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SUCTION CLEANER WHEEL ADJUSTMENTS

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2 Sheets-Sheet 1

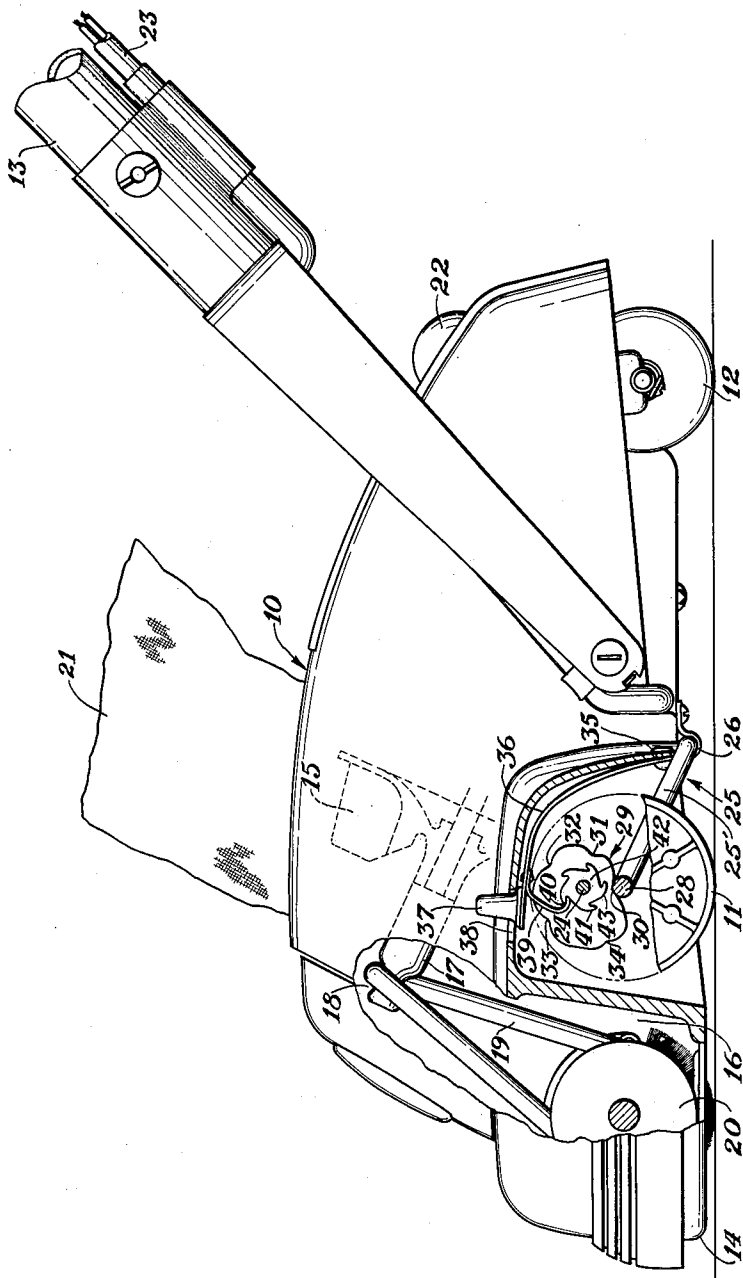


Fig. 1

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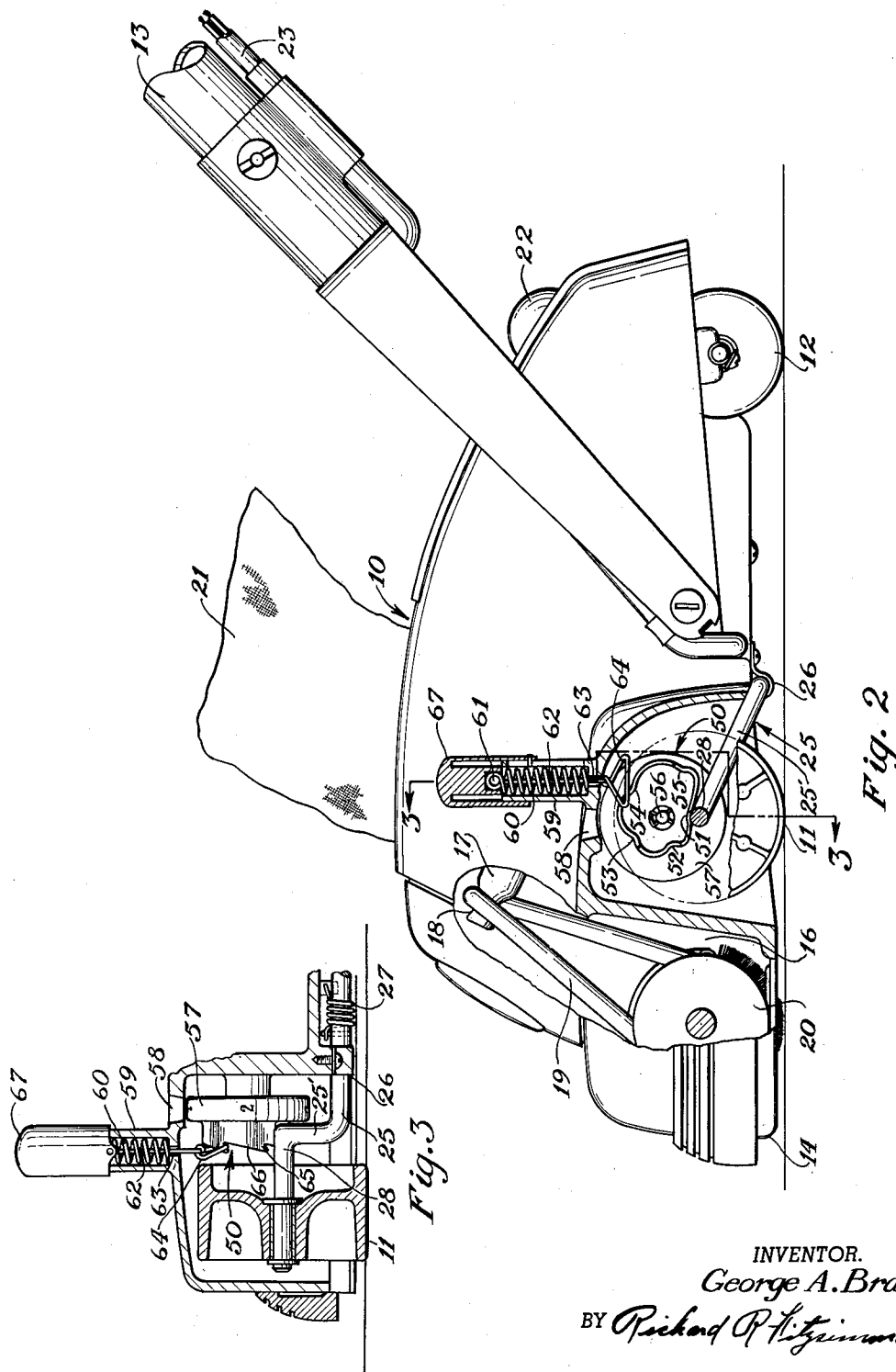
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11 Claims. (Cl. 15—339)

The present invention relates to suction cleaners and more particularly to means for adjusting the suction nozzle relative to the surface covering being cleaned.

Present day floor coverings are of a wide variety of types such as bare floors or linoleums, rugs or carpets with a short stiff nap, rugs or carpets with a long soft nap, cotton rugs, hooked rugs and a large variety of other fabrics.

In order to provide a cleaner which will properly clean all types of present day floor coverings, it is necessary to provide cleaners with a wide range of nozzle adjustments or range shifting arrangements.

The type of nozzle adjustment which is the simplest, from an ease of operation standpoint, is the push type in which the operator merely pushes downwardly on a foot pedal or other actuator in making the adjustment.

According to the present invention the adjustment is made by utilizing the foot pressure to store sufficient energy in a spring to adjust the height of the nozzle against the cleaner weight carried by the adjusted wheel and to do so immediately following the removal of the foot.

According to the present invention the nozzle adjusting mechanism is of the step-by-step type in which the adjustment is made in increments each time the operator depresses the control button. Preferably an indicator is provided to advise the operator what adjusted position the nozzle is in at all times.

As will be readily appreciated, a foot operated adjustment according to the present invention affords the designer the greatest freedom of choice in locating the foot operated button and it may be positioned directly above the wheel being adjusted or elsewhere without changing in any degree the effort required to adjust the wheel.

Other objects and advantages of the present invention will become apparent as the description proceeds when taken in connection with the accompanying drawings in which:

Figure 1 is a plan view of a suction cleaner partly in section showing how the present invention is applied thereto.

Figure 2 is a view similar to that of Figure 1 showing a modified form of the invention, and

Figure 3 is a fragmentary sectional view taken on line 3—3 of Figure 2 looking in the direction of the arrows.

Figure 1 construction

Referring to Figure 1 of the drawing the reference numeral 10 represents the body of a suction cleaner mounted for ambulatory movement on front and rear wheels 11 and 12 respectively and is propelled about by a handle 13 in the usual manner. At its forward end the body 10 is provided with a downwardly facing suction nozzle 14 which communicates with the suction side of a fan 15 by way of a suction passageway 16. A shaft 17 extends forwardly from the fan 15 into the suction passageway 16 and is provided with a belt pulley 18. A transmission belt 19 drivingly connects the pulley 18 to an agitator 20 rotatably mounted within the nozzle 14

2

in a position to contact the surface covering when the cleaner is in operation. The fan 15 is driven by a motor (not shown) housed within the body 10 to the rear of the fan 15. A filter bag 21 is connected to the exhaust outlet of the fan 15 to receive the dirt laden air discharged therefrom and its upper end is supported from the handle in the conventional way. The motor is connected in series circuit with a switch operated by the switch actuator ball 22. The switch and motor are connected to a service cord 23 supported from the upper end of the propelling handle.

The motor is energized by operating the actuator 22 for the switch and the cleaner is propelled about by means of the handle 13. The suction produced by the fan 15 will draw the surface covering being cleaned upwardly against the nozzle 14 where it will be cleaned by the combined action of the agitator 20 and the air being drawn therethrough by the action of the fan. The dirt laden air will pass upwardly through the suction nozzle 14, pass through the fan 15 and be discharged into the filter bag 21 where the dirt will be separated therefrom and deposited in the bag 21.

As previously stated, the mouth or lips of nozzle 14 should be positioned at different distances from the floor for maximum effectiveness in cleaning different types of floor coverings. For that purpose, the front wheels 11 are made adjustable relative to the body 10 and nozzle 14. The manner in which the wheels 11 are adjusted is the main feature of the present invention.

The wheels 11 are attached to the body 10 by means of a U-shaped rock shaft 25 having its bight portion pivoted to body 10 at 26 to the rear of the nozzle 14, the shaft being biased in an upward or clockwise direction as by a torsion spring 27, shown in Figure 3. The spring 27 is not absolutely essential since the wheels are normally biased upwardly by the weight of the cleaner. However, the spring is preferable in order to prevent the wheels from dropping as the cleaner is picked up.

The wheels 11 are rotatively mounted on pintles 28 which extend outwardly from the forward ends of crank arms 25' on rock shaft 25.

Rotatively mounted on the body 10 by pivot pin 24 above one of the pintles 28 is a sector 29 having a plurality of positioning detents 30, 31, 32, 33 and 34 spaced at equal angles from one another. The positioning detents 30 to 34 inclusive form stops to be engaged by the said one of said pintles 28 and are spaced at different radial distances from the pivot 24, the detent 30 being the closest to the pivot 24 and the detent 34 being the farthest away from it. Thus when the pindle 28 is seated in detent 30 the nozzle will be closest to the floor and when it is seated in detent 34 the nozzle will be farthest away from the floor.

Attached to the body 10 at 35 is one end of a comparatively strong leaf spring 36 which extends upwardly and forwardly to a point above and forwardly of the pivot 24. A push button 37 is attached to the forward end of the spring 36 and extends upwardly through an opening 38 in the body 10 where it is conveniently accessible to the operator.

A lighter leaf spring pawl 39 is attached to the forward end of the spring 36 and extends downwardly to engage any one of a plurality of teeth 41 on a ratchet wheel 42 rigidly secured to sector 29. As shown, the teeth 41 are opposite and correspond in number to detents 30 to 34, inclusive, and are peripherally separated from each other by cam surfaces 43 for a purpose which will presently appear.

If desired, an indicator may be provided to indicate to the operator the position of the adjusting mechanism. One such indicator will be described in connection with the modification of Figures 2 and 3.

Operation of Figure 1

As shown in Figure 1, pintles 28 are seated in detent 30 and the nozzle is adjusted to its minimum height cleaning position. When it is desired to change the position of the nozzle to a higher cleaning position, it is merely necessary for the operator to step on the button 37 and remove her foot. Depression of the button deflects spring 36 downwardly and causes the end 40 of spring 39 to ride over one of the cam surfaces 43 and become engaged behind the next lower tooth 41. As the operator removes her foot, spring 36 resumes its unstressed position and in doing so operates through pawl 39 to rotate the ratchet wheel 42 and sector 29 clockwise until pintle 28 seats in detent 31 thereby raising the nozzle one increment. If higher nozzle positions are desired, the same procedure is followed until the proper position is reached.

Since downward pressure on the cleaner has been released before the adjustment is made, the spring 36 in returning to its unstressed position need only exert that force necessary to overcome the weight of the cleaner carried by the front wheels and the insignificant frictional forces involved.

When the setting is such that the detent 34 engages the pintle 28, the next adjustment will be from the highest to the lowest position of the nozzle as is characteristic of all repeating step-by-step adjustments.

Construction of Figures 2 and 3

The modification of Figures 2 and 3 is similar to that of Figure 1 and where the parts are the same they have been given the same reference numerals.

In this modification one of the pintles 28 is biased upwardly against the periphery of a combined sector and ratchet wheel 50, the periphery of which is formed with positioning detents 51, 52, 53, 54 and 55 separated by cam surfaces as in the first modification. The member 50 is rotatably mounted on the body 10 by a pivot pin 56 directly above pintle 28. Integral with the member 50 is an indicator 57 which is provided with indicia "1," "2," "3," "4," and "5," or the like, on its periphery which are visible through an opening 58 in body 10.

Extending upwardly from the body 10 to one side of the opening 58 is a tube 59 which houses a coiled compression spring 60. The upper end of spring 60 is reversely looped at 61 and has a straight portion 62 extending downwardly through an opening 63 in the body 10 and terminating in a looped end 64 which acts as a spring pawl in a manner which will presently appear.

The edge of the member 50 opposite the indicator 57 is formed with a plurality of teeth 65, one for each of the detents 51 to 55 inclusive, and these are separated by cam surfaces 66. The loop 61 of spring 60 is secured to the interior of an actuator button 67 slidably mounted on the exterior of tube 59.

Operation of Figures 2 and 3

The operation of the modification of Figures 2 and 3 is substantially the same as that of the first modification except that the sector moves counter-clockwise in adjusting from one position to another. Starting from the position shown, downward pressure is applied to the button 67 to compress spring 60 until the lower end of the loop 64 rides over cam surface 66 and engages the tooth 65 to the right of the detent 51. When the pressure is released from button 67, spring 60 moves loop 64 upwardly rotating sector 50 counter-clockwise until pintle 28 is seated in the next detent. The above operation may be continued until the indicia visible through the opening 58 indicates that the desired adjustment has been achieved.

While in both modifications the sector is shown provided with five positioning detents, it is to be understood that a lesser or greater number may be provided. For present day floor coverings it has been found that a suffi-

cient range of adjustment may be secured with a five position adjustment.

While the invention has not been shown as applied to a suction nozzle of the type used with tank type cleaners, it will be apparent that it is admirably adapted for such use. In such cases the nozzle might be supported by a skid rather than by one or more wheels. Moreover, it will be obvious that the rotating control sector could be replaced by a sliding wedge shaped member interposed between the support proper and the body of the nozzle and capable of supporting the nozzle at different heights as the wedge is moved to different positions.

While I have shown and described several modifications of my invention it is to be understood that these are to be taken as illustrative only and not in a limited sense. I do not wish to be limited to the particular structure shown and described but wish to include all equivalent variations thereof except as limited by the scope of the claims.

I claim:

1. A suction cleaner comprising, a body having a downwardly facing suction nozzle, supporting means for mounting said body for ambulatory movement, means for movably securing said supporting means to said body, movable means for moving said supporting means relative to said body to vary the height of said nozzle above a supporting surface, spring means for moving said movable means, and manually actuatable means for stressing said spring means whereby upon release of said manually actuatable means the energy stored in said spring means by the manual stressing thereof is operative to actuate said movable means to move said supporting means relative to said body to change the position of said nozzle relative to the supporting surface, said movable means including a rotatable sector having a plurality of peripherally spaced positioning detents engageable with said movable securing means, said positioning detents being located at different radial distances from the axis of said sector and said spring means upon being released being operable to rotate said sector to position a different one of said positioning detents into engagement with said movable securing means.

2. A suction cleaner according to claim 1 including a visible indicator to indicate which positioning detent is in engagement with said movable supporting means.

3. A suction cleaner comprising, a body having a downwardly facing suction nozzle, front and rear wheels secured to said body for mounting said body for ambulatory movement, a sector rotatably mounted on said body adjacent said front wheels, a plurality of positioning detents about the periphery of said sector at different radial distances from its axis of rotation, said front wheels being movably mounted on crank arms one of which is biased against the periphery of said sector by the weight of the cleaner and is selectively engageable with each of said positioning detents, a ratchet wheel rigid with said sector, a normally unstressed spring mounted on said body adjacent said ratchet wheel, a pawl carried by said spring and selectively engageable with the teeth on said ratchet wheel when said spring is stressed, and manually actuatable means for stressing said spring and for engaging said pawl with a selected tooth of said ratchet wheel whereby upon release of said manually actuatable means the spring will rotate said sector to bring another of said positioning detents into contact with said one crank arm and thus vary the position of said nozzle relative to a supporting surface.

4. A suction cleaner according to claim 3 including a visible indicator for indicating the position of said nozzle relative to the supporting surface.

5. A suction cleaner according to claim 4 in which said indicator is rotatable with said sector and has indicia thereon which are visible through an opening in said body adjacent to said manually actuatable means.

6. A suction cleaner according to claim 3 in which

said sector is in the form of an annulus with the teeth of said ratchet wheel formed in one edge thereof.

7. A suction nozzle comprising a body member having a downwardly opening mouth for cleaning a floor, means including an adjustable support member movable toward and away from the underside of said body for supporting said mouth at different elevations with respect to a floor, and means for adjusting the positions of said body and support members relative to one another comprising a control means pivotally mounted on one of said members having indentations at different radial distances from said pivot and being selectively engageable with the other of said members for determining the relative positions of said members with respect to one another, and manually operable means for moving said control means progressively from one to another of said indentations, said manually operable means including spring actuated means engageable with said control means when manually stressed and operable when the pressure thereon is released to move said control means to a new position in opposition to the weight of said nozzle member.

8. A suction cleaner having a body member supporting a motor-driven fan in communication with a downwardly opening suction nozzle positioned adjacent the floor, front and rear sets of wheels supporting said cleaner for ambulatory movement over a floor, one set of said wheels including a member movably connecting the same to said body member for movement toward and away therefrom to adjust the height of said nozzle opening above the floor, a notched disk pivotally supported on one of said members on an axis offset from the geometric center of the disk and having its rim positioned to engage the other of said members to hold the two members different distances apart as said disk is pivoted from position to position on its axis, a manually operable foot pedal and spring mechanism connected to said cleaner and normally held in an upper position by the spring, said spring mechanism being depressed as the foot pedal is depressed to store energy in the spring in sufficient amount to advance said disk from one position to the next, said spring upon being depressed and released engaging said disk so as to advance it from one position to the next as it returns to its normal unstressed position.

9. A suction cleaner having a body supporting a motor-driven fan in communication with a downwardly opening suction nozzle positioned adjacent the floor, front and rear wheels supporting said cleaner for ambulatory movement on the floor, said front wheels being movable toward and away from the cleaner on an axle having an off-set portion pivotally connected to the cleaner, means for adjusting the position of said axle with respect to said cleaner including an eccentric pivotally supported between said axle and said cleaner so as to change the relative positions of said front wheels and said axle as said eccentric is rotated, a ratchet wheel secured to said eccentric, and means for engaging said ratchet wheel and advancing it one increment at a time comprising a spring

having one end supported on said cleaner and a free end arranged to engage and advance said ratchet wheel each time said free end is depressed and then released.

10. A suction nozzle having a downwardly opening suction mouth for cleaning a floor; adjustable support means carried by said nozzle for supporting said mouth at different elevations with respect to a floor; and means for adjusting said supporting means; said adjusting means comprising a rotatable control member for adjusting the vertical spacing of said supporting means relative to said nozzle, and spring means constructed to be manually stressed and then released, said control member having peripherally spaced cams thereon interposed between said support means and said nozzle and spaced at different radial distances from the axis of rotation of said control member for progressively raising and lowering said nozzle relative to said support means and having peripherally spaced engageable means, one for each of said cams, said spring means being operable when manually stressed and thereafter released to engage one of said peripherally spaced engageable means and move said control member to a new position and to space said nozzle a different distance from a floor each time said spring means is stressed and released.

11. In combination with a suction cleaner having a main body provided with a suction nozzle and supported on sets of front and rear wheels; of manually operable rotatable control means for adjusting one of said sets of wheels through a limited vertical range relative to said nozzle to adjust the latter to different elevations relative to the floor, said control means comprising a rotatable control member having a plurality of peripherally spaced cams at different radial distances from the axis of rotation of said control means and being interposed between said one set of wheels and said body and cooperable therewith to hold said wheels and body at progressively different spaced positions relative to one another as the control member is moved in the same direction through a range of movement to progressively bring said cams into operative position, and a manually operable rotatable actuator for advancing said control member one increment for each cycle of operation, said actuator including a plurality of peripherally spaced engageable members corresponding in number to the number of said cams and a spring arranged to be stressed manually and operable upon release to engage one of said engageable members and advance said control member one increment whereby said nozzle is adjusted to a different elevation under power manually impressed upon said spring and thereafter released to operate said control member.

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