

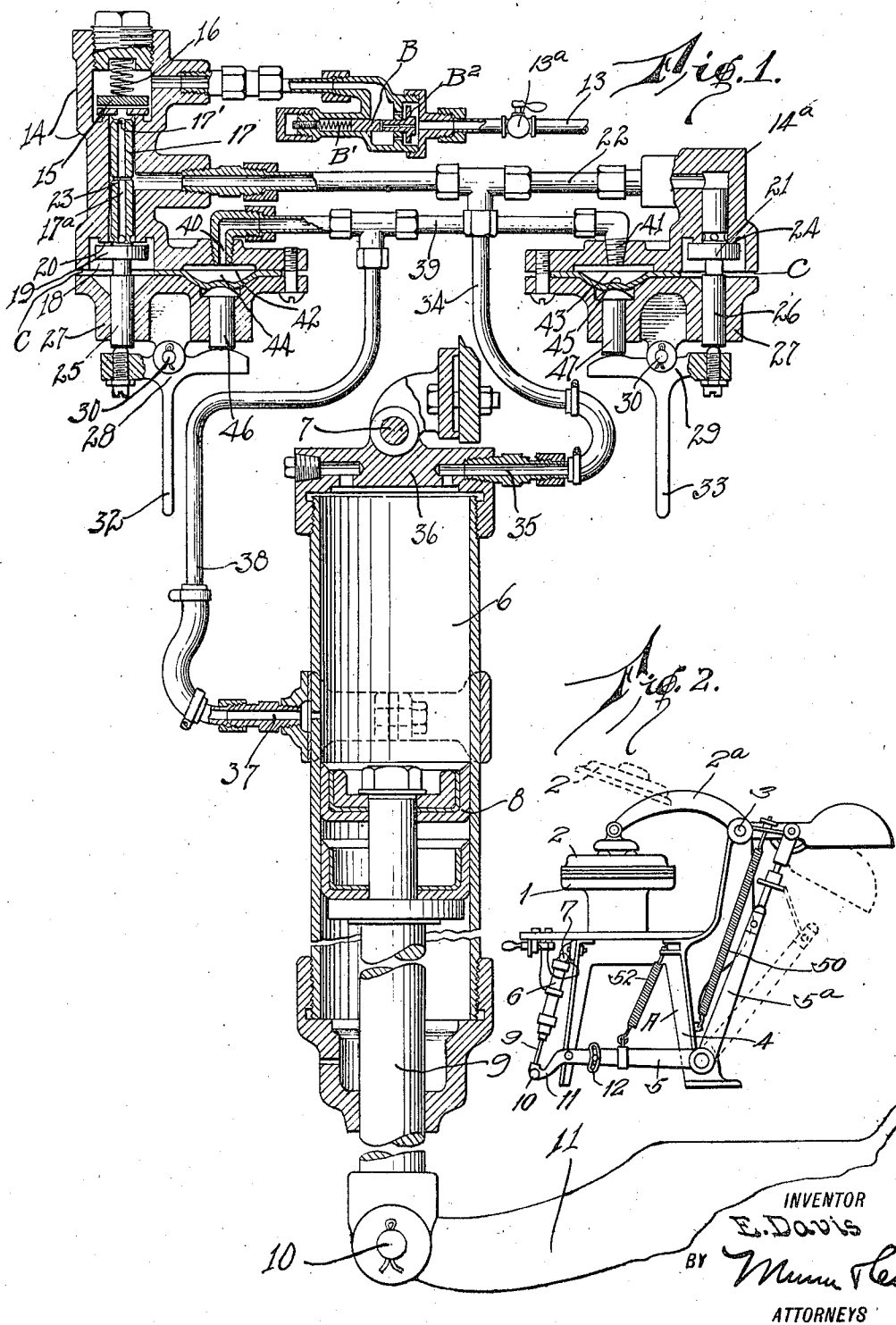
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E. DAVIS

PNEUMATIC CONTROL AND SAFETY DEVICE FOR PRESSING MACHINES

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UNITED STATES PATENT OFFICE.

ERNEST DAVIS, OF CHICAGO, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO
LIBERTY NATIONAL BANK, TRUSTEE, OF SYRACUSE, NEW YORK.

PNEUMATIC CONTROL AND SAFETY DEVICE FOR PRESSING MACHINES.

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My invention relates to improvements in pneumatic or fluid operated control and safety devices for pressing machines, particularly platen pressing machines, such as are used in garment factories, tailor shops, laundries and the like and has for its object to provide such pressing machines with a particularly simple and efficient means by which the machine is operated by power and controlled by the operator without danger to the operator owing to premature closing of the machine, and to the operator after the machine has started on its closing movement, if the operator tries to put his hand between the pressing elements to smooth out wrinkles etc., he discovers after the machine has been started. It further has for its object to provide a particularly simple operating mechanism by which both hands of the operator must be out of the path of the closing press head or platen when the head is closing and further by which the head or movable platen is held in closed position until released by the manually operable mechanism. It further has for its object a controlling mechanism, by which, although two hands are required to effect the closing of the press, but one hand is necessary to effect the opening of the press. A further object of the invention, is to provide a controlling and power device, which can be quickly attached to the standard type of pressing machines now operated by foot power, without changing the construction of the machine. Other objects appear throughout the specification.

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 sectional view of an embodiment of my invention showing the arrangement of the valves and the power cylinder.

Figure 2 is a side elevation of one form of pressing machine provided with this power means.

I have here shown my invention as applied to a conventional type of garment and laundry pressing machine consisting of a stationary pressing element, platen or buck 1, a movable element or the head or platen 2 suitably carried in any well known manner

on the forward arm of a yoke or lever 2^a pivoted at 3 to the frame A, and means for actuating the head. The head 2 is actuated through suitable motion transmitting mechanism from a member as a lever 5 to which foot power is usually applied, this lever 5 being connected to the rear arm of the yoke 2^a through suitable toggle mechanism designated generally 5^a. Depression of the lever 5 causes the head 2 to be moved toward the buck 1 from the position indicated in dotted lines, Fig. 1, and such depression of the lever 5 straightens the toggle 5^a. The press is opened by means of a counter-weight on the rear arm of the yoke 2^a and also by means of springs 50 and 52.

The power means constituting part of my invention for actuating the head 2 is here shown as connected to the lever 5 which is usually a pedal, although the power means may be connected to any other part of the mechanism for actuating the head 2.

The power mechanism comprises a fluid operated motor, as a cylinder 6 pivoted at 7 to the frame 4 to have an oscillating movement during the up and down movement of the lever 5 and a piston 8 movable in the cylinder and having its rod 9 connected at 10 to the power lever 5, through an attachment of part 11 which attachment is substituted for the usual pedal plates the part 11 being connected to the lever 5 by an adjustable clamping member 12. The piston 8 is actuated, preferably, by compressed air and the admission of air to the cylinder is controlled by a two handed operated mechanism and the exhausting of the air to open the press is affected by the operation of any one of the handles of the two handed mechanism.

This controlling mechanism comprises generally means for actuating the movable element of a pressing machine, which means comprises a fluid operated motor, a conduit system for a motive fluid connected to the motor, means for controlling the flow of motive fluid to and from the motor through the conduit system including a normally open intake valve, a normally closed exhaust valve, manual means for controlling the actuation of the power means and operable to close the exhaust valve and open the intake valve, and manually releasable pressure operated means connected in said system and controlled by the operation of the motor for

holding the exhaust valve closed after the same has been operated by the manual means and the motor has completed its operation, said holding means being operable by the manual means to open the exhaust valve.

More specifically this controlling mechanism comprises a fluid operated motor, or cylinder, a normally closed intake or control valve in the feed pipe to the motor, normally open exhaust valves connected in multiple with the fluid motor and in multiple with the control valve, one of the exhaust valves being also connected to the control valve to open the control valve when said exhaust valve is closed and manual means individual to the exhaust valves for closing the same. It further includes means operated by the pressure in the motor or cylinder for holding the exhaust valves closed, said means being operable to release the exhaust valves by the manual means, all whereby both exhaust valves must be closed and held closed manually when the intake valve is open in order to effectively conduct the fluid or air to the cylinder to actuate the piston, and upon the releasing of either handle the pressure will be discontinued and the press will stop in its closing movement, and whereby the press is held closed by the pressure in the motor after it has been completely closed by the motor.

13 designates the air feed line which is connected to any suitable source of supply of compressed air or other fluid.

13^a is a shut-off valve therein.

14 is the valve casing having a normally closed intake or control valve therein, which is pressed toward its seat by a spring 16 and the air pressure.

The valve 15 as here shown is provided with a stem 17 sliding in a passage formed in a valve casing 14 and arranged coaxially with the chamber in which the valve 15 is located, this stem 17 having a lengthwise passage therethrough communicating through lateral ducts 17' with the chamber in which the valve 15 is located, so that, when the valve 15 is open, the air passes from the valve chamber through the ducts 17' and the passage of the stem 17.

The valve casing 14 is connected by pipes 22 and 34 to the intake coupling 35 in the head 36 of the cylinder 6.

19 and 21 designate a pair of normally open exhaust valves located in chambers in the valve casing 14 and the valve casing 14^a, these valves 19 and 21 coacting with seats 20 and 24 in the valve casings. Each valve 19 and 21 is provided with a stem 17^a similar to the stem 17 of the valve 15, the stem 17^a of the valve 19 being provided with a lengthwise passage which opens into the valve chamber 18 of the valve 19 through lateral ducts located adjacent to the head of the valve, these ducts being similar to the ducts 17'. Preferably the valve stems 17 and 17^a

are formed integral and the passage of the unitary stem is formed with lateral ducts 23 located intermediate of the valve heads 15 and 19, the ducts being in line with the pipe 22. One or both heads may be detachable for facilitating assembling in the valve casing 14. The valve 21 also has a stem similar to the stem 17^a, the lengthwise passage of the stem of the valve 21 opening into the valve casing 14^a and communicating through the chamber in the valve casing 14^a with the pipe 22. The valve chambers for the exhaust valves 19 and 21 open into the outer air at C. The intake valve 15 is normally closed and the exhaust valves 19 and 21 normally open.

The exhaust valves are closed by the operator and the closing of the valve 19 also opens the intake valve 15 to permit the air to pass from the feed line 13 through the valve casing 14, passages of the valve stem 17, ducts 23, pipes 22 and 34 into the cylinder to actuate the piston 8 on its power stroke.

The exhaust valves 19 and 21 are normally operable by levers 28 and 29 pivoted at 30 and handles 32 and 33 which when operated to rock the levers 28 and 29 thrust against the stems or plungers 25 and 26 thrusting against the exhaust valves 19 and 21 and pressing said valves against their seats, and when pressing the valves 19 against its seat opening the intake valve 15 owing to the fact that the stems of the valves 14, 19 are a unit. These plungers or stems 25, 26, are carried in suitable casing sections 27 detachably secured to the valve casings 14, 14^a.

In the event, the handle 33 is not operated to close the exhaust valve 21, the air will pass through the pipe 22 out through the valve casing 14^a past the open exhaust valve 21 and no pressure will be applied to the piston 8.

In the event the handle 33 is operated to close the exhaust valve 21 but the handle 32 is not operated to close the exhaust valve 19, then no air will pass into the pipe 22 to the cylinder for the reason that the intake valve 15 is seated. Hence both handles 32 must be operated in order to permit air to flow to the cylinder 6 to actuate the piston 8 and close the press, and if before the press is closed, either handle 32 or 33 is released, the press will stop in its closing movement as if the handle 32 is released the intake valve 15 will close and if the handle 33 is released the pressure of the air through the pipe 32 will first open the exhaust valve, so that, the air can escape and hence no pressure will be applied to the piston 8.

The exhaust valves 19 and 21 are held in their closed position after the piston 8 has been actuated on its power stroke by means operated by pressure in the cylinder 6 through conduit connections including a

pipe 38 communicating with a port associated with the cylinder 6 and located above the position occupied by the piston 8 when at the limit of its power stroke, the pipe 38 communicating with the pipe 39 which communicates at its opposite ends with diaphragm chambers 42, 43, in which diaphragms 44, 45 are located, these diaphragms acting upon stems or plungers 46, 47, which are acted upon by arms of the levers 28 and 29 respectively located on the opposite sides of the pivots 30 of the levers 28 and 29 to the sides on which the arms coacting with the stems 25 and 26 of the exhaust valves are located. The plungers 46 and 47 have suitable heads for coacting with the diaphragms 42, 43. The diaphragm chambers 42 and 43 are thus connected in multiple with the cylinder 6 through the pipes 38, 39 and couplings 40, 41. These diaphragm chambers are formed between the valve casing 14, 14^a, and the sections 27 and the plungers 46, 47, are carried in said sections 27.

When the piston 8 approaches the end of its power stroke the air passes through the pipes 38 and 39 to the diaphragm chambers 42, 43, pressing the diaphragms against the plungers 46, 47, causing the plungers to engage the arms of the levers 28, 29 and thus hold said levers in their operated positions, that is, the position assumed when both exhaust valves are closed and the intake valve 15 opens. Thus the pressure is held applied as long as desired by the operator. To release the pressure and permit the press to open, the handles 32, 33 are moved respectively to the left and to the right, that is toward each other causing the levers 28, 29 to release the plungers 26, 27 and also move the diaphragms 44, 45 against the air pressure and such movement permits the air pressure to open the exhaust valves 19 and 21 and the spring 16 or the air pressure to close the intake valve 15.

The exhaust valves now being open, the air in the cylinder will then exhaust through the pipes 34 and 22 and passages 17^a of the exhaust valves. The passages through the coupling 37 is relatively small so that the pressure does not build up in the diaphragm chambers 42, 43, until after the movement of the piston 8 has stopped. Hence the operator must keep hold of the handles momentarily after the press is completely closed. This operation is of importance as the pressing machines often times are provided with spring padding and by this construction the operator must maintain his hold on the handles 32, 33, until the press is completely closed and the padding compressed and there is no chance that at the last moment that the operator might release his hands for the purpose of smoothing out a wrinkle, etc., on the garment. If the pres-

sure from the cylinder 6 was immediately applied before the piston 8 came to a complete stop, the operator might have time in an unguarded moment to place one or both of his hands between the pressing elements for the purpose of smoothing the article being worked on, and the exhaust valves now being held closed by the diaphragm 44 the press would continue to close and squeeze and burn the operator's hands.

The operating of either handle 32, 33 to open either valve 19 or 21 serves to relieve the pressure in the cylinder 6 and permit the press head to open under the influence of the counter-spring and counter-weight.

Operation of the handle 33 to open the exhaust valve 21 only would relieve the pressure in both diaphragm chambers 42, 43, as this operation releases the pressure in the cylinder 6, the intake valve 15 is free to close by the spring 16 or by air pressure and in so doing will open the other exhaust valve 19 as there is no force being applied to the valve 19 tending to hold it closed.

A suitable compensating valve B is located in the pipe 13. This valve B is acted upon by a spring B' tending to hold the valve open. The valve is also formed with a passage B² therethrough. The purpose of this valve is for preventing the air pressure from being violently applied to the piston 8 and hence violently closing the press. In operation the air pressure would tend to close the valve B against the action of the spring B' so that the air passes through the small passage B² of the valve until the pressure is modified enough to permit the spring 31 to overcome the pressure of the air of the valve B.

It will thus be seen that the exhaust valves 19 and 21 are connected in multiple with the cylinder through the pipes 22 and 34 and the valve casing 14 and 14^a, and that the valve chamber controlled by the intake valve 15 is connected in multiple with the chambers of the exhaust valves 19 and 21 so that both exhaust valves must be closed in order to effectively apply pressure to the piston 8.

I claim:

1. The combination in a machine comprising a movable element, of power means for actuating said element comprising a fluid operated motor, conduit system for a motive fluid connected to the motor, means for controlling the flow of motive fluid to and from the motor through said conduit system including a normally closed intake valve, a normally open exhaust valve, manual means for controlling the operation of the power means and operable to close the exhaust valve and open the intake valve, and manually releasable pressure operated means in said system controlled by the operation of the motor for holding the exhaust valve

closed and the intake valve open after the same has been operated by the manual means, and the motor has completed its operation, said holding means being operable by the manual means to open the exhaust valve.

2. The combination in a machine comprising a movable element, of power means for actuating said element, a fluid operated motor, and a conduit system including piping for supplying the motive fluid to and from the motor, manually operable means for controlling the flow of motive fluid to and from the motor through the conduit system, fluid operated means operable to hold the manually operable means in its manually operated position assumed when said conduit system is open to conduct the motive fluid to the motor and closed to the outlet of motive fluid from the motor, and manual means for releasing the fluid operated means, the conduit system including piping for conducting motive fluid to and from said fluid operated holding means.

3. The combination of claim 2 in which the fluid operated motor is a cylinder and a piston movable therein and the conduit system has a normally closed intake valve and a normally open exhaust valve operable in conjunction with the intake valve, and means is provided tending to close the intake valve and open the exhaust valve, and the manually operable means operates to close the exhaust valve and open the intake valve and said valves are held in their operated position by the fluid pressure controlled by the movement of the piston and acting through said manually operable means.

4. The combination in a pressing machine comprising co-operating pressing elements, one movable toward and from the other, and motion transmitting mechanism for actuating the movable element, of power means for actuating said mechanism comprising a fluid operated motor an inlet and outlet conduit system connected to the motor and means for controlling the flow of motive fluid to and from the motor through said conduit system including normally closed intake valve, a normally open exhaust valve, manual means for closing the exhaust valve and opening the intake valve, means operated by the pressure of the motive fluid in the fluid motor for holding the exhaust valve closed and the intake valve open after the same have been operated by the manual means.

5. The combination in a pressing machine comprising co-operating pressing elements, one movable toward and from the other, and motion transmitting mechanism for actuating the movable element, of power means for actuating said mechanism comprising a fluid operating motor an inlet and outlet conduit system connected to the motor, and

means for controlling the flow of motive fluid to and from the motor through said conduit system including a normally closed intake valve, a normally open exhaust valve, manual means for closing the exhaust valve and opening the intake valve, means operated by the pressure of the motive fluid in the fluid motor, and acting on the manual means for holding the exhaust valve closed and the intake valve open after the same have been operated by the manual means, the last mentioned means being operable by the manual means to open the exhaust valve.

6. The combination in a pressing machine comprising cooperating pressing elements one of which is movable toward and from the other and motion transmitting mechanism for actuating the movable element, of power means for actuating said mechanism comprising a fluid operative motor and a conduit system for supplying the motive fluid to the motor, manually operable means for controlling the flow of motive fluid to and from the cylinder through the conduit system, and means operated by the back pressure of the motive fluid from the motor for holding the manually operable means in its manually operated position assumed when said conduit system is open to conduct the motive fluid to the motor and closed to the outlet of the fluid from the system.

7. The combination of claim 6 in which the fluid operated motor is a cylinder and a piston movable therein, and the conduit system has a normally closed intake valve and a normally open exhaust valve operable in conjunction with the intake valve, and means is provided tending to close the intake valve and open the exhaust valve, and the manually operable means operates to close the exhaust valve and open the intake valve, and said valves are held in their operated position in which the intake valve is opened and the exhaust valve closed by back pressure from the cylinder acting through said manually operable means.

8. The combination in a pressing machine comprising cooperating pressing elements, one movable toward and from the other and motion transmitting mechanism for actuating the movable element, of power means for actuating said mechanism comprising a fluid operated motor and means for controlling the flow of motive fluid to and from said motor comprising an intake conduit, a normally closed control valve in said conduit, a pair of exhaust valves connected in multiple with the motor, and manual means individual to the exhaust valves for closing the same, one of said means operating to open the control valve.

9. The combination in a pressing machine comprising cooperating pressing elements, one movable toward and from the other and motion transmitting mechanism for actuat-

ing the movable element, of power means for actuating said mechanism comprising a fluid operated motor and means for controlling the flow of motive fluid to and from said motor comprising an intake conduit, a normally closed control valve in said conduit, a pair of exhaust valves connected in multiple with the motor, manual means individual to the exhaust valves for closing the same, one of said manual means operating to open the control valve and means for holding the exhaust valves closed after the press is closed.

10. The combination in a pressing machine comprising cooperating pressing elements, one movable toward and from the other and motion transmitting mechanism for actuating the movable element, of power means for actuating said mechanism comprising a fluid operated motor, a feed pipe for a motive fluid, a normally closed control valve in said pipe, normally open exhaust valves connected in multiple with the fluid motor and also connected in multiple with the control valve, one of the exhaust valves being connected to the control valve to open the control valve when said exhaust valve is closed, and manual means individual to the exhaust valves for closing the same.

11. The combination in a pressing machine comprising cooperating pressing elements, one movable toward and from the other and motion transmitting mechanism for actuating the movable element, of means for actuating said mechanism comprising a fluid operated motor and means for controlling the flow of motive fluid to and from said motor comprising an intake conduit, a normally closed control valve in said conduit, a pair of exhaust valves connected in multiple with the motor, manual means individual to the exhaust valves for closing the same, one of said manual means operating to open the control valve, fluid operated means for holding the exhaust valves in their closed position and conduit connections between the said fluid operated means and the motor.

12. The combination in a pressing machine comprising cooperating pressing elements, one movable toward and from the other and motion transmitting mechanism for actuating the movable element, of power means for actuating said mechanism comprising a fluid operated motor and means for controlling the flow of motive fluid to and from said motor comprising an intake conduit, a normally closed control valve in said conduit, a pair of exhaust valves connected in multiple with the motor, manual means individual to the exhaust valves for closing the same, one of said manual means operating to open the control valve, fluid operated means for holding the exhaust valves in their closed position, and conduit

connections between the said fluid operated means and the motor, said connections being connected in multiple with the fluid motor.

13. The combination in a pressing machine comprising cooperating pressing elements, one movable toward and from the other and motion transmitting mechanism for actuating the movable element, of power means for actuating said mechanism comprising a fluid operated motor, a feed pipe for a motive fluid, a normally closed control valve in said pipe, normally open exhaust valves connected in multiple with the fluid motor and also connected in multiple with the control valve, one of the exhaust valves being connected to the control valve to open the control valve when said exhaust valve is closed, manual means individual to the exhaust valves for closing the same, and fluid operated means connected with the motor for holding the exhaust valves in their closed position.

14. The combination in a pressing machine comprising cooperating pressing elements, one movable toward and from the other and motion transmitting mechanism for actuating the movable element, of power means for actuating said mechanism comprising a fluid operated motor and means for controlling the flow of fluid to and from said motor comprising an intake conduit, a normally closed control valve in said conduit, a pair of exhaust valves connected in multiple with the motor and manual means individual to the exhaust valves for closing the same, one of said insert means operating to open the control valve, fluid operated means for holding the exhaust valves in their closed position and conduit connections between the said fluid operated means and the motor, the said fluid operated means being controlled by said manual means.

15. The combination in a pressing machine comprising cooperating pressing elements, one movable toward and from the other and motion transmitting mechanism for actuating the movable element, of power means for actuating said mechanism comprising a fluid operated motor, a feed pipe for a motive fluid, a normally closed control valve in said pipe, normally open exhaust valves connected in multiple with the fluid motor and also connected in multiple with the control valve, one of the exhaust valves being connected to the control valve to open the control valve when said exhaust valve is closed and manual means individual to the exhaust valves for closing the same, fluid operated means connected in multiple with the motor for holding the exhaust valves in their closed position, the said fluid operated means being controlled by said manual means.

16. The combination in a pressing ma-

chine comprising cooperating pressing elements, one movable toward and from the other, and motion transmitting mechanism for actuating the movable element, of power means for actuating said mechanism comprising a cylinder, a piston movable in the cylinder and connected to said mechanism and means for controlling the flow of motive fluid to and from the cylinder comprising a pair of valve casings, a normally closed intake valve and a normally open exhaust valve, in one of said casings, the valves being connected together so that closing of the exhaust valve opens the intake valve, a feed pipe connected to the casing in which said normally closed intake valve, and normally opened exhaust valve are located, a normally open exhaust valve in the other casing, conduit connections connecting said valve casings in multiple with the cylinder and means individual to the exhaust valves for moving them to their closed position.

17. The combination in a pressing machine comprising cooperating pressing elements, one movable toward and from the other, motion transmitting mechanism for actuating the movable element of power means for actuating said mechanism comprising a cylinder, a piston movable in the cylinder and connected to said mechanism and means for controlling the flow of motive fluid to and from the cylinder comprising a pair of valve casings, a normally closed intake valve and a normally open exhaust valve in one of said casings, the valves being connected together so that closing of the exhaust valve opens the intake valve, a normally open exhaust valve in the other casing, conduit connections connecting said casings in multiple with the cylinder, means individual to the exhaust valves for moving them to their closed position, and fluid operated means connected with the cylinder and operating to hold the exhaust valves in their closed position, said fluid operated mechanism operating on the exhaust valves through said manual means and the connections between said fluid operated means and the cylinder

being arranged to be uncovered by the piston as the piston approaches the end of its power stroke.

18. A pneumatic control and safety device for pressing machines comprising a cylinder, a piston in said cylinder arranged to be connected to the treadle of a pressing machine, a normally closed control valve for admitting air under pressure to said cylinder, means for manually operating said valve, and compressed air means associated with said valve operating means for maintaining said first named control valve in open position.

19. A pneumatic control and safety device for pressing machines comprising a cylinder, a piston in said cylinder arranged to be connected to the treadle of a pressing machine, a normally closed control valve for admitting air under pressure to said cylinder, means for manually operating said valve, and compressed air means associated with said valve operating means for maintaining said first named control valve in open position, said compressed air means deriving its source of air from said cylinder.

20. A pneumatic control and safety device of the character described comprising a cylinder, a piston within the cylinder arranged for connection with the treadle of the pressing machine, a control valve for admitting air under pressure to said cylinder, manually operated means for opening said control valve, a pair of exhaust valves communicating with said cylinder, one of said exhaust valves being arranged to close simultaneously with the opening of said control valve, manually operated means for closing the remaining exhaust valve, and compressed air means deriving its source of air from said cylinder for holding each of said exhaust valves in closed position, said manually controlled means for operating said exhaust valves being capable of resisting the force of said compressed air means for opening said exhaust valves when manual force is applied thereto, whereby air may be exhausted from said cylinder at will.

ERNEST DAVIS.

CERTIFICATE OF CORRECTION.

7

Patent No. 1,609,273, granted November 30, 1926.

to ERNEST DAVIS.

It is hereby certified that error appears in the printed specification of the above mentioned patent requiring correction as follows: Page 5, line 102, claim 14, for the word "insert" read "manual"; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 15th day of February, A. D. 1927.

William A. Kinnan,
Acting Commissioner of Patents.

Seal.