Sept. 3, 1929. G. W. JOHNSON ET AL 1,727,013

ELECTRICALLY OPERATED LAUNDRY PRESSING MACHINE

Filed Oct. 9, 1925 3 Sheets-Sheet 1

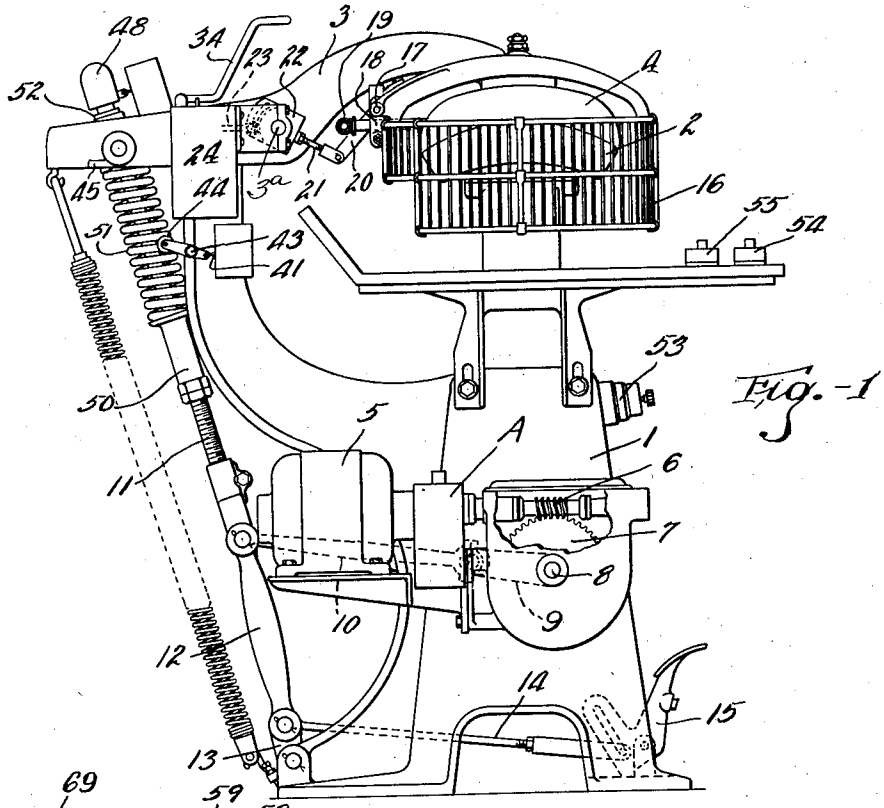


Fig. -1

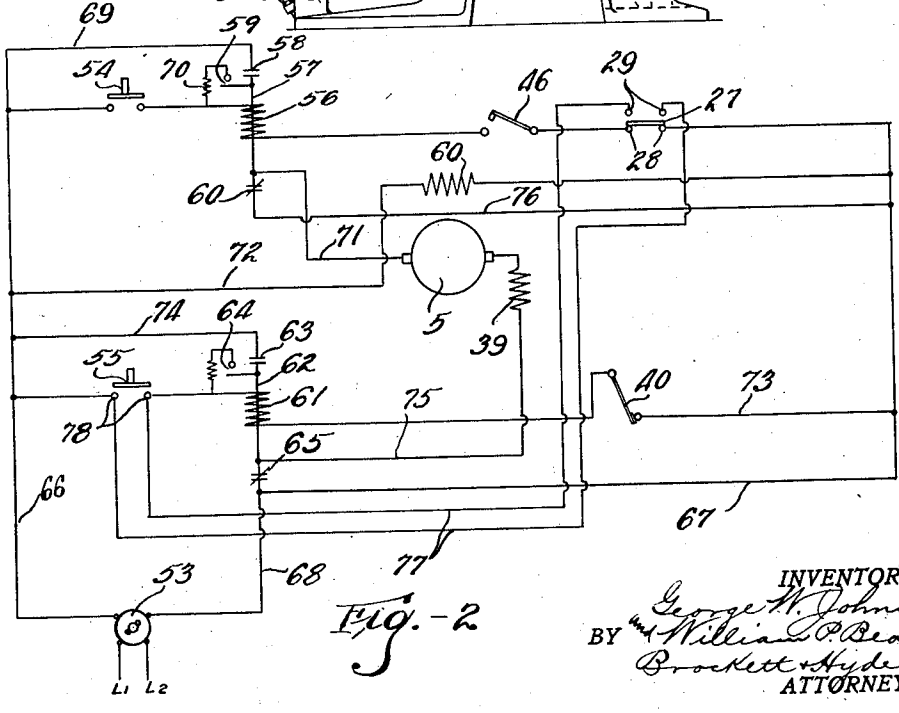


Fig. -2

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Filed Oct. 9, 1925 3 Sheets-Sheet 2

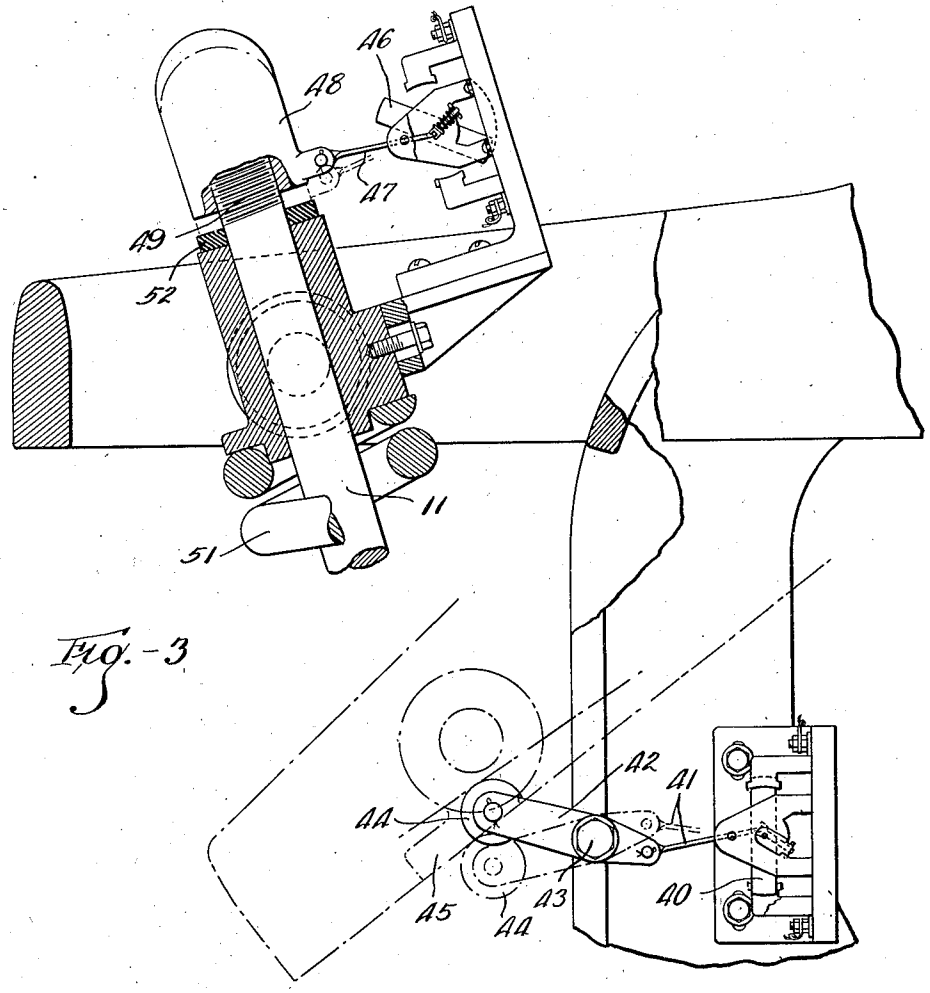


Fig. -3

Fig. -4

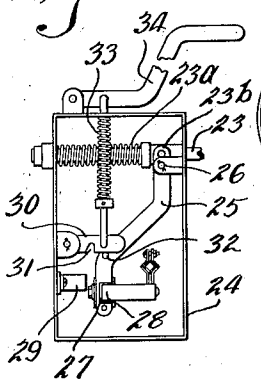
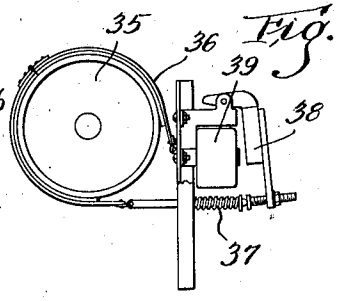


Fig. -5



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ELECTRICALLY OPERATED LAUNDRY PRESSING MACHINE

Filed Oct. 9, 1925 3 Sheets-Sheet 3

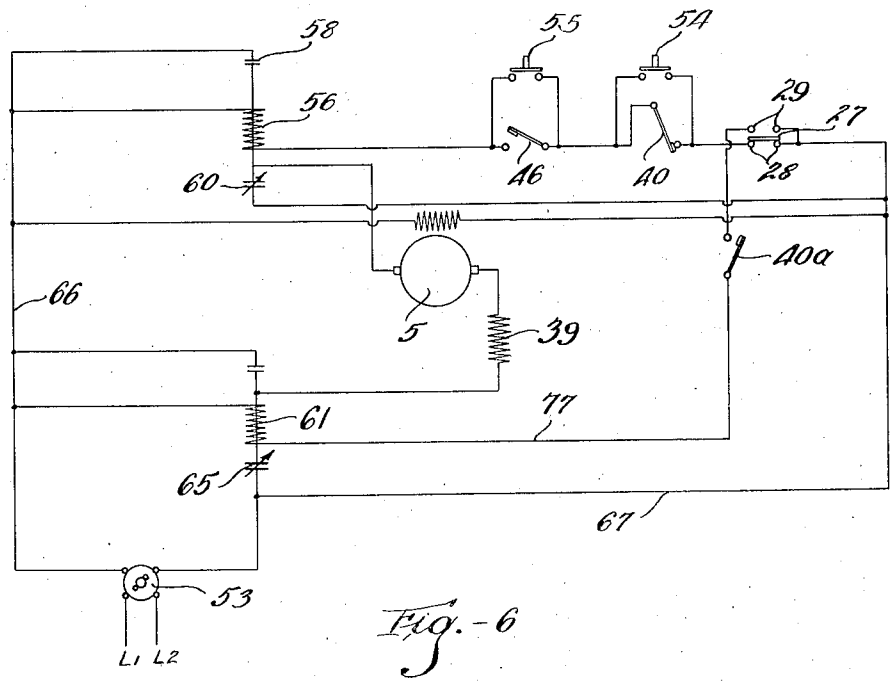


Fig. - 6

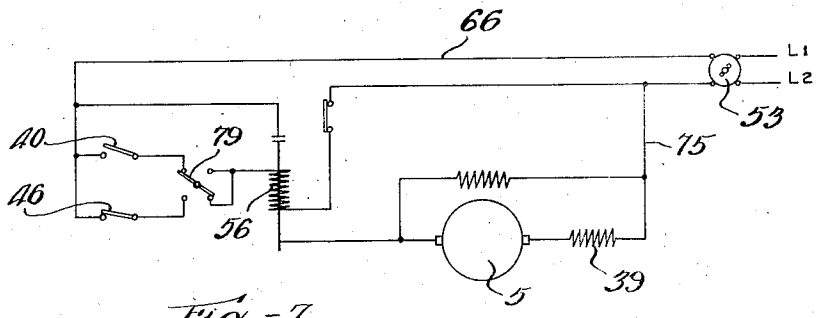


Fig. - 7

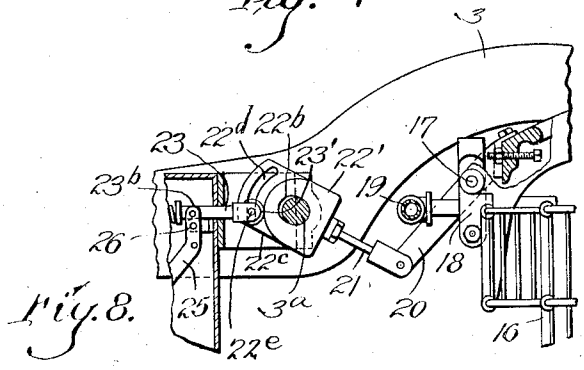


Fig. 8.

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UNITED STATES PATENT OFFICE.

GEORGE W. JOHNSON AND WILLIAM P. BEATTIE, OF CINCINNATI, OHIO, ASSIGNORS TO THE AMERICAN LAUNDRY MACHINERY COMPANY, OF NORWOOD, OHIO, A CORPORATION OF OHIO

ELECTRICALLY-OPERATED LAUNDRY PRESSING MACHINE.

Application filed October 9, 1925. Serial No. 61,504.

This invention relates to power operated pressing machines, such as are used for pressing garments and in laundries for ironing wearing apparel. The invention has more particular relation to that class of pressing machines in which the press is both closed and opened by the power mechanism and under emergency conditions is not only stopped from further closing or pressure operation, but is promptly opened with all parts restored to full open position.

The present invention is an improvement upon the machine shown, described and claimed in a copending application of Charles E. Waream and George W. Johnson, filed of even date herewith, Serial No. 61,466.

The object of the present invention is to generally improve the operating and control mechanism for said prior pressing machine, and more specifically to provide separate, manual and automatic switches, together with maintaining circuits, motor brake mechanism and an emergency switch, for producing the various normal and emergency operations, together with the necessary reversible motor for producing such operations.

A further object of the invention is to provide operating mechanism for a press of this kind embodying a reversible electric motor operated normally in the forward direction both to open and close the press and under emergency conditions in the reverse direction to open the press.

Further objects of the invention are in part obvious and in part will appear more in detail hereinafter.

In the drawings, Fig. 1 is an end elevation, partly broken out and in section of one form of pressing machine embodying the invention; Fig. 2 is a wiring diagram, illustrating the control and operating circuits; Fig. 3 is a detail view, on a larger scale, partly broken out and in section, of the rear end of the head carrying lever and associated parts; Fig. 4 is a detail sectional elevation, illustrating the guard operated switch mechanism; Fig. 5 is a detail view of the brake and its controlling or operating parts; Figs. 6 and 7 are diagrammatic views, corresponding to Fig. 2 and illustrating other arrangements of control circuits; and Fig. 8 is a detail view, partly in section, illustrating the mounting of the guard and its connection to the switch mechanism which it operates.

So far as its frame, pressing elements and operating mechanism are concerned the press may be of any suitable construction and in large measure is illustrated as of the same general construction and arrangement as the press shown in a prior application of John P Singiser, filed July 26, 1923, Serial No. 653,931, for pressing machines, to which reference may be made for further description and illustration of the parts, if necessary or desirable.

Briefly described, the press comprises a suitable frame 1 supporting the lower pressing member or bed 2 and provided with an arm of lever 3 pivoted on the pin 3^a carrying the upper pressing member or head 4. 5 indicates the motor means, which may be any power driven shaft or element, but is shown as an electric motor, the shaft of which rotates a worm 6 driving a worm wheel 7 on a shaft 8 provided with a crank 9 connected by the connecting rod 10 to the knuckle of a pair of upper and lower toggle members 11, 12, the lower member of which is mounted upon a short emergency third toggle member 13 connected by a link 14 to the treadle operating member 15. The guard 16 is pivoted at 17 upon brackets 18 clamped to a part of the piping 19 connected to and movable with the head 4. Secured to the guard is an arm 20 extending rearward and connected by a link 21 to a sliding member 22 in turn connected to a rod 23 extending into the casing 24 of an emergency switch to be hereinafter more fully described. The arrangement of said connection between the sliding member 22 and the rod 23 includes the following features: The sliding member 22 is provided with a slot 22^b engaging the head lever pivot 3^a and being disposed lengthwise of the link 21. Concentric with the right hand end of this slot, as shown in Fig. 8, is a cam surface 22′ adapted to be engaged by a roller 23′ carried by the rod 23. This roller is mounted upon a pin 22^e carried by the end of the rod 23 and passing into a slot 22^d extending from a portion 22^c of the sliding member 22. From the foregoing it will be seen that the parts are in normal position, as shown in Fig. 8, when the head and head lever may be moved up

and down without effect upon the rod 23, because the cam surface 22′ and the slot 22^d are concentric with the pivot 3^a when it is in the forward part of the slot 22^b, as shown in Fig. 8, but when the guard is raised, the sliding member is moved forward with the result that the side walls of the slot 22^d fold upon the pin 22^e and move the rod 23 to operate the emergency switch. All the parts so far referred to are arranged in like manner with said Singiser application.

Fig. 4 shows in detail the emergency switch. The rod 23 before referred to is moved to the right in Figs. 1 and 4, each time the guard is obstructed or has upward movement relative to the upper pressing member. Such movement is normally resisted by the compression spring 23^a. Rod 23 is pivotally connected at 23^b to the short arm of a switch lever 25 pivotally mounted at 26 in the casing and which at its lower end carries a bridging contact 27 adapted to bridge either of its two sets of contacts 28 or 29. Under normal conditions the bridge 27 closes the gap across contacts 28, but when the guard is obstructed the bridge moves away from contacts 28 and closes a circuit across contacts 29, as will more fully appear. In the latter position the switch lever 25 is latched by a latch lever 30 having a recess 31 to receive a pin 32 of the switch lever, said latch lever being normally urged downwardly by a compression spring 33, and when latched being capable of upward releasing movement by operation of the hand lever 34, to allow the switch lever 25 to return to normal position bridging contacts 28.

Fig. 5 illustrates in detail the braking mechanism for the motor means, indicated generally at A, Fig. 1, the motor shaft being provided with a brake drum 35 surrounded by a brake band 36 normally moved to braking position by the compression spring 37, and the braking effect of which may be reduced or prevented by movement of the armature 38 toward an electro-magnet coil 39. In other words, this is a friction brake on the motor shaft releasable by energization of the magnet coil 39.

Fig. 3 illustrates in its upper portion the predetermined pressure limit switch and in its lower portion the open limit switch. The open limit switch includes the switch member 40 of common snap switch type having both open and closed positions and being of the self closing type. The switch member 40 of this switch is connected by a link 41 to a lever 42 pivoted at 43 on the stationary frame and having an anti-friction member, such as a roller 44, actuated by a convenient portion of the rear arm of the head lever 43, such as a ledge or shoulder 45 on the head lever.

The predetermined pressure switch is of a type similar to the open limit switch and may also be a self-closing switch. This switch member 46 is connected by a link 47 to a nut or head member 48 adjustably mounted as by the threads 49 on the upper end of the upper toggle member 11. Below the lever arm 3 said toggle member is provided with an adjustable nut 50, adjustment of which varies the pressure of a compression spring 51. When the press is in open position the spring 51 expands until the nut 48 is seated upon the collar 52, as shown in dot-dash lines, Fig 3, but when the press is closed the production of pressure compresses the spring 51 until a predetermined value of pressure is reached and thereby elevates the nut 48 above the collar 52 or to the full line position, Fig. 3 and thereby moves the switch parts to the position shown and opens switch 46.

Rotation of the motor 5 obviously turns the crank 9, thereby either straightening the toggles 11, 12 to close the press and apply pressure or breaking or opening said toggles to open the press, each of the opening and closing operations requiring approximately 180 degrees of rotation of the crank. Such rotation may obviously be in either direction. In other words, the press may be first closed and then opened by successive 180 degree half cycle movements of the crank in the same direction and in either direction or it may be closed by a half cycle of movement in one direction and opened by a half cycle of movement in the opposite direction. When closed the press may be opened by crank movement in either direction.

Fig. 2 illustrates one arrangement of electric circuits for actuating and controlling the motor means. 53 indicates a main switch of suitable form adapted to connect the circuits to the main leads L^1, L^2. 54, 55 respectively represent the closing and release buttons, which are of common form closed by the pressure of the operator's thumb and normally opened by a spring. 56 represents the coil of a forward relay, the pole 57 of which closes the normally open contacts 58, 59 and opens the normally closed contacts 60. 46, 40 respectively represent the predetermined pressure limit and open limit switches before referred to. 27 indicates the bridge member of the emergency switch, which normally bridges the contacts 28 and upon emergency operation moves away from said contacts and closes the circuit across the contacts 29. Opposite the armature of motor 5 is located its field coil 60 and in circuit with the armature is the brake release coil 39. 61 indicates the coil of the reverse relay, energization of which causes the pole 62 to close the normally open contacts 63, 64 and open the normally closed contacts 65. The operation is as follows:

Let us assume that the press is in full open position, in which position switch 46 is closed

and switch 40 is open. Closing of the switch 54 by the operator establishes a circuit from L^1 by way of wire 66, switch 54, coil 56, switch 46, switch 27, wire 67 to L^2. Said circuit actuates the pole 57 and establishes a maintaining circuit through the coil 56 from L^1 by way of wire 66, wire 69, contacts 58, 59, resistance 70 to said coil. A motor circuit is also established by way of wires 66 and 69, contacts 58, pole 57, wire 71, armature of motor 5, brake coil 39, wire 75, normally closed contacts 65, wire 68 to L^2. The field coil 60 is in a circuit 72 always closed across the switch 53. The brake is therefore released and the motor starts to rotate in the forward direction and continues to rotate even though the operator's finger is removed from the starting button 54. Rotation of the motor actuates crank 9 and through link 10 moves the toggle members toward straightened position.

The spring 51 at the upper end of the upper toggle member is selected with the proper strength or compressive resistance and is so adjusted by adjustment of the nut 50 that upward movement of the nut 48 to the full line position, Fig. 3, will occur when the pressure imparted to the spring 51 is any desired predetermined amount, say one thousand pounds. Therefore, when the upper pressing member or head engages the work and pressure begins to be applied, such pressure increases beginning immediately with contact with the work, regardless of its thickness or of the amount of straightening movement of the toggles 11, and continues until the required predetermined pressure, say one thousand pounds, has been produced, whereupon upward movement of the nut 48 away from the collar 52 opens the switch 46. The effect is to de-energize coil 56, enabling the relay pole 57 to return to open position and open contacts 58, 59 and close contacts 60, thereby opening the motor circuit and de-energizing the brake coil 39. The motor not only stops, but, also, the brake release coil releases the brake band to the effect of the brake spring 37, which promptly applies the brake and brings the motor to rest. The closing and pressure operations are, therefore, terminated by or in accordance with an exact measurement of pressure actually applied to the work, and such measurement and determination of the closing operation occur in like manner, regardless of the thickness of the work, be it a handkerchief, or a heavy garment, such as an overcoat, or a blanket or like thick article. The parts remain in closed and pressure position until a release operation is initiated.

The release operation is initiated by depressing the release button 55, which completes a circuit from L^1 through wire 66, button 55, coil 61 and open limit switch 40 which is now closed, wires 73, 67 and 68 to L^2. The movement of pole 62 closes contacts 63, 64 and opens contacts 65. Contacts 63, 64 not only complete the maintaining circuit for the coil 61, in the same manner as contacts 58, 59 complete it for coil 56, but also complete a motor circuit from wire 74 by way of contacts 63, pole 62, wire 75, brake coil 39, the armature of motor 5, wire 71, normally closed contacts 60 and wires 76, 67 and 68 to L^2.

The direction of current flow through the armature 5 is now reversed. Consequently the motor begins to rotate, but in the reverse direction, so that the crank 9 also rotates reversely and continues such operation, breaking and opening the toggle members 11 and 12 until finally the ledge 45 engages roller 44 and opens the open limit switch 40, the opening of which breaks the relay circuit through the coil 61 and enables the pole 62 to return to normal position, opening contacts 63, 64 and closing contacts 65. The effect is to open the motor circuit and de-energize brake coil 39, causing the motor to promptly stop with application of the brake, as before. The opening movement is thereby limited or determined by the effect of and in accordance with the position of the moving members and particularly by the effect of and in accordance with the position of the head lever.

When the press is open, the switch 40 is open and switch 46 is closed. The first closing movement of the press moves the shoulder 45 away from roller 44 so that the open limit switch is released for its own closing operation, ready for subsequent control of the open press movement. Likewise when the press is closed under pressure open limit switch 40 is closed and the predetermined pressure limit switch 46 is open. During the first portion of the opening movement of the press, spring 51 expands and nut 48 moves downwardly to the collar 52, releasing the predetermined pressure limit switch 46 to its own closing movement, so that while the press head is moving upwardly the predetermined pressure limit switch is closed, ready for subsequent control of the next closing operation.

The foregoing is the normal operation of the press, repeated in recurring half cycles under the full control of the operator by his or her actuation of the closing and release buttons 54, 55. The emergency operation will now be described.

Contacts 28 which are normally closed by the emergency switch bridge 27 are in the circuit through the coil 56 of the forward relay. Consequently if at any time during the closing operation when coil 56 is energized and maintains the motor circuit closed, the guard 16 is obstructed, such as by the presence of the operator's hand or arm, so that it has upward movement relative to the downwardly moving head, the switch 27 is actu-

ated and moves away from contacts 28 and thereby opens the circuit through coil 56 and produces precisely the same stopping operation produced by opening of the predetermined pressure limit switch 46. In other words, the effect of movement of bridge 27 away from contacts 28 is to open the motor circuit and apply the brake. However, actuation of the bridge 27 not only moves it away from contacts 28, but also moves it into bridging engagement with contacts 29, which are in a circuit 77, bridging the contacts 78 closed by the release button 55. As a result, the bridging of contacts 29 by actuation of the emergency switch performs precisely the same operation as pressure upon the release button, to wit, the initiation of an opening or releasing operation by energization of coil 61 of the reverse relay, the actuation of its pole 62, and the completion of a reverse motor circuit and energization of the brake release coil 39. Therefore, in case of emergency actuation of the guard 16, whatever be the position of the pressing members, a release or opening operation is initiated and completed until terminated by opening of the open limit switch 40, as before.

It will also be observed that the motor circuits completed by each of the relays 56, 61, includes the normally closed contacts 65 or 60 of the opposite relay. In other words, when forward coil 56 is energized to complete the forward motor circuit, said circuit includes the contacts 65 of the reverse relay, and when reverse coil 61 is energized to complete a reverse motor circuit, said circuit includes the closed contacts 60 of the forward relay. Therefore, when the forward relay 56 is energized and the head is moving downwardly, closure of either of the switches 55, 27 opens the contacts 65 and opens the motor circuit before the reverse motor circuit is established by way of the contacts 63. Likewise, when the reverse relay 61 is energized to complete a reverse motor circuit and the head is moving to open position, pressure upon the start button 54 opens the contacts 60 and opens the reverse motor circuit before it can be completed at the contacts 58.

With this press, therefore, the operator is not only safeguarded by the provision of a guard which stops the press in case of emergency or danger, but there is no liability of the operator's arm being pinned and held between the pressing members, which promptly move to full open position where they are brought to rest. The press, therefore, automatically frees the operator instead of confining her. However, if desired, and as shown, the press may be provided with the emergency toggle member 13 with an operating treadle 15 therefor to mechanically open the press in case the other safeguards described fail to function.

Fig. 6 illustrates a diagram of motor circuits and control circuits therefor of modified form and arranged so that press closing and opening movements are both produced by rotation of the motor through 180 degree half cycles in the forward direction, the opening operation under emergency conditions, however, being produced by reverse motor operation, as before. In this scheme, most of the parts are operated in like manner with Fig. 2, the arrangement alone differing. In this case, both the closing and opening switches 54, 55 are in a circuit through the coil 56 of the forward relay, the maintaining circuit being established by the shunting of said switches respectively around the open limit switch 40 and predetermined pressure limit 46. The circuit 77 through the contacts 29 of the emergency switch is again through the coil 61 of the reverse relay, but said circuit in this case is made to include an extra open limit switch 40^a which is alike in construction and arrangement and manner of operation with the normally open limit switch 40 and likewise is self-closing and is mounted upon a stationary portion of the press frame to be opened by a part of the head lever when the same reaches open position.

When the press is open, switch 40 is opened and switch 46 is closed. Closure of switch 54 energizes the coil of the forward relay and completes a forward motor circuit from L^1 by way of wire 66, contacts 58, armature of motor 5, brake coil 39, contacts 65 to L^2. As soon as the head starts downwardly the open limit switch 40 closes after which the finger may be removed from the closing button 54. The closing operation proceeds until the predetermined pressure limit 46 opens and breaks the circuit through the coil 56. The parts are now closed and remain closed until the release button 55 is closed, which completes a circuit through coil 56 by way of switch 40 and button 55. The opening operation proceeds until the open limit switch 40 opens and again de-energizes the forward relay. As before, the contacts 28 are in the same circuit with the coil 56 and emergency operation breaks the forward motor circuit, but in addition closes a circuit through contacts 29, wire 77 and the coil 61 of the reverse relay, thereby setting up a reverse motor circuit for press opening purposes. This circuit also includes the extra open limit switch 40^a which terminates the emergency release operation. In this press therefore, normal opening operation is by forward rotation of the motor and is terminated by opening of the switch 40, while emergency release operation is by reverse rotation of the motor and is terminated

by the switch 40ª. Otherwise, the press parts and their arrangements are of the form as before described.

In Fig. 6 the opening and closing operations are produced by separate switches 54, 55, shunting the switches 40, 46. Fig. 7 shows another modification where the open and pressure limit switches 40, 46 are again in the same circuit through the forward relay 56 which is the only relay affecting normal opening and closing operations. However, said switches are in parallel circuits including contacts of a double throw switch 79 having two positions, in one of which it completes a circuit from the switch 40 to relay 56 and in the other of which it completes a circuit from the switch 46 to the relay 56. The closing and release operations, therefore, are performed in this case by moving the switch 79 to one or the other of these two positions instead of by operating separate switches. The emergency operation is obviously the same as described in connection with Fig. 6.

What we claim is:

1. A pressing machine, comprising relatively movable pressing members, a reversible electric motor for producing relative movement thereof, means for normally rotating said motor forwardly to close and open the press, and emergency means for producing reverse rotation of said motor to open the press when its closing movement is obstructed.

2. A pressing machine, comprising relatively movable pressing members, a reversible electric motor for operating the same, forward and reverse circuits for said motor, a manually operatable switch for closing one of said circuits to produce press closing operation, a switch operatively associated with a moving press part for opening the circuit so closed, and an emergency switch arranged when closing movement of the press is obstructed to open one and close the other of said circuits.

3. A pressing machine, comprising relatively movable pressing members, a reversible electric motor for operating the same, forward and reverse motor circuits, manually operatable switch mechanism including two sets of contacts, one for producing closing and the other opening movement of the press, automatic switch means operated by the moving press parts for terminating the press closing and opening operations, and an emergency switch arranged when closing movement of the press is obstructed to open one and close the other of said circuits.

4. A pressing machine, comprising relatively movable pressing members, a reversible electric motor for operating the same, controlling circuits for said motor, manually operatable switch means for producing press closing movement, a switch operated by a moving press part for limiting press closing movement, manually operatable switch means for producing press opening movement, a switch operated by a moving press part for terminating the press opening movement, and a reversing switch operated when closing press movement is obstructed for opening the press closing circuit and closing the press opening circuit.

In testimony whereof we hereby affix our signatures.

GEORGE W. JOHNSON
WILLIAM P. BEATTIE.