July 29, 1930. A. H. ADAMS 1,771,476

PRESSING MACHINE

Filed Feb. 29, 1928

Fig. 1.

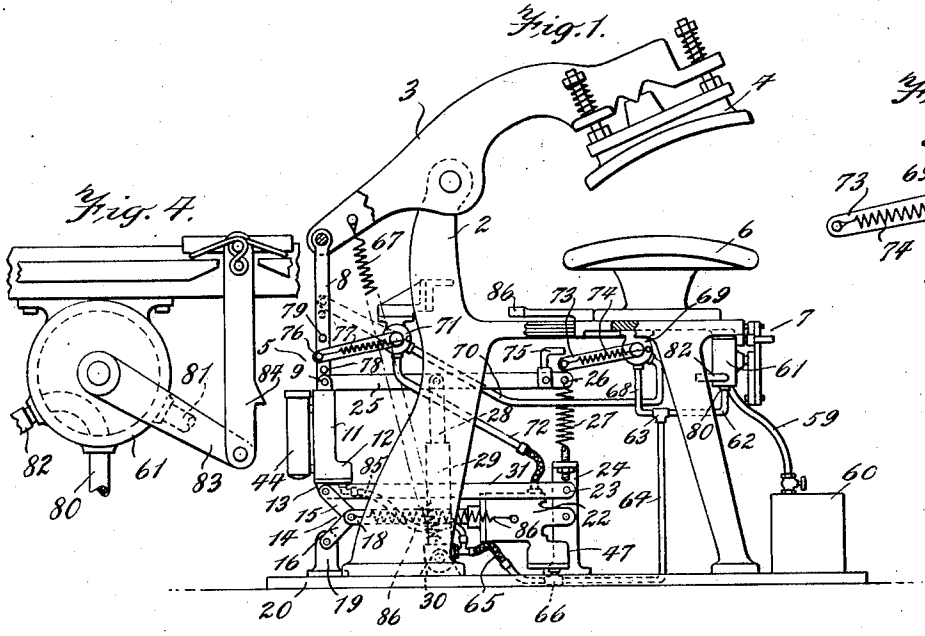


Fig. 5.

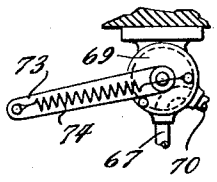


Fig. 4.

Fig. 2.

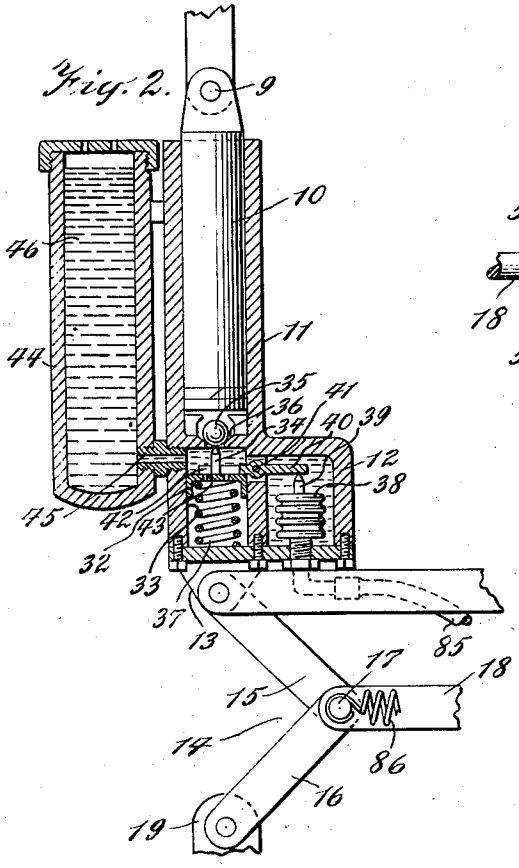
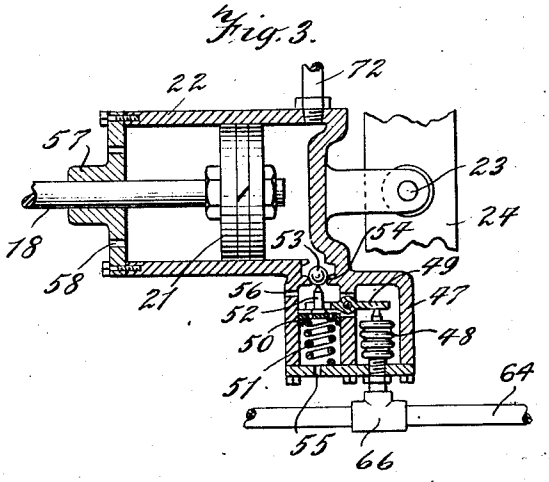


Fig. 3.



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1,771,476

UNITED STATES PATENT OFFICE

ARTHUR H. ADAMS, OF LA GRANGE, ILLINOIS, ASSIGNOR TO TROY LAUNDRY MACHINERY COMPANY, INC., OF NEW YORK, N. Y., A CORPORATION OF DELAWARE

PRESSING MACHINE

Application filed February 29, 1928. Serial No. 257,897.

This invention relates to pressing machines, especially to machines for pressing or ironing garments and the like.

An object of the invention is the provision of a press the jaws of which initially close quickly under light pressure and upon encountering a certain predetermined resistance, close finally under relatively heavy pressure.

More specifically, it is an object of the invention to construct a pressing machine with a closing mechanism comprising a low pressure means, a high pressure means and dynamometer arrangement, so interconnected that the jaws of the press are closed upon the work rapidly by the low pressure means and then, upon the encountering of certain predetermined resistance are finally closed firmly upon the work by the high pressure means.

Another object is the provision of safety means for preventing the application of heavy pressure to the jaws of the press except when the said jaws are nearly closed.

A further object is to provide a pressing machine having initial and final closing means for the jaws thereof, and means for preventing retrograde movement of the jaws after operation of the initial closing means.

These and other objects and advantages of the invention and the manner of obtaining them will be made clear in the following description and accompanying drawings.

In the drawings Fig. 1 shows in elevation a laundry pressing machine constructed in accordance with my invention.

Fig. 2 shows a detailed view partly in section of a portion of the power mechanism of the press shown in Fig. 1.

Fig. 3 is a vertical sectional view of the large power cylinder of the machine shown in Fig. 1.

Fig. 4 is a fragmentary view of the two-hand control mechanism for operating the press.

Fig. 5 is a detailed view of the automatic valve for admitting air to the large cylinder of the press.

Referring more particularly to the press, reference numeral 1 indicates a pressing machine table having a bearing arm 2 for pivotally supporting a lever 3 which has attached to one end a head 4 and to the other end a power mechanism 5. Table 1 has supported thereon a buck 6 which cooperates with the pressing head 4, and carries attached to its front edge a valve mechanism 7 by means of which the operation of the press is controlled. For keeping the lever arm 3 in a tilted position tension spring 67 is provided.

The power mechanism 5 comprises a link 8 pivotally attached at its upper end to the lever arm 3 and pivotally attached at its lower end 9 to a piston 10 working within a cylinder 11. Cylinder 11 has an enlarged housing portion 12 at the lower end thereof, which has secured thereto a bearing member 13 for connecting with a toggle arrangement 14. This toggle arrangement consists of a link 15 and a link 16 which are pivotally connected together, and to a piston rod 18 at 17. The lower end of link 16 is pivotally supported by a bearing 19 attached to a base plate 20. The piston rod 18 attaches, as best shown in Fig. 3, to a piston 21 working within a large cylinder 22 pivotally supported at 23 to a standard 24 attached to the base plate 20. Attached to the lower end 9 of the link 8 is one end of a lever arm 25, the other end of which connects at 26 to a tension spring 27. The other end of tension spring 27 is connected to the upper end of the standard 24. Pivotally attached to an intermediate point in the lever arm 25 is a piston rod 28 which carries a piston working within a small cylinder 29, which cylinder is pivotally supported by a bearing member 30 mounted on the base plate 20. For keeping the cylinder 11 in its proper working position a reach rod 31 is pivotally interconnected between the bearing member 13 and an intermediate point on the standard 24.

Within the housing 12 of the cylinder 11 is positioned a guide member 32 working within a guide 33. Attached to the guide member 32 is a push rod or projection 34 which, in the upward position of the guide member 32, contacts with a ball valve 35 and pushes the same from its seat 36. For thrusting the guide member into an upward position the compression spring 37 is provided. Positioned in another chamber in the housing 12 is an

expansible member 38, which may be in the form of metal bellows, as shown, or if desirable might be in the form of a cylinder and piston. Attached to the upper end of the expansible member 38 is a push rod 39 which cooperates with a rocker arm 40 pivotally supported at 41 by the housing 12. The left-hand end of rocker arm 41 is forked at 42 so as to fit around the push rod 34. If the guide member 32 fits very closely inside of the guide 33 it may be necessary to provide perforations in order to permit fluid to pass up by the guide member when the same is pushed down by the action of rocker arm 40, as will be explained more fully hereinafter. Mounted beside the cylinder 11 is a reservoir 44 which is interconnected by a nipple 45 with the housing 12 of the cylinder 11. Within the reservoir 44 is a quantity of suitable liquid 46 such as oil, water, glycerine, or the like. This liquid due to the nipple connection 45 fills also the hollow portions of the housing 12. The large cylinder 22 is provided with a housing 47 containing an expansible member 48, rocker arm 49, guide member 50 and spring 51, similarly to housing 12. Attached to the guide member 50 is a projection 52 which contacts when the guide member is in an upward position, with a ball valve 53 and lifts the same from its seat 54. The guide member 50 is provided with perforations similarly to the guide member 32 and the housing 47 is provided with perforations 55 and 56 for permitting passage of fluid therethrough. The piston rod 18 works within a guide 57 attached to the end of the cylinder, which is also perforated, as shown at 58, in order to permit air to be forced out of the cylinder upon movement of the piston 21. For the operation of the press a series of pipes for conducting fluid under pressure, such as compressed air, to the various working parts of the press, is provided. This series of pipes consists of a pipe line 59 leading from a source of compressed air or other fluid 60, to a two-hand control valve 61, which valve is connected by a pipe 62 leading to a T connection 63 joined to a pipe 64 leading to the small cylinder 29. At the point of connection between the pipe 64 and the cylinder 29 a portion of flexible hose 65 may be provided, in which case the pipe 64 can be of rigid material. Connected between the pipe 64 and the expansible member 38 in the housing 12, is a flexible hose 85. At 66 a tap is made in the pipe line 64, which leads to the expansible member 48 within the housing 47. Also joined to the T connection 63 is a pipe 68 leading to an automatic valve 69. The valve 69 is connected by a pipe70 to a second valve 71 in series therewith, which valve is connected by another pipe 72 with the cylinder 22. Valve 69 is provided wth a lever arm 73 for operating the same, this arm being held in a given position by means of a snap-by spring 74 and being rocked in one direction through contact with the end of the lever arm 25 and in the return direction by means of a finger 75 attached to the lever arm 25, The valve 71 has a lever arm 76 and spring 77 similarly to the valve 69, the lever arm 76 being moved in an upward direction by a projection 78 attached to the link 8 and moved in a return direction by projection 79 attached to the link 8.

The control valve 61 may be of the two-position type such as illustrated in Fig. 4 and have three ports, an inlet port 81, an outlet port 80 and an exhaust port 82. For the operation of the valve a lever arm 83 is provided, to which is attached a link 84 manually operable through suitable mechanism. The operating mechanism of valve 61 may be of the type disclosed in the copending application of Edward D. Phinney, filed on even date herewith, and hence further detailed description thereof is believed to be unnecessary. For limiting the upward movement of the right-hand end of the lever arm 25, which works in a slot in a table 1, a stop 86 is attached to the table.

The operation of the press is as follows:

When the press is in the open position as shown in Fig. 1 and it is desired to close the same, the control mechanism of valve 61 is operated, rocking the lever arm 83 in an upward direction and opening the valve 61 so that compressed air flows from the tank 60 through the pipe 59, inlet port 81, outlet port 80, pipe 62, pipe 64 and into the small cylinder 29, causing the piston therein to push the piston rod 28 in an upward direction carrying with it the left-hand end of the lever arm 25, the right hand end of which is held in normal position by the tension spring 27. As the lever arm 25 moves upward, it carries with it the piston 10 of the cylinder 11. As the piston 10 moves out of the cylinder 11 fluid 46 is sucked from the reservoir 44 through the nipple 45 up past the ball valve 35 into the cylinder. This procedure continues until the head 4 strikes the buck 6, when, due to the increased resistance the left-hand end of the lever arm 25 can no longer rise. The left-hand end of the lever arm 25 now being stationary and the piston 28 continuing to rise in the cylinder 29, the tension spring 27 is stretched, thus permitting the right-hand end of the lever arm 25 to move in an upward direction. Upon this upward movement the lever arm strikes against the lever arm 73 of the valve 69, pushing the same in an upward direction. As soon as this lever arm 73 has been pushed but slightly the snap-by spring 74 passes by center and snaps the lever arm 73 still further in an upward direction, thereby opening the ports in the valve and permitting compressed air to flow from the pipe 62 and 68 through the valve 69 and pipe 70 to the

valve 71. During the closing movement of the head on the buck the link 8 moves in an upward direction, causing the projection 78 to strike on the end of the lever arm 76 and open the valve 71 under the action of the snap-by spring 77. This valve 71 is therefore now open and the compressed air passes through the valve from the pipe 70 and through the pipe 72 to the large cylinder 22. The ball valve 53 in the housing 47 attached to the cylinder 22, when no pressure is applied to the expansible member 48 from the pipe line 64 would be held in an open position by the spring 51. However, when pressure is in the pipe 64, as it now is, the member 48 will be expanded in an upward direction rocking the rocker arm 49 around its pivot and compressing the spring 51, thus permitting the ball valve 53 to drop on its seat 54. This valve is therefore now closed and the air entering the cylinder from the pipe 72 acts on the piston 21 forcing it in a left-hand direction. This movement of the piston 21 is transmitted through the piston rod 18 to the toggle 14, which straightens out and forces the head 4 tightly down onto the buck 6. The force of the piston 21 is transmitted through the rod 18 and toggle link 14 to the link 8 and rocker arm 3 through the liquid in the cylinder 11, which is not compressible. As pressure is now being applied to the pipe line 64 and hence to the tube 85, the member 38 is expanded in an upward direction, thus rocking the rocker arm 40 around its pivot point 41 and compressing the spring 37, permitting the ball valve to drop on to its seat 36 without restraint from the projection 34. As the projection 34 was retracted the ball valve 35 was free to drop on to its seat 36 when the liquid ceased to flow from the reservoir 46 into the cylinder 1, which occurred as soon as the left-hand end of the lever arm 25 ceased to rise. The ball valve 35 now being in closed position, pressure is transmitted through the toggle to the cylinder 11 and from the cylinder 11 through the liquid within the cylinder to the piston 10, thence through link 8 to the lever 3.

When it is desired to open the press it is necessary merely to move the lever arm 83 of the valve 61 in a downward direction, thus shutting off the intake port 81 and permitting air to pass from the pipe 64 through the pipe 62, port 80, through the valve and out of the exhaust port 82. As soon as this movement of the valve occurs air rushes out of all of the various pipes permitting the expansible members 38 and 48 to collapse and the springs 37 and 51, through the action of the projection 34 and 52, to thrust the ball valves 35 and 53 off their seats. As soon as the valve 35 is open liquid in the cylinder 11 is forced out by the piston 10 under the action of the press opening spring 67, back into the reservoir 44, thus permitting the head 4 to move away from the buck 6. At the same time the ball valve 53 being open, air is forced out of the cylinder 22 by the piston 21 under the action of the spring 86. As the head 4 moves to its open position the link 8 moves in a downward direction, causing the projection 79 to strike against the lever arm 76, and snap the valve 71 to its closed position. The piston 28 moves downwardly within the cylinder 29 under the action of the closing spring 67 and the spring 27, forcing air out of the cylinder 29 through the pipes 64 and 62 and valve ports 80 and 82. Upon the downward movement of the right-hand end of the lever arm 25, the finger 75 engages the end of the lever arm 73 and snaps the valve 69 to its closed position.

The press is now in its initial position and ready for another cycle of operation.

It will be seen that by the particular interconnection of piston rod 28 with the lever 3 through the lever arm 25 and the spring 27, I have provided an arrangement which causes high pressure to be applied to the head only when the head meets with a certain resistance. The feature is of importance as it insures that heavy pressure shall not be applied to the head before it is fully seated on the buck. Where the heavy pressure is applied when the head reaches a given angular position, regardless of whether it has struck the buck or not, uniform results with different thicknesses of goods are not always obtained. With a press constructed in accordance with my invention heavy pressure is applied to the head only when the head meets with resistance due to striking goods on the buck, hence greater economy of operation of the press is insured, as the movement of the piston in the large cylinder can be made relatively small, thus consuming a relatively small amount of compressed air. In operation, after goods are placed in the jaws of the press and the control valve opened, the head will be moved against the goods until a certain resistance is encountered, this resistance being determined by the spring 27, which in conjunction with the lever arm 25 acts as a sort of dynamometer. When this resistance is encountered air is admitted to the large cylinder and heavy pressure applied to the jaws of the press. It will be obvious that in order to select the degree of pressure at which operation of the large cylinder is initiated, it is necessary merely to adjust the tension of the spring 27. This adjustment might be accomplished in any suitable manner, for example, by means of a screw threaded arrangement, as shown in Fig. 1.

In operating the press under any given condition it would probably be desirable in most cases to utilize the small closing cylin-

der 29 to the greatest degree possible, in which case the spring 27 should be made of such strength that it can be stretched by the cylinder acting through lever arm 25 just sufficiently to operate the valve 69 and let air in the large power cylinder.

As when the dynamometer-like arrangement such as I have shown is used, heavy pressure is applied to the head when the resistance is encountered, some safety feature is desirable, in order to insure that the heavy pressure will not be applied to the head when the head is too far away from the buck. That is to say, some safety feature is desirable in order to prevent the press from injuring the operator should he accidently get his arm between the head and the buck when the press is closing. This safety feature I have shown embodied in the valve 71. This valve not being open until the head reaches a position fairly close to the buck, no air can reach the high pressure cylinder until that position is reached, and hence it is impossible when the press is not sufficiently closed, to apply heavy pressure, regardless of the position of the pressure responsive valve 69. This valve 71 should be made to operate only when the head is near enough to the buck for pressing operations and too near to endanger the person of the operator.

While I have disclosed a spring for determining the amount of resistance which causes heavy pressure to be applied to the press, it will be obvious that weights might be used as well, in which case the weights might be placed on the lever arm 25 and moved to a suitable position to cause the press to be operated in the desired manner.

The lever arm 25 acts to amplify the movement of the piston rod 28 to a suitable degree for operating the valve 69. The point of connection between the piston rod and the lever arm may therefore be selected to give the desired result.

I find it desirable to use snap-by springs on the valves 69 and 71 in order to secure quick action. However, these springs are not absolutely necessary as the valves might be of the ordinary spring closed type. If ordinary valves should be used they would open relatively slowly under the action of the press but the operation of the press would be exactly the same.

The dynamometer feature of my invention is not necessarily limited to use with a fluid pressure operated press as it is applicable to presses using other types of power means as well. In other types of presses the movement of the spring retained end of the dynamometer lever arm could be used to put in operation other kinds of heavy pressure applying means.

It will be obvious to those skilled in the art that the invention is capable of a wide variety of modifications and adaptations and that the present disclosure is intended merely to illustrate its nature without limiting its scope, which is defined in the claims.

What I claim is:

1. In a pressing machine, a pair of pressing jaws, means for closing the said jaws, separately actuated means for giving the jaws a final heavy squeeze, means responsive to the encountering by said jaws, of a certain predetermined resistance for operating said means second mentioned, and means for rendering the second mentioned means ineffective until said jaws are moved into pressing relation.

2. In a pressing machine, a pair of pressing jaws, low pressure means for closing said jaws, high pressure means for giving the jaws a final squeeze and means responsive to the encountering, by said jaws, of a certain resistance, for initiating the operation of said high pressure means, and means for rendering the high pressure means ineffective until said jaws are in pressing relation.

3. In a pressing machine, a pair of pressing jaws, a power source for closing said jaws, means responsive to the encountering of resistance by said jaws for causing said power source to apply heavy pressure to said jaws, and means for preventing the application of heavy pressure until said jaws are in pressing relation.

4. In a pressing machine, a pair of pressing jaws, power means for closing the said jaws, and means for varying the pressure applied by said power means in accordance with the pressure encountered by the said jaws, the first mentioned means including separately actuated high pressure and low pressure mechanisms.

5. A pressing machine according to claim 4 wherein means is provided for preventing the application of heavy pressure to the jaws of the press until the said jaws approach a predetermined spacing.

6. In a pressing machine, a pair of pressing jaws, a low pressure means for closing said jaws, a high pressure means for applying heavy pressure to said jaws, means for preventing actuation of said high pressure means until said jaws approach a pressing position, and means for automatically switching from the low pressure to the high pressure means.

7. In a pressing machine, a head and a cooperating buck, said head being secured to one end of a pivoted lever arm having a free end, a second lever arm connected at one end to the free end of said first mentioned lever arm, a tension spring connected to the other end of said second lever arm and to a fixed point, a small fluid operated cylinder means connected to an intermediate point of said second lever arm for moving the head toward the buck, a large fluid operated cylinder, an expansible locking means interconnected be-

tween said large cylinder and said first mentioned lever arm and means for supplying fluid under pressure to said cylinders.

8. A pressing machine according to claim 7 wherein the second mentioned lever arm cooperates with a valve for controlling the flow of fluid to said large cylinder.

9. In a pressing machine a first pivoted lever arm, said lever arm having a pressing head connected to one end thereof, a second lever arm, said second lever arm having one end connected with the free end of the first mentioned lever arm and having its other end connected to a tensioning means, a small fluid pressure operated cylinder pivotally interconnected with an intermediate point of said second lever arm, a toggle interconnected between a fixed point and an expansible locking means, the other end of said locking means being connected to the end of said second mentioned lever connected to the first mentioned lever, a large fluid pressure operated cylinder operably interconnected to the midpoint of the said toggle, and means for supplying fluid under pressure to said large and said small fluid operated cylinders.

10. A pressing machine according to claim 9 wherein the expansible locking means comprises a hydraulic cylinder.

11. In a pressing machine, a pivotally mounted lever arm, a pressing head connected to one end of said lever arm and a power means connected to the other end of said lever arm, said power means comprising a small fluid pressure operated cylinder connected to said lever arm and a large fluid pressure operated cylinder, said large cylinder being interconnected with said lever arm through a toggle mechanism and an expansible locking means.

12. In a pressing machine, a lever arm, a pressing head connected to one end of said lever arm, a power means, and an expansible locking means comprising a hydraulic cylinder means interconnected between said power means and the other end of said lever arm.

13. In a pressing machine, a first lever arm, a pressing head connected to one end of said lever arm, a second lever arm, a low power means connected to an intermediate point on said second lever arm, one end of said second lever arm being connected to the free end of said first lever arm and the other end of said second lever arm being connected to a tension spring, a high power means interconnected with said first lever arm and means responsive to movement of the spring retained end of the second lever arm for operating the said high power means.

14. In a pressing machine, a power mechanism comprising a lever arm, a high power cylinder connected to one end of said lever arm, a tension spring to the other end of said lever arm and a low power cylinder to the intermediate point of said arm, a pipe for conducting fluid to said low power cylinder and a second pipe line for connecting fluid to said high power cylinder, a valve in said second pipe line adapted to be opened by movement of the spring retained end of said lever arm.

15. In a pressing machine an expansible locking means comprising a cylinder, a piston for said cylinder, a fluid reservoir subject to a constant pressure, a fluid connection between said reservoir and said cylinder and a check valve for preventing flow of fluid from said cylinder to said reservoir.

16. In a pressing machine an expansible locking means according to claim 15 wherein means is provided for opening the check valve, said means comprising a spring for opening the valve; and an expansible fluid pressure operated device for opposing said spring.

17. In a laundry pressing machine, a high power cylinder and a low power cylinder, a lever arm, means for interconnecting said cylinders with said lever arm, supply pipes for conducting fluid to said cylinders, a valve for controlling flow of fluid to both of the cylinders and two valves in the pipe line leading to said high power cylinder, one of said valves being operated responsive to the moving of said lever arm to a certain position and the other of said valves being operated in response to the encountering by said lever arm of a certain resistance.

18. In a pressing machine a pressing arm, a fluid operated cylinder, a fluid locking means interconnected between said cylinder and said pressing arm, a check valve in said locking means and a vent valve in said cylinder, means for supplying fluid under pressure to said cylinder and means responsive to a decrease in said pressure below a certain value for opening both of the aforementioned valves.

19. In a pressing machine a low pressure cylinder, a lever arm having an intermediate point connected with said cylinder, a high pressure cylinder, pipe lines for supplying fluid under pressure to said cylinders, two valves interconnected in the line leading to said high pressure cylinder, one of said valves being operated responsive to movement to a predetermined position at one end of said lever arm and the other of said valves being operated responsive to movement to a predetermined position of the other end of said lever arm, the said other end of said lever arm being held in a normal position by means of a tension spring.

20. In a pressing machine a head and a buck, means for moving the head toward the buck and means for squeezing the head against the buck, means responsive to the encountering of resistance to movement of the head toward the buck for operating said means for squeezing the head against the buck and means for preventing the operation of said means for squeezing the head against the

buck except when the head has reached a pressing position adjacent the said buck.

21. In a laundry pressing machine, a pair of pressing jaws, means for closing the jaws, hydraulic means for locking the jaws in closed position, and means for applying heavy pressure to said jaws through the last mentioned means.

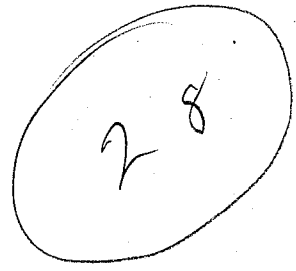
22. In a laundry pressing machine, a pair of pressing jaws, pneumatic means for closing the jaws, hydraulic means for locking the jaws in closed relation, and means for applying heavy pressure to the jaws.

23. In a laundry pressing machine, a pair of pressing jaws, means for closing the jaws, hydraulic means for preventing retrograde movement of the jaws in closed relation, and means for applying heavy pressure to the jaws.

24. In a pressing machine, a movable pressing arm, a small cylinder and a large cylinder interconnected with said arm, fluid supply pipe lines for said cylinders, a quick operating valve in the pipe line of the large cylinder, and means responsive to the encountering of a certain resistance to movement, by said arm, for actuating said valve.

In testimony whereof, I have signed my name to this specification this 28th day of February, 1928.

ARTHUR H. ADAMS.



DISCLAIMER

1,771,476.—*Arthur H. Adams*, La Grange, Ill. PRESSING MACHINE. Patent dated July 29, 1930. Disclaimer filed April 21, 1933, by the assignee, *Troy Laundry Machinery Company, Inc.*

Hereby enters this disclaimer to claims 21 and 23 in said specification which are in the following words, to wit:

"21. In a laundry pressing machine, a pair of pressing jaws, means for closing the jaws, hydraulic means for locking the jaws in closed position, and means for applying heavy pressure to said jaws through the last mentioned means.

"23. In a laundry pressing machine, a pair of pressing jaws, means for closing the jaws, hydraulic means for preventing retrograde movement of the jaws in closed relation, and means for applying heavy pressure to the jaws."

[*Official Gazette May 16, 1933.*]