

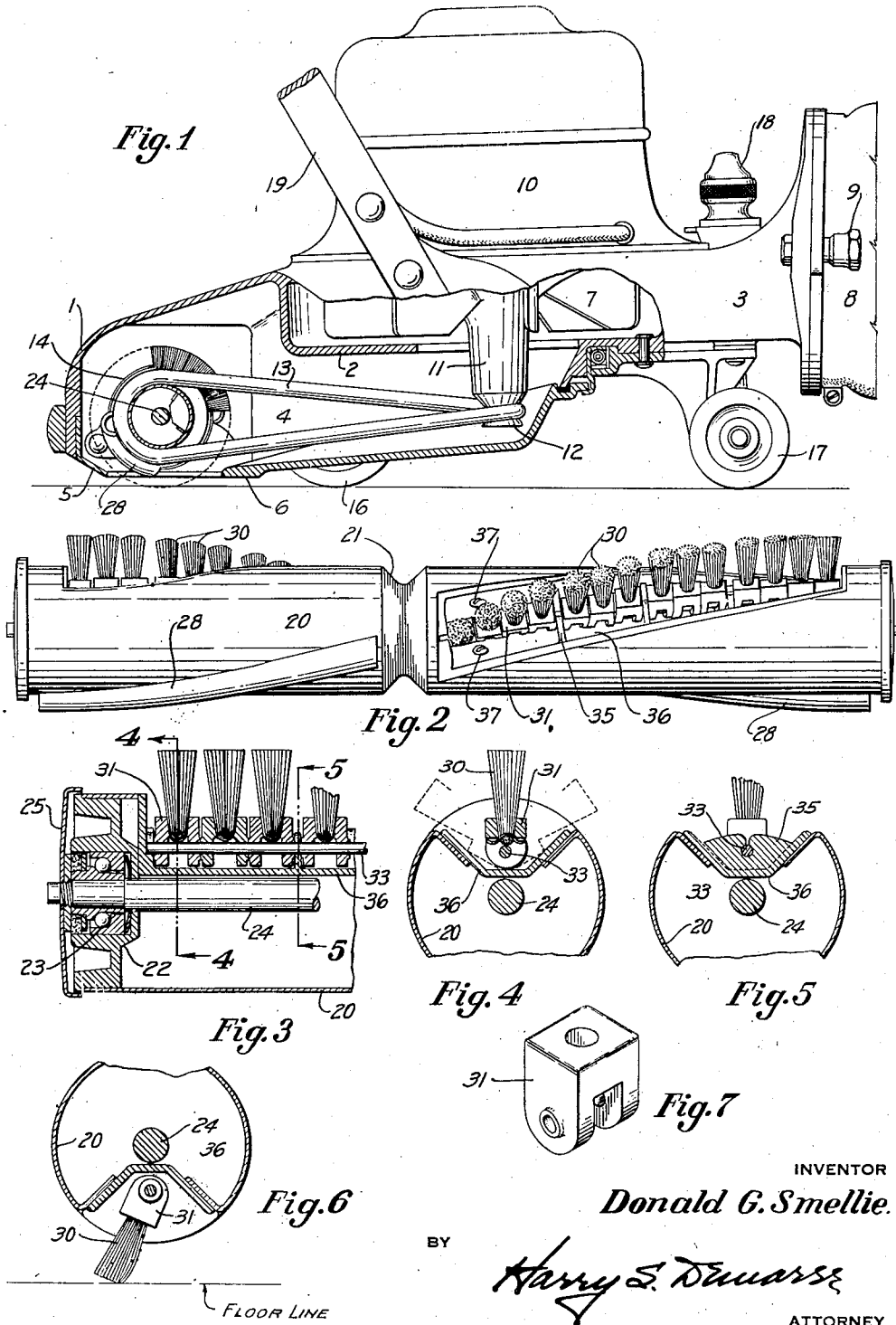
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SUCTION CLEANER

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SUCTION CLEANER

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5 Claims. (Cl. 15-6)

The present invention relates to suction cleaners in general and in particular to a new and novel agitator for a suction cleaner. More specifically the invention comprises a rotary agitator for a suction cleaner provided with positive agitating and brushing means, the latter being formed of helically disposed brush tufts individually pivoted. The cleaner agitator constructed in accordance with the present invention is also improved in the arrangement of beating and brushing elements which are so designed that maximum effectiveness is provided by a structure including fewer elements.

It is an object of the present invention to provide a new and improved suction cleaner. It is another object of the invention to provide a new and improved suction cleaner rotary agitator. A further object of the invention is to provide a rotary agitator provided with helically arranged pivoted brush elements. Still another object of the invention is to provide a rotary agitator for a suction cleaner in which brush elements are helically arranged and the individual tufts thereof are individually pivoted about helically extending axes. A further object of the invention is to provide a rotary agitator for a suction cleaner in which greater brush life is insured by the presence of great flexibility and movement in the bristle elements which however are sufficiently long to sweep bare floors. Another object of the invention is to provide a rotary agitator for a suction cleaner in which helically disposed brush elements are aligned with helically disposed rigid beating elements. These and other more specific objects will appear upon reading the following specification and claims and upon considering in connection therewith the attached drawing.

Referring now to the drawing—

Figure 1 illustrates a side elevation of a modern suction cleaner incorporating the present invention, certain parts being broken away to show the agitator, the suction-creating means, and the power-transmitting means positioned within the cleaner casing;

Figure 2 is a side elevation of the agitator constructed in accordance with the present invention;

Figure 3 is a partial longitudinal section through the agitator along the helically extending brush elements;

Figure 4 is a transverse section upon the line 4-4 of Figure 3;

Figure 5 is a transverse section upon the line 5-5 of Figure 3;

Figure 6 is a sectional view illustrating the contact of a pivoted brush element with a supporting bare floor;

Figure 7 is a view in perspective of a tuft seat.

The rotary brushing and beating agitator is an accepted part of the modern suction cleaner and its presence is recognized as a necessity for effective cleaning. The rotating rigid beating elements of the agitator vibrate the surface covering undergoing cleaning and dislodge therefrom the foreign material. The flexible brush elements carried by the agitator rotate in contact with the surface covering and supplement the effect of the rigid beating elements by straightening the covering pile and by dislodging any material adhering to the top of the surface covering. The brush elements of the usual agitator have a radial extension substantially equal to that of the rigid beater elements and the surface-contacting orbits of the two elements are substantially of equal diameter.

It is desirable in good agitator design that the bristle elements have as great a length as possible. The greater the length of the brush bristle, the greater is the permitted flexing thereof and with great flexing greater brush life is possible. In the agitator constructed in accordance with the present invention the brush bristles have their effective lengths increased as the brush elements are individually pivoted.

This pivotal mounting of the brush also makes possible a bristle length which permits the brush to sweep bare floors when the cleaner is passed thereover, the dislodged material being carried away by the cleaning air drawn into the cleaner. No claim is made in the present case to the broad invention of a floor-sweeping agitator which invention instead is set forth and claimed in a co-pending patent application Serial No. 242,714 in the name of Howard Earl Hoover.

An additional advantage of the cleaner constructed in accordance with the present invention is that the brush elements are aligned with the rigid beating elements and the beating elements and brush elements are so arranged upon the cleaner body that each portion of surface covering undergoing cleaning is contacted by both beating elements and brush elements.

Referring again to the drawing a modern suction cleaner is illustrated comprising a main casing having a nozzle 1, a fan chamber 2 and an exhaust outlet 3. An air passageway 4 connects the nozzle 1 to the fan chamber 2. Cleaning air enters the nozzle 1 between the surface-contacting lips 5 and 6, traverses the air passageway 4

and enters the fan chamber 2 under the action of the suction-creating fan 7. The air is exhausted through the exhaust outlet into the dust bag 8 which is removably secured thereto by manually operable means 9.

The suction-creating fan 7 is driven by an unshown motor positioned within the motor casing 10, shaft 11 of which extends into the air passageway 4 where it is formed as a pulley 12. A power-transmitting belt 13 extends forwardly from this pulley 12 to drive an agitator, indicated generally by the reference character 14, which is positioned within the nozzle 1. This agitator will hereinafter be fully described.

The cleaner is movably supported upon front wheels, one of which is indicated by the reference character 16, and by rear wheels, one of which is indicated by the reference character 17. Nozzle height adjusting means 18 are provided by which the nozzle can be raised and lowered to vary the contact of the lips 5 and 6 and the agitator 14 with a surface covering undergoing cleaning. As in the usual suction cleaner a pivoted handle 19 is provided by which the operator may propel the machine over a supporting surface.

Referring now to Figures 2 to 7, inclusive, the rotary agitator constructed in accordance with the present invention is clearly illustrated. A cylindrical body 20 is formed substantially midway of its length with a reduced portion 21 which acts as a pulley and seats the power-transmitting belt 13 afore-described. An end plate 22 at each end of the body 20 seats upon a ball bearing 23 which rotatably supports the body 20 upon a through supporting shaft 24, the ends of which are carried within the nozzle 1 of the cleaner. A thread guard member 25 non-rotatably seats upon the end of shaft 24 and overlies the end plate 22 and body 20 to provide protection for the bearing 23 against foreign material.

Helically extending rigid beater bars 28, 28 are mounted upon the surface of cylindrical body 20 and extend thereabove. Each bar 28 extends one-half of the agitator length, that is, from one end thereof to the centrally located pulley, and the bars are positioned upon opposite halves of the agitator.

Aligned with each beater element 28 and forming in effect an extension thereof upon the opposite side of the centrally located pulley is a brush unit comprising a series of pivoted brush elements 30, 30, etc. carried by a removable back. Each brush element comprises a flexible brush tuft 30 which is carried by and stapled in a tuft seat 31. Each tuft seat 31 is bifurcated at its lower end and the brush elements of the entire series is pivotally mounted upon a helically extending wire 33 which functions as the pivotal axes for the individual elements. The wire or rod 33 is carried by longitudinally spaced supports 35 mounted upon a brush back 36 which is removably secured within the body 20 by manually removable screws 37, 37, etc. As is clearly illustrated in the drawing the brush back 36 lies entirely within the normal contours of the agitator body and is formed with diverging side walls which permit the brush elements to pivot upon either side of a central position, as indicated in dotted lines in Figure 4. The series of brush elements and the brush back form a brush unit which is removable as a unit from the agitator body upon the removal of the securing screws 37, 37, etc.

In the operation of the cleaner embodying an

agitator construction in accordance with the present invention, when the cleaner is passed over a surface covering the suction created within the nozzle 1 by the suction-creating fan 7 causes the surface covering to be lifted upwardly into contact with the front and rear lips 5 and 6. The rotating agitator causes the beater elements 28, 28 to contact the lifted surface covering and to vibrate it to dislodge therefrom the embedded foreign matter. The pivoted brush tufts are rotated and upon contact with the surface covering each is flexed and pivoted from its radial position which it assumes under the action of centrifugal force, the angular or flexed positions being as shown in dotted lines in Figure 4. Each portion of the surface covering undergoing cleaning is contacted by a beater element and by a brush element and the surface covering depressions are conveyed from end to end of the agitator by the aligned brush and beater elements.

When the cleaner passes from a surface covering onto a bare floor the pivoted brush elements immediately assume their outermost radial positions and when so positioned they extend through the plane of the nozzle mouth as defined by the lips 5 and 6 and into contact with the supporting floor, as illustrated in Figure 6, and as indicated by the dotted line orbit of the brush element in Figure 1. Foreign material positioned upon the bare floor is agitated and the air stream entering the cleaner conveys it to the receptacle thereof.

I claim:

1. A brush unit for incorporation into a rotary agitator for suction cleaners comprising a rigid back and a series of individually pivoted helically arranged brush elements mounted on said back upon fixed axes.

2. In a suction cleaner, a nozzle having lips, means to support said lips above a supporting plane, a rotary agitator positioned in said nozzle, rigid beating elements on said agitator extending in rotation substantially into the plane of said nozzle lips, and a radially deflectible flexible brush element pivoted on said agitator upon a fixed axis and extended below said lips in agitator rotation to contact a bare supporting floor at said supporting plane and adapted to be deflected radially by a surface covering.

3. A rotary agitator for a suction cleaner comprising a cylindrical body with an agitating-element-receiving recess in its surface, a removable brush unit comprising a back and spirally arranged pivoted brush elements so positioned and arranged thereon as to extend helically relative to the axis of rotation of said agitator body with said back positioned in said recess, the pivotal axes of said brushes extending in the direction of the brush helix, and means releasably securing said back in said recess.

4. In a suction cleaner, a casing adapted to be positioned upon a supporting plane, an agitator including a body mounted for rotation on said casing, a beater element on said body extended radially into a surface covering-contacting position in the rotation of said body, the radial extension of said element being insufficient to contact a bare supporting plane, and a radially deflectible brush element mounted on said body on a fixed axis for pivotal movement and having a radial extension sufficient to enable it to contact a bare supporting plane in the rotation of said body, said brush element being adapted to be de-

flected radially by a surface covering in a beater-contacting position.

5. In a suction cleaner, a casing adapted to be positioned upon a supporting plane, an agitator including a body mounted for rotation on said casing, a beater element on said body extended radially into a surface covering-contacting position in the rotation of said body, the radial extension of said element being insufficient to contact a bare supporting plane, and a brush element pivotally mounted on said body on a fixed

axis radially spaced from the axis of rotation of said body, the outer end of said brush element describing an arc which varies in radial distance from the axis of rotation of said body, the portion of said arc at greatest radius from the axis of body rotation intersecting the supporting plane in the rotation of said body, said brush element being adapted to be deflected radially by contact with a surface covering in a beater-contacting position.

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