

Dec. 15, 1936.

J. B. SANDO

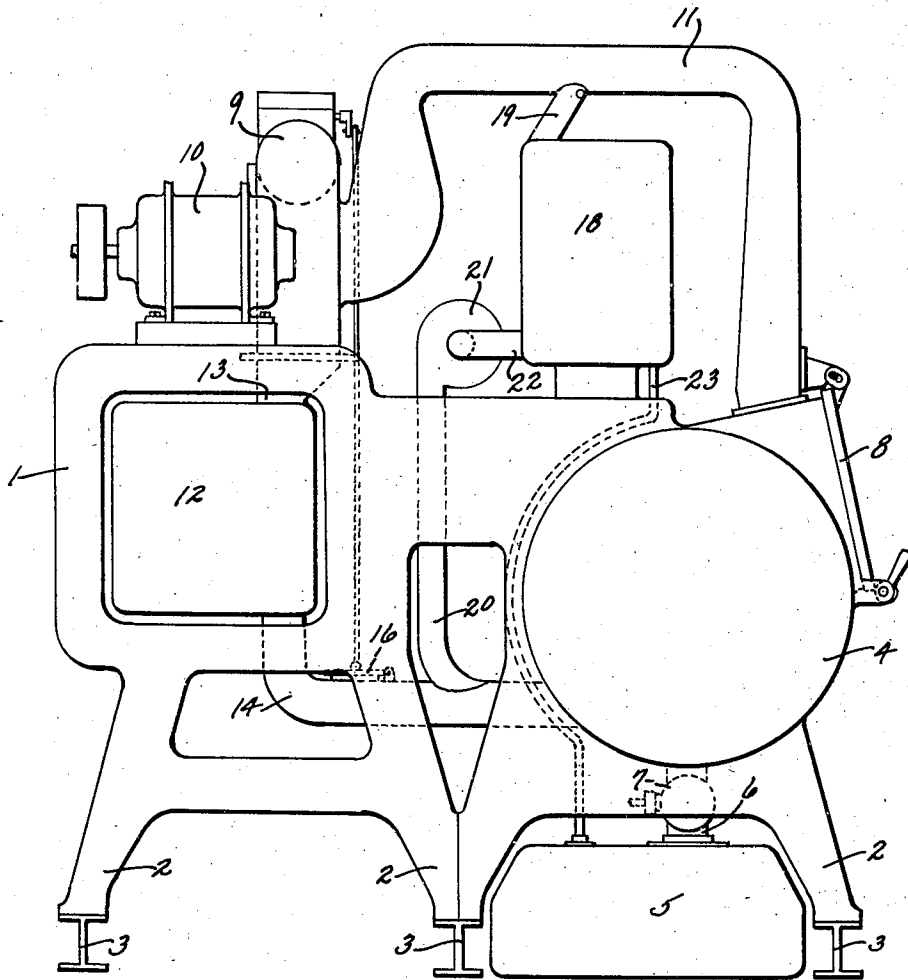
2,064,084

APPARATUS FOR CLEANING FABRIC

Filed April 22, 1931

2 Sheets-Sheet 1

Fig. 1.



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Fig. 2.

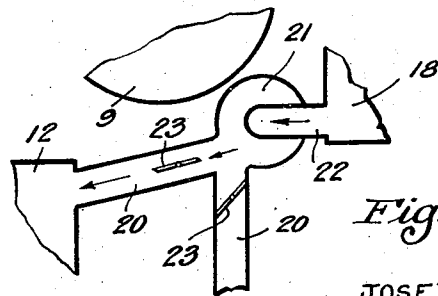
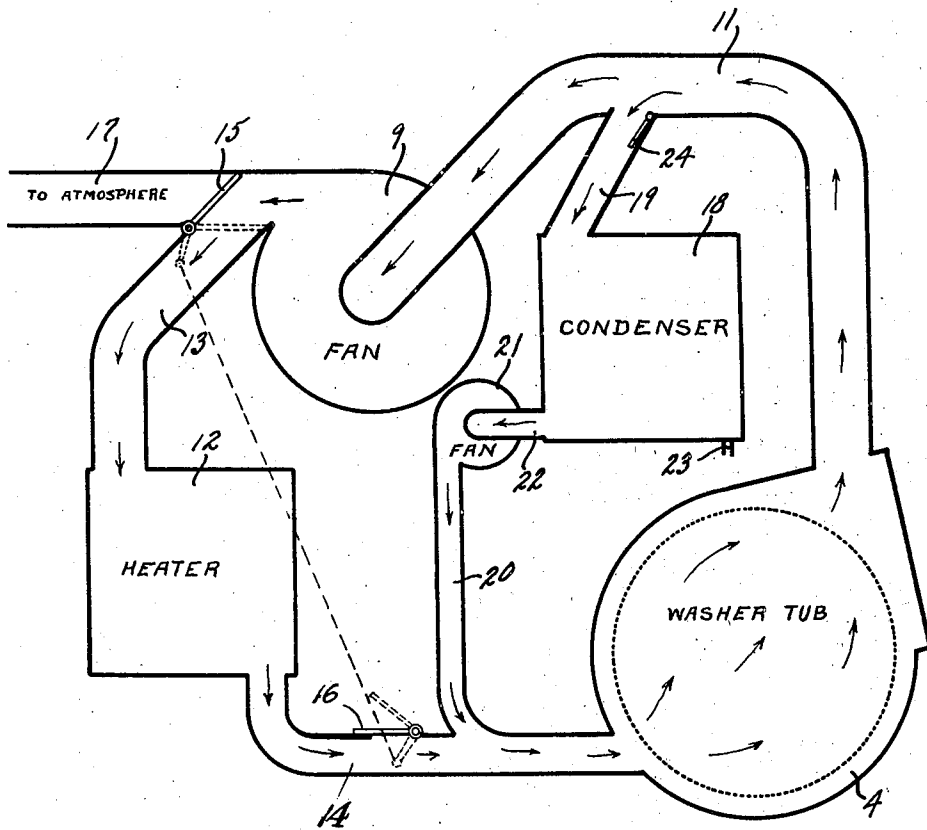


Fig. 3.

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# UNITED STATES PATENT OFFICE

2,064,084

## APPARATUS FOR CLEANING FABRIC

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Application April 22, 1931, Serial No. 531,918

2 Claims. (Cl. 34—3)

My invention relates to apparatus for cleaning fabric, and, particularly, to the drying and deodorizing apparatus forming a part thereof.

In treating fabric with a volatile detergent, and especially one having a low boiling point, it is desirable to prevent loss of the detergent by evaporation, hence, a closed system is preferably provided. Ordinarily, after the treating medium or detergent is drained from the fabric being treated and as a part of the cleaning operation, the fabric is dried in such closed systems by employing a fan to force hot air through a circuit including an air heater, the treating compartment containing the fabric, and a condenser. By this method, the circulating heated air picks up and carries the detergent from the fabric to the condenser in vapor form where it is condensed to liquid form and then drained off to any desired point. With this method, all detergent is entirely removed from the fabric.

It is one object of my invention to provide an improved means for removing all detergent from the fabric undergoing treatment in a short period of time comprising an apparatus whereby only that portion of the heated air which is most saturated with the detergent passes through the condenser, the balance or major portion of the heated air not entering the condenser and not being cooled thereby but passing in its partially saturated condition into the air heater wherein it is reheated before passing again through the treating compartment containing the fabric whereby it absorbs additional vapors and more nearly approaches saturation. In this manner, a great deal of the heat usually necessary for heating the circulating air is conserved since all of the air is not cooled by the condenser and absorption and condensation of the detergent vapors is more rapid which results in drying the fabric in considerable less time. I accomplish this object by connecting the condenser in parallel with the circuit through the fan, air heater and treating compartment.

Another object of my invention is to provide a means that takes the form of a suitable valve or shut off damper provided at or adjacent the condenser intake and in the condenser circuit so that the condenser can be cut out of the normal air circulating circuit entirely for any desired period of time whereby the air may be passed through the heater and through the fabric treating compartment repeatedly to become thoroughly saturated with the volatile detergent before a part thereof is allowed to pass through

the condenser for the removal of detergent liquid by condensation.

Various other objects and advantageous features of my invention will be seen in the following description and one embodiment thereof may be seen in the accompanying drawings wherein similar characters of reference designate corresponding parts, and wherein:

Fig. 1 is an end elevation of a fabric treating apparatus embodying my invention; Fig. 2 is a diagrammatical view of the apparatus; and Fig. 3 is a diagrammatical view showing a modified arrangement of parts.

Referring to the drawings, I have shown a washer or treating compartment adapted to receive fabric to be treated with a fabric treating medium or detergent, and a drying and deodorizing apparatus, mounted on a suitable frame 1 which has the lower ends of its legs 2 supported on I-beams 3. The apparatus consists of a treating compartment 4 having the usual rotatable drum therein connected to a sump tank 5 by means of a drain pipe 6 under the control of a valve 7, the treating compartment 4 being provided with a door 8 that may be tightly sealed. A fan 9 driven by a motor 10 is mounted on the upper part of the frame 1 and has its intake end connected to the upper side of the treating compartment 4 by means of a suitable conduit 11. The fan discharge is connected to an air heater 12 by means of a conduit 13 and the air discharge of the air heater 12 is connected to the treating compartment 4 by means of a conduit 14. Obviously, when the fan 9 is in operation, air will be forced continuously through the circuit from the treating compartment 4, through conduit 11, through fan 9, through conduit 13, through air heater 12, through conduit 14, and thence again to and through the treating compartment 4.

Suitable air valves 15 and 16 are provided at convenient places in the various parts of the air circulating system and are operable simultaneously by a single means and normally held in the full line position, shown in Fig. 2, by spring means (not shown). After the drying operation just described, the air valves 15 and 16 are moved to the dotted line position wherein the valve 15 will close off the intake to the heater 12 and open a passage from the fan 9 to the atmosphere through a conduit 17 while the valve 16 will open a port to permit atmospheric air to enter the conduit 14 and be drawn through the treating compartment 4. Such forced circulation of atmospheric air through the treated goods is con-

tinued until the goods are thoroughly deodorized after which they are moved from the treating compartment 4 and a fresh batch of goods introduced therein.

5 In accordance with my invention, a condenser 18 is interconnected in parallel with the air circulating circuit just described by being connected with the conduit 11 and the conduit 14 by means of a conduit 19 which connects the intake of the condenser with the conduit 11 and the conduit 20 which connects the discharge of the condenser with the conduit 14. As shown, a fan 21 is disposed in the conduit 20 and has its intake side connected to the discharge of the condenser 18 by a short conduit 22. Thus, when the fan 21 is in operation, a portion of the air circulating in the drying circuit hereinbefore described will be drawn in through the conduit 19, through the condenser 18 wherein the detergent in vapor form is transformed into liquid form, through the conduit 22, through fan 21, and then discharged through conduit 20 into conduit 14 where it enters the circuit of air hereinbefore described and travels through the treating compartment 4 therewith.

20 With this construction, the more saturated heated air passing through the horizontal portion of the conduit 11 will normally pass along the lower side of that portion of the conduit due to the force of gravity and, since the conduit opening leading to conduit 19 is in the lower side of that portion of the conduit 11, of course, the most saturated air will pass into the conduit 19 and thence through the condenser 18 as above described, the detergent being removed from the saturated hot air by condensation and the condensed detergent flowing to the sump tank 5 through the conduit 23. A damper or shut-off valve 24 is provided at the junction of conduits 40 11 and 19 to either close off the circulation through the condenser 18 if desired or partially close off the circulation and thereby regulate the amount of saturated air drawn through the condenser 18 by the fan 21.

45 In the operation of this apparatus, referring to Fig. 2, a batch of goods together with a suitable quantity of volatile detergent is placed in the treating compartment 4 and the goods treated until they are ready for the drying operation. 50 Then, the valves 15 and 16 being in the full line position shown and the valve 24 being in open position as shown, the fans 9 and 21 are started in operation whereby a circuit of air will be created from the fan 9 to and through the air heater 55 12, to and through the treating compartment 4, and thence back to the fan. During the travel of the heated air through the treating compartment 4, the air becomes saturated with the volatile detergent and the saturated air is drawn into the condenser 18 by operation of the fan 21 wherein 60 the volatile detergent is condensed out and passes to the sump tank 5 through the conduit 23 while the air from the discharge side of the fan 21 passes into the conduit 14 and is combined with the stream of heated air coming from the air heater 12. This operation is continued until all of the volatile detergent has been removed from the goods in the treating compartment whereupon the valves 15 and 16 are moved to the position shown by the dotted lines in Fig. 2 whereby 70 the fan 9 will draw atmospheric or room air through the port in the conduit 14 controlled by the valve 16, through the treating compartment 4 and to and through the fan, and then discharge the air to the atmosphere again through

the conduit 17, travel of air through the air heater 12 being closed off by the valve 15. This operation is continued until the goods in the treating compartment are completely deodorized and, if desired, the valve 24 may be closed to cut off the condenser 18 from this circuit. 5

In some instances, it may be desirable to conduct the relatively cool air from the condenser 18 through the air heater 12 before it passes into the air circuit traveling through the treating compartment 4 and, as shown in Fig. 3, this may be accomplished by connecting the conduit 20 with the air heater 12 instead of with the conduit 14. In such an arrangement, suitable valve control means 23 are provided for switching the air stream from the fan 21 from one conduit to the other. 15

With the above construction, I have provided a method and apparatus for treating fabric, and particularly an apparatus for drying and deodorizing fabric embodying numerous advantageous features. For instance, I have provided a means for drying the fabric and removing volatile detergent from the circulating drying air wherein the condensing circuit is separate and apart 25 from the heated air circuit, such circuit being in parallel therewith. The apparatus is so constructed that the condensing means may be entirely cut off as an operative part of the apparatus until the heated circulating air has been circulated through the fabric being treated for such a time as to become almost completely saturated with detergent. Further, the detergent separating means being separate and apart from the heated air circuit or in parallel therewith 30 serves the heat used to a great extent in that only a part of the heated air, that which is most highly saturated, passes through the condensing means wherein it becomes cooled while the remainder of the heated air which is saturated to a lesser degree passes again through the air heater and fabric treating compartment without being cooled. Means have been provided for regulating the amount of treating medium laden air that is taken from the main drying circuit. Various other advantageous features will be readily apparent. 45

What I claim is:

1. Apparatus of the character described, comprising a fabric treating compartment wherein the work is subjected to a volatile treating medium, means for drying the work in said compartment including a fan and an air heater freely communicating in series with each other and with said treating compartment to provide a 55 closed heated air circuit through said compartment and thereby vaporize treating medium from the work, and means for recovering the vaporized treating medium from the circulated air, including a fan and a condenser communicating 60 in series with each other in a secondary circuit in shunt around said first named fan, the inlet to said secondary circuit and its condenser being at the bottom of the main air stream at the junction between said circuits, and valve means 65 at said junction adjustable to various positions to control the relative quantity of air flowing through the two circuits and also to a position in which all flow through the secondary circuit is shut off.

2. Apparatus of the character described, comprising a fabric treating compartment wherein the work is subjected to a volatile treating medium, means for drying the work in said compartment including a fan and an air heater freely 75

communicating in series with each other and with said treating compartment to provide a closed heated air circuit through said compartment and thereby vaporize treating medium from the work, and means for recovering the vaporized treating medium from the circulated air, including a fan and a condenser communicating in series with each other in a secondary circuit in shunt around said first named fan and air heater, the inlet to

said secondary circuit and its condenser being at the bottom of the main air stream at the junction between said circuits, and valve means at said junction adjustable to various positions to control the relative quantity of air flowing through the two circuits and also to a position in which all flow through the secondary circuit is shut off.

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