SUCTION CLEANER NOZZLE CONSTRUCTION

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3 Claims. (Cl. 15—355)

This invention relates to nozzle construction for a suction cleaner and it pertains particularly to a suction cleaner nozzle mounted on wheels and having a floating brush, which nozzle and brush are separately adjustable on the wheels.

Nozzles or nozzle attachments for suction cleaners are used extensively for cleaning rugs and floors. However, on rugs a problem is created because rugs have varying depths of nap and the problem is accentuated where the nozzle is provided with an adjustable brush. For these reasons various attempts have been made to improve the glidability of a nozzle over a floor and particularly over a rug. More recently, nozzles have been provided with wheels to permit easier movement of the nozzle but the relationship between the wheels and the adjustable brush has continued to be troublesome, particularly with a wide range of variation in carpet depth.

It has been found that the problem is not completely solved by the provision of wheels on nozzles for suction cleaners. As a matter of fact, one reason why wheels have not been generally adopted earlier has been the general opinion that a nozzle without wheels performs a more satisfactory cleaning operation by permitting the nozzle to rest directly upon the rug surface.

With the improvement of the suction qualities of a suction cleaner, however, a nozzle has sufficient nozzle air velocity that in many cases the nozzle will “freeze” to the rug surface and prevent any back and forth movement whatsoever over a rug surface. One way to prevent “freezing” is to provide a suction bleed-off valve in the suction conduit between the nozzle and the suction cleaner. Such a valve merely reduces the suction in the nozzle but does not cure the problem without reducing cleaning efficiency. The addition of wheels on the nozzle minimizes the possibility of a nozzle “freezing” to the nap of a rug by providing lever means for loosening a nozzle.

When a pair of wheels are mounted on a suction cleaner nozzle, however, other factors must be taken into consideration. In the first place, rugs have different naps so that a nozzle will react differently on a rug having a short nap as compared to a carpet having a deep nap. Moreover, where the nozzle is provided with a floating brush, which is generally used for agitating a surface being cleaned and loosening particles such as lint, the brush may be movable between operating and nonoperating positions. Thus it has been found that where wheels are provided on a suction cleaner nozzle having a brush, the nozzle should be adjustable not only between different positions on the wheels but also independently of the brush operation whereby the operator may set the desired position for both brush and nozzle as the cleaning conditions dictate. Finally, where an unwheeled nozzle creates a psychological reluctance of moving a nozzle off a rug onto a bare floor for fear of scratching the floor, a wheeled nozzle has the opposite effect, which with a floating brush provides an expedient method for cleaning floors.

In addition, it is necessary that a nozzle having a separately adjustable brush is easily and quickly adjustable with a minimum of complicated structure on carriage wheels.

Accordingly, it is a general object of this invention to provide a suction cleaner nozzle having a pair of wheels adjustable to varying degrees of operation depending upon the nap of a rug or carpet on which the nozzle is used.

It is another object of this invention to provide a suction cleaner nozzle and a floating brush both of which are adjustable independently of a pair of nozzle-carrying wheels.

It is another object of this invention to provide a nozzle with a pair of wheels and a floating brush which may be easily adjusted to provide a maximum of rug and bare floor cleaning ability with a minimum of force to move the nozzle over the surface being cleaned.

Finally, it is another object of this invention to provide a suction cleaner nozzle construction by which the described problems and difficulties are overcome in a simple, effective and inexpensive manner.

These and other objects and advantages apparent to those skilled in the art may be obtained by the parts, constructions, arrangements, combinations and subcombinations comprising the present invention, the nature of which is set forth in the following general statement, a preferred embodiment of which—illustrative of the best mode in which applicant has contemplated applying the principles—is set forth in the following description and illustrated in the accompanying drawings and which is particularly and distinctly pointed out and set forth in the appended claims forming a part hereof.

Generally, the improved suction cleaner nozzle construction of the present invention may be stated as including front and rear walls, each wall having a lip along the lower edge thereof, the lips being spaced to form a nozzle mouth, a carriage mounted on the back of the rear wall, a pair of wheels mounted on the carriage, means for adjusting the wheels at varying distances below the mouth of the nozzle, a floating brush mounted in the carriage, and means for adjusting setting the brush between retracted and operative positions.

In the drawings a preferred embodiment of the invention is shown by way of example:

FIG. 1 is a perspective view of an attachment for a suction cleaner showing the improved nozzle in position for use on a tubular conduit;

FIG. 2 is a rear elevational view of the nozzle showing wheels mounted on a carriage and a floating brush in the lowered position;

FIG. 3 is a vertical sectional view taken on the line 3—3 of FIG. 2;

FIG. 4 is a vertical sectional view showing the brush and wheels in the retracted position;

FIG. 5 is an elevational view, partly in section, showing the wheels in the retracted position;

FIG. 6 is a fragmentary plan view taken on the line 6—6 of FIG. 5;

FIG. 7 is a vertical sectional view taken on the line 7—7 of FIG. 5;

FIG. 8 is an enlarged vertical sectional view taken on the line 8—8 of FIG. 6;

FIG. 9 is a diagrammatic view of the nozzle on a deep pile carpet with wheels lowered and brush in a floating position; and

FIG. 10 is a diagrammatic view of the nozzle on a short nap carpet with wheels partially retracted and brush in a raised position.

Similar numerals refer to similar parts throughout the drawings.

In the drawings, a nozzle generally indicated at 1 is attached to the lower end of a tubular conduit 2, the upper end of which is secured to a flexible hose 3 leading to a source of suction in the usual manner. As shown in FIGS. 3, 4 and 5, the nozzle 1 includes a tubular portion 4 and a mouth 5 disposed between a front wall 6 and a rear wall 7. The lower ends of walls 6 and 7
are provided with outturned lips 8 and 9, respectively, which facilitate easier gliding of the nozzle over a surface to be cleaned such as a rug or carpet.

The nozzle 1 is provided with a pair of wheels 10 and 11 which are longitudinally spaced at opposite ends of the nozzle as shown in FIG. 2. In addition, the nozzle 1 is provided with a floating brush 12 having bristles 13 extending downwardly behind the lip 9 of the rear wall 7.

The entire assembly of the wheels 10 and 11 and brush 12 is mounted on a carriage generally indicated at 14 which is movable vertically with respect to the nozzle 1. The carriage 14 is attached to a plate 15 which is mounted on the rear wall 7 of the nozzle 1 by screws 16 engaging threaded bosses 17 extending rearwardly from the rear wall.

As shown in FIGS. 2, 3, and 4, the carriage 14 extends longitudinally across the back of the nozzle 1 and is composed of sheet metal stampings including a support plate 18 adjacent to the plate 15 and having an outturned portion 19 at the upper side thereof. At opposite ends of the outturned portion 19 there are extended portions 20 and 21 which extend over the wheels 10 and 11 and downwardly at 22 and 23 and thereby form lower supports for the wheels. Side wall members 24 and 25 are provided along opposite edges of the portions 20 and 21 and downturned portions 22 and 23 to form a U-shaped configuration. As shown in FIG. 5, the wheels 10 and 11 are mounted on axles 26 and 27, respectively, which extend through and between the side wall members 24 and 25 for each wheel support.

The carriage 14 also includes a back plate 28 having an upper longitudinal flange 29 (FIG. 7) overlapping one edge of the outturned portion 19. At its opposite end the plate 28 is provided with flanges 30 and 31, which flanges are adjacent the members 25 on opposite wheel supports and which are secured to said members by the axles 26 and 27 which extend therethrough.

As shown in FIGS. 3, 4, and 7, the support plate 18 together with its outturned portion 19 and the back plate 28 form a substantially U-shaped housing for a floating brush 12. The brush, being substantially co-extensive with the length of the nozzle 1, is movable between retracted or non-operative position (FIG. 4) and a floating or operative position (FIG. 3). The brush 12 is manipulated between those positions by a projection 32 having a handle 33. The projection 32 extends through an inverted L-shaped slot 34 in the back plate 28 and the projection is movable longitudinally of the brush within the upper end of the slot for locking the brush in the retracted or non-operative position as shown in FIG. 4.

The brush floats in the position of FIGS. 3 and 5 due to a pair of leaf springs 35 and 36, the upper ends of which are secured to the underside of the outturned portion 19 by rivets 37 and 38, respectively. Although a pair of leaf springs 35 and 36 are disclosed, a single bow spring may be used instead. The lower ends of the springs 35 and 36 engage the top of the brush back 12 and are slideable thereover as the brush moves up and down in the floating position. The carriage 14 is likewise movable between upper, lower and intermediate positions, for which purpose the plate 15 is provided with a pair of elongated slots 39 and 40 having three similar horizontal positions 41, 42, and 43. The slots 39 and 40 are engaged by detents 44 and 45, respectively, which extend outwardly from a slide 46 which is secured to the upper side of the portion 19 of the projection 32 by a pair of rivets 47 and 48 extending through similar slots 49 and 50, respectively, in the slide. The slide 46 is provided with a handle 51 extending upwardly therefrom so that the detents 44 and 45 may be moved longitudinally of the carriage 14 to the various levels 41, 42, and 43 of the slots 39 and 40 and thereby raise and lower the carriage in various locked positions. Thus the wheels 10 and 11 on the carriage are movable from the lowest position of FIG. 3 to the retracted position of FIG. 4.

As shown in FIGS. 5 and 7, the carriage 14 is secured to the plate 15 by a pair of longitudinally spaced pins 52 and 53 which have similar heads 54. The pins 52 and 53 extend through vertical slots 55 and 56, respectively. Inasmuch as the slots 55 and 56 are substantially wider than the pins 52 and 53, each pin is provided with similar annular bearings 57 which are disposed between one side of the support plate 18 and a collar 58, all of which are secured tightly together by a head 59, substantially as shown in FIG. 12. Accordingly, as the carriage is moved up and down by manipulation of the handle 51, the pins 52 and 53 move up and down within the slots 55 and 56, respectively.

In operation, the carriage 14 is moved up and down to adjust the position of the wheels 10 and 11 with respect to the lips 8 and 9 of the nozzle 1. When the wheels 10 and 11 are disposed in the lowest position, they are positioned below the lips 8 and 9 by a distance indicated by an arrow 60 in FIG. 9. Likewise, when the carriage 14 is retracted the wheels 10 and 11 are still positioned below the lips 8 and 9 of the nozzle 1 by a distance indicated by an arrow 61 in FIG. 10. As shown in FIG. 9, a deep pile carpet 62 requires the carriage to be in the lowest position to provide greater air opening area around the mouth of the nozzle and thereby minimize the amount of nap of the carpet 62 drawn upwardly onto the mouth as shown by the arch 63. At the same time the floating brush 12 may be lowered to agitate the nap of the rug and thereby facilitate the cleaning operation.

On the other hand, a rug 64 (FIG. 10) having a shorter nap is easier to clean by reducing the distance between the bottom of the nozzle 1 and the lips 8 and 9 so that an arch 65 may be provided by the uplifting suction created in the mouth of the nozzle 1. The brush 12 is retracted as shown in FIG. 10 or retained in the lowered position similar to FIG. 9, depending upon the amount of agitation of rug nap desired.

Accordingly, the device of the present invention provides a suction cleaner nozzle mounted on a retractable wheel carriage, which carriage includes a retractable floating brush. A nozzle having wheels has increased usability with a greater variety of rugs or carpets. Where the wheels support the nozzle, less force is required to push and pull the nozzle over a rug and if an excess amount of rug nap is drawn into the mouth of the nozzle to “freeze” the nozzle on the rug, the wheels give leverage to facilitate separation of the rug from the nozzle without turning the cleaner off. The combination of the adjustable wheels with the floating brush likewise increases the cleaning advantages of the nozzle. The wheel carriage and the brush are quickly adjusted manually but by the adjustment the brush action is not minimized because the brush is separately adjustable. Thus the floating brush is always in the same relationship to the wheels.

In the foregoing description certain terms have been used for brevity, clearness and understanding, but no unnecessary limitations have been implied therefrom as such words are used for descriptive purposes and are intended to be broadly construed.

Having now described the invention, construction, operation and use of a preferred embodiment thereof and the advantageous, new and useful results obtained thereby, the new and useful suction cleaner nozzle construction and reasonable mechanical equivalents thereof obvious to those skilled in the art are set forth in the appended claims.
I claim:

1. In a suction cleaner nozzle of the type wherein a nozzle has front and rear walls, and wherein each wall has a lip along the lower edge thereof forming a nozzle mouth; the improvement including a carriage adjustably mounted for vertical movement on the rear wall of the nozzle, a pair of spaced wheels mounted on the carriage, first means on the carriage and the rear wall for adjustably setting the position of the nozzle mouth at varying vertical distances from the wheels, a floating brush mounted on the carriage and in a zone between the nozzle mouth and the wheels, and second means independent of the first means for adjustably setting the brush between non-operative and operative positions.

2. In a suction cleaner nozzle of the type wherein a nozzle has front and rear walls, and wherein each wall has a lip along the lower edge thereof forming a nozzle mouth; the improvement including a carriage mounted for vertical movement on the rear wall of the nozzle, a wheel mounted at each end of the carriage and rearwardly of the rear wall of the nozzle, a brush mounted for vertical movement on the carriage, slot and detent means on the carriage and rear wall for adjustably setting the vertical position of both wheels simultaneously with respect to the mouth of the nozzle, and slot and projection means on the brush and the carriage for moving the brush between operative and retracted positions.

3. In a suction cleaner nozzle of the type wherein a nozzle has front and rear walls, and wherein each wall has a lip along the lower edge thereof forming an elongated nozzle mouth; the improvement including a plate mounted on the rear wall of the nozzle, the plate having longitudinally spaced vertical slots and having a pair of longitudinally spaced second slots having at least two horizontal portions, a carriage mounted for vertical movement on the plate and having pins slidably engaging the vertical slots, the carriage also having detent means engaging the second slots for adjustable setting in the horizontal portions thereof, the carriage also having walls forming an inverted U-shaped member substantially co-extensive with the nozzle, a wheel mounted at each end of the carriage and rearwardly thereof, a brush mounted in the inverted U-shaped member for vertical movement therein, an inverted L-shaped slot in one wall of the member, projection means on the brush extending through the slot for moving the brush vertically between operative and retracted positions, and spring means within the member for holding the brush normally in the operative position, whereby the carriage is adjustably mounted for vertical placement of the wheels with respect to the lips of the nozzle.

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