United States Patent [19]

Frauendorf

[11] **3,849,815**

[45] **Nov. 26, 1974**

[54] **METHOD AND APPARATUS FOR STEAMING AND SMOOTHING OF CLOTHING IN A CLOSED CHAMBER**

[75] Inventor: **Manfred Frauendorf**, Nurnberg, Germany

[73] Assignee: **Normbau GmbH. Maschinen-Apparate-Werkzeuge & Co.**, Nurnberg, Germany

[22] Filed: **Nov. 10, 1972**

[21] Appl. No.: **305,253**

[30] **Foreign Application Priority Data**

Nov. 12, 1971 Germany 2156405

[52] **U.S. Cl.** ..... **8/149.1**, 8/149.3, 68/5 C

[51] **Int. Cl.** **D06c 1/04**

[58] **Field of Search** ..... 8/149.3, 149.1; 68/5 R, 68/5 A, 5 B, 5 C, 5 D, 5 E

[56] **References Cited**

UNITED STATES PATENTS

2,297,230	9/1942	Langen	8/149.3 X
2,446,502	8/1948	Wehrli	8/149.3 X
3,234,571	2/1966	Buss	68/5 C X
3,660,013	5/1972	Payet et al.	8/149.3 X

Primary Examiner—Billy J. Wilhite
Assistant Examiner—Philip R. Coe
Attorney, Agent, or Firm—Browdy and Neimark

[57] **ABSTRACT**

A method is disclosed for steaming and smoothing articles of clothing in a closed chamber with a lockable processing chamber and with means for admitting steam and hot air. Short abrupt treatments of saturated or hot steam at constant pressure above atmospheric are introduced into the chamber and the pressure is lowered to a vacuum by condensation of the moisture onto the clothing. After several such treatments the clothes are dried by hot air which is blown thereover from above.

13 Claims, 6 Drawing Figures

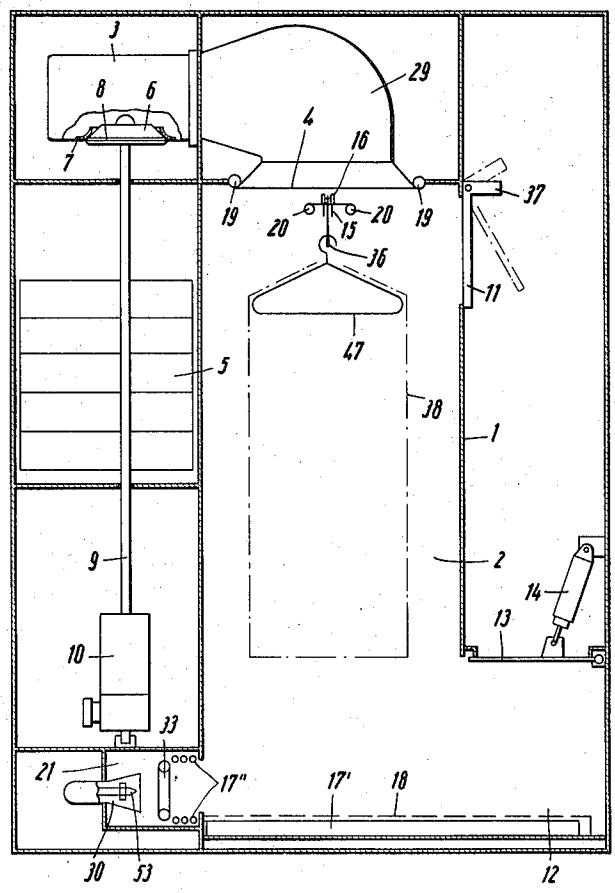


Fig. 1

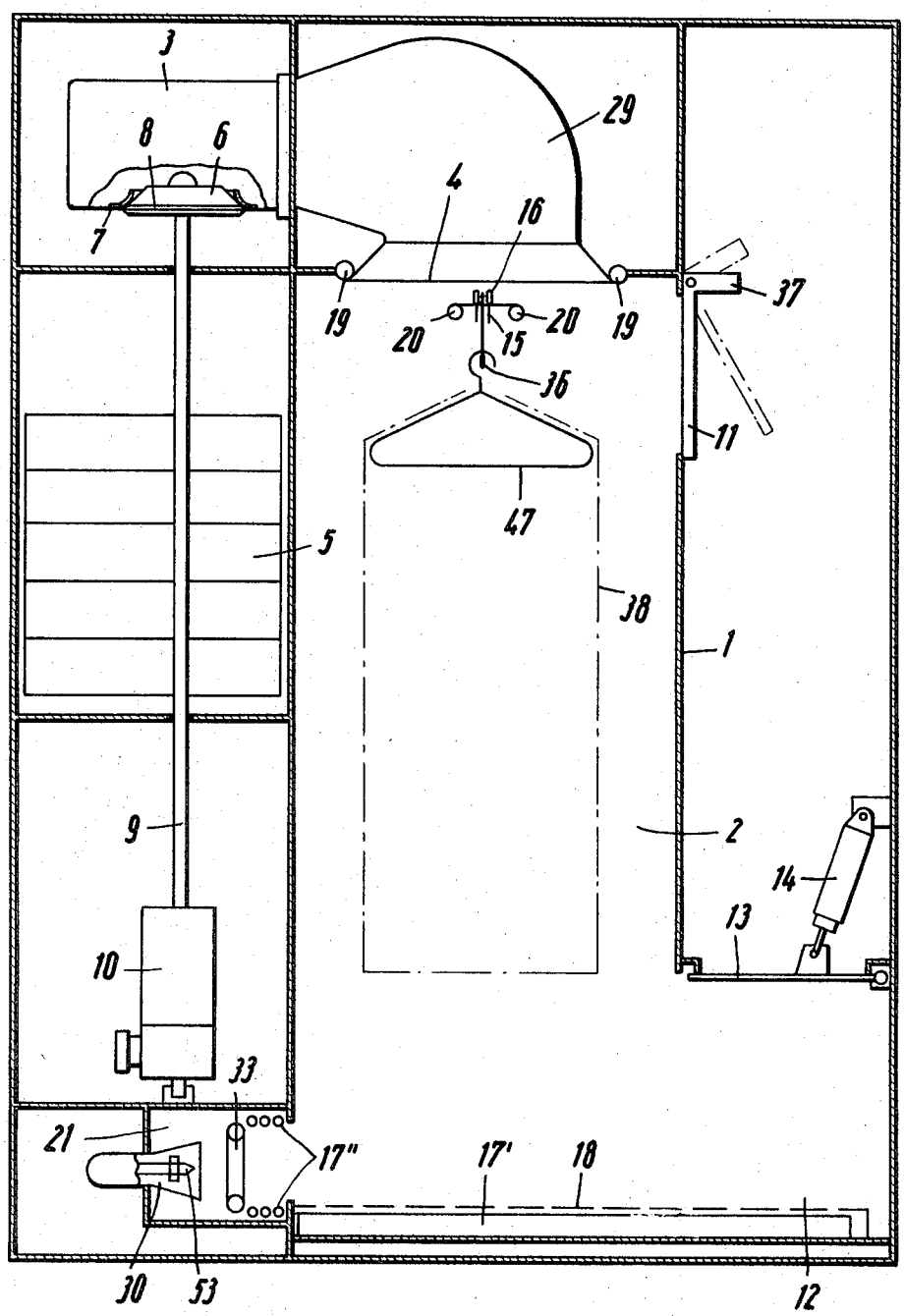

3
8
6
7
29
4
16
19
20
15
20
19
37
36
11
47
5
38
1
9
2
14
13
10
33
21
17"
17'
18
30
53
12

Fig. 2

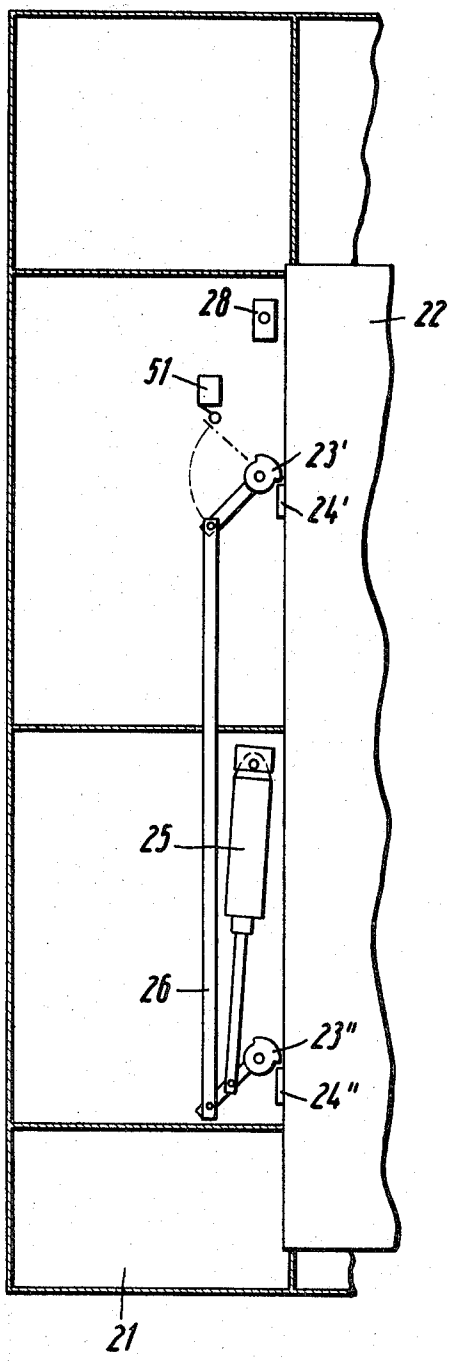


Fig. 3

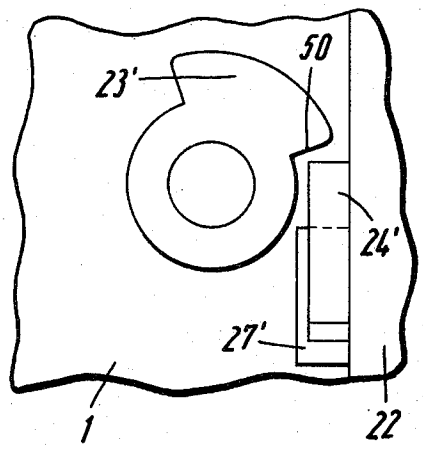


Fig. 4

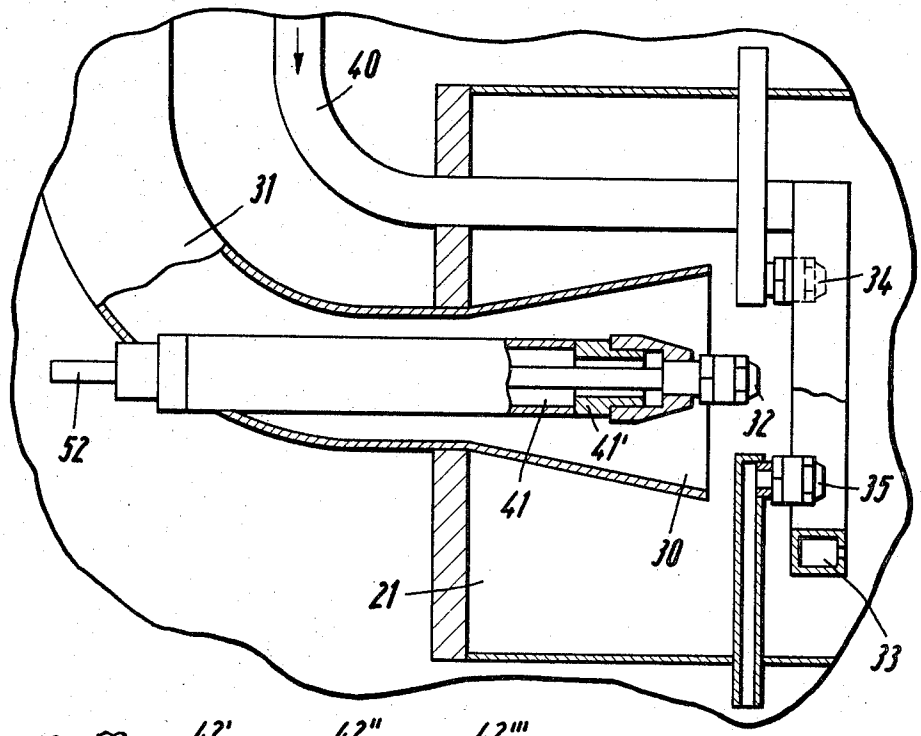

40
31
34
52
41'
32
35
41
30
21
33

Fig. 5

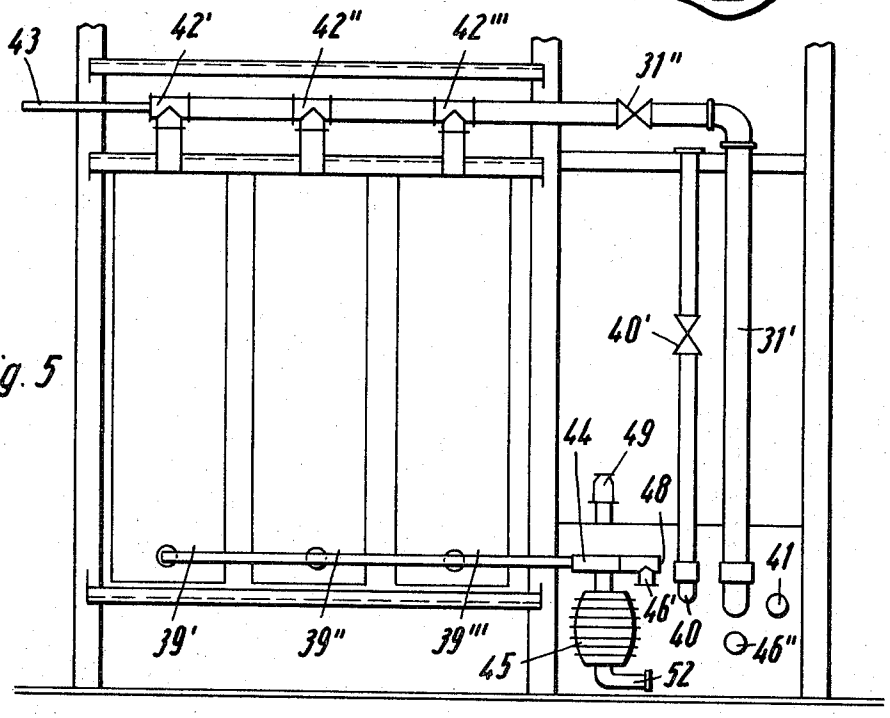
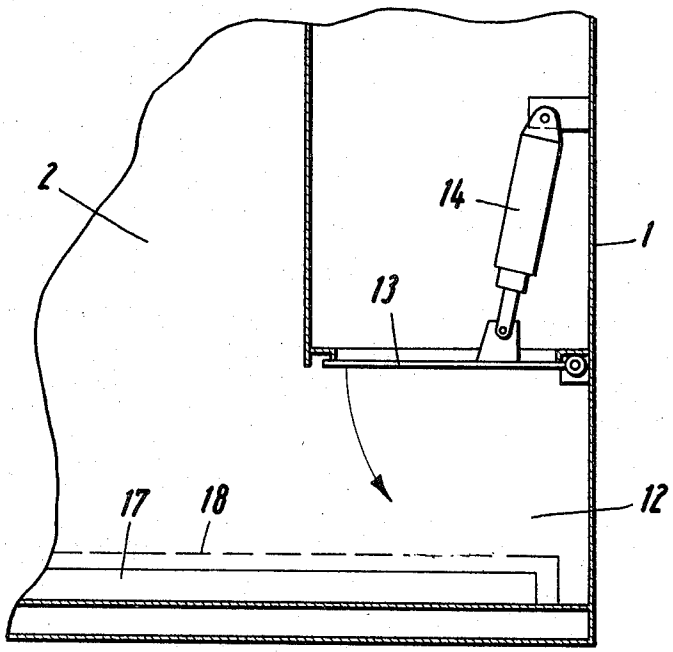

43
42'
42"
42'''
31"
40'
31'
44
49
48
41
39'
39"
39'''
46'
40
46"
45
52

Fig. 6



METHOD AND APPARATUS FOR STEAMING AND SMOOTHING OF CLOTHING IN A CLOSED CHAMBER

FIELD OF THE INVENTION

The present invention concerns a method for the steaming and smoothing of articles of clothing in a closed chamber having a lockable processing chamber with means for admitting steam and hot air.

BACKGROUND OF THE INVENTION

Three principal prerequisites are needed for the steaming and smoothing of articles of clothing: adequate moisture, sufficiently high temperature for the specific type of fiber and cloth, application of pressure and an effective exposure time to moisture, temperature and pressure, depending on the technology of the method. In known ironing machines or clothes presses, these three prerequisites are used in various combinations. Recently, incompletely closed chambers have been used for smoothing articles of clothing, without the application of pressure, in which the articles of clothing are subjected individually in sequence or simultaneously in groups to a treatment with steam and drying air. In a known variety of such devices, the treatment is effected by passage through a tunnel, with the article of clothing being treated with steam and then with drying air, either during the passage or during intermittent pauses. In a second type of device, a number of articles of clothing are placed in a chamber which is lockable but not sealed with respect to the outside atmosphere, and there subjected simultaneously to the various stages of treatment.

In the known steam tunnels or finishers with discontinuous feed, only the heat and moisture are used during the steaming process, but not pressure. The known devices are sensitive to the relative atmospheric humidity on a given work day. Moreover, in the previously known devices the influential parameters of temperature and moisture can be varied only to an unsatisfactory degree and neither higher pressure nor lower pressure (with respect to the outside atmosphere) can be developed or controlled in the steam phase in order to achieve an optimum match between the course of the treatment for various articles of clothing as a function of type of fiber, and the nature of the treatment.

In the known devices, pressure is exerted on the surface of the article of clothing in the drying phase only by the air flowing past, so that the amount of drying air is constant per unit of time because of the constant airflow rate, and the time spent in the drying zone merely changes the amount of air for each article of clothing.

SUMMARY OF THE INVENTION

The object of the present invention is to create a method with which the articles of clothing of various kinds can be smoothed, in which temperature, moisture and pressure can be varied individually and plurally in any desired manner, and the smoothing effect is considerably improved with respect to the heretofore known methods.

The object is achieved according to the invention primarily in that an excess pressure is created in the chamber that is to accept the articles of clothing to be smoothed by means of one or more short, abrupt injections of steam, and pressure being capable of being reduced to a vacuum (adjustable at will) through condensation of moisture with variation of the exposure time, and that simultaneously or successively injected dry saturated steam or hot steam alone or in combination with steam admitted abruptly into the room heats the articles of clothing, after which the remaining residual steam is released and hot air is blown in bursts over the articles of clothing from top to bottom.

By means of the shock-steaming according to the invention, the processing chamber is filled practically instantly with a preset volume of steam. By means of the nearly adibatic expansion of this volume of steam in the finitely bounded processing chamber, the moisture contained in said steam condenses out nearly completely and abruptly on the articles of clothing, since these are initially the coldest of all parts of the processing chamber.

The vacuum which is formed immediately upon the first shock wave can be reduced by subsequent further single or plural shock steamings and/or admission of saturated or hot steam, so that in the following steaming phase a rapid heating of the articles of clothing upon evaporation of the moisture on the fibers is achieved, with the resultant excess pressure in the processing chamber being limited as to duration and magnitude.

The moisture that has condensed out on the cloth composing the articles of clothing is sucked into the cloth by the briefly active vacuum that is created.

Subsequent abrupt treatment with hot air on the one hand leads to a discharge of the evaporated liquid, with a suction effect being exerted on the articles of clothing by the hot air passing over them from top to bottom; the remaining moisture is sucked out of the cloth, and an additional smoothing effect is produced by the pressure of the flow of the passing hot air.

According to a further feature of the invention, a brief pause can be introduced between the single or plural phases of steam admission and between the end of the steam admission and the beginning of the hot-air drying, in order to produce a prolonged time of action of the steam and moisture on the articles of clothing, with the admission of steam and heat being controlled and limited by adjustable temperature ranges.

The brief production of large amounts of steam is unsuitable for small steam-generating facilities and, especially if other steam consumers are connected, leads to a breakdown of steam generation and/or the steam supply. To avoid this shortcoming and to achieve the abrupt expansion of a specific amount of steam (and hence, moisture), the steam used to produce the steam burst is advantageously taken from a known steam source and collected in an intermediate storage means.

During the processing times for the articles of clothing between two successive fillings and/or between two "shock steamings," enough steam can collect in the intermediate storage device so that no abrupt stress is imposed on the steam source during the steam burst.

The connecting line from the steam storage device to the processing chamber is opened or closed in known fashion intermittently by a valve and is (according to a feature of the invention) many times larger than the inlet cross section of the continuously open line between the steam source and the steam storage device.

In this manner, when the valve to the processing chamber is opened, the pressure in the steam storage device drops abruptly, so that the amount of steam and the residual pressure can be controlled as a function of time.

Heretofore, fabric treatments such as finishes, impregnating agents, scents or the like have been applied in solvent baths in chemical cleaning machines. Water-resistant impregnating agents which adhere substantially to the cloth were prepared in an aqueous solution, with the article of clothing being completely saturated.

The invention enables the application of a substantively adhering wet impregnating agent, a scent or deodorant to eliminate the odor of perspiration or other means, in such a manner that the agents are sprayed by a special spraying device into the closed saturation chamber, with the steam acting as the carrier.

In an analogous manner, according to another feature of the invention, water of condensation or percolated condensate can be sprayed together with hot steam or dry saturated steam in order to deposit a still larger amount of moisture on the cloth during the "shock moistening" than the steam alone contains.

The additional moistening of the steam burst, according to another feature of the invention, can also be accomplished by having a conventional expansion nozzle spray wet steam with a high moisture content.

The process is advantageously carried out in such a manner that the quantity of air and hence the air velocity can be continuously adjusted by changing the air inlet cross section and varied as desired during the hot air drying, in order to attain an optimum match to the special conditions required for the articles to be processed.

In this connection, the hot air temperature can be regulated and limited alone or interacting with conventional temperature limiting devices.

According to the invention, depending on the conditions of the articles of clothing to be processed in one or more temperature ranges, which are governed by conventional thermostatic limiting devices, the state and characteristics of the processing steam can be varied. This is achieved by appropriate charging with a "shock burst" of steam from a steam storage device, saturated or hot steam from an annular nozzle device, and/or additional moistening of the steam by spraying water of condensation or percolation condensate and/or moistening by means of a wet steam nozzle, with each device adjustable either alone or in combination with others.

The invention also pertains to a method for smoothing articles of clothing in a closed chamber with a lockable processing chamber with means for input of steam and hot air. The device for practicing the method of the invention is primarily characterized in that the processing chamber is made in the form of a pressure chamber, that an excess pressure valve, a nozzle arrangement for separate or combined feed of steam in different conditions, of water of condensation or percolator condensate and a saturated or heated steam intermediate storage device are provided for abrupt shock damping.

According to an advantageous sample embodiment of the invention, the air inlet pipe of a hot-air blower is connected to the roof portion of the processing chamber. By an advantageous forming of the guide walls of the air inlet pipe, a constantly different hot air charge with downwardly directed direction of flow over the cross section of the processing chamber is maintained.

For additional heating of the added hot air and to avoid condensation of the steam fed into the chamber, the air pipe and guide system are heated.

Advantageously, a supplementary heater is mounted on the floor of the processing chamber to avoid condensation, wherein the supplementary heater, according to a further feature of the invention, is covered by a strainer disk mounted some distance above it. This avoids having some article of clothing possibly fall from the hanger and come in contact with the floor heater and possibly be damaged. The nozzle chamber located horizontally in the lower part of the processing chamber is advantageously heated in the same way.

A heat register is mounted in known fashion in the air inlet path of the blower. The heat register is constructed according to the invention in such a manner that a large free cross section exists between the heating plates and the heating pipes, in order to keep the intake resistance to a minimum.

In the same advantageous fashion, the cold air intake openings are made so that their cross section is at least **25** times greater than the intake opening of the hot air blower. This results in the intake noise being largely reduced at the same time as the air resistance is lowered.

For bringing the articles of clothing to be processed in the processing chamber, a fixed carrier track is provided according to the invention in said chamber, as well as a connecting tank that can be raised or lowered automatically, located outside the chamber and above the doors of the processing chamber. This ensures that the articles of clothing suspended on a movable carrier can be shifted from said carrier to the processing chamber and removed again from said chamber after processing, preferably by means of a switching arrangement, with the track arrangement of the carrier being selected so that the loading and unloading can be carried out in a continuous sequence.

The carrier tracks according to another feature of the invention, are also heated to prevent condensation of the steam on these relatively cooler metal parts. The arrangement is advantageously made so that the heat for the air intake and guide system, the carrier rails, heat register, flow and nozzle chamber heat are connected in series.

The nozzle arrangement for supplying various kinds of steam is advantageously made so that an annular nozzle surrounding the shock steam nozzle serves for the saturated steam.

A wet steam nozzle or alternately a nozzle to moisten the steam with water of condensation or percolated condensate is mounted in the mouth of the shock steam nozzle.

To control the steam and hot air, according to the invention an exhaust air flap is provided in one wall of the processing chamber and the blower has an adjustable intake flap. The arrangement is such that the exhaust and inlet flaps open before the hot air blower is turned on.

A shaft motor with automatic end-point shut-off or a hydraulically or pneumatically operable cylinder and piston arrangement is advantageously employed for moving the intake flap for the blower. The intake flap is made cone-shaped and provided with a sealing means

against the intake air and the steam backpressure. The automatically limiting drive of the shaft motor or cylinder piston arrangement is continuously adjustable in all directions of movement.

A hydraulically or pneumatically operable cylinder and piston arrangement is provided to control the exhaust flap.

To add cloth finishing agents such as impregnating substances, deodorants or the like, according to a further feature of the invention, at least one more nozzle with a stream axis parallel to the shock steam nozzle is provided.

The apparatus according to the invention is automatically controlled, with steering means provided for the accomplishment of the individual processes of the shock smoothing treatment. A known variety of programmed-card control mechanism can be used for control.

This provides an advantageous control of the course of the process by programmed cards, which eliminates error and is set optimally for the articles of clothing to be processed by changing the program.

Closing the processing chamber door automatically actuates a door lock through a pushbutton switch and the completely automatic execution of the program is started (after locking is complete by means of the drive provided therefor) by means of a start switch.

Actuating the processing chamber door to move it from the open position also advantageously activates switching means to cause the carrier track to drop after opening (and to rise upon closing) of the processing chamber door.

The movable carriers supporting the transport means, which slide on the carrier rails, are provided with a spring loaded section for hanging up the articles of clothing to be processed. This ensures that depending on the type of articles of clothing only the maximum number of articles admissible in each case will be added, and thus the amount of space for free movement (especially necessary in hot-air drying) is left to allow the clothes to flutter and the setting of creases produced by forced folding due to insufficient space for movement is avoided.

Advantageously, deep indentations are provided for two different types of clothing. Advantageously, the ratio of the indentations of different depths is approximately 1:2. In one sample embodiment that has been made, five indentations are provided for overcoats or trenchcoats, 10 for outer clothes, skirts, dresses, sweaters, blouses and the like.

BRIEF DESCRIPTION OF THE DRAWINGS

Further features and advantages of the invention are discussed in more detail with reference to the drawings, which represent a sample embodiment in schematic form:

FIG. 1 is a schematic cross section through a device according to the invention.

FIG. 2 is a partial section of FIG. 1, with locking device.

FIG. 3 is a detail of the locking device according to FIG. 2 on a reduced scale.

FIG. 4 is a schematic representation of a nozzle arrangement.

FIG. 5 is a partial cross section of the steam storage device, and

FIG. 6 shows the air outlet flap with adjustment means.

DESCRIPTION OF PREFERRED EMBODIMENTS

FIG. 1 is a schematic representation of a device according to the invention for smoothing articles of clothing in a closed chamber. The device consists of a housing 1 with a processing chamber 2, covered by a hood 29 and having an exhaust chamber 12 at the bottom and to one side. Outside the processing chamber 2, on the side of said chamber 2 which is opposite exhaust chamber 12, a nozzle chamber 21 provided with heating device 17'' is mounted. Above the nozzle chamber 21 is a heat register 5 as well as the air intake opening control device, consisting of an intake opening flap 6, conical in shape and with its convex surface against a stop ring 7 in the closed position. A seal 8 is provided in the vicinity of the edge. An actuating motor 10 is used to move the intake air flap, said motor being advantageously in the form of a self-stopping shaft motor and moving the valve cone 6 (in the drawing) up or down via a connecting rod 9.

Above the heat register, a hot air blower 3 is mounted, which connects to an air outlet opening in hood 29, such that the hot air that is fed in flows through the processing chamber 2 from top to bottom. On one side wall of processing chamber 2, preferably above the exhaust chamber 12, an excess pressure flap 11 is movably provided in the wall of housing 1. Excess pressure flap 11 is provided with a counterweight 37, said counterweight preferably being made adjustable, in order to control the opening pressure. Below the intake opening of the blower 3 is a known type of heat register 5 which heats the intake air.

In exhaust chamber 12, as shown in detail in FIG. 6, an exhaust flap 13 is mounted movably. A cylinder-piston arrangement 14 serves to activate it.

In processing chamber 2 a carrier track arrangement 15 is provided, on which the carrier hangers 36 slide. On these carrier hangers 36, articles of clothing 38 are hung at intervals on clothes hangers 47.

A floor heater 17' is mounted on the floor of the processing chamber 2. This floor heater 17' is covered by a perforated cover sheet 18. This ensures that any article of clothing 38 that falls from a carrier hanger 36 will not come in direct contact with floor heater 17' and be damaged.

Nozzle chamber 21 is provided with a heater device 17'' that is in the heater circuit of floor heater 17'.

The air outlet opening 4 in hood 29 is surrounded by a hood heater 19. The carrier track 15 has a carrier track heater 20. Advantageously, hood heater 19, carrier track heater 20, heat register 5 and floor heater 17' are connected in series in the order given above.

FIG. 2 shows a partial section of FIG. 1, with the air guide arrangement left out of hood 29 and the nozzle arrangement omitted from nozzle chamber 21. A door 22 is tiltably fastened on hinge pins. Locking is accomplished by locking devices 23' and 23'', activated jointly by an activating cylinder 25 via connecting rod 26.

From the enlarged view in FIG. 3 it is evident that the eccentrically formed notched discs 23' and 23'' press against lugs 24' and 24'' (see also FIG. 2) on door 22, thus pulling the door against stops 27' and 27'', located on housing 1 of the processing chamber 2, closing and locking it. In the arrangement shown in the drawing in

FIG. 3, the position of the guiding edge of the notched discs 23′ and 23″ is such that door 22 can be opened.

It is evident from FIG. 2 that when door 22 is closed a pushbutton switch 28 is depressed. The cylinder device 25 is activated by pushbutton switch 28 via a control switch which is not shown, and the door is locked against stops 27′ and 27″ by notched discs 23′ and 23″.

In the locked position, the control rod 26 activates the automatic program by means of start switch 51.

Processing chamber door 22 is unlocked automatically by the programmed control device.

FIG. 4 shows the nozzle arrangement mounted in nozzle chamber 21 on an enlarged scale. This nozzle arrangement consists primarily of a shock steam nozzle 30 with a conical sheathing and feed 31′ with shock valve 31″.

The steam content of container 39 of the steam storage device is supplied by connection 43 from the steam line and discharged via valve 31″ in bursts into shock nozzle 30 (FIG. 5).

A feed 41 is arranged in the center of the opening of the cone of the shock steam nozzle 30; a wet steam expansion nozzle 53 can be screwed onto the forward end 41′ of said feed. Alternatively, a spray nozzle 32 with feed 52, which is connected to a condenser 45 by a control valve which is not shown (FIG. 5), can be attached to connection 41′, in order to spray water of condensation or percolated condensate to moisten the saturated or hot steam that emerges through nozzle 30 and/or annular nozzle 33.

The annular nozzle 33 with line 40 leads to a control valve 40′ and is fed directly from the steam line.

In addition, two more nozzles 34 and 35 are included, through which impregnating agents, deodorants and the like can be added. The arrangement of nozzles 34 and 35 is such that their stream axes are parallel to the steam jet axes of nozzles 30 and 32 or 52.

It is evident from FIG. 1 that the steam near the floor is blown diagonally through the processing chamber 2. This avoids a direct disturbance of the injected steam by the articles of clothing 38. The steam jets strike the opposite wall in the exhaust chamber 12. This method of injecting the jet ensures that the processing chamber 2 is filled by a cloud of steam in the vicinity of the articles of clothing; said cloud passes through the clothing from bottom to top.

FIG. 5 shows the steam storage device according to the invention. In the sample embodiment shown, three storage compartments 39′, 39″ and 39‴ are provided. These three containers are supplied by a main steam supply line 43, connected to a steam source (not shown), via T-connections 42′, 42″, 42‴. The main steam supply line 43 then becomes the shock steam line 31, which runs to the shock steam nozzle 30.

In the lower part of the storage compartments 39′, 39″ and 39‴ connections run to line 44. A line runs via connection 48 to a steam valve (not shown) and thence to connection 41 for the wet steam nozzle 53 that may be added to connection 41′ if desired.

From line 44 a connection branches off to the condensate collecting container 45, to whose lower end a line 52 runs via a valve (not shown) to a nozzle 32 which may be added to spray condensate. Stub 49 on line 44 runs to the heater connections for the air inlet system, carrier track heater, heat register, floor and nozzle chamber heaters, and terminates at junction 46″, which runs via a condensate drain to the condensate line of the steam source. By means of connector 46′ on line 44 the resultant condensate is drained from compartments 39 and the standpipe of connection 49 via a condensate drain.

The line 43 from the steam source to connections 42 of the steam storage container 39 is made several times smaller (roughly 1:6) than the filling connection 42 and the inlet cross section of line 31 to shock steam nozzle 30. This dimensioning means that in the shock steaming the container 39 is emptied nearly instantaneously with a simultaneous pressure drop, because steam from the steam source cannot flow in from the line 43 at the same rate. The annular jet 33, which can be cut in in any steaming phase, is fed directly via line 40 and a steam valve (not shown) from the steam source.

This ensures a uniform loading of the steam source, while on the other hand the necessary amount of steam with appropriate moisture content, temperature and pre-settable heat content is available for the brief period of shock steaming — between 1 and 4 seconds.

According to a feature of the invention, this is important so as not to heat sensitive chemical fibers, e.g., polyacrylonitrile fibers, to the melting point.

For automatic control of the processing procedure and/or use of the method according to the invention, a switching arrangement (not shown in greater detail) is housed in a control panel. A main switch is provided with which the entire system can be activated. By means of the programmed switching system, insertable program cards are used in known fashion to give the pre-programmed control commands to the control, activation and indicating devices after the machinery is started.

The side walls of the processing chamber 2 as well as door 22 are reinforced by braces and protected against heat loss by a filling of insulation.

The method according to the invention takes place in the following steps, with the just described processes occurring in the apparatus according to the invention:

The correct number of articles of clothing 38 is placed on carrier hanger 36. The carrier hangers 36 are so made that they have depressions or notches in which clothes hangers 47 for clothing 38 can fit.

Five deep indentations are provided for smoothing coats, lounge jackets, jackets or trenchcoats. The spaces between the indentations are set so that the clothes hung in them do not come in contact with each other. If for example dresses are being given the smoothing treatment, 10 dresses can be hung in a row on a carrier hanger 36, with 10 less deep indentations being provided for them, spaced equidistantly over the length of the carrier hanger 36. However, the arrangement can also be such that in addition to the five deep notches for coats, five more shallow notches are provided to accept dresses.

Outside device 1, in suitable fashion, a carrier track loop is provided, fitted with a switch, and a connection that can be varied and lowered to link up with the carrier track 15 inside the processing chamber 2.

On door 22 there is an activating device (not shown) for a control valve, by which the connection of the carrier track is displaced upward from the vicinity of door 22. Door 22 is then closed by the operator, a tripping pin (not shown) attached to door 22 activates pushbut-

ton switch **28**, so that door **22** is held shut with the aid of activating cylinder **25** and locking devices **23, 23'**. The processing chamber is sealed hermetically by a sealing means on door **22**. In the final portion of looking devices **23'**, **23''** the latter activate a control switch **51** that starts the control mechanism for the smoothing operation.

The various control commands for the blower, intake flap temperature range, exhaust flap valves and the like are pre-programmed on a small program card. Advantageously, three temperature ranges are provided for the steam treatment and/or hot air treatment as a function of the articles of clothing to be smoothed.

Activating the main switch closes the intake flap **6** by means of motor **10.** The exhaust flap **13** is likewise activated by activating device **14.** After the program card is inserted in the program switching mechanism, a lamp indicates readiness for operation. The treatment process begins when the door is closed and completely locked.

Then the valve **31''** for the shock steam is opened so that the shock steam flows through nozzle **30** into the processing chamber **2,** diagonally across the lower area. Depending on the program selected according to the type of goods to be processed, simultaneously or in another phase of steaming, steam can be added via annular nozzle **33** (or wet steam via nozzle **52** or some other substance mentioned in the description). Within the preset temperature range a thermostatic limiter cuts off any further input of heat in any form of steam.

The brief abrupt release of steam from the steam storage device fills the processing chamber **2** abruptly with steam, and the predetermined amount of steam in the chamber expands nearly adiabatically.

The injected air is thus heated suddenly and exhausted from processing chamber **2** via excess pressure flap **11.** The briefly held pressure following expansion of the steam volume is dropped to the level of the opening pressure to which the excess pressure flap **11** is set, e.g., 0.15 atm. over the ambient pressure. The expanding steam, with ca. 90 percent moisture content and a final temperature of 50° to 60°, then condenses preferably on the clothing as the coldest articles inside the processing chamber **2.** This immediately creates a highly efficient vacuum that draws the moisture into the cloth. After a brief pause, one or more steamings occur with shock steam from nozzle **30** and/or hot or saturated steam from annular nozzle **33** with constant heating of the clothing and at the pressure set with the excess pressure flap.

After a variable set pause between the individual steaming phases and the following drying process, the exhaust flap **13** opens. At the same time the intake flap **6** is opened by motor **10,** depending on the air velocity required at air outlet opening **4.**

After the two flaps open, the high-powered blower **3** cuts in. The drawn-in air is heated in heat register **5** and in the hood **29** of the air feed by heater **19** and guided from top to bottom over the clothes. The air is exhausted from chamber **12** via the open exhaust opening **13** to the outside. The pressure generated by the blower and the air passing over them produces an additional smoothing effect with the aid of the sudden exhausting of the hot air.

If desired, depending on the nature of the treatment for the clothing to be processed, the air volume can be changed during the drying process by changing the position of the intake flap **6** by means of motor **10.**

After the hot air is blown through, the exhaust flap **13** closes and the intake flap **6** reopens together with locks **23'** and **23''** and door **22** can be opened by the operator, again by hand. After the door has opened to a certain angle, the carrier track activating switch is triggered, so that the depressable part of the carrier-track system is again lowered in front of the door opening. The steamed and smoothed clothing can then be shifted by means of the carrier hangers **36** onto the carrier track system in front of the machine and moved away over a switching device.

The storage containers **39'** to **39'''**, which are largely emptied in the shock steaming, are refilled from the steam source during the next processing period, so that in the next cycle of the process there will again be enough steam for the shock steaming, of the appropriate temperature and at the correct pressure.

The invention is not limited to the sample embodiment shown and described. It also covers all expert improvements as well as all partial and subcombinations of the described and/or shown features, as well as modifications of the method and combination of the several means.

What is claimed is:

1. A method for steaming and smoothing articles of clothing in a closed chamber comprising the steps of:

placing the articles of clothing at room temperature in the closed chamber;

injecting a pre-determined amount of steam in a short abrupt burst and at a limited excess pressure above atmospheric pressure into the chamber, wherein a vacuum is created in said chamber by the condensation of the moisture contained in said steam on the articles of clothing;

injecting a further pre-determined amount of steam in a short abrupt burst and at a limited excess pressure above atmospheric pressure into the chamber, wherein said articles of clothing are heated to a predetermined temperature, dependent upon the character of the articles of clothing to be smoothed, by the evaporation of the condensation on the articles of clothing;

dropping said pressure in said chamber to atmospheric pressure; and

blowing hot air in bursts along said articles of clothing from the top to the bottom.

2. The method of claim **1** wherein said pressure of said steam being injected into said chamber is adjustable.

3. The method according to claim **2** wherein said pressure of said steam is adjusted from an initial pressure to a pre-determined final pressure by expansion of said steam in the chamber.

4. The method of claim **1** further comprising the step of feeding hot steam at constant pressure into the chamber.

5. The method of claim **4** further comprising the step of spraying water of condensation into said hot steam in the chamber.

6. The method of claim **1** further comprising the step of spraying a cloth treatment agent into said steam in the chamber during the first steam injecting step.

7. The method of claim 1 further comprising the step of spraying a cloth treatment agent into said steam in the chamber during the second steam injecting step.

8. The method of claim 1 further comprising the step of additionally moistening said steam during the first steam injecting step.

9. The method of claim 1 wherein a pause is provided between the first and second steam injecting steps and between the second steam injecting step and the hot air blowing step.

10. The method of claim 1 wherein the supply of heat to the said chamber by means of the second steam injecting step is terminated when a pre-determined temperature is reached.

11. The method of claim 1 wherein the supply of heat to the chamber by means of the hot air blowing step is terminated when a pre-determined temperature is reached.

12. The method of claim 1 wherein the speed of said hot air being blown into the chamber is continuously adjusted.

13. The method of claim 1 wherein the speed and flow rate of said hot air being blown into the chamber are adjustable during the hot air blowing step.

* * * * *