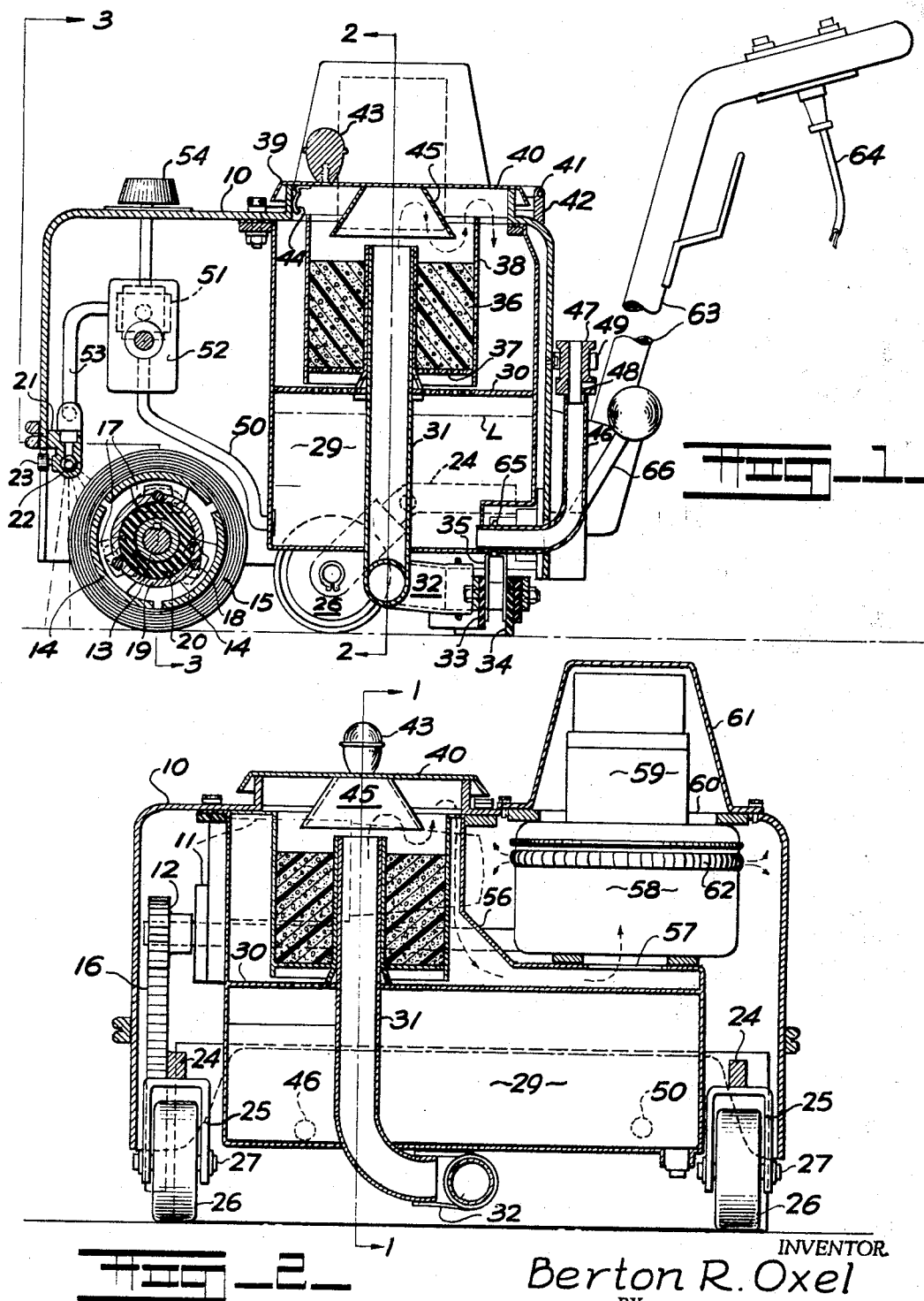
B. R. OXEL

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FLOOR SCRUBBING MACHINE

Filed June 16, 1965

2 Sheets-Sheet 1



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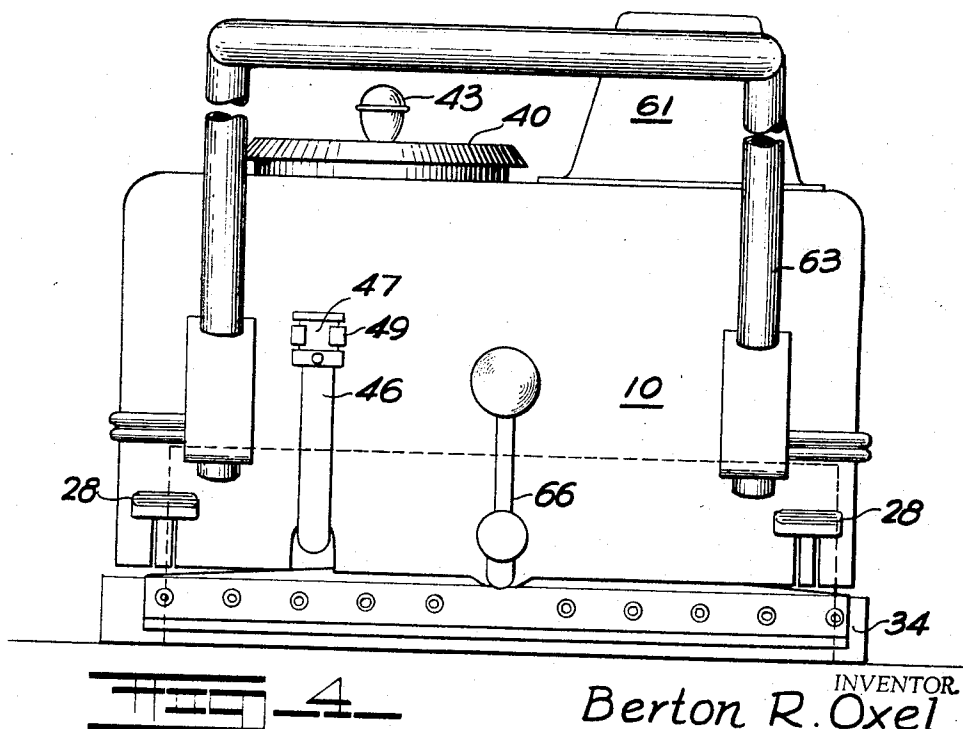
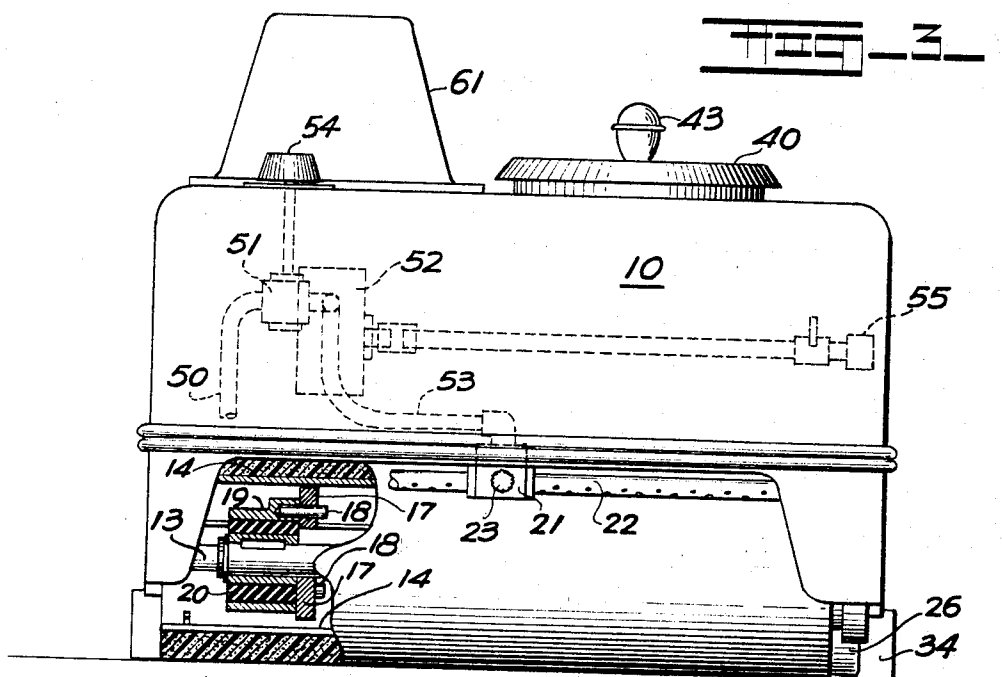
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FLOOR SCRUBBING MACHINE

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ABSTRACT OF THE DISCLOSURE

A floor scrubbing machine having a floor scrubbing element in the form of a foamed plastic scrubbing cylinder expandably mounted on a segmented expandable roll device actuated by the centrifugal spin of the device.

This invention relates to a floor scrubbing machine and more particularly to a floor scrubbing machine incorporating a novel, flexible and resilient scrubbing element.

The principal object of the invention is the provision of a floor scrubbing machine of the type that dispenses liquid and detergent and revolves a scrubbing element in contact with the floor and subsequently picks up the liquid.

A further object of the invention is the provision of a floor scrubbing machine of a relatively simple and light-weight construction incorporating motor-driven flexible, resilient scrubbing means.

A still further object of the invention is the provision of a floor scrubbing machine having a floor scrubbing element in the form of a foamed plastic scrubbing cylinder expandably mounted on a segmented expandable roll device actuated by the centrifugal spin of the device.

A still further object of the invention is the provision of a floor scrubbing machine incorporating a floor scrubbing element that is resilient and flexible and thereby adaptable to various irregularities in a floor surface being scrubbed so as to engage all of them despite said irregularities.

A still further object of the invention is the provision of a floor scrubbing machine incorporating a floor scrubbing element that may be easily renewed or replaced as desired and which will effectively scrub a floor.

The floor scrubbing machine disclosed herein comprises an improvement in the art relating to such devices which have heretofore been rather heavy, cumbersome and awkward machines to handle. The present invention contemplates an improved scrubbing element and a relatively, small, light-weight machine built therearound so as to provide liquid and detergent for the scrubbing element and means for picking up the liquid and returning it to the machine. In particular, the novelty resides in the floor scrubbing element and its ability to conform to irregular-shaped surfaces of floors being scrubbed reaching into pockets, cracks, crevices and accommodating bulges and ridges while maintaining desirable scrubbing contact and action with the floor despite such irregularities.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being the intention to cover all changes and modifications of the example of the invention herein chosen for purposes of the disclosure, which do not constitute departures from the spirit and scope of the invention.

The invention is illustrated in the accompanying drawing, wherein:

FIGURE 1 is a vertical section through the floor scrubbing machine and taken on line 1—1 of FIGURE 2.

FIGURE 2 is a vertical section through the machine and taken on line 2—2 of FIGURE 1.

FIGURE 3 is a front elevation of the machine with

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parts broken away and parts in cross section and taken on line 3—3 of FIGURE 1.

FIGURE 4 is a back elevation of the machine which comprises the right side as seen in FIGURE 1.

By referring to the drawings and FIGURES 1 and 2 in particular, it will be seen that the floor scrubbing machine comprises a supporting housing 10 to which various operative components are attached as hereinafter described. These components include an electric motor 11 incorporating a gear reducing unit and a drive sheave 12. A transversely positioned rotatable shaft 13 is journaled in suitable bearings in the opposite sides of the supporting housing 10 and is arranged to carry three radially positioned, circumferentially spaced segments 14 of a cylindrical shaped roll which in turn supports on their exterior surfaces a foamed plastic scrubbing cylinder 15. The segments 14 of the cylindrical roll supporting the foamed plastic scrubbing cylinder are arranged for movement relative to the shaft 13 and responsive to the centrifugal spin of the same as imparted thereto by a belt 16 which connects the shaft 13 with the sheave 12 on the electric motor 11. The means establishing the flexible and resilient connection movably positioning the segments 14 comprises brackets 17 each of which have arcuate slots therein arranged as sections of a spiral path having its axis on said shaft 13. The brackets 17 are arranged in oppositely disposed, longitudinally aligned pairs on each of the segments 14. Pins 18 projecting from the sides of sleeves 19 engage the slotted brackets 17 and the sleeves 19 are carried on the shaft 13 through an intermediate resilient member 20.

The supporting housing 10 carries a bracket 21 which adjustably positions a liquid discharge pipe 22 which is apertured longitudinally on the lower half thereof, as best illustrated in FIGURE 3 of the drawings. A set screw 23 engaged in the bracket 21 holds the apertured tube 22 in desired position as shown. A pair of angular arms 24 are pivoted intermediate their ends to the supporting housing 10 at either side thereof and each of the angular arms 24 has a bifurcated member 25 on its forward end, as best seen in FIGURE 2 of the drawings, and ground engaging wheels 26 are pivotally mounted on axles 27 extending transversely of the bifurcated members 25. The opposite end of the angular arms 24 are connected to a pair of pedals 28 which extend out of the back of the supporting housing 10 as best seen in FIGURE 4 of the drawings so that the vertical position of the wheels 26 relative to the supporting housing 10 may be altered by engaging and moving the pedals 28. Ratchet devices on the supporting housing 10 engage the angular arms 24 and hold the same in desired relation. In normal position, the wheels 26 are relatively close to the supporting housing 10. In transport position the wheels 26 are moved downwardly to elevate floor scrubbing machine and the foamed plastic scrubbing cylinder 15.

The ratchet device referred to in connection with the positioning of the wheels 26 comprise an arrangement whereby the pedals 28 are pivoted to the supporting housing 10 for movement into and out of engagement with the angular arms 24 whereby the position of said angular arms and hence the wheels 26 may be controlled.

The supporting housing 10 carries a liquid tank 29 therein which is positioned in the supporting housing between the wheels 26 and the angular arms 24 heretofore referred to and suspended from the uppermost portion of the supporting housing 10 by suitable fasteners. The tank 29 has an apertured partition 30 and a vertical tubular member 31 is positioned through the tank 29 in sealing relation thereto. The tubular member 31 extends outwardly of the bottom of the tank 29 and is connected to a flexible hose 32 which communicates with a transversely positioned, water collection nozzle which is transverse in V-

shape and largely defined by a pair of spaced parallel rubber members 33 and 34 respectively.

It will be observed that the member 34 extends downwardly a distance greater than the member 33 and acts as a squeegee on the floor surface to gather up the water previously deposited thereon, as hereinbefore described. The forward rubber member 33 and the inverted housing to which they are secured and which is generally indicated by the numeral 35 extends completely across the back lower portion of the floor scrubbing machine, as best seen in FIGURES 1 and 4 of the drawings. The upper end of the tubular member 31 extends upwardly through the apertured partition 30 of the tank 29 and forms means for locating and holding a circular filter element 36 which has a central opening therethrough registering with the upper portion of the tubular member 31. The bottom of the filter element 36 rests on an apertured support plate 37 which in turn is held by a cylindrical body member 38 so that an annular chamber is formed thereby which receives and hold the filter element 36.

The supporting housing 10 is provided with a relatively large opening above the filter element 36 and the cylindrical body member 38 and the opening is defined by an annular flange 39 and normally closed by a hinged closure 40, which is hinged as at 41 to a hinge bracket 42 on the support housing 10. A knob 43 permits the closure 40 to be readily opened, and a spring catch 44 holds the closure 40 in normally closed relation. The bottom of the closure 40 carries an inverted cone-shaped member 45 which is positioned directly over the upper end of the tubular member 31 so that water and air moving upwardly through the tubular member 31 will strike the undersurface of the closure 40 and the inner surface of the conical member 45 and be deflected downwardly into the filter element 36 where the liquid will be clarified as the dirt is held by the filter element, and the resulting clarified liquid will drain downwardly through the apertured partition 30 into the liquid storage tank 29.

In order that water and/or a detergent liquid may be supplied to the tank 29, a combination filler and sight gauge is incorporated and is in communication therewith. The combination filler pipe and sight gauge comprises an L-shaped tubular member, a major portion of which is preferably formed of a transparent plastic material. The member is indicated in FIGURES 1 and 4 of the drawings by the numeral 46, and it will be observed that the horizontal portion of the L-shaped tubular member extends into the tank 29 through a suitable sealing gasket and communicates with said tank. The upper end of the vertical portion of the tubular member 46 is positioned above the partition 30 of the tank 29 and has a suitable end fitting 47 thereon including a sideward vent 48. Water and/or liquid detergent may therefore be fed directly into the tank 29 through this convenient tubular fitting and the level of liquid in the tank 29 may be observed through the vertical section thereof which is transparent. Then it is desired to empty the liquid in the tank 29, the fitting 47 is detached from a spring clip 49 on the housing 10 where it is normally positioned, and the L-shaped tubular fitting 46 swung to a position where the end fitting 47 is lower than the bottom of the tank 29 whereupon the liquid in the tank will drain outwardly therethrough. In order that the liquid and/or detergent in the tank 29 may be delivered to the apertured pipe 22 heretofore referred to for supplying liquid in proper location to the foamed plastic scrubbing cylinder 15 a pipe 50 extends from the tank 29 to a valve 51 which is directly connected with a pump 52 and the outlet of the pump 52 is connected by a pipe 53 with the apertured pipe 22 heretofore referred to.

The valve 51 has a long, vertical operating shaft extending upwardly through the support housing 10 where it is provided with a knob 54 and arranged with suitable indicia so that the amount of liquid pumped from the

tank 29 to the apertured pipe 22 may be controlled conveniently.

The pump 52 is provided with a drive pulley 55 which is engaged against the belt 16 heretofore referred so that the pump operates whenever the electric motor 11 is energized and the foamed plastic scrubbing cylinder 15 is revolved.

By again referring to FIGURES 1 and 2 of the drawings, it will be seen that the air and water collected between the squeegee-like members 33 and 34 and heretofore referred to and moved upwardly through the tubular member 31 will be separated by the conical body member 45 and the water will, as heretofore described, be delivered to the filter element 36. The air will follow the broken arrows on FIGURES 1 and 2 of the drawings and will flow upwardly out of the upper end of the cylindrical body member 38 and then downwardly into the portion of the tank 29 above the apertured partition 30 therein which is above the normal liquid level therein as indicated by the broken line and the letter L. Any water remaining in the air will thereupon be delivered to the apertured partition 30 and will be drained back into the tank 29. The air freed of moisture then flows sidewardly, as best seen in FIGURE 2 of the drawings, through the passageway defined by the lowered top portion 56 and upwardly out of an opening 57 and into direct communication with a vacuum fan enclosed in a housing 58 and driven by an electric motor 59 positioned immediately thereabove. The electric motor 59 is positioned above the uppermost surface of the supporting housing 10 and therefore extends upwardly through an opening 60 therein and is provided with a secondary closure 61 which is secured to the supporting housing 10 by suitable removable fasteners so that this portion of the device is conveniently accessible. The air is discharged from the vacuum fan 58 through the apertures 62 into the supporting housing 10 where it must flow downwardly and generally into that area of the device in front and to the rear of the water pick up squeegee-like members 33 and 34 where it serves to assist in drying the floor.

It will thus be seen that the support housing 10 carries the several necessary components of the floor scrubbing machine and the housing in turn is provided with a convenient handle of inverted U-shaped and generally indicated by the numeral 63. The electrical conductors for energizing the electric motors 11 and 59 are carried within the housing 10 and upwardly through the hollow handle 63 and extend therefrom near the outer end thereof as best seen in FIGURE 1 of the drawings where in the conductor comprises a flexible extension 64.

It will occur to those skilled in the art that it will be desirable to move the members 33 and 34 vertically at such time as desirable, and in order to do so the supporting transverse housing 35 is secured to the support housing 10 by way of a cam shape member 65 which has an actuating arm 66 extending outwardly therefrom and upwardly relative thereto. By moving the actuating member 66 from side to side, the relative position of the cam body member 65 is altered and the housing 35 and the squeegee-like members 33 and 34 are raised and lowered in desirable degree. It will be observed that the flexible connection 32 which exists between the housing 35 and the area between the squeegee-like members 33 and 34 and the tubular member 31 permits this vertical adjustment. The transverse V-shape of the housing 35 and the squeegee-like members 33 and 34 tend to move the water or detergent liquid on the floor to the center portion thereof so that it will be more readily picked up by the vacuum action heretofore described.

It will thus be seen that a floor scrubbing machine has been disclosed which incorporates several novel features. Primarily among these is the arrangement of the foamed plastic scrubbing cylinder 15 which is held securely to the segments 14 of the supporting roll by which the foamed plastic scrubbing cylinder 15 is revolved when

the same revolve and centrifugal force moves the segments outwardly along the cam slots engaged by the pins 18 as heretofore referred to. At such time as the roll is stationary, the same may be readily detached from the machine and removed and the foamed plastic scrubbing cylinder 15 changed as will be necessary due to wear from time to time. Upon re-installation and re-energization of the machine, the expanding action of the segments 14 will again securely hold and drive the foamed plastic scrubbing cylinder 15. By the same arrangement, it will be seen that irregularities in the floor surface are easily accommodated by the machine. The foamed plastic scrubbing cylinder 15 itself will accommodate considerable irregularities and additionally the movable arrangement of the segments 14 of the supporting roll permit relatively great accommodation with respect to door sills, raised tile or cracks and the like in the floor being cleaned. The floor scrubbing machine disclosed herein therefore meets the several objects of the invention as it is capable of scrubbing any type of floor of almost any surface configuration or design or irregularity, and at the same time it provides for the quick and easy interchange of the actual foamed plastic scrubbing cylinders which comprises the actual floor engaging or scrubbing elements, and it incorporates novel means for adjusting the water and soil pickup mechanism and effecting separation of the water so that a considerable quantity of it can be re-used by the machine.

These several features make the machine extremely portable, and at the same time highly efficient in its operation, and having thus described my invention, what I claim is:

1. In a floor scrubbing machine having a supporting housing open at its bottom, a scrubbing roll positioned transversely of said housing for rotation relative thereto, said scrubbing roll consisting of a shaft journaled in said housing, a plurality of circumferentially spaced roll segments, relatively movable engaged means on said roll segments and shaft mounting said roll segments for radial movement relative to said shaft, a flexible cylindrical scrubbing member engaged on said roll segments,

a motor in said housing and means interconnecting said motor and shaft for rotating said shaft, said relatively movable engaged means including drive means on said shaft, resilient means connecting said drive means to said shaft, means connecting said segments to said drive means, said last named means permitting independent radial movement of said segments under the influence of said centrifugal motion of said roller.

2. In a scrubbing machine having a supporting housing open at its bottom, a scrubbing roll positioned transversely of said housing for rotation relative thereto, said scrubbing roll consisting of a shaft journaled in said housing, a plurality of circumferentially spaced roll segments, relatively movable engaged means on said roll segments and shaft mounting said roll segments for radial movement relative to said shaft, said shaft having resilient rubber-like sleeves thereon and metal sleeves thereover, said movable engaged means including pins on said metal sleeves parallel with said shaft, slotted brackets on said segments and said pins engaged in said slotted brackets, said slots in said brackets extending radially and circumferentially of said shaft, a flexible cylindrical scrubbing member engaged on said roll segments, a motor in said housing and drive means interconnecting said motor and shaft.

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