

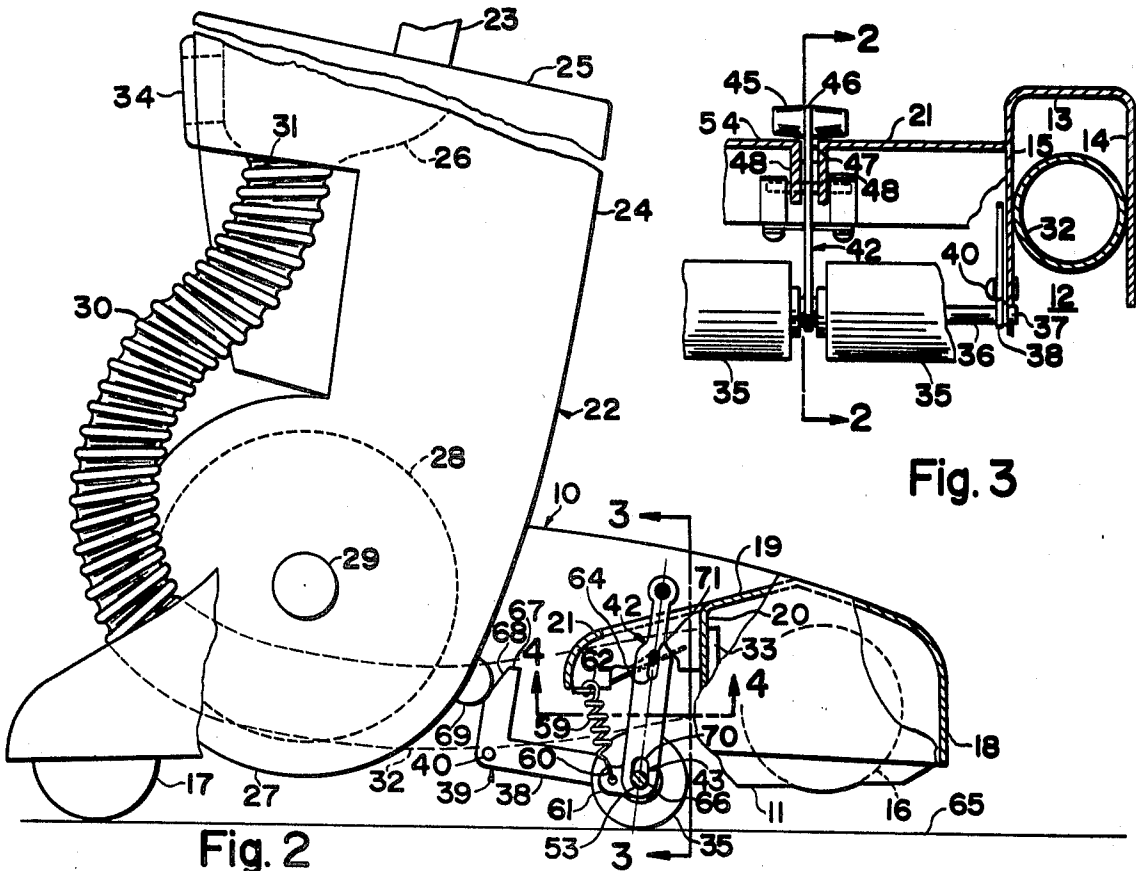
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**J. L. BALZER**

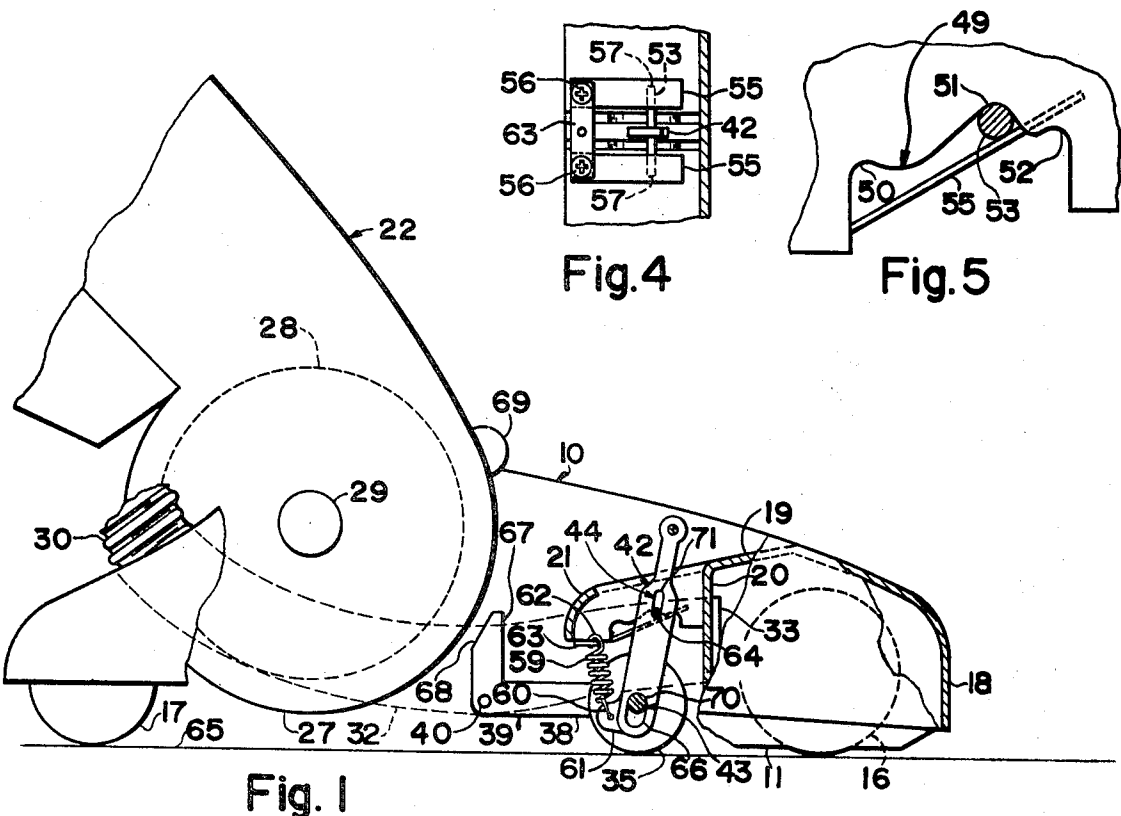
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## SUCTION CLEANER NOZZLE ADJUSTMENT

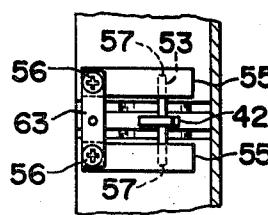
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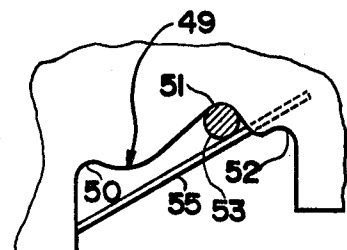
**Fig. 2**



**Fig. 1**



**Fig.4**



**Fig.5**

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## SUCTION CLEANER NOZZLE ADJUSTMENT

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5 Claims

### ABSTRACT OF THE DISCLOSURE

In an upright suction cleaner, movement of the propelling handle to its rest position raises the nozzle from one of a plurality of selected operative positions to an inoperative position and renders a nozzle adjusting device ineffective, and movement of the handle from its rest position renders the nozzle adjusting device effective to reposition the nozzle to any one of the plurality of positions selected prior to movement of the handle to its rest position.

### BACKGROUND OF THE INVENTION

The invention relates to upright cleaners and more particularly to nozzle height adjusting means which return the nozzle to one of any previously selected operative positions upon movement of the nozzle from its inoperative nozzle position.

In the prior art such as disclosed in the patent to George P. Daiger No. 2,677,845 the nozzle upon movement out of its inoperative position is always returned to the same operating position, that is the "normal" position regardless of previously selected other positions.

In applicant's invention shifting the nozzle out of its inoperative position effects operation of mechanism to return the nozzle to any one of a plurality of operating positions selected prior to raising the nozzle to its inoperative position. In other words, if the nozzle is in a selected "low," selected "normal" or selected "high" position it will be returned to any one of these three previously selected positions.

### SUMMARY

According to the present invention an upright suction cleaner is provided with a first adjusting device to shift the nozzle to different selected operative positions to clean thin pile surfaces such as "Indoor-Outdoor" rugs, "Normal" pile surfaces, and deep pile surfaces such as "Shag" rugs.

A second adjusting device, operated by moving the cleaner propelling handle to its rest position, raises the nozzle to an inoperative position relative to the different types of surfaces, so that if desired a hose can be connected to the cleaner for off-the-floor cleaning.

The invention is directed to providing first and second adjusting mechanisms to effect nozzle adjustments to different selected operative positions, to shift the nozzle to an inoperative position and so interconnect the mechanisms that the nozzle is automatically returned to the nozzle position selected prior to moving the nozzle into and out of its inoperative position.

### DESCRIPTION OF THE DRAWING

FIG. 1 is a view partly in section showing nozzle adjusting devices arranged to maintain the nozzle in the selected "Normal" position;

FIG. 2 is a broken side view, partly in section, along line 2—2 in FIG. 3 showing the nozzle adjusting devices arranged to maintain the nozzle in its inoperative position relative to the surface to be cleaned;

FIG. 3 is a section along line 3—3 in FIG. 2;

FIG. 4 is a section along the line 4—4 in FIG. 2, and

FIG. 5 is an enlarged view of the cam surface shown in FIGS. 1 and 2.

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### DESCRIPTION OF THE PREFERRED EMBODIMENT

The embodiment of the invention herein disclosed comprises an upright suction cleaner having a substantially U-shaped body 10 including a nozzle 11 from the opposite ends of which rearwardly project similar inverted U-shaped passageways, one of which is shown at 12 and forms a suction passageway provided with a top wall 13, outer wall 14 and an inner wall 15. The other unshown passageway is similar in construction to suction passageway 12 and provides a passageway for a motor-driven belt to rotate an agitator 16 in the nozzle 11, as is common in the art. Both the passageways extend to the rear of the body 10 to which the rear wheels 17 are attached. The nozzle 11 has a front wall 18, top wall 19 and rear wall 20 from which rearwardly projects a continuation of the top wall 19 to form an apron 21 disposed between the inner side walls of the passageways.

A handle indicated generally at 22 includes a hand grip 23 attached to the upper end of an elongated housing 24 having an upper portion 25 for a filter bag 26 and a lower portion 27 for a suction creating motor-fan unit indicated by the dotted line 28. The handle 22 has its lower housing portion 27 arranged between the passageways 12 and is suitably rotatably supported on the inner walls 15 thereof by pins 29.

A flexible hose 30 has its outlet end 31 connected to the filter bag 26 and has a portion 32 disposed in the suction passageway 12 with its inlet end 33 supported in the nozzle rear wall 20 and exposed to the interior of the nozzle 11 for entrance of dirt-laden air into the hose 30 which conveys such air to the filter bag 26. A suitable air inlet 34 is provided in the bag housing portion 25 for conveying dirt-laden air to the bag 26 when a hose is connected thereto for off-the-floor cleaning in a manner well known in the art.

The front end of the body 10 is supported on a pair of rollers or wheels 35 rotatably mounted on a shaft 36, one end 37 of which is seated in an arm 38 of a lever 39 rotatably supported on a pin 40 attached to the inner wall 15 of the suction passageway 12. A similar unshown lever is also mounted on the belt passageway to pivotally support the opposite end of the shaft 36.

A first nozzle adjusting means or device for shifting the nozzle 11 through a range of positions to clean thin pile rugs such as the "Indoor-Outdoor" type to the thick pile rugs such as the "Shag" type rugs is provided, and comprises an elongated control member 42 having spaced lower and upper elongated slots 43 and 44 respectively, and a hand grip 45 located above the rearwardly extending apron 21 of the nozzle top wall 19. The wheel shaft 36 extends through the lower slot 43 to rotatably support the adjusting control member 42, and the upper portion 46 of the latter projects upwardly through a slot 47 in nozzle top wall apron 21. The slot 47 is formed by spaced walls 48 depending downwardly from the nozzle apron 21 and the lower marginal edges of the walls 48 are each provided with a cam surface means or a sector 49 having recessed areas 50, 51 and 52 respectively representing the three nozzle positions for cleaning deep pile "Shag" rugs, "Normal" pile rugs and the thin pile "Indoor-Outdoor" rugs.

A detent means including a pin 53 is slidably mounted in the upper slot 44 in the control member 42 and is adapted to engage any of the areas 50, 51 and 52 in the cam surfaces 49 when the member 42 is moved to different nozzle positions. Suitable indicia is placed on the top surface 54 of the nozzle apron 21 adjacent to the slot 47 and cooperates with the hand grip 45 to indicate to the slot 47 and cooperates with the hand grip 45 to indicate the adjusted positions of the nozzle. A pair of

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leaf springs 55 are mounted by screws 56 to the nozzle apron 21 and are arranged alongside the depending walls 48 to engage the opposite end portions 57 of the detent pin 53 to retain the latter in any one of the selected recessed areas 50, 51 and 52 and thereby prevent shifting of the selected nozzle adjustment unless the band grip 45 is manually moved to other nozzle positions.

A tension spring 59 has one end 60 attached to a projection 61 at the bottom of the control member 42 and its other end 62 is secured to a bracket 63 held in position by the two screws 56. The spring 59 at all times exerts a force on the control member 42 to move the latter upwardly relative to the nozzle apron 21 so that the lower end 64 of the top slot 44 engages the detent pin 53 to urge the latter into any one of the selected recesses 50, 51 and 52 which represent different nozzle operative positions, one of which is shown in FIG. 1.

In the event the cleaner handle 22 is in an operative position, as shown for example in FIG. 1, and the cleaner is lifted off of the surface 65, or the body 10 is pivoted about the rear wheels 17 to raise the nozzle 11, then the front wheels 35 are free to move downwardly about the pins 40, but such movement of the wheels is limited by the shaft 36 abutting the bottom 66 of the lower slot 43. The spring 59 exerts sufficient upward force on the control member 42 to overcome the weight of the lowered front wheels 35 and thus prevent downward shifting of the control member 42 relative to the detent pin 53 to thereby maintain the nozzle in any of its selected adjusted positions upon returning the front wheels 35 to the surface 65.

A second nozzle adjusting means or device is provided to raise the nozzle 11 to an inoperative position relative to the surface 65, as shown in FIG. 2. In this nozzle position a hose may be attached to the hose air inlet 34 for off-the-floor cleaning. The second adjusting mechanism comprises the front wheels 35 on the shaft 36, the ends of which are mounted at the forward ends of the arms 38 of the levers 39. In addition each lever 39, only one of which is shown, has an arm 67 upstanding from the pin 40 and is provided with a cam surface 68 which engages a projection 69 at opposite ends of the motor-fan housing 27 when the handle 22 is moved to its storage or rest position, representing the inoperative position of the nozzle 11, as shown in FIG. 2.

In operation, FIG. 1 shows the first and second nozzle adjusting means arranged for on-the-floor cleaning with the handle 22 in an inclined cleaner propelling position and the nozzle 11 adjusted to clean the surface 65. The adjusting control member 42 is arranged for cleaning rugs of "Normal" pile thickness with the detent pin 53 seated in the cam recess 51 and the spring 59 forcing the adjusting member 42 upwardly so that the bottom 64 of the upper slot 44 engages the detent pin 53. The front wheels 35 rest on the surface 65 and the wheel shaft 36 seats against the top end 70 of the lower slot 43 to thus assist the spring 59 in biasing movement of the control member 42 in an upward direction.

The cleaner is moved by the handle 22 over the surface 65 causing the nozzle 11 to operatively engage the surface 65. The motor-fan unit 28 rotates the agitator 16 and also creates suction in the nozzle 11 to clean the surface 65. The resulting dirt-laden air is conveyed by the hose 30 to the filter bag 26 which removes the dirt and allows clean air to pass into the atmosphere.

If it is desired to clean an "Indoor-Outdoor" type of rug represented by the surface 65 then the operator grasps the control hand grip 45 moving the member 42 forwardly to such rug position as noted on the indicia adjacent the slot 47 in the nozzle apron 21 and such forward movement of the control member 42 shifts the detent pin 53 into the cam recess 52 and the leaf springs 55 yield to allow such movement of the detent pin 53.

In order to raise the nozzle 11 to clean a thick pile "Shag" type rug the control hand grip 45 is moved rear-

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wardly about the wheel shaft 36 to the "Shag" position noted on the indicia causing the detent pin 53 to seat in the cam recess 50 to elevate the nozzle 11 the required distance above the surface 65 for cleaning such rug.

If the front wheels 35 are raised off the surface 65 by lifting the cleaner or tilting the nozzle 11 upwardly about the rear wheels 17 while the control member 42 is in any one of the foregoing three selected nozzle positions, then the front wheels 35 will pivot downwardly about the pins 40 and seat the wheel shaft 36 at the bottom 66 of the lower slot 43 in the control member. Further downward travel of the wheel shaft 36 is prevented by the spring 59 which maintains the control member 42 in its selected positions and the bottom surface 64 of the upper slot 44 seated against the detent pin 53. This arrangement insures that when the front wheels 35 are replaced on the surface 65 the first adjusting means will reposition the nozzle to any one of its previously selected positions.

In order to raise the nozzle 11 to an inoperative position relative to the surface 65, the cleaner handle 22 is raised from an operative position to its inoperative position shown in FIG. 2 and which also represents the storage or rest position of the handle. During upward movement of the handle 22 to its inoperative position each of the projections 69 engages the adjacent cam surface 68 on the lever arms 67 to rotate the latter in a clockwise direction about the pins 40 to the position shown in FIG. 2.

Initial clockwise rotation of the levers 39 cause the front wheel shaft 36 to move downwardly in the lower slot 43 into engagement with the bottom surface 66 thereof. Thereafter continued clockwise rotation of the levers 39 bodily displaces the control member 42 downwardly until the detent pin 53 is seated against the top surface 71 of the upper slot 44. During such displacement of the control member 42 the leaf springs 55 retain the detent pin 53 in any one of the cam recesses 50, 51 and 52 representing the nozzle position selected prior to movement of the cleaner handle 22 to its inoperative position.

While the cleaner handle 22 is in the rest position shown in FIG. 2 the cleaner may be employed for off-the-floor cleaning by attaching one end of a hose to the air inlet 34 and the opposite end of the hose is provided with a suitable nozzle for cleaning surfaces above the floor in a manner known in the art.

When the cleaner handle 22 is moved downwardly into an operative cleaner-propelling position, the projections 69 are disengaged from the lever cam surfaces 68 whereby the nozzle 11 drops due to the weight of the forward portion of the body 10, and the wheel shaft 36 moves upwardly within the lower slot 43 into abutting engagement with the upper surface 70 thereof. The front wheel shaft 36 continues its upward movement and since the shaft is engaging the upper edge 70 of the slot 43, such shaft movement displaces the control member 42 upwardly relative to the detent pin 53 until the latter seats against the bottom surface 64 of the upper slot 44. The spring 59 assists in effecting such upward movement of the front wheels shaft 36 and the control member 42.

During such upward movement of the control member 42, the latter slides relative to the detent pin 53 which guides such displacement of the member 42 so that it returns to the previous selected nozzle position relative to any one of the cam recesses 50, 51 and 52 in which the nozzle 11 was adjusted prior to moving the cleaner handle 22 into its rest position.

The leaf springs 55 operate to retain the detent pin 53 in any one of the selected cam recesses 50, 51 and 52 during return movement of the control member 42 to its selected position upon rotating the cleaner handle 22 downwardly out of the rest position.

From the foregoing description it is obvious that upon movement of the cleaner handle 22 from its rest position to an operating position the nozzle 11 is automatically returned to any one of its three previously selected posi-

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tions for cleaning surfaces of the "Shag" rug type, "Normal" pile depth and the "Indoor-Outdoor" type rug.

The embodiment of the present invention shown and described is only illustrative and is not to be taken in a limiting sense. The present invention includes all equivalent variations of the embodiment disclosed and is limited only by the scope of the claims.

I claim:

1. In a suction cleaner,
  - (a) a body provided with a surface cleaning nozzle,
  - (b) wheel means movably mounted on said body for supporting said nozzle relative to the surface being cleaned,
  - (c) first adjusting means including stationary cam means having portions representing different operative nozzle positions,
  - (d) detent means movably mounted for engagement with said stationary cam means,
  - (e) and control means connecting said wheel means with said detent means and movable to shift said detent means into selective engagement with said different portions of said stationary cam means to move said wheel means relative to said body to adjust said nozzle to a selected operating position relative to the surface being cleaned,
  - (f) second adjusting means movable to an inoperative nozzle position to shift said wheel means and render said first adjusting means ineffective and said nozzle inoperative with respect to the surface being cleaned,
  - (g) and means for retaining said movable detent means in the selected nozzle position with respect to said stationary cam means while said nozzle is in said inoperative position for guiding the return of said first adjusting means to its said selected nozzle position when said second adjusting means is moved from its said inoperative nozzle position.

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2. In a suction cleaner as described in claim 1, and said stationary cam means being arranged on said body, said connecting control means slidably mounted on said wheel means, and said detent means slidably mounted with respect to said connecting control means.

3. In a suction cleaner as described in claim 1, and said second adjusting means upon movement to its said inoperative nozzle position shifting said wheel means relative to said connecting control means and the latter relative to said detent means to shift said nozzle to its inoperative position.

4. In a suction cleaner as described in claim 2, and said second adjusting means upon movement to its said inoperative nozzle position shifting said wheel means relative to said connecting control means and the latter relative to said detent means to shift said nozzle to its inoperative position.

5. In a suction cleaner as described in claim 1, a propelling handle forming part of said second adjusting means and mounted on said body for movement to and from a rest position, said handle upon movement to its rest position effecting movement of said wheel means relative to said body to render said first adjusting means ineffective and said nozzle inoperative with respect to the surface being cleaned.

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