

May 16, 1944.

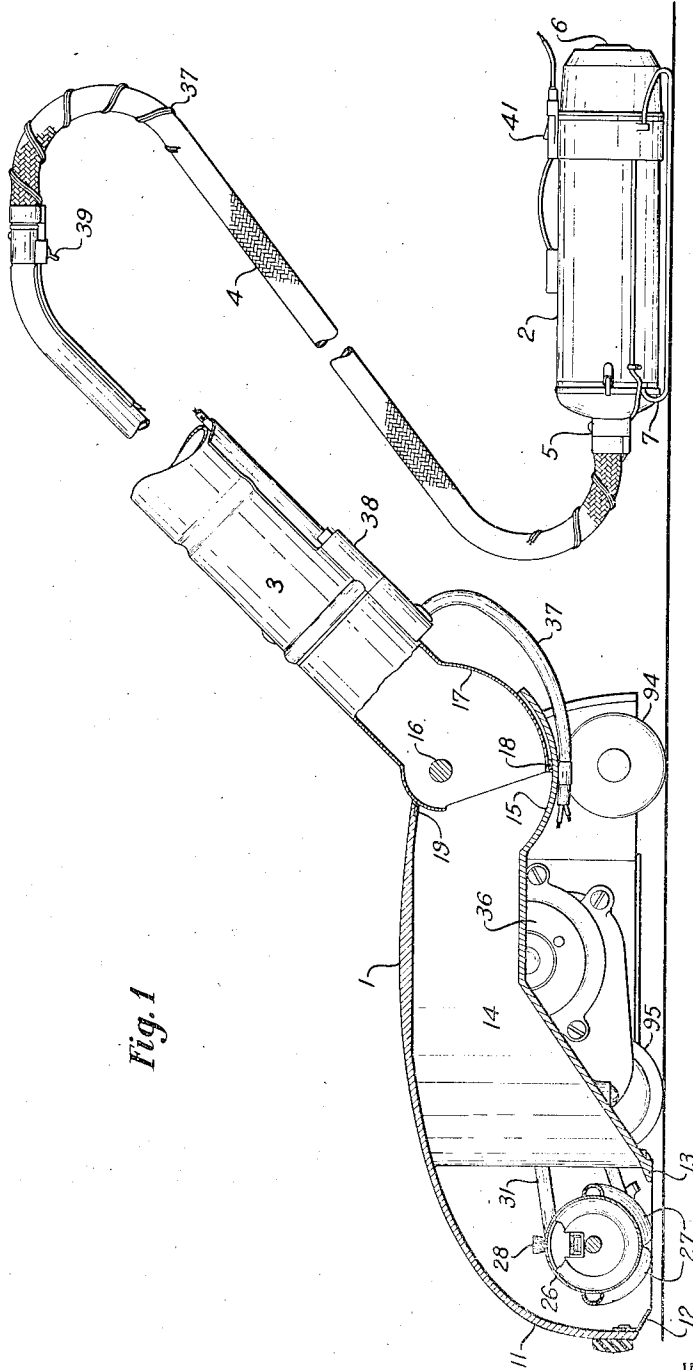
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2,348,861

SUCTION CLEANER

Filed June 21, 1941

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

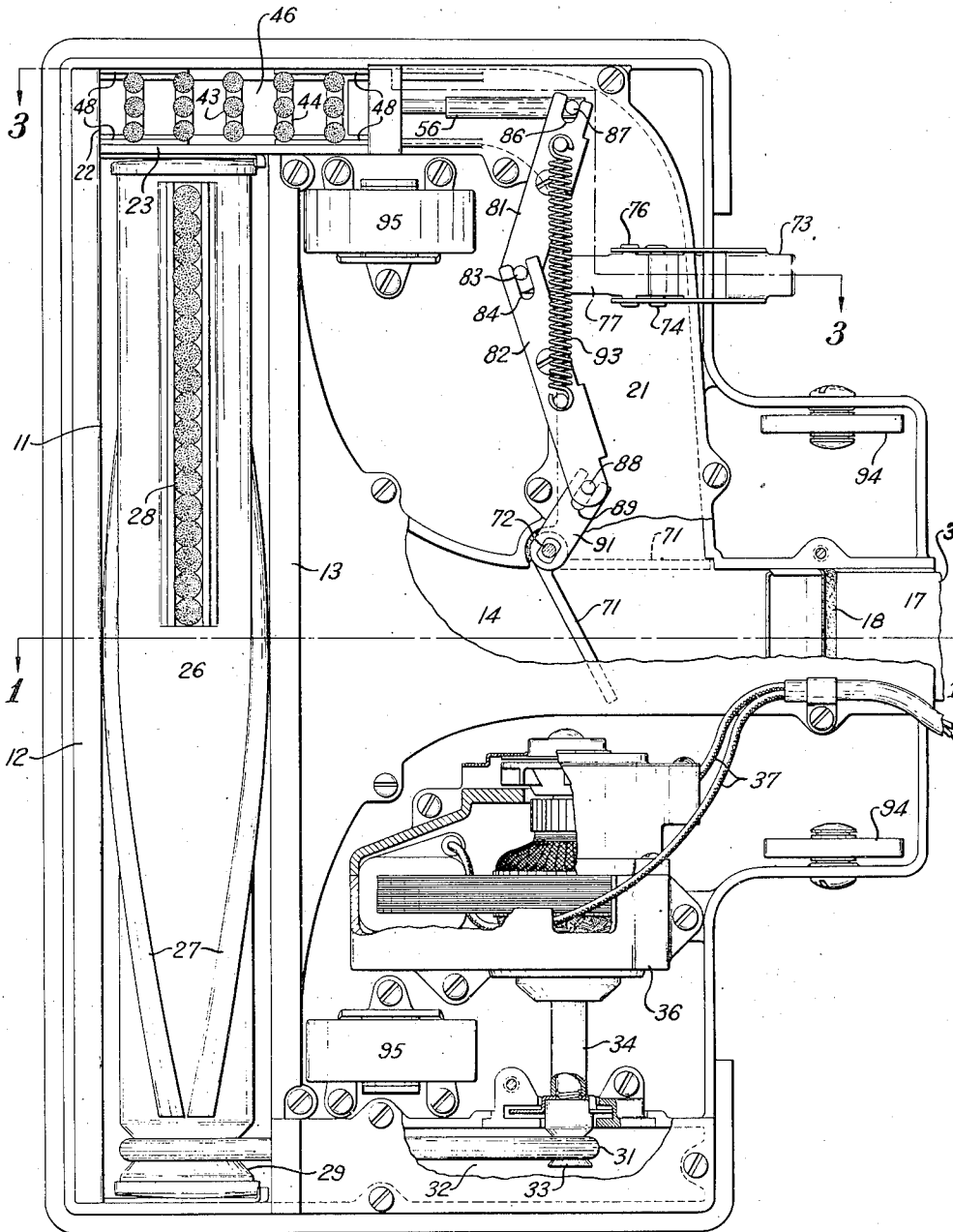


Fig. 2

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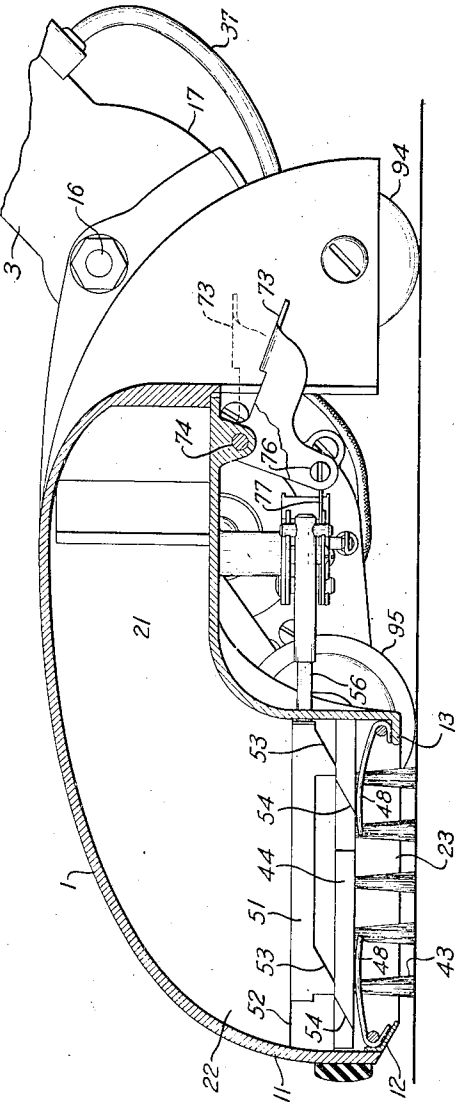


Fig. 3

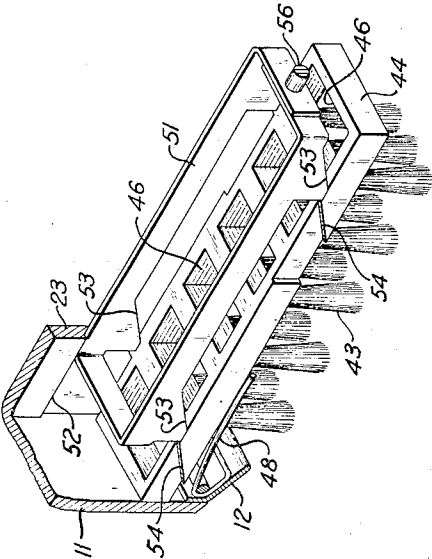


Fig. 4

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2,348,861

SUCTION CLEANER

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Application June 21, 1941, Serial No. 399,083

7 Claims. (Cl. 15-9)

The present invention relates to suction cleaners in general and more particularly to an improved suction cleaner which is adapted to clean surface coverings by the use of both surface agitating and air cleaning means and which is capable of being operated upon the floor and closely adjacent surfaces, such as baseboards, to pick up and remove foreign material immediately adjacent thereto. More specifically the present invention comprises a suction cleaner provided with surface agitating means and which incorporates cleaning and brushing means so positioned and arranged as to remove foreign material from a surface immediately adjacent a vertical wall or baseboard.

In the usual on-the-floor cleaner which, for reason of efficiency, incorporates a surface covering agitator within the nozzle, difficulty is usually experienced in removing foreign material from a surface immediately adjacent a vertical wall such as a baseboard. The agitator within the nozzle necessarily ends somewhat short of the extremity of the nozzle and, because the suction is effective across the entire length of the nozzle, it cannot be concentrated in the desired strength immediately adjacent the wall. In the suction cleaner constructed in accordance with the present invention, the usual surface-agitating means are positioned within the nozzle and in the usual on-the-floor cleaning operation air is drawn through the nozzle past the point of surface agitation by that agitator. There is also incorporated into the machine, however, a special nozzle inlet at one end of the main nozzle and which is provided with its own agitating means of a special design, and which is adapted to be connected directly to the suction-creating means to the exclusion of the cleaner main nozzle. Person-operated means are provided which enable the operator to control selectively the functional interconnections of the machine so that it is adapted for normal surface cleaning or for effective cleaning adjacent baseboards, etc. The means and mechanisms by which this is effected will hereinafter be fully set forth.

It is an object of the present invention to provide a new and improved suction cleaner. It is another object of the invention to provide a new and improved suction cleaner which is capable of cleaning surface coverings and also of cleaning immediately adjacent baseboards and other vertical surfaces which contact a horizontal surface. A still further object of the invention is to provide a suction cleaner in which a main

suction nozzle is provided for surface cleaning and in which an auxiliary nozzle is provided for cleaning immediately adjacent vertical surfaces rising from the supporting floor. A further object of the invention is to provide a suction cleaner in which the main surface-cleaning nozzle contains a rotary agitator and in which a supplementary secondary nozzle is provided with stationary agitating means which are manually adjustable to and from operating position. A further object of the invention is to provide a suction cleaner in which a main cleaner nozzle containing a surface covering agitator, and also a secondary nozzle containing a stationary agitator, are provided together with means to connect selectively the source of suction thereto. These and other more specific objects will appear upon reading the following specification and claims and upon considering in connection therewith the attached drawings to which they relate.

Referring now to the drawings in which the preferred embodiment of the invention is illustrated:

Figure 1 is a view of the complete suction cleaner unit;

Figure 2 is a bottom view of the floor unit with a portion of the air passageway broken away;

Figure 3 is a vertical section upon the line 3-3 of Figure 2 and illustrates the manually operable adjustment by which the stationary brush of the secondary nozzle is raised and lowered and also by which the air-flow-controlling valve is controlled;

Figure 4 is a isometric view of the stationary brush of the secondary nozzle and the connecting part of the adjusting mechanism.

The suction cleaner in which the present invention is illustrated comprises a floor unit, indicated generally at 1, and a suction-creating unit, indicated generally at 2. It is to be understood, however, that the present invention can be incorporated as well into a unit in which the suction-creating means form a part of the floor unit and are movable therewith. The floor unit 1 is that part of the cleaner which is manually propelled by the operator over the surface to be cleaned and includes the surface-contacting elements and means by which the dirt is to be removed from the surface. It is seen generally to include the main body, which is also indicated by the reference character 1 to which is pivotally connected a handle 3 of an enlarged tubular air-conducting type, preferably rigid. The upper end of the handle 3 connects to a flexible air-

conducting conduit 4 which leads directly to the intake 5 of the suction-creating unit 2. The latter houses the usual suction-creating and air-filtering means which are designed to draw air through the conduit 4 from the floor unit, filter that air to remove the carried foreign material therefrom and to exhaust it through the exhaust outlet 6 into the surrounding atmosphere. The suction-creating unit 2 may be any common and well known cannister type suction-creating unit but is preferably mounted upon suitable supporting means 7 which enable it to be pulled around upon the supporting surface with but little effort by a force exerted through the flexible tube 4.

Turning again to the floor unit 1, it is seen that the body thereof comprises a nozzle 11 formed with surface-contacting front and rear lips 12 and 13. An air passageway 14 extends rearwardly from the nozzle 11 which at its rearward end is formed as a seat 15 the bottom surface of which extends concentrically with the pivotal axis 16 of the handle 3. The lower end 17 of the handle is contoured on its underside to conform to the seat 15 so that in the pivotal movement of the handle in a vertical plane between a substantially vertical position and a substantially horizontal position the curved portion 17 will at all times move closely adjacent to the seat 15. A seal 18 carried by the handle portion 17 reduces the leakage of air therebetween to a minimum. There is additionally a fixed seal 19 carried by the upper wall of the air passageway 14 in contact with the upper side of the handle which also aids in reducing the air leakage.

A second air passageway 21 joins the passageway 14 immediately forward of the handle mounting and extends laterally to the side of the machine and then forwardly to end in a downwardly facing opening or mouth immediately adjacent the end of main nozzle 11. The forward and lower end of this second passageway 21 at its point of adjacency to the nozzle 11 can be recognized as a second nozzle, indicated by the reference character 22, and will be referred to as the secondary nozzle, the main nozzle 11 being the primary nozzle. It is to be observed that the nozzles 11 and 22 have a common dividing wall 23 which extends substantially into the plane of the nozzle lips 12 and 13 thereby completely separating the nozzle openings.

Surface-agitating means are provided within each of the nozzles 11 and 22, the agitating means for the former being positively driven while those of the latter are stationary. There are also provided valve means which are manually controllable which determine selectively the flow of air into the two nozzles.

The agitating means of the primary nozzle 11, it is seen, comprise a rotary agitator 26 of the usual type which comprises rigid beater elements 27 and flexible brush elements 28. A pulley surface 29 at the end of the agitator spaced farthest from the nozzle 22 seats a power-transmitting belt 31 which extends rearwardly in a belt channel 32 to connect to a driving pulley 33 carried upon the extended end of a motor shaft 34. That shaft forms a part of a separate driving motor which is provided especially for the agitator 26 and is indicated generally by the reference character 36. It is seen to be positioned upon the underside of the floor unit 1 immediately rearward of the nozzle 11 and to the side of the air passageway 14. Conductors 37 extend upwardly

from the motor 36 to a separable plug 38 and thence along the handle 3 to a manually operable switch 39. From the switch 39 the conductors extend along the flexible conduit 4 to be connected at the suction-creating unit 2 to an incoming source of current. The latter unit is provided with its own current-controlling switch 41 upon its upper surface by which the suction-creating means are controlled.

The agitating means for the secondary nozzle is illustrated in Figures 2, 3 and 4 and is seen to comprise a stationary brush 43 having spaced tufts of bristles and a back 44 formed with a plurality of apertures or ports 46 which open between the bristle tufts. Back 44 is seen to extend the width of the secondary nozzle 22 and at its ends contacts the front and rear walls thereof. Coil springs 48, 48 carried by the front and rear nozzle lips 12 and 13 abut the underside of the rigid brush back 44 and at all times urge it upwardly within the nozzle 22. The brush movement upwardly under the urging of the springs 48 is restricted, however, by the presence above the brush back of a cam positioner 51 which is mounted within the nozzle 22 for sliding movement forwardly and rearwardly, being held in sliding contact with the overhanging shoulder 52 on the adjacent face of the wall 23 by the force of springs 48 transmitted through the brush back 44. The side walls of the cam positioner 51 are formed along their undersides with spaced downwardly inclined cam surfaces 53 which are adapted to cooperate with opposed similarly sloped surfaces 54 on the back 44. A shaft 56 connects to the rearward end of the positioner 51 and extends slidably through the rear wall of the nozzle 22 and is adapted, upon being itself moved forwardly and rearwardly, to move the positioner 51 from a rearward position in which the brush is held in a lower operating position, illustrated in Figure 3, to a forward position in which the cam surfaces 53 abut the similarly inclined surfaces 54 upon the brush back and in which position the brush is raised, by the force of springs 48, from its surface-contacting position to an upper inoperative position.

Manually operable means are provided by which the plunger 56 is reciprocated forwardly and rearwardly to adjust the brush. These means are clearly illustrated in Figures 2 and 3. Before they are described, however, reference will be made to the air-flow-controlling valve structure for the same manually operable means controls both the valve and the brush.

Referring to Figure 2 in particular, a valve 71 is seen to be pivoted upon a vertical shaft 72 at the junction of the passageways 14 and 21. Valve 71 is adapted to assume either the full line or dotted line positions in which it closes, respectively, the primary nozzle 11 and the secondary nozzle 22 from the source of suction as represented by the handle 3 and the suction-creating means connected thereto. It is only necessary to pivot the valve 71 between these two positions to determine into which nozzle air will be drawn by the suction means of the cleaner, and the means which control the valve position is, as stated above, the same means which controls the position of the stationary brush in the nozzle 22.

The manually operable means which controls both the stationary brush position and air-flow-controlling valve position is clearly illustrated in Figures 2 and 3 and is seen to comprise first a two position foot pedal 73 which is pivoted at

74 and pivotally connected therebeyond at 76 to a link connector 77. A pair of centrally pivoted lever arms 81 and 82 are pivotally mounted upon the underside of the casing and extend substantially horizontally. Lever 81 carries a pin 83 which is connected to the connector 77 and which slidably seats within a slot 84 in the second lever 82.

The opposite end of link 81 is slotted at 86 and slidably seats a pin 87 carried by the rear end of the shaft 56. Similarly, the opposite end of the lever 82 carries a pin 88 which seats within a slot 89 formed in a link 91 which is non-rotatably carried by the vertical shaft 72 of the valve 71. A coil spring 93 interconnects the levers 81 and 82 from opposite sides of their pivot points, the relationship being such that with the adjacent ends of the levers 81 and 82 pivoted either slightly forwardly or rearwardly the spring 93 passes over center with respect to their pivotal axes and tends to draw their outer ends together as is illustrated in Figure 2. As the permissible pivotal movement is limited it is clear that the spring 93 performs a locking function. The change in position of the lever arms 81 and 82 is accomplished by upward and downward pivotal movement of the foot lever 73 which, as stated, is connected thereto through the link 77, and this movement has the obvious result of moving the shaft 56 forwardly and rearwardly to raise and lower the brush, and also of moving the valve 71 into closing relationship with respect to passageways 14 and 21, the spring 93 functioning to maintain the parts in the new position until intentionally altered by the operator repositioning the foot lever 73.

It is also to be understood that the interconnections are such that with the air passageway 21 closed by the valve 71 the brush 43 is in its raised inoperative position and cleaning air will be drawn through the nozzle 11. Also, that with the valve 71 closing the passageway 14 leading to the main nozzle 11 the cleaning air is drawn through the secondary nozzle 22 and the brush 43 is in its lower operative position.

The floor unit 1, as is usually the case in manually operable floor cleaners is movably supported upon wheels which in the present instance are indicated at the front of the machine by 95 and at the rear of the machine by 94. These wheels preferably have a relationship such that the front end of the machine maintains its proper adjustment with respect to the surface covering undergoing cleaning at all times in cleaner operation.

The operation of the cleaner constructed in accordance with the present invention is as follows. The operator intending to place the machine in use, it being interconnected as illustrated in Figure 1, places the suction-creating means of unit 2 in operation by closing the electrical switch 41 which connects to the incoming power source. Air is immediately drawn through the floor unit 1, upwardly through the handle 3 and flexible tube 4 and into the suction-creating unit 2. If the operator desires to clean a floor surface or a surface covering thereover he propels the machine back and forth thereon by a force exerted upon the handle 3. If a floor covering is undergoing cleaning the operator will close the switch 39 which will energize the electric motor 36 whereupon agitator 26 within nozzle 11 will be rotated by the power transmitted thereto by the belt 31. In this on-the-floor cleaning operation the pivoted foot lever 73 is in

its upper position and the valve 71 will be in the dotted line position illustrated in Figure 2 in which the passageway 21 is closed so that cleaning air will be drawn through the main cleaner nozzle 11. Because of the position of the foot lever 73 the stationary brush 43 will be held in its upper position by the spring 48 in its inoperative position, this being proper for no cleaning air is being drawn through the secondary nozzle 22. In this on-the-floor cleaning, then, the operator will propel the machine back and forth and the foreign material upon the surface covering will be dislodged by the agitator 26 and the air passing into the nozzle 11 will carry that dislodged foreign material through the air passageway 14 and into the hollow handle 3 and thence into the suction-creating unit 2. The operator is able to move the machine back and forth as in the usual suction cleaner through the pivotal mounting of the hollow handle 3 upon the body of the floor unit.

Upon completing cleaning of the surface covering the operator may desire to clean the floor immediately adjacent the baseboard of the room. This will require that the cleaner be moved closely adjacent to the baseboard and that the operator depress the foot lever 73 from its upper position to the position illustrated in Figure 3. This movement of the foot lever immediately effects the pivotal movement of the valve 71 from the dotted line position, illustrated in Figure 2, to the full line position and it also simultaneously produces the downward movement of the stationary brush 43 into the position illustrated in Figure 3, the cam surfaces 53 sliding rearwardly upon the brush back 44 to accomplish this result.

In this relationship the main cleaner nozzle is now sealed from the suction-creating means, the passageway 14 being closed by the valve 72, and the entire air flow to the cleaner enters through the secondary nozzle 22 and passes through the air passageway 21 into the hollow handle. The machine is moved by the operator along the baseboard of the room and the stationary brush 43 passing closely adjacent to the baseboard stirs up the foreign material adjacent thereto. The latter is picked up by the air stream entering the nozzle, passes upwardly through the ports 46 in the brush back and upwardly into the air passageway 21, and thence to the suction-creating means.

Upon the operator completing the cleaning of the room around the baseboard the machine can again be converted into a surface covering cleaner simply by raising the manually operable lever 73 from the position illustrated in Figure 3 to the dotted line position illustrated therein which movement of the lever will result in the repositioning of the valve 71 and of the stationary brush unit 43 to that initially found in the on-the-floor cleaning operation.

I claim:

1. In a suction cleaner, a body formed with a main elongated nozzle and a secondary nozzle of lesser extent positioned at the end thereof and at the side of said body with its length perpendicular to the length of said main nozzle, air passageways extended from said nozzles to a common junction, a stationary surface-contacting agitating element vertically adjustable in the mouth of said secondary nozzle, and single manually operable means to control selectively the flow of air through each of said nozzles and to raise and lower said agitating element.

2. In a suction cleaner, a body formed with a

main elongated nozzle and a secondary nozzle of lesser extent positioned at the end thereof and at the side of said body, air passageways extended from said nozzles to a common junction, a rotary agitator in said main nozzle, a motor to drive said rotary agitator, a stationary surface-contacting agitating element vertically adjustable in the mouth of said secondary nozzle, and means to energize and de-energize said motor, raise and lower said agitating element in said secondary nozzle, and selectively control the flow of air through each of said main and secondary nozzles.

3. In a suction cleaner, a body formed with a main elongated nozzle and a secondary nozzle of lesser extent positioned at the end thereof and at the side of said body, air passageways extended from said nozzles to a common junction, a vertically adjustable brush in said secondary nozzle, and single means at said junction to control selectively the flow of air through said nozzles and to raise and lower said brush.

4. In a suction cleaner, a main nozzle, a secondary nozzle, a vertically adjustable brush in said secondary nozzle, valve means to control selectively the flow of air through each of said nozzles, and single manually operable means to adjust simultaneously said brush and to operate said valve.

5. In an elongated suction cleaner, a main nozzle, a secondary nozzle at one end thereof, an adjustable brush in said secondary nozzle, valve means to control selectively the flow of air through said nozzles, and manually operable means to adjust said brush and to operate said

valve, comprising a manually operable two-position lever, a pair of lever arms pivoted intermediate their ends and connected at their adjacent ends for conjoint pivotal movement, one of said lever arms being connected to said brush and the other to said valve, tension means interconnecting said lever arms for over-center movement with respect to the pivotal axes of said lever arms to hold said lever arms in an adjusted position, and a link connecting said manually operable lever to the adjacent ends of said lever arms to transmit the operating force therebetween.

6. In a suction cleaner, a body, a main suction nozzle extended transversely across the front end of said body, a secondary nozzle of lesser size at the end of said main nozzle and adjacent one side of said body, a stationary brush in the mouth of said secondary nozzle including spaced tufts of bristles and a carrying back therefor, said back being formed with openings to permit cleaning air to enter said nozzle therebetween and means to control selectively the flow of air through each of said nozzles.

7. In a suction cleaner, a body, a main suction nozzle extended transversely across the front end of said body, a secondary nozzle of lesser size at the end of said main nozzle and adjacent one side of said body, valve means to control selectively the flow of air into said nozzles, a vertically adjustable brush in the mouth of said secondary nozzle, and manually operable means to control said valve and to position said brush in operative and inoperative positions.

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