March 29, 1966 M. W. BOXER ET AL 3,242,600

ACTUATING UNIT FOR PRESS

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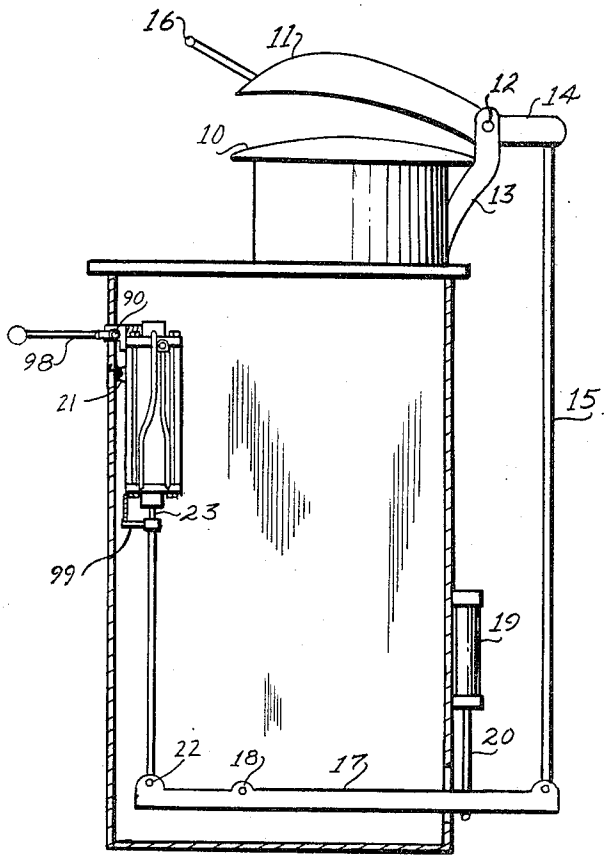


Fig 1

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ACTUATING UNIT FOR PRESS

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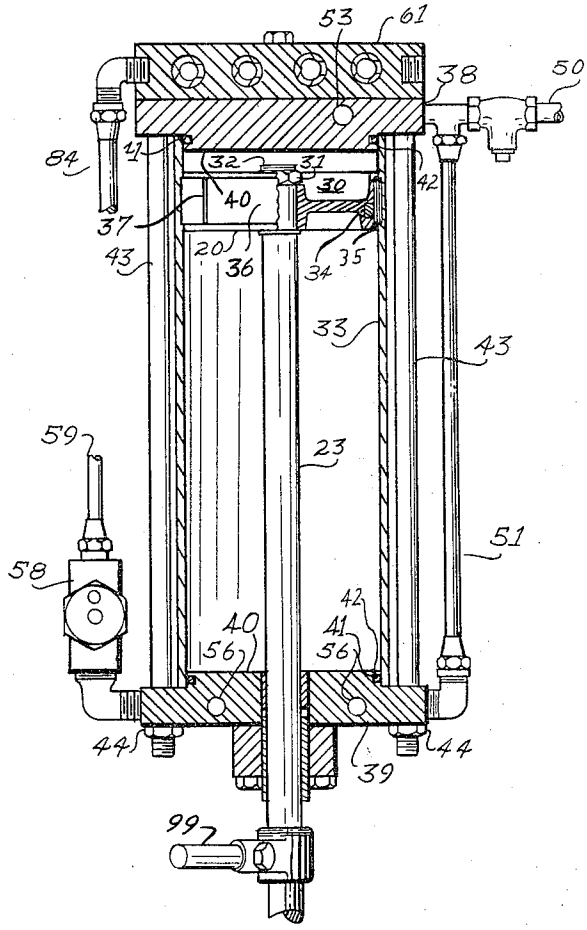


Fig 2

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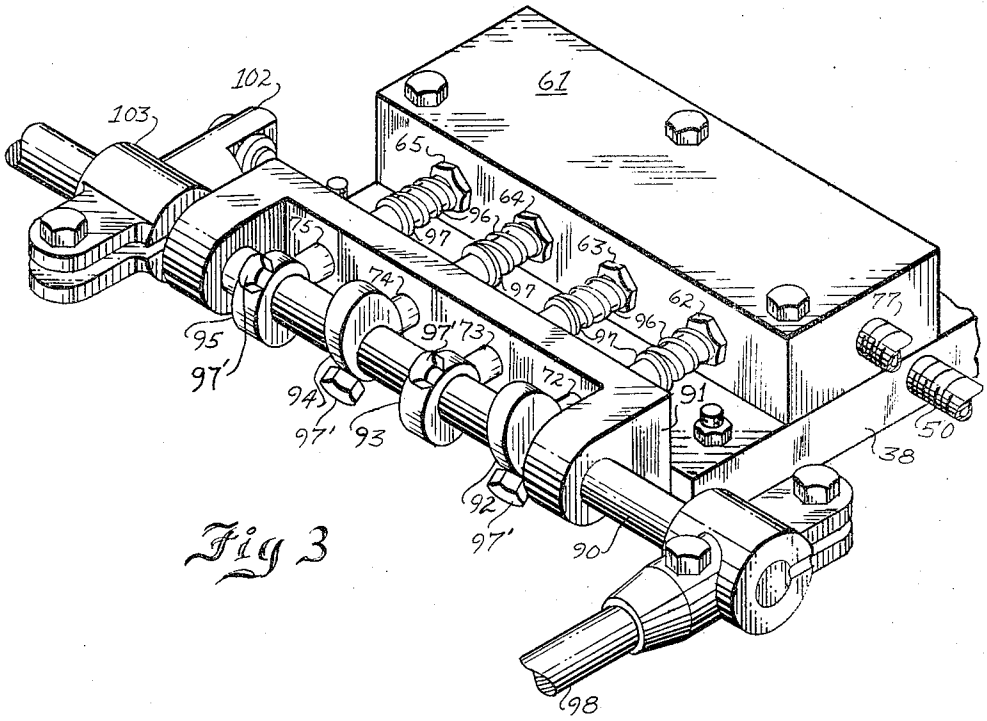


Fig 3

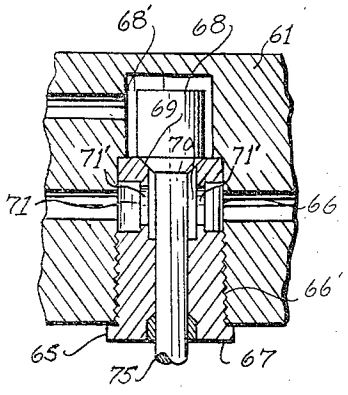


Fig 4

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ACTUATING UNIT FOR PRESS

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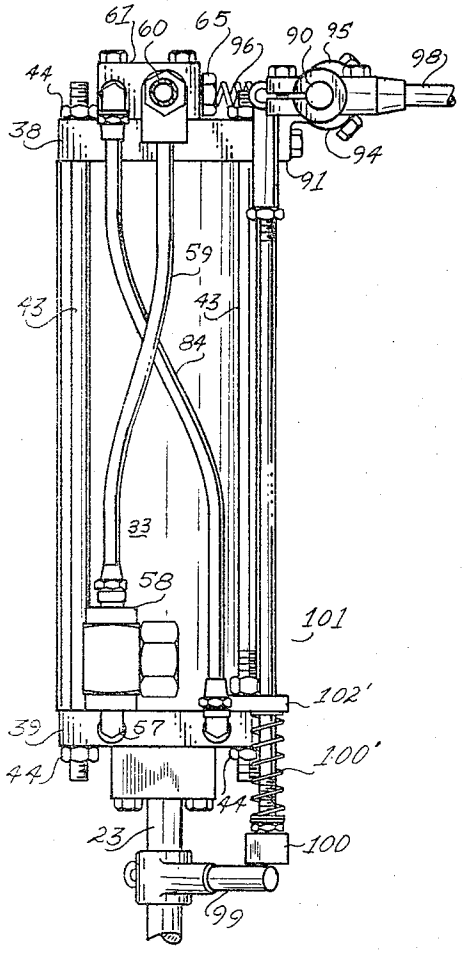


Fig 6

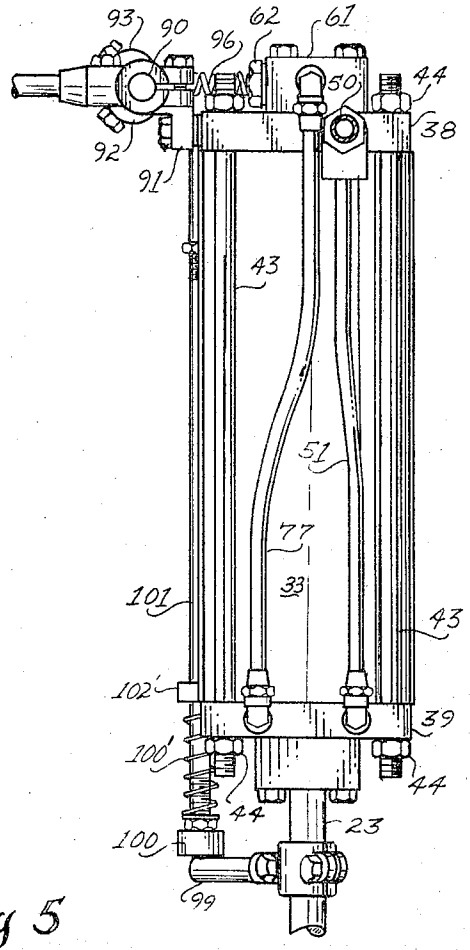


Fig 5

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March 29, 1966 M. W. BOXER ETAL 3,242,600

ACTUATING UNIT FOR PRESS

Filed June 29, 1964 5 Sheets-Sheet 5

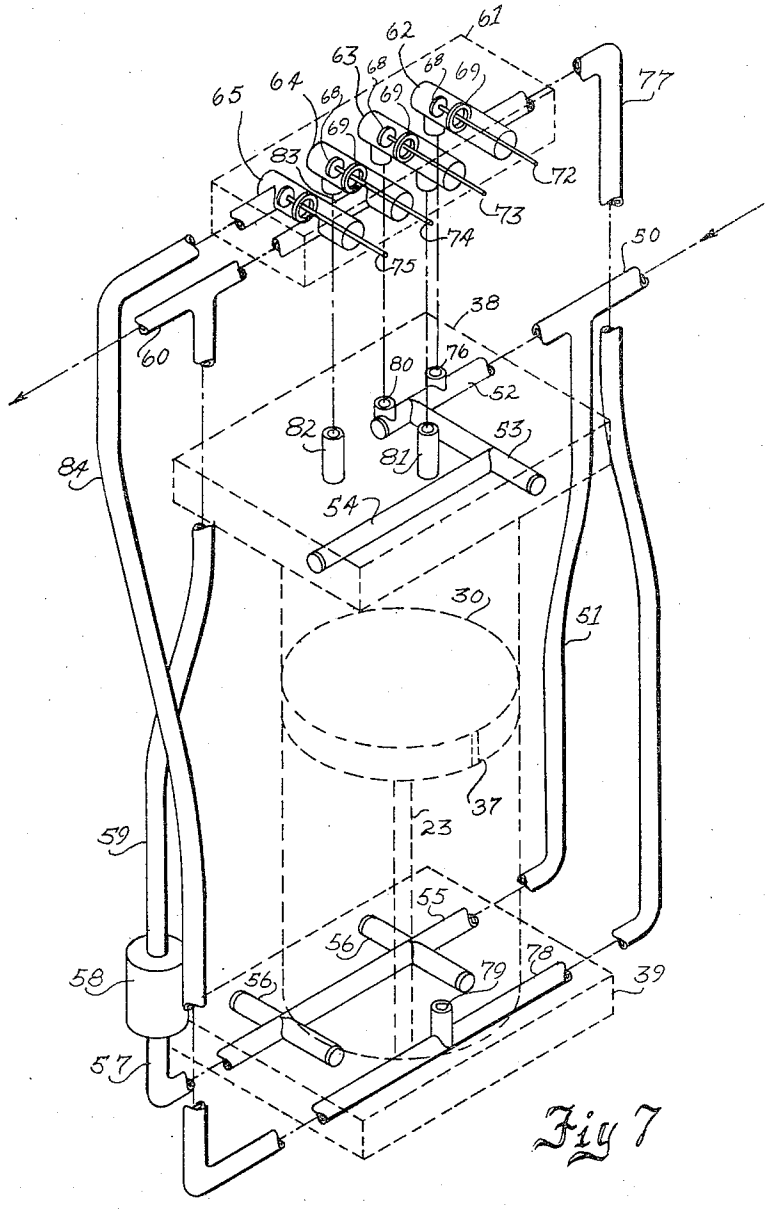


Fig 7

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United States Patent Office 3,242,600 Patented Mar. 29, 1966

3,242,600

ACTUATING UNIT FOR PRESS

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Filed June 29, 1964, Ser. No. 378,762
1 Claim. (Cl. 38—17)

This invention relates to pressing machines, and is particularly concerned with a power operated actuating unit for operating a garment or laundry press. The present application is a continuation in part of inventor Martin W. Boxer's copending application Serial No. 126,163, filed July 24, 1961, entitled "Power Control for Pressing Machines," now abandoned.

Conventional garment or laundry presses include a stationary buck surmounted by a pivotally supported press head, with appropriate mechanism for pivotally moving the head to and from the buck and for applying appropriate pressure. Such presses commonly provide means for supplying steam to the head, to the buck, or to both the head and the buck for heating or steaming garments and are frequently referred to as steam presses. Steam presses generally are either foot presses or power presses. Foot presses conventionally employ a foot pedal for actuating the head while power presses employ a power mechanism, usually in the form of an air actuated piston and cylinder arrangement, for actuating the head. Although steam is available to the press head, to the buck, or to both the head and buck of power presses for heating or steaming garments as an incident to pressing operations, air pressure has heretofore been universally utilized in power mechanisms such as piston and cylinder arrangements for power actuation of the press head.

The limitations of foot presses are readily understood. For example, physical strength and agility of the operator is required, the pressing operation is time consuming, and the quality of work is subject to the human frailties of the operator. In power presses, in which air pressure under the manual control of the operator provides the responsive physical action of the head, the outstanding problems include those of insuring accurate and immediate responsive movement of the head to control by the operator.

One of the requirements for effectively finishing a wide range of garments and fabrics on pressing equipment of this general nature is that the operator be able to vary and control the speed of the head as well as the pressure of the head against the garment or fabric. Heretofore, power presses have had but limited available range as to either head speed or pressure and such ranges of speed or pressure as have been available have required multiple control means.

The present invention provides a fluid pressure power mechanism adaptable to a foot press so as to convert the foot press to a power press. In addition, the invention is applicable to certain previous power presses by the addition of linkage members to provide an improved operating mechanism therefor. Further, the present invention uses steam pressure for power actuation of the head and hence provides readily controllable head speeds as well as of pressures not heretofore available While specific temperatures and pressures are not necessarily critical, and may best be determined by those skilled in the art in conformity with the structure and environs present, live steam of approximately 40 p.s.i. at a temperature in the neighborhood of 240° F. is suggested.

Among the outstanding features of the present invention is the provision of a single multiple valve unit by which, in response to predetermined movement of a single handle, operations of the press head may be controlled. A further feature of the invention is the provision of means for maintaining a balance of pressure on opposite sides of the activating piston of a cylinder-piston combination, whereby a triggered condition is maintained so that upon the application of power, the reaction of the piston will be substantially immediate. Means for constantly maintaining the cylinder and piston combination at an elevated temperature at which steam does not readily condense is also provided and with the balancing of piston pressures and the maintenance of the elevated temperature considerable economy of power is achieved. Since both head pressure and speed are readily controlled as prompt and faithful responses to a simple unitary valve mechanism, production rates and quality of production superior to those of previous presses are achieved.

In addition, the mechanical structure and arrangement of the invention is such as to render the device easily applied to and removed from present day foot presses. A unique characteristic of the present invention is the front location of the power unit for ease of installation and accessibility for adjustment and repair. Thus, the conversion of an apparatus to power operation with the present invention is neither time consuming nor does it require substantial change in original structure. However, the mechanism is also applicable to and may be incorporated in a mechanism originally designed for its use.

Thus, it is among the objects of the present invention to provide novel and improved means for activating the press head of conventional laundry and garment presses. A further object of the present invention is to provide a novel, rapidly and faithfully responsive power means for activating a press head. It is also among the objects of the present invention to provide a power mechanism applicable to present day laundry and garment presses so as to convert foot presses to power presses or to improve the operation of the power presses. A further object of the present invention is to provide a steam power mechanism for garment and laundry presses. Another important object of the present invention is to provide power means for a press which is rapidly responsive to valve control so as to avoid delayed and sluggish reaction. Another object is to provide a press power mechanism capable of readily controllable ranges of operating speeds and pressures which permit an operator to effectively finish a wide range of garments and fabrics. Another object of the invention is to provide power means for laundry and garment presses of improved economy of operation, particularly with respect to power consumption. The objects of the invention also include that of providing a novel and improved unitary valve arrangement for fluid operated power presses; means readily adaptable to present apparatus with a minimum of time, labor, and constructional changes; and a mechanism well adapted to meet the demands of economic manufacture.

While certain features of the present inventive concept may be broadly applicable to a wide variety of types of apparatus, particularly in the general field of laundry and garment pressing, the invention is an actuating unit particularly adapted for and is here shown as directed to laundry and garment presses.

In the accompanying drawings:

FIGURE 1 is a side elevational view, partially in

cross-section, of a conventional type laundry or garment press with an embodiment of the present invention installed.

FIG. 2 is a vertical section of the cylinder-piston arrangement of that embodiment of the invention shown in FIG. 1.

FIG. 3 is a perspective view of the valve control mechanism of that embodiment of the invention shown in FIG. 1.

FIG. 4 is a detailed central section of a valve used with the valve control mechanism in FIG. 3.

FIG. 5 is an enlarged side elevation of the cylinder-piston arrangement as seen in FIG. 1.

FIG. 6 is an enlarged elevation of the opposite side of the cylinder-piston arrangement as seen in FIG. 5.

FIG. 7 is a diagrammatic illustration of the fluid flow circuit and cylinder-piston arrangement of the present invention.

Referring now to FIG. 1 of the drawings, there is depicted a laundry or garment press of the general type for which the present invention is intended. In this figure, the numeral **10** indicates the buck defining the surface, usually padded, on which the laundry or garment is draped for the pressing operation. The buck frequently includes means for delivering live steam to the garment. It will be understood, however, that since such means and the control thereof form no part of the present invention, the disclosure is not encumbered by such mechanism. Mounted for pivotal movement towards and from the buck **10** there is provided the press head **11** pivotally mounted as at **12** on a suitable, fixed, rigid extension **13** of the machine base. Such heads, like the buck, also frequently include means for delivering live steam to the garment. As stated with respect to the buck, such means and the control therefor form no part of the present invention. Beyond the pivotal point **12**, the operating arm **14** supporting the press head **11** is extended to be engageable by a linkage means such as a vertical link **15**, the reciprocations of which provide for the pivotal movement of the head **11** toward and from the buck **10**. As commonly provided, a manually engageable handle **16** is secured to the head by which the head may be guided by hand. An actuator or rocker arm **17** is pivoted as at **18** to a rigid portion of the frame structure. The arm **17** may be the typical treadle of a conventional foot press and the forwardly protruding treadle portion is here shown as cut away. The return or opening stroke of the head is checked by a dash pot **19** commonly called an oil check or shock absorber which absorbs the inertia force of the head opening. The rod **20** of the dash pot **19** extends beneath the arm **17** to cushion the downward movement of that end of the arm **17** to which vertical link **15** is attached. The structure thus far recited is entirely conventional with most standard, present day, presses.

For the power actuation of the rocker arm **17**, the unit of the present invention is pivotally mounted by a suitable bracket **21** to the frame of the press. The piston rod **23** of the cylinder-piston arrangement of the present invention, hereinafter described in detail, extends downwardly to engage the rocker arm **17** as at **22**. As well understood by those versed in the use and operation of laundry and garment presses of the general type to which the present invention pertains, upon downward movement of the piston rod **23**, the rocker arm **17** will rock in counterclockwise direction, as viewed in FIG. 1, on its pivotal mounting **18** to force the link **15** upwardly. Such upward movement of the link **15** through engagement with the arm **14** rocks the head structure to bring the head **11** downwardly against the buck **10**.

Turning now to FIG. 2 of the drawing, it will be seen that the cylinder-piston arrangement of the actuating unit includes a piston **30** mounted on the piston rod **23** and secured thereto by a nut **31** engaging the upwardly protruding threaded end **32** of the piston rod. The

piston **30** defines a peripheral wide piston ring groove **35** in which is set a split, preferably non-metallic, piston ring **36**. The vertical split **37** of the ring **36** constitutes the restricted pressure bypass opening shown to the left in FIG. 2 and diagrammatically by dotted lines of FIG. 7. Behind the split piston ring **36** an O-ring seal **34** is mounted in a central recess of the groove **35**.

The bypass opening **37** is an important feature of the present invention. It will be understood that despite the provision of the bypass opening **37**, pressure may be applied on the upper face of the piston **30** to drive the piston rod **23** downwardly, or oppositely on the lower face of the piston **30** to drive the piston rod **23** upwardly. However, the bypass opening **37** will, during intervals between piston movement, provide for the equalization of pressures in the cylinder **33** on opposite sides of the piston **30**. This equalization of pressures provides a triggering of the piston **30** for prompt response upon the application of pressure to one or the other side of the piston **30** by avoiding the time lag usually required for building up pressure on one side of a piston until it exceeds the pressure on the opposite side of the piston.

In the absence of the bypass opening **37**, the pressure within the cylinder **33** above or below the piston **30** after a stroke of the piston would tend to be retained within the cylinder and resist a stroke in the opposite direction. However, with the provision of the bypass opening **37**, pressure following a stroke of the piston **30**, will bleed through the bypass opening **37** to the opposite side of the piston. This occurs without movement of the piston and provides a balanced pressure condition on both sides of the piston before the next stroke of the piston **30**. Thus, the piston **30** will be promptly and faithfully responsive to variations of positively applied pressure to either side of the piston **30**.

The cylinder **33** is mounted between upper and lower cylinder heads **38** and **39**, each of which includes a projecting boss **40**, conforming in size and configuration with the inner walls of the cylinder **33** so as to be snugly received within the ends thereof. Grooves **41** are provided in the walls of the bosses **40** to receive sealing O-rings **42** and insure a leakproof connection between the cylinder **33** and the heads **38** and **39**. The cylinder **33** and heads **38** and **39** are retained in assembled relation by tie rods **43** extending through protruding flanges of the heads **38** and **39** externally of the cylinder **33**. Nuts **44** on the rods **43** bear against the outer faces of the flanges of the heads **38** and **39** to retain the structure in the manner shown.

As more clearly indicated in FIG. 7, steam is introduced into the upper cylinder head **38** from a conventional source of steam (not shown) through a supply line **50** threaded into the head **38**, and from which a branch line **51** (see FIG. 7) leads to the lower cylinder head **39**. In the upper cylinder head **38**, the steam enters a duct **52** from line **50** and which communicates with a transversely extending duct **53** communicating with a terminal duct **54** parallel with the duct **52**. Thus, as steam is admitted to the duct **52**, the steam enters the ducts **53** and **54**. The branch line **51** leading to the lower cylinder head **39** communicates with one end of the through duct **55** in the lower cylinder head **39** and with intermediate transverse branch ducts **56** extending from the through duct **55** in the lower cylinder head **39**. The through duct **55** communicates at its other end with a discharge line **57** which leads to a steam trap **58**. The steam trap **58** is joined by a return line **59** to the exhaust line **60** from the valve block **61**. The exhaust line **60** may exhaust steam to the air or may lead to a unit (not shown) for condensing the steam for reuse. It will be understood that the ducts **52**, **53**, **54**, **55** and **56** are most conveniently formed simply as cavities or channels within the cylinder heads **38** and **39**. It will also be understood that steam in these ducts serves to heat the cylinder heads **38** and **39** so that condensation of steam within the cylinder **33** is retarded by the heat of

the cylinder heads 38 and 39. This retarding of the condensing of steam within the cylinder 33 reduces the need for providing steam simply to replace steam lost by condensation and serves to reduce the power required for operation of the apparatus of the invention and to aid in providing a highly efficient and quickly responsive apparatus.

The valve block 61 of the present invention is provided as diagrammatically shown in FIG. 7 with four similar valves 62, 63, 64 and 65 (the latter being shown in detail in FIG. 4). For each valve, a valve recess 66' is provided in the open end of which a valve cage 67 is threadably inserted. Each valve cage 67 defines a valve chamber 66 within the valve block 61, and a valve seat 69 continuous with a cylindrical recess 70 is formed in the inner end of each valve cage 67. A valve stem 72, 73, 74, or 75 extends through each valve cage 67 and through the cylindrical recess 70 to join a valve body 68 in the valve chamber 66.

Each valve body 68 is shaped to seat in the valve seat 69 when it moves toward the valve seat 69 and to place the valve chamber 66 in communication with the cylindrical recess 70 in each valve cage 67, when it moves away from the valve seat 69. Channels 71' extend outwardly from each cylindrical recess 70 to join the cylindrical recess 70 to an annular channel 71 extending around the circumference of each of the valve cages 67 and each valve 62, 63, 64 or 65 serves to establish or break communication between a valve chamber 68 and an annular channel 71.

When the first valve 62 is opened by moving the valve body 68 away from the valve seat 69 steam which has been admitted into valve chamber 68 through a port 76 extending from the duct 52 in the upper cylinder head 38 passes from the annular channel 71 of the valve 62 to a line 77 leading to the lower cylinder head 39. Communicating with the lower end of line 77 is a through duct 78 in the lower cylinder head 39 by which steam is admitted to the lower end of the cylinder 33 through a port 79. The port 79 also provides for discharge of steam from the cylinder 33 when the piston 30 descends as hereinafter explained.

The valve 63 also receives steam into its valve chamber 68 from the duct 52 in the upper cylinder head 38 by way of a port 80. When the valve 63 is open, steam passes from the annular channel 71 of the valve 63 into a duct 81 which passes through the upper cylinder block 38 and opens into the upper end of the cylinder 33. Thus, when the valve stem 73 is actuated to open the valve 63, steam pressure is admitted to the upper end of the cylinder 33 to move the piston 30 downwardly and when the valve stem 72 is actuated to open valve 62, steam pressure is admitted to the lower end of the cylinder 33 to move the piston 30 upwardly.

The valve chamber 68 of the third valve 64 communicates with the cylinder 33 by way of a port 82 and its annular channel 71 connects by way of a duct 83 within the annular channel 71 of the fourth valve 65. The annular channel 71 of the valve 65 also communicates with the steam discharge line 60 and the valve chamber 68 of the valve 65 (shown in detail in FIG. 4) communicates with a steam line 84 leading from the through duct 78 in the lower cylinder head 39. It will be understood, that the various ports mentioned above, duct 83, and those portions of the lines 50, 51, 57, 60, 77 and 84 extending into the cylinder heads 38 and 39 and the valve block 61 are most conveniently formed as channels or recesses in the cylinder heads 38 and 39 and the valve block 61. Where necessary, the various lines mentioned are inserted into the ducts and retained in position by conventional fittings (not shown).

From the foregoing, it will be seen that when the valves 62 and 64 are open and the valves 63 and 65 are closed, steam will be delivered to the lower end of the cylinder 33 through the supply line 50, the duct 52, the port 76, the valve 62, the line 77, the duct 78, and the port 79 will be exhausted from the upper end of the cylinder 33 as the piston moves upwardly through the port 82, valve 64, the duct 83, the annular channel 71 of the valve 65, and the discharge line 60. On the other hand, with the valves 62 and 64 closed and the valves 63 and 65 open, steam enters the upper end of the cylinder 33 through the supply line 50, the duct 52, the port 80, the valve 63, and the port 81 and is exhausted from the lower end of the cylinder 33 through the port 79, then through duct 78, the line 84, the valve 65, and the exhaust line 60. It thus will be noted, that in the operation of the actuating unit, the valves 62 and 64 must be simultaneously opened to provide for upward movement of the piston 30 and the valves 63 and 65 must be simultaneously opened to provide for downward movement of the piston, it being understood that when the valves 62 and 64 are open, the valves 63 and 65 must be closed and when the valves 62 and 64 are closed, the valves 63 and 65 are open.

For simultaneously opening valves 62 and 64 while valves 63 and 65 are closed and for sequentially simultaneously opening valves 63 and 65 while valves 62 and 64 are closed, there is provided a manually controlled valve cam shaft 90, mounted for rotation in a bracket 91 secured to the upper cylinder head 38. Secured on the cam shaft 90 for movement therewith, there are provided individual valve actuating cams 92, 93, 94 and 95 for operation of the valve stems 72, 73, 74 and 75 of the valves 62, 63, 64 and 65. Each valve stem extends through the bracket 91 to engage a cam and each valve stem is encircled by a spring 96 mounted between an exterior hexagonal head on each valve cage 67 and a shoulder 97 fixedly positioned on each valve stem adjacent the bracket 91. Thus, each valve is urged to closed position by a spring 96. The cams serve to open the valves against the tension of the springs 96 when the cams force inwardly the ends of the valve stems. It will be noted the cams 92 and 94 are arranged with their operating lobes in registration so that rotation of the cam shaft 90 will cause the valves 62 and 64 to open and close simultaneously. The operating lobes of the cams 93 and 95 are in registration and angularly displaced from the lobes of the cams 92 and 94 so that the cams 93 and 95 simultaneously open the valves 63 and 65 while springs 96 are urging the valves 62 and 64 closed and so that the cams 93 and 95 open the valves 63 and 65 while springs 96 are urging the valves 63 and 65 closed. The cams are fixedly positioned on the cam shaft 90 by bolts 97' extending through the cams and engaging the cam shaft 90 and it will be understood that the angular relationship between cams may be varied if desired.

An operating handle 98 is attached in known manner to one end of the cam shaft 90. The angular position of the handle 98 relative to the cams 92, 93, 94 and 95 is such that when the handle 98 extends outwardly from the press in a substantially horizontal plane as shown in FIG. 1, the valve stems 72, 73, 74 and 75 of all the valves are engaging low dwell portions of the cams. With the handle 98 in this position, all of the valves are closed and no steam is entering or leaving the cylinder 33 to raise or lower the piston 30. Thus, whenever the handle 98 is placed in this position, motion of the piston 30 is immediately stopped. However, steam is entering the cylinder heads 38 and 39 through the lines 50 and 51 and being spread throughout the heads 38 and 39 by the ducts 52, 53, 54, 55 and 56.

The steam entering the cylinder heads 38 and 39 serves to maintain the cylinder 33 and any steam trapped in the cylinder 33 at an elevated temperature which is sufficient to prevent condensation of the confined steam. Moreover, any slight difference in the pressure of the confined steam above and below the piston 30 is being reduced by the flow of steam through the bypass opening 37. Thus, when steam subsequently enters the cylin-

der 33 to move the piston 30 upwardly or downwardly, there is no requirement for steam simply to replace a steam loss by condensation or simply to overcome an excessive difference in steam pressure on opposite sides of the piston 30. It will be understood that this substantially reduces the power required to operate the actuating unit disclosed herein.

The cams 92, 93, 94 and 95 are also positioned relative to the handle 98 so that upon counterclockwise rotation of the handle 98 as viewed in FIG. 1 and FIG. 3, the cams 93 and 95 cause the valves 63 and 65 to open. The handle 98 has a neutral position shown in FIG. 3 in which all valves are in the position indicated in FIG. 7 and in which pressure is not exerted in either direction upon the piston 30 upon counterclockwise or downward motion of handle 98 from this neutral position, the piston 30 moves downwardly to force the head 11 downward toward the buck. Similarly, with upward motion of the handle 98 from the neutral position, the piston 30 moves upwardly to raise the head 11 from the buck 10.

It will be understood that upward or downward motion of the piston 30 is stopped whenever the handle is returned to neutral position and that motion of the head 11 can be selectively controlled by the handle 98.

Thus, a garment on the buck 10 is pressed simply by moving the handle 98 downwardly to move the piston 30 and head 11 downwardly. The head 11 will be pressed against the garment and will continue to exert pressure on the garment as long as the handle 98 is downward. Normally, as soon as the head is closed on the garment the operator handle 98 is returned to the neutral position. Unless this is done, valve 63 will continue to feed steam above the piston 30 and valve 65 will continue to exhaust steam from under the piston. However, if the valves are allowed to close by returning the handle 98 to neutral, the bypass opening 37 in the piston will allow the pressure above and below the piston to equalize.

When the pressing operation is complete, the handle 98 is moved past neutral to its upward position to cause the head 11 to raise. Upward motion of the head 11 at any point is stopped by manually returning the handle 98 to its neutral position. However, upward motion of the head 11 is automatically stopped at that position which permits a garment to be most easily positioned on or removed from the buck 10 by an actuator 99 which cooperates with a rod 101 to cause the cam bar 90 and handle 98 to move to the neutral position of the handle 98 after predetermined upward motion of the piston 30. The rod 101 also cooperates with a spring 100′ to return the handle 98 to neutral postion after downward motion of the handle 98 and the head 11 and release of the handle 98.

The actuator 99 extends from the piston rod 23 below the cylinder 33 and moves with the rod 23 to engage a head 100 at the lower end of the rod 101. The rod 101 is substantially vertical and at its upper end is pivotally attached to an arm 102 extending from a bracket 103 mounted at the opposite end of the cam shaft 90 from the handle 98. At its lower end above the head 100, the rod 101 is slidably inserted through a mounting bracket 102′ and the spring 100′ extends between the head 100 and mounting bracket 102′ to force the rod 101 downwardly when compressed.

The spring 100′ is selected and the arm 102 is positioned so that when the handle 98 is in neutral position, the spring 100′ is not substantially compressed. Moreover, the position of the arm 102 is also selected so that downward motion of the handle 98 causes upward motion of the arm 102 and the rod 100′ and compression of the spring 101′. It will be understood that upward motion of the handle 98 causes downward motion of the arm 102 and the rod 101, but no compression of the spring 100′. Thus, when the valves 62 and 64 are open, the rod is extended downwardly and the spring 100′ is not compressed and when the valves 63 and 65 are open, the rod is in an upward position in which the head 100 is compressing the spring 100′.

The actuator 99 is arranged in known manner to be selectively positioned at various points along the rod 23 and it will be understood that with the valves 62 and 64 open, the rod 23 moves upwardly and the actuator 99 will strike the head 100 on the downwardly extending rod 101. When this occurs, the rod 101 starts to move upward with the piston 30 and the arm 102 causes counterclockwise rotation of the cam shaft 90 and downward motion of the handle 98 to its neutral position. This closes the valves 62 and 64, and automatically stops the head 11 at a selected predetermined raised position.

However, when the handle 98 is moved downwardly to open the valves 63 and 65 and lower the head 11 toward the buck 10, the rod 101 is moved upward by the arm 102 and the head 100 compresses the spring 100′. Thus, when the handle 98 is releaseed the spring 100′ forces the head 100 downwardly to rotate the cam shaft 90 and return handle 98 to neutral position for which it may be subsequently moved upward to cause the head 11 to move upward. Thus, the handle 98 is automatically returned to neutral position after both upward and downward motion of the head 11. This prevents the waste of steam and facilitates the operation of the actuating unit of the invention.

From the foregoing, it will be seen that the compact structure of the cylinder, piston and valve controls permits the present invention to be easily attached or detached at any suitable location of a conventional foot press or power press without undue modification of the original structure. As indicated above should the device be applied to a foot press in order to convert the foot press into a power press, the usual treadle is removed from the treadle arm and the treadle arm is used as the pivot arm 17 illustrated in FIG. 1. An existing power press may be altered to be actuated by the present power mechanism by the simple attachment of the piston rod 23 of FIG. 1, to the pivoted actuating link (not shown) customarily found at the lower portion of such power operated devices. Moreover, the angular relationships among the cams, the arm 102, and the handle 98 may be readily varied to provide a variety of operating sequences.

With the present device applied it will be noted that a simple single movement, under manual control, of cam shaft 90 will provide for the simultaneous opening of bottom inlet and top exhaust passages to raise the piston or top inlet and bottom exhaust passages to move the piston downwardly.

Further, it will be noted that since the entry of steam into the cylinder 33 is automatically terminated after each stroke and since the piston is provided with a bypass opening 37 through which pressures may equalize between operations of the piston, neither side of the piston is ever subjected to sustained pressure after termination of a stroke. Thus, the piston is at all times triggered to promptly respond to the application of pressure to one side thereof or the other.

Further, it will be noted that the present construction provides for maintenance of the cylinder heads, and hence the entire cylinder-piston combination, at an elevated temperature which precludes waste of steam through condensation, and reduces the time required to obtain sufficient steam pressure to move the piston. Further, since automatic means is provided for returning all valves to closed position after each upward or downward stroke, the present invention is easy and convenient to operate.

It will, of course, be understood that the specific apparatus herein presented is by way of illustration only, and is meant to be in no way restrictive; therefore, numerous changes and modifications may be made and the full use of equivalents resorted to without departing from the

spirit or scope of the invention as outlined in the appended claim.

What is claimed as invention is:

In a steam piston and cylinder combination for use as the actuating means for the head of a steam press, an upper cylinder head defining ducts to receive steam for maintaining said upper cylinder head at an elevated temperature, a lower cylinder head defining ducts to receive steam for maintaining said lower cylinder head at an elevated temperature, a cylinder mounted between said heads in heat conductive relation therewith, and means for delivering steam to the ducts defined by said cylinder heads independently of the delivery of steam to said cylinder for actuating the piston of the steam piston and cylinder combination.

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