Sept. 10, 1963 H. W. JANSON 3,103,450

FABRIC TREATING APPARATUS

Filed Jan. 12, 1962 3 Sheets-Sheet 1

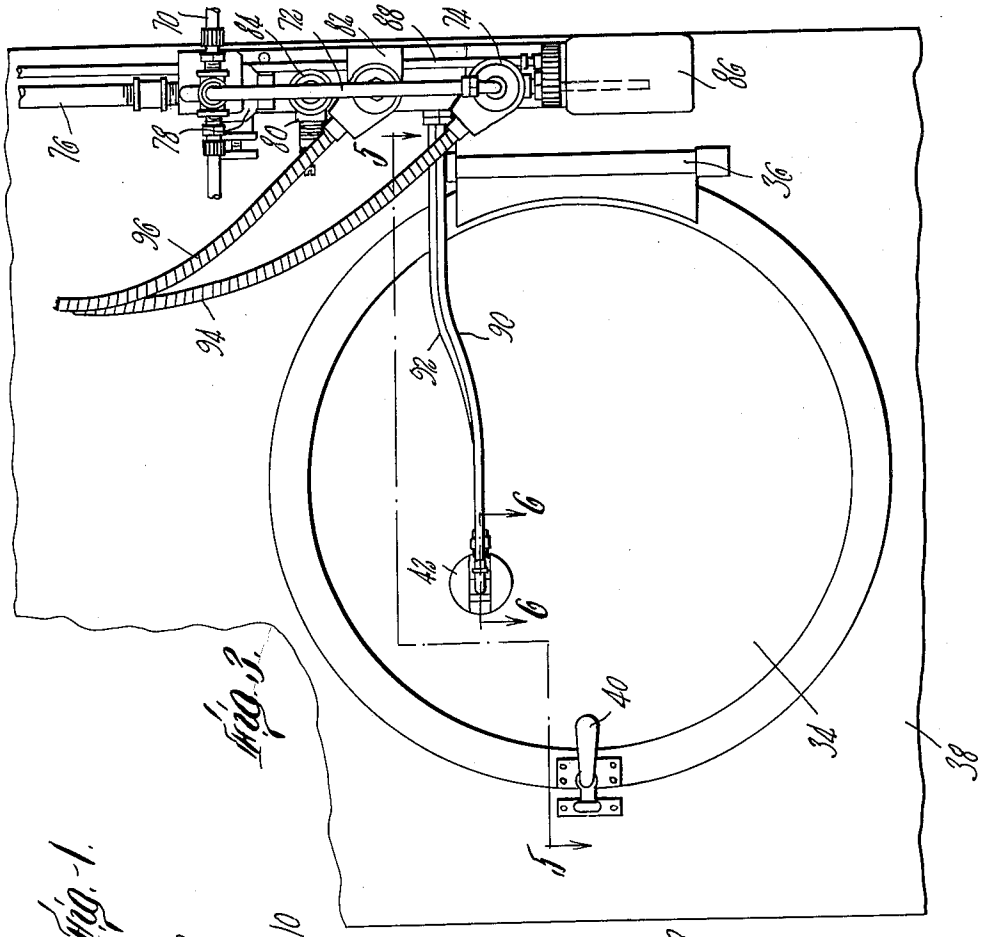


Fig. 3.

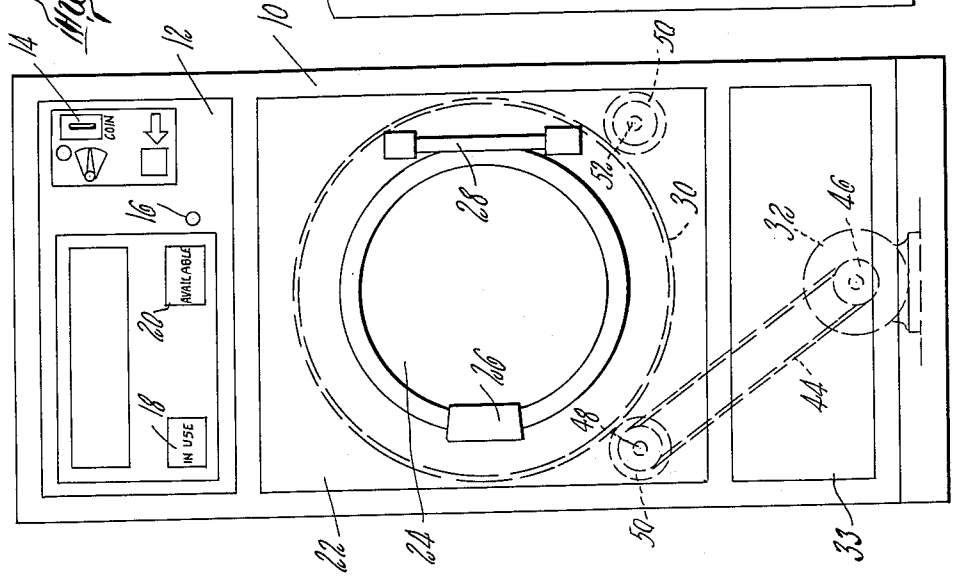


Fig. 1.

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FABRIC TREATING APPARATUS

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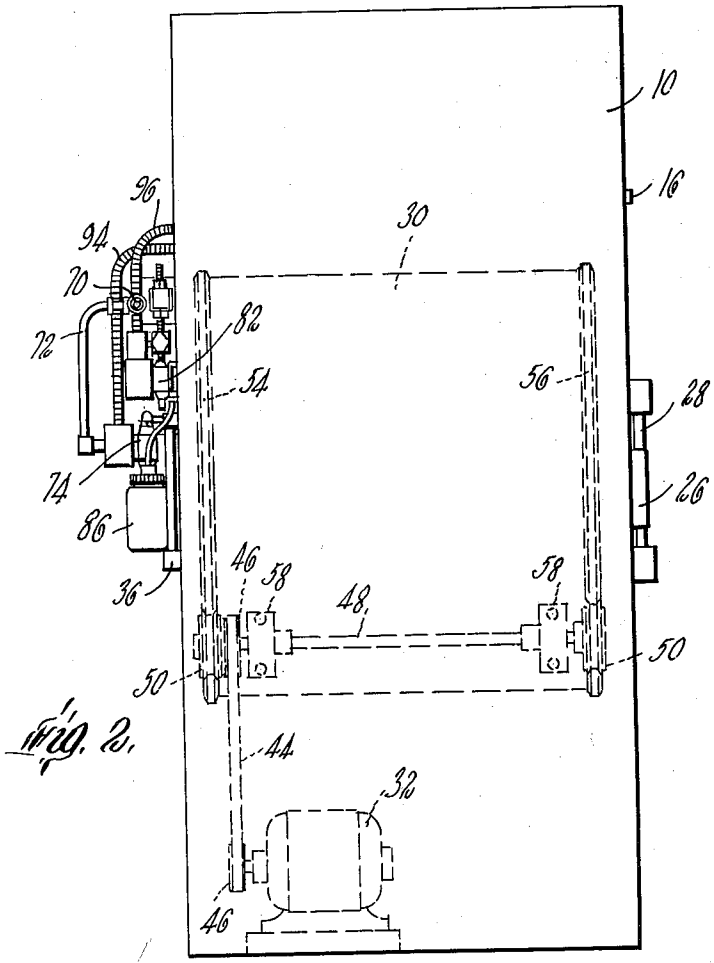


Fig. 2.

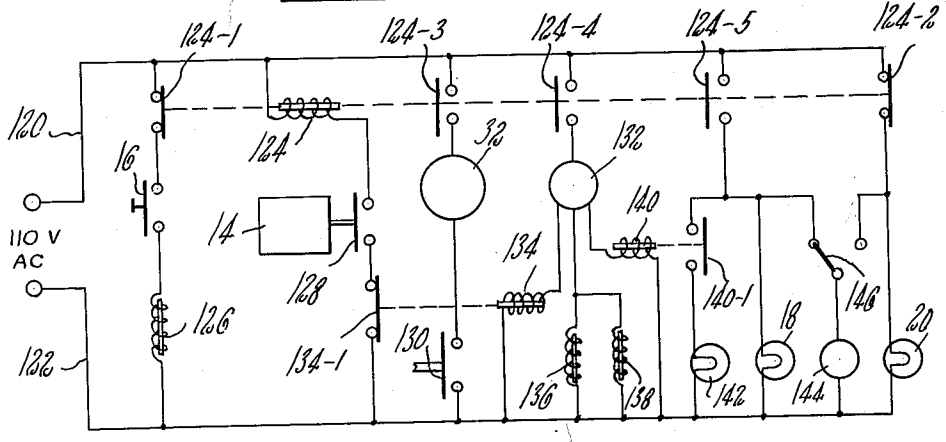


Fig. 7.

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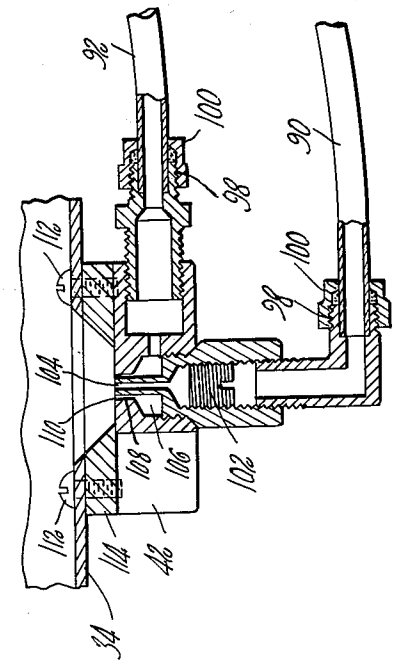


Fig. 6.

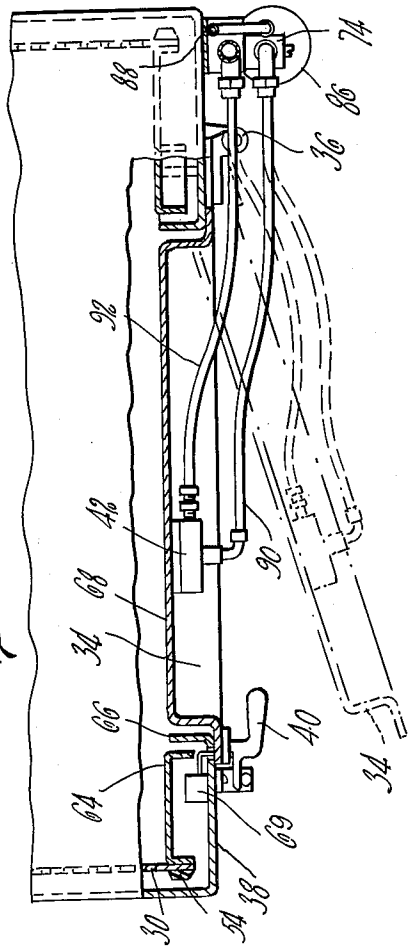


Fig. 5.

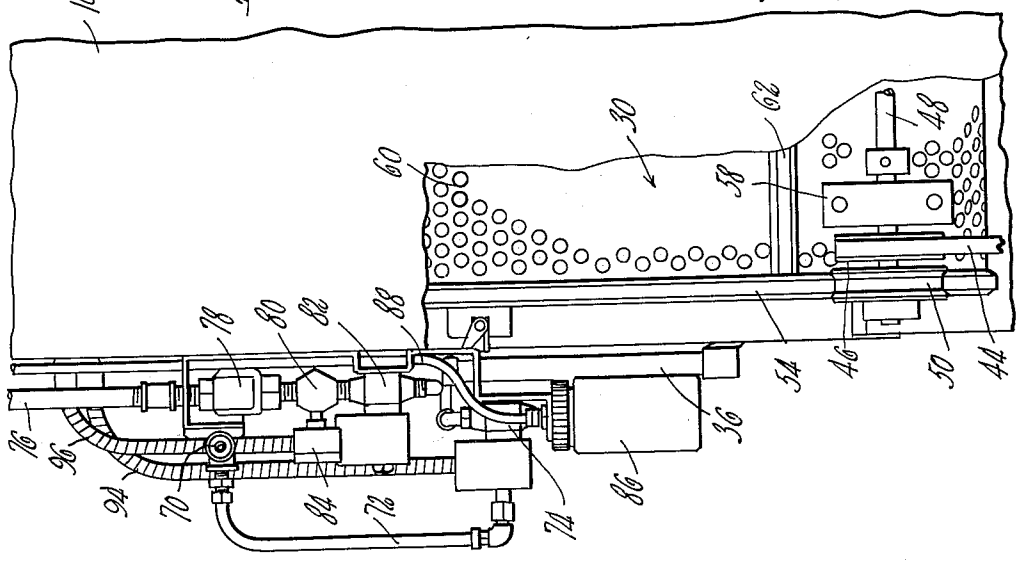


Fig. 4.

United States Patent Office 3,103,450 Patented Sept. 10, 1963

3,103,450
FABRIC TREATING APPARATUS

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4 Claims. (Cl. 118—48)

This invention relates to fabric treating systems and to improved apparatus particularly useful in such systems.

In recent years substantial attention has been given to the development of textile cleaning systems and apparatus of the self-service nature in which a customer may deposit the articles to be cleaned in a vending type of machine which will return the articles to the customer in cleaned condition. Due to the apparent convenience to the customer and to the savings in labor expense such apparatus offer significant commercial advantage. However, as dry cleaning systems involve a number of steps and a substantial investment in equipment, there are considerable problems associated with attempts to automate existing types of systems. It is difficult to incorporate the several dry cleaning steps employed in commercial techniques in a single machine. Further, many established dry cleaning establishments have a substantial existing investment in excellent cleaning equipments. A usual process, for example, employs perchloroethylene as a cleaning agent, which is an expensive component that must be reclaimed for competitive dry cleaning operations.

Accordingly, it is an object of the invention to provide novel and improved apparatus adapted to function as transition apparatus between an existing dry cleaning system and a self-service type of customer service.

Another object of the invention is to provide a novel control apparatus for receiving soiled fabric articles and returning them to a customer in an automatic and controlled manner which enables the use of existing regular dry cleaning equipment.

A further object of the invention is to provide apparatus that enable the provision of a low cost, fast self-service type of dry cleaning service which incorporates the quality cleaning operation of a commercial dry cleaner established system.

Still another object of the invention is to provide novel apparatus for receiving soiled articles and through which they may be returned to the customer after dry cleaning treatment in which provision is made for treatment of the articles with an atomizable fabric conditioning agent while they are being aerated in the apparatus.

In a preferred embodiment constructed in accordance with the principles of the invention there is provided a system including a textile article receiving chamber rotatably supported within a housing having doors at opposite ends which permit access to the chamber. One of the access doors is responsive to a conventional coin operated vending type of mechanism which controls the locking of the door and permits textile articles to be deposited within the chamber. The other access door permits an operator to remove the deposited articles and to treat them in the commercial dry cleaning system. After the articles have been cleaned the operator returns them to the chamber in which they are tumbled in an aerating action and treated with a suitable fabric treating agent in atomized form. This material is introduced through a nozzle arrangement mounted on the system access door which permits the introduction of the treating agent throughout the chamber as the clothes are being aerated. The system operates under timing control and includes signaling devices for both the operator and the customer so that an accurately timed cycle is insured. The chamber is arranged so that the customer access door is automatically locked when the power is off, and interlocks are provided so that a simple, reliable, trouble-free self-service type of transition is provided for a commercial dry cleaning establishment in which clothes and other fabric articles are treated with a fabric conditioning agent.

Other objects, features and advantages of the invention will be seen as the following description of a preferred embodiment thereof progresses in conjunction with the drawings, in which:

FIG. 1 is a front elevational view of the dry cleaning vending apparatus constructed in accordance with the principles of the invention;

FIG. 2 is a side elevational view of the apparatus shown in FIG. 1;

FIG. 3 is a rear view of a portion of the dry cleaning vending apparatus showing certain details of the rear or operator access door, the nozzle and control mechanisms controlling the operation of the nozzle for introducing a bacteria killing agent;

FIG. 4 is a side elevational view of a portion of the vending apparatus structure and particularly the operator access door structure and adjacent valving and control elements;

FIG. 5 is a top view, partially in section taken along the line 5—5 of FIG. 3, of the operator access door showing the diffusing nozzle structure;

FIG. 6 is a sectional view taken along the line 6—6 of FIG. 3 of the diffusing nozzle structure mounted on the operator access door of the apparatus; and

FIG. 7 is an electrical diagram of circuitry employed in the system shown in FIGS. 1–6.

FIGS. 1 and 2 show the housing **10** of the dry cleaning and vending machine constructed in accordance with principles of the invention. This structure is styled to be attractive in appearance and has an upper panel **12** which includes a coin receptacle and control unit **14**, control push button **16** and indicator lights **18**, **20** for indicating to the customer the use status of the machine. The middle panel **22** includes a circular customer access door **24** having a handle **26** mounted on a hinge structure **28**. The door includes a solenoid operated lock which is released in response to the depression of button **16** (except during dry cleaning cycles) to permit introduction or removal of articles from the apparatus by the customer.

Mounted within the housing in axial alignment with the door **24** is a tumbling chamber **30** which is driven in rotation by motor **32** mounted in back of the lower panel **33**.

As shown in FIG. 3, a similarly formed operator access door **34** is mounted, also in axial alignment, on hinges **36** on the rear panel **38** of the apparatus and has a latch handle **40** to permit access by an operator to the rear of the tumbling cylinder **30** so that he may remove soiled articles and treat them in the commercial dry cleaning apparatus, and then return the cleaned articles in the tumbling cylinder.

Also mounted on the rear structure is a nozzle apparatus **42** for introducing an atomizable fabric treating material such as a bactericidal agent into the tumbling cylinder **30**.

Electric power supplied to the apparatus in conventional manner powers the electric motor **32** housed in the lower portion of the structure which drives by means of the belt **44** and drive pulley **46** a trundling shaft **48**, as indicated in FIGS. 3 and 4. Two support and trundling pulleys **50** are provided on the shaft **48** at front and rear ends thereof on one side of the housing and a second set of idler trundling support pulleys **50** are correspondingly positioned on a second shaft **52** on the other side of the housing **10**. Each trundling pulley engages a trundling belt **54**, **56** positioned at the ends of the chamber **30** which rotatably support that chamber in position concentric with the customer access door **24**. Each support shaft

48, 52 is supported on suitable bearing blocks 58 secured to the housing framework.

As indicated in FIGS. 4 and 5, the tumbler chamber 30 is formed of a perforated metal sheet 60 formed in a cylinder that carries axially extending bars 62 on the outer surface thereof to increase the rigidity of the cylindrical sheet 60. Inwardly extending end walls 64 define an enclosure within which the articles to be treated are retained. The housing 10 adjacent each door 24, 34 has an inturned flange 66 radially spaced from an outwardly extending flange on the end wall 64. Each door has an offset interior wall surface 68 which is aligned with the chamber end wall 64 when the door is closed so that a substantially smooth enclosing surface results. Immediately behind latch 40 is an interlock switch 69 employed to control motor 32.

A metering apparatus is mounted adjacent the door 34 on the rear panel. This apparatus includes a liquid material supply line 70 which is connected through a junction and conduit 72 to a solenoid controlled three-way valve 74. Air supply is provided on line 76 through an air strainer 78 and a regulator 80 to a solenoid controlled air valve 82. An air pressure gauge 84 is also provided. The liquid is metered into a metering container 86 with which a vent line 88 communicates and is siphoned out through a first flexible line 90 connected to a nozzle structure 42 mounted on the door 34. In similar manner a second flexible air line 92 is connected to the nozzle structure 42 from the air solenoid control valve 82. Electrical lines 94, 96 connect the solenoids for valves 74, 82 respectively to the control circuitry.

A detailed view of the nozzle structure 42 is shown in FIG. 6. Each flexible line 90, 92 is connected to the entrance conduit of the nozzle structure by means of a conventional coupling 98, 100 to provide adequate sealing. The liquid flows through a spiral diffuser 102 to an elongated central tube and orifice 104. Air is conducted into a chamber 106 concentric with and surrounding diffusing orifice 108 which has an exit orifice 110 arranged to provide a flow of air past the liquid stream from orifice 108 to aspirate and diffuse the material for entrance into the tumbler cylinder. The entire structure is mounted on the door 34 by suitable securing means such as bolts 112 through a flared transition member 114 dimensioned to insure the proper air flow characteristics so that there will be adequate diffusion of the liquid. A suitable fabric treating agent is an aqueous solution of neomycin, an antibiotic produced by a strain of Streptomyces closely related to *Streptomyces fradiae,* and which is described in United States Patent No. 2,830,011.

The electric circuitry employed in this system is shown in schematic form in the diagram of FIG. 7. That circuitry is supplied by a 110-volt electric power over lines 120, 122. The circuitry includes a main control relay 124 which controls normally closed contacts 124–1 and 124–2 and normally open contacts 124–3, 124–4 and 124–5. Connected in series with contacts 124–1 is push button 16 and the customer access door lock solenoid 126. Connected in series with the relay 124 is a set of normally open contacts 128 which are operated by the coin control receptacle 14 and a set of normally closed contacts 134–1. Connected in series with contacts 124–3 is the motor 32 and a switch 130 operated by interlock 69 to open the motor circuit when the second or operator access door 34 is open. A timer 132 is connected in series with contacts 124–4 and controls solenoid 134, metering solenoid 136 (which operates valve 74), metering solenoid 138 (which operates valve 82) and control solenoid 140 (which operates normally open contacts 140–1). Contacts 124–2 and 124–5 control visual and audible signalling devices; the "In Use" lamp 18, an operator warning lamp 142 and an audible signal 144 being energizable when contacts 124–5 are closed; and the "Available" lamp 20 and the audible alarm 144 being energizable when contacts 124–2 are closed. An operator

controlled toggle switch 146 selects the circuit to which the audible alarm element 144 is connected.

In operation of the system all the relays are normally deenergized, the customer access door 24 is locked, and lamp 20 is energized indicating that the apparatus is available. A customer desiring to utilize the apparatus pushes button 16, energizing solenoid 126 to unlock door 24 and deposits the articles to be treated in the chamber 30. She then deposits the indicated amount of money in coins in the vending control 14 and that unit operates contacts 128 to energize relay 124. With that energization the door 24 is locked, motor 32 and timer 132 are started, and the signalling circuitry is operated to deenergize lamp 20 and to energize lamp 18 (indicating the apparatus is in use) and audible signal 144 (provided toggle switch 146 is in the position shown in FIG. 6). The audible signal from element 144 at a control console in the dry cleaning establishment, for example, alerts an operator that the machine is in use. The operator silences the signal by operating toggle switch 146 and opens the rear door 34, operating contacts 130 to stop motor 32. The operator removes the articles to be cleaned and subjects them to a dry cleaning routine, as with a suitable solvent such as perchloroethylene in the dry cleaning establishment.

The timer 132 energizes solenoid 140 ten minutes before the end of the cycle, closing contacts 140–1 to energize flasher light 142 instructing the operator to return the cleaned articles to chamber 30. The articles are returned through the rear door 34 and, when that door is closed, the electric motor 32 is again energized to rotate the tumbling cylinder producing an aeration of the articles. Five minutes before the end of the cycle the neomycin metering operation is initiated by energization of solenoids 136, 138 and the articles are sprayed with the bactericidal agent in a treatment that prevents the formation of perspiration odor on the fabrics. At the end of the cycle solenoid 134 is energized, opening contacts 134–1 to deenergize relay 124 and terminate the tumbling and aeration action. Buzzer 144 signals the operator that time cycle has terminated and he moves toggle switch 146 to the apparatus available position. Light 20 is also energized and contacts 124–1 are closed so that the front door 24 may be unlocked by depressing pushbutton 16. After the articles have been removed the apparatus is ready for another operation.

Thus it will be seen that the invention provides a controlled self-service transition system which permits the use of a coin operated vending system with use of existing dry cleaning equipment in which the dry cleaning operation may be performed in the time tested commercial manner but enables the customer to deposit and after a fixed time interval to automatically receive cleaned, treated and aerated articles. While a preferred embodiment of the invention has been shown and described, various modifications thereof, as in the physical arrangement of components or in details of the control circuitry, will be obvious to those skilled in the art. Therefore it is not intended that the invention be limited to the disclosed embodiment or to details thereof, and departures may be made therefrom within the spirit and scope of the invention as defined in the claims.

What is claimed is:

1. Apparatus for employment in conjunction with a fabric dry cleaning operation comprising a housing,

a rotatable tumbler drum mounted within said housing,

said drum having a circumferentially extending trundling belt adjacent either end thereof,

a support shaft positioned on each side of said drum,

each shaft having a trundling pulley corresponding to each trundling belt secured thereon and positioned for engagement with the associated trundling belt,

means to drive one of said shafts to rotate said tumbler drum,

each end wall of said drum having an axially disposed cylindrical opening,
said housing having a cylindrical flange member concentric with and extending into each end wall opening,
and a cylindrical door structure cooperating with each end wall,
each door being hingedly supported on said housing and having an interior surface adapted to be aligned with the interior surface of the adjacent drum end wall when the door is closed,
said housing and doors being arranged so that said tumbler drum may be rotated when said doors are closed,
a nozzle structure mounted on one of said doors for introducing a dispersed material into said tumbler drum,
metering apparatus mounted on said housing adjacent said one door and flexible conduit means including a liquid receiving supply line and an air receiving supply line connecting said nozzle structure with said metering apparatus,
said nozzle structure including a liquid orifice concentrically located with respect to a portion of said liquid supply line,
an air chamber surrounding said liquid orifice,
and an air orifice concentric with and surrounding said liquid orifice operable for entraining and diffusing liquid ejected from said liquid orifice for distribution in said drum.

2. Fabric treating apparatus comprising a casing,
a rotatable tumbler drum mounted within said casing,
drive means for rotating said tumbler drum about an axis,
a nozzle structure mounted on said casing for introducing a dispersed material into said tumbler drum in a direction generally parallel to the axis of rotation of said tumbler drum,
said nozzle including a liquid orifice,
an air chamber surrounding said liquid orifice,
and an air orifice concentric with and surrounding said liquid orifice,
metering apparatus mounted on said casing including a metering container having a dip tube therein,
a first valve for controlling the introduction of a liquid material into said metering container,
a second valve for controlling the discharge of material from said metering container through said dip tube,
a liquid receiving supply line connecting said liquid orifice and said dip tube,
an air supply line connected to said air chamber,
and third valve means in said air supply line,
said third valve means permitting air flow through said air chamber to draw a predetermined amount of liquid from said metering container through said liquid orifice for dispersion in said tumbler drum in a fabric treating operation.

3. Fabric treating apparatus comprising a casing,
a customer access door mounted on one side of said casing,
a second door mounted on said casing,
a rotatable, open ended, perforated tumbler drum mounted within said casing between said doors so that access may be had to the interior of said drum through either door,
a coin operated device mounted on said casing,
a mechanism interlocked with said coin operated device to control customer accessibility to said drum,
drive means for rotating said tumbler drum about an axis,
a nozzle structure mounted on said casing for introducing a dispersed material into said tumbler drum in a direction generally parallel to the axis of rotation of said tumbler drum,

said nozzle including a liquid orifice,
an air chamber surrounding said liquid orifice,
and an air orifice concentric with and surrounding said liquid orifice,
metering apparatus mounted on said casing including a metering container having a dip tube therein,
a first valve for controlling the introduction of a liquid material into said metering container,
a second valve for controlling the discharge of material from said metering container through said dip tube,
a liquid receiving supply line connecting said liquid orifice and said dip tube,
an air supply line connected to said air chamber,
and third valve means in said air supply line,
said third valve means permitting air flow through said air chamber to draw a predetermined amount of liquid from said metering container through said liquid orifice for dispersion in said tumbler drum in a fabric treating operation.

4. Fabric treating apparatus comprising a casing,
a customer access door mounted on one side of said casing,
a second door mounted on said casing,
a rotatable, open ended, perforated tumbler drum mounted within said casing between said doors so that access may be had to the interior of said drum through either door,
a coin operated device mounted on said casing,
a mechanism interlocked with said coin operated device to control customer accessibility to said drum,
drive means for rotating said tumbler drum about an axis,
a nozzle structure mounted on said second door for introducing a dispersed material into said tumbler drum in a direction generally parallel to the axis of rotation of said tumbler drum,
said nozzle including a liquid orifice,
an air chamber surrounding said liquid orifice,
and an air orifice concentric with and surrounding said liquid orifice,
metering apparatus mounted on said casing adjacent said second door including a metering container having a dip tube therein,
a first valve for controlling the introduction of a liquid material into said metering container,
a second valve for controlling the discharge of material from said metering container through said dip tube,
a flexible liquid receiving supply line connecting said liquid orifice and said dip tube,
a flexible air supply line connected to said air chamber,
and third valve means in said air supply line,
said third valve means permitting air flow through said air chamber to draw a predetermined amount of liquid from said metering container through said liquid orifice for dispersion in said tumbler drum in a fabric treating operation,
and said flexible supply lines permitting opening and closing of said second door without disconnecting said supply lines.

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