May 9, 1944. H. V. SMITH 2,348,268

FLOOR SCRUBBING MACHINE

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FIG. 2.

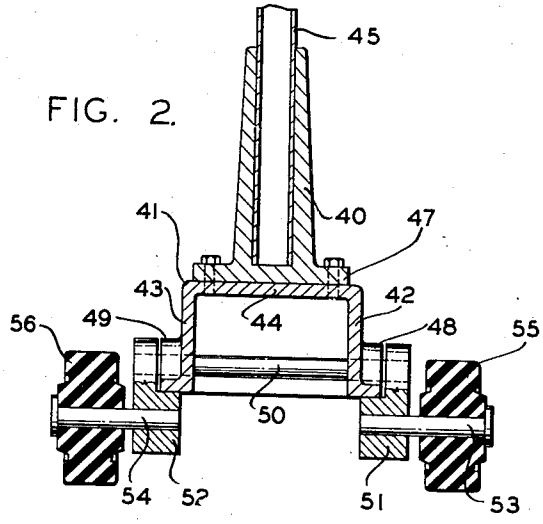
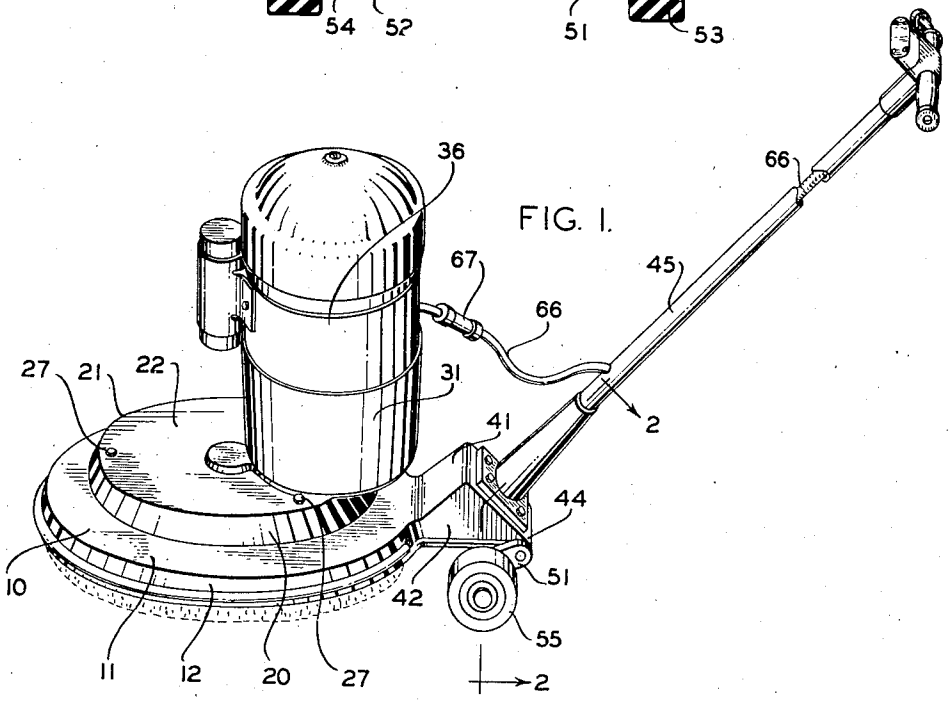


FIG. 1.



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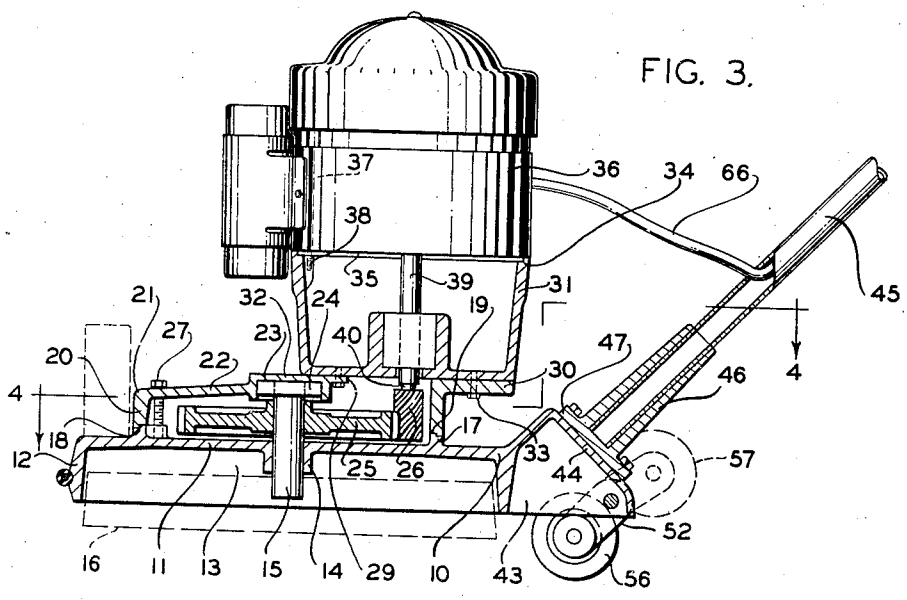
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FLOOR SCRUBBING MACHINE

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FIG. 3.



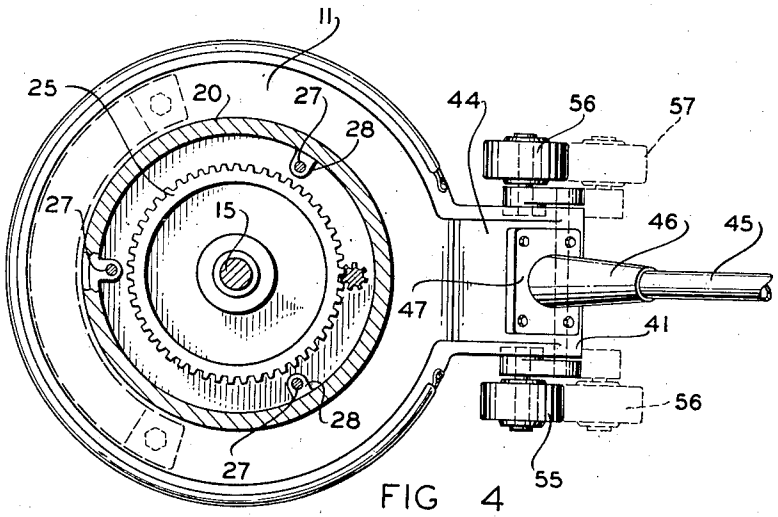


FIG 4

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FLOOR SCRUBBING MACHINE

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FIG. 5.

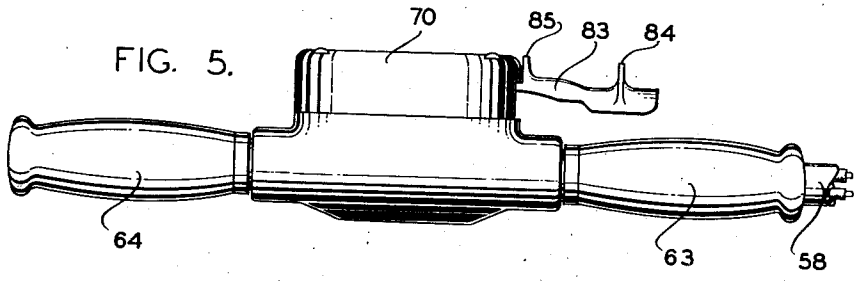


FIG. 6.

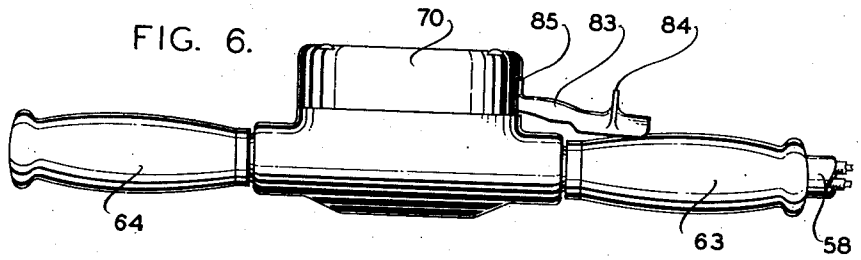


FIG. 7.

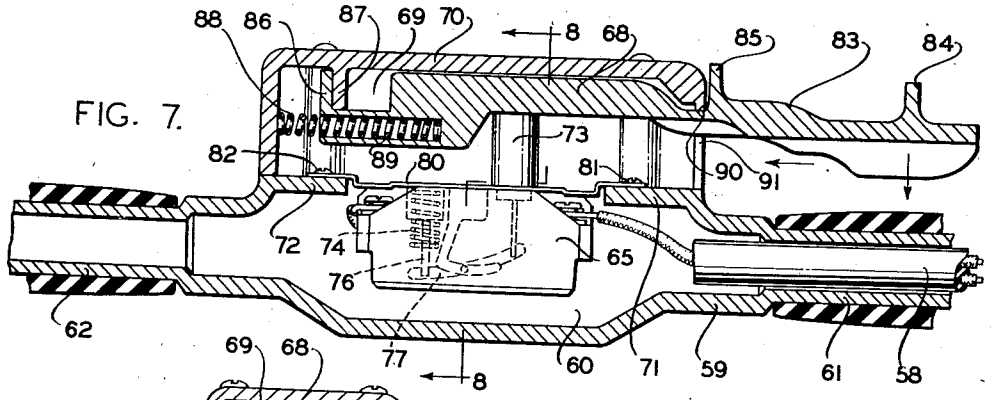
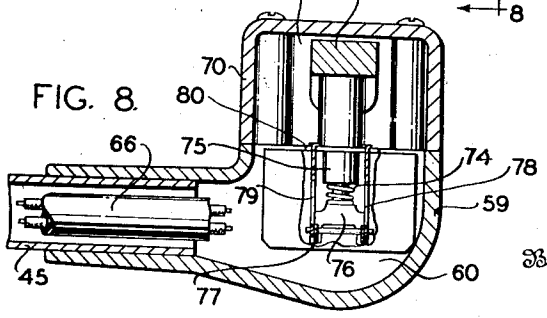


FIG. 8.



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Patented May 9, 1944 2,348,268

UNITED STATES PATENT OFFICE

2,348,268

FLOOR SCRUBBING MACHINE

Henry V. Smith, St. Paul, Minn.

Application April 29, 1942, Serial No. 441,047

2 Claims. (Cl. 15—49)

My invention relates to floor scrubbing machines and has for its object to provide a system of supports formed of castings so constructed and put together that the entire construction will thereby be made particularly rigid and effective for use and wherein the tendency and danger of the parts becoming loose or separated is eliminated.

Machines of this type are adapted when in an operative position to have a rotary scrubbing member rotated at relatively considerable speed directly in contact with the floor while the machine is capable of being moved about over the floor surface. Such a machine carries a motor and motor mounting with the shaft of the motor operating in a vertical position and through suitable gearing transmitting its power to rotate the brush. The motor is a principal agent of gravity for pressing the brush upon the floor.

Heretofore it has been the practice to provide a bracket for holding the motor in position, the bracket being bolted to the base housing for the brush, and a grave difficulty has been encountered in this type of floor scrubbing machine in that the stresses and vibrations caused by the high speed motor, in operating its vertical driving shaft through the gearing connections therefrom to the brushes, has caused the parts as previously constructed to become loose and to tend to separate, resulting in undue noise and unsatisfactory work, and in rather rapid deterioration and wear, which in the end might cause ultimate failure of the machine.

A further difficulty has resulted from the closing and opening of the switch. In practice this has been effected by holding down a clamping member in the hand grasping the handle by which the apparatus is controlled and guided in operation. This is normally caused to be held in switch-breaking position by spring means, which exerts considerable pressure on the hand of the operator. After a certain length of time of operation the hand may become so tired that it is necessary to relax the grip and discontinue the operation of the machine while the hand is rested. This results in loss of time and less efficient operation because of frequent starting and stopping of the motor, and means is provided by my invention for remedying this difficulty.

It is, therefore, a principal object of my invention to so construct the means for supporting the brush and the motor and the driving mechanism from the motor in relation to one another and in relation to the mounting of the handle for moving the apparatus that this loosening, noise and possible separation of parts and final failure of the machine is avoided.

It is a further object of my invention to form a single base casting which at the same time shall be a support for the motor and the gearing connected therewith and which forms a housing for a removable brush, and which has a portion thereof projected from this housing to connect with the handle for moving the machine and to form a support for the rollers, which are adapted in one position to hold the brush and its housing casting away from the floor while the machine is being moved from point to point when not in operation.

It is a further object of my invention to provide in connection with the base member above-described an annular mounting ring integral with the base casting and a second casting having an annular portion associated with the annular ring so that the two are in effect locked together, said second casting having a portion forming a means to connect thereto the motor support and another portion forming a housing for the brush-driving gearing connection from the motor.

It is a further object of my invention to provide a casting having a central sleeve for forming a support for the side bearing of the vertical motor shaft and a cup-like portion having an annular edge co-operating with the motor casing whereby the motor casing may be rigidly supported upon the cup-like member and by it through the second named casting and the base casting support the motor in proper operative position.

It is a further object of my invention to secure the motor by bolts or otherwise directly to the cup-like casting and to arrange the several castings so that when they are held together they will form a compact and attractive appearing organization adapted to operate with a high degree of efficiency and with no tendency from vibration and motor force to loosen or separate any of the parts.

It is a further object of my invention to construct the hand grip switch member so that the same may be slid longitudinally within the switch casing where a finger on the sliding switch bar will engage a part of the switch casing and hold the parts with the switch closed and thus make unnecessary the gripping of the switch bar in the hand of the operator over any extended period of time.

The full objects and advantages of my invention will appear in the detailed description thereof forming a part of the specification of this application, and the novel features producing the

advantageous results above-referred to will be particularly pointed out in the claims.

In the drawings illustrating an application of my invention in one form:

Fig. 1 is a side elevation perspective view of my improved floor scrubbing machine.

Fig. 2 is a sectional view taken on line 2—2 of Fig. 1.

Fig. 3 is a side elevation view of my floor scrubbing machine with some parts in section.

Fig. 4 is a sectional plan view taken on line 4—4 of Fig. 3.

Fig. 5 is a front elevation view of the handlebar and hand gripping switch member showing the latter in inoperative position.

Fig. 6 is a view similar to Fig. 5, showing the hand gripping switch member in locked position.

Fig. 7 is a sectional elevation view taken through the handlebar and the switch casing.

Fig. 8 is a transverse sectional view taken on line 8—8 of Fig. 7.

As illustrated my floor scrubbing machine comprises a main base casting 10 which has a circular top portion 11 and a depending annular flange portion 12. The flange portion 12 and the top 11 encloses a chamber 13, open at its bottom, Fig. 3.

The circular top portion 11 is provided with a central depending boss 14 through which extends a vertical shaft 15. Upon the shaft 15 is mounted a removable circular scrubbing brush indicated in dotted lines at 16 in Fig. 3. Upon the upper side of the top plate 11 is formed an annular rib 17, Fig. 3, which is provided with a ship-lap groove and tongue 18 adapted to be engaged by a corresponding ship-lap groove and tongue 19 on the bottom of an annular flange 20 of a top casting 21. The casting 21 has a circular cover portion 22 which centers above the shaft 15 and provides at 23 a seat for a bearing support 24 or shaft 15. Upon the shaft 15 is a spur gear 25 which meshes with a pinion 26 later to be described. The casting 21 is held in position on the casting 10 by means of bolts 27 which extend through the top portion 22 of casting 21 and are threaded into bosses 28 formed on the top plate 11 of casting 10. The casting 21 thus is held with a direct tongue and groove vertical thrust support upon the base casting 10 housing the rotary brush 16.

The casting 21 is formed with a circular opening 29, Fig. 3, and with a semi-circular projection 30. A third cup-shaped casting 31 rests directly upon the projection 30 and the raised portion 32 forming the bearing housing 23 and is secured thereto by bolts or rivets 33. The upper edge of the cup-shaped casting 31 is provided with a ship-lap annular tongue and groove 34 which receives the corresponding formation 35 of the base of vertically supported motor 36. This in turn is secured in position by long screws 37 which are screwed into bosses 38 on the inside of cup casting 31.

The motor 36 is provided with a vertical shaft 39 which is operatively connected at its end 40 with the spur gear 26. It will be apparent from the above description that the rotary brush 16, the shaft 15 and gearing 25 and 26, and the motor 36, are all formed into a substantially integral structure made up of the three castings 10, 21 and 31 so united and held together as to avoid vibration effects whereby loosening can take place.

The casting 10 is provided with an integral extension portion 41 having side walls 42 and 43, Figs. 1 and 3, and a top wall 44. This top wall 44 has the plane of its outer surface angularly disposed to the horizontal plane of the top wall 11 of base casting 10 at just the right angle to have secured thereto the operating handlebar 45. This handlebar is set in a socket formed in a projecting arm 46 which has a securing plate 47 bolted to the face of top member 44. In this manner the handlebar is secured directly to the main base casting and the use of brackets or separable attaching means is avoided.

The side walls 42 and 43 of the casting projection 41 are provided with bosses 48 and 49 and through these bosses in the side walls 42 and 43 apertures are provided forming a journal for a shaft 50. Upon projecting ends of the shaft 50 are secured swinging arms 51 and 52 provided respectively with axle pins 53 and 54 which form journals for ground rollers 55 and 56 preferably formed of rubber or other non-electrical conducting material. The arms 51 and 52 are rigidly secured upon the shaft 50 so that said arms and the rollers or wheels carried thereby may be swung together into the position indicated in dotted lines at 57 on Figs. 3 and 4. In the full line position of Figs. 3 and 4, the wheels 55 and 56 are in a position to form a fulcrum for the base casting 10 and parts supported thereby whereby they and the brush carried by them may be swung out of contact with the floor and be rolled from place to place when not in use. When the wheels 56 and 57 are swung to take their dotted line positions, the entire apparatus is dropped to put its weight upon the surface of brush 16, which is the operative position of the device.

The handlebar 45 is hollow and carries through it the electric cable 66. Upon the handlebar is mounted a transverse frame structure 59, Fig. 7, which forms a chamber 60 and, by means of extension supports 61 and 62, forms the mountings for handles 63 and 64. The cable 58 passes through the extension 61 of frame structure 59 into chamber 60 where its wires enter a switch box 65. After passing through the switch box 65, where contact is made and broken in a known way (not shown), the wires go in a separate cable 66 through the handlebar 45 and through a connector 67 to the motor 36.

For closing the switch a floating bar 68 is held within a chamber 69 formed within a casing 70 secured to projecting portions 71, 72 of the handlebar 59 at the top of chamber 60 therein. The member 68 is supported upon a plunger 73 which extends down into the switch box 65 as shown in dotted lines in Fig. 7 and also shown in Fig. 8. A strong compression spring 74 is housed at one end in a cup 75 and is engaged at its lower end by a follower 76 connected with a lever system 77 which is pivoted to arms 78, 79 carried by a plate 80, Fig. 7, which is secured at 81 and 82 to the separated support members 71 and 72. By this means the floating bar 68 is normally held in contact with the top of casing 70 as shown in Fig. 7. This floating bar has a hand grip member 83 formed with upstanding projecting parts 84 and 85. The floating bar 68 also has an upstanding member 86 held in engagement with a down-turned rib 87 secured to top of casing 70, and the projection 86 is normally held in engagement with a rib 87 by means of a compression spring 88 seated in a bore 89 in the floating arm 68. When in this position, as shown in Figs. 5 and 7, the floating bar will be

projected outwardly so that the handle grip and its projections 84 and 85 will be entirely outside of casing 70. In this position the floating bar 68 may be rocked upon the fulcrum formed with its contact with rib 87. This rocking pushes the plunger 73 down against the force of spring 74 and through means not shown operates the switch to close the circuit to the cable 66 and motor 36. It follows that if the handle grip is held in the hand and the hand gripped sufficiently to effect this movement, the motor will be put in operation and will remain in operation as long as the handle is so gripped and held down.

But in practice it has been found that although this is a desirable feature, since whenever the grip is released the motor will be immediately stopped, it has a disadvantage that the hand of the operator may grow tired and may relax the grip when it is not desired to stop operation of the motor. The floating bar 68 is adapted to slide freely over the plunger 73, so that whenever it is desired to have the switch operating means locked in circuit closing position, through operation of handle grip 83 the bar 68 may be slid inwardly against the pressure of spring 88 to bring the projection 85 against a lip 90 at the top of opening 91 through which bar 68 extends outwardly to handle grip 83. This brings the parts in the position shown in Fig. 6, when the operator may relax his hold on the handle grip 83 and simply hold the handle 83 for operating the machine and the switch will remain closed until it is desired to reopen it, which is effected by merely sliding the floating bar 68 outwardly by action of the handle grip 83.

The advantages of my invention will be apparent from the description in detail heretofore given. A particular advantage resides in the fact that the brush or scrubber housing is formed in a single casting to which the operating handle is directly attached, and that the motor is supported directly upon a cup casting which in turn is secured to a casting formed and connected to the base casting in which the scrubber is housed in such manner as to render the entire motor supporting structure substantially unitary and integral. Thus the motor, mounted to one side in order to enable the cleaner to be passed under low-lying articles, is so positioned by direct mounting upon the base casting scrubber housing and not upon a bracket construction extending laterally of the base casting. This effectively avoids separation or looseness of parts which at the very best render such a device noisy when it should run silently and which ultimately may produce a failure.

A further great advantage of my invention resides in the provision of a switch closing member which may be kept operative either entirely by the grip of the hand or by longitudinal movement to bring it into a position to lock the switch operating member in position to hold the switch with the circuit closed.

I claim:

1. In a floor scrubber of the horizontal rotary type embodying a scrubber member and gearing for rotating it about a vertical shaft, a base casting having an integral circular depending flange substantially enveloping in close relation the rotating limits of the scrubber member, a circular annular rib integrally formed on the top of said base casting and spaced from the outer limits thereof, a second casting having an annular flange, said flange and rib being of the same diameters and formed to provide a union between the same, means rigidly securing the second casting to the rib to form a housing for the gearing that drives the scrubber, a cup casting supported upon and secured to the top of the second casting toward one side thereof and toward the side of the base casting, and a vertical-shaft motor held directly upon the upper annular edge of said cup casting.

2. In a floor scrubber of the horizontal rotary type embodying a scrubber member and gearing for rotating it about a vertical shaft, a base casting having an integral circular depending flange substantially enveloping in close relation the rotating limits of the scrubber member, a circular annular rib integrally formed on the top of said base casting and spaced from the outer limits thereof, a second casting rigidly secured to the upper part of the first casting and forming a housing for the gearing, said second casting having an upper horizontal wall, a cup casting having a bottom horizontal wall engaging the first-named horizontal wall and being rigidly secured thereto in a position toward one side of the base casting, and a vertical-shaft motor having the bottom of its walls engaging the upstanding edges of the cup casting and being rigidly secured thereto.

HENRY V. SMITH.