

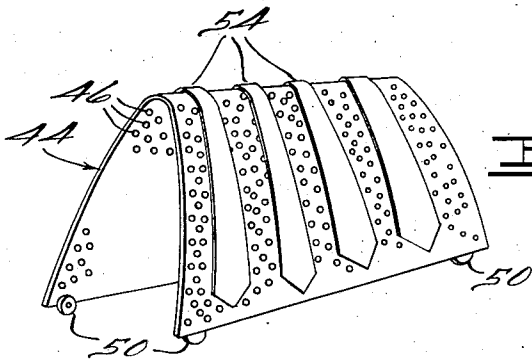
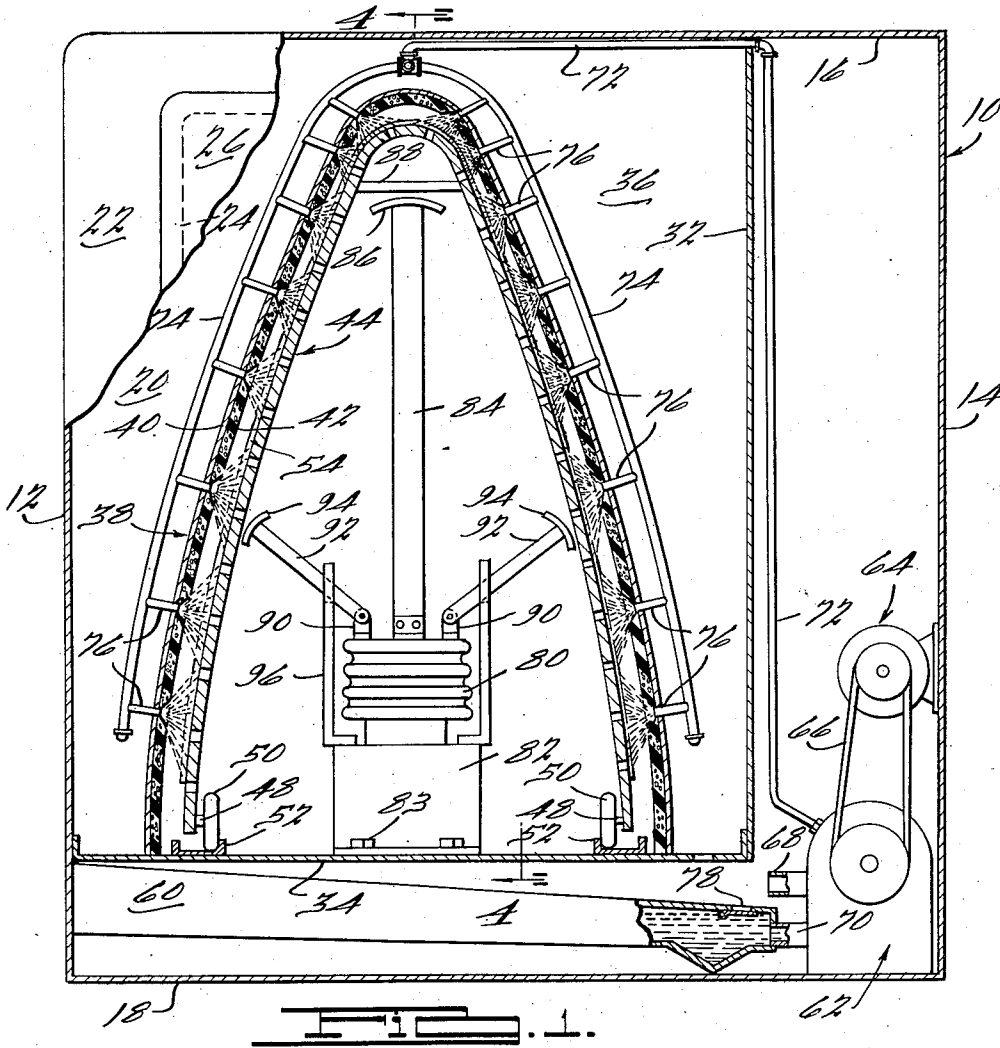
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DRY CLEANING MACHINE

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2 Sheets-Sheet 1



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DRY CLEANING MACHINE

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14 Claims. (Cl. 38--2)

This invention relates to dry cleaning apparatus and has particular reference to an apparatus for cleaning and pressing neckties or similar articles.

Heretofore it has been customary for dry cleaning establishments to clean neckties by immersing the ties in a tank of washing or cleaning fluid and then, after the ties are sufficiently dried, to press each tie individually by a more or less conventional apparatus. The pressing operation requires a substantial amount of hand labor, with the result that the cost of the cleaning and pressing operation as conventionally carried out is relatively high. The present invention consists of an apparatus for automatically cleaning and pressing a number of ties at a single operation of the apparatus. By means of the present invention, a cleaning establishment will be able to efficiently clean and press a given number of articles such as neckties with far less labor and at less expense than is possible employing conventional practices.

A principal object of the invention is to provide an apparatus for cleaning and pressing articles of apparel such as neckties.

Another object of the invention is to provide a new and improved apparatus for cleaning and pressing a number of neckties or the like at a single operation.

Other and further objects of the invention will be apparent from the following description and claims and may be understood by reference to the accompanying drawings, of which there are two sheets, which by way of illustration show a preferred embodiment of the invention and what I now consider to be the best mode in which I have contemplated applying the principles of my invention. Other embodiments of the invention may be used without departing from the scope of the present invention as set forth in the appended claims.

In the drawings:

Fig. 1 is a vertical sectional view of my cleaning and pressing apparatus;

Fig. 2 is a perspective view of one of the forms employed in the apparatus and showing articles to be cleaned located thereon;

Fig. 3 is a view similar to Fig. 1 but showing the pressing stage of operation of the apparatus; and

Fig. 4 is a sectional view on line 4--4 of Fig. 1.

Referring more particularly to the drawings, the apparatus consists of a cabinet or box-like structure 10 having side walls 12 and 14, a top wall 16, a bottom wall 18, end wall 20, and a front wall 22 having an access opening 24. The opening 24 is adapted to be closed by a door 26 which is seated against a flange 28 surrounding the access opening in the front wall 22. A seal 30 may be secured on the door 26 or on the flange 28 as desired, and the door may be suitably fastened to the wall 22 in air-tight relation. Within the cabinet 10 a vertical wall 32 and a horizontal wall or platform 34 extend between the front and rear walls 22 and 20 to define a processing chamber 36 within the cabinet 10.

A fixed form 38 is located within processing chamber

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36 and is supported on the horizontal wall 34. The form 38 is in the shape of an inverted U and may consist of an outer sheet of metal 40 having lining 42 of resilient, porous material on its underside. The lining 42 may be made of foam rubber or any other suitable resilient and porous material. The form 38 extends substantially from front to back of the chamber 36.

A movable form 44, also of inverted U shape and complementary in shape to the form 38, is adapted to be positioned beneath and within the fixed form 38 in spaced relation thereto. The form 44 may be made of flexible sheet metal or of a suitable plastic or other material and is provided with a series of apertures or perforations 46 substantially throughout its entire area. The form 44 is provided at its lower corners with pins 48 having wheels or rollers 50 journaled thereon. A pair of spaced tracks 52 are secured on the lower wall 34 of chamber 36 and extend from the front to the back thereof. The articles to be cleaned such as the neckties 54 shown in Fig. 2 are laid over the movable form 44 in the manner illustrated when the form 44 is withdrawn from the processing chamber. It will be apparent that the forms 38 and 44 may be of any desired length so as to accommodate a relatively large number of articles to be cleaned at a single operation.

After the articles to be processed have been placed on the movable form 44, the form is then positioned beneath the fixed form 38 by sliding form 44 along the tracks 52 toward the back of the chamber. The door 26 is then secured in place and the chamber 36 will be sealed for carrying out the cleaning and pressing process.

A tank or reservoir 60 is located within the cabinet 10 beneath the wall 34 and, as shown, the tank 60 slopes slightly toward the right-hand end thereof. A pump unit indicated at 62 is supported on the bottom wall 18 of the cabinet and is driven by an electric motor 64 suitably supported within the cabinet and adapted to drive the pump 62 by means of a belt 66. The pump means 62 comprises a vacuum pump operable for evacuating atmosphere from the interior of cabinet 10 so as to effect a partial vacuum within the cabinet 10. The pump means 62 is provided with an inlet pipe 68 communicating with the interior of cabinet 10 so that upon operation of the vacuum pump the atmosphere within the cabinet will be evacuated. A suitable atmospheric discharge (not shown) will be employed. The pump also includes a liquid pump having inlet 70 connected to the lower end of tank 60 so as to draw cleaning fluid from the tank and to discharge such fluid through a line 72. It will be apparent that a single pump means or two separate pumps may be employed for selectively effecting the pumping of cleaning fluid and the evacuation of the cabinet. The lower wall 34 of the chamber 36 is provided with a series of apertures or openings so that the atmosphere within the chamber 36 may be evacuated by the pump means. The partition 34 may consist merely of a series of spaced metal strips for supporting the tracks 52 and the fixed form 38 so that the chamber 36 is in open communication with the pump inlet 68.

A series of pipes 74 are spaced from and conform to the curvature of the fixed form 38 and such pipes may be arranged in spaced relation throughout the length of the form 38. All of the pipes 74 are supplied with cleaning fluid from pipe 72. Each pipe 74 has a series of spray nozzles 76 extending therefrom through suitable apertures in the form 38. It will be noted that the ends of the nozzles 76 terminate inwardly of the underside of the lining material 42. Upon operation of the liquid pump means the nozzles 76 are adapted to discharge a spray of cleaning fluid onto the articles 54 on the form 44 in the manner indicated in Fig. 1.

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The cleaning fluid may be any suitable liquid and is preferably maintained at about 120° F. The cleaning fluid is discharged from nozzles 76 under pressure and the cleaning cycle may be carried out for a suitable time interval, for example, about forty-five seconds. The excess fluid is adapted to drain off of the articles 54 and the two forms onto the top wall of the reservoir 60 where such excess fluid will flow by gravity toward an opening 78 at the lower end of the top wall of the tank 60. The provision of the numerous perforations 46 in the form 44 facilitates penetration of the pressurized cleaning fluid through the material of the articles being cleaned and also facilitates drainage of excess fluid from the apparatus.

After the cleaning cycle has been completed, the pressing cycle is initiated, and it will be understood that suitable automatic controls may be employed for initiating and terminating the various cycles of operation of the machine. The controls for the motor 64 and the pump means may be either manually operable or automatically operable to effect a complete cleaning and pressing cycle. At the end of the cleaning cycle as described, the pump means is operated to evacuate the atmosphere within cabinet 10. The pressing operation is carried out within the partial vacuum which exists within the cabinet so as to facilitate drying of the articles. A means is provided for lifting the movable form 44 upwardly against the underside of the resilient lining 42 on the underside of the fixed form 38 to press the articles between the two forms. Such means comprises an expansible and contractible bellows 80 mounted on a bracket 82 which is secured on the horizontal partition 34 by screws 83. The sealed bellows 80 is adapted to expand in response to reduced pressure within the cabinet to actuate a series of lever arms which engage the movable form 44 and press the same against the fixed form 38. Two or more of the pressure responsive lifting devices may be employed as desired, depending upon the length of the forms. Each bellows 80 has a vertically extending rod 84 secured on its upper surface and provided with a curved plate 86 on its upper end. The form 44 has a horizontally disposed strap 88 extending between its side walls adjacent the upper end thereof and, when the bellows 80 is in its contracted position as shown in Fig. 1, the plate 86 is spaced slightly below the strap 88 so as to enable the form 44 to be slid into and out of the chamber 36. A pair of lugs 90 are also secured on the upper surface of bellows 80 and lever arms 92 are pivoted at one end on lugs 90 and are provided with curved plates or shoes 94 on their outer ends. At each side of bracket 82 is a vertically disposed support 96 having a vertical slot 98 within which one of the arms 92 is disposed. In the contracted position of the bellows 80 the arms 92 rest against the bottoms of slots 98 so that the plates 94 are spaced inwardly from the inner surface of form 44 so as to permit the form to move into and out of the chamber on tracks 52. As soon as the atmosphere within cabinet 10 has been partially evacuated, for example, the seven-eighths of normal atmospheric pressure, the bellows 80 will expand in a vertical direction to raise rod 84 against the strap 88 and continued expansion of the bellows will lift form 44 firmly against the resilient lining of the fixed form 38 to press the articles 54 between the forms. As the bellows is expanded, the pivot points of the arms 92 will be raised and the outer ends of the arms 92 will swing downwardly into engagement with the sides of the form 44 so as to firmly press the sides of form 44 against the fixed form 38 as illustrated in Fig. 3. Evacuation of cabinet 10 may be continued until about one-half an atmosphere remains in the cabinet, which should be sufficient to substantially completely dry the articles and effect the pressing operation. Since the lining 42 on the fixed form is resilient and porous, it will not effect undesirable creases or sharp edges on the ties or other articles being pressed.

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Furthermore, the porous lining and the perforations in the form 44 not only facilitate drainage of liquid after the cleaning cycle is completed but, in addition, facilitate evacuation of the atmosphere and vapor particles on such surfaces and on the articles being pressed.

After the pressing operation has been carried for a suitable period of time, the pump 62 is shut off and a normal atmospheric pressure is established in cabinet 10. As soon as normal atmospheric pressure exists in the cabinet 10, the bellows 80 will contract so as to return the form 44 onto the tracks 52, whereupon the form with the cleaned and pressed articles thereon may be removed from the cabinet.

The invention has been illustrated as comprising only one pair of pressing forms within the cabinet 10, but it is contemplated that in commercial practice it may be advisable to employ two or more sets of forms in a single apparatus so that a large number of articles can be processed at the same time.

While I have illustrated and described a preferred embodiment of my invention, it is understood that this is capable of modification, and I therefore do not wish to be limited to the precise details set forth but desire to avail myself of such changes and alterations as fall within the purview of the following claims.

I claim:

1. Apparatus for cleaning and pressing neckties or the like, comprising means defining a processing chamber, a fixed form in said chamber, a movable form on which the articles to be processed may be placed, means for positioning said movable form in spaced relation to said fixed form with the articles therebetween, means for spraying a cleaning fluid onto the articles on said form, means for evacuating said chamber, said forms having complementary article pressing surfaces thereon, and means operable for moving said forms into engagement thereby to press said articles between said forms while said chamber is evacuated.

2. Apparatus for cleaning and pressing neckties or the like, comprising means defining a processing chamber, a fixed inverted U-shaped form in said chamber, a movable form of similar shape and on which the articles to be processed may be placed, means for positioning said movable form in spaced relation beneath said fixed form, means for spraying a cleaning fluid onto the articles on said form, means for evacuating said chamber, said forms having complementary article pressing surfaces thereon, and means operable in response to evacuation of said chamber for moving said movable form against said fixed form to press said articles between said forms while said chamber is evacuated, said last means being operable to return said movable form onto said positioning means in response to establishment of normal atmospheric pressure in said chamber.

3. Apparatus for cleaning and pressing neckties or the like, comprising means defining a processing chamber, an inverted U-shaped form in said chamber, a movable form complementary in shape to said first form and on which the articles to be processed may be placed, means for positioning said movable form in spaced relation beneath said first form, a series of spray nozzles associated with said first form for spraying a cleaning fluid onto the articles on said form, said forms having complementary article pressing surfaces thereon, means for evacuating atmosphere from said chamber, and means for moving said forms into engagement thereby to press said articles between said forms while said chamber is evacuated.

4. Apparatus for cleaning and pressing neckties or the like, comprising means defining a processing chamber, a fixed form in said chamber, a movable form on which the articles to be processed may be placed, means for positioning said movable form in spaced relation to said fixed form with the articles therebetween, said forms having complementary article pressing surfaces thereon,

means for spraying a cleaning fluid onto the articles on said form, means for evacuating said chamber, and pressure responsive means operable in response to evacuation of said chamber for moving said movable form against said fixed form to press said articles between said forms while said chamber is evacuated.

5. Apparatus according to claim 4 wherein said forms are inverted U-shaped and said movable form is disposed beneath said fixed form.

6. Apparatus according to claim 4 wherein said spraying means comprises a series of spray nozzles extending through said fixed form and directed toward said movable form.

7. Apparatus according to claim 4 wherein said movable form is provided with a series of perforations extending substantially over its entire area, and the underside of said fixed form is provided with a lining of resilient, porous material.

8. Apparatus according to claim 4 wherein said pressure responsive means comprises an expansible and contractible bellows exposed to the atmosphere in said chamber and lever means connected thereto and engageable with said movable form to move the latter against said fixed form upon expansion of said bellows in response to evacuation of said chamber.

9. Apparatus for cleaning and pressing neckties or the like, comprising wall means defining an enclosed processing chamber, a fixed form of inverted U shape in said chamber, a movable form complementary in shape to said fixed form and on which a series of articles to be processed may be placed, means for positioning said movable form with the articles thereon beneath and within said fixed form in spaced relation thereto, a plurality of spray nozzles adapted to spray cleaning fluid onto the articles on said movable form, the underside of said fixed form having a lining of resilient, porous material and said movable form having an article pressing surface thereon provided with a series of perforations, pump means for supplying said fluid to said spray nozzles, means for evacuating atmosphere from said chamber, means engageable with said movable form and operable to lift the same and the articles thereon against the underside of said fixed form for pressing the articles between said forms while said chamber is evacuated, and pressure responsive means exposed to said chamber for effecting operation of said means for lifting said form when the pressure in said chamber is reduced a predetermined amount.

10. Apparatus for cleaning and pressing neckties or the like, comprising wall means defining an enclosed processing chamber, a fixed form of inverted U shape in said chamber, a movable form complementary in shape to said fixed form and on which a series of articles to be processed may be placed, means for positioning said movable form with the articles thereon beneath and within said fixed form in spaced relation thereto, said forms having complementary article pressing surfaces thereon, a plurality of spray nozzles associated with said fixed form and adapted to spray cleaning fluid onto the articles on said movable form, a reservoir for cleaning fluid, pump means for supplying said fluid from said reservoir to said spray nozzles, said pump means being operable for evacuating atmosphere from said chamber, pressure responsive means

in said chamber, a series of arms connected to said pressure responsive means and engageable with the underside of said movable form, said pressure responsive means being actuated in response to evacuation of said chamber for causing said arms to engage said movable form and lift the same and the articles thereon against the underside of said fixed form for pressing the articles between said forms while said chamber is evacuated, said pressure responsive means being operable to actuate said arms to return said movable form onto said positioning means in response to the establishment of normal atmospheric pressure in said chamber.

11. Apparatus for cleaning and pressing neckties or the like, comprising means defining a processing chamber, a fixed form in said chamber, a movable form on which the articles to be processed may be placed, means for locating said movable form in spaced relation to said fixed form with the articles therebetween, said forms having complementary article pressing surfaces thereon, means for spraying a cleaning fluid onto the articles on said form, means for evacuating atmosphere from said chamber, and pressure responsive means operable in response to evacuation of said chamber for moving said movable form against said fixed form to press said articles between said forms while said chamber is evacuated, and for returning said movable form onto said locating means in response to establishment of atmospheric pressure in said chamber.

12. Apparatus for cleaning and pressing neckties or the like, comprising means defining a processing chamber, a movable form on which the articles to be processed may be placed, a second form in said chamber, means for positioning said movable form in spaced relation to said second form with the articles to be processed therebetween, said forms having opposed article pressing surfaces thereon, means for spraying a cleaning fluid onto the articles on said movable form, means for evacuating said chamber, and pressure responsive means operable in response to evacuation of said chamber for moving one of said forms against the other to press said articles between said forms while said chamber is evacuated.

13. Apparatus according to claim 12 wherein said forms are inverted U-shaped and said movable form is disposed beneath said second form.

14. Apparatus for cleaning and pressing neckties or the like, comprising means defining a processing chamber, an article supporting form in said chamber, a second form in said chamber overlying said article supporting form in spaced relation thereto, said forms having complementary article pressing surfaces thereon, means for spraying cleaning fluid onto said articles, means for evacuating said chamber, and means operable in response to evacuation of said chamber for moving said forms into engagement thereby to press said articles between said forms while said chamber is evacuated.

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