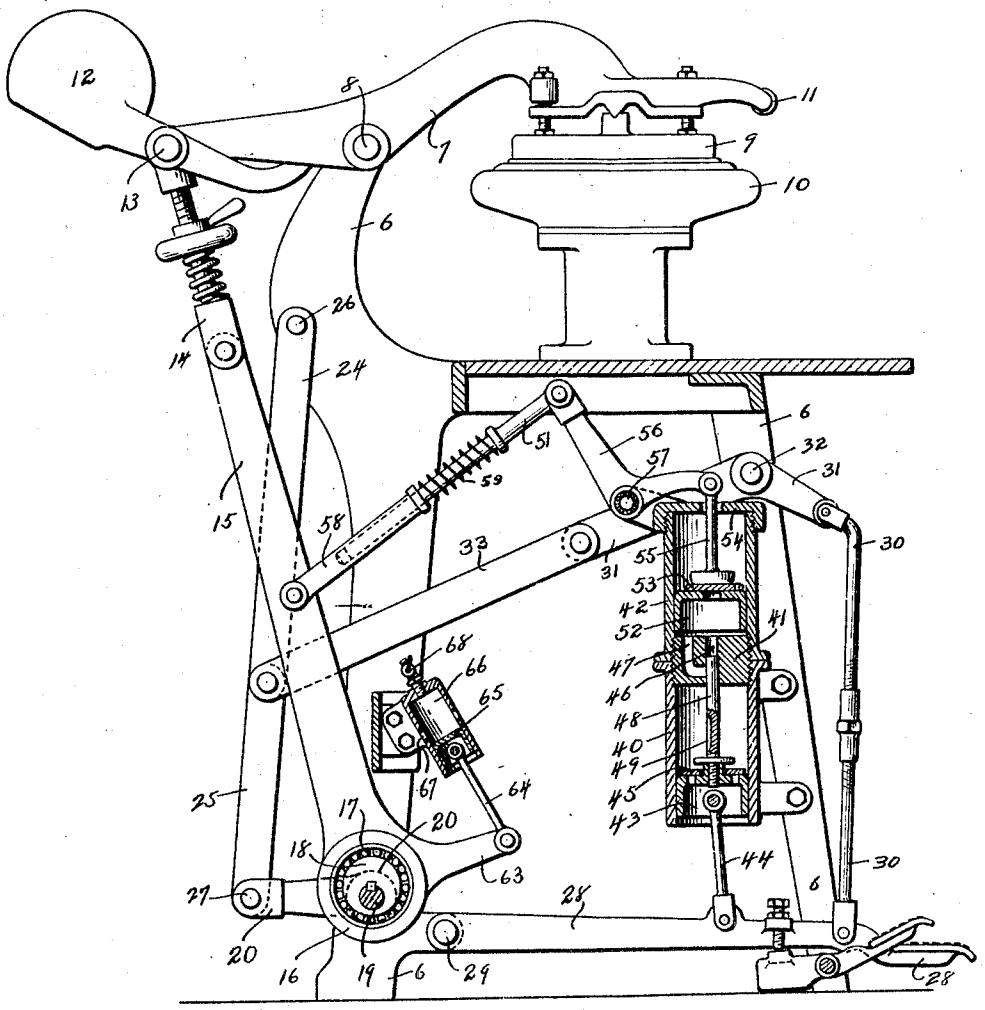
Dec. 27, 1927. 1,653,860

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GARMENT PRESS

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GARMENT PRESS.

Application filed October 27, 1923. Serial No. 671,120.

This invention relates to presses and more particularly to improvements over the pressing machine shown in my copending application filed October 27, 1923, Serial Number 671,119.

A main object of the invention is to provide improvements in pressing machines possessing improvements therein designed to produce smooth, efficient, quiet, and easily operated presses capable of producing great pressure, and having provisions by which the opening stresses and strains of the machine are absorbed against a pneumatic cushion or dashpot, the compressed air from which is in turn utilized to open the press, thereby rendering unnecessary the use of springs or heavy counterbalance weights for opening the press. A further object is to produce a pressing machine having facilities for manually closing the press lightly under initial pressure and subsequently increasing the compression between the closed press members to produce final pressure with minimum physical effort. An additional object is to provide structural improvements in the dashpot and in a pneumatic motor for opening the press by utilizing the motive power derived from the reacting compression force generated by the machine at the inception of the opening cycle.

With the above principal objects in view, the invention has relation to certain improved combinations and arrangements of parts, an example of which is shown in the accompanying drawings illustrating embodiments of the invention serving to disclose the construction and mode of operation thereof. The machine may be varied in construction, operation and use without departing from the principle of the invention; and it is understood therefore that the marketable structure itself may differ from the drawings in certain respects.

The figure in the drawing illustrates a pressing machine constructed in accordance with the principles of the invention, the said press being shown closed and in side elevation as well as in partly vertical section.

Referring further to the drawings for a more detailed description of the invention, there is shown a pressing machine frame 6 upon which a press lever 7 is pivoted at 8; and the forward end of the press lever carries a pressing head 9 which is adapted to engage with great pressure upon the buck 10. A hand hold bar or handle 11 by which the head is manually moved downwardly into contact with the buck is carried by the head. The rear end of the press lever carries a counter balance weight 12 designed to balance the head 9 thereby rendering the head easy to move into closed position by the manual effort of the operator pulling down on the hand 11, and in this machine the function of the weight is to statically balance the head and not to produce an overbalance condition to raise the head as is the case with presses now in use, for I employ improved means for raising the head after the pressing operation which eliminates springs and weights heretofore employed for such purpose, and which the operator must necessarily physically overcome to close the head.

A toggle link 14, comprising a suitable pressure compensating spring with length adjustor hand wheel and lock nut, is pivotally swung on a bearing 13 carried by the rear end of the press lever 7 and this link is pivoted to a link 15 the lower end of which carries a hub 16. The lower end of this main operating toggle 14—15 contains a roller bearing 17 in the hub within which a cam 18 is rotatably confined within the said roller bearing. The cam is fixed to a shaft 19, and the shaft is journaled in the frame of the machine; and an arm 20 is likewise fixed to the shaft 19. The cam is therefore capable of being rotated by oscillating the arm 20, and suitable manual power means is provided for thus operating the arm and cam for producing high pressure as will be described. When the pressing machine is in normally open position, the cam arm 20 stands in a vertical position with the cam 18 rotated to its low horizontal position; and similarly after the press head is closed, the cam remains in the same position until forcibly revolved upwardly by the final pressure creating means as will now be described.

A cam arm operating toggle, comprising pivotally connected links 24 and 25, has its upper end pivoted at 26 on the press frame and its lower end pivotally connected at 27 to the cam driving arm 20. A power lever, in this instance a pedal 28, is pivoted at 29 on the frame; and a draw link 30 connects the pedal with a toggle operating lever 31 which lever is pivoted at 32 upon the

press frame, the longer end thereof being connected with the toggle 24—25 through the agency of a link 33. It is now understood how the pedal 28 is adapted to swing the lever 31 which in turn straightens the toggle 24—25 thereby swinging the cam driving arm 20 downwardly to a horizontal position as shown in the drawing, and thus the cam 18 is rotated upwardly to its position of maximum height which correspondingly lifts the main operating straightened toggle 14—15 to produce high compression between the pressing members 9 and 10. The operation of the pedal 28 is accomplished with little manual effort by reason of the fact that the cam and shaft rolls in roller bearings. The press lever 7 is also preferably similarly mounted upon roller bearings whereby the head 9 is easily brought down into contact with the buck 10 prior to manipulation of the pedal 28.

It is to be observed that the cam rotating arm 20 is swingable through substantially a ninety degree arc, and the pedal and toggle mechanism is therefore designed to oscillate the arm 20 through one-quarter of a revolution to roll the cam in the roller bearings to its uppermost position; and at the beginning of the pedal stroke, the arm 20 easily starts without undue resistance by virtue of the light contacting engagement existing between the closed head and buck, and by virtue of the angular purchase thrust of which the toggle 24—25 is capable against the arm 20; but as the pedal 28 continues its downward movement, the resistance increases against turning the cam because the head begins to close tightly onto the buck. As the said resistance builds up, the toggle 24—25 gradually approaches a straight position above the oscillating arm following it down thereby rapidly overcoming the said increasing resistance offered to the rotating cam. At the end of the cam rotation, the cam arm 20 has reached a horizontal position with the toggle 24—25 straightened out in a vertical bracing position and the arm 20 is held locked down by virtue of the straightened locked position of the toggle 31—33. Thus it is observed how the design and arrangement of parts are so laid out as to obtain the maximum working efficiency, thus making for ease and convenience in operation of the manually operated high power press. Furthermore all the pedal travel or stroke is utilized to impose final high pressure between the head and buck, thus providing a high leverage operating mechanism calling for an expenditure of minimum effort on the operator's part.

A pressing machine of this character capable of generating great pressure necessarily requires efficient opening mechanism by which the substantially large quantity of power accumulated or stored up in the machine parts while under compression may be quietly and safely expended or absorbed at the inception of the press opening movement; and to this end I provide a dashpot designed to absorb the first opening shock of the press, the operation of which generates compressed air which is subsequently utilized to break the main operating toggle and raise the head 9 away from the buck and off of the work after the pressing operation has been completed; and to this end I provide a pneumatic motor supplied by air from the dashpot which acts to break the toggle 14—15 rearwardly, all of which will now be described.

A unitary or combination dashpot cylinder 40 and pneumatic motor cylinder 42 is mounted on the frame of the pressing machine to absorb the opening shock of the moving parts as the final pressure creating means opens, and immediately thereafter the pneumatic motor raises the head. A head 41 is shown common to each cylinder. The dashpot 40 is fitted with a piston 43 which has a connecting rod 44 connected with the pedal 28, and when the pedal 28 rises under the opening force of the toggles driven by the back rotation of the cam, the air within the cylinder 40 is compressed and retards the pedal to prevent violent and noisy contacting of parts. A flap valve 45 normally closes ports in the piston head during the upward reciprocation of the piston 43, but the valve opens as the piston goes down to permit air under atmospheric pressure to flow into the cylinder, thus making ready for the next pedal opening stroke. The cylinder head 41 is made with a valve port 46 which connects with a valve passage 47 which leads upwardly to the pneumatic cylinder thereby connecting the dashpot and motor. The dashpot piston 43 carries a valve rod 48 which normally seals and closes off the valve passage 47 to prevent the compressed air in the cylinder 40 from flowing upwardly to the pneumatic motor 42. This valve rod 48 is provided with an air passage 49 which registers and communicates with the valve passage 47 shortly after the dashpot piston 43 has moved upwardly partway through the cylinder 40; and thus the compressed air in the cylinder 40 is discharged upwardly into the pneumatic motor by virtue of the registering passages 49 and 47.

A freely movable pneumatic motor piston 52 is fitted in the cylinder 42, and this piston is provided with ports normally closed by a flap valve 53 which permits air to flow into the cylinder 42 during the time the piston 52 is gravitating downwardly from the uppermost to the lowermost end of the pneumatic motor. The upper end of the cylinder 42 is equipped with a cylin-

der head 54 through which a push rod 55 reciprocates, and the lower end of the push rod is provided with a valve seating head to rest against the flap valve 53 during the upward travel of the piston 52, and it is therefore understood how the air being discharged from the dashpot upwardly to the underneath side of the piston may not escape through the valve ports covered by the flap valve 53 for the reason that the headed push rod 55 seats the flap valve tightly over the piston port.

A bell crank 56 is pivoted at 57 and has connection with the push rod 55. A toggle breaking link or press opening link 58 has one end pivotally attached to the bell crank with its other end pivotally attached to the main operating toggle 14—15 thereby connecting up the piston 52 with the toggle. A spring thrust cushion 59 is included in the structure of the link 58 making the link longitudinally contractable or expansible by which all lost motion existing in the bell crank and push rod connections is removed, and therefore the spring thrust cushion 59 is designed to seat the headed push rod 55 firmly against the valve 53. The link is in fact composed of the two shouldered telescoping elements 58 and 51 with a weak spring confined therebetween to take up slack and wear in parts. As the compressed air from the dashpot acts upwardly against the motor piston 52, the piston reciprocates to break the main operating toggle 14—15 and thus quickly raises the head; and the press head rises easily for the reason that the press lever is sensitively balanced. But the motor so energetically drives the head up that a cushioning stop is sometimes employed by which the head and press lever is brought to rest without rebounding, as will now be described.

A dashpot arm 63 is made integral with the hub 16 or with the lower toggle link and carries on the outer end thereof a connecting rod 64 and a piston 65 which slidably fits in a dashpot cylinder 66 which is anchored to the frame. The dashpot 66 preferably has air ports 67 by which the air escapes from the dashpot during the first part of the upward travel of the piston therein; and after the piston 65 has passed over the ports, the air confined in the dashpot acts as a cushion stop to prevent the toggle 14—15 from approaching its normal resting position with attendant excess noise or violent motion. A hand regulated valve 68 is included in the dashpot by which the operator regulates the resistance and cushioning effect of the air confined therein, and by trial or experiment the valve 68 is properly set to permit the toggle 14—15 to rapidly approach a rear limited position without too violently coming to rest.

After the pneumatic motor piston 52 has spent its force in raising the head, it disconnects and becomes separated from the mechanical connection 51—56 and gravitates back to its lowermost position and stands ready for the next stroke. I have devised this particular pneumatic motor improvement for raising the press head, and have made the motor piston free and as a separable element to move in the cylinder and have disconnected it from the piston rod 55 in order that the operator will not have to physically move the piston in the cylinder during the head closing stroke. Inasmuch as the bell crank and other parts employed for lifting the press head are preferably carried on ball bearings, and inasmuch as the motor piston is disconnected from these parts, it follows that all parts move freely and the operator does not have to overcome the resistance of the piston sliding in the motor cylinder.

However my invention is not limited in use to a disconnected piston and toggle breaking push rod for in some presses the motor piston is connected to the rod 55 and in such case it is practical to manufacture the piston of pure bakelite and internally polish or nickel plate the motor cylinder, and thus a low coefficient of friction will be found to exist and the parts will function smoothly and frictionlessly with a dry and non-lubricated cylinder.

The machine works easily and does not tire the operator by further reason of the fact that no springs or counterbalancing weights are employed to overbalance the head for lifting it at the end of the pressing operation. The invention is presented to fill a want felt for an improved pressing machine.

What I claim is:

1. A pressing machine comprising cooperating press members, operating means for opening and closing the press and for producing compression between the members, a dashpot cooperating with the operating means, an air motor cylinder placed in alignment with and forming a part of the dashpot, a cylinder head separating the dashpot and air motor cylinders, said cylinder head being provided with a fluid passage therethrough connecting the dashpot and air motor, and a mechanical connection established between the air motor and operating means.

2. A pressing machine combination comprising cooperating press members, operating means for opening and closing the press, a dashpot cooperating with the operating means, an air motor cylinder carried on the dashpot, said structure having a fluid passage connection established between the dashpot and air motor, a mechanical connection established between the air motor and operating means, and means operated by the dashpot acting on the fluid passage to close

said passage during part of the dashpot operation and open said passage during the remainder of the dashpot operation.

3. A pressing machine comprising cooperating press members, operating means for opening and closing the press, a dashpot cooperating with the operating means, an air motor cylinder mounted in alignment with and forming a part of the dashpot, said dashpot and air motor having a fluid passage connection established therebetween, a mechanical connection between the air motor and operating means, and a separable means forming a part of the air motor whereby said separable means disconnects itself from that portion of the air motor which is connected with the operating means.

4. A pressing machine combination comprising cooperating press members, operating means for opening and closing the press, a dashpot cooperating with the operating means, an air motor cylinder unitarily constructed with and forming a part of the dashpot, said structure having a fluid passage connection established between the dashpot and air motor, a mechanical connection established between the air motor and operating means, and a dashpot cushion stop cooperating with the operating means to prevent rebounding toward closed position.

5. A press comprising in combination, cooperating press members, a press opening and closing means and compressing means, a cylinder, a head disposed in the cylinder dividing it into dashpot and air motor sections, a fluid connection established between the dashpot and closing and compressing means, and a mechanical connection made between the air motor and press opening means.

6. A pressing machine combination comprising cooperating press members at least one of which is movable, a handle carried upon the movable press member by which the operator closes the press, a toggle linkage connected with the movable member, a cam upon which the linkage is pivotally supported at its lower end, an arm fixed to the cam, a toggle having one end fixed pivotally and the other end pivotally attached to the arm, a power pedal connected with the toggle by which the full pedal stroke is utilized in swinging the arm and rotating the cam, a combination dashpot and air motor connected with the said power pedal by which the strain incident to the opening of the press is dissipated against an air cushion, and a lost motion connection established between the toggle linkage and air motor for opening the press by the force of compressed air received from the dashpot.

7. In combination, a pressing machine comprising cooperating pressing members movable one in relation with the other, operator actuated means for forcing the members into tight compression, a dashpot to absorb the opening shock at the inception of the parting movement of the pressing members, motor means connected with the dashpot, a lost motion connection established between the motor means and pressing members for driving the head up by power derived from the dashpot, and a spring employed to maintain taut the lost motion connection.

8. In combination a pressing machine embodying pressing members, levers for opening and closing the press, a dashpot connected with the levers, an air motor receiving air from the dashpot, a control valve in the air motor, an expansible connecting rod serving to join the air motor to the levers, and means operated by the connecting rod for closing the valve.

9. In combination, a pressing machine embodying pressing members, levers for opening and closing the press, an air motor, a control valve in the air motor, an expansible connecting rod serving to join the air motor to the levers and means operated by the connecting rod for closing the valve, and means operated by the press for compressing air and discharging same into the air motor.

In testimony whereof I affix my signature.

JAMES C. LEDBETTER.