April 2, 1935. F. N. BEEDE 1,996,714

MECHANISM FOR PRESSING AND CONDITIONING FABRICS AND GARMENTS

Filed Oct. 17, 1930 3 Sheets-Sheet 1

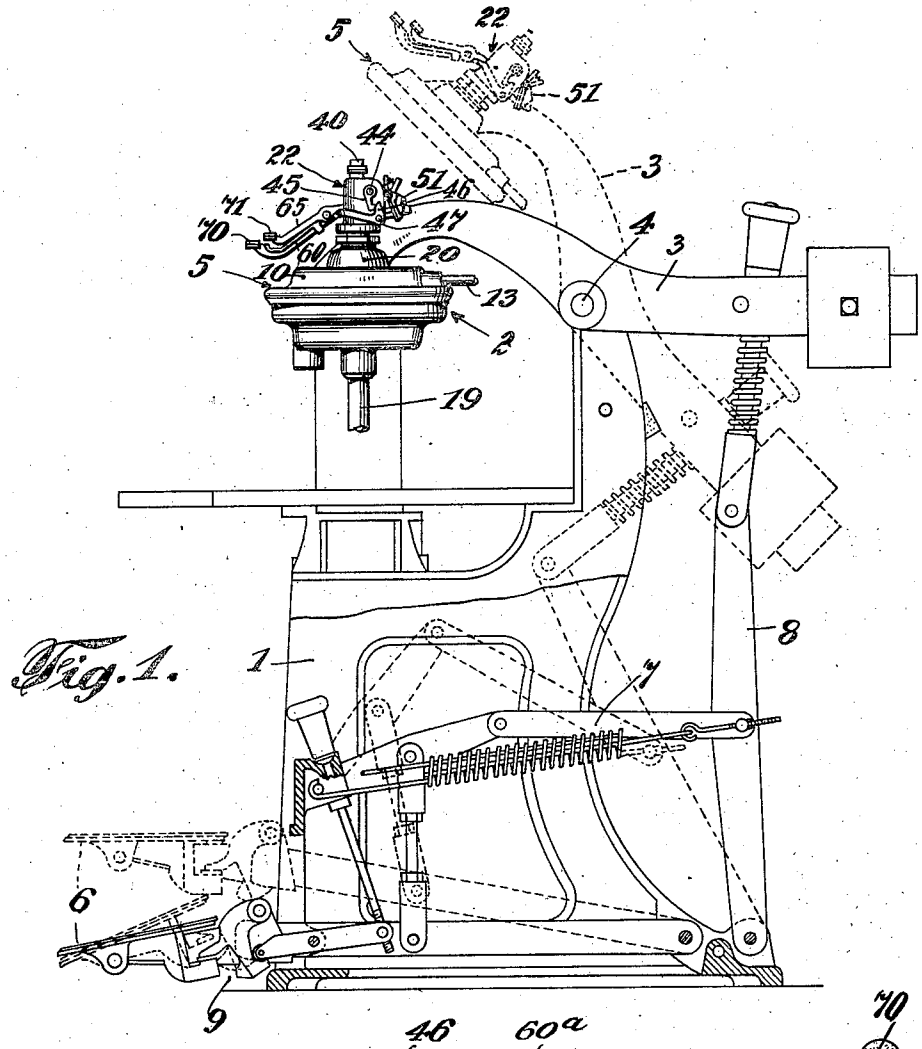


Fig. 1.

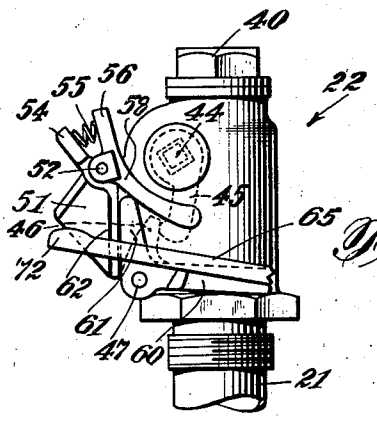


Fig. 4.

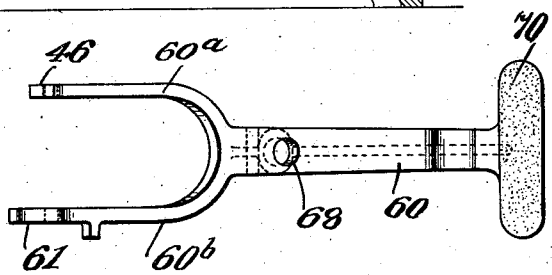


Fig. 8.

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MECHANISM FOR PRESSING AND CONDITIONING FABRICS AND GARMENTS

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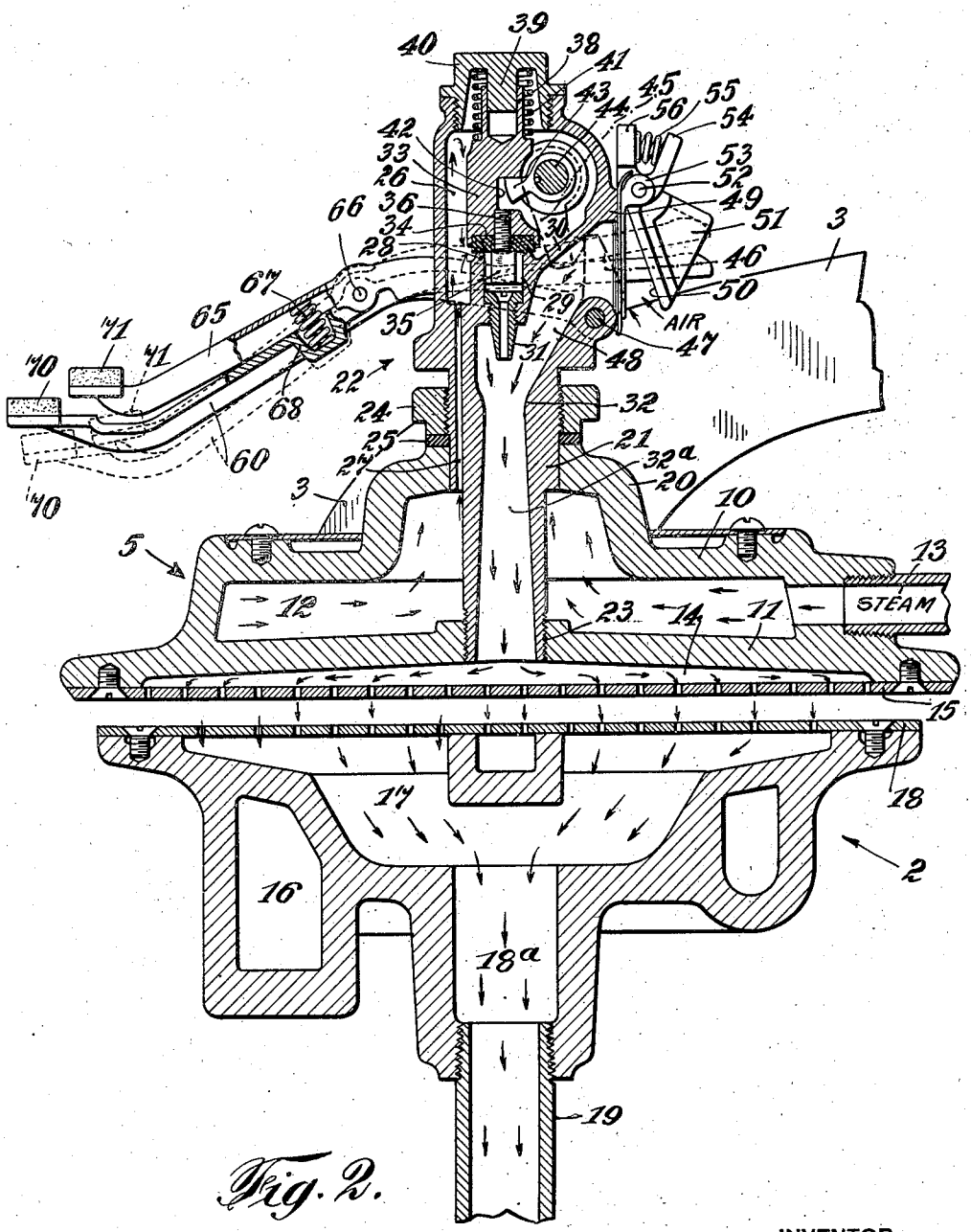


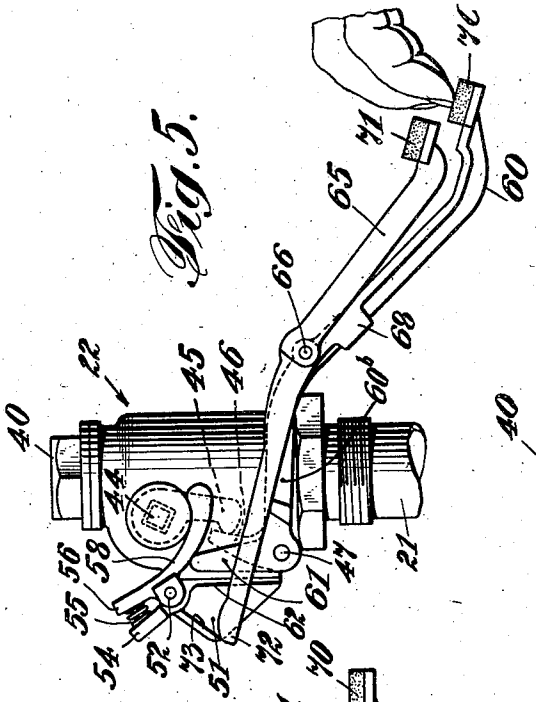
Fig. 2.

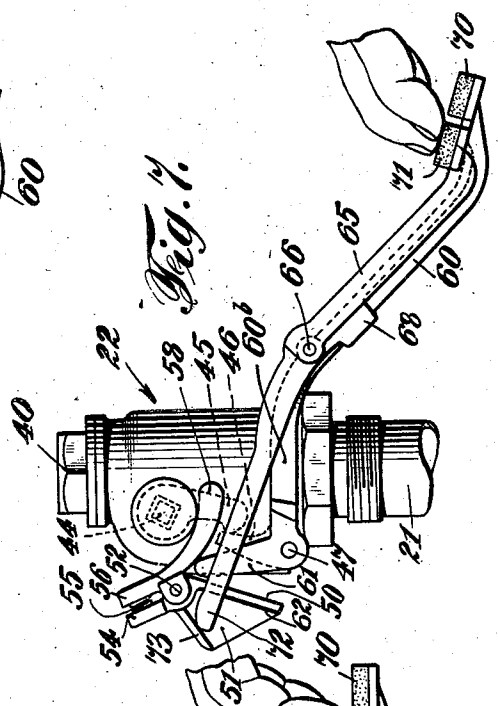
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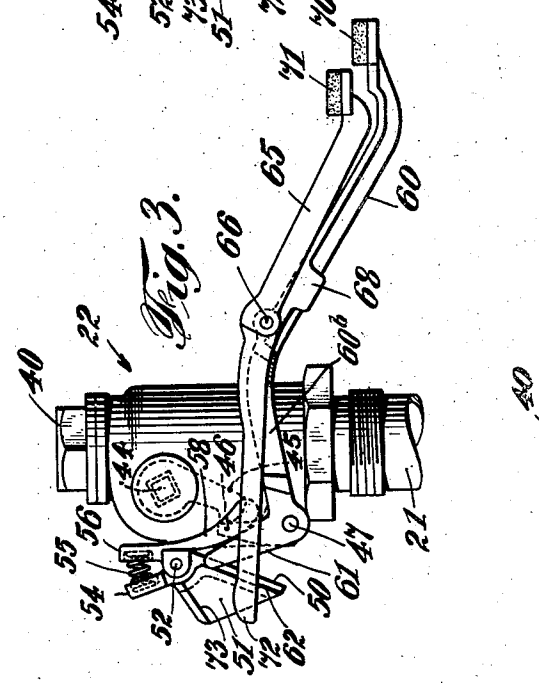
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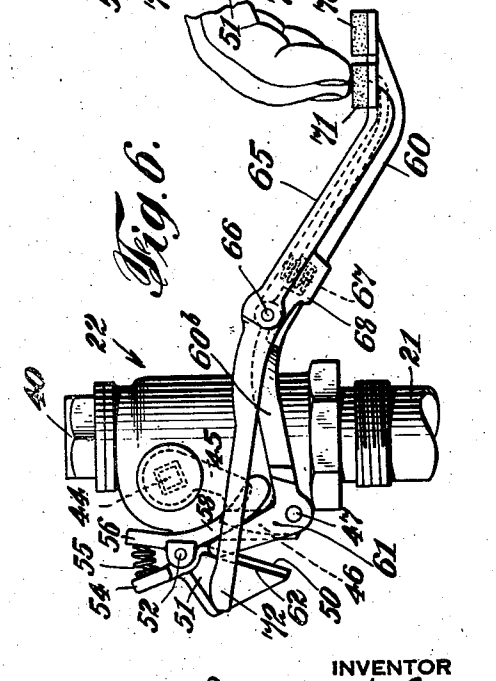
MECHANISM FOR PRESSING AND CONDITIONING FABRICS AND GARMENTS

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UNITED STATES PATENT OFFICE

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MECHANISM FOR PRESSING AND CONDITIONING FABRICS AND GARMENTS

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Application October 17, 1930, Serial No. 489,447

8 Claims. (Cl. 68—9)

My invention relates to a process and mechanism for treating fabrics and garments, and is well adapted for use in connection with garment and/or fabric steaming and pressing machines embodying a pair of pressing elements one being movable to and from the other to press fabrics or garments therebetween, such for instance, as that disclosed in the patent to R. G. Beede, No. 1,715,115, dated May 28, 1929.

Prior to my invention the methods and mechanisms generally employed in connection with pressing or ironing machines embodying a pair of pressing elements of the above type, provided for a supply of steam to be forced through or upon the garment or fabric supported between the pressing elements, and certain of such mechanisms were further provided with means for drawing or blowing air through the supported garment or fabric after the movable pressing element, or head, had been raised from pressing engagement with the buck. The condensed steam rising from the garment is drawn or sucked back through the garment or fabric into the buck under such method, and the result is that the fabric or garment thus treated is resaturated, and consequently the threads or fibers re-expand sufficiently to more or less restore old wrinkles and to deform the creases imparted intentionally by the pressing operation. Another result of such method is that the passage of air through the garment at atmospheric temperature while the head is removed from the buck tends to cool the buck and thus necessitates an increased consumption of fuel to restore the buck to desirable pressing temperature. Furthermore the normal moisture content of the fabric or garment after treatment in the above manner can be approximated only by prolonged air treatment, and when the garment is removed from the pressing machine and hung up to dry it tends to lose the shape and creases intended to be imparted by the pressing operation.

With the foregoing in mind, one of the principal objects of my invention is the provision of suitable means for controllably forming a mixture of steam and air, with the air usually greatly in excess of the volume of steam mixed therewith, and supplying such mixture from one pressing element to and through the garment, usually while the pressing elements are in pressing engagement or in proximity to each other so that the desired conditioning or reconditioning of the fabrics and/or garments is had and preserved when the fabric or garment has been steamed and/or pressed, as hereinafter pointed out, and then subjected to the mixture of air and steam which removes the excess moisture from the fabric or garment as it passes therethrough without resaturating the fabric or garment as occurs in the known methods referred to.

A fabric or garment treated in accordance with my invention when removed from the pressing machine has a moisture content close to normal and will dry quickly to normal moisture content (controlled by surrounding air conditions) with the thread or fiber and nap conditioned or reconditioned to present a refreshed or finished appearance and with the creasing produced by the steam and pressing unimpaired. Also by eliminating the resaturation in removing the excess moisture I eliminate the reformation of wrinkles which occur under known methods as above referred to.

The improved valve mechanism having the stated function as here disclosed, is also devised to permit the usual initial pressing and steaming operations to be performed, and to enable the steam or steam and air supply to be easily and conveniently controlled in different ways, as sufficiently explained hereafter.

By providing a method and means for mixing steam drawn from the head with air at normal temperature (or with heated air), the moisture in the steam is dissipated through the greater volume of air, and the highly aerated steam thus provided is sprayed upon or through the garment (usually while still under pressure) so that the garment or material may be removed immediately after the stated treatment in a dryer and more natural condition than has heretofore been possible; that is, with the desired reconditioning of the texture and nap of the fabric produced by steaming and pressing and unimpaired by the air suction treatment usually resorted to after pressing, as above sufficiently explained.

In connection with the stated improved features or functions, the invention provides a normally open passage through the head and its distributing chamber, and through the buck, for the circulation of air so that, for example, if suction is applied to the buck with the head in pressing condition, an effective air circulation through the fabric or garment may be obtained. An open passage is provided through the buck and its distributing chamber, so that when aerated steam is supplied from the head, escaping moisture may find a free passage outward through the buck.

The novel valve mechanism providing the improved functions or treatment processes referred

to, may be employed in connection with either the head or the buck, so that, for example, the aerated steam may be supplied from the head through the garment and discharged through the buck, or vice versa, and in the broader aspect, therefore when reference is made in the claims to the head or buck, it should be understood that these terms are interchangeable, and are not intended as limitations unless such limitation is definitely indicated. As otherwise expressed, in the present machine the head and buck may have interchangeable functions.

From the preceding and following description it will be understood that the invention provides a conditioning means and method which leaves the garment in the condition obtained by pressing without upsetting or disturbing the creases or nap formation so produced, resulting in a better and more lasting set and finish. It has been known that the present suction method of drying as (above referred to) draws the steam and vapor which rise from the garment when the head is raised, back into the garment where it fully condenses into moisture and is absorbed by the garment material, releasing or upsetting the creases and set of the fabric or nap before this floating steam can be removed.

The present invention provides for removal of excess moisture while the head is in pressing position, by forcing a blast of expanded steam mixed with a large volume of air through the garment, thus taking up the excess moisture in the garment and in the padding below it, and discharging this moisture through the opening in the buck. This opening may be a pipe to which the suction means is normally connected in known machines, or it may be a passage leading to improved valve mechanism of the present type in which provision is made for a normally-open air passage through the buck (or head as the case may be).

The invention avoids the consumption of power ordinarily involved in producing suction for drawing air through the garment.

The characteristics and advantages of the invention are further sufficiently explained in connection with the following detail description of the accompanying drawings, which show one representative embodiment of the mechanism and also explain the performance of the process. After considering this example, skilled persons will understand that many variations may be made without departing from the principles disclosed, and I contemplate the employment of any structures or process operations which are properly within the scope of the appended claims.

In the drawings:—

Fig. 1 is a right-side elevation of one typical form of pressing machine, with some parts in section, and with the invention mechanism incorporated therein in one form;

Fig. 2 is a vertical section, enlarged, through the head and buck and the improved valve mechanism;

Figs. 3 to 7 inclusive show different operative positions of the valves and controlling mechanism; and

Fig. 8 is a plan view of one of the controlling levers.

In Fig. 1 a typical garment-pressing machine is shown, including a frame 1, a buck 2, or lower member of a pressing couple supported thereon, arms 3 fulcrumed on the frame at 4, and supporting at their forward ends the head 5 (or upper member of the pressing couple), a treadle 6, and toggle mechanism 7, 8, for moving the head to and from pressing position under control of the treadle, and with or without locking mechanism 9 for retaining the head in pressing position, also under control of the treadle. Parts of the machine in general are shown in light lines and parts embodying the invention structure, including the buck, head and valve mechanism thereon, are shown in heavier lines.

As best shown in Figure 2, the head 5 has connected or integral upper and lower walls 10, 11, respectively, enclosing a heating chamber 12 to which steam is supplied as by a pipe connection 13. The lower wall is formed to provide a distributing space or chamber 14 for the perforated cover plate 15. The buck is formed with a heating chamber 16 to which steam is supplied at any convenient point (not shown) and its upper side is formed to provide a receiving chamber 17 with a perforated cover plate 18 with a discharge opening or passage 18a, at any convenient point, to which a pipe 19 is connected to offcarry air, steam and moisture to any convenient discharge point. The plates 15 and 18 are covered with cloths or pads (not shown).

At a convenient point, which may be near the center, the top-plate 10 of the head has a boss 20, formed to receive a tubular portion 21 of a valve-body 22, which, with its connected and associated parts, constitutes in one form a principal part of the invention mechanism. The lower end of the tubular portion 21 is threaded and screwed into a tapped hole 23 in the lower wall 11, for supply of steam, or a mixture of air and steam, to the distributing chamber 14. A gland nut 24 and washer 25 or other suitable packing are provided to seal the valve-body where it enters the boss 20.

A steam chamber 26 is formed in the upper portion of the body, and steam is supplied to it from the heating-chamber 12 through one or more holes 27. A steam-valve seat 28 is formed at the top of a tubular formation 29 in a wall 30, and a steam nozzle 31 is detachably located (for instance as by a screw connection as shown) in the lower end of the tubular steam-passage, with its end properly located, anterior to a throat 32 in the tubular portion 32a of the valve-body, which has a Venturi formation for an injector effect, as will appear. A reciprocating valve support or valve-stem 33 has a face or valve disk 34 of any suitable material co-operating with the valve-seat 28, and a guide may be provided such as the head 35 of a screw 36 which retains the valve-disk. The screw-head reciprocates within the tubular steam-passage 29 below the valve-seat and is flattened or channeled on each side to provide for steam passage. The upper end of the valve-support or stem 33 is in the form of a sleeve 38 slidably mounted on a stud 39 at the center of a screw-cap 40 which closes the upper end of the valve-body, and a helical spring 41 is placed about the sleeve and compressed between the screw-cap and the valve-support to urge the valve to closed position. The valve-support or stem 33 has at one side a slot 42 to receive a lug 43 projecting from a stem or shaft 44 which passes through the body, in which it is revolubly mounted, with suitable packing (not shown). One end of the steam valve-operating shaft or stem 44 projects from the valve-body at one side thereof, and has thereon a short arm 45 (Fig. 1), the end of which confronts an arm or lug 46 forming a part of one of the controlling levers, referred to below.

The valve-body 22 is formed with an air-passage 48 leading from a port at one side of the body

to the upper end of the Venturi passage 32a. The face 49 of the body about the air-port is finished off flat to provide a seat for the face 50 of an air-valve or damper 51, which is pivotally mounted on a pin 52 in a lug 53 on the body. The damper has an integral lug 54, and a helical spring 55 is placed between this lug and another lug or spring-socket 56 formed on the upper end of a lever 58, (Figs. 3 to 7), which is pivotally mounted on stem 52 independently of damper 51 and its lug 54.

The valve-structure as a whole may vary considerably, the principal features being a steam-valve and an air-valve independently controllable and arranged to supply selectively steam, or a mixture of steam and air, to a passage such as the Venturi passage, leading to the distributing chamber of the head (or in some cases the buck, as above sufficiently referred to). The operating means may also vary greatly, but in a preferred arrangement as shown, such means consists in associated levers having devices to operate the respective valves, or elements connected to the valves, and arranged for independent or co-operative manipulation, as follows:—

A main operating lever 60 (see Figs. 1, 2, etc., and especially the plan view, Fig. 8) has at one end a fork providing arms 60a and 60b, located at opposite sides of the valve body and fulcrumed on the ends of a shaft or pin 47 which passes through a bearing hole formed in the body below the air port. The lug or arm 46, above mentioned, is formed integrally on the fork arm 60a of the lever, and the other fork arm 60b has at its end, adjacent the valve body, at the side opposite to lug 46, a short upwardly projecting lug or arm 61, one face and the end of which co-operates with lever 58, and the other face or end co-operates with a face 62 of the air-valve or damper 51 projecting laterally and parallel to the active valve face 50. Thus the lever-arm 61 is always located between the lever-arm 58 and the face or flange 62. Another controlling lever 65, is pivotally connected at 66 to lever 60, and may be of channel section or have a flange overlying lever 60, to engage one end of a spring 67 which is held in a socket 68 in lever 60, tending to move the outward ends of the levers divergently. Lever 65 has a finger-pad 71 and lever 60 has a pad 70, these being located close together for convenient finger-manipulation. Lever 65 has a rearwardly extending arm terminating in a rounded or cam-like end 72, to co-operate in some cases with the face 73 of a flange projecting laterally from the air-damper 51.

Spring 41 of the steam-valve acts through the valve, upper face of slot 42, lug 43, stem 44, and arm or lug 46 on arm 60a of lever 60, to normally hold the steam-valve shut and maintain the outward end of the lever and the finger-pad in an upward position, as in Figs. 1, 2 and 3; and spring 67 normally maintains the outward end of lever 65 and its finger-pad 71 in an upward position in relation to lever 60 and its pad 70, and the rear end 72 of lever 65 in relatively-depressed position. Spring 67 is of less strength than spring 41 so that when the finger-pad 71 is depressed without first depressing pad 70, the outer end of lever 65 will move down, and continue with lever 60, while the rear end 72 of lever 65 is moved to a position to co-operate with face 73 of the air-damper, and thereafter further depression of pad 71 will cause the lever 60 to be also depressed, to open the steam-valve, as will appear. Spring 55 is of suitable strength and length to normally maintain the lugs or spring seats 54 and 56 in their most separated positions (Fig. 1), and thus to move lever 58 to a position relatively close to the face of the air-damper (in an angular direction) as also shown in Fig. 3, and also to allow for substantial relative angular movement of the lever and the damper in their various operations, as will appear.

In operation, the garment or fabric being placed on the buck as usual, the head is lowered to pressing position for initial steaming, though of course steam may be applied to the garment while the head is not fully clamped down, as may be desired. The damper is normally in open position, (Fig. 3), affording a free air opening through the port to passage 48 and the Venturi tube 32, so that if desired suction apparatus of well known types (not shown) may be connected to pipe 19 for suction drying as usual.

For the initial steaming, pad 70 of lever 60 which may be conveniently referred to as the "steam lever" since it most directly controls the steam valve, is depressed, without depressing pad 71, so that the levers retain their normal relative positions. Lug or arm 61 is thus moved clockwise in Fig. 3 and acts on lever 58 to move it to position of Fig. 4 and in this movement the lever acting through spring 55 moves the damper 51 to closed position, thus closing the air passage substantially before the steam valve is opened; and upon further depression of pad 70 the arm or lug 46 of lever 60 acts through arm 45, stem 44, and lug 43, to fully open the steam-valve.

The levers and associated parts are then in the position of Fig. 5. Lever 58 has been moved to its extreme counter-clockwise position by movement of lug 61 to its extreme position in the clockwise direction, this further movement of lever 58 after closing of the air damper being permitted by compression of spring 55. It will be noted in Fig. 5 that in the stated extreme downward position of lever 60, when its pad is depressed without depression of the pad 71 of lever 65, the latter remains in relatively elevated position, held so by spring 67, and the rear end 72 of the lever does not contact with flange 73 of the air damper, permitting the damper to remain in closed position and preventing any access of air to passage 48 and the Venturi tube. The steam valve having been opened in the manner described, a steam under desired pressure (determined by pressure in the heating chamber 12), is discharged from nozzle 31, through the tubular passage of the valve body to the distributing chamber and garment or fabric, usually while the latter is under pressure between the head and buck.

According to customary procedure, the head is then raised and air at atmospheric temperature is drawn down through the fabric into the buck by suction, with the disadvantages above noted. In accordance with the present improved conditioning or reconditioning process, as also above referred to, after the initial steaming and while the garment or fabric remains under pressure, that is, with the head still in pressing position, I supply to the distributing chamber and the head a mixture of steam and air, with a propulsive effect derived from the pressure of the steam in the heating chamber, and injector action of the steam jet from the nozzle 31, and this mixture is forced through the garment and into the buck and discharged therefrom, carrying away excess moisture from the garment and producing the very advantageous and improved results above noted. This is done by opening the steam

valve or allowing it to remain open while the air damper at the same time is opened or remains open if it has not previously been closed. The desired valve operations may be effected by different modes of manipulation of the levers. Thus, if the steam lever 60 remains in fully depressed position, as in Fig. 5, to open the air valve and supply the steam and air mixture, it is only necessary to shift one finger to pad 71 of lever 65 which then moves to the position of Fig. 7, elevating the rear end 72 of the lever into contact with the flange face 73 of the air damper and opening the damper, as also shown in Fig. 7, spring 55 being in this case fully compressed.

If just previous to the application of the steam and air mixture, the levers are in normal or idle position, as in Fig. 3, with the steam valve closed and the air valve open, to supply the stated mixture it is only necessary to depress pad 71 of lever 65. As the pad moves down to the lever of the other pad 70, as shown in Fig. 6, with the forward portion of lever 65 engaging on lever 60, the rear end 72 of lever 65 is raised to engage flange 73 of the damper which is thus held open, while further depression of pad 71 causes full depression of lever 60 and the opening of steam valve while the air valve remains open, the parts then being in the position of Fig. 7.

After steam and air have been forced through the garment for the desired time, the levers are permitted to return to normal position, shutting off the steam supply and leaving the air valve open; the head is raised, and the garment or fabric removed and hung for completion of drying, in a properly reconditioned or normalized state. Excess moisture has been expelled from the garment while subjected to the steam and air treatment, without possibility of return of the fabric structure to its pre-pressed condition; the moisture content is only slightly above the normal content, as determined by that of surrounding air, and the garment very quickly dries to normal moisture content condition without upsetting its conditioning, losing the formed creases, etc., as above fully explained.

This is especially so because the air and steam mixture is at relatively high temperature due to the heat of the injecting steam and relatively low humidity due to the proportion of steam to air, so that the moisture content of the total steam and air mixture is much lower than the degree of saturation of the garment after the initial steaming; whereby excess moisture down to practically the normal moisture content of the garment or fabric is quickly and efficiently expelled from the garment upon passage therethrough of the mixture and without recondensation of rising steam, as in the ordinary suction process.

Chilling of the buck is also avoided since the air and steam mixture forced through the garment and through the buck is at relatively high temperature, resulting in substantial fuel economy.

While in many cases, with many fabrics and in many of the different garment pressing operations, the steam and air conditioning operation may be performed while the head is pressed or clamped down, as above referred to, this steam and air conditioning treatment may also be applied while the garment or fabric is not under positive pressure, or while the head is elevated, or is held more or less close to the garment or fabric without definite pressure thereon. Thus, for example, in shoulder pressing, the shoulder portion of the garment may be placed on the buck and the head brought close to it without definite pressure and combined steam and air applied to the shoulder by proper manipulation of the valve levers as above referred to. Or, for conditioning velvet fabrics where the principal object is to raise the pile, the head construction may be inverted so that the pressing face will support the fabric the same as the buck face does whereby the steam and air may thus be driven through the fabric while supported on the buck and without mechanical pressure applied to the upper or pile surface of the fabric.

Fig. 2 shows a thin plate or frame located at the face of the airport, which may be employed to support a screen covering the airport area, to clean or filter entering air. This may be omitted in some cases.

Reference has been made above to the action of the lugs carried by the fork arms of lever 60, when the lever is depressed, to first close the air valve and then open the steam valve. In the precise arrangement of parts shown, in which arm 45 controlling the steam valve is in direct contact with lug 46, and spring 41 serves not only to close the steam valve but to maintain lever 60 at its outer end normally in upward position, the exact action may be that the steam valve is slightly opened while the air valve is being closed; but these actions ensue so rapidly that in effect the air valve is closed practically before the steam valve opens or at any rate before it is fully opened, and thereafter the steam valve may be additionally opened to any desired extent by further depression of the lever.

I claim:—

1. In garment or fabric pressing and conditioning apparatus, a pressing couple, means associated with one member of the couple for supplying to and passing through the garment or fabric and the other member of the couple a mixture of steam and air with the air greatly in excess of the steam by volume.

2. In garment or fabric pressing and conditioning apparatus, a pressing couple, and associated therewith, means for mixing and supplying to and passing through the garment or fabric while under pressure steam and air, said means comprising a passage leading to one member of the pressing couple, and an air valve and a steam valve for selectively controlling the supply of steam alone and air and steam together to the passage, and a discharge passage for carrying off air, steam and moisture from the other member of the pressing couple.

3. In apparatus of the class described, in combination with a buck and a head relatively movable for pressing, valve and fluid passage mechanism in the head comprising a steam valve, an air valve, means for operating them to supply steam alone or a mixture of steam and air from the head to the buck, and passages for conveying the stated fluids to, through and away from a garment or fabric.

4. In apparatus of the class described, in combination with a buck and a head relatively movable for pressing, valve and fluid passage mechanism in the head comprising a steam valve, an air valve, common means for operating them collectively to supply steam alone, and means for operating the air valve to subsequently supply a mixture of steam and air, and passages for conveying the stated fluids to, through and away from a garment or fabric, while between the head and buck.

5. In combination with a pressing couple comprising a head and buck, a distributing chamber in one of said pressing members, valve mechanism associated with said one member and comprising a body providing a passage leading to the distributing chamber of said member of the pressing couple, an air passage leading into the first passage and having a port, a valve controlling the air port, a steam nozzle adjacent the point where said passages meet and arranged to direct steam discharged therefrom through said first passage and toward the pressing face of said one pressing member, a valve controlling the steam nozzle, and means for operating the valves independently or simultaneously to effect supply of steam alone or steam with air, which steam or mixture is driven through the first passage with injector effect due to steam pressure and velocity.

6. In combination with a pressing couple comprising a head and buck, a distributing chamber in one of said pressing members, valve mechanism associated with said one member and comprising a body providing a passage leading to the distributing chamber of said member of the pressing couple, an air passage leading into the first passage and having a port, a valve controlling the air port, a steam nozzle arranged to inject steam in said first passage and arranged to direct steam discharged therefrom through said first passage and toward the pressing face of said one pressing member from adjacent the lower end of the second passage, a valve controlling the steam nozzle, and means for selectively operating the valves to effect supply of steam alone or steam with air, which steam or steam with air is driven through the first passage with injector effect due to steam pressure and velocity.

7. In combination with a pressing couple comprising a head and buck, a distributing chamber in one of said pressing members and means for moving them relatively to pressing position, valve mechanism associated with said one member and comprising a body providing a Venturi passage leading to the distributing chamber of said member of the pressing couple, an air passage and port leading to a portion of the passage remote from the distributing chamber, a valve controlling the air port, a steam nozzle arranged to inject steam in said Venturi passage toward the pressing face of said one member, a valve controlling the steam nozzle, and levers for operating the valves, one lever being pivotally mounted and having means to close the air valve and open the steam valve, and the other lever being pivotally mounted on the first one so that its depression also will effect depression of the first one, the second lever having means controlling the positioning of the air valve.

8. The structure defined in claim 7 with the addition of a spring intermediate the levers, normally maintaining the second named lever at its manipulable end spaced above the adjacent end of the other lever.

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