April 5, 1932. E. DAVIS 1,852,507

ACTUATING FOLLOW-UP MECHANISM FOR PRESSING MACHINES

Filed July 11, 1929 2 Sheets-Sheet 1

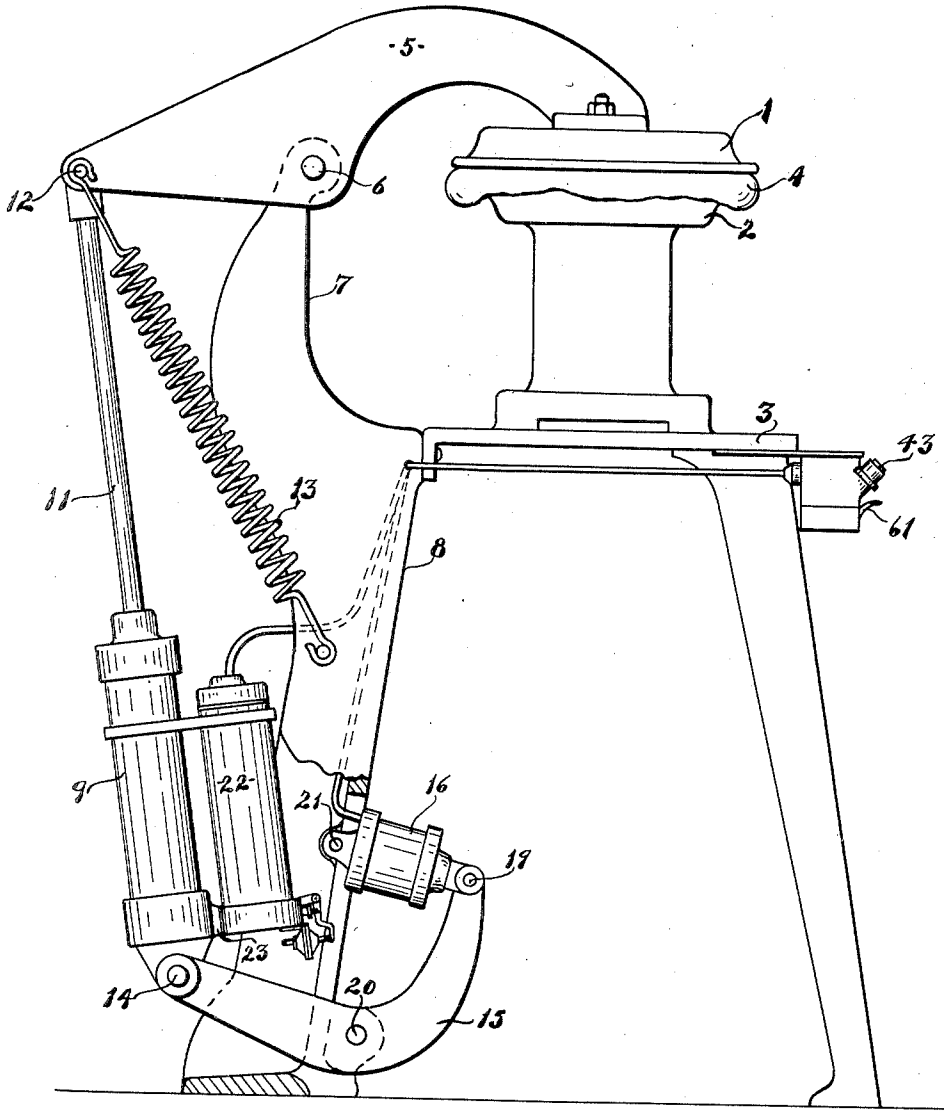


FIG. 1.

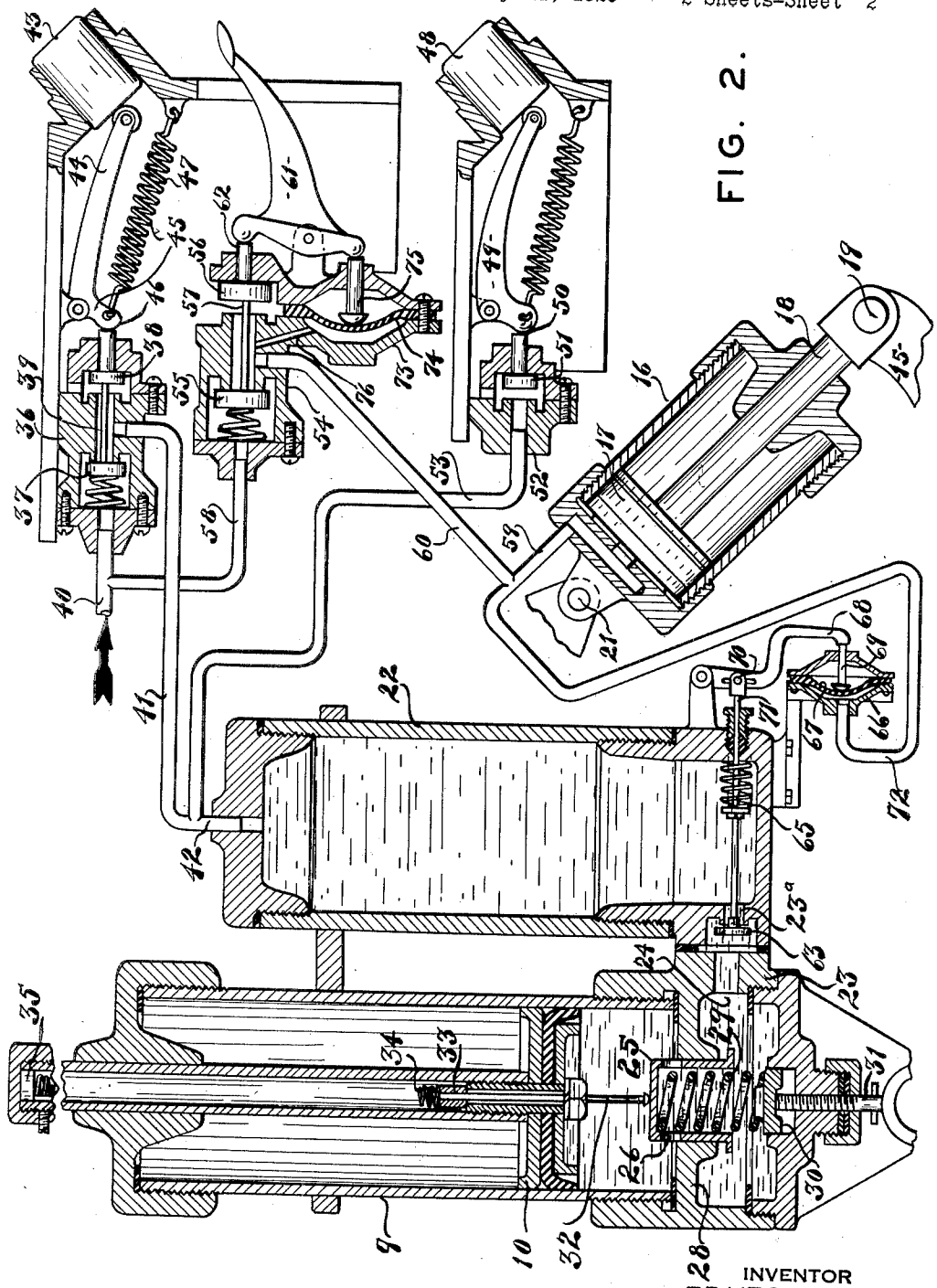
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FIG. 2.



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UNITED STATES PATENT OFFICE

ERNEST DAVIS, OF SYRACUSE, NEW YORK, ASSIGNOR TO THE PROSPERITY COMPANY INC., OF SYRACUSE, NEW YORK, A CORPORATION OF NEW YORK

ACTUATING FOLLOW-UP MECHANISM FOR PRESSING MACHINES

Application filed July 11, 1929. Serial No. 377,569.

This invention relates to pressing machines, as garment and laundry pressing machines, and has for its object, a particularly simple and efficient actuating mechanism including a so-called follow-up mechanism, whereby maximum pressure can be delivered, regardless of such conditions as different thicknesses of work and the padding on one or both of the pressing elements, and regardless of the amount of the settling of the padding.

The invention consists in the novel features and in the combinations and constructions hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawings in which like characters designate corresponding parts in all the views.

Figure 1 is a side elevation, partly broken away, of a pressing machine embodying my invention.

Figure 2 is an enlarged sectional view, partly diagrammatic, through the cylinders and contiguous parts thereof and the control valves for the cylinders.

This invention comprises, generally, motor means for applying pressure to the movable element of a pressing machine to the full capacity of the motor, until the resistance offered to the pressing element is equal to the force applied to the motor means, and additional booster mechanism acting through the motor means to effect a final pressure action, the motor means and connections serving as a mechanical motion transmitting part or link to transmit the motion of the booster mechanism. The motor means is so connected as to transmit its motion directly to the movable pressing element, and by this is meant, that the motion is transmitted through parts which do not reach a limit of movement before the motor has reached its limit of movement; as for instance, as through toggle mechanism which reaches the limit of its movement when the toggle straightens.

As here illustrated, my invention is embodied in a conventional type of pressing machine in which the cooperating pressing elements are respectively, a head 1 and a buck 2, the buck being stationary and mounted upon a suitable frame 3, and the head being movable toward and from the buck. The buck is provided with a yielding of compressible padding 4 on which the work is laid.

The head 1 is carried by a lever 5 pivoted between its ends at 6 to a standard 7 forming an upright extension of the back leg 8 of the frame of the machine.

The motor means of the actuating mechanism is here shown as pressure operated and has a cylinder 9 having a piston 10 therein, the rod 11 of which is pivoted at 12 to the rear arm of the head carrying lever 5. The piston 10 is single acting and the press is opened when the pressure in the cylinder is released by counter-springs 13.

The cylinder 9 is pivoted at its lower end at 14 to one arm of a booster lever 15, which is actuated preferably, by a pressure operated motor, as the cylinder 16 having a piston 17 movable therein, the rod 18 of which is pivoted at 19 to the other arm of the lever 15.

The lever 15 is pivoted at 20 between its ends to the lower end of the back leg 8 of the frame where it is angular in form and the cylinder 16 is also pivoted at 21 to said back leg. In the illustrated embodiment of my invention, the piston 10 is operated by a hydraulic fluid and the piston 17 by air, and air pressure is also applied to the hydraulic fluid to force it into the cylinder 9.

22 designates a reservoir for a hydraulic fluid, as oil, this being mounted on the bracket 23 which supports the cylinder 9 and which is also, the head of the cylinder. The bracket is the part of the cylinder 9 pivoted at 14 to the lever 15. The reservoir 22 has an outlet passage 23^a opening into a chamber 24 in the head of the cylinder 9, which chamber 24 opens through a port into the piston chamber, this port having a valve 25 therein.

The valve 25 is here shown as cap shaped and open at its bottom and formed with openings 26 in its sides opening into the piston chamber above the partition 28 separating the chamber 24 from the piston chamber. The valve 25 slides in a suitable guide in the partition 28 and is normally held with its

openings 26 wholly above the partition, by a spring 29. The spring 29 extends into the cap shaped valve 25 and thrusts at its upper end against the head of the valve and at its lower end against an abutment 30 adjustable to locate the openings 26 by means of an adjusting screw 31.

When pressure is applied to the surface of the body of the oil in the reservoir 22, the oil first is forced into the chamber 24, then through the valve 25 and the openings 26 thereof into the piston chamber to actuate the piston 10 to close the press.

Means is provided for checking the opening movement of the press, so that the head comes to an easy stop at the end of its opening movement. This means acts to partly close the valve 25 to retard the outlet of oil from the cylinder 9 back through the valve 25, chamber 24, passage 23^a, into the reservoir 22 as the piston 10 approaches the end of its retrograde movement.

As here illustrated, the piston is provided with a push rod 32 extending in advance of the pressure face thereof, this rod telescoping into the piston rod, or a hollow portion thereof, and having a head 33 within the hollow portion of the piston rod, which head is acted upon by a compression spring 34 located in the hollow portion of the piston rod, the spring thrusting at its upper end against an abutment 35 within the hollow portion of the piston rod.

As the press opens, or approaches its wide open position, the push rod 32 engages the head of the valve 25 and depresses the valve so as to move the openings 26 more or less, into the guide for the valve 25 and thus partly close or cut off the openings 26, so that the oil is retarded in its outflow out of the cylinder and hence, the movement of the piston 10 checked. After sufficient pressure is applied to the oil in the reservoir 22 to close the press, the pressure of the oil against the valve 25 will open the valve 25 to its full extent and it will always open to its full extent after the piston 10 has been started on its power stroke. The amount of the checking movement can be regulated by means of the adjusting screw 31.

The flow of motive fluid to and from the reservoir 22 against the surface of the body of oil therein, and to and from the cylinder 16 is controlled by suitable control valves which are manually or operator operated.

36 designates the case of a valve for controlling the flow of motive fluid to the upper portion of the reservoir 22.

37 and 38 are respectively, a normally, closed spring pressed, intake valve, and a normally open exhaust valve in the casing 36, these being connected together by a stem 39, so that they act as a unit. The intake end of the valve 36 is connected to a supply pipe 40 for a motive fluid as compressed air. The casing 36 is connected at a point between the valves by a pipe 41, to a coupling 42 at the upper end of the reservoir 22. The pipe 41 serves both as an inlet and exhaust pipe. The valves 37, 38 are operated by any suitable means here shown as a push button 43 which acts on a lever 44 having an arm 45 acting against the end of the stem 46 of the exhaust valve 38. The movement of the lever 44 is against the action of a returning spring 47. Obviously, depression of the push button 43 will close the exhaust valve 38 and open the intake valve 37 against its spring, so that air is free to flow from the pipe 40 to the reservoir 22 to force the oil therein into the cylinder 9 to actuate the piston 10 therein.

In order that both hands of the operator may be required to close the press, a second push button 48 is employed, this acting on a lever 49 similar to the lever 44, the lever acting upon the stem 50 of a normally open exhaust valve 51, in a casing 52 which is connected by a pipe 53 to the coupling 42.

Obviously, if only the push button 43 is depressed, the air instead of effectively pressing from the pipe 41 into the reservoir 22, will exhaust out through pipe 53 and valve casing 52. If only the push button 48 is depressed, no air will pass through the pipe 41 because the intake valve 37 remains closed. Hence, both push buttons must be depressed to effect the closing of the press.

The flow of air to the booster cylinder 16 is controlled by a mechanism similar to that in the casing 36 and comprising a casing 54 having a normally closed spring pressed intake valve 55 therein, a normally open exhaust valve 56, these being connected together by a stem 57. The intake and other valve casing 54 is connected by a pipe 58 to the feed pipe 40 and the casing is connected at a point between the surfaces to a coupling 59 in the head of the cylinder 16, by a pipe 60.

The valves 55, 56 are operated by a manual as a lever 61 grouped with the push button 33 and having an arm acting on the stem 62 of the exhaust valve 56. Obviously, during upward movement of the lever 61, the intake valve 55 will be operated and the exhaust valve 56 closed, so that air is free to pass from the pipe 58 through the valve casing 54, pipe 60 to the cylinder 16 to actuate the booster piston 17 therein. The pressure of the oil in the cylinder 9 is locked in the cylinder 9 after the piston 10 has been actuated on its power stroke by means controlled by the lever 61, this means being here shown as a normally open check valve 63 in the passage 23 connecting the reservoir 22 with the open chamber 24, this check valve being held open by a spring 65.

The check valve is closed against the action of its spring by pressure operated means controlled by the lever 61, which controls the operation of the booster piston 17. The pres-

sure operated means is here shown as a diaphragm chamber 66 and a diaphragm 67 therein, which when actuated acts on a lever 68 through a sliding stem 69, this lever being connected at 70 to the stem 71 of the check valve 63. The pressure side of the diaphragm chamber 66 is connected by a pipe 72 to the pipe 60 leading to the booster cylinder 16. This pipe 60 is both the intake and exhaust pipe.

The valves 55 and 56 which control the flow of air to and from the booster cylinder 16 are held in their operated positions by pressure operated means, as a diaphragm chamber 73 having a diaphragm 74 therein, which through a sliding stem 75 acts upon an arm of the lever 61. The pressure side of the diaphragm chamber 73 is connected by a duct 76 to the interior of the valve casing 54. Hence, when the valves 55, 56 are operated by the lever 61, they are locked in their operated positions by the diaphragm 74.

In the operation of the press, the operator depresses both push buttons 43, 48 permitting air to enter the top of the reservoir 22 to force the oil therein into the cylinder 9 to actuate the piston 10 therein and close the press, the piston 10 delivering all the power it is capable of and hence, taking up as much compression in the padding as possible. Thereafter, the operator pulls up on the lever 61 to boost the pressure. To open the press, the operator depresses the lever 61.

This actuating mechanism is particularly advantageous in that, always a maximum pressure is delivered and the maximum pressure of a piston 10 is delivered before the booster operation comes into operation.

What I claim is:

1. In a garment pressing machine in combination cooperative pressing elements, one of which is movable toward and from the other; means for actuating the movable element including hydraulic motor means; motion transmitting means between the motor means and the movable pressing element to translate the movement of the motor means with a direct thrust action to close the press with maximum pressure until the resistance of the movable pressing element equals the force applied by the hydraulic motor means; booster means separate from the motor means and spaced apart therefrom; motion transmitting means between the booster means and the motor means for moving said motor means to boost the pressure applied to the movable pressing element.

2. In a garment pressing machine in combination cooperative pressing elements, one of which is movable toward and from the other; means for actuating the movable element including hydraulic motor means; motion transmitting means between the motor means and the movable pressing element to translate the movement of the motor means with a direct thrust action to close the press with maximum pressure until the resistance of the movable pressing element equals the force applied by the hydraulic motor means; booster means connected by lever mechanism with the motor means and operable to move said motor means and apply greater pressure to the movable pressing element after the motor means has been operated to the limit of its capacity, the motor means and said connections forming means to transmit the motion of the booster means to the movable pressing element.

3. In a pressing machine, cooperating pressing elements, one of which is movable toward and from the other, hydraulic motor means for actuating the movable element including a cylinder and a piston movable therein and connections between the piston and the cylinder, whereby the motion of the piston is transmitted to the movable element until the resistance offered to the movable element equals the force applied to the piston, and means separate from the cylinder and connected thereto by lever means and operable to move the cylinder and piston as a unit to increase the pressure applied to the movable pressing element.

4. In a pressing machine, cooperating pressing elements, one of which is movable toward and from the other, hydraulic motor means for actuating the movable element including a cylinder and a piston movable therein and connections between the piston and the cylinder for transmitting the motion of the piston to the movable element until the resistance offered to the movable element is equal to the force applied to the piston, and booster means operable to move the cylinder and piston as a unit to increase the pressure, said booster means including a cylinder and a piston movable therein and motion transmitting means between the booster piston and the first mentioned cylinder, and means for controlling the flow of motive fluid successively to the cylinders.

5. In a pressing machine, a supporting frame, cooperating pressing elements, one of which is movable toward and from the other, hydraulic motor means including a cylinder having a piston movable therein, motion transmitting connections between the piston and the movable element, whereby the movement of the piston is applied directly to the movable element until the resistance of the movable element is greater than the force applied to the piston, a booster cylinder, and a piston therein, and a lever pivoted between its ends to the frame and having one arm thereof pivoted to the first mentioned cylinder and carrying the same, and the other arm thereof pivoted to the booster piston, and means for controlling the flow of motive fluid successively to the cylinders.

6. In a pressing machine, a frame, a buck mounted on the frame, a head carrying lever pivoted to the frame, hydraulic motor means including a cylinder, a piston movable in the cylinder and having its rod connected directly to the head carrying lever, a second cylinder, a piston movable therein, a lever pivoted between its ends to the frame and at its opposite ends respectively to the first cylinder to support the same and to the rod of the piston movable in the second cylinder, and means for controlling the flow of motive fluid successively to the cylinders.

7. In a pressing machine, cooperating pressing elements, one of which is movable toward and from the other, means for actuating the movable element including a cylinder, a piston movable in the cylinder, the cylinder having an exhaust port and a normally open valve therein having a spring tending to open it, means for controlling the flow of motive fluid to the cylinder through said port and means movable with the piston for partly closing the valve in said port and thereby checking the opening movement of the press when the piston approaches the end of its retrograde movement during the opening of the press.

8. In a pressing machine, cooperating pressing elements, one of which is movable toward and from the other, means for actuating the movable element including a cylinder, a single acting piston in the cylinder and connections between the piston rod and the movable element, the cylinder having a combined intake and outlet port at one end thereof, a normally open valve in said port, a spring tending to hold the valve open, and means carried by the piston and projecting in advance thereof and movable into engagement with said valve to partly close it during the latter part of the retrograde movement of the piston as the press opens, and means for controlling the flow of motive fluid to and from the cylinder through said port.

9. In a pressing machine, a frame, cooperating pressing elements, one of which is movable toward and from the other, the frame including an upright member, a lever carrying the movable element pivoted to the upper end of said frame member, a second lever pivoted to the lower end thereof, a cylinder pivoted to one arm of the second lever, a piston movable in the cylinder and having its rod connected to the first lever, a second cylinder pivoted to the upright frame member, a piston movable therein and having its rod connected to the other arm of the second lever, and means for controlling the flow of motive fluid successively to and from the cylinders.

10. In a pressing machine, cooperating pressing elements, one of which is movable toward and from the other, mechanism for cylinder, a single acting piston therein and connections between the piston rod and the movable element, the cylinder having an intake and outlet port, a reservoir for a hydraulic fluid communicating with said port, a valve in said port, a spring for holding the valve in open position, the piston having means to partly close the valve as the piston approaches the end of its retrograde movement during the opening of the press, and operator controlled means for applying pressure to the fluid in the reservoir.

11. A garment pressing machine including in combination a frame; cooperative pressing elements, one of which is movable with respect to the other to close and open the press; a lever pivoted to the frame and carrying the movable pressing element; a booster lever pivoted to the frame; a cylinder and piston one of which is pivotally connected with the first lever and the other of which is pivotally connected with the booster lever; a reservoir to supply liquid to the cylinder during the closing of the press; and means for operating the booster lever to move the cylinder and piston as a unit to apply heavy pressure to the pressing elements.

12. A garment pressing machine including in combination a frame; cooperative pressing elements, one of which is movable with respect to the other to close and open the press; a lever pivoted to the frame and carrying the movable pressing element; a booster lever pivoted to the frame; a cylinder and piston one of which is pivotally connected with the first lever and the other of which is pivotally connected with the link; a liquid reservoir rigidly connected with the cylinder and movable as a unit therewith; a conduit between the reservoir and the cylinder through which liquid flows to the cylinder during the closing of the press and through which liquid flows back through the reservoir during the opening of the press; valve means to control the flow of liquid through the conduit; and motor means connected with the booster lever for operating said booster lever to move the cylinder and piston as a unit to apply heavy pressure to the pressing elements.

In testimony whereof, I have hereunto signed my name at Syracuse, in the county of Onondaga and State of New York, this 29 day of June, 1929.

ERNEST DAVIS.