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2,146,262

GARMENT CLEANING SYSTEM

Filed Oct. 23, 1935

3 Sheets-Sheet 1

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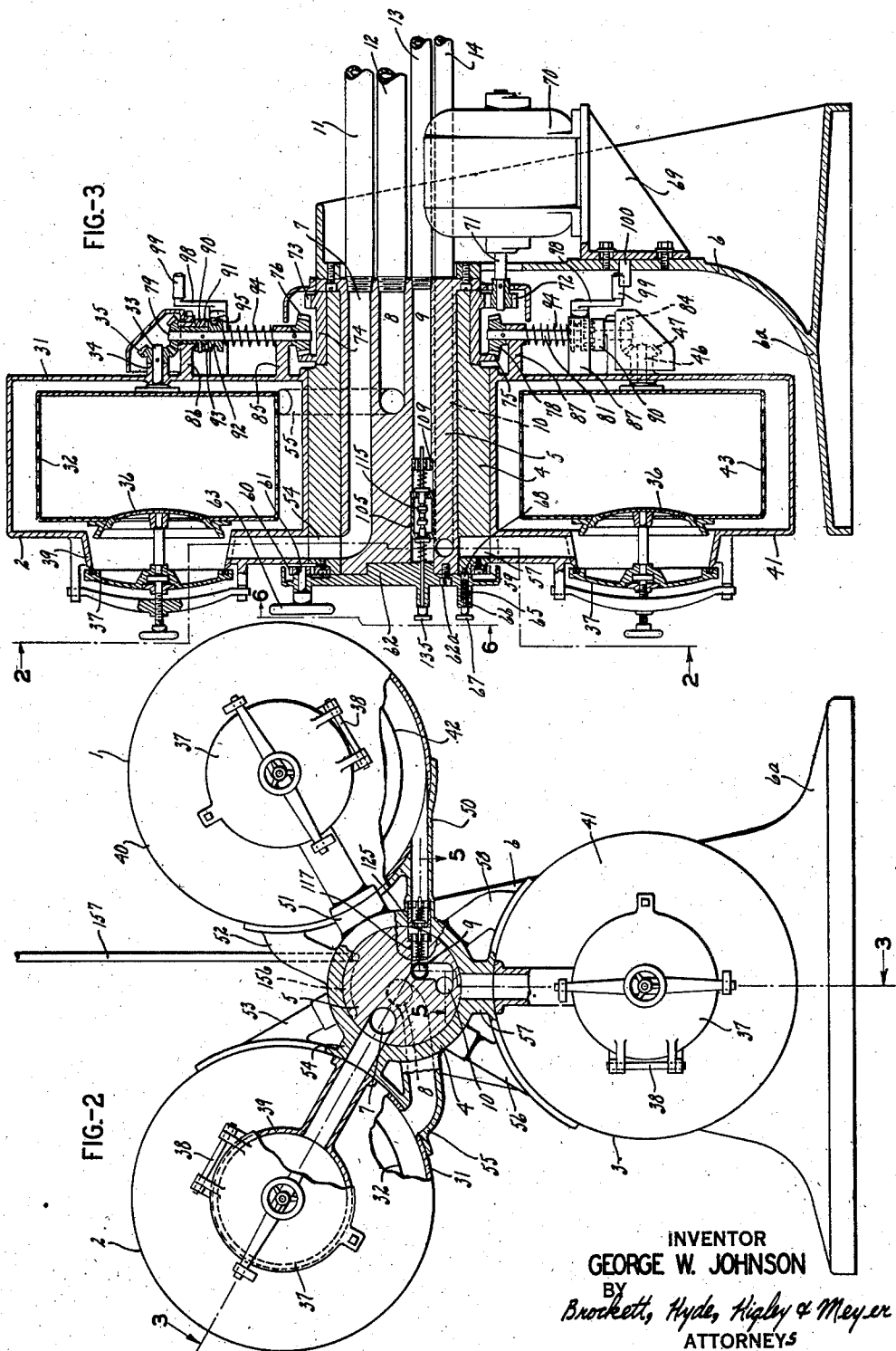
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3 Sheets-Sheet 3

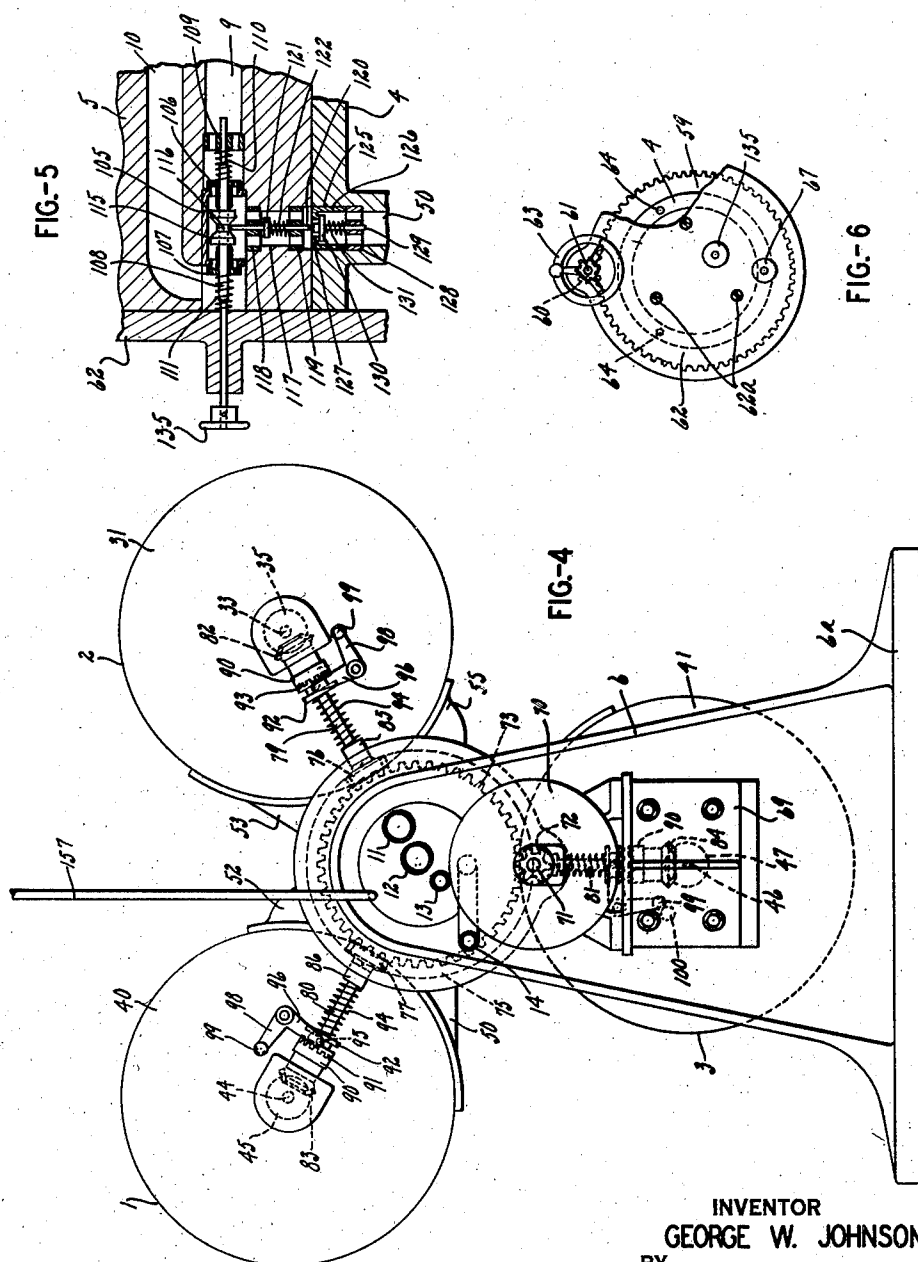


FIG.-4

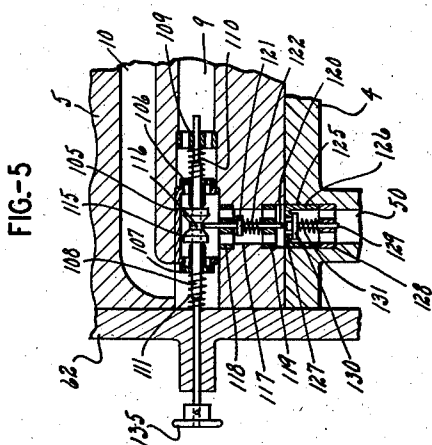


FIG.-5

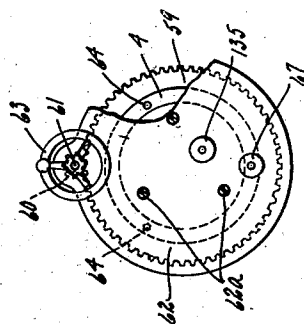


FIG-6

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GARMENT CLEANING SYSTEM

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12 Claims. (Cl. 68—20)

My invention relates to fabric treating systems and more particularly to an improved system in which a plurality of fabric treating operations may be performed simultaneously.

5 In fabric treating systems it has heretofore been the practice to wash or clean the goods in a treating vessel containing a cleaning fluid or solvent which is then drained from the vessel. The cleaned fabric is either dried in the same vessel
10 or the fabric is removed from the treating vessel and dried in a separate vessel or hung in a dry room.

When the fabric is dried in the same vessel, no time or labor is involved in removing the goods
15 to a separate drying vessel or room. In such systems, means are also usually provided to recover the solvent during the drying operation. This feature is of particular importance in dry cleaning systems in which a volatile solvent, such
20 as benzine or carbon tetrachloride, is utilized. Such solvents are comparatively expensive and in the economical operation of such systems it is essential that they be recovered for reutilization in the process. If the drying and deodorizing
25 operations are effected in the same vessel as the cleaning or washing operation, however, the rate of production is somewhat limited.

In systems in which the fabric is removed from the treating vessel after the solvent has been
30 drained from the cleaned fabric the rate of production is high but much time is consumed and labor involved in removing and drying the fabric. Furthermore, when a volatile solvent is employed as the cleaning agent no means is usually provided
35 for recovering the valuable solvent which consequently contaminates the surrounding air and injuriously affects the health and comfort of the operators.

In accordance with the present invention, I
40 have provided a substantially closed system in which the drying and deodorizing operations are effected in the same vessel as the washing or cleaning operation but improved means associated with the system are provided for simul-
45 taneously drying and deodorizing fabric in one treating vessel while the cleaning or washing operation is being effected in a separate treating vessel. Improved means are also provided for unloading the cleaned, dried, and deodorized
50 fabric from one vessel and inserting another charge while the cleaning and the drying or deodorizing operations are being effected in other treating vessels which form a part of my improved system.

55 It is therefore an object of my invention to

provide an improved system in which goods may be cleaned or washed in a treating vessel while it is in one position, and which vessel may then be moved to another position for drying or for
5 drying and deodorizing the fabric without removing the goods from the treating vessel.

Another object is to provide an improved system comprising a plurality of treating vessels in which goods are washed or cleaned in one treating vessel while another batch of goods are being
10 simultaneously dried and deodorized in a separate vessel which is connected to and forms part of the same system.

A further object is to provide an improved system comprising a plurality of treating vessels in
15 which goods may be washed or cleaned in one vessel which is moved to a different position and goods in another vessel which is connected to the system may be washed and cleaned while the goods in the first vessel are being dried or de-
20 odorized.

A still further object of my invention is to provide an improved system comprising a plurality of treating vessels connected to the system in such
25 a manner that the fabric may be cleaned in one vessel, the cleaned goods may be dried and deodorized in a second vessel, and the dried and deodorized goods may be unloaded, and an additional batch of goods may be inserted in a third
30 vessel.

My invention will be better understood by reference to accompanying drawings in which:

Fig. 1 is a diagrammatical view partly in cross section of my improved system;

Fig. 2 is a front elevational view of the treating
35 vessels taken on the lines 2—2 of Fig. 3 and showing means, partly in cross section, for supporting the treating vessels in position and connecting them with the remainder of the system;

Fig. 3 is a cross section on the line 3—3 of Fig. 2;

Fig. 4 is a rear elevational view of the apparatus shown in Fig. 2;

Fig. 5 is a cross sectional view on the lines 5—5 of Fig. 2, and

Fig. 6 is a front elevational view taken on the
45 line 6—6 of Fig. 3, the front plate being partially broken away to show the underlying gear structure.

While in the accompanying drawings my invention is shown as forming a part of a dry cleaning,
50 system in which a volatile solvent is utilized and recovered, it will be understood that I do not desire to limit myself in this respect as obviously my improved system may be employed when water or water and soap or other suitable detergent is
55

utilized, in which case it may not be economical to reclaim the solvent or recover the steam evolved during the drying operation.

Referring to the drawings my improved system comprises a plurality of treating vessels 1, 2, and 3, supported on a ring 4 which is rotatably mounted upon a cylinder or axis 5. The cylinder 5 is, in turn, supported by an upwardly extending frame 6, having an enlarged base 6a which is adapted to rest upon the floor of the building.

Extending through the cylinder 5 are a plurality of passages 7, 8, 9, and 10 which are connected to conduits 11, 12, 13 and 14, respectively. The conduit 11 leads to a heater 15 provided with a suitable heating coil 16, the conduit 12 leads to a condenser 17 provided with a coil 18 through which a suitable cooling fluid, such as water, may be circulated, the conduit 13, which is controlled by a valve 19, leads to a storage tank 20, and the conduit 14, which is controlled by a valve 21, leads to a sump tank or collecting vessel 22.

The treating vessel 2 comprises an outer casing 31 and an inner perforated cylinder or drum 32 which is rotatably supported in the casing 31 by means of a trunnion 33 journaled in a bearing 34 extending outwardly from the casing 31. A beveled gear 35 is pinned to the outer end of the trunnion 33. Opposite the trunnion 33, the drum 32 is provided with an opening which is normally closed by a door 36. The door 36 is rotatably supported by a door 37 for an aligned opening in the casing which is hinged, as indicated at 38, to an annular flange 39 extending outwardly from the casing 31. The door construction is similar to that disclosed in copending application No. 726,460 to Russel A. Hetzer to which reference may be made for further details if found necessary or desirable.

Treating vessels 1 and 3 are likewise composed of outer casings 40 and 41 provided with inner rotatable drums 42 and 43, respectively. The doors for the inner drums and the outer casing are similar to those of treating vessel 2 and have accordingly been designated by the same reference numerals. Drums 42 and 43 are also provided with trunnions 44 and 46, respectively, see Figs. 3 and 4, which extend through bearings in casings 40 and 41 and are provided with beveled gears 45 and 47, respectively.

Treating vessel 1 is supported from the ring 4 by means of a frame having cored branches forming conduits 50, 51, and 52, and in a like manner treating vessels 2 and 3 are supported from ring 4 by frames having cored branches 53, 54, and 55, and 56, 57, and 58, respectively. Conduits 50, 53, and 56 are provided for the purpose of supplying clean fluid to or for draining used solvent from the treating vessels when the respective treating vessels are in the position occupied by treating vessel 1 as illustrated in the drawings. In a like manner, conduits 51, 54, and 57 are provided for the purpose of passing air into the treating vessels, and conduits 52, 55, and 58 are provided for the purpose of passing air from the treating vessels to condenser 17 when the respective treating vessels are in the position occupied by treating vessel 2, as illustrated in the drawings.

The front portion of the ring 4 is reduced to provide an annular recess for a gear 59 which is fastened to the ring. Gear 59 meshes with a spur gear 60 supported on a shaft 61 which extends through an opening in a plate 62 and is provided with a hand wheel 63. The plate 62 is fastened to the cylinder 5 by any suitable means, such as screws 62a. It will therefore be apparent that by

turning hand wheel 63, ring 4 may be rotated and treating vessels 1, 2, and 3 may be revolved to the desired position.

The ring 4 is provided with a plurality of notches 64 which are spaced 120 degrees apart and extending outwardly from the plate 62 is a hollow boss 65 through which a pin 66 extends. The pin is provided with a head 67 at one end and a collar 68 adjacent the other end. A spring is coiled around the pin within the boss, one end of which bears against the inner end of the boss and the other end of which bears against the collar 68. When it is desired to revolve receptacle 1, say from the position shown in Fig. 2, to the position occupied by receptacle 2, the pin 66 is pulled outwardly, hand wheel 63 is rotated in an anticlockwise direction and when the receptacle 1 has been rotated 120 degrees, the pin 66 snaps under the influence of the spring into one of the notches 64.

Supported by a suitable bracket 69 attached to the frame 6 is a motor 70 to the shaft 71 of which a pinion 72 is attached. The pinion 72 meshes with a gear 73 which is rotatably mounted upon the ring 4. The gear 73 has an elongated hub 74, the inner side of which is provided with a beveled gear 75 that meshes with beveled gears 76, 77, and 78 which are pinned to shafts 79, 80, and 81, respectively. Supported on the other end of each of the shafts are beveled gears 82, 83, and 84, which mesh with beveled gears 35, 45, and 47 respectively. The shafts are maintained in position by means of brackets 85, 86, and 87 which extend outwardly from the respective casings.

A collar 90, provided with teeth 91, is pinned to the shaft of each of the beveled gears 82, 83, and 84, as illustrated in Figs. 3 and 4 of the drawings, and slidably mounted on each shaft 79, 80, and 81 are clutches 92 provided with teeth 93. Coil springs 94 disposed around each shaft normally maintain each of the clutches in meshing engagement with the teeth of collar 90.

Each of the clutches 92 is provided with a groove into which extends a pintle 95 formed on each of the arms 96 of bell crank levers which are pivotally mounted upon a shaft extending outwardly from each casing. The other arm 98 of each of the bell crank levers is provided with a handle 99 by means of which the clutches may be thrown out of mesh with the teeth of collars 90. Extending outwardly from the frame 6 is a stud 100 which automatically throws clutch 92 out of mesh with collar 90 when the respective treating vessels reach that position.

As will be readily apparent from the drawings, the operation of motor 70 rotates drums 32 and 42 when treating vessels 1 and 2 are in the position illustrated in Figs. 2 and 4, but since clutch 92 is disengaged from the collar 90 pinned to shaft 81, the drum 43 will be maintained stationary when treating vessel 3 is in the position shown in the drawings. If for any reason, however, it is desired to discontinue the rotation of either the drum 32 or the drum 42 when they are in the position illustrated, the clutch 92 controlling the operation of that drum may be manually disengaged.

As illustrated in Figs. 3 and 5, the passage 9 adjacent the front end of cylinder 5 is provided with a casing 105, the ends of which are cored and provided with outwardly extending annular flanges which form seats for valves 106 and 107 which are mounted upon a rod 108. Spaced from the valve 106 in the passage 9 is a bracket 109 provided with passages through which the solvent

may flow and which supports the inner end of rod 108. Valves 106 and 107 are normally maintained in closed position by means of springs 110 and 111, spring 110 being coiled around the rod 108 between the bracket 109 and the valve seat 106 and spring 108 being coiled around the rod 108 between the plate 62 and valve 107. Affixed to the rod 108 and arranged within the casing 105 is a double cone shaped element 115, the apices of which terminate in a substantially annular collar 116 for purposes to be later described.

The cylinder 5 is also provided with a passage 117 leading laterally from passage 9 in which are supported a pair of apertured brackets 118 and 119 in which a rod 120 is slidably mounted. Rod 120 is provided with a collar 121 and spring 122 coiled around rod 120 is disposed between bracket 119 and collar 121 and holds rod 120 in engagement with collar 116 which is located between the cones 115.

Arranged within the ring 4 are a plurality of passages 125, only one of which is shown in detail, see Figs. 2 and 5. Each of the passages is provided with a collar 126, the upper terminal of which extends inwardly and downwardly to form valve seats 127. Collars 126 are supported in position by apertured brackets 128 through the center of which stems 129 of valves 130 extend. Interposed around the valve stems 129 between the brackets 128 and valves 130 are coil springs 131 which normally maintain valves 130 in closed position. As indicated in Fig. 2, one of the passages 125 communicates with conduit 50 and passage 117. The other passages 125 communicate with conduits 53 and conduit 56, respectively, and with passage 117 when ring 4 is rotated to selectively bring the conduits 53 and 56 to the position occupied by conduit 50, as shown in Fig. 2 of the drawings. From the foregoing description, it will therefore be evident that treating vessels 1, 2 and 3 are identical in construction and in the manner in which they are mounted upon ring 4.

In the operation of my improved system, it may be assumed that the treating vessels are in the positions illustrated in the drawings and that the drum 42 contains soiled fabric, drum 32 contains fabric which has been cleaned, and drum 43 contains fabric which has been cleaned, dried, and deodorized. Pressure is first exerted upon head 135 of rod 108. As the rod is pushed inwardly the base of the inner cone presses against and opens valve 106 and as rod 120 rides upon the inclined face of the other cone, it is forced downwardly, opening valve 130. Solvent from storage tank 20 is then supplied to the treating vessel 1, rod 108 is released, valves 106 and 107 are maintained in their normal closed position by the action of springs 110 and 111 and valve 130 is closed by the action of spring 131. The motor 66 is then started in operation which rotates inner drums 32 and 42. After the fabric in vessel 1 has been cleaned and the fabric in treating vessel 2 has been dried and deodorized, rod 108 is pulled out, the outer base of cone 115 forces valve 107 open and rod 120, riding upon the face of the inner cone, opens valve 130. The used solvent may then be drained from the treating vessel 1 to the sump tank 22 through passage 10, and conduit 14.

While fabric is being cleaned in receptacle 1, fabric in receptacle 2 which has previously been washed in the solvent is being dried and deodorized. In practicing this phase of the invention,

air from the heater 15 is passed through conduit 11, passage 7 of cylinder 5 and conduit 54 to the casing 31 where the solvent is evaporated from the fabric. The solvent laden vapors are then drawn by fan 140, which is connected by a conduit 141 to the condenser 17 and by a conduit 142 to the heater 15, through conduit 55, passage 8 and conduit 12 to the condenser 17, the condensed solvent being passed through conduit 143 to the sump tank 22, as illustrated in Fig. 1 of the drawings. After the air has been circulated through the treating vessel 2 for a sufficient length of time to dry the fabric, lever 144 is operated which opens valve 145 and moves valve 146 to close conduit 142 and open conduit 147 to the atmosphere. Air is then drawn in to the treating vessel 2 from the atmosphere through valve 145, conduit 11 passage 7 and is passed out of the treating vessel through conduit 55, passage 8, conduit 12, condenser 17 and conduits 141, 142, and 147 to the atmosphere. During the drying of the fabric it will be understood that the drum 32 may be rotated, if desired, by motor 70.

While the fabric is being cleaned in vessel 1 and the cleaned fabric is being dried and deodorized in vessel 2, the cleaned, dried, and deodorized fabric in receptacle 3 is being unloaded and a new charge of soiled fabric is placed in the vessel. Rod 67 is then pulled outwardly against the action of the spring and hand wheel 63 is turned to rotate the treating vessels 120 degrees. Treating vessel 1 is then in the position occupied by treating vessel 2, and treating vessels 2 and 3 occupy the position of treating vessels 3 and 1, respectively. The operations just described may then be repeated.

The solvent in sump tank 22 is renovated by passing it to evaporator 150, provided with heating coils 151, the vapors from which pass upwardly through conduit 152 to condenser 153, provided with a cooling coil 154, and the solvent condensed therein is passed through conduit 155 into the storage tank 20.

As illustrated in Figs. 1 and 2 of the drawings, cylinder 5 is provided with a recess 156 which communicates with conduits 52 and 53, when these conduits are in the position shown in Fig. 2. A pipe 157 leading from this recess connects with a pipe 158 leading from the sump tank 22 which has a branch extending into the storage tank 20. Means are thus provided to effectively vent the system to the atmosphere.

From the foregoing specification, it will be apparent that I have provided an improved system in which fabric may be simultaneously subjected to a plurality of different treatments. For example, while fabric is being cleaned in one treating vessel, cleaned fabric may be dried and deodorized in another vessel, and the cleaned, dried and deodorized fabric may be unloaded from a third vessel and a new charge of soiled fabric inserted. A high rate of production may therefore be obtained and the fabric may be economically dried and deodorized without removing it from the treating vessel.

It will also be seen that all parts of the apparatus are substantially closed to the atmosphere during the treating operation and also during the drying operation or during the simultaneous treating and drying operations except the drum which occupies the loading and unloading position. This feature is of particular importance in cleaning and drying fabric with a volatile solvent, such as benzene or carbon

tetrachloride, because in such cases it is highly desirable to avoid the contamination of the solvent with the moisture which is present in atmospheric air.

To those skilled in the art, many modifications of and widely different embodiments and applications of my invention will suggest themselves without departing from the spirit and scope thereof. My disclosure and the description herein are purely illustrative and are not intended to be in any sense limiting.

What I claim is:

1. Fabric treating apparatus comprising a central support, a treating vessel having an outer casing and an inner rotatable drum mounted to revolve on said support, said support having passages therein communicating with said treating vessel through which a cleaning fluid may be passed to the treating vessel and used solvent drained therefrom when the vessel is in one position upon said support, means whereby said passages may be opened and closed when the vessel is in said position, means for rotating the drum to wash the fabric and means whereby the treating vessel may be revolved to a second position on said support, said support being provided with additional passages independent of the cleaning fluid passages communicating with the treating vessel when it is in the second position through which a gaseous medium may be passed through the treating vessel to dry the fabric therein.

2. Fabric treating apparatus comprising a central support, a plurality of treating vessels, each having an outer casing and an inner rotatable drum, revolvably mounted to move in unison upon said support, supply and drain conduit means communicating with one of said vessels when it is in a predetermined position on said support through which cleaning fluid may be supplied to and drained from the vessel, means whereby said conduits may be opened and closed when the vessel is in said position, conduit means independent of the supply and drain conduit means communicating with and leading from another treating vessel through which a gaseous medium may be passed to dry fabric therein when the first vessel is in communication with the fluid supply and drain conduits, and means whereby the vessels may be revolved on said support to a position in which the first vessel is in communication with the drying medium conduits.

3. Fabric treating apparatus comprising a central support, a plurality of treating vessels, each having an outer casing and an inner rotatable drum revolvably mounted to move in unison upon said support, conduit means through which solvent may be supplied to and drained from one of said treating vessels when it is in a predetermined position on said support, means whereby said conduits may be opened and closed when the vessel is in said position, conduit means independent of the supply and drain conduit means communicating with another vessel through which a gaseous medium may be passed to dry the fabric therein when the first vessel is in communication with the solvent supply and drain conduits, means whereby the vessels may be revolved on said support to a position in which the first vessel is in communication with the conduits through which the drying medium is passed, and means for simultaneously rotating the drums of two of said treating vessels.

4. Fabric treating apparatus comprising a central support having a plurality of fluid and air

passages therein, a plurality of treating vessels, each having an outer casing and an inner rotatable drum, mounted to move in unison on said support, communicating means between the fluid passages in said support and one of said treating vessels through which solvent may be supplied to and drained from the treating vessel, means whereby said passages may be opened and closed when the vessel is in said position, and communicating means between the air passages in said support and another treating vessel through which air may be passed to dry the fabric in the second treating vessel when the vessels are in a selected position on said support, and means whereby said vessels may be revolved to a second selected position on said support in which the air passages are in communication with the first vessel and the second vessel is in a position where the fabric may be readily removed and a new charge inserted.

5. Fabric treating apparatus comprising a central support having a plurality of fluid and air passages therein, a plurality of treating vessels, each having an outer casing and an inner rotatable drum, revolvably mounted to move in unison on said support, communicating means between the fluid passages and one of said vessels through which solvent may be supplied to one of said vessels and drained therefrom, means whereby said fluid passages may be opened and closed when the vessel is in said position, and communicating means between another treating vessel and the air passages through which the gaseous medium may be passed through the second treating vessel to dry the fabric therein when said vessels are in a selected position on said support, means for washing the fabric in the first vessel, means for simultaneously passing a gaseous medium through the second vessel to dry the fabric therein, and means whereby the vessels may be revolved on said support to a second selected position in which the air passages are in communication with the first vessel and the second vessel is in a position to be readily unloaded and recharged.

6. Fabric treating apparatus comprising a central support having liquid and air passages therein, a plurality of treating vessels, each having an outer casing and an inner rotatable drum, revolvably mounted to move in unison on said support, means whereby said treating vessels may be revolved upon said support, communicating means between each of the treating vessels and the liquid passages through which liquid may be selectively supplied to the treating vessels and drained therefrom when each of the treating vessels is at a selected position on said support, means whereby said liquid passages may be opened and closed when each vessel is in the selected position, and communicating means between each of said treating vessels and the air passages through which air may be passed through the treating vessels when each of said treating vessels is at a second selected position on said support, said treating vessels being arranged upon said support in such a manner that when one vessel is in communication with the fluid supply and drain passages another treating vessel is in communication with the air passages.

7. Fabric treating apparatus comprising three treating vessels, each having an outer casing and an inner rotatable drum, revolvably mounted to move in unison upon a support, supply and drain conduit means communicating with one of said vessels through which a cleaning fluid may be

supplied to and soiled liquid drained therefrom when said vessels are in a predetermined position on said support, means whereby said supply and drain conduits may be opened and closed when the vessel is in said position, conduit means independent of the supply and drain conduits communicating with a second vessel through which gaseous medium may be passed to dry the fabric therein and the third vessel being in a position where it may be readily unloaded and recharged when the first vessel is in communication with the supply and drain conduit means and the second vessel is in communication with gaseous medium conduits, and means whereby said treating vessels may be revolved to interchange their position on said support.

8. Fabric treating apparatus comprising a support having a plurality of liquid and air passages therein, three substantially similar vessels, each having an outer casing and an inner rotatable drum, revolvably mounted to move in unison on said support, communicating means between the fluid passages and one of said treating vessels through which liquid may be supplied and drained from one of said treating vessels, communicating means independent of the fluid passages between the air passages and another vessel through which gaseous heating medium may be passed to dry the fabric in the second vessel and the third vessel being so disposed with respect to the axis of the support that fabric may be readily removed and a new charge inserted when said vessels are in a predetermined position on said support, means whereby said liquid passages may be opened and closed when the vessels are in said position, and means whereby the vessels may be revolved on said support to a position whereby the third vessel communicates with the liquid drain and supply passages, the first vessel communicates with the air passages and the second vessel is in a position where it may be readily unloaded and recharged.

9. Fabric treating apparatus comprising a central support, a treating vessel having an outer casing and an inner rotatable drum movably mounted on said support, said support being provided with passages communicating with said treating vessel through which a cleaning fluid may be passed to the treating vessel and the used fluid drained therefrom when the treating vessel is in one position on said support, means whereby said passages may be opened and closed when the vessel is in said position, and means whereby said treating vessel may be moved on said support to a second position, said support being provided with additional passages independent of the cleaning fluid passages which communicate with said treating vessel when it is in the second position through which a gaseous medium may be passed to and from the treating vessel when the treating vessel is in the second position.

10. Fabric treating apparatus comprising a central support, a treating vessel having an outer casing and an inner rotatable drum movably

mounted on said support, said support being provided with liquid passages communicating with said treating vessel through which cleaning fluid may be passed to the treating vessel and the used solvent drained therefrom, means whereby said passages may be opened and closed when the vessel is in said position whereby said treating vessel may be substantially closed to the atmosphere when the treating vessel is in a selected position on said support, means whereby said treating vessel may be moved upon said support to a second selected position, said support being provided with air passages independent of said liquid passages which communicate with said treating vessel when it is in the second selected position, and means for passing air into the treating vessel through one of said air passages and expelling it through another air passage.

11. Fabric treating apparatus comprising a central support, a treating vessel having an outer casing and an inner rotatable drum mounted to revolve on said support, said support being provided with passages communicating with said treating vessel through which cleaning fluid may be passed to the treating vessel and the used solvent drained therefrom, means whereby said passages may be opened and closed when the vessel is in said position whereby said treating vessel may be substantially closed to the atmosphere when the treating vessel is in a selected position on said support, means whereby said treating vessel may be revolved on said support to a second selected position, said support being provided with air passages independent of the cleaning fluid passages which communicate with said treating vessel when it is in the second selected position, and means for circulating air from a closed circuit or from the atmosphere through the air passages, and the treating vessel to dry or deodorize the fabric when the treating vessel is in the second selected position.

12. Fabric treating apparatus comprising a central support, a plurality of treating vessels, each having an outer casing and an inner rotatable drum mounted to revolve in unison upon said support, said support being provided with liquid passages communicating with one of said treating vessels, when said vessels are in a predetermined position on said support, through which cleaning fluid may be supplied to and drained from the treating vessel, means whereby said liquid passages may be opened and closed when the vessels are in said predetermined position on said support whereby the vessel is substantially closed to the atmosphere during the cleaning operation, air passages in said support independent of said liquid passages which are connected in a closed circuit and communicate with a second vessel when the vessels are in said predetermined position, and means whereby said vessels may be revolved to a position in which the first vessel is in communication with the air passages.

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