

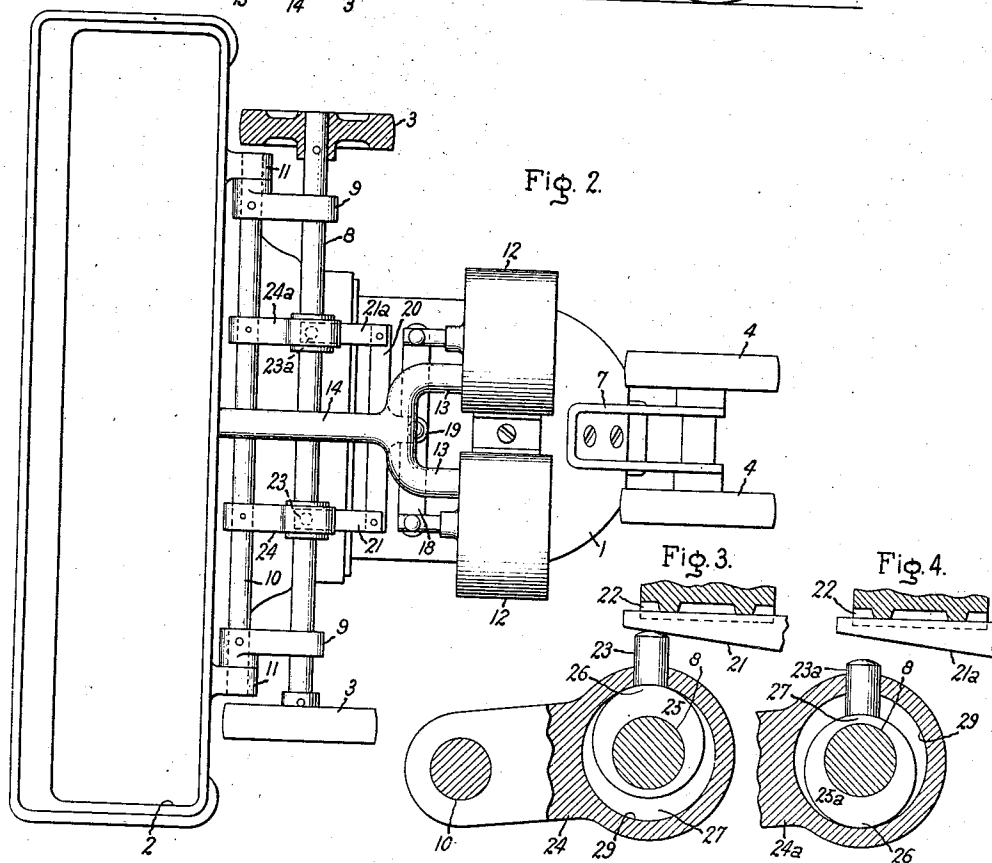
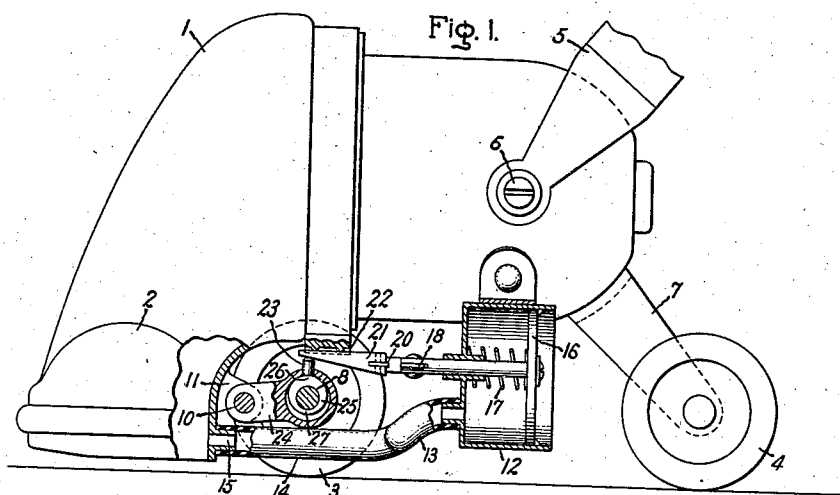
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VACUUM CLEANER

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VACUUM CLEANER

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Continuation of application Serial No. 362,729, October 25, 1940. This application August 29, 1941, Serial No. 498,744

7 Claims. (Cl. 15—16)

This application is a continuation of my application Serial No. 362,729, filed October 25, 1940.

The present invention relates to vacuum cleaners of the type having an ambulatory casing provided with a suction nozzle presented to the surface being cleaned.

The object of my invention is to provide in vacuum cleaners of this type an improved construction for adjusting the height of the suction nozzle, and for a consideration of what I believe novel and my invention, attention is directed to the following description and the claims appended thereto.

In the accompanying drawing, Fig. 1 is a side elevation, partly in section, of a vacuum cleaner embodying my invention; Fig. 2 is a bottom plan view of the vacuum cleaner; and Figs. 3 and 4 are enlarged views illustrating the operation of the nozzle adjustment.

Referring to the drawing, there is shown a vacuum cleaner having a casing 1 containing a motor driven suction fan for creating a suction at a suction nozzle 2 which is supported above the surface to be cleaned by front and rear supporting wheels 3 and 4. The cleaner is moved by a handle attached to a fork 5 pivoted at 6 on the casing. The rear wheels 4 are supported in a bracket 7 fixed to the casing, and the front wheels 3 are fixed to an axle 8 rotatably carried in arms 9 pinned to a rock shaft 10 journaled in bosses 11 on the under side of the casing.

Fixed to the under side of the casing are a pair of cylinders 12 connected by conduits 13 and 14 to a hollow projection 15 in the rear wall of the suction nozzle. In the cylinders 12 are pistons 16 which are biased to the right, as viewed in Fig. 1, by compression springs 17. The suction at the suction nozzle acts through the conduits 13 and 14 and tends to move the pistons 16 to the left. The position of the pistons 16 in the cylinders 12 is accordingly dependent upon the suction at the suction nozzle. The pistons are connected by a link 18 at the mid-point of which is pivoted the tongue 19 of an equalizer bar 20. The ends of the equalizer bar 20 are pivotally connected to wedges 21 and 21a slidably carried in guides 22 on the under side of the cleaner casing. The wedges 21 and 21a are independently movable in that if one of the wedges is held stationary, the other wedge will be moved by the pistons 16 acting through the link 18 and the equalizer bar 20. The weight of the cleaner casing is transmitted to the front supporting wheels 3 through pins 23 and 23a slidably carried in arms 24 and 24a pinned to the rock shaft

10. The upper ends of the pins 23 and 23a bear on the under sides of the wedges 21 and 21a. The lower ends of the pins 23 and 23a bear on eccentrics 25 and 25a fixed to the axle 8 and rotatable in clearance holes 29 in the free ends of the arms 24 and 24a. When the cleaner is in use, the suction at the nozzle acts through the pistons 16 to move the wedges 21 and 21a to such position that the suction at the nozzle is maintained at a constant value determined by the tension of the springs 17. As the cleaner is moved over carpets of varying thicknesses, the wheels sink into the nap of the carpet and different nozzle adjustments are required if the cleaning efficiency is to be maintained. The above described arrangement tends to automatically adjust the position of the nozzle so as to maintain constant nozzle suction which it has been found is the most desirable condition for efficient cleaning.

In previous constructions for automatically adjusting the suction nozzle it has been found that due to friction in the moving parts the force required to adjust the nozzle was subject to a wide variation. It has accordingly been difficult to devise a control for automatically adjusting the nozzle which had the required degree of sensitivity and was at the same time able to move the wheels so as to properly adjust the suction nozzle. In the present construction, for example, the wedges 21 and 21a would have some tendency to stick in the guides 22 and hold the nozzle in the wrong position. This difficulty is avoided by the eccentrics 25 and 25a which are spaced 180° apart on the wheel axle 8 so that when the high part 26 of one of the eccentrics is uppermost, the low part 27 of the other eccentric is uppermost. The operation of the eccentrics is illustrated in the enlarged and somewhat exaggerated Figs. 3 and 4 where the high part 26 of the eccentric 25 and the low part 27 of the eccentric 25a are uppermost. Under this condition the vacuum cleaner nozzle is supported on the axle 8 substantially wholly by the pin 23 which is between the high part 26 of the eccentric 25 and the adjacent wedge 21, while the pin 23a has dropped down onto the low part 27 of the eccentric 25a providing a clearance between the upper end of the pin and the wedge 21a so this wedge can be easily moved by the pistons 16 to the proper position for maintaining constant suction at the nozzle. When the wheels 3 have turned 180° from the position shown in Figs. 3 and 4, the high point 26 of eccentric 25a and the low point 27 of eccentric 25 will be

uppermost so the pin 23a will be lifted into supporting engagement with the wedge 21a and the pin 23 will drop down away from the wedge 21 to provide a clearance permitting easy movement of the wedge 21 by the pistons 16. From one aspect this can be considered as an arrangement for temporarily removing the load from the automatic nozzle adjustment mechanism or for reducing the resistance to movement of such mechanism. Since the axle 8 turns with the front supporting wheels 3, each of the wedges 21 and 21a is in the unloaded condition once during each revolution of the wheels. By means of the above described arrangement it is possible to use a sensitive nozzle adjustment device, such as the suction responsive pistons 16, and to obtain the proper nozzle adjustment under all conditions of operation.

What I claim as new and desire to secure by Letters Patent of the United States, is:

1. In a vacuum cleaner having a suction nozzle, supporting wheels, means supporting the nozzle on said wheels including an adjustable support whereby the height of the nozzle above the surface being cleaned may be varied, automatic means tending to adjust said support to a predetermined position, and means operated by rotation of the wheels for periodically supporting the nozzle independent of said support whereby said support may be more readily adjusted.

2. In a vacuum cleaner having a suction nozzle, supporting wheels, adjustable means supporting the nozzle on said wheels whereby the height of the nozzle above the surface being cleaned may be varied, means responsive to the suction at the nozzle tending to adjust said adjustable means to a position of constant suction, another support for the nozzle movable toward and away from a supporting position and effective while in the supporting position to remove load from said adjusting means, and means for periodically moving said second support toward and away from the supporting position whereby the adjusting means may be more readily adjusted.

3. In a vacuum cleaner having a suction nozzle, supporting wheels, independently movable weight transmitting members arranged between the nozzle and said wheels, said members being adjustable to vary the height of the nozzle above the surface being cleaned, means effective during the use of the cleaner for periodically shifting the weight of the cleaner from one of said

members to unload the same whereby it may be more easily adjusted, and automatic means tending to adjust said members to a position corresponding to a predetermined nozzle adjustment.

4. In a vacuum cleaner having a suction nozzle, supporting wheels, independently movable members, means including eccentrics rotatable with the wheels for cooperating with said members to transfer the weight of the cleaner to said wheels, said members being adjustable to vary the height of the nozzle above the surface being cleaned and said eccentrics being angularly displaced whereby the distribution of the weight of the cleaner between said members varies during the rotation of the eccentrics, and automatic means tending to adjust said members to a position corresponding to a predetermined nozzle adjustment.

5. In a vacuum cleaner having a suction nozzle, supporting wheels, independently movable members, means rotatable with the wheels in cooperation with said members to transfer the weight of the cleaner to said wheels, said means having angularly displaced projections cooperating with said members and said members being adjustable to vary the height of the nozzle above the surface being cleaned, and automatic means tending to adjust said members to a position corresponding to a predetermined nozzle adjustment.

6. In a vacuum cleaner having a suction nozzle, supporting wheels adjustable to vary the height of the nozzle above the surface being cleaned, an axle carrying said wheels, angularly displaced projections on said axle, independently movable wedges cooperating with each of said projections to transfer the weight of the cleaner to said axle, and automatic means tending to move said wedges to a position corresponding to a predetermined nozzle adjustment.

7. In a vacuum cleaner having a suction nozzle, supporting wheels adjustable to vary the height of the nozzle above the surface being cleaned, an axle carrying said wheels, angularly displaced projections on said axle, independently movable wedges cooperating with each of said projections to transfer the weight of the cleaner to said axle, and means responsive to the suction at the nozzle tending to move said wedges to a position corresponding to a predetermined nozzle suction.

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