May 18, 1926. 1,584,925

D. S. GUNTHER

GREASE, DIRT, AND PAINT REMOVING APPARATUS

Filed April 20, 1925 4 Sheets-Sheet 1

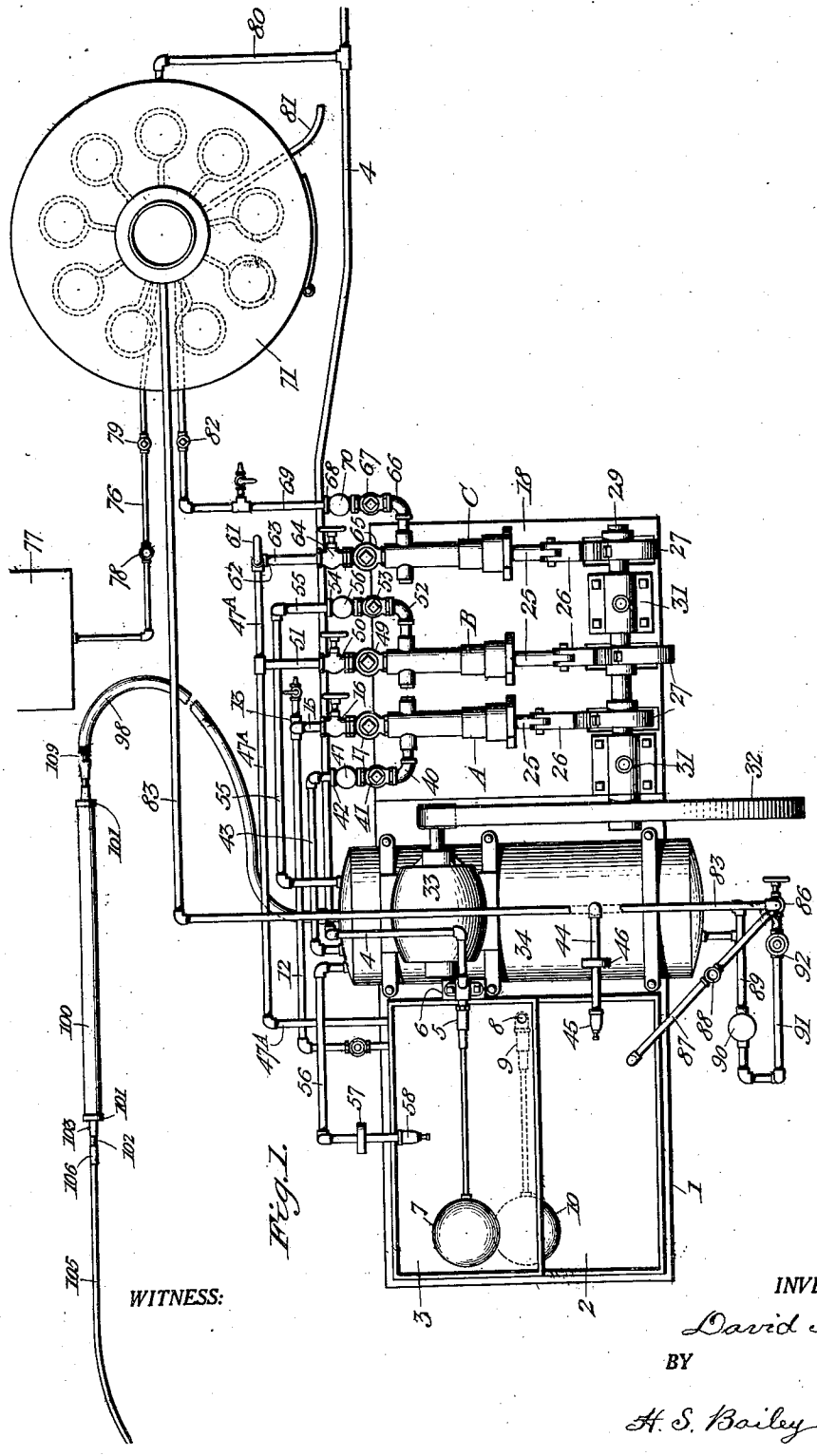


Fig. 1.

WITNESS:

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Fig. 2.

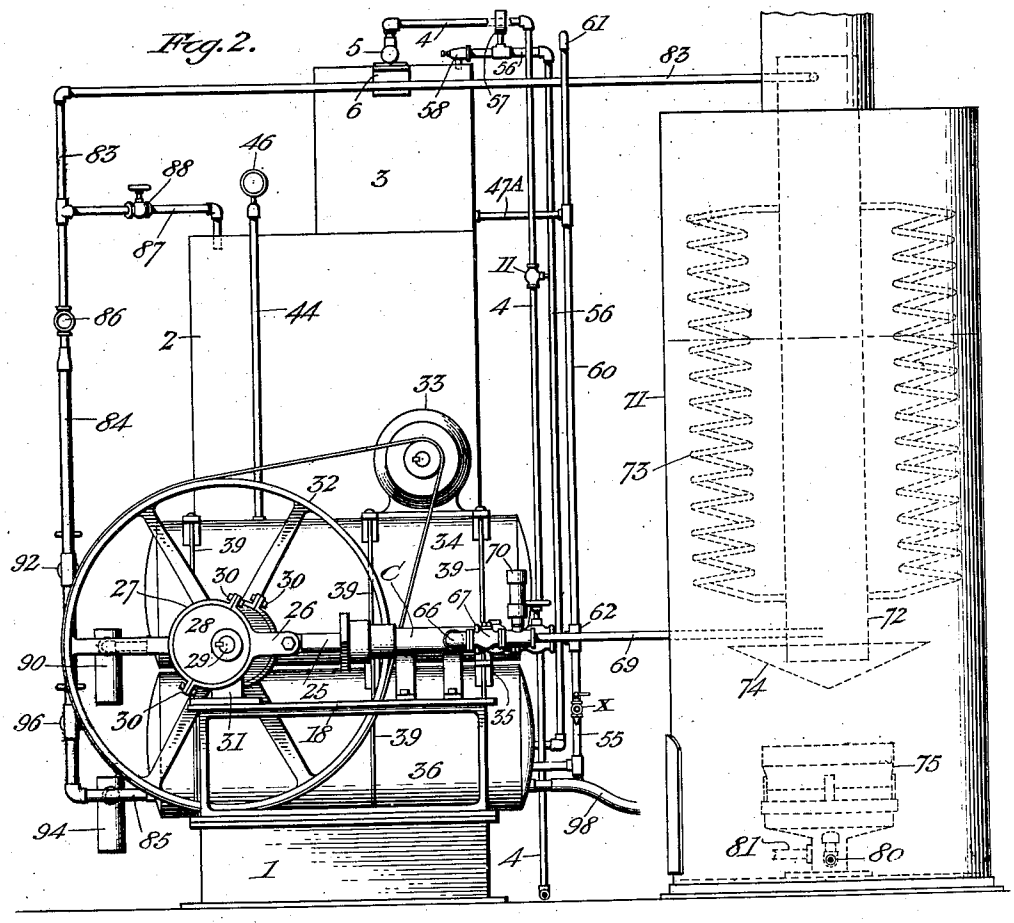


Fig. 6.

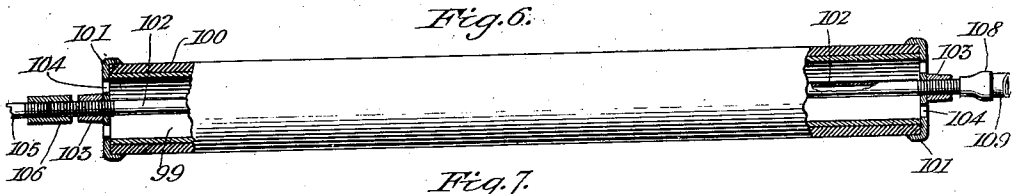
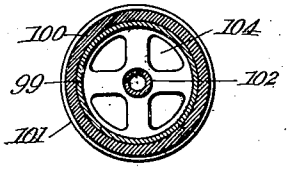


Fig. 7.



Fig. 8.



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Fig. 3.

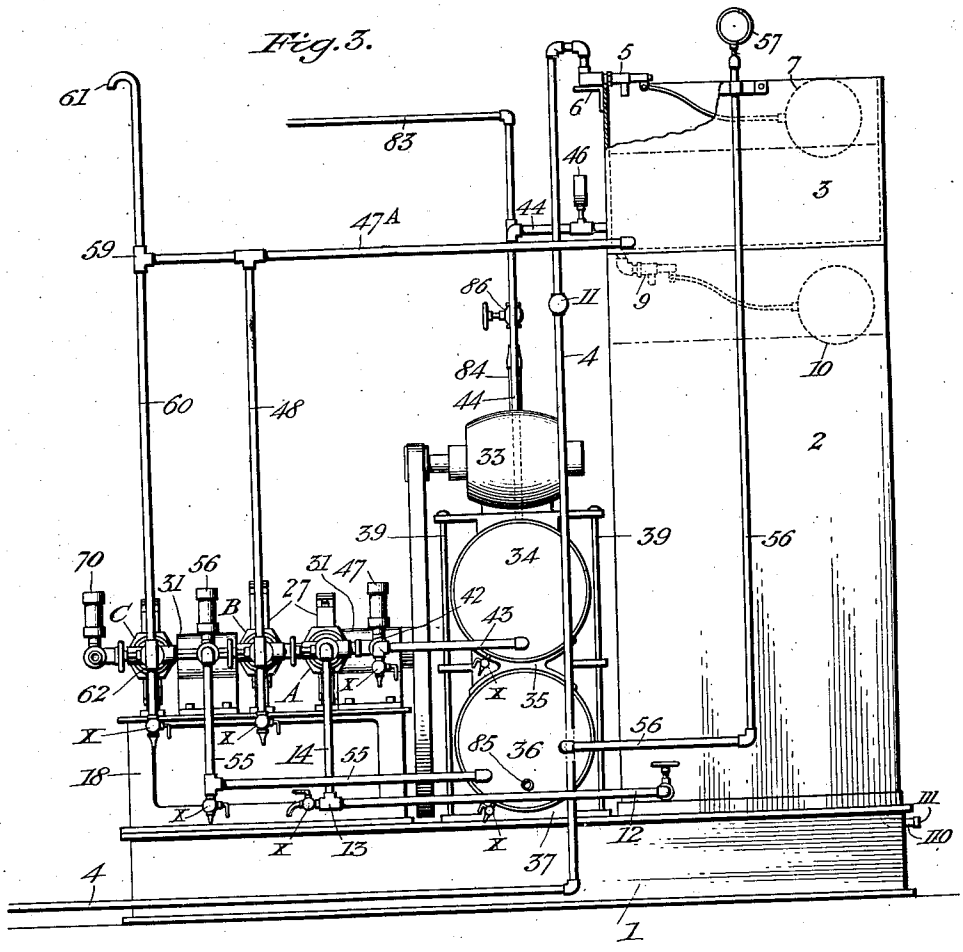
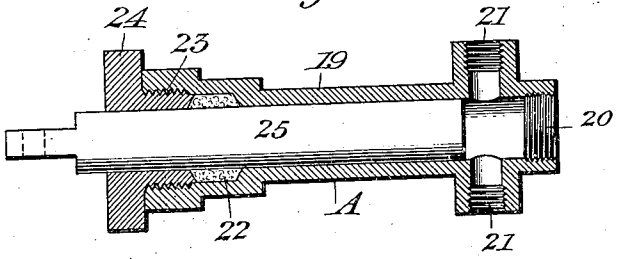


Fig. 9.



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Filed April 20, 1925 4 Sheets-Sheet 4

Fig. 4.

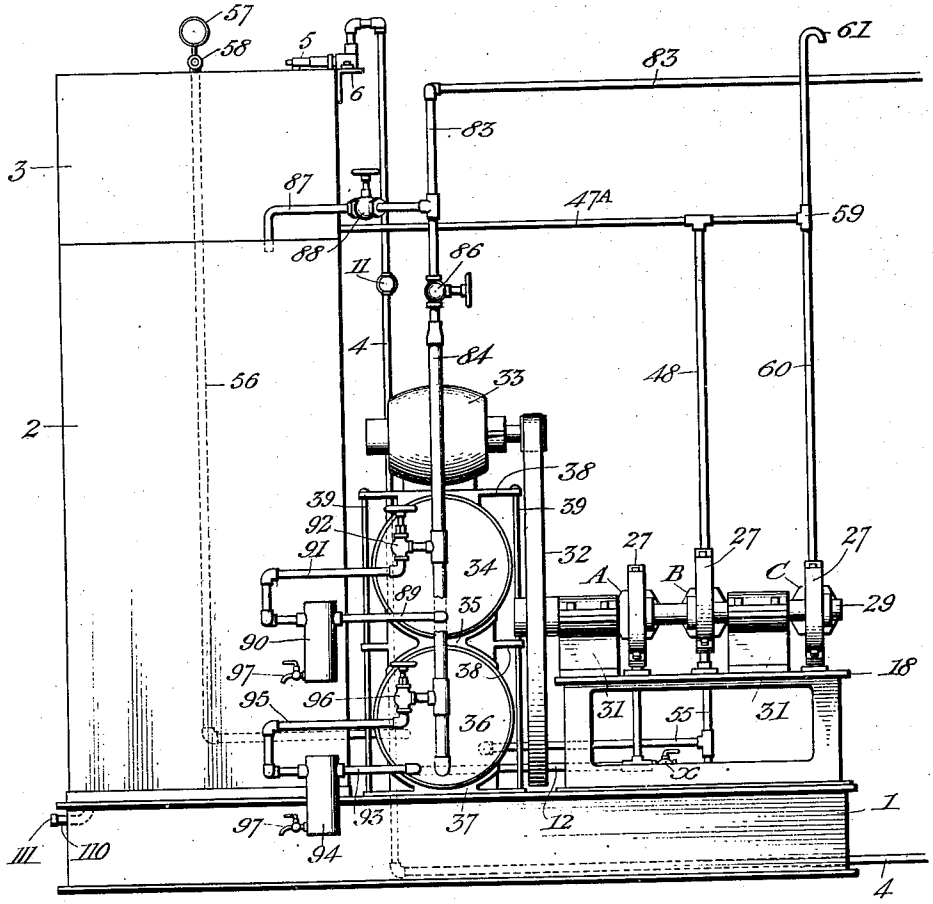
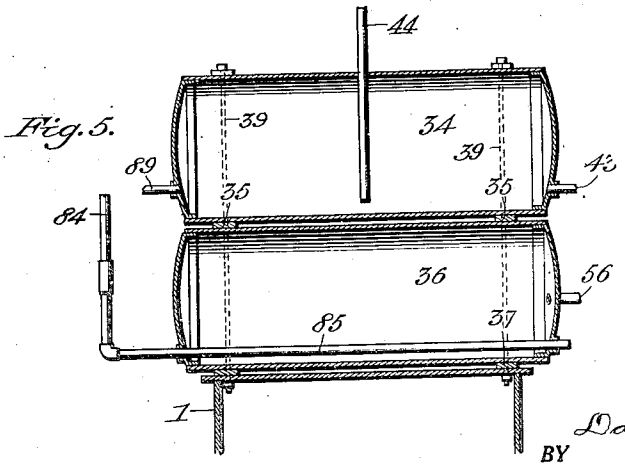


Fig. 5.



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UNITED STATES PATENT OFFICE.

DAVID S. GUNTHER, OF DENVER, COLORADO.

GREASE, DIRT, AND PAINT REMOVING APPARATUS.

Application filed April 20, 1925. Serial No. 24,692.

My invention relates to improvements in grease, dirt and paint removing apparatus.

The main object of the invention is to provide an apparatus of this character wherein a suitable cleaning solution under pressure is mixed with suitable proportions of steam and with water under pressure, and discharged under pressure against the object to be cleaned.

Further to provide an apparatus comprising a solution supply tank, a solution pressure tank, a water supply tank and a water pressure tank, and pumps for forcing the solution, and water into the respective tanks, a mixing pipe being provided which is connected by valved pipes with said tanks and with a source of steam under suitable pressure, whereby solution, water and steam are mixed in suitable proportions and discharged under pressure through said pipe, a hose having a suitable nozzle being connected to said pipe.

Further to provide an apparatus of this character which is primarily adapted for cleaning automobiles, and which comprises a tank for holding a suitable saponaceous solution, a water supply tank connected with the solution tank and with the city supply, and float-operated valves in said tanks, whereby the water and the solution in the respective tanks are maintained at a constant level, said water and said solution being pumped into separate pressure tanks; a mixing pipe being provided which is connected with a source of steam under pressure, and also with the said pressure tanks by valved connections, whereby steam, water and solution are admitted under pressure to said mixing pipe and in suitable proportions, and discharged therefrom under suitable pressure to remove dirt or grease from an object.

These and other objects to be hereinafter pointed out, are accomplished by the mechanism illustrated in the accompanying drawings in which:

Figure 1 is a plan view of the improved apparatus, showing a steam generating boiler connected therewith.

Figure 2 is a side view of the same.

Figure 3 is a front end view thereof.

Figure 4 is a rear end view.

Figure 5 is a vertical longitudinal sectional view through the solution and the water pressure tanks.

Figure 6 is a side view partly in section of the improved form of nozzle used in connection with the apparatus, a portion only of the discharge pipe being shown.

Figure 7 is a side view partly in section of the discharge pipe.

Figure 8 is a transverse sectional view through the nozzle, and

Figure 9 is a horizontal sectional view of one of the pumps.

Referring to the accompanying drawings,

The numeral 1 indicates a suitable base upon one end portion of which is mounted a vertically disposed tank 2, which will hereafter be referred to as the solution tank. This tank is adapted to hold a solution of water and soap or other suitable saponaceous substance, and suitable quantities of this substance may be supplied to the tank at intervals, for instance, it has been found in practice, that by supplying ten ounces of the cleaning substance every ten hours, a solution suitable for the purpose is provided, the proper strength of the solution being maintained by an automatically controlled water supply which also maintains a constant supply of solution in the tank.

Upon the top of the solution tank 2, is secured a water supply tank 3, which is about half the width of the solution tank, and about one third of its depth. The water tank is supplied by a pipe 4, which connects with the city water supply, and with a float-operated valve 5, which is secured to a bracket 6 on the upper edge of the water tank. The valve 5 is the ordinary type of ball cock valve, comprising the valve proper and an operating float 7, which rises and falls with the water level in the tank to open or close the valve, as will be understood.

The bottom of the water tank has an outlet hole 8, which communicates with the solution tank, and in this hole is screwed an elbow, in which is screwed a valve 9, similar to the valve 5, and operated by a float 10.

Further description of these valves is

deemed unnecessary as they are in common use and their construction and operation is well known. As the solution is drawn from the solution tank, as will be hereinafter set forth, the float 10 gradually descends until it opens the valve 9, which permits water to flow into the solution tank, and when the supply in the water tank drops below the normal level, the valve 5 is opened by the action of the float 7, and city water then flows into the water tank until the valve 5 shuts off the supply by the rising of the float 7.

Thus, the two automatically operating valves 5 and 9 act to maintain the solution in the tank 2 at a practically constant normal level.

The pipe 4 is provided with a cut off valve 11, by which the flow of water through the pipe 4 can be regulated, or entirely cut off, when desired.

A horizontally disposed outlet pipe 12, connects at one end with the lower end of the solution tank 2, and the opposite end of this pipe is provided with a T 13, to which is connected a vertical pipe 14, the opposite end of which is connected by means of a short pipe 15, a cut off valve 16, and a check valve 17, with the inlet end of a horizontally disposed pump A, which is rigidly mounted on a platform 18, which is supported upon the base 1.

The pump A comprises a barrel or cylinder 19, having a threaded inlet 20 at one end, and diametrically opposite lateral threaded outlets 21, which are adjacent the inlet end. The opposite end of the cylinder is increased in diameter over the main portion thereof to provide a packing box 22, the entrance portion of which is threaded, as shown, to receive the packing gland 23, of a nut 24, which form the cylinder head.

A combined piston and piston rod 25 fits snugly in the cylinder, and the outer end of the piston is pivotally connected to an arm 26, which projects from a divided ring 27, which surrounds a disk 28, which is eccentrically mounted upon a drive shaft 29, to which it is keyed or otherwise rigidly secured. The ends of the divided ring are bolted together, as shown at 30, to secure the said ring upon the disk, as will be understood.

The shaft 29 is mounted in bearings 31, which are bolted to the platform 18, and upon the inner end of this shaft is keyed a belt wheel 32, which is belted to the driving pinion of an electric motor 33, which is supported upon a horizontally disposed circular tank 34, which rests in saddles 35, which are supported on a similar tank 36, which in turn, rests in saddles 37, which are supported upon the base member 1.

The base of the motor 33 and also the saddles 35 and 37 are formed with lateral projections, having alined holes through which the rods 39 are passed, the lower ends of which are bolted to the base member 1, thus securely holding the motor 33 and the tanks 34 and 36 in the relation shown in the drawings.

The lower tank 36 is a water pressure tank, and the upper tank 34 is a solution pressure tank.

The right hand outlet of the pump A is plugged, as it is not used in the present instance, but the left hand outlet receives an elbow 40, to which is coupled a check valve 41, which is connected by a T 42, to which is connected one end of a pipe 43, the other end of which connects with the adjacent end of the solution tank 34, near the bottom thereof, as clearly shown in Figure 3. On the suction stroke of the piston 25, solution is drawn from the solution tank through pipes 12, 13 and 15, cut off valve 16, and check valve 17, to the pump cylinder 19, and on the reverse stroke of the piston, the check valve 17 automatically closes, and the solution in the pump is forced through the elbow 40, check valve 41 and pipe 43 to the solution pressure tank 34. A pipe 44 extends from near the bottom of the solution pressure tank and up through the top of the same and over the upper edge of the solution supply tank 2, and upon the end of this pipe, is screwed an ordinary relief valve 45, which can be set to open at any desired pressure, and a pressure gauge 46 is interposed in the horizontal portion of the said pipe 44 to indicate the pressure in the said solution pressure tank 34 at all times.

When the pressure in the tank 34 rises beyond the required degree, the relief valve 45 is thereby opened and solution is forced into the tank 2, until the high pressure in the tank 34 is relieved, when the valve 45 automatically closes. Thus, the relief valve 45 prevents excessive pressure in the tank 34, and the consequent danger of explosion.

The T 42 to which is connected the pipe 43 leading to the pressure tank 34 has connected thereto an ordinary cylindrical expansion chamber 47, which permits expansion of air at all times in the said pipe 43. The manner of utilizing the solution in the pressure tank 34, will be hereinafter fully set forth.

An outlet pipe 47^A extends from the lower end of the water supply tank 3, and a pipe 48 is connected by a T with the pipe 47^A and extends down beyond the intake end of a pump B, which is secured upon the platform 18 and which is in all respects identical with the pump A, and therefore requires no separate description.

A check valve 49 is screwed into the inlet end of the pump B and a cut off valve 50 is screwed into the check valve, and a pipe 51 connects the cut off valve with the water

pipe 48. The left hand outlet of the pump B is plugged, as it serves no purpose in the present instance, but the right hand outlet has connected therewith an elbow 52, to which is connected a check valve 53 which is connected by means of a T 54, with a pipe 55, which extends outwardly a short distance, then downwardly and then over to the adjacent end of the water pressure tank 36, to which it is connected.

The T 54 has connected therewith a cylindrical expansion chamber 56 similar to the chamber 47, which permits air expansion in the pipe 55.

The pump B is operated by an eccentric disk 28 on the driving shaft 29, as in the case of the pump A previously described, and the said pump B draws water from the water supply tank 3, through pipes 47A, 48 and 51, and through the cut off valve 50 and the check valve 49 to the barrel of the said pump, and forces the water out through the elbow 52, check valve 53, and pipe 55, to the water pressure tank 36, the check valve 53 preventing back pressure of the water through the pump.

A relief pipe 56 extends up from the end of the water pressure tank 36 and over the rim of the water tank 3, and that portion of the pipe 56 which extends over the rim of the water tank is provided with a pressure gauge 57, and upon the end of the pipe is screwed an ordinary relief valve 58, which can be set to open at any desired pressure, so that any pressure in the tank 36, above the normal or desired pressure, will open the valve 58, which allows water to flow from the water pressure tank into the water supply tank, until the pressure in the pressure tank drops to normal, when the valve 58 automatically closes; the valve 58 thus preventing excessive pressure in the water pressure tank with the consequent danger of explosion.

The manner of utilizing the water in the water pressure tank will be hereinafter fully set forth.

Steam is also employed as a component of the cleansing mixture, and the steam is generated and applied in the following manner:

The water pipe 47A which extends from the bottom of the water supply tank 3, is extended beyond the point where it connects it with the pipe 48, and terminates in a T 59 to which is connected a vertical pipe 60, a portion of which extends up to a point above the level of the water in the water supply tank, and terminates in a semi-circular bend 61, which is open to the atmosphere to provide an air vent in the water line. The lower portion of the pipe 60 extends down below the inlet end of the pump C, which is bolted to the platform 18, and which is a counterpart of the pumps A and B and which is also operated by an eccentric disk, mounted on the driving shaft 29 in the same manner as described in connection with the pump A.

A T 62 is interposed in the lower portion of the pipe 60, and a branch pipe 63 connects the T 62, with a cut off valve 64, which connects with a check valve 65, which connects with the inlet end of the pump C.

The left hand outlet of the pump 3 is plugged as it serves no purpose in the present instance, but the right hand outlet has connected therewith an elbow 66, to which is connected a check valve 67, which in turn is connected by a T 68 with a water pipe 69, the T 68 having an expansion chamber 70 similar to the chambers 47 and 56.

The pipe 69 leads to a suitable boiler adapted for quickly generating steam, and which in the present instance comprises the usual case or shell 71, in which is supported a water column 72, which extends from a point below the center of the shell to a slight distance within the base of a smoke stack on the top of the shell. The water column is surrounded by a plurality of vertically disposed pipe coils 73, which are connected at their upper and lower ends to the water column, the upper end of said coils being connected to the column above the water line therein. A deflector 74, is attached to the lower end of the water column, and a suitable burner 75 is secured to the base of the shell and beneath the deflector. The burner may be of any desired character, and in the present instance it is one in which distillate is used as a fuel, and is fed to the burner through a pipe 76 from a tank 77, the pipe 76 being provided with a cut off valve 78, and a check valve 79. It is not deemed necessary to describe the construction of this burner, and it is only necessary to state that it is of a style in common use and is provided with a rotary fan (not shown) which is operated by water from a branch pipe 80, which connects with the main water supply pipe 4, the water used to operate the fan being conveyed away from the burner by a pipe 81. The pipe 69 which leads from the pump C, connects with the lower end portion of the water column 72, and when the pump is operating, a constant supply of water is forced into the lower end of the column through the said pipe 69, and the pipe is provided with a check valve 82, which prevents back pressure of the water through the said pipe 69. The water circulates through the coils 73, which are quickly heated, and the steam generated in the coils passes into the upper portion of the column.

A steam pipe 83 extends from the upper end of the column and connects with the upper end of a slightly larger vertical pipe 84 which constitutes a mixing pipe and

which is positioned near the rear ends of the pressure tanks 34 and 36, and the lower end of this pipe terminates in a horizontal pipe 85 which extends entirely through the water pressure tank 36 and slightly beyond the opposite end thereof.

The pipe 83, just above the point where it connects with the pipe 84, is provided with a cut off valve 86 and a branch pipe 87 is connected to the pipe 83, and extends over the upper end of the solution tank 2. The branch pipe 87 is provided with a cut off valve 88 by which steam is admitted to the solution tank, when necessary, to pre-heat the solution therein. A pipe 89 extends from the rear end of the solution pressure tank 34, and connects with an ordinary sediment trap 90, and a pipe 91 extends from the sediment trap and connects with the mixing pipe 84, the pipe 91 having a cut off valve 92. A pipe 93 extends from the rear end of the water pressure tank 36 and connects with a sediment trap 94, and a pipe 95 extends from the sediment trap 94 and connects with the mixing pipe 84 below the point of connection therewith of the pipe 91, and the pipe 95 is provided with a cut off valve 96. The sediment traps 90 and 94 are each provided with a drain cock 97.

The end of the pipe 85 which extends through the water pressure tank 36, has coupled thereto a hose 98, and the free end of this hose connects with a special character of nozzle, which is so constructed that it will not become unduly heated by the cleansing mixture passing through it and therefore can be held by the operator without inconvenience.

The nozzle comprises a handle portion in the form of a metal tube 99 of suitable length which is encased in a jacket 100 of any suitable heat resisting material.

The ends of the tube and of the jacket are closed by caps 101 which are provided with central apertures through which is passed a metal tube 102, the end portions of which are threaded and extend a short distance beyond the caps 101. Nuts 103 are screwed upon these threaded ends and against the caps, thereby securely holding the tube 102 against endwise movement in the said handle portion of the nozzle.

The caps 101 are provided with relatively large air openings 104 which permit the passage of air through the handle, which contributes materially towards keeping the handle from becoming overheated.

A discharge tube 105 of suitable length is secured to one end of the tube 102, by a coupler 106, and the discharge end of this tube is slightly flattened as shown at 107, to provide an elongated opening. The small end of an ordinary reducer 108 is screwed upon the opposite end of the tube 102, and a short section of pipe 109 is screwed into the large end of the said reducer, the said pipe being secured at its opposite end in the free end of the hose 98.

The tubes 102 and 105 are preferably quarter inch tubes, but the tube 109 which connects the hose 98 and the reducer 108 is preferably a half inch tube.

In the practical operation of the improved apparatus, it is desirable to maintain about a hundred pounds of pressure in each of the pressure tanks, and a steam pressure of about 75 pounds. The solution tank is filled with water and a sufficient quantity of soap or other suitable saponaceous material is placed in the tank to produce a solution of the required strength.

The motor is then started, and motion is transmitted to the driving shaft 29 through the belt and belt wheel 32, thereby operating the pumps A, B and C. The pump A draws solution from the solution tank 2, and forces it into the solution pressure tank 34; the pump B draws water from the water supply tank 3, through pipes 47A and 48, and forces it into the water pressure tank 36, and the pump C also draws water from the supply tank 3 through pipes 47A and 60, and forces it into the water column 72.

When the pumps A and B have raised the pressure in the pressure tanks 34 and 36 to the required number of pounds, the apparatus is ready for service, and by opening the valves 86, 92 and 96, steam, solution, and water, respectively, are admitted to the mixing pipe 84, in such proportions as will be found to give the best results in removing dirt and grease from an object, and this mixture, under a predetermined pressure, is forced out of the pipe 84 and through the pipe 85, which extends through the water tank and through the hose and nozzle, and against the object to be cleaned.

It has been found in practice, that a solution of the proper strength and temperature, forced through a relatively small discharging tube under high pressure against a grease and dirt covered body such as an automobile, will quickly and thoroughly remove the grease and dirt without injury to paint or enamel, and when it is desired to remove paint or enamel, the same apparatus is employed but a different solution is used. As before stated, the solution in the tank 2 is pre-heated by turning steam into the top of the tank through the pipe 87, so that the solution enters the pressure tank in a heated condition, and the admission of steam to the mixing pipe 84 still further heats the solution as well as the water which is mixed therewith, so that the mixture discharges in a thoroughly heated condition.

The pipe 85 is passed through the water pressure tank to prevent its being chilled, as the hot mixture passing through this pipe soon heats the water in the tank, and keeps it

warm enough to prevent lowering the temperature of the mixture in the pipe.

The continuous outflow of solution from the tank 2, when the apparatus is in operation, is offset by a corresponding inflow of water from the tank 3, the equalization being accomplished by the float operated valves 5 and 9, as hereinbefore stated, and the strength of the solution is maintained by the adding of soap or other cleansing agent to the supply of solution in the tank, at regular intervals.

The supply of water from the water pressure tank, which enters the mixing pipe 84, is regulated by the valve 96; the supply of steam to said mixing pipe is regulated by the valve 86, and the supply of solution from the solution pressure tank to the mixing pipe is regulated by the valve 92, so that a mixture of the desired strength or consistency as well as temperature is effected in the mixing pipe, and the supply of any one of the components of the mixture can be increased or diminished at any time.

The pipes 12, 48, 55, 60 and 69, are each provided with a drain cock X, as well as the two pressure tanks, and the solution tank 2 is provided with a drain pipe 110 in its bottom end, which is normally closed by a cap 111, which is removed when it is desired to drain the tank.

Having described my invention what I claim as new and desire to secure by Letters Patent is:

1. In apparatus of the character described, the combination with a tank for holding solution under pressure, a tank for holding water under pressure, and a steam generator; of a mixing element, valved pipes connecting said mixing element and said steam generator, said mixing element and said solution pressure tank, and said mixing element and said water pressure tank, a solution supply tank, a water supply tank connected therewith, and automatically operating means for regulating the flow of water from the water supply tank to the solution supply tank, thereby to maintain constant level in the latter tank, pumps, pipes connecting one of said pumps with the solution supply tank and with the solution pressure tank, pipes connecting the other pump with the water supply tank and with the water pressure tank, a valved pipe leading from the steam line to the upper end of the solution supply tank, pipes connecting the solution pressure tank and solution supply tank, and the water pressure tank and the water supply tank, said pipes being provided with pressure relief valves and a discharge hose connected to said mixing element.

2. In apparatus of the character described, the combination with a tank for holding solution under pressure, a tank for holding water under pressure and a steam generator; of a mixing pipe, a portion of which passes entirely through said water pressure tank, valved pipes connecting the steam generator and the mixing pipe, the solution pressure tank and the mixing pipe, and the water pressure tank and the mixing pipe, thereby to furnish regulated supplies of steam, of solution, and of water, under pressure, to said mixing pipe, means for continuously supplying said tanks, means for maintaining a predetermined pressure in said tanks, and a discharge hose connected to that end of the mixing pipe which projects through the said water pressure tank.

3. In apparatus of the character described, the combination with a water pressure tank, and a solution pressure tank; of a solution supply tank, a water supply tank above the solution supply tank having an outlet into said solution tank, an automatically operating valve in said outlet for controlling the inflow to the solution tank and automatically operating means for controlling the inflow to the water tank, means for drawing liquids from the respective supply tanks and forcing them under pressure into the respective pressure tanks, a steam supply, an outlet pipe and valved connections between the respective pressure tanks and the outlet pipe and between the steam supply and the outlet pipe.

4. In apparatus of the character described, the combination with a water pressure tank and a solution pressure tank, of a solution supply tank, a water supply tank above the solution supply tank having a valved outlet to the solution supply tank, and a float in the solution supply tank connected with the valve in said outlet, whereby the admission of water to the solution supply tank is automatically controlled; pumps for drawing liquids from the respective supply tanks and forcing them under pressure into the respective pressure tanks; a discharge pipe, a steam supply, valved connections between the pressure tanks and the discharge pipe and between the steam supply and the discharge pipe and a valved connection between the steam supply and the upper portion of the solution supply tank.

5. In apparatus of the character described, a solution supply tank, a water supply tank supported upon and having an outlet into the solution supply tank, a float operated valve for controlling the inflow to the solution supply tank, a float operated valve for controlling the inflow to the water supply tank; a horizontally disposed water pressure tank, a horizontally disposed solution pressure tank supported upon the water pressure tank, a pipe extending through said water pressure tank and terminating at one end in a vertically disposed mixing pipe, a steam supply, a valved connection between the steam supply and the upper end of the mix-

ing pipe, means for continuously drawing solution from the solution supply tank and forcing it into the solution pressure tank, means for continuously drawing water from the water supply tank and forcing it into the water pressure tank, valved connection between the solution and water pressure tanks and said mixing pipe, a valved connection between the steam supply and the upper end of the solution supply tank and a discharge hose on the free end of the pipe extending through the water pressure tank.

In testimony whereof I affix my signature.

DAVID S. GUNTHER.