

June 26, 1928.

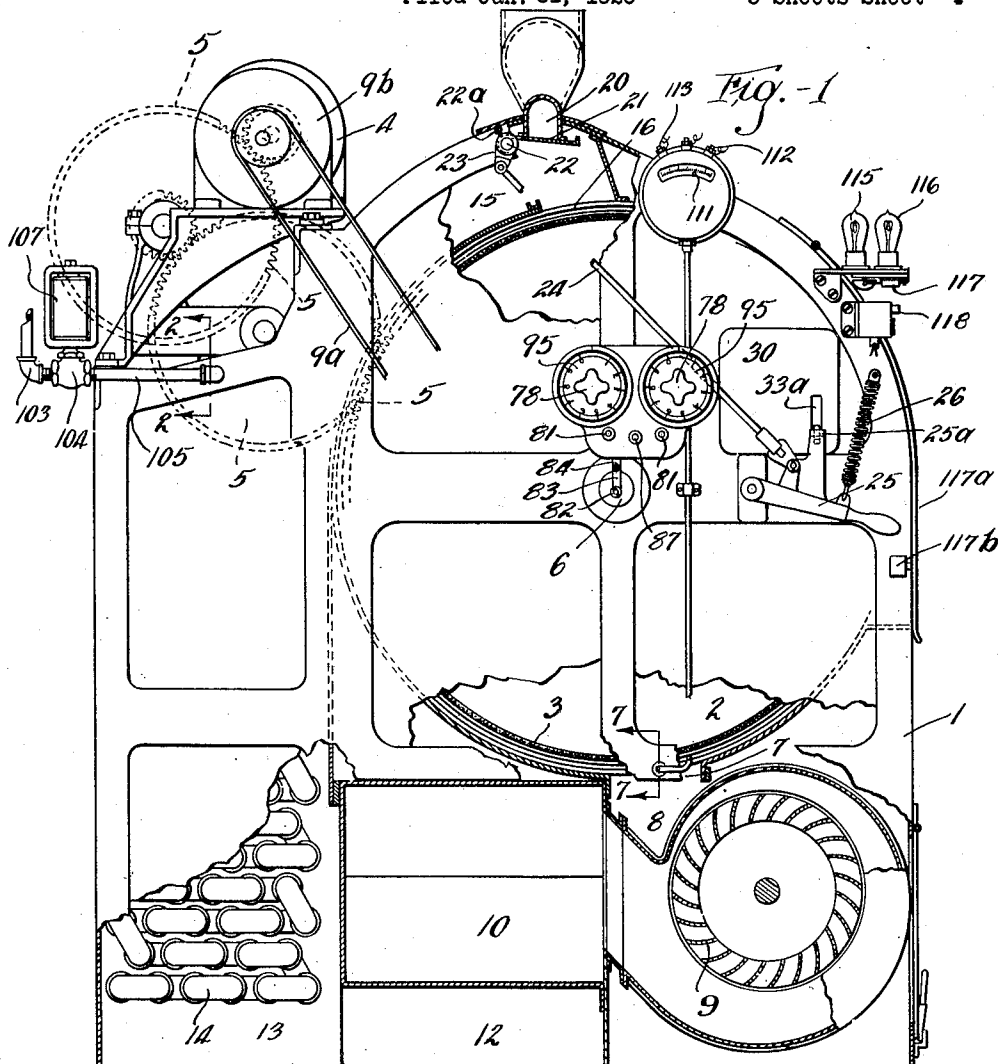
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E. J. CARROLL

APPARATUS FOR TREATING FABRICS

Filed Jan. 31, 1925

3 Sheets-Sheet 1



June 26, 1928.

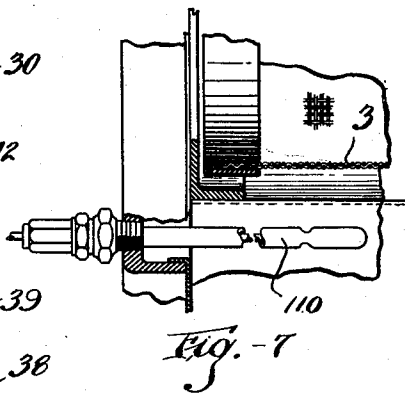
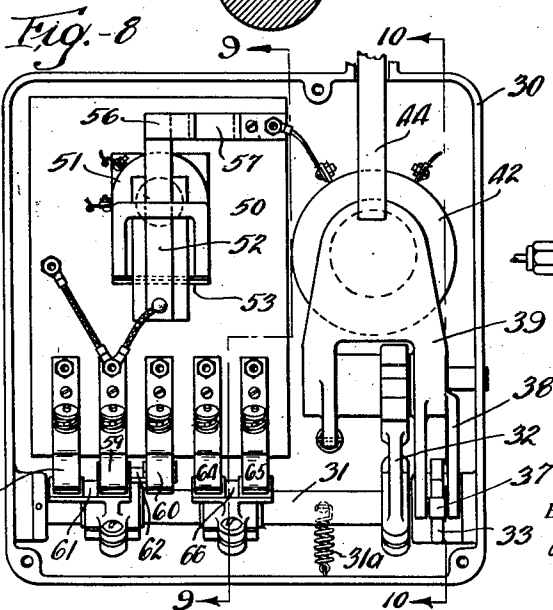
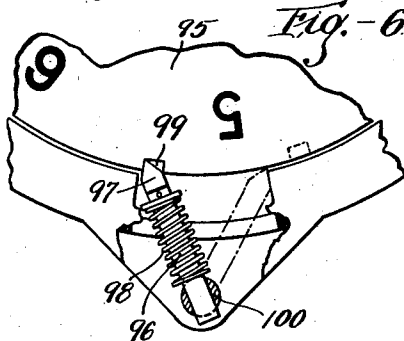
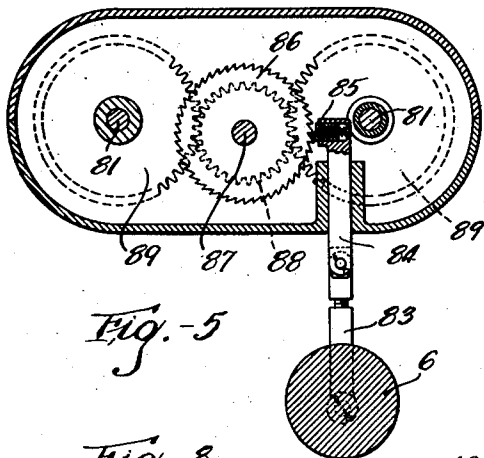
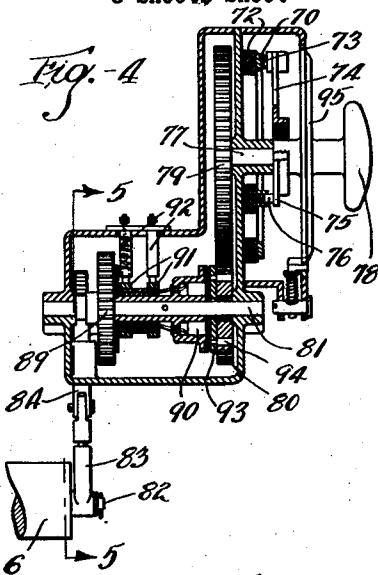
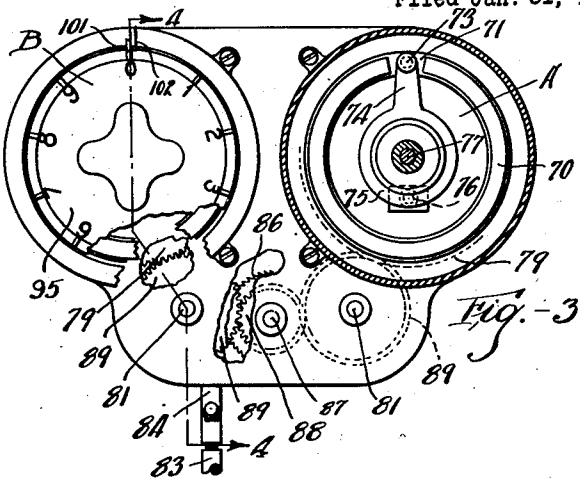
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Filed Jan. 31, 1925

3 Sheets-Sheet 2



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APPARATUS FOR TREATING FABRICS

Filed Jan. 31, 1925

3 Sheets-Sheet 3

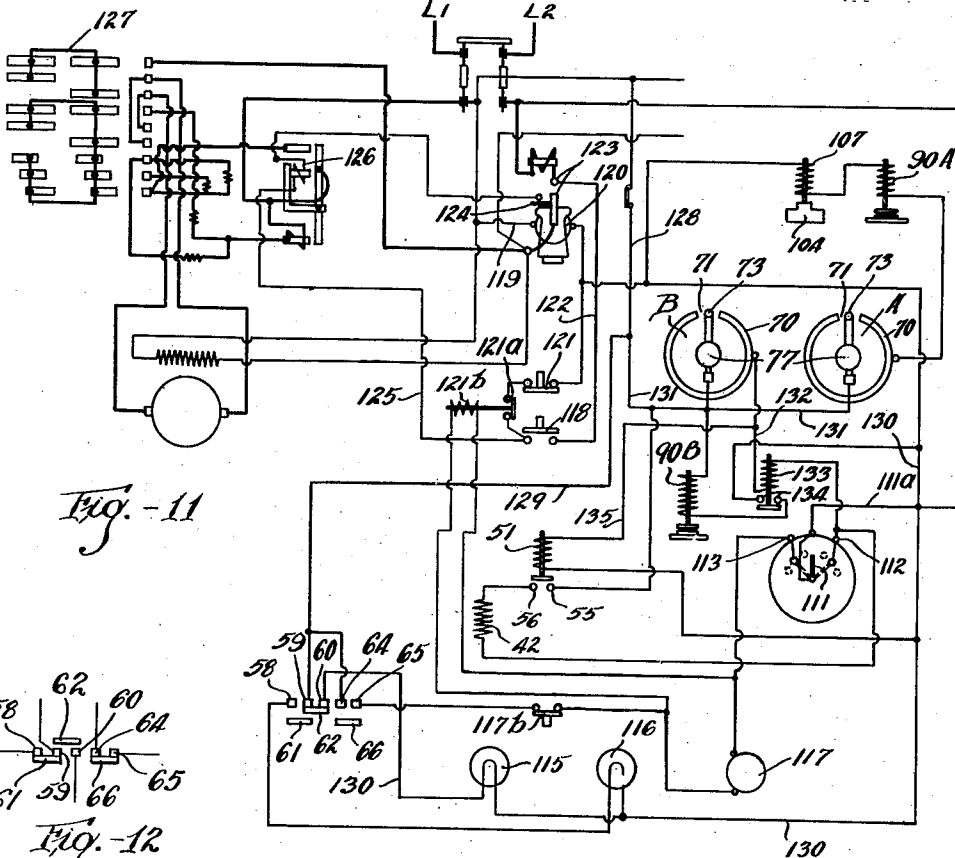


Fig. -11

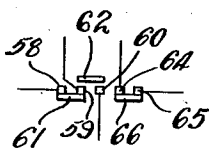


Fig. -12

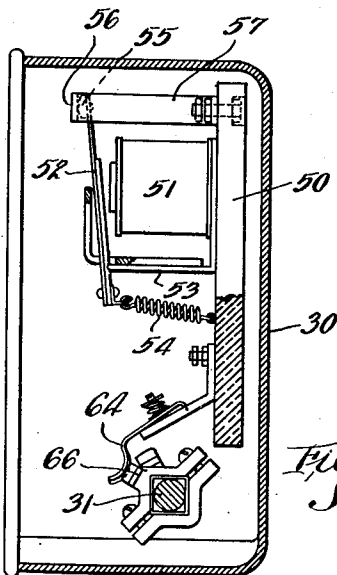


Fig. -9

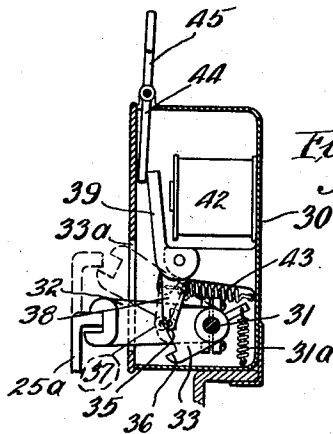


Fig. -10

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1,675,160

UNITED STATES PATENT OFFICE.

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APPARATUS FOR TREATING FABRICS.

Application filed January 31, 1925. Serial No. 6,061.

This invention relates to improvements in apparatus for treating fabrics, such apparatus being used in dry cleaning plants for removing dry cleaning agents from the fabric and for freshening or renovating the same after the dry cleaning operation.

One object of the invention is to provide improved apparatus of this character within which the fabric material, such as wearing apparel, is first dampened by a steam current, one important purpose of the steam being to minimize static effects in the apparatus and reduce fire hazard by humidifying the air during the first part of the cycle of operation when the static effect is usually a maximum, and in which apparatus the material is next subjected to a current of heated air to first remove the moisture and volatilize the cleaning fluids and then to deodorize the material, and in which apparatus the material is finally subjected to a current of cold or fresh air for cooling and freshening purposes.

A further object of the invention is to provide improved control means for the apparatus, which means is entirely automatic in character so that after the operator has started the machine he is free to do other work until the material has been sufficiently cooled and is ready to be removed. More specifically, the invention aims to provide control means which effects the introduction of steam into the machine for a predetermined period, then terminates the steam supply and effects the flow of heated air through the machine to remove the moisture and volatilize the cleaning fluids from the work and after said removal continues said flow for a predetermined period to deodorize the materials; and which finally effects the flow of cold or fresh air through the machine to cool and freshen the materials. The invention also provides a signal system so arranged that when the materials have been cooled to a predetermined degree an audible or other suitable signal is automatically produced, notifying the operator that the work is ready to be removed, and during the flow of heated and cold air automatically produces visible or other suitable signals to advise the operator as to what is taking place in the machine.

Further objects of the invention are in

part obvious and in part will appear more in detail hereinafter.

In the drawings, Fig. 1 is an end elevation of a drying tumbler embodying my invention, parts being broken away and in section; Fig. 2 is a detail sectional view on the line 2—2, Fig. 1; Fig. 3 is a front view of the timing mechanism, part of said casing being broken away to show the mechanism therein; Fig. 4 is a sectional elevation thereof on the line 4—4, Fig. 3; Fig. 5 is a similar view on the line 5—5, Fig. 4; Fig. 6 is a detail view of a part of the timing mechanism; Fig. 7 is a detail sectional view of a thermostatic device on the line 7—7, Fig. 1; Fig. 8 is a front elevation of the latching mechanism, the casing cover being omitted; Fig. 9 is a sectional elevation thereof on the line 9—9, Fig. 8; Fig. 10 is a similar view on a reduced scale, on the line 10—10, Fig. 8; Fig. 11 is a diagrammatic view of the electric circuits; and Fig. 12 is a detail view, showing another position of certain contacts.

For purpose of illustration, the drawings show apparatus of the tumbler type, its particular construction and arrangement being largely immaterial. The machine here illustrated includes a suitable hollow frame or casing 1 in which is a drying chamber 2 containing a foraminous work holding drum 3, within which the fabric or clothing is tumbled or agitated by rotating the drum. For this purpose, the drum is turned first in one direction and then in the other by a suitable source of power, such as an electric motor 4 having its driving shaft connected by suitable gearing 5 to the shaft 6 of the drum.

Communicating with the drying chamber through an opening 7 is an air chamber 8 within which is a fan or blower 9 driven by belt 9^a from motor 9^b and having its suction side connected with the air chamber 8 and its outlet communicating with a passage 10 opening to the atmosphere at one end of the machine. The fan motor may be a constantly rotating motor controlled by a separate switch and circuit, or may be in circuits controlled by or in connection with the circuits for other part of the apparatus, as in my copending application hereafter referred to. Atmospheric air entering the casing inlet opening 12 at the opposite end of

the machine flows into the heating chamber 13 in which is a suitable heating device, such as the steam pipes or coils 14. From chamber 13, the heated air flows through passage 15 and opening 16 into the drying chamber 2 through the work containing drum therein, and thence into the air chamber 8 and the fan or blower 9, being discharged by said fan through the casing outlet passage 10.

At the top of the tumbler casing is the cold or fresh air inlet 20 which is covered during the flow of steam and of heated air by a damper 21 adjustably mounted by means of a set screw 22^a upon a shaft 22 having an arm 23 connected by a link 24 with a pivoted, manually operable control lever 25. When said control lever is held in its lowermost position, as in Fig. 1, by the latch mechanism hereinafter described, the damper 21 covers the cold air inlet. When the latch mechanism is actuated to release the control lever, the latter is pulled to its uppermost position by a spring 26, thereby rocking the shaft 22, swinging the damper 21 downwardly to open the cold air inlet and closing the passage 15 through which heated air passes into the drying chamber.

The latching mechanism for control lever 25 is arranged within a suitable casing 30, secured to one end wall of the tumbler casing. Journalled in the lower portion of this latch casing is a shaft 31, normally tending to turn in a clockwise direction under the action of a spring 31^a, and upon which shaft are fixedly mounted latch arms 32 and 33. Arm 32 extends through a vertical slot 33^a in the front wall of the latch casing (Fig. 10) and has a bifurcated forward end to receive the hook extension 25^a of control lever 25. Latch arm 33 is provided with upper and lower shoulders or abutments 35, 36 for cooperation with a roller 37 on the depending trigger arm 38 of a pivoted armature 39. Said armature cooperates with a coil 42, being normally held away from said coil by a spring 43. When the latching parts are in the position shown in full lines, Fig. 10, the control lever 25 is held or latched in its lower position, Fig. 1, by the engagement of its hooked extension 25^a in the recess in the end of latch arm 32 which, together with the latch member 33, is held in the position shown by the engagement of the armature trigger 38 with latch arm abutment 35. The latching parts may be released by energization of coil 42, which attracts the armature 39 and moves the roller 37 thereof outwardly and away from abutment 35, thereby permitting latch members 32 and 33 to be raised by the spring 31^a (Fig. 10) and control lever 25 to be raised by the spring 26 (Fig. 1), thereby shifting the damper 21 from hot air to cold air position. Suitable means may also be provided for tripping the parts manually, such as a

finger lever 44 pivoted on the latch casing and having a thumb piece 45 exposed above the same and a lower arm lying in front of the armature. Assuming the latch to be released with the roller 37 lying against abutment 36, as in dotted lines Fig. 10, and coil 42 to be de-energized, the armature 39 and its attached arm 38 are now subject to the influence of spring 43, so that when lever 25 is depressed manually its hooked extension 25^a enters the recess in arm 32 and pulls said arm downwardly until the roller 37 snaps in behind the abutment 35, the parts then being locked or latched in the position shown in full lines Fig. 10 until again released.

In the latch casing 30 at one side of the coil 42 is an insulating support 50 carrying a coil 51 with which cooperates an armature 52 pivotally mounted intermediate its ends on a bracket 53 carried by the insulating support 50. This armature is held away from coil 51 by a spring 54. The upper end of said armature carries a contact 55 adapted for cooperation with a stationary contact 56 electrically connected to the coil 42 and carried by a bracket 57 secured to the upper end of the insulating support 50. Mounted upon the lower end portion of this insulating support below the magnetic coil 51 is a set of five contact fingers. The first three of these fingers, numbered 58, 59 and 60 are adapted for cooperation with the bridging contacts 61, 62 carried by an insulating block mounted upon the shaft 31. The remaining two contact fingers 64 and 65 are adapted for cooperation with a bridging contact 66 on an insulating block also fast upon the shaft 31.

In the present machine there are two operations, each of which it is desired to terminate after a predetermined but definite time interval, to wit, the steaming and deodorizing operations. The machine is therefore provided with timing mechanism including two like timing devices, one for each of said operations. In Fig. 3 let it be assumed that the timer "A" at the right is for the steaming operation and the timer "B" at the left is for the deodorizing operation. Except as hereinafter noted description of one thereof will therefore suffice for both.

Each timer includes a stationary circular conducting segment 70 having a gap 71 and mounted upon an insulating base 72, said segment co-operating with a movable contact 73 carried by a conducting arm 74 having a ring portion 75 co-operating with a stationary brush 76. Said ring and arm portions are mounted to turn with a shaft 77 provided at one end with an operating knob 78 and at the other end with a gear 79 adapted to be driven by a gear 80 loosely rotatable on the shaft 81. The two gears 80 for the two timing devices, one at each side

of the timer casing shown in Fig. 3, are adapted to be individually and selectively driven by suitable driving mechanism, such as by a connection to the motor 4, which reversely rotates the drum 3. In the present instance the timers are actuated by said motor by means of a connection to the drum shaft 6, said connection including an eccentrically arranged shaft pin 82 connected by a rod 83 to a reciprocable slide 84 provided with a yielding pawl 85. Said pawl cooperates with the teeth of a ratchet wheel 86 on a shaft 87 having a pinion 88 meshing with two gears 89, one connected to rotate each of the shafts 81, before referred to. Therefore, said shafts 81 are continually rotated in one direction when the drum is in operation, and regardless of reversals of rotation of the drum.

Suitable means is provided to connect either of the two timing devices to be driven by its shaft 81 when desirable. The means shown for the purpose is an electromagnetic clutch, comprising a coil 90 rotatable with the shaft 81 and having proper electrical connections through the conducting rings 91 and brushes 92, and which coil co-operates with an armature in the form of a disk 93 having free but relatively small longitudinal motion on shaft 81 and provided with pins 94 entering openings of the gear 80. When the electro-magnetic coil is energized the armature 93 is attracted toward said coil and is caused to turn with it and with shaft 81, thereby driving gear 80 and pinion 79 and causing the arm 74 to move the contact 73 over the segment 70. The motion of both of the arms 74 when so driven, is in the clockwise direction, Fig. 3.

To set either of the timers, the knob 78 is turned in the counterclockwise direction, Fig. 3, thereby loosely rotating the pinions 79 and 80 and armatures 93. The parts are turned an amount having a definite time value, as predetermined by the speed of shaft 6 and as indicated by the dial 95 also carried by shaft 77. When adjusted, the parts will stay in the position to which adjusted until the clutch is coupled by energization of the coil 90, whereupon rotation of the drum shaft 6 through pawl 85 will turn the ratchet 86 and drive the gears to turn arm 74 and ultimately restore the parts to initial or zero position with the contact 73 opposite the gap 71.

Preferably means is provided to produce a quick break in the circuit when the gap is reached. For this purpose the drawings show a pin 96 having a V head 97 urged yieldingly by the spring 98 against the periphery of the dial 95, which is provided at one point in its periphery with a notch or recess 99. Said pin is mounted to slide crosswise in a stub shaft 100 loosely journalled to turn in the casing. Fig. 6 shows the

parts in the zero position of the timer, with the pin 96 inclined toward the left and its head urged yieldingly by the spring into the recess 99. When the dial is turned with the shaft 77 to set the timer the first increment of motion of the dial in the counterclockwise direction moves the notch 99 to the right in Fig. 6, carrying with it pin 96 and turning the same with the shaft 100 to the dotted line position Fig. 6, with the head of the pin pressed against the periphery of the dial. Operation of the timer by shaft 6 returns the dial to its original position and during the last increment of its return motion the recess 99 comes into range of the pin 96 which enters said recess and with the pin passes over dead center position and finally subjecting the dial to the expanding effect of the spring 96, which therefore quickly snaps the dial to its final position, with a quick passing of contact 73 from the segment 70 to the gap 71. The final position of the parts is determined by any suitable stop means, such as the member 101 on the dial which engages a fixed stop or abutment 102 on the casing.

The machine is also provided with suitable means for introducing a suitable moistening agent, such as live steam, to the air circulating system, said steam preferably entering the air circulating system before the air current reaches the work being treated. The purpose of this live steam is to keep moist the air laden with gas volatilized from materials previously subjected to a dry cleaning operation and thus reduce or eliminate fire hazard. The tendency to produce minute arcs by static effects is also reduced or eliminated and the steam assists in freeing lint from the garments. The means shown for introducing steam comprises a steam supply pipe 103 connected by way of a valve 104 with a pipe 105 extending into the heating chamber, such as near the top thereof, where said pipe is perforated as at 106 to form jets. Valve 104 is normally closed, but is opened by energization of an electromagnet, the coil of which is indicated at 107.

Certain operations of the machine, such as the shifting of the damper 21 and the sounding of an alarm at the conclusion of all operations, are preferably governed by thermostatically controlled means, such as the thermostatic element or member 110 extending into the air circulation system at a suitable point, preferably at a point beyond the drying chamber, and which element is connected to and actuates the movable current conducting arm 111 of a thermostatic controller, said arm co-operating with two individually adjustable contacts 112, 113, the first of which is for the maximum temperature and the second of which is for the minimum temperature as will appear.

Referring to the diagram, Fig. 11, 115 indicates a lamp, the illumination of which occurs when hot air is being circulated, while the lamp 116 indicates the circulation of cold air. 117 represents a suitable signal device such as a buzzer, bell or the like, for indicating the termination of all operations.

The operation is as follows: Let us assume that the parts are in the position shown in Fig. 1, with the drum loaded with material to be dried and de-odorized and that the outer door 117^a of the casing is closed. Said door in closed position closes a normally open switch 117^b in a circuit to the audible signal 117. The machine is started by energizing the fan driving motor through its main switch and particularly by depressing the starting button 118, Fig. 11. The starting circuit is as follows: From L¹ by way of wire 119 through the coil of the relay 120, thence through the stop buttons 121, 121^a, start button 118 and by way of wire 122 to L². Energization of coil 120 closes the two sets of normally open contacts 123 and 124. Closing of contacts 124 completes a maintaining circuit for the coil 120, from the stop button 121 by way of wire 125, the series coil 126 of a contactor and contacts 123, while contacts 123 also complete the motor circuit to and through the drum controller indicated generally at 127, and which may be driven by any suitable driving mechanism, such as a pilot motor or the like. Said controller by steps reduces the resistance in the motor circuit, finally throwing it across the line and on the second half of its cycle reverses the motor circuit and again varies the resistance so that the effect of the controller is as usual to produce rotation of the motor first in one direction and then in another to thereby rotate the drum 3 reversely in opposite directions. Drum shaft 6 of course rotates reversely in opposite directions but regardless of the direction of its rotation its effect upon the pawl 85 which actuates the timing mechanism is the same. It has been assumed for example that the timer "A" for the steam operation is set for, say five minutes, and the timer "B" which controls the de-odorizing operation, is set for, say, six minutes, by rotation of the timer shafts 77 to their proper positions, and that the adjustable maximum and minimum contacts 112, 113 of the thermostatic controller have been set for definite desirable maximum and minimum temperatures. Since the contacts 124 are closed to complete a circuit through the stop buttons 121, 121^a, a circuit is completed from L¹ by way of wires 128, 129 to the contact 59, which is bridged to contact 60 by bridge 62, thence through the lamp 115 and by wire 130 to the stop button 121 and thence to L². Lamp 115 is therefore illuminated and indicates

circulation of hot air. The damper 21 is in the position shown in Fig. 1 and atmospheric air is drawn in at the bottom of the machine, passed through the heater and thence to the drying chamber and is then discharged by the fan to the atmosphere. At the same time a circuit is completed from wire 128 by way of wire 131, and timer "A" through the coil 107 which opens the valve 104 and causes steam to be supplied to the air current to moisten the air current in the drying chamber. Likewise the clutch actuating coil 90^a of the timer "A" is energized, thereby closing its particular magnetic clutch and connecting the timer "A", controlling the steam supply, to be driven by the shaft 6.

The steaming operation proceeds for a definite period governed by the setting of the timer "A", five minutes in this instance, and at the end of said period the circuit through the timer "A" is quickly broken by the spring pin 96, Fig. 6, thereby de-energizing coils 107 and 90^a, cutting off the supply of steam and de-energizing the clutch operating coil and terminating the drive of the timer "A", which remains ready for another setting.

The second step or phase of the operation now proceeds, to wit, the drying operation during which atmospheric air heated in the heater is circulated over the clothes as before, but without a supply of steam. This operation continues until the last vestige of moisture or cleaning fluid or substance is removed from the clothes, whereupon the temperature of the air current leaving the drying chamber begins to rise until finally it reaches a maximum, causing the thermostatic element 110 to produce movement of the arm 111 sufficient to reach the maximum contact 112. This completes a circuit from wire 131 through the contact 73 and segment 70 of timer "B" and by way of wire 132, coil 133, the thermostatic controller and wire 111^a to L². Energization of coil 133 closes the normally open contacts 134, completing a circuit from wire 131 through coil 90^b of the timer "B" and contacts 134 to wire 130 and to L² and thereby closing the magnetic clutch of said timer and causing the same to be driven, like timer "A", by the reversely rotated drum shaft 6. The initial setting of timer "B" has also completed a circuit from the segment 70 of said timer by way of wire 135 through the coil 51, thereby opening the normally closed contacts 56, 55 and opening the circuit through coil 42 of the latch mechanism, so as to maintain the latching parts in their latching positions, Fig. 10.

With the parts in this position, the third step or phase of the operation proceeds, to wit, the de-odorizing operation, during which hot air is circulated through the work

in the machine for a period determined by the timer "B", six minutes in this particular instance. When this period is concluded the controlling circuit through timer "B" is opened by the passage of its contact 73 off from its segment 70, thereby de-energizing coil 133 and opening contacts 134 and de-energizing coil 90^b, so that the magnetic clutch is uncoupled. The timer "B" remains at rest ready for another setting. Opening of the circuit through timer "B" also de-energizes the circuit through coil 51, thereby permitting the circuit through coil 42 to be closed at the contacts 55, 56, so that the latching parts are tripped by the armature 39 and the arm or lever 25 is released for operation by its spring 26. At the same time rotation of the shaft 31 by its spring 31^a shifts the bridging contacts 61, 62, 66 to the position shown in Fig. 12 in which position the circuit from 59 to 60 is broken and new circuits are established between contacts 58, 59 and 64, 65.

Movement of the lever 25 shifts the damper 21 to the cold air position, opening the fresh or cold air inlet 20 and closing the passage 15.

The circulation of hot air during the deodorizing period, terminated in the manner just described, has for its effect the removal from the work of any slight traces of odor such as might cling to the work as the result of the use of detergents, dry cleaning agents or any other materials.

When the bridging contacts 61, 62, 66 are shifted to their second position, just referred to, the circuit through the hot air lamp 115 is interrupted and a new circuit is established across the contacts 59, 58 through the cold air lamp 116, the illumination of which indicates the flow of fresh or cold air over the work. At the contacts 64, 65 a circuit is established through the now closed door operating switch 117^b and through both the audible signal 117 and the coil 121^b, but said circuit is interrupted at the thermostatic controller. When the cold air passed across the work reduces the temperature of the air current to the desired minimum, represented by the position to which the minimum contact 113 is adjusted, the arm 111 of the thermostatic controller reaches contact 113 and completes a circuit through the thermostatic controller, thereby de-energizing relay coil 120 and stopping the machine and sounding an alarm at the signal 117, advising the operator that the particular cycle has been completed. The door is opened, thereby opening switch 117^b and stopping the alarm, and the drum is unloaded and reloaded. Next, the two timers, "A" "B" are reset for the desired period for steaming and de-odorizing, the handle 25 is pulled down to again latch the damper 21 in hot air position, the doors are closed and

the start button 118 is depressed to initiate another cycle. If for any reason the operator fails to reset the dial "B" for the deodorizing timer the damper lever will not remain in the hot air circulating position, due to the fact that coil 51 is not energized, contacts 55, 56 are closed and coil 42 remains energized. If the operator fails to set the damper lever after setting the timers an audible signal will again be sounded when the casing door is closed, because the bridging contact 66 remains in its position Fig. 12, and the circuit through the audible signal 117 remains complete. Such warning therefore advises the operator to set the damper lever. Neither can the machine be re-started until coil 121^b is de-energized by setting the damper lever.

The cycle of operations may be interrupted at any time by depressing stop button 121, thereby de-energizing all circuits except those through the wire 128, and upon depressing the start button with all parts in their proper positions the cycle may be continued to its proper conclusion from the point at which it was interrupted.

Considering the mechanism as a whole it is practically automatic throughout, the operation requiring only the setting of the various parts and the initiation of the cycle, which is carried out to conclusion without attention by the operator, who is notified of the completion of the cycle by the audible signal. During the cycle of operations the work is first steamed, then dried, then de-odorized, and then cooled, the steaming and de-odorizing periods being definitely limited to any predetermined period and the drying and cooling periods terminating when predetermined maximum and minimum temperatures are respectively reached. The net result is a proper drying and freshening of the work in the most efficient manner. While the invention is applicable particularly for use in dry cleaning plants, it will be understood of course that certain features may also be used in connection with other classes of work such as in laundries, etc.

While, of course, the control of the latching mechanism in the present apparatus is effected by a thermostatic element sensitive to variations in temperature, nevertheless, in a way the air circulation is controlled by or in accordance with the humidity of the heated air. In other words, the humidity of the heated air has an effect upon the temperature to which the thermostatic element is sensitive and by setting the thermostatic element to a desired maximum temperature responsive point, practically any desired predetermined minimum degree of humidity may be reached in the drying operation. For example, in wet wash plants the goods are tumbled in a drying tumbler, such as the one here described, not only to break up the

mass, but also to remove a portion of the water. With the present apparatus, the maximum temperature setting may be reduced and the de-odorizing period of such duration that when the hot air is cut off there will remain in the material a predetermined percentage of moisture which may be greater than the percentage of moisture in clothes dried for other subsequent laundry operations.

Again, in drying woolen materials a lower temperature is desirable than for other materials to prevent injury to the wool. Control of the temperature may be effected in different ways. For example, in Fig. 1, the damper 21 is adjustably mounted by the set screw 22¹ on shaft 22 and therefore adjustable relative to the operating link 24. Damper 21 may thereby be adjusted during the drying operation so as to admit cold air in small quantity to the circulating air current to reduce its temperature to such a degree that it will not injure the material and will still be hot enough to liberate the moisture from the same.

What I claim is:

1. Apparatus for treating fabrics, comprising a receptacle for the fabric, means for subjecting the fabric to a current of heated air, means for supplying a moistening agent to said air current before it reaches the fabric, means for terminating the supply of said moistening agent, and means for terminating said air current when the temperature of said air current leaving the fabric reaches a predetermined degree.

2. Apparatus for treating fabrics, comprising a receptacle for the fabric, means for subjecting the fabric to a current of heated air, means for supplying a moistening agent to said air current before it reaches the fabric, means for terminating after a predetermined limited time the supply of said moistening agent, and means for terminating said air current when the temperature of said air current leaving the fabric reaches a predetermined degree.

3. Apparatus for treating fabrics, comprising a receptacle for the fabric, means for supplying a moistening agent to the fabric and for subjecting the fabric to the flow of a current of heated air, means for stopping the supply of the moistening agent at the end of a limited time period, and means arranged when the temperature of said air current is a predetermined maximum to reduce the temperature of the air current to which the fabric is subjected.

4. Apparatus for treating fabrics, comprising a receptacle for the fabric, means for supplying a moistening agent to the fabric, means for terminating such supply after a predetermined time period, means for subjecting the fabric to a current of heated air, and means adapted when the temperature of

said air current reaches a maximum to reduce after a limited time the temperature of the air current to which the fabric is subjected.

5. Apparatus for treating fabrics, comprising a receptacle for the fabric, means for supplying a moistening agent to the fabric, means for terminating such supply, means for subjecting the fabric to a current of heated air, and means adapted when the temperature of said air current reaches a maximum to reduce after a limited time the temperature of the air current to which the fabric is subjected.

6. Apparatus for treating fabrics, comprising a receptacle for the fabric, means for supplying moisture to the fabric for a limited time period, means for subjecting the fabric to the effect of a current of heated air, and means adapted when the temperature of said air current reaches a maximum to reduce after a limited time the temperature of the air current to which the fabric is subjected and for cutting off the flow of air to said fabric when the temperature of said air current reaches a predetermined minimum.

7. Apparatus for treating fabrics, comprising a receptacle for the fabric, means for subjecting the fabric to the effect of a current of heated air, and means adapted when the temperature of said air current reaches a maximum to reduce after a limited time the temperature of the air current to which the fabric is subjected and for cutting off the flow of air to said fabric when the temperature of said current reaches a predetermined minimum.

8. Apparatus for treating fabrics, comprising a receptacle for the fabric, means for supplying moisture to the fabric for a limited time, means for subjecting the fabric to the effect of a current of heated air, means adapted when the temperature of said air current reaches a maximum to reduce after a limited time the temperature of the air current to which the fabric is subjected and for cutting off the flow of air to said fabric when the temperature of said air current reaches a predetermined minimum, and means adapted when said minimum temperature is reached to produce an alarm.

9. Apparatus for treating fabrics, comprising a receptacle for the fabric, means for supplying moisture to the fabric for a limited time period, means for subjecting the fabric to the effect of a current of heated air, means adapted when the temperature of said air current reaches a maximum to reduce after a limited time the temperature of the air current to which the fabric is subjected and for cutting off the flow of air to said fabric when the temperature of said air current reaches a predetermined minimum, and means adapted when said mini-

imum temperature is reached to stop the machine.

10. Apparatus for treating fabrics, comprising a receptacle for the fabric, means for supplying moisture to the fabric for a limited time period, means for subjecting the fabric to the effect of a current of heated air, means adapted when the temperature of said air current reaches a maximum to reduce after a limited time the temperature of the air current to which the fabric is subjected and for cutting off the flow of air to said fabric when the temperature of said air current reaches a predetermined minimum, and means adapted when said minimum temperature is reached to produce an alarm and stop the machine.

11. Apparatus for treating fabrics, comprising a receptacle for the fabric, means for subjecting the fabric in said receptacle to a moistening agent, means for subjecting the fabric to a current of heated drying air, means for subjecting the fabric to a current of cool air, and controlling means for determining the initiation of each of said operations.

12. Apparatus for treating fabrics, comprising a receptacle for the fabric, means for subjecting the fabric in said receptacle to a moistening agent, means for subjecting the fabric to a current of heated drying air, means for subjecting the fabric to a current of cool air, and controlling means for determining the initiation and the duration of each of said operations.

13. Apparatus for treating fabrics, comprising a receptacle for the fabric, means for subjecting the fabric in said receptacle to a moistening agent, means for subjecting the fabric to a current of heated drying air, means for subjecting the fabric to a current of cool air, and controlling means including terminating means for at least one of said operations.

14. Apparatus for treating fabrics, comprising a receptacle for the fabric, means for subjecting the fabric in said receptacle to a moistening agent for a limited time period, means for subjecting the fabric to a flow of heated drying air, means for subjecting the fabric to a flow of cool air, and temperature responsive means for terminating one of said air flow operations.

15. Apparatus for treating fabrics, comprising a receptacle for the fabric, means for subjecting the fabric in said receptacle to a moistening agent for a limited time period, means for subjecting the fabric to a flow of heated drying air, means for subjecting the fabric to a flow of cool air, temperature responsive means for terminating one of said air flow operations, and means whereby said timing and said temperature responsive means are dependent on each other.

16. Apparatus for treating fabrics, comprising a receptacle for the fabric, means for subjecting the fabric to a moistening operation, means for subjecting the fabric to a drying operation by subjecting the same to a current of heated air, means for subjecting the fabric to a cooling operation by subjecting the same to a current of cool air, and time responsive means and temperature responsive means for controlling one of said operations.

17. Apparatus for treating fabrics, comprising a receptacle for the fabric, means for subjecting the fabric to a moistening operation, means for subjecting the fabric to a drying operation by subjecting the same to a current of heated air, means for subjecting the fabric to a cooling operation by subjecting the same to a current of cool air, and time responsive means and temperature responsive means for controlling said drying operation.

18. Apparatus for treating fabrics, comprising a receptacle for the fabric, means for subjecting the fabric to a moistening operation, means for subjecting the fabric to a drying operation by subjecting the same to a current of heated air, means for subjecting the fabric to a cooling operation by subjecting the same to a current of cool air, and time responsive means and temperature responsive means for controlling one of said operations, said time responsive means being controlled by said temperature responsive means.

19. Apparatus for treating fabrics, comprising a receptacle for the fabric, means for subjecting the fabric to a moistening operation, means for subjecting the fabric to a drying operation by subjecting the same to a current of heated air, means for subjecting the fabric to a cooling operation by subjecting the same to a current of cool air, and time responsive means and temperature responsive means for controlling one of said operations, one of said responsive means being controlled by the other responsive means.

20. Apparatus for treating fabrics, comprising a receptacle for the fabric, means for subjecting the fabric to a moistening agent for a limited period, means for subjecting the fabric to a heated drying agent, temperature responsive means for terminating the operation of said drying means, and means rendered effective thereby for subjecting the fabric to the effect of a cooling agent.

21. Apparatus for treating fabrics, comprising a receptacle for the fabric, means for subjecting the fabric to a moistening agent for a limited period, means for subjecting the fabric to a heated drying agent, temperature responsive means for terminating the operation of said drying means, means rendered effective thereby for subjecting the

fabric to the effect of a cooling agent, and temperature responsive means for terminating said cooling operation.

22. Apparatus for treating fabrics, comprising a receptacle for the fabric, means for supplying a moistening agent to the fabric, means for subjecting the fabric to a flow of heated air, time controlled means for automatically terminating the supply of moistening agent to the fabric, and time controlled means for terminating the flow of heated air to the fabric.

23. Apparatus for treating fabric, comprising a receptacle for the fabric, means for supplying a current of heated air to the fabric, and means adapted when the temperature of said air current reaches a predetermined maximum to reduce after a limited time the temperature of the air current supplied to the fabric.

24. Apparatus for treating fabric, comprising a receptacle for the fabric, means for subjecting the fabric to a flow of air, and means for terminating the flow of air to said fabric a predetermined time period after the temperature of said air current reaches a predetermined degree.

25. Apparatus for treating fabrics, comprising a receptacle for the fabric, means for

subjecting the fabric to a moistening agent, means for subjecting the fabric to a flow of heated air, means for subjecting the fabric to a flow of cool air, and time responsive means and temperature responsive means for controlling said operations.

26. Apparatus for treating fabrics, comprising a receptacle for the fabric, means for subjecting the fabric to a moistening agent for a limited time period, means for subjecting the fabric to a current of heated air, means for terminating the flow of heated air to said fabric, and means rendered effective thereby for subjecting the fabric to a flow of cool air.

27. Apparatus for treating fabrics, comprising a receptacle for the fabric, means for subjecting the fabric to a moistening agent for a limited time period, means for subjecting the fabric to a current of heated air, temperature and time responsive means for terminating the flow of heated air to the fabric, and means rendered effective thereby for subjecting the fabric to a flow of cool air.

In testimony whereof I hereby affix my signature.

EMIL J. CARROLL.