Dec. 24, 1929. A. TRAUBE 1,740,716

DRY CLEANING APPARATUS

Filed May 18, 1928 2 Sheets-Sheet 1

FIG. 1.

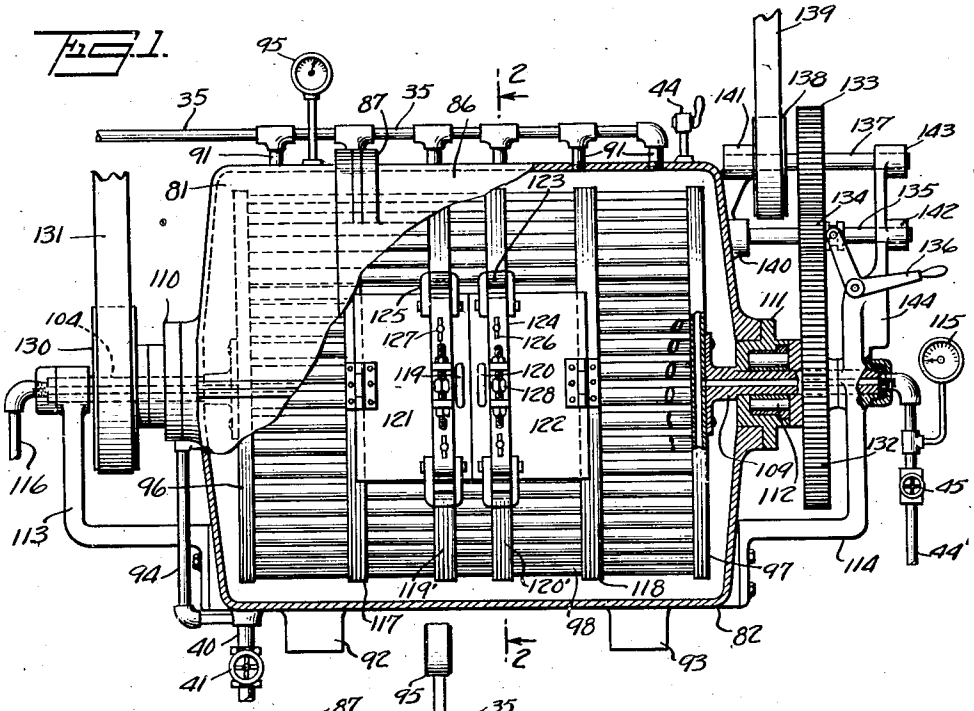
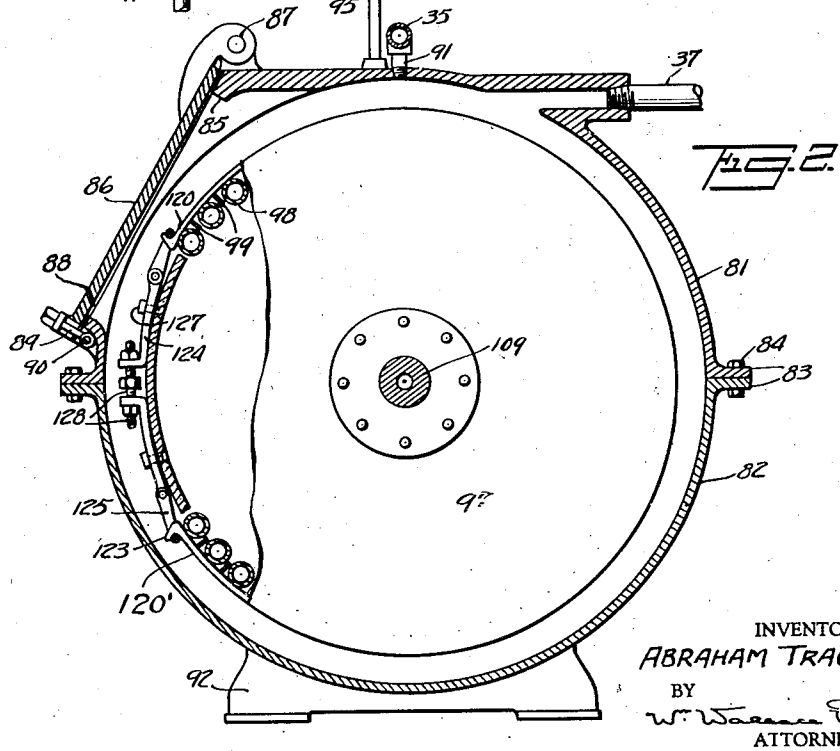


FIG. 2.



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Filed May 18, 1928 2 Sheets-Sheet 2

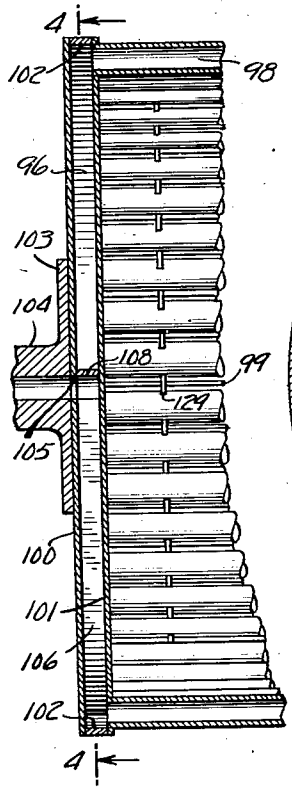


FIG. 3.

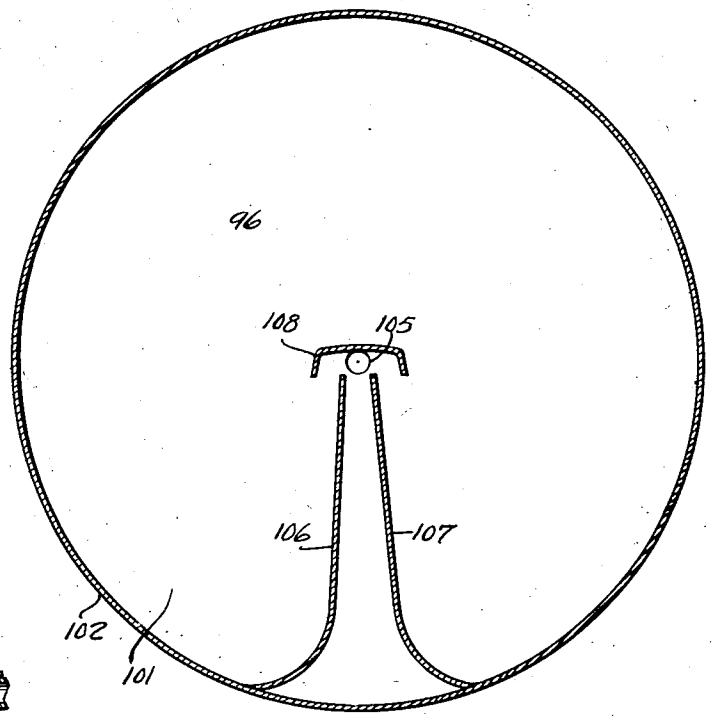


FIG. 4.

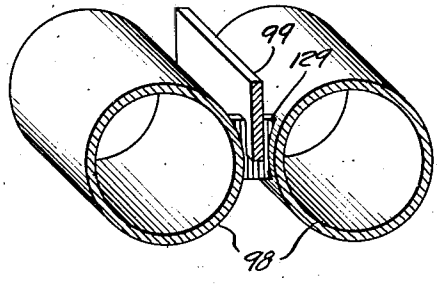


FIG. 5.

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UNITED STATES PATENT OFFICE

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DRY-CLEANING APPARATUS

Application filed May 18, 1928. Serial No. 278,653.

This invention relates to dry-cleaning apparatus of the type described in the specification of my United States Patent Number 1,291,266 dated January 14, 1919.

One object of this invention is to provide improved means for spraying the solvent upon the material carried in the rotor or drum.

A further object is to provide improved means for drying the material.

Further objects will be apparent from the particular description of the complete apparatus and from the appended claims.

The present invention consists in the novel construction and arrangement of parts hereinafter described, illustrated in the accompanying drawings and particularly pointed out in the appended claims, it being understood that various changes in the form and details of construction may be made without departing from the spirit or sacrificing any of the advantages of my invention.

In the drawings: Fig. 1 is a front elevation of the dry-cleaning machine with part of the casing and part of the rotor shown in section; Fig. 2 is a view at right angles to Fig. 1, with the casing and a portion of the rotor shown in section on the line 2—2 of Fig. 1; Fig. 3 is a central sectional view of one end of the rotor; Fig. 4 is a cross section taken on the line 4—4 of Fig. 3; and Fig. 5 is an enlarged detail view showing a portion of the rotor in isometric projection.

The casing of the machine consists of an upper part 81 and a lower part 82 forming a horizontal closed cylinder with longitudinal connecting flanges 83 secured together by bolts 84. In the front of the upper part of the casing an opening 85 is closed by a door 86 hinged along its upper edge at 87 and engaging upon a packing or flexible seat 88 in order to secure an air tight joint when secured in the closed position by means of bolts 89 pivoted to the casing at 90 and engaging slots or recesses in the edge of the door. An overhead spray pipe 35 has a series of branch pipes 91 communicating with the interior of the casing and arranged in a straight line directly above and parallel to the axis of the rotor hereinafter described. The lower part of the casing is formed with supporting feet 92, 93 and a sight gage 94 is provided on the end of the lower part 82 in order that the level of the solvent in the lower part of the casing may be readily ascertained. In the upper part of the casing a vacuum gage 95 is provided.

The rotor above referred to comprises two hollow ends or headers 96, 97 connected with each other by a circumferential series of longitudinal tubes 98 and blades 99 arranged alternately. The header 96 consists of two discs 100, 101, and a spacing ring 102 welded together to form a steam space, and the ends of the tubes are expanded into holes provided in the disc 101 and thus supply steam to said steam space. Secured on the outer face of the disc 100 by means of a flange 103 is a hollow trunnion 104 which communicates with the said steam space through a central hole 105 in the said disc 100. Fitted between the discs 100, 101 are two radial plates or baffles 106, 107 extending from close proximity to the said hole 105 to a point near the ring 102 and being curved from such point to meet the curvature of the ring 102, and adjacent to the inner ends of the said baffles is a cup-shaped baffle 108, the arrangement of these baffles 106, 107, 108 being such that, as the rotor rotates slowly in either direction, any condensed steam will be raised by the baffles 106 or 107 and will be directed to the opening 105 by the baffle 108 so that accumulation of water in the header 96 is avoided. The header 97 has a hollow trunnion 109 similar to the trunnion 104 and the headers 96 and 97 are similar except that the header 97 is not provided with baffles 106, 107, 108. The rotor is carried between the ends of the casing 81, 82 by means of bearing bushes 110, 111 having roller bearings 112 and the outer end of the trunnion 104 is mounted in a bearing in a bracket 113 secured on the end of the lower part 82 of the casing, while the outer end of the trunnion 109 is mounted in a bearing in a bracket 114 which is secured on the opposite end of the said part 82. The steam pipe 44′ supplies steam to the hollow trunnion 109 and has a pressure gage 115 thereon, and the exhaust steam from the trunnion 104 is led off by means of a pipe connection 116. Completely

encircling the series of tubes 98 and blades 99 are two bands 117, 118 and between these bands a number of tubes and blades are cut away to provide an opening for the introduction and withdrawal of the clothing or other material to be cleaned, and two additional bands 119′, 120′ extend around the rotor from edge to edge of such opening. Two doors 121, 122 are hinged to the bands 117, 118 and have handles 119, 120 by means of which they may be swung outwards when they are in proper alignment with the opening 85 in the casing. In order to retain the said doors 121, 122 in the closed position against centrifugal force when the rotor is rotating each door is provided with means for engaging hooks 123 on the ends of the bands 119′, 120′. These means consist of a pair of slide bars 124 each provided with a shackle 125 to engage a hook 123 and nut and screw means 128 for drawing the two slide bars towards each other in order to hold the door securely in position. Each slide bar 124 has a guide slot 126 engaging a pin 127 fixed to the door to serve as guides for the door fastening means.

The blades 99 are secured in place by welding to the headers 96 and 97 and to the bands 117, 118, 119′ and 120′; and at intervals in the length of the rotor; plates or blocks 129 are provided, these parts 129 being slotted to receive the blades 99 and being welded to the said blades 99 and to the tubes 98 so that a rigid structure is provided. The blades 99 are radially disposed and while serving to strengthen and brace the rotor structure they are also adapted to serve as deflecting vanes to receive the solvent spray from the overhead spray pipes and direct same inwardly to the material contained in the rotor.

Between the bracket 113 and the bearing ring 110, the trunnion 104 has secured thereon a pulley 130 to which motion may be transmitted by means of a belt 131 for the purpose of rotating the rotor at high speed to extract moisture from the material in the rotor. For the purpose of rotating the rotor at low speed—in both directions—as in the cleaning and the drying operations a large diameter gear wheel 132 is secured on the trunnion 109 between the bearing ring 111 and the bracket 114 and is driven from a small diameter wheel 133 through the medium of an idler pinion 134, mounted freely upon a shaft 135 and having a shift lever 136 by means of which it may be moved in an axial direction into or out of mesh with the gears 132, 133. The gear wheel 133 is secured on a shaft 137 which is driven by a pulley 138 to which motion is imparted by a driving belt 139 from any suitable source of power and through the medium of suitable reversing means—not shown—whereby the rotor may be caused to rotate in either direction. The shafts 135 and 137 are mounted between bosses 140, 141 on the upper part 81 of the casing and bosses 142, 143 on an extension 144 of the bracket 114.

In the operation of this apparatus the clothing or other material to be cleaned is placed in the rotor and the doors of the rotor and of the casing are then closed and secured and after the proper manipulation of the appropriate valves solvent is supplied through the overhead supply pipe 35 and the inlet pipes 91 by the creation of a vacuum within the machine, and as the rotor is slowly rotated by gear 132 first in one direction and then in the other the solvent is sprayed to the interior of the rotor, being directed to all parts of the material as the rotor rotates and the vanes or blades 99 deflect the spray inwardly to the interior of the rotor. In certain cases the solvent may be retained for a time in the machine so that the material may be rotated in a solvent bath having a level at approximately one third of the height of the casing. After the completion of this cleaning operation a further supply of solvent may be provided to rinse the material and the solvent drains from the machine through outlet 40 and valve 41, while the vacuum in the machine is still maintained, and in order to extract the moisture from the material the rotor is then rotated at high speed by the pulley 130 and belt 131 and all vapors are drawn off through the pipe line 37. After this extracting operation steam is supplied through the steam line 44 and passes through the tubes 98 to the trunnion 104 and to the exhaust pipe 116, and while the tubes are thus heated by the steam passing therethrough the rotor is again rotated slowly first in one direction and then in the other by means of the gear 132. When unloading the machine after the completion of the process as outlined above all pipe connections to the machine are closed except the valve 44 which is opened to destroy the vacuum in the machine and thus permit opening of the door 86 in the casing.

Although the above description and the accompanying drawing describe and illustrate a practical embodiment of my invention, I do not desire to be limited to the details of this disclosure, for, in the practical application of my invention, many changes may be made in form, construction and operation, as circumstances may require or experience may suggest, without departing from the spirit of this invention within the scope of the appended claims.

I claim:—

1. In a dry-cleaning apparatus, a casing, hollow-walled means in the said casing for carrying the material to be cleaned, and means for spraying a cleaning solvent from the upper part of the machine on to the said material.

2. In a dry-cleaning apparatus, a casing, rotary hollow-walled means in the casing for carrying the material to be cleaned, a series

of spray pipes arranged in a row for spraying the material with solvent, and means for conducting solvent to said spray pipes.

3. In a dry-cleaning apparatus, a casing, hollow-walled means in the casing for carrying the material to be cleaned, a series of spray pipes arranged in a row for spraying the said material with solvent, means for deflecting the spray through said hollow walls on to said material, and means for conducting solvent to said spray pipes.

4. In a dry-cleaning apparatus, a casing, a hollow-walled rotor mounted in the casing and carrying the material to be cleaned, a series of spray pipes arranged in a line parallel to the axis of rotation of the rotor, and means for supplying solvent to the said spray pipes to spray the material to be cleaned.

5. In a dry-cleaning apparatus, a casing, a rotor comprising a circular series of tubes mounted in the machine and carrying the material to be cleaned, and means for spraying solvent upon the material in the rotor.

6. In a dry-cleaning apparatus, a casing, a rotor mounted in the machine and carrying the material to be cleaned, means for heating the walls of the rotor to dry the material carried thereby, a row of spray pipes in the upper part of the casing for spraying solvent upon the said material, and means for conducting solvent to said spray pipes.

7. In a dry-cleaning apparatus, a casing, a rotor comprising tubes for the passage of heating medium and trunnions for the supply and exhaust of such medium, means for supplying solvent to the machine to clean material carried in the rotor, and means for rotating the rotor.

8. In a dry-cleaning apparatus, a casing, a rotor comprising an annular series of tubes mounted to rotate within the casing about a horizontal axis, a series of overhead spray pipes in the top of the casing arranged in a line parallel to the axis of the rotor, means for supplying solvent to the spray pipes to spray the material carried in the rotor and means for rotating the rotor to ensure proper spraying of the material.

9. In a dry-cleaning apparatus, a casing, a rotor mounted to rotate within the casing about a horizontal axis, a row of overhead spray pipes in the top of the casing arranged in a straight line parallel to the axis of the rotor, means for conducting solvent to the spray pipes, means for rotating the rotor at low speed, means for deflecting the spray to the interior of the rotor, and means for heating the walls of the rotor to dry material carried therein.

10. In a dry-cleaning apparatus, a machine casing, a series of spray pipes for the supply of solvent in the top of the casing, and a rotor for carrying the material to be cleaned comprising a pair of end headers, a series of parallel tubes connecting said headers and forming the side walls of the rotor, and a pair of hollow trunnions mounted on the end headers and carried in the end walls of the machine.

11. In a dry-cleaning apparatus, a machine casing, means for spraying solvent into the interior of the casing, and a rotor for carrying the material to be cleaned comprising end plates, a circumferential series of parallel tubes, a series of parallel blades interposed between the tubes to direct the spray of solvent inwardly to the material in the interior of the rotor, and end trunnions for supporting the rotor in the end walls of the machine.

12. In a dry-cleaning apparatus, a machine casing, overhead spray pipes for the supply of solvent to the interior of the machine, and a rotor for carrying the material to be cleaned comprising hollow end members, a circular series of tubes connecting the end members, vanes interposed between the tubes to deflect the sprays of solvent to the material in the said rotor, end bearings for the support of the rotor, and means for conducting heating medium through the hollow end members to dry the material in the rotor after the completion of the spraying operation.

13. In a dry-cleaning apparatus, a machine casing, a series of overhead spray pipes arranged in a straight line in the top of the machine, and a rotor mounted with its axis parallel to the line of spray pipes and comprising hollow end discs, a hollow trunnion projecting from each of the end discs, a circular series of tubes connecting the end discs and forming a cylindrical wall for the rotor, vanes interposed between the said tubes and also connecting the said end discs, intermediate bands encircling the tubes and vanes, and hinged doors in the said cylindrical wall.

14. In a dry-cleaning apparatus, a machine casing, means for spraying solvent into the casing, and a rotor for carrying the material to be cleaned comprising hollow end discs, a series of connecting tubes, means for conducting steam to one of the said discs and from the second disc to exhaust, and means for facilitating the discharge of condensed steam from the second disc.

15. In a dry-cleaning apparatus, a machine casing, means for spraying solvent into the casing, and a rotor for carrying the material to be cleaned comprising hollow end discs, hollow connecting means between the said discs, a hollow trunnion on each disc, means for conducting steam through the said trunnions, and baffles located in one of the said discs for raising condensed steam to the level of the adjacent trunnion.

In testimony whereof I have signed my name to this specification.

ABRAHAM TRAUBE.