(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 617 342 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
24.07.2013 Bulletin 2013/30

(51) Int Cl.:
A47L 11/34 *(2006.01)* ***A47L 11/40*** *(2006.01)*

(21) Application number: **13150021.7**

(22) Date of filing: **02.01.2013**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(30) Priority: **18.01.2012 US 201261587934 P**

(71) Applicant: **Bissell Homecare, Inc.**
Grand Rapids, MI 49544 (US)

(72) Inventors:
- **Pruiett, Jason W.**
  Grand Rapids, MI 49508 (US)
- **Haley, Kevin**
  Byron Center, MI 49315 (US)
- **Warfield, Cynthia Anne**
  Cedar Springs, MI 49319 (US)

(74) Representative: **Schaumburg, Thoenes, Thurn, Landskron, Eckert**
Postfach 86 07 48
81634 München (DE)

(54) Method of cleaning a carpet segment

(57) The embodiments of the invention relate to methods of use of an extraction cleaning machine for cleaning a carpet segment of relatively rectangular configuration defined by a first edge, a second edge and opposite side edges comprising (a) applying a liquid cleaning solution to the carpet segment in a narrow band that extends between the side edges and moves between the first and second edges and (b) applying suction in a narrow band that extends between the side edges and moves between the first and second edges. Acts (a) and (b) can be repeated and performed in a predetermined sequence to improve the cleaning effectiveness of an extraction cleaning machine.

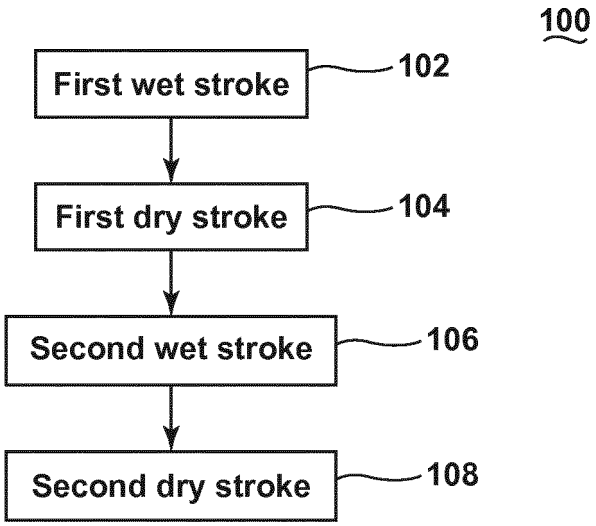


FIG. 2

EP 2 617 342 A1

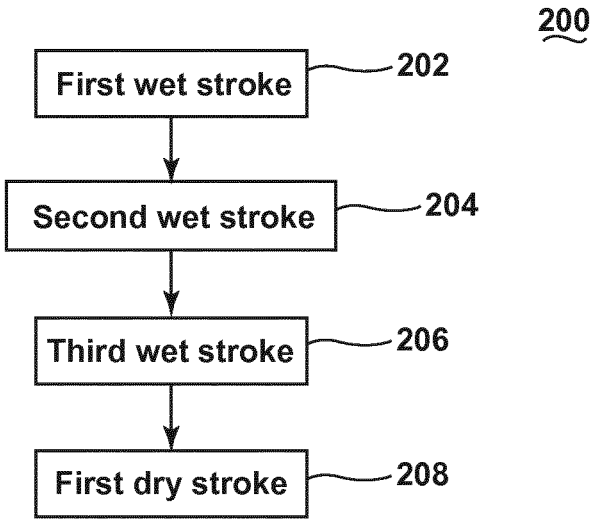

200
First wet stroke
202
Second wet stroke
204
Third wet stroke
206
First dry stroke
208

FIG. 3

Description

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims the benefit of U.S. Provisional Patent Application No. 61/587,934, filed January 18, 2012, which is incorporated herein by reference in its entirety.

BACKGROUND

[0002] Extraction cleaning machines are known for deep cleaning carpets and other fabric surfaces such as upholstery. Most carpet extractors comprise a fluid delivery system, a fluid recovery system, and, optionally, an agitation system. The fluid delivery system typically comprises one or more fluid supply tanks for storing cleaning fluid, a fluid distributor for applying the cleaning fluid to the surface to be cleaned, and a fluid supply conduit for supplying the fluid from the supply tank to the fluid distributor. The fluid recovery system typically comprises a recovery tank, a suction nozzle adjacent to the surface to be cleaned and in fluid communication with the recovery tank through a working air conduit, and a vacuum source in fluid communication with the working air conduit to draw cleaning fluid from the surface to be cleaned through the nozzle and working air conduit into the recovery tank. The agitation system can include an agitator element for scrubbing the surface to be cleaned, an optional drive means, and selective control means. The agitation system can include a fixed or driven agitator element that can comprise a brush, pad, sponge, cloth, and the like. The agitation system can also include driving and control means including motors, turbines, belts, gears, switches, sensors, and the like. See, for example, U.S. Patent No. 6,131,237 to Kasper et al. and U.S. Patent No. 7,073,226 to Lenkiewicz et al.

BRIEF SUMMARY

[0003] According to an embodiment of the invention, a method of cleaning a carpet segment of relatively rectangular configuration defined by a first edge, a second edge and opposite side edges comprises: (a) applying a liquid cleaning solution to the carpet segment in a narrow band that extends between the side edges and moves between the first and second edges, (b) applying suction in a narrow band that extends between the side edges and moves between the first and second edges, (c) repeating act (a), and (d) repeating act (b). The acts (a), (b), (c) and (d) can be carried out successively with an end of a preceding act defining a beginning of a subsequent act.

[0004] According to another embodiment of the invention, the movement of the cleaning solution narrow band in act (a) and the movement of the suction narrow band in act (b) are in opposite directions.

[0005] In yet another embodiment, the method can further comprise mechanically agitating the carpet segment during movement of the suction narrow band in acts (b) and (d).

[0006] In another embodiment, the method can further comprise heating the liquid cleaning solution prior to applying the liquid cleaning solution in acts (a) and (c).

[0007] According to another embodiment of the invention, the acts (a) through (d) are carried out with an extraction machine.

[0008] In yet another embodiment, a method of cleaning a carpet segment of relatively rectangular configuration defined by a first edge, a second edge and opposite side edges comprises: (a) applying a liquid cleaning solution to the carpet segment in a narrow band that extends between the side edges and moves between the first and second edges, (b) repeating act (a), (c) repeating act (a), and (d) applying suction in a narrow band that extends between the side edges and moves between the first and second edges. The acts (a), (b), (c) and (d) can be carried out successively with an end of a preceding act defining a beginning of a subsequent act.

[0009] According to another embodiment of the invention, the movement of the cleaning solution narrow band in act (a) and the movement of the cleaning solution narrow band in act (b) are in opposite directions.

[0010] According to another embodiment of the invention, the movement of the cleaning solution narrow band in act (a) and the movement of the cleaning solution narrow band in act (c) are in the same direction.

[0011] According to another embodiment of the invention, the movement of the cleaning solution narrow band in act (a) and the movement of the suction narrow band in act (d) are in opposite directions.

[0012] In yet another embodiment, the method can further comprise mechanically agitating the carpet segment during movement of the suction narrow band in act (d).

[0013] In another embodiment, the method can further comprise heating the liquid cleaning solution prior to applying the liquid cleaning solution in acts (a), (b), and (c).

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] In the drawings:

FIG. 1 is a schematic of an extraction cleaning machine according to a first embodiment of the invention.

FIG. 2 is a flowchart illustrating a method of use of an extraction cleaning machine according to a second embodiment of the invention

FIG. 3 is a flowchart illustrating a method of use of an extraction cleaning machine according to a third embodiment of the invention.

DETAILED DESCRIPTION

[0015] The embodiments of the invention relate to methods of sequencing wet and dry strokes of an extraction cleaning machine, often referred to as an extractor or deep cleaner, for cleaning carpets and other soft surfaces. The methods can be used with any suitable extractor, non-limiting examples of which include commonly assigned U.S. Patent No. 6,131,237 to Kasper et al., U.S. Patent No. 7,784,148 to Lenkiewicz et al., and U.S. Patent No. 7,320,149 to Huffman et al., which are incorporated herein by reference in their entirety. While the embodiments of the invention are described in the context of cleaning carpets, it will be understood that the embodiments of the invention are also suitable for use with any suitable soft surface, non-limiting examples of which include rugs, upholstery and drapes.

[0016] Figure 1 is a schematic of an extractor 10 suitable for use with the embodiments of the method. Any suitable type of extractor having a fluid delivery and recovery system can be used with the embodiments of the invention described herein. The details of the extractor are not germane to the invention; only those components necessary for a complete understanding of the embodiment of the invention are described.

[0017] The extractor 10 includes a fluid delivery system comprising a first cleaning fluid supply 12 and a second cleaning fluid supply 14 storing first and second cleaning fluids, respectively. The first and second cleaning fluid supplies 12, 14 can include a refillable tank, container and/or bladder. The first and second cleaning fluids can comprise any suitable cleaning fluid, including, but not limited to, water, concentrated and/or diluted detergent, stain remover, odor remover and the like. For example, the first cleaning fluid can be water, and the second cleaning fluid can be a concentrated detergent. Although not illustrated, other supply tanks or containers can be provided such that the fluid delivery system delivers cleaning fluid from separate tanks or containers that contain the same or different concentrations or compositions of cleaning fluid.

[0018] The first and second cleaning fluid supplies 12, 14 can be fluidly coupled with a mixing/metering assembly 16 through respective first and second cleaning fluid supply lines 18, 20. The flow of fluid from the first and second cleaning fluid supplies 12, 14 through the first and second cleaning fluid supply lines 18, 20 to the mixing/metering assembly 16 can be controlled by first and second valve mechanisms 22, 24, respectively. The first and second cleaning fluids can be optionally mixed by the mixing/metering assembly 16 to provide a cleaning solution to a spray assembly 26 for distributing the cleaning solution onto the surface to be cleaned. The spray assembly 26 can include one or more sprayers, such as those described in U.S. Patent No. 7,784,148 to Lenkiewicz et al. referenced above.

[0019] The fluid delivery system also includes an optional heater 28 and a pump assembly 30. The heater 28 can be any suitable heater configured to heat fluids, such as an in-line heater. The pump assembly 30 has a first inlet in fluid communication with the mixing/metering assembly 16 and an outlet in fluid communication with an inlet of the spray assembly 26. The pump assembly 30 is operatively connected to a motor/fan assembly 32 for operation of a primer stack portion thereof, as described in the aforementioned Kasper patent. Alternatively, the pump can comprise a conventional solenoid pump.

[0020] The fluid recovery system comprises a recovery chamber or tank 34 which is used to store spent cleaning solution and debris that is recovered from the surface to be cleaned. A nozzle assembly 36 is in fluid communication with the recovery tank 34 for ingesting spent cleaning solution and debris for collection within the recovery tank 34. The nozzle assembly 36 can be part of a foot assembly (not shown) configured to be positioned adjacent the surface to be cleaned during use of the extractor 10. The foot assembly can further include additional components such as an agitator assembly comprising one or more agitators, such as a brush roll, for example, for agitating and providing mechanical cleaning action to the surface to be cleaned. The motor and fan assembly 32 is fluidly coupled with the nozzle assembly 36 for providing suction to draw the spent cleaning solution and debris on the surface being cleaned through the nozzle assembly 36 and into the recover chamber 34. Air drawn into the fluid recovery system through the nozzle assembly 36 is drawn through the motor and fan assembly 32 before being exhausted from the extractor 10.

[0021] The extractor 10 can also include a control system 38 for operably controlling the various components of the extractor 10, such as the first and second valve mechanisms 22, 24, the mixing/metering assembly 16, the pump 28, the heater 30 and the motor/fan assembly 32, for example. The extractor 10 can also include an actuator 40, such as a button or trigger, which can be selectively actuated to control the delivery of cleaning solution to the surface to be cleaned.

[0022] In use, upon actuation of the actuator 40 by a user, the control system 38 can control the first and second valve mechanisms 22, 24 to supply the first and second cleaning fluids to the mixing/metering assembly 16 to generate a cleaning solution. The control system 38 can further control the pump 28 and optionally the heater 30 to provide the cleaning solution to the spray assembly 26 for application to the surface to be cleaned. The control system 38 can be

configured to control the motor/fan assembly 32 such that during application of the cleaning solution, suction is not applied through the nozzle assembly 36. Alternatively, the control system 38 can be configured to apply suction during the application of the cleaning solution. Upon release of the actuator 40, the control system 38 can control the components of the extractor 10 to cease dispensing of the cleaning solution through the spray assembly 26. The spent cleaning solution and debris on the surface being cleaned can be removed by suction through the nozzle assembly 36 and stored in the recovery chamber 34 for later disposal by the user. Suction through the nozzle assembly 36 can be initiated automatically by the control system 38 upon release of the actuator 40, manually by the user through a second actuator operably coupled with the motor/fan assembly 32, or suction can be automatically applied by the control system 38.

[0023] Figure 2 illustrates a method 100 of use of the extractor 10 for cleaning a surface to be cleaned, such as an area of carpet. The methods of the embodiments of the invention are described with respect to a "stroke" of the extractor 10. As used herein, a stroke refers to movement of the extractor 10 relative to the surface being cleaned in a single direction, with or without the distribution of cleaning solution, from the perspective of a user positioned behind the extractor 10. A "forward stroke" refers to movement of the extractor 10 in a forward direction, away from the user. A "reverse stroke" refers to movement of the extractor 10 in a reverse direction, back towards the user. A "wet stroke" refers to a stroke, either forward or reverse, during which the user has actuated the actuator 40 to distribute cleaning solution to the surface being cleaned. A "dry stroke" refers to a stroke, either forward or reverse, during which the motor/fan assembly 32 is actuated to provide suction to the nozzle assembly 36 to remove spent cleaning solution and/or debris on the surface being cleaned without distribution of cleaning solution to the surface. During the dry stroke, the agitator assembly can also be actuated.

[0024] The method 100 starts with the assumption that the user has filled the first and second cleaning fluid supplies 12, 14 with the desired cleaning fluids, has positioned the extractor 10 on the surface to be cleaned and is standing behind the extractor 10. At 102 the user can push the extractor 10 in a forward direction, away from the user, while actuating the actuator 40 to distribute cleaning solution to the surface, thus completing a first wet stroke. At 104 the user can pull the extractor 10 in a reverse direction, back towards the user, over the same general area traversed during the first wet stroke 102, without actuating the actuator 40, thus completing a first dry stroke. At 106 the user can again push the extractor 10 in a forward direction, generally traversing the same area of the surface traversed during the first wet stroke at 102 and the first dry stroke at 104, while actuating the actuator 40 to distribute the cleaning solution, thus completing a second wet stroke. At 108 the user can pull the extractor 10 in a reverse direction, generally traversing the same area of the surface traversed during the previous strokes at 102, 104 and 106, without actuating the actuator 40, thus completing a second dry stroke.

[0025] While the method 100 is described as beginning with a forward stroke, it will be understood that the method 100 can begin with a reverse stroke. The method 100 can be completed one or more times over the same general area of the surface or may be used to clean a larger area. For example, the method 100 can be used one or more times on the same general area to clean a stain or spot on the surface being cleaned. In another example, the method 100 can be repeated multiple times in the process of cleaning an entire room.

[0026] The method 100 can be used to clean a carpet segment having a first edge defined by a position of the extractor 10 at the start of the first wet stroke, a second edge defined by a position of the extractor 10 at the end of the first wet stroke and opposite side edges extending between the first and second edges of the carpet segment. The width of the carpet segment between the opposite side edges can generally be defined by a width of a cleaning solution spray pattern that is dispensed by the spray assembly 26 and/or a width of the nozzle assembly 36. Alternatively, the width of the carpet segment can be defined by the width of the extractor foot assembly, with the cleaning solution spray pattern and the width of the nozzle assembly 36 extending across at least a portion of the width of the foot assembly. In this manner, movement of the extractor 10 according to the strokes of the method 100 defines a relatively rectangular carpet segment that is cleaned according to the method 100.

[0027] Movement between edges of the carpet segment during the method 100 generally defines a stroke, with each stroke being carried out successively such that an end of one stroke is followed by a beginning of a second stroke within a relatively short period of time, on the order of seconds or minutes, for example. In one example, the period of time between strokes may be based on the amount of time it takes a user to actuate the actuator 40 to dispense a cleaning solution at the beginning of a wet stroke and provide momentum to move the extractor 10 and/or the amount of time it takes a user to release the actuator 40 at the end of a wet stroke and reverse the movement of the extractor 10.

[0028] A distance between the first and second edges of the carpet segment can vary depending on the user's approach to cleaning the surface to be cleaned. For example, when the user is cleaning an entire room, the distance between the first and second edges of the carpet segment may be greater than the distance between the first and second edges when the user is cleaning only a portion of a room, such as during a spot treatment.

[0029] Figure 3 illustrates a second method 200 of use of the extractor 10 for cleaning a carpet segment of a surface to be cleaned, such as an area of carpet. The method 200 is similar to the method 100 except for the sequence and ratio of wet and dry strokes.

[0030] The method 200 starts with the assumption that the user has filled the first and second cleaning fluid supplies

12, 14 with the desired cleaning fluids, has positioned the extractor 10 on the surface to be cleaned and is standing behind the extractor 10. At 202 the user can push the extractor 10 in a forward direction, away from the user, while actuating the actuator 40 to distribute cleaning solution to the surface, thus completing a first wet stroke. At 204 the user can pull the extractor 10 in a reverse direction, back towards the user, over the same general area traversed during the first wet stroke 202, while actuating the actuator 40 to distribute cleaning solution to the surface, to complete a second wet stroke. At 206 the user can again push the extractor 10 in a forward direction, generally traversing the same area of the surface traversed during the first and second wet strokes at 202 and 204, while actuating the actuator 40 to distribute the cleaning solution, to complete a third wet stroke. At 208 the user can pull the extractor 10 in a reverse direction, generally traversing the same area of the surface traversed during the previous strokes at 202, 204 and 206, without actuating the actuator 40, thus completing a first dry stroke.

[0031] Similar to the first method 100, the method 200 can be completed one or more times over the same general area of the surface or may be used to clean a larger area. For example, the method 200 can be used one or more times on the same general area to clean a stain or spot on the surface being cleaned. In another example, the method 200 can be repeated multiple times in the process of cleaning an entire room.

[0032] The methods 100 and 200 provide different cleaning stroke sequences that can be used with an extractor to provide improved cleaning performance compared to the standard sequence of cleaning strokes used with an extractor, as illustrated by the test results provided below.

Cleaning Performance Evaluation

Methods

[0033] ASTM International has proposed a test method for a laboratory test for determining the relative carpet cleaning effectiveness of a wet extraction cleaning system when tested under standard conditions titled "DRAFT Test Method for Measuring the Carpet Cleaning Effectiveness of Wet Extraction Cleaners," dated January 20, 2010. The cleaning system is defined as a wet extraction appliance coupled with its included or recommended chemical cleaning formula. The proposed standard determines the carpet cleaning effectiveness based on a standard cleaning method that includes two wet strokes followed by two dry strokes ("two wet/two dry strokes").

[0034] The carpet cleaning effectiveness of three different commercially available extraction cleaning systems was tested according to the ASTM draft standard using the two wet/two dry strokes cleaning method outlined in the proposed standard. The cleaning effectiveness was also tested using the method 100 and 200 of Figures 2 and 3 according to the ASTM draft standard in place of the two wet/two dry strokes standard cleaning method to compare the cleaning effectiveness of the methods 100 and 200 with the standard method.

[0035] The amount of water retained ("water retention") by the carpet after cleaning according to the ASTM draft standard using each of the different cleaning methods was determined by weighing the carpet test sample before and after cleaning.

Extraction Cleaning Systems

[0036] The three extraction cleaning systems tested include:

1) BISSELL® Lift-Off® Deep Cleaning System with the BISSELL® 2X Professional Deep Cleaning formula ("BISSELL® Lift-Off®").
2) BISSELL® Proheat® 2X 9200 Deep Cleaning System with the BISSELL® 2X Professional Deep Cleaning formula ("BISSELL® Proheat®").
3) Hoover® Max Extract® 60 with the Hoover® 2X Concentrate Deep Cleansing formula ("Hoover® Max Extract®").

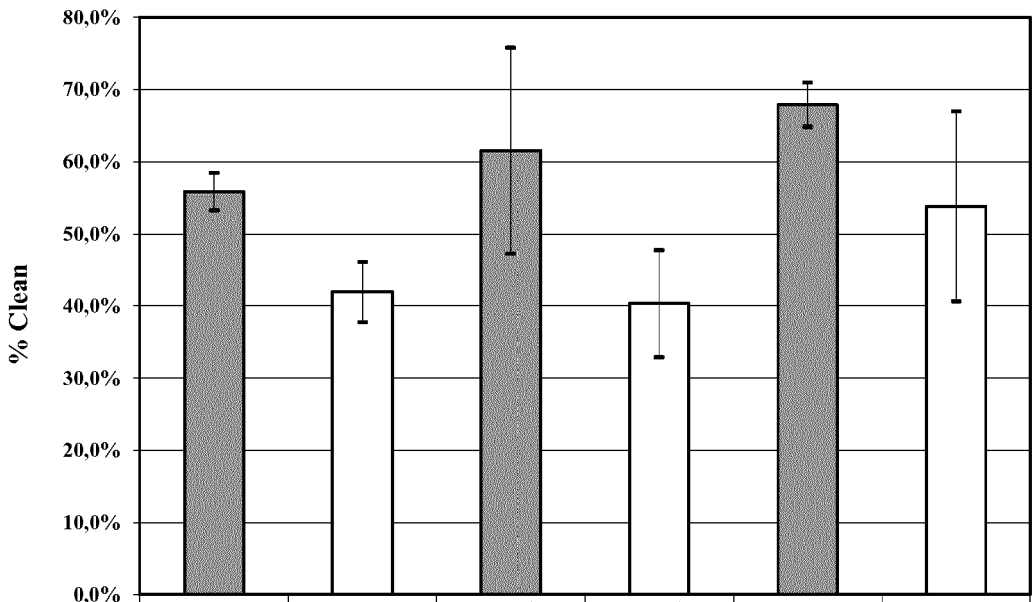
Test Results

[0037] Charts 1-7 illustrate test data obtained for the three extraction systems listed above, BISSELL® Lift-Off®, BISSELL® Proheat®, and Hoover® Max Extract® according to the ASTM draft standard using each of the different cleaning methods, the ASTM standard cleaning method and the methods 100 and 200 of Figures 2 and 3.

[0038] Charts 1-3 below illustrate the average percent clean test results at the 95% confidence interval for each of the three extraction cleaning systems according to the ASTM draft standard using the two wet/two dry strokes standard cleaning method, the method 100 ("1 wet 1 dry/I wet 1 dry") and the method 200 ("3 wet/1 dry"). For all of the Charts 1-6, the grey bars correspond to the first, forward stroke traveling in the direction of the lay of the carpet test sample (with the lay of the carpet) and the white bars correspond to the first stroke traveling in the direction opposite to the lay of the carpet test sample (against the lay of the carpet). The average percent clean value and percent clean value plus

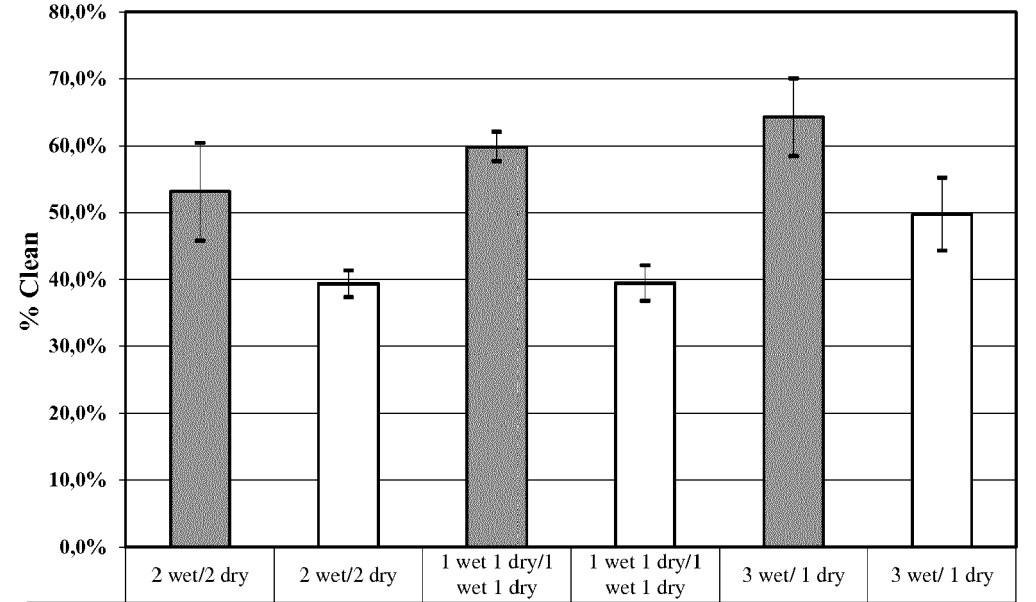
and minus two standard deviations ("+2s" and "-2s") is also shown. The percent clean values are calculated as described in the ASTM draft standard.

Chart 1: BISSELL® Lift-Off® % Clean

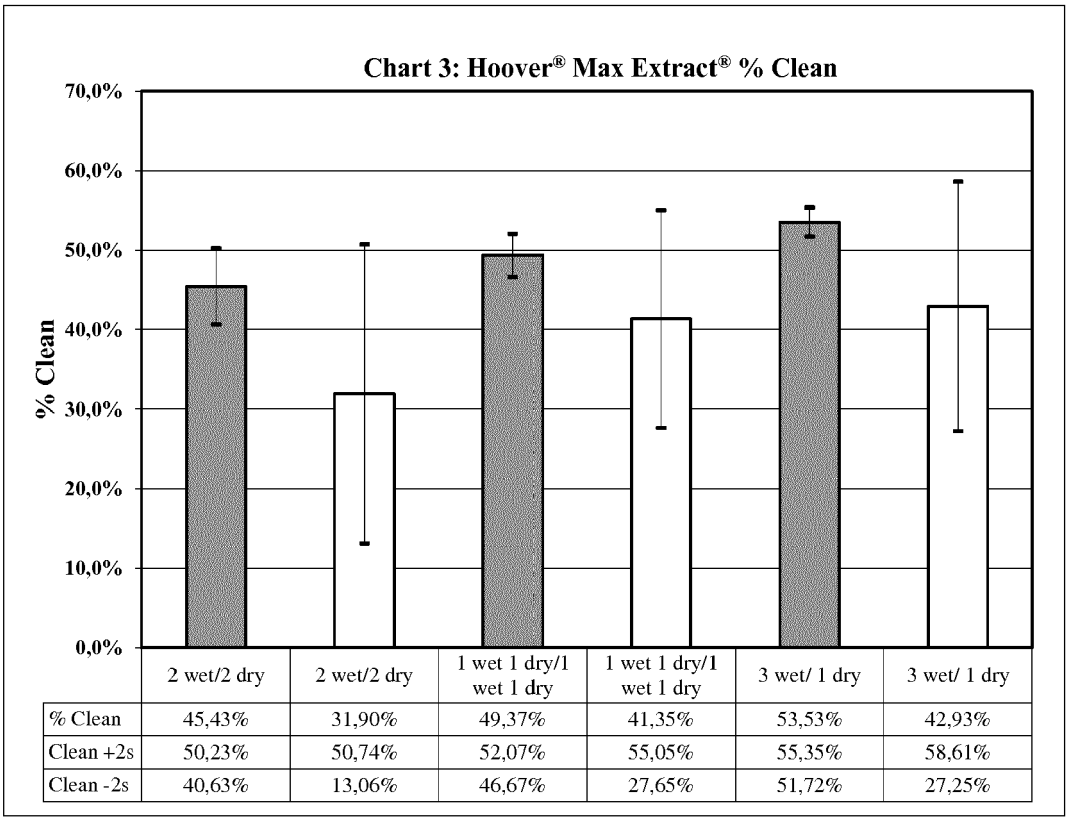


	2 wet/2 dry	2 wet/2 dry	1 wet 1 dry/1 wet 1 dry	1 wet 1 dry/1 wet 1 dry	3 wet/ 1 dry	3 wet/ 1 dry
% Clean	55,84%	41,96%	61,55%	40,34%	67,90%	53,78%
Clean +2s	58,44%	46,12%	75,86%	47,76%	70,97%	66,94%
Clean -2s	53,24%	37,81%	47,25%	32,91%	64,83%	40,63%

Chart 2: BISSELL® Proheat® % Clean

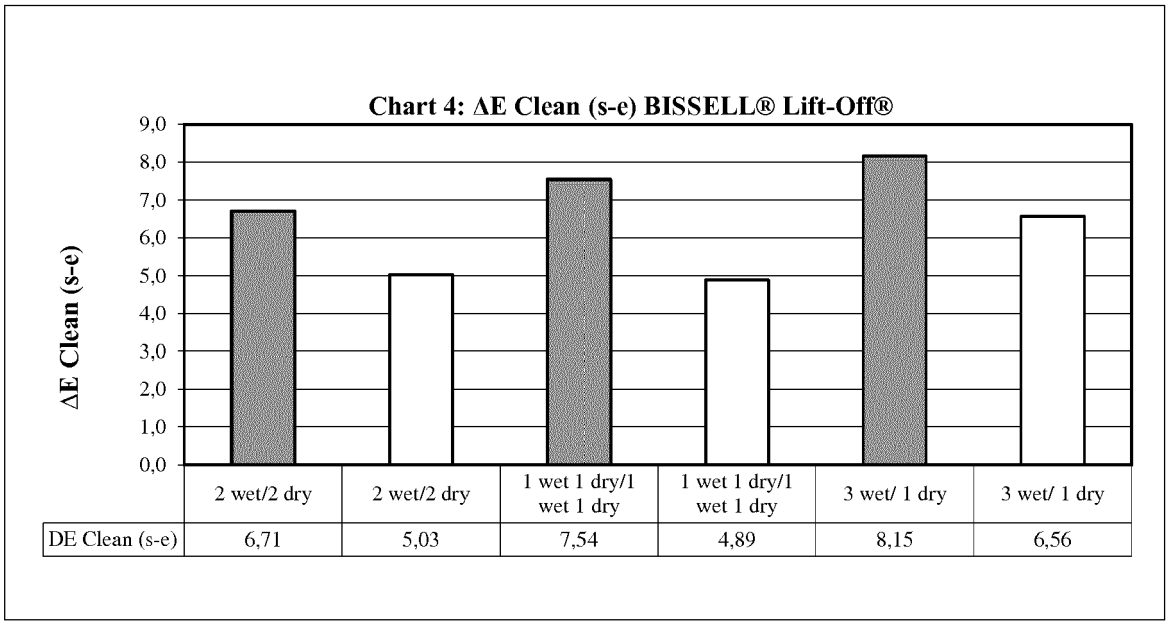


	2 wet/2 dry	2 wet/2 dry	1 wet 1 dry/1 wet 1 dry	1 wet 1 dry/1 wet 1 dry	3 wet/ 1 dry	3 wet/ 1 dry
% Clean	53,11%	39,35%	59,86%	39,46%	64,25%	49,76%
Clean +2s	60,44%	41,32%	62,05%	42,08%	70,07%	55,21%
Clean -2s	45,78%	37,38%	57,67%	36,84%	58,43%	44,31%

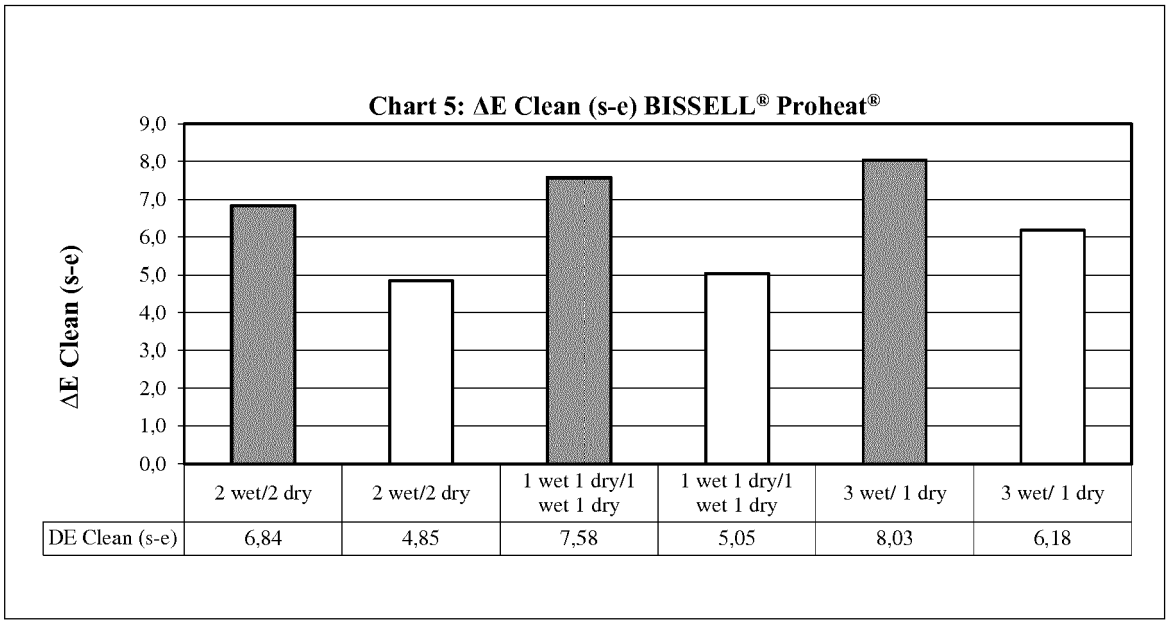


	2 wet/2 dry	2 wet/2 dry	1 wet 1 dry/1 wet 1 dry	1 wet 1 dry/1 wet 1 dry	3 wet/ 1 dry	3 wet/ 1 dry
% Clean	45,43%	31,90%	49,37%	41,35%	53,53%	42,93%
Clean +2s	50,23%	50,74%	52,07%	55,05%	55,35%	58,61%
Clean -2s	40,63%	13,06%	46,67%	27,65%	51,72%	27,25%

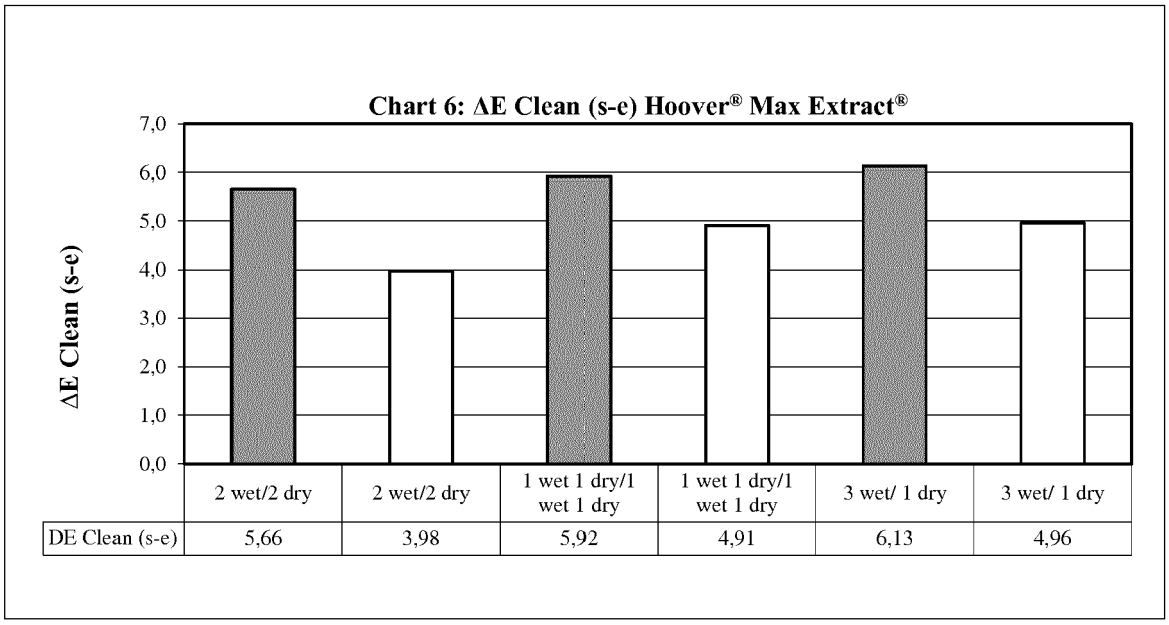
[0039] Charts 4-6 illustrate the average Delta-E (ΔE) at the 95% confidence interval for each of the three extraction cleaning systems according to the ASTM draft standard using the two wet/two dry strokes standard cleaning method, the method 100 ("1 wet 1 dry/l wet 1 dry") and the method 200 ("3 wet/1 dry"). As discussed in the ASTM draft standard, ΔE is a number representing the distance in color space between two colors. ΔE is derived mathematically and is used in colorimetry to evaluate the extent of color differences and change. ΔE (s-e) is a measure of the change in ΔE between the soiled carpet sample and the carpet sample after it has been cleaned.



	2 wet/2 dry	2 wet/2 dry	1 wet 1 dry/1 wet 1 dry	1 wet 1 dry/1 wet 1 dry	3 wet/ 1 dry	3 wet/ 1 dry
DE Clean (s-e)	6,71	5,03	7,54	4,89	8,15	6,56



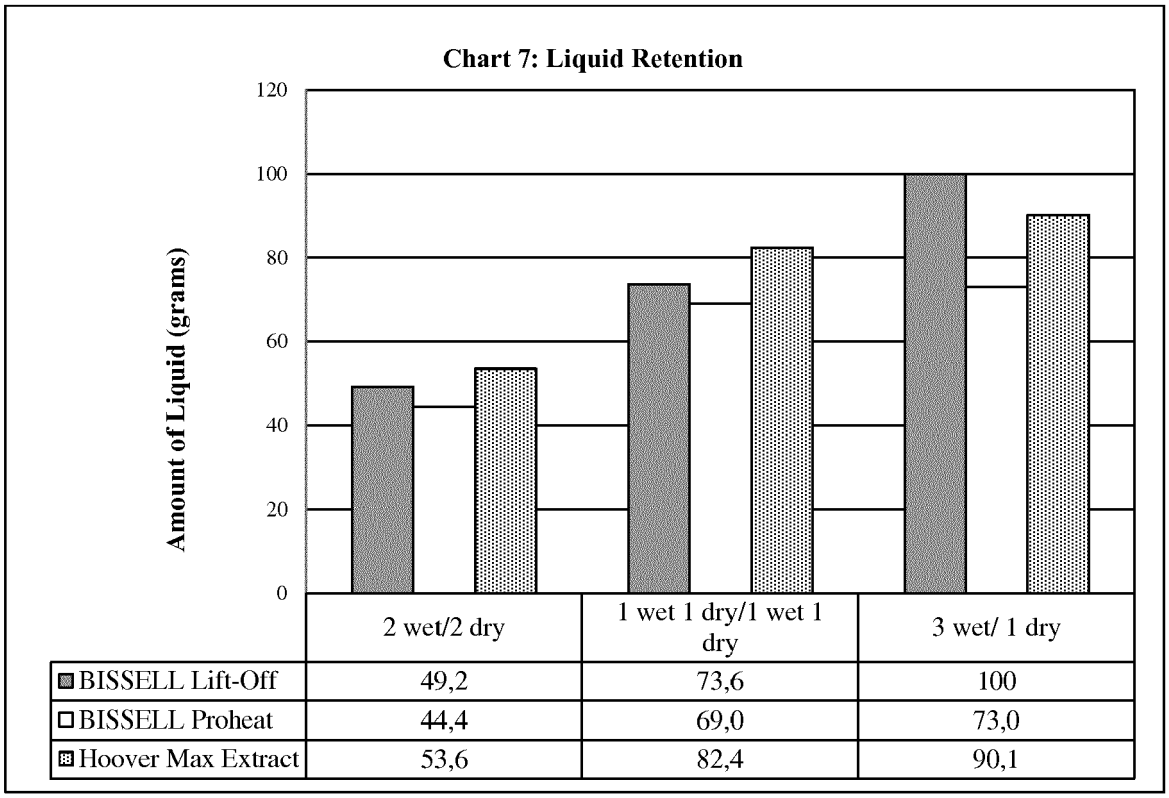
	2 wet/2 dry	2 wet/2 dry	1 wet 1 dry/1 wet 1 dry	1 wet 1 dry/1 wet 1 dry	3 wet/ 1 dry	3 wet/ 1 dry
DE Clean (s-e)	6,84	4,85	7,58	5,05	8,03	6,18



	2 wet/2 dry	2 wet/2 dry	1 wet 1 dry/1 wet 1 dry	1 wet 1 dry/1 wet 1 dry	3 wet/ 1 dry	3 wet/ 1 dry
DE Clean (s-e)	5,66	3,98	5,92	4,91	6,13	4,96

[0040] As can be seen in Charts 1-6, the sequencing of the wet and dry strokes used during an extraction cleaning method effects the carpet cleaning effectiveness of the BISSELL® Lift-Off®, BISSELL® Proheat®, and Hoover® Max Extract® extraction cleaning systems. Referring now to Charts 1-3, in general, the average percent clean for 1 wet 1 dry/ 1 wet 1 dry (method 100) and 3 wet/1 dry (method 200) cleaning methods is greater than the standard 2 wet/2 dry cleaning method for all three extraction cleaning systems when starting cleaning with the lay of the carpet. As illustrated in Charts 4-6, in general, ΔE(s-e) is greater for the 1 wet 1 dry/ 1 wet 1 dry (method 100) and 3 wet/1 dry (method 200) cleaning methods than the standard 2 wet/2 dry cleaning method for all three extraction cleaning systems both with and against the lay of the carpet. This data suggests that the 1 wet 1 dry/ 1 wet 1 dry (method 100) and 3 wet/1 dry (method 200) cleaning methods are on par and often better than the standard 2 wet/2 dry cleaning method for cleaning carpets.

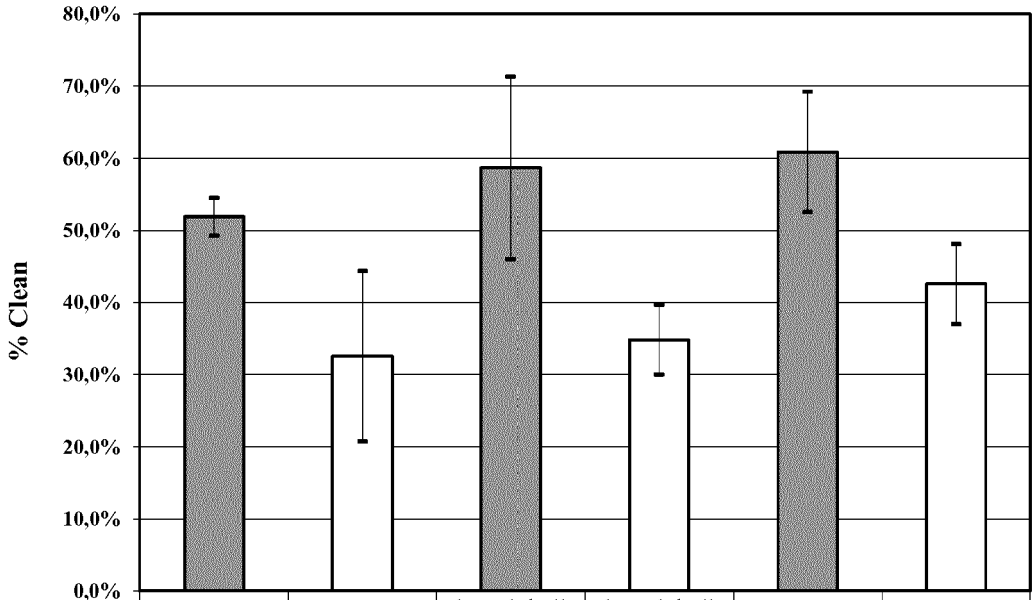
[0041] Chart 7 illustrates the average amount of liquid retained by the carpet when cleaned using each three extraction cleaning system for each cleaning method with and against the lay of the carpet.



[0042] As can be seen in Chart 7, while each of the three cleaning methods includes four strokes, each method results in different amounts of liquid retained by the carpet. For example, while the standard 2 wet/2 dry method and method 100 of 1 wet 1 dry/l wet 1dry both comprise two wet strokes and 2 dry strokes, the sequencing effects the amount of liquid retained by the carpet, with the method 100 resulting in an increase in the amount of retained liquid compared to the standard method. The method 200 of 3 wet/1 dry has four strokes total, the same as the standard method and method 100, however the method 200 has 3 wet strokes and 1 dry, resulting in more liquid retained by the carpet than either the standard method or method 100.

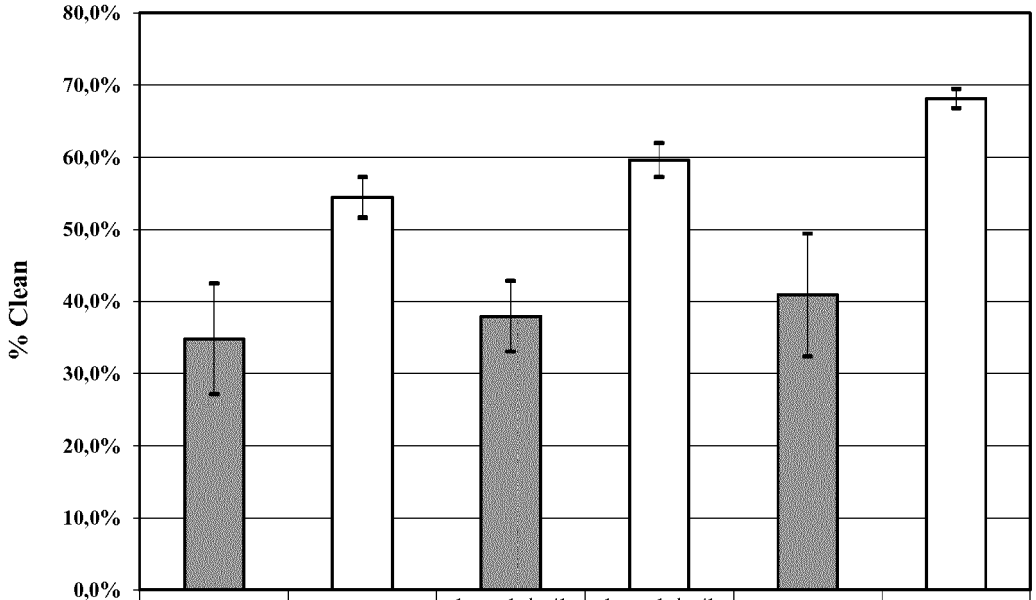
[0043] Charts 8 and 9 illustrate the test data obtained for the BISSELL® Lift-Off® extractor used with the BISSELL® 2X Professional Deep Cleaning formula and the BISSELL® 2X Fiber Cleansing formula according to the ASTM draft standard using each of the different cleaning methods, the ASTM standard cleaning method and the methods 100 and 200 of Figures 2 and 3.

Chart 8: BISSELL® Lift-Off® Fiber Cleansing % Clean



	2 wet/2 dry	2 wet/2 dry	1 wet 1 dry/1 wet 1 dry	1 wet 1 dry/1 wet 1 dry	3 wet/ 1 dry	3 wet/ 1 dry
% Clean	51,89%	32,58%	58,68%	34,83%	60,87%	42,61%
Clean +2s	54,48%	44,37%	71,33%	39,65%	69,23%	48,15%
Clean -2s	49,30%	20,79%	46,03%	30,01%	52,52%	37,07%

Chart 9: BISSELL® Lift-Off® Professional % Clean



	2 wet/2 dry	2 wet/2 dry	1 wet 1 dry/1 wet 1 dry	1 wet 1 dry/1 wet 1 dry	3 wet/ 1 dry	3 wet/ 1 dry
% Clean	34,81%	54,45%	37,97%	59,63%	40,93%	68,13%
Clean +2s	42,49%	57,27%	42,86%	62,01%	49,46%	69,47%
Clean -2s	27,13%	51,62%	33,08%	57,25%	32,40%	66,79%

[0044] As can be seen in Charts 8 and 9, even when different cleaning formulas are used with the extractor, the sequencing and ratio of wet and dry strokes in the cleaning method affects the cleaning effectiveness of the extraction cleaning system.

[0045] The results shown herein illustrate the effect of the sequencing and the ratio of wet and dry strokes in the cleaning effectiveness of an extraction cleaning system. Even when the total number of strokes in the cleaning method is the same, the cleaning effectiveness and the amount of liquid retained by the carpet varies depending on the sequencing and the number of wet and dry strokes. This information can be provided to a user in the form of an instructional manual or a label on the machine such that the user can make an informed decision on how to use the extraction cleaning system to clean the carpet to meet the needs of the user.

[0046] For example, if the user only desires a normal level of cleaning effectiveness and low liquid retention, the standard 2 wet/2 dry method can be used. Alternatively, if the user desires a higher level of cleaning effectiveness and a slightly greater amount of liquid retention is acceptable, then the user can use the method 100 of 1 wet 1 dry/ 1 wet 1 dry. In a third option, if the user desires a higher level of cleaning effectiveness and is not concerned with the amount of retained liquid, the user can use the method 200 of 3 wet/1 dry. The user can use additional dry strokes as needed following the method 200 or any of the methods described herein to suction additional liquid from the surface to decrease the amount of liquid retained by the surface.

[0047] To the extent not already described, the different features and structures of the various embodiments may be used in combination with each other as desired. That one feature may not be illustrated in all of the embodiments is not meant to be construed that it cannot be, but is done for brevity of description. Thus, the various features of the different embodiments may be mixed and matched as desired to form new embodiments, whether or not the new embodiments are expressly described.

[0048] While the invention has been specifically described in connection with certain specific embodiments thereof, it is to be understood that this is by way of illustration and not of limitation. Reasonable variation and modification are possible within the scope of the forgoing disclosure and drawings without departing from the spirit of the invention which is defined in the appended claims.

Claims

1. A method of cleaning a carpet segment of relatively rectangular configuration defined by a first edge, a second edge and opposite side edges, the method comprising:

   (a) applying a liquid cleaning solution to the carpet segment in a narrow band that extends between the side edges and moves between the first and second edges;
   (b) applying suction in a narrow band that extends between the side edges and moves between the first and second edges;
   (c) repeating act (a); and
   (d) repeating act (b);
   wherein acts (a), (b), (c) and (d) are carried out successively with an end of a preceding act defining a beginning of a subsequent act.

2. The method of claim 1 wherein the movement of the cleaning solution narrow band in act (a) and the movement of the suction narrow band in act (b) are in opposite directions.

3. The method of claim 1, further comprising mechanically agitating the carpet segment during the movement of the suction narrow band in acts (b) and (d).

4. The method of claim 1, further comprising heating the liquid cleaning solution prior to applying the liquid cleaning solution in acts (a) and (c).

5. The method of claim 1 wherein the acts (a) through (d) are carried out with an extraction machine.

6. A method of cleaning a carpet segment of relatively rectangular configuration defined by a first edge, a second edge and opposite side edges, the method comprising:

   (a) applying a liquid cleaning solution to the carpet segment in a narrow band that extends between the side edges and moves between the first and second edges;
   (b) repeating act (a);

(c) repeating act (a); and
(d) applying suction in a narrow band that extends between the side edges and moves between the first and second edges;
wherein acts (a), (b), (c) and (d) are carried out successively with an end of a preceding act defining a beginning of a subsequent act.

7. The method of claim 6 wherein the movement of the cleaning solution narrow band in act (a) and the movement of the cleaning solution narrow band in act (b) are in opposite directions.

8. The method of claim 6 wherein the movement of the cleaning solution narrow band in act (a) and the movement of the cleaning solution narrow band in act (c) are in the same direction.

9. The method of claim 6 wherein the movement of the cleaning solution narrow band in act (a) and the movement of the suction narrow band in act (d) are in opposite directions.

10. The method of claim 6, further comprising mechanically agitating the carpet segment during the movement of the suction narrow band in act (d).

11. The method of claim 6, further comprising heating the liquid cleaning solution prior to applying the liquid cleaning solution in acts (a), (b) and (c).

12. The method of claim 6 wherein the acts (a) through (d) are carried out with an extraction machine.

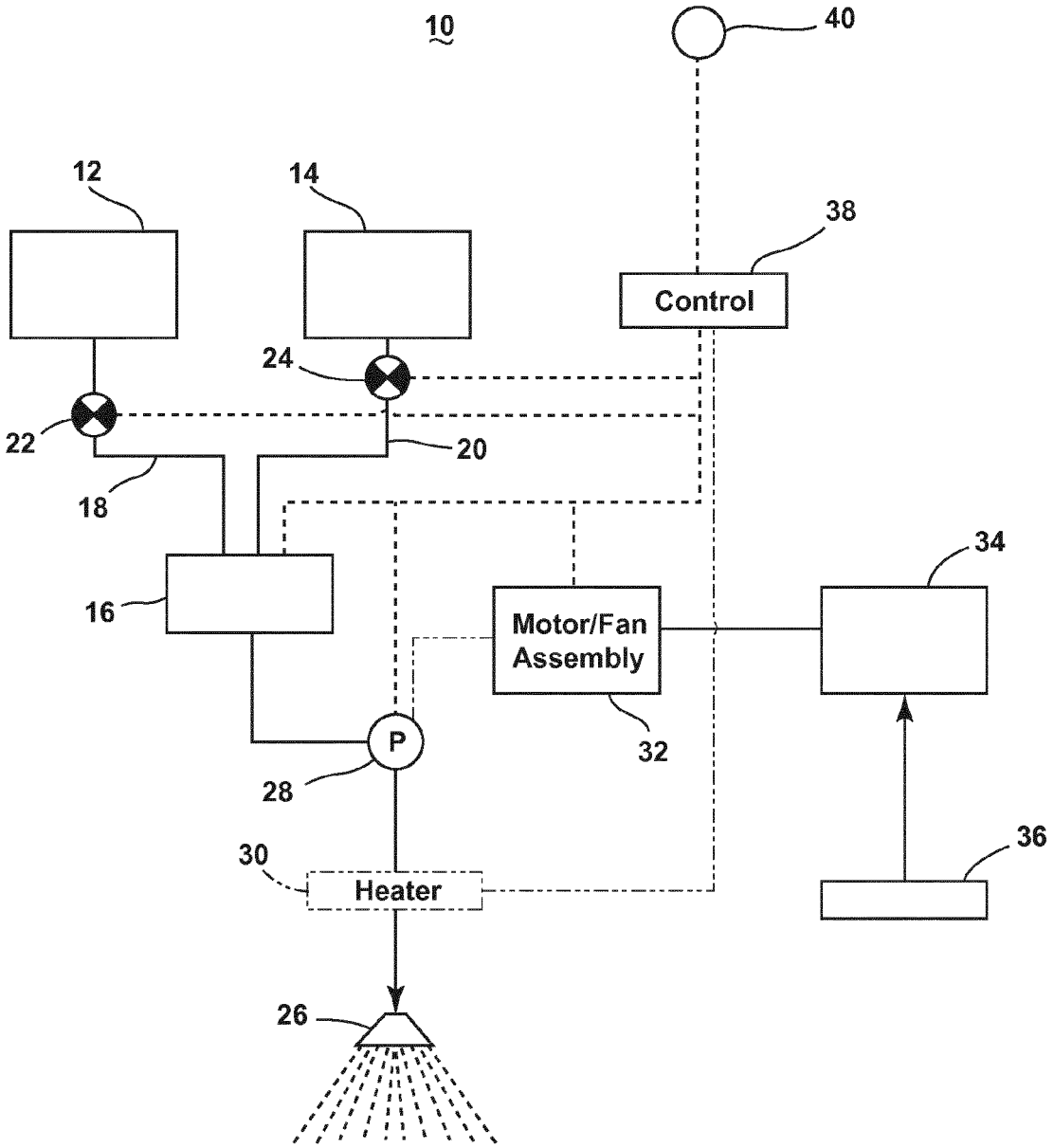

10
40
12
14
38
Control
24
22
20
18
16
34
Motor/Fan
Assembly
32
P
28
30
Heater
36
26

FIG. 1

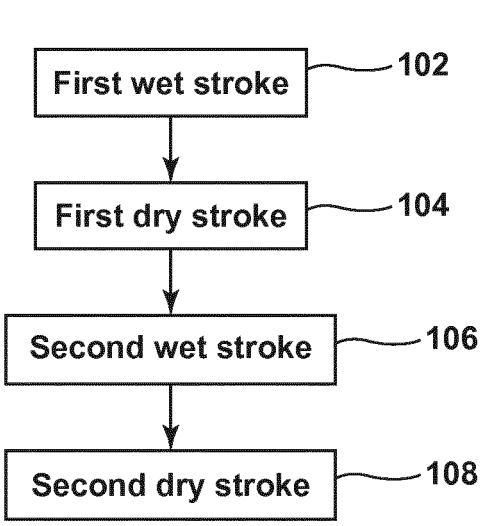

100
First wet stroke
102
First dry stroke
104
Second wet stroke
106
Second dry stroke
108

FIG. 2

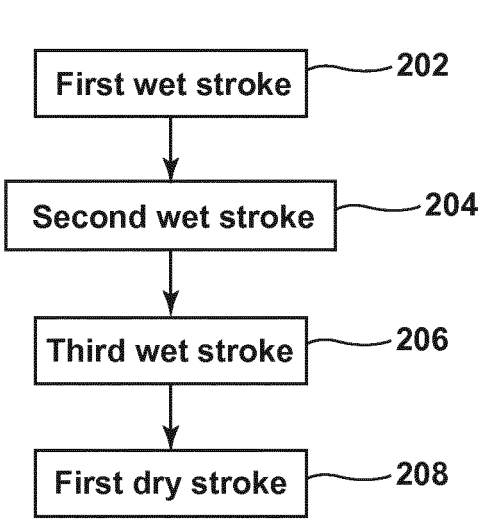

200
First wet stroke
202
Second wet stroke
204
Third wet stroke
206
First dry stroke
208

FIG. 3

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 13 15 0021

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2003/135952 A1 (COATES DONALD A [US] ET AL) 24 July 2003 (2003-07-24) * paragraphs [0002], [0042] - [0043]; claims; figures *	1-12	INV. A47L11/34 A47L11/40
X,D	US 6 131 237 A (KASPER GARY A [US] ET AL) 17 October 2000 (2000-10-17) * columns 25-26; figure 1 *	1-12	
X	US 2001/039684 A1 (KASPER GARY A [US] ET AL) 15 November 2001 (2001-11-15) * paragraphs [0116] - [0138]; figure 1 *	1-12	
X	EP 2 335 545 A2 (BISSELL HOMECARE INC [US]) 22 June 2011 (2011-06-22) * paragraphs [0033] - [0042]; figures *	1-12	
X	US 5 867 860 A (HARRIS ROBERT [US]) 9 February 1999 (1999-02-09) * column 1, lines 34-53 *	1-5	
X	WO 2006/066303 A1 (BLAKELY CLIVE JOHN [AU]) 29 June 2006 (2006-06-29) * pages 4-7, 11; figures 1-4 *	1-5	TECHNICAL FIELDS SEARCHED (IPC) A47L
X	EP 2 327 348 A1 (BISSELL HOMECARE INC [US]) 1 June 2011 (2011-06-01) * paragraphs [0021] - [0027]; figure 1 *	1-5	
X	US 2011/107545 A1 (CAGNINA ALESANDRO [IT] ET AL) 12 May 2011 (2011-05-12) * paragraphs [0025] - [0032] *	1-5	
X	WO 2004/089179 A2 (BISSELL HOMECARE INC [US]; MINER JONATHAN L [US]; HUFFMAN ERIC C [US];) 21 October 2004 (2004-10-21) * page 14, line 6 - page 15, line 9 *	6-12	

-/--

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	16 May 2013	Lopez Vega, Javier

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 13 15 0021

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 4 123 818 A (HURWITZ MATHEW) 7 November 1978 (1978-11-07) * column 5, lines 19-58; figures * -----	6-12	

TECHNICAL FIELDS SEARCHED (IPC)

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	16 May 2013	Lopez Vega, Javier

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

1 EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 13 15 0021

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

16-05-2013

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2003135952 A1	24-07-2003	CN 1768667 A	10-05-2006
		US 2002170137 A1	21-11-2002
		US 2003135952 A1	24-07-2003
US 6131237 A	17-10-2000	NONE	
US 2001039684 A1	15-11-2001	US 7862623 B1	04-01-2011
		US 2001039684 A1	15-11-2001
EP 2335545 A2	22-06-2011	AU 2010249272 A1	07-07-2011
		CN 102100504 A	22-06-2011
		EP 2335545 A2	22-06-2011
		JP 2011125720 A	30-06-2011
		KR 20110070808 A	24-06-2011
		US 2011146720 A1	23-06-2011
US 5867860 A	09-02-1999	AU 3821597 A	20-02-1998
		US 5867860 A	09-02-1999
		WO 9804179 A1	05-02-1998
WO 2006066303 A1	29-06-2006	NONE	
EP 2327348 A1	01-06-2011	AU 2010241499 A1	09-06-2011
		CN 102068218 A	25-05-2011
		EP 2327348 A1	01-06-2011
		US 2011119861 A1	26-05-2011
US 2011107545 A1	12-05-2011	AU 2010280517 A1	15-03-2012
		CA 2769261 A1	10-02-2011
		CN 102573592 A	11-07-2012
		EP 2459047 A2	06-06-2012
		EP 2534993 A1	19-12-2012
		US 2011107545 A1	12-05-2011
		WO 2011015812 A2	10-02-2011
WO 2004089179 A2	21-10-2004	AU 2004227911 A1	21-10-2004
		CN 1767782 A	03-05-2006
		GB 2414385 A	30-11-2005
		JP 4489763 B2	23-06-2010
		JP 2006521892 A	28-09-2006
		KR 20050105520 A	04-11-2005
		RU 2361503 C2	20-07-2009
		US 2006179599 A1	17-08-2006
		WO 2004089179 A2	21-10-2004
US 4123818 A	07-11-1978	CA 1087814 A1	21-10-1980

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 13 15 0021

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

16-05-2013

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		US 4123818 A	07-11-1978

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 61587934 A **[0001]**
- US 6131237 A, Kasper **[0002] [0015]**
- US 7073226 B, Lenkiewicz **[0002]**
- US 7784148 B, Lenkiewicz **[0015] [0018]**
- US 7320149 B, Huffman **[0015]**

Non-patent literature cited in the description

- *DRAFT Test Method for Measuring the Carpet Cleaning Effectiveness of Wet Extraction Cleaners,* 20 January 2010 **[0033]**