

Sept. 3, 1957

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2,805,009

STEAM-AIR GARMENT FINISHER

Filed Dec. 17, 1954

4 Sheets-Sheet 1

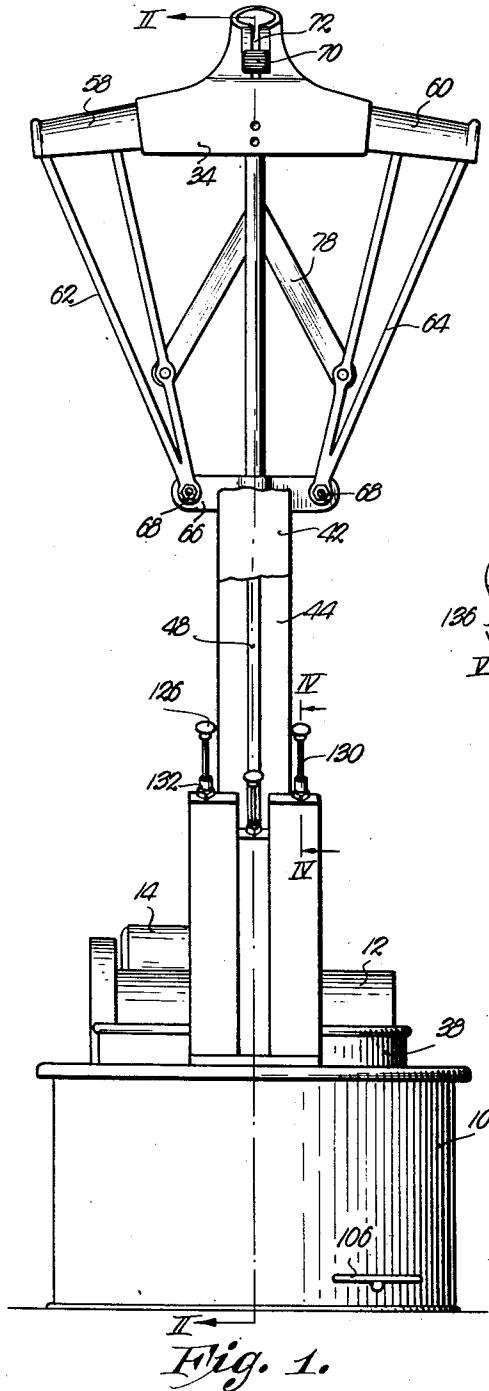


Fig. 1.

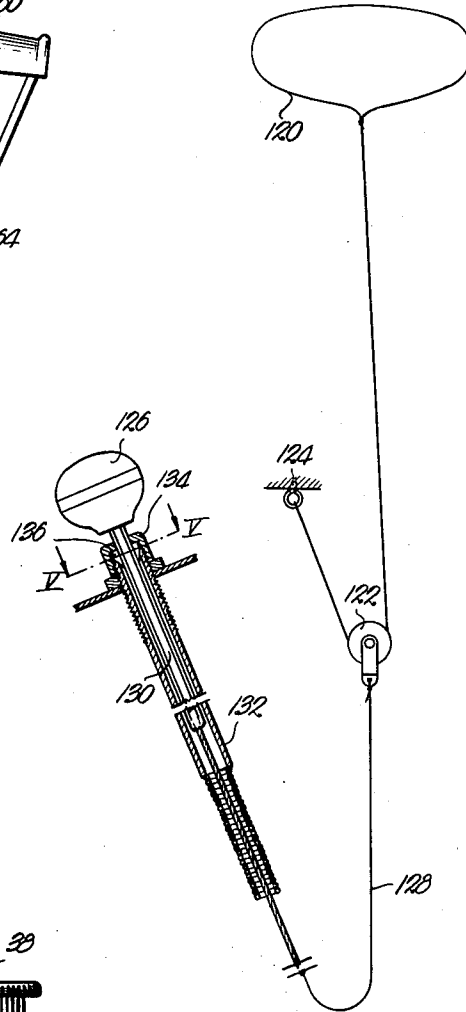


Fig. 4.



Fig. 5.

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4 Sheets-Sheet 2

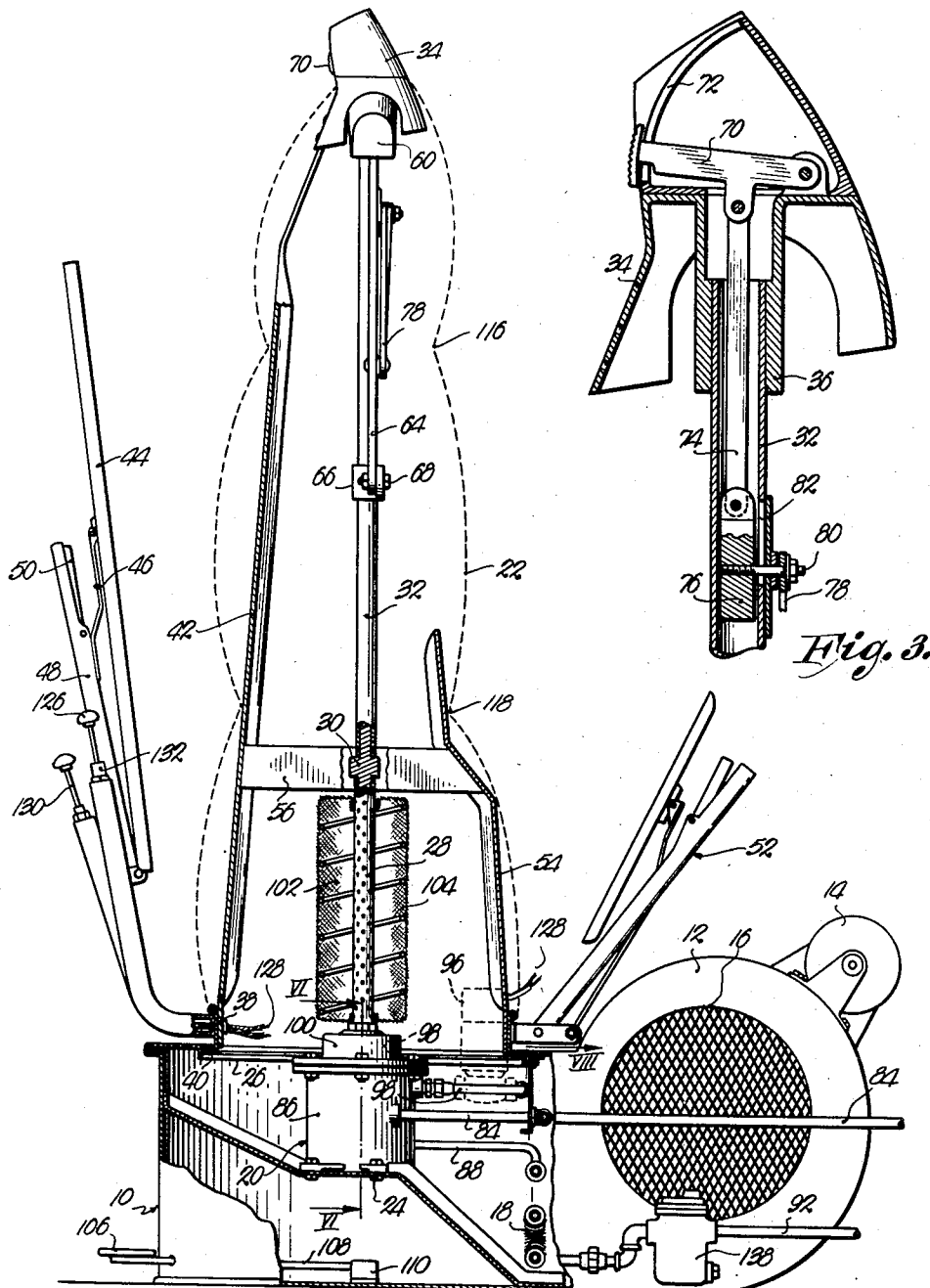


Fig. 2.

Fig. 3.

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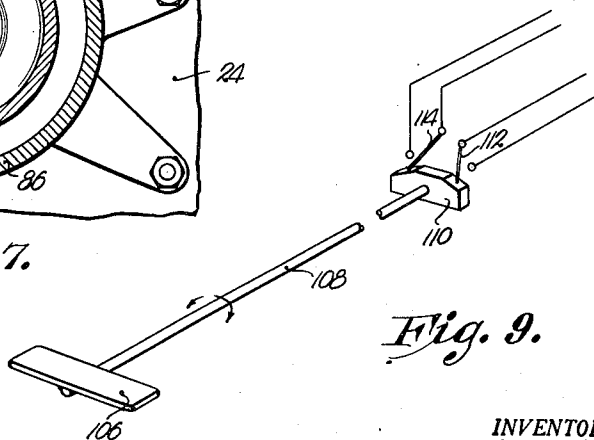
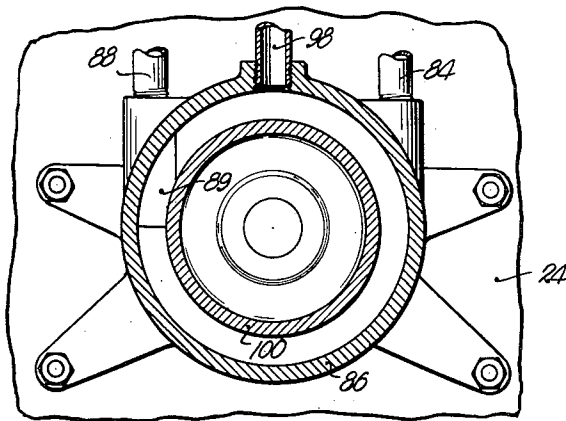
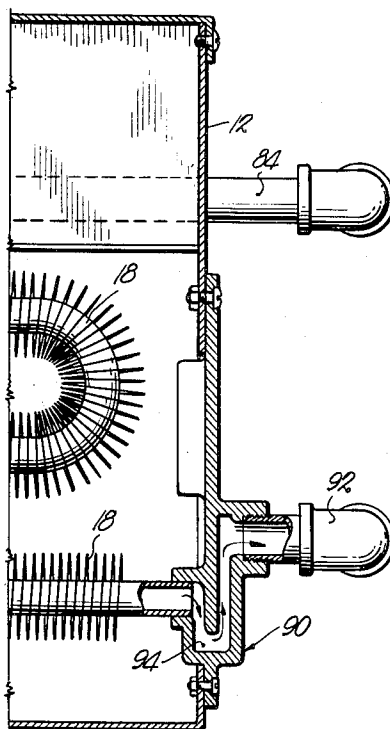
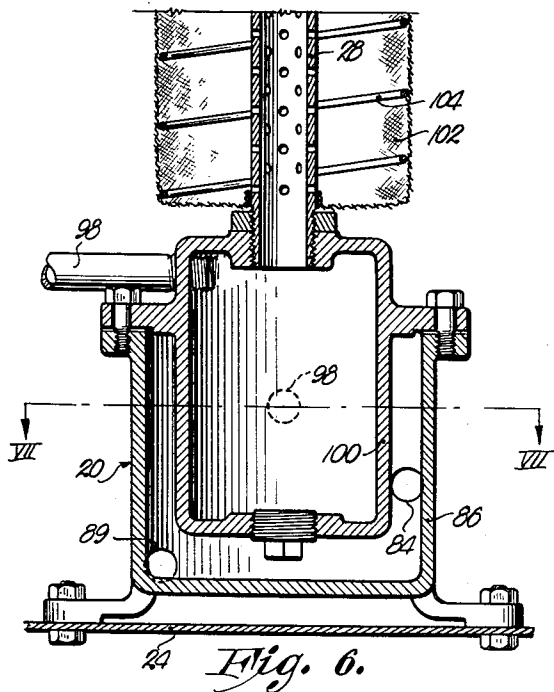
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STEAM-AIR GARMENT FINISHER

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4 Sheets-Sheet 3



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STEAM-AIR GARMENT FINISHER

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4 Sheets-Sheet 4

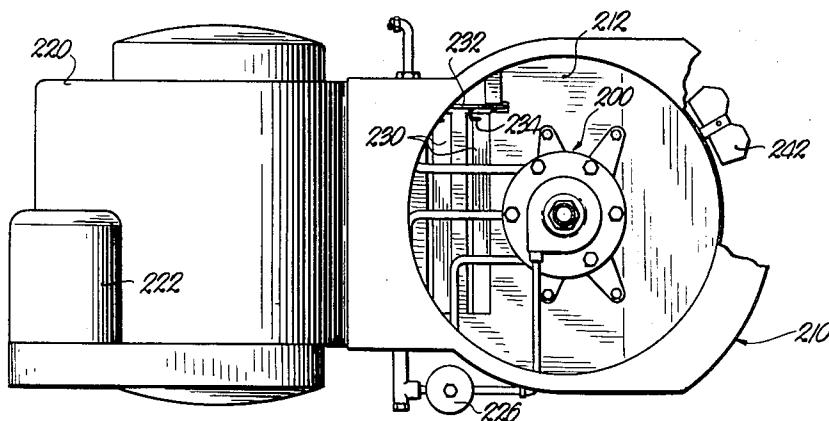


Fig. 10.

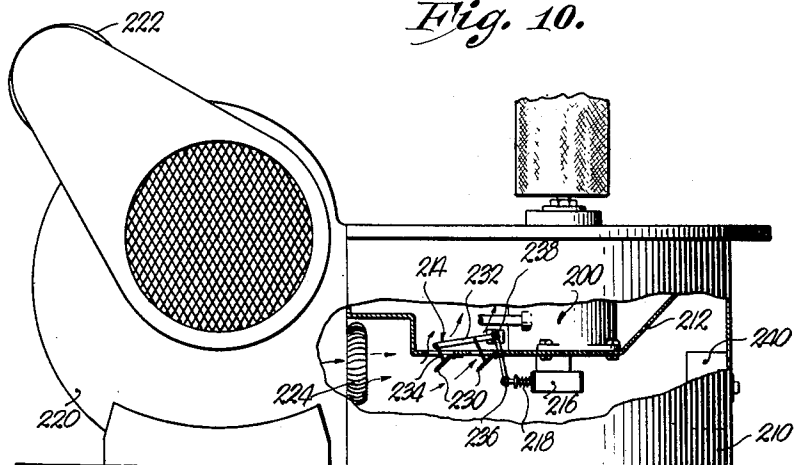


Fig. 11.

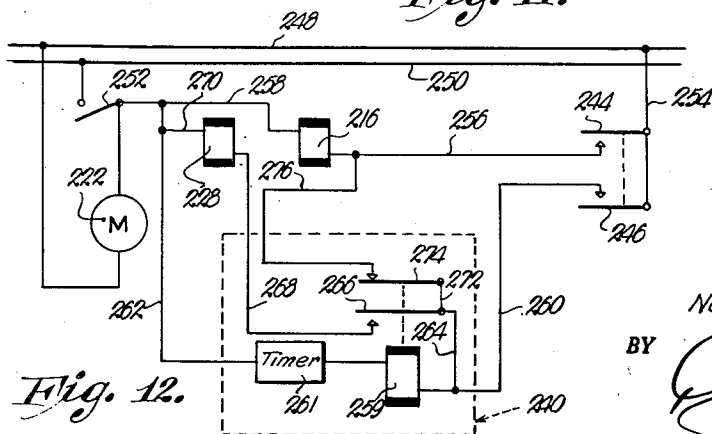


Fig. 12.

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2,805,009

STEAM-AIR GARMENT FINISHER

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Application December 17, 1954, Serial No. 476,000

17 Claims. (Cl. 223—67)

This invention relates to garment finishing machines and has for its principal object the provision of improvements in the invention disclosed by my copending application, Serial No. 410,296, filed February 15, 1954, now Patent #2,736,471, dated February 28, 1956, for "Revolving Type Garment Finisher Having Adjustable Shoulder Structure," this being a continuation-in-part of said application.

It is the most important object of the present invention to provide a garment finisher with improved steam-control structure operable to separate and prevent formation of condensate in such manner as to treat the garments with steam having a relatively high temperature and which is relatively dry.

Another object of the instant invention is to provide steam-control structure that maintains a given pressure within a condensate collection and separation chamber even while the steam is being exhausted to the garment so that such condensate cannot pass to the garment as in conventional garment finishers.

It is an aim of this invention to include still further in said steam-control structure, a heat exchange relationship such as to prevent condensate formation in the steam as it is released to the garment.

A still further aim in the provision of said steam-control structure is to couple a heating coil in the steam system in a novel manner to provide means to heat air that is forced through the garment.

A further aim of the present invention is to provide a unique water leg or sump for collection of condensate after flow thereof through said coil to maintain prime in a water trap that is included in the system.

An additional and very important object of this invention is the provision of means for controlling flow of air across the said heating coil and into a permeable bag over which a garment to be finished is draped.

Still further, it is an object of this invention to provide an automatic cycle of operation permitting steaming of the garment for a predetermined period of time, followed by continued drying by hot air, all without operator attention.

Other aims and objects include the provision of improved, adjustable shoulder structure, refinements in a rotatable bag assembly for mounting the garment, and a novel manifold unit for directing the steam to the garment, which unit also supports the said rotatable assembly.

In the accompanying drawings:

Figure 1 is a front perspective view of a steam-air garment finisher made pursuant to one form of the present invention, showing the same with the garment-receiving bag entirely removed.

Fig. 2 is a vertical, cross-sectional view taken on line II—II of Fig. 1 illustrating the said bag by dash lines.

Fig. 3 is an enlarged, fragmentary, vertical, cross-sectional view showing the upper portion of the finisher.

Fig. 4 is an enlarged, cross-sectional view taken on line IV—IV of Fig. 1 and illustrating schematically drawstring take-up means for the bag.

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Fig. 5 is a cross-sectional view taken on line V—V of Fig. 4.

Fig. 6 is an enlarged, fragmentary, cross-sectional view taken on line VI—VI of Fig. 2.

Fig. 7 is a cross-sectional view taken on line VII—VII of Fig. 6.

Fig. 8 is an enlarged, cross-sectional view taken on line VIII—VIII of Fig. 2.

Fig. 9 is an enlarged view partially schematic, illustrating the switch control for the electrical components of the machine.

Fig. 10 is a plan view with the rotatable assembly entirely removed, showing a modified form of the instant invention.

Fig. 11 is a side elevational view of the machine shown in Fig. 10, parts being broken away and in section to reveal details of construction; and

Fig. 12 is a wiring diagram showing the electrical components of the modification of Figs. 10 and 11.

In the form of my invention illustrated by Figs. 1—9, base 10 is hollow as seen in Fig. 2, and a blower 12, operated by an electric motor 14, communicates therewith at the rear of the base 10 for directing air from intake 16 across a heating coil 18, thence across a steam receiver 20 and ultimately through a garment (not shown) to be finished when draped over a permeable bag 22.

Receiver 20 is mounted rigidly on a shelf 24 within the base 10, extends upwardly through an opening 26 in the top of the base 10 and terminates in an upright, tubular, perforated manifold 28 within the bag 22. Manifold 28 communicates with the receiver 20 and has a plug 30 closing the upper end thereof and operating also to rotatably support a tubular upright 32 having a neckpiece 34 on its uppermost end. A tubular stem 36 forming a part of the neckpiece 34 receives the upper end of upright 32 as shown in Fig. 3, bag 22 having an opening in its upper end for receiving the neckpiece 34.

An annulus 38, rotatable within the opening 26 is surrounded by a resilient gasket 40, and when the lowermost open end of the bag 22 is placed around the annulus 38, it is preferably attached to the annulus 38 through use of a drawstring or other fastening means, not shown.

Annulus 38 is connected with the neckpiece 34 by means of a backing member 42 for a clamping plate 44 that is likewise mounted on the annulus 38 for rotation therewith. Plate 44 is swingable on a leaf spring 46, the latter of which is in turn secured to a lever 48 swingable toward and away from the backing member 42 and releasably held in place through mechanism not fully shown but including a latch 50.

A similar clamping assembly broadly designated by the numeral 52, is mounted on the annulus 38 for cooperation with a backing plate 54 that joins with the annulus 38. Cross means 56 interconnecting the backing members 42 and 54 may join with the upright 32 for rotation therewith.

Shoulder supporting means likewise mounted on the upright 32 for rotation therewith, includes a pair of shoulder elements 58 and 60 secured rigidly to the uppermost ends of corresponding V-shaped arms 62 and 64. A cross bar 66 attached to the upright 32 swingably receives the apex ends of the arms 62 and 64 through use of pivots 68.

Shoulder members 58 and 60 are moved toward and away from each other on each side respectively of the stem 36 beneath neckpiece 34 upon manual swinging of a lever 70 riding in slot 72 of neckpiece 34.

A lever 74, reciprocable within the tubular upright 32, pivotally interconnects the lever 70 and a follower 76. Links 78 for the arms 62 and 64 pivotally connect the latter with a pin 80 extending from the follower 76 through a slot 82 in the upright 32.

Steam emanating from a suitable source, not shown, flows through a supply pipe 84 into an outer chamber or vessel 86 of the receiver 20 and thence through the coil 18 by way of conduit 88, extending into chamber 86 as at 89. Coil 18 connects with a water leg 90 as shown in Fig. 8 and from the leg 90 the steam passes through a return line 92. Leg 90 is formed to provide a circuitous path for the steam and is adapted to collect condensate draining from chamber 86 and the coil 18 within a sump portion 94 forming a part of leg 90.

Upon opening of a solenoid valve 96 within a conduit 98 and preferably disposed exteriorly of the bag 22 and the base 10, steam flows from the outer chamber 86 of the receiver 20 into an inner chamber or vessel 100 and thence into the manifold 28 that connects with the inner chamber 100 as shown in Fig. 6.

Steam emanating from the perforations of the manifold 28 must pass through a permeable bag 102, enclosing a spring 104 coiled about, and spaced from, the manifold 28.

Electric motor 14 and solenoid 96 are controlled by a foot pedal 106 on the outermost end of a shaft 108 that extends through the base 10. A block 110 on the inner end of shaft 108 closes switch 112 to motor 14 when the pedal 106 is turned in one direction and closes switch 114 to solenoid 96 when the pedal 106 is swung in the opposite direction.

When fluid is directed into the bag 22 under pressure, the latter would normally balloon fully except for control means shown in Fig. 4. At selected points on the bag 22, such as at 116 and 118, there is provided a drawstring 120 looped around a pulley 122 and secured to a suitable rigid connection 124. The connection 124 should constitute a rotary part of the machine such as the upright 32, the backing members 42 and 54 or the cross means 56.

Drawstring 120 is manipulated by pulling outwardly on a knob 126 to in turn pull on a flexible cable 128 connected to the pulley 122. A polygonal rod 130 reciprocable within tube 132 is interposed between cable 128 and knob 126, and is releasably held against inward movement by tightening a cap 134 on the tube 132 against a split wedge 136 that is thus forced into the upper end of tube 132 and against the rod 130. A plurality of such assemblies, i. e., one for each drawstring 120 respectively, is provided on the annulus 38 for rotation therewith.

While the operation of the garment finisher of Figs. 1-9 has hereinabove been made clear as the component parts thereof have been described, the operation may be summarized as follows:

When a garment is placed on the bag 22 it may be clamped in place through use of the clamping means that includes plate 44, together with the clamp 52, and if such garment is in the nature of a coat or shirt normally open at the front, the holding effect of the relatively long plate 44 assures passage of the steam or air through the entire bag 22. The nature of the garment will, of course, dictate the positions of the knobs 126 and when the latter are pulled outwardly and locked through use of cap 134 various points as at 116 and 118 along the bag 22 will be restricted in diameter and not be permitted to balloon outwardly when steam or air are admitted under pressure into the bag 22.

The unit may be rotated on the vertical axes of the upright 32 and the manifold 28, while the garment is draped over the bag 22, and the position of the shoulder pieces 58 and 60 is likewise determined by the nature of the garment; they may be moved toward or away from the stem 36 merely by manipulating the lever 70 that extends through the slot 72 of neckpiece 34.

When it is desired to direct air under pressure into the bag 22 for passage through the garment, the operator need merely manipulate the pedal 106 in one direction to actuate the motor 14. When the pedal 106 is turned in the opposite direction, steam will be permitted to flow

through the conduit 98, past solenoid valve 96 and into the inner chamber 100.

It is of extreme importance to note that the capacity of pipe 84 that supplies steam to the outer chamber 86 is appreciably greater than the capacity of the conduit 98 that supplies steam to the inner chamber 100 from chamber 86 when solenoid valve 96 is open. Consequently, even when steam is being exhausted into the bag 22 from the manifold 28, there is a maintained steam pressure within the outer chamber 86 which acts to separate the condensate before it enters the chamber 100. Such steam is not permitted to condense within the chamber 100 since the latter is in heat-exchange relationship to the steam within the outer chamber 86. Therefore, all steam that passes upwardly through the manifold 28, for flow outwardly through bags 102 and 22 and ultimately through the garment, has a relatively high temperature and is relatively dry at the time it is released from manifold 28.

Steam emanating from line 84 flows through the coil 18 from the outer chamber 86, and all condensate (which is separated within the chamber 86 from the steam that flows to the garment) flows to the water leg 90 via conduit 88 where it collects in the sump 94. Such water seal in the leg 90 prevents trap 138 within the return line 92 from losing prime.

The modification of my invention as shown in Figs. 10 to 12 inclusive, is essentially the same as the embodiment above described and illustrated in Figs. 1 to 9 inclusive. However, steam receiver 200 is mounted in base 210 upon a partition 212 that separates the lower portion of base 210 from the upper portion thereof when gate or shutter means 214 is closed.

The shutter 214 is opened to the position seen in Fig. 11 by a solenoid 216 attached to the partition 212 therebelow, which solenoid 216 is also seen in Fig. 12. When closed, as by a spring 218 on the solenoid 216, the shutter means 214 blocks the flow of air to the garment mounted as previously described above the base 210. Such flow of air is produced by a fan in housing 220 that is in turn operated by a motor 222 seen in Figs. 10, 11 and 12. When the shutter mechanism 214 is open, the air flows across coil 224 in the direction of the arrows in Fig. 11 and in the same manner as hereinabove set forth. Solenoid valve 226 for controlling flow of steam, comparable to valve 96, is seen in Fig. 10, and its solenoid is designated by the numeral 228 in Fig. 12.

Shutter mechanism 214 may take any suitable form, but as illustrated, it includes hingedly mounted gates or doors 230 within, and forming a part of, the partition 212 and pivotally coupled with one leg of an L-shaped crank 232 by short links 234. The other leg of crank 232 is pivotally connected with reciprocable core 236 of the solenoid 216 and upon which the spring 218 is mounted. Crank 232 is swingable on pivot pin 238 suitably mounted within the base 212 above the partition 212.

A timing unit broadly designated by the numeral 240, is shown in Figs. 11 and 12. A foot pedal 242 (see Fig. 10) controls switches 244 and 246 in much the same manner as switches 112 and 114 are controlled as seen in Fig. 9, it being understood that switches 244 and 246 are ganged together for simultaneous movement so that when the pedal 242 is horizontally disposed, switches 244 and 246 are both open, whereas, when pedal 242 is turned in one direction, switch 244 closes, and when the pedal 242 is turned in the opposite direction, the switch 246 closes.

When the machine is to be placed in operation, the circuit shown in Fig. 12 is coupled with supply lines 248 and 250 by closing manual switch 252 which also energizes motor 222 for continuous operation whether or not the shutter mechanism 214 is open. When switch 244 is closed, solenoid 216 is energized to open the

shutter mechanism 214 against the action of spring 218, through a simple circuit that may be traced as follows:

From line 248, through wire 254, closed switch 244, wire 256, solenoid 216, wire 258 and closed switch 252 to line 250.

When, however, the pedal 242 is tipped in the opposite direction to open the switch 244 and close the switch 246, the solenoid 216 is deenergized and the spring 218 closes the shutter mechanism 214.

Closing of switch 246 energizes solenoid 259 of timing unit 240 through the following circuit:

From line 248, through wire 254, closed switch 246, wire 260, solenoid 259, timer 261, wire 262, and closed switch 252 to line 250.

As solenoid 259 closes switch 266, the solenoid 228 is energized, to open valve 226 and discharge steam to the garment, through the following circuit:

From line 248, through wire 254, closed switch 246, wires 260 and 264, closed switch 266, wire 268, solenoid 228, wires 270, 262 and 258, and closed switch 252, to line 250.

Timer 261, which may be of any suitable, conventional character, will deenergize the solenoid 259 to discontinue the flow of steam to the garment after a predetermined period of time through opening of switch 266, whereupon switch 274 closes to energize solenoid 216, thereby opening the shutter mechanism 214 and permitting flow of air to the garment, all through the following circuit:

From line 248, through wire 254, closed switch 246, wires 260, 264 and 272, closed switch 274, wires 276 and 256, solenoid 216, wire 258, and closed switch 252, to line 250.

As long as the switch 246 remains closed, the closed switch 274 will thereafter maintain the solenoid 216 energized and thereby maintain the shutter mechanism 214 open as shown in Fig. 11. The air flowing from the housing 220 and across the coil 224 will continue to pass through the garment until such time as the operator again turns the foot pedal 242 to the horizontal neutral position where both switches 244 and 246 are open as seen in Fig. 12. The motor 222 will continue operating regardless of the position of the pedal 242 until such time as the switch 252 is opened.

In summary, when a machine of the type shown in Figs. 10 to 12 inclusive, is placed in operation, steam is initially admitted to the receiver 20 for flow through the coil 224 in order to heat the latter, whereupon a garment to be finished is placed upon the permeable bag shown in Fig. 2, but intended to be included also as a part of the last-described embodiment of the invention. Thereupon, pedal 242 is actuated in a manner to close the switch 244, thereby energizing solenoid 216 and opening the shutter mechanism 214. Air passing into the bag inflates or balloons the latter and the operator may fit the bag to the garment by manipulating one or more of the manual knobs 126 as hereinabove described.

After the garment is thus fitted to the bag, switch 244 is opened to close the shutter mechanism 214 and thereby block the flow of air to the bag. Switch 246 is closed to initiate the automatic cycle of operation which, as above-described, constitutes steaming of the garment for a predetermined period of time while solenoid 28 is energized and thereupon drying of the garment with hot air while solenoid 216 is energized and until the pedal 242 is returned to a neutral position.

All other parts of the modification of the invention shown in Figs. 10 to 12 inclusive, and the operation thereof, may be the same as above outlined in describing the embodiment of Figs. 1 to 9 inclusive and, therefore, need not be repeated.

Having thus described the invention what is claimed as new and desired to be secured by Letters Patent is:

1. In a garment finisher, steam-control structure including a steam receiver having a first and a second closed

vessel, the first closed vessel being provided with a steam inlet and a steam outlet, the second vessel having an outlet for directing steam to a garment to be finished; and means for controlling flow of steam from the first vessel to the second vessel, said second vessel being disposed in heat exchange relationship to the first vessel whereby the second vessel is heated by steam in the first vessel to prevent condensation of steam in the second vessel.

2. In a garment finisher, steam-control structure including a steam receiver having a first and a second closed vessel, the first closed vessel being provided with a steam inlet and a steam outlet, the second vessel having an outlet for directing steam to a garment to be finished; conduit means interconnecting said vessels; and valve means in said conduit means for controlling flow of steam from the first vessel to the second vessel, said second vessel being disposed in heat exchange relationship to the first vessel whereby the second vessel is heated by steam in the first vessel to prevent condensation of steam in the second vessel.

3. In a garment finisher as defined by claim 2 wherein the capacity of said inlet for the first vessel is greater than the capacity of said conduit means whereby a predetermined steam pressure is maintained in the first vessel during flow of steam from the second vessel.

4. In a garment finisher, steam-control structure including a steam receiver having a first and a second closed vessel, the first closed vessel being provided with a steam inlet and a steam outlet; a perforated manifold communicating with the second vessel for directing steam to a garment to be finished; and means for controlling flow of steam from the first vessel to the second vessel, said second vessel being disposed in heat exchange relationship to the first vessel whereby the second vessel is heated by steam in the first vessel to prevent condensation of steam in the second vessel.

5. In a garment finisher as defined by claim 4 wherein said manifold has a permeable bag surrounding the same.

6. In a garment finisher as defined by claim 5 wherein is provided support means on the manifold within the bag for maintaining the latter spaced from the manifold.

7. In a garment finisher, the combination of a steam coil for heating air to be directed to a garment being finished, said coil having an inlet and an outlet; and steam-control structure including a steam receiver having a first and a second closed vessel, the first vessel being provided with a steam inlet and a steam outlet, the second vessel having an outlet for directing steam to a garment to be finished, means coupling said inlet of the coil with said outlet of the first vessel, and means for controlling flow of steam from the first vessel to the second vessel.

8. In a garment finisher, the combination of a steam coil for heating air to be directed to a garment being finished, said coil having an inlet and an outlet; steam-control structure including a steam receiver having a first and a second closed vessel, the first vessel being provided with a steam inlet and a steam outlet, the second vessel having an outlet for directing steam to a garment to be finished, means coupling said inlet of the coil with said outlet of the first vessel, and means for controlling flow of steam from the first vessel to the second vessel; and water sealing means including a condensate receiver communicating with said outlet of the coil.

9. In a garment finisher, steam-control structure including a steam receiver having an inner and an outer closed vessel; a supply pipe connected with the outer vessel for directing steam thereinto; a conduit interconnecting the vessels; valve means in the conduit for controlling flow of steam from the outer to the inner vessel; manifold means communicating with the inner vessel for directing steam to a garment to be finished; and con-

duit means communicating with the outer vessel and disposed to drain condensate therefrom.

10. In a garment finisher as defined by claim 9 wherein is provided water sealing means for said structure including a condensate receiver, and wherein is provided a steam coil interposed between said conduit means and said condensate receiver for heating air to be directed to said garment.

11. In a garment finisher, a steam receiver having a pair of interconnected chambers; a perforated manifold communicating with one of the chambers for directing steam to a garment to be finished; a spring carried by the manifold, said spring being coiled about the manifold and spaced therefrom; a bag enclosing the spring; a coil connected with the other chamber for heating air to be directed to said garment; and means for directing steam into said other chamber for flow to the manifold and the coil.

12. In a garment finisher, a steam receiver having an inner and an outer chamber; a conduit joining the chambers; a perforated manifold communicating with the inner chamber for directing steam to a garment to be finished; a coil connected with the outer chamber for heating air to be directed to said garment; means for directing steam into said outer chamber for flow to the manifold and the coil; and means in the conduit for controlling flow of steam therethrough.

13. In a garment finisher having a hollow, open top base provided with means for supporting an open bottom, garment-receiving, permeable bag in communication with said top of the base, the combination of a steam coil in the base; means for creating artificial currents of air and directing the same into the base and across the coil for flow into the bag; and steam-control structure including a steam receiver coupled with said coil to supply steam thereto, said receiver being within the path of travel of said air.

14. In a garment finisher having a hollow, open top base provided with means for supporting an open bottom, garment-receiving, permeable bag in communication with said top of the base, the combination of a perforated partition in the base; a steam coil in the base below the partition; means for creating artificial currents of air and directing the same into the base and across the coil for flow into the base below the partition; shutter mechanism in the perforation of said partition; and power means coupled with said mechanism for opening the same to permit said air to flow into the bag.

15. In a garment finisher having a hollow, open top base provided with means for supporting an open bottom, garment-receiving, permeable bag in communication with said top of the base, the combination of a perforated partition in the base; a steam coil in the base below the

partition; means for creating artificial currents of air and directing the same into the base and across the coil for flow into the base below the partition; shutter mechanism in the perforation of said partition; power means coupled with said mechanism for opening the same to permit said air to flow into the bag; and steam-control structure including a steam receiver mounted on said partition and coupled with said coil to supply steam thereto.

16. In a garment finisher having a hollow, open top base provided with means for supporting an open bottom, garment-receiving, permeable bag in communication with said top of the base, the combination of a perforated partition in the base; a steam coil in the base below the partition; means for creating artificial currents of air and directing the same into the base and across the coil for flow into the base below the partition; shutter mechanism in the perforation of said partition; power means coupled with said mechanism for opening the same to permit said air to flow into the bag; steam-control structure including a steam receiver mounted on said partition and coupled with said coil to supply steam thereto; a steam manifold in the bag and coupled with said receiver for directing steam into the bag; and valve means for controlling flow of steam to the manifold.

17. In a garment finisher having a hollow, open top base provided with means for supporting an open bottom, garment-receiving, permeable bag in communication with said top of the base, the combination of a perforated partition in the base; a steam coil in the base below the partition; means for creating artificial currents of air and directing the same into the base and across the coil for flow into the base below the partition; shutter mechanism in the perforation of said partition; power means coupled with said mechanism for opening the same to permit said air to flow into the bag; steam-control structure including a steam receiver mounted on said partition and coupled with said coil to supply steam thereto; a steam manifold in the bag and coupled with said receiver for directing steam into the bag; valve means for controlling flow of steam to the manifold; and a timer assembly coupled with said power means and with said valve means for regulating flow of steam and air to the bag in timed sequence.

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