A carpet cleaning apparatus and method of retrofitting a vacuum cleaner provides a vacuum cleaner with a sweeper housing carrying a rotating brush assembly for contacting a surface of a carpet. A collection device is carried in the sweeper housing along with a fan assembly. A suction hose is connected in circuit with the fan assembly and the collection device. A pump driven vessel is carried externally to the sweeper housing for fluid communication with a spray nozzle. The spray nozzle is arranged externally to the housing to dispense fluid under pressure a spaced distance from the housing.
CARPET CLEANING APPARATUS AND METHOD
OF CONSTRUCTION

REFERENCE TO CO-PENDING APPLICATION

[0001] This application claims the benefit of U.S. Provisional Application No. 60/515,518, filed Oct. 29, 2003.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] This invention relates generally to vacuum apparatuses for cleaning carpet, and more particularly to vacuum apparatuses having mechanism for spraying a treatment liquid onto carpet.

[0004] 2. Related Art

[0005] Typically, over time, carpet requires an application of an odor eliminator, a protectant and/or a vacuum enhancement product. Commonly, odor eliminators, carpet protectants and vacuum enhancement products come in a liquid state, and are applied by a user through the use of aerosol cans, spray bottles and the like. As such, the user typically carries a hand held container with the desired liquid treatment therein, and applies the liquid treatment by bending at the waist to dispense a spray pattern of the liquid onto the area of the carpet requiring treatment. Accordingly, the application of a liquid carpet treatment product generally proves to be laborious and tiresome, let alone time consuming. In addition, applying a uniform spray of the liquid carpet treatment product can prove difficult.

SUMMARY OF THE INVENTION

[0006] A carpet cleaning apparatus provide an easy and efficient manner in which to apply liquid carpet treatment products on carpet to facilitate cleaning the carpet without saturating the carpet. The apparatus has a sweeper housing carrying a rotating brush assembly for contacting a surface of a carpet. A collection device is carried in the sweeper housing along with a fan assembly. A suction hose is connected in circuit with the fan assembly and the collection device. A pump driven vessel is carried externally to the sweeper housing for fluid communication with a spray nozzle. The spray nozzle is arranged externally to the housing to dispense fluid under pressure a spaced distance from the housing.

[0007] Another aspect of the invention provides a method of retrofitting an upright vacuum cleaner. The vacuum cleaner comprises a sweeper head incorporating a rotating brush assembly for contacting a surface of a carpet and an upright housing attached to the sweeper head. The housing incorporates a collection device and an upstanding handle, with a suction hose connected in circuit with a fan assembly and the collection device. The retrofitting comprises providing a pump driven vessel and attaching the vessel externally to the housing and further, providing a spray nozzle and attaching the spray nozzle externally to one of the sweeper head and the housing for fluid communication with the vessel. The nozzle is positioned to dispense the fluid under pressure in a mist form a spaced distance from the sweeper head.

[0008] Some of the objects, features and advantages of the invention include an apparatus that increases the usefulness and efficiency of a standard upright vacuum cleaner, applies a liquid treatment uniformly to a carpet while vacuuming the carpet, is readily attachable to a vacuum cleaner, is of relatively compact size, is readily removable from the vacuum cleaner, enables the application of liquid cleaner to difficult to reach areas of a carpet, regulates the amount of liquid cleaner being applied to the carpet, dispenses liquid cleaner in a controlled pattern, and is economical in design, manufacture and use.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] These and other objects, features and advantages of this invention will become more readily apparent in view of the following detailed description of the preferred embodiments, appended claims and accompanying drawings, in which:

[0010] FIG. 1 is a perspective view of an upright vacuum cleaner having a liquid applicator system constructed according to one embodiment of the invention;

[0011] FIG. 2 is a partially exploded perspective view of the vacuum cleaner and liquid applicator system of FIG. 1;

[0012] FIG. 3 is a perspective view of an upright vacuum cleaner having a liquid applicator system constructed according to a second embodiment of the invention;

[0013] FIG. 4 is a schematic front view of the vacuum cleaner of FIG. 1;

[0014] FIG. 5 is a schematic front view of the vacuum cleaner of FIG. 3;

[0015] FIG. 6 is a perspective view of a walk-behind vacuum cleaner having a liquid applicator system constructed according to a third embodiment of the invention;

[0016] FIG. 7 is a partial rear perspective view of the applicator system of FIG. 6;

[0017] FIG. 8 is a perspective view similar to FIG. 6 showing the liquid applicator system of FIG. 6 attached to a front portion of the vacuum cleaner;

[0018] FIG. 9 is a perspective view of an upright vacuum cleaner having a liquid applicator system constructed according to a fourth embodiment of the invention attached thereto;

[0019] FIG. 9A is a partial perspective view of the applicator system of FIG. 9;

[0020] FIG. 10 is a perspective view of a walk-behind vacuum cleaner having a liquid applicator system constructed according to a fifth embodiment of the invention; and

[0021] FIG. 11 is a schematic diagram showing generally the operation sequence of the various embodiments.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0022] As illustrated in FIGS. 1-3, one construction of a liquid applicator system for vacuum is shown generally at 10 attached to an upright vacuum cleaner 12. The liquid applicator system 10 provides an operator of the vacuum cleaner 12 with the ability to apply a liquid carpet treatment 14, for example and without limitation, an odor eliminator,
a carpet protectant or vacuum enhancement solution, each of which may be obtained from ReNew Systems Inc., located in Bay City, Mich., to carpet under controlled conditions while the operator is vacuuming the carpet. The liquid applicator system 10 improves the cleaning efficiency and usefulness of the vacuum cleaner, and is readily adaptable for quick attachment and removal from the vacuum cleaner 12. Accordingly, the liquid applicator system 10 may be retrofitted or interchanged from one vacuum cleaner to another, as desired.

[0023] The vacuum cleaner 12 in FIGS. 1-3 is generally constructed having an upright configuration, such as that shown in U.S. Pat. No. 6,591,446 to Bair et al., incorporated herein by reference in its entirety. The vacuum cleaner 12 has a sweeper head, referred to hereafter as a base 18 pivotally attached to an upright housing 20. The housing 20 is typically constructed having a polymeric outer shell 22. The vacuum cleaner 12 has an upstanding handle 26 attached to and extending generally upwardly from the housing and terminating in an ergonomically constructed hand grip 26. As shown in FIGS. 4 and 5, the base 18 has a rotating brush assembly 28 driven by a fan motor 30, as is known, wherein the brush assembly 28 contacts a surface of the carpet 16 to loosen embedded dirt and debris from the surface being vacuumed. Typically, upright household vacuum cleaners are constructed having single-stage motors, wherein the motor operates to drive the brush assembly and also create the suction or vacuum, such as through a turbine fan assembly located generally at 32, to lift the loosened dirt and debris from the carpet and direct it through a suction hose or tube 34 connected in circuit with the fan assembly 32 to a collection device, generally referred to hereafter as a storage container or bag 35 within the upright housing 20.

[0024] Unlike extractor type cleaner machines, commonly referred to as steam cleaners, vacuum cleaners in use today, and particularly household use vacuum cleaners, such as that shown generally at 10, typically are not powerful enough to generate the vacuum or suction necessary to lift liquid from the surface of the carpet 16. Accordingly, vacuum cleaners are generally classified as dry removal systems for carpet, rather than liquid removal systems. Generally, the amount of suction created by a dry removal vacuum cleaner or extractor is a function of how much current or amperage the motor can effectively and safely draw, and the cubic feet per minute (CFM) of air the turbine fan needs to draw. Typically, dry removal vacuum cleaners employ an amperage between about 6-14 amps, and draw about 40-60 CFM of air, which is generally not enough CFM, typically 100 CFM or more, to lift liquid from carpet. Upon applying the liquid carpet treatment 14 to the surface of the carpet 16 utilizing the present invention, the operator may use the vacuum cleaner 12 without impacting the ability of the liquid carpet treatment 14 to act on the carpet 16, or have concern about vacuuming the liquid into the storage container 35 of the vacuum cleaner 12.

[0025] Some liquid carpet treatments 14 require several minutes, and in some cases up to 20 minutes or more to act on the carpet 16, and to dry. Thus, the operator can later vacuum over the liquid treated area of carpet 16 with the vacuum cleaner 12 of the present invention without jeopardizing the ability of the liquid carpet treatment 14 to act on the carpet 16. After the specified amount of time for the given liquid carpet treatment 14 to act has elapsed, depend-
nozzle 38 when the pump 40 is de-energized. Otherwise, when the pump 40 is energized, the liquid 14 is pumped from the vessel 36, through the fluid lines or tubes 44 and dispensed out the nozzle 38 under pressure in a predetermined spray pattern spaced outwardly from the housing 20.

[0030] The housing 48 in FIGS. 1-5 may be attached to the shell 22 of the vacuum cleaner 12 through a variety of mechanisms. As best shown in FIG. 2, the housing 48 is attached by a pair of screws 54 having a thread pitch and diameter suitable for secure fastening to polymeric material. The screws 54 extend through a pair of flanges 56 extending laterally from the housing 48, and are then screwed into the shell 22 of the vacuum cleaner 12. It should be recognized that the screws 54 may be self tapping, or holes may be preformed in the shell 22 of the vacuum cleaner 12, as desired. Otherwise, any suitable mechanism, for example and without limitation, self adhesive Velcro® pads, adhesives such as cyanoacrylate or super glue, Velcro® straps, or any other desired method for attachment may be used to attach the housing 48 for the pump 40 to the shell 22 of the vacuum cleaner 12.

[0031] As shown in FIGS. 3 and 5, the housing 48 containing the aerosol can or pump 40 is attached to the shell 22 as in FIGS. 1, 2 and 4, however, the vessel 36 is attached to the shell 22 separately from the pump housing 48. Generally, a bracket 58, typically fabricated from formed wire or plastic, is attached to the shell 22 through the use of screws, adhesives or Velcro® (not shown), as described above. The bracket 58 may be preformed to receive the specific shape of the vessel 36, or the bracket 58 may be transformable in shape to accommodate a variety of vessel shapes. In either case, the vessel 36 may be set into the pocket 50 of bracket 58 for use, and lifted therefrom for storage or refilling. Regardless of how the vessel 36 is carried by the vacuum cleaner 12, the vessel 36 is generally attached to the vacuum cleaner 12 so that it can be readily removed, when desired.

[0032] A battery pack 60 is preferably enclosed within or attached to the housing 48 containing the pump 40. The battery pack 60 generally has a plurality of batteries, such as AA size batteries, for example and without limitation. Preferably, the batteries are rechargeable, so that an AC adaptor 62 (FIG. 9), preferably having standard plug terminals 64 for receipt in a standard wall 110 v outlet (not shown), may be used to recharge the batteries. The housing 48 has an access door 66 allowing the operator to easily access the battery pack 60 and the pump 40 for servicing purposes.

[0033] As shown in the embodiments in FIGS. 1-5, the spray nozzle 38 may be attached to the base 18 of the vacuum cleaner 12. The same methods discussed above for attaching the housing 48 for the vessel 36 to the shell 22 of the vacuum cleaner 12, such as screws, adhesives or Velcro® pads may be used, as desired, to attach the spray nozzle 38 to the base 18. The spray nozzle 38 is generally positioned so that the spray pattern of the liquid carpet treatment 14 is dispensed to span the width of the brush assembly 28, or more. As such, depending on the width of the vacuum cleaner 12, more than one spray nozzle 38 may be used to cover the width desired with the liquid treatment 14. Additionally, as mentioned above, the spray nozzles 38 are desirably positioned to dispense a spray pattern outwardly and in front of the base 18 of the vacuum cleaner 12 so that the liquid carpet treatment 14 contacts the carpet 16 approximately 6-12 inches in front of the base 18 of the vacuum cleaner 12. This provides the dwell time necessary for certain treatments to work into the fibers prior to brush contact. The spray nozzle 38 is selected to dispense a predetermined volume of the liquid carpet treatment 14 per square foot (ft²) of carpet 16 area as a mist, such that the carpet 16 does not become saturated with the liquid 14, as normally occurs during a wet extraction or steam cleaning operation. Generally, the spray nozzles 38 are selected to dispense about 0.0256 ounces of liquid carpet treatment 14 per ft² of carpet 16, which is much less, on the order of about 100 times less, than would be applied during a steam or extraction cleaning procedure. A suitable range would be between 0.01 ounces and 0.05 ounces per square foot of carpet. The spray nozzle 38 desirably has a dripless dispensing tip 68 so that the liquid carpet treatment 14 is only dispensed through the tip 68 when the pump 40 is actuated and the liquid 14 is under a positive pressure. Suitable spray nozzles are available from Spray Systems Co., located in Wheaton, Ill., for example. This assures that the liquid 14 does not accidentally drip from the nozzle 38 onto the carpet 16. Additionally, the spray nozzle 38 is generally adjustable by rotating the tip of the nozzle 38 to adjust the spray pattern of the liquid carpet treatment 14, so that it is dispensed as a light mist rather than a carpet saturating flow. By light mist is meant droplets of liquid in the range of 80 microns in diameter to 250 microns in maximum diameter.

[0034] The spray nozzle 38 is in fluid communication with the pump 40, and thus the vessel 36, though a series of generally flexible fluid lines or tubes 44. The tubes 44 are connected to the respective components though standard hose connections. It should be recognized that though a single spray nozzle 38 is represented in FIGS. 1-5, that any number of spray nozzles 38 may be used. If more than one spray nozzle 38 is used, desirably a manifold (see reference numeral 292 of FIG. 9) is incorporated between the pump 40 and the spray nozzles 38. Generally, the manifold 292 has a single inlet for the liquid coming from the vessel 36, and a number of outlets corresponding to the number of spray nozzles 38.

[0035] The liquid applicator system 10 has an actuator switch housing 70 with the actuator switch or button 42 thereon. The housing 70 is attached adjacent the hand grip 26 of the vacuum cleaner 12 in an ergonomically accessible position for the operator, preferably using the same methods of attachment described above, such as Velcro straps or pads, adhesives, screws and the like, thereby allowing for quick attachment and removal of the actuator housing 70 to and from the hand grip 26 of the vacuum cleaner 12. Accordingly, the operator can use the vacuum cleaner 12 as desired, while having ready access to the button 42 to activate and deactivate the liquid applicator system 10. The button 42 is preferably in electrical communication with the pump 40 through a wire connection 72, or otherwise in communication with the pump 40 or aerosol can to actuate the pump 40 on command. When an operator depresses the button 42 in the actuator housing 70, an electrical signal is sent to the pump 40 to actuate the pump 40, and thus, to pump carpet treatment 14 to the spray nozzle or nozzles 38.

[0036] As mentioned above, generally vacuum cleaners do not have the suction or vacuum necessary to draw liquid up from the carpet being vacuumed. However, to provide the
operator with the visual reassurance that no liquid is entering the vacuum cleaner 12 and display what is entrained in the air flow, and specifically the storage container 35, a filtration mechanism, referred to hereafter as a capture cup 74 is incorporated within the vacuum tube 34 upstream of the storage container 35. The capture cup 74 is generally constructed having a transparent top 76, desirably formed from plastic, sized for reception on a bottom member 78. A filter paper disc 80 having a lower limit of particulate filtration of about 0.3 μm in place in the capture cup 74 generally between the top 76 and the bottom 78 to interrupt the air flow to the storage container 35 and trap debris and liquid as it flows into the capture cup 74. The top 76, being generally transparent, enables the operator to see into the capture cup 74, thereby allowing the operator to readily see when the cup 74 is full of debris or liquid saturated and in need of emptying, and a wash of filter paper 80. Importantly, the operator can readily see into the capture cup 74 while vacuuming to see if fluid is being drawn toward the storage container 35 and likely to enter the housing 20 of the vacuum cleaner 12, as evidenced by the filter paper 80 becoming wetted.

[0037] As shown in FIGS. 6-7, another embodiment incorporates a liquid applicator system 110 adapted for use with a walk-behind industrial type vacuum cleaner 112. The applicator system 110 has similar components as in the previous embodiments, only more suited to industrial use. Accordingly, similar reference numerals are used to refer to like components, but are offset by a factor of 100.

[0038] The vacuum cleaner 112 has a pair of rear wheels 82 supported for rotation about an axle 83 and a pair of front wheels (not shown) supported for rotation about another axle (not shown). The front and rear wheels support a housing 84 for movement on the axle. The housing 84 has a front portion 86 and a rear portion 88 with a top 89 and laterally spaced sides 90, 91 extending between the front portion 86 and the rear portion 88. The housing 84 contains a motor, a storage container for receiving the waste and debris vacuumed up by the vacuum, and rotary brushes for cleaning the carpet surface, among other components (not shown) typically housed in walk-behind style vacuum cleaners.

[0039] As shown in FIG. 6, the liquid applicator system 110 has at least one, and shown here as a pair spray nozzles 138, by way of example and without limitation, similar to those describe above, attached generally externally to the front portion 86 of the housing 84. The spray nozzles 138 are preferably dripped, as described above in the previous embodiments, and are attached to the housing 84 in a spaced relation from one another using similar methods of attachment as described in the previous upright vacuum cleaner embodiments. The spray nozzles 138 are in fluid communication by way of a pair of flexible or bendable fluid lines or hoses 144 with a pump 140 located in a housing 148 (FIG. 7) fastened to the rear portion 88 of the vacuum 112. It should be recognized that the spray nozzles may be attached to the front portion 86 or sides 90, 91 of the vacuum 112, as desired, and that additional hoses will be incorporated to supply the additional spray nozzles.

[0040] The housing 148 is generally sized to receive the pump 140, a battery 160, a vessel 136 and a manifold 92. The manifold 92 is in fluid communication with the hoses 144 coming from the spray nozzles 138, and at least one fluid line or hose 144 coming from the pump 140. Accordingly, the manifold 92 has an inlet for receiving liquid carpet treatment through the hose 144 extending between the pump 140 and the manifold 92, and a plurality of outlets for distributing the liquid carpet treatment in generally equal volumes to the spray nozzles 138. Desirably, the manifold 92 has an accessory outlet for directing liquid carpet treatment 114 to a spray wand 94 through another hose 95.

[0041] The wand 94 is generally used to treat remote areas of the carpet 16 being vacuumed, or otherwise difficult areas to access with the spray nozzles 138 attached to the vacuum 112, such as tight corners and locations under desks, for example. The wand 94 has a handle 96 with an actuator trigger 97 at one end, and a spray tip or nozzle 98 at the other end. The spray nozzle 98 generally distributes a spray of liquid carpet treatment in the same spray pattern as the spray nozzles 138 on the front portion 86 of the vacuum cleaner 112. The spray wand 94 is in fluid communication with the vessel 136 via the manifold 92, and is actuated independently from the nozzles 138.

[0042] The housing 148 may be an enclosed housing, or an at least partially open housing, as desired. The housing 148 has a back panel 99 with a pair of key slots 101 each having an enlarged opening and a narrowed slot extending from the opening to facilitate attachment of the housing 148 to the vacuum 112. As shown in FIG. 7, the housing 148 is attached to the rear portion 88 of the vacuum 112 by attaching a pair of fasteners 105 having enlarged heads 107 to the rear portion 88 of the vacuum 112, and thereafter, placing the enlarged openings of the key slots 101 over the enlarged heads 107 of the fasteners 105, and once in position, allowing the housing 148 to move downwardly to slidably engage the enlarged heads 107 of the fasteners 105 against the rear panel 99 adjacent the narrowed slots. It should be recognized that other attachment mechanisms may be used to attach the housing 148 to the vacuum 112, such as for example, straps, direct mounting by fasteners and the like. In addition, it should be recognized that the housing 148 may be attached to other locations of the vacuum 112, for example, as shown in FIG. 8, the housing 148 is shown attached externally to the front of the vacuum 112. Otherwise, the function of the liquid application system 110 remains the same as described above.

[0043] The housing 148 is shown here as being generally open, and has a base 109 extending generally perpendicularly from the rear panel 99 and a shelf 111 extending from the rear panel 99 in a spaced and generally parallel relation to the base 109. A space between the base 109 and the shelf 111 is sized to receive the pump 140, the battery 160 and the manifold 92. The shelf 111 is sized to carry the vessel 136 thereon. Additional support may be provided for the shelf 111 by incorporating a support member, shown here as a plate 113 extending laterally between the base 109 and the shelf 111.

[0044] The battery 160 is positioned within the space between the base 109 and the shelf 111 and operably connected to the pump 140 by a wire connection, so that when a button or switch 142 is triggered, the pump 140 is actuated. The battery 160 is preferably rechargeable, such as through a plug in adaptor (not shown) suitable for plugging into a standard 110 v wall outlet, as discussed above in the previous embodiments.
The vessel 136 is placed on the shelf 111 and secured thereon by a strap 115 extending around the vessel 136 and the rear panel 99 of the housing 148. The vessel 136 is generally sized to hold a volume of liquid treatment up to 3 gallons, or more, as desired. The hose 144 is shown here entering an opening 117 in the top of the vessel 136 so that liquid may be drawn upwardly and outwardly from the vessel 136 by the pump 140. It should be recognized that the opening 117 may be located toward a bottom portion of the vessel 136, so that the liquid could flow outwardly from the vessel 136 with the assistance of gravity. It should also be recognized that the vessel 136 may be secured to the housing 148 in any variety a ways, such as by having at least partially enclosed side walls (not shown) extending at least partially around the vessel, for example.

To actuate the pump 140, the actuator switch 142 is attached to the pump through a wire connection 119. The actuator switch 142 is desirably attached to a handle 121 on the vacuum 112, and placed ergonomically for ready access by an operator of the vacuum 112. When the operator triggers the switch 142, a switch (not shown) within the pump 140 is triggered, thereby actuating the pump 140 independently from the operation of the vacuum 112 to pump the liquid carpet treatment at selected times to the spray nozzles 138.

A fourth alternate embodiment for a liquid applicator system 210 attachable to an upright vacuum cleaner is shown in FIGS. 9 and 9A. The applicator system 210 functions similarly to the embodiment in FIG. 1, however, instead of having spray nozzles attached to a base 218 of the vacuum 212, at least one spray nozzle 238, or more, as shown in phantom lines, is supported out beyond a front 123 of the base 218 by a flex-hose or hoses 125, depending on how many spray nozzles 238 are used.

The liquid applicator system 210 has a housing 248, a pump 240 having an inlet and an outlet received in the housing 248, and a vessel 256 containing liquid carpet treatment 214 in fluid communication with the inlet of the pump 240. The outlet of the pump 240 is constructed for attachment to the bendable flex-hose 215, preferably using a quick-connector, such as that disclosed in U.S. Pat. No. 4,527,745 for example, incorporated herein by reference in its entirety, or as shown generally at 127 in FIG. 9A. The quick connector 127 has a key 129 sized and shaped for receipt in a keyway 131 within the housing 248. The key 129 is preferably secured within the keyway 131 through a cammed engagement (not shown) by rotating the quick connector 127 in the direction of the arrows, and relative to the housing 248. It should be understood that more that one flex-hose may be used, as is shown in phantom lines in FIG. 9, to ensure adequate spray coverage of the liquid carpet treatment 214 on carpet 216. Where more than one flex-hose 125 is incorporated in the system 210, desirably a manifold 292 having the desired number of outputs is incorporated as discussed in the previous embodiment.

The flex-hose 125 is generally constructed from a material compatible with the types of liquid carpet treatment mentioned above, and others that could be anticipated for use in treating carpet. Desirably, the flex-hose 125 is formed of a plastic or polymeric material, for example and without limitation, high density polyethylene (HDPE), or a polypropylene tube encased in a resilient outer jacket fabricated from either HDPE or a metallic material, such as 304 stainless steel, for example. The flex-hose 125 may be shaped by bending the hose 125, as desired, to retain the spray nozzles 238 in a selected position outwardly from the front 123 of the base 218 of the vacuum 212. The spray nozzles 238 are positioned to spray the desired area of the carpet 216 about 6-12 inches outwardly in front of the base 218. This gives the liquid carpet treatment 214 a delayed time to act and wick on the carpet 216 prior to the agitator brush contacting the sprayed fibers of carpet 216. It should be recognized that upon bending the flex-hose 125 to the desired shape, the flex-hose 125 retains the formed shape in use, therefore, generally not requiring a secondary support between the attachment to the manifold 292 and the spray nozzles 238. It should also be understood that the flex-hose 125 may be reshaped to a desired configuration in which it will remain, and that the flex-hose 125 can be arranged to spray to the side of the vacuum 212, if desired.

A fifth alternate embodiment for a liquid applicator system 310 attachable to a walk-behind vacuum cleaner 312 is shown in FIG. 10. The applicator system 310 functions similarly as the embodiment in FIG. 8, however, instead of having spray nozzles attached directly to a front portion 323 of the vacuum 312, at least one spray nozzle 338, or more as shown in phantom lines, is supported out beyond the front portion 323 of the vacuum 312 by a flex-hose or hoses 325, depending on how many spray nozzles 338 are used. The spray nozzles 328 and flex hoses 325 are generally the same as in the previously described embodiment, and therefore, are not discussed in detail any further.

It should be understood that the liquid applicator systems discussed in the presently preferred embodiments above are readily retrofitted or attachable and removable from the vacuum cleaners, regardless of the type of liquid applicator system and vacuum cleaner. Accordingly, the operator may easily retrofit the liquid applicator system to one vacuum cleaner, and thereafter remove it for attachment to another vacuum cleaner. As shown schematically in FIG. 11, it should be recognized that the operator may utilize the vacuum cleaner with the liquid applicator system in place, though the liquid applicator system need not be in use. It should also be recognized that the operator could utilize the liquid applicator system on the vacuum cleaner with the vacuum cleaner in an "off" mode. FIG. 11 is intended to shown generally the inter-relation of the components of the liquid applicator systems discussed with the components of the selected vacuum cleaner as the two operate conjunctively.

It is to be understood that the embodiments discussed above are exemplary embodiments of the presently preferred constructions, and thus are intended to be illustrative and not limiting. The scope of the invention is defined by the following claims.
providing a pump driven liquid containing vessel; providing a spray nozzle; and attaching the spray nozzle externally to one of the housing and sweeper head for fluid communication with the vessel, the nozzle being arranged to dispense fluid under pressure in the form of a mist a spaced distance from the sweeper head.

2. The method of claim 1 further comprising incorporating a flexible hose which can be bent into and held in a designated position between the spray nozzle and the vessel, and bending the hose to position the spray nozzle in its best spraying position.

3. The method of claim 1 further comprising providing a mechanism interrupting the flow path of dirt to the collection device and providing visualization of any trapped moisture collected in the mechanism.

4. The method of claim 3 further comprising providing a filter in the mechanism to provide filtration of the flow path and separation of liquid upstream of the collection device.

5. The method of claim 1 further comprising attaching an actuator on the upright handle, the actuator being in operable communication with the vessel and actutable to spray the fluid from the spray nozzle independently from the operation of the vacuum cleaner.

6. The method of claim 1 including providing a battery for driving the pump carried on the vacuum cleaner and arranging the vessel containing the liquid within the vessel to the pump.

7. The method of claim 1 including arranging the vessel for suction feed of the liquid within the vessel to the pump.

8. The method of claim 1 including providing a plurality of spray nozzles and attaching the spray nozzles for fluid communication with the pump driven vessel, and arranging each of the nozzles to dispense fluid under pressure a spaced distance from the sweeper head.

9. The method of claim 8 further comprising utilizing a separate flexible hose to attach each spray nozzle for fluid communication with the pump driven vessel and bending the hose to position the spray nozzle in its desired spraying position.

10. The method of claim 1 including dispensing about 0.0256 ounces of fluid through the spray nozzle per square foot of carpet.

11. The method of claim 1 including spraying liquid about 6-12 inches in front of the sweeper head.

12. A carpet cleaning apparatus, comprising: a sweeper housing; a rotating brush assembly for contacting a surface of a carpet carried in said sweeper housing; a collection device carried in the sweeper housing; a fan assembly carried in the sweeper housing; a suction hose connected in circuit with the fan assembly and the collection device; a pump driven vessel carried external to said sweeper housing; and a spray nozzle carried externally to the housing for fluid communication with the vessel, the nozzle being arranged to dispense fluid under pressure a spaced distance from the housing.

13. The apparatus of claim 12 further comprising a flexible hose attached to the spray nozzle, the flexible hose being bendable to retain a selected position for spraying the fluid on the desired area of the carpet outwardly from the housing.

14. The apparatus of claim 12 further comprising an actuator operable independently from the apparatus to energize the pump driven vessel at selected times to dispense fluid through the spray nozzle.

15. The apparatus of claim 12 further comprising a bracket arranged to be releasably attached to said housing, said bracket being arranged to carry said pump driven vessel externally from said housing.

16. The apparatus of claim 12 further comprising a spray wand in fluid communication with said pump driven vessel and being actutable independently from said nozzles to spray fluid under pressure onto a selected area of the carpet.

17. The apparatus of claim 12 wherein said spray nozzle is arranged to dispense about 0.0256 ounces of fluid per square foot of carpet.

18. The apparatus of claim 12 wherein said spray nozzle is arranged to dispense liquid about 6-12 inches in front of the housing.

19. The apparatus of claim 12 further comprising a liquid trapping filtration mechanism interrupting the flow path of dirt to the collection device and providing visualization of any moisture trapped in the mechanism.

20. A method of operating a vacuum cleaner, the vacuum cleaner comprising: a sweeper head incorporated a rotating brush assembly for contacting a surface of a carpet, an upright housing attached to the sweeper head, the upright housing incorporating a collection device and an upstanding handle, a suction hose connected in circuit with a fan and fan motor, and the collection devise, a pump driven liquid containing vessel and a spray nozzle, comprising:

a. attaching the spray nozzle externally to one of the housing and sweeper head for fluid communication with the vessel; and

b. moving the vacuum cleaner over the carpet and spraying a light mist of liquid on said carpet in the form of droplets in the range of 80 microns to 250 microns in maximum size on said carpet a spaced distance from said sweeper head in a path to be vacuumed over.

21. The method of claim 20 further comprising providing a mechanism interrupting the flow path of dirt to the collection device and providing visualization of any trapped moisture collected in the mechanism.

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