April 13, 1943. I. J. OWEN 2,316,709

CARPET SWEEPER

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FIG. 1.

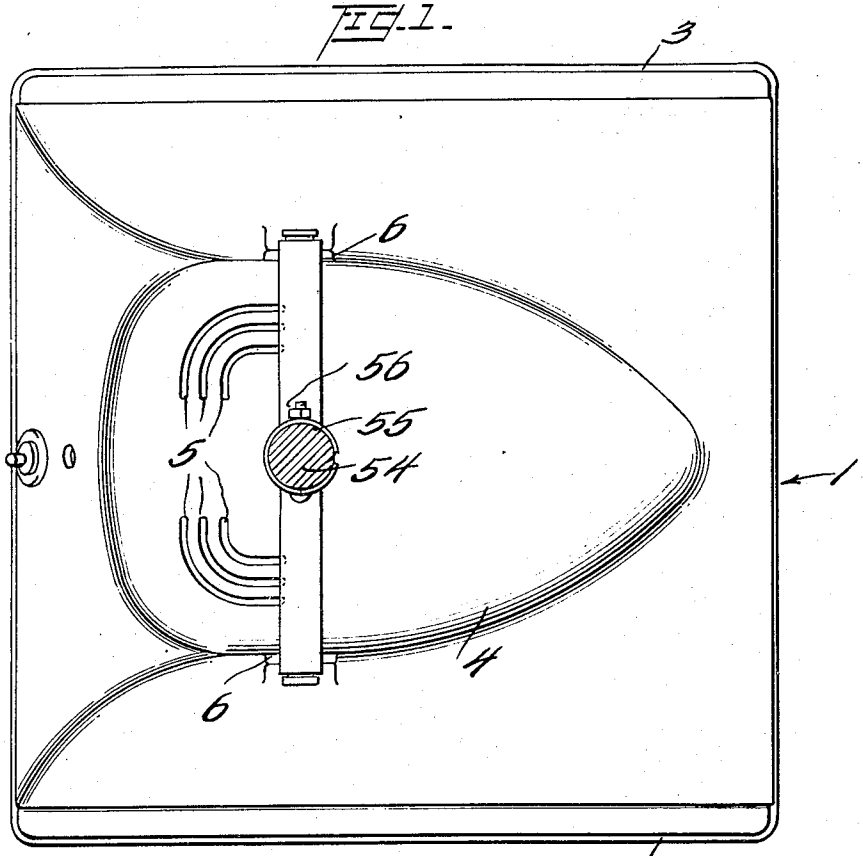
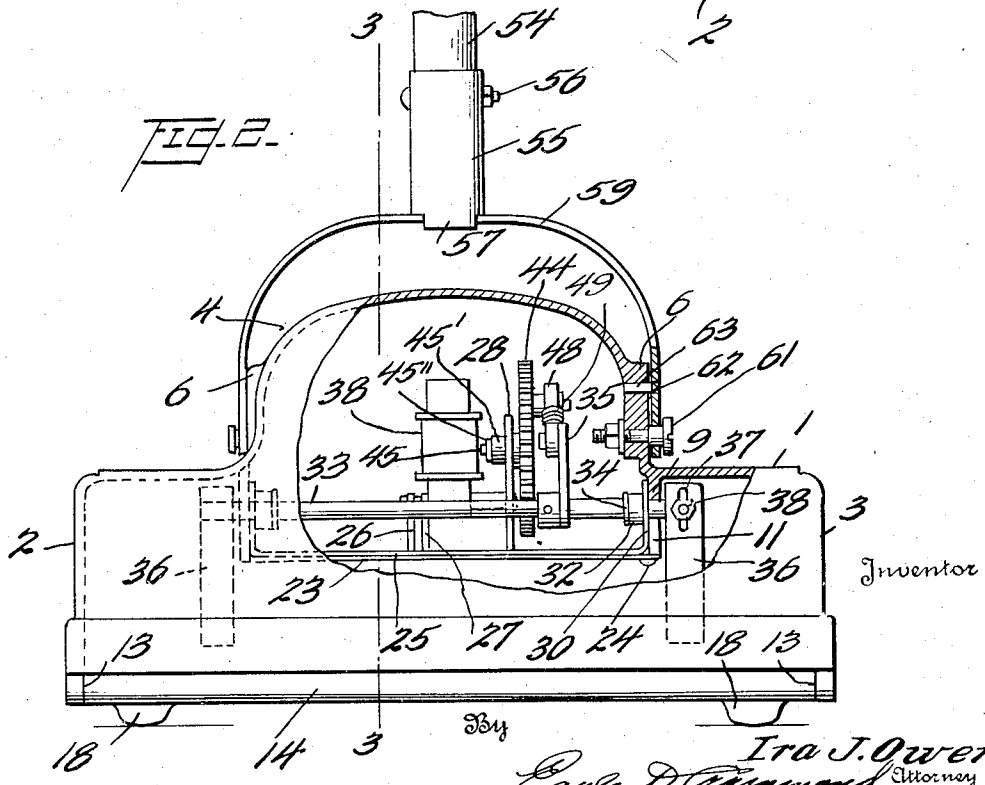


FIG. 2.



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FIG. 3.

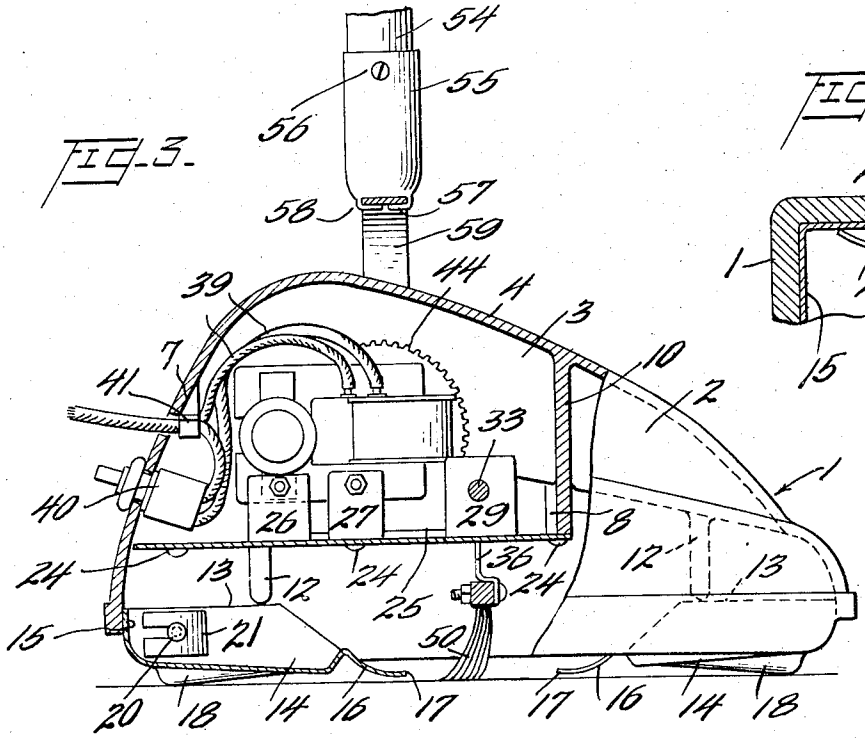


FIG. 11.

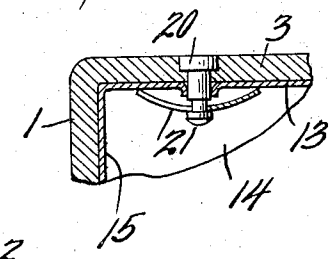
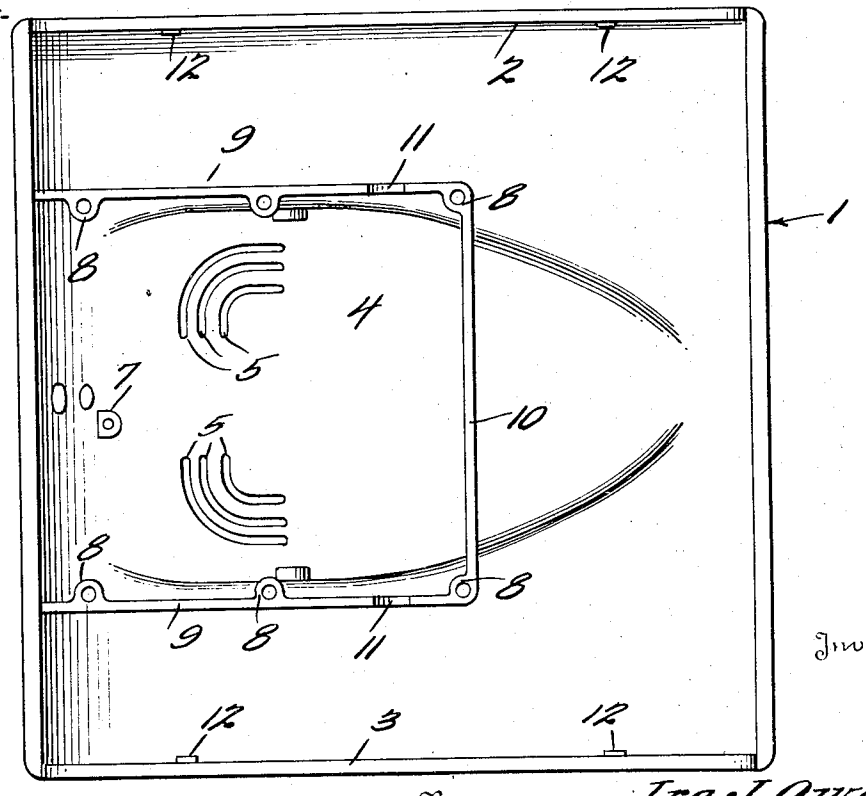


FIG. 4.



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FIG. 5.

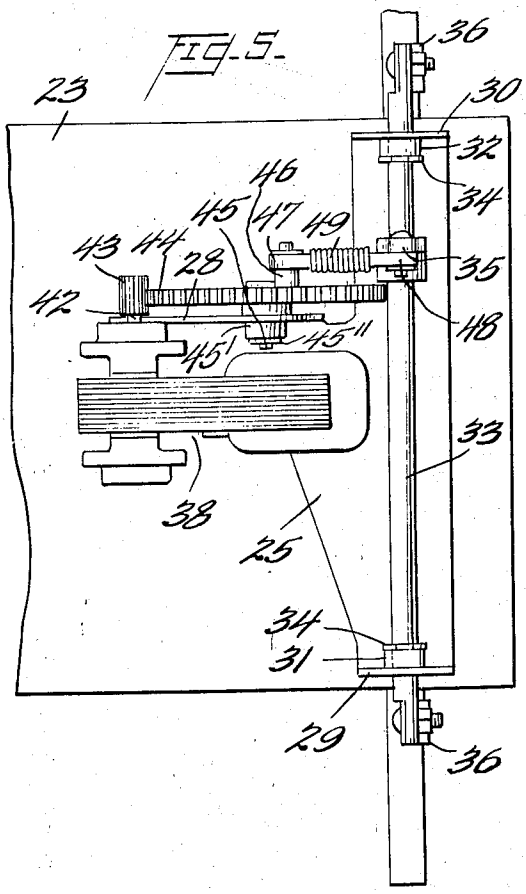


FIG. 6.

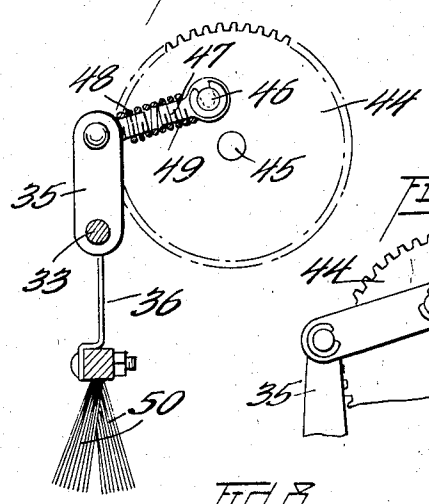


FIG. 12.

FIG. 8.

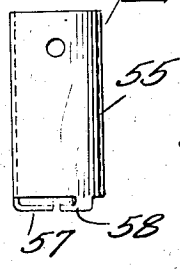


FIG. 9.

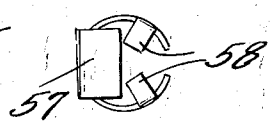


FIG. 7.

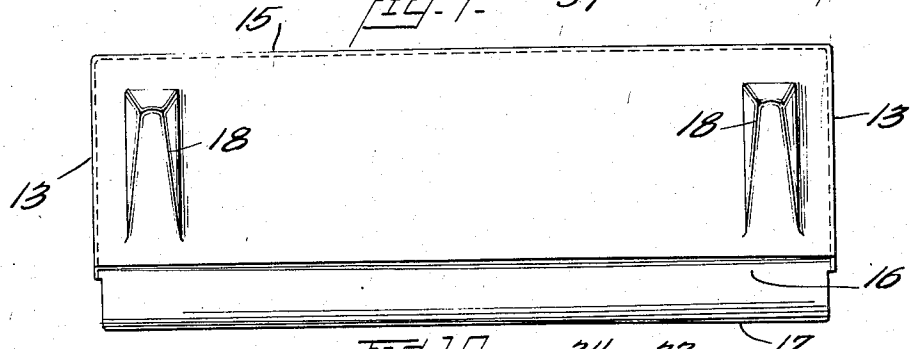
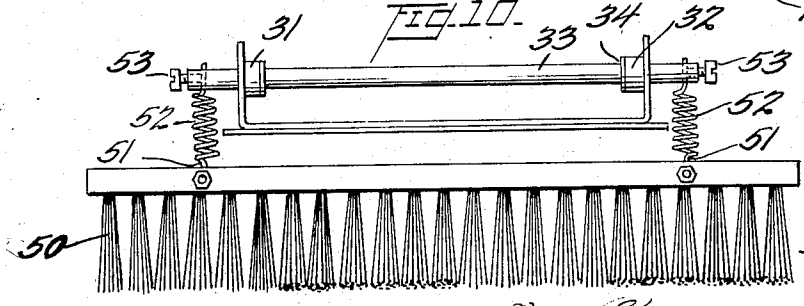


FIG. 10.



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Patented Apr. 13, 1943 2,316,709

UNITED STATES PATENT OFFICE

2,316,709

CARPET SWEEPER

Ira June Owen, Winnetka, Ill., assignor of one-third to Julius H. Kiel and one-third to Robert B. Kiel, both of Wilmette, Ill.

Application May 17, 1941, Serial No. 394,007

7 Claims. (Cl. 15—47)

This invention relates to improvements in floor cleaning machines. More particularly, it relates to improvements in power driven machines of the carpet sweeper type described and claimed in my copending application Serial No. 363,345, filed October 29, 1940, issued April 21, 1942, as Patent No. 2,280,077.

Heretofore, machines of the manually propelled carpet sweeper type have usually been provided with rotating brushing elements which, in one way movement of the machines, brushed the pile of carpets and the like in only one direction. The machine shown and described in the identified copending application provides a sweeper utilizing a motor driven oscillating brush which treats a surface with a back and forth brushing action in any direction of movement of the machine. The present invention resides in an improved machine of similar character and of simplified construction.

Objects of the invention include the provision of an improved machine for sweeping a carpet or floor which mechanically imitates as far as possible and produces the same effect as would be obtained with a brush or broom and a dust pan, and a machine which can be glided or slid over a supporting surface in any direction while the machine is being operated.

Other objects of the invention include the provision of a machine having a one piece molded housing, a novel brush action, a unitary brush driving mechanism and brush support, combined dust pans and runner supports and a new operating handle structure.

Further objects of the invention will become apparent from the following detailed description having reference to the accompanying drawings wherein like reference numerals have been used to represent like parts throughout the several views and wherein:

Fig. 1 is a top plan view of one embodiment of the invention.

Fig. 2 is a front end view of the machine of Fig. 1, partly in section, showing motivating mechanism and handle mounting details.

Fig. 3 is a side view of the machine taken partly in section on the line 3—3 of Fig. 2.

Fig. 4 is a bottom plan view of the housing.

Fig. 5 is a top plan view of the motor driven sweeping mechanism and base structures.

Fig. 6 is a detail side view showing brush driving connections.

Fig. 7 is a bottom plan view of one of the dust pans.

Fig. 8 is a side elevation of the handle fastening.

Fig. 9 is a bottom plan view of the element of Fig. 8.

Fig. 10 is a view showing a modified form of brush mounting.

Fig. 11 is an enlarged detail section showing the dust pan mounting.

Fig. 12 is a broken side view corresponding to Fig. 6 but showing modified brush driving connections.

Having reference to the drawings, the machine embodies an integral housing 1 of the form illustrated having vertical side walls 2 and 3, and a contoured top having a centrally disposed dome shaped portion 4, provided with ventilating openings 5 and substantially parallel vertically extending lugs 6 affording mountings for a bail and handle structure. Inwardly thereof the housing is provided with integral anchoring lugs 7 and spaced downwardly extending mounting posts or lugs 8 joined by parallel side flanges 9 and transverse flange 10. The lower ends of the posts are apertured to receive mounting screws and terminate in a common horizontal plane with the lower edges of the flanges to receive an overlying mounting plate. The mounting lugs and flanges serve as reinforcements for the top part of the housing and define in conjunction with the dome portion of the top an open recess for receiving and housing a motor actuated driving mechanism presently to be described. Flanges 9 are provided with slots or recesses 11 for accommodation of shaft extensions from said mechanism.

The housing is an integral one piece structure of suitable molded composition. Its design, providing curved surfaces and reinforcing elements, is such as to provide a remarkably rigid structure with a minimum weight of material. The vertical side walls are each provided with spaced reinforcing thickened ribs 12 which terminate short of the bottom of the side walls to provide at their lower ends inwardly directed stops for abutting engagement with end walls 13 of dust pans 14 hereinafter described. The provision of the one piece molded casing presents advantages from the manufacturing standpoint. Moreover, a rigid casing is provided which does not require machining and into which parts can be assembled with the minimum amount of work and assembly operations. The molded structure produces a case which is small and compact as compared with conventional forms and provides, in the single molding operation, without the extra

operations of spotting and drilling, apertures in proper relation for mounting the sweeper mechanism, dust pans, and other structural elements.

The sweeper pans 14 are designed to support the sweeper in predetermined spaced relation to a surface over which the sweeper is being operated. These pans, which are preferably made from relatively thin soft cold rolled steel, have combined vertical and curved rear walls 15, vertical end walls 13 which fit closely within the side walls of the casing, longitudinally extending raised dams 16, and free edges 17 which allow sweepings to be easily carried into the pans by the sweeping action of the brush. The pans are additionally provided in the bottom portions adjacent the ends with integral pressed out portions 18 forming supporting points or gliders on which the sweeper may be glided or slid over the floor surface with a minimum amount of friction. The end walls of the pans are each apertured and provided with integral extruded bearings 19 adjacent the rear of the pan and these bearings are located substantially above the supporting contact points of the gliders. The pans are pivotally mounted on headed studs 20 extending through the sides of the casing adjacent its front and rear corners and through the pan bearings. The pivotal connection is maintained by arcuate springs 21 which are provided with button hole slots so as to straddle the inner ends of the studs in annular grooves adjacent the ends of the studs. The contact points of the gliders are so related to the pivotal mountings of the pans that when pressure, due to the weight of the sweeper, is applied to the contact points, the pans tend to close against the sweeper case. Inward swinging motion of a pan is limited by engagement of the end walls thereof with the stops on the casing. The pans may be swung downwardly and outwardly toward the ends of the casing to completely open the casing for cleaning or for access to working parts. The relatively small contact or point supports provide a minimum of friction so that the sweeper may be easily glided over the surface in a circular, sidewise angular or forward and back movement.

The sweeping mechanism comprises an assembled unit supported within the housing over the coplanar edge faces of the depending flanges 9 and 10, and the ends of the anchoring posts 8. This mechanism embodies a supporting plate or sub-base 23, the marginal edges of which underlie and engage the depending flanges 9 and 10 and are apertured in registry with the holes in the ends of the mounting posts 8 to receive self tapping anchoring screws 24 detachably supporting the sub-base. In its assembled position the sub-base forms a closure for the recess defined by the flanges and dome portion of the casing preventing the entrance of dust into the driving mechanism.

Supporting plate 23 carries on its upper side, bolted thereto, the integral motor base 25 provided with marginal upstanding spaced motor mounting lugs 26, 27 and 28 and aligned lugs 29 and 30 carrying shaft bearings 31 and 32. Driven shaft 33, extends through the bearings 31 and 32, with extensions on opposite sides of the base. The shaft is positioned in its bearings by washers 34 and is arranged to be rotated in an oscillatory movement by crank lever 35 fixed to the shaft intermediate its bearings. The extended end portions of the shaft are apertured radially and are cut away to provide flat seating surfaces to receive brush supporting brackets 36. The supporting brackets consist of flat metal strap members angularly bent at their lower ends to provide receiving seats for detachable floor treating members and are provided at their upper ends with slots 37 adapted to adjustably receive therethrough the mounting screw bolts 38 passing through the radially apertured shaft extensions to fix the brackets in their adjusted positions so that a floor treating member carried thereby will have direct driving connection with the shaft.

An electric motor 38 is supported between lugs 26 and 27 on one side of the base and lug 28 on the other side. This motor is connected to leads 39 by way of the manually operable switch 40 mounted in the rear wall of the casing. The conductor leads are suitably clamped in position within the casing by clamping means 41 anchored to lug 7. Driving shaft 42 of the motor has fixed thereto pinion 43 meshing with a composition gear 44 supported by stud shaft 45 staked to the gear and journaled in oilless bearing 45' staked to lug 28. The free end of stud shaft 45 is provided with an annular groove to detachably receive horse shoe washer 45'' maintaining the assembly. An eccentrically mounted crank pin 46 staked to the gear provides pivotal connection with a resilient pitman assembly between the pin and the lever 35. This assembly comprises rod 47 having an oilless bearing pivotally mounted on the crank pin, rod 48 having a similar bearing pivotally connected with the lever 35 and an intermediate spring 49. The rods 47 and 48 are provided with screw threads to screw the parts into the spring at opposite ends thereof to procure secure connections. The spring 49 is designed as a tension and compression spring and in reality acts as a shock absorber between the rods 47 and 48, allowing the spring to lengthen or shorten, as the gear 44 revolves. Brush arms 36 detachably support brush 50 extending transversely of the casing. The arms may be of any desired material inclusive of flat spring stock. When formed of resilient material a flexing of the arms results as the brush touches the floor resulting in a kicking action when sweeping over the edges of the pans to carry dirt to the rear of the retaining dams. As the brush 50 makes contact with the surface to be cleaned in its oscillating movement, it meets with sudden resistance and the spring 49 also allows the brush to be momentarily retarded but as the gear wheel 44 is driven by the motor pinion and continues to rotate the brush is released thereby providing in effect a kicking or spring action to the bristles. After passing its lowermost depending point a certain amount of power is built up until it returns thereto, thus assisting the brush to pass through its lowermost point and resulting in reducing the amount of power necessary to oscillate the brush that would otherwise be required were the spring 49 not employed in connecting the rods 47 and 48. The result of this operation is a more effective whisk broom action.

The unitary structural organization of the motivating means permits its removal or replacement through the bottom of the casing as a unit, free access being had to the casing with the pans in their open position. When the motivating means and its plate base is fixed in position, the casing is divided into a sweeping compartment and a motor compartment, the latter being completely closed at the bottom by the face plate. The bearing lugs of the motor base are set inwardly from the edge of plate 23

in such position as to closely overlie the shaft receiving recess in the flanges 8 and 9, thus preventing entry of dust to the motor compartment through the slots. The motor compartment is ventilated and cooled under the action of fan 60 fixed to the armature shaft of the motor, air being allowed to enter and leave the casing through the openings 5.

Referring now to Fig. 10, there is shown a modified brush mounting. Here, the brush 50 is mounted on the loop ends 51 of strong coil springs 52 which have their upper ends passing through diametrically disposed apertures in modified forms of shaft extensions. Ends of the shaft are drilled and tapped and are provided with the set screws 53 intersecting the diametrically disposed apertures to clamp the upper ends of the springs, said screws being releasable from clamping position to permit adjustment of the springs and thereby vertical adjustment of the brush.

The structure hereinbefore described is arranged to be glided or slid over a surface to be cleaned by the handle 54 telescoped at its lower end within the metal ferrule or receiving member 55. Bolt 56 passing through the ferrule and handle afford a detachable connection between the members. The ferrule is provided with integral downwardly extending lugs 57 and 58 which are bent around the strap bail 59 at its center after which the assembly may be spot welded. Depending ends of the bail are apertured for pivotal association with bolts 61 passing through the mounting lugs 6 of the casing. The bolts have a pivotal bearing surface outside the casing wider than the thickness of the bail strap to allow a slight outward flexing of the bail strap ends. Above the points of pivot the bail ends are provided with small apertures 62 adapted to receive the outer rounded end of a bail stay pin 63 anchored in the casing. When the bail is moved into the vertical position, its ends are forced outwardly by the cam action of the stay pin until the stay pin registers with the apertures 62 to seat therein. In this position the bail will be maintained in its vertical position by the stay pins.

The brush 50 consists of a narrow backing member transversely apertured to receive the mounting bolts of the bracket. The brush is distinguished by angularly displaced bristle sections which are in alternating arrangement throughout the length of the brush. This construction contributes to a substantial reduction in torque and allows the use of a much smaller motor than would be found necessary to operate a brush having aligned bristles. The back and forth or oscillatory movement of the brush produces a sweeping action and result comparable with a normal broom action, and when the machine is slowly moved over a surface such as a high pile carpet or the like, the carpet pile is brushed in both directions in differentiation from the action of the conventional rotary brush machines. Other floor treating members shown and described in the copending application may be utilized interchangeably with the brush, if desired.

The operation of the machine and its associated parts will be apparent from the foregoing description. When in use, the motor is energized and the machine is progressed in any direction over the surface to be treated. The position of the machine with respect to the treated surface is maintained by the point contact gliders which permit either circular or linear movement with a minimum of friction. The oscillatory movement of the brush produces a double sweeping action in opposite directions, resulting in a thorough cleaning of floors and pile fabrics.

While the invention has been described in connection with a specific embodiment, words which have been used are words of description rather than of limitation, and practice of the invention within the scope of the appended claims may be resorted to without departing from the true scope and spirit of the invention in all its aspects.

I claim:

1. In a device of the character described, a unitary open bottom housing of molded composition having inner reinforcing and partitioning flanges with coplanar lower edges defining separate dust receiving and mechanism receiving compartments in the housing, spaced dust pans pivotally mounted at opposite ends of the housing, a unitary motor driven floor sweeping mechanism comprising a plate support, a motor base with spaced marginal supporting lugs mounted on the upper side of said plate support, an electric motor supported on said base, a driven shaft journaled in lugs of the base with extensions at opposite sides of the base, a floor treating unit, means supporting said floor treating unit on the shaft extensions in radially spaced relation to the shaft and below said plate support, driving connections between said motor and said driven shaft for driving the floor sweeping unit in a back and forth sweeping movement, and means for detachably mounting said mechanism within the housing with the plate support overlying the coplanar edges of the flanges to close the separate compartments.

2. In a carpet sweeper, a one-piece open bottom housing of molded composition having depending inner reinforcing and partitioning flanges with coplanar edges defining a separate mechanism receiving compartment in the housing, said housing being provided with apertures for ventilating said compartment, a unitary floor treating mechanism supported against the coplanar edges of the flanges and extending within the separate compartments, said unit comprising a base constructed and arranged to form a bottom closure for the compartment, an electric motor with ventilating fan mounted on the upper side of said base, a driven shaft journaled on said base with extensions on opposite sides of the base, a brush transversely of the housing for oscillatory movement therein, means for mounting said brush on the shaft extension in radial spaced relation to the shaft, and means connecting said motor and driven shaft for driving the floor treating unit.

3. In a motor driven carpet sweeper mechanism, a base, a driven shaft journaled on said base, a rock lever fixed to said shaft, a brush adjustably supported on said shaft in radial spaced relation in respect to the shaft, an electric motor mounted on the base and driving connections between said motor and rock lever comprising a pinion and reducing gear and an extensible and contractible pitman pivotally connected with said gear and rock lever for swinging said brush in a back and forth movement.

4. In a motor driven carpet sweeper mechanism, a base structure, aligned bearings on the upper side of the base, a driven shaft journaled in said bearings with ends extended on opposite sides of the base, a rock lever fixed to the shaft intermediate the bearings, an elongated brush

adjustably supported on the ends of said shaft in radial spaced relation to the shaft, and motivating means on the upper side of said base for oscillating said brush, said means comprising an electric motor, reduction gearing driven by the motor and a resilient pitman pivotally connected with said gearing and rock lever.

5. In a carpet sweeper mechanism, a supporting base, a driven shaft journaled on said base, a rock lever fixed to said shaft, a brush unit supported for radial adjustment on said shaft, an electric motor, a pinion and reduction gear driven by said motor, and an extensible and contractible pitman connecting said gear and rock shaft to oscillate said brush, said pitman comprising rod sections pivotally connected respectively with the rock shaft and gear, and a coil spring connecting the rod sections in alignment.

6. In a carpet sweeper, a one-piece open bottom housing of molded composition, a unitary electric motor driven sweeper mechanism comprising an oscillating brush detachably mounted within the housing, spaced dust pans pivotally mounted in the sides of the housing at front and rear portions thereof so as to telescope within the housing in closed position and to swing downwardly and outwardly to open the housing, each of said pans comprising a formed sheet metal member having vertical end walls, a curved rear wall and a bottom wall having a raised transverse portion defining a dust retaining wall and having integral portions thereof extending downwardly to define supporting gliders, said gliders being tapered downwardly to provide relatively small supporting surfaces whereby the sweeper can be glided over a surface in any direction while in operation, said gliders being tapered downwardly to provide relatively small supporting surfaces to minimize friction in movement of the pan over a surface in any direction.

7. A carpet sweeper dust pan comprising a formed sheet metal member having vertical end walls, a curved rear wall and a bottom wall having a longitudinally raised portion defining a dust retaining dam and integral spaced portions struck downwardly to provide supporting gliders for spacing the pan above a supporting surface.

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