

Dec. 19, 1939.

C. H. TAYLOR

2,183,826

SUCTION CLEANER

Filed Aug. 15, 1936

2 Sheets-Sheet 1

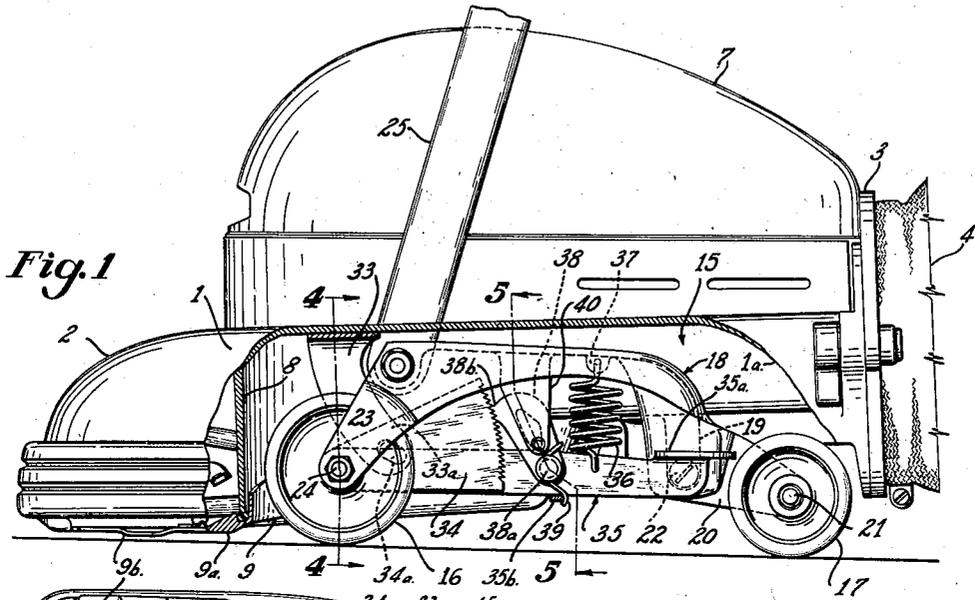


Fig. 1

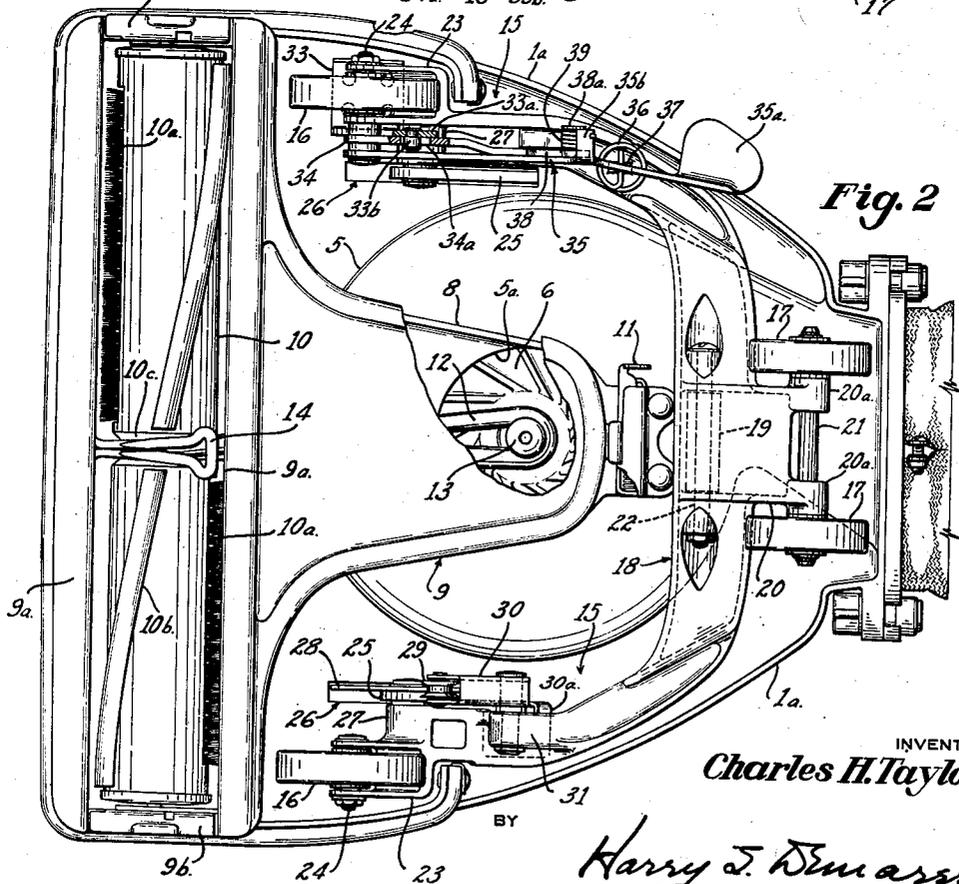


Fig. 2

INVENTOR  
*Charles H. Taylor*

BY  
*Harry J. Demasse*

ATTORNEY

Dec. 19, 1939.

C. H. TAYLOR

2,183,826

SUCTION CLEANER

Filed Aug. 15, 1936

2 Sheets-Sheet 2

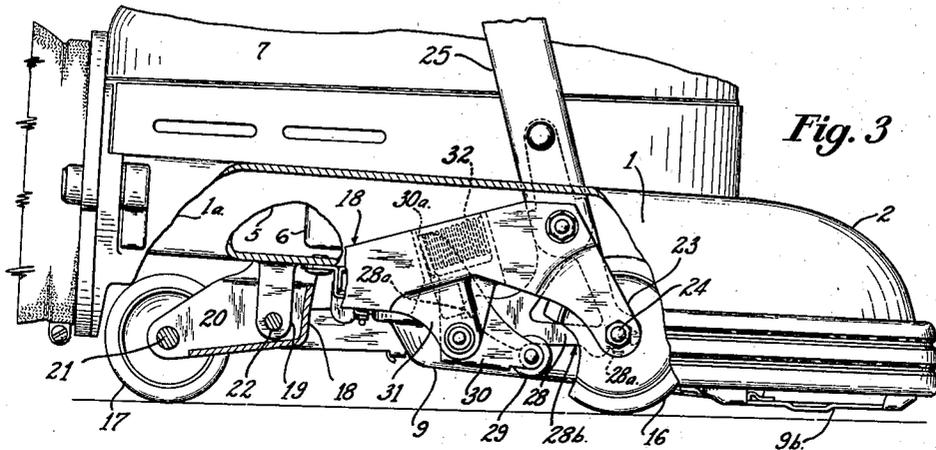


Fig. 3

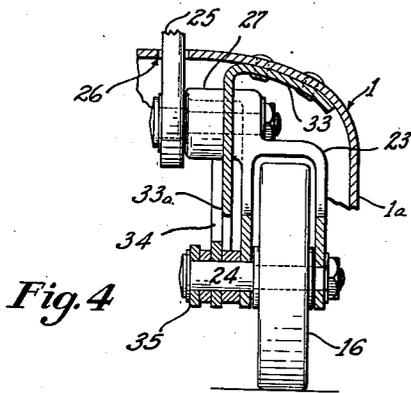


Fig. 4

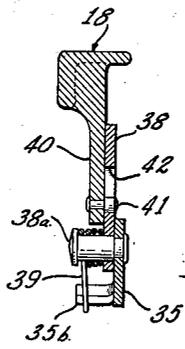


Fig. 5

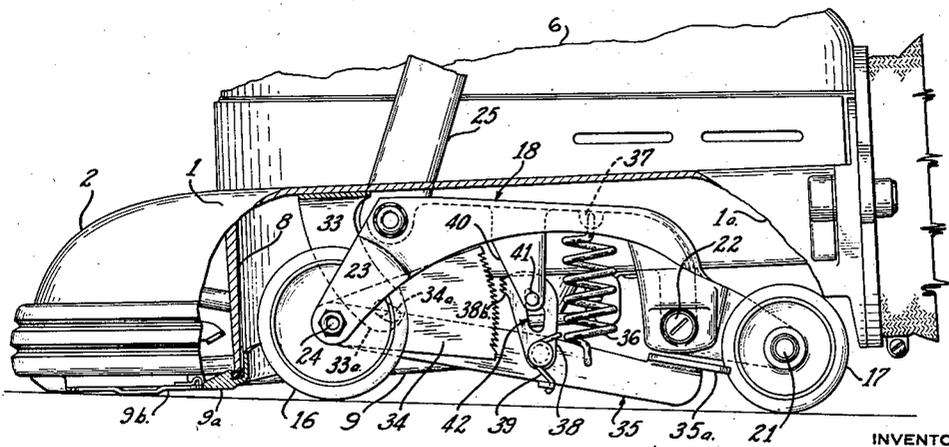


Fig. 6

INVENTOR

Charles H. Taylor

BY

Harry S. Duwars

ATTORNEY

# UNITED STATES PATENT OFFICE

2,183,826

## SUCTION CLEANER

Charles H. Taylor, North Canton, Ohio, assignor  
to The Hoover Company, North Canton, Ohio,  
a corporation of Ohio

Application August 15, 1936, Serial No. 96,222

12 Claims. (Cl. 15—16)

This invention relates to improvements in suction cleaners and more particularly to an improved nozzle height adjusting mechanism for regulating the height of the nozzle of a suction cleaner above the surface to be cleaned. For the purpose of distinguishing the improved mechanism from the type previously in use, it may be defined as "automatic" in its operation, thus drawing a sharp line of distinction between the raising and lowering the nozzle manually by means of a hand operated adjusting device and a device which automatically sets or regulates the height of the nozzle to the particular floor covering to be cleaned.

As well known in the art of suction cleaning, the effectiveness of the operation is dependent in a large measure upon the proper initial setting of the nozzle above the surface to be cleaned and the height adjustment for one type of carpet or rug may not be correct for another type. Actually, then, it is only possible to maintain a high degree of cleaning effectiveness by resetting the nozzle adjustment for each kind or grade of floor covering to be cleaned. But heretofore such precise adjustment has been quite impossible and chiefly because the average operator has neither the knowledge or the patience needed to keep the nozzle height adjustment properly set.

Without entering into a detailed discussion of the effect of nozzle height adjustment upon efficient cleaner operation, it can be stated that for the average or ordinary grades of carpets and rugs, a constant setting of the suction nozzle will produce fairly satisfactory results. But with the existing trend toward a wide variation in kinds and textures of floor coverings, it is practically impossible to maintain effective cleaning performance by manual nozzle height adjusting means—this being particularly true of carpets and rugs which differ considerably in thickness and depth of the pile and hence, the amount that the wheels will sink into the nap.

This statement explains sufficiently the object of the invention and also the desirability of a so-called "automatic" or "self-regulating" type of adjusting mechanism by means of which the cleaner is set to the proper operating nozzle height without exercise of judgment on the part of the operator. In other words, the operator merely performs the simple operation of pressing a lever and the nozzle adjusts itself to the proper height, this adjustment being gauged entirely by the character of the carpet on which the cleaner is resting at the time. Thus, with a possible range of adjustment from a bare or

linoleum covered floor to an extremely soft, thick-piled Chinese rug, it is possible to effectively clean by suction all floor surfaces or coverings between these two extremes.

With this introduction, a suction cleaner of the more or less standard type and design and equipped with the improved nozzle adjusting mechanism will now be described in connection with the accompanying drawings wherein:

Figure 1 is a view in side elevation of a suction cleaner in its normal operating position and with a portion of the side wall broken away to show the supporting carriage or chassis and the nozzle adjusting mechanism associated therewith;

Figure 2 is a bottom plan view of the cleaner;

Figure 3 is also a view in side elevation of the cleaner, but of the opposite side from that of Figure 1;

Figure 4 is a detailed view in vertical section taken on line 4—4 of Figure 1;

Figure 5 is also a detailed view in section taken on line 5—5 of Figure 1, and

Figure 6 is a view in side elevation corresponding to Figure 1, but with the nozzle height adjusting mechanism shown with the parts thereof transposed by the depression of the foot lever.

Referring to the cleaner in its general aspects, the same comprises a main casing 1, having a nozzle portion 2, extending transversely of its forward end and having the form of an elongated chamber with a downwardly facing opening. The casing extends rearwardly from the nozzle portion, gradually converging to a rearwardly opening flanged outlet connection 3 to which is attached a dirt receptacle in the form of a fabric bag 4. Centrally of the casing 1 is a circular fan chamber 5, visible from the underside thereof, and enclosing a fan 6, having direct driving connection with a motor (not shown) enclosed within a domelike cover or hood 7 surmounting the casing 1. The inlet to the fan chamber has the form of a circular opening or eye 5a located centrally of the bottom wall of the fan chamber and concentric with the vertical axis of the fan and its driving motor. Surrounding the rear half of the fan eye 5a and extending forwardly towards the nozzle portion 2, with a slight outward flare is a depending wall 8 curving abruptly through a right angle as it approaches the nozzle and forming the rear wall thereof at its outer ends. This depending wall forms the sides of a passage extending forwardly and communicating with the interior of the nozzle 2, said passage being closed at its bottom by a plate 9, having an upwardly

facing marginal groove bearing against the bot-  
 tom edge of the wall 8 and suitably lined with  
 a resilient material to form an air tight seal.  
 This bottom plate 9 is shaped to conform with  
 5 the outline of the wall 8, and preferably com-  
 prises, as an integral part thereof, the bottom  
 section of the nozzle portion 2, consisting of a  
 pair of parallel lips 9a, 9a, connected at their  
 10 ends by means of a pair of end lips 9b, 9b. These  
 lips form the relatively wide suction mouth lead-  
 ing to the nozzle chamber immediately above and  
 in which is located a rotating agitator 10, con-  
 sisting of a cylindric shell having brush elements  
 10a, 10a, arranged lengthwise thereof and heli-  
 15 cally arranged beater elements 10b, 10b. The  
 bottom plate 9 is removable to uncover the noz-  
 zle chamber and the passage leading rearwardly  
 therefrom, being detachably held in place by a  
 suitable latch member 11 at the extreme rear end  
 20 of the bottom plate. Also enclosed within the  
 passage from the nozzle chamber to the fan  
 chamber is a drive belt 12 engaging a pulley 13  
 carried at the lower end of the fan shaft and  
 extending forwardly therefrom engages a pulley  
 25 groove 10c midway between the ends of the agi-  
 tator 10 and immediately above a guard mem-  
 ber 14, extending transversely of the suction  
 mouth, as clearly shown in Figure 2.

Again referring to the main casing 1, with its  
 30 centrally disposed circular fan chamber 5, it  
 will be noted that along the edges of the casing  
 and extending rearwardly from the ends of the  
 nozzle 2 are depending curvilinear walls 1a, 1a,  
 and between these depending marginal walls 1a,  
 35 1a, and the outer side walls of the fan chamber  
 5, are cavities or hollow spaces 15 which have  
 a depth substantially equal to the height of the  
 casing 1 itself. It is within these cavities en-  
 closed by the marginal side walls 1a, 1a, of the  
 40 casing, that is located the wheeled support for  
 the casing as well as the nozzle adjusting mecha-  
 nism associated therewith.

Referring first to the supporting means for the  
 cleaner, the same comprises a common arrange-  
 45 ment of carrier wheels 16, 16 journaled or sup-  
 ported just inwardly from the sides of the casing  
 and immediately to the rear of the nozzle por-  
 tion thereof and a pair of wheels 17, 17 having  
 more the character of a two-wheeled caster lo-  
 50 cated beneath the rear end of the casing. But  
 in the present arrangement the front and rear  
 wheels are not mounted separately upon the  
 cleaner casing as is the more common construc-  
 55 tion but are carried on a separate frame mem-  
 ber to form therewith a carriage or chassis which  
 supports the entire cleaner. This carriage or  
 chassis has a two point connection with the cas-  
 ing, one being a pivotal connection just forwardly  
 60 of the rear caster assembly and which permits  
 the entire cleaner body to tilt about a horizontal  
 axis and the other, an adjustable connection be-  
 tween the forward ends of the chassis and the  
 casing through an intermediate foot operated  
 65 pawl and ratchet mechanism, which functions to  
 bring about the desired tilting of the cleaner  
 body on the wheeled chassis and thus maintain  
 the desired elevation of the nozzle above the  
 carpet surface.

Referring particularly to the frame which  
 70 forms the chassis or carriage, the same is a U-  
 shaped casting 18, pivotally connected centrally  
 of its base portion at the lower end of a bracket  
 19 depending from the underside of the fan  
 chamber 5. The frame member has an integral  
 75 bearing bracket 20 consisting in part of a pair of

spaced transverse webs which straddle the sup-  
 porting bracket 19. At the outer end of the bear-  
 ing bracket 20 is mounted a transverse axle 21  
 on which the rear wheels or casters 17, 17 are  
 journaled. A pivot pin 22 passes horizontally 5  
 and transversely through the supporting and  
 bearing brackets 19 and 20, the underside of the  
 frame member 18, being recessed as shown in  
 Figure 2, to accommodate the enlarged ends of  
 10 the bolt which serves as the pivot pin 22.

Now, from the point of pivotal connection of  
 the frame member 18 with the underside of the  
 casing 1, the lateral extremities thereof curve  
 forwardly within the cavities 15 between the wall  
 of the fan chamber and the outer marginal walls 15  
 1a, 1a, of casing 1, terminating just rearwardly of  
 the nozzle portion 2, in the form of fork mem-  
 bers 23, 23, in which the front wheels 16, 16 are sup-  
 ported, the same being journaled on bearing  
 shafts 24, 24, at the ends of said fork members. 20

Pivotaly connected to the chassis 18 just rear-  
 wardly of and above the front wheel supporting  
 members 23, 23 is an inverted U-shaped bail  
 member 25 which forms the lower extremity of  
 the handle of the cleaner and, straddling the 25  
 dome-like cover 7, projects through longitudinal  
 slots 26, 26 in the top wall of the casing 1 with  
 its ends pivotally connected to bearing bosses  
 27, 27, integral with the innermost portion of the  
 chassis frame 18 and projecting laterally and in- 30  
 wardly therefrom (Figure 4). Thus the cleaner  
 handle is carried by the wheeled chassis and quite  
 independently of the casing 1.

Associated with the handle bail 25 and co-act- 35  
 ing with the chassis frame 18 on the side oppo-  
 site the nozzle adjusting mechanism (Figure 3)  
 is a handle position control device which serves  
 to restrain the handle from free swinging move-  
 ment and to define its extreme position as well as  
 its intermediate or working range. This device 40  
 is already in common use, except that in its pre-  
 sent application the action is between a cam sector  
 carried by the handle bail and a spring pressed  
 roller mounted on the chassis instead of on the  
 cleaner casing. Thus, as clearly shown in Figure 45  
 3, the cam sector 28 is fixed to the end portion  
 of the handle bail 25 on the side of the cleaner op-  
 posite the nozzle adjusting mechanism, said sec-  
 tor projecting below the bail end pivot and hav-  
 ing along its arcuate lower edge three notches, the  
 50 endmost notches 28a being semi-circular in shape  
 and the intermediate notch 28b being somewhat  
 elongated. Now bearing edgewise against the  
 notched edge of the sector 28, is a cam roller 29  
 carried at the free end of a bell crank lever 30 55  
 pivotally mounted intermediate its ends at the  
 lower extremity of a depending web 31 integral  
 with the chassis frame 18, the portion or arm 30a  
 beyond the pivot point projecting upwardly and  
 forming an abutment for one end of a compres- 60  
 sion spring 32, suitably supported on the chassis  
 frame 18. Manifestly, the spring acting through  
 the lever 30 holds the roller 29 against the edge  
 of the control sector 28, so that while it is pos-  
 sible to shift the handle from one position to an- 65  
 other quite readily, the spring-pressed cam roller  
 29 holds the handle in that position.

Referring now to the automatic nozzle height  
 adjusting mechanism, attention is first directed  
 to the fact that as thus far described, the chassis 70  
 frame 18 has direct connection with the casing  
 1 only at the point of pivotal connection just  
 forwardly of the rear caster mounting. But, the  
 cleaner casing is not free to turn at this pivotal  
 connection, (limited as the arc would necessarily 75

be) because of a second point of connection between the chassis frame 18 and the forward end of the cleaner casing, namely, through a depending bracket 33 affixed to the top wall of the casing 1 and having a flat slightly curved arm 33a extending downwardly with a rearward curvature, as shown in Figure 2. This bracket 33 is mounted immediately above the right front carrier wheel 16 with its depending arm portion 33a extending downwardly immediately inside the forked wheel supporting member 23. There is however, no direct connection between the adjacent end of the chassis frame 18 and the bracket 33, but rather an indirect connection through a link or ratchet sector 34 journaled on an extension of the same bearing shaft 24 that supports the carrier wheel 16.

As clearly shown in Figure 1, the ratchet sector 34 has the form of an elongated triangular shaped plate pivoted at its apex and extending rearwardly therefrom with its bottom edge horizontal and its arcuate toothed edge facing rearwardly and adapted to be engaged by a pawl member presently to be described. This sector also has pin and slot connection intermediate its pivotal mounting on the bearing shaft 24 and its toothed edge with the bracket arm 33a, the latter carrying at its lower end, a laterally projecting pin 33b, engaging a relatively short slot 34a formed in the ratchet sector 34 and extending somewhat obliquely to the radial center line thereof. Thus it is apparent that the ratchet sector 34 provides a link between the chassis 18 and the casing 1 and that by rocking said sector vertically through a predetermined arc, a somewhat reduced rocking or tilting of the casing on its chassis will follow.

Now, journaled upon the same bearing shaft 24 which carries the wheel 16 and the ratchet sector 34 is an operating lever 35. This lever 35 extends rearwardly just inside the ratchet sector 34 and in a substantially horizontal direction, its rear end terminating practically in line with the pivotal axis of the chassis frame 18 and is there provided with a foot pedal 35a projecting laterally from beneath the lower edge of the marginal wall 1a of the casing 1. The foot operated lever 35 is normally held against downward movement by a relatively stiff coil spring 36 attached at one end to the lever just forwardly of its pedal extremity 35a and extending vertically upwardly, is anchored at its upper end to a lug 37 depending from the under side of the chassis frame 18 immediately above.

And finally, a pawl 38 is pivotally mounted on the operating lever 35 substantially intermediate its ends and in the plane of said ratchet sector 34. A laterally projecting pin 38a supports the pawl 38 which, extending in a general upward and forward direction, is provided at its end with several teeth 38b, complementing the teeth along the arcuate edge of the ratchet sector 34. A torsion spring 39, coiled around the pivot pin 38a with one end hooked around a lug 35b at the lower edge of the operating lever 35 and the other end around the back edge of the pawl 38 as clearly shown in Figure 1, acts to yieldingly hold the pawl in engagement with the ratchet sector 34.

From the description of the pawl and ratchet mechanism to this point, it might be concluded that upon depressing the lever 35, the pawl would click over the ratchet teeth and upon releasing the same, the forward end of the casing would be raised a given distance; in other

words, that it is but the application of a typical pawl and ratchet adjustment. But this is not the case since such an arrangement would be only partially operative because the nozzle could not be lowered, once it had been elevated to its extreme height, since there would be no way of releasing the pawl to allow the nozzle to be lowered. It is to be understood therefore, that the present adjusting mechanism is not to be confused with a foot operated ratchet device for elevating the nozzle but is, on the contrary, an adjusting mechanism which functions with but a single depression of the foot lever for setting the nozzle to the proper height for a particular surface. In other words, the depressing of the operating lever causes the nozzle to be lowered into contact with the carpet surface and upon releasing the lever the nozzle is elevated a predetermined fixed amount or distance regardless of the previous setting. But in order to bring this action about, it is necessary to control the movement of the pawl 38 with relation to the ratchet sector 34.

Thus, referring to Figure 6, there will be seen immediately above the pawl 38, an arm 40 depending from the under side of the chassis frame 18 and along the inner side of the pawl, said arm carrying a laterally projecting pin 41 engaging a somewhat irregularly shaped slot 42 located in the central portion of the pawl 38. This pin and slot connection serves to impart a cam action to the pawl, throwing it into and out of engagement with the ratchet sector 34. More particularly the cam action controls the pawl so that it disengages the ratchet sector at the beginning of the downward stroke of the lever 35 and holds it in that position (as in Figure 6) until the lever is released, whereupon the pawl is quickly thrown into engagement with the ratchet sector. That this cam action takes place is somewhat evident from the shape of the slot 42 in the pawl, being relatively wide at its lower end and converging toward its upper end thereby producing the oblique cam surface necessary to impart a quick lateral throw to the pawl as it shifts upwardly and downwardly with the operating lever 35.

Having thus set forth a structure embodying the improved nozzle adjusting mechanism, its operation will be understood from the following discussion:

Let it be assumed that the cleaner has been wheeled onto a carpet preparatory to operating it thereon and that so far as the nozzle height adjustment is concerned, it may or may not be properly set for that particular carpet, although the nozzle is elevated above the carpet surface as shown in Figure 1. Now, to obtain the correct setting the operator merely depresses the lever 35 to its fullest extent and upon releasing it the nozzle of the cleaner is automatically adjusted to the proper height regardless of previous setting.

The automatic action will now be described in detail: When the foot operated lever 35 is depressed from the substantially horizontal position shown in Figure 1 to the position shown in Figure 6 wherein the outer end practically contacts the carpet or floor surface, the first step is the disengaging of the pawl 38 from the ratchet sector 34, by the cam action of the stationary pin 41 in the slot 42 of the pawl 38. Now, immediately upon the release of the ratchet sector 34 by the pawl, the entire forward end of the cleaner casing 1 is free to tilt downwardly until the suc-

tion mouth of the nozzle rests flush upon the carpet surface, for obviously, having released the pawl sector 34 the casing can rotate freely about its pivotal connection with the chassis 18 and, the greater mass of the cleaner being forwardly of the pivotal axis, the nozzle simply drops into contact with the carpet surface.

But an important point to be noted here is, that the bottom surface of the nozzle being made up of wide lips surrounding the suction mouth, affords a relatively large contact surface and of such area that there is no appreciable penetration or sinking of the nozzle into the nap or pile of the carpet. This is important because it is the plane of contact of the nozzle with the carpet that establishes the base from which the nozzle adjustment is made and this base will vary with the grade and type of carpet upon which the adjustment is made. For example, if the cleaner is resting on a bare floor or a hard surface covering such as linoleum, the depression of the foot lever 35 lowers the nozzle into contact with the surface and this surface coincides with the plane of contact of the wheels, because there is no surface penetration by either nozzle or wheels. But now assume that the cleaner is placed upon a rug or carpet having a definite nap. Manifestly, under the weight of the cleaner the wheels will sink to a certain depth into the nap and this will determine an apparent plane of contact lying somewhere between the tips of the carpet fibers and the bare floor, depending somewhat on the stiffness of the nap and the resiliency of the carpet backing. In other words, the plane of contact represented by the wheel treads may vary considerably in a vertical direction from the actual carpet surface, which for the purpose of this discussion may be assumed to be the plane determined by the end of the upstanding carpet fibers, commonly called the carpet pile. But when the nozzle is lowered into contact with the surface of a carpet or rug its extended area does not cause any appreciable penetration of the pile, whereas the wheels may sink the full depth of the pile. Thus it is that the plane established by the nozzle resting upon the carpet pile is not only above that established by the wheels, but that, regardless of the character of the carpet, the base from which the adjustment takes place is always the plane of contact of the nozzle upon the upstanding carpet fibers and is fixed regardless of the depth of wheel penetration.

Now, the vertical distance separating these planes is manifested in a slightly greater or less relative displacement of the chassis 18 and the cleaner casing 1 in the act of depressing the foot pedal 35, and this displacement is in turn reflected in a slightly greater or less variation in the angular displacement of the ratchet sector 34 after it has been released by the pawl 38, as shown in Figure 6. This means, of course, that immediately upon the disengagement of the ratchet sector by the pawl, it will swing downwardly through a small angle represented by one or more of the ratchet teeth as the downward movement of the nozzle portion of the casing is transmitted thereto through the bracket 33. But with the base established by contact of the nozzle with the carpet, it is only necessary to release the operating lever 35, whereupon the spring 36 acts to retract the lever into normal horizontal position as in Figure 1, the upward movement of the lever first throwing the pawl 38 into engagement with the ratchet sector 34, and thence

swinging it upwardly in a counter-clockwise direction through a small arc, this movement of the ratchet sector 34 being transmitted to the casing through the bracket arm 33 with a slight degree of lost motion due to the pin and slot connection therebetween.

And finally, this upward lifting or elevating movement of the nozzle is previously determined for a particular type and style of cleaner and is constant regardless of varying surface conditions. For example, if  $\frac{3}{8}$  of an inch is predetermined as the proper nozzle height setting for a particular cleaner, the adjusting mechanism is designed to raise the nozzle this distance above the surface of the carpet pile regardless of the type or character of the carpet.

Thus, to summarize the important features of the so-called automatic nozzle adjustment, the first to be noted is that while the floor level determined by the plane of wheel contact is variable with different types and grades of carpets and rugs, the plane from which the adjustment is made, is always established by the contact of the nozzle with the true carpet surface and that this plane coincides with the pile surface regardless of the kind and texture of the carpet. And secondly, having established this plane from which the adjustment is to be made, the distance to which the nozzle is elevated above said plane is constant for that particular cleaner, so that the ultimate result is that regardless of the type of floor covering to be cleaned, the proper nozzle height setting is quickly and accurately obtained merely by depressing the foot pedal and then releasing it, the interconnection between the pawl carried by the operating lever and the tooth ratchet sector acting automatically to set the nozzle at its proper and correct height for the most effective and economical cleaning.

Thus, it follows that the adjustment is automatic insofar as it relieves the operator of the necessity for exercising any judgment as to the proper nozzle height adjustment for a particular carpet, this having previously been determined upon and incorporated in the design of the nozzle adjusting mechanism. Consequently, the only responsibility the operator has is to depress and release the pedal and the cleaner functions automatically to regulate or set its own height of nozzle adjustment for the particular carpet surface to be cleaned.

And finally, the incorporation of the nozzle adjusting mechanism in conjunction with a wheeled chassis supporting the cleaner casing so that the latter can be tilted to a slight angle about a transverse horizontal axis of pivotal connection, provides a very compact and satisfactory means of combining the supporting and adjusting mechanism. On the other hand, it is not essential that the cleaner body be supported upon a separate or independent carriage or chassis in order to obtain the automatic nozzle adjustment herein disclosed, providing either the forward or rear wheel mounting be pivotally connected to the casing of the cleaner. For example, in Figure 1, the rear caster mounting might readily be an integral part of the casing 1 rather than of the chassis frame 18, thus devoting the U-shaped frame member 18 to the mounting of the front wheels 16 and through which the elevating mechanism would still function quite as well to obtain the automatic adjustment of the nozzle.

Having thus set forth a preferred embodiment of my invention, I claim:

1. In a suction cleaner having a casing includ-

ing a nozzle and a wheeled support having pivotal connection with said casing, means for adjusting the height of said nozzle above the surface to be cleaned comprising an adjustable link 5 connecting said support with said casing independently of said pivotal connection and having a toothed sector, an operator actuated lever pivotally mounted on said wheel support adjacent said link, a spring-pressed pawl carried by said lever and normally having engagement with said sector to hold said link in adjusted position, and means acting to disengage said pawl and sector in the movement of said lever in one direction, thereby permitting said nozzle to be lowered into 10 contact with said surface and to reengage said pawl and sector to effect the raising of said nozzle a predetermined distance above said surface during the movement of said lever in the opposite direction.

2. In a suction cleaner having a casing including a nozzle and a wheeled support having pivotal connection with said casing, means for adjusting the height of said nozzle above the surface of the carpet to be cleaned, comprising a ratchet 25 sector pivotally carried by said support and having pin and slot connection with the underside of said casing at a point removed from its point of pivotal connection with said support, a foot-actuated operating lever mounted adjacent said ratchet sector, a spring-pressed pawl carried by said operating lever and normally engaging said ratchet sector to maintain said nozzle at a given height, means for shifting said pawl out of engagement with said ratchet sector in the movement of said operating lever in one direction 30 thereby allowing said nozzle to drop into contact with the carpet surface, and to effect its reengagement with said ratchet sector at the commencement of the return movement of said operating lever to elevate said nozzle to a predetermined distance above the carpet surface, and tension means acting to facilitate the return movement of said operating lever.

3. In a suction cleaner having a casing including a nozzle portion and a wheeled support pivotally connected to the underside of said casing and having wheels journaled thereon, means for adjusting said casing relative to said wheeled support to vary the height of said nozzle above the surface of the carpet to be cleaned, comprising 35 an adjustable link connecting said casing with said wheeled support and provided with a toothed sector, a foot operated lever pivotally mounted on said wheeled support, a spring pressed pawl pivotally mounted on said lever and normally adapted to have toothed engagement with said sector, means acting to shift said pawl to release said sector during the depression of said lever thereby effecting the lowering of said nozzle into 40 contact with the carpet surface and to allow the pawl to reengage said sector at the commencement of the return movement of the lever to effect the elevation of said nozzle to a predetermined height above said carpet surface, and tension means acting on said lever to impart the return movement thereto.

4. In a suction cleaner having a casing with a nozzle at its front end and a wheeled carriage extending lengthwise beneath said casing and 45 pivotally connected therewith adjacent the rear end thereof, an adjustable ratchet sector connecting said casing with said wheeled carriage adjacent the front end of said casing, an operating lever pivotally mounted on said carriage 50 adjacent said ratchet sector, a pawl pivotally

mounted on said operating lever, tension means acting on said pawl to hold the same normally in toothed engagement with said sector, tension means acting on said operating lever to hold the same in its normal position wherein the nozzle 5 portion of said casing is supported at a predetermined height above the floor level, and a cam acting on said pawl member during the movement of said operating lever in one direction to release said sector whereby said nozzle is permitted to drop into contact with the surface of the floor covering and, upon the subsequent release of said operating lever and its return to its normal position under the tension of said spring to reengage said pawl with said sector and thereby 10 actuate said link to raise said nozzle a predetermined fixed distance above the surface of said floor covering.

5. In a suction cleaner having a body including a nozzle and a wheeled support having pivotal connection with the underside of said casing, a link connecting said support with said casing whereby the vertical rocking movement of said link imparts a tilting movement to said casing to raise and lower said nozzle, means normally 15 holding said link against movement including a spring-pressed link-engaging member, a spring-actuated lever operatively connected with said link-engaging member, a fixed cam member acting to shift said link-engaging member in a direction to disengage said link in the movement of said lever against the tension of its spring thereby to cause said nozzle to drop downwardly into contact with the carpet surface and to effect the re-engagement of said link by said link-engaging member at the moment said lever is released and commences its return stroke under the tension of its spring, thereby raising said nozzle to a predetermined height above the carpet surface.

6. In a suction cleaner having a body including a nozzle and a wheeled support pivotally connected to said body, a link also pivotally connecting said body with said support and having a ratchet sector, a spring-pressed pawl normally engaging said ratchet sector, a lever carrying 20 said pawl and adapted to be shifted in opposite directions, said pawl having pin and slot connection with said support whereby it is disengaged from said ratchet sector during the movement of said lever in one direction and into engagement with said ratchet sector at the commencement of the movement of said lever in the opposite direction, whereby said nozzle is lowered into contact with the surface of the floor covering to be cleaned and thence raised to a predetermined height above said surface.

7. In a suction cleaner having a body including a nozzle and a wheeled support pivotally connected to said body, a link connecting said body with said support and having a toothed 25 ratchet sector, a spring-pressed pawl normally engaging said ratchet sector to maintain said body in fixed relation to said support, and mechanism for operating said pawl successively to release said ratchet sector thereby to permit said body to drop under its own weight until said nozzle contacts the floor and to reengage said ratchet sector and raise said nozzle to a predetermined height above the floor.

8. In a suction cleaner having a body including a nozzle and a wheeled support pivotally connected with said body, a ratchet member pivotally connecting said wheeled support with said body at a point spaced from the first mentioned point of pivotal connection, a pawl normally engaging 30

said ratchet member to maintain said body in fixed relation with said support, an operating lever mounted on said support and having operative connection with said pawl, and means for shifting said pawl out of engagement with said ratchet member in the movement of said lever in one direction thereby permitting said body to drop downwardly with said nozzle resting on the surface of the floor covering to be cleaned and thence into engagement with said ratchet member at the commencement of the return stroke of said lever to raise said body to a height predetermined by the movement of said ratchet member during the return stroke of said lever.

9. In a suction cleaner having a casing including a nozzle and a wheeled support having pivotal connection with said casing, means for adjusting the height of said nozzle above the surface to be cleaned, comprising a link connecting said wheeled support with the nozzle end of said casing and having a ratchet sector, a lever pivotally mounted on said wheeled support, a spring-pressed pawl carried by said lever and normally engaging said ratchet sector to hold said link against displacement, said pawl being cam controlled to disengage said pawl from said ratchet sector in the movement of said lever in one direction to allow said nozzle to drop into contact with the surface to be cleaned and to re-engage said sector at the commencement of the return stroke of said lever and elevate said nozzle to a predetermined height above said surface.

10. In a suction cleaner having a casing including a nozzle and a wheeled support having pivotal connection with said casing, means for adjusting the height of said nozzle relative to the surface to be cleaned comprising a link connecting said wheeled support with said casing and provided with a ratchet sector, an operating lever pivotally mounted on said support, a pawl carried by said lever and normally engaging said ratchet sector to hold said nozzle in a given position of adjustment, a cam mounted on said support and acting to shift said pawl to release said ratchet sector in the movement of said lever in one direction and permit said nozzle to drop into contact with the floor surface and to shift said pawl into engagement with said sector at the com-

mencement of the return stroke of said lever and elevate said nozzle to its predetermined height above the surface to be cleaned.

11. In a suction cleaner having a casing including a nozzle and supported upon a carriage having pivotal connection with the underside of said casing, means for adjusting the height of said nozzle above the surface to be cleaned, comprising a link pivotally connecting said carriage with said casing adjacent the nozzle end thereof, an operating lever pivotally mounted on said carriage, a spring-pressed pawl carried by said operating lever and normally engaging said ratchet sector to hold said casing in a fixed relation to said carriage, a fixed cam member on said carriage and engaging a slot in said pawl to shift the same out of engagement with said ratchet sector upon the movement of said operating lever in one direction thereby permitting said nozzle to drop into contact with the carpet surface and to shift said pawl into reengagement with said ratchet sector at the commencement of the movement of said operating lever in the opposite direction thereby to raise said nozzle to a predetermined height above the surface to be cleaned.

12. In a suction cleaner having a casing and provided with a nozzle at its forward end and a wheeled carriage pivotally connected to its underside adjacent its rear end, a link connecting said carriage with said body adjacent said nozzle and adapted to swing in a vertical plane to vary the height of the nozzle above the surface to be cleaned, a foot-actuated lever pivotally mounted on said carriage, a spring acting on said lever to yieldingly oppose its depression, a spring-pressed pawl mounted on said lever and normally engaging a ratchet sector on said link to hold said casing in a fixed position of nozzle height adjustment, a cam acting on said pawl to shift the same out of engagement with said ratchet sector upon the depression of said lever thereby permitting said nozzle to drop into contact with the carpet surface and to re-engage said pawl with said ratchet sector at the commencement of the return movement of said lever and thereby raise said nozzle to a predetermined height above said surface.

CHARLES H. TAYLOR.