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Bayless et al.

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[54] **VACUUM CLEANER SUCTION TOOL FOR CLEANING DEEP PILE SHAG RUGS**

[76] Inventors: **Frank K. Bayless,** 9 Garden City Rd., Darien, Conn. 06820; **Horace W. Brundage,** 277 Loveland; **Robert A. Evans,** 86 Mitchell, both of Stamford, Conn. 06902; **John W. Hoover,** 49 Clark St., Milford, Conn. 06460

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Related U.S. Application Data

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[52] **U.S. Cl.** **15/397,** 15/417

[51] **Int. Cl.** **A47l 9/06**

[58] **Field of Search** 15/396, 397, 402, 416, 15/417

[56] **References Cited**

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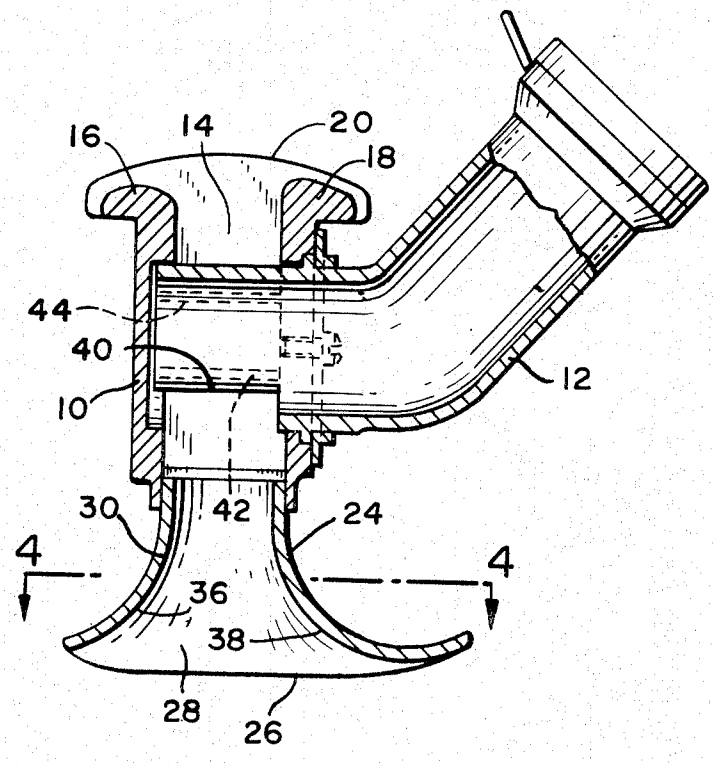
Primary Examiner—Edward L. Roberts
Assistant Examiner—C. K. Moore
Attorney, Agent, or Firm—William S. Henry

[57] **ABSTRACT**

In accordance with the present invention there is provided a suction tool having a plurality of spaced narrow, hollow nozzles depending from the body of the tool and elongated in a horizontal direction parallel to the normal forward and backward horizontal movement of the tool. The lower surfaces or lips of these nozzles are curved upwardly at their opposite ends and the interior surfaces of the nozzles adjacent their opposite ends are convexly curved. The hollow nozzles communicate with the interior of the body of the tool, which in turn is connected through the usual hollow wand or handle and flexible hose with a source of suction in a vacuum cleaner unit. This construction enables the several nozzles to penetrate the deep pile of a shag rug by parting the fibers and thus the nozzle openings are brought fairly close to the base of the rug and the air flow into the nozzles is able to entrain deeply embedded dirt. The shape of the nozzles enables them to be moved with reasonable ease between and over the fibers and to comb out the fibers as the tool is moved.

4 Claims, 7 Drawing Figures



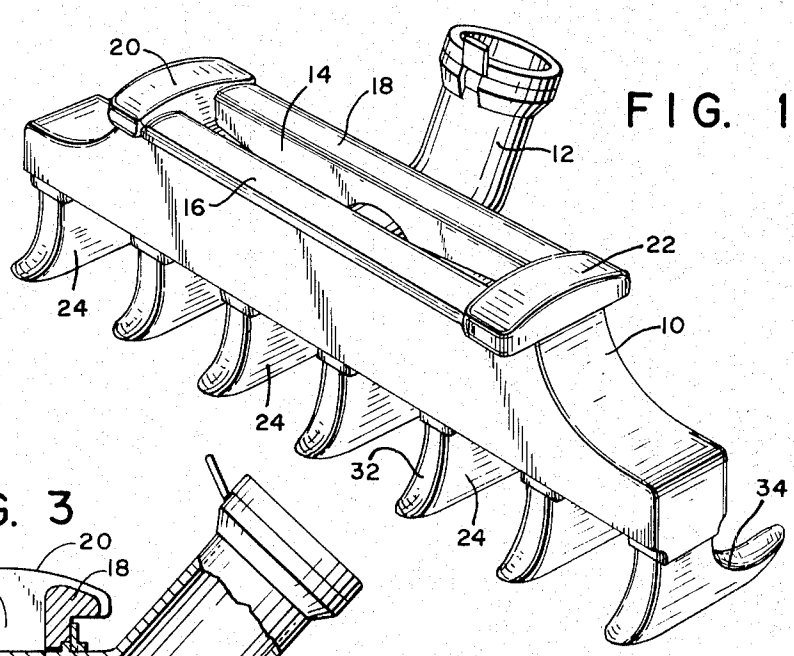


FIG. 1

FIG. 3

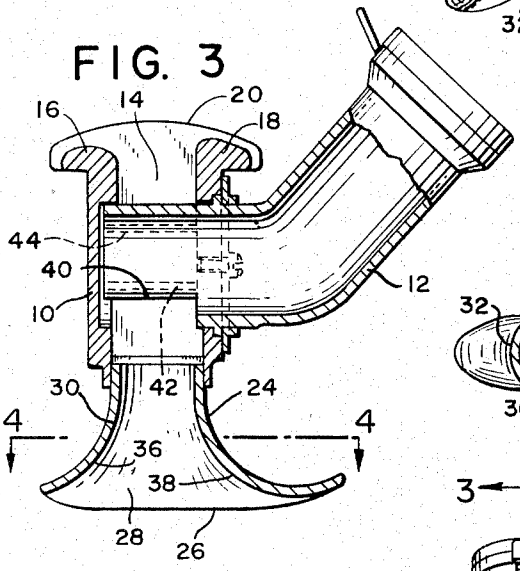


FIG. 4

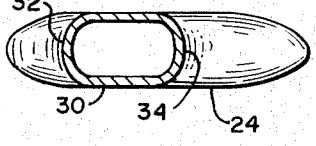


FIG. 5

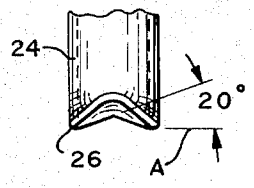


FIG. 2

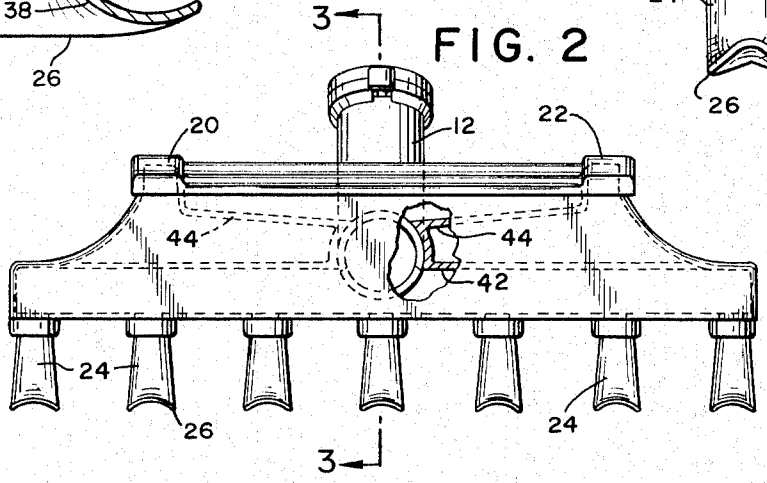
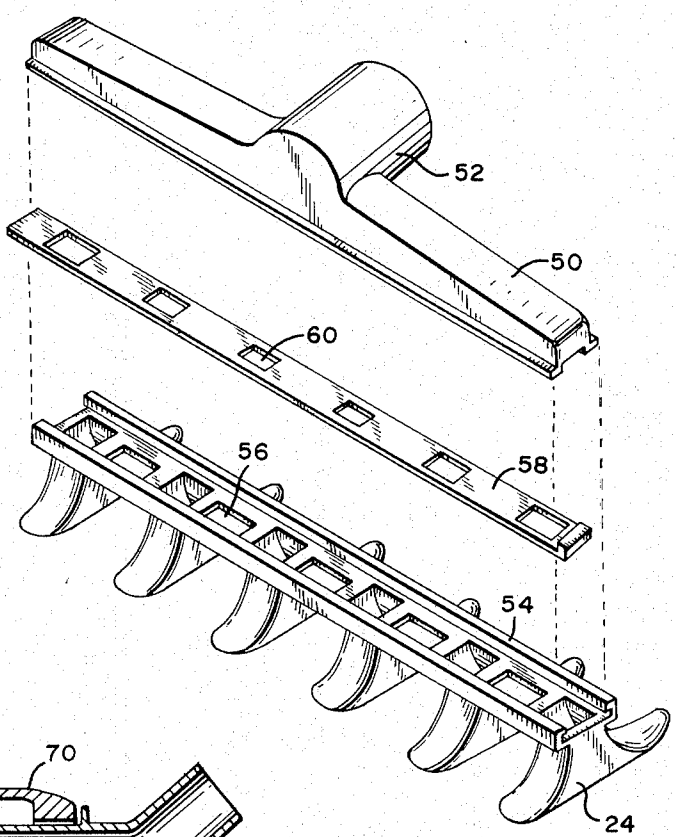


FIG. 6



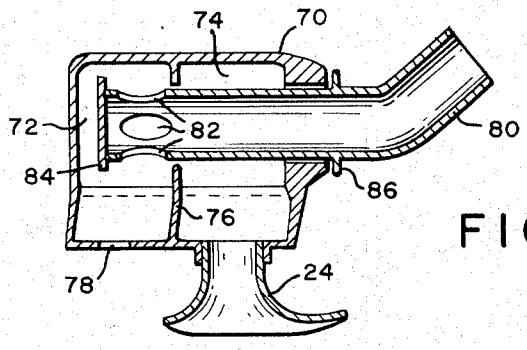


FIG. 7

VACUUM CLEANER SUCTION TOOL FOR CLEANING DEEP PILE SHAG RUGS

This application is a division of our copending application Ser. No. 141,547, filed May 10, 1971, now U.S. Pat. No. 3,745,603, issued July 17, 1973.

BACKGROUND OF THE INVENTION

In recent years, so-called shag rugs have become quite popular. The fibers forming the pile are exceedingly long, usually several inches, thus making vacuum cleaning of such a rug very difficult. The ordinary suction nozzle, which is elongated in a direction at right angles to the normal direction of the movement of the nozzle, resists movement over the rug as the lips of the nozzle tend to dig into the pile and in addition, the long fibers are drawn into the nozzle and the interior configuration of the latter is such that the fibers are not readily withdrawn. Moreover, inasmuch as the nozzle will only slide over the fibers, the nozzle opening is held so far above the base of the rug as to prevent the air flow from penetrating deeply enough to remove deeply embedded dirt. In addition, the use of an ordinary nozzle tends to mat down the fibers, giving the surface of the rug an unattractive appearance. A suction nozzle provided with a motor-driven rotary brush has all the above disadvantages, and in addition the long fibers are apt to get wrapped around the brush and the rotary brush causes undesirable fuzzing or untwisting of the rug fibers.

SUMMARY OF THE INVENTION

The suction tool in accordance with the present invention, because of the plurality of spaced relatively narrow nozzles elongated in a direction parallel to the direction of movement of tool, is able to penetrate the fibers and bring the suction openings close to the base of the rug. The exterior contours of the nozzles enable them to part the fibers so that the tool may be moved without difficulty back and forth, and the interior contour makes it easy to withdraw fibers which may be drawn into the nozzles. Also, the combing action of the narrow nozzles gives an attractive appearance to the surface of the rug.

In accordance with another embodiment of the invention, suction openings are formed in the body of the tool between the spaced nozzles so that air may be admitted from adjacent the upper surface of the fibers for entraining surface litter, and valve means are provided for regulating flow through these openings and the nozzles, respectively.

DESCRIPTION OF THE FIGURES

FIG. 1 is a prospective view of a suction tool in accordance with the present invention;

FIG. 2 is a front view of the tool shown in FIG. 1;

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

FIG. 4 is a cross-sectional view taken on the line 4—4 of FIG. 3;

FIG. 5 is an elevational view looking towards the left in FIG. 4;

FIG. 6 is an exploded view of a cleaning tool in accordance with a second embodiment of the invention; and

FIG. 7 is a cross-sectional view of a still further embodiment of the invention.

Referring more particularly to FIGS. 1 through 3, reference character 10 designates the hollow body of suction cleaning tool the interior of which may be connected to a source of suction in a vacuum cleaner through an elbow 12 which is rotatably mounted in the body. One face of the body is formed with an elongated suction opening 14 bounded along its sides by parallel lips 16 and 18 and at its ends by gliding pads 20 and 22 which extend outwardly beyond the lips.

Depending from the opposite face of the body 10 is a plurality of spaced relatively narrow nozzles 24. As shown, these nozzles are elongated but in a horizontal direction at right angles to the body so as to extend parallel to the direction of movement of the suction tool as it is moved back and forth horizontally over a rug and preferably are narrower than the space between adjacent nozzles. As appears more particularly from FIG. 3, each nozzle terminates in lips 26 bounding a suction opening 28 and the lips extend a greater distance rearwardly of the tube or shank portion 30 of each nozzle than forwardly thereof. The lips are curved upwardly at opposite ends of the nozzles, similar to runners of a sleigh, while the tube or shank portions 30 are contoured so as to have curved forward and rear surfaces 32 and 34, respectively as is shown in FIG. 4. The interior of each nozzle is contoured so as to provide smoothly curved surfaces 36 and 38 connecting the tube or shank portion 30 with the lower elongated nozzle portion. As appears from FIG. 5, the angle between the line A representing a surface on which the nozzle 24 is resting and the inner surfaces of rear lip portion may be approximately 20°.

The elbow 12 also serves as a rotary valve to connect either the nozzles 24 or the suction opening 14 to the interior of the elbow and hence to the source of suction. To accomplish this, the cylindrical portion of the elbow which is within the body 10 is formed with a cut-away section 40 which cooperates with partitions 42 and 44. With the parts in the position shown in FIG. 3, air may flow through the nozzles 24 into the body below partition 42 and through the cut-away section 40 into the elbow. On the other hand, if the body 10 is rotated 180° about the elbow, so as to bring the lips 16 and 18 and the pads 20 and 22 into operative position on a rug, the air flows through the suction opening 14, along the outer surface of partition 44 and through cut-away portion 40 into the elbow. Thus, suction is applied to whichever side of the tool is in contact with the rug.

In using the above described suction tool for cleaning a deep pile shag rug, if there is surface litter to be removed, the body 10 is rotated so as to bring the elongated suction opening 14 into operative position on the rug. Because of the large surfaces presented by the wide lips 16 and 18 and the pads 20 and 22, the tool may be moved back and forth over the long fibers of the deep pile and the in-rushing air will entrain dirt and litter at the upper surface of the rug. However, due to the deep pile, very little if any air will be moved down in the neighborhood of the back of the rug, and practically no embedded dirt will be removed.

In order to pick up this type of dirt, the body 10 is rotated so as to bring the nozzles 24 into operative position. If the tool is now moved back and forth the nozzles, being narrow and elongated in the direction of this movement, will sink down into the pile and may be moved without much resistance between the fibers.

Such movement is also facilitated by the curved runner-shaped lips **26** and the curved surfaces **32** and **34** on the exterior of the shank portions **30.** In this way the suction openings **28** of the nozzles **24** are brought close to and moved over the upper surface of the back of the rug and the flow of air thus produced at this surface is able to entrain and remove deeply embedded dirt. This air flow sucks some of the long fibers into the nozzles **24,** but due to the smooth curved interior surfaces **36** and **38,** the fibers do not get caught therein, but come out without resistance as the nozzle is moved along.

It is true that during any single stroke of the cleaning tool, sections of rug between the spaced nozzles **24** are not cleaned, but in moving the tool back and forth, the operator gradually moves it sideways as well so as to clean the entire width of the rug, and in so doing moves the nozzles **24** over all parts of the rug.

In the cleaning tool shown in FIG. **6,** instead of having a surface litter suction opening on one side of a rotatable tool and the embedded dirt nozzles on the other, both are on the same side and a slide valve serves to direct air flow through one or the other. Thus the tool comprises an upper body part **50** having an elbow **52** for connecting the tool to a source of suction, and a lower body part **54** carrying the spaced nozzles **24.** Between the nozzles the lower body part is formed with suction openings **56** and a slide valve **58** having valve ports **60** is slidably mounted between the upper and lower body parts. The ports are so proportioned and spaced that they may be aligned with either the openings **56** or the interior of the nozzles **24,** the valve **58** being somewhat longer than the body parts **50** and **56** so that one end or the other of the valve extends beyond the body and may be moved manually lengthwise so as to alter the valve setting. The openings **56** may be progressively larger towards the ends of the suction tool in order to compensate for the fact that they are located further from the elbow **52.**

In operation, if it is desired to remove surface litter, the valve **58** is set so that its ports **60** are aligned with openings **56** and hence all the air will enter through these openings, the nozzles **24** being closed by the solid part of the valve. For deep embedded dirt cleaning, on the other hand, the valve **58** is shifted so as to close the openings **56** and align the ports **60** with the nozzles **24** whereby all air is drawn in through the nozzles.

In FIG. **7** there is shown an embodiment in which the valve for regulating the air flow is so arranged as to be shifted automatically, thus relieving the operator of the necessity of doing this. Here the body **70** of the tool is divided into a forward chamber **72** and rear chamber **74** by a partition **76.** The bottom of the forward chamber is formed with one or more surface cleaning suction openings **78** while the spaced nozzles **24** depend from and communicate with the rear chamber. The elbow **80,** which serves to connect the tool to a source of suction, also constitutes a tubular slide valve having ports **82** in its side near its forward end. The valve extends through the rear wall of chamber **74** and through partition **76** and is formed at its front end with a radial flange **84** and near its other end with a similar flange **86,** the flanges being spaced by a distance greater than that between the partition **76** and the outer surface of the rear wall of chamber **74.**

In using this cleaning tool, as forward force is applied to a wand or handle connected to elbow **80,** the tubular valve is moved forwardly until flange **86** contacts the rear wall and thereafter the continued application of force moves the entire cleaning tool forwardly. Under these conditions, the ports **82** connect the interior of the valve to chamber **72** and hence air is drawn in through suction openings **78** to remove surface litter. When the operator reverses the direction of force applied to the wand, this first pulls the valve backwards until the flange **84** contacts the partition **76,** whereupon the entire tool moves backward. Inasmuch as the ports **82** now establish communications with the chamber **74,** air is drawn in through nozzles **24** to effect embedded dirt cleaning. It will thus be seen that the valve is shifted automatically, and without any conscious effort on the part of the operator, every time the direction of movement of the cleaning tool is reversed so as to accomplish surface cleaning on the forward stroke and embedded dirt cleaning on the backward stroke.

While three more or less specific embodiments of the present invention have been shown and described, it is to be understood that this has been done for the purpose of illustration only and the scope of the invention is to be determined by the scope of the appended claims.

What is claimed is:

1. In a vacuum cleaner suction tool for cleaning high pile shag rugs, a hollow elongated body, means for connecting the interior of said body to a source of suction, a plurality of spaced hollow tubes depending from said body and communicating with the interior thereof, the lower end of each tube terminating in a suction nozzle elongated in a horizontal direction substantially at right angles to the horizontal lengthwise extent of said body, the length of each nozzle being substantially greater than the dimension of the tube in a direction parallel to the length of the nozzle, said hollow body being formed with at least one surface cleaning suction opening, and valve means for regulating air flow alternatively through said opening and through said nozzles, respectively.

2. In a suction nozzle as defined in claim **1,** said surface cleaning suction opening being formed in the wall of said body opposite to nozzles, and the connecting means comprising a tubular member rotatably mounted with respect to said body and serving as said valve for regulating air flow alternatively through said opening and said nozzles, respectively.

3. In a suction nozzle as defined in claim **1,** said body being formed with a plurality of surface cleaning suction openings, said openings being located in the lower wall thereof between said hollow tubes, said valve means regulating air flow alternatively through said openings and through said nozzles, respectively.

4. In a suction nozzle as defined in claim **1,** a partition dividing said hollow body into a forward chamber and a rear chamber, the lower wall of one of said chambers being formed with said surface cleaning suction opening, said hollow tubes communicating with the other of said chambers, and the connecting means comprising a tubular member slidably mounted in the rear wall of said rear chamber and in said portion and formed with a port alignable with either of said chambers, said tubular member serving as said valve for regulating air flow alternatively through said opening and said nozzles, respectively.

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