Jan. 9, 1951 L. H. SNYDER 2,537,166

ADJUSTABLE HEIGHT MECHANISM FOR FLOOR CLEANERS

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Fig. 1

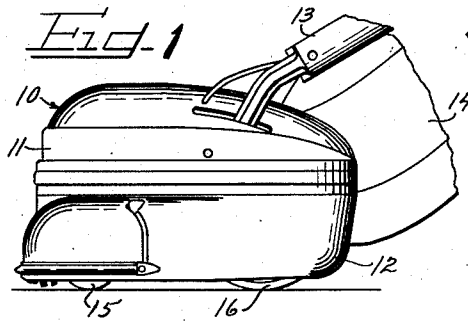


Fig. 2

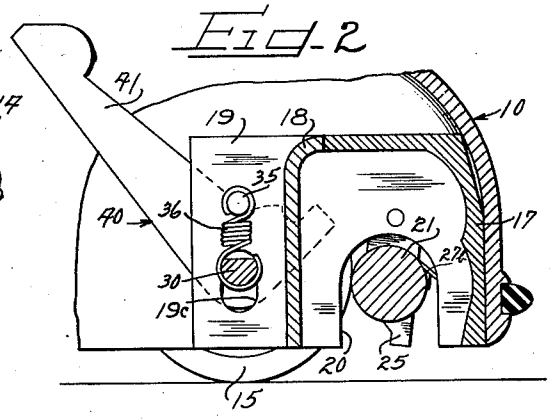
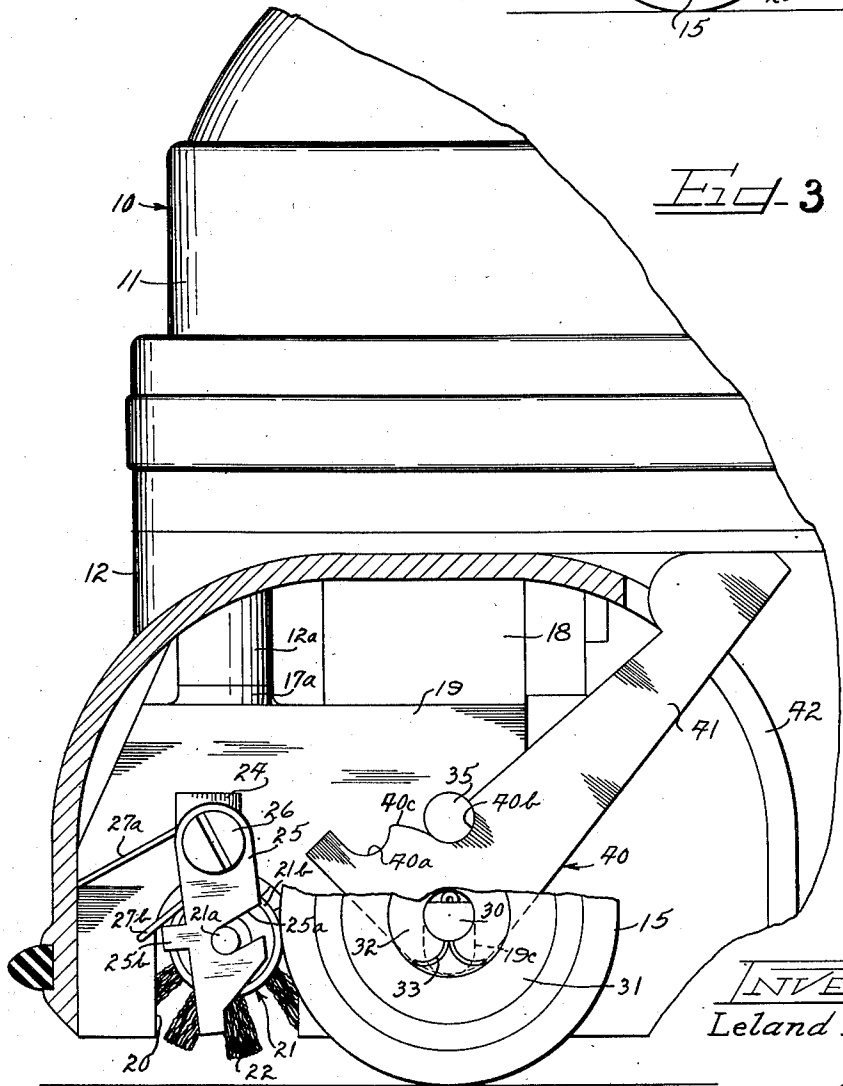


Fig. 3



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ADJUSTABLE HEIGHT MECHANISM FOR FLOOR CLEANERS

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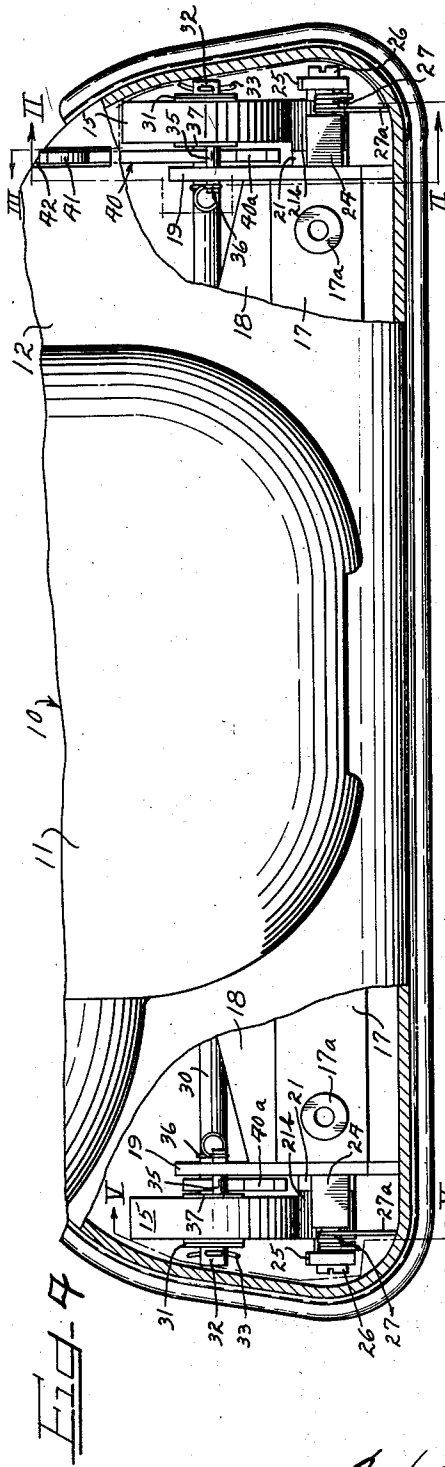


Fig. 4

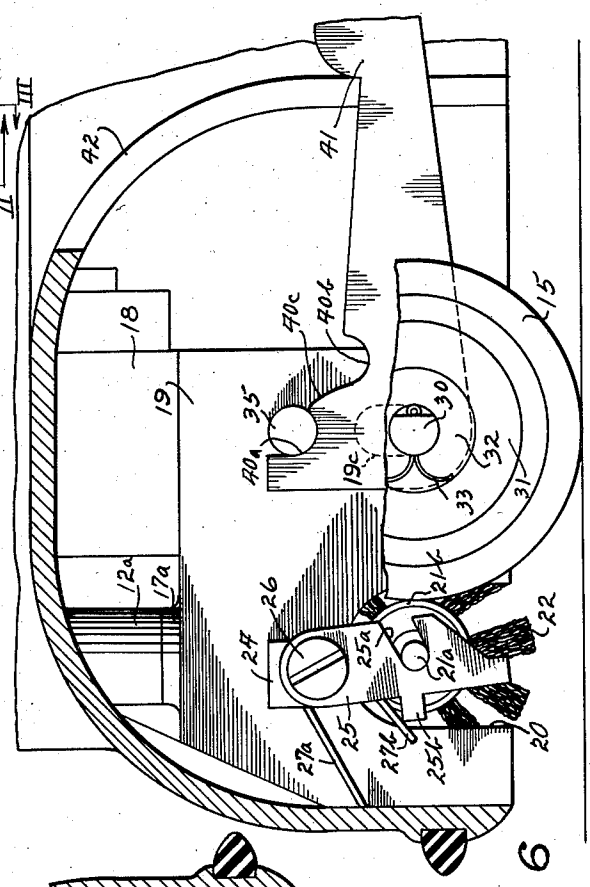


Fig. 6

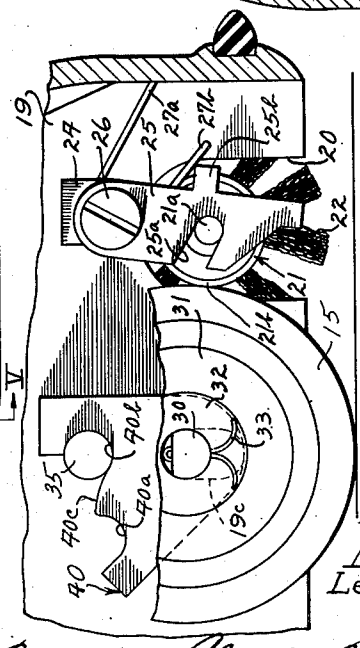


Fig. 5

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ADJUSTABLE HEIGHT MECHANISM FOR FLOOR CLEANERS

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Application September 29, 1945, Serial No. 619,350

4 Claims. (Cl. 15—354)

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This invention relates to an adjustable vacuum cleaner, carpet sweeper or the like, including a rotary brush arrangement for cleaning floor surfaces, rugs and the like. More particularly, the invention relates to a device of the nature indicated including means for varying the distance from the floor surface to the rotary brush so that the brush action can be regulated according to the height of the nap of the rug being cleaned and according to the desired severity of brush action.

According to the present invention, a vacuum cleaner or carpet sweeper provided with a rotary brush operative at a fixed level with respect to the sweeper body is also provided with means for varying the height of the sweeper body above the floor. Preferably, a shaft supporting a pair of front wheels is vertically movable with respect to the sweeper body under the upwardly biasing influence of suitable resilient means, and wedge, cam or lever means operate against a fixed point on the sweeper body to depress the front wheels and thereby to elevate the sweeper body to any desired extent.

It is, therefore, an important object of the present invention to provide a sweeper including a rotary brush that may be elevated or depressed with respect to the floor surface to effect any desired type of beating or brushing action.

Another important object of the present invention is to provide a sweeper of the type indicated in which there is a floating connection between a pair of front wheels and the sweeper body and in which a lever, cam or wedge member serves to depress or elevate the sweeper body (and the rotary brush) with respect to a floor surface.

Other and further objects and features of the present invention will become apparent from the following description, the accompanying drawings and the appended claims.

The drawings show, by way of a preferred example of a cleaner according to the present invention, a vacuum cleaner identical with that disclosed and described in my copending applications Serial No. 619,351 and Serial No. 619,352 entitled, respectively, "Vacuum Cleaner" and "Vacuum Cleaner with Illuminating Device," filed of even date with the present application. Application Serial No. 619,352 is now abandoned. The first mentioned application contains claims drawn to the casing structure, while the second mentioned application contains claims drawn to the battery supplied illuminating circuit. Reference is made to said two copending applications for

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features not shown or disclosed in the present applications.

On the drawings:

Figure 1 is a fragmentary side view of a vacuum cleaner according to the present invention;

Figure 2 is an enlarged fragmentary vertical cross-sectional view taken along the line II—II of Figure 4;

Figure 3 is a greatly enlarged, fragmentary side view, taken along the line III—III of Figure 4, with parts broken away, and showing the adjusting means in one operating position;

Figure 4 is a greatly enlarged, fragmentary plan view, with parts broken away;

Figure 5 is a greatly enlarged, fragmentary cross-sectional view, with parts broken away, taken along the line V—V of Figure 4; and

Figure 6 is a fragmentary vertical cross-sectional view, similar to Figure 3, but showing the adjusting means in another operating position.

In Figures 1 to 4, the reference numeral 10 indicates generally a vacuum cleaner according to the present invention. As shown in Figure 1, the vacuum cleaner 10 includes a sweeper body having an upper casing 11 and a lower casing 12 rigidly connected to the upper casing, a handle 13 pivotally connected to the sweeper body and a dust bag 14. The sweeper body is supported from a pair of front wheels 15 and a rear wheel 16.

The front part of the lower casing 12 opens downwardly and serves to receive a suction nozzle formed by a front nozzle part 17 and a rear nozzle part 18. The front nozzle part 17 may be affixed to the lower casing 12 by means of bolts connecting lugs 17*a* on the upper surface of the front nozzle part 17 and lugs 12*a* depending from the front cover 12. Means (not shown) provide communication between the suction nozzle, a suction fan and a conduit connecting the suction fan to the dust bag 14. Plates 19 integral with the rear nozzle part 18 close off the lateral ends of the suction nozzle. The plates 19 are formed at their forward ends with downwardly opening slots 20 that accommodate the ends of the rotary brush shaft 21 carrying brushes 22 arranged in spiral lines about the brush shaft 21.

The end plates 19 further carry above the slots 20 outstanding lugs 24 from which are pivotally suspended plates 25 whose rear sides are inwardly and downwardly slotted, as at 25*a*, to receive the constricted ends 21*a* of the brush shaft 21. More particularly, the plates 25 are suspended from the outer terminal surfaces of the lugs 24 by means of screws 26, and the heads of the screws 26 are spaced from the outer ter-

minal surface of the lugs 24 by torsion springs 27 having upper longer arms 27a whose ends lay against the front wall of the lower casing 12 and whose lower ends 27b abut against a forward projection or spur 25b from the plates 25 at about the level of the bottom of the slots 25a. The torsion spring 27 thus urges the pivotable plate 25 backwardly so that a serrated terminal surface 21b on the rotary shaft 21 is urged into frictional engagement with the front wheels 15 for driving the rotary shaft 21.

The front wheels 15 are freely rotatable on a shaft 30 extending transversely of the sweeper through slots 19c in the plates 19 that permit only upward and downward movement of the shaft with respect to the sweeper body. Washers 31, caps 32 and cotter pins 33 on the ends of the shaft 30 outside the wheels 15 serve to keep these wheels on the shaft 30. Above the slots 19c, a pin or stud 35 is affixed in each plate 19 so as to project laterally on both sides of each plate 19. On the inside of each plate 19, the free ends of a tension spring 36 are hooked around the shaft 30 and the inside end of the pin 35, so as to bias the shaft 30 upwardly as far as permitted by the slots 19c.

The front wheels 15 are kept in spaced relationship to the outside of the plates 19 by washers 37 fixed to the shaft 30. Between each wheel 15 and each plate 19 a cam member 40 is rigidly attached to the shaft 30, which thus acts as a rock shaft to synchronize movements of the two cam members 40. The members 40 are generally of a V shape, and the crotch of said V is formed with a camming surface adapted to contact that part of the pin 35 outside the plates 19 to depress or elevate the shaft 30 with respect to the sweeper body. As shown in the drawings, the forward end of the crotch of the cam member 40 is formed with a recess 40a adapted to receive and hold the shaft 30 at a certain distance from the pin 35, as shown in Figure 6. Adjacent the other and rear leg of the V-shaped member 40, the latter is formed with another recess 40b adapted to receive and hold the shaft 30 a smaller distance from the pin 35, as shown in Figures 3 and 5. Between these two recesses, the crotch of the V is provided with a curved surface 40c permitting swinging movement of the member 40 so as to lodge the pin 35 in either of the recesses 40a and 40b. One of the cam members 40 is provided with a rearwardly directed arm 41 forming a continuation of the rear leg of the V-shaped member movable in the slot 42 in the rear of the lower casing member 12 for manual actuation of the cam member 40.

It will be apparent that the shaft 30 movable upwardly or downwardly in the slots 19c is biased upwardly by the spring 36 and that movement of the arm 41 and thereby of the two cam members 40 (through the agency of the shaft 30 acting as a rocking shaft) will cause a camming or wedging action of the surfaces 40a, 40b, and 40c functioning to space the shaft 30 at a greater or smaller distance from the pin 35, thus elevating or depressing the front wheels (which are freely rotatable about the shaft 30) with respect to the sweeper body. The rotary brush shaft being fixed with respect to the sweeper body, it is evident that the height of the brush shaft above the surface being swept can be regulated at will for more or less severe brush action and for correlation with the height of the nap of any rug being cleaned.

It should be understood that the above disclosed means for varying the height of a rotary brush in a cleaning device equipped with a rotary brush operative at a fixed level with respect to the sweeper body may be utilized not only in the vacuum cleaner disclosed hereinabove, but in any other carpet sweeper or vacuum cleaner provided with such a rotary brush.

Many other details of construction may also be varied within a wide range without departing from the principles of this invention, and it is therefore not my purpose to limit the patent granted on this invention otherwise than necessitated by the scope of the appended claims.

I claim as my invention:

1. An adjustment device for use with a carpet sweeper having a downwardly opening casing and cleaning means operating at a substantially fixed level with respect to said casing comprising a wheel supporting shaft mounted in said casing for limited vertical movement, a stud secured in said casing in overlying relationship to said shaft, a spring operating between said stud and said shaft to urge said shaft upwardly, and a cam member secured to said shaft and coacting with said stud so that in one angular position said cam member will displace said shaft downwardly from said stud more than in another angular position.

2. An adjustment mechanism for use with a carpet sweeper having a downwardly opening casing and cleaning means operating at a substantially fixed level with respect to said casing comprising a wheel supporting shaft mounted in said casing for limited vertical movement, a stud secured in said casing in overlying relationship to said shaft, a spring operating between said stud and said shaft to urge said shaft upwardly, a cam member secured to said shaft, said cam member having a plurality of notches in the cam surface thereof selectively engageable with said stud by rotation of said cam so that in one angular position said cam member will displace said shaft downwardly from said stud more than in another angular position, an extension on said cam projecting outside of said casing to permit manual selection of the angular position of said cam, said notches cooperating with said stud to resiliently maintain said cam member in any one selected position.

3. An adjustment mechanism for use with a carpet sweeper having a downwardly opening casing and cleaning means operating at a substantially fixed level with respect to said casing comprising a wheel supporting shaft supported in said casing side walls for limited vertical movement, a stud secured in each casing side wall with portions thereof projecting out of each face of the respective side walls in overlying relationship to said shaft, springs respectively operating between one projecting portion of each stud and said shaft to urge said shaft upwardly, a cam member secured to each end portion of said shaft and coacting respectively with the other said projecting portion of each stud so that in one angular position said cam members will displace said shaft downwardly from said studs more than in another angular position, and means operable from the outside of said sweeper to vary the position of said cams.

4. An adjustable mounting assembly for a wheel-supporting shaft, comprising vertical end plates having vertically extending slots for freely receiving the ends of said shaft, horizontally alined pins fixedly carried by said plates in vertically spaced relation above said slots, springs

anchored to said shaft to bias the latter upwardly, and cam members for mounting upon said shaft as a rock-shaft and having sets of spaced pin receiving recesses and cam surfaces joining said recesses, said cam surfaces coacting with said pins as the cam members are rocked with said shaft to shift one or another set of said recesses into pin-receiving position.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
654,776	Barber	July 31, 1900
896,050	Zwemer	Aug. 11, 1908
1,266,638	Spangler	May 21, 1918
1,448,397	Friend	Mar. 13, 1923
1,482,953	Tideman	Feb. 5, 1924
1,485,880	Palmer	Mar. 4, 1924
1,582,692	Riebel	Apr. 27, 1926
2,172,911	Kirby	Sept. 12, 1939
2,309,214	Rey	Jan. 26, 1943