United States Patent

[11] 3,617,205

[72] Inventor William H. Wisdom
9806 Van Dyke Drive, Dallas, Tex. 75218

[21] Appl. No. 798,553
[22] Filed Dec. 20, 1968
[23] Division of Ser. No. 712,123, Mar. 11, 1968, Pat. No. 3,439,374
[45] Patented Nov. 2, 1971

[54] METHOD FOR CLEANING CARPETS AND LIKE MATERIALS
3 Claims, 9 Drawing Figs.

[52] U.S. Cl. 8/137, 8/149.1
[51] Int. Cl. A47l 7/00
[50] Field of Search 15/302, 320, 321, 322, 40; 68/6, 7, 240; 38/75, 77, 78; 8/149.1–149.3, 137

[56] References Cited

UNITED STATES PATENTS

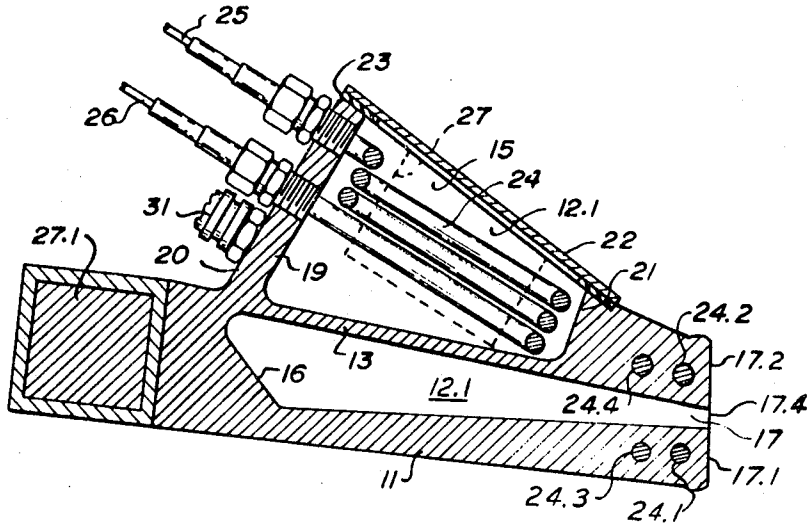
1,803,693	5/1931	Cutting	15/320
3,262,146	7/1966	Hays	15/321
1,892,792	1/1933	Thompson	38/75 UX
2,497,435	2/1950	Branneman	15/321 X
3,061,959	11/1962	Blumenfeld	15/346 X

FOREIGN PATENTS

569,799	2/1933	Germany	15/321
414,163	8/1934	Great Britain	15/320

Primary Examiner—William I. Price
Attorney—Lyle G. Trorey

ABSTRACT: A carpet and rug cleaning method involving successive rolling, spraying, and nearly simultaneous exposure to vacuum and to heat. Method achieves faster drying than heretofor was common, with minimal wicking. Prerolling, spraying under pressure with the spray impinging the carpet at an acute angle so as to loosen rather than to imbed soil together with application of the vacuum and heat, used to achieve the foregoing.



PATENTED NOV 2 1971

3,617,205

SHEET 1 OF 4

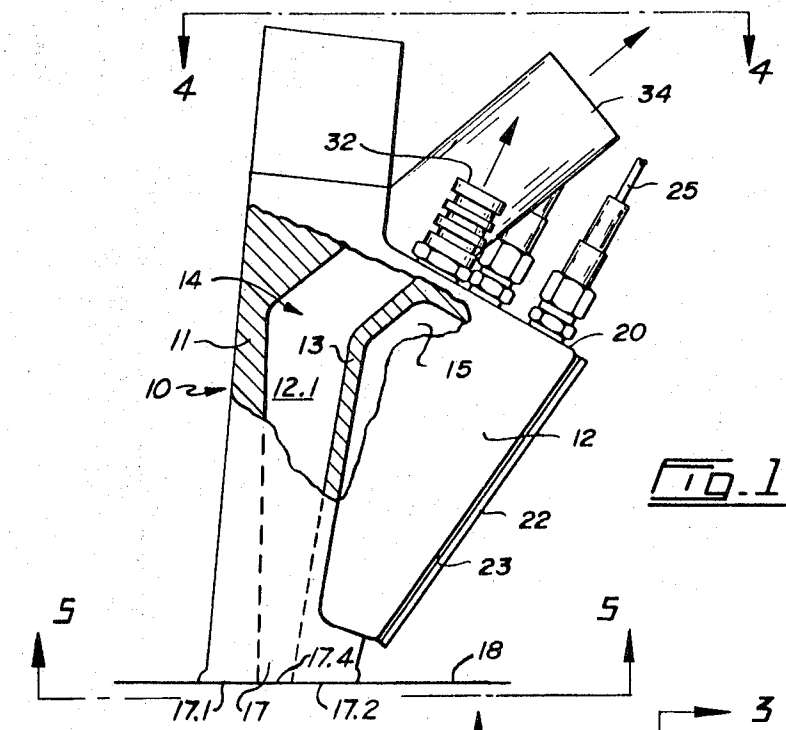


FIG. 1.

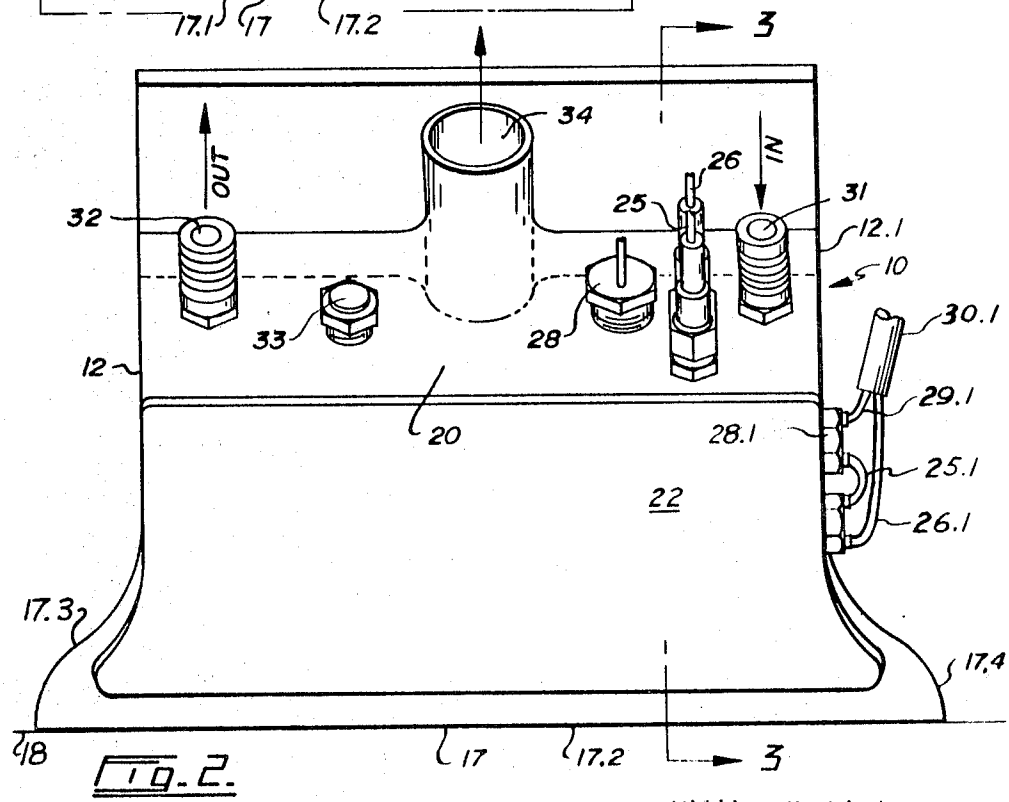


FIG. 2.

William H. Wisdom,
Inventor

by

Lyle C. Trorey,
Agent

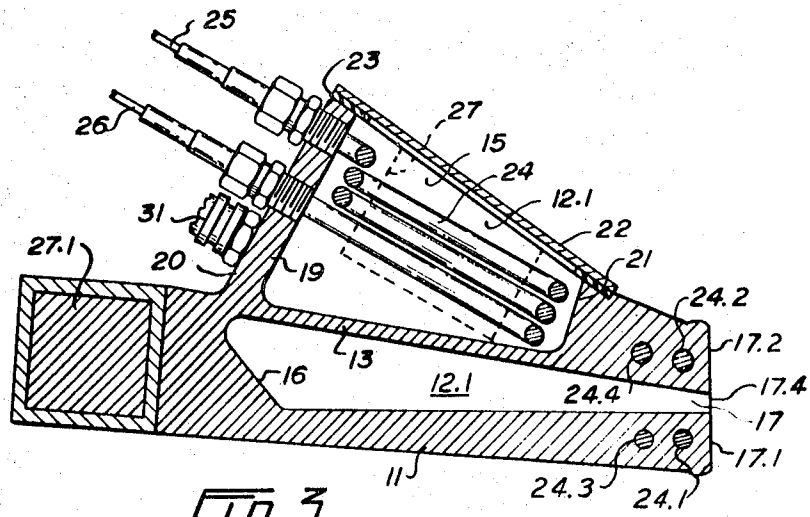


FIG. 3.

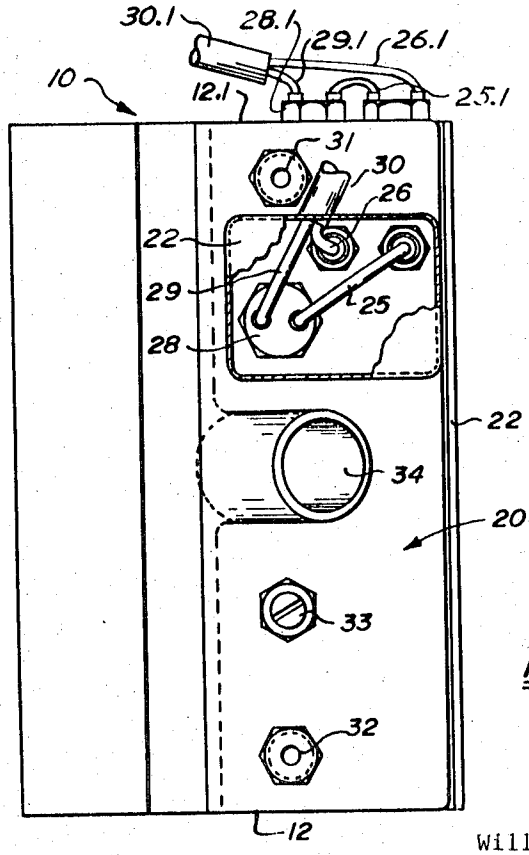


FIG. 4.

William H. Wisdom,
Inventor.

by Lyle G. Trorey,
Agent

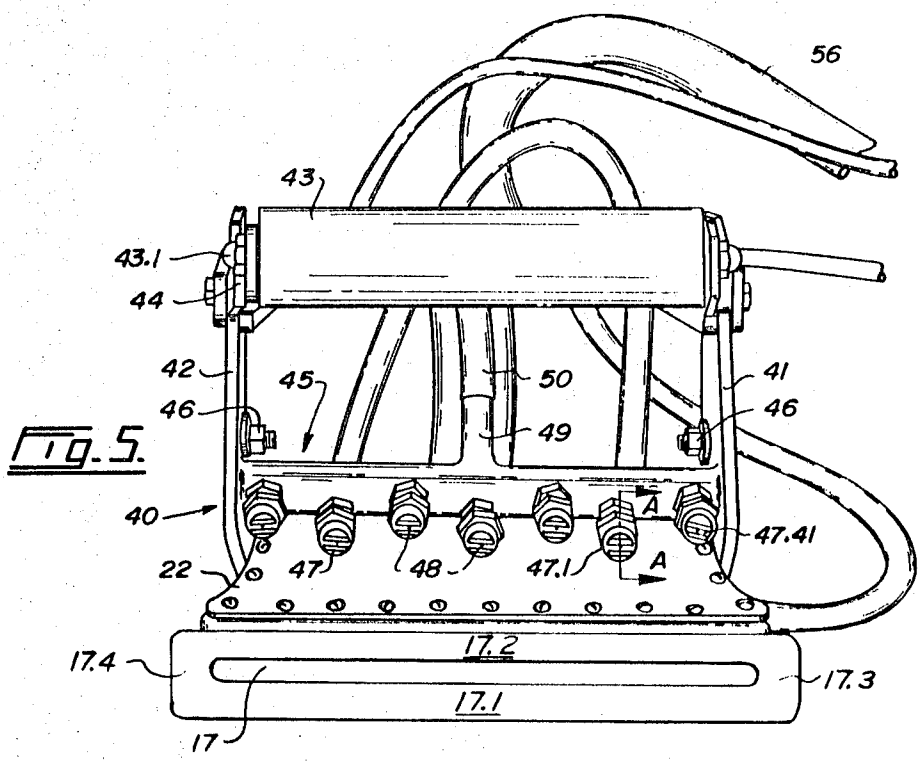


FIG. 5.

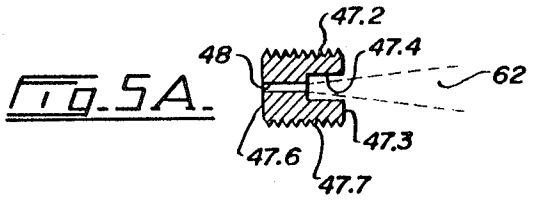


FIG. 5A.

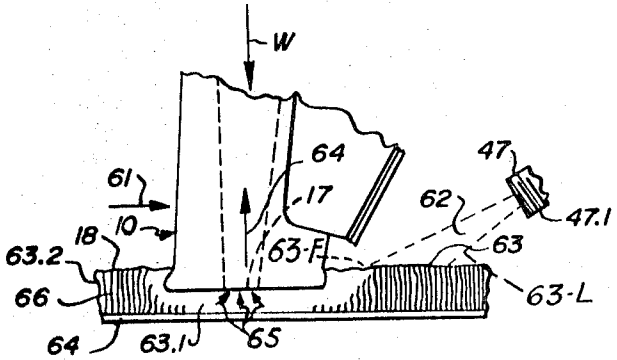


FIG. 8.

William H. Wisdom,
Inventor

by

Lyle G. Trorey,
Agent

FIG. 6.

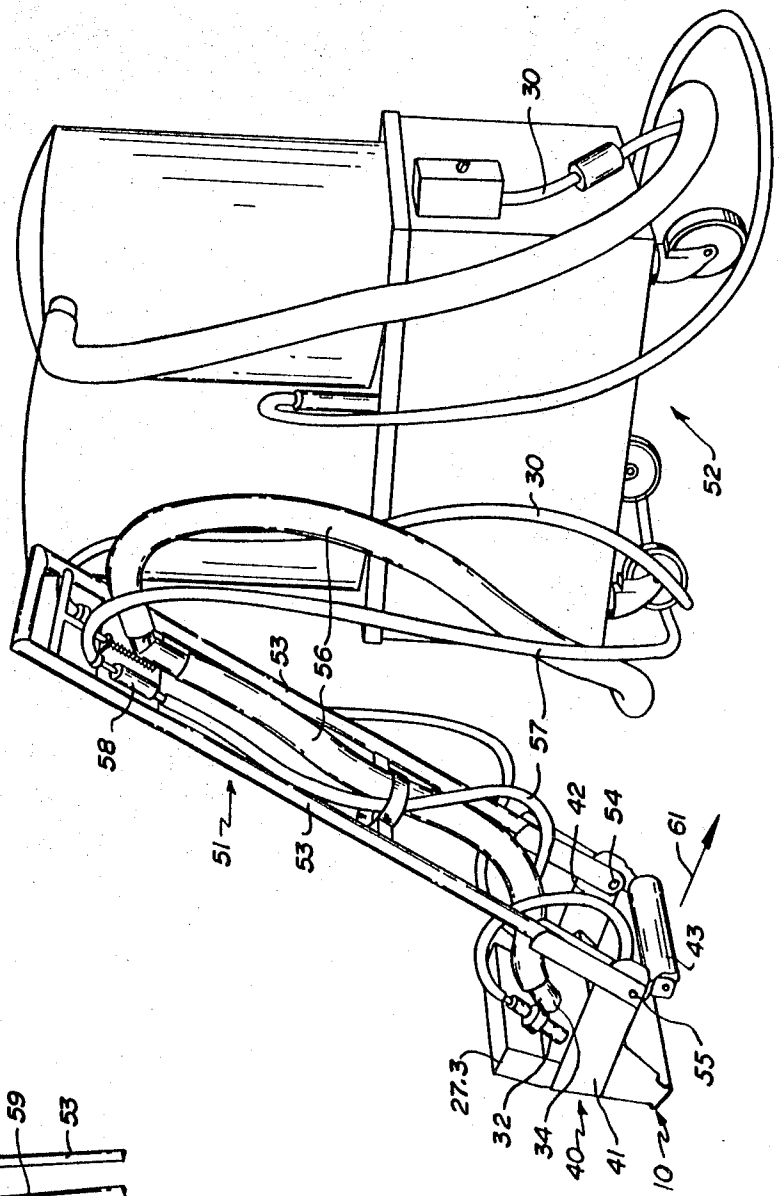
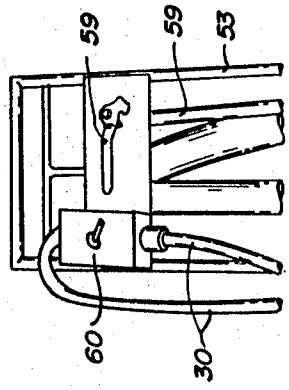


FIG. 7.



William H. Wisdom,
Inventor

by

Lyle G. Trorey,
Agent

METHOD FOR CLEANING CARPETS AND LIKE MATERIALS

CROSS REFERENCE TO RELATED APPLICATIONS

This application is a division of copending application Ser. No. 712,123, Mar. 11, 1968 now U.S. Pat. No. 3,439,374.

BACKGROUND OF THE INVENTION

Field of the Invention

The invention relates to a method for cleaning rugs, carpets, upholstery and like fabrics and particularly, but not exclusively, to insituous cleaning of these materials. Apparatus expressing the method forms subject matter of U.S. Pat. No. 3,439,374 above.

Prior Art

A copending United States application Ser. No. 723,325 and a method division of the said continuation being application Ser. No. 751,634 together with a further divisional application of the continuation namely application Ser. No. 825,474 relate to portable rug dyeing machine and method, John A. Thompson and the present applicant William H. Wisdom being therein named as coinventors.

The copending joint application teaches a boiler unit including a tank for holding hot dye and cleaning solution mounted on a portable, wheeled base. Means are provided for drawing off steam and hot solution from the tank and conducting it under pressure to a remote, hand-operated applicator equipped with spray nozzle and a vacuum chamber. The applicator is moved over the surface to be dyed, simultaneously spraying solution into the fabric and subjecting the sprayed fabric to a vacuum to prevent excessive wetting thereof. The foregoing process is used first, with a cleaning solution in the boiler unit for cleaning the fabric to be dyed. The cleaning solution is then replaced with a dye solution and the procedure is repeated.

In the present state of the art employment of known methods and apparatus can cause what is known in the trade as wicking, adverse effects of which are well known in the trade. My copending U.S. application Ser. No. 638,890 now U.S. Pat. No. 3,436,787 provides a method and apparatus for the cleaning of rugs, carpets, and like material, such that adverse effects of wicking are reduced compared to effects obtained from prior comparable apparatus and method. As well, this application teaches a relatively simple cleaning head structure to effect cleaning by the method, and of reducing moisture content by vacuum and substantially simultaneous application of heat.

According to my copending application a cleaning head assembly is moved relatively to a surface of a carpet or like material being cleaned. Were the method to be employed in a fixed cleaning apparatus such as in a cleaning plant, the rug or carpet can be moved relative to a stationary head, the relative motion being the same regardless of whether the head or the carpet be stationary. The head assembly includes a generally hollow nozzle unit with an inner partition defining a suction chamber and a cavity. The suction chamber has a long narrow suction nozzle suitably integral therewith, the nozzle itself being generally according to the prior art. Means are provided to heat the head assembly and the cavity. It is preferred to use an electrical heating element coil disposed within the cavity, but for instance gas heating means can be employed. Means are provided to introduce cleansing fluid under pressure to the cavity where the fluid is heated preferably to boiling point, the nozzle unit also being heated to attain about the same temperature. The suction chamber has a suction port for connection to a flexible hose of the vacuum source, which source is desirably a wet vacuum apparatus as before explained. A jet tube is secured in spaced relationship to the nozzle unit, the tube having nozzle outlets each being adapted to discharge a fanlike spray of steam and water vapor, or droplets, under pressure to impinge upon a strip of carpet generally parallel to and adjacent to the nozzle aforesaid. Thus impingement is at an acute angle to the strip surface, with advantages as later explained.

The head assembly is moved relative to a surface of the rug so that a surface element or strip is first sprayed with hot fluid and steam under pressure impinging thereon at an acute angle thus to penetrate the nap, and as the motion progresses the element is next subjected to a vacuum. When the nozzle reaches the wet element, so that the fluid, now containing dirt particles in suspension together with loose dirt, is withdrawn passing outwards of the vacuum chamber to the vacuum hose aforesaid. As well as being subjected to vacuum which removes a substantial part of the moisture, the nozzle element itself is hot, so that heating also takes place which assists drying.

It is desirable that end walls defining the nozzle be urged against the surface, both for improved sealing and for better heat transmission. Accordingly, means are provided to load the nozzle and, while optimum loading varies with ambient temperature, humidity, and other parameters, I have found that a loading of the order of 3 to 4 pounds per lineal inch of nozzle is typically optimum for high-nap carpets. When the loading is too little, improvement of cleaning and drying will result from increasing the loading. This can readily be detected by an experienced operator. When the loading exceeds the optimum, further improvement of cleaning and drying does not result and, since the head is moved manually by common handle means, too much loading will cause difficulty in manipulating the head. Thus, notwithstanding the loading may tend to be critical, optimum loading can readily be ascertained in any particular cleaning operation, whatever the nap height, by loading until no noticeable increase in effectiveness results from further loading.

To maintain the nozzle sidewalls in a proper position against the carpet, a roll is provided constructed and arranged so that, when the head assembly is moved, rolling of the carpet element occurs before spraying. While the head assembly will be operable without such rolling means, as well as an obvious result of greater ease of control, it has been found that subjecting the carpet nap to prerolling as above provides better cleaning and drying, together with less wicking.

It is thus seen that the method of the copending application includes steps of: rolling a strip of carpet, then subjecting the rolled strip to a hot spray impinging the nap at an acute angle and penetrating so as to loosen the soil rather than driving it downwards to become embedded, then substantially simultaneously subjecting the sprayed strip to a vacuum and to pressure and heat. In the method it will be seen that the vacuum and heating operation actually occurs in three discrete steps, first a leading edge of the heated nozzle comes into contact with the wet strip to heat it, then the wet strip after this first heating is subjected to a vacuum as the nozzle passes over it, and lastly the strip, after having been subjected to a vacuum as above, is again subjected to heat and pressure from a following edge of the nozzle. Hereinafter, a phrase such as, substantially simultaneous application of heat and exposure to a vacuum, is used in a meaning to include the discrete steps above.

The method and apparatus are operable when the spray impinges at other than an acute angle, but full advantage of the invention of the copending application is best obtained by means of acute angle spraying, the acute angle being desirably within limits stated later in this disclosure.

The present invention relates to the cleaning of rugs, carpets, and the like. U.S. Pat. No. 3,262,146 issued 26 July 1966 to Fred E. Hays pertains particularly to a mechanism for supplying high pressure steam of a solvent containing solution to one chamber of a two-chamber cleaning nozzle, and simultaneously creating a vacuum in the other chamber of the nozzle, means being provided to condense and collect detergent vapor returned in a vacuum line from the nozzle. An object of this invention is to provide improved simplified two-tank mechanism for supplying under substantial pressure steam from a solvent-bearing solution contained in one of the tanks, and for maintaining a controlled vacuum in the other tank.

There are many patents relating to apparatus of this general kind. For instance, British patent 486,500 granted to

Frederick William Taylor in 1938 teaches selectively applying, by way of surface treating means movable over it, at least one flowable medium from a plurality of fixed sources of supply of different flowable media, and applying suction to the article from a fixed suction-producing means for removing waste matter from the article under treatment.

Prior patents include a head structure which may be complex, or may be relatively simple. Many variations in head structure are known and have been patented, as have been methods associated therewith.

SUMMARY OF THE INVENTION

Prior art apparatus and method, both for dealing with rugs and carpets in-situ and for cleansing and renovating at a cleaning plant, are capable of giving generally satisfactory, and in some cases excellent, results.

The method herein distinguishes over that of my copending application aforesaid by the substantially simultaneous exposure to heat being at a different and generally higher temperature, and in that the heat is applied in a different manner.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevation showing a nozzle unit in a working position relative to a surface of a carpet being cleaned, a part of a sidewall being broken away to show interior construction.

FIG. 2 is an elevation view of FIG. 1.

FIG. 3 is a section on 3—3 of FIG. 2.

FIG. 4 is a plan of a deck of the head unit as seen from 5—5 of FIG. 1, additional structure including an improved head assembly according to the invention being shown.

FIG. 5–A is a detail showing only a jet of a jet nozzle, sectioned on line A—A of FIG. 5.

FIG. 6 is a perspective of the head assembly showing ancillary equipment, and means connecting the head thereto.

FIG. 7 is a detail of an outer end of a handle assembly showing electrical and fluid control means.

FIG. 8 is a diagram illustrating a jet discharge pattern, shown on sheet 3 of the drawings.

DESCRIPTION OF PREFERRED EMBODIMENTS

There follows a detail description, related to the drawings, of embodiments of the invention given by way of example the invention not being limited to the particular examples described and illustrated.

Referring to FIGS. 1, 2, and 3 a nozzle unit indicated generally by the numeral 10 is generally hollow having a backwall 11 and substantially parallel sidewalls 12 and 12.1. An inner partition wall 13, best seen in FIG. 3, divides the interior of the nozzle unit into a suction chamber 14 and a cavity 15. The suction chamber is defined by the back wall 11, the partition aforesaid, and an inner end wall 16, the partition wall 13 converging towards the back wall 11 as seen in FIG. 3 to an elongated narrow suction nozzle opening 17, defined by adjacent edges of longitudinal lip walls 17.1, 17.2, and inner edges of end walls 17.3, 17.4 of the sidewalls 12 and 12.1. In the working position shown in FIG. 1, the walls edges of which define the nozzle opening 17 are maintained in contact with an upper surface 18 of e.g., a carpet being cleaned. It is to be noted that the back wall 11 is nearly at right angles to the said surface in the working position.

The cavity 15 is defined by the partition wall 13, the sidewalls 12 and 12.1 an inner surface 19 of a deck 20, a lower wall 21, and a closure 22. The closure 22 is removably secured by obvious bolt means (not shown in FIG. 3) to outer edges of the deck 20, the lower wall 21 and the sidewalls 12 and 12.1, a sealing gasket 23 being provided as shown.

An electrical heating element 24 is disposed within the cavity as seen, electrical connections thereto being designated 25 and 26. The heating element is coiled in a generally rectangular shape, the coils being disposed in spaced relationship to the cavity walls as seen in FIG. 3. A cavity weight 27 indicated in FIG. 3 in broken outline for convenience of illustration, is disposed within the heating element coil, and is obviously secured in position.

Referring particularly to FIGS. 2 and 4 the lead 25 is connected to one terminal of a thermostat 28, a second terminal of which is connected to a conductor 29 of a two conductor electric cable 30, the other conductor of which is the connector 26 aforesaid. Thus the thermostat 28, which extends into the cavity 15, serves to control the temperature therein.

A nozzle-heating means has at least one heating element as shown e.g. at 24.1, and preferably four viz 24.1, 24.2, disposed adjacent the walls 17.1, 17.2, with additional elements 24.3, 24.4, as shown. These elements are adapted to heat the nozzle lips. Electrical connections are shown in FIG. 4 including a lead 25.1 from the elements to one terminal of a second thermostat 28.1, a second terminal of which is connected to one lead 29.1 of a second two conductor cable 30.1 the remaining conductor 26.1 of which runs to the elements. The cables 30 and 30.1 are connected in parallel. For convenience of illustration the lines 25.1 and 26.1 are shown external of the sidewall as in the second thermostat 28.1. They can be, and I prefer that they are, internal, with the thermostat 28.1 in any position adapted properly to control lip temperature.

A fluid inlet port 31 and a fluid outlet port 32 of the deck 20 provide for a passage of fluid, as later will be explained, into and out of the cavity 15, and a safety valve 33 is also provided communicating with the cavity. The numeral 34 indicates a suction port which, as best seen in FIG. 1 communicates with the suction chamber 14. The port 34 is a vacuum hose connection, as is later explained.

As seen in FIG. 5, a floor tool head assembly generally indicated by the numeral 40 includes the nozzle unit 10, to the opposite sidewalls of which are secured outwardly extending members 41 and 42. A roller 43 is rotatable of a shaft 43.1 of adjustable securing means 44 at outer ends of the said brackets. The adjustment means 44 are obviously constructed and arranged so that when the roller is in contact with the surface of the carpet being cleaned, the nozzle unit 10 assumes the position indicated in FIG. 1.

A jet tube 45 is adjustably secured by means 46 at inner ends of the brackets 41, 42, and the jet tube has a plurality of jet outlet nozzles 47 each having openings 48. The jet outlet nozzles are preferably uniformly spaced from one another in a staggered arrangement as seen in FIG. 5, with nozzles designated 47 and 47.1 being aligned in one row, spaced from a second row a right-hand nozzle of which is designated 47.41. Thus a spray from nozzles of the spaced rows has parallel spaced parts.

Each of the jet outlet nozzles 47, 47.1 has a central nozzle element as seen in section in FIG. 5–A. A jet element 47.2 as shown in section in FIG. 5–A has a front wall 47.3, a deep groove 47.4, rectangular in section, extends about half the depth of the unit. The opening 48 is disposed central of the groove extending from a bottom wall thereof through an inner wall 47.6, the unit being threaded as seen at 47.7 to be screwed into a threaded opening of each jet outlet nozzle. The longitudinal slots 47.4 of each jet outlet nozzle can be aligned, or can be misaligned as is the slot of the nozzle 47.41 which misalignment will, as later be described, result in change in spray distribution.

The jet tube 45 has an inlet port 49 to accept a hose 50 connecting the said inlet port to the fluid outlet port 32.

FIG. 6 is a perspective showing the floor tool head assembly 40 and a handle assembly 51, the floor tool assembly and handle being shown in working position operatively connected to ancillary equipment indicated generally by the numeral 52.

The handle assembly has spaced side members 53 rotatably mounted, as seen at 54 and 55, at outer ends of the brackets 41 and 42. Known means can be provided selectively to lock the handle at one of several alternate positions. A vacuum hose 56 is shown extending from the vacuum hose connection 34 to the ancillary equipment, and a fluid supply hose 57 extends from the fluid inlet port 31 (FIG. 2) to the equipment 52, a fluid control valve 58 being provided to control flow of

fluid. As seen in FIG. 7 only, the valve 58 has a control lever 59 placed in a position so as to be in convenient reach of a hand of an operator. A switch 60 is also provided in the cable 30.

The ancillary equipment 52 does not form a part of the present invention, and is therefore not described in detail. The particular ancillary equipment shown in FIG. 6 by way of example, includes a vacuum pump to which an end of the vacuum hose 56 remote from the head vacuum hose connection 34 is connected. The fluid supply hose 57 has an end remote from the head connected to a fluid tank supplying fluid to the cavity 15 (FIG. 1). The tank contains a cleansing fluid, usually water and a detergent or other agent as known in the art. Hereinafter the term fluid refers to such cleansing fluid unless otherwise stated.

OPERATION

The following description refers particularly to FIGS. 6, 7, and 8, the whole apparatus being connected as shown in FIG. 6. Upon the valve 58 being opened, fluid under pressure will pass through the fluid supply hose 57 to enter the cavity of the nozzle unit, there to be heated. The thermostat 28 (FIG. 2) setting is suitably 250° F.

The heated fluid will be forced out through the jet outlet nozzles 47.41 (FIG. 5) to be discharged against the surface 18 as a spray having an approximate length equal to that of the elongated nozzle opening 17. The cavity-heating element will not only heat the fluid therein but also will heat particularly the walls defining the nozzle opening.

The thermostat setting being above boiling point, after initial heating the discharge will be steam and water droplets. Pressure in the cavity does not exceed fluid supply pressure, which however is maintained by the ancillary equipment to be sufficient for adequate forceful discharge through the jets. The temperature of the fluid in the cavity will, naturally, be its boiling point under the particular conditions. With the cavity dry, temperature of the assembly is controlled by the thermostat setting—which setting is only slightly higher than the desired boiling point.

The cavity heater heats not only the fluid in the cavity but also heats the nozzle unit 10, the said unit being preferably of a metal having a high thermal conductivity, e.g. aluminum. With a head according to my U.S. Pat. No. 3,436,787, sidewalls defining the nozzle opening obtain heat only from that source, the temperature at the nozzle opening being lower than that of the steam—and much lower when the nap is wet. I overcome this by providing at least one nozzle-heating means 24.1, with the thermostat 28.1 maintaining nozzle lip temperature at a desired level, say about 270° or 280° according to the material of the nap. The effect here attained, it is to be noted, is distinguished from that of a household steam iron because of the separate nozzle-heating means resulting in a nozzle lip temperature independently maintained at a higher temperature than, otherwise and in the household iron as normally used, would be attained.

In cleaning for example a carpet, the floor tool assembly 40 is pulled by the handle 51 in a direction indicated by an arrow 61. Referring to FIG. 8, a long thin spray 62 will be discharged against the surface 18 to impinge upon an area element indicated by the numeral 63, which area has a length about equal to the length of the elongated nozzle opening 17, and a width according to the thickness of the spray 62. As the unit 10 moves in the direction of the arrow 61, it is seen that the nozzle 17 will reach the position 63 so that moisture and dirt will be sucked upwards through the nozzle opening 17 as indicated by arrows 65, the numeral 66 designating nap of the carpet, the carpet base or backing being indicated at 64.

The jet tube 45 is, as has been explained with reference to FIG. 5, adjustably spaced from the nozzle opening 17, so that the jets 47, 47.1, FIG. 8, are spaced from the nozzle opening and as shown are oriented to direct the spray discharge 62 towards the nozzle opening to impinge the surface 18 at an acute angle, suitably 20° to 40°. Thus, rather than driving embedded soil downwards through the nap 66 towards the carpet base 64 as would be the case with a vertically impinging spray, acute impingement tends to loosen and dislodge embedded dirt and soil. There is further action with spaced jet rows giving two strikes of hot-sprayed solution from the aforesaid parallel spaced parts of the spray, the second strike appearing to lift the first strike so assisting in removal of dirt and moisture laden soil. Thus moisture, loose dirt, and dirt and soil in suspension, will be sucked from the nap 66 through the nozzle opening 17 passing through, see now FIG. 6, the vacuum hose 56 to discharge into a discharge tank of the ancillary equipment 52. The cleaning action is effected by passage of the fluid sprayed on the surface through the nap 66, and as well by suction.

In addition to the cleaning action, drying action is effected, first by sucking out the moisture as explained above, and secondly by heat from the nozzle. The nozzle opening width can suitably be a quarter of an inch, the nozzle walls 17.1, 17.2 have wide lips as seen in FIG. 1, to enhance drying. In this way it has been found that the nap, while it may not be dry, is more nearly dry than after cleaning with comparable apparatus of the prior art, including that of my copending application aforesaid, since the instant nozzle lips are independently maintained at a required temperature optimum, as known in the art, for the particular nap. It is clear that if further drying is required, this can be accomplished by a second passage of the floor tool, this time with the fluid valve 58 closed, when additional drying would be effected by suction and by heat. Or alternatively attach the hose to a source of air, suitably the exhaust of the vacuum apparatus, when heated air will be blown through the nap by the head and augmented by the nozzle lip heating.

DESCRIPTION OF METHOD

Referring to FIG. 8, it is convenient to describe the method by considering the nozzle unit 10 and the spray 62 to be stationary, and that the carpet is moving relative to the nozzle unit and spray in a direction opposite to that indicated by the arrow 61, the relative motions being the same.

It is thus seen that an area element or strip of carpet 63 is first subjected to a spray of hot-cleaning solution droplets and steam under pressure. Next, the hot solution penetrates the nap by the force of the jet, aided by capillarity and gravity dissolving and loosening the soil embedded in the nap. Impingement being at acute angle to the surface, the soil is urged away from a leading edge 63–L FIG. 3 towards a following edge 62–F of the strip rather than, as has been explained, being driven downward to be further embedded in the nap. This penetration continues until the leading edge 63–L reaches the nozzle 17 when the strip is substantially simultaneously subject to downward pressure as indicated by an arrow W FIG. 8, to a vacuum and also to heat from lips of the nozzle unit 10. As before explained, there are discrete actions of heating and vacuum, which are described as being substantially simultaneous. This action takes place when the strip 63 has moved to a position 63.1 beneath the nozzle opening 17. As the motion continues, the strip 63 reaches a position 63.2 clear of the nozzle unit 10. While the process is continuous cleaning a swath, considering an individual unit strip 63 it is seen that the method steps are successive.

In the description related to FIG. 3, mention was made of a weight 27 within the cavity 15. An additional weight 27.1 FIG. 3 can also be used, this weight being disposed above the nozzle 17 as shown. Additionally, an auxiliary weight 27.3 shown in FIG. 6 only can be added, the weight being disposed as shown, thus the weight W FIG. 8 is the weight of the floor tool assembly, plus the weight 27, plus the weight 27.1, together with the weight of the auxiliary weight 27.2. The magnitude W is important, since it affects seal of the nozzle opening against the nap, and heat transfer. It is found that W should be, typically, about 3 or 4 pounds/lineal inch of nozzle when high-nap

materials are being cleaned. Lower unit loading is used with lower nap materials.

The actual weight varies with the kind of carpet, temperature, humidity, and other factors. In practice, it is a simple matter for an experienced operator to tell whether he needs more or less weight. If the weight is too small, drying and cleaning are impaired. If it is too great, movement is difficult. The optimum weight is that beyond which increase does not materially increase cleaning and drying effectiveness. Thus the optimum weight is best ascertained and specifically defined as above, rather than in terms of unit load.

As is well known in the trade, particularly in cleaning carpets of some kinds, wicking is a problem—the adverse effects of wicking being well known both to the trade and to householders who have had carpets cleaned by in situ methods. These effects are also troublesome in commercial cleaning establishments. Using a method according to my copending application, it is found that wicking, and the adverse effects thereof, are materially reduced. Still further reduction is effected by the instant improved head and method.

DESCRIPTION OF FIGURE 5-A

Reference is now made to FIG. 5-A, when all the grooves 47.2 are aligned, the width of the sprayed strip is as narrow as can be attained with the particular jet nozzle in use and the particular nozzle configuration.

It will be seen that fluid under pressure forced outwards through the opening 48 would, if unimpeded, form a conical discharge. Sidewalls of the deep groove confine the discharge from a single jet to a fanlike pattern so that the multiple discharge (62 FIG. 8) is long and narrow. The width can be increased by skewing the nozzle unit slots, in FIG. 5 the slot 47.41 is skewed to illustrate this adjustment means.

The fluid used is commonly water, with an added cleaning agent suited for the particular material being cleaned. The water may, or may not, be heated before entering the head cavity. Sophisticated equipment illustrated in FIG. 6 and designated by the numeral 52 is not necessary. Cold, or preferably hot, water with the cleaning agent being added by means of any common mixer device readily available, may be used.

The vacuum source can be a common vacuum-producing device of adequate capacity, of the type known in the trade as wet, i.e. adapted for wet evacuation as here required. While it is, or may be, convenient to use a discharge tank such as shown in FIG. 6, including a desudsing unit, simpler equipment may be substituted.

I claim:

1. A method of cleaning and drying carpets and other materials having a nap, the method including continuous operations as follows:

a. direct a heated cleansing fluid under pressure to form a long narrow spray to impinge a strip of the material at an acute angle of between twenty and forty degrees, the strip having a leading edge, impingement by the spray dissolving and loosening soil imbedded in the nap urging it towards the leading edge,

b. provide relative motion between the spray and the material so that a swath of material is impinged as aforesaid,

c. the strip having been impinged by the spray, apply heat and pressure substantially simultaneously to the strip whilst continuing the motion,

d. concurrently with operation (c) expose the strip to a vacuum to withdraw soil laden moisture from the sprayed strip, the pressure and heat aiding drying, the heat vacuum and pressure being applied by means of a head assembly, the pressure being an optimum depending upon kind of material, temperature, humidity and other factors, the optimum being defined as a value increase beyond which does not materially increase cleaning and drying effectiveness, and wherein the head assembly includes a suction nozzle having a heated lip, the heat being applied by the pressure urging the heated lip against the nap,

e. roll the strip prior to impingement by spray in step (a), and

f. continue the motion and operations so that the swath is continuous being formed of material which has been subjected to the operations above.

2. A method according to claim 1, where the heat applied by the lip is at a controlled temperature of between 270° and 280° F. and wherein the long narrow spray has parallel spaced parts so that, from the motion as aforesaid, the strip is impinged by two jet strikes in succession.

3. A method of cleaning and drying carpets and other materials having a nap, the method including continuous operations as follows:

a. direct a heated cleansing fluid under pressure to form a long narrow spray to impinge a strip of the material at an acute angle of between 20 and 40°, the strip having a leading edge, impingement by the spray dissolving and loosening soil imbedded in the nap urging it towards the leading edge,

b. provide relative motion between the spray and the material so that a swath of material is impinged as aforesaid,

c. the strip having been impinged by the spray, apply heat and pressure substantially simultaneously to the strip whilst continuing the motion,

d. concurrently with operation (c) expose the strip to a vacuum to withdraw soil laden moisture from the sprayed strip, the pressure and heat aiding drying, the heat vacuum and pressure being applied by means of a heated head assembly, the pressure being an optimum depending upon kind of material, temperature, humidity and other factors, the optimum being defined as a value increase beyond which does not materially increase cleaning and drying effectiveness, and wherein the head assembly includes a suction nozzle with a lip, the heat being applied by pressure urging the lip against the nap,

e. roll the strip prior to impingement by spray in step (a), and

f. continue the motion and operations so that the swath is continuous being formed of material which has been subjected to the operations above.

* * * * *