

Feb. 16, 1971

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3,562,844

PORTABLE RUG DYEING MACHINE

Original Filed Feb. 11, 1964

2 Sheets-Sheet 1

FIG. 1

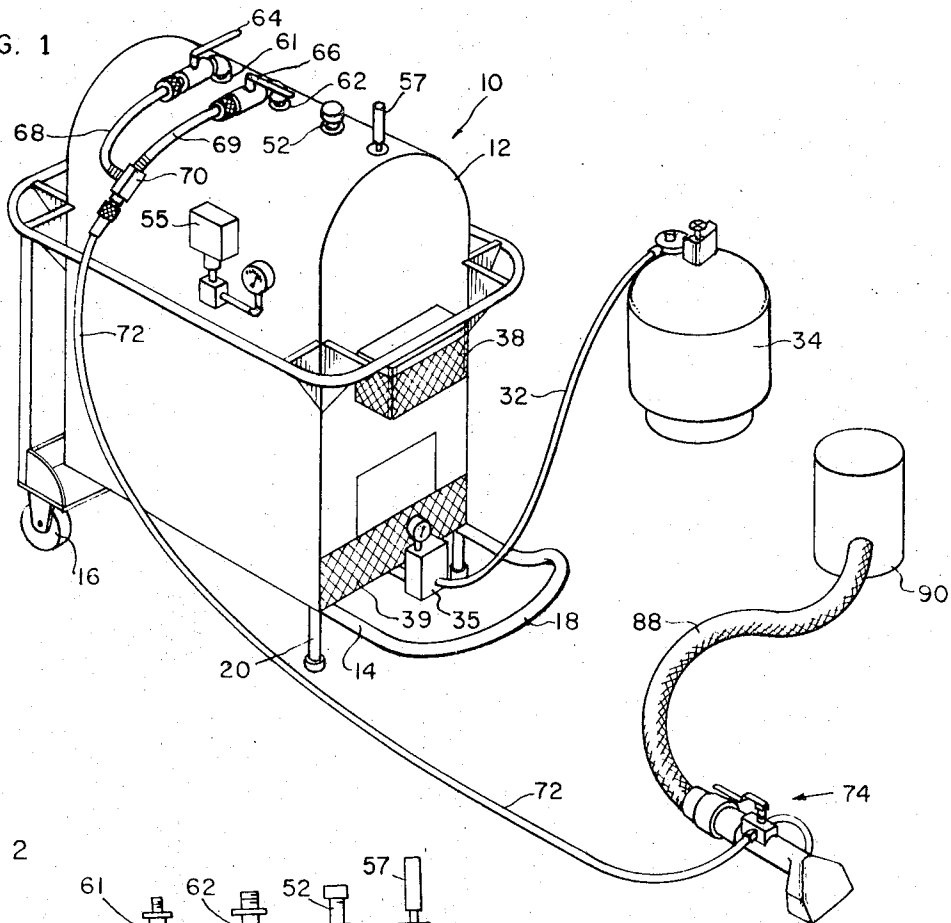
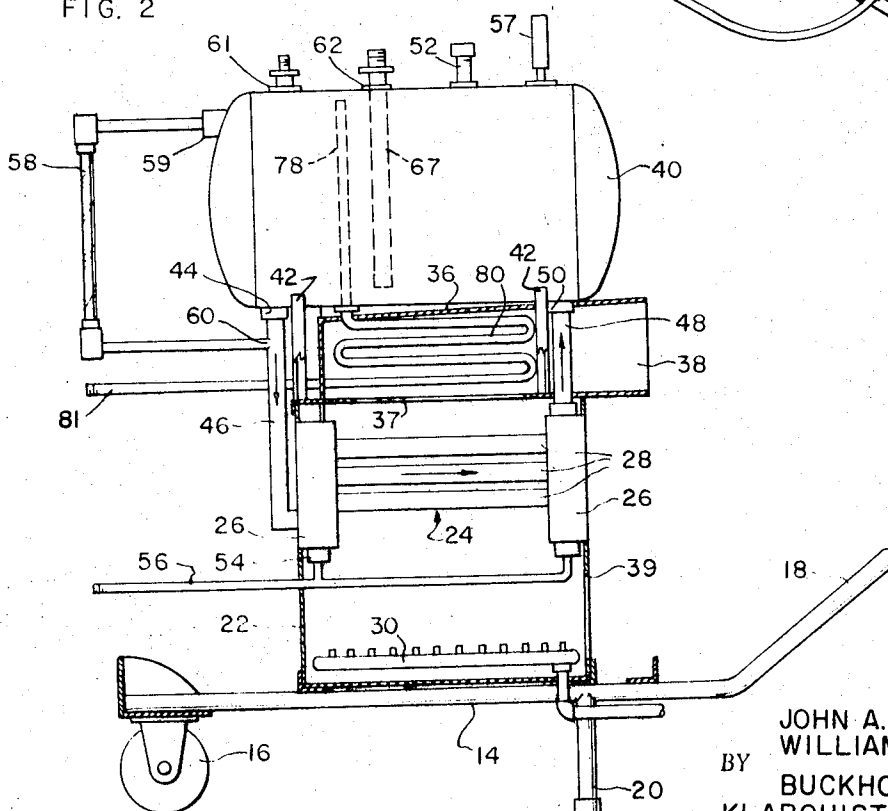


FIG. 2



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PORTABLE RUG DYEING MACHINE

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Continuation of application Ser. No. 723,325, Mar. 29, 1968, which is a continuation of application Ser. No. 344,085, Feb. 11, 1964. This application Nov. 10, 1969, Ser. No. 871,654

Int. Cl. A47I 11/34

U.S. Cl. 15—302

4 Claims

ABSTRACT OF THE DISCLOSURE

Applicator for spraying dye and/or cleaning solution into rug and upholstery fabric and subjecting fabric to a vacuum, particularly for use with portable apparatus. Head portion with open bottom nozzle in contact with the fabric, a vacuum chamber and a spray chamber in the head and nozzles directing spray into the fabric. Means to connect with vacuum source and source of solution under pressure.

This is a continuation of application Ser. No. 723,325, filed Mar. 29, 1968, and now abandoned, which is in turn a continuation of application Ser. No. 344,085 filed Feb. 11, 1964, now abandoned.

The present invention relates to apparatus for dyeing fabrics and more particularly to a portable rug and upholstery cleaning and dyeing machine.

Heretofore in dyeing rugs it has been necessary to take up the rug from the floor and transport it to a special plant where the rug is cleaned, dipped in a hot dye bath and then thoroughly dried. Similarly in dyeing upholstery, the fabric must usually be removed from the piece of furniture, dry cleaned, and then dipped in dye solution. Naturally these are very painstaking, time consuming and therefore expensive operations, and subject the owner to much inconvenience.

Accordingly, a primary object of the invention is to provide a new and improved portable machine for dyeing rugs, upholstery and other fabrics while the same are in place in their normal, useful environment.

Another object of the present invention is to provide a new and improved hand-operated dye applicator which sprays a dye solution into the fabric and simultaneously subjects the surface being sprayed to a vacuum whereby excessive wetting of the fabric is prevented.

A further object of the invention is to provide a new and improved portable rug and upholstery dyeing machine which may be utilized to clean the fabric prior to application of the dye.

Still another object of the invention is to provide a new and improved portable rug and upholstery dyeing machine, including a spray and vacuum applicator, in which the temperature, pressure and concentration of the dye can be regulated to suit the nature of the fabric being dyed.

The foregoing and other objects and advantages of the present invention will be more readily ascertained from inspection of the following specification taken in connection with the accompanying drawings wherein like numerals refer to like parts throughout, while the features of novelty will be more distinctly pointed out in the appended claims.

In the drawings:

FIG. 1 is a perspective view of a machine in accordance with the present invention;

FIG. 2 is a view partly in section through the machine of FIG. 1 with the housing removed;

FIG. 3 is a perspective view of the dye applicator portion of the machine of FIG. 1;

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FIG. 4 is a sectional view of the applicator of FIG. 3;

FIG. 5 is a bottom plan view of the applicator.

A detail description following, related to the drawings, gives exemplification of preferred embodiment of the invention, which however is capable of expression in structure other than that particularly described and illustrated.

With reference first to FIGS. 1 and 2 of the drawings, the illustrated rug dyeing machine 10 includes a stainless steel, upright housing 12 mounted on a tubular support or base 14 provided with a pair of casters 16 at the front end thereof and an upwardly curved tubular handle portion 18 at the opposite end thereof for propelling the machine. A pair of rubber-tipped tubular legs 20 extend downwardly from the rear end of the frame 14 a greater distance than the casters 16 extend downwardly from the front end of the frame, whereby the entire frame and housing is inclined from the horizontal in a direction from the wheeled front end toward the rear handle end thereof in order to enhance the operation of the boiler unit within the housing.

A stainless steel, rectangular firebox 22 is mounted adjacent the rear end of the frame within the housing 12. Within the firebox is mounted a tube-type boiler 24, including a pair of generally horizontally opposed cylindrical header boxes 26. A plurality of boiler tubes 28 extend in three horizontal rows from one header box 26 to the other.

A gas fired burner unit 30 is disposed within the firebox 22 beneath the boiler and is connected by a flexible conduit 32 to a remote butane or other suitable combustible gas source 34. A gas pressure control valve and gauge 35 is mounted at the handle end of the housing in the supply line between the burner 30 and gas source 34. A sheet metal exhaust hood 36 is mounted over a top opening 37 atop the firebox 22 and has an open exhaust end 38 which extends through an opening in the rear end of the housing 12. The lower, rear end of the housing and firebox are provided with aligned air intake and access openings 39.

A large hot water, or liquid, supply tank 40 is mounted over the hood 36 by means of four struts 42 which straddle the hood and are affixed to the upper four corners of the firebox. The tank is provided with a first bottom opening 44 from which a downcomer pipe 46 extends downwardly into a lower endwall portion of the forward header box 26. A riser pipe 48 extends downwardly from a second bottom opening 50 in the tank 40 to a top opening in the rear header box 26. Thus, as the boiler is heated, water circulates from the tank 40 down through the downcomer 46, into the front header box 26, through the boiler tubes 28, and upwardly from the rear header box 26, through the riser 48 and back into the tank 40 due to the rearward inclination of the boiler components.

A liquid filler opening 52 and cap therefor are provided at the top of the tank and suitable drain openings 54 are provided in the bottom of each header box. A drain pipe 56 leads from the drain openings and projects through the front end wall of the housing 12. Steam pressure control means 55, including a gauge, is mounted on a sidewall of the housing. For added safety, a steam relief valve 57 designed to blow off under a steam pressure of 50 p.s.i. is provided at another opening in the top of the tank. A water glass, or liquid level indicator 58, is mounted on the forward end wall of the housing and is connected at its upper and lower ends by suitable conduit to an upper opening 59 in the front end wall of the tank and a lateral opening 60 in the downcomer respectively.

The top of the tank is also provided with flanged steam and hot liquid drawoff openings 61 and 62 respectively, over which suitable ball control valves 64 and 66 are

mounted. A liquid drawoff tube 67 is connected at its upper end to the liquid control valve 66 and extends downwardly into the interior of the tank, through the opening 62, terminating near the bottom of the tank. Two short lengths of conduit or hose 68 and 69, one from the steam control valve 64 and the other from the liquid control valve 66, meet at a Y coupling 70. A much longer, flexible hose 72 extends from the Y coupling 70 to a remote liquid spray applicator 74.

The boiler is also provided with superheating means by which dry, superheated steam may be drawn from the machine for steam drying fabrics following either detergent cleaning or a dye spraying operation. Such means includes a steam drawoff tube 78 extending upwardly through an opening in the bottom of the tank 40 and terminating above the surface level of the liquid in the tank. The lower end of the tube 78 extends into the hood 36 and is coupled to a coiled length of metal tubing 80 disposed within the hood and terminating at an outer end 81 beyond the front wall of the housing 12. The outer end of the tubing 80 is provided with a suitable shutoff valve and coupling means (not shown) for coupling a length of flexible hose thereto.

Now with particular reference to FIGS. 3, 4 and 5, the applicator 74 includes a tubular stem portion 84 having suitable coupling means 86 at one end thereof for attachment of a flexible vacuum conduit 88 leading from a vacuum source 90 (FIG. 1). Mounted at the opposite end of the stem 84 is a transversely extending, elongate head portion 92 which has a hollow interior enclosed by front and rear side walls 94 and 96 respectively, opposite end walls 98 and a top wall 100. The flat bottom of the head is open, that is, provided with a large mouth 101. A baffle 102 is disposed within the mouth 101 transversely of the stem 84 and extends from one end wall 98 to the other thereof so as to partition the interior of the head into two chambers, a front vacuum chamber 104 in communication with the interior of the stem 84 and a rear spray chamber 106. The lower edge surface of the baffle 102 is provided with notches 103 at intervals to minimize the gripping power of the vacuum chamber when adjacent a rug or other surface and to prevent excessive penetration of the dye and cleaning solutions into the fabric being treated.

A right angle spray nozzle 108 is mounted in the rear end wall 96 within the spray chamber so as to direct a liquid spray uniformly outwardly of the bottom end opening 101. The spray nozzle 108 includes a suitable coupling 110 at the exterior face of the rear wall 96 to which is attached one end of a short length of flexible tubing or conduit 112. The opposite end of the tubing 112 is coupled to the outlet end of a shutoff valve 114 mounted on the upper portion of the stem 84. A lever type handle 115 is provided on the valve so that the valve may be conveniently controlled by hand pressure. The long length of flexible hose 72 leading from the steam and hot liquid drawoff openings of the dye machine is coupled to the inlet end of the valve 114.

The illustrated form of applicator 74 is a hand model especially adapted for cleaning and dyeing upholstery. However, it will be appreciated that a floor model of the same applicator for dyeing rugs will be of the same general construction and arrangement except for having a slightly larger head and a longer stem, which also serves as a handle.

In order to dye a fabric, for example upholstery, the tank 40 is filled with a detergent solution which is preferably nonionic in nature to prevent subsequent acidic or basic problems with the dye solution used. The detergent solution is then brought to a boil at from 20 to 40 pounds steam pressure. The hot detergent solution is then sprayed with the applicator into the fabric to be dyed, as the applicator is moved over the fabric surface, and at the same time the vacuum is applied continuously to prevent

excessive wetting of the upholstery and to remove dirt drawn up from the upholstery by the detergent.

Immediately following cleaning, and without necessarily drying the fabric, the dyeing operation can commence. First, however, the detergent solution must be drained from the tank and boiler system and replaced with a liquid dye solution. The dye solution is heated to boiling and applied at a steam pressure in the tank of preferably from about 20 to 40 p.s.i. The hot liquid dye solution is sprayed into the fabric through the applicator nozzle and again the vacuum is applied continuously throughout the dye spraying operation in order to prevent excessive wetting of the fabric. The concentration and pressure at which the dye is sprayed is controlled by varying the relative amounts of steam and hot dye solution entering the hose 68 at the Y juncture 69 by means of the ball valves 64 and 66. Of course, the temperature of the dye solution as it is applied to the fabric will vary depending upon the steam pressure in the tank. The desired temperature will vary somewhat according to the dye and fabric being dyed, but as a general rule the dye solution should exceed a temperature of 212 degrees Fahrenheit as it is applied to the fabric in order for the dye to set properly and permanently in most fabrics.

If desired, or found necessary, the superheated dry steam may be used to dry the fabric following either the cleaning or dyeing operation. The dry steam can also be used, if desired, to dry the fabric following the preliminary cleaning operation.

Briefly summarized, the method of the invention includes the preliminary cleaning of the fabric to be dyed by spraying the same with a hot, preferably boiling, detergent solution and simultaneously applying a vacuum to the surface area being sprayed. Then, the cleaned surface is sprayed with a hot dye solution while the surface being sprayed is simultaneously exposed to a vacuum, again to prevent excessive wetting of the material.

Although for practical purposes the fabric surface may be considered as being sprayed and vacuumed simultaneously, in actuality a first predetermined fabric surface area corresponding in size to that of the opening in the spray chamber of the applicator is sprayed at the same time that a second predetermined surface area corresponding in size to that of the opening in the vacuum chamber and immediately adjacent the first area is vacuumed due to the nature of the applicator used. The dyeing technique is similar to that used in vacuuming a rug, that is, the applicator is moved with a back-and-forth motion over the fabric surface so that a sprayed surface area is exposed to subatmospheric pressure immediately after such area has been sprayed.

In some instances, depending on the fabric and dye material, it may be necessary or desirable to add to the dye solution a wetting or dispersing agent to facilitate even spread of the dye. With some dyes it is also desirable to incorporate a setting agent in the dye solution to "fix" the dyes in the fabric.

What is claimed as new is:

1. In a machine for treating rugs, upholstery and other fabrics having a permeable surface, the machine including:

- (1) a boiler adapted to heat a treating solution therein under pressure, producing a steam constituent and a solution constituent;
- (2) a first flexible conduit means;
- (3) means to introduce into said first conduit means, under pressure, a mixture having a steam constituent and a treating constituent;
- (4) means to vary the amount of at least one constituent introduced into the first conduit means;
- (5) a vacuum source; and
- (6) a second flexible conduit means connected to said vacuum source; with the first and second conduit means extending to an applicator for spraying the mixture to impinge the permeable surface of the

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fabric and for subjecting the sprayed surface to vacuum; wherein the applicator includes in combination:

- (a) a tubular stem portion including coupling means at one end thereof for attachment to said second conduit means,
 - (b) at an end of the stem remote from the coupling means, an elongated head portion extending transversely of a hollow interior defined by front and rear walls, opposite end walls, and a top wall, the elongated head portion having an open flat bottom providing a large mouth defined by lower edge surfaces of the front and rear walls and the end walls, the mouth being adapted to be placed in contact with the fabric,
 - (c) the head having a baffle extending between the opposite end walls so as to partition the hollow interior into two chambers, a vacuum chamber communicating with said tubular stem portion and a spray chamber defined by a top wall thereof, the baffle, the opposite end walls and the rear wall,
 - (d) a spray nozzle within the spray chamber, and means connecting the nozzle to said first conduit means to direct spray uniformly outwardly of the spray chamber,
 - (e) the spray nozzle being spaced upwards from the lower edge surface of the rear wall towards the spray chamber top wall.
2. Structure as defined in claim 1, wherein the baffle has a lower edge surface generally coplanar with the wide mouth lower edge surfaces aforesaid, the baffle lower edge

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having spaced notches adapted to minimize gripping power of the vacuum in the vacuum chamber when the lower edge surfaces are in contact with the fabric and to reduce penetration of the solution.

3. Structure as defined in claim 2 together with a valve provided in said first flexible conduit means and mounted on said tubular stem portion.

4. Structure as defined in claim 3, the spray nozzle being a right angled nozzle mounted in said rear wall, said first flexible conduit means extending rearwardly and upwardly from the nozzle to said valve.

References Cited

UNITED STATES PATENTS

15	742,880	11/1903	Lotz.
	919,606	4/1909	Locke et al.
	2,243,935	6/1941	Williamson.
	2,292,435	8/1942	Crites.
	2,293,115	8/1942	Child.
20	2,571,575	10/1951	Holmes.
	2,581,002	1/1952	Creswell.
	2,908,030	10/1959	Schuchman et al.
	2,909,800	10/1959	Grindle et al.

FOREIGN PATENTS

25	499,826	1/1913	France.
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U.S. Cl. X.R.

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