

July 10, 1928.

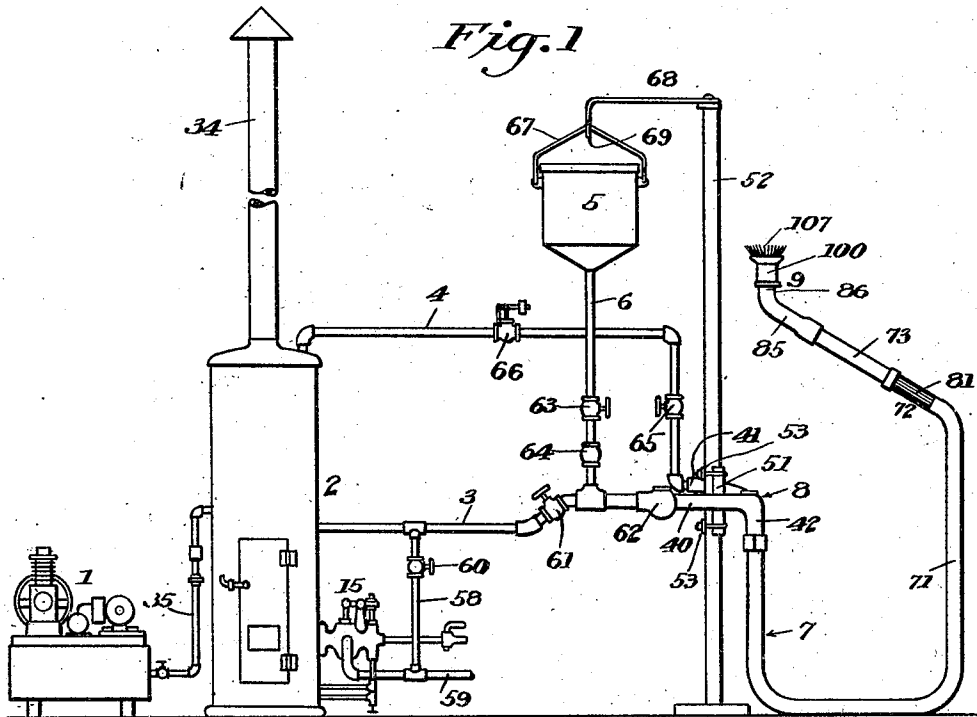
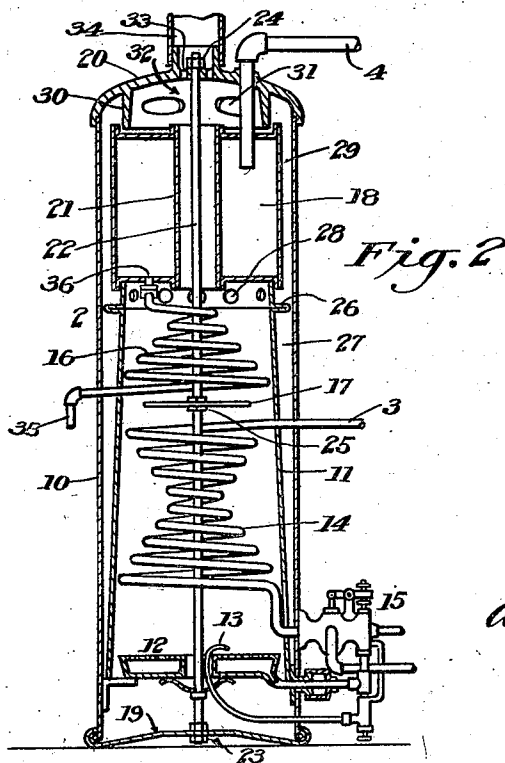
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WASHING AND CLEANING APPARATUS

Filed Feb. 2, 1926

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

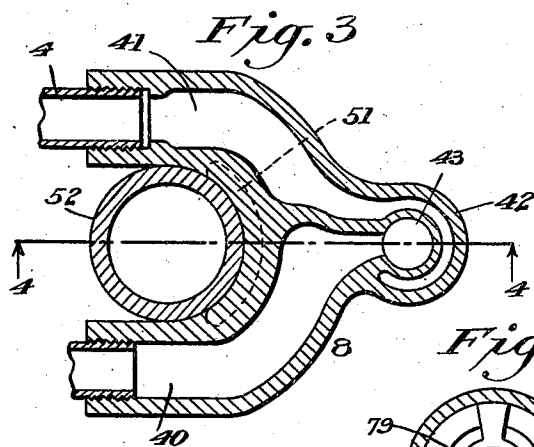
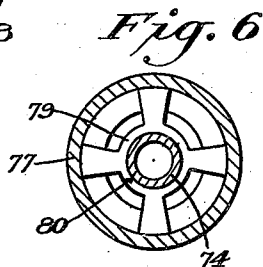
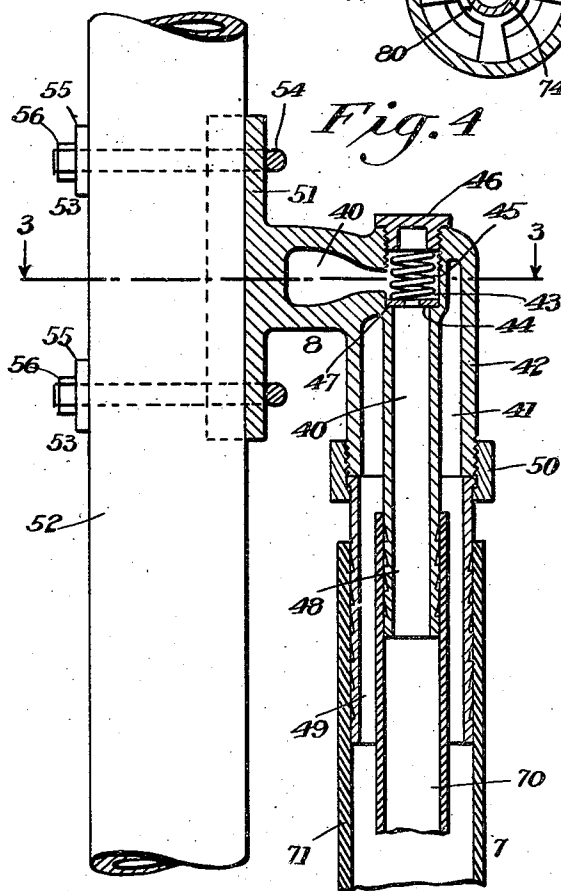
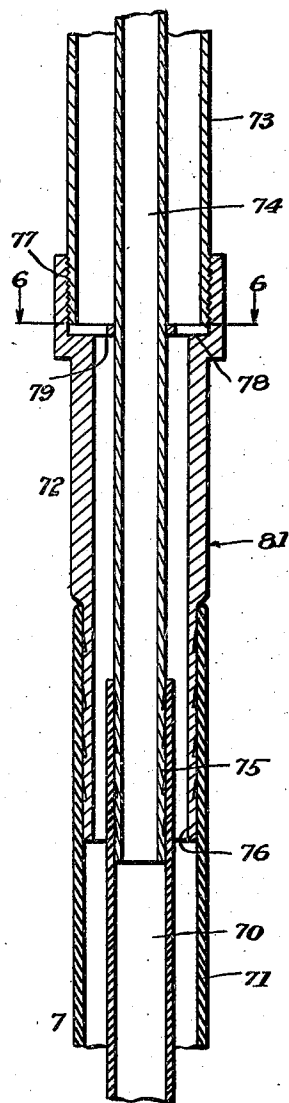


Fig. 5



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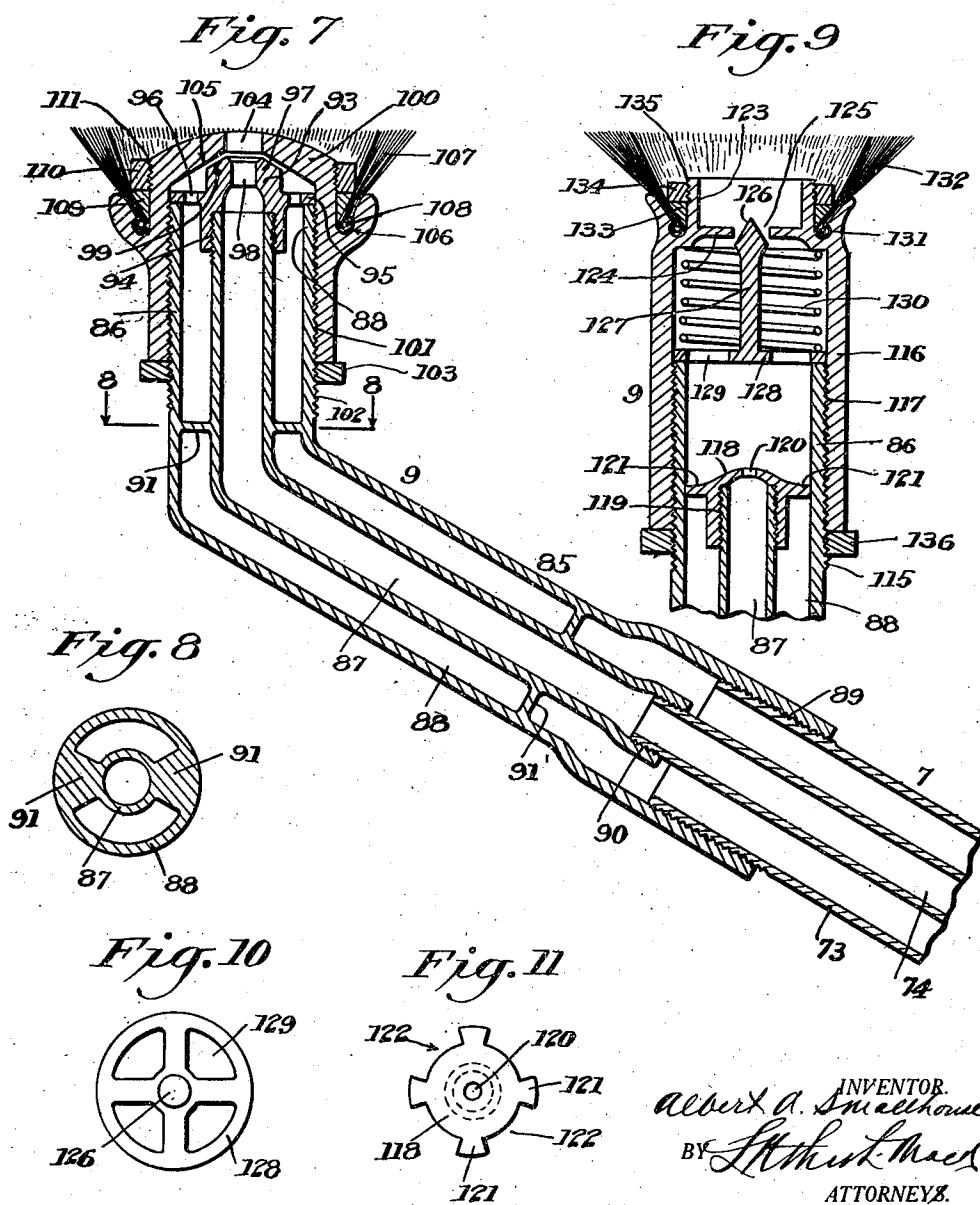
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WASHING AND CLEANING APPARATUS

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE.

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WASHING AND CLEANING APPARATUS.

Application filed February 2, 1926. Serial No. 85,514.

My invention relates to a washing apparatus, and more particularly to an apparatus for the production and application of a forced hot-air mist for washing and cleaning automobiles or for other washing and cleaning purposes.

The object in general of my invention is to provide a simple, efficient and economical washing apparatus of the character stated, by means of which compressed air may be reheated, to the desired temperature, mixed in the proper proportions with liquid, and the air and liquid atomized and applied to the surfaces of automobiles or to other surfaces for washing the same and removing grease, paint or dirt therefrom.

A more particular object is to provide a forced hot-air mist washing apparatus in which the liquid may be shut off when a surface is washed by the mist and only the hot air turned on and applied to said surface to dry the same.

Other objects and advantages will appear as the description progresses.

The use of steam in washing and cleaning automobiles scalds the paint or enamel and destroys the finish thereof, but this objectionable feature is eliminated in the use of my forced hot-air mist, which effectively washes and cleans the surfaces of the automobiles without in any way impairing the paint or enamel thereof.

My invention is illustrated in the annexed drawings which form a part of this specification, and in which:

Fig. 1 is an elevation of an apparatus for practicing my washing and cleaning method.

Fig. 2 is a vertical longitudinal section of the water heater and air reheater forming part of the apparatus shown in Fig. 1.

Fig. 3 is a horizontal sectional view taken on line 3—3 of Fig. 4, showing the water and air union and the pole on which the collector is mounted.

Fig. 4 is a vertical longitudinal section taken on line 4—4 of Fig. 3, showing water and air union, the pole on which the collector is mounted and the delivery conduit leading from the collector.

Fig. 5 is a fragmentary longitudinal sectional view of the handle and connecting portions of the water and air conduit.

Fig. 6 is a cross sectional view of the water and air conduit taken on line 6—6 of Fig. 5.

Fig. 7 is a longitudinal sectional view of one form of nozzle employed in my invention.

Fig. 8 is a cross section of the nozzle shown in Fig. 7 taken on line 8—8.

Fig. 9 is a longitudinal section of another form of nozzle employed in my invention.

Fig. 10 is a plan view of the valve employed in the nozzle shown in Fig. 9.

Fig. 11 is a view of the cap of the water tube in the nozzle shown in Fig. 9.

Corresponding reference numerals designate the same parts in all the views.

My invention includes generally an air compressor 1, a heater 2 for heating water and reheating the air compressed by said compressor, a water pipe 3 leading from said heater, an air pipe 4 leading from said heater, a chemical container 5 connected by a pipe 6 to the water pipe 3; a water and air tube 7, a water and air union 8 connecting the water pipe 3 and air pipe 4 and said conduit 7, and a nozzle 9 on the outer end of said conduit.

The heater 2 includes an outer casing 10, an inner casing 11, a burner 12 in the lower end of said inner casing, a pilot burner 13 associated with said burner, a water heating coil 14 in said inner casing immediately above said burner, an automatic water and gas control valve 15 to which said water heating coil, burner and pilot burner are connected, an air reheating coil 16 in the upper part of the inner casing 2 above said water heating coil, a baffle plate 17 between said water heating coil and said air heating coil, and a reheated air reservoir 18 on top of the inner casing 11 and within the outer casing 10.

The outer casing 10 is closed at the bottom by a wall 19 and at the top by a head 20. Through the center of the air reservoir 8 extends a vertical tube 21 and a rod 22 extends through the bottom wall 19, burner 12, water coil 14, baffle plate 17, air coil 16, tube 21 and head 20, and said rod is secured by nuts 23 to said bottom wall and by a nut 24 to said head, whereby said bottom wall and head are held on the lower and upper ends of the outer casing 10. The baffle plate 17 is held on the rod 22 by nuts 25. The inner casing 11 converges slightly upwardly and is formed with an external annular bead 26 near its upper end to prevent any heat from passing below the same into

the annular space 27 between the inner and outer casings.

The inner casing is provided with heat outlets 28 above the head 26 through which heat passes from the inner casing into the outer casing and upwardly through the annular space 29 between the outer casing and the reheated reservoir 18. The head 20 is formed with a depending annular flange 30 which extends close to the top of the reheated air reservoir and is provided with ports 31 through which heat passes from the space 29 into the heat chamber 32 within said flange at the top of the reheated air reservoir.

It will thus be seen that the air in the reservoir 18 is reheated at the bottom of the reservoir by the heat in the top of the inner casing, at the sides of the reservoir by the heat in the space 29, and at the top by the heat in the chamber 32. The head 20 is provided with outlets 33 leading from the heating chamber 32 into a stack 34 through which the products of combustion pass from the heater. Compressed air passes from the compressor 1 through a pipe 35 into the coil 16 and from the coil into the bottom of the reservoir at 36. The air pipe 4 leads from the top of the reheated air reservoir 8 out through the head 20. The water pipe 3 leads from the upper end of the water heating coil 14.

The water and air union 8 is formed with a water duct 40, an air duct 41 and a depending elbow 42 into which said ducts converge and through which they extend, the water duct 40 extending through the air duct in said elbow. In the top of the elbow 42 in the water duct 40 is located a check valve 43 which consists of an apertured disk 44, a spring 45 and a screw plug 46 seated in the top wall of the elbow and bearing against the spring 45 which normally holds said disk on its seat 47.

The water duct 40 extends below the air duct 41 in the elbow 42 and is formed with a hose nipple 48 on its lower end. A hose nipple 49 is coupled, by a screw coupling 50, to the lower end of the air duct 41 in the elbow 42, into which nipple extends the water duct nipple 49. The union 8 is formed with a vertically extending saddle 51 which is detachably secured on a standard 52 by clamp 53, each of which clamps comprises a U-bolt 54 extending around the saddle and standard, a bar 55 extending across the side of the standard opposite said saddle, and nuts 56 screwed on the ends of the bolt against said bar. The clamps 53 and saddle 51 hold the water and air union 8 on the standard 52 at the desired elevation.

A cold water by-pass 58 connects the water supply pipe 59 leading into the automatic water and gas control valve 15, and

the hot water pipe 3 leading from the heater, there being a valve 60 for controlling said by-pass. A control valve 61 and a check valve 62 are provided in the water pipe 3, the check valve being located forwardly of the control valve and at the union 8. The pipe 6 leading from the chemical container 5 connects to the water pipe 3 at a point between the control valve 61 and the check valve 62. A control valve 63 and a check valve 64 are provided in the chemical pipe 6, the check valve being located between the water pipe 3 and the control valve. In the air pipe 4 are provided a control valve 65, and a safety valve 66, the safety valve being located between the control valve and the air reservoir 18. The chemical container 5 may be suspended on the upper end of the standard 52 by means of a handle 67 connected thereto and an arm 68 secured to the upper end of the standard and formed with a hook 69 which is engaged by said handle.

The water and air tube 7 consists of a smaller water hose 70 and a larger air hose 71 through which the water hose extends, a metal handle section 72, a metal outer pipe section 73 and an inner metal pipe 74 of smaller diameter than the handle section and pipe section, the pipe section 74 extending through said handle section and pipe section. The inner pipe 74 is formed with a nipple 75 on its inner end while the handle section 72 is formed with a nipple 76 on its corresponding end. The water hose 70 is fitted at one end on the nipple 48 and at its other end on the nipple 75, while the air hose 71 is fitted at one end on the nipple 49 and at its other end on the nipple 76. The handle section 72 is connected at its outer end to the inner end of the pipe section 73 by means of a screw joint 77. Said joint is formed with a seat 78 therein upon which rests a spider 79 which is engaged by the adjacent end of the pipe section 73 and held firmly upon said seat. The spider 79 is provided with a central opening 80 through which extends the water pipe 74 whereby said pipe is held centralized with relation to the pipe section 73. The handle section 72 is formed with a handle 81 to be gripped by the hand of the operator for directing the nozzle 9.

The nozzle 9 is formed with a shank member 85 and a discharge member 86 extending outwardly at an obtuse angle to said shank member. The shank member and discharge member are formed with an inner water duct 87 and an outer air duct 88 surrounding said water duct. The duct 88, at the inner end of the shank member 85, is screw connected at 89 to the outer end of the pipe section 73, while the duct 87, at the inner end of the shank member 85, is screw connected at 90 to the outer end of the water

pipe 74. The inner water duct 87 is connected to and spaced within the outer air duct 88 by segmental webs 91 formed integral with said ducts. A water cap 93 is screw connected at 94 on the discharge end of the water duct 87. The cap 93 is formed with an external flange 95 which engages the discharge end of the air duct 88 and is provided with outlets 96 through which air discharges from said duct. The cap 93 is formed with a head 97 on its outer side; which head is provided with an outlet port 98 and is formed with a conical outer surface 99. An air cap 100 fits over the end of the discharge member 86 of the nozzle 8, said cap having an internal thread 101 which engages an external thread 102 on the duct 88 of said member, there being a lock nut 103 seated on said external thread for engaging the inner end of the cap 100 for locking the cap adjusted to different positions on said discharge member.

The head of the cap 100 is provided with a central outlet 104 which registers with the water cap outlet 98, and said cap head is formed with an internal conical surface 105, which surface upon turning the cap may be brought into engagement with the conical surface 99 of the water cap 97 to shut off the discharge of air from the nozzle through outlet 104, or moved away from the surface 99 to varying degrees to regulate the discharge of air from the nozzle.

The air cap 100 is provided with an annular external groove 106 in its outer end in which is fitted the inner end of an outwardly diverging conical brush 107, the bristles of the brush at its said inner end being wrapped around a wire ring 108. A conical clamp ring 109 fits over the outer end of the cap 100 against the inside of the inner end of the brush 107; and a nut 110 is screw seated at 111 on the outer end of the cap and engages the clamp ring 109 which in turn engages the inside of the brush and clamps the brush against the outer side of the groove 106, thereby the brush is securely clamped in the head 100.

In the form of nozzle shown in Figs. 9, 10 and 11 the delivery member 86 is provided with an external thread 115 on its outer air duct 88 and a cap 116 fits over the end of said member and has an internal thread 117 which engages the thread 115. The end of the inner water duct 87 and the cap 118 thereon lie a short distance within the end of the outer air duct 88. The cap 118 is screw connected on the end of the water duct 87 as at 119 and is provided with an outlet 120 and a plurality of radial legs 121 which engage the interior of the air duct 88 and center the water duct 87 in said air duct, the spaces 122 between the lugs 121 permitting the air in the air duct to pass the cap 118. The outer end portion 123 of the cap

116 is reduced slightly in diameter and a transverse wall 124 divides said reduced portion from the body of the cap, said reduced portion being open at its outer end.

The transverse wall 124 is provided with an outlet 125 which is controlled by a conical valve 126 on the end of a stem 127 which is formed with a circular base 128 on its inner end, which base is provided with outlets 129 through which air and water pass from the end of the discharge member 86. A coil spring 130 surrounds the valve stem 127, bearing at one end against the wall 124 and at its other end against the valve base 128 for holding said base against the end of the discharge member 86. The outer end of the cap 116 is provided with an annular groove 131 in which is clamped an outwardly diverging conical brush 132 by means of a clamp ring 133 and a nut 134 screw seated at 135 on the outer end of the reduced end 123 of the cap. By turning the cap 116 the valve 126 may be adjusted in and out of the outlet 125 for regulating the atomization and flow of the air mist out of the outlet. A lock nut 136 is seated on the thread 115 for engaging the inner end of the cap 116.

It will be noted that in both forms of my nozzle the air discharged therefrom is directed from all directions towards the center of the nozzle which breaks up and finely atomizes the air and water into an air mist, thus preventing water bullets from forming which scratch a surface against which they may be directed.

In the form of nozzle shown in Fig. 7 the discharged air is directed by the conical surfaces 99 and 105 from all directions to the center of the outlet 104 which thoroughly atomizes the water which passes out straight from the outlet 98, into a fine air mist.

In the nozzle shown in Fig. 9 the conical surface of the valve 126 directs the water and air from all directions to the center through the outlet 125, which thoroughly atomizes the water into a fine air mist.

The air mist passing from the nozzle is directed against the surface to be washed and the paint, grease, or dirt loosened by the mist is rubbed off the surface by the brush 107 or 132.

Chemicals instead of water may be used by closing the water valve 61 and opening the chemical valve 63.

When a surface has been washed the valve 61 may be closed to shut off the water and only the hot air directed through the nozzle upon said surface to dry the same.

What I claim is:

1. A cleaning system comprising a heater provided with a combustion chamber, a water pipe having a coil supported in said chamber, a compressed air supply pipe also

having a coil supported in said chamber, a heating drum in the combustion zone connected with said air coil, means for separately introducing the heated compressed air from said drum, and water from said water heating coil to a point of discharge, and means for supporting a cleaning element under pressure in communication with the point of discharge for admixture with the heated air and water, for the purpose described.

2. A cleaning system comprising a heater provided with a combustion chamber, a water heating coil supported in said chamber, a compressed air heating coil also supported in said chamber, an air reheating drum in said chamber connected with said air heating coil, means for separately conducting the heated compressed air and water from said drum and from said water heating coil, respectively, to a point of discharge, means for supporting a cleaning element under pressure in communication with the point of discharge for admixture with the heated air and water, means for supplying air and water under pressure to said coils, respectively, and means for independently controlling the volume of the heated air, water and cleaning element as required.

3. A cleaning system of the character described including a heater comprising inner and outer drums spaced apart and providing an annular chamber therebetween, separate water and air coils mounted within the inner drum and having separate inlets and outlets, means connected with said water coil for circulating water therethrough, means connected with said air coil for forcing air under pressure therethrough, a compressed air storage receptacle above said inner drum and in said outer drum and spaced therefrom to provide a heat zone therebetween, said receptacle being in communication with said air coil, a burner in said heater arranged for supplying heat to said water and air coils and said receptacle, a discharge nozzle, and independent means for conducting the heated compressed air and the heated water to said nozzle for mixture in a cleaning operation, for the purpose described.

4. A cleaning apparatus comprising a heater having an outer casing, an inner drum of smaller diameter than said casing and concentrically positioned thereon, providing a combustion chamber, a burner in the lower portion of said drum, an air reservoir mounted in said casing above said drum and providing an annular heat zone in the upper

portion of the casing, said combustion zone and said heat zone being in communication, separate water and air heating coils in said combustion zone, a connection between said air coil and said reservoir, means for connecting said air and water coils with air and water pressure systems respectively, and separate means for conducting the heated air and water from said air reservoir and said water coil to a common point of discharge, for use in a cleaning operation.

5. A cleaning apparatus comprising a heater having an outer casing, an inner drum of smaller diameter than said casing concentrically positioned therein providing a combustion chamber, a burner in the lower portion of said drum, a narrow reservoir mounted in said casing above said drum and providing an annular heat zone in the upper portion of the casing, said combustion zone and said heat zone being in communication, separate water and air heating coils in said combustion zone, a connection between said air coil and said air reservoir, means for connecting said air and water coils with air and water pressure systems respectively, means apart from said heater for supporting a cleaning solution, and separate means for conducting the heated air and water from said air reservoir and said water coil, respectively, and said cleaning solution to a common point of discharge for use in a cleaning operation.

6. A cleaning apparatus comprising a heater having an outer casing, an inner drum of smaller diameter than said casing concentrically positioned therein providing a combustion chamber, a burner in the lower portion of said drum, a narrow reservoir mounted in said casing above said drum and providing an annular heat zone in the upper portion of the casing, said combustion zone and said heat zone being in communication, separate water and air heating coils in said combustion zone, a connection between said air coil and said air reservoir, means for connecting said air and water coils with air and water pressure systems respectively, means apart from said heater for supporting a cleaning solution, separate means for conducting the heated air and water from said air reservoir and said water coil, respectively, and said cleaning solution to a common point of discharge for use in a cleaning operation, and means for independently controlling the volume of said heated air and water and said cleaning solution.

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