

Sept. 13, 1955

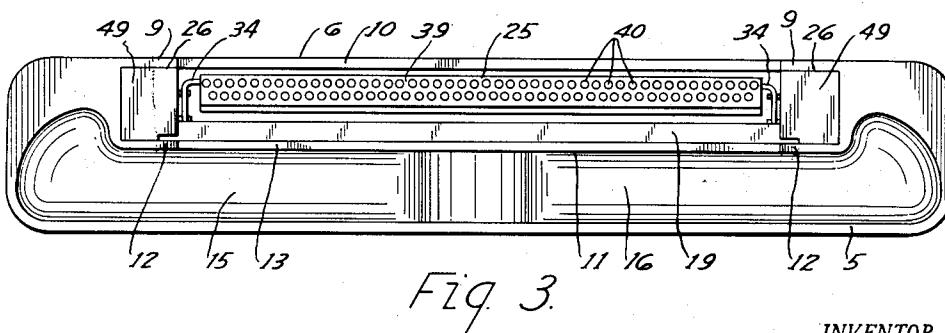
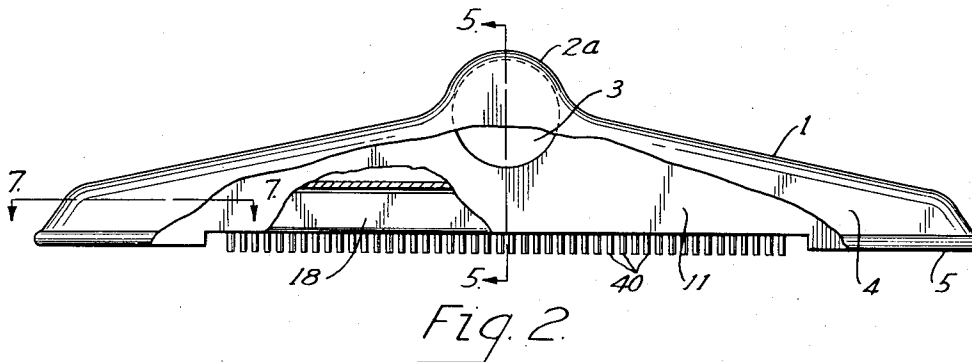
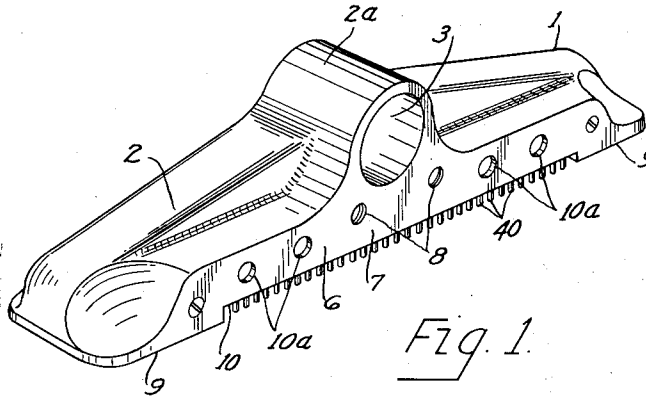
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2,717,409

VACUUM CLEANER NOZZLE

Filed Sept. 15, 1950

4 Sheets-Sheet 1



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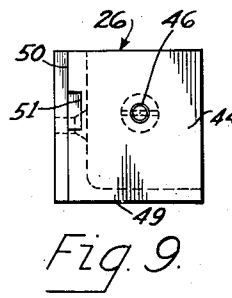
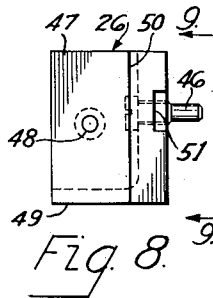
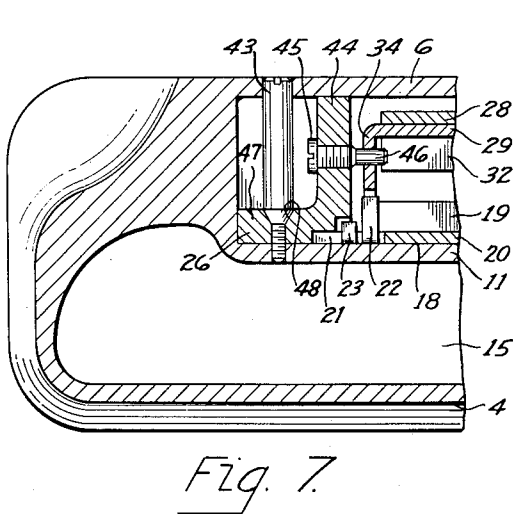
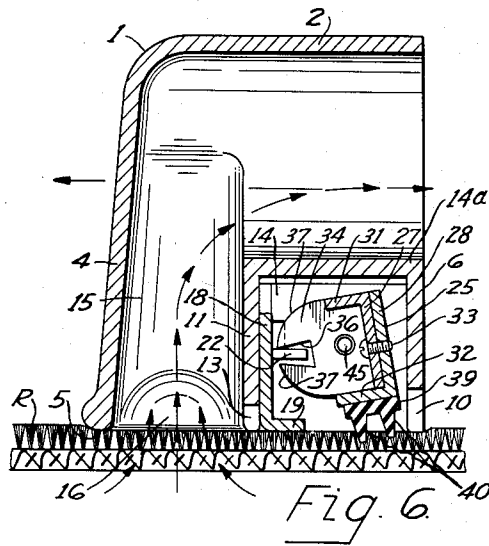
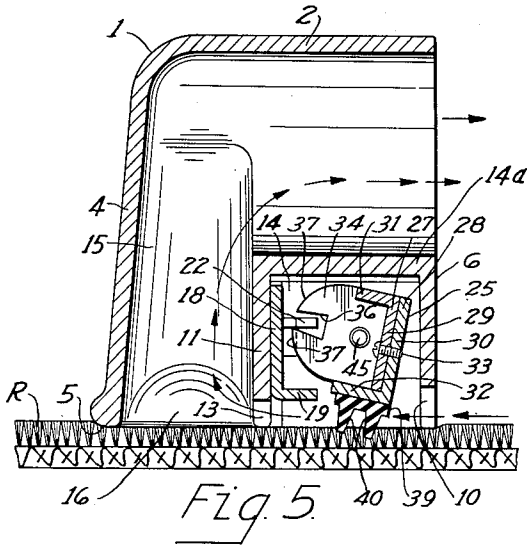
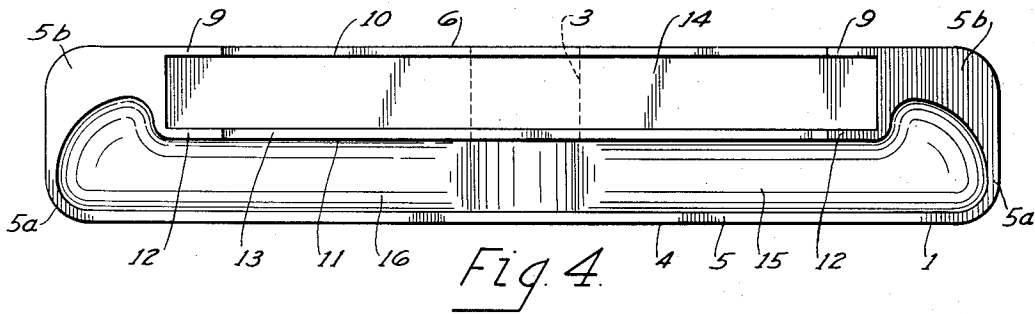
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4 Sheets-Sheet 2



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4 Sheets-Sheet 3

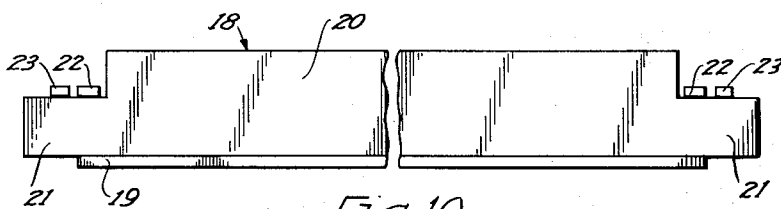


Fig. 10.

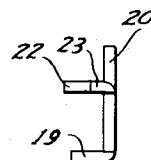


Fig. 11.

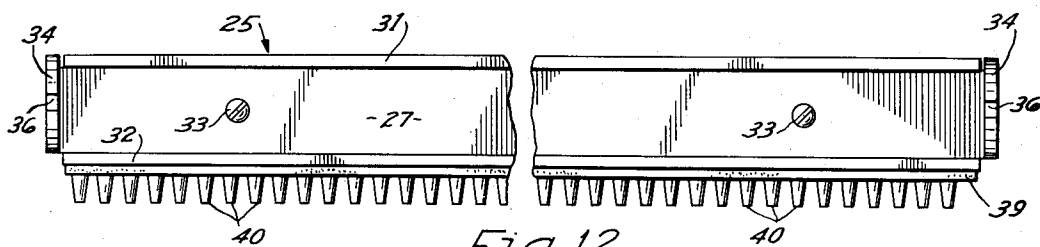


Fig. 12.

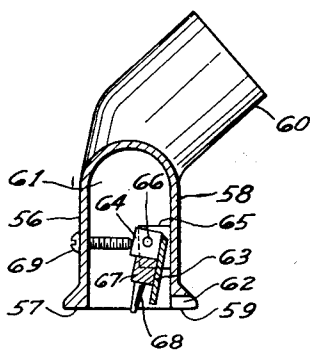


Fig. 13.

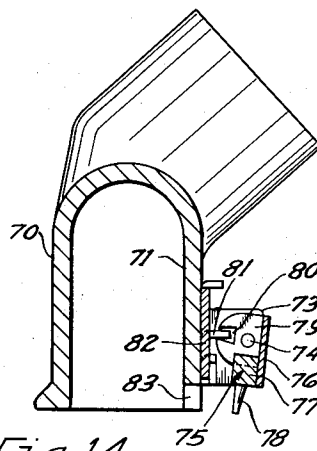


Fig. 14.

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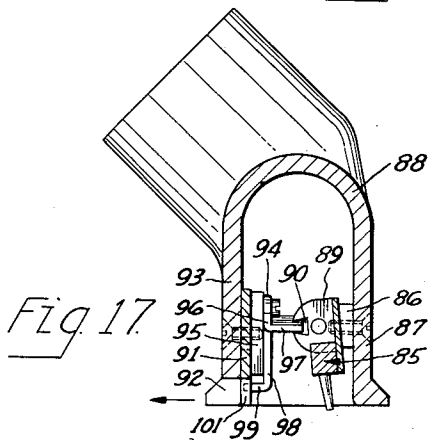
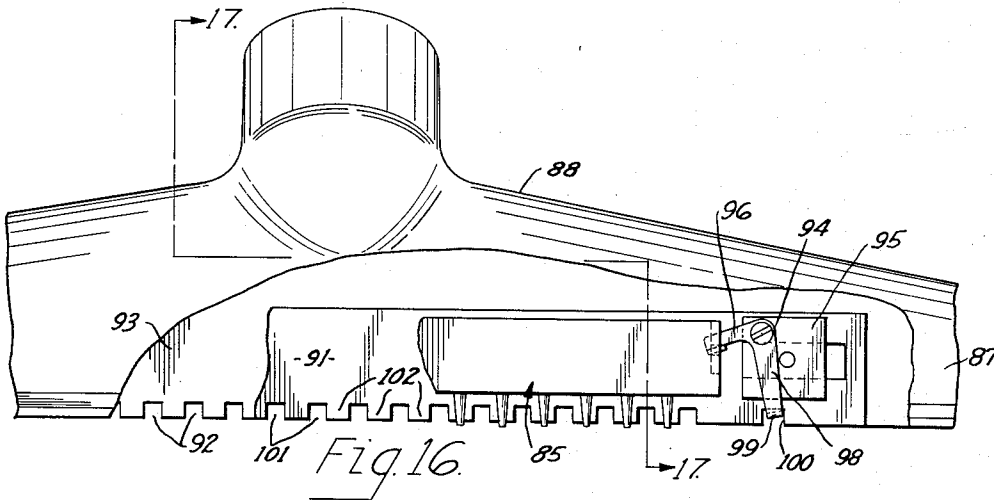
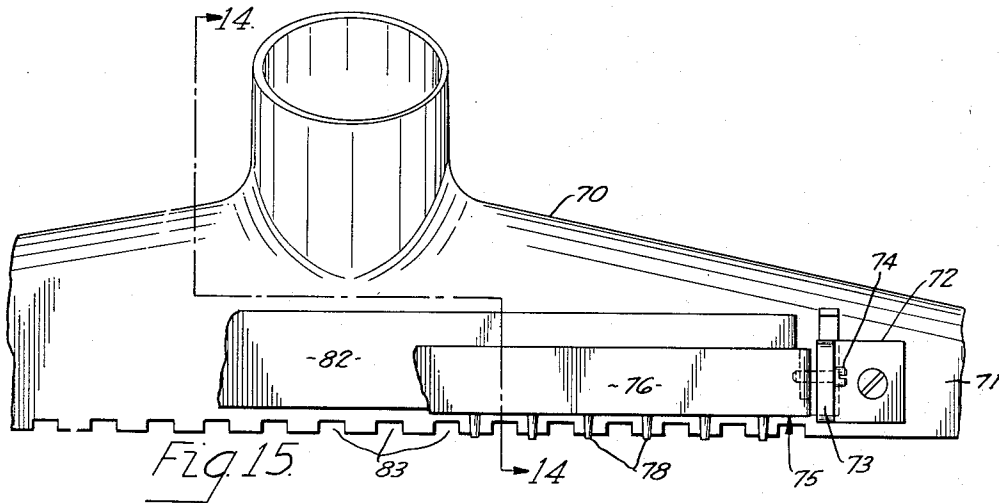
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4 Sheets-Sheet 4



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1

2,717,409

VACUUM CLEANER NOZZLE

Herbert T. Draudt, North Olmsted, Ohio

Application September 15, 1950, Serial No. 185,074

11 Claims. (Cl. 15—369)

This invention relates to vacuum cleaners and in particular to vacuum cleaner suction nozzles which are adapted to ride over the surface of carpets, rugs and the like to remove dirt and other foreign particles therefrom.

Foreign matter or dirt of the type sought to be removed from the surface of carpets by conventional vacuum cleaners usually lodge (a) on the top surface of the rug nap as in the case of lint, animal hair, threads, etc., and/or (b) in the roots of the nap where the same joins the rug backing below the top surface of the rug as in the case of grit and sand. An effective method of removing the first type of foreign matter which tends to cling to the nap is to employ a nozzle which draws in air at high velocity over the surface being cleaned. A satisfactory and effective method of removing the second type of dirt is to concentrate the suction force so that the flow of air passes upwardly through the carpet or other surface being cleaned so as to dislodge and draw out the foreign particles embedded below the surface. These two methods of cleaning may be accomplished by providing a relatively small opening or orifice or series of small orifices in the surface contacting lip or rim of the nozzle and controlling the flow of air along the surface of the rug through said openings by means of gates and the like. When these small orifices are closed or substantially closed, the main force of suction will be utilized for "through rug" cleaning to remove sub-surface particles, and when they are open the suction will be applied to top surface cleaning since the resistance to flow of air through these small orifices will be less than through the body of the rug or carpet. Since the size of the orifices is small in comparison to the size of the main opening in the bottom of the nozzle, surface air will pass through the orifices at a relatively high velocity.

With the rug cleaning efficiency that has been attained in modern vacuum cleaners, vacuum cleaning of rugs and the like has become a routine household chore. The experienced operator's attention is mainly concerned with guiding the cleaner head or nozzle to the uncleaned portions of the rug or carpet and in maneuvering the nozzle around furniture and other objects resting on the surface. Little if any attention is paid to the efficiency of the cleaning operation and as a result, if lint, animal hair, threads or the like are passed over by conventional nozzles they are likely to remain on the rug. On the other hand, if the operator notices such top surface particles, he or she must perform some additional operation to remove same which interrupts and therefore slows down the whole cleaning operation.

I have overcome these disadvantages by providing a vacuum cleaner nozzle which effectively cleans both surface and sub-surface foreign particles without requiring additional attention from the operator or additional steps on the operator's part during the cleaning operation.

An object of the present invention is to provide a vacuum cleaning nozzle which readily removes foreign particles from the surface of and below the surface of rugs and carpets without additional attention or extra

2

steps on the part of the operator. A further object of my invention is to provide a vacuum cleaner nozzle which permits efficient vacuum cleaning of rugs in a minimum of time. Another object is to provide a vacuum cleaning nozzle that is simple in design, economical to manufacture and which can be handled with facility and ease by the operator.

These and other objects of my invention will readily appear from the following description of preferred embodiments thereof reference being had to the accompanying drawings in which Figure 1 is a perspective rear view of a preferred form of nozzle embodying my invention; Figure 2 is a front elevation of the nozzle of Figure 1 with portions thereof cut away to show details of construction; Figure 3 is a bottom view of the nozzle of Figure 1; Figure 4 is a view similar to Figure 3 with certain parts removed, the nozzle housing alone being shown; Figure 5 is a transverse section of the nozzle taken on the line 5—5 of Figure 2 and showing the gate in the open position; Figure 6 is a transverse section similar to Figure 5 showing the gate in the closed position; Figure 7 is a fragmentary horizontal section taken on the line 7—7 of Figure 2; Figure 8 is a front view of a pivot and guide block which form a part of my invention; Figure 9 is a side elevation of the block of Figure 6 as viewed along the line 9—9 of Figure 8; Figure 10 is a rear elevation of a gate which forms a part of my invention; Figure 11 is an end view of the gate of Figure 10; Figure 12 is a front elevation of an agitator element which forms a part of my invention; Figure 13 is a transverse section showing a modified form of my improved nozzle; Figure 14 is a transverse section taken on the line 14—14 of Figure 15 showing another form of nozzle; Figure 15 is a fragmentary rear elevation of the nozzle of Figure 14; Figure 16 is a fragmentary front elevation of another modified nozzle, a portion thereof being cut away to show the details of construction; and Figure 17 is a transverse section taken on the line 17—17 of Figure 16.

It is usual practice in vacuum cleaning rugs and carpets for the operator to guide the cleaner nozzle over the surfaces being cleaned in a series of reciprocating movements and gradually advancing the nozzle until the entire area has been covered. In order to clean both surface and sub-surface foreign particles from rugs, carpets and the like, I have provided a nozzle of the general design heretofore described which includes a gate or other closure means for controlling flow of high velocity surface air into the nozzle and an agitator member which coacts with the gate in such a manner as to scrape and comb the rug surface and loosen threads, lint, and the like so that these particles will be readily picked up by the high velocity stream and carried into the nozzle. More specifically, the agitator member is mounted on the nozzle head with the agitator tips in contact with the surface of the rug when the nozzle is in proper position for cleaning and with the agitator member free to pivot with respect to the nozzle in response to movements of the nozzle over the surface. The gate is actuated to open and close the high velocity orifices in the nozzle by the agitator member which at the same time works and loosens the surface particles adjacent the orifices so that when the orifices are open the lint, threads, etc., are carried by the high velocity surface flow through the orifices and into the nozzle. For example, on the forward stroke of the nozzle over the surface being cleaned, the agitator member effects a preliminary agitating of the surface and rocks or pivots about its mountings to move the gate to the closed position, that is, the high velocity openings are closed and the full force of suction is employed to clean through the body of the rug or carpet to remove sub-surface foreign matter. On the return or rearward stroke, the agitator

3

member pivots in the opposite direction to move the gate to the open position and again scrapes and loosens the surface particles so that same are picked up and carried by the high velocity stream through the small orifices into the nozzle.

Referring now to the drawings and in particular to Figures 1 and 2, a preferred form of my improved nozzle comprises an elongated housing 1 open on its underside with a main inlet orifice 15 which is adapted to lie adjacent the top surface of the rug or carpet R to be cleaned and having its upper portion closed by a top wall 2 which is embossed as indicated at 2a and provided with an outlet passageway 3 therein which communicates with a vacuum source, not shown, through a conventional hollow wand or handle, not shown. Extending downwardly from top wall 2 and transversely of the embossed portion 2a are laterally spaced front and rear walls 4 and 6 and a middle wall 11. The front wall 4 has a straight continuous bottom edge or lip 5 joining curved bottom end edges 5a and bottom end surface 5b, all in the same plane and defining in part the main inlet orifice 16. The middle wall 11 terminates at its bottom ends in short lips or edges 12 in the plane of the orifice 16 and joining into the surfaces 5b. The central portion of the middle wall 11 is notched between the lips 12 and defines a narrow elongated orifice 13 controlled by the gate 18. The front, end and middle walls define the main suction chamber 15 of the nozzle through which air passes from the inlet orifices 13 and 16 to the outlet passageway 3. The rear wall 6 may be formed with a smooth flat exterior surface 7 with threaded bolt holes 8 to permit the housing to be connected to an auxiliary swivel carriage unit, not shown, for supporting the nozzle in position adjacent the rug surface. The use of a supporting carriage on the rear of the housing is optional, but is mentioned and provided for to illustrate and facilitate the desirable maintenance of the orifice 16 in the plane of the carpet. The carriage tends to support the wand more or less and add to the "feel" that tells the operator when the orifice departs from its best relation to rug or carpet. The nozzle is manipulated and operated by means of the hollow wand or handle inserted in passageway 3 and connected to the housing in a suitable manner to permit the nozzle to swivel on the end of the wand. I prefer that my nozzle have substantial fore and aft depth of rug contact, Figures 1, 3-6, to facilitate parallelism between the orifice 16 and the surface to be cleaned and for the "feel" mentioned in connection with the use of the auxiliary carriage, especially when the latter is not employed.

The rear wall 6 may at its extreme ends terminate in short lips 9 in the plane of the orifice 16 and lips 5, 5a, 5b and 12, but throughout the major portion of its length the rear wall terminates short of the plane of the orifice 16, being notched longitudinally and defining with the surface to be cleaned an orifice 10 preferably larger than the orifice 13. The rear wall 6 is also perforated as at 10a. The rear wall 6 defines with the middle wall 11 a chamber 14 within which are disposed the gate 18 and its actuating mechanism and agitator 39 presently to be described. The chamber 14 is closed at its top by the wall 14a and is open at the bottom. The apertures 10a open to the upper portion of the chamber 14 and permit air to move therethrough along with the air entering through the orifice 10 to feed the orifice 13 when the gate 18 is open as shown in Figure 5. The chamber 14 communicates with the chamber 15 only through the orifice 13 when the gate 18 opens the orifice 13 to facilitate high velocity surface cleaning. Air entering the chamber 14 through the apertures 10a flows downwardly and across the chamber 14 tending to clean the upper parts of the chamber and its contents. Air passing from the orifice 10 to the orifice 13 tends to flow with increasing speed from the former to the latter and between and transversely of the projections 40 of the agitator 39, Figure 5, tending to clean the agitator. I prefer that the aggregate area of

4

the orifices 10 and 10a be so substantially greater than the orifice 13 that substantially maximum air movement at maximum velocity through the orifice 13 will not be impaired.

The orifice 13 in the center wall 11 constitutes an auxiliary opening in the housing adjacent the surface being cleaned which permits high velocity air flow to pass from the exterior of the nozzle along the rug surface into front chamber 15. As heretofore mentioned, the high velocity of surface flow results from constricted flow through the relatively small orifice 13 which, by way of example, may be about $\frac{1}{8}$ - $\frac{3}{16}$ inches high by 6-7 inches long, and in all events substantially of the same area as the outlet passage 3. The effect of this flow is that surface lint and other similar clinging matter in the path of the high velocity stream will be dislodged from the nap of the carpet or rug and carried into the chamber 15 and finally into the dirt receptacle associated with the cleaner. However, the "through rug" cleaning efficiency of the nozzle is materially reduced when this auxiliary opening 13 is open. It is therefore desirable that the auxiliary surface opening be closed during at least a part of the cleaning operation.

As discussed above the cleaning of a rug by a vacuum cleaner is usually accomplished by a series of forward and rearward strokes of the nozzle over this surface. I have found that if the auxiliary opening in the nozzle head is closed during half of the cleaning cycle, for example, on the forward stroke, and is open on the other half of the cycle, that is, on the rearward stroke, both surface and sub-surface foreign particles will be effectively removed. To effect opening and closing of the auxiliary opening during a cleaning cycle, I have provided an elongated gate member 18 in rear chamber 14 of the housing adjacent center wall 11 and the orifice 13 therein. Gate 18 is angle shaped having a smooth bottom flange 19 integral with a vertically extending wall portion 20, see Figures 10 and 11. Guide arms 21 project from each end of wall portion 20 to guide the gate in substantially vertical movements across orifice 13 of center wall 11. Gate actuating lugs 22 are formed on each of the guide arms 21 and project rearwardly therefrom to engage slots 36 in forwardly facing ears 34 of the agitator assembly 25 as will be described in detail later. Another lug 23 is formed on each of the arms 21 adjacent the gate actuating lugs 22 and project rearwardly into slots 51 formed in stationary guide blocks 26, see Figures 7, 8 and 9, located at opposite ends of rear housing chamber 14 and cooperate therewith to limit the extent of vertical movement of the gate member. Slots 51 in the guide blocks 26 are of proper length to permit gate member 18 to close orifice 13 at the lower limit of movement, that is, with bottom flange 19 lying in the plane of center wall bottom edge 12, and to open the orifice at the upper limit of movement, that is, with bottom flange 19 spaced above the surface being cleaned by a distance at least as great as the height of orifice 13. The length of gate member 18 is slightly greater than the length of orifice 13 so that the gate effectively blocks the flow of air therethrough when the gate is moved to a closed position over the slot. The rounded bottom surface on flange 19 offers a minimum of resistance to the sliding of the nozzle over the surface being cleaned when the gate has been lowered to the closed position.

In order to actuate the movement of gate member 18 between the open and closed positions, an agitator assembly generally indicated at 25 is pivotally connected to blocks 26 so as to pivot or swing about an axis substantially parallel to the longitudinal axis of the nozzle. The agitator assembly 25 consists of elongated angle members 27 and 28, each having vertical portions 29 and 30 and horizontal flanges 31 and 32, respectively. Members 27 and 28 are fastened together by screws 33 so that the vertical portions 29 and 30 of each lie adjacent each other and form a rigid channel shaped assembly as shown. Each end of member 27 has an ear 34 formed

5

integrally therewith and bent or folded at right angles to project transversely of portion 29. The ears 34 have pivot holes 35 formed therein and have slots 36 formed on the rounded outer edges 37 thereof for engaging the gate actuating lugs 22 on the gate member 18. It will be noted that the slots 36 are formed to converge inwardly toward the outer edges 37, that is, the slots 36 are narrower at the point adjacent the edges 37 than at points remote from the edges, whereby to permit vertical movement of lugs 22 as the ears 34 are rotated without binding or jamming of same in the slots. The edges 37 of the ears are rounded as shown to permit free movement of the gate in vertical directions without interference from the ears.

An agitator 39 comprising a plurality of spaced conical projections or tips is secured to the underside of flange 32 so that the tips 40 extend downwardly and contact the surface being cleaned at all times during the cleaning cycle. Although the tips 40 may be formed of short relatively stiff projections of animal hair or the like suitably secured to flange 32, I prefer to form or mold the agitator 39 from a suitable wear resistant resilient material such as rubber of the type used in automobile tires and to make the tips 40 integral with the agitator. Each of the tips 40 tapers slightly toward its end to promote flexibility and because of its composition is particularly well adapted to resist the wear which results from constant contact with the surface being cleaned. The agitator 39 preferably has two rows of tips 40, the tips in each row being spaced from each other and staggered with relation to the projections in the adjacent row. With this arrangement of agitator tips, resistance to the flow of high velocity surface air through the agitator is held to a minimum and also a space is provided into which each agitator projection may fold or bend without jamming against the adjacent projection in the other row. This form of air pervious agitator has the additional advantage of effectively scraping, combing and otherwise agitating the surface of the carpet or rug so as to loosen hairs, threads and the like without becoming entangled with same.

Stationary guide blocks 26 located at each end of the rear chamber 14 are secured to the housing by means of screws 43 which pass through suitable apertures in rear wall 6 and threadedly engage appropriate holes in center wall 11 of the housing. Each block has a wall 44 extending transversely of the rear chamber 14 which is drilled or otherwise formed to receive a pivot screw 45 which has a cylindrical projection 46 extending beyond the outer surface of the wall to engage pivot hole 35 in the agitator assembly ears 34. The front wall 47 of the block is disposed adjacent the center wall 11 of the housing and has a tapered hole 48 through which securing screw 43 passes to hold the block securely in place. The bottom surface 49 of the block is smooth and lies in the plane of the main opening 16.

Vertically extending guide slots 50, see Figures 7, 8 and 9 are formed in the blocks 26 at the juncture of walls 44 and 47 to receive the guide arms 21 of the gate member 18 and to guide the gate in its vertical movements. Slots 51 are also formed in front walls 47 of the blocks to receive the stop lugs 23 of gate member 18, and are of a predetermined length so as to limit the vertical movement of the gate between its open and closed positions. With this arrangement of securing blocks 42, the entire gate and agitator assemblies may be removed from the rear chamber 14 of the housing for repair or replacement of parts simply by removal by the two screws 43 which hold the blocks 42 in position.

In operation with the source of vacuum connected to the nozzle and the nozzle in position adjacent the surface of the rug, air is drawn up through the main opening 16 into front chamber 15 and passes to the dirt catching receptacle of the cleaner. When the nozzle is moved in the forward direction as indicated by the

6

arrow in Figure 6, the agitator tips 40 are swept rearwardly toward the rear wall 6 thereby causing the agitator assembly to rotate in a counterclockwise direction as viewed in Figure 6 about the pivot projection 46. This pivoting movement causes ears 34 on the agitator assembly to rotate in a similar direction thereby effecting downward movement of the gate by engagement of gate actuating lugs 22 on the gate 18 with slots 36 in the ears. Gate member 18 moves downwardly until the gate stop lugs 23 engage the bottom of slots 51 in blocks 26 at which time the lower surface of the gate flange 18 will lie substantially in the plane of the main opening 16. In this position, gate member 18 effectively blocks the passage of high velocity surface air through the auxiliary openings or orifices 10 and 13 in the housing walls. Thus on the forward stroke of the nozzle, the full force of suction of the vacuum cleaner is applied directly over the area of the carpet under the main opening 16 whereby to draw air through the carpet as indicated by the small arrows in Figure 6 to remove sub-surface foreign particles from the rug R.

When the nozzle is moved over the carpet on the rearward stroke of the cleaning cycle as shown in Figure 5, the reverse action takes place. Agitator tips 40 are moved forwardly toward center wall 11 of the housing, the agitator assembly rotates in a clockwise direction about the pivot projection 46, and slots 36 in the agitator ears 34 move upwardly and effect a corresponding movement of the gate. The upward movement of the gate member 18 is limited by engagement of the stop lugs 23 on the gate with the top of the slots 51 in blocks 26. At this upper limit of movement the bottom edge of gate flange 19 is preferably even with the top edge of the center wall orifice 13 and the orifice is thereby open. With the gate so positioned, air will be drawn into front chamber 15 of the nozzle at high velocity along the top surface of the rug through orifices 10 and 13 in the rear and center walls 6 and 11, respectively, whereby to pick up and effectively remove surface dirt that has been loosened by the agitator tips 40 in advance of the orifices.

Another form of my invention is illustrated in Figure 13 wherein the nozzle housing 55 has a front wall 56 terminating in a surface contacting lip 57 and a rear wall 58 with a similar lip 59 lying in the plane of lip 57. A tubular coupling 60 is provided to connect the nozzle to a vacuum source and communicates with chamber 61 defined by the front and rear walls of the housing. Lip 59 of rear wall 58 has a transverse opening therein preferably in the form of a plurality of spaced inverted U-shaped slots or orifices 62 similar to slots 83 and 92 shown in Figures 15 and 16 and which extend longitudinally along rear wall 58.

In order to control the flow of high velocity surface air through orifices 62, a gate 63 is secured to a pivot block 64 which in turn is pivotally supported on rear wall flange 65 by means of pins 66. The bottom edge of gate 63 is formed with a plurality of spaced slots, not shown, which correspond in number, size and shape to slots 62 in rear wall lip 59 but which are offset from the slots 62 so as to block and seal the lip slots when the gate is pivoted against the rear wall. An agitator holding member 67 is likewise secured to pivot block 64 and has a plurality of downwardly depending spaced agitator tips 68 which extend longitudinally of gate 63 in contact with the surface being cleaned. The tips 68 are spaced to lessen the resistance to the flow of high velocity air therethrough. In order to limit outward pivoting of the gate from the orifices 62, a screw 69 is provided, which projects from front wall 56 and engages block 64 at its outer limit of movement.

The operation of this nozzle is substantially the same in principle to that described in connection with a nozzle of Figure 1, except that the gate 63 pivots about the axis of pivot pin 66 toward and away from the opening

62 in the rear wall lip in response to movement of the nozzle in forward and reverse directions over the surface being cleaned. Thus, during the forward movement of the nozzle over the surface, agitator tips 68 will be moved to the right as viewed in Figure 13 and the gate will pivot against orifices 62 to close same and the nozzle will draw air through the carpet in the manner previously described. When the nozzle is moved rearwardly, the parts will assume the position shown in Figure 13 with the gate removed from the openings to admit high velocity surface flow through the openings 62 into chamber 61 whereby to effectively remove surface particles from the rug surface.

Another form of my invention illustrated in Figures 14 and 15 is similar in principle of operation to the nozzle of Figure 1 except that the gate and agitator members are mounted exteriorly of the nozzle. Secured to the rear wall 71 of housing 70 is an angle member 72 which has one leg 73 projecting outwardly from the wall 71. A pivot pin 74 which extends transversely through leg 73 provides pivotal support for agitator assembly 75 which consists of a backing member 76, an agitator holder 77 secured thereto and brush tips 78 depending downwardly from the brush holder and engaging the surface being cleaned. The backing member has ears 79 which correspond generally to the ears 34 of the agitator assembly 25 described in connection with the nozzle of Figure 1 and likewise has a converging forwardly facing slot 80 for engaging a lug 81 on the gate 82. The angle member 72 is provided with guide slots, not shown, on its inner face to guide the gate 82 in vertical movements adjacent the rear wall 71 of the housing 70 and to limit vertical movements of the gate between positions for opening and closing a plurality of inverted U-shaped slots or orifices 83 in the bottom edge of the rear wall. The control of air through orifices 83 is effected in the same manner as described in connection with Figure 1, the gate being actuated between orifice open and orifice closed positions by the pivotal movements of the agitator assembly 75 in response to forward and rearward stroking movements of the nozzle relative to the surface being cleaned.

Still another modified form of my invention is shown in Figures 16 and 17 wherein pivotal movement of the agitator in the direction of forward and rearward stroking of the nozzle actuates movement of the gate parallel to the longitudinal axis of the nozzle housing for opening and closing auxiliary openings or orifices in the nozzle lip. As shown, the agitator assembly 85 is pivotally mounted on a support block 86 secured to the front wall 87 of the nozzle housing 88. The agitator assembly has an ear 89 corresponding to ears 34 and 79 heretofore described which has a rearwardly facing converging slot 90 for actuating the gate 91 mounted for sliding movement against the inner surface of rear wall 93.

Movement of the gate 91 parallel to rear wall 93 for controlling the flow of high velocity air through a plurality of slots or orifices 92 in the bottom edge of rear wall 93 is accomplished by means of a bell crank 94 pivotally connected to a block 95 which is secured to the rear wall. The bell crank 94 is arranged to pivot about an axis transversely of the longitudinal axis of the nozzle and has one arm 96 bent over at its end as at 97 to project into the opening 90 of the ear 89. The other arm 98 of the bell crank extends at right angles from arm 96 and terminates in a bent end 99 which projects into a slot 100 in the gate 91. Thus, as arm 96 of the bell crank is caused to move in vertical directions by the pivotal action of ear 89, the other arm 98 of the bell crank will pivot through a path parallel to rear wall 93 and move gate 91 in the same direction by virtue of engagement of the arm 98 with gate slot 100. The block 95 is formed to support the gate 91 for sliding movement in this direction and to limit movement of the gate for opening and closing orifices 92 in the rear wall.

The auxiliary opening or orifices 92 in rear wall 93 are spaced as shown in Figure 16 and in a similar manner the gate 91 is formed with a plurality of inverted U-shaped slots 101 which correspond substantially in number, size and shape to the orifices 92. When the gate is moved longitudinally of the nozzle and parallel to rear wall 93 to the open position, gate openings 101 will be aligned with orifices 92 to permit the passage of high velocity air therethrough and effect surface cleaning of the rug or carpet. When the gate is moved in the reverse direction to the closed position, the solid portions 102 separating the gate slots 101 will be aligned with orifices 92 whereby to block and seal same against the flow of high velocity surface air therethrough.

The principle of operation of the modified form of nozzle shown in Figures 16 and 17 is the same as previously described, the orifices 92 in the rear wall 93 being open when the nozzle is moved rearwardly over the rug surface in the direction of the arrow shown in Figure 17 and being closed when the nozzle is moved forwardly.

The advantages of my improved vacuum cleaner nozzle may be attained by other variations of the nozzle structure. For example, the position of the various agitator assemblies may be reversed with respect to their mounting on the nozzle so as to cause the gate in each instance to open on the forward stroke of the nozzle rather than the rearward stroke as described. Also, it is possible to reverse the positions of the agitator assembly and gate with respect to each as well as to dispose the gate interiorly and the agitator exteriorly of the housing. It is apparent that other changes may be made to the nozzles herein described and illustrated without departing from the spirit and scope of my invention and therefore I do not wish to be limited to the specific embodiments of my invention as shown and described. The essential features of the invention are set forth in the appended claims.

I claim:

1. A vacuum cleaner nozzle comprising a housing having a main opening adapted to be placed in cleaning position adjacent the surface to be cleaned and at least one auxiliary opening joining said main opening and providing communication between said main opening and the exterior of the nozzle when the nozzle is in said cleaning position, said main opening lying substantially in the plane of the surface to be cleaned, the plane of said auxiliary opening being substantially normal to the plane of said surface, means for opening and closing said auxiliary opening comprising a gate co-extensive with said auxiliary opening and movable relative to said housing, an agitator member having a plurality of elongated flexible spaced projections contacting the surface to be cleaned adjacent said auxiliary opening, said agitator member being connected to said housing for pivoting about a fixed axis in response to movement of said nozzle over said surface, said axis extending transversely of the direction of said movement of said nozzle over said surface, said agitator member being operatively connected to said gate whereby pivotal movement of said member causes said gate to open and close said auxiliary opening.

2. A vacuum cleaner nozzle comprising a housing having a main opening adapted to be placed in cleaning position adjacent a surface to be cleaned and at least one auxiliary opening joining said main opening and providing communication between said main opening and the exterior of the nozzle when the nozzle is in said cleaning position, said main opening lying substantially in the plane of the surface to be cleaned, the plane of said auxiliary opening being substantially normal to the plane of said surface, means for opening and closing said auxiliary opening comprising a gate coextensive with said auxiliary opening and supported for sliding movement relative to said housing normal to the plane of said surface, stops on said housing for limiting movement of said gate between a closed position with the lower edge thereof in the plane of said main opening and an open position with said lower edge of the

gate spaced above said plane of the main opening by a distance at least equal to the height of said auxiliary opening, an agitator member having a plurality of spaced projections contacting the surface to be cleaned adjacent said auxiliary opening, said agitator member being connected to said housing for pivoting about an axis in response to movement of said nozzle over said surface, said axis extending transversely of the direction of said movement of said nozzle over said surface, said agitator member being operatively connected to said gate whereby pivotal movement of said member causes said gate to open and close said auxiliary opening.

3. A vacuum cleaner nozzle adapted to be moved forwardly and rearwardly over the surface of a rug or the like for cleaning same, comprising a housing having a closed upper portion and spaced front, rear and center walls depending from said upper portion and each terminating in a surface contacting edge, said front and center wall edges defining a main opening in said nozzle having communication with a source of vacuum, said rear and center walls having auxiliary openings therein extending upwardly from and intersecting the respective edges of the rear and center walls, a gate disposed adjacent said center wall between said rear and center walls, means for supporting said gate on said housing for movement normal to said surface between positions out of and in alignment with said auxiliary openings, said gate in said positions respectively opening and closing said auxiliary openings to the surface flow of air therethrough, a surface contacting member mounted on said housing for pivoting about an axis in response to reversals in direction of movement of said nozzle over said surface, said member engaging said gate to move same toward and away from said surface in response to movement of said nozzle forwardly and rearwardly over said surface.

4. The nozzle according to claim 3 in which the bottom edge of said gate at one limit of movement thereof lies substantially in the plane of said main opening and at the other limit of movement is spaced above the said plane of the main opening by a distance at least equal to the height of said opening in said center wall.

5. The nozzle according to claim 3 in which said surface contacting member is disposed between said center wall and said rear wall.

6. The nozzle according to claim 1 in which said gate and said agitator member are connected together and are mounted on said housing for simultaneous pivotal movement about said fixed axis and relative to said housing.

7. The nozzle according to claim 6 in which said auxiliary opening consists of a plurality of spaced slots formed in the portion of said housing adjacent said surface, said gate having similarly formed slots in the portion thereof adjacent said surface, said gate slots and said housing slots being misaligned whereby the portions of said gate intermediate the gate slots block said housing slots when said nozzle is moved over said surface in at least one direction transversely of the pivotal axis of said gate and said agitator member.

8. The nozzle according to claim 1 in which said housing has a front and rear wall each terminating in a lower edge, said wall edges defining said main opening, said gate being supported on the exterior of one of said walls for movement normal to the plane of the surface being cleaned, said agitator member being pivotally mounted exteriorly of said housing.

9. The nozzle according to claim 1 in which said housing has a closed upper portion and a front wall and a rear wall depending from said upper portion, each of said walls terminating in a lower edge adapted to contact said surface, said edges of said walls defining said main opening in said housing, the edge of one of said walls having said auxiliary opening formed therein, said gate being disposed adjacent said one of said walls and being supported for movement parallel to said fixed axis of said agitator member and across said auxiliary opening, said gate also having a slot formed in the bottom edge thereof adjacent the surface to be cleaned, and means for actuating movement of said gate relative to said one wall in response to pivotal movement of said agitator member about said axis whereby pivoting of said agitator member in one direction causes said gate to close said auxiliary opening and pivoting of the agitator member in the opposite direction causes said gate to open said auxiliary opening.

10. The nozzle according to claim 9 in which said means consists of a bell crank pivotally connected to said housing, said crank having one arm engaging said agitator member and another arm engaging said gate whereby pivotal movement of said agitator member causes said crank to pivot parallel to the fixed axis of said agitator member to move said gate for opening and closing said auxiliary opening.

11. The nozzle according to claim 3 in which said gate has a lug projecting therefrom, said member having an ear portion projecting toward said gate in alignment with said lug, said ear portion having a recess formed therein into which said lug is adapted to extend, pivotal movement of said member about said axis causing said ear portion to rock correspondingly and to induce vertical movement of said gate.

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