SINGLE LAY SHIRT PRESS

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4 Claims. (CI. 223—57)

This is a continuation-in-part of my co-pending application, Serial Number 335,538, filed February 19, 1953, now abandoned.

This invention relates to garment pressing machines in general, and particularly to machines for pressing shirts.

During recent years laundry operations have been mechanized to a large extent, and output per worker has steadily increased. Hand pressing or hand finishing has been eliminated almost entirely except for shirts which, because of their shape, have required a considerable amount of hand pressing for satisfactory appearance.

Various attempts to finish shirts entirely by machine have been made, but these have been generally unsatisfactory.

I have found that shirts, either starched or unstarched, can be rapidly finished entirely by machine if the different pressing operations are broken up into proper sequences for utilization of several pressing machines properly arranged with respect to one another.

The machine constituting the subject matter of the present invention is intended to receive the shirt after the sleeves, the cuffs, the collar and the yoke (i.e., the shoulder portions) of the shirt have been pressed on other machines. It is preferred that these other machines be arranged in close proximity to the machine about to be described, which may be called the "body press" or "bosom press," so that the finishing of an individual shirt becomes a continuous operation.

Heretofore body presses have been used in which a back (on which the shirt is dressed) was provided with a bar or wire expanders for aligning the garment on the form and for maintaining pressure on the seams during the pressing operation. Because in these machines, the expanders are not heated, temperature differentials between the expanders and the heated bucks causes condensation of the moisture in the garment with consequent uneven pressing and creasing resulting in rough areas and wrinkles in the finished garment. Another major disadvantage in these prior machines resides in the tendency for the expanders to move the shirt on the buck during engagement of the pressing irons, thereby moving the back and bosom out of alignment, which causes creases and uneven stretching.

It is well known in the art that the best finish is obtained when all surfaces of the portion of the garment being pressed are subjected to heat and pressure simultaneously. This is important, otherwise some areas of the garment may dry out before being pressed and when pressure is later applied, no moisture is present and the dry nap is not pressed down as well as when it is moist.

It is a primary object of the present invention to provide an improved machine for pressing the back and bosom of a shirt or other garment wherein the above-mentioned disadvantages are entirely eliminated.

Another object is to provide in such a machine means for bringing the ironing heads into contact with the surfaces of the garment to be pressed with sufficient pressure to hold the garment in place while the movable pressing elements are moving outwardly; then, while the movable pressing elements hold the garment taut, the ironing heads are brought into final pressing position under full pressure, whereupon the shirt is finished without creases or rough areas.

Still another object is to provide a machine in which the entire body of the garment is finished by a plurality of power actuated pressing or ironing elements while it is dressed on a form without removing it therefrom, with means for automatically controlling the pressing operations so that heat and pressure are applied to all areas of the garment simultaneously.

A further object is to provide a machine of the aforesaid type in which the movable pressing elements are actuated automatically in timed sequence with the pressing heads so that the side portions of the garment are stretched without moving the body on the form and the pressing heads move into final pressing relation in such sequence that all portions of the garment are pressed simultaneously.

The above, and other objects are accomplished in a garment pressing machine having opposing heated pressing heads, actuating means for closing and opening said pressing heads, a heated resilient garment buck, movable pressing elements in expanding relationship within said buck, means for moving said buck and said movable pressing elements from a loading position to a pressing position between said pressing heads, and means for moving said movable pressing elements outwardly into full pressing relationship with a heated flange on said heated pressing head, while said heated pressing heads move from contact pressure on said resilient buck to full pressing pressure.

With these and other objects in view, I have described herein preferred embodiments of the invention. Reference is made to the accompanying drawings in which reference characters are used to designate corresponding parts herein referred to.

In the drawings:

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The text continues with detailed descriptions and drawings. The paragraphs are numbered for reference.

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The text concludes with drawings and references to the drawings.
Fig. 22 is a diagram of the control air circuit of the machine.

Referring now to Figs. 1 to 14 and 22, it may be seen that my improved pressing machine comprises a frame and cabinet structure designated generally by numeral 10. The frame is constructed of rigid steel structural members and has steel panel members secured thereto to enclose the mechanism and present a neat appearance.

A body or buck 12, on which the garment to be pressed is draped, is rigidly mounted in upright position on a table 14. The table or carriage 14 is U-shaped in section and each of the legs of the U carries a pair of rollers 16 suitably mounted on stub axles. A trackway 18 (see Figs. 1, 2, and 3) consisting of a pair of inwardly facing channel members, extends the full length of the cabinet of the machine and receives the rollers 16, thereby providing means for supporting the table 14 in such manner that it can be transported to and fro for loading, unloading and pressing as will be described below.

The buck 12 is suitably constructed of springs and padding such that it is compressible and is heated by steam or other means. A pair of movable pressing elements 20 mounted on levers 22 are disposed partially within the buck at each side thereof so that the movable pressing elements are heated from the buck to substantially the same temperature as the buck. The levers 22 are pivotally mounted at 26 on the table 14 and each has a lower extension 24. The extensions 24 are分别ively pivotally connected to a power cylinder 28 and a piston rod 30 carried by the cylinder (Fig. 4) so that when air is admitted to one end of the cylinder, the extensions 24 will be moved away from each other, and when air is admitted to the other end of the cylinder, the extensions will be moved toward each other.

Movement of the lever extensions 24 will cause corresponding movement of the levers 22 about their pivot axes, and thus the movable pressing elements 20 are extended or retracted with respect to the buck 12.

As can be seen from Figs. 1, 4 and 5, the lever extensions 24 are also connected by means of rods 32, 34, to opposite ends of a crosshead 36 which is pivotally mounted on a frame bracket 40 by means of an axle 38. The axle extends to the opposite side of the bracket and carries on its outer end a lever 42 on which is mounted a roller 44. Referring now to Figs. 1, 2 and 11, it may be seen that a manually operable lever 46 is pivotally mounted in the frame at 48, and it has a downwardly extending portion 50 which is mounted on a cam 52.

The parts are mounted on the machine frame in such relationship that the cam 52 engages the roller 44 when the table is in loading position as shown in Fig. 1. At this time, both ends of cylinder 28 are open to the atmosphere (as will be seen from a description of the control of the machine) and the movable pressing elements 20 are in retracted position. It is therefore possible for the machine operator to move the pressing elements manually for at least a portion of their movement by throwing the hand lever 46 toward the left, or when the cam 52 will, through the intermediary of the roller 44, lever 42, axle 38 and crosshead 36, move the rods 32 and 34 to expand the movable pressing elements. The purpose of this feature will subsequently appear as the description proceeds.

Mounted on the top portion of the buck 12 is a neck clamp assembly 54. This assembly comprises a handle 56 and a clamp 58 operated by the handle through a toggle linkage. The details of the clamp assembly 54 are not important with respect to the present invention, as any suitable type of clamp may be used. Also mounted on the top of the buck is a sleeve expander assembly 60, the details of which are shown in Fig. 9. The sleeve pressing elements consist of a double cylinder 62 having a central inlet and exhaust port 64 and end inlet and exhaust ports 66, 68. A piston rod 70 and a piston 72 are slidably mounted in the left end of the assembly as shown, the piston rod having an elongated reversely bent portion 74. The right end of the assembly is similar, the rod 76 being disposed in substantial alignment with the rod 74.

The table 14 carries a tail clamp assembly 78 (Figs. 1, 2 and 10) which comprises a clamp element 80, preferably of spring material, mounted on an upright member 82. The latter is fixed to a rod 84 which also carries an arm 86 extending at substantially right angles relatively thereto. The arm 86 is urged downwardly by a pair of coil springs 88, the rod 84 being pivotally mounted on the table 14. The clamp 80 is therefore continuously urged into engagement with the buck 12.

An air cylinder 90 is suitably mounted on the table and the piston rod thereof is arranged to engage the outer end of the arm 86 for moving it upwardly in opposition to the springs 88, thereby moving the clamp 80 away from the buck. The control circuit of the machine is arranged so that the clamp "removes," i.e. moved away from the buck by manual control as will be explained.

The right-hand portion of the press (as viewed in Fig. 1) consists of an upright cabinet structure in which the ironing or pressing heads are mounted and into which the table assembly, including the buck 12, is adapted to be received in the pressing operation.

As can be seen in Figs. 1 and 3, the trackway 18, on which the table 14 travels, extends into the cabinet portion to the extreme right-hand side of the machine.

The pressing heads 92 (see Figs. 1, 2, 6 and 12 to 14) are preferably of conventional cast, steam heated type and are provided with flanges 94, the upright facing portions of which engage the movable pressing elements 20 at the extreme pressing position as shown in Fig. 14. The heads 92 are carried by the upright structural members 96, two of which are disposed on each side of the machine, by means of slide-blocks 98. The latter are slidably mounted on horizontal tracks 100 which are in turn secured to the uprights 96. As can be seen in Figs. 1 and 6, the slide-blocks 98 each carry a set of rollers 102, eight on each side, which engage the tracks 100, thereby to support the pressing heads and maintain alignment thereof. The heads 92 are mounted on the slide-blocks 98 by means of self-adjusting devices comprising plates 104 and posts 106, the details of which form no part of this invention, it being sufficient for the purposes hereof to note that the heads 92 are permitted a limited amount of movement with respect to the slide-blocks thereby to permit snug engagement of the heads with the buck 12.

The heads 92 are moved into and out of engagement with the buck 12 by a pair of rocker-arms 108. The rocker-arms are pivotally mounted in the machine frame at 110 and are operatively connected to the leveling plates 104 by connecting rods 111. Ball and socket joints are used at each end of the rods 111 to accommodate the self-adjusting action of the heads. A pair of coil springs 112 connected to the rocker-arms 108 below the pivots 110, carried on supporting rods 109. (Figs. 1 and 6) continually urge the heads toward open or non-pressing position.

The rocker-arms are rocked about the pivots 110 by means of a power cam 114 (Figs. 3, 6, 7 and 8). The cam 114 operably engages a pair of rollers 116, each of which is carried on a slide-block 118 slidably supported in a trackway 120, rollers 122 being provided to facilitate sliding and for maintaining alignment. A connecting link 124 is pivotally connected to the slide-block and the respective rocker-arm as shown in Fig. 6, thereby providing an actuating linkage.

The cam 114 is moved longitudinally of the machine, changing pressure at the lower end of cylinder 28 to move the pressers upwardly, pressure being applied at the upper end of cylinder 28 to move the pressers downwardly.
by a connecting rod 126 which is in turn actuated by a piston (not shown) in power cylinder 128. The latter is pivotally mounted at its rear end on a bracket 130 secured to the base of the machine. A master valve (Figs. 1 and 22) controls the inlet and exhaust of air to and from the cylinder 128 as will be explained below. It is apparent, however, from the foregoing that when the cam 114 is in its retracted position as shown in dotted lines in Fig. 3, the springs 112 will have rocked the rocker-arms 108 about their pivots 110, thereby moving the pressing heads 92 to full open position, in which position movement of the buck 12 is permitted. When the cam 114 is in the right of Fig. 3, and 8 to the position shown in the dot-dash lines in Fig. 3, the rocker-arms 108 will be rocked about the pivots 110, thereby moving the pressing heads 92 to fully closed position, in which position the flanges 94 are in pressure engagement with the movable pressing elements as shown in Fig. 14. Movement of the cam 114 is limited by a cam-stop assembly 132 which is carried by a bracket 134 and has an adjustment nut 136 for adjusting the limit of cam movement.

The power cam 114 is provided with laterally disposed cam surfaces 138 for engagement with the rollers 116 and with an additional cam surface 140 on the bottom thereof, which lower surface, upon movement of the cam toward the right of the figures, engages a roller 142. The roller 142 is carried by a lever 144 which actuates a valve 146 (Fig. 22), which valve controls operation of the movable pressing element cylinder 28.

Referring now to Figs. 1, 2 and 22, it will be seen that an air cylinder 148 is disposed just under the table 14 and is supported by a support rod 150 at its rear end. The cylinder 148 has a piston rod 152 operatively connected to the forward end of the table for movement of the same to and fro into and out of the cabinet portion of the machine. Movement of the piston rod 152 is controlled by the "in" and "out" valves 154, 156, which are operated by a table reverse valve cylinder 158. The cylinder 158 is fed through a needle-check valve 160 which permits free flow into the cylinder but restricts exhaust of air thencefrom, thereby delaying movement of the table 14 outwardly of the cabinet portion until the pressing heads have opened sufficiently to release the buck 12.

The table 14 has a cam 162 mounted on its forward portion, which cam is adapted to engage a roller 164 upon movement of the table into the cabinet portion of the machine. The roller 164 is carried by a bellcrank lever 166 which is arranged to actuate a valve 168 which controls operation of the master valve 132.

A pedal 170 mounted on the front end of the machine is operably connected to a valve 172 which is connected by conduits to a sleeve-expander cylinder operating valve 174, the movable pressing element cylinder 28 and the clamp operating cylinder 90.

Referring now particularly to Fig. 22, the operation of the machine will be described.

Let it be assumed that the various parts are in the position shown in Figs. 1 and 2 with buck 12 in position for loading, the movable pressing elements 20 and the sleeve expander 60 in retracted position, the neck clamp 58 in open position and the tail clamp 80 in closed or engaged position. The operator now picks up a shirt or similar garment (the sleeves, cuffs, collar and yoke portions of which have been finished by previous operations), and dresses it upon the buck 12. After the shirt has been disposed on the form, the button and button strips are clamped in place by the operation of handle 56, and the operator steps on the pedal 170 which admits air into the tail clamp cylinder 90 through air line 176 (the main air supply line), valve 156 (which is a normally open valve held open by the action of spring 180) and 194. The cylinder thus actuated bellcrank lever 78 and moves the clamp 80 away from the buck 12, which permits the operator to place the tail portions of the shirt under the clamp 80 and then release the pedal 170 which opens the exhaust port of valve 172 and permits the springs 88 to move the clamp to clamping position.

The operator then grasps the lever 46 and moves it toward the left, whereupon the cam 52 will first engage the lever 186 to actuate valve 174. The latter admits air to the center port 64 of the sleeve expander cylinder 62 through lines 178, 188 and 190. This causes an outward movement of the pistons 72 and the expanders 74, 76, which support the sleeves of the shirt away from the sides of the buck 12 in such position that they will not swing into a position between the buck and the pressing heads when the table is rapidly traversed into pressing position.

Further movement of the hand lever 46 causes the roller 44 (Fig. 5) to engage the crosshead 36 (Fig. 4) and thereby move the movable pressing elements 20 outwardly sufficiently to place a slight tension on the shirt.

The garment is thus dressed on the buck with the various portions clamped and the sleeves held partially extended, and is ready for the finish pressing operation which is accomplished automatically with a single lay.

Initiation of the automatic sequence of operation of the machine is accomplished by the operator closing the main electrical on the (not shown) to the timer 192. The timer 192 is preferably of the electronic type, obtainable commercially and forms no part of this invention so will not be described in detail. The timer opens a magnetic valve 194 which admits air under pressure from the main air line 176 to line 196. This causes operation of table reverse valve cylinder 158 through branch line 198 thereby rocking the lever 200 about its pivot 202 against spring 159 which opens "table in" valve 154 and simultaneously closes "table out" valve 156.

Air then travels through the line 204 to the left-hand end of table cylinder 148, causing the table 14 to be traversed to the right into the cabinet portion carrying the buck 12 into position between the pressing heads 92. The table 14 thereupon moves to the right and at the completion of its movement in this direction, the cam 162 engages the roller 164 and opens the valve 168. This admits air from branch pressure line 206 into line 208 actuating servo 210 which in turn opens master valve 132. Master valve 132 is a normally closed valve to line 212. An open exhaust port 133 vents the left end of cylinder 138 to the atmosphere. Valve 132 then admits air from the main air line 176 through branch line 212 into power cylinder 125 which thrusts cam 114 toward the right.

Movement of cam 114 to the right actuates rocker arms 108, which immediately causes pressing heads 92 to close, but before the pressing heads are moved into full-pressure position, the cam surface 140 engages the roller 142 and opens valve 146 which admits air from line 196 into line 214, thereby causing the cylinder 28 to expand the movable pressing elements 20. It will be seen that movement of the movable pressing elements 20 from the partially expanded position to which they were moved by the hand lever 46 to their fully expanded position (which is limited by the stretch of the shirt on the buck) takes place during the last increment of closing movement of the pressing heads. In other words, the movable pressing elements do not begin their movement until the heads have closed on the buck with what is called, for want of a better term, "contact pressure." In this position, the heads are in firm contact with the garment on the buck, and the pressure is sufficient to hold the shirt in place on the buck, and in the initially stretched position, due to the high resiliency of the buck. The flanges have not contacted the movable pressing elements (Fig. 13), and as the heads 92 continue to close, the movable pressing elements move outward to remove any slack in that portion of the shirt caused by the contact pressure against the bosom and back of the shirt. As the cam 114 continues its travel toward the right, the
heads 92 are moved swiftly but gradually in full pressing pressure and at the same time the movable pressing elements are expanded to stretch the shirt, the movement of the heads and movable pressing elements is very important in the operation of the machine and is, in considerable measure, responsible for the superior finish of the garment outlined. As the shirt is stretched by the movable pressing elements while the head of the closing to full pressing pressure, the bosom, back, and side portions are pressed and all wrinkles are ironed out and creases eliminated or removed.

Reference to Figs. 7 and 8 will make clear the action of the cam 114 during the closing of the heads. It will be noted that the surface 138 of the cam 114 is relatively steep for a considerable portion of its rightward movement, then the slope becomes extremely gradual for the remainder of the cam travel. By proper relationship of the cam surface 138 to the surface 140, almost any desired relationship of movement between the heads 92 and the movable pressing elements 20 may be had. In the present instance, the movable pressing elements and heads have simultaneous movement, but if desired, the cam 114 is provided with dwell portions which will permit movement of the movable pressing elements during momentary cessation of head movement after the latter have moved into contact pressure.

It is preferred to control the sequential movement of the pressing heads and the movable pressing elements by means of a cam, various other means may be resorted to. For example, Figs. 12 to 14 inclusive, which illustrate the relative positions of the heads and pressing elements during pressing show a modified arrangement means for the valve 146. In this modification, the valve 146 is magnetically actuated and a switch 214 is mounted inside the buck 12 for energizing the valve solenoid (not shown).

A lever 216 is disposed so that it is moved against a spring into circuit closing position as the padding on the buck is compressed by expanding of the heads. Figs. 15, 16 and 17 illustrate another modification of the means for actuating the valve 146. In this modification, the valve is disposed within the buck 12 in such position that it is engaged by a lever 218 upon compression of the buck by the pressing heads with consequent compression of the buck, expanding springs 220.

Fig. 18 shows another modification wherein the valve 146 may be controlled by an electric switch which comprises a contact 222 adapted to be received between spring contacts 224 upon compression of the buck. Figs. 19 and 20 show still another modification wherein the valve 146 is mechanically actuated by a lever system 226.

Fig. 21 illustrates a modified means for moving the movable pressing elements outwardly of the buck upon compression of the latter. A telescoping pipe 228 is connected to each movable pressing element, the pipe opening at its inner end into an air chamber 230. When the buck is compressed, air from the chamber 230 forces the telescoping sections of pipe outwardly, thereby moving the pressing elements. The latter may be retracted manually or by a spring (not shown).

It will thus be understood that the movable pressing elements are moved outwardly to stretch the garment at the side seams thereof in timed relation with respect to closing movement of the pressing heads. As herein described, there is simultaneous movement of the pressing elements and heads during the last increment of movement of the latter, but if desired, the sequence of operation is the same, the various parts may be varied to provide for momentary interruption of the closing movement of the pressing heads which the pressing elements move outwardly. This may be accomplished by providing a dwell portion on the surface 138 of cam 114 or by other suitable means.

As above mentioned, the completion of the stroke of the cylinder 128 causes snug engagement of the heads 92 with the garment on the buck 12 with the side portions of the flanges 94 in engagement with the garment portions stretched by the movable pressing elements 20 (see Fig. 14). The buck 12 is made up of padding and spring pressed portions and is therefore compressible to a considerable extent. Accordingly, the garment on the buck may be subjected to any desired pressure. The compression of the buck is limited by the spring 159 pulling the heads 94 with each other or with the pressing elements. The buck itself is preferably heated by steam or other means and the pressing elements will also be heated from the heat of the buck. This greatly improves the finish of the garment being pressed because it assures drying out of the side seams where the latter are constant or more layers with consequent elimination of rough nap.

When the cam 114 has completed its stroke, the pressing heads 92 will be in the position shown in Fig. 14 with the flanges 94 in contact. This full pressure position is maintained for a predetermined period depending upon the amount of moisture in the shirt. Any desired dwell time can be provided by proper adjustment of the timer 192. The latter then initiates the release sequence of the machine which will now be described.

The timer 192 causes the valve 194 to move to exhaust position by means of its electromagnetic control. This vents the reverse valve cylinder 158 through the needle check valve 160 which throttles the release of air from cylinder 158, thereby to delay operation of the table cylinder 148 until the pressing heads 92 have had time to open and release buck 12. Air lines 206 and 208 are then open to the atmosphere, thereby releasing pressure on the spring 159 pulling the heads 94 with the garment on the buck 12 with the side portions of the flanges 94 in engagement with the garment portions stretched by the movable pressing elements 20 (see Fig. 14). The buck 12 is made up of padding and spring pressed portions and is therefore compressible to a considerable extent. Accordingly, the garment on the buck may be subjected to any desired pressure. The compression of the buck is limited by the spring 159 pulling the heads 94 with each other or with the pressing elements. The buck itself is preferably heated by steam or other means and the pressing elements will also be heated from the heat of the buck. This greatly improves the finish of the garment being pressed because it assures drying out of the side seams where the latter are constant or more layers with consequent elimination of rough nap.

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the preferred form thereof, and changes in the construction and arrangement of the various parts may be made without departing from the principles or scope of the invention.

I claim:

1. In a single lay garment pressing machine having opposing heated pressing heads having heated flanges extending beyond the sides of said heads, actuating means for closing and opening said pressing heads, a heated resilient garment buck having a body portion having sides corresponding to the adjacent opposed head portions, movable heated pressing elements positioned in moving relationship within said buck at opposite sides thereof, means for moving said buck and said movable heated pressing elements from a loading position to an initial contact pressure position between said pressing heads, and means for moving said movable heated pressing elements outwardly into pressing relationship with said heated flanges on said heated pressing heads, while said heated pressing heads move from contact pressure on said resilient buck to final pressing compression on said resilient buck.

2. The combination set forth in claim 1 including means for closing said heads and moving said buck along a line between said heads in response to the movement of said buck pressing position.

3. The combination set forth in claim 1 including control means for delaying movement of said buck from pressing position toward loading position until said heads have opened.

4. The combination set forth in claim 1 including timing means operable to cause movement of said buck from a loading position at the start of the timing cycle into a pressing position between said heads, and means operable in conjunction with said timing means to cause operation of said buck moving means to effect the pressing operation, the opening of said heads, and the return movement of the buck to the loading position in predetermined sequence at the end of the timing cycle.

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