

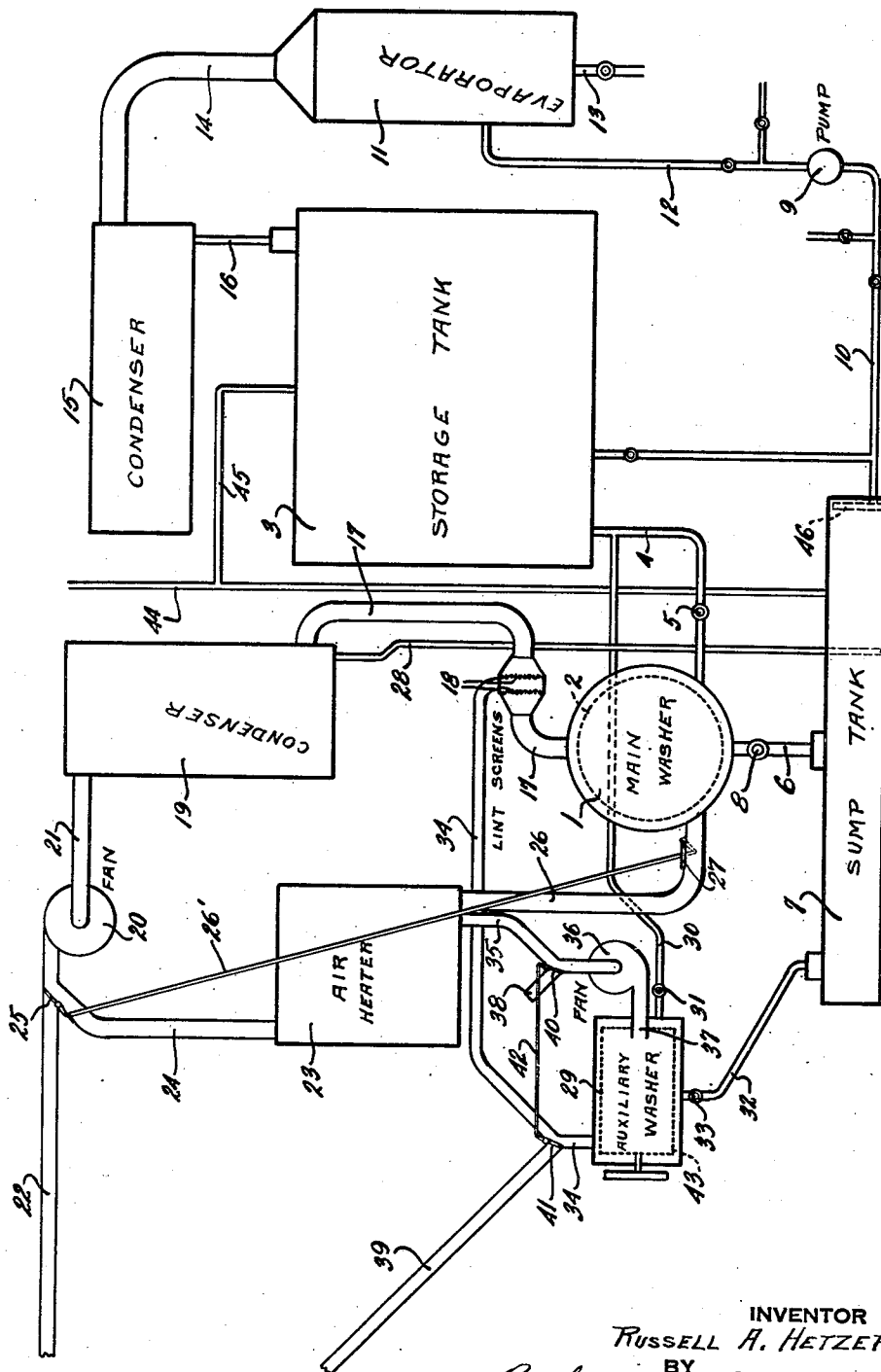
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GARMENT TREATING MACHINE

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GARMENT TREATING MACHINE

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My invention relates to method and apparatus for treating fabric with a volatile detergent having a low boiling point, together with apparatus for removing all of the detergent from the fabric, and removing the foreign matter from the detergent after the treating operation whereby the same detergent may be used in subsequent operations with but little loss of volume thereof.

The objects of my invention are to provide an apparatus for carrying out the method above specified that embodies dual washing compartments which can be independently operated but have connections with a single system or apparatus whereby auxiliary treating compartments may be provided without substantially increasing the cost; to provide a method and apparatus for cleaning fabric which makes a greater production speed possible; and to provide an apparatus for treating fabric that is conducive to floor space economy.

Various other objects and advantageous features of my invention may be seen in the following description and one embodiment thereof may be seen in the accompanying drawing wherein similar characters of reference designate corresponding parts, and wherein the figure shown illustrates diagrammatically a fabric cleaning system embodying my invention.

In fabric cleaning apparatus of the above type, it is desirable to provide a treating medium reclaiming circuit including a storage tank, a sump tank, an evaporator and condenser; and a fabric treating circuit including a drying condenser, and an air heater. A suitable pump is also provided for circulating the treating medium from one container to another in the treating medium reclaiming circuit as desired.

Referring to the drawing, I have diagrammatically shown an apparatus for treating fabrics together with a means for supplying a volatile detergent to a treating compartment, removing the detergent from the treating compartment after the treating operation and then removing the foreign matter from the detergent and transferring it to a storage tank ready for use in a subsequent operation, similar to the apparatus disclosed in my copending application, Serial No. 462,061, filed June 18, 1930, for Method and apparatus for cleaning fabric to which reference may be had for details not herein shown. As in this previous application, the apparatus comprises a fabric treating compartment 1 that is provided on its interior with the usual rotatable goods container 2 driven in alternately reverse directions by a motor or power unit, not shown.

The apparatus also comprises a storage tank 3 for containing a supply of the volatile liquid used in the treating operation, this liquid being preferably although not necessarily carbon tetrachloride, and a pipe 4 connects the storage tank 3 with the treating compartment 1 and is provided with a valve 5 for regulating the quantity of treating medium which passes from the storage tank to the treating compartment.

A pipe 6 leads from the bottom of the compartment 1 to a sump tank 7, the pipe being provided with a valve 8 for controlling the flow of treating medium from the compartment to the sump tank. The sump tank is, in turn, connected to the intake side of a pump 9 by a pipe 10, the discharge side of the pump 9 being connected to an evaporator 11 by means of a pipe 12. This evaporator 11 is provided with a sludge drain 13 and a pipe 14 connects the top thereof with a condenser 15 having a pipe 16 connecting it with the storage tank 3. The apparatus including the sump tank 7, evaporator 11, condenser 15, and storage tank 3 provide what may be termed as the treating medium reclaiming circuit.

As shown, a pipe 17 having lint screens 18 therein connects the treating compartment 1 with a condenser 19 which is, in turn, connected to the intake side of a fan 20 by a pipe 21. The discharge side of the fan 20 has access to the atmosphere by means of a conduit 22 and is connected to an air heater 23 by means of a pipe 24. A valve 25 operable by a rod 26 is adapted to selectively close off the conduit 22 or the conduit 24 as desired. The air heater 23 is operatively connected with the treating compartment 1 by a pipe 26 which has a valve 27 therein that is likewise operable by the rod 26 so that it may be moved simultaneously with the valve 25, the valve 27 being adapted to open the treating compartment 1 to the atmosphere through a short section of the pipe 26. A treating medium drain pipe 28 leads from the condenser 19 to the sump tank 7. The apparatus just described forms what may be termed the fabric treating circuit of the apparatus.

In accordance with my invention, an auxiliary fabric treating compartment 29 is provided to operate in the same circuits as the treating compartment 1. As shown, the auxiliary treating compartment 29 has connection with the storage tank 3 through a pipe 30 under the control of a valve 31 whereby the auxiliary treating compartment may be supplied with treating medium. The compartment 29 also has connection with the

treating medium reclaiming circuit hereinbefore described by being connected with the sump tank 7 by means of a pipe 32 under the control of a valve 33. This pipe provides means for draining the treating medium from the auxiliary treating compartment into the sump tank 7.

In order to connect the auxiliary treating compartment 29 in the fabric treating circuit hereinbefore described, a pipe 34 leads from the auxiliary treating compartment to the pipe 17 that connects the treating compartment 1 with the condenser 19. Another pipe 35 leads from the air heater 23 to the intake side of a fan 36, the discharge side of the fan 36 being connected to the auxiliary treating compartment 29 by a pipe 37. Thus, the auxiliary treating compartment and the treating compartment 1 are both adapted to operate in the same fabric treating circuit which includes the condenser 19, fan 20, and air heater 23.

A means is provided for circulating atmospheric air through the auxiliary treating compartment 29 for deodorizing purposes independently of the treating compartment 1 and the fabric treating circuit hereinbefore described and this means consists of branch pipes 38 and 39 having communication with the atmosphere and branching out from the pipes 35 and 34 respectively that lead to the auxiliary treating compartment.

Valves 40 and 41 under the control of a single rod 42 are provided for selectively closing off the branch pipes 38 and 39 or the pipes 35 and 34. In this last position, with the fan 36 in operation, atmospheric air will be drawn into the intake side of the fan 36 through the pipe 38, forced through the auxiliary treating compartment 29 and the goods therein, and will then exhaust through the pipe 39. Thus, the auxiliary treating compartment is provided with a deodorizing means individual thereto.

In the operation of the apparatus, when the treating compartment 1 is used, the goods to be cleaned are placed inside the inner revolvable container 2 and the compartment tub is sealed. At this time, the auxiliary treating compartment 29 is either sealed or the valves 40 and 41 are in a position to close off the pipes 35 and 34 whereby a cleaning or drying operation may take place, or a deodorizing operation may be taking place. After sealing of the treating compartment 1, the desired quantity of cleaning medium is permitted to flow from the storage tank 3 through pipe 4 into the compartment tub by opening the valve 5, and the container 2 is oscillated or rotated until all of the goods therein have been subjected to the treating medium.

Upon this part of the treating operation being completed, the treating medium is permitted to drain from the treating compartment 1 through pipe 6 into the sump tank 7 by opening the valve 8 and, after the treating medium is completely drained from the compartment 1, the fan 20 is placed in operation which will force air through the duct 24, through the heater 23, thence through duct 26, through compartment 1 where the heated air will mingle with the goods and become partly saturated with the liquid fumes, thence through pipe 17 and lint screens 18, through condenser 19 where the treating medium vapor will be condensed to drain in liquid form through the pipe 28 to the sump tank 7. From the condenser 19, the air is drawn through duct 21 back to the intake side of the fan 20. Thus, a means for drying the goods in the treating com-

partment 1 is provided and during this operation the valves 25 and 27 are, of course, in the position shown in the drawing wherein they will cut off exhaust of air from the fan 20 to the atmosphere through the pipe 22 and will prevent intake of room air into the pipe 26 whereby the drying operation will take place in a closed circuit. At the same time, without disturbing the closed circuit with which the main treating compartment forms a part, a cleaning, drying or deodorizing operation may be taking place in the auxiliary treating compartment.

After the goods in the treating compartment 1 have been thoroughly dried by the evaporation process just described, they are deodorized by the continuous operation of the fan 20 and shifting of the valves 25 and 27. As shown, the valve 25 is located at the discharge side of the fan 20 and, when shifted to the deodorizing position, closes the passageway to the pipe 24 and heater 23, and opens the passageway to the pipe 22 leading to the atmosphere. Likewise, the valve 27 is located in the horizontal position of the duct 26 and is arranged to admit room air into the duct when moved to open position. These valves are moved simultaneously since they are connected by the rod 26'. With this arrangement, when the valves 25 and 27 are moved to the positions just described, the cool room air will be drawn into the duct 26 through the opening uncovered by the valve 27 and through the treating compartment 1 where it will mingle with the goods therein and from there will be drawn out through the pipe 17, condenser 19, and pipe 21 into the suction side of the fan 20, and thence out to the atmosphere through the pipe 22. This operation is continued until all of the treating medium odor has been removed from the goods, any treating medium vapor removed being condensed in the condenser 19 and, during this operation, the cleaning and deodorizing step may be taking place in the auxiliary treating compartment 29 but not the drying step.

As to the treating medium reclaiming circuit, to replenish the storage tank 3 with purified treating medium, the used treating medium, is drawn out of the sump tank 7 by means of the pump 9 and pipes 10 and 12 and delivered into the evaporator 11 where the treating medium is heated to a degree to cause the medium to change from liquid to vapor form. The non-vaporizing dirt and sludge remaining in the evaporator 11 may be drawn off through pipe 13 from time to time, while the treating medium vapor rises and passes through the pipe 14 into the condenser 15 wherein it is condensed to liquid form and gravitates through pipe 16 into the storage tank 3. Suitable lint screens, filters, water separators, or the like, may be placed in this reclaiming circuit as desired.

When the auxiliary treating compartment 29 is used, the goods are placed into the revolvable container 43 of the compartment and the tub thereof is sealed. At this time, the door of the main treating compartment tub must be closed or some means must be provided for closing off the pipe 26 and pipe 17 below the lint trap 18. A suitable quantity of treating medium is then permitted to flow from the storage tank 3 into the treating compartment 29 through the pipe 30 by opening the valve 31 and the cylinder 43 is oscillated or rotated until the goods in the compartment have been completely subjected to the treating medium. After this operation, the treating medium is drained from the treating com-

partment 29 into the sump tank 7 through the pipe 32 by opening the valve 33.

Upon the greater bulk of the treating medium being drained from the treating compartment 29, assuming that the valves 40 and 41 are in the position shown in the drawing to close off the pipes 38 and 39, the fan 36 is placed in operation which will dry the goods in the treating compartment 29 by drawing air from the air heater 23 through pipe 35 into the intake side of the fan 36 and then forcing the heated air through the duct 37, treating compartment 29 where the heated air will mingle with the goods and become partly saturated with treating medium, thence through pipe 34, lint screen 18 and a portion of the pipe 17, and through condenser 19 where the saturated air is cooled and the treating medium in condensed form drains to the sump tank 7. The air with the treating medium removed therefrom is drawn outwardly through pipe 21, fan 20, and pipe 24 into the air heater 23, completing the circuit. It will be noted that the valves 25 and 27, like the valves 40 and 41 must be in the closed position as shown. During this period, cleaning or drying may be taking place in the main treating compartment. After the goods in the treating compartment 29 are sufficiently dried, the valves 40 and 41 are moved to close the pipes 35 and 34 and open the pipes 38 and 39 as hereinbefore described whereby operation of the fan 36 will draw room air through the pipe 38 into the intake side of the fan 36, and will force the room air into the treating compartment 29 through the pipe 37 and through the goods therein, and thence outwardly to the atmosphere through the pipe 39 and again a cleaning, drying or deodorizing operation may be taking place in the main treating compartment.

The apparatus is so constructed that the fabric treating circuit is closed against free communication with the atmosphere but means are provided for relieving excess pressure conditions in the circuit, since this condition is the only one that will occur to any noticeable extent due to the fact that the cleaning medium and the goods, as well as the air, are subjected to heat during the treating steps. It will be noted that the pipe 28 leading from the condenser 19 to the sump tank 7 extends into the sump tank to a point adjacent the bottom of the sump tank whereby a liquid seal is provided for the end of this pipe. With the valves and treating compartments sealed as hereinbefore described, this pipe provides the only pressure relief vent means in the treating circuit. However, as will be apparent, the pressure relief vent means is also capable of relieving a vacuum condition in the treating circuit.

In contra-distinction to the closed treating circuit, the treating medium reclaiming circuit is preferably provided with vent means so as to be open to the atmosphere. As shown, a vent pipe 44 leads from the top of the sump tank 7 to the atmosphere and the branch vent pipe 45 leads from the storage tank 3 to the vent pipe 44. In order to maintain a liquid seal over the lowermost end of the pipe 28, the treating medium discharge pipe 10 leading from the sump tank terminates in the sump tank in a T connection 46, the lower end of the T being adjacent the bottom of the sump tank and the uppermost end adjacent the top thereof, with the connection between the pipe 10 and the T at a point intermediate the upper and lower ends of the T. Thus, a siphon effect is created with the treating medium being with-

drawn from the sump tank from the bottom of the tank until the level of the treating medium in the sump tank is the same as the level of the connection between the pipe 10 and the T 46 whereupon the siphon effect will be broken and no more treating medium will be drawn from the sump tank. Therefore, since the connection between the pipe 10 and the T 46 is somewhat above the bottom of the sump tank, a given level of treating medium will always remain in the sump tank, this level being sufficiently high to completely cover the lowermost end of the pipe 28. Thus, I have provided an apparatus wherein the treating circuit is closed to the atmosphere while the treating medium reclaiming circuit has free access thereto.

With the above construction, I have provided an apparatus wherein a number of treating compartments may be connected in the same closed circuit to operate therein without the necessity of providing extra or additional apparatus. This permits several qualities of goods to be treated simultaneously by placing one quality of goods in each treating compartment. Also, such construction provides for additional treating compartments at very low costs.

What I claim is:

1. A dry cleaning apparatus comprising a main circuit including a main washer, a condenser, a fan and an air heater in series in the order named, an auxiliary circuit including an auxiliary washer and another fan in series, said auxiliary washer being connected to said main circuit between said main washer and said condenser, and said other fan being connected thereto at the discharge side of said air heater, an air inlet on the intake side of said main washer and an air outlet on the discharge side of said first named fan, deodorizing valves in said main circuit controlling said air inlet and air outlet, one of said valves being common to both of said circuits, an air inlet and an air outlet in said auxiliary circuit on either side of said auxiliary washer and fan, and deodorizing valves in said auxiliary circuit controlling the air inlet and outlet in said circuit.

2. A dry cleaning apparatus comprising a main circuit including a main washer, a condenser, a fan and an air heater in series in the order named, an auxiliary circuit including an auxiliary washer and another fan in series, said auxiliary washer being connected to said main circuit between said main washer and said condenser, and said other fan being connected thereto at the discharge side of said air heater, an air outlet between said first named fan and said air heater, a valve controlling said air outlet, the same being common to both the main circuit and the auxiliary circuit, an air inlet on the intake side of said main washer and another deodorizing valve controlling said inlet individual to said main washer, an air inlet and an air outlet on either side of said auxiliary washer and fan, and deodorizing valves individual to said auxiliary washer controlling the air inlet and air outlet in the auxiliary circuit.

3. A dry cleaning apparatus, comprising a main circuit including a main washer, a condenser, a fan and an air heater connected in series in the order named, an air inlet between said air heater and main washer, an air outlet between said fan and said air heater, a pair of valves positioned one at said air inlet and one at said air outlet and adapted to close or open both thereof, and an auxiliary circuit including as a unit an auxiliary

washer and an air circulating fan connected therewith, the discharge end of said auxiliary circuit communicating with the main circuit between the main washer and condenser and the supply end of said auxiliary circuit communicating with the main circuit between the main washer and the air heater, an air inlet in the supply

end of the auxiliary circuit, an air outlet in the discharge end of the auxiliary circuit, and another pair of valves for said auxiliary air inlet and air outlet and adapted to open or close both thereof.

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